

**Global Assumptions (to be used for all scenarios)**

- Model a 1% annual nominal reduction in heat pump cost, which aligns with the projected cost curve from the NREL Electrification Futures study's Moderate Advancement scenario. [Source](#)
- Assume zero carbon capture and sequestration for the industrial segment.
- Remove any maximum participation rate used for all customer segments. The resulting GHG emissions reduction will be calculated for these scenarios, and may exceed or fall short of 65%, as determined by the model.
- The prohibition on fossil fuels will be modeled for all new buildings seven stories or smaller using electrification starting in 2026, except for commercial and industrial buildings larger than 100,000 square feet. Starting in 2029, all new buildings should be modeled with electric heating, per the legislation passed in May 2023.
- Remove all hydrogen and RNG systemwide blending.
  - CRA acknowledges these supply-side alternatives may be used in a targeted fashion for difficult-to-electrify industrial customer applications. However, this use for RNG and hydrogen is outside the scope of the specific scenarios CRA is recommending at this time.
- All four scenarios should use the same weatherization (including for industrials) and TENS assumptions as the LTP.
- No incremental costs (relative to reference case) for electrification should be added for new construction for any customer that is prohibited from installing fossil fuel equipment per NYS legislation passed in May 2023.
  - Accordingly, the Reference Case for these three scenarios should remove all residential and commercial gas customer growth starting in 2026 (and therefore there will be no costs or benefits associated with electrifying new construction in the modeling).
    - CRA plans to recommend this change in the Reference Case in its Preliminary Findings Report that will be filed in March 2024.
- Starting in 2028, assume that 0.5% of existing customer conversions of furnace systems and 0.5% of new customers adopt ground-source heat pumps for residential and commercial market segments, each increasing 0.5% annually through 2043
  - Average capital cost of \$30,000 before incentives.
  - Model a 45% reduction in annual energy usage compared to customers that use a ccASHP.

- *Geothermal heat pump assumptions were developed using CRA research and stakeholder input from NY-GEO.*
- The electrification of boilers should be assumed to occur using the same adoption rates as furnaces in all scenarios.
- Please conduct a BCA for each of the new scenarios using each of the SCT, Rate Impact Measure, and Utility Cost Tests.

#### **Suggested Incentives to Model (Scenarios 2, 3, and 4)**

- Please model the point-of-sale rebates for LMI customers from the High Efficiency Electric Home Rebate Act for both electrification and weatherization. These rebates should be modeled beginning in 2024.
  - The HEEHRA rebate covers 100% of the costs to electrify and weatherize homes in low-income households and 50% of the costs for moderate-income households up to \$14,000. Heat pump unit rebates max out at \$8,000 with additional rebates for wiring, circuit breaker panel work, etc., for the max total rebate of \$14,000. [Source](#)
- Non-LMI customers are eligible for a 30% federal tax credit up to \$2,000 for heat pumps and \$1,200 for weatherization via the 2022 Inflation Reduction Act. [Source](#)
- Geothermal heat pump system tax credits are also available.
  - Utility point-of-sale rebate through the NYS Clean Heat program: For this specific heat pump sizing, the point-of-sale rebate would be \$5,400 per geothermal system.
  - 2022 Inflation Reduction Act for ten years beginning in 2023: 30% tax credit for residential customers and 40% for commercial customers through 2032 (assumes 10% bonus tax credit provision for commercial customers).
  - 25% NY State tax credit up to \$5,000 for residential customers.
  - [Source 1](#), [Source 2](#). *Developed using CRA research and stakeholder input from NY-GEO.*
- For the purposes of these scenarios, please assume these tax credits continue at these levels through 2043. We recognize that under current federal policy, tax credits begin to sunset in 2032, but continued incentives will likely be necessary to support continued adoption of these technologies.
- Please assume tax credits and rebates are available for all eligible customers. In other words, there are no budgetary constraints for these programs.

#### **Suggested Scenario Specific Assumptions**

1. Base LTP scenario but utilizes full electrification for customers with furnaces using ccASHPs (electric backup) and assume hybrid systems using conventional ASHPs for customers with boilers:
  - Use the same adoption rate that the Companies currently assume for their Initial LTP.

- Assume that customers with furnaces adopt ccASHPs for the residential, commercial, municipal, and industrial market segments.
  - Assume that customers with boilers convert to ASHP systems using mini-split air source heat pumps for residential, commercial, municipal segments assuming same adoption rate as gas furnace conversions.
  - Reduction in pipeline and storage capacity fixed costs, decreasing by 0.5% each year starting in 2028 through 2043. Additionally, please be sure to remove the pipeline and storage capacity cost premiums that were added for hydrogen/RNG.
2. Hybrid Heating Scenario utilizing ccASHPs for furnaces for all segments and ASHPs for boilers. Also, please include the following assumptions:
- Use the same adoption rate that the Companies currently assume for their Initial LTP.
  - Include incentives as a customer benefit for weatherization and heat pumps (ccASHPs, air-source heat pumps, and geothermal heat pumps).
  - Reduction in pipeline and storage capacity fixed costs, decreasing by 0.5% each year starting in 2028 through 2043. Additionally, please be sure to remove the pipeline and storage capacity cost premiums that were added for hydrogen/RNG.
3. Full Electrification Scenario utilizing ccASHPs for all segments (furnaces and boilers):
- Use the same adoption rate that the Companies currently assume for their Initial LTP.
  - Includes incentives as a customer benefit for weatherization and heat pumps (ccASHPs, air-source heat pumps, and geothermal heat pumps).
  - 1.0% reduction in pipeline and storage capacity fixed costs, decreasing an additional 1.0% each year starting in 2028 through 2043. Additionally, please be sure to remove the pipeline and storage capacity cost premiums that were added for hydrogen/RNG.
  - Introduce strategic downsizing for the natural gas system, using the steps below as a proxy for downsizing.
    - 1.0% reduction in O&M costs, decreasing an additional 1.0% each year starting in 2028 through 2043 due to strategic downsizing of the system.
    - 1.0% reduction in CapEx spend, decreasing an additional 1.0% each year starting in 2028 through 2043 due to fewer infrastructure needs.
4. Full Electrification Scenario utilizing ccASHPs for all segments (furnaces and boilers):
- Use the same adoption rate as the NYSEG/RG&E Initial LTP's "CLCPA Full Electrification Scenario" (this is the only scenario that has a different adoption rate; the first three use

the same adoption rate from the Initial LTP).

- Include incentives as a customer benefit for weatherization and heat pumps (ccASHPs, air-source heat pumps, and geothermal heat pumps).
- Utilize reduced up-front costs for ccASHP system as shown in Table 11 (page 35) of Strategen’s Comments on the NYSEG/RG&E Initial LTP (this is the only scenario that utilizes different up-front costs; the first three use the same up-front costs as the Initial LTP’s Full Electrification scenarios).
- 3.0% reduction in pipeline and storage capacity fixed costs, decreasing an additional 3.0% each year starting in 2028 through 2043. Additionally, please be sure to remove the pipeline and storage capacity cost premiums that were added for hydrogen/RNG.
- Introduce strategic downsizing for the natural gas system, using the steps below as a proxy for downsizing.
  - 3.0% reduction in O&M costs, decreasing an additional 3.0% each year starting in 2028 through 2043 due to strategic downsizing of the system.
  - 3.0% reduction in CapEx spend, decreasing an additional 3.0% each year starting in 2028 through 2043 due to fewer infrastructure needs.