Residential HVAC Gas Heat Pumps

Logic Model + Market Progress Indicators

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Nicor Gas | Energy Efficiency Program

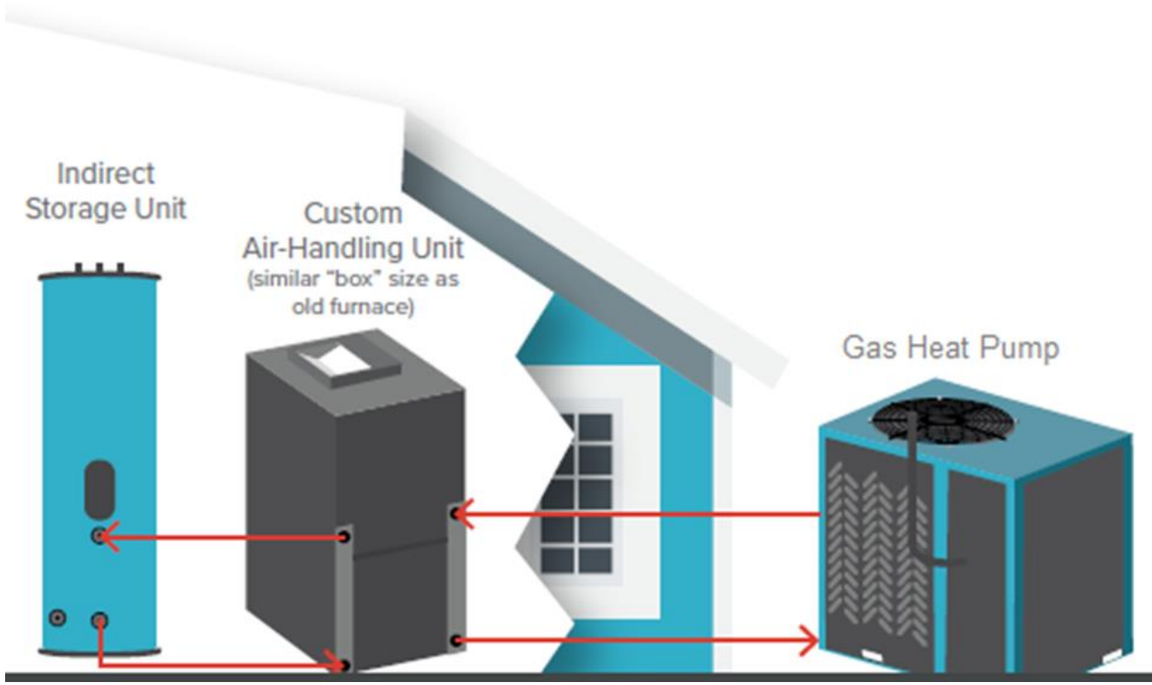
Agenda

1. Market Transformation Initiative Overview
2. Logic Model
3. Market Progress Indicators
4. Next Steps

Residential HVAC Gas Heat Pumps

Residential gas heat pumps (GHP) are a highly energy-efficient technology used for space heating, water heating, and a “combi” option that combines space heating and water heating.

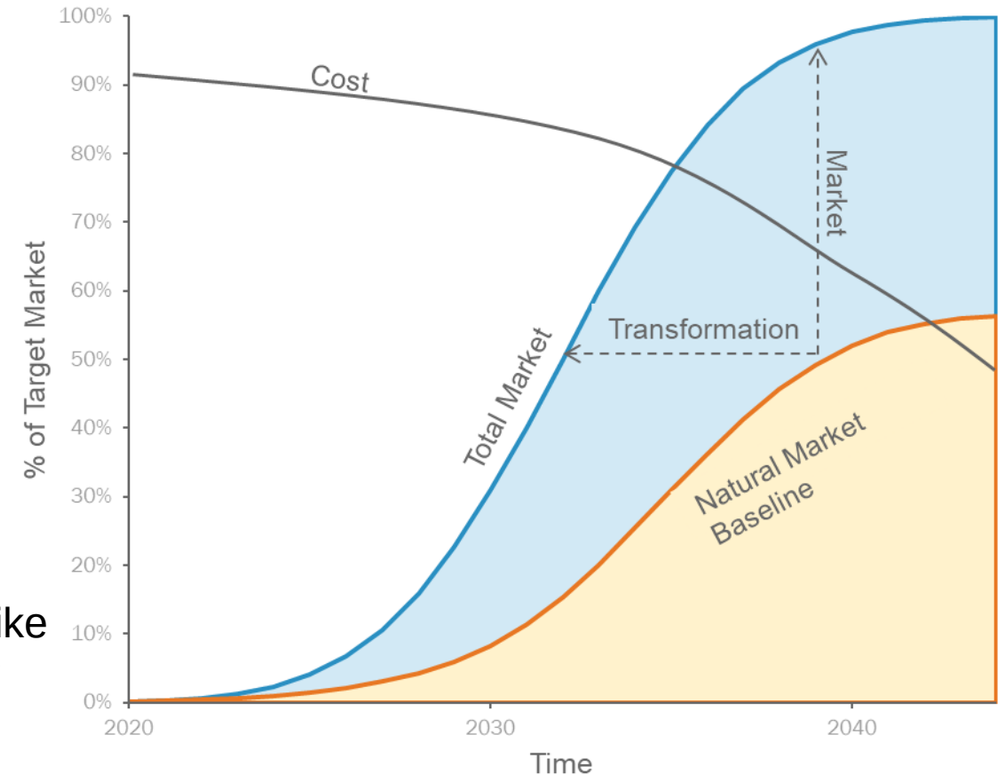
- Up to 140% efficiencies
- Comfort space heating to -40º F
- Lower heating bill up to 50% and reduces CO2 emissions
- Ability to operate on renewable natural gas and hydrogen to further reduce emissions
- Operating using refrigerants (ammonia) with very low or no global warming potential
- Adoption does not increase electrical load and additional burden on the electrical grid
- Fewer retrofit barriers than other GHG reduction solution alternatives and no panel upgrades



Why Residential HVAC Gas Heat Pumps (GHP)?

Market Transformation (MT) is the strategic process of intervening in a market to ***create lasting change*** that results in the ***accelerated adoption of energy-efficient products***, services and practices.

- Residential market: Approximately four million furnaces purchased each year in North America
- Multiple gas heat pump manufacturers in the market
- Superior performance and reliability in cold climates
- Diverse solution for affordable and aggressive decarbonization goals.
- More than 70% of Illinois households depend on natural gas to keep them warm
- In Illinois natural gas is often half the cost of electricity
- Ability to pair as a dual fuel system
- National awareness and/or support is elevated through partnerships like North American Gas Heat Pump Collaborative, Consortium of Energy Efficiency, Inflation Reduction Act and Energy Solutions Centers
- Opportunity to support the development of a stretch code that includes residential gas heat pumps



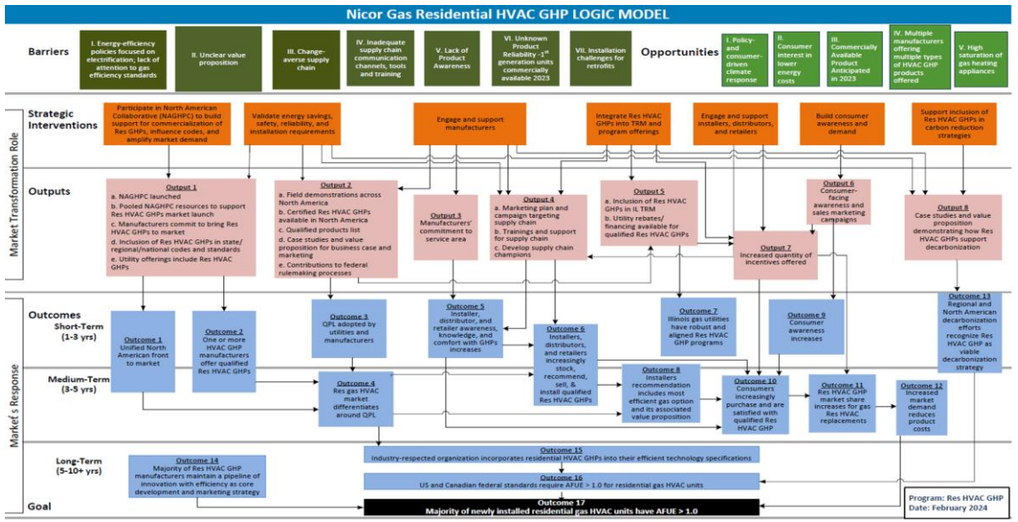
Residential Gas Heat Pump Logic Model

Per the Market Transformation Savings Protocol Process Recommendation, Nicor Gas created the residential HVAC GHP logic model by following the below activities:

1. Conducting market research
2. Draft MT theory
3. Draft intervention strategies
4. Develop market progress indicators
5. Refine and finalize

Logic Model and Market Progress Indicators development started in 2023, building on years of product development and market research.

- National consumer market research was conducted in 2021 with the North America Gas Heat Pump Collaborative
- Supply chain research was conducted in 2021
- 2022-2023 Residential GHP Manufacturer Feedback
- Guidehouse feedback was incorporated in 2023



Logic Model: Barriers

There are many barriers to market adoption, largely driven by residential HVAC GHPs' newness to the market

1. **Energy policies**
   - Affects manufacturers, trade allies, and consumers
2. **Unclear value proposition**
   - Until business case is explained, supply chain is hesitant to adopt residential HVAC GHPs
3. **Change-adverse supply chain**
   - New technology hurdles and new training protocols
4. **Inadequate supply chain infrastructure**
   - Need for improved communication, tools, and training
5. **Lack of awareness**
   - Affects both midstream actors and downstream participants
6. **New product reliability concerns**
   - Delays market acceptance and adoption
7. **Installation challenges**
   - Unique retrofit scenarios require adequate trade ally training and experience

Logic Model: Strategic Interventions

Participate in NAGHPC to build support for commercialization of residential GHPs, influence codes, and amplify market demand	Validate energy savings, safety, reliability, and installation requirements	Engage and support manufacturers	Integrate residential HVAC GHPs into TRM and program offerings	Engage and support installers, distributors, and retailers	Build consumer awareness and demand	Support inclusion of residential HVAC GHPs in carbon reduction strategies

Strategic interventions require action in different parts of the market to be effective. They are loosely categorized by:

1. **Create and market the value proposition**
   - To raise awareness, build market demand, and increase market adoption
2. **Build business case**
   - Conduct defensible case studies and integrate product into IL TRM, DSM program offerings and carbon reduction strategies
3. **Support and engage the HVAC supply chain to increase product and awareness**
   - Manufacturers, distributors, installer, and retailers

Logic Model: Impact

The long-term impact is tied to influencing the adoption of Federal Standards for gas residential heating systems with greater than 1.0 AFUE

- Outcome 15 – Industry-respected organization incorporates residential HVAC GHPs into their efficient technology specifications
- Outcome 16 – US and Canadian federal standards require AFUE > 1.0 for residential gas HVAC units
- Outcome 17 – Majority of newly installed residential gas HVAC units have AFUE > 1.0

Market Progress Indicators

- **17 total MPIs**
  - Connects each LM outcome with a MPI, metric, and data source
- **Metric examples:**
  - # of qualified residential GHPs available
  - QPL inclusion
  - Market share
  - Product cost
- **Data source examples:**
  - Surveys
    - Distributor
    - Retailer
    - Installer
    - Consumer
    - North American Gas Heat Pump Collaborative
  - Residential GHP shipment/sales data
  - Respected organization specification inclusion

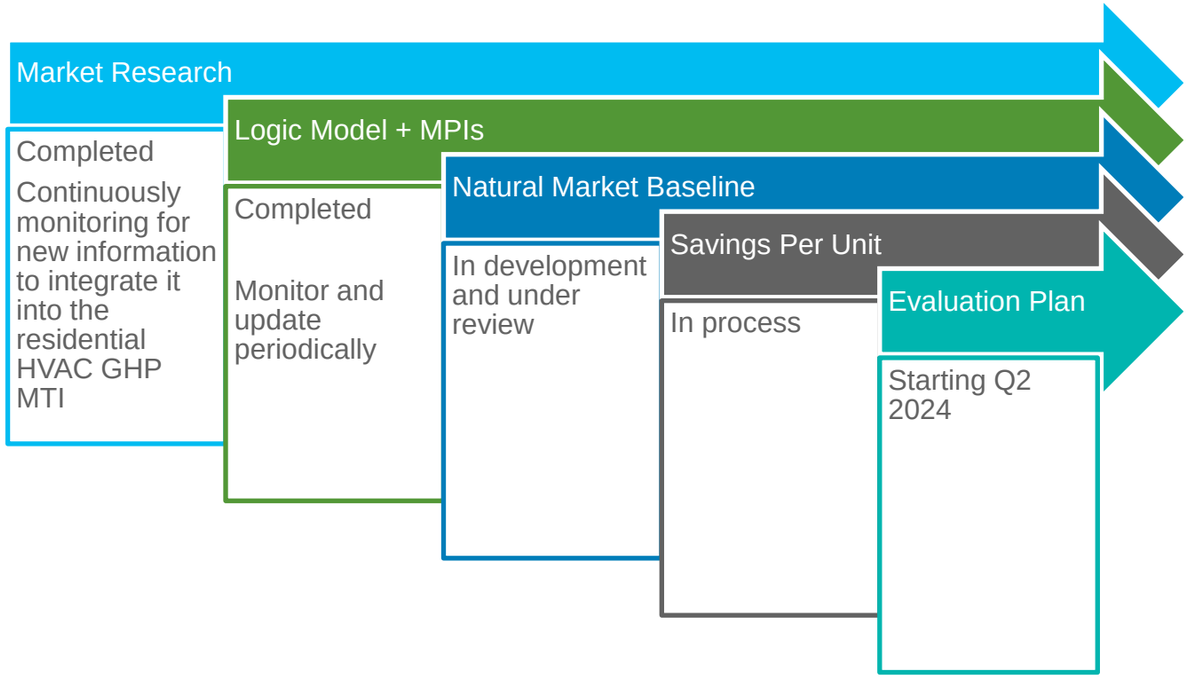
Outcome#	Term	Logic Model Outcome	Market Progress Indicator (MPI)	Metric	Data Source	Notes
1.	Short to Medium	Unified North American front to market	a. Formation of NAGHPC b. NAGHPC membership; Res HVAC GHP Committee membership c. Res HVAC GHP Committee annual and year-over-year budget changes d. Res HVAC GHP technical and programmatic information available	a. NAGHPC incorporated b. Number of member organizations; number of NA gas customers represented, and % of NA gas customers represented c. Res HVAC GHP Committee annual budget as approved by Committee d. Standardized program design and Res HVAC GHP collateral materials available to members	a. NAGHPC incorporation documents b. NAGHPC membership information c. NAGHPC committee budget information d. NAGHPC Res HVAC GHP product information and collateral	
2.	Short to Medium	One or more HVAC GHP manufacturers offer qualified Res HVAC GHPs	Year-over-year increases in number of Res HVAC GHPs commercialized	Number of qualified Res HVAC GHPs available in the marketplace (measured by number of model categories or individual SKUs)	a. NAGHPC and Res HVAC GHP Committee member interviews b. NAGHPC and Res HVAC GHP Committee documentation c. Discussions/interviews with manufacturers d. Sales data	
3.	Short	QPL adopted by utilities and manufacturers	a. Existence of QPL b. Year-over-year increases in number of manufacturers represented and models listed on QPL c. Year-over-year increases in number of utilities using QPL to define program-eligible equipment	a. Published QPL available to manufacturers and utilities b. Number of manufacturers represented in QPL c. Number of Res HVAC GHP models represented in QPL d. Number of utilities using QPL to define program-eligible equipment	a. QPL document b. Utility staff interviews c. (Manufacturer interviews to determine if/why they're not using QPL, & future plans to use QPL)	

Next Steps

- Open to any comments from the Illinois SAG MT working groups on the completed LM and MPI components
- Revisions and updates will be made as needed as work continues

Coming down the pipeline:

- Evaluator/SAG review of Natural Market Baseline
  - Estimated for Q3 SAG MT meeting
- Develop evaluation methodology
  - Use MPIs to guide
  - In collaboration with Guidehouse
- Implementation planning
  - Bringing strategic interventions into practice



Questions?

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