



Phelps Gate Station

Natural Gas Long-Term Plan Technical Session

Case 23-G-0437

November 29, 2023

NYSEG/RG&E's Planning Team is Comprised of a Diverse Group of SMEs



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NYSEG · RG&E

Part of the Avangrid family

The Initial LTP Filing Contains Significant Supporting Documentation



Initial Gas Long-Term Plan

New York State Electric & Gas
and Rochester Gas and Electric

Case 23-G-0437

October 2, 2023

Executive Summary *(16-page overview)*

Report *(79-page narrative description of LTP)*

- I. Introduction
- II. Service Area Characteristics
- III. Reference Case
- IV. Decarbonization Transition
- V. LTP Methodology
- VI. Long-Term Plan
- VII. Conclusions and Implementation Actions

Appendices *(~175 pages of detailed documentation)*

- A. Modeling of Decarbonization Actions
- B. Energy Prices
- C. Benefit-Cost Analysis Methodology
- D. Scenario and LTP Modeling Outputs
- E. Reference Case Documentation



Avangrid is Committed to Reducing GHG Emissions

Commitments include:

- Carbon neutral scope 1 and 2 emissions by 2030
- Connect renewable energy to over 3 million customers in the Northeast
- Utility actions:
 - Help customers increase energy efficiency and other key programs
 - Facilitate adoption of electric heat pumps and other cleaner, less-emissions-intensive heating options
 - Engage DAC, LMI communities; stakeholder collaboration
 - Continue leak-prone pipe replacement
 - Invest in gate and regulatory station modernization
 - Design and implement Utility Thermal Energy Network Pilots
 - Connect RNG
 - Study blending of green hydrogen
- Develop Just Transition Plan to ensure that customers, communities, and workers are not left behind in the energy transition.

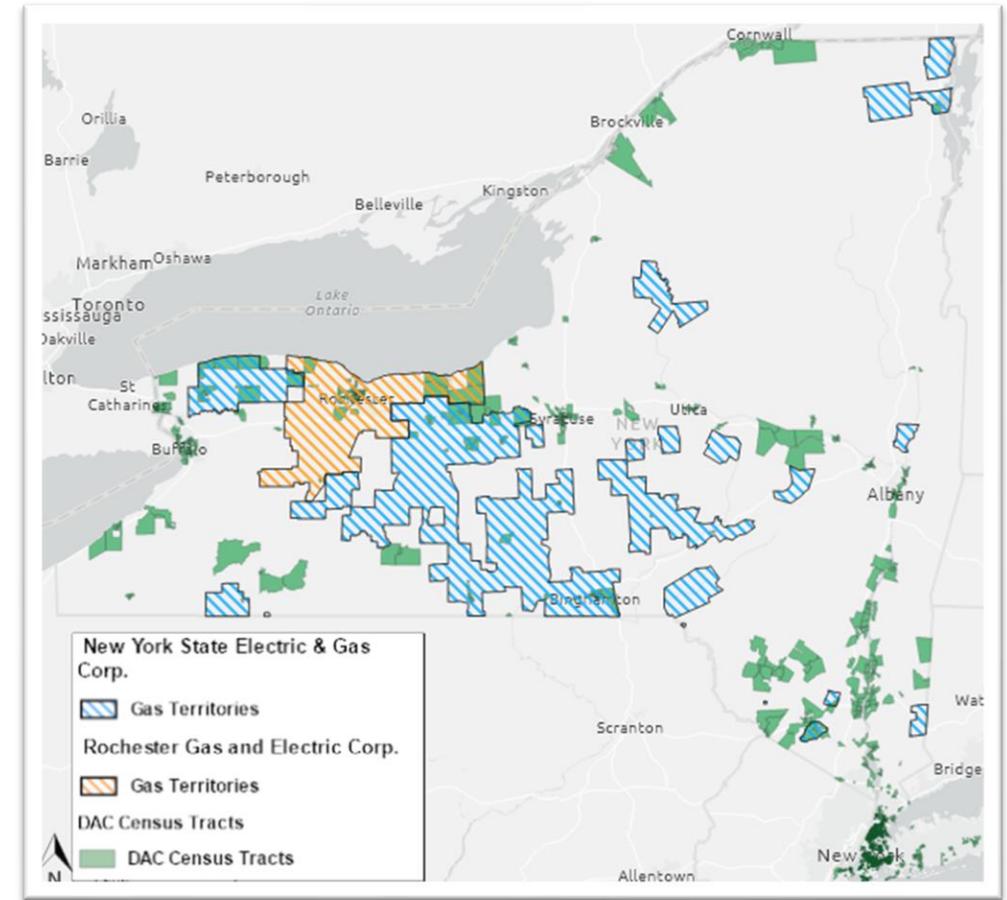
AVANGRID seeks to contribute actively and decisively to a low-carbon and sustainable future, delivering clean, low emission energy, minimizing the environmental impact of our activities and supporting and promoting actions that address climate change. Such efforts must be compatible with social and economic growth.
(Climate Action Policy, Feb. 2023)

The Impact of the LTP on Disadvantaged Communities and Low- and Moderate-Income Customers Must be Addressed



A foundational aspect of Avangrid’s “Just Transition” is respectful engagement with communities (including DACs) and constituencies (including LMI customers) with the objective of making a positive impact. NYSEG and RG&E are currently pursuing positive outcomes for DACs and LMI customers through several policies and programs including:

- Explicit consideration of DACs when prioritizing capital investments.
 - Three of the Companies’ existing larger LPM replacement projects are located within DACs.
- Explicit consideration of DACs as part of the NPA processes.
- Procurement practices that result in 85% of vendor companies meeting sustainability standards based on a 43-factor ESG score.
- Continuation of the Residential Methane Detection Program that distributes devices to low-income customers to alert customers of the presence of methane in their homes, accompanied by safety outreach and education.



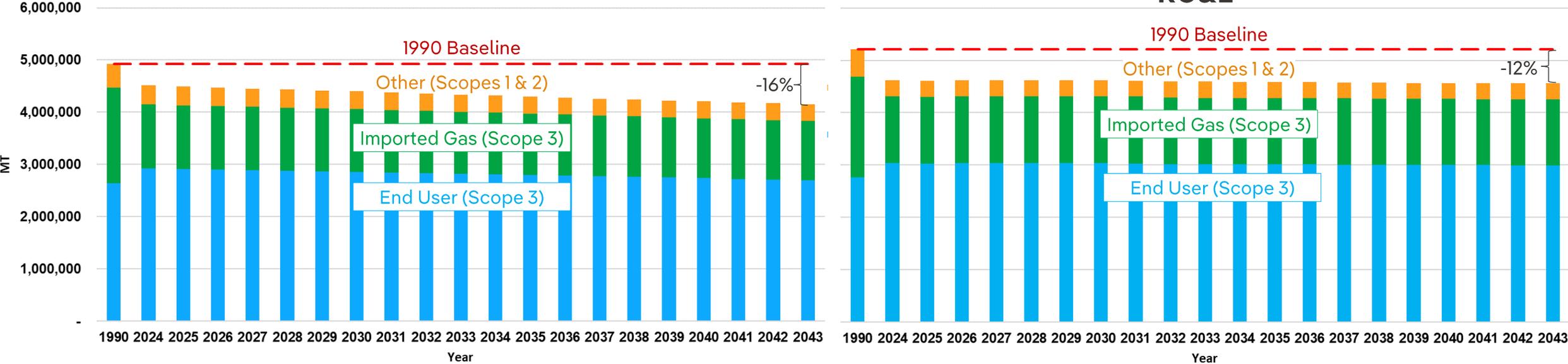
Scope 3 Emissions Must be Addressed to Achieve Emissions Reduction Goals



Reference Case GHG Emissions CO2e (20-Year Global Warming Potential)

NYSEG

RG&E





The LTP Reflects a Judicious Balance Among Guiding Principles



Safe Operations: Meet or exceed all applicable safety regulations, policies, and procedures to assure safe operations of the gas network.

Adequate & Reliable Service: Maintain adequate and reliable delivery and energy supply service to all customers throughout the year, including on the coldest days.

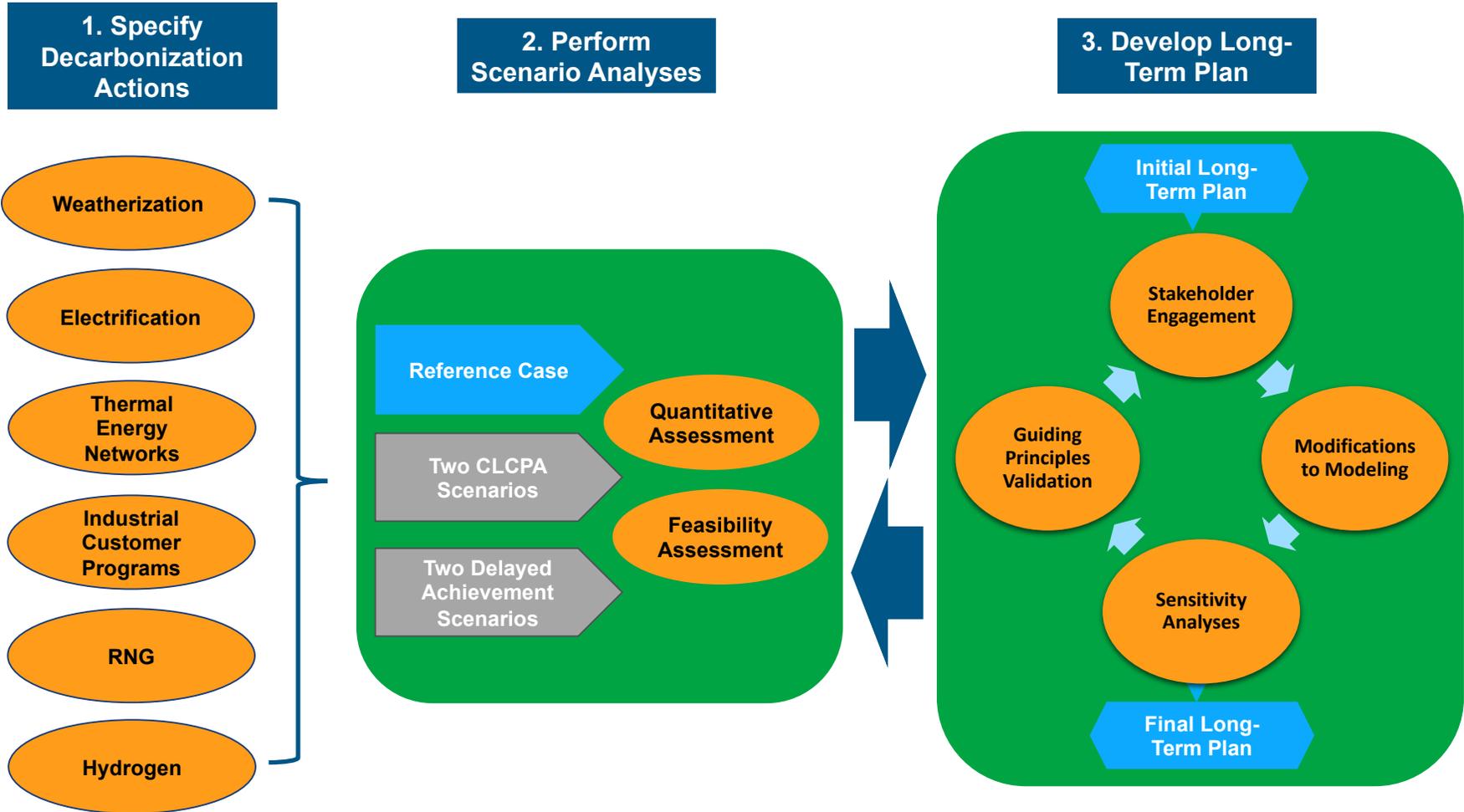
Energy Affordability: Plan and operate the network, acquire energy supplies, and pursue environmental objectives as efficiently as possible to maintain affordability, with particular attention to the needs of LMI customers and DACs.

GHG Emissions Reductions: Propose, design, and execute climate actions to achieve responsible, meaningful, and sustained GHG emissions reductions.

Customer Choice: Preserve customer choice regarding customer-sited energy investments and energy usage, consistent with legislative and regulatory mandates.

Energy Resilience: Promote energy system resilience by anticipating threats posed by climate change and avoiding or minimizing the impact and duration of major energy outages.

The Long-Term Plan Methodology Employs a 3-Step Bottom-Up Analysis





Step 1 Involves Specifying Six Decarbonization Actions

Weatherization

Install building envelope weatherization measures (e.g., insulation) to reduce energy use.

Building Electrification

Install air source heat pumps and electrify other gas appliances to reduce natural gas use and increase electric use.

Industrial Customer Programs

Increase energy efficiency of natural gas use in process loads, electrify space heating, and employ carbon capture.

Thermal Energy Networks

Install ground source heat pumps served by a thermal energy (e.g., ground source) network.

Renewable Natural Gas

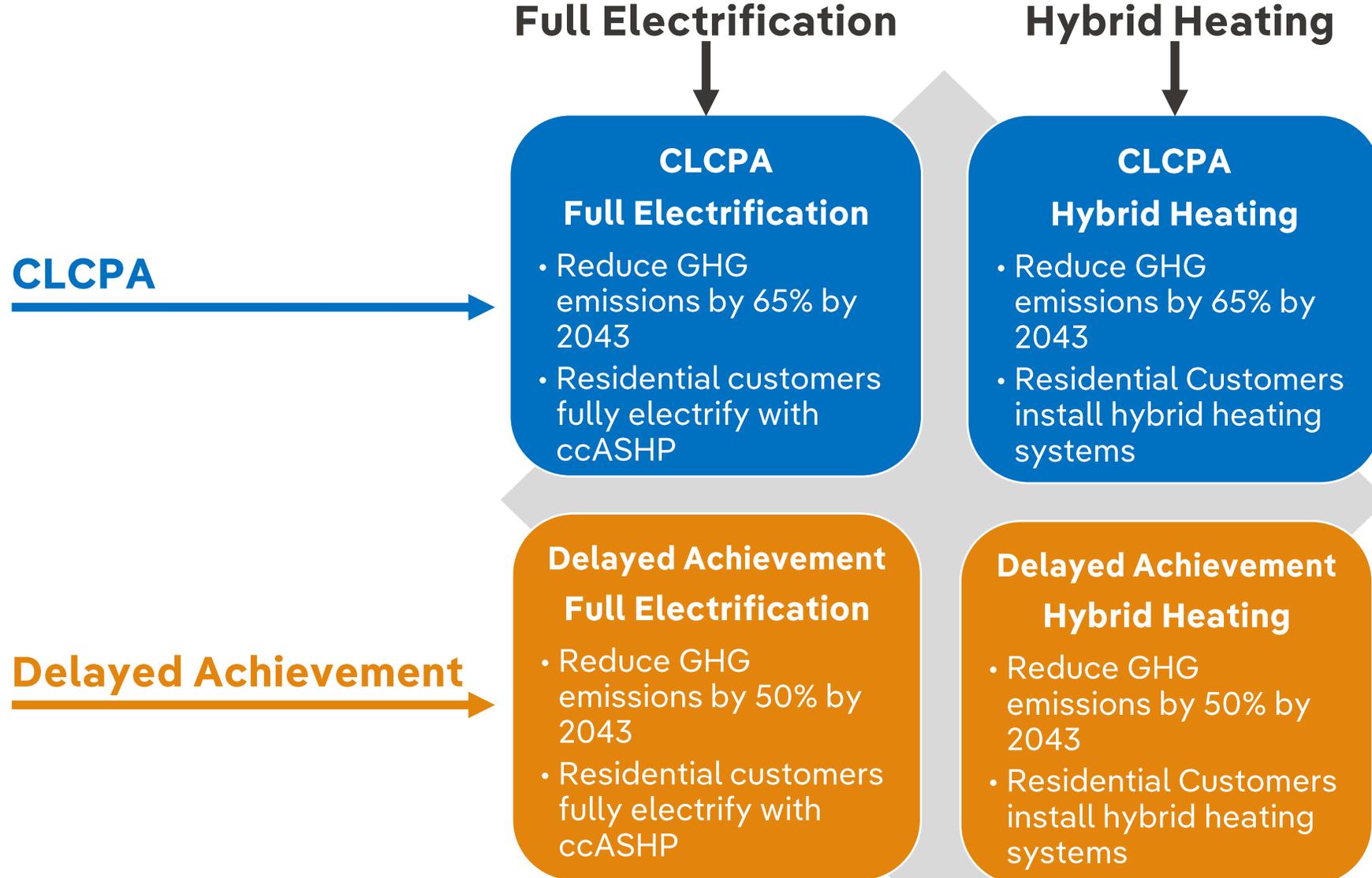
Replace traditional natural gas with RNG from existing biogas feed sources.

Green Hydrogen

Replace traditional natural gas with green hydrogen blended into the distribution system.



Step 2 Includes Performing Scenario Analyses to Inform the LTP





Each Scenario is Defined by a Portfolio of Decarbonization Actions

Action	CLCPA Scenario 65% GHG emissions reduction by 2043	Delayed Achievement Scenario 50% GHG emissions reduction by 2043
1 Weatherization	<ul style="list-style-type: none"> Residential: 100% of max achievable savings; all measures Commercial: 0.5% load reduction/year Municipal: 1% load reduction/year 	<ul style="list-style-type: none"> Residential: 50% of max achievable savings; all measures Commercial: 0.25% load reduction/year Municipal: 0.5% load reduction/year
2 Electrification	<ul style="list-style-type: none"> Full Electrification: Install ccASHP to electrify furnaces and boilers at a pace necessary to hit target GHG emissions reductions Hybrid Heating: Install hybrid heating to electrify residential furnaces (not boilers), install ccASHP to electrify commercial and municipal furnaces (not boilers) at a pace necessary to hit target GHG emissions reductions 	
3 Industrial Customer Programs	<ul style="list-style-type: none"> Energy Efficiency of Process Load: 0.5% process load reduction/year Electrify Space Heating: furnace/heater and boiler conversions to ccASHP at a pace necessary to hit target emissions reductions Carbon Capture: (large customers) 0.5% carbon capture/year 	<ul style="list-style-type: none"> Energy Efficiency of Process Load: 0.25% process load reduction/year Electrify Space Heating: furnace/heater (not boiler) conversions to ccASHP at a pace necessary to hit target emissions reductions Carbon Capture: (large customers) 0.25% carbon capture/year
4 TENS	<ul style="list-style-type: none"> One 24-home + 9 business project/year starting in 2028 	<ul style="list-style-type: none"> One 24-home + 9 business project every other year starting in 2028
5 RNG	<ul style="list-style-type: none"> Optimistic Growth Scenario, 100% of RNG produced in LDC territory; 2% of RNG produced in PA and OH 	<ul style="list-style-type: none"> Achievable Deployment Scenario, 100% of RNG produced in LDC territory; 1% of RNG produced in PA and OH
6 Hydrogen	<ul style="list-style-type: none"> 2028 start, blend incremental 1.25%/year 	<ul style="list-style-type: none"> 2030 start, blend incremental 1%/year

*All actions start in 2026 unless otherwise indicated.

Full Electrification Scenarios are More Expensive than Hybrid Heating Scenarios



The CLCPA-Full Electrification scenario is projected to cost \$6.8 billion for NYSEG and \$7.8 billion for RG&E, whereas the CLCPA-Hybrid Heating scenario is projected to cost \$6.0 billion for NYSEG and \$7.3 billion for RG&E.

- The Hybrid Heating scenarios also have a lower projected cost per unit of GHG emission reduction and a lower projected impact on electric peak winter demand.

NYSEG

	Cost per GHG Emission Reduction (\$/MT CO ₂ e)	2043 GHG Reduction (% vs. 1990)	Total Cost 2024-2043 (NPV \$M)	2043 Electric Winter Peak Demand Impact (MW)
NYSEG				
CLCPA-Full Electrification	\$ 704	-65%	\$ 6,759	879
CLCPA-Hybrid Heating	\$ 618	-65%	\$ 6,032	434
Delayed-Full Electrification	\$ 714	-50%	\$ 4,781	662
Delayed-Hybrid Heating	\$ 580	-50%	\$ 3,919	313

RG&E

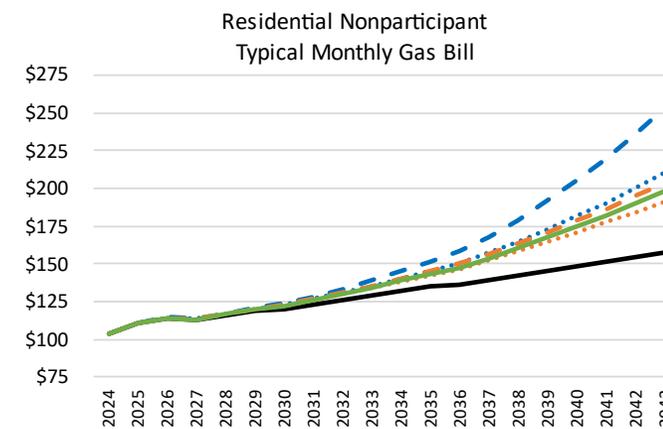
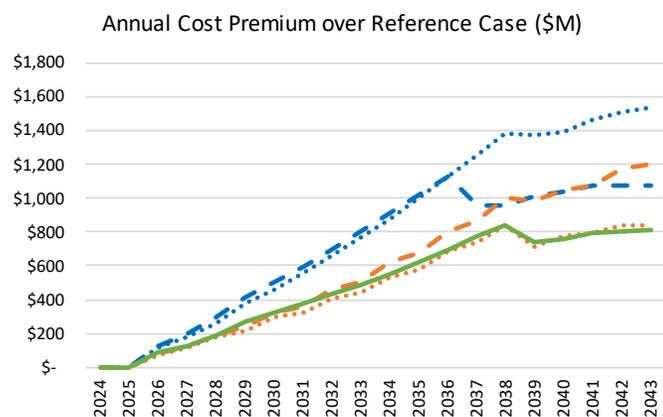
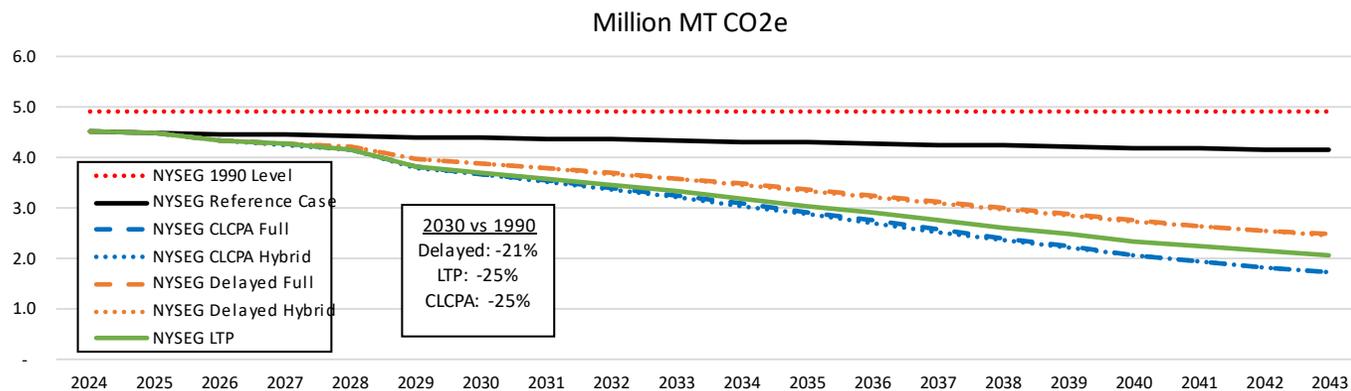
	Cost per GHG Emission Reduction (\$/MT CO ₂ e)	2043 GHG Reduction (% vs. 1990)	Total Cost 2024-2043 (NPV \$M)	2043 Electric Winter Peak Demand Impact (MW)
RG&E				
CLCPA-Full Electrification	\$ 775	-65%	\$ 7,813	1,302
CLCPA-Hybrid Heating	\$ 622	-65%	\$ 7,288	568
Delayed-Full Electrification	\$ 809	-50%	\$ 5,781	1,041
Delayed-Hybrid Heating	\$ 579	-50%	\$ 4,828	406



The NYSEG Long-Term Plan is More Cost Effective than the Scenarios

The LTP achieves significant emissions reductions and emphasizes decarbonization actions that are more cost effective

NYSEG	Cost per GHG Emission Reduction (\$/MT CO2e)	2043 GHG Reduction (% vs. 1990)	Total Cost 2024-2043 (NPV \$M)	2043 Electric Winter Peak Demand Impact (MW)
CLCPA-Full Electrification	\$ 704	-65%	\$ 6,759	879
CLCPA-Hybrid Heating	\$ 618	-65%	\$ 6,032	434
Delayed-Full Electrification	\$ 714	-50%	\$ 4,781	662
Delayed-Hybrid Heating	\$ 580	-50%	\$ 3,919	313
Long-Term Plan	\$ 475	-58%	\$ 4,095	291

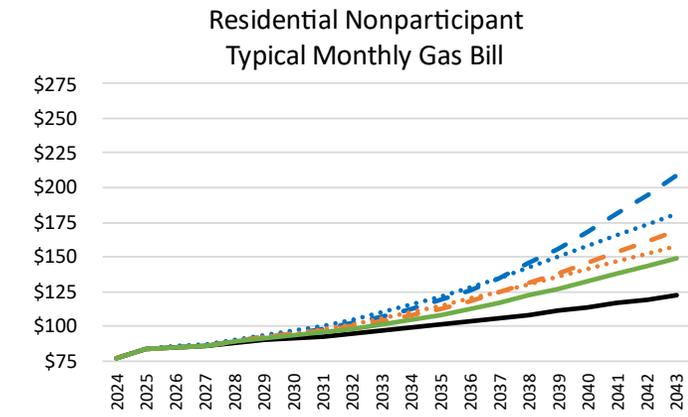
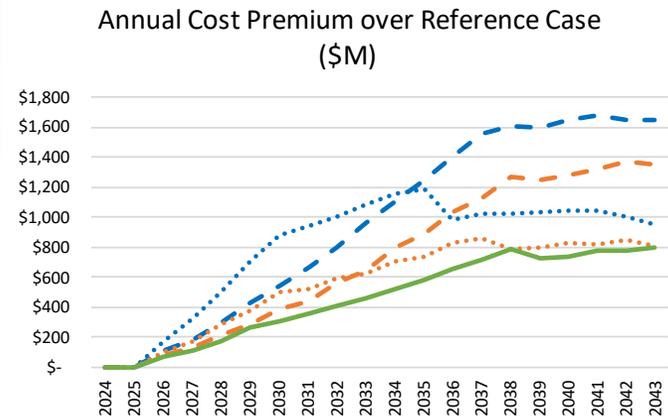
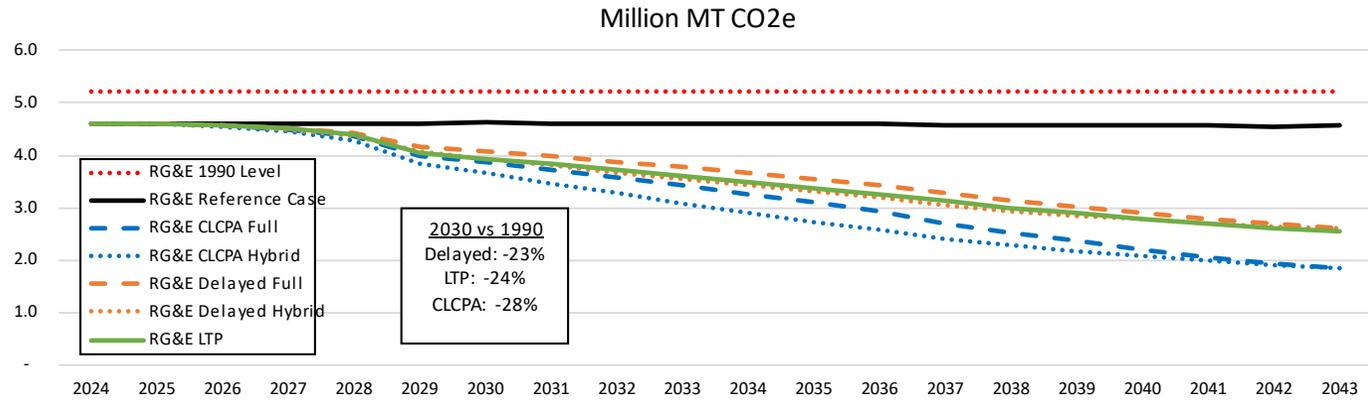




The RG&E Long-Term Plan is More Cost Effective than the Scenarios

The LTP achieves significant emissions reductions and emphasizes decarbonization actions that are more cost effective

RG&E	Cost per GHG Emission Reduction (\$/MT CO2e)	2043 GHG Reduction (% vs. 1990)	Total Cost 2024-2043 (NPV \$M)	2043 Electric Winter Peak Demand Impact (MW)
CLCPA-Full Electrification	\$ 775	-65%	\$ 7,813	1,302
CLCPA-Hybrid Heating	\$ 622	-65%	\$ 7,288	568
Delayed-Full Electrification	\$ 809	-50%	\$ 5,781	1,041
Delayed-Hybrid Heating	\$ 579	-50%	\$ 4,828	406
Long-Term Plan	\$ 475	-51%	\$ 3,811	316



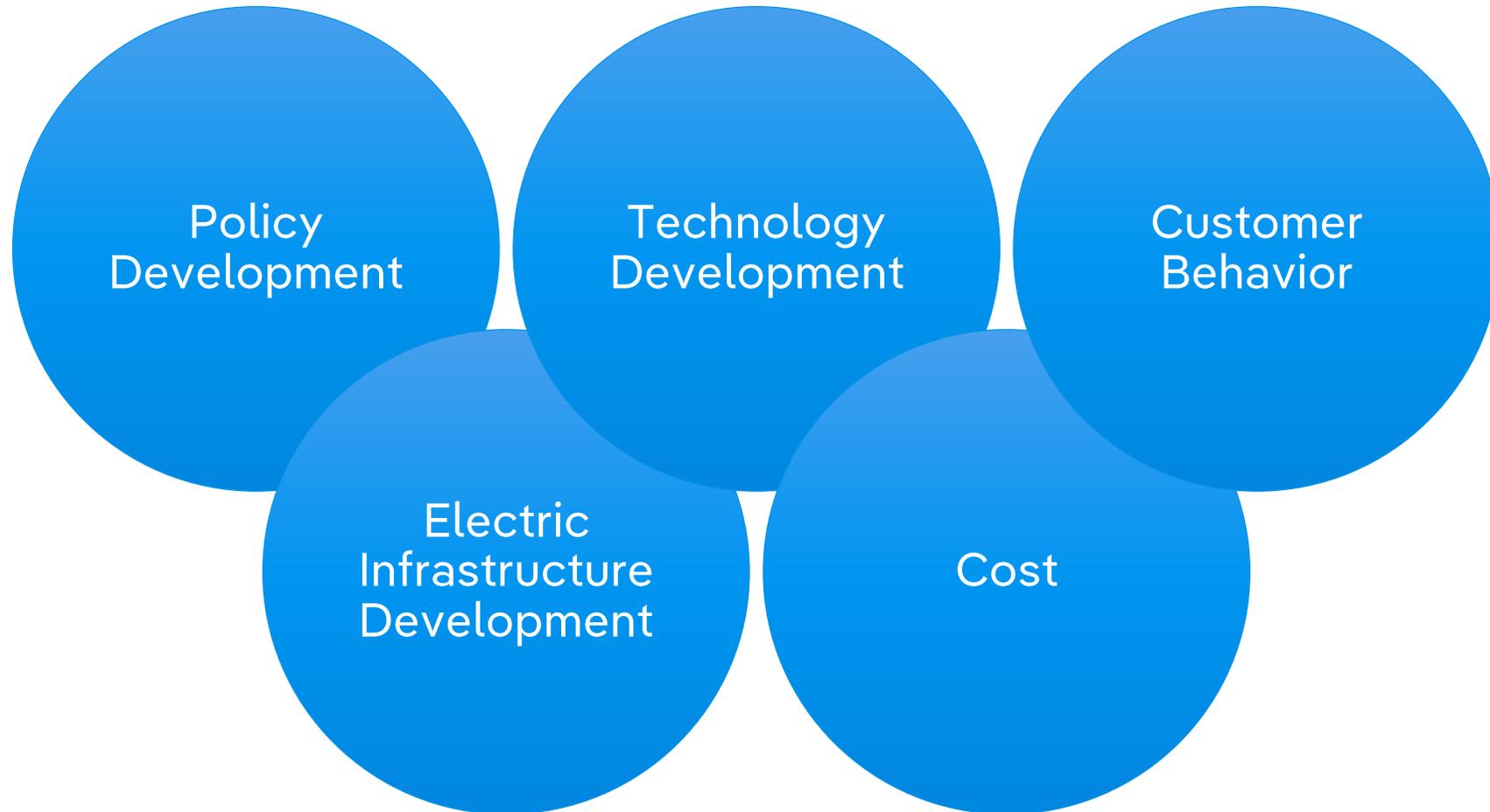
Step 3 Involves Developing the Portfolio of Decarbonization Actions for the Long-Term Plan



Action		Long-Term Plan Decarbonization Actions
1	Weatherization	<ul style="list-style-type: none"> • Same as CLCPA Scenarios, except eliminate replacing windows from residential standard income program because of high cost per GHG emissions reduction
2	Electrification	<ul style="list-style-type: none"> • Residential: Install hybrid heating to electrify residential furnaces (not boilers) at a pace that reaches a max of 75% of customers choosing to electrify at end-of-equipment life, because it is likely that a certain proportion of customers will not convert without a mandate • Commercial: Install ccASHP to electrify furnaces (not boilers) at a pace that reaches a max of 30% of customers choosing to electrify at end-of-equipment life, because high cost per GHG emissions reduction and competitive pressures will likely discourage commercial conversions • Municipal: Install ccASHP to electrify furnaces (not boilers) at a pace that reaches a max of 50% of customers choosing to electrify at end-of-equipment life, because high cost per GHG emissions reduction and budget constraints will likely discourage municipal conversions
3	Industrial Customer Programs	<ul style="list-style-type: none"> • Energy Efficiency of Process Load and Carbon Capture: Same as CLCPA Scenario • Electrify Space Heating: Install ccASHP to electrify furnaces (not boilers) at a pace that reaches a max of 30% of customers choosing to electrify at end-of-equipment life, because high cost per GHG emissions reduction and competitive pressures will likely discourage industrial conversions
4	TENs	<ul style="list-style-type: none"> • Same as CLCPA Scenarios
5	RNG	<ul style="list-style-type: none"> • Same as CLCPA Scenarios
6	Hydrogen	<ul style="list-style-type: none"> • Same as CLCPA Scenarios



It is Important to Acknowledge Several Uncertainties in the LTP





Hybrid Heating is the Preferred Approach to Building Electrification

The benefits of hybrid heating include:

Significant reduction to GHG emissions due to use of electric heat on most days of the year

More reliable than full electrification with ccASHP due to gas furnace backup

Lower up front installation cost than ccASHP

More cost effective (\$/GHG emissions reduction) than ccASHP

No impact on winter electric peak, so less buildout of electric system required compared to ccASHP



Non-Pipe Alternatives Are Embedded in the LTP

- The Companies are committed to building a robust and diverse portfolio of NPA projects that will grow over time as new opportunities emerge to address traditional natural gas system needs through cost-effective and innovative NPA solutions.
- The Companies are gaining experience in what may be the most challenging step in the process: negotiating and finalizing contracts with winning bidders that provide a sufficient level of reliability at a final cost that is acceptable from the perspective of the Companies and the NPA provider.
- The Companies continue to evaluate all leak prone pipe replacement projects for NPA suitability and have developed a comprehensive offer to encourage customers located in targeted leak prone main replacement areas to pursue full electrification.
- As part of the current rate case Joint Proposal, the Companies have agreed to continue to evaluate future gas projects, including leak-prone main replacement projects, for the applicability of NPAs.



NYSEG/RG&E Will Pursue Several Actions to Implement the LTP

Customer Programs

- Implementing new and modified programs that enable comprehensive, integrated solutions that reduce emissions
- Continuing the residential methane detection program (*Joint Proposal*)
- Continuing the geothermal program (*Joint Proposal*)

Investments

- Continuing the Leak-Prone Main replacement program (*Joint Proposal*)
- Funding to modernize gate and regulatory stations, increasing resilience and reducing methane emissions (*Joint Proposal*)

Learning

- Piloting non-residential and air source heat pumps (*Joint Proposal*)
- Monitoring advances in technology related to heat pumps
- Piloting certified natural gas procurement with quantification of emissions benefits (*Joint Proposal*)
- Piloting coordinated planning in areas where the Companies serve both natural gas and electricity customers
- Monitoring the progress of NPAs within New York and other jurisdictions
- Monitoring the evolution of the RNG and hydrogen markets
- Piloting TEN projects

DACs and LMI Customers

- Reflecting DAC status when identifying NPA opportunities and evaluating NPA proposals (*Joint Proposal*)
- Expanding reporting obligations related to the marketing of energy efficiency and building electrification programs within DACs (*Joint Proposal*)
- Expanding eligibility for Energy Affordability programs (*Joint Proposal*)

Engagement

- Engaging with communities to collaborate on initiatives that contribute to the achievement of their decarbonization goals
- Engaging with industrial customers regarding current energy profiles, the potential for industrial heat pumps and other clean energy solutions for industrial processes that rely on natural gas
- Engaging with non-affiliated electric companies that overlap with the Companies' natural gas service areas to consider opportunities for coordinated planning
- Engaging with Company workforce



Several Key Facts Must be Part of the Decarbonization Discussion

Avangrid is Committed to Reducing GHG Emissions

Significantly reducing GHG emissions is necessary to address climate change

The high cost of decarbonization cannot be ignored

- Therefore, it will be important to ensure the LTP is as cost effective as possible overall, and that DACs and LMI customers receive support

Hybrid heating is critical to success

- Hybrid heating will significantly reduce GHG emissions while improving reliability and resiliency, reducing costs, and reducing electric infrastructure needs

Safety and reliability cannot be sacrificed

Customers want choice and have high expectations for reliability



Questions