# Gas System Long-Term Plan

Consolidated Edison Company of New York, Inc.
Orange & Rockland Utilities, Inc.
**Nov 29, 2023**

## Abstract

The Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc. have completed a detailed planning analysis for their combined natural gas distribution service territories. The plans presented throughout this report reflect the requirements stipulated by the New York State Public Service Commission in its Gas Planning Proceeding (20-G-0131). The Companies have undertaken the various analyses described here to provide a comprehensive understanding of the priorities, challenges, and customer benefits that will materialize in the coming decades.

# Contents


**I. Executive Summary ..... 1**
**II. Introduction ..... 11**
**III. Service Areas ..... 14**
a. Con Edison ..... 14
i. Gas Customers ..... 16
ii. Disadvantaged Communities ..... 17
iii. NY Facilities Agreement & Associated Pipeline Access ..... 21
iv. History of Pipeline Capacity Constraints ..... 22
b. Orange & Rockland ..... 27
i. Gas Customers ..... 29
ii. Disadvantaged Communities ..... 29
iii. History of Pipeline Capacity Constraints ..... 31
c. Common to both Companies ..... 31
d. Distinct among New York LDCs ..... 31
i. Complexity of Joint Supply Portfolio ..... 32
ii. Uncertainty of Future Demand Has Changed Planning Processes ..... 32
iii. Joint Supply Portfolio Must Have Flexibility to Match All Outcomes ..... 32
iv. Early Movers in EE, DR and NPAs ..... 32
**IV. LTP Methodology: Forecasting and Planning ..... 34**
a. Forecasting Demand ..... 34
i. Volume Forecasting (Con Edison) ..... 34
ii. Volume Forecasting (O&R) ..... 35
iii. Peak Demand Forecasting (Con Edison) ..... 36
iv. Peak Demand Forecasting (O&R) ..... 39
v. Reliability Standards ..... 40
b. Demand-Side Programs ..... 40
i. New York State Clean Heat ..... 40
ii. Gas Energy Efficiency ..... 41
iii. Non-Pipeline Alternatives (Con Edison) ..... 42
iv. Non-Pipeline Alternatives (O&R) ..... 43
v. Con Edison Gas Demand Response Pilot ..... 44
c. Supply Planning ..... 45
i. Joint Portfolio ..... 46
ii. Pending joint portfolio additions ..... 47
iii. Supply-Demand Outlook ..... 47
iv. Gas Supply Strategy ..... 49
v. De-Contracting Methodology ..... 49
vi. Update on areas Vulnerable to Supply Constraints ..... 51
d. Additional Planning Methodologies ..... 53
i. GHG Accounting ..... 53
ii. Comparison of Alternatives ..... 53
iii. Low-Carbon Fuels ..... 54
iv. Utility Thermal Energy Networks (UTEN) ..... 56

v. Assessment of Costs ..... 57
e. Affordability ..... 61
i. Bill Impacts ..... 61
ii. Benefit Cost Analysis ..... 63
iii. Gas Bill Compared to Income ..... 63
iv. Comparative Customer Economics ..... 64
**V. Decarbonization Pathways ..... 66**
a. Reference Pathway ..... 67
i. Assumptions ..... 67
ii. Sales and Peak Demand Forecasts ..... 68
iii. Capital Expenditure Plan ..... 70
iv. Gas Sector GHG Emissions ..... 73
v. Projected Costs: Reference Pathway ..... 73
vi. Natural Gas System Profile, Supply Resources: Reference Pathway ..... 74
b. Hybrid Pathway ..... 74
i. Assumptions ..... 75
ii. Sales and Peak Demand Projections ..... 77
iii. Capital Expenditure Plan ..... 78
iv. Gas Sector GHG Emissions ..... 80
v. Projected Costs: Hybrid Pathway ..... 81
vi. Natural Gas System Profile, Supply Resources: Hybrid Pathway ..... 83
vii. Achieving the Outcomes in the Hybrid Pathway ..... 84
c. Deep Electrification Pathway ..... 85
i. Assumptions ..... 86
ii. Sales and Peak Demand Projections ..... 87
iii. Capital Expenditure Plan ..... 88
iv. Gas Sector GHG Emissions ..... 90
v. Projected Costs: Deep Electrification ..... 90
vi. Natural Gas System Profile, Supply Resources: Deep Electrification Pathway ..... 94
vii. Achieving the Deep Electrification Pathway ..... 94
d. Comparison of Pathway Assumptions and Dependencies ..... 95
i. Assumptions on Electrification Adoption and Pathway Dependencies ..... 95
ii. Assumptions on LCF's and Pathway Dependencies ..... 96
iii. Assumptions on Energy Efficiency Adoption and Pathway Dependencies ..... 97
iv. Assumptions on Capex Assumptions and Pathway Dependencies ..... 98
v. Conclusion on Pathway Assumptions and Dependencies ..... 99
**VI. Conclusion ..... 100**

# I. Executive Summary

A changing climate, advances in technology, new policy priorities, and evolving customer expectations have ushered in a period of transformation for New York's energy delivery networks.

In response to climate change, New York State and New York City have established a goal of achieving net-zero greenhouse gas ("GHG") emissions by 2050 through policy and legislative actions, supported by market enablement. In addition, the State and City continue to acknowledge the importance of energy system reliability, a growing need for infrastructure resilience to respond to a changing climate, the costs and benefits of efforts to address climate change, and the equity of the distribution of those costs and benefits. These efforts will result in significant changes to the natural gas industry in the State including new business models, investments in clean energy, and exploration of new ways to use existing infrastructure as a resource to serve customers' future needs. Recently approved Electric and Gas Rate Plans establish a strong foundation that will enable Con Edison to continue pursuing these significant changes.[1]

Legislative requirements, changing priorities, and technological improvements will result in significant increases in the electrification of building heating systems. Significant technological and economic challenges and uncertainties remain to be solved during this transition to a low-carbon economy. All

[1] Case 22-E-0064, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service*; and Case 22-G-0065, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service*, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plans with Additional Requirements (issued July 20, 2023) ("2022 Con Edison Rate Plans").

stakeholders (utilities, customers, environmental and other advocacy groups, legislators, the New York State Public Service Commission (the "Commission"), and other State agencies) have an interest in the means and methods used to achieve the transition. All these interests need to be considered to meet state policy objectives for decarbonizing the New York economy.

***We welcome this call to action.*** Con Edison and O&R[2] have firmly committed to a *Clean Energy* future. We are leading efforts to mitigate climate change and achieve net-zero GHG emissions by 2050 on behalf of our 1.2 million gas, 3.9 million electric, and approximately 1,530 steam customers. We have been an early mover in reducing GHG emissions in our region in a variety of ways, including by accelerating our efforts to electrify building heating, encouraging the adoption of electric vehicles, increasing energy efficiency, proposing ways to decarbonize and reduce the use of fossil natural gas and pursuing opportunities to use our gas delivery system in new and innovative ways. We employ industry leading practices in our gas delivery for system safety and leak management which, in turn, reduce direct emissions from our system. We will continue to engage in these industry-leading practices throughout the transition. We will also continue to engage our customers in achieving a clean energy future by increasing investments in energy efficiency, offering innovative heating electrification programs, and making investments and providing energy services with a focus on providing benefits to low- and moderate-income customers and those residing in disadvantaged communities ("DACs"). Customer adoption will take time and be critical to the success of these programs.

Specifically, the Companies' commitment calls for us to reimagine our gas delivery system between now and 2050, including:

- substantial reductions in the amount of natural gas consumed by customers;
- significant growth in the use of electricity to heat buildings;
- meaningful increases in overall building efficiency to reduce the need for energy for heating;
- shrinking the geographic scope of the gas delivery system to focus on serving customers with substantial challenges to heating electrification;
- decarbonizing the gas provided to the remaining customers;
- continued investment in the safety and environmental efficacy of the remaining gas delivery system; and
- instituting policy changes that will provide remaining customers with affordable service.

To plan for these developing changes, the Companies have refined the Gas Long Range Plans ("GLRP") published in January 2022 (Con Edison) and January 2021 (O&R). We have developed this Gas System Long-Term Plan ("GSLTP") to manage the evolution described above and achieve the clean energy future, without compromising our focus on safety, reliability, and resilience. Because there is uncertainty in the trajectory and timing of technology, policy, and customer adoption, we will build flexibility into our planning and in future long-term plans. This GSLTP aligns with Con Edison and O&R's core strategies, and articulates the processes, actions, and investments that we need to achieve our comprehensive strategic objectives in four key areas:

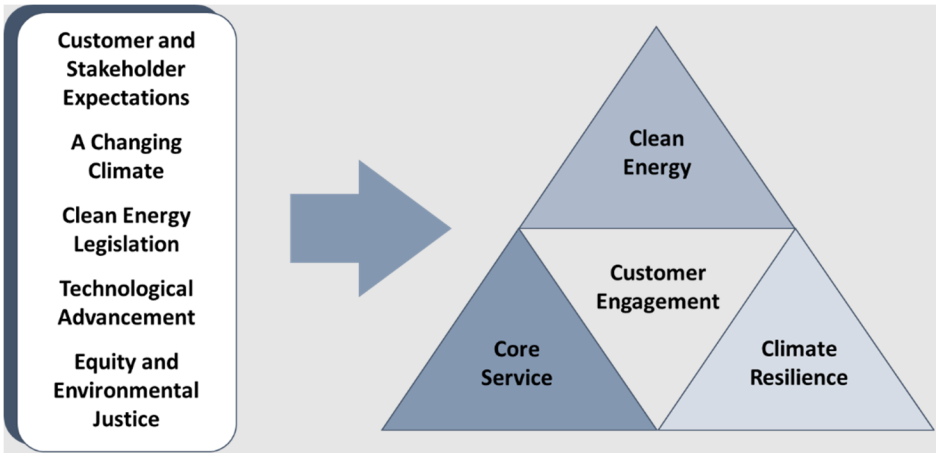
- **Clean Energy:** Economy-wide net-zero GHG emissions in our service territories by 2050

[2] The Consolidated Edison Company of New York, Inc. is referred to throughout this document as Con Edison and Orange and Rockland Utilities, Inc. is referred to as O&R. Together, these are the Companies.

- **Climate Resilience:** Increased resilience of our energy infrastructure to adapt to climate change
- **Core Service:** World-class safety, reliability, and security, while managing the rate impacts and equity challenges of the energy transition
- **Customer Engagement:** Industry-leading customer experience and facilitation throughout the energy transition

Our Clean Energy strategic objective is supported by five pillars: 1) build the grid of the future; 2) empower all our customers to meet their climate goals; 3) reimagine the gas system; 4) lead by reducing our Companies' carbon footprint; and 5) partner with our stakeholders.

Figure 1**:** Industry and societal trends apply directly to the Companies' strategic objectives.




To meet our strategic objectives, we anticipate investing up to $8.7 billion in our gas delivery system through 2030. Beyond 2030, we will need to continue investing in our gas delivery system to maintain its safety and reliability as we work to reduce overall gas consumption to ultimately achieve net-zero GHG emissions economy-wide in our service territories by 2050.

In this GSLTP, the Companies evaluate three representative pathways (Reference, Hybrid, and Deep Electrification) that represent potential end states. These pathways vary in assumptions about the level of adoption of different energy technologies and explore the effects of varying levels of policy evolution and investment needed in the broad strategic objectives shown in Figure 1.

The *Reference* Pathway reflects the current legal and policy framework and does not achieve state or city net zero greenhouse gas emissions goals. Clean energy investments that our regulators have approved, and existing legislation (including limited regulatory, technological and market changes during the next two decades) inform *Reference* pathway assumptions.

The *Hybrid* Pathway is further refined from our existing GLRP and incorporates both clean electricity and low-carbon gaseous fuels ("LCFs") and meets the State's economy-wide greenhouse gas emissions goals. In this pathway, gas volumes decline significantly from the Reference Pathway, and require regulatory

support. Many 'difficult-to-electrify'[3] buildings will retain a gas connection to minimize the customer cost of delivered energy and strengthen energy resilience. Customers in these difficult-to-electrify buildings will be encouraged to transition through a variety of incentives. But many, depending upon location, will retain the option to use low- to zero-carbon gaseous fuels, such as renewable natural gas ("RNG"), hydrogen and synthetic natural gas to help meet the 2050 GHG reduction goals.

The *Deep Electrification* Pathway incorporates the assumptions of the Climate Action Council ("CAC")/ New York State Energy Research & Development ("NYSERDA") integration analysis and meets the State's economy wide greenhouse gas emissions goals. This pathway assumes that gas delivery service is significantly reduced by 2050 to serve select large customers. Energy needs are assumed to be met almost fully through electrification and delivered steam produced by Con Edison's decarbonized district heating system. This pathway will require substantial technological advancement and regulatory support as well as expeditious customer adoption of different heating technologies.

These pathways, explored in more detail in Chapter V, are assessed on relative GHG emissions reductions from 2023 and estimated costs, and utilize GHG accounting methods consistent with the requirements of New York State's Climate Leadership and Community Protection Act ("CLCPA"). Features of the pathways are summarized in Figure 2.

Figure 2: Representative Pathways, Key Projected Outcomes for Con Edison and O&R (2043)

| | Reference | Hybrid | Deep Electrification |
|---|---|---|---|
| **2043 Gas Volume, % reduction from 2023** | 171 TBTU, 21% reduction | 125 TBTU, 42% reduction | 39 TBTU, 82% reduction |
| **Gas Sector Emissions Reductions from 2023 (scopes 1 and 3)** | 23% | 62% | 87% |
| **Gas Supply Mix (2043)** | 5% Certified Natural Gas | 36% RNG; 6% Clean Hydrogen; 58% Certified Natural Gas | 21% RNG; 79% Certified Natural Gas |
| **Electric Peak, % increase from 2023 to 2043** | Con Edison: 34%<br>ORU: 42% | Con Edison: 13% – 32%<br>ORU: 29% – 67% | Con Edison: 49% – 91%<br>ORU: 45% – 93% |

*Note: includes firm and interruptible customers, excluding steam and electric generators*

Under all pathways analyzed, Con Edison and O&R will continue to provide safe and reliable gas delivery service in our communities. The Companies have not selected a single, preferred pathway because we strongly believe it is premature to do so at this time. We need to continue planning and preparing for a range of possible outcomes in order to meet our obligations to provide safe and reliable service. This decision is further supported by the BCA ratios presented below that were requested by Stakeholders. The results show a range of ratios for each pathway, which overlap with one another, demonstrating quantitatively, that it is unclear which pathway should be preferred. The Companies fully support the

[3] Hard to electrify customers are defined as customers for which electrification is only feasible during a gut renovation. For hard to electrify customers, new internal electric and/or distribution system will need to be installed and the upgrades cannot be performed while the space is occupied. Examples include buildings connected to the district steam system, or buildings with more than 7 stories that circulate heat via steam.

clean energy transition and CLCPA goals, which are part of our Clean Energy Commitment. However, the future trajectory of important factors, such as legislation/regulation, technology, and customer behavior, will develop over time and are not entirely within our control. Significant changes in all three of these areas will be supported by continued stakeholder collaboration and are required to drive high levels of electrification, achieve a reasonable balance between affordability and emissions reductions, and realize the development of low carbon fuels. All of which are required for the Companies to pursue either the Hybrid or Deep Electrification Pathways.

The Reference Pathway represents the current trajectory, factoring in all existing and planned demand reduction programs, as well as the current regulatory and legislative environment. The Reference Pathway will continue to inform our short-term rate case funding requests. The Companies believe that as New York State makes more progress in implementing the clean energy transition, the Reference case will converge with the Hybrid and Deep Electrification Pathways. This expected change in the Reference case is not a new trend, as the Companies' peak demand forecasts reflect the dramatic shift in recent years, driven by both policy changes and the programs the Companies have implemented to reduce demand. In fact, the peak demand forecast developed by the Companies in 2015 anticipated a 25% **growth** in peak demand for the 20-year forecast beginning with winter 2015/2016 compared with our current Reference Case which projects a 13% **reduction** in peak demand over the next 20 years. The Companies will continue to refine the Reference case annually to reflect new customer adoption rates, new policies, and new technologies.

The Companies emphasize that engagement by all stakeholders in the process will be needed to determine the optimal path forward and have incorporated their feedback into this final GSLTP. Any outcomes of such engagement should incorporate principles of equity and environmental justice to guide our related clean energy program designs and infrastructure investments. The Companies will file annual reports in the second and third years of this planning cycle to update stakeholders, Department of Public Service staff ("Staff"), and the Commission on the progress the Companies have made on GSLTP implementation efforts with respect to this plan. Con Edison and O&R will continue to pursue key strategies to move toward decarbonization. (See Figure 3.)

Figure 3: Key Gas Decarbonization Strategies

| Reduce the GHG footprint of the existing system | | Transition customers away from fossil fuel use | | Advocate for practical policy changes |
|---|---|---|---|---|
| Reduce emissions arising from operating the gas distribution system | Decarbonize the gas delivered | Promote energy efficiency and heating electrification | Reverse the growth of the natural gas customer base | Seek regulatory frameworks that address overall investment in the gas system |
| • Continued investments in methane emissions reduction programs (e.g., enhanced LDAR (leak detection and repair), further strengthening damage prevention, and continue installing natural gas detectors)<br>• Continuation of the Companies' main replacement programs, with some modifications | • Advocate for ability to procure LCFs, which have higher commodity costs than fossil natural gas, and to include them as part of the supply portfolio whose costs are passed on to customers<br>• Make sound investments in low- and zero-carbon gaseous fuels, including synthetic methane, RNG, and hydrogen<br>• Pilot procurement of certified gas to reduce upstream methane emissions | • Seek increased funding for transformational heat pump incentives and energy efficiency, including deep energy retrofits that invest in building shell improvements<br>• Increase investments in electric system capacity as electrification efforts advance | • Advocate for the elimination of subsidies for new mains or services associated with new gas connections (i.e., 100-ft rule)<br>• Pursue Non-Pipeline Alternatives ("NPAs") that mitigate the need for gas infrastructure investment | • Pursue depreciation changes in accord with CLCPA goals, or a similarly effective construct, to manage long-term customer bill impacts<br>• Develop regulatory frameworks that allow for the strategic and economic downsizing of the natural gas distribution system<br>• Support thoughtful legislative efforts that advance heating electrification requirements for new buildings |

The focused effort on decarbonization pathways that this GSLTP describes will significantly reduce total sales volumes and GHG emissions. The Companies expect sales volumes for firm and interruptible[4] delivery service to fall by 21%-82% by the end of the 20-year planning horizon (2043) and GHG reduction to fall by 23%-87%, depending on the policy and market developments in the next decade.[5] Emissions reductions will be driven by existing programs and will accelerate as new programs are added, buildings

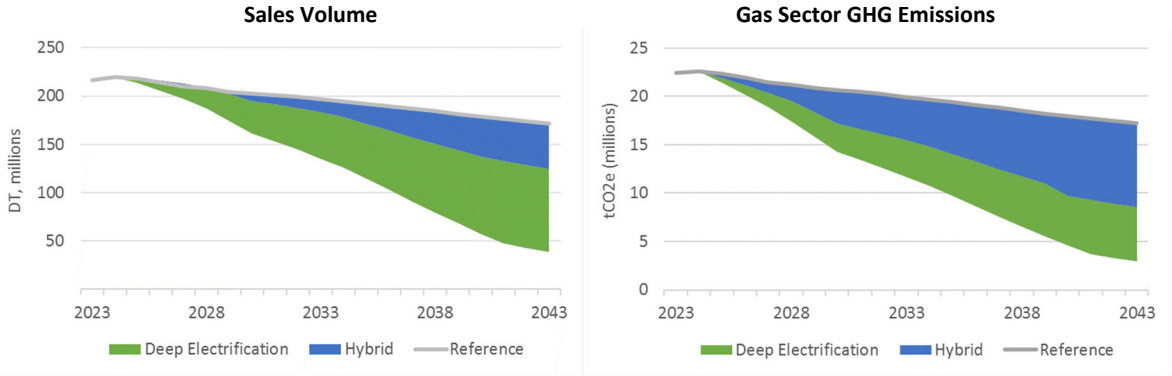
[4] Figure 4 includes only gas distribution customers. It does not include large-scale electric generation or Con Edison steam production.

[5] Firm service sales volumes include service to sales or transportation customers taking service under firm service classifications and excludes gas sales associated with non-firm customers, such as electric generation and steam production. Because service requirements differ for non-firm customers (*i.e.*, they may be interrupted), the Companies do not plan for or procure supplies to meet their requirements during peak winter periods.

get more efficient and customers adopt electrification, new buildings connect to electric instead of gas service, and new fuels become available for difficult-to-electrify customers.[6]

The Hybrid and Deep Electrification pathways are projected to meet economy-wide CLCPA objectives by 2050. The Companies expect that updates to the Reference pathway, which reflects current rate case funding requests and existing legislative and regulatory requirements, will converge with the other pathways over time as additional legislative, regulatory, technological, and business model changes are achieved.

Figure 4: Con Edison and O&R – Projected Decline in Total Sales Volume and Gas Sector GHG Emissions (2023-2043)




*Note: Sales and emissions figures pertain to firm and interruptible customers. Steam and electric generation are not reflected here.*

The pathways analysis highlights the fundamental long-term business model challenges that must be addressed. Distribution rates are likely to rise as delivered gas volumes decline, although customer bill changes may be mitigated as efficiency of customer usage increases. Absent implementation of asset depreciation practices that recognize a more limited economic life of gas delivery investments, the smaller number of customers served in the future would be required to pay for remaining gas system costs. Alternative depreciation approaches can help to address this unintended result of decarbonization policies. Figure 5, below, was extended beyond the required 20-year planning horizon to 2050 to illustrate this phenomenon (grey shaded areas). Figure 5 presents projected Gas System and Fuel Supply Costs[7] and a gas system delivery rate ("System Rate"[8]) for all three pathways.[9]

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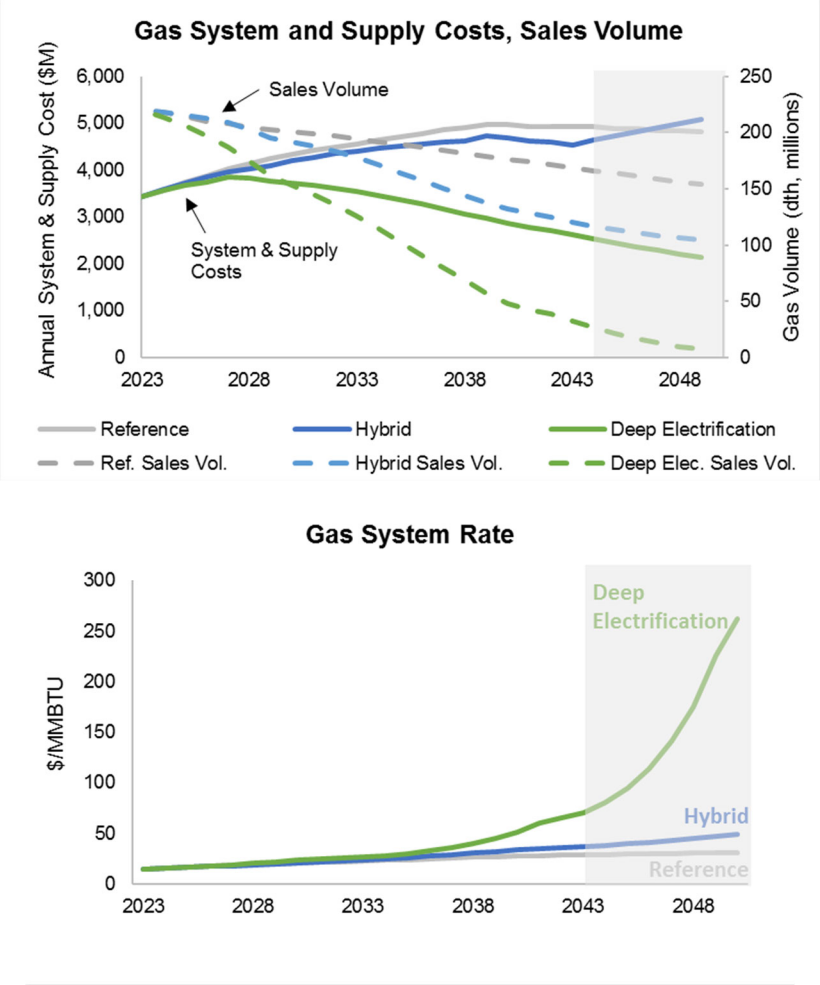
6 Emissions reductions are projected to continue past the planning horizon (*i.e.*, beyond 2043), but performance in later periods is challenging to model with precision.

7 Gas system and fuel supply costs are presented throughout this GSLTP in lieu of a revenue requirement, which does not capture commodity charges that are passed through to customers at cost. The Companies present 'gas system and fuel supply costs' (*i.e.*, distribution service revenue requirement plus fuel expense) in recognition that fuel supply costs are expected to rise as LCFs are integrated into the fuel mix to achieve decarbonization objectives.

8 The System Rate is a generic rate; it does not reflect a particular service class or rate design. As used throughout this GSLTP the System Rate is equal to gas system and fuel supply costs ($) divided by sales volume (MMBtu).

9 Unless otherwise specified, all figures that appear in this GSLTP are presented using 2023 dollars (*i.e.*, without inflation assumptions).

Figure 5: Range of GSLTP Cost Impacts on Con Edison and O&R Customers (2023-2050)




Additionally, Figure 5 illustrates the steep increase in rates driven by significantly reduced consumption coupled with more steady costs to deliver safe and reliable service.

This GSLTP incorporates a more granular look at potential long-term bill impacts among the Companies largest service classes("SC"). Figure 32 in Section IV presents projected bill impacts for select SCs using the representative costs and usage profiles for each of the Pathways presented. The Companies used projected 2023 revenues as the baseline for estimating long-term changes in revenues and rates in 2043 and 2050. The trajectory of potential bill impacts over time conveys the urgent need to avoid disproportionally burdening customers that will remain in later periods by taking action now and seeking creative solutions that recover system costs during the period of high utilization and over a large customer base (*e.g.*, through the use of accelerated depreciation and other changes to capital recovery policies, innovative cost reduction programs, tapping alternative sources of funding, etc.). As is discussed in Chapter V, changes to capital recovery policies are one opportunity to attenuate the cost impacts shown in these bill impacts.

In addition to the Bill Impact analysis, the Companies have compared the projected annual gas bill for a residential customer to quintiles of incomes for New York State[10] as one way to understand the impact of each pathway on customers, similar to a 'share-of-wallet' assessment. The Companies use a 6% threshold for energy costs when calculating discounts for its low-income programs. Since this focuses on the gas bill, we used a 3% threshold instead of 6%. In 2023, customers in the first 3 quintiles of income have gas costs exceeding 3%. By 2043, customers in the first 4 quintiles have gas costs exceeding 3% for the Hybrid and Deep Electrification pathways that meet the state's decarbonization goals. By 2050, it affects all quintiles under both the Hybrid and Deep Electrification Pathways, further demonstrating the urgent need for action.

As requested by Stakeholders, the Companies have developed benefit cost analyses ("BCA") using a Societal Cost Test ("SCT") for each of the three Pathways. Figure 33 in Chapter IV Section e provides a summary of the ranges of BCAs which includes sensitivity analysis around factors such as customer economics, depreciation, and electric peak.[11] None of the pathways have benefits that exceed costs through 2043. Among the CLCPA-compliant pathways, the Hybrid Pathway has the highest BCA score range. Using a higher cost of carbon would increase the BCA ratios under all three. It should be noted that assumptions used in the BCA analysis, as formulated by NYS, do not include non-quantifiable benefits from reducing GHG emissions like improved public health, improved air quality, job creation over and above displaced jobs and improved economic opportunities as discussed in the Climate Action Council Final Scoping Plan. The ability to quantify those benefits may show benefits exceeding costs.[12]

The Companies will continue to manage operating and capital planning strategies to mitigate the cost impacts these investments will have on customers. Nevertheless, it is clear from our GSLTP analyses that the current gas delivery business model will need to evolve as GHG reduction programs take effect. Our ability to maximize the decline in the use of fossil natural gas and the emissions from the gas delivery system over the next two decades, while minimizing customer bill impacts, will depend on developing appropriate regulatory policies, pacing, and adaptation of customer switching. Con Edison and O&R will continue to collaborate with stakeholders, advocate for cost-effective and technology-neutral policies, and seek all opportunities that support decarbonization. The Companies' policy priorities are summarized in Figure 6, below.

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[10] US Bureau of Labor Statistics. https://www.bls.gov/cex/tables/geographic/mean/cu-state-ny-income-quintiles-before-taxes-2-year-average-2020.htm

[11] Those specific sensitivities were chosen because their underlying assumptions are undetermined and sensitive in nature.

[12] The analysis uses the NYS DEC BCA framework cost of carbon of 3% since this is the most commonly used cost. All assumptions used in the BCA ranges are described and provided in Appendix G and Chapter IV.

Figure 6: Con Edison and O&R will pursue policy changes that can support decarbonization

| Policy priorities | Objectives (short- to medium-term) |
|---|---|
| • Sustain an economic framework that supports operation of a safe, reliable, resilient gas delivery system throughout the clean energy transition<br>• Advocate for a sustainable economic model that considers and mitigates customer and utility impacts of the clean energy transition<br>• Reduce capital investment in the system by gradually reducing the gas geographic footprint<br>• Emphasize the continued importance of overall energy system reliability during the clean energy transition<br>• Reduce infrastructure investments needed for the clean energy transition by substantially increasing the energy efficiency of buildings<br>• Develop decarbonization strategies for customers whose uses are most challenging from a GHG elimination perspective | • Gain regulatory support for deep energy retrofits such as building shell investments, and frameworks that allow for cost-effective electric heat adoption for the large majority of building typologies in the Companies' service territories<br>• Align depreciation lives with the CLCPA and/or investment recovery methods, resulting in balancing of inter-generational customer bill impacts and a reasonable and faster return of capital invested<br>• Continue to emphasize and enhance the coordination of gas and electric plans to maintain safe and reliable service throughout the clean energy transition<br>• End socialized support of new customer connections, eliminate exemptions for gas end uses in new construction, and ultimately develop regulatory capabilities to require existing customers in areas targeted for gas infrastructure removal to disconnect from the system<br>• Gain regulatory support to adopt LCF as an integral solution to meet clean energy goals and recover higher supply costs to accelerate market development |

These and other policy interventions that reduce our customers' consumption of natural gas will, in parallel, require development of incremental capacity and capabilities on the Companies' combined electric systems. Con Edison and O&R will manage the evolution of our gas delivery business, while maintaining focus on safe and reliable service for our customers. We carefully evaluate and apply these considerations as we pursue the decarbonization initiatives described throughout the remainder of this GSLTP.

# II. Introduction

The Commission initiated the Gas Planning Proceeding in March 2020[13] to evaluate opportunities to improve natural gas system planning and operational practices and to enable LDCs to meet evolving policy goals and customer expectations transparently and equitably. The Commission recognized the need to assess LDC plans for the future of the gas system over a twenty-year planning horizon in light of New York State's CLCPA, which requires New York to reduce economy-wide greenhouse gas emissions 40 percent from 1990 levels by 2030 and at least 85 percent by 2050. The State's CLCPA implementation framework is described in the CAC Final Scoping Plan.[14]

Con Edison and O&R have collaborated with Staff, the other New York LDCs, and stakeholders on a variety of matters related to gas planning modernization and CLCPA decarbonization efforts through the Gas Planning Proceeding. This collaboration has led to a series of detailed filings that cover a range of important issues that will guide the future of the State's natural gas industry.[15]

In May 2022, the Commission published its *Order Adopting Gas System Planning Process*.[16] The Commission directed LDCs to prepare and provide the following in LTPs:

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13 Case 20-G-0131, *Proceeding on Motion of the Commission in Regard to Gas Planning Procedures* ("Gas Planning Proceeding"), Order Instituting Proceeding (Issued March 19, 2020) ("Initiating Order").

14 Scoping Plan - New York's Climate Leadership & Community Protection Act (climate.ny.gov).

15 These filings include, among other things, evaluations of vulnerable locations in each company's service territory and reports and proposals focused on the evaluation of programs to reduce peak and overall demand for natural gas in New York State.

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

- A demand forecast that reflects any anticipated growth and/or reduction in peak demand and the effects of innovative rate designs;
- The impact of demand-reducing investments and programs, including energy efficiency and electrification;
- An evaluation of supply resources the Companies plan to use to meet customer demand;
- An explanation of how reliability will be forecasted and measured along with metrics that will be used to identify future reliability risks;
- Solutions to address supply and demand imbalances with a focus on NPAs;
- A description of how alternative solutions to traditional infrastructure investments (*e.g.*, NPAs) will be considered; and
- Where feasible, a "No Infrastructure Option" for meeting natural gas supply needs.

These required long-term planning elements are to be evaluated over a 20-year planning horizon and will be used to help the Companies, the Commission, and stakeholders assess different approaches for meeting the State's natural gas planning and environmental policy goals.

Con Edison and O&R have evaluated how these elements can be expected to drive outcomes in terms of emissions reductions, the level of reliance on natural gas as an energy resource over time (both in terms of peak demand and total volumes), cost impacts that will affect customer bills, and other effects on the natural gas business in downstate New York.

The Companies evaluated these required elements in three pathway scenarios. The *Reference* Pathway reflects the current legal and policy framework and does not achieve state or city net zero greenhouse gas emissions goals. The *Hybrid* Pathway is further refined from our existing GLRP that incorporates both clean electricity and LCFs and meets the State's economy wide greenhouse gas emissions goals. The *Deep Electrification* Pathway incorporates the assumptions of the CAC/ NYSERDA integration analysis and meets the State's economy wide greenhouse gas emissions goals. This pathway assumes that gas delivery service is significantly reduced by 2050 to serve select large customers.

Each of these pathways and key features of Con Edison and O&R gas system planning methodologies are explored in the six sections of this GSLTP. The Executive Summary (Chapter I) provides an overview of the Companies' strategic objectives, which are consistent with the objectives of the GSLTP, and provides a summary of the quantitative results for each pathway. This Introduction (Chapter II) includes the key requirements for long-term plans the Commission established in the Gas Planning Order and describes the organization of the Con Edison and O&R GSLTP. Chapter III describes the Companies' service territory characteristics, including the features that are common to both Companies that support a joint approach to many aspects of gas system planning. Chapter IV describes the Companies' methodology for Demand Forecasting and Supply Planning and describes how Con Edison and O&R approach other aspects of planning across all three pathways (*e.g.*, comparison of different project alternatives) as well as customer bill impacts. Chapter V describes the Reference, Hybrid, and Deep Electrification scenarios in depth and presents more detailed discussions of the range of outcomes, including GHG emissions reductions, the gas demand profile in our service territories. The results are based on the pace of policy development that unfolds in New York over the next 20-years. Chapter VI presents a Conclusion based on the extensive analysis that has been completed.

In addition, Con Edison and O&R have prepared a mapping to reference documents and a set of Appendices that contain additional detail on planning methodologies. These include:

A: Environmental Justice Policy Statement
B: Demand
C: Supply
D: Engineering
E: Emissions
F: Bill Impacts
G: Benefit Cost Analysis
H: Comparative Customer Economics

Con Edison and O&R have participated in the extensive stakeholder engagement processes that Staff has directed following the filing of the initial GSLTP on May 31. The Companies have considered all stakeholder feedback and integrated improvements to the plan, as appropriate and consistent with the Companies' regulatory and statutory obligations. Stakeholders will provide one final round of comments and the Companies may provide a final response in January 2024.

Con Edison and O&R have actively engaged with stakeholders to evaluate a range of issues addressed throughout the GSLTP. The Companies have participated in ten stakeholder meetings on technical and modeling approaches and have responded to 278 information requests pertaining to data sources, assumptions, and analyses relied upon throughout the GSLTP. In addition, Con Edison and O&R have closely reviewed stakeholder feedback and recommendations that have been shared during technical conference discussions and in written comments from stakeholders. The Companies have addressed many of the recommendations in the sections that follow.

# III. Service Areas

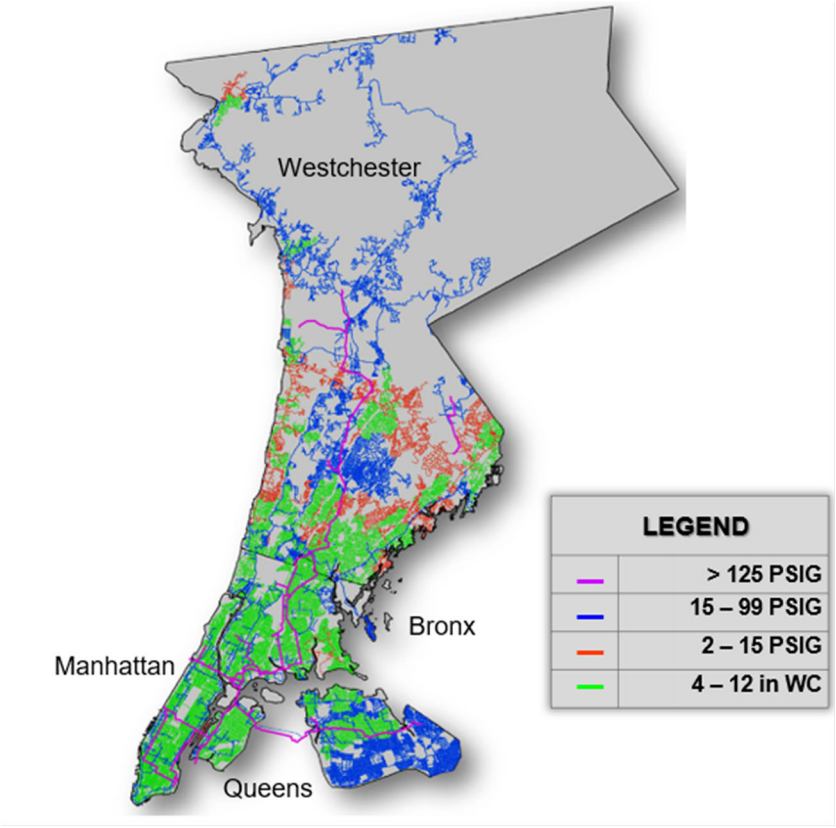
The characteristics of utility service provided by Con Edison and O&R are strongly influenced by the attributes of the customers and regions each company serves. The downstate New York region creates a unique set of challenges and opportunities that utility planners must consider when evaluating investments in reliability, safety, resilience and decarbonization for the long-term. These and other key features of each company's service territory are discussed in this Chapter III.

## a. Con Edison

Con Edison provides gas service to customers in Manhattan, the Bronx, portions of Queens, and portions of Westchester County. Con Edison owns and operates approximately 4,400 miles of gas mains and approximately 378,000 service connections[17] and delivers more than 340 million dekatherms annually to more than 1.1 million customer meters. Approximately 300 miles of distribution mains are large-diameter mains (16" or greater) that mostly connect the transmission mains to smaller-diameter distribution mains.

[17] Service Connections, particularly in New York City, can service large multi-dwelling premises, which is why Con Edison has 1.1 million customer meters and only 378,000 connections.

Figure 7: Con Edison Gas System

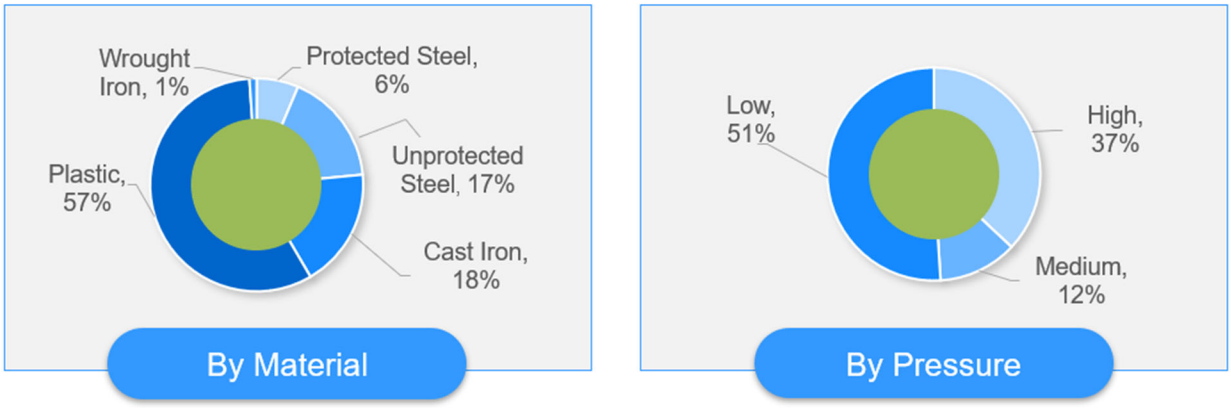



Approximately 95 miles of the mains are operated at transmission pressure (*i.e.*, greater than 125 pounds per square inch gauge) ("psig"). Con Edison's gas transmission facilities are comprised of 4 to 36-inch diameter mains in Manhattan, Queens, the Bronx, and Westchester County, with a maximum operating pressure ("MAOP") of 245-350 psig. There are approximately 100 regulators supplying gas from the transmission system into the distribution system and 51 remote operated valves ("ROVs") that facilitate the safe and reliable operation of the system.

The Company receives natural gas from interstate gas pipelines at several delivery points, called metering stations or citygates, where the pressure is reduced, and the gas is fed into the company's 8,300 miles of mains and service pipes for delivery to customers. When flows of gas to the Con Edison system exceed demand, the surplus is put in storage at facilities in Louisiana, Pennsylvania, and northern New York State. Most of Con Edison's natural gas customers use gas for cooking, space heating, and water heating.

Approximately 57% of Con Edison's gas distribution system mains consist of high-density polyethylene plastic piping. A comparatively smaller portion of the system is comprised of cast iron, bare steel and other material, as shown in Figure 8, below.

Figure 8: Gas Distribution System Pipe Material Composition and Pressure – Con Edison (2023)




### *i. Gas Customers*

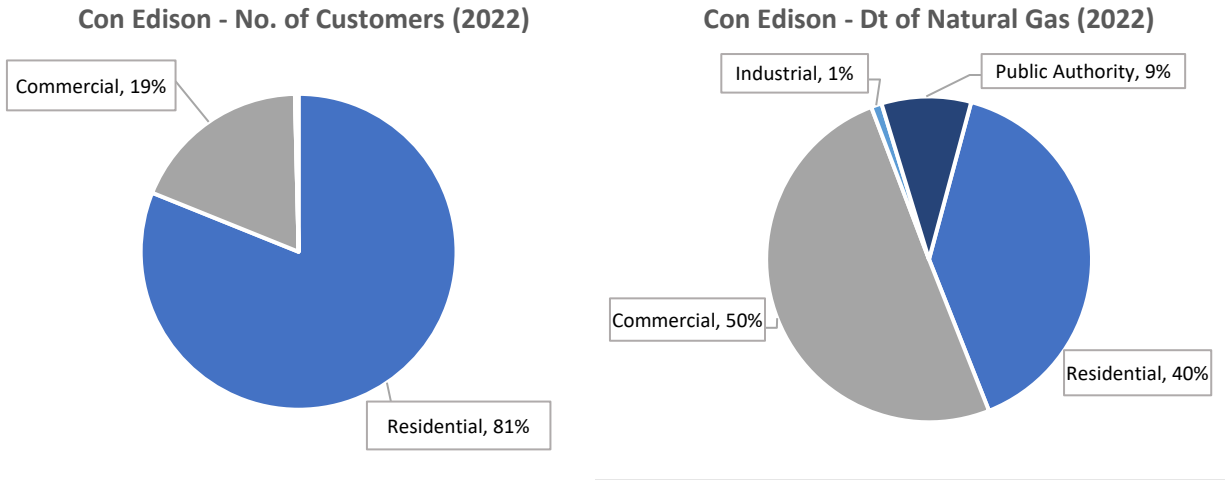
Con Edison delivers gas to a wide variety of customers, including: residential customers, commercial offices, restaurants, hotels, sports and recreational facilities, schools, hospitals, biomedical research facilities, fire houses and other emergency operations centers, manufacturing companies, supermarkets/bodegas, and electric and steam generators.[18]

New York State regulatory policy requires that natural gas distribution customers have the retail choice to purchase their natural gas supply from competitive energy supply companies ("ESCOs"). In the alternative, a customer can continue to rely on their LDC to procure their natural gas supply (these customers are referred to as full-service or sales customers). Despite the retail choice policy of the State, LDCs are required to plan for the firm pipeline capacity requirements needed to serve all firm natural gas customers, including both ESCO-served customers and LDC-served customers. In order to execute those plans, LDCs sign long-term contracts with interstate pipeline companies to procure enough pipeline capacity to meet peak day needs of all their customers; the LDCs then release this capacity to ESCOs with firm customer load in the LDCs' service territory, and ESCOs procure the gas commodity on behalf of their customers. Combined with the firm pipeline capacity, this allows LDCs and ESCOs to meet the supply needs of their customers.

[18] Most Con Edison customers receive firm natural gas distribution service. For firm service customers, natural gas supply and delivery cannot be curtailed except under exigent and unforeseeable circumstances. The LDC gas delivery infrastructure and supply plans are designed to support all firm customer demand under peak load conditions. Unlike firm service, interruptible service customers typically have alternatives that they can rely on during peak periods of demand on the gas system. Gas service is not guaranteed for interruptible service customers during peak demand periods. Plans described in this GSLTP are designed specifically to address *firm* service customer requirements.

Con Edison's customer base consists largely of residential customers, while deliveries to its Commercial and Industrial base were just over half of overall volumes in 2022.

Figure 9: Ratios of Firm Customers and Usage by Class (2022)[19]




### *ii. Disadvantaged Communities*

This GSLTP is an opportunity to examine solutions that may enhance access to energy supplies and technologies and address environmental burdens in ways that will meet the needs of Con Edison's most economically vulnerable and historically environmentally burdened customers in a clean and affordable manner. This opportunity aligns with State policy goals; the CLCPA has a target that at least 35% of funding for clean energy programs be directed to disadvantaged communities.

Con Edison's service territory consists of multiple communities that have been identified as DACs pursuant to the CLCPA. The Climate Justice Working Group ("CJWG") was established as a result of the CLCPA and tasked with developing criteria and identifying DACs throughout New York.[20] The CJWG recently voted to approve and adopt final criteria for identifying DACs during a meeting on March 27, 2023. As required by the CLCPA, the CJWG identified DACs based on geographic, public health, environmental hazard, and socioeconomic criteria.[21]

Con Edison provides gas and electric service to a relatively high concentration of DACs throughout New York, Bronx, and Queens Counties; approximately 45% of all census tracts in Con Edison's service territory were determined to be DACs pursuant to the CJWG criteria. The Company serves a more modest number of DACs in Westchester County.

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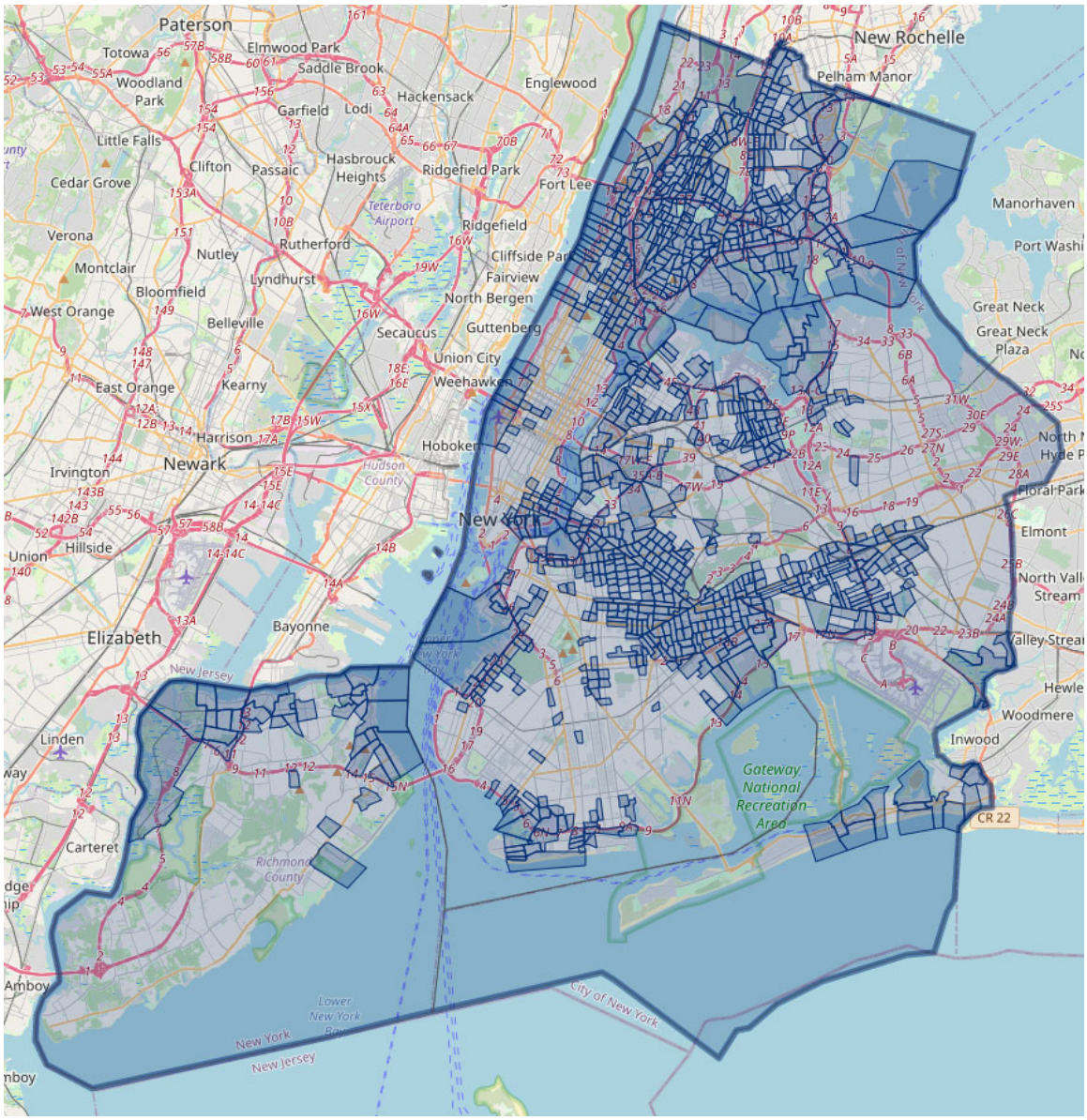
19 2022 Annual Report of Consolidated Edison Company of New York, Inc.

20 The CLCPA defines Disadvantaged Communities as "communities that bear burdens of negative public health effects, environmental pollution, impacts of climate change, and possess certain socioeconomic criteria, or comprise high-concentrations of low- and moderate-income households."

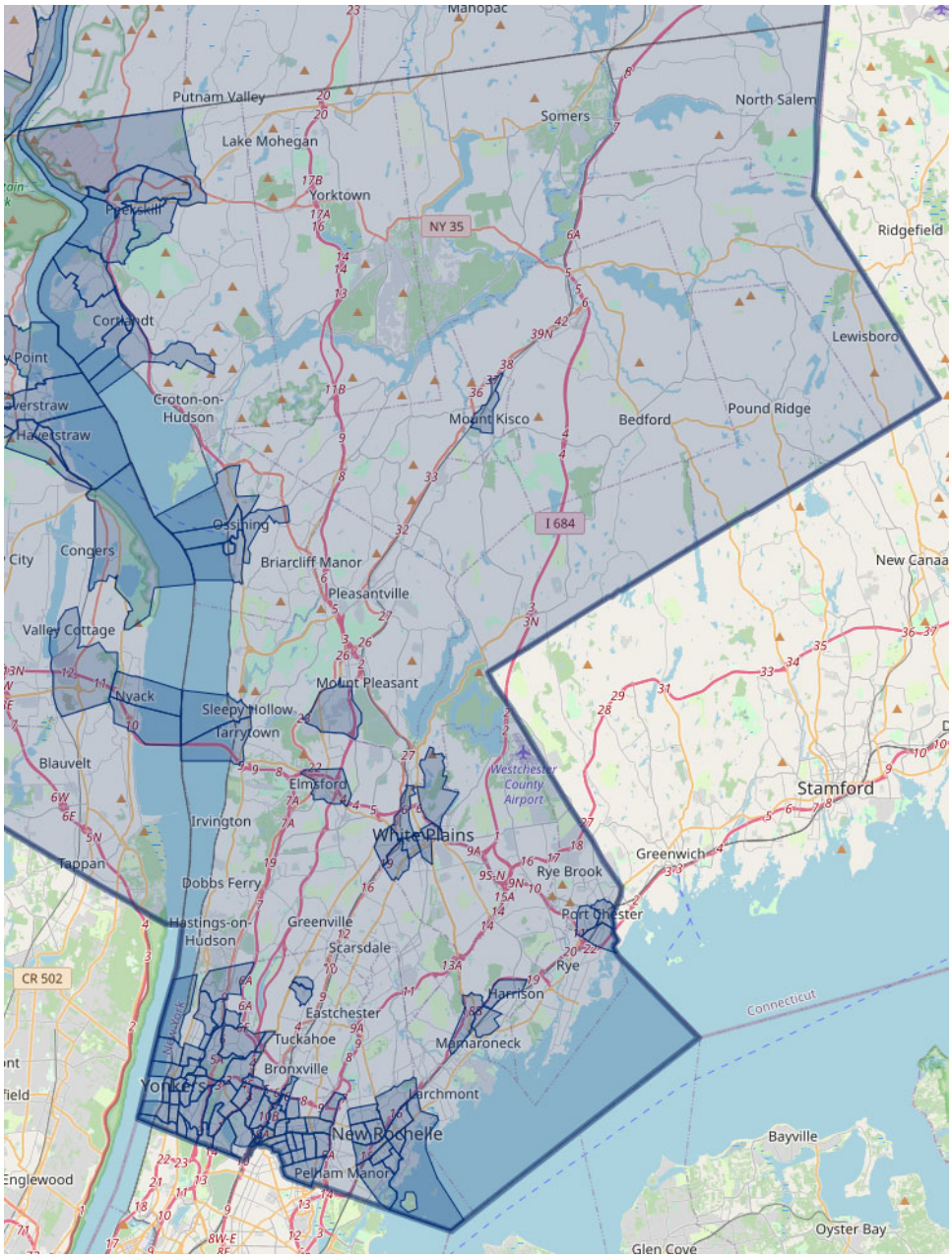
21 A fact sheet on the final criteria is pending, along with an interactive map and final report, which will be made available online as soon as practicable. See also, Draft Disadvantaged Communities Criteria and List Technical Documentation (March 9, 2022). https://climate.ny.gov/resources/disadvantaged-communities-criteria/

Figure 10: Disadvantaged Communities – New York City Region Map[22]




[22] New York City Region Map. https://climate.ny.gov/resources/disadvantaged-communities-criteria/. Note that the large blue shading signifies all or a portion of the Regional Maps published by the CJWG, and not Con Edison's service territory.

Figure 11: Disadvantaged Communities – Westchester County[23]




In addition to geographically-defined DACs, as part of the CJWG criteria, any household in the state with total income that is 60% or below the State median income is considered a DAC, regardless of that household's geographic location. Con Edison offers an energy affordability program ("EAP") to reduce bills for eligible low-income gas or electric customers such that a typical participating customer spends no more than 6% of household income on utility energy bills. Subject to total funding caps, the EAP discount is adjusted automatically to account for increased energy delivery costs resulting from utility investment plans. As of December 2022, Con Edison's EAP serves 140,620 gas and electric

[23] Mid-Hudson Region Map. https://climate.ny.gov/resources/disadvantaged-communities-criteria/

("Combination") and 3,632 gas-only customers, as illustrated in Figure 12:. The Company has provided approximately $38.5 million in discounts in 2022.

Figure 12: Con Edison, Low Income Program, December 2022[24]

| Rate Discount | Electric-only | Gas-only | Combination |
|---|---|---|---|
| Existing Customers | 326,111 | 3,632 | 140,620 |

Enabling an equitable clean energy transition is particularly challenging for DACs, as these customers tend to live in older, less-efficient buildings that are less conducive to electrification. Actions to provide energy efficiency investments and/or bill discounts to disadvantaged customers will not only lessen utility cost burdens but may enhance access to clean transportation, goods, and services. The Companies have formed an Environmental Justice Working Group ("EJWG") and Executive Steering committee and recently finalized a company Environmental Justice Policy Statement (Appendix A) to apply an equity lens to our work and investments. Key components of our policy statement include commitments that:

- Our operations will not disproportionately burden DACs;
- We will work to understand DAC concerns;
- Our clean energy investments will benefit DACs; and
- We will provide opportunities for employment in our clean energy future.

As part of Con Edison's recent rate case, the Company will be filing an annual Disadvantaged Communities Report ("Annual DAC Report") including extensive data regarding our investments, engagement and workforce development efforts in DACs.[25] The Annual DAC Report will reflect Con Edison's commitment to assess how its operations affect DACs. Relevant to the gas system, the report will provide information on how Con Edison tracked and report key metrics related to DAC data, Clean Energy Spending, facilities installed and number of participants in DACs, footage of leak-prone pipe ("LPP") retired and associated avoided emissions, as well as leak repairs in DACs. The Company will also convene stakeholder meetings following the annual filings to discuss and provide feedback on the report.[26]

Con Edison is proactively pursuing a number of key DAC-related objectives through the EJWG. The EJWG's objectives are embodied by two subcommittees: "CLEAN" (Continue Learn Employ Aspire Next) and "FAIR" (Factors Adequacy Improvement Report). The CLEAN team is focused on: partnering with DACs to develop responsive and appropriate programs and projects; educating Company employees on environmental justice and the applications of the CLCPA; expanding efforts to recruit and train residents

[24] Case 19-G-0066, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service* (Con Edison 2019 Rate Case Proceeding), Energy Affordability Program Report, December 2022 (January 30, 2023).

[25] In addition to reporting on DACs required by the 2022 Con Edison Rate Plans, the Commission directed energy efficiency and building electrification program administrators to file reports on clean energy investments benefitting Disadvantaged Communities by December 31, 2023 (*See*, Case 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative*, Order Directing Energy Efficiency and Building Electrification Proposals (issued July 20, 2023).

[26] 2022 Con Edison Rate Plans, Order, p. 140, Attachment 1 (Joint Proposal), p.119.

of DACs in clean energy careers; advancing meaningful engagement between environmental justice stakeholders and senior Company leadership; and tracking regulatory developments and assisting with Justice40 initiative components of federal funding applications. The FAIR team is focused on working with operational groups to develop assessment and prioritization methodologies to purposefully direct benefits to DACs in Company work planning; developing internal project scoring and other levers to advance work that will benefit DACs; supporting and advising on the development of the company's first DAC report; and increasing the provision of clean energy benefits to DACs.

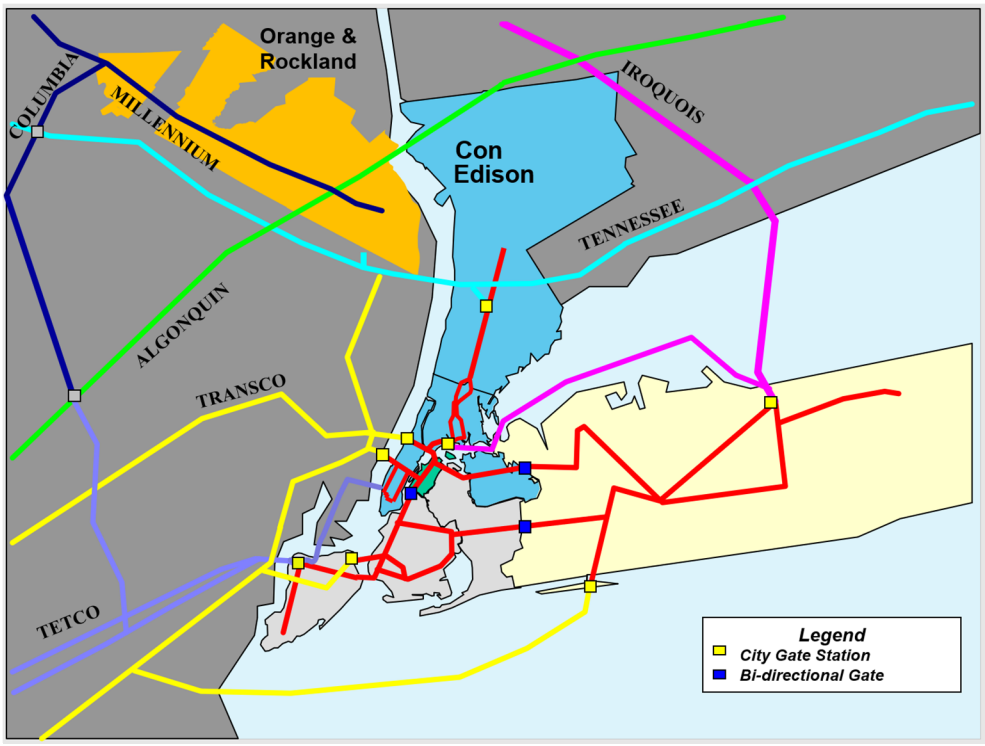
Some tangible outcomes to date yielded from the efforts described above include: working with IT to geocode five million customers to indicate which service addresses are in DACs and developing GIS and static map resources; developing the internal Environmental Justice webpage to house DAC maps and other resources; hosting a Strategic Issues Seminar (over 300 in person and on-line attendees); drafting the Company's Environmental Justice Policy Statement; hosting workshops with thought leaders on integrating environmental justice into Company culture and work; revising 'white paper' and capital driver scoring processes to integrate metrics assessing benefits to DACs; and exploring a partnership with a leading academic institution on a DAC workforce development initiative.

### *iii. NY Facilities Agreement & Associated Pipeline Access*

Some Con Edison facilities are part of a larger regional network called the New York Facilities ("NYF") System, jointly operated by Con Edison, National Grid Metro and National Grid Long Island. The NYF System is serviced by four interstate gas pipelines - Transcontinental Gas Pipeline ("Transco"), Texas Eastern Pipeline ("TETCO"), Tennessee Gas Pipeline ("TGP") and Iroquois Gas Transmission System ("Iroquois"). NYF system member utilities may receive gas from all four pipelines and transfer supplies among the utilities. In addition, Con Edison's distribution system is connected directly to the Algonquin Gas Transmission Pipeline ("Algonquin").

Figure 13 below shows the NYF system in red, and its associated connections to Iroquois, Tennessee, Transco and Texas Eastern interstate pipelines.

Figure 13: Pipeline System




### *iv. History of Pipeline Capacity Constraints*

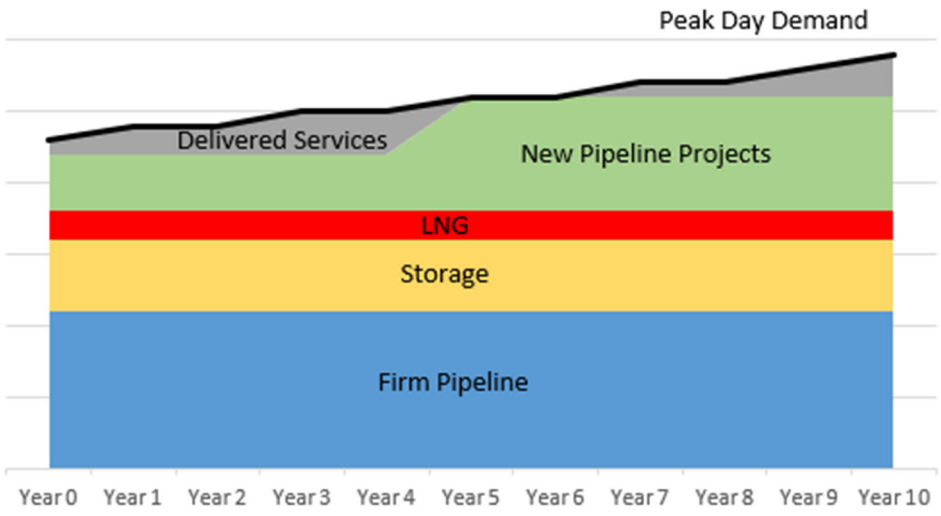
Con Edison has been managing supply challenges for several years. Since NYC began phasing out the use of heavy heating oils in 2011 and the decade-long reduction in natural gas supply prices, which encouraged many customers to switch to firm natural gas service, Con Edison's firm peak demand has grown 41%. Prior to 2016, the Companies' planning process focused on the establishment of new pipeline capacity contracts to meet growing peak demand. Contracts were chosen based on a variety of factors, including locational need within the Companies' service territories, diversity of supply, feasibility, and cost to customers. These arrangements typically required new pipeline infrastructure, which resulted in long lead times and the need for considerable contracted volume.

The outlook for successful development and construction of new projects became increasingly challenging in 2016 when required state-issued permits for pipelines began to be frequently denied in the region. Concurrently, Con Edison began receiving feedback from stakeholders that while natural gas was playing a large role in decreasing the use of heavy heating oils and contributing to a large decrease in NOx, SOx, PM2.5, and black carbon emissions (consistent with state and local environmental goals), its role in meeting other state and NYC goals for greenhouse gas reductions was less clear.

As a result, as peak demand continued to grow, the increased growth was met by procuring larger quantities of delivered services, typically in the form of peaking contracts. Delivered services are contracts with counterparties that can prove they have access to the required primary firm pipeline capacity necessary to make supply deliveries reliably to gate stations in the Companies' service territories. Since these supplies were only needed on the coldest days of the year, the contract structure was for a day-ahead call for supply to be delivered on up to 15, 30, or 60 days of the winter period. The Companies typically paid a demand charge for the right to call on the supply, and a market

price for the commodity when used. In the past, as the volumetric need for these contracts grew, the Companies ultimately replaced them with a contract for incremental pipeline capacity and the Companies' portfolio re-balanced between pipeline capacity and peak demand. The Illustrative Portfolio below demonstrates how the Companies historically managed their gas portfolio to meet increasing peak demand.

Figure 14: Illustrative Portfolio, Historic (Dt/day)




In recent years, the Companies' reliance on Delivered Services increased due to customer growth coupled with a lack of new pipeline projects coming into the region. Delivered Services, which were about 5% of total peak demand needs in Winter 2014/2015, grew to 18% of peak demand needs in Winter 2019/2020. Due to extensive efforts by the Companies to not only increase pipeline capacity in the supply portfolio, but to reduce peak demand, Delivered Services are now expected to represent at most 10 percent of total peak demand needs. With successful completion of the Tenn East 300L and the Iroquois ExC projects, the need for Delivered Services is projected to be eliminated by Winter 2028/2029 (see Figure 29).

In addition to an increased reliance on delivered services, the Companies also began to explore and implement alternative demand-side and alternative supply-side solutions to meeting customers' energy needs. During 2017, Con Edison held a collaborative on gas peak demand reduction during which the potential demand reduction capability of a variety of technologies was evaluated.[27] Con Edison made comprehensive additions to its planning process as a result of this collaborative, including the Smart Solutions for Natural Gas Customers program and the related requests for Commission approval to implement these programs starting in September 2017. This program had multiple components, including doubling the size of Con Edison's gas energy efficiency programs and issuing a NPS request for

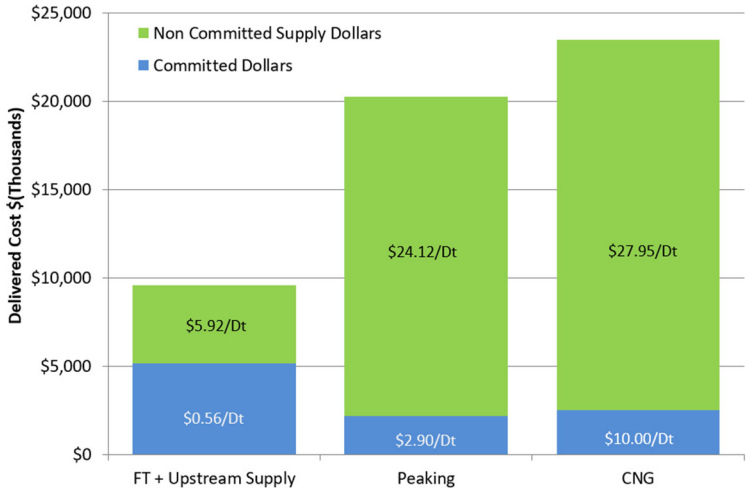
[27] Case 16-G-0061, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service*, Con Edison Gas Peak Demand Reduction Collaborative Report (filed December 22, 2017).

proposals seeking new solution types from the marketplace.[28] It also developed a gas demand response pilot program, which was discontinued in 2022.[29]

As the level of delivered services in the portfolio increases, the risk of maintaining a portfolio capable of meeting the growing peak demand of customers also grows. This is because a finite amount of pipeline capacity exists to the downstate New York area and unlike pipeline capacity procured directly from an interstate pipeline, delivered services do not have associated renewal rights. In fact, the counterparties who own the capacity have no obligation to continue making it available for sale or even to keep it dedicated to New York customers. Con Edison described the risk associated with high reliance on delivered services in both the Smart Solutions filing and in its last two filed rate cases.[30]

The economic benefits of delivered services are that they have low reservation costs. However, if they are relied upon for a large number of days similarly to a Compressed Natural Gas ("CNG") station, the amount spent on supply dollars would be significantly greater than if they were purchased on pipeline capacity. Figure 15 illustrates this using historic prices. The Companies strive to keep customer bill volatility as low as possible and the use of delivered services works against this objective.

Figure 15: Illustrative Comparison of Costs for 30 days of service for 25,000 Dt/d




Despite the comprehensive efforts made, by late 2018, updated forecasts indicated that peak demand would exceed available pipeline capacity, procured in any form, in most of Westchester County by the winter of 2020/2021. To maintain reliable service to existing firm gas customers in Westchester County, on March 15, 2019, Con Edison implemented a temporary moratorium on new and increased usage by

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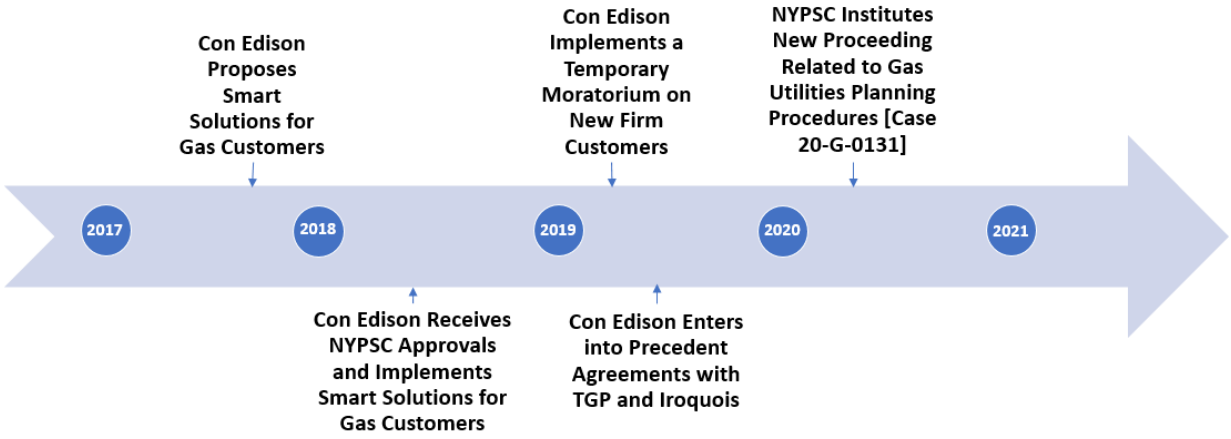
[28] Case 17-G-0606, *Petition of Consolidated Edison Company of New York, Inc. for Approval of the Smart Solutions for Natural Gas Customers Program* (Smart Solutions Proceeding), Petition of Consolidated Edison Company of New York, Inc. for Approval of the Smart Solutions for Natural Gas Customers Program (Filed September 29, 2017).

[29] Smart Solutions Proceeding, Gas Demand Response Report on Pilot Project – 2021/2022 (July 15, 2022).

[30] Con Edison 2019 Rate Case Proceeding, Direct Testimony of Con Edison Gas Infrastructure, Operations and Supply Panel, pp. 151-153. See also, Case 22-G-0065, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Service* (Con Edison 2022 Rate Proceeding), Direct Testimony of Con Edison Gas Infrastructure, Operations and Supply Panel, pp. 116-118.

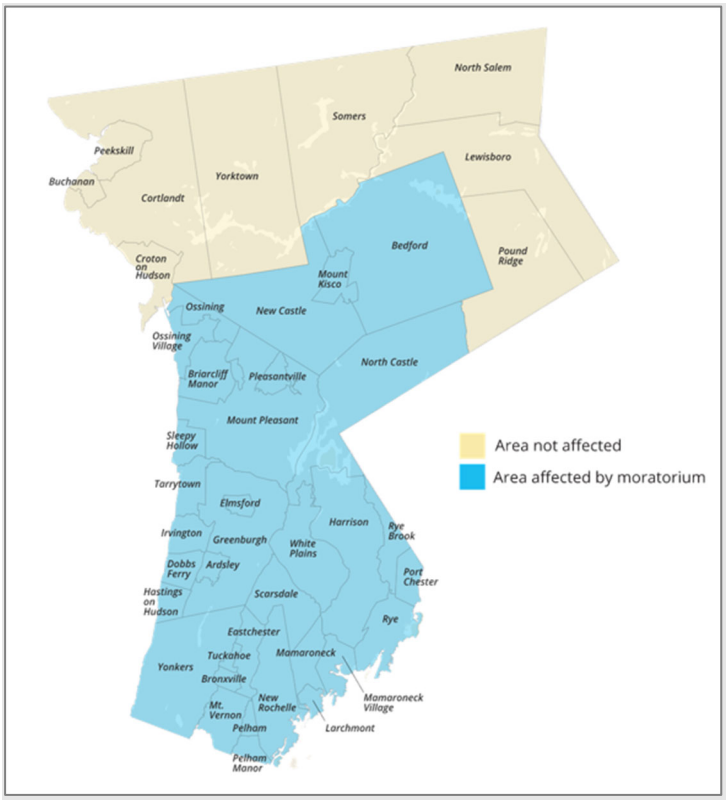
existing firm customers in most of Westchester County. As of November 16, 2023, a combination of lower peak demand forecast and increased supply resulting from the Tennessee East 300 Project coming online resolves the Westchester supply-demand gap, eliminates the need for any delivered services in later years, including near-term elimination of the need for compressed natural gas to support the moratorium region's peak demand, and generally supports reliability of gas service throughout our service territory. For these reasons, as well as for the additional reasons provided in Chapter IV of this Plan (under "Westchester Temporary Moratorium" section), this moratorium is in the process of being lifted on December 1, 2023.

Figure 16: Timeline of Events Associated with Con Edison's Temporary Moratorium




Concurrent with the start of the moratorium, NYSERDA, the Commission and New York Power Authority ("NYPA") announced a $250 million Westchester Clean Energy Investment Program to provide local investment in clean energy alternatives such as electric heat pumps, high-efficiency appliances, equipment and building materials to reduce demand in order to accommodate new customers.

Figure 17: Moratorium Map




In the spring of 2019, Con Edison moved forward with multiple efforts to increase pipeline capacity. Two precedent agreements were signed with existing pipelines already serving the region, TGP and Iroquois.[31] These agreements allowed for the creation of additional pipeline capacity to existing Con Edison citygates solely through increasing compression facilities, thereby minimizing the environmental impact of construction.

In addition to the pipeline precedent agreements, as part of its 2019 rate case settlement agreement the company accelerated a main replacement project in Queens, which increased the receipt capability at the Texas Eastern – Lower Manhattan citygate ("LM"). This on-system solution, completed in 2021 has helped to increase LM deliveries by 200 MDt/day and the Companies have contracted for an additional 147.5 MDt/day of capacity through permanent releases from existing shippers.

As required by the Initiating Order establishing the gas planning proceeding in March 2020, in July 2020 the Companies filed supply/demand analyses, which described the areas of Con Edison's and O&R's service territories that were vulnerable to supply constraints. For Con Edison, two areas were determined to be vulnerable to supply constraints due to insufficient pipeline capacity based on

[31] *See:* https://www.coned.com/en/about-us/media-center/news/2019/04-24/con-edison-seeks-expanded-natural-gas-capacity; https://www.coned.com/en/about-us/media-center/news/2019/05-09/con-edison-to-enhance-gas-deliverability-for-nyc

hydraulic flow modeling, including Central and Southern Westchester County and most of its NYC territory, the exception being lower Manhattan.[32]

The Company provides an update on the status of these vulnerable areas in Chapter IV of this plan.

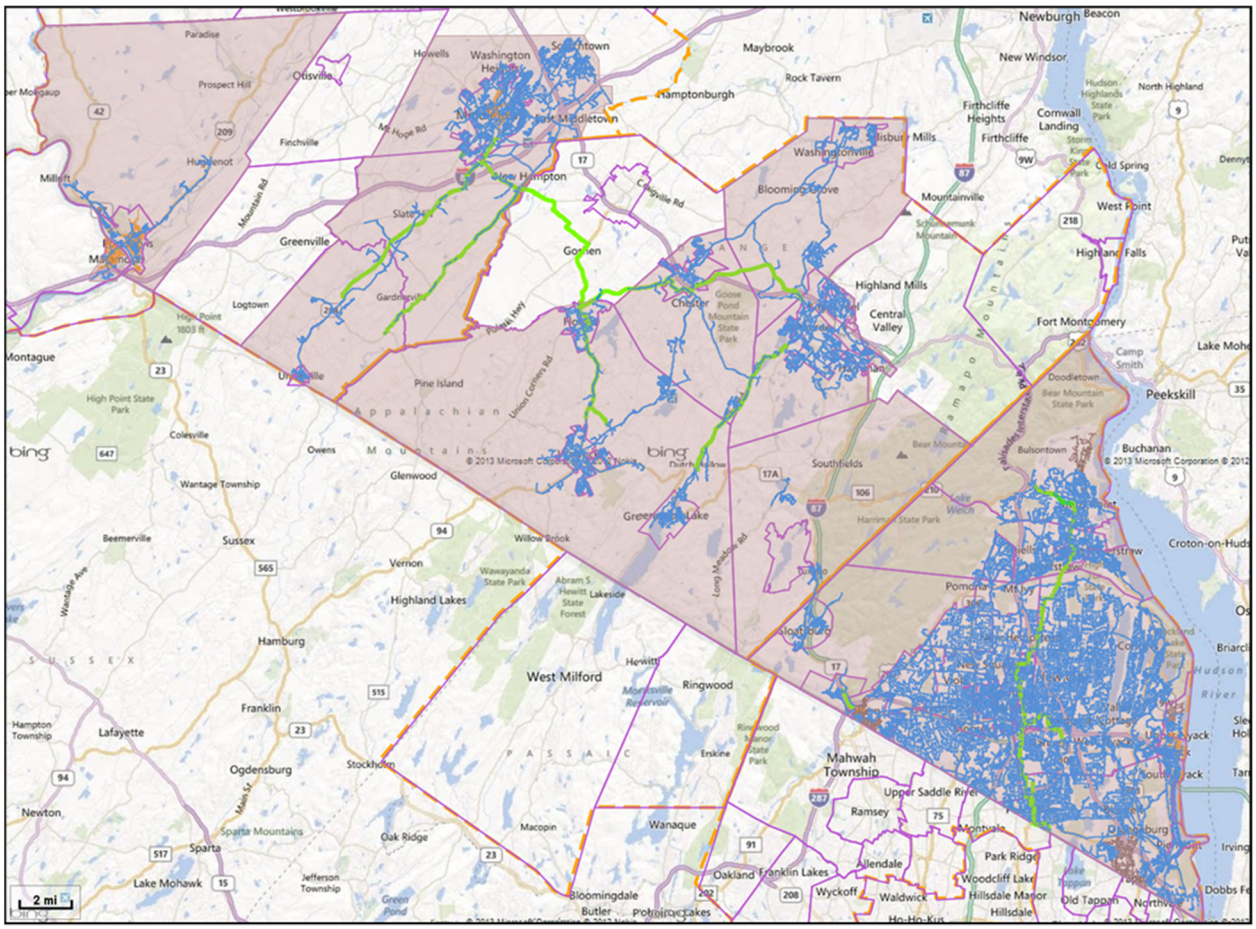
### b. Orange & Rockland

O&R provides gas delivery service to more than 141,000 customers across 66 communities through two separately integrated gas distribution systems, one in Orange County and the other in Rockland County. O&R owns and operates 1,885 miles of gas main ranging in size from 1¼ inch diameter to 20-inch diameter (including one mile of transmission pipeline), with 106,843 services to customer meters. O&R's distribution main is operated at various pressures, including 79 miles operated at transmission pressure (125 psig or more).

Customers in Orange County are served by Millennium Pipeline Company ("Millennium") and Columbia Gas Transmission ("Columbia") through a series of supply points off the Millennium pipeline. O&R's gas infrastructure in Orange County has largely followed the major highways that cross the rural and mountainous county, with pockets of development.

[32] As defined in the Initiating Order, a "vulnerable location" is a portion of the system where gas may not be able to be delivered safely and reliably within the next five years, which could be caused by a shortage of pipeline capacity serving the area, a distribution infrastructure deliverability issue, or a combination factors.

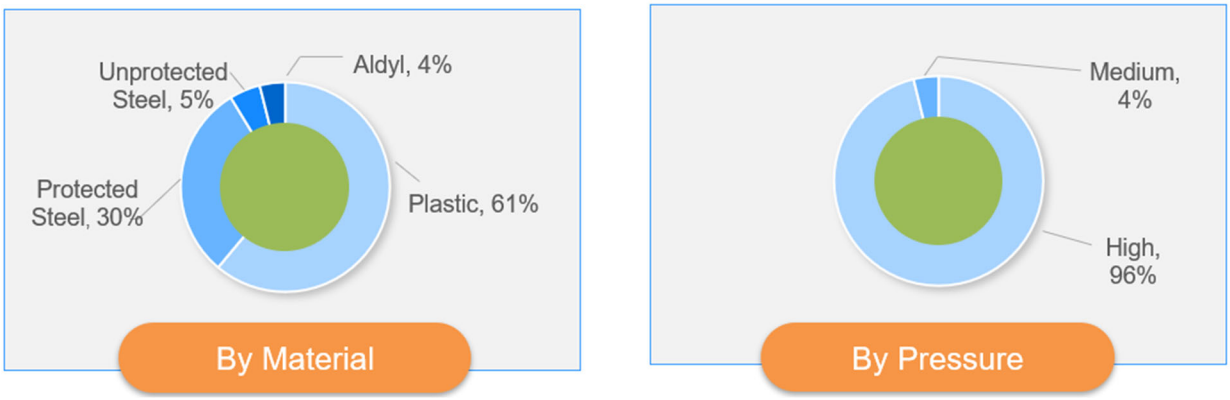
Figure 18: O&R's Gas Service Territory




The Rockland County gas system is more densely developed than the Orange County system and gas supplies are provided through three different interstate pipelines: Millennium, TGP, and Algonquin. This arrangement maximizes O&R's capability and flexibility to take and distribute gas supply for these communities.

Together, the Orange and Rockland counties have a networked high-pressure distribution main system with redundancy built among most of the 13 gate stations for flexible operations in the event of an interruption at one of the gate stations or in a feeder line. Approximately 61% of O&R's gas system mains consist of high-density polyethylene plastic piping, while a smaller portion of the system is comprised of bare steel, Aldyl plastic and other material as shown in Figure 19 below.

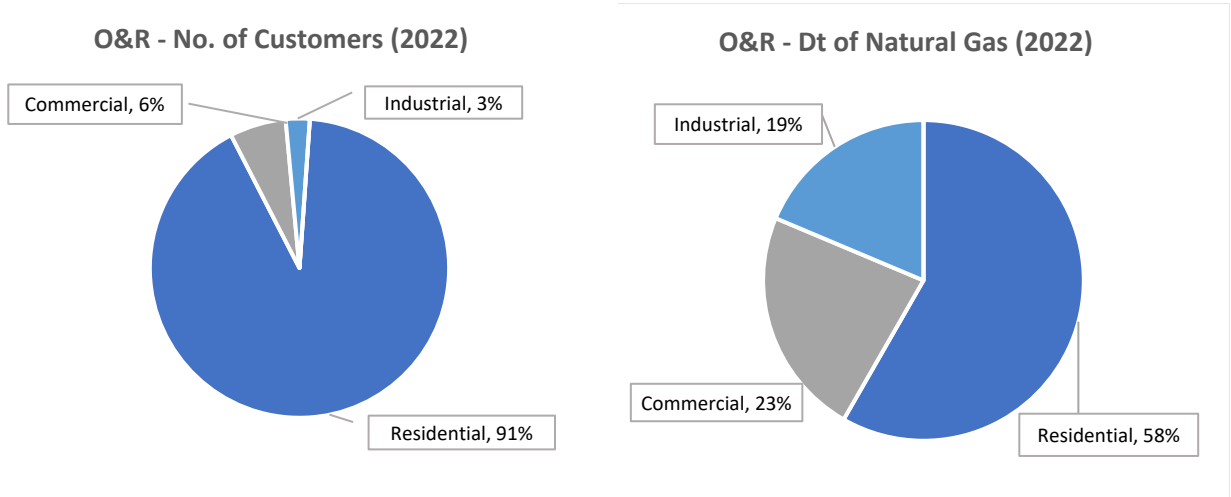
Figure 19: Gas System Pipe Material Composition and Pressure – O&R (2023)




### *i. Gas Customers*

O&R's customer base consists of mostly residential customers, while deliveries to its Commercial and Industrial base were approximately 42% of overall volumes in 2022.

Figure 20: Ratios of Customers and Usage by Class (2022) [33]

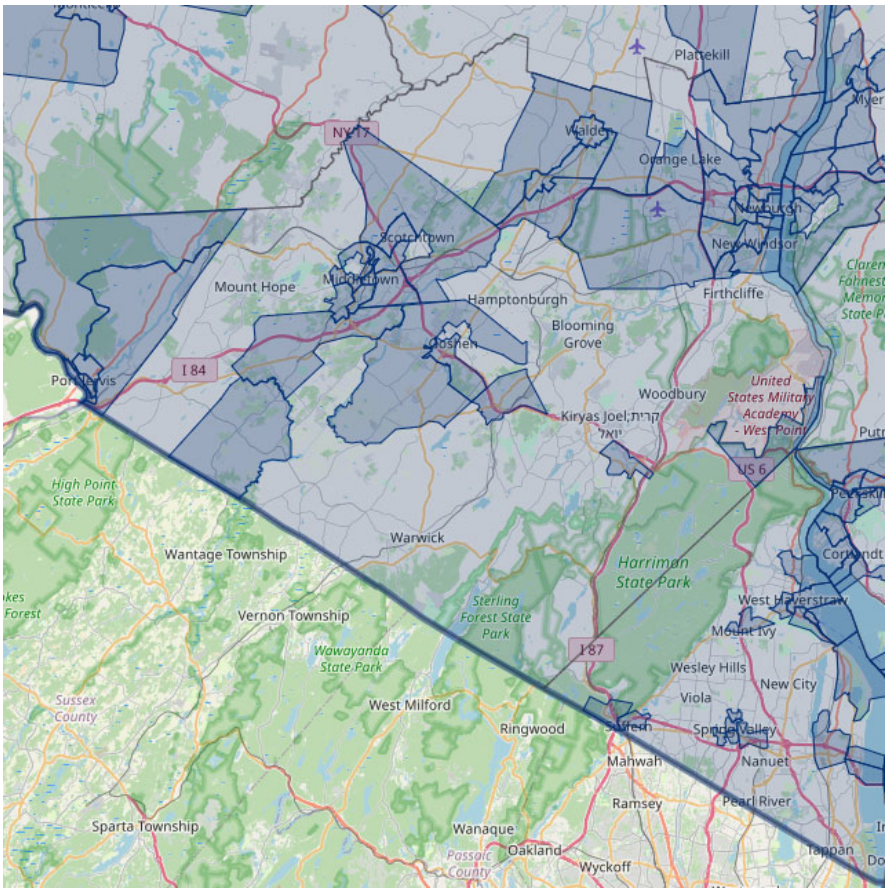



### *ii. Disadvantaged Communities*

While comparatively smaller than the number in Con Edison's gas territory, Orange and Rockland has DACs interspersed throughout its service territory.

[33] 2022 Annual Report of Orange and Rockland Utilities, Inc.

Figure 21: Disadvantaged Communities – Orange and Rockland Counties[34]




As of December 2022, O&R served approximately 11,474 combination customers and 36 gas-only customers through its Energy Affordability Program as detailed in the Figure 22, below. The design of the O&R EAP is conceptually similar to the Con Edison program, with a 6% typical energy expenditures target for participating customers and benefit levels that automatically adjust to account for increased delivery costs resulting from utility investment plans, subject to a total funding cap. The Company has provided approximately $5.4 million in gas rate discounts in 2022. [35]

Figure 22: O&R Low Income Program Participants, December 2022

| Rate Discount | Electric-only | Gas-only | Combination |
|---|---|---|---|
| Existing Customers | 4,334 | 36 | 11,474 |

[34] Mid-Hudson Region Map. https://climate.ny.gov/resources/disadvantaged-communities-criteria/. Note that the large blue shading signifies all or a portion of the Regional Maps published by the CJWG, and not Con Edison's service territory.

[35] Case 14-M-0565, *Proceeding on Motion of the Commission to Examine Programs to Address Energy Affordability for Low Income Utility Customers*, Electric and Gas Low Income Monthly Report, December 22 (January 30, 2023).

### *iii. History of Pipeline Capacity Constraints*

Unlike Con Edison, O&R does not have a history of experiencing supply constraints. However, O&R began to implement demand reduction programs as a result of its most recent gas rate agreement,[36] including the development of a gas demand response pilot and significantly increasing the size of its gas energy efficiency programs.

In 2020, the regions of Monroe, Kiryas Joel, and Palm Tree were identified as being vulnerable to supply constraints due to local distribution system restrictions.[37] These are areas where the distribution system is not capable of meeting the forecasted peak demand without falling below minimum design pressure requirements and/or exceeding existing equipment flow specifications. While not at the time, classified as a vulnerable location, O&R was monitoring the Sloatsburg area for potential localized constraints.

The Company provides an update to the status of these vulnerable areas in Chapter IV of this plan.

## c. Common to both Companies

While Con Edison and O&R have separate and distinct service territories, the Companies conduct their gas supply planning jointly and maintain a combined portfolio of interstate pipeline, storage, and other supply contracts. Through these planning processes, the Companies assess their future system demands, run hydraulic flow models to study peak day flows at various temperatures, evaluate any potential supply needs over five years and assess the impact of contingencies, such as the loss of a citygate. Other factors the Companies consider when performing gas supply planning include the need for balancing service (*i.e.*, the flexibility to draw from - or inject gas supplies into – storage facilities in response to short term fluctuations in demand or as system conditions may warrant).

## d. Distinct among New York LDCs

The Companies must consider the unique features of their service territories when planning and operating the gas system. For example, Con Edison has pipeline capacity constraints that affect large areas of its system, notably portions of Westchester County. Con Edison also has significant amounts of gas-fired electric and steam generation served by its transmission system. Because generators are interruptible gas customers, the Companies do not plan for the peak demand needs of these generators as part of the gas supply portfolio, but balancing generator gas deliveries versus actual usage is critical to the reliable operation of the gas distribution system. In fact, strong coordination between Gas Control and the Electric and Steam Generators is crucial to the downstate reliability of all three commodities. O&R has more localized distribution constraints but does not face deliverability challenges at its citygates. These factors present unique gas supply planning challenges.

It is important to note, that while only firm customer gas requirements are included in peak day supply planning, the demand from interruptible customers are included in the emissions, reliability, and cost analyses presented in this GSLTP.

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[36] Case 21-G-0073, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Orange and Rockland Utilities, Inc. for Gas Service*, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plans, with Additional Requirements (Issued April 14, 2022).

[37] Case 20-G-0131, *Proceeding on Motion of the Commission in Regard to Gas Planning Procedures,* Supply/Demand Analysis for Vulnerable Locations (filed July 17, 2020).

### *i. Complexity of Joint Supply Portfolio*

Con Edison and O&R manage a joint gas supply portfolio that allows for the combined use of each company's gas supply and interstate pipeline capacity contracts, including storage. This allows flexibility in balancing each of the systems. This flexibility exists where each of the service territories are served by the same pipeline (*i.e.*, TGP and Algonquin). The Companies have a total of 77 individual pipeline and storage contracts in service, which provide 1,794 MDt/day of capacity to the gate stations in the Companies' service territories. On-system, there is one liquefied natural gas ("LNG") facility and one trucked supplied CNG station. The LNG facility contributes to the supply portfolio as well as provides a reliability backstop in the case of pipeline or on-system events that reduce supply and/or pressure. The CNG station supplements supply to the moratorium region of Westchester, will no longer be required to maintain reliability once this moratorium is lifted on December 1, 2023, and can be removed from the existing site starting in Spring 2024.[38]

The joint supply approach offers synergies but also adds a degree of complexity. As an example of such synergies, Con Edison and O&R have the ability to leverage pipeline supplies being delivered from TGP, Millennium and Algonquin across both service territories. Similarly, balancing can be performed jointly across both service territories for added flexibility in system operations. The Companies have consistently found that the benefits of this approach outweigh the complexity.

### *ii. Uncertainty of Future Demand Has Changed Planning Processes*

The Companies have a strong history of managing this joint gas supply portfolio process over the past 25 years. In the most general sense, the Companies have not changed the process by which they perform gas supply planning for this GSLTP. What has changed are the strategies for addressing projected future shortfalls in supply. In recent years, the Companies have taken more aggressive action on demand-side measures and pursued only smaller, less environmentally impactful increases in pipeline capacity infrastructure to address supply challenges. The Companies expect that as customer demands begin to decline meaningfully in future years as a result of State and City decarbonization statutes and policies, they will begin "right-sizing" their joint supply portfolio.

### *iii. Joint Supply Portfolio Must Have Flexibility to Match All Outcomes*

To maintain reliability, while reimagining the gas system, the Companies must consider not only the current 20-year peak demand forecast (updated annually), but also scenarios for other likely peak demand outcomes. This scenario-based approach is prudent and necessary for ensuring adequate supplies for customers until alternatives are ultimately adopted. Chapter V discusses in detail the range of potential outcomes the Companies project may be probable and appropriate to consider for planning purposes.

### *iv. Early Movers in EE, DR and NPAs*

The Companies have a long history of implementing cost-effective energy efficiency and demand response programs for its electric business; Con Edison was one of the first LDCs in the nation to test the ability of demand-side alternatives to offset the need for pipeline capacity and local distribution infrastructure. In response to the constraints on the Con Edison and O&R gas systems, the Companies have enhanced their implementation of demand side management efforts to reduce peak day demand

[38] The CNG supply station is only in-service during the winter months.

requirements on their systems and reduce overall gas throughput. Such measures lower emissions associated with the gas systems and align with the City and State's climate goals.

NPAs, for example, present an important tool that the Companies can use to advance the objectives of this GSLTP. In accordance with the Gas Planning Order, the Companies filed proposed NPA frameworks in August 2022, which included proposed suitability criteria, cost recovery mechanisms and incentives. The Companies anticipate that adoption of these frameworks will facilitate the development and implementation of NPAs in their service territories. Con Edison has already taken steps to integrate NPAs into its utility planning process and has worked to begin to cost-effectively implement NPAs. O&R has begun the process of integrating NPAs into its planning process.

# IV. LTP Methodology: Forecasting and Planning

Forecasting demand and supply for natural gas over a 20-year planning horizon is a complex process that requires a deep understanding of a range of factors that influence consumer behavior. Accurate near-term predictions and longer-term forecasts must reflect variables that include weather patterns, economic trends, customer economics and disruption, and assumptions concerning changes in public policy. Con Edison and O&R jointly develop forecasts, using consistent assumptions, to inform decisions about how much gas to procure. This Chapter IV explores the approach the Companies use to forecast demand and validate the supply portfolio's ability to meet these demands over the planning horizon. In addition, Con Edison and O&R present methodologies used to determine optimal investment strategies for meeting customer needs safely and reliably (*e.g.*, the Benefit/Cost Analysis ("BCA") framework applied to certain gas assessments).

## a. Forecasting Demand

### *i. Volume Forecasting (Con Edison)*

Con Edison forecasts sales volumes using projected customer counts and modifiers to the base period volumes. This approach is applied on a class-by-class basis. Base period volume modifications that drive the volume forecast are described in Figure 23.

Figure 23: Forecasting Details (Con Edison)

| Detail | Description |
|---|---|
| Weather Normalization | Adjustment to normalize base period volumes in an effort to account for change in volumes due to deviations from normal weather (heating degree days) and/or water temperature. |
| Adjustments | Interruptible Adjustments are to properly model customers who transferred to/from firm/interruptible within the base period so that their forecasted volumes are appropriately identified as firm or interruptible. Non-firm volumes are forecasted for interruptible customers.<br><br>Low Income Adjustments can be applied, if necessary, to reflect changes in the distribution of low-income customers during the base period. |
| Energy Efficiency | Volumes for relevant service classes are adjusted to reflect the best knowledge of the impact from gas conservation including Con Edison and NYSERDA programmatic efforts in addition to 'organic' (naturally occurring) energy efficiency. |
| Electrification | Volume reductions due to electrification of heating and electrification of gas appliances such as hot water heaters, stovetops, ovens, and clothes dryers. Commodity Forecasting uses an in-house REV / DER Forecasting Model to estimate these numbers. |
| New Business | The new business forecast reflects the projected delivery volumes in the forecast years associated with new business customers anticipated to take service in each of the forecast years. Estimated volume is derived by a customer forecast. |
| Oil to Gas Conversions | Although Con Edison's oil-to-gas conversion initiatives have ended, there is still a healthy population of oil-fired buildings in the service territories and as such there are ongoing oil to gas conversions. The company's Gas Operations group provides a forecast of customers by service class which is considered when projecting future volumes from this customer segment. |
| Gas Vehicles | Given the consistency of actual volumes, the Natural Gas Vehicles forecast is assumed to be equal to the prior year absent any new information. |
| Distributed Generation Riders | Project Managers from Con Edison's Distribution Planning Department provide information related to future DG customers including the timing of going online as well as each project's expected usage. |
| Other | Other adjustments as needed such as including the COVID-19 Pandemic, impact of climate change on heating degree day normals, etc. |

### *ii. Volume Forecasting (O&R)*

Similarly, O&R delivery volume is forecasted applying historical customer counts, economic data and industry growth drivers including employment using time-series regression equations. These equations

are on a class-by-class basis. O&R actual base period volumes may be adjusted, as described by the details in Figure 24.

Figure 24: Forecasting Details (O&R)

| Detail | Description |
|---|---|
| Weather Impact | Adjustment to normalize base period volumes in an effort to account for change in volumes due to deviations from normal weather (heating degree days). |
| Billing Days | Number of billing days |
| Employment | Adjustment reflects prevailing economic conditions and the state of the economy. |
| Price Impact | Reflects price elasticity |
| Energy Efficiency | Volumes for relevant service classes are adjusted to reflect the best knowledge of the impact from gas conservation including O&R and NYSERDA programmatic efforts in addition to organic energy efficiency. |
| Electrification | Volumes lost due to electrification of heating and non-heating appliances are currently derived from our peak demand forecast and converted into volumes across the corresponding service classes. Commodity Forecasting currently uses an in-house model to obtain these numbers; we are currently working to create an electrification tool for O&R similar to the one used for Con Edison. |
| Interruptible Services | Service Class 8 and Service Class 9 are normalized as if no interruptions have occurred, and this becomes the forecast |
| Known Projects | The new business forecast reflects the projected delivery volumes in the forecast years associated with new business customers anticipated to take service in each of the forecast years. Estimated volume is derived by bills/customer forecast. |

### *iii. Peak Demand Forecasting (Con Edison)*

Con Edison's peak demand forecast is an annually produced twenty-year forecast of load growth that is presented as a firm peak demand forecast for the service area system and is further broken down into more local forecasts for use in planning the need for Transmission Regulator Stations. Generally, it is the combination of the winter load growth/reduction most recently experienced and the net growth expected to be realized over a twenty year period from known Large New Construction, Small Residential (1-4 family) New Construction, Net Transfers (Interruptible to Firm and Firm to Interruptible), Steam to Gas, DG and Combined Heat and Power ("CHP"), Oil to Gas Conversions ("OTG"), the effects of State and local laws/policies on OTG, Energy Efficiency Programs ("EE") / Naturally Occurring Conservation, Electrification of Heating ("EoH") and Non-Heating ("EoNH") appliances/equipment; all influenced by the economy, projected shifts in consumer behavior, and any event that causes a significant impact to the Firm Gas Peak Demand Forecast (*e.g.*, the COVID-19 Pandemic). These contributing factors are illustrated in Figure 25.

The natural gas peak demand forecasting process involves the following steps: 1) establish the weather adjusted base peak demand from the most recent winter period; 2) quantify incremental demand

growth; 3) add the incremental demand growth discretely to the base peak demand; and 4) generate transmission regulator forecasts. "Growth" could be positive or negative over the 20-year horizon.

### *Design Conditions*

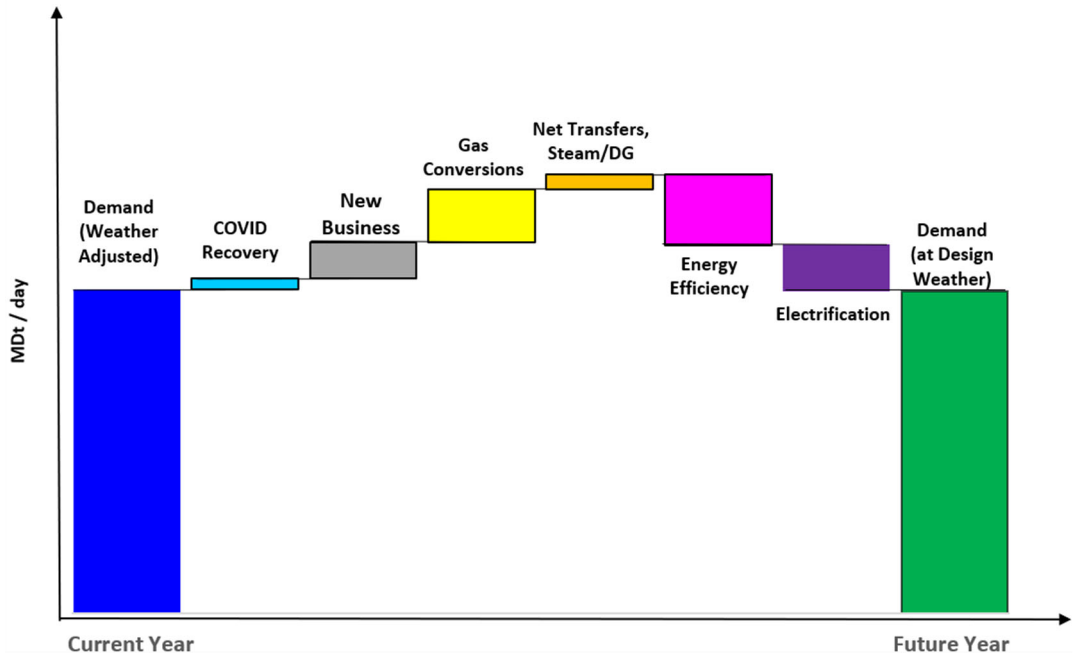
For planning purposes, Con Edison uses a weather reference of 0°F Temperature Variable ("TV") for design conditions. Historically, utilities plan their gas system to provide continuous and uninterrupted service to firm customers under the severe winter weather conditions that can be anticipated throughout a service area. The use of peak day requirements for a specific design TV as a criterion to design gas supply portfolio for firm gas customers is an established practice for both Con Edison and O&R. TV is calculated for the Con Edison gas service area using the National Weather Station ("NWS") readings at Central Park National Weather Station, captured by Con Edison weather vendor (Maxar Technologies). The design conditions assume that all gas supply and delivery facilities are in service. This is required for reliability when facilities are out of service and TVs are above zero.

In terms of weather, Con Edison uses TV as a reference point in the weather adjustment process. The TV is used in calculating and forecasting future system demands, considering extreme winter conditions (sustained low temperatures over two Gas-Day periods). The Gas Day Average ("GDA") temperature is a 24-hour arithmetic average starting at 10 AM using the Central Park weather station dry bulb temperature. The formula for calculating the system TV on a daily basis incorporates two days' worth of GDA's. The current day's GDA is weighted at 70% and the previous day's GDA at 30%. Heating demand is influenced by wind speed, Con Edison uses average wind speed ("WS") over the Gas-Day as a variable. The current Design Criteria for WS is 10 mph.

### *Demand Reduction for Con Edison*

Con Edison's peak demand forecasting methodology considers the potential impact of conservation and energy efficiency. All energy efficiency programs (programmatic and organic) that are expected to reduce the peak demand forecast over twenty years are included in the peak demand estimate. These include programs administered by both Con Edison and NYSERDA. This data is used to calculate a peak load shape factor ("PLSF"), a percentage that models the amount of EE for different customer types on a zero-degree design day. After a review of these various programs and their potential impact, the projections are applied to the peak demand forecast.

Figure 25: Design Day Approach for Con Edison and O&R




EoH accounts for residential and commercial customer heating equipment turnover, and the electrification of space heating. The EoH projections are applied to reduce the peak demand forecast, based on a model/engine. This model uses an EoH forecast lever framework that considers factors including, but not limited to, the economy, the economics behind heat pump technology, laws/regulations, customer disruption, and technical limitations.

Incremental growth projected for the 2020 year that did not materialize due to the COVID-19 pandemic is also projected. An assessment is made using the projections for 2020 and subsequent years to account for the amount of firm peak demand that Con Edison may see in future years from large new construction and conversions that may have been delayed.

The COVID-19 pandemic had an impact on the Firm Gas Peak Demand Forecast. At the onset of the lockdown residential load increased while commercial load decreased. For this reason, this new modifier has been added to account for the recovery from the pandemic, and its impact on the forecast over the next few winters is expected to increase peak demand. Based on recent trends, it is expected that this forecast item may remain up to the next two years. Commercial gas peak demand has slightly decreased due to hybrid work schedules.

### *Westchester Temporary Moratorium*

Due to supply constraints in Westchester County's Zone One, Con Edison announced a temporary moratorium on new firm customer service for this region/zone of our service territory on January 17, 2019, which went into effect on March 15, 2019. Westchester Zone One is all of the County except for a small section on the northern border of Westchester County which is served by a different pipeline than the Zone One region. As of November 16, 2023, a combination of lower peak demand forecast and increased supply resulting from the Tennessee East 300 Project coming online resolves the Westchester supply-demand gap, eliminates the need for any delivered services in later years, including near-term

elimination of the need for compressed natural gas to support the moratorium region's peak demand, and generally supports reliability of gas service throughout our service territory. The Companies have an obligation to serve once sufficient capability to provide reliable gas service becomes available. Additionally, we are subject to anti-discrimination requirements by which we must provide comparable service to all similarly situated customers. Thus, the addition into our system of 115,000 Dt/day, which constitutes sufficient supply to serve customers in the Westchester moratorium region, from the Tennessee East 300 Project and the other factors described above, necessitates lifting the temporary moratorium. Consequently, this moratorium is in the process of being lifted on December 1, 2023.

### *iv. Peak Demand Forecasting (O&R)*

O&R's Gas Peak Demand forecast is an annual twenty-year forecast of load growth. It is the combination of the winter load growth most recently experienced and the growth expected to be realized over a twenty-year period from known projects, the economy, and consumer behavior. Similar to Con Edison, it also includes residential and commercial growth and accounts for Energy Efficiency/ DSM programs, Natural Conservation, and other modifiers such as DG/CHP, Oil to Gas Conversion, EoH and EoNH appliances/equipment, and any additional adjustment as required (*e.g.*, recovery from the COVID-19 pandemic).

#### *Design Conditions*

For planning purposes, O&R uses a weather reference of 0°F TV for design conditions. This process adjusts the most recent actual winter System Firm Peak Demand to the design weather. The primary inputs for the weather adjustment process are the daily service area firm demand and the weather. The hourly weather is obtained through the National Weather Station readings at White Plains or the weather station at Spring Valley.

In terms of weather, O&R uses TV as a reference point in the weather adjustment process. The TV is used in calculating and forecasting future system demands, considering extreme winter conditions (sustained low temperatures over two Gas-Day periods). The GDA temperature is a 24-hour arithmetic average starting at 10 AM using the Spring Valley weather station dry bulb temperature. The formula for calculating the system TV on a daily basis incorporates two days' worth of GDA's. The current day's GDA is weighted at 80% and the previous day's GDA at 20%. O&R uses average WS over the Gas-Day as a variable and the current Design Criteria for WS is 10 mph.

#### *Demand Reduction*

The potential impact of conservation and energy efficiency represents an additional source that must be considered while developing the peak demand forecast. The demand side management forecast includes all energy efficiency programs that are expected to reduce the peak demand forecast over twenty years. These include both those administered by NYSERDA, and those administered by O&R. The DSM forecast includes New Efficiency: New York ("NENY") amounts provided by the Customer Clean Energy Programs department. After a thorough review of the various programs and the potential impact, O&R applies the projection to the Firm Gas Peak Demand Forecast.

The EE natural conservation and CLCPA load modifier is calculated and forecasted by O&R using historical customer counts and their consumption over time. EoH and EoNH accounts for residential and commercial customer heating equipment turnover and the electrification of space heating and non-heating appliances/equipment. This load modifier is calculated and forecasted using an in-house

calculation engine model that uses an EoH and EoNH forecast lever framework which considers factors including, but not limited to, the economy, the economics behind heat pump technology, laws/regulations, customer disruption, technical limitations, and other factors.

The COVID-19 pandemic had an impact on the Firm Gas Peak Demand Forecast. At the onset of the lockdown residential load increased while commercial load decreased. For this reason, this new modifier was added to account for the recovery from the pandemic and its impact on the forecast over the next few winters. Based on recent trends, this forecast item was removed in the 2023 forecast cycle and is reflected in the September filing update.

#### *v. Reliability Standards*

The Companies' demand reliability standards are based on meeting a zero-degree TV peak day. Please refer to the table in Appendix B. The TV is set at 0°F to reflect the fact that there is no reserve margin for the gas system. Unlike electric system design practices, LDC reliability planning standards (including the design basis for Con Edison and O&R Gas Systems) do not generally include a capability to continue serving load after loss of the most significant supply element in the system, include calculations for how frequently any individual customer might experience loss of service ("loss of load expectations"), do not include reserve margins to accommodate any loss of supply due to equipment issues on a peak day, cannot operate safely with diminished system operating pressures, and rely on transportation from distant supply sources not under the Companies' direct control. Restoration of gas customers after a widespread event is significantly more challenging than for electric customers due to the requirement that all customers be 'relit' individually and must show that their house piping is capable of safely holding pressure before gas is provided to the customer again.

In summary, in contrast to the electric system which maintains about a 19% reserve margin to allow for generation or transmission outages on the electric system during the peak hour, 100% of gas supply resources are assumed to be available to meet peak design day customer demand requirements. The loss of a gas interstate pipeline, compressor station, or a gate station could result in a loss of gas supply to firm gas customers.

### b. Demand-Side Programs

#### *i. New York State Clean Heat*[39]

The NYS Clean Heat Program ("NYS CHP"), which launched on April 1, 2020, provides customers, contractors, and other heat pump solution providers with a consistent experience and business environment throughout New York State. The NYS CHP supports a consistent statewide heat pump program designed to achieve the State's ambitious heat pump goals and build the market infrastructure for a low-carbon future. The NYS CHP includes initiatives to advance the adoption of efficient electric heat pump systems for space and water heating applications throughout the State. The NY Electric Utilities provide incentives to support customer adoption of eligible heat pump technologies, including cold climate air source heat pump ("ccASHP") systems, ground source heat pump ("GSHP") systems, variable refrigerant flow ("VRF") systems, larger scale heat pump systems in commercial and multifamily buildings and heat pump water heaters ("HPWHs"), as well as their promotion and pricing by

[39] Case 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative*, NYS Clean Heat 2022 Annual Report Final[39] Case 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative* ("NE:NY Proceeding"), NYS Clean Heat 2022 Annual Report Final.

contractors and other heat pump solution providers. The Implementation Plan[40] and the two Program Manuals[41] provide detail about the Clean Heat Program, including incentive structures and levels, eligible technologies, program rules and processes, and information for participating contractors. The NYS CHP is implemented in coordination with a portfolio of NYSERDA-led market development initiatives, which aim to build market capacity to deliver building electrification solutions. The market development efforts, which are described in Appendix 1 of the Implementation Plan, include support for training and qualification of contractors, processes to assure quality installations, marketing, and education initiatives to help customers understand and select among options and to operate systems optimally, and research and demonstration initiatives.

In 2022, Con Edison experienced significant growth in its program and achieved both the annual savings targets as well as the cumulative six-year NENY target. Con Edison exceeded its annual savings target by 1,271,197 MMBtu and exceeded the cumulative program savings target by 215%. Con Edison also helped catalyze a shift toward residential customers decommissioning their fossil fueled systems. In 2022, ASHP installations with decommissioning of existing fossil fuel heating systems accounted for over 50% of all projects acquired.

Due to accelerated program achievement, Con Edison petitioned the Commission for additional program funding in February 2022. On August 11, 2022, the Commission authorized additional funding for the program and required Con Edison to work with Staff, stakeholders, and market participants to implement necessary changes to relaunch the program. The Con Edison Clean Heat Order[42] included a $10 million per month Continuity Funding Mechanism to sustain the program through the NENY Interim Review.

Despite ongoing complications from the COVID-19 pandemic, O&R increased program participation in its Clean Heat Program while maintaining program budgets in 2021 and 2022. O&R expanded delivery channels, leveraging midstream programs to streamline the customer experience and provide increased safety precautions to customers and trade allies alike by minimizing in-person contact. In 2021 and 2022 O&R exceeded its annual NENY target for the NYS CHP and achieved a cumulative 46,719 MMBtu in energy savings, compared to a target of 23,448 MMBtu, or more than 99 percent above the target. Through 2022, the Company's cumulative spend has been $141/MMBtu, 25 percent below the NENY budget of $188/MMBtu.

### *ii. Gas Energy Efficiency*

Con Edison's energy efficiency programs assist customers in taking greater control over their energy use. Con Edison tailors incentives to meet the needs of the range of customers it serves through specific programs designed for low-and-moderate income customers, 1-4 family homes, multifamily buildings,

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40 NE:NY Proceeding, NYS Clean Heat: Statewide Heat Pump Program Implementation Plan. The Joint Efficiency Providers' work in coordinating development of the NYS Clean Heat Program began in 2029, following the issuance of the Commission's NE:NY Order – NE:NY Proceeding, Order Authorizing Accelerated Energy Efficiency Targets (issued December 13, 2018) ("2018 NE:NY Order").

41 NE:NY Proceeding, NYS Clean Heat: Statewide Clean Heat Pump Program Manual ("Program Manual"), (initially filed on March 16, 2020 and most recently refiled on March 1, 2023); NYS Clean Heat Con Edison Heat Pump Program Manual, (initially filed on January 12, 2023 and most recently refiled March 1, 2023).

42 NE:NY Proceeding, Order Approving Funding for Clean Heat Program (issued August 11, 2022) ("Con Edison Clean Heat Order"), p. 93.

and commercial & industrial building owners and businesses. Since 2020, Con Edison gas energy efficiency programs have achieved more than 26 million MMBtu of energy savings. Going forward, the Company will focus on helping customers undertake comprehensive projects that include measures that reduce heating loss by better sealing a building's envelope.

The Company uses multiple delivery channels to educate customers about available offerings. These include working directly with property owners, engaging with market partners such as contractors and distributors, and partnering with community organizations. A list of names and statuses of all programs is included in the Company's Clean Energy Dashboard Scorecard.

O&R offers a comprehensive suite of gas energy efficiency programs, designed to address the needs of all customer segments. The programs include: Residential Gas HVAC, Residential Gas Behavioral, and C&I Gas HVAC.

The Residential Gas HVAC Program targets energy savings throughout the residential customer base of O&R's service territory. The program provides rebates for ENERGY STAR® space heating and water heating appliance upgrades, weatherization upgrades, and low flow devices. Trade allies are integral to the success of this program and are made aware of program eligibility and rebate levels through newsletters, direct contractor outreach, and webinars. The Residential Gas Behavioral Program was launched in 2019. The primary goal of this initiative is to encourage energy savings through voluntary behavioral changes in residential customers.

O&R's C&I Gas HVAC Program was launched in 2019 and targets energy savings throughout the C&I gas customer base of O&R's service territory. The program provides rebates for ENERGY STAR® space heating and water heating appliance upgrades, low flow devices, and C&I custom gas projects.

Since 2020, O&R gas energy efficiency programs have achieved more than 1.1 million MMBtu of energy savings. Going forward, the Company will focus on comprehensive projects, including insulation and air sealing, helping customers to reduce heating loss and improve building efficiency and comfort.

#### *iii. Non-Pipeline Alternatives (Con Edison)*

Con Edison has begun to implement NPAs as substitutions for traditional gas infrastructure. In December 2021, Con Edison filed a petition seeking Commission approval for proposed regulatory treatment to implement a portfolio of NPA projects. In June 2022, the Commission issued an order (2022 NPA Order) approving Con Edison's proposal for a set of specific NPA projects, including the Electric Advantage NPA program and area load relief projects described below.[43] Detailed information can be found in Con Edison's NPA Implementation Plan, filed on November 17, 2022.[44]

The most recent Gas Rate Plan establishes an interim framework for advancing NPAs pending Commission action on Con Edison's general framework filing in the Gas Planning proceeding (Case 20-G-0131). Having this interim framework in place will avoid delays in exploring NPA opportunities pending resolution of the general framework filing. During the term of the rate plan, Con Edison will work to test

[43] Case 19-G-0066, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Gas Serv., et al.,* ("Gas Rate Proceeding"), Order Approving Non-Pipes Alternatives Projects Amortization Period and Shareholder Incentive Mechanism for Specified Projects (issued June 17, 2022).

[44] Gas Rate Proceeding, Non-Pipeline Alternatives Implementation Plan (filed November 17, 2022).

NPA projects additionally focused on gas service line replacements. Con Edison will convene a stakeholder engagement meeting in Rate Year 1 (2023) to discuss the progress made related to Con Edison's efforts to develop NPAs focused on gas service line replacement.[45]

While the Companies recognize that their distribution systems will become smaller as gas usage decreases over time, how, where and when the systems become smaller is subject to considerable uncertainty due to factors largely outside of the Companies' direct control. These factors include the pace of advances in technology, changes in statutory/regulatory requirements, and customer behavior and adoption rates. It is anticipated that NPAs may help the Companies gather more data regarding these factors. Con Edison will continue to share NPA program details with stakeholders going forward, and O&R will follow Con Edison's lead once the NPA programs in the O&R service territory mature to the point that enrollments can begin. The Companies will continue to evaluate opportunities to conduct detailed distribution-level system modeling to enhance geographic NPA and electrification targeting capabilities. The Companies will provide any available updates in future GSLTP cycles.

#### *Main Replacement Program NPA (Electric Advantage)*

Con Edison's Electric Advantage NPA program is designed to eliminate the need for specific gas main replacements in the Company's Gas Infrastructure Reduction or Replacement Program, which replaces leak-prone sections of gas main. The goal of the NPA program is to retire leak-prone gas mains by focusing on specific radial gas mains with a low number of services. Con Edison's NPA team will engage customers connected to the gas system on these leak-prone mains to offer solutions– including incentives– for conversion of all natural gas end uses to electric. Each individual NPA project will be for a specific radial gas main and will only proceed if all customers on the targeted radial gas main agree to implement the Company's full electrification solution. Con Edison notes that it will require every customer reliant on such a main to agree to fully end gas use prior to the implementation of an NPA.

#### *Area Load Relief Projects*

The second type of NPAs in Con Edison's NPA Implementation Plan are related to identified areas with forecasted capacity constraints where future gas infrastructure may be needed to manage future load. These area load relief NPAs are designed to avoid the construction of this additional gas infrastructure through geographically targeted demand reduction. Each area load relief NPA has a target specific peak day dekatherm reduction that must be achieved by a specific year. Demand reduction strategies utilized in these NPAs will include both energy efficiency and electrification of natural gas end uses. In the 2022 NPA Order, the Commission approved the amortization period and shareholder incentive mechanism for the following proposed area load relief NPA projects: (i) Soundview (Bronx); (ii) Port Chester (Westchester); (iii) Bayside (Queens). Con Edison is currently implementing energy efficiency and electrification solutions to help avoid the traditional projects identified in the Soundview area. More information can be found in the Con Edison's NPA Implementation Plan.

### *iv. Non-Pipeline Alternatives (O&R)*

O&R has begun the process of implementing NPA projects in the second half of 2023. As an initial step toward NPA implementation, O&R has identified an initial set of potential NPA projects. Similar to Con Edison, O&R plans to investigate NPAs as a potential substitute of specific leak-prone pipe replacement projects. Additionally, although O&R is not currently projecting any area load constraints, O&R has

[45] 2022 Con Edison Rate Plans, Order, p. 21, Attachment 1 (Joint Proposal), p. 98.

identified two near-term gas system expansion projects that might also be good candidates for NPAs. Lastly, when feasible, O&R will investigate the possibility of utilizing NPAs for large new gas business projects.

### *v. Con Edison Gas Demand Response Pilot*

Between November 1, 2018 and March 31, 2022, Con Edison operated a two-pronged Gas DR Pilot that tested the feasibility of incentivizing customers to reduce net natural gas demand during the entirety of peak gas demand days (24-hour period from 10:00 am to 10:00 am the following day) on very cold winter days. The Pilot Program consisted of: (i) a Performance-Based Gas DR offering for commercial and industrial ("C&I") customers and multi-family buildings with centralized heating systems; and (ii) a smart thermostat Direct Load Control ("DLC") offering for residential customers. The Pilot's objective was to understand the opportunity for customers to reduce usage over a peak gas demand day.

#### *Performance-Based Gas DR Offering*

Throughout the program term, Con Edison gathered load reduction data to assess participants' ability to provide consistent and predictable load reductions. Evaluations of program performance spanning four years indicated that load reductions achieved by the pilot were not statistically significant. As a result, Con Edison cannot incorporate any peak day benefits of the program into the gas demand forecasting process. Additionally, even in cases where there was evidence of positive load reductions, the reductions were not high enough to create a path to program cost effectiveness.

Con Edison implemented the Gas DR Pilot starting in 2018 and throughout the program's four-year duration, Con Edison did not observe weather temperatures close to the Con Edison's peak day system design criteria. After thorough analysis, Con Edison was unable to provide insight into how customers could perform at temperatures approaching system design criteria. As a result, the Gas DR Pilot was not able to indicate that gas demand response can be relied upon as an operational tool to reduce system-wide peak gas demand.

#### *DLC Gas DR Offering*

Throughout the program term, Con Edison tested different combinations of thermostat reductions and event lengths to observe: (i) how various event parameters would affect the amount of load relief achieved during an event; (ii) the amount of load reduction lost because of snapback after an event; and (iii) the percentage of customers that chose to opt-out of an event.

Events in prior years indicated that increasing the temperature setback resulted in higher average load reductions, including after accounting for opt-outs and snapback. Con Edison also tested various starting times and concluded that the optimal timeframe for implementing Gas DR DLC events to maximize load reduction is around the morning peak in gas consumption. However, while the average net removed load per device increased over the years by utilizing this strategy, the benefits derived from load reduction per enrolled device was small compared to the costs incurred per enrolled device. As a result, under the current framework, the reductions were not high enough to create a path to program cost effectiveness.

#### *Gas DR Pilot Conclusion*

While demand response remains a valuable tool in managing peak electric demands, the results of this pilot demonstrated the challenges inherent in bringing customer-driven peak reduction to the gas system. Given the Pilot's performance and the insights gained from both internal and third-party

evaluation, Con Edison concluded that the Pilot was not a viable option for load relief. The Company therefore ended this Pilot. In the future, Con Edison will continue benchmarking with other utilities and stakeholders to determine if there are other strategies Con Edison could test for a future Gas DR Program.

### c. Supply Planning

The gas supply planning process involves an assessment of whether demand can be met with the existing asset portfolio to maintain the integrity and reliability of natural gas service.

Con Edison and O&R manage a joint gas supply and capacity portfolio that allows for the combined use of both Companies' gas supply and interstate pipeline capacity contracts (including storage) to serve the Companies' gas customers. Hydraulic modeling is done each year to determine which assets are best used to service which citygate. There are a few pipelines that deliver to both Con Edison and O&R. Although assets are not allocated by company, the costs are allocated to Companies based on their peak demand requirements. As with demand forecasting, the Companies evaluate supply and capacity requirements over a ten-year period and integrate and extend this to present a 20-year planning horizon to determine the plan to meet the peak demand needs of firm gas customers.

The Con Edison and O&R Supply Planning organization prioritizes: (i) reliability; (ii) flexibility, feasibility, and diversity; and (iii) economics in its pipeline capacity and storage portfolio procurement practices. Reliability is pursued by securing sufficient pipeline capacity to meet design day demand. Currently this means closely monitoring progress on pending pipeline projects on which the Companies have contracted as shippers and evaluating and renewing existing contracts as their terms expire. The Companies prioritize contracts with city gate delivery and seek to negotiate Rights of First Refusal ("ROFR") in pipeline and reverse asset management agreements ("AMA")[46], if possible. Having a significant portfolio of contracted pipeline capacity helps avoid excessive reliance on delivered services or trucked CNG services.

Historically, the Companies have used AMAs, to optimize the gas supply portfolio, by selling off excess assets during non-peak periods. These AMA contracts generate revenues that are passed back to customers to reduced overall gas costs. The Companies will continue this practice where there are instances that pipelines that are subscribed to year-round are not used during certain specific months or assets that can be released for more than they cost. Figure 26 presents the release amounts that have been returned back to customers over the last 5 years.

Figure 26: AMA Revenues, 2019-2023 (partial year)

| | 2019 | 2020 | 2021 | 2022 | 2023 (9 mo) |
|---|---|---|---|---|---|
| AMA revenues ($) | 22,756,815 | 17,426,685 | 18,128,465 | 35,954,534 | 29,881,884 |

In recent years, the Companies have begun procuring AMA agreements as well, referring to them as "reverse AMAs". Firm capacity entitlements from a reverse AMA are considered comparable to holding

[46] A reverse AMA is essentially the inverse of a traditional AMA, where the Companies release an asset such as excess capacity and receive a fee. Through a reverse AMA, the Companies would receive the use of an asset in exchange for a fee.

pipeline capacity over the period the agreement is in place. This is because in addition to negotiating full access to existing pipeline capacity by paying an AMA fee to the capacity holder, the Companies have insisted upon renewal terms in these agreements, which closely mimic those found in traditional pipeline agreements. Reverse AMAs are preferable to Delivered Services as they do not hold the same renewal risk or subject customers to price volatility during high demand periods.

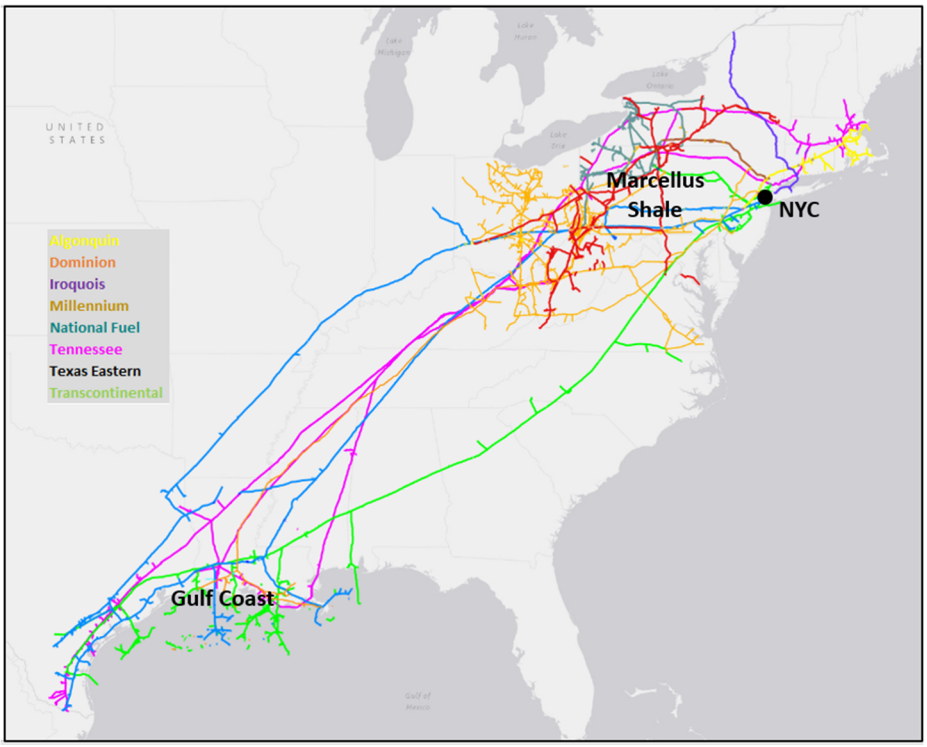
The Companies pursue flexibility, feasibility, and diversity by maintaining a mix of pipeline capacity and storage with access to various producing regions throughout the United States. In addition, the Companies retain contracts with daily and intra-day balancing provisions.

Finally, a focus on economics entails identifying the lowest delivered-cost options for pipeline and storage capacity with high utilization, pursuing pricing structures for delivered services in the near-term that can reduce price volatility, and monitoring the forecasted supply-demand balance to determine whether there are opportunities to de-contract for supply resources.

### *i. Joint Portfolio*

The Companies' joint supply portfolio consists of 77 individual pipeline and storage contracts, which provide 1,794 MDt/day of capacity to the gate stations in the Companies' service territories. Con Edison also has one on-system LNG facility and one on-system trucked CNG facility, which contribute to the supply portfolio and provides a reliability backstop in the case of pipeline or on-system events that reduce supply and/or pressure. The interstate pipelines that bring gas to the downstate region under these contracts are pictured in Figure 27.

Figure 27: Interstate and Intrastate Pipeline Resources Used to Serve Con Edison and O&R Service Territories



### *ii. Pending joint portfolio additions*

In addition, the Companies have three major contracts for pipeline capacity that are in various stages of permitting and construction. More details for each project can be found in Appendix C.

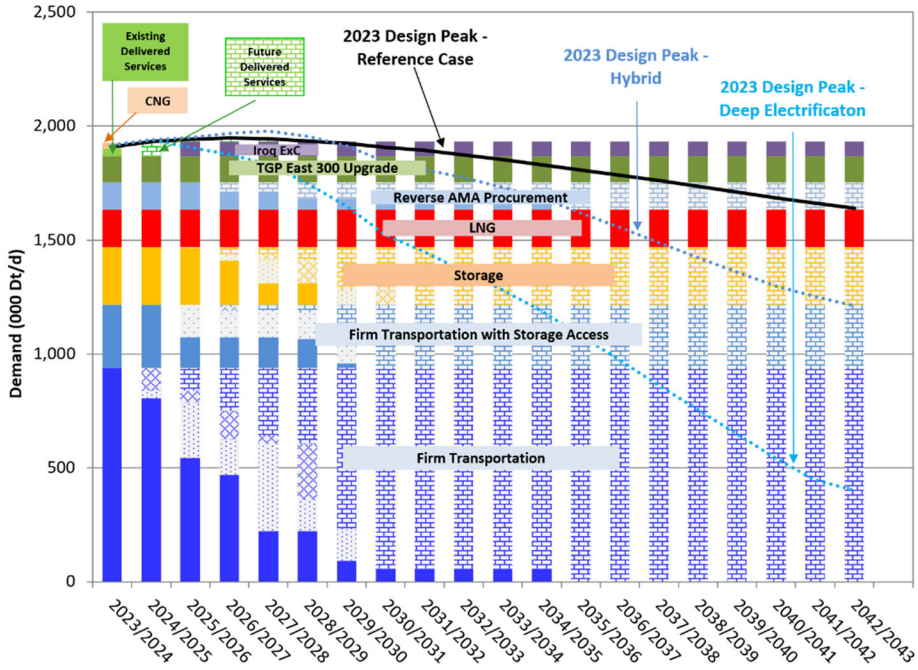
- The **East 300 Upgrade** fully entered service on November 16, 2023, increasing natural gas capacity on the existing TGP pipeline system by 115,000 Dt/day to citygates in Westchester County
- The **Expansion by Compression ("ExC")** project will increase natural gas capacity on the existing Iroquois pipeline by 125,000 Dt/day split equally between Con Edison's Hunts Point citygate in the Bronx and National Grid ("NGRID")'s South Commack citygate in Long Island, resulting in 62,500 Dt/day for Con Edison
- The new **Mountain Valley Pipeline (MVP) (and associated Equitrans expansion)** will provide the Companies 250,000 Dt/day of upstream pipeline transportation from new supply receipts points in Appalachia into existing pipeline capacity on Transco pipeline; this project does not alter the ability of the Companies to deliver incremental gas supplies to its customers

The TGP East 300 Upgrade project is fully in service from November 16, 2023. The Iroquois ExC project is awaiting air permit approvals from both New York and Connecticut state environmental agencies and is currently expected to enter service for the 2025-2026 winter season. Combined, these two projects will provide the Companies with sufficient additional citygate pipeline capacity resources to reliably meet firm customer peak demand needs over the full planning horizon. The TGP project entering service has significantly diminished the reliance on delivered services and when the Iroquois project enters service, it will be decreased even further and is currently forecasted to be eliminated altogether as early as the 2029-2030 winter season.

### *iii. Supply-Demand Outlook*

With the TGP East 300 Upgrade in-service, once the Iroquois ExC project is completed, Con Edison and O&R expect to no longer have any need for new increased future citygate-delivered pipeline infrastructure to meet firm peak demand growth, and as a result the Companies do not expect to execute precedent agreements for incremental pipeline capacity contracts in the future. In fact, the Companies expect peak demand to reach its zenith in approximately 2027, and to begin a steady glide path downward from that point onward. As peak demands begin to fall the Companies will begin to evaluate opportunities to allow the expiration of capacity contracts that are currently needed to meet peak demand. See Figure 28, below.

Figure 28: Con Edison and O&R Forecasted Growth Requires No New Citygate Commitments




As Figure 29 indicates, the successful in-service of TGP East 300 Upgrade project will allow the trucked CNG facility to be retired and combined with the addition of Iroquois ExC project, eliminating the need for delivered services (in bright green) by winter 2028-2029. Of course, pipeline infrastructure construction can be subject to delays and/or permit denials. Figure 29 presents the range of outcomes for the amount of delivered services required in the portfolio over the next 10 years.

Figure 29: Percentage of Delivered Services under Scenarios of Pipeline Completion

| Delivered Services as a Percentage of Peak Demand | Only East 300 In-Service [MDT (%)] | ExC & East 300 In-Service [MDT (%)] |
|---|---|---|
| Winter 2024-2025 | 61 (3%) | 61 (3%) |
| Winter 2025-2026 | 74 (4%) | 12 (1%) |
| Winter 2026-2027 | 78 (4%) | 16 (1%) |
| Winter 2027-2028 | 77 (4%) | 14 (1%) |
| Winter 2028-2029 | 67 (3%) | 5 (0%) |
| Winter 2029-2030 | 57 (3%) | 0 (0%) |
| Winter 2030-2031 | 38 (2%) | 0 (0%) |
| Winter 2031-2032 | 25 (1%) | 0 (0%) |
| Winter 2032-2033 | 6 (0%) | 0 (0%) |
| Winter 2033-2034 | 0 (0%) | 0 (0%) |
| Winter 2034-2035 | 0 (0%) | 0 (0%) |

Segments shaded with a "brick" pattern in Figure 28 represent pipeline capacity contract end dates for which the Companies have a ROFR or other renewal mechanism. The portfolio clearly maintains sufficient flexibility to be reduced as peak demand decreases over time. As decline occurs, the Companies will assess which of these contracts will be permanently eliminated from the supply portfolio and at what time, without compromising the Companies' ability to provide safe and reliable service.

### *iv. Gas Supply Strategy*

In light of this supply picture, the Companies current gas supply strategies remain practical and prudent. In the short-term (*i.e.*, 1-5 years) the Companies will: extend existing pipeline capacity contracts with citygate deliverability; add renewal rights to delivered services contracts when possible; incorporate impacts of changing forecasts and policies into the planning process; continue the use of multi-year peaking contracts as needed; seek opportunities to optimize upstream capacity; and maintain a lower dependence on the amount of delivered services that are required to meet design day demand.

The Companies currently maintain contracts for a portfolio of Delivered Services for up to two or three-year durations based on availability. However, the continued availability of Delivered Services is questionable because shippers who hold this capacity can market it outside of the service territory. There is no regulatory renewal right and no certainty that the Companies can continue to rely on the same Delivered Services contracts. Typically, Delivered Services are priced at the daily city gate index price which is subject to significantly higher price volatility during high demand periods. The Companies have addressed some of this price volatility risk by diversifying the type of Delivered Services procured, including additional base Delivered Services to the portfolio.[47] However, the Companies have remained focused on reducing the reliance on Delivered Services.

The Companies see the additional capacity from the TGP East 300 and ExC projects as part of the on-going strategy to reduce the reliance on Delivered Services in the portfolio, alleviating the uncertainty of future renewals and mitigating the added price volatility of these services. As shown in Figure 29, the introduction of the TGP East 300 and ExC projects into the supply portfolio will almost completely eliminate the need to rely on Delivered Services. While based on current peak demand forecasts, the Companies are not projecting the need for any new service moratoriums, with or without these projects, their completion will reduce any risk that such a need arises in the future. The Companies will continually evaluate the need for new service moratoriums through this on-going planning process.

In the longer-term (*i.e.*, 5-20 years) the Companies will: incorporate impacts of changing forecasts and policies into planning process; continue the strategy of minimizing the length of committed contracts while retaining renewal rights; maintain diversity, future supply security, and flexibility; maximize existing pipeline capacity utilization; and plan for necessary de-contracting upon pipeline project in-service and declines in peak demand.

### *v. De-Contracting Methodology*

As firm peak demand slows and begins to decrease, the Companies will begin reducing the supply portfolio to match the changing needs of customers. The Companies anticipate limitations in adding additional flexibility to firm pipeline transport, storage contracts, and reverse AMAs. Our ability to add

[47] Base Delivered Services are a commitment to procure gas at the city gate for a set winter term (typically December through February or November through March) and are priced at a NYMEX index price plus a fixed basis.

flexibility depends on demand for the particular asset. A large number of the contracts in our portfolio cross multiple states and access multiple markets. These contracts are likely to be the most challenging to change since there are other customers who may be willing to accept existing or longer terms than the Companies are looking for. The reverse AMAs are likely the most difficult to change since these are releases from shippers and not from pipelines themselves. These shippers are subject to their own set of limitations with the pipeline. The availability of peaking may potentially increase, and prices may decrease if the overall demand for gas in the country including exports were to decrease. To the extent possible, the Companies will accomplish this by first reducing and then eliminating the procurement of delivered services. The Companies will then target the least flexible pipeline capacity contracts, with no access or association with storage. This will create a smaller but more flexible portfolio over time, which could be critical if the balancing requirements of the remaining customers increase at times during the transition to clean energy.

In anticipation of the need to de-contract, the Companies have begun the process of ranking contracts, to clearly identify which will be targeted for de-contracting first. These rankings will be completed by pipeline, citygate delivery point and storage field. The Companies' initial review is included in Appendix C. This ranking will be revisited and updated as necessary as part of the on-going gas planning process.

For de-contracting of pipeline contracts, there are number of factors to be considered:

- First, the peak forecast is done for the various regions. Then hydraulic flow models would be run by the Companies' Gas Engineering teams to determine where the decrease in supply need is projected to occur, which will determine which pipelines can be further evaluated for contract reductions.
- Once the pipeline(s) and specific gate stations have been identified, the Companies will identify contracts that are equal or smaller than the target reduction volume, or for which flexibility to reduce capacity has been verified with the pipeline and compare those to current contract rankings.
- Contracts must then be reviewed and compared for any distinguishing characteristics that add to their portfolio value, potential access to storage, no-notice capabilities, access to multiple liquid receipts points, hourly or flexibility afforded by the pipeline, GHG emissions profile, etc.
- If, after review, there are multiple contracts remaining, the highest ranked contract for elimination would be prioritized for termination, considering both expiration dates and notice requirements.
- Before actual termination, the market value of the contract will be assessed to see if that changes the economic value of the contract and warrants a change in its ranking. If warranted the Companies will enter into AMA or permanent capacity transactions to capture any value.

In addition to decreases in peak demand, once system balancing requirements have decreased appropriately, de-contracting of storage assets can commence. The attributes of storage fields can vary from field to field, so a detailed evaluation will be required before prioritizing a field for termination. Similar, to the pipeline contract ranking, the storage ranking will also be re-visited and modified annually, as necessary, through the on-going gas planning process. While all fields will have basic attributes such as total inventory volume, injection and withdrawal quantities, demand and variable/fuel charge, considerable value can be added to the portfolio if a contract affords additional flexibility. (See Figure 30.)

Figure 30: Pipeline Capacity Supply Resources

| Storage Field | Intraday (Inject) | Intraday (Withdraw) | Can do after ID3 | Monthly Inventory Requirement |
|---|---|---|---|---|
| Texas Eastern FSS and SS1 | X | X | X | X |
| KLNG | | X | | |
| Honeoye | X | X | | |
| Nat Fuel FSS | X | X | | |
| Dom GSS | X | X | | |
| Texas Eastern SS1 | X | X | X | X |
| Tenn FSMA | X | X | X | |
| Transco SS2 | | X | X | |
| Transco WSS | X | X | X | |
| Transco ESS | X | X | X | |
| Transco GSS | X | X | X | X |
| Col FSS | X | X | X | X |
| Stagecoach | X | X | | |

### *vi. Update on areas Vulnerable to Supply Constraints*

Many changes to the supply-demand outlook have occurred since the 2020 filing on vulnerable areas. On the Con Edison system, peak demand forecasts have decreased due to the economic impacts of the Covid-19 pandemic and an increased forecasted growth in heating electrification. In addition, the supply outlook has improved to both Con Edison sub-regions previously identified as vulnerable to supply constraints due to limitations on pipeline capacity.

**Con Edison – Central & Southern Westchester County Gas Supply Outlook:** Firm peak demand from current customers in this region is supplied with the combination of existing Tennessee pipeline contracts, a reverse AMA contract, deliveries by NGRID as per the NYF agreement, procurement of all available pipeline capacity in the form of delivered services and deliveries through the Con Edison distribution system north from the Bronx and the Yonkers trucked CNG facility, which is capable of delivering 25,000 Dt per day.

As described in the July 2020 filing, the TGP East 300 Upgrade pipeline project is critical to resolving the supply constraint affecting this region. This project, which is designed to bring an additional 115,000 Dt per day of pipeline capacity to the existing White Plains, Knollwood, and Rye areas, went into partial service on November 1, 2023, and fully in service on November 16, 2023. Since it's in-service, the supply constraints and associated vulnerabilities in this region will be mitigated and the supply portfolio will have the firm capacity necessary to provide service to new customers or increased firm service to existing customers, consistent with regulatory requirements. In addition, the Yonkers trucked CNG station will no longer be required to maintain reliability and can be removed starting in Spring 2024.

The Companies are following the procedures filed as required in the Gas Planning Proceeding for Moratorium Management to lift the current moratorium on new gas connections currently in place in

most of Westchester County.[48] Customers in the current moratorium region will regain the same access to natural gas service as customers throughout the rest of the Con Edison and O&R service territories effective December 1, 2023.

**Con Edison - The Bronx, mid-upper Manhattan & Queens Gas Supply Outlook:** Firm peak demand in this region is currently met with the combination of existing Transco, Texas Eastern and Iroquois pipeline contracts, reverse AMA contracts, deliveries by NGRID as per the NYF agreement, procurement of additional pipeline capacity in the form of delivered services and the on-system LNG facility.

As described earlier, the completion of the on-system Queens Transmission Project combined with procurement of existing pipeline capacity available at the Texas Eastern – LM citygate has increased the supply portfolio serving this region, decreasing the reliance on delivered services.

Further reduction of delivered services reliance will occur since the Tennessee East 300 project is now in service. The flow of supplies north from the Bronx to Westchester will no longer be required. In fact, flow will be reversed such that supply will flow south from Westchester to the Bronx.

Finally, as described in the July 2020 filing, the Iroquois ExC project will further decrease the reliance on delivered services in this region. This project is designed to bring an additional 125,000 Dt per day of pipeline capacity, split evenly between Con Edison and NGRID, to the existing Hunts Point citygate in the Bronx and South Commack citygate in Long Island. This project has not yet received all required approval from either the New York or Connecticut state environmental agencies and as such the Companies do not expect it to enter service prior to November 2025. If the Iroquois ExC project enters service, it is possible that the supply constraints in this region will be resolved for a minimum of five years, and it will therefore no longer be vulnerable to supply constraints as defined by this proceeding. However, this region's supply-demand outlook is impacted by Con Edison firm peak demand and by that of the two NGRID downstate distribution companies. As such, the NYF member companies will continually monitor the collective supply-demand balance as part of the agreement's long term planning requirements.

On the O&R system, two areas of concern were discussed in the 2020 filing: Kiryas Joel and Sloatsburg. In Kiryas Joel, the concern in 2020 was related to constrained gas distribution system capacity, which has been largely resolved already. A district regulator station was revamped in 2022 to increase its capacity and reliability, and a sizable portion of the upgraded gas distribution main installation has been completed. In addition, alternative technologies have been explored, such as electric heat pumps and battery storage for the Kiryas Joel area. Due to continued load growth in Kiryas Joel area, O&R will continue to monitor the gas distribution system to ensure adequate capacity and reliability. In the Sloatsburg area, the concern was related to O&R's ability to provide firm gas service to two potential large customers. These new customer loads have not materialized yet, and O&R will continue to monitor the situation. At the moment, O&R does not have any gas supply constraints.

### *Consideration of Interruptible Customers*

[48] Case 20-G-0131, *Proceeding on Motion of the Commission in Regard to Gas Planning Procedures*, Con Edison Public Communication Plan – Natural Gas Moratorium (filed December 27, 2022).

Con Edison and O&R both offer interruptible service classes. These customers receive a reduced transportation rate in exchange for switching to an alternate fuel on the highest demand days of the winter. Thus, interruptible customer usage is not planned for the supply portfolio used to meet peak day demand. Transfers between interruptible and firm service do occur and expectations for increases in firm peak demand are included in the forecasting process. The Companies closely monitor the rate of transfers for any changes to the historical trend and for any legislative, regulatory or code changes which could accelerate transfers. A sudden influx of transfers from interruptible to firm could cause unplanned increases in reliance on delivered services. Con Edison currently has 546 interruptible customers with a combined estimated peak demand of approximately 185 MDt/day while O&R has 69 interruptible customers with a combined estimated peak demand of approximately 20 MDt/day.

## d. Additional Planning Methodologies

### *i. GHG Accounting*

Con Edison and O&R have followed the approach to GHG accounting that is described in the Joint Utilities' December 1, 2022, Proposal for an Annual Greenhouse Gas Emissions Inventory Report.[49] The GHG Inventory Proposal presents 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 Con Edison and O&R customers to provide a comprehensive understanding of the emissions associated with supply and demand.

For additional information pertaining to the GHG inventory methodology used to quantify emissions impact figures that are presented throughout this GSLTP, please refer to the GHG Inventory Proposal. Economy-wide emissions calculations were performed using emissions factors consistent with those used in the NYS GHG Inventory (including upstream out-of-state emissions and downstream in-state emissions).

### *ii. Comparison of Alternatives*

The Companies believe that gas alternatives (*e.g.*, NPAs) can be valuable tools in its planning process and the Companies will continue to focus on and evaluate NPAs. As such, Con Edison filed a framework for evaluating and implementing NPAs, along with a BCA handbook, in 2020. The framework uses a multi-step process to identify, evaluate, and implement NPA projects in lieu of gas infrastructure projects. The method includes assessing system needs, determining project suitability, conducting feasibility analysis, developing procurement strategies and market solicitations, and designing portfolios. O&R has developed a similar process for projects in its service territory.

The gas system projects from the traditional planning process are evaluated against certain screening and suitability criteria to identify potential candidates for NPAs. The screening and suitability criteria balance available resources against the risk of not addressing system needs within the capital plan timeframe.

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[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").

Projects that meet established NPA suitability criteria will be evaluated for potential NPAs,[50] including a review of overall feasibility, and a BCA. A customer segment analysis is performed to understand the best measures available. If the portfolio is deemed feasible, a Request for Proposals may be issued to develop a more granular understanding of total costs and benefits. If the proposed projects have benefit-to-cost ratios above the required threshold and present an appropriate level of execution risk, Con Edison, and O&R NPA teams will consult with DPS staff and then proceed to implementation.

Con Edison will continue to evaluate NPAs as substitutions for traditional gas infrastructure and implement them when cost effective and feasible. O&R has applied the screening and suitability criteria to their current capital budget, which gives an indication on the percentage of the budget that could be included in NPA evaluation.

The Companies plan to employ various procurement approaches for NPA, including leveraging existing contracts, competitive procurement, and strategic timing to meet NPA portfolio needs. Both Con Edison and O&R plan to provide necessary information on targeted areas through solicitations and on each company's NPA webpage.

For more information on Con Edison's and O&R's NPA evaluation methodologies, please refer to the Gas Planning Proceeding.[51]

### *iii. Low-Carbon Fuels*

Con Edison and O&R see a role for LCFs to decarbonize gas consumption for difficult-to-electrify customers and to achieve NYS and NYC clean energy goals by 2050 regardless of the pathway. We are founding sponsors of the Low Carbon Resource Initiative[52] which seeks to develop and commercialize technologies that will allow greater use of innovative LCFs. Our pathways consider the procurement of certified natural gas to reduce emissions in the near-term, the introduction of LCFs into our gas distribution system in 2030, and a gradual phase-in of LCFs to fully phase out fossil natural gas in our system by 2050. Through our collaboration, research, and analysis, we have identified three LCFs to potentially utilize in our pathways: RNG, clean hydrogen, and synthetic natural gas.

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[50] Con Edison and O&R, along with other natural gas LDCs, filed proposed NPA screening and suitability criteria in August 2022. Projects excluded from NPA consideration involve immediate system needs relating to safety, reliability, service obligations, and non-distribution projects where NPAs are not applicable. Additionally, projects with an insufficient lead-time for developing pricing estimates and implementing non-traditional customer-sited solutions are excluded. Gas distribution system reinforcement projects associated with system load growth have been identified as suitable for NPA consideration.

Commission action on these proposals has not yet occurred but is expected in 2023. As a result, the NPA evaluation procedure described here represents a proposed approach. *See:* Gas Planning Proceeding, *Con Edison's Proposals for Non-Pipe Alternative Screening and Suitability Criteria* (August 10, 2022); and Gas Planning Proceeding, *Orange & Rockland's Proposals for Non-Pipe Alternative Screening and Suitability Criteria* (August 10, 2022).

[51] *See also* Con Edison 2019 Rate Case Proceeding, Proposal for Use of a Framework to Pursue Non-Pipeline Alternatives to Defer or Eliminate Capital Investment in Certain Traditional Natural Gas Distribution Infrastructure (September 15, 2020) (Con Edison Gas BCA Framework). O&R plans to file a Gas BCA Handbook in its next rate proceeding. O&R expects to hew closely to the Con Edison Gas BCA Handbook provided there is action by the Commission on it prior to O&R's rate filing.

[52] https://lcri-vision.epri.com/

### *Renewable Natural Gas*

RNG is a pipeline-compatible gaseous fuel derived primarily from anaerobic digestion and thermal gasification. Anaerobic digestion is the process in which bacteria break down organic matter from animal manure, food waste, landfill gas, and water resource recovery facilities to produce biogas. Thermal gasification is the breakdown of biomass material from agricultural residue, energy crops, forestry residue, and municipal solid waste into component gases and ash in an enclosed reactor. Though RNG is already being produced at considerable quantities in the United States today and is expected to scale up, our adoption of RNG would be supply-limited based on our share of gas consumption and the amount of RNG produced in the Eastern U.S. We assume that Con Edison and O&R use their representative share of RNG produced by anaerobic digestion from the Mid-Atlantic and the rest of the Eastern U.S., in addition to the full amount produced by anaerobic digestion in our service territories, which is 40 TBTU total in an "achievable deployment" scenario where only 33% of total RNG feedstock is captured (ICF RNG Technical Potential Study).[53] Due to the uncertainty around thermal gasification, we would only count on the thermal gasification located in our service territories, which is projected to be 7 TBTU total in the same achievable deployment scenario (ICF RNG Technical Potential Study). As a result, the estimated maximum amount of RNG that we will be able to source is 48 TBTU of RNG per year, representing approximately 20% of current annual volumetric usage.

RNG potential in our service territories can be found in Appendix C. New York City is interested in selling RNG from wastewater treatment plants. It issued an RFEI in May 2023. Con Edison may potentially buy any RNG available for the steam system, subject to DPS Staff review, and would connect it using our standard interconnection process. The Company's most recent rate plan that was approved by the Commission's Order[54] directs the Company to submit detailed reporting prior to the construction of any interconnection project to receive RNG. The hope and expectation is that the data collected and reported can better inform future discussions of RNG.[55]

### *Hydrogen*

Hydrogen has the potential to significantly reduce GHG emissions from gas consumption because hydrogen fuel does not include methane. Our plans explore utilizing fully clean hydrogen produced via electrolysis powered by renewable energy (green hydrogen), and potentially nuclear energy (pink hydrogen), as necessary. We assume that the maximum potential amount of hydrogen that can be blended into natural gas infrastructure before significant utility and customer upgrades are required is ~20% by volume (7% by energy).

### *Synthetic Natural Gas*

Synthetic natural gas ("SNG") combines hydrogen with captured $CO_2$ to create methane via a process known as methanation. Because SNG is produced using captured $CO_2$, our analysis assumes there are net-zero emissions associated with SNG production, delivery, and combustion.

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53 NYSERDA and ICF, Potential of Natural Gas in New York State (April 2022).

54 2022 Con Edison Rate Plans, Order, pp.124-129.

55 2022 Con Edison Rate Plans, Order, pp.124-129, Attachment 1 (Joint Proposal), p. 96.

The Company also sees a role for certified natural gas to lower emissions in the near-term. As part of O&R's latest rate case, O&R received approval for a Certified Natural Gas pilot for up to $100,000 annual cost above traditional supplies.

Similarly, Con Edison's most recent rate plan Order also approved a certified natural gas pilot program designed to allow for the procurement of certified natural gas during the rate period.[56] Purchases will be limited to an annual cost above traditional supplies of $800,000 per year. During the terms of the current rate plans, Con Edison has agreed to provide a GHG emissions scorecard as part of its earnings adjustment mechanism ("EAM") reporting requirements, providing NYC's most current GHG inventory and any other data available for the County of Westchester.[57] These actions will provide the Companies, stakeholders and the Commission with further data with which to assess the long-term costs and benefits and the overall viability of Certified Natural Gas as part of its long-term planning. Con Edison will file an annual report with specified minimum details describing the progress of the pilot program. Additionally, Con Edison has agreed to limit potential purchases to suppliers that have achieved certain recognized ratings and Con Edison will include a supplier survey with any RFP issued.

The Companies have observed notable positive progress with respect to the potential impact of Certified Natural Gas on emissions. More suppliers are embracing the concept of certifying their natural gas supplies, which is resulting in an increasing number of wellfields being differentiated by reputable certifiers. The monitoring technology for production sites is improving quickly, with advances in satellite and ground-based technologies well documented. The Inflation Reduction Act ("IRA") requires EPA to develop penalty standards based on "empirical data" and the EPA is in the process of updating its greenhouse gas reporting rules to incorporate this requirement. These developments will further solidify estimates of the potential emissions reductions of Certified Natural Gas.

The Companies expect to execute the first Certified Natural Gas transactions in the fourth quarter of 2023.

### *iv. Utility Thermal Energy Networks (UTEN)*

As directed by the Commission, Con Edison and O&R have each submitted proposed UTEN projects.[58] As part of the filings, the Companies provide details on pilot project selection, project descriptions, implementation time and cost controls, budgets, rate design, and labor and workforce development. The most comprehensive of the files has been the May 2023 Supplemental Informational Filing.[59] A supplemental filing was also done in August 2023 to update our proposed Chelsea project and the overall portfolio budget.[60]

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[56] 2022 Con Edison Rate Plan, Order, p.134, Attachment 1 (Joint Proposal), pp. 93-95.

[57] 2022 Con Edison Rate Plan, Order, p. 89.

[58] Case 22-M-0429, *Proceeding to Implement the Utility Thermal Energy Network and Jobs Act* (Thermal Energy Network Proceeding), Order on Developing Thermal Energy Networks Pursuant to the Utility Thermal Energy Network and Jobs Act (issued September 15, 2022). ("Thermal Energy Network Order")

[59] UTEN Proceeding, Supplemental Information for Consolidated Edison Company of New York, Inc.'s Utility Thermal Energy Network Pilot Project Proposals (filed May 19, 2023) (Supplemental Information Filing).

[60] UTEN Proceeding, Updated Supplemental Information for Consolidated Edison Company of New York, Inc.'s Utility Thermal Energy Network Pilot Project Proposals (filed August 16, 2023) (Updated Supplemental Information Filing).

The applicable scope and scale by which UTEN can be deployed economically (when compared to ground-source and air-source heat pumps) is uncertain at this time. The Companies are in the process of evaluating the pilot in order to better understand the cost, suitability to their service areas, and implementation requirements of this technology, and are further open to implementing viable applications of UTEN as an alternative to traditional gas infrastructure. In addition, we have also included an assumption of using ground-source heat pumps for 20% of electrified floor space in Westchester for both Hybrid and Deep Electrification Pathways. To clarify further, we have assumed UTEN to be included in the ground source heat pump 20% floor space assumption.

### *v. Assessment of Costs*

Con Edison and O&R have conducted a detailed assessment of cost impacts for the three decarbonization pathways that are presented in this GSLTP.

The Companies completed the long-term cost analysis using a modified (*i.e.*, aggregated, or simplified) Revenue Requirements framework, which reflects capital investments and an associated return on investment, regulatory assets, prudent and reasonable operating expenses, depreciation, and amortization (*i.e.*, of plant and equipment), and taxes. Commodity costs, which are a pass-through on customer bills today, are considered in the estimation of total cost impacts as well. Forecasted LCF costs affect all three pathways but are most acute for the Hybrid and Deep Electrification Pathways. Gas system and fuel supply costs are shown for each pathway as proxy for revenue requirements.

The cost implications discussed for each decarbonization pathway represent gas system costs only. Electric system costs and customer-side conversion costs are not contemplated in the analyses the Companies have undertaken to date. In the future, a larger percentage of total energy costs for customers will come from electricity as customers electrify end-use consumption. Substantial investments in new electric transmission and delivery infrastructure will be required to enable electrification and meet growth in peak electric demand. However, some offsets are expected from elimination of gasoline costs for vehicle transport and heating fuel costs for buildings.

#### *Cost Impacts: Modeling Inputs*

The Companies' cost impact modeling inputs include existing rate base, new investment (*i.e.*, capital investment and regulatory assets), operations and maintenance ("O&M") expenses, depreciation and amortization, and taxes.

#### *Capital Expenditures, Regulatory Assets*

Capital investments projected over the 2023-2042 period reflect conventional cost categories. The largest capital cost component for both Con Edison and O&R is the ongoing Mains Replacement Program ("MRP"), which will end in approximately 2030 for O&R, and which will run through approximately 2040 for Con Edison. The discussion of each decarbonization pathway in Chapter V describes assumptions that affect capital expenditure projections for that pathway.

The Companies are federally regulated by the Pipeline and Hazardous Materials and Safety Administration ("PHMSA") under the Department of Transportation and must follow certain regulations when determining when to replace transmission pipeline segments. Under PHMSA regulations there are maximum allowable operating pressure ("MAOP") confirmation requirements. PHMSA rules provide six (6) methods that can be utilized for MAOP reconfirmation. Of the six methods, there is only one

method that is viable for the Companies. The list below describes each method and why each method may or may not be viable for the Company.

- **Method 1 - Pressure test:** The pressure test method allowed by PHMSA requires the verification of material property records. This method requires the section of main to be removed from service and regulator stations isolated so that a hydrostatic pressure test can be performed. If successful, the section then needs to be dewatered and reconnected to the system. All water removed from the gas main must be treated as hazardous waste contaminated with benzene. If the pressure test is unsuccessful, extensive investigation would need to be conducted to identify the source of the anomaly. Any liquid that is leaked into the environment will be required to be remediated.
  **Reason for rejecting this Method:** This entire process is time consuming and can only be conducted during warmer temperatures which would prevent the series of projects to be completed in the required timeframe. If the anomaly cannot be identified and/or repaired, the section of main would need to be replaced.
- **Method 2 – Pressure Reduction:** This method requires derating the pipeline so that the new MAOP is less than the historical actual sustained operating pressure by using a pressure test safety factor of 0.67 times the sustained operating pressure.
  **Reason for rejecting this method:** This method is not feasible due to the fact that the decreased MAOP would be insufficient to maintain adequate gas pressure to safely supply natural gas to the firm gas customer. In addition, Con Edison's 350 psig transmission system supplies National Grid's 350 psig transmission system.
- **Method 3 – Engineering Critical Assessment:** This method requires the use of a smart pig and an engineering critical assessment to establish a safety margin equivalent to that provided by a pressure test. It is an analytical process utilizing fracture mechanics principles to determine if a pipeline is structurally sound enough to meet the service requirements for a specific period of time.
  **Reason for rejecting this method:** Con Edison's transmission mains are not piggable and would need to be retrofitted to be able to accommodate a smart pig. In addition, the level of specific data and conservative assumptions required to perform a rigorous engineering assessment that assesses the criticality of the anomaly and adjusts the projected growth rates based on site specific parameters cannot be obtained.
- **Method 4 – Pipe Replacement:** Replacement of the transmission main which would require a new hydrostatic pressure test and all pertinent material and testing records.
  **This is the only method that is viable for the Companies.**
- **Method 5** – Pressure reduction for pipeline segments with small potential impact radii.
  **Reason for rejecting this method:** Con Edison's gas transmission system does not have a potential impact radius of less than 150 feet and therefore this method cannot be used.
- **Method 6 – Alternative Technology:** At this time, an alternative technology that provides an equivalent or greater level of safety has not been identified.

For method 2, the degree to which the pipeline segments would have to be derated to satisfy PHMSA requirements[61] would result in the hydraulic model solving for system pressures below design which would lead to firm customer outages in areas of the Bronx, Manhattan, Queens, and Westchester. Additionally, the ability to supply gas to National Grid at the interconnecting pipelines would be reduced and or eliminated. At these lower MAOPs, the design day demand reductions required to maintain design pressures would vary by area but is approximately 40%-55%. These significant demand reductions are currently not forecasted in any of the pathways to be achieved by the deadlines of the PHMSA's MAOP reconfirmation requirements.

The two main components of gas regulatory assets that affect cost impact models are EE programs and NPAs. Regulatory asset balances decline over time as funding for building envelope improvements shifts to the electric rate base in 2024 (consistent with the NENY interim review) and gas energy efficiency programs sunset by 2035.

### *O&M Expenses*

The Reference Pathway O&M budget represents expected spending that will be required to support the Con Edison and O&R gas systems under existing law and regulatory policies. The Companies developed a directionally representative view of changes to O&M to reflect the end-state infrastructure required to support the strategic downsizing of the gas system for the Hybrid Pathway and the Deep Electrification Pathway.

Each O&M cost category was evaluated to determine the rationale for expected directional changes and estimated impacts. Most O&M program changes reflect the strategic downsizing and a smaller system footprint. Cost reductions are projected using a linear decline in pipe mileage or customer accounts for each pathway.

Some O&M cost projections are a function of factors such as the number of leak repairs completed or decreases in MRP and service replacement.

### *Taxes, Depreciation*

Con Edison and O&R assume that tax policy remains static through 2042. Depreciation practices in use today apply in the evaluation of all three pathways. The Deep Electrification Pathway includes an analysis of system-wide costs with an alternative depreciation approach.

### *Fuel Mix Costs*

There is significant uncertainty around future costs for production and implementation of LCFs at scale. The assumptions used for this GSLTP are summarized in Figure 31. These assumptions are based on data available today, but Con Edison and O&R acknowledge that these values may change over time. These costs do not include any on-system infrastructure costs that may be required. The Companies will continue to refine the analyses described in this GSLTP as more data becomes available and the markets for these solutions mature.

Certified gas is natural gas that has been deemed to be produced according to criteria determined by an independent third party, with a focus on minimizing leaks of methane throughout the production

[61] Per CFR 49 PART § 192.624 maximum allowable operating pressure reconfirmation: Onshore steel transmission pipelines.

process. The three most prominent certifying agencies in North America today are Equitable Origin, MiQ, and Project Canary.[62]

Figure 31: Projected Fuel Costs (20-year average price in 2023 dollars)

| Fuel | Average Price ($/Dt) | Assumption/Rationale |
|---|---|---|
| Fossil Natural Gas (with transport and storage costs) | $5.64 | Includes cost of gas with transport and storage |
| Certified Gas | $5.74 | Assumed $0.10/Dt premium on top of fossil natural gas |
| RNG | $19.28 | Weighted average costs by feedstock, per NYSERDA's "Potential of Renewable Natural Gas in New York State" report (April 2022). RNG potential in our service territory can be found in Appendix C. The estimated utility interconnection costs of $1.5 million per anaerobic digestion facility and $2 million per thermal gasification facility are included in this levelized cost. |
| Clean Hydrogen | $9.31 | Reflects NYERSDA's production cost estimate from the Integration Analysis and the DOE Hydrogen Shot goal of 80% decline in production cost. At this time, the Companies do not plan to increase hydrogen levels after the 20-year span of the GSLTP. |
| Synthetic Natural Gas | $23.13 | Price is projected using the peer-reviewed methodology;[63] assumes continuous operation with 0 standby hours (full load hours set to 8,760). Hydrogen shot goal applied to hydrogen production portion. |

### *Cost Impacts: Output Metrics*

The Companies' financial analysis of the Pathways described in Chapter V focus on projected rate base and Gas System and Fuel Supply Costs expressed on a $/customer basis. In addition, the Companies provide an assessment of the system rate that is projected to apply under certain conditions. Other modeling results that may be pathway-specific appear throughout Chapter V.

### *Other Significant Provisions from Con Edison Most Recent Gas Rate Plan*

Many of the provisions related to the most recent Gas Rate Plan approved in July 2023 have been discussed throughout this chapter. Several other provisions that were not previously addressed in the LTP but were provisions agreed to in the rate plan and affect the LTP include the following:

- Tariff Changes. Con Edison eliminated the "concurrent connections" language from its Gas Tariff that previously allowed multiple customers seeking to connect to the Company's gas distribution system to pool their installations and avoid connection costs. Con Edison also modified its procedures to add a requirement that no customer will receive a service

[62] Natural Gas Intelligence (https://www.naturalgasintel.com/what-is-certified-gas/)

[63] Gore, Ortloff, and van Leeuwen. Production Costs for Synthetic Methane in 2030 and 2050 of an Optimized Power-to-Gas Plant with Intermediate Hydrogen Storage. Applied Energy, Volume 253, November 2019.

determination for natural gas service of any size or for any purpose without first acknowledging in writing that they have been provided information on non-fossil alternatives and that they are aware of climate protection laws and regulations. Additionally, in the absence of enacted legislation or further Commission action in the Gas Planning proceeding (Case 20-G-0131), Con Edison may file a petition requesting a waiver of the Commission's regulations to eliminate the "100-ft. rule" and "revenue test" customer gas connection incentives.[64]

- Con Edison agreed to cease marketing efforts aimed at encouraging customers to sign up for natural gas service.[65]
- The rate plan includes earnings adjustment mechanisms that incentivize more building electrification. [66]
- Finally, the Company's gas rate design reflects a phase-out of declining block rates in SC 2 and SC 3, which will incentivize gas conservation.[67]

### e. Affordability

The Companies are committed to mitigating the cost impacts of gas system transformation, especially on low- and moderate-income customers. As discussed above, Con Edison and O&R are active participants in the Energy Affordability Policy Proceeding, a statewide proceeding examining ways to enhance the structure of the Energy Affordability Program to provide greater relief to a larger set of customers. The Companies will seek to continue using the Energy Affordability Policy Proceeding as a framework to provide greater assistance to the customers that most need it. For this GSLTP, the Companies have performed several analyses to consider the affordability of each of the Pathways. The Companies will continue to work with DPS Staff and all Stakeholders to address the affordability challenges faced by customers.

#### *i. Bill Impacts*

The Figures below present projected bill impacts for select service classifications ("SC") using the representative costs and customer usage profiles for each of the pathways presented in this GSLTP. The Companies used projected 2023 revenues[68] as the baseline for estimating long-term changes in revenues and rates in 2043 and 2050 resulting from the representative gas service costs and customer determinants in each of the Pathways. The estimated gas service costs include base revenue requirements and gas supply costs reflecting the level of LCFs / certified natural gas in each pathway.[69]

The rates and bill impacts developed for this analysis are for illustration only and rely on a relatively limited set of planning assumptions specific to the GSLTP that are likely to differ from those presented in future rate proceedings. Further details of the bill impact analysis can be found in Appendix F of this

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64 2022 Con Edison Rate Plans, Order, p. 99, Attachment 1 (Joint Proposal), p. 96.

65 2022 Con Edison Rate Plans, Order, p.99, Attachment 1 (Joint Proposal), p. 96.

66 2022 Con Edison Rate Plans, Order, p.147, Attachment 1 (Joint Proposal), p. 36.

67 2022 Con Edison Rate Plans, Order, p.121, Attachment 1 (Joint Proposal), p. 71.

68 At current rates, Bill impacts include taxes (CECONY, O&R) and other surcharges as currently applicable (O&R).

69 This analysis does not attempt to project future rate changes pertaining to surcharges, base revenue requirements that are not GSLTP-related, or other factors such as accelerated depreciation. Please refer to Appendix F for more detail on how the bill impacts were developed.

GSLTP. Any future rates would continue to be informed by the prevailing costs/billing determinants and an iterative review of a cost-of-service study and bill impacts for all customer classes.

Figure 32: Representative Average Annual Gas Bills at Pathway Rates ($2023)

| CECONY | | | | |
|---|---|---|---|---|
| **SC-1 - Residential/Religious Firm Sales Service** | **2023** | **2043** | **2050** | Avg Use/Mo. |
| Reference | $562 | $1,170 | $1,219 | 5 Therms |
| Hybrid | $562 | $1,396 | $1,578 | |
| Deep Electrification | $562 | $3,384 | $6,254 | |
| **SC-2 Rate I - General Firm Sales Service** | **2023** | **2043** | **2050** | |
| Reference | $4,867 | $8,902 | $9,563 | 300 Therms |
| Hybrid | $4,867 | $12,197 | $16,881 | |
| Deep Electrification | $4,867 | $21,873 | $82,165 | |
| **SC-2 Rate II - General Firm Sales Service** | **2023** | **2043** | **2050** | |
| Reference | $7,789 | $14,683 | $15,715 | 400 Therms |
| Hybrid | $7,789 | $19,572 | $26,227 | |
| Deep Electrification | $7,789 | $37,577 | $143,269 | |
| **SC-3 - Residential/Religious – Heating** | **2023** | **2043** | **2050** | |
| Reference | $2,568 | $4,972 | $5,328 | 100 Therms |
| Hybrid | $2,568 | $6,338 | $8,175 | |
| Deep Electrification | $2,568 | $12,525 | $47,102 | |

| O&R | | | | |
|---|---|---|---|---|
| **SC-1 - Residential and Space Heating** | **2023** | **2043** | **2050** | Avg Use/Mo. |
| Reference | $1,843 | $3,008 | $3,606 | 100 ccf |
| Hybrid | $1,843 | $5,090 | $9,241 | |
| Deep Electrification | $1,843 | $3,877 | $9,239 | |
| **SC-2 - General Service (Small)** | **2023** | **2043** | **2050** | |
| Reference | $4,197 | $6,533 | $7,751 | 300 ccf |
| Hybrid | $4,218 | $8,736 | $13,986 | |
| Deep Electrification | $4,218 | $14,066 | $69,008 | |
| **SC-2 - General Service (Large)** | **2023** | **2043** | **2050** | |
| Reference | $38,561 | $60,982 | $72,859 | 3,000 ccf |
| Hybrid | $38,770 | $83,050 | $135,328 | |
| Deep Electrification | $38,770 | $136,891 | $690,593 | |

The usage levels in the tables above illustrate the potential bill impact on "typical" households or businesses currently taking service under each of the stated service classes. Actual customer usage in any service class is highly situationally dependent and will vary by an individual customers' annual usage and seasonal variation. On average, the bill impacts reflect increasing customer costs across each of the Pathways as customer usage on the system declines. The Companies acknowledge that the long-term impacts shown will likely be unsustainable for many, if not most of our customers. This validates the need for the Companies to take early action to collaborate on addressing customer affordability alongside decarbonization efforts.

The trajectory of potential bill impacts over time conveys the urgent need to avoid disproportionally burdening customers that will remain in later periods by taking action now and seeking creative solutions that recover system costs during the period of high utilization and over a large customer base (*e.g.*, through the use of accelerated depreciation and other changes to capital recovery policies, innovative cost reduction programs, tapping alternative sources of funding, etc.). As is discussed in

Chapter V, changes to capital recovery policies are one opportunity to attenuate the cost impacts shown in these bill impacts.

### *ii. Benefit Cost Analysis*

In the BCA Framework Order, the Commission designated the Societal Cost Test ("SCT") as the primary measure of cost effectiveness.[70] The Companies have used the SCT and industry best practices to develop the BCA analysis in the absence of gas-specific BCA guidance. The Companies performed the SCT for each of the representative pathways by comparing the NPV of each pathway's benefits and costs to a baseline case over the 20-year planning horizon. To pass the BCA, a value greater than 1.0 must be achieved. Figure 33, below provides a summary of the ranges of BCAs which includes sensitivity analysis around factors such as customer economics, depreciation, and electric peak.[71] The Pathways and sensitivities are compared to a baseline scenario that maintains current market shares of building equipment and today's costs associated with the production and delivery of energy to customers. In addition, the analysis uses the NYS DEC BCA framework cost of carbon of 3% since this is the most commonly used cost. Using a higher cost of carbon would increase the BCA ratios under all three pathways. As Figure 33 indicates, none of the pathways have benefits that exceed costs through 2043. Among the CLCPA-compliant pathways, the Hybrid Pathway has the highest BCA score range. It should be noted that the assumptions used in the BCA analysis as formulated by NYC does not include non-quantifiable benefits from reducing GHG emissions like improved public health, improved air quality, job creation over and above displaced jobs and improved economic opportunities as discussed in the Climate Action Council Final Scoping Plan. The ability to quantify those benefits may show benefits exceeding costs.[72] This further supports the Companies' arguments for not selecting a particular, preferred pathway.

Figure 33: Summary of BCA Results for the Reference, Hybrid, and Deep Electrification Pathways

| ***NPV ($B, 2024 - 2043)*** | **Reference** | | **Hybrid** | | **Deep Electrification** | |
|---|---|---|---|---|---|---|
| **Company** | **CECONY** | **ORU** | **CECONY** | **ORU** | **CECONY** | **ORU** |
| **Benefits (Low - High)** | **$14 - $14** | **$2 - $2** | **$23 - $23** | **$3 - $4** | **$33 - $39** | **$5 - $5** |
| **Costs (Low - High)** | **$55 - $28** | **$3 - $2** | **$77 - $42** | **$9 - $6** | **$142 - $87** | **$12 - $8** |
| **Net Benefit (Low - High)** | **$(41) - $(15)** | **$(2) - $(0.2)** | **$(54) - $(19)** | **$(5) - $(2)** | **$(109) - $(48)** | **$(7) - $(2)** |
| **BCA Score (Low - High)** | **0.25 - 0.48** | **0.47 - 0.91** | **0.30 - 0.54** | **0.40 - 0.68** | **0.23 - 0.45** | **0.39 - 0.68** |
| **CEI Total BCA Score (Low - High)** | **0.26 - 0.51** | | **0.31 - 0.56** | | **0.25 - 0.47** | |

### *iii. Gas Bill Compared to Income*

The Companies reviewed the range of potential impacts on households in various income brackets. The income brackets represent the quintiles of income throughout NYS based on consumer surveys. Under all three pathways in 2023, incomes below $60,000 (60% of participants) have gas bills above 3% which is half of the 6% that the Companies use when calculating discounts for its low-income programs. By

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70 New York State Public Service Commission, Order Establishing the Benefit-Cost Analysis Framework, January 21, 2016, pg 12. ("BCA Framework Order").

71 Those specific sensitivities were chosen because their underlying assumptions are undetermined and sensitive in nature.

72 A more detailed description of the sensitivities completed are described in Appendix G.

2043, incomes below $100,000 (80% of participants) are impacted under all three pathways except for O&R's reference case. By 2050, outside of the reference pathway, incomes up to $250,000 (includes all participants) are impacted. The analysis further confirms that maintaining customer affordability over the long term will be a significant challenge if incomes do not keep pace with energy costs. The Companies have programs in place to insulate low-income customers from the effects of higher gas bills; however, the table suggests that affordability issues may also arise with customers in higher income quintiles over time. The Companies recognize the urgent need that exists to develop creative solutions to manage affordability for customers. The Companies will continue to work with stakeholders, policymakers, and regulators to strategically address these challenges and opportunities.

### *iv. Comparative Customer Economics*

CECONY developed an analysis that compared the customer economics of air and ground source heat pumps versus a gas boiler using average electricity and gas rates under the Hybrid and Deep Electrification Pathways.[73] The analysis shows that, under the Hybrid Pathway, ASHP are projected to have a total cost of ownership[74] that is lower than a gas boiler in beginning in 2036 for single family homes, while GSHP are projected to become more economical than a gas boiler in 2031 for High Rise Commercial buildings. Under the Deep Electrification Pathway, the comparative economics analysis shows that GSHPs and ASHPs become more economical than gas boilers in the 2026-2031 timeframe.

Figure 34: Installation year in which the lifecycle cost of a heat pump is lower than that of a gas boiler

| | Hybrid | Deep Electrification |
|---|---|---|
| Single-Family | ASHP: 2036<br>GSHP: 2039 | ASHP: 2029<br>GSHP: 2030 |
| Multi-Family | ASHP: 2040<br>GSHP: After 2043 | ASHP: 2030<br>GSHP: 2031 |
| High-Rise Commercial | ASHP: 2037<br>GSHP: 2031 | ASHP: 2029<br>GSHP: 2026 |

Although ASHPs and GSHPs may become more cost-effective on a total lifecycle cost basis, under the Hybrid pathway, heat pumps have a higher up-front cost than gas boilers and the payback period may not be not short enough to be economically "attractive" for a customer.[75] Under the Deep Electrification pathway, the gas system rate increases significantly as the smaller number of customers served in the future would be required to pay for remaining gas system costs. As a result, in the Deep Electrification pathway, ASHPs provide an attractive payback beginning in 2038 for single-family homes and high rise

[73] Please refer to Appendix H for more detail the comparative economics analysis methodology and results.

[74] Total cost of ownership is the cost to the customer of a device over its useful life, including both up-front and operating costs.

[75] An attractive payback period is defined as the time in which a customer must be paid back for their investment to make it attractive enough for them to invest. The attractive payback period is assumed as six years for residential buildings and five years for commercial buildings in the analysis, consistent with the hurdle rates from CECONYs recent Non-Low-and-Moderate Income Energy Efficiency and Building Electrification Portfolio Proposal Filing under case 18-M-0084 (November 2, 2023). See: https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={00798C8B-0000-C950-90C0-CA442D7A6B57}

commercial, and in 2039 for multifamily homes. The output from the comparative customer economics analysis was not used to refine assumptions in the Pathway analysis because it is assumed that policy will drive market adoption in both Pathways.

# V. Decarbonization Pathways

Con Edison and O&R are committed to reducing GHG emissions and helping to lead the State's transition to a clean energy future. We remain vigilant in observing the market and planning actions we can take to reimagine our gas system. To evaluate GHG reduction potential in the future, the Companies have explored a range of strategies and emissions reduction technologies.

We have assembled three representative pathways (Reference, Hybrid, and Deep Electrification). None of these pathways require growth-related infrastructure investment in order to balance supply and demand; therefore, they are all "no infrastructure" options. Each pathway satisfies customer energy needs safely and reliably and leads to a distinctly different gas system profile. The three pathways' assumptions vary in the level of adoption of technologies with emissions reduction potential across the energy value chain.

The comparative need for policy evolution and capital investment to achieve incremental reductions are also explored in these pathways. Representative technologies that will be part of any natural gas transformation portfolio are presented in Figure 35, below.

Figure 35: Innovative Clean Energy Technologies[76]

| Technology | Description | Value |
|---|---|---|
| Building Envelope and Insulation | Technology that reduces the total energy requirements of a building by improving thermal insulation | Reduces energy consumption, emissions, customer energy costs, and capital costs for heating/cooling equipment |
| Air Source and Ground Source Heat Pumps | Highly efficient electric-powered system that uses a refrigerant to move heat from one area to another to provide water heating, space heating, and air conditioning. | Enables customers to transition from less energy efficient and more polluting on-site fossil fuel combustion systems (such as boilers, water heaters, and furnaces) for water and space heating |
| Advanced Metering Infrastructure (AMI) | Digital meters that remotely and continuously read customer energy usage information | Provides customers with valuable consumption information and enables innovative pricing and improves evaluation of demand side management programs |
| Low-to-Zero Carbon Gaseous Fuels | Gaseous fuels with a lower GHG impact than natural gas that could supplement our energy delivery system (e.g., green hydrogen) | Reduces or eliminates GHG emissions from our energy delivery system and generation facilities. |
| Carbon Capture and Storage | Technology that absorbs carbon from point-sources (such as steam boilers) or directly from the air to offset carbon emissions | Reduces GHG emissions from the source and supports economy wide net-zero GHG emissions goals |

The use of these and other technologies, and the priority that must be placed on policy and regulatory evolution to make incremental strides in the clean energy transition are described for the three representative pathways that Con Edison and O&R have developed below.

Finally, Con Edison and O&R will continue to emphasize the needs of DACs in all facets of its proposed natural gas system plans.

## a. Reference Pathway

### *i. Assumptions*

The Reference Pathway reflects today's legal and policy framework which implement important first steps (such as targeting new construction for fossil free alternatives) even if they do not achieve State or

[76] The Companies note that achievement of GHG emission reductions described in the context of the Hybrid and Deep Electrification Pathways relies on technological advancements and improvement in the economics of, *e.g.*, long-duration energy storage systems, dispatchable emissions free generation resources (DEFRs), hydrogen supply chain components, RNG, SNG, and carbon capture technologies. Technology advancement, pilot project deployments, and market development initiatives are being addressed in a variety of regulatory proceedings (*e.g.*: Case 18-E-0130, the Energy Storage Proceeding; 20-E-0197, the Local T&D Planning Proceeding; 15-E-0302, Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard) and in other venues (*e.g.*, Gov. Hochul's 2023 State of the State address, which included a proposal related to NYPA's ownership of energy storage resources).

city economy-wide net zero greenhouse gas emissions reduction goals. Clean energy investments that our regulators have approved, and existing legislation, including limited regulatory, technological, and market changes during the next two decades inform Reference Pathway assumptions.

Con Edison currently reviews the cost of gas appliances and the aging of gas appliances for change out to electric in its Reference Pathway forecasting model. Furthermore, a confidential life cycle cost assessment of gas appliances versus electric appliances is currently being updated to reflect current costs and rebates and will be considered for the next firm gas peak demand forecast cycle. Not only does the Reference Pathway forecasting model include the drivers behind the evolving competition between gas and electric appliances, but it also includes other drivers such as the economy, disruption to customers/tenants, policy/laws and the availability of gas supply. For instance, because the model is driven by current regulation, it precludes including gas appliances for new construction and alterations that increases square footage by 10% or more.

It should be noted in regards to partial electrification that the EoNH forecast is an element of the Electrification of heating model. To include solely partial electrification of non-heating appliances would be an out of model, manual adjustment. It should also be noted that the economics of hot water heaters and stovetops favor natural gas and there are currently only small incentives. If all of the Companies customers were to electrify these appliances over the next 20 years, that would save approximately 10 MDt/day/year which ranges from 2-9% of annual usage depending on the pathway.

### *ii. Sales and Peak Demand Forecasts*

The Reference Pathway demand forecast is calculated using a "bottom-up" deterministic approach beginning with actual historical sales and peak demand data and is adjusted for known and measurable factors. GHG emissions decrease slowly as sales and peak demand are reduced through the implementation of current laws and policy.

The current natural gas sales forecast and peak demand (for Con Edison and O&R separately) were developed using the methodology noted in Chapter IV. The forecast takes into account NYC Local Law 154 and Local Law 97 and NYS' CLCPA, which impacts Westchester and O&R.

The development of the sales forecast began with performance over the 12 months ending September 30, 2022. Figure 36 demonstrates that Con Edison and O&R (shown together) sales are expected to be stable through 2026 and then steadily decline through 2043. Peak demand for the Companies increases slightly over the next several years and then steadily declines. (See Figure 37, below.) Over the next several years, growth in peak demand can be attributed to an increase in the number of customer accounts and in growth in use per account.

Figure 36: 20-Year Reference Pathway Gas Sales Volume Forecast for the Companies (2023-2043)

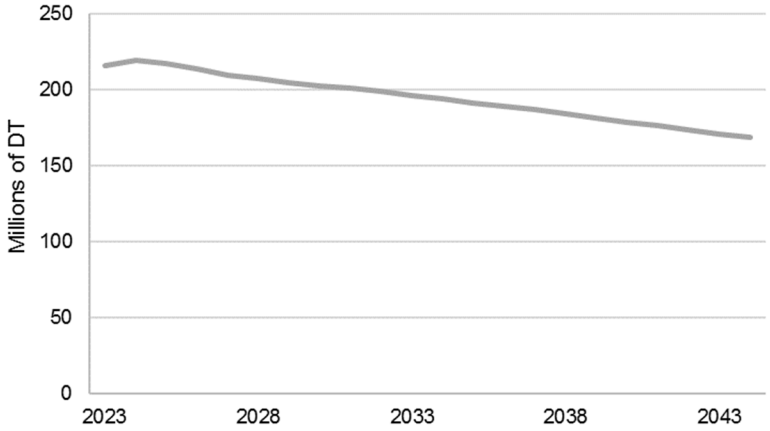
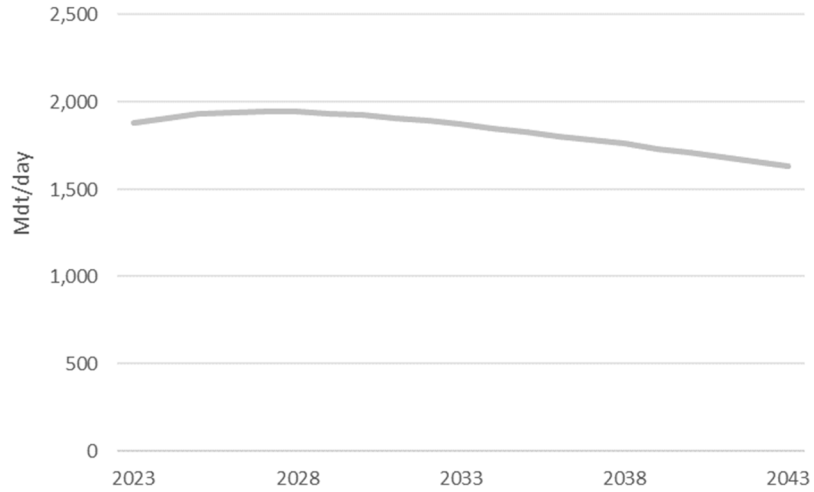
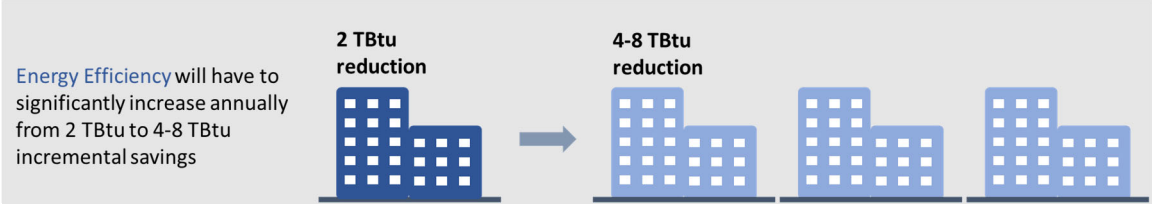



Figure 37: 20-Year Reference Pathway Peak Demand Forecast for the Companies (2023-2043)




Decreases in sales and peak demand after 2027 are attributable to existing GHG reduction efforts, namely energy efficiency, heating and non-heating electrification, and the impacts that are expected under laws that are in effect today. (See Chapter IV for more detail on how these factors influence sales volume and peak demand.) Energy efficiency will remain a key decarbonization focus. The Companies remain committed to offering low-cost energy efficiency measures and to pursuing more aggressive interventions that can reduce the demand for gas on our systems. Figure 38 exemplifies the rapid scale-up in energy efficiency that will be needed in all three pathways.

Figure 38: Customer adoption of energy efficiency measures must accelerate to meet clean energy goals.




The Companies develop energy efficiency forecasts based on utility programs and plans that include NENY and Clean Heat programs.[77] In addition, the forecast includes savings projections from NYSERDA. Collectively, these programs provide resources and incentives to the residential (1 to 4 dwelling units), multi-family, and commercial customer segments to promote energy efficiency. Con Edison and O&R also develop forecasts of "organic" (*i.e.*, non-programmatic) energy efficiency that customers pursue without the aid of the programs mentioned previously. The Companies include a forecasted reduction to the Reference Pathway demand and sales projections to reflect existing and future customers switching from gas to electric service for both heating and non-heating purposes. The Companies will continue to examine the impact of the law and will adjust forecasts as appropriate. The Reference pathway also reflects a change in weather as climate change impacts the region: a projected decrease in future heating degree days is represented in the forecast. Covid-19 has changed commercial load as work from home has become more common. It is expected that office load during peak days will be slightly less than before the pandemic.

### *iii. Capital Expenditure Plan*

The Companies have developed and submitted capital expenditure plans in their respective rate cases for meeting the overall needs of the Companies' business operations. Those plans include investments for main replacement programs, relocations of gas infrastructure required due to construction activities of municipalities (referred to below as public improvement in the Con Edison service territory and municipal in the O&R territory), reliability/safety capital and other business areas. The Companies project maintaining planned capital budgets through 2025 (Con Edison) and 2024 (O&R). These planned expenditures are at an advanced or near-execution stage and have previously been determined by each of the Companies to be necessary for providing safe and reliable service, for operational efficiency or legal, regulatory or code compliance requirements.

#### *Con Edison*

The capital expenditure plan for the Con Edison Reference Case (Figure 39) includes the following assumptions: 1) maintains current rate base budgets through 2025 with new rates in place in 2026; 2) the sales and demand forecasts as presented above; 3) the Gas Infrastructure Reduction or Replacement program ("GIRRP") will be in place through 2040 and then be reduced to a nominal spend to address emerging issues; 3) the service replacement continues at a similar level through most of the planning horizon with a steep decline starting in 2040; 4) continued investment in transmission pipe replacement to comply with federal regulations (PHMSA) drives spend through 2035 and then declines to a nominal

[77] The Companies will continue their Clean Heat electrification programs with an increased emphasis on weatherization according to the budgets and terms outlined in the Commission's recent NENY Interim Review Order. Specific plans for those programs will be included in the Companies forthcoming proposals in the NENY proceeding.

amount by 2041; 5) public improvement investments for relocation of assets when NYC or Westchester County seeks to use a right-of-way for municipal infrastructure remain consistent through 2043; 6) capital expenditures for customer connections begin to decline in 2028; and 7) Other programs to maintain safety and reliability of the system continue through the planning horizon (*e.g.*, regulator stations, system reinforcement). Total Con Edison capital expenditures in the Reference Case decrease by approximately 70% over the twenty-year forecast horizon mainly due to the completion of the GIRRP program in 2040.

In Con Edison's most recent Commission-approved Gas Rate Plan,[78] Con Edison agreed to lower its miles of GIRRP replacement targets. This reduction reflects a recognition that gas usage will decrease and the system will be smaller in the future. In addition, under the GIRRP Con Edison will consider whether a gas main is at the end of a system or has a small number of customers attached that are easy to electrify when assessing emerging projects to determine if the gas main can be eliminated rather than be replaced. Con Edison will also consider delays in main replacement work to support and facilitate electrification efforts, as long as there are no adverse safety or operational impacts of doing so. Finally, the Gas Rate Plan clearly recognizes that LPPs retired through NPAs rather than replaced will count toward the GIRRP annual targets.[79]

Additionally, the Gas Rate Plan sets more stringent leak backlog targets than the last rate plan for purposes of applying negative adjustments. In order to earn Positive Revenue Adjustments ("PRAs"), Con Edison agreed to repair more leaks within specified periods. To Con Edison's knowledge, no other LDC is subject to such conditions for earning PRAs.[80] The Gas Rate Plan also funds AMI-enabled natural gas detectors, which allows for real-time, on-site monitoring of leaks at customer premises. This technology is expected to help Con Edison identify and address leaks sooner, providing both safety and environmental benefits.[81]

Finally, under the Gas Rate Plan, Con Edison will use advanced leak detection ("ALD") technology. It will survey at least one-third of its distribution system each calendar year and will survey its entire system during the term of the rate plan. Con Edison will file a report annually with the results of its High Emissions Survey program. In Rate Year 1, Con Edison will convene a stakeholder engagement meeting to review and discuss year-to-date developments related to the ALD program.[82]

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78 2022 Con Edison Rate Plans, Order, pp.38-39, 46, 99, Attachment 2 (Joint Proposal), Appendix 19.

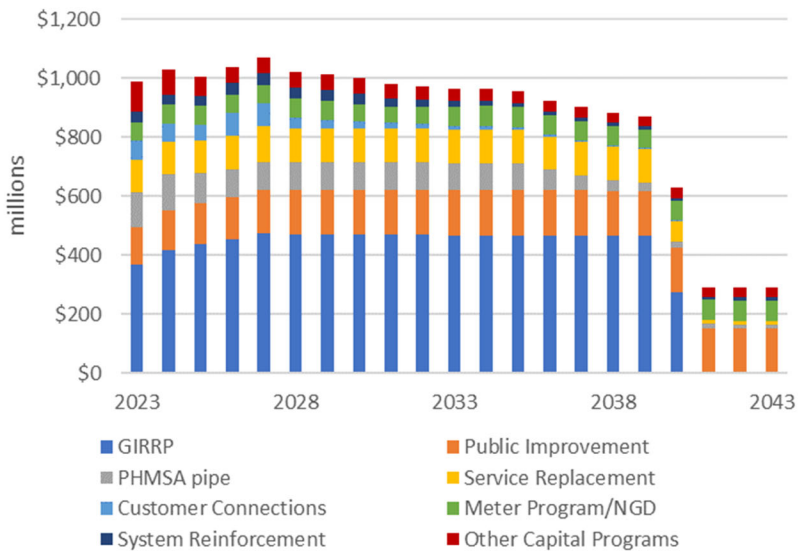
79 2022 Con Edison Rate Plans, Order, p.105, Attachment 1 (Joint Proposal), p.98.

80 2022 Con Edison Rate Plans, Order, p. 99, Attachment 1 (Joint Proposal), Appendix 19.

81 2022Con Edison Rate Plans, Order, p. 44, Attachment 1 (Joint Proposal), p. 91.

82 2022 Con Edison Rate Plans, Order, p. 99, Attachment 1 (Joint Proposal), pp. 97-98.

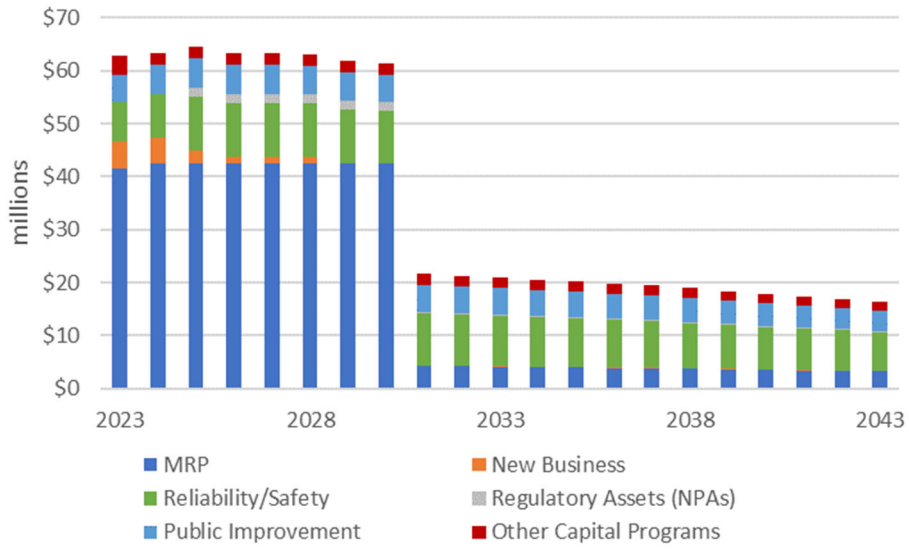
Figure 39: Con Edison Reference Pathway Projected Capital Spending (2023-2043)




*O&R*

The capital expenditure plan for the O&R Reference Case (Figure 40) includes the following assumptions: 1) maintains current rate base budgets through 2024 with new rates in place in 2025; 2) the sales and demand forecasts as presented above; 3) the Main Replacement Program and service replacement programs will continue and be completed by 2030 and then be reduced to a nominal spend to address emerging issues 4) continued investment in system safety and reliability, public improvement and other programs with nominal reductions over the planning horizon proportional to peak day gas volume reductions. Total O&R capital expenditures in the Reference Case decrease by approximately 74% over the twenty-year forecast horizon mainly due to the completion of the O&R mains and service replacement program by 2030.

Figure 40: O&R Reference Pathway Projected Capital Spending (2023-2043)

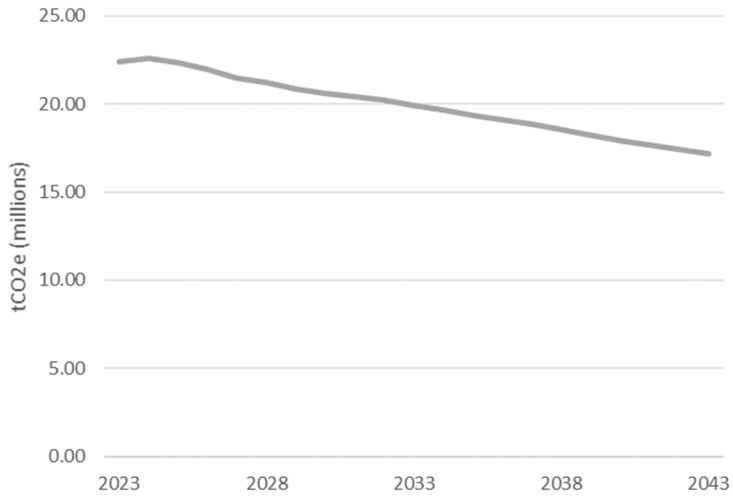


### *iv. Gas Sector GHG Emissions*

Reference Case GHG emissions were projected by applying appropriate emission factors to the Companies' Reference Case forecasted sales volumes. Annual emissions were calculated for $CO_2$, CH4, and $N_2O$. Total $CO_2$ equivalent ("$CO_2e$") emissions were calculated by converting $CH_4$ and $N_2O$ emissions to $CO_2e$ assuming a 20-year global warming potential ("GWP").

Figure 41 presents the Companies' Reference Case Scope 1 and Scope 3 gas distribution emissions for 2023 through 2043. Over 99% of the Company's gas emissions are Scope 3 emissions.

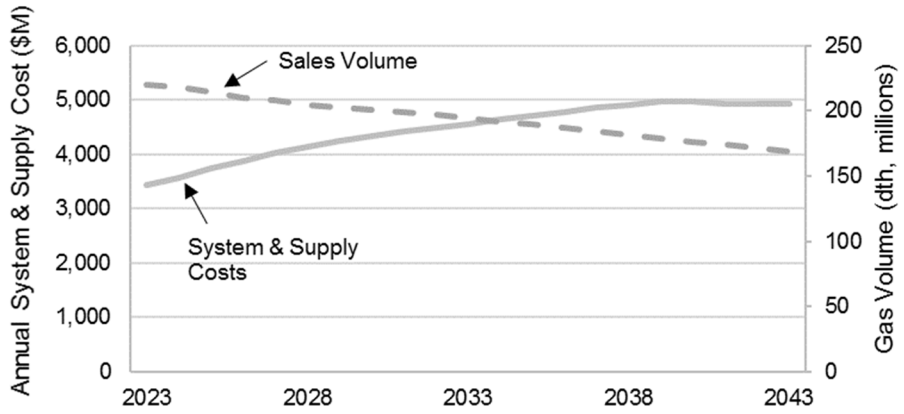
Figure 41: Reference Pathway Gas Sector GHG Emissions (Con Edison and O&R combined, 2023-2043) (excludes steam and electricity production)




### *v. Projected Costs: Reference Pathway*

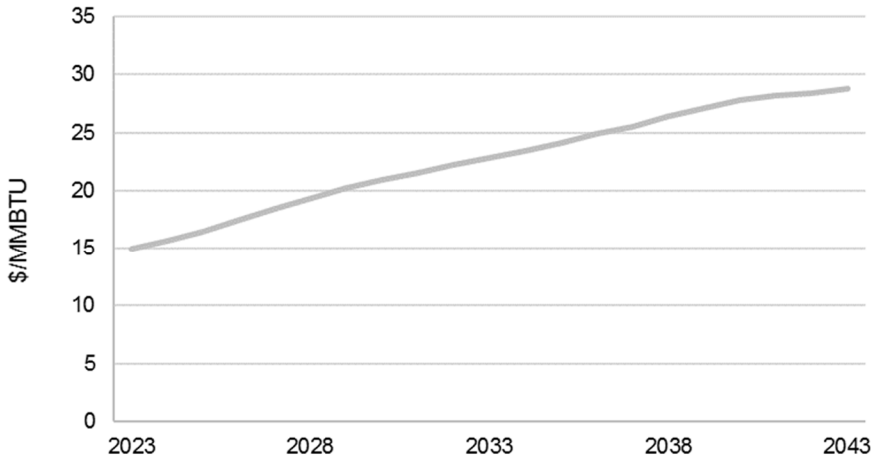
Bill impacts for the Reference Case were evaluated based on forecasted Gas System and Fuel Supply Costs over the GSLTP term. To develop Gas System and Fuel Supply Costs, the Companies forecasted gross plant in service plus capital additions and regulatory assets minus accumulated depreciation to estimate net plant. Other adjustments are made to net plant to calculate rate base. In the Reference Pathway, the Companies' combined rate base is forecasted to grow at a compounded annual growth rate of approximately 2%. Rate base is used to calculate the cost of equity and the cost of debt. Taxes, O&M and purchased fuel costs are calculated as well. Figure 42 presents projected Gas System and Fuel Supply Costs under the Reference Pathway.

Figure 42: Reference Pathway Gas System and Fuel Supply Costs and Sales Volume (2023-2043)




A general System Rate ($/MMBtu) makes evaluation of cost trends more illustrative, as is shown in Figure 43.

Figure 43: Reference Pathway Gas System Rate ($/MMBtu)




#### *vi. Natural Gas System Profile, Supply Resources: Reference Pathway*

The Reference Case assumes that by 2043, approximately 240,000 customers from both Con Edison and O&R will have left the gas system and there will no longer be any contracts for delivered services or CNG. In addition, the Reference Case assumes that there are no LCFs, only certified natural gas. There is currently one RNG project under construction that should interconnect to the Con Edison system by 2026. The plant will market the RNG to a third party since the Companies do not have the authority to procure the plant output at market value.

### b. Hybrid Pathway

The Hybrid Pathway is further refined from the Companies' existing GLRPs, relies on both clean electricity and LCFs, and meets the State's economy wide GHG goals. In this pathway, while gas volumes significantly decline relative to the Reference Pathway, many difficult-to-electrify buildings will still

retain a gas connection to minimize the cost of electric system upgrades, at the same time strengthening energy resilience. Stimulated by a variety of incentives, the improved economics of building electrification are expected to drive significant customer conversions. However, to achieve the levels of electrification envisioned in this pathway and enable a strategic and orderly downsizing of the gas system, customers in targeted areas may be required to electrify their end uses. The Hybrid pathway will achieve the State's economy-wide emission reduction goals, assuming technology advances to allow adoption at scale and there is sufficient regulatory and policy support to enable this transition, including the ability to transition customers off the gas system.

For the Hybrid Pathway, the Companies project a decline of approximately 44% in delivered gas volumes by 2043. Due to increased electrification, the gas system geographic footprint is reduced and focused on serving areas of the system with high-density, difficult-to-electrify customers based on their proximity to supply mains or gate stations. The Companies would reduce the carbon intensity of the remaining delivered gas volumes through implementation of LCFs, with a target of 100% adoption by 2050. If, however, LCFs do not materialize in a meaningful way, the gas system will need to be phased out in the long-term to achieve carbon neutrality.

### *i. Assumptions*

In modeling the Hybrid Pathway, Con Edison refined assumptions from its GLRP, including an evaluation of the electric generation, building heating and transportation segments. While O&R uses a similar general approach in modeling its Hybrid Pathway, it relies on assumptions specific to its service territory, customer profile and financials.

Figure 44: Summary of Hybrid Pathway End-State (2043) Assumptions

| Category | Description - CECONY | Description – O&R (NY) |
|---|---|---|
| Key Features | Leverages existing electric, gas and steam infrastructure<br>Mitigates customer complexity and disruption<br>Diversification of fuel facilitates reliability | |
| Sales and Peak Demand | Customers/services/footprint similar to Reference Pathway through 2029. Reduction of approximately 50% from 2030 to 2050 | |
| Policy Action Assumed | Incentives continue to reduce upfront costs for electrification of transport and heating<br><br>New business gas ban phased in through 2030 with limited exemptions beyond 2030 | |
| Capital Expenditures | Customer connections largely phased out by 2030, main replacement programs end by 2030 (O&R) and 2040 (Con Edison); routine CapEx in rate case through 2024 (O&R) and 2025 (Con Edison) then proportional to main mileage; annual LCF interconnection investments of $10M for Con Edison beginning in 2030 | |
| Challenges | Requires significant breakthrough in deployment of scalable LCFs | Same as CECONY |
| % of floorspace with gas heating | 48% | 38% |
| % of floorspace with gas water heating | 24% | 28% |
| % of floorspace with gas cooking/other | 48% | 38% |
| % of floorspace with heat pumps | 35% | 50% |

| Category | Description - CECONY | Description – O&R (NY) |
|---|---|---|
| % of floorspace on steam | 8% | 0% |
| % of floorspace on oil | 9% | 12% |
| % of floorspace with hybrid heating | 16% (8% hybrid boiler, 8% dual-fuel HP) | 8% dual-fuel HP |
| Building Envelope (% reduction in space heating load) | 2030: 9% reduction in energy consumed per square foot in buildings due to appliance and building shell improvements; 2043: 23% reduction | Same as CECONY |
| Heat pump COP - Average Heating | ASHP: 2 - 2.9; GSHP: 2.9 - 3.4 | Same as CECONY |
| Heat pump COP - Peak Heating | ASHP: 1.4 - 2.1; GSHP: 2.7 - 2.8 | Same as CECONY |
| % of LDVs electrified | 67% | Same as CECONY |
| % of M/HDVs electrified | 53% | Same as CECONY |
| % of MTA buses electrified | 100% | n/a |
| Gas sales (TBTU) | 110 | 14 |
| Gas peak demand (MDt/Day) | 1,046 | 132 |
| Gas volume (% reduction from 2023) | 42% | 45% |
| Gas sector emissions reduction (% from 2023) | 62% | 63% |
| Electric sales (GWh) | 70,869 | 6,397 |
| Electric peak demand (MW) | 14,680 - 17,089 | 1,470 - 1,905 |
| Electric Peak (% increase from 2023) | 13 - 32% | 29- 67% |
| Steam sales | 19 TBTU | n/a |
| Economy-wide emissions reduction (from 1990) | 73% | 72% |
| Gas supply for electric generation (100% clean Hydrogen) | 39 TBTU | n/a |
| Gas supply for steam production | 7 TBTU | n/a |
| Certified Gas (% of 2043 gas distribution) | 58% | Same as CECONY |
| RNG (% of 2043 gas distribution) | 36% | Same as CECONY |
| Hydrogen (% of 2043 gas distribution) | 6% | Same as CECONY |

### *Electric Generation*

Con Edison projects a substantial increase in electric sales and peak demand due to increased electrification of buildings, transportation and other end uses. Compared to 2023, Con Edison's electric system peak is expected to be from 13-32% higher. O&R's electric system peak would be 29-67% higher than 2023. Clean hydrogen is introduced for gas-fired electric generation located in Con Edison's territory in 2035, and transitions to 100% hydrogen by 2040 to achieve CLCPA targets for 100% clean electricity. Con Edison projects that approximately 39 TBTU of new clean and reliable hydrogen supply is needed to meet electric generation needs.[83]

[83] A process to "identify the actions needed to pursue attainment of the Zero Emissions by 2040 Target" on the electric system is the subject of a recent Commission Order. This GSLTP does not presume the outcome of

### *Building Heating*

For Con Edison, the Hybrid Pathway targets low-rise residential buildings to electrify heating by 2050, resulting in approximately 42% of Con Edison floorspace adopting electric heat pumps. This includes approximately 78% of single-family homes ("SFH"), 53% of low-rise multi-family homes ("MFH"), 36% of low-rise commercial buildings, and 20% of high-rise buildings in NYC and Westchester. The remaining space heating load assumed would be served by LCFs and district steam by 2050. Nearly all oil usage is phased out by 2050, which drives near-term growth in gas floorspace. Customers are incentivized to transition to electrified end-use solutions but may still retain a physical gas connection if they are in targeted areas with a high density of difficult-to-electrify buildings to minimize capital expenditures and strengthen energy resilience by retaining the option to use LCFs.

In the O&R territory, 65% of all building floor space is electrified by 2050, including 70% of SFHs, 60% of MFH, and 60% of commercial establishments. Roughly 45% of electrifying customers will migrate to an ASHP while 20% will have a ground source heat pump ("GSHP"). Oil is nearly eliminated by 2050. The significant composition of non-natural gas heating in existing O&R buildings today results in less required conversion of existing natural gas heating customers than Con Edison.

### *Other Building End Uses*

For both Con Edison and O&R, it is assumed that when customers electrify their space heating, they electrify all other end-uses, such as stoves and clothes dryers. Customers that maintain gas service for space heating will also use gas for other end-uses, such as cooking. In Con Edison's territory, about half of the customers that electrify their water heating are assumed to electrify all other end-uses. The Companies have adjusted the O&R Hybrid Pathway model to allow for partial electrification of buildings similar to Con Edison and have increased the amount of electric water heating in the O&R Hybrid Pathway to 80% to be consistent with Con Edison.

## *ii. Sales and Peak Demand Projections*

The Hybrid Pathway starts with the natural gas sales and peak demand forecasts used in the Reference Pathway and described in detail in Chapter IV. However, sales and peak demand decline substantially over the forecast period compared to the Reference Pathway, driven by increased electrification and energy efficiency. New Business connections and oil-to-gas conversions continue at a lower rate through 2030 and then are phased out altogether. As presented in Figure 45, annual sales volumes for Con Edison and O&R (shown together) are expected to decline gradually by approximately 1% annually through 2027, and then decline to approximately 3.4% per year over the 2028-2043 period. Peak day gas demand is expected to remain relatively flat through 2029 and then begin to decline by approximately 3.4% annually through 2043 as presented in Figure 46.

that process. *See* Case 15-E-0302, *Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard*, Order Initiating Process regarding Zero Emission Target (May 18, 2023).

Figure 45: 20-Year Hybrid Pathway Gas Sales Volume Forecast Compared to the Reference Pathway

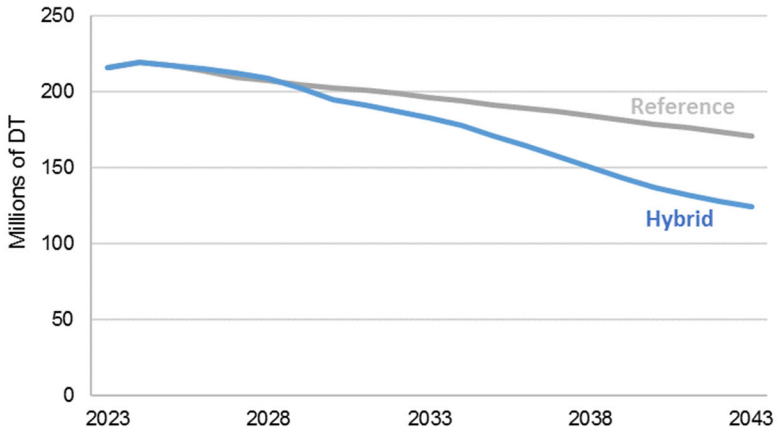
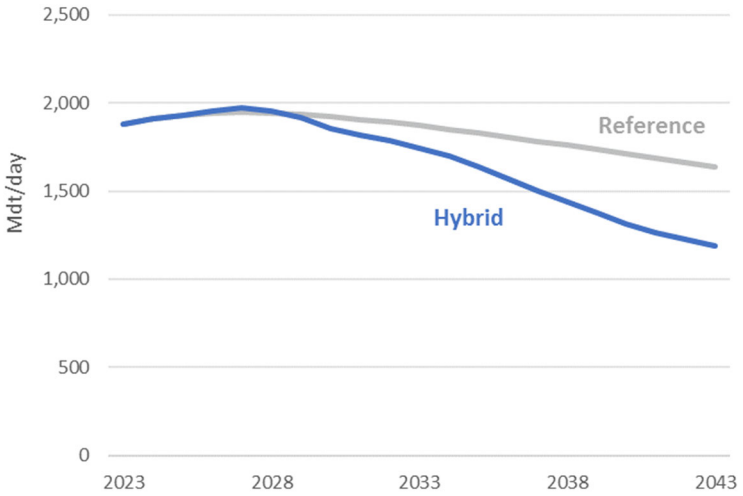



Figure 46: 20-Year Hybrid Pathway Peak Demand Forecast Compared to the Reference Pathway



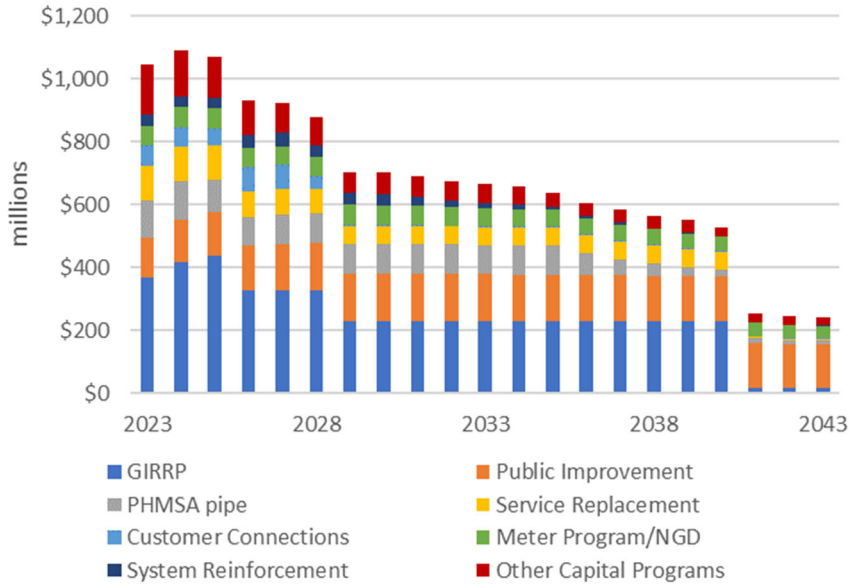

The rapid scale-up in energy efficiency discussed in the Reference Pathway and shown in Figure  would also be needed for the Hybrid Pathway.  However, to enable the more aggressive GHG reductions in the Hybrid Pathway, a 9% reduction in energy consumed per square foot in buildings is needed by 2030, and 23% by 2043 (compared to today).  These additional reductions were factored into the Hybrid Pathway sales and demand projections but would necessitate further scaling of energy efficiency investments in these areas.

### *iii. Capital Expenditure Plan*

Through this GSLTP, the Companies can advance projects necessary to support the CLCPA goals, including attracting and expanding local employment and enabling the transformation of the buildings and other sectors.  The Companies evaluated the changes to the Reference Pathway capital expenditures that would be needed to enable outcomes envisioned in the Hybrid Pathway.  Overall, this pathway would require approximately $3.9B less in overall capital expenditures through 2043 than the Reference Pathway for Con Edison and O&R combined.  The Companies would need still need to make

investments in core programs like safety/reliability, but at a lesser rate due to a decreasing customer footprint. Planned capital expenditures under a Hybrid Pathway are illustrated in Figure 47, below.

Figure 47: Con Edison Hybrid Pathway Capital Expenditure (2023-2043)

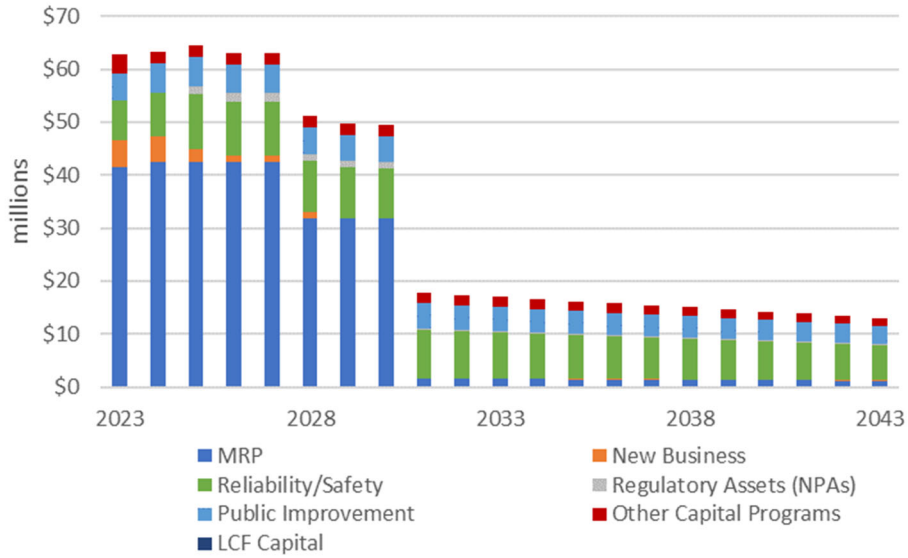



The long-term capital expenditure plans for the Con Edison Hybrid Pathway include the assumptions previously identified in the Reference Pathway. Other high-level considerations for the Hybrid Pathway include the following:

- Using NPAs where feasible for the replacement of aged or leak-prone assets.
- Maintaining threshold level of routine capital expenditures that declines as the projected customer demand shrinks over time.
- New business capital expenditures decline in earnest after 2027 and are largely phased out by 2029.
- Decrease in spend is driven by reduction in main and service replacement.

Con Edison's capital expenditures in the Hybrid Pathway decrease by approximately 77% over the twenty-year forecast horizon due to reductions in: service replacements; projects related to pressure control; regulator station; transmission and generation related to decreased customer demand; as well as the GIRRP ending in 2040. For O&R, differences relative to the Reference Pathway include lower routine capital expenditures resulting from reduced customer demand. The total O&R capital expenditures in the Hybrid Pathway are projected to be approximately 79% lower in 2043, as illustrated in Figure 48.

Figure 48: O&R Hybrid Pathway Projected Capital Spending (2023-2043)

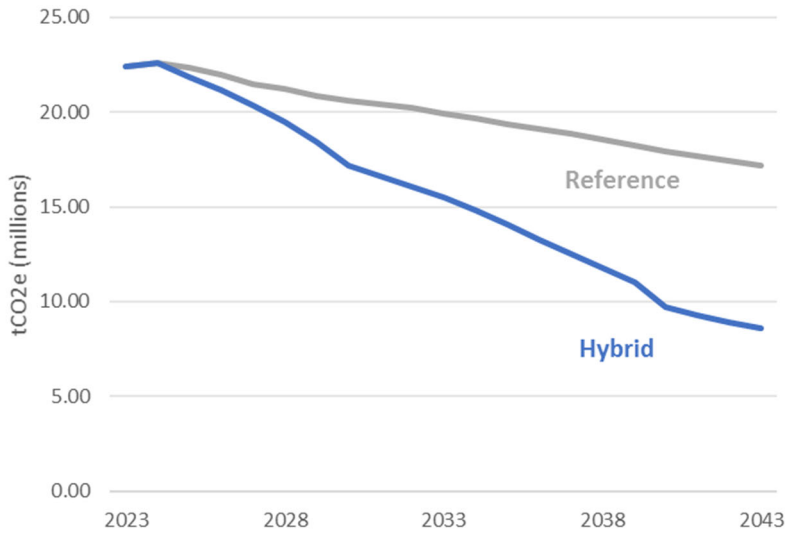



The Companies have identified their respective capital expenditures by category under the Hybrid Pathway in more detail in Appendix D.

### *iv. Gas Sector GHG Emissions*

Similar to the Reference Pathway, we estimate GHG emissions for the entire supply and delivery chain. We assume the same emissions factors as laid out in the NYS GHG Inventory. To determine the emissions impact of changes in the usage mix, it was necessary to disaggregate the electric generation, building heating and transportation segments into sub-segments to determine the historical and projected usage mix. Figure 49 presents the Companies' Hybrid and Reference Scenario Scope 1 and Scope 3 emissions for 2023 through 2043. Over 95% of the Companies' emissions are Scope 3 emissions.

Figure 49: Hybrid Pathway Gas sector GHG Emissions Compared to the Reference Pathway (Con Edison & O&R combined)[84]




The GHG analysis assumes that CECONYs GIRRP is completed by 2040 and O&R's MRP is completed by 2030, reducing downstream emissions. The emissions savings from these main replacement programs is estimated using EPA-reported data, the NYC GHG inventory and the current inventory of leak-prone pipe. Certified gas reduces the upstream emissions factor associated with natural gas usage by 47%.[85]

### *v. Projected Costs: Hybrid Pathway*

Bill impacts were evaluated for the Hybrid Pathway based on forecasted revenue requirements over the GSLTP term reflecting estimates of the Companies' capital investments and O&M costs required annually to reach the projected end state. Annual O&M expenditures continue to decline after 2028 consistent with strategic downsizing of the system. The added expenses of using LCFs such as hydrogen blending in the larger distribution system, such as elevated leak response and regulator station replacements/retrofits, were included in the O&M cost estimates.

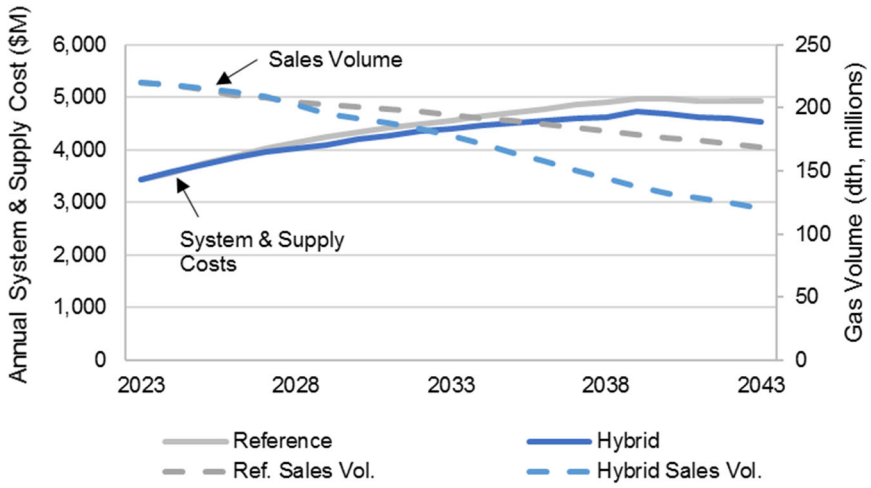
Under the Hybrid Pathway, Con Edison's gas system rate base is forecasted to increase at a compounded annual growth rate of approximately 1% through 2043 and its O&M expenses are expected to decline at a compounded annual rate of approximately 0.36%. O&R's rate base is forecasted to increase at a compounded annual growth rate of approximately 2% through 2043 and its O&M expenses are expected to decline at a compounded annual rate of approximately 1.43%.

Figure 50 presents projected sales volume and Gas System and Fuel Supply Costs under the Hybrid and Reference pathways to illustrate that costs are projected to rise as sales of natural gas fall.

[84] Emissions calculations exclude gas for steam production and electric generation.

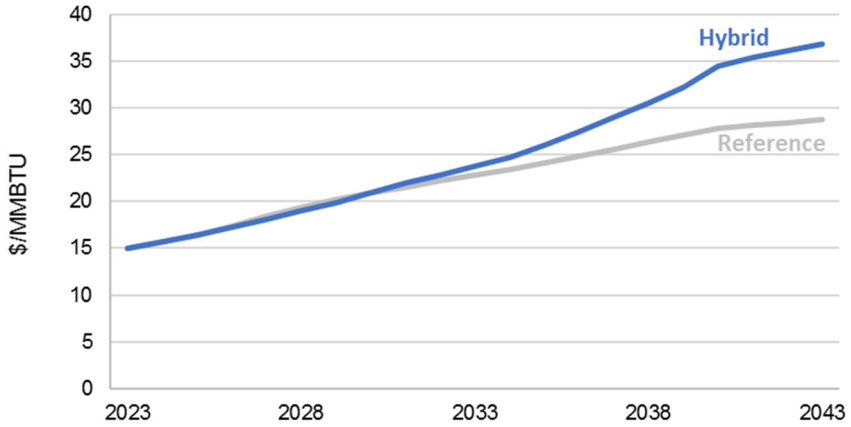
[85] CLCPA Implementation Proceeding, GHG Inventory Proposal, p. 18.

Figure 50: Hybrid Pathway Gas System and Fuel Supply Costs and Sales Volumes Compared to the Reference Pathway




The Hybrid Pathway general System Rate ($/MMBtu) shown over the 2023-2043 period in Figure 51 brings this trend into sharper relief, demonstrating the customer impact of the Hybrid Pathway.

Figure 51: Hybrid Pathway Gas System Rate Compared to the Reference Pathway ($/MMBtu)




Drivers of the bill impacts over time include the introduction of more expensive LCFs into the gas supply mix, declining sales, and maintaining adequate levels of gas capital to ensure safety and reliability. As the system footprint is reduced and assets are abandoned, the rate impact on remaining customers becomes more pronounced. For this reason, it is important to consider policies that help manage the impact of higher utility rates on remaining customers, such as apportioning a greater share of municipal/public improvement costs to be borne by NYC and municipalities.

### *vi. Natural Gas System Profile, Supply Resources: Hybrid Pathway*

The Hybrid Pathway contemplates a reduction in the existing gas system footprint of approximately 50% by 2050. This magnitude in reduction may necessarily involve selectively determining specific areas that are appropriate to retire the gas system throughout the LTP timeframe. The Companies are in the process of determining where leak-prone pipe segments within each system can be met with potential demand-side solutions as an alternative to replacement.

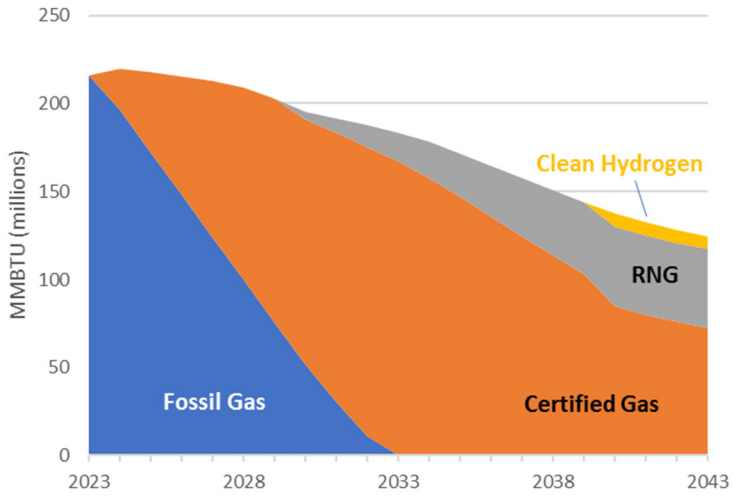
For non-leak prone segments of the system, the Companies would identify and prioritize the most cost-effective areas of the system to selectively target for elimination of gas infrastructure. These could include areas with low density of single-family homes and low-rise multi-family buildings driven through a high penetration of electrified heating and strategic decommissioning of local gas infrastructure. The Companies anticipate certain areas with high density of commercial and large multi-family buildings will be significantly more difficult-to-electrify and could take much longer to decommission. Therefore, the Company projects that these areas would continue be served by the gas distribution system using LCFs through 2043.

The Companies will begin procuring certified natural gas in 2024 until such time as future gas deliveries can be met with LCFs. By 2030, approximately 73% of fossil natural gas delivered is Certified Gas, and by 2033 all remaining fossil natural gas needs are met through the procurement of certified gas. LCFs are blended into the Con Edison distribution system starting in 2030 and fully displace fossil natural gas by 2050. LCFs are blended in the system, with the same mix delivered to all distribution customers.

The Companies assume that we would utilize the full amount of RNG we can source, phasing into the system starting in 2030 with its full potential realized by 2040. The Companies project that hydrogen blending in the gas distribution system begins in 2040 at approximately 7 TBTU per year at a level of approximately 7% (by energy) of the projected gas consumption in 2050.86 SNG produced from clean hydrogen facilities will be explored as a way to meet remaining economy-wide GHG emissions reduction targets.

[86] Note that our ability to blend hydrogen into gas the systems and the percentage that may be blended will be contingent on completion of our main replacement programs and successful piloting and thorough compatibility testing of hydrogen in our gas system and customers' equipment. Additionally, hydrogen usage is currently technically limited to 7% by energy (20% by volume) due to the significant infrastructure upgrades associated with higher levels of hydrogen blending.

Figure 52: Hybrid Pathway – Total System Throughput and Gas Composition (2022-2043)




### *vii. Achieving the Outcomes in the Hybrid Pathway*

Realizing the gas sales, demand and emissions reductions envisioned in the Hybrid Pathway will require collaboration with our regulators and state energy policy leaders and significant regulatory and legislative actions. Key policies to effectuate the reduction in the system footprint under the Hybrid Pathway include eliminating the existing obligation to serve, improving the Companies' ability to transition existing customers off the gas system, and effectively eliminating all new customer connections and entitlements. It is critical that the Companies continue making investment for gas safety and reliability while reducing the footprint and recover its investments made to date. The Companies can further reduce emissions by adopting LCFs and certified gas in their portfolio and continuing their efforts in their respective main replacement programs, along with continuing methane emission reduction initiatives.

Con Edison and O&R do not project a need to procure new interstate pipeline capacity resources beyond those already in process to meet the gas demand requirements in the Hybrid Pathway but would need to decarbonize its remaining supply sources over time to meet statewide emissions reduction targets. In this GSLTP, the Companies are targeting the addition of new sources of LCFs for their supply portfolio starting in 2030 and are diligently seeking out potential sources. This pathway will be enabled by existing and new technologies that can bring LCF production to scale.

To enable RNG adoption in our systems by 2030, the Companies would need to interconnect anaerobic digestion facilities within our service territories in the near-term and procure additional volumes of RNG as needed from the wider region, following regulatory approval. As advancements in thermal gasification technology will be required to cost effectively scale RNG production from all feedstocks, the Companies would also explore a thermal gasification pilot in or near NYC. In the mid-2030s and beyond, it may become necessary to expand RNG procurement to anaerobic digestion facilities across the rest of the Eastern U.S and purchase RNG from local thermal gasification facilities.

Enabling hydrogen blending in our systems by 2040 would require upgrades to our existing gas infrastructure and interconnection to regional hydrogen supplies. Additionally, to deliver the quantities of hydrogen needed to enable net-zero emissions in steam production and electric generation, Con

Edison would need a dedicated hydrogen pipeline in its service territory by 2040. We further assume that hydrogen would be blended into our gas system from this dedicated pipeline.

SNG would be required to phase out fossil natural gas in the system after RNG and hydrogen have been sourced. The Companies may explore procurement pilots to test the SNG market and make targeted purchases to aid in market scale-up starting in the late 2030s.

Meeting projected demand growth from electrification will drive the need for future investments on the electric system, such as strengthening core utility infrastructure and building out both new capacity and new grid capabilities (*e.g.*, integration of DERs, peak demand management). Given the current uncertainty surrounding the pace of widespread adoption of electric solutions in buildings and long-duration storage, a decarbonized gas distribution system would help to enable NYS emissions goals and maintain system reliability and resiliency as buildings in our service territories electrify.

As discussed in the Reference Pathway, Con Edison and O&R will continue to emphasize the needs of DACs in all facets of its proposed natural gas system plans. The CLCPA requires that DACs receive a minimum of 35% of the benefits of spending on clean energy and energy efficiency programs, projects or investments in housing, workforce development, pollution reduction, energy assistance, energy, transportation, and economic development.

### c. Deep Electrification Pathway

The *Deep Electrification* Pathway incorporates the assumptions of the CAC/ NYSERDA integration analysis and meets the State's economy wide greenhouse gas emissions goals. This pathway assumes that gas delivery service is significantly reduced by 2050 to serve select large customers. Energy needs are assumed to be met almost fully through electrification and delivered steam produced by Con Edison's decarbonized district heating system. This pathway will require substantial technological advancement and regulatory support as well as expeditious customer adoption of different heating technologies. The Deep Electrification Pathway relies on significant legislative and regulatory framework shifts over the next 1-3 years to facilitate the achievement of this pathway's aims beginning immediately. Near-term policy developments are critical to catalyzing and compounding early successes in later years.

Con Edison and O&R anticipate that a limited set of customers that are extremely difficult-to-electrify will be permitted to retain natural gas service. The end-state result is the decommissioning of nearly the entire gas distribution system. This is consistent with the CAC Scoping Plan's gas transition discussion of strategic downsizing of gas infrastructure. The Companies' analysis indicates that preserving a small part of the system may be the most practical solution to support the most difficult-to-electrify customers. The ultimate evolution of gas system infrastructure will depend on the type of end-uses, the number and location of remaining customers, and their proximity to existing infrastructure.

The Deep Electrification Pathway envisions only a limited role for LCFs in the gas distribution system. Despite this limited role, it is important that the Companies be empowered to pursue these resources immediately. By 2030, we expect that 70 – 75% of all fossil natural gas procurement will be certified gas, and that by 2033, all fossil natural gas procurement will be certified gas. However, fossil natural gas procurement will decrease markedly over time as sales decline and RNG begins to enter the system. By 2050, LCFs will displace fossil natural gas altogether.

To enable RNG adoption in our system by 2030, the Company would need to interconnect anaerobic digestion facilities within our service territory in the near-term and seek regulatory approval to procure RNG in our gas distribution system. The Companies would also explore a thermal gasification pilot in or near NYC, as advancements in thermal gasification technology will be required to cost effectively scale RNG production from all feedstocks. In the long-term, the Companies would likely need to purchase RNG from local thermal gasification facilities to meet gas demand in our service territory.

### *i. Assumptions*

Deep Electrification represents a dramatic shift in the use of the Companies' existing natural gas distribution systems. This pathway requires a rapid transition to electrification of fossil natural gas fuel building heating to minimize the need for combustion at customer locations. Approximately 74% of residential and commercial customers (as measured by floorspace) will transition to electric space heating by 2043 under the Deep Electrification Pathway. This is projected to drive an approximately 82% reduction in annual gas throughput. The Deep Electrification Pathway, like the Reference and Hybrid Pathways, assumes that carbon offsets will be used to meet net-zero GHG targets after direct GHG emissions reductions are achieved. The end-state assumptions for the Deep Electrification Pathway are captured in Figure 53, below.

Figure 53: Summary of Deep Electrification Pathway End-State (2043) Assumptions

| Category | Description - CECONY | Description – O&R |
|---|---|---|
| Key Features | Relies on existing technology solutions.<br>Eliminates emissions in the buildings sector. | |
| Sales and Peak Demand | Customers/services/footprint decline starting in 2029. Gas volumes reduced by 92% (O&R) and 97% (Con Edison) by 2050. | |
| Policy Action Assumed | Electrification of space and water heating aligned with CAC Integration Analysis Scenario 3. No new business in the mid-to-long-term as customers are required to electrify. Oil to gas conversions discontinued within five years. | |
| Capital Expenditures | Customer Connections phased out by 2031, main replacement programs end by 2031 (Con Edison and O&R); routine CapEx in rate case though 2024 (O&R) and 2025 (Con Edison) then proportional to main mileage | |
| Challenges | Requires building codes and standards that mandate building electrification. Requires emergence of long-duration battery storage | Same as CECONY |
| % of floorspace with gas heating | 13% | 21% |
| % of floorspace with gas water heating | 13% | 21% |
| % of floorspace with gas cooking/other | 13% | 21% |
| % of floorspace with heat pumps | 73% | 77% |
| % of floorspace on steam | 6% | 0% |
| % of floorspace on oil | 7% | 2% |
| % of floorspace with hybrid heating | 0% | Same as CECONY |
| Building Envelope (% reduction in space heating load) | 2030: 20% reduction in energy consumed per square foot in buildings due to appliance and building shell improvements; 2043: 41% reduction | Same as CECONY |

| Category | Description - CECONY | Description – O&R |
|---|---|---|
| Heat pump COP - Average Heating | ASHP: 2 - 2.9; GSHP: 2.9 - 3.4 | Same as CECONY |
| Heat pump COP - Peak Heating | ASHP: 1.4 - 2.1; GSHP: 2.7 - 2.8 | Same as CECONY |
| % of LDVs electrified | 86% | Same as CECONY |
| % of M/HDVs electrified | 53% | 42% |
| % of MTA buses electrified | 100% | n/a |
| Gas sales (TBTU) | 31 | 8 |
| Gas peak demand (MDt/Day) | 291 | 74 |
| Gas volume (% reduction from 2023) | 84% | 69% |
| Gas sector emissions reduction (% from 2023) | 88% | 77% |
| Electric sales (GWh) | 94,401 | 7,787 |
| Electric peak demand (GW) | 19,408 - 24,760 | 1,654 - 2,211 |
| Electric Peak (% increase from 2022) | 49 - 91% | 45 - 93% |
| Steam sales | 10 TBTU | n/a |
| Economy-wide emissions reduction (from 1990) | 86% | 82% |
| Gas supply for electric generation (100% clean Hydrogen) | 27 TBTU | n/a |
| Gas supply for steam production | 3 TBTU | n/a |
| Certified Gas (% of 2043 gas distribution) | 79% | Same as CECONY |
| RNG (% of 2043 gas distribution) | 21% | Same as CECONY |

#### *Electric Generation*

Clean hydrogen is introduced for gas-fired electric generation located in the Con Edison and O&R service territories in 2035, and transitions to 100% hydrogen by 2040 to achieve CLCPA targets for 100% clean electricity. From a technology standpoint, this pathway will be enabled by the development and inclusion of clean hydrogen production technologies and/or infrastructure that will bring hydrogen to our service territory.

#### *Building Heating*

For Con Edison in the Deep Electrification Pathway, renewable electricity and decarbonized steam are used to serve approximately 80% of space heating load in NYC and Westchester by 2043, with 15%-20% of building square footage retaining a gas connection for space heating. Deep Electrification includes incremental electrification and energy efficiency through improved appliance efficiency and building envelope upgrades. The vast majority of customers are unable to replace gas equipment at end-of-life in the mid-long-term. In addition, the Companies have adjusted the O&R Deep Electrification Pathway model to allow for partial electrification of buildings similar to Con Edison.

### *ii. Sales and Peak Demand Projections*

Sales volumes in the first several years are consistent with the other pathways. However, the rapid pace of conversion to electricity drives a steep decline in sales and peak demand as compared to the Reference and Hybrid Pathways. See Figure 54 and Figure 55, below.

Figure 54: 20-Year Deep Electrification Pathway Gas Sales Volume Compared to the Reference Pathway

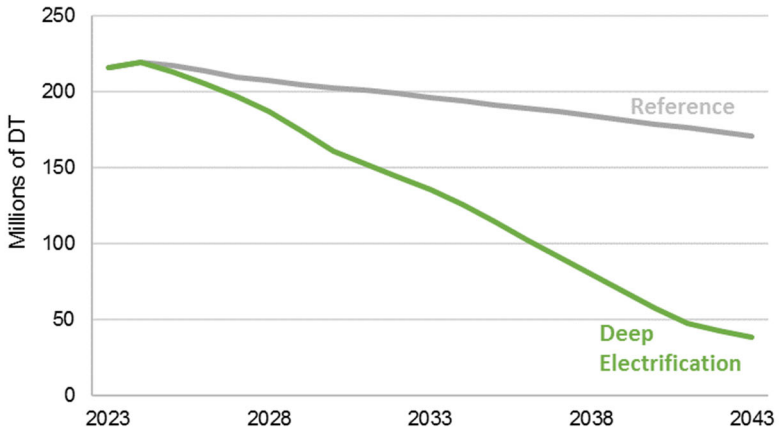
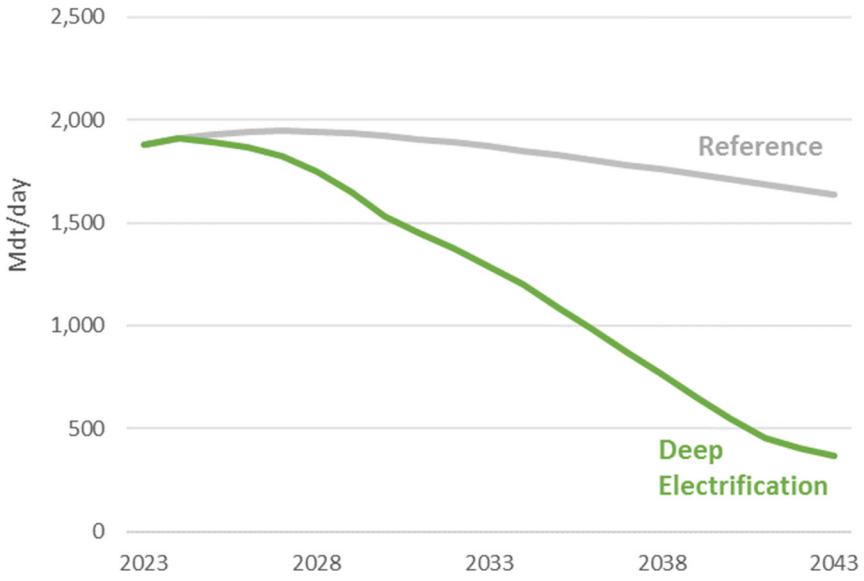



Figure 55: 20-Year Deep Electrification Pathway Peak Demand Projection Compared to the Reference Pathway




The rapid scale-up in energy efficiency discussed in the Reference Pathway and shown in Figure 38 would also be needed for the Deep Electrification Pathway. However, to enable the more aggressive GHG reductions in the Deep Electrification Pathway, a 20% reduction in in space heating load per square foot in buildings is needed by 2030, and 41% by 2043 (compared to today). These additional reductions were factored into the Deep Electrification Pathway sales and peak projections but would necessitate further scaling of energy efficiency investments.

### *iii. Capital Expenditure Plan*

Similarly, to the Reference and Hybrid Pathways, the Deep Electrification Pathway maintains the planned capital budgets through 2025 (Con Edison) and 2024 (O&R) which reflect previously developed and submitted capital investment plans in their respective rate cases.

Due to the reduction in gas system footprint under this pathway, capital spending is projected to reduce significantly over the twenty-year period. Con Edison capital expenditures in the Deep Electrification Pathway decrease by approximately 92% over the twenty-year forecast horizon as illustrated in Figure 56 and there is a 95% reduction for O&R as illustrated in Figure 57.

Figure 56: Con Edison Deep Electrification Pathway Capital Expenditure (2023-2043)

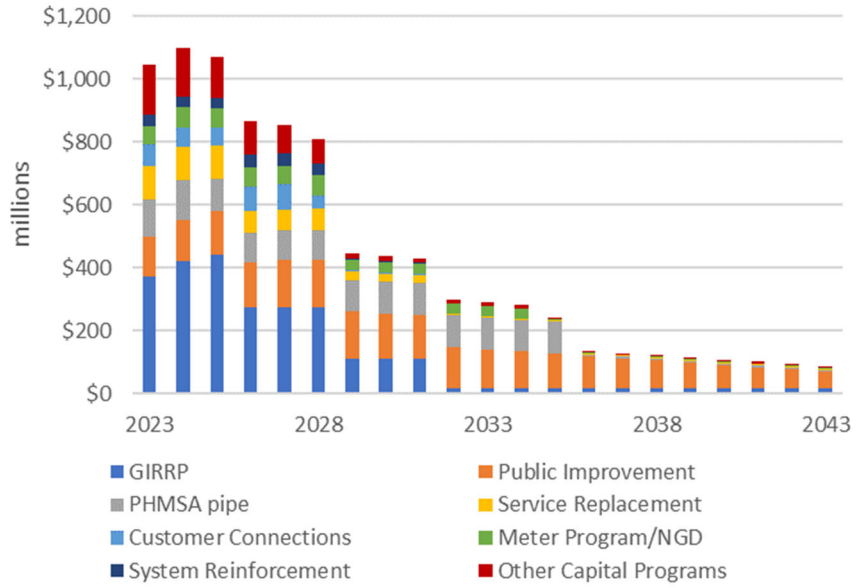
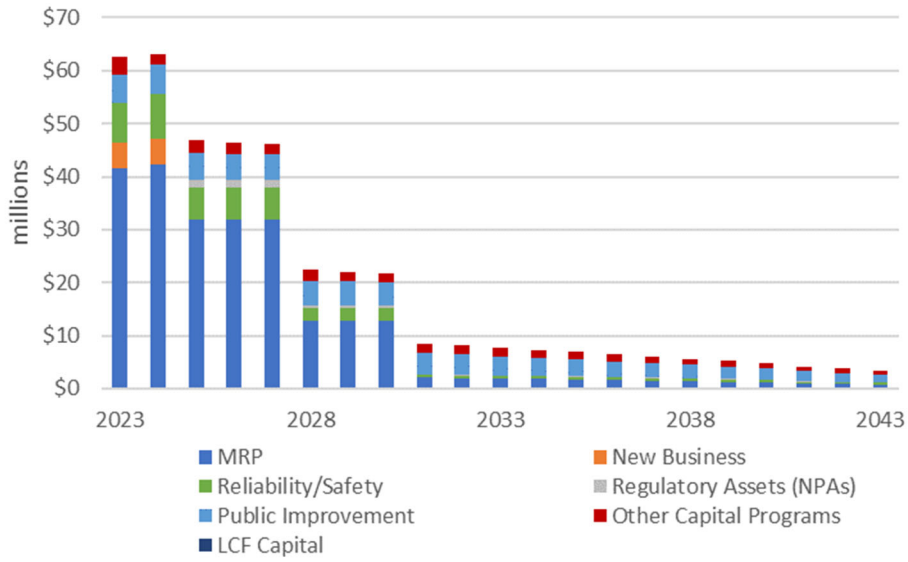



Figure 57: O&R Deep Electrification Pathway Capital Expenditure (2023-2043)




The high-level assumptions previously identified in the Hybrid Pathway also apply to the Deep Electrification Pathway at a faster pace.

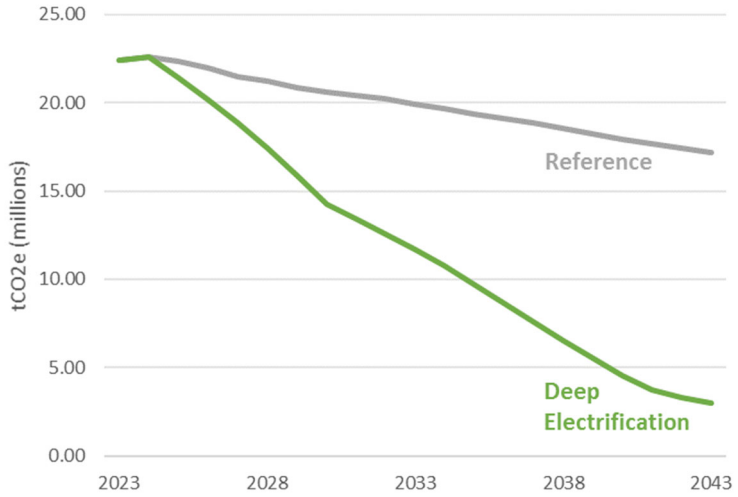
- Using NPAs where feasible for the replacement of aged or leak-prone assets.

- Maintaining threshold level of routine capital expenditures (CapEx) that declines as the projected customer demand shrinks over time.
- The new business CapEx decline is phased out for O&R altogether in 2025. Con Edison expects a significant decline in customer connection capital expenses in 2028, and elimination of these investments altogether by 2032.

### *iv. Gas Sector GHG Emissions*

Core assumptions on the timing and emissions impact of GIRRP, MRP, and certified gas are consistent between the Hybrid and Deep Electrification Pathways. The difference in GHG emissions over time is driven primarily by the significantly lower gas sales volume seen in Deep Electrification. GHG emissions will decline by 87% through 2043 under the Deep Electrification Pathway. See Figure 58, below.

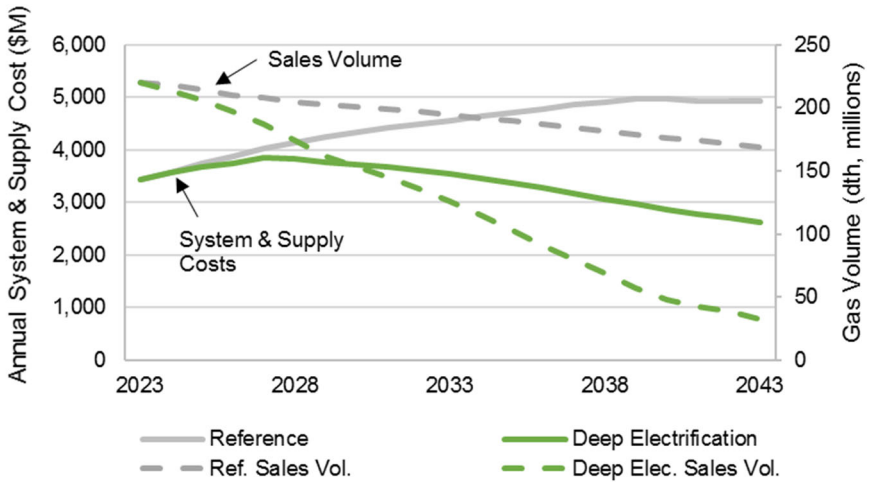
Figure 58: Deep Electrification Pathway Gas sector GHG Emissions Compared to the Reference Pathway (Con Edison and O&R Combined)




### *v. Projected Costs: Deep Electrification*

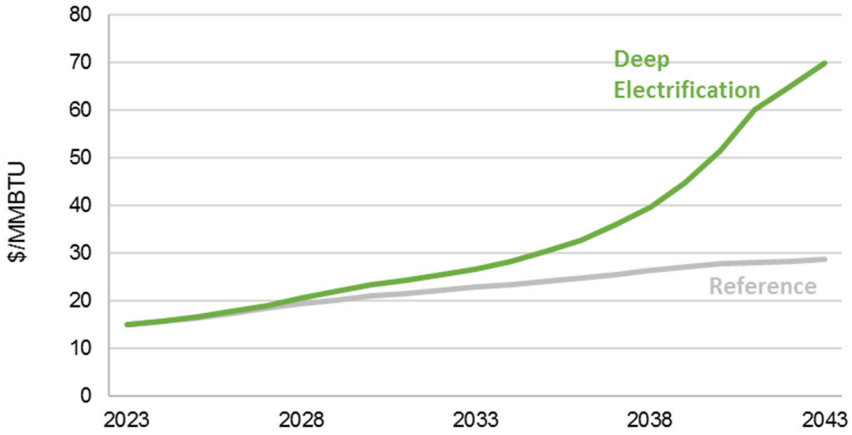
Capital investments under the Deep Electrification Pathway are projected to decline by 50% compared to the Reference Pathway due largely to the significant decrease of the Companies' main replacement programs and other capital-intensive programs as system use declines and the distribution system is decommissioned. Annual O&M expenditures begin to decline starting in 2028 consistent with timing for significant abandonment of main and service assets.

Figure 59: Deep Electrification Pathway Gas System and Fuel Supply Costs and Sales Volumes Compared to the Reference Pathway




While system costs will decline significantly, so will the base of customers to which such costs apply. The pace of customer conversion under Deep Electrification strategies will create untenable rate increases for remaining customers that would lead to even greater customer losses. Figure 60 illustrates this trend through 2043. The exponential increase in rates is projected to continue through full achievement of the State's economy-wide clean energy objectives in 2050.

Figure 60: Deep Electrification Pathway Gas System Rate ($/MMBtu)



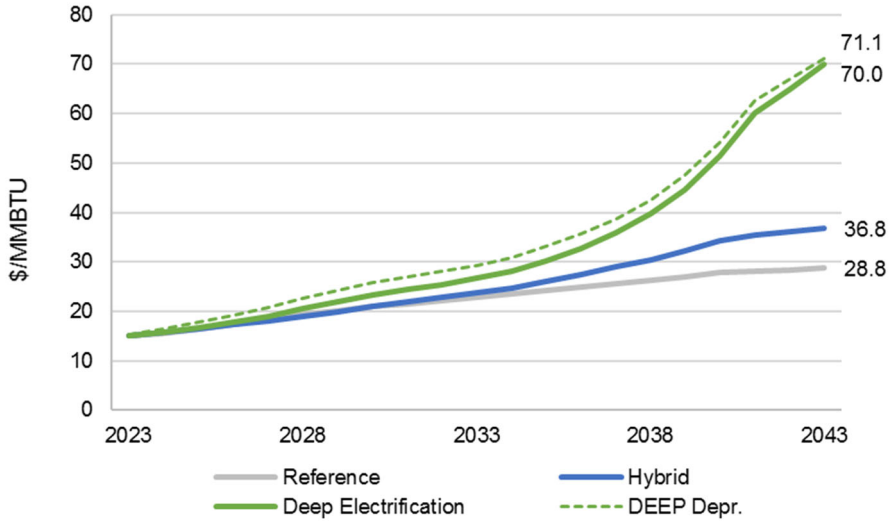

### *Accelerated Depreciation*

The clean energy transition will shorten the standard lifecycle of gas investments. Without a change in policies that direct utility depreciation practices, gas customers that remain on the system could be forced to bear rapidly escalating costs as electrification efforts take effect. Alternative depreciation approaches can help to address this unintended result of decarbonization policies.

Con Edison and O&R made a filing with the Commission in November 2022 that examined the structure of accelerated depreciation and its potential impact on customers through 2050.[87] The analysis sought to provide illustrative examples for how the CLCPA may impact the Companies by applying four depreciation methodologies to three scenarios with varying levels of gas sales, ranging from business as usual to medium and high levels of electrification of customers. The analysis showed that, absent a policy intervention to facilitate an alternative depreciation strategy, as 2050 approaches assertive decarbonization policies will cause the revenue requirement per customer to increase at an exponential rate. Failing to increase depreciation in the near term will produce significant intergenerational inequity as gas demand and the number of customers decline. Customers remaining on the system will bear a significantly higher share of the costs of the Companies' assets.

Accelerating depreciation can help with recovering investment costs and reducing intergenerational inequity. However, it is unlikely to alleviate the problem entirely. The Companies' analysis showed that even depreciating over a period shortened by 10 years or depreciating all assets through 2050 will still result in a significant amount of remaining rate base due to capital expenditures that will be required to maintain a safe and reliable system for customers.

Figure 61: Gas System Rate ($/MMBtu)




[87] Gas Planning Proceeding, Con Edison and O&R Depreciation Study: Analysis of Gas Planning Scenarios (November 8, 2022).

Figure 62: Gas System and Fuel Supply Costs per Customer

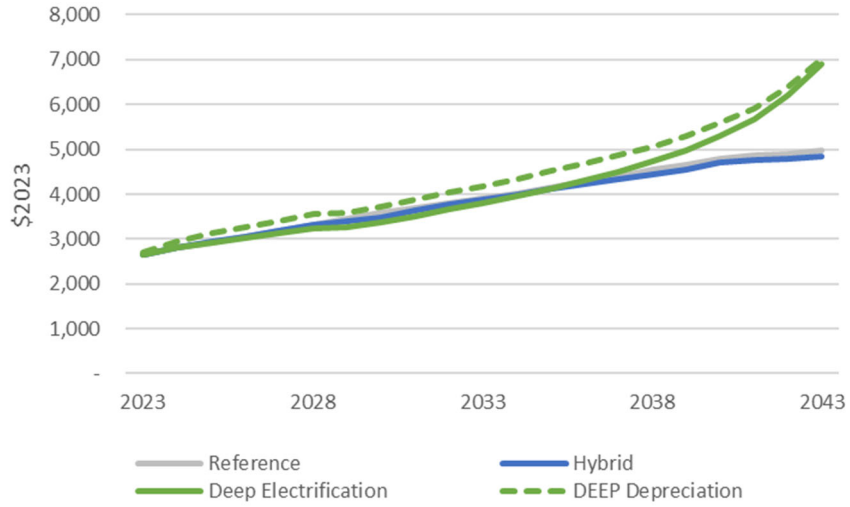
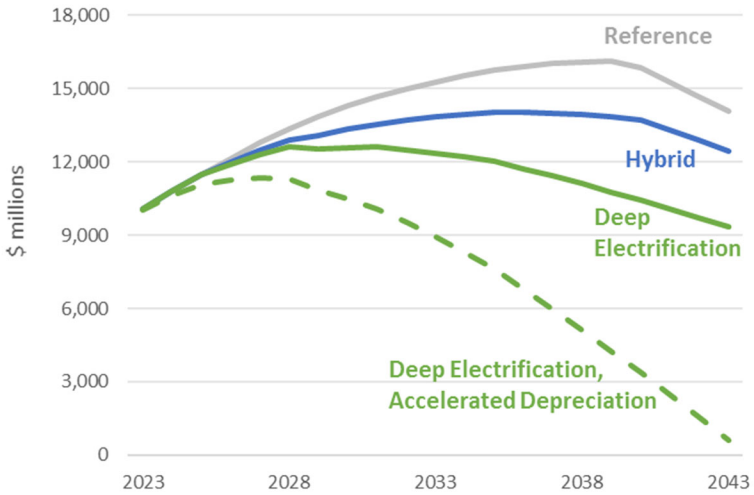



Figure 61 and Figure 62 suggest that accelerating the depreciation of gas investments would have a limited effect on the System Rate and costs per customer through 2043. However as is illustrated in Figure 63, accelerating depreciation would reduce the net (undepreciated) plant balance that remains in 2043 by over $8.5 billion.

Figure 63: Con Edison and O&R Rate Base, All Pathways (2023-2043)




A range of appropriate cost recovery mechanisms should be explored to address the potential unrecovered costs that are likely to remain in 2050.[88] Other cost reduction mechanisms include securitization using bonds issued to finance plant balances, a trust fund created to support these future

[88] See, Con Edison 2019 Rate Case Proceeding, Study on Depreciation and Climate Change (June 1, 2021).

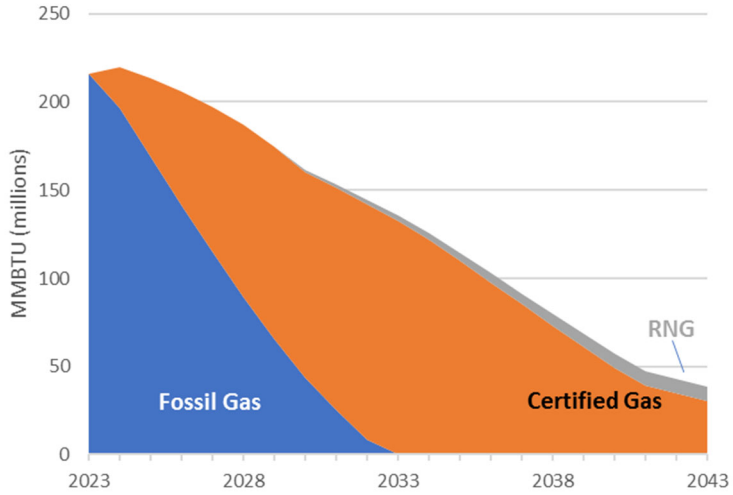
obligations and a public benefits charge, which would be applied to fund costs associated with new policies that provide a societal benefit.

### *vi. Natural Gas System Profile, Supply Resources: Deep Electrification Pathway*

The Deep Electrification Pathway contemplates a reduction in the existing gas system footprint of approximately 95% by 2050. There are multiple ways that gas system infrastructure may evolve to serve remaining consumption. This will depend on the type of end-uses, number and location of remaining customers, and proximity to existing infrastructure.

In this pathway, RNG enters the Con Edison distribution system in 2030 and makes up 21% of the supply for gas distribution by 2043. RNG is blended with fossil natural gas in the system before fully displacing fossil natural gas in the gas system by 2050. The Companies assume that we begin procuring certified natural gas in 2024. By 2030, 73% of fossil natural gas is Certified Gas, and by 2033 all fossil natural gas needs are met through the procurement of certified gas. See Figure 64 below.

Figure 64: Deep Electrification Pathway - Total System Throughput and Gas Composition (2023-2043)




RNG would primarily be sourced locally. In an "achievable deployment" scenario where only 33% of total RNG feedstock is captured (ICF RNG Technical Potential Study), 10 TBTU of RNG is estimated to be available in the Con Edison service territory, and 1.3 TBTU in the O&R service territory. The RNG need in this pathway is based on the amount required to fully displace fossil natural gas in the distribution system by 2050, which is 6 TBTU for Con Edison and 2 TBTU for O&R. Thus, the total RNG potential in the CEI service territories is enough to supply 100% of CEI gas demand in 2050. RNG is first phased into the system in 2030, and its full amount is realized by 2040.

### *vii. Achieving the Deep Electrification Pathway*

Similarly, to the Hybrid Pathway, achieving the outcomes envisioned in the Deep Electrification Pathway will require collaboration with our regulators and state energy policy leaders and will require significant regulatory and legislative actions. A regulatory framework is needed for transitioning existing customers off the gas system and key polices including eliminating the existing obligation to service, improving the Companies' ability to transition existing customers off gas system, and effectively eliminating all new customer connections and entitlements with extremely limited or no exceptions. It is critical that the

Companies continue making investment for gas safety and reliability while reducing the footprint and recover its investments made to date.

### d. Comparison of Pathway Assumptions and Dependencies

In response to feedback from PA Consulting and stakeholders, the Companies committed to providing further detail on its technology adoption assumptions in the Revised GSLTP, including high level assumptions pertaining to Market Readiness and Policy/Regulation "dependencies" and assumptions that indirectly support adoption rates for different technologies in the Hybrid and Deep Electrification Pathways.

#### *i. Assumptions on Electrification Adoption and Pathway Dependencies*

Figure 65 compares the adoption of electrification measures assumed in 2030 and at the pathway end-state of 2043 for the Hybrid and Deep Electrification Pathways. These assumptions are further supported by Figure 66, which provides details on the Companies' high-level assumptions for Market Readiness and Policy/Regulation dependencies that indirectly support adoption rates for space heating.

Figure 65: Comparison of Building Electrification Adoption in 2030 and 2043

| 2030 | |
|---|---|
| Hybrid | Deep Electrification |
| Electric Heat Pump Adoption | |
| SFH: 18%<br>MFH: 9%<br>COM: 9% | SFH: 23%<br>MFH: 22%<br>COM: 23% |
| Total: 10% | Total 22% |
| HP Water Heater Adoption | |
| SFH: 21%<br>MFH: 16%<br>COM: 18% | SFH: 21%<br>MFH: 22%<br>COM: 23% |
| Total: 18% | Total: 22% |

| 2043 | |
|---|---|
| Hybrid | Deep Electrification |
| Electric Heat Pump Adoption | |
| SFH: 60%<br>MFH: 26%<br>COM: 28% | SFH: 73%<br>MFH: 72%<br>COM: 76% |
| Total: 36% | Total: 74% |
| HP Water Heater Adoption | |
| SFH: 72%<br>MFH: 65%<br>COM: 49% | SFH: 76%<br>MFH: 76%<br>COM: 76% |
| Total: 62% | Total: 76% |

Figure 66: Summary and Comparison of Building Electrification Assumption Dependencies [89]

| | | Hybrid Pathway | Deep Electrification |
|---|---|---|---|
| ** | **Ongoing:** Develop the skilled workforce necessary to deliver upgrades at the required pace and scale | ✓ | ✓✓ |
| ** | **Ongoing:** Facilitate deployment of innovative third-party financing models | ✓ | ✓✓ |
| * | **Ongoing:** Protections for low-income customers who do not currently pay directly for heating | ✓ | ✓✓ |
| ** | **Ongoing:** Policy support for technical innovations to enable electrification of difficult-to-convert customers | | ✓ |

[89] Double check marks indicate that deeper intervention will be required relative to the other decarbonization pathways. The highlighted dependencies were explicitly modeled in the pathways analysis at the cost and scale shown in Figure 47 (Hybrid Pathway) and Figure 56 (Deep Electrification Pathway). The remaining dependencies are assumed to be required to achieve the levels of electrification in each pathway.

* Indicates dependencies that rely on regulatory and/or policy developments.

** Indicates dependencies that rely on market and/or technology development in addition to any regulatory and/or policy developments that may be also be needed.

| | | Hybrid Pathway | Deep Electrification |
|---|---|---|---|
| * | **By 2030:** Compression of building permitting cycle for building electrification and envelope upgrades | ✓ | ✓✓ |
| * | **By 2030:** Ability to gradually modify the gas footprint by eliminating any new customer connections and requiring existing customers in targeted areas to disconnect from the gas system | ✓ | ✓✓ |
| * | **By 2030:** Regulations that phase out fossil fuel use in **new buildings**, without exceptions | ✓ | ✓✓ |
| * | **By 2030:** Policies that support bundling electrification with building envelope upgrades | ✓ | ✓✓ |
| * | **By 2030:** Adoption of ultra-low GWP refrigerants | | ✓ |
| * | **By 2030:** Expanded incentives for early retirement of old heating systems | | ✓ |
| * | **By 2030:** All new sales of heating systems for low-rise residential buildings are heat pumps | | ✓ |
| * | **By 2035:** Regulations that phase out fossil fuel use in **existing buildings**, without exceptions | | ✓ |
| * | **By 2035:** All new sales of heating systems for MFH and COM are heat pumps | | ✓ |
| * | **By 2040**: Zero emission power sector | ✓ | ✓✓ |

### *ii. Assumptions on LCF's and Pathway Dependencies*

Figure 67 compares the level of LCF's assumed in 2030 and at the pathway end-state of 2043 for the Hybrid and Deep Electrification Pathways. Figure 68 provides details on the Companies' high-level assumptions for Market Readiness and Policy/Regulation dependencies that indirectly support the level of LCF's required.

Figure 67: Comparison of LCF Adoption in 2030 and 2043

| | Hybrid | Deep Electrification |
|---|---|---|
| 2030 | RNG: 4 TBTU (1 TBTU from AD in our service territories, 4 TBTU from AD in other parts of NYS and the Eastern U.S.)<br>$H_2$: 0<br>SNG: 0 | RNG: 1 TBTU (from AD in our service Territories)<br>$H_2$: 0<br>SNG: 0 |
| 2043 | RNG: 45 TBTU (4 TBTU from AD and 7 TBTU from TG in our service territories, 33 TBTU from AD in other parts of NYS and the Eastern U.S.)<br>$H_2$: 7 TBTU<br>SNG: 0 | RNG: 8 TBTU (4 TBTU from AD in our service territories, 4 TBTU from TG in our service territories)<br>$H_2$: 0<br>SNG: 0 |

Figure 68: Summary and Comparison of LCF Assumption Dependencies[90]

| | | Hybrid Pathway | Deep Electrification |
|---|---|---|---|
| * | **By 2023:** Hydrogen Hub approval (DOE); with a subsequent review by the PSC of matching funds | ✓ | |
| * | **Ongoing:** Support for continued use of our gas system to deliver low-carbon fuels for heating needs and dispatchable generation as an integral part of maintaining system reliability / resource adequacy | ✓✓ | ✓ |
| * | **By 2030:** Recognition and awareness of low-carbon fuels as a decarbonization solution and regulatory establishment of LCF definitions certification processes | ✓✓ | ✓ |

[90] *See supra*, note 76.

| | | Hybrid Pathway | Deep Electrification |
|---|---|---|---|
| ** | **By 2030:** Market growth for RNG produced from anaerobic digestion (AD) facilities, including government incentives to support the development of projects (e.g., tax credits) | ✓✓ | ✓ |
| * | **By 2030:** Approval to interconnect with and purchase RNG from AD facilities within our service territories | ✓ | ✓ |
| * | **By 2030:** Approval for pilots for LCF to test the impacts of these fuels in gas system planning (e.g., RNG interconnection) | ✓✓ | ✓ |
| * | **By 2030:** Approval to pass through costs of LCF to the customer | ✓ | ✓ |
| * | **By 2030:** Approval to purchase RNG from AD facilities in other parts of NYS and the Eastern US | ✓ | |
| ** | **By 2035**: Commercialization of and market growth for RNG produced from thermal gasification (TG) facilities, including government incentives to support the development of projects | ✓✓ | ✓ |
| * | **By 2035:** Approval to interconnect with and purchase RNG from TG facilities within our service territories | ✓✓ | ✓ |
| ** | **By 2040:** RNG is fully scaled from all feedstocks available to us at an average price of $19/MMBTU | ✓✓ | ✓ |
| * | **By 2035:** Approval for construction of dedicated hydrogen pipeline that delivers hydrogen to CECONY service territory and approval to recover costs | ✓ | |
| * | **By 2040:** Approval for pilots for LCF to test the impacts of these fuels in gas system planning (e.g., hydrogen blending) and proven means to control emissions from hydrogen combustion | ✓ | |
| * | **By 2040:** Regional hydrogen supply chain and scale-up of renewable generation fleet to power hydrogen production | ✓ | |
| ** | **By 2040:** DOE Hydrogen Shot production cost declines achieved (80% reduction) | ✓ | |

### *iii. Assumptions on Energy Efficiency Adoption and Pathway Dependencies*

Figure 69 compares the adoption of Energy Efficiency assumed in 2030 and at the pathway end-state of 2043 for the Hybrid and Deep Electrification Pathways. These assumptions are further supported by Figure 70, which provides details on the Companies high level assumptions on Market Readiness and Policy/Regulation dependencies that indirectly support adoption rates for Energy Efficiency.

Figure 69: Comparison of Energy Efficiency Adoption in 2030 and 2043

| | Hybrid | Deep Electrification |
|---|---|---|
| 2030 | 9% | 16% |
| 2043 | 23% | 32% |

Figure 70: Summary and Comparison of Energy Efficiency Assumption Dependencies[91]

| | | Hybrid Pathway | Deep Electrification |
|---|---|---|---|
| * | **Ongoing:** Coordination of utility program offerings with state and city programs for LMI customers | ✓ | ✓✓ |
| * | **Ongoing:** Codes and standards to improve energy efficiency, reduce emissions, and enhance building resilience in new construction and major retrofits | ✓ | ✓✓ |
| * | **By 2030:** Expanded funding for EE incentives to target building envelope improvements | ✓ | ✓✓ |

[91] *See supra*, note 76.

| | | Hybrid Pathway | Deep Electrification |
|---|---|---|---|
| ** | **By 2030:** Increased participation in programs for improved controls and demand response | ✓ | ✓✓ |
| * | **By 2035:** Expanded EE funding for low and moderate-Income customers | ✓ | ✓✓ |
| * | **By 2035:** Codes and standards to improve energy efficiency, reduce emissions, and enhance building resilience in existing buildings | ✓ | ✓✓ |

### *iv. Assumptions on Capex Assumptions and Pathway Dependencies*

The Hybrid and Deep Electrification Pathways were modeled to reflect certain assumptions around major categories of future capital expenditures such as new business, main replacement programs, other safety and reliability, climate initiatives and other investments. The Companies reviewed their respective Reference Pathway scenario capital investment plans to determine how potential actions may result in a revised future estimate of CapEx (Figure 71) using the dependencies for Hybrid and Deep Electrification Pathways shown in Figure 72.

Figure 71: Comparison of CapEx in 2030 and 2043

| CapEx Assumptions 2030 | |
|---|---|
| Hybrid | Deep Electrification |
| $7.8 B | $7.0 B |
| MRP & Service Replacements | |
| $3.7 B | $3.1 B |
| Customer Connections | |
| $401 M | $397 M |
| CES Programs | |
| $378 M | $334 M |

| CapEx Assumptions 2043 | |
|---|---|
| Hybrid | Deep **Electrification** |
| $15.0 B | $9.5 B |
| MRP & Service Replacements | |
| $6.6 B | $3.5 B |
| Customer Connections | |
| $436 M | $401 M |
| CES Programs | |
| $455 M | $357 M |

Figure 72: Summary and Comparison of CapEx Dependencies[92]

| | | Hybrid Pathway | Deep Electrification |
|---|---|---|---|
| * | **By 2023:** Regulations that phase out fossil fuel use in new buildings, with current list of exceptions continuing to serve gas to customers | ✓ | ✓ |
| * | **By 2026:** Ability to begin reducing MRP mileage gradually through 2032 from the current 80 miles/year (CECONY) | ✓ | ✓✓ |
| ** | **By 2026:** Begin phasing down all Gas EE programs through 2035 | ✓ | ✓✓ |
| * | **2026-2035:** Gradual migration of EE and NPA related costs from the gas rate base to the electric rate base | ✓ | ✓ |
| * | **By 2028:** NPA electrification work funded via electric rate base | ✓ | ✓ |
| * | **By 2029:** Ability to begin paring back capital investments in multiple categories (MRP, pressure control regulator stations, meters, etc.) to right-size investments. | | ✓ |
| * | **By 2030:** Obligation to serve and customer subsidies (100-foot rule) eliminated | ✓ | ✓ |
| * | **By 2030:** Ability to fund a dedicated hydrogen pipeline to serve dedicated infrastructure (CECONY) | ✓ | |

[92] *See supra*, note 76. Note: In Figure 72 double check marks indicate that *reduced* capex would be required relative to the other decarbonization pathway.

| | | Hybrid Pathway | Deep Electrification |
|---|---|---|---|
| * | **By 2030:** Ability to modify the gas footprint by eliminating any new customer connections and requiring existing customers to disconnect from the gas system | | ✓ |
| * | **By 2030:** Ability to gradually modify the gas footprint by eliminating any new customer connections and requiring existing customers in targeted areas to disconnect from the gas system, while maintaining the gas system in select areas | ✓ | |
| * | **By 2032:** Regulations that phase out fossil fuel use in new buildings, **without** exceptions | | ✓ |
| * | **By 2032:** Ability to wind down the MRP to only service emergent needs while being able to expand leak surveillance and repair activities | | ✓ |
| * | **By 2032:** Continue the MRP program primarily in the zones to keep gas. Zones to electrify will only have LPP work performed to address emergent needs. | ✓ | |

### *v. Conclusion on Pathway Assumptions and Dependencies*

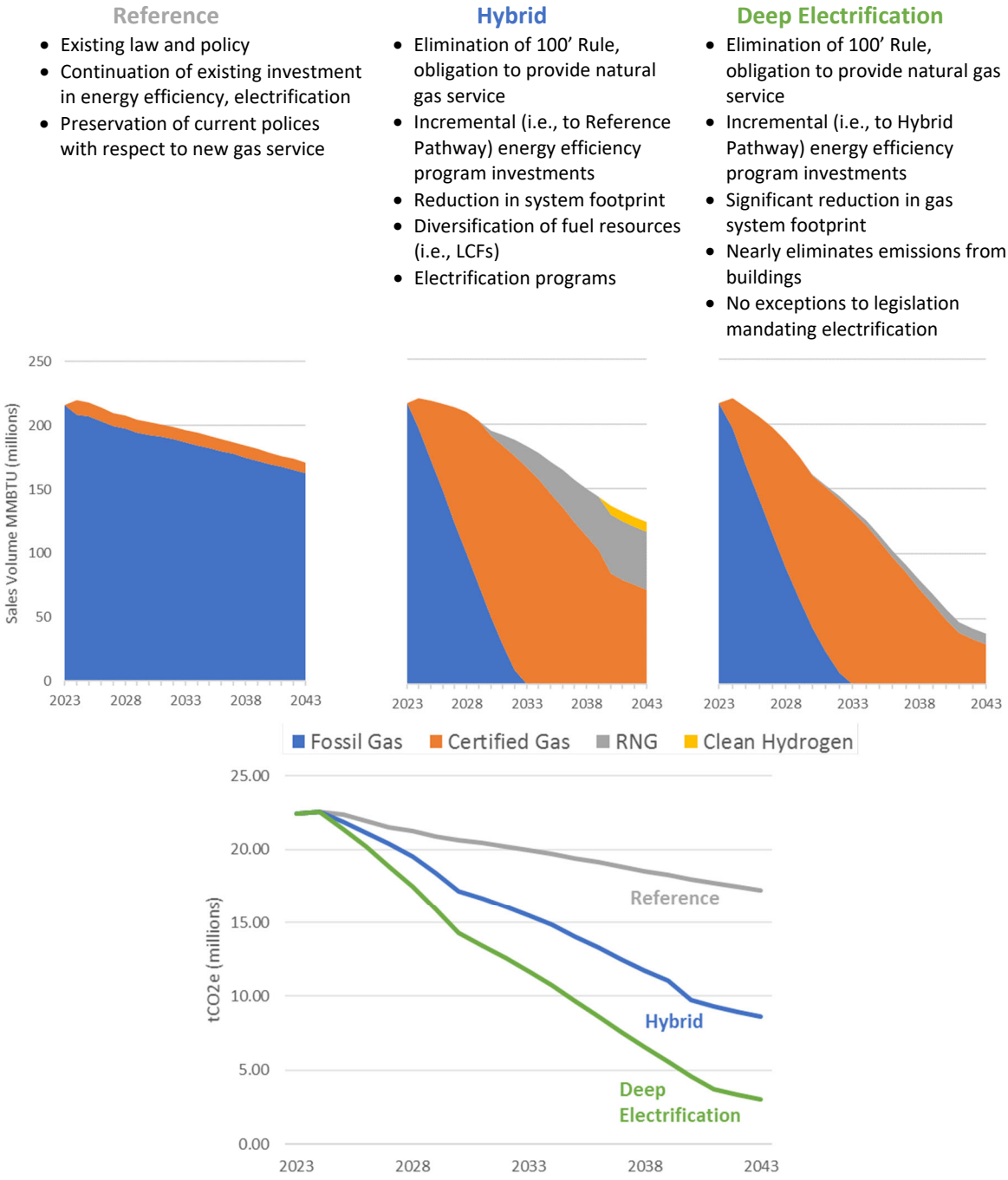
In reviewing the Hybrid and Deep Electrification Pathway dependencies, the Companies determined that many of the required actions are common to both the Hybrid and Deep Electrification Pathways, particularly prior to 2030. The pathway dependencies begin to diverge more meaningfully after 2030. The precise course that the transition will follow will be affected by both regulatory/legislative and technological changes noted in the dependencies figures above. The Companies cannot predict the final outcome at this time but will closely monitor and advocate for changes that will enable the State to make progress in moving toward a clean energy future. As such, the Companies need to plan for a range of possible outcomes in order to continue meeting our obligations to provide safe and reliable service.


## VI. Conclusion

Gas sales and emissions in the Con Edison and O&R service territories are projected to fall in all three pathways evaluated in this GSLTP. The decline in emissions in the Reference Pathway will result from existing energy efficiency and electrification programs that are expected to continue. However, the Reference Pathway's substantial reliance on conventional fossil natural gas will prevent achievement of sufficient GHG emissions reductions to meet the CLCPA targets.

Stakeholders understand that a business-as-usual approach will be insufficient to achieve New York's economy-wide objectives. Figure 73, below indicates the departure from the status quo that is necessary to achieve a carbon-neutral economy by 2050. Ambitious decarbonization strategies that include energy efficiency, electrification, and procurement of LCFs will enable more meaningful emissions reductions.

Figure 73: Reference, Hybrid, and Deep Electrification Pathways - Total Sales by Resource Type, Gas Sector GHG Emissions (2023-2043)




Con Edison and O&R will continue to advocate for regulatory reforms that will facilitate the investments and programs that can drive emissions reductions and progress toward New York State's goals. Policy reforms must be designed to achieve decarbonization while managing customer costs. Significant progress in emissions reductions may be costly. Figure 74 and Figure 75 demonstrate that the customer impact of robust decarbonization policies is expected to be significant. The gas system rate under the Deep Decarbonization Pathway would nearly double that of the Reference Pathway by 2043.

Figure 74: Gas System and Fuel Supply Costs and Sales Volume (2023-2043)

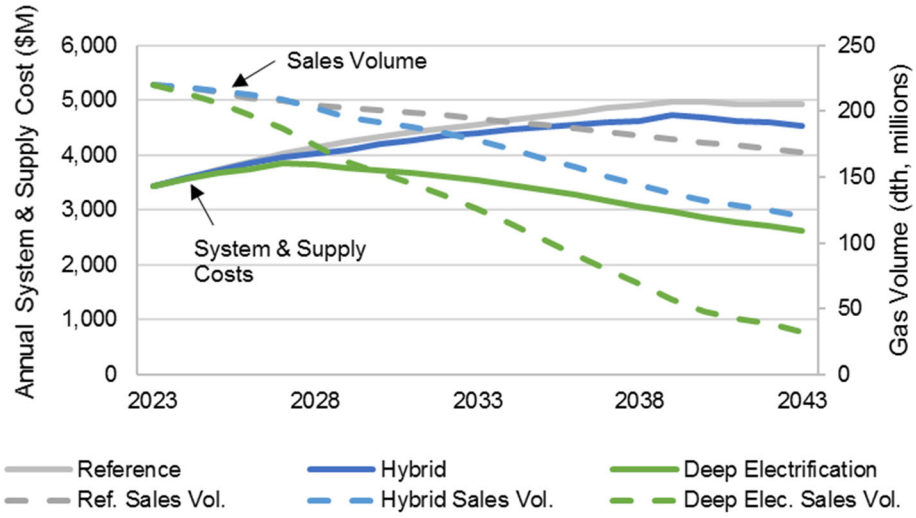
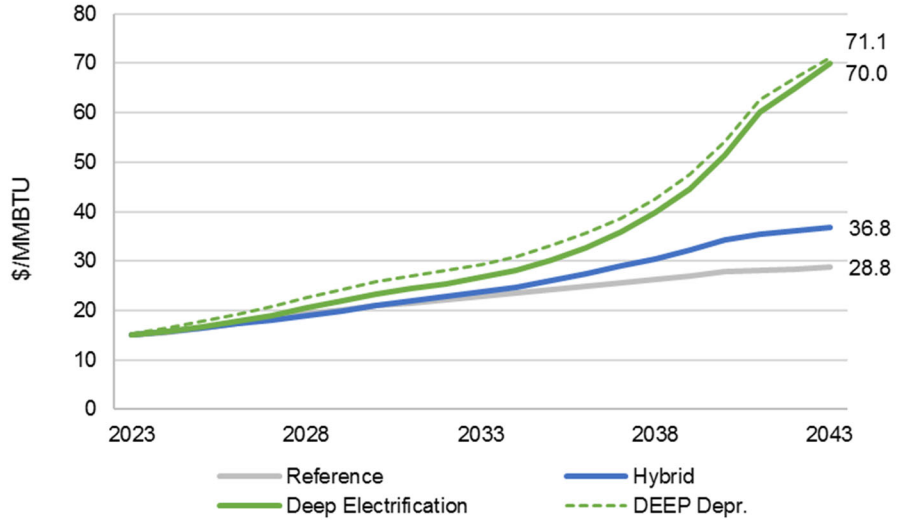



Figure 75: Gas System Rate ($/MMBtu)




The trajectory of potential bill impacts over time conveys the urgent need to avoid disproportionally burdening customers that will remain in later periods by taking action now and seeking creative solutions that recover system costs during the period of high utilization and over a large customer base (*e.g.*, through the use of accelerated depreciation and other changes to capital recovery policies, innovative cost reduction programs, tapping alternative sources of funding, etc.)

Achieving the State's vision for the future will require partnership, determination, advances and scaling of various technologies and widespread customer adoption of cleaner forms of energy. The Companies expect to shrink the size of their natural gas distribution systems to align with the decrease in fossil natural gas customers. Con Edison and O&R will continue to encourage regulators and legislators to make constructive policy changes that will enable this gradual resizing, along with decarbonization of

the remaining supply. Allowing the Companies to procure, transmit, and deliver LCFs during and throughout the transition will provide a valuable path to compliance for hard-to-electrify buildings. Achieving this result will require regulatory reforms that support safety and reliability investments in the gas system to enable the delivery of these substantially lower volumes of fuels to customers—especially those for which electrification presents the most significant challenges. Allowing prudent LCF investment in stages beginning today will allow the market to mature in time to support a ramp up in procurement that is necessary to meet the State's objectives.

Innovative approaches to accelerated depreciation and associated financial models, if implemented expeditiously, will balance the effect the energy transition will have on customers and the Companies throughout the transition. Likewise, the Companies and customers will benefit from a regulatory framework that encourages needed safety and reliability investments while continuing core features of the utility service model including the opportunity to earn a fair return.

Con Edison and O&R are well equipped to coordinate the evolving needs of both the electric and gas systems and we stand ready to enable New York's clean energy future. We look forward to continuing to collaborate with our customers, stakeholders, and policymakers to decarbonize the New York economy.