IL EE Stakeholder Advisory Group:
Market Transformation (MT) Savings Working Group Meeting

Thursday, August 29, 2024

1:00 – 3:30 pm
Teleconference

Attendees and Meeting Notes

Meeting Materials

- Agenda
- Nicor Gas Presentation: Efficient Rooftop Unit MT Initiative
- Nicor Gas Presentation: Residential HVAC Gas Heat Pumps MT Initiative
- Nicor Gas and Guidehouse Presentation: Theory-Based Evaluation Approach for Nicor Gas MTI Programs
- Guidehouse Memo: Nicor Gas Market Transformation Initiative: Residential Gas Heat Pump Theory-based Evaluation Plan (August 29, 2024)
- Guidehouse Memo: Nicor Gas Market Transformation Initiative: High Performance Windows Theory-based Evaluation Plan (August 29, 2024)
- Ameren Illinois Presentation: High Performance Windows MT Initiative Update
- Ameren Illinois Presentation: Luminaire Level Lighting Controls MT Initiative Update

Attendees

Name	Company or Organization
Celia Johnson	SAG Facilitator (Celia Johnson Consulting)
Jane Anderson	SAG Meeting Support (Inova Energy Group)
Abigail Miner	IL Attorney General's Office
Alexis Hamilton	Guidehouse
Andrey Gribovich	DNV
Bahareh van Boekhold	Illume Advising
Brady Nemeth	Resource Innovations
Brent Nakayama	Leidos
Cher Seruto	Eco Spark
Chris Burgess	MEEA
Chris Vaughn	Nicor Gas
Corey Grace	Resource Innovations

Name	Company or Organization
Courtney Golino	Guidehouse
Dave Kilgore	Ameren Illinois
Elder Calderon	ComEd
Elizabeth Horne	ICC Staff
Ellen Rubinstein	Resource Innovations
Haley Burton	Ameren Illinois
Jeff Mitchell	Resource Innovations
Jim Fay	ComEd
John Lavallee	Ameren Illinois
Jonathan Skarzynski	Nicor Gas
Karen Horkitz	KSH Advising
Kathryn Collins	Guidehouse
Kim Janas	IL Attorney General's Office
Laura Agapay-Read	Guidehouse
Lilieric Florez Monroy	Peoples Gas & North Shore Gas
Matt Armstrong	Ameren Illinois
Michael Collins	Franklin Energy
Murtaza, Danish	Peoples Gas & North Shore Gas
Nic Crowder	Ameren Illinois
Nick Warnecke	Ameren Illinois
Nicole Karpavich	Resource Innovations
Philip Mosenthal	Optimal Energy, representing NCLC
Randy Opdyke	Nicor Gas
Rocco Guaragno	Resource Innovations
Ryan W	Guidehouse
Sarah Wells	Slipstream
Shane Perry	Ameren Illinois
Sidney Daller	Ameren Illinois
Thomas Manjarres	Peoples Gas & North Shore Gas
Tim Dickison	Ameren Illinois
Tina Grebner	Ameren Illinois
Todd Malinick	Opinion Dynamics
Wayne Leonard	Guidehouse

Meeting Notes

See red text for follow-up items.

Opening and Introductions

Purpose of the meeting:

1. For Nicor Gas to share a progress update on the Efficient Rooftop Unit MT initiative
2. For Nicor Gas to share a progress update on the Residential HVAC Gas Heat Pumps MT Initiative
3. For Nicor Gas and Ameren Illinois to share progress updates on the High Performance Windows MT initiative
4. For Ameren Illinois to share a progress update on the Luminaire Level Lighting Controls MT initiative.

Nicor Gas Efficient Rooftop Units: Natural Market Baseline

Randy Opdyke, Nicor Gas and Rocco Guarango, Resource Innovations

Agenda

- Technology Overview
- Development Process
- Natural Market Baseline – Nicor estimates
- Sources

Efficient Rooftop Units: Technology Overview

- Improvement over the historically inefficient RTU (roof top unit) product
- Improvements affect whole-box efficiency
- Two tiers of equipment with both a prescriptive and performance path to
- compliance.
    - Tier 1 includes box upgrades (box insulation and low leak dampers)
    - Tier 2 includes Tier 1 upgrades and an Energy Recovery Ventilator or Condensing Furnace.
- Other organizations developing ERTU initiatives:
    - Northwest Energy Efficiency Alliance (NEEA)
    - CEE (MN)
    - CalMTA
    - Department of Energy

ERU Tiers and Components

- Tier 1: Prescriptive Path
    - All panels (door liners, top panels, divider panels, and mullions) adjacent to conditioned air, including the base, shall be fully insulated with a minimum of R-12.
    - Leakage rate of outdoor and return air mixing dampers shall be no greater than the rate described in ASHRAE/IESNA 90.1-2019 Table 6.4.3.4.3.
- Tier 1: Performance Path
    - ≥ 0.65, as measured by CSA P.8 – Edition 3.0
        - A new testing metric
- Tier 2: Prescriptive Path -- must meet all Tier 1 requirements, and:
    - 2A: The unit includes heat or energy recovery with a heat/energy recovery ventilator.
    - 2B: A furnace with a condensing heat exchanger (90+% TE)
- Tier 2: Performance Path
    - ≥ 0.80, as measured by CSA P.8 – Edition 3.0

Efficient Rooftop Units NMB: Development Process

- Natural Market Baseline Purpose: "…a forecast of the future in which no utility-funded energy-efficiency programmatic intervention exists."
    - NMB measures the future market if there were no utility interventions
- Nicor Gas has developed, and its evaluator has reviewed:
    - Methodology
    - Data Sources
    - Assumptions
- The NMB will be reviewed and potentially revised according to the schedule in the Theory Based Evaluation plan.
    - NMB is not a static document

Development Process

- Process was not in a vacuum.
- Market Research (2022-2024)
    - Completed by GTI Energy: Provided insight into the existing ERTU market in Nicor Gas's service area.
- NEEA Market Share Forecast (Q3 2022)
    - NEEA: Informed Nicor Gas' NMB
- CEE Minnesota NMB (Spring 2024)
    - Minnesota's CEE NMB informed the Nicor Gas' NMB
- Guidehouse Review (Q3 2024)
    - Guidehouse: Covered review of methodology, data sources and final NMB curve

Natural Market Baseline Review
Kathryn Collins, Guidehouse

- Data Sources Review
    - Guidehouse evaluated the data sources provided by RI for the efficient rooftop units (eRTU) Natural Market Baseline (NMB), regarding their scope and accuracy, and checked for more recent updated versions.
    - Guidehouse reviewed the sources and did not find any discrepancies and confirmed the most recent copies were referenced.
- Variables Review
    - Guidehouse conducted an in-depth review of RI's methodology for determining the eRTU NMB variables. This included analyzing given sources and researching market trends.
    - Guidehouse found that all variables chosen are well defined and appropriate.
- Review Follow-Up
    - Guidehouse generally agrees with the natural market baseline metrics and recommends revisiting the baseline if historical data on Tier 1 and Tier 2 adoptions within the region become available.
    - Guidehouse generally agrees with the forecast start year but recommends that this be reviewed during the first NMB review.
    - Guidehouse generally agrees with the maximum market share but expects this variable to be reviewed during subsequent NMB reviews.

Natural Market Baseline

- Final product of the work that went in to NMB. Full goes out to 2050, ten first years are most important

- Y-axis only goes up to 3% - highlights how low adoption of tech is without utility intervention.

Theoretical Model
- ERTU NMB adoption curve developed using a modified S-curve.
    - Contains six individual variables
- Very little ERTU and ERTU-proxy data is available, which is why NMB relies on theoretical modified S-curve.

Model Inputs
- The model start year was when Nicor Gas started intervening in the market.
    - 2022
- The initial market share was estimated from the market research.
    - 0% - estimated from market research by GTI
- The start of hypergrowth, the ramp period, and the maximum market share
- had several contributing factors.
    - 2040, based on several factors; ramp period 20 years
- The factor was chosen because of its slower initial adoption rate but stronger adoption during hypergrowth.
    - 361

Sources
- Used to collect information and data.
- Based off several organizations.
- More information on sources is in the appendix.

Comparison NMBs
- Highlights collaborative partners natural market baseline.
- Generally aligned with partners, but each initiative is slightly different with different variables and goals.

Next Steps:
- Nicor Gas Efficient Rooftop Unit Initiative – Overview of Natural Market Baseline Review for Comments
- **Comments due Friday, September 13**
    - Send feedback to:
        - Randy Opdyke, Nicor Gas (rwopdyke@southernco.com)
        - Rocco Guaragno, Resource Innovations (aguaragno@resource-innovations.com)
        - Please CC Celia@CeliaJohnsonConsulting.com

Nicor Gas Residential HVAC Gas Heat Pumps MT Initiative
Randy Opdyke, Nicor Gas and Nicole Karpavich, Resource Innovations

Agenda
- Background and Development
- NMB, Methodology, Assumptions, Data Sources
- Next Steps
- Appendix
    - References

    - Sources

NMB Purpose

- "…a forecast of the future in which no utility-funded energy-efficiency programmatic intervention exists."
    - What does the market look like in which no utility intervention exist and what does that potential forecast look like.
- Nicor Gas has developed, and its evaluator has reviewed:
    - Methodology
    - Data Sources
    - Assumptions
- NMB will be revised over time (on a schedule determined in the Theory Based Evaluation plan) based on new data.

Development and Review Timeline

- Q3 2023
    - Draft NMB created
    - Resource Innovations
    - Guidehouse was involved in the beginning
- Q2-Q3 2024
    - Guidehouse review

Guidehouse Natural Market Baseline Review
Kathryn Collins, Guidehouse

- Data Sources Review
    - Guidehouse evaluated the data sources provided by RI for the Residential Gas HVAC NMB, regarding their scope and accuracy, and checked for more recent updated versions.
    - Guidehouse reviewed the sources and did not find any discrepancies and confirmed the most recent copies were referenced.
- Variables Review
    - Guidehouse conducted an in-depth review of RI's methodology for determining NMB variables. This included analyzing given sources and researching market trends.
    - Guidehouse found that all variables chosen are well defined and appropriate, with minor comments on how RI may better define proxy technologies used to develop the "early years" section of the hybrid model.
- Review Follow-Up
    - Commercial Availability, 2027: variable to be reviewed during the first NMB review.
    - Start of Hypergrowth, 2035: variable to be reviewed during subsequent NMB reviews prior to 2028.
- Recommendations:
    - Define all technology measures used as proxies in the Natural Market Baseline.
    - Clarify which data in the primary data collection comes from which technology measures (GHPWHs vs. Res Combi).

Res HVAC GHPs NMB Forecast 2024 – 2038

- Shows adoption rate and number of GHPs adopted
- Estimated rate that was assumption

- Residential gas HP is new technology
    - Don't anticipate much uptick due to significant barriers
    - High incremental cost, limited access to technology,
    - Adoption is more of a trickle from the very beginning

Res HVAC GHPs NMB 2024 – 2038

- Shows same info in different format.
- Slow nature of adoption – recognizing barriers to new technology.
- First 5-10 years of NMB is most important, will have further refinements as new data is available.
    - Focused more on first 10ish years
- Forecasting 1.2% after 15 years

NMB Methodology 2024 – 2038 Hybrid Approach Incorporating Two Approaches to Adoption Rate (Market Share)

- Goal: Forecast the adoption rate and number of units adopted in the absence of utility intervention as realistically as possible.
    - # of NMB Units = # Eligible Units * NMB Market Share
- Approach to Forecasting NMB Market Share:
    - Different than ERTUs – more complex. Used a hybrid approach and acknowledge that they had a lack of data for residential gas heat pumps.
        - Wanted to ground it in reality
    - Early Years 2024 – 2034: draws on general approach and primary data collected for a similar technology (used gas heat pump water heater data).
    - Later Years 2035 – 2038: uses theoretical modified S-Curve
        - Well established way of categorizing growth of market share

NMB Methodology 2024 – 2038: Estimate Number of Eligible Units

- # of NMB Units = # Eligible Units * NMB Market Share
- Based on Nicor Gas' 2020 TEAPot* residential customer forecast
    - Housing types: single family - regular and low income
    - Heating equipment types: furnace & other fossil space heat, boiler
- # $\boldsymbol{Eligible\ Units}$ = # New Constr t + # Turnover t + # Early Repl t
    - Where:
        - Furnace & Other: # $Turnover_t$ = (# Total Res Cust t – # New Constr t) / 20
        - Boiler: # $Turnover_t$ = (# Total Res Cust t – # New Constr t) / 25
    - And:
        - # $Early\ Replt$ = (Total Res Custt – New Constrt - # Turnovert) * 1.5%**

NMB Methodology 2024 – 2038: Hybrid Approach Incorporating Two Approaches to Adoption Rate

- Early years 2024-2034: draws on general approach and primary data collected for a similar technology (GHPWH research)
    - Using gas heat pump water heater as it is a compatible technology—has similar barriers. Used that information as a proxy.
    - $\boldsymbol{Adoption\ Rate = Consideration\ Rate * Conversion\ Rate}$
    - Where:
        - Consideration Rate 2 = GHPWH % Installers Familiar * % GHPWH Installers Recommending [of those who are familiar]

    - And:
        - Conversion rate is based on Diffusion of Innovation Curve (innovators, early adopters, etc.)
- Later years 2035 - 2038: uses theoretical modified S-Curve
    - This curve estimates Res HVAC GHP sales (as a % of total heating equipment sales) in each year; does not estimate the cumulative installed Res HVAC GHP stock
    - S-curve is well established way in the growth of market share
    - Went through 2038 because acknowledging the greater uncertainty of estimating too far out.

NMB Methodology Early Years 2024 – 2034

- Early Years 2024-2034: Use Approach and Primary Data from Gas Heat Pump Water Heater Technology
- Gas Heat Pump Water Heater (GHPWH) and Res HVAC GHP systems function similarly
    - GHPWHs utilize gas heat pump technology for domestic hot water heating.
    - Res HVAC GHPs utilize gas heat pump technology for space conditioning and domestic hot water heating.
- Both systems face similar market barriers
    - Very limited number of manufacturers
    - New/unknown technology by supply chain and consumers
    - Substantially higher first cost of GHP options over baseline technologies
    - Consumer reliance on supplier recommendations
- Early research only focused on GHPWH
    - Due to similarities, GHPWH primary data research used as a proxy

NMB Methodology Early Years 2024 – 2034

- Applied the diffusion of innovation adoption categories
- $\boldsymbol{Adoption\ Rate = Consideration\ Rate * Conversion\ Rate}$
    - Where:
        - Consideration Rate 2 = GHPWH % Installers Familiar * % GHPWH Installers Recommending [of those who are familiar]
    - And:
        - Conversion rate is based on Diffusion of Innovation Curve (innovators, early adopters, etc.)
- Conversion Rate based on Diffusion of Innovation Adopter Categories
- Analysis assumes:
    - 50% of “eligible” Innovators (1.25%) adopt Res HVAC GHPs the year they become commercially available (2027); 100% of “eligible” Innovators (2.5%) adopt the next year (2028)
    - 100% of Early Adopters adopt 8 years after all Innovators have adopted (16% in 2035)
    - Adoption between 2028 and 2035 grows linearly

NMB Methodology Later Years 2035 – 2038

- Later Years Uses Modified S-Curve: Estimates Res HVAC GHP sales (as a % of total heating equipment sales) in each year; does not estimate the cumulative installed Res HVAC GHP stock.
- Highlighting the variables used
    - Max market share forecasting it only hit about 9%
    - Incorporated what is going on in energy policy landscape

Methodology

- The modified s-curve has 4 main inputs to consider:
    - Maximum Market Share: the maximum level of market saturation.
    - Start of Hypergrowth: The point at which a product's market share begins to rapidly accelerate.
    - Ramp Period: The period between the start of hypergrowth and takeover point.
    - Factor: A factor based on the estimated upper and lower limits of the ramp period.
        - Factor is a result of defining the upper and lower limits of the ramp period in the s-curve. The equation is as follows, where the upper and lower limits are the percent of total market penetration.
- In conclusion, no right model for these inputs. Can use a variety of data sources and historical data on where we think this will land. Will be updated when new information is available.

Bahareh van Boekhold: I have a question about heat pump water heaters (HPWH). Are any other entities that are running HPWH MT?

- *Randy Opdyke: It's a new technology that hit the market this summer. There is a good amount of utilities that were involved in a larger scale early adoption pilot. Ours is through the early technology program. Minnesota CEE has residential GHP on their list for MT. New Jersey Natural Gas, New Mexico Natural Gas, and Southern California are also considering it. A lot of utilities in Canda are also looking at it thru a MT perspective.*

Next Steps:

- Nicor Gas Residential HVAC Gas Heat Pumps MT Initiative – Overview of Natural Market Baseline Review for Comments
- **Comments due Friday, September 13**
    - Send feedback to:
        - Randy Opdyke, Nicor Gas (rwopdyke@southernco.com)
        - Please CC Celia@CeliaJohnsonConsulting.com

Nicor Gas and Guidehouse: Theory-Based Evaluation Approach for Nicor Gas MTI Programs

Randy Opdyke, Nicor Gas and Kathryn Collins, Guidehouse

- Worked closely with Guidehouse on this from the beginning from development of logic model. Work closely w evaluator is critical in thinking about best way to evaluate this. Is a best practice. Important evaluator is involved.
- Spent time this summer working out the questions with the team.

Overall HPW MTI Evaluation Approach

- In satisfaction of IL TRM Attachment C, Guidehouse has prepared a theory-based evaluation plan with input from Nicor Gas and the future program implementor, Resource Innovations.
- The theory-based evaluation plan was developed to be adaptable to all future initiatives Nicor Gas may wish to operate under the Market Transformation Initiative (MTI) process. At this time, Nicor Gas has submitted to the SAG evaluation plans for both High Performance Windows (HPW) and Residential Gas-powered Heat Pumps (RGHP).
- This presentation will provide an overview of two major themes in the evaluation plan:
    - 1) our approach to identifying evaluation activities and Market Performance Indicators (MPIs) under review for CY2025-2028.
    - 2) Discuss the theory-based evaluation of these activities according to the principles laid out in IL TRM Attachment C.

Overall HPW MTI Evaluation Approach

- The template Evaluation Plan has five sections:
    - 1. Introduction
        - Contains unique initiative details
    - 2. MPI Assessment
        - Contains unique initiative details
    - 3. Determining MTI Energy Savings
    - 4. Evaluation of Evidence Gathered
    - 5. Market Progress Evaluation Report
- Only first two sections of the plans will have substantial differences; other sections may have edited language to address the technology, but the steps to the initiatives are consistent in both plans.

Identifying Evaluation Activities and MPIs

- These are the unique details.
- Both the HPW and RGHP evaluation plans are designed to provide an initial plan for evaluation activities proposed for the first four years of the MTIs. The lists of evaluation activities, associated data sources, and MPIs identifies for evaluation in CY2025-2028 are preliminary and Guidehouse will also include a detailed overview of the evaluation activities each year in the Annual Evaluation Plan.
- Guidehouse used the follow steps to create the following tables and those found in the evaluation plans:
    - 1. Prioritization of MPIs according to inputs, proceeding and dependent MPIs, and associated time periods as laid out in the logic model.
    - 2. Cross comparison of expected MPI data sources based on the MPI Table.
    - 3. Identified earliest reasonable evaluation year for each MPI based on prioritization and availability of data.
    - 4. Proposed timeline for documentation/collection of data sources associated with MPIs.
- Will require ongoing review. Will reconsider at the beginning of each year what MPIs are more likely to be active during the evaluation period and that appropriate data sources are available
- Plan to meet with Nicor Gas and RI to discuss updates to MDI section of the plan before submitting annual evaluation plan
    - May include changing targeted MPIs

Overview of HPW Evaluation Activities

- Provide an overview of the evaluation activities that have identified for HPW (high performance windows).
- Over the 4 years, plan to evaluate 11 MPIs using 11 data sources.
- MPIs and data sources were all identified on the timeline from the logic model and MPI table that was previously reviewed and presented to the Working Group.
- No significant gaps in the MPI.

Overview of RGHP Evaluation Activities

- Both the 13 data sources on the left and 8 MPIs on the right (to be reviewed in four year period); both tables and previous ones are included in the evaluation plan.
- Provides a sense of the mapping effort that was performed to predict activities for each year.
- Note: There are a few skipped MPIs, that is the nature of inputs and expected time period.
    - Ex/ MPI IV is dependent on MPI I-III was marked for a medium time period (3-5 years after MPI program was started).

Assessment of Market Progress Indicators

- Step 1: Evaluation of MPIs
    - Guidehouse will report on progress toward goals and objectives described in logic model (LM) and market progress indicators (MPIs) as provided by Resource Innovations, to establish initiative's influence on adoption and compliance in Nicor Gas' territory.
- MPIs which have been classified by the evaluator as "leading," defined here as having demonstrated some measurable progress in the time period under review, will be reviewed against the preponderance of evidence standard.
    - Will be the outcome of the step
- Assessment of MPIs requires incorporation of multiple judgments of progress based on preponderance of evidence approach. Bulk of evaluation activities take place in first step.
    - Qualitative – based on surveys, in-depth interviews or observational data collection
    - Quantitative – based on market share or production data

Determining MTI Energy Savings

- Measuring the Market or calculating total market units
    - Nicor Gas has developed a methodology to measure the market based on existing information. Nicor Gas will share the data and output with Guidehouse for assessment of the reasonableness and appropriateness of the results. Details on this methodology are included in the Evaluation Plan to address the use of Total Market Units in the estimate of total net savings.
    - Modeling can be undertaken using publicly available census data, Nicor Gas data, and the results of a market characterization survey on windows conducted between 2022 and 2023. However, as more data sources come in, variables can be added or updated.
- Reviewing Natural Market Baseline
    - Guidehouse and Nicor Gas will use best available data to determine if any adjustments need to be made to the natural market baseline as a prospective update, including any external factors that could adjust the baseline forecast.

Evaluation of Evidence Gathered

- Final step: Attribution Approach
  - The assignment of attribution for leading MPIs based on the HPW MTI impacts for Nicor Gas and its implementer will begin prior to the submission of the annual evaluation plan.
  - The relative influence of each MPI under review in a given evaluation year will take into consideration the expected impact of each MPI and its associated activities as well as any delays in MPI development. The annual evaluation plan will translate the relative influence of the MPIs into an initial weighting approach for the given evaluation year. The initial weighting approach will be documented in the annual evaluation plan.
  - The relative weight of each leading MPI will be taken into consideration in defining the final Attribution Factor.
  - Overall, the assessment will determine whether the savings associated with the MTI, based on the Energy Savings Framework, will be attributed to the MTI as a binary (yes/no) recommendation.

Bahareh van Boekhold: For the review, the conceptual idea on the memo is the same. Are the MPIs for Gas water heaters identified or not? Or is it just conceptual?

- *Kathryn: Yes. Are already MPIs developed for the residential GPHP – presented earlier this year. Those MPIs are reflected in the evaluation plan as well as associated data sources. The Residential Gas-powered Heat Pump Logic Model and MPI table were presented to this group back in February: Wednesday, February 28 Market Transformation Savings Working Group Meeting - Illinois Energy Efficiency Stakeholder Advisory Group Illinois Energy Efficiency Stakeholder Advisory Group (ilsag.info)*

Next Steps:

- Guidehouse Memo: Nicor Gas Market Transformation Initiative: High Performance Windows Theory-based Evaluation Plan (August 29, 2024)
  - **Comments due Friday, September 19**
    - Send feedback to:
      - Randy Opdyke, Nicor Gas (rwopdyke@southernco.com)
      - Kathryn Collins, Guidehouse (Kathryn.collins@guidehouse.com)
      - Please CC Celia@CeliaJohnsonConsulting.com
- Guidehouse Memo: Nicor Gas Market Transformation Initiative: Residential Gas Heat Pump Theory-based Evaluation Plan (August 29, 2024)
  - **Comments due Friday, September 19**
    - Send feedback to:
      - Randy Opdyke, Nicor Gas (rwopdyke@southernco.com)
      - Kathryn Collins, Guidehouse (Kathryn.collins@guidehouse.com)
      - Please CC Celia@CeliaJohnsonConsulting.com

Ameren Illinois High Performance Windows: LM + MPIs, NMB

Tim Dickison, Ameren Illinois) and Brady Nemeth, Resource Innovations

Agendas

- Two different presentations:
- Logic Model + Market Progress Indicators
  - The Process
  - Logic Model
  - Market Progress Indicators

    - Next Steps
- Natural Market Baseline
    - Background and Development
    - Methodology, Data Sources, Key Assumptions
    - NMB
    - Next Steps
    - Appendix

The Process

- Goal: identify intervention points in the Ameren service territory.
- Per the Market Transformation Savings Protocol Process Recommendation, creating a logic model includes the following:
    - 1. Conducting market research
    - 2. Drafting MT theory
    - 3. Drafting intervention strategies
    - 4. Developing market progress indicators
    - 5. Refining and finalizing
- SAG's role is to "review revised logic model."

The Process

- AIC formally launched the HPW MTI in 2023. The AIC Logic Model (LM) was created in 2024 and has been reviewed by AIC's evaluator, Opinion Dynamics (ODC).
- This is the first MTI in IL to have multiple IOUs (Nicor Gas and AIC) incorporating it into their respective MT portfolios.
- Similarities between Nicor and Ameren.
- Nicor Gas LM and MPIs:
    - Were created in 2021 and finalized through 2022
    - Had input from NEEA based on their experience in the NW
    - Had inputs from Market Characterization reports in 2022
    - Was reviewed by SAG in 2023
- Terms:
    - LM: Logic Model
    - MPI: Market Progress Indicators
    - MTI: Market Transformation Initiative
    - ODC: Opinion Dynamics

The Process

- While several overarching themes are present in both, there are purposeful differences between the two:
    - The market has moved in the 2 years since finalization of Nicor Gas'
        - Driven by ENERGY STAR v7 going live
    - The service territories between the two utilities differ
        - Dense Chicago suburbs vs. Ameren more in rural/central Illinois.
    - Different climate zones can affect savings and value proposition.
        - Nicor more in northern climate zone

The Logic Model

- Very complex, so recommend reviewing on your own.

The Logic Model: Barriers

- Several barriers exist outside of just the buy down of the measure's incremental cost:
    - **1. Unclear manufacturer business case**
        - Concern with manufacturing w/ thin glass, additional cost concerns.
        - Been hesitant with ENERGYSTAR version 7 – has been the largest jump in ES windows in over a decade. Hesitancy from manufacturers.
    - **2. Limited product availability**
        - Historic jump in ENERGY STAR requirements. Windows are largely a made-to-order product.
    - **3. Lack of supply chain awareness**
        - Little familiarity with efficiency benefits across all levels – including within windows manufacturers themselves.
            - Oftentimes people buying windows for comfort or sound
    - **4. Complex supply chain distorts market signals**
        - Consumers love windows, but frequently purchase through third parties (distributors, retailers, homebuilders).

Logic Model: Strategic Interventions

- Of orgs looking to get involved with, many have a lack of familiarity with energy efficiency framework and don't understand utilities are incentivizing people to go with more efficient windows.
- Strategic Interventions can be categorized into several groups:
    - 1. Supply chain engagement
        - Make it easier for builders, raters, retailers, etc. to pick HPW for winning bids.
        - Oftentimes, apples to apples bids not being given to customers.
    - 2. Incorporation of HPW measure(s) into program offerings
        - Create the carrot to point the supply chain's enthusiasm towards.
    - 3. Collaborate efforts to amplify demand
        - Use industry groups, such as PAWS, to amplify messaging and signals to the market.
    - 4. Calibrate customer demand
        - Connect the dots between homeowners love of windows and the supply chain who provides them.

Logic Model: Expected Outcomes

- Short/Mid/Long-term highlights:
    - HPWs increasingly scoped and used in home retrofits
    - Distributors and installers quote HPWs as a standard practice
    - HPWs become standard practice (new construction and retrofit)
- Ultimate goals
    - HPWs required in IL building code
    - Market Share of HPWs > 70%+ in AIC's service area

Market Progress Indicator (MPI)

- In the logic model, every single outcome (17) is tied to a MPI.
- 17 Total MPIs:
    - Connects every outcome to an MPI, measurable metric, and potential data source
- Metric Examples:
    - Awareness rate – customers or retailers aware of HPW.

    - Recommendation rate – how frequently is a distributor recommending in their bids.
    - Product cost – see costs come down along the way.
- Data Source Examples – is a tough spot in MT programs:
    - Surveys
        - Builder, rater, distributor, installer, etc.
    - ENERGY STAR shipment data report
    - HERS data
        - Home Energy Rating
- Up Next:
    - Requesting SAG feedback on Logic Model and Market Progress Indicators
    - Theory Based Evaluation – 2025
    - HPW Pilot – starting 2024

Next Steps:

- Logic Model and Market Progress Indicators for Ameren Illinois High Performance Windows MT Initiative
    - **Comments due Friday, September 13**
    - Send feedback to:
        - Tim Dickison, Ameren Illinois (TDickison@ameren.com)
        - Brady Nemeth, Resource Innovations (bnemeth@resource-innovations.com)
        - Please CC Celia@CeliaJohnsonConsulting.com

High Performance Windows: Natural Market Baseline

Tim Dickison, Ameren Illinois and Brady Nemeth, Resource Innovations

NMB Purpose and Development

- "…a forecast of the future in which no utility-funded energy-efficiency programmatic intervention exists."
- Ameren has had the following developed and reviewed by Opinion Dynamics:
    - Methodology
    - Data Sources
    - Assumptions
- Like the Logic Model (LM) + Market Progress Indicators (MPI) work, Ameren is now the second IL IOU to create a HPW natural market baseline. While the high-level methodology remains consistent, values unique to Ameren Illinois service territory have been used to create a different NMB.
- Terms:
    - LM: Logic Model
    - MPI: Market Progress Indicators

NMB Development Process

- Nicor Gas:
    - Draft developed by RI
    - Third-party review and feedback
    - SAG Presentation: Q2 2024
- Ameren Illinois
    - Same overall methodology by RI
    - Adjustments unique to AIC territory

    - Evaluator review
    - SAG Presentation: Q3 2024

HPW NMB

- Market share of HPW is expected to get in double digits in 2035 without any utility intervention.
    - First years are most important as interventions by utilities can be impetus to market changing.
- Appendix shows up to 2050.

Methodology

- Ameren has used a simple S-curve.
- This curve is estimating unit market share: HPW sales as a percent of total window sales in any given year. It is *not* estimating the cumulative installed stock of HPW.
- Curve terminology is in the appendix.

Methodology

- The curve has 4 main inputs to consider:
    - 1. Maximum Market Share: the maximum level of market saturation.
    - 2. Start of Hypergrowth: The point at which a product's market share begins to rapidly accelerate.
    - 3. Ramp Period: The period between the start of hypergrowth and takeover point.
    - 4. Factor: A numerical value which defines the upper and lower limits of the ramp period. For further explanation, see appendix.
- No right answer for the inputs since building a model for a future.

Sources

- Nine unique sources were used to triangulate a NMB unique to Ameren's service territory.
    - Good national level data from industry experts.
    - Primarily used cofounded study with Ameren, Nicor Gas and ComEd.
- Sources have more information in the appendix.

Key Assumptions

- The data drove several main assumptions:
    - HPW sales have been relatively flat for decades, remaining around 2% for the last 15-20 years.
        - With "business as usual", this market share will double in approximately ten years.
    - Illinois has factors that may drive estimates higher than national sales estimates.
        - Colder, northern state with increased need to save energy and improve comfort.
        - High retrofit opportunity, where greater benefits are felt by homeowners in older homes.
            - Though incremental cost will be driven up in new construction scenario.
    - ENERGY STAR v7 was the largest efficiency jump for windows since before 2010.
    - HPW will likely reach max market share faster than the adoption of double glazing or Low-E glazing largely due to ENERGY STAR's role in the market.

- Unique to Ameren
    - Ameren survey data indicates modest growth above historic norms.
        - Lower than Nicor or ComEd's when comparing the two
    - Fewer households in Ameren territory (compared to Nicor Gas) currently have or have recently replaced their windows with HPW.
    - Almost double the rate of customers purchasing through a retailer in Ameren territory as opposed to a distributor or installer.

Variable Summary and NMB

- Can see hypergrowth starting in 2035
- Doesn't reach max market share until 2050, even with this curve.

Comparisons with Other NMBs

- NEEA, CEE and Nicor Gas NMBs represent valuable comparisons for Ameren.
- All NMBs estimate slow growth with annual market share in the single digits until beyond 2030.
    - Consistent among all three: Estimate slow growth with annual market share below 10% until 2030.
- The biggest unknown across the board is the impact of ENERGY STAR. Updates to the NMB will be expected to be called out in the forthcoming (2025) theory-based evaluation plan developed in conjunction with ODC.
- Ameren not first to add HPW.
    - NEEA (PNW, CEE (MN), Nicor Gas
    - Do expect there will be updates to NMB as get more national and local sales data to compare to.
    - How the NMB is updated will be called out in evaluation plan coming to SAG from Ameren in 2025.

- Up Next
    - Requesting SAG feedback on NMB
    - HPW Pilot Implementation
        - In the process of this, working with Nicor Gas.
    - Theory Based Evaluation

Next Steps:

- Natural Market Baseline for Ameren Illinois High Performance Windows MT Initiative
    - **Comments due Friday, September 13**
        - Send feedback to:
            - Tim Dickison, Ameren Illinois (TDickison@ameren.com)
            - Brady Nemeth, Resource Innovations (bnemeth@resource-innovations.com)
            - Please CC Celia@CeliaJohnsonConsulting.com

Ameren Illinois Luminaire Level Lighting Controls MT Initiative Update

Nic Crowder, Ameren Illinois

LLC Project Volume

- Standard Program – prescriptive program
    - 2023: 20 projects, 444,617 Gross kWh
    - 2024: 14 projects, 673,053 Gross kWh

        - Is partial year data (up to middle of August)
- Small Business Direct Install Program (SBDI)
    - 2023: 224 projects, no Gross kWh
        - LLLC measures were mixed with NLC. Became standalone in 2024
    - 2024: 167 projects, 825,267 Gross kWh

Participation Pathways and Incentives 2023

- Participation Pathways:
    - Standard Lighting
    - Small Business Direct Install
- Control Technologies Incentives:
    - LLLC Standard lighting incentives:
        - $1.50 per watt controlled for LLLC
    - Small Business Direct Install:
        - NLC (includes LLLC) – $1.25 per watt controlled
    - Introduced a cap mid-year at $100 per fixture

Participation Pathways and Incentives 2024

- Participation Pathways:
    - Standard Lighting
    - Small Business Direct Install
- Control Technologies Incentives:
    - Standard Lighting and Small Business Direct Install (SBDI)
        - $1.50 per watt controlled – LLLC
        - All incentives capped at $75 per fixture for LLLC in both Standard and SBDI.
        - Can still be paired with LED fixture upgrades and watt reduced incentives

Training, Education and Marketing 2023

- Training & Education:
    - Offered six 1-day Free Program Ally training on NLC/LLLC in six different cities across the territory.
    - Offered two 2-part Webinars for Distributors and Installers on how to bid, sell, procure, and install NLC/LLLC systems.
    - Offered NLC session at Ameren IL Business Symposium and at an Electric Board of Missouri and Illinois Conference.
- Marketing Energy and Non-Energy Benefits:
    - Worked with NEEA to brand BetterBricks marketing collateral highlighting NEBs for use with Program Allies and Customers.
    - Promote NLC/LLLC savings and non-energy benefits in Monthly newsletters for both Customers and Program Allies.
    - Developed bidding guide for NLC/LLLC projects for Program Allies.

Training, Education and Marketing 2024

- Training & Education Overview
    - Offering self-paced online NXT Level I and II Certification.
    - Workshops including NXT Level Certification overview and sign up along with live LLLC Demo Board commissioning.
        - 4 Workshops targeting Installers, Distributors, A&E Firms and Trade Organization Partners

        - A Workshop targeted for all EE Business Program Field Staff and Engineering Team
        - Ameren Illinois Business Symposium will include an NLC/LLLC session and live LLLC Demos
    - EE Business Program Energy Advisors will use LLLC Demo Boards throughout the territory at Distributor locations and events to educate and engage with Installers.
    - Promote Marketing and Support collateral for Program Allies.

Training, Education and Marketing 2024

- Workshops Detail and Training Schedule
    - Commissioning and troubleshooting with hardware and software using live equipment.
    - Training for attendees using NXT Level modules
    - Distributing Marketing and Support Collateral
    - Can travel around the territory with demo boards to better understand troubleshooting and commissioning to help get program ally installers the competence to understand components of Luminaire Level lighting controls.

Closing and Next Steps

Feedback is requested on the following documents:

1. Nicor Gas Efficient Rooftop Unit Initiative – Overview of Natural Market Baseline Review for Comments
    - **Comments due Friday, September 13**
    - Send feedback to:
        - Randy Opdyke, Nicor Gas (rwopdyke@southernco.com)
        - Rocco Guaragno, Resource Innovations (aguaragno@resource-innovations.com)
        - Please CC Celia@CeliaJohnsonConsulting.com
2. Nicor Gas Residential HVAC Gas Heat Pumps MT Initiative – Overview of Natural Market Baseline Review for Comments
    - **Comments due Friday, September 13**
    - Send feedback to:
        - Randy Opdyke, Nicor Gas (rwopdyke@southernco.com)
        - Please CC Celia@CeliaJohnsonConsulting.com
3. Logic Model and Market Progress Indicators for Ameren Illinois High Performance Windows MT Initiative
    - **Comments due Friday, September 13**
    - Send feedback to:
        - Tim Dickison, Ameren Illinois (TDickison@ameren.com)
        - Brady Nemeth, Resource Innovations (bnemeth@resource-innovations.com)
        - Please CC Celia@CeliaJohnsonConsulting.com
4. Natural Market Baseline for Ameren Illinois High Performance Windows MT Initiative
    - **Comments due Friday, September 13**
        - Send feedback to:
            - Tim Dickison, Ameren Illinois (TDickison@ameren.com)
            - Brady Nemeth, Resource Innovations (bnemeth@resource-innovations.com)
            - Please CC Celia@CeliaJohnsonConsulting.com

5. Guidehouse Memo: Nicor Gas Market Transformation Initiative: High Performance Windows Theory-based Evaluation Plan (August 29, 2024)
    - **Comments due Friday, September 19**
        - Send feedback to:
            - Randy Opdyke, Nicor Gas (rwopdyke@southernco.com)
            - Kathryn Collins, Guidehouse (Kathryn.collins@guidehouse.com)
            - Please CC Celia@CeliaJohnsonConsulting.com
6. Guidehouse Memo: Nicor Gas Market Transformation Initiative: Residential Gas Heat Pump Theory-based Evaluation Plan (August 29, 2024)
    - **Comments due Friday, September 19**
        - Send feedback to:
            - Randy Opdyke, Nicor Gas (rwopdyke@southernco.com)
            - Kathryn Collins, Guidehouse (Kathryn.collins@guidehouse.com)
            - Please CC Celia@CeliaJohnsonConsulting.com