ETA
EFFICIENT TECHNOLOGY ACCELERATOR

Efficient Technology Accelerator 2025 Annual Report

March 31, 2026

ACKNOWLEDGEMENTS

Minnesota's Efficient Technology Accelerator (ETA) is a partnership funded by Minnesota's investor-owned utilities and by utilities that voluntarily opt to participate, including CenterPoint Energy, Minnesota Energy Resources, Minnesota Power, Otter Tail Power, Xcel Energy, Great River Energy, Missouri River Energy Services, and the Southern Minnesota Municipal Power Agency.

ETA is administered by the Minnesota Department of Commerce, Division of Energy Resources and implemented by the nonprofit Center for Energy and Environment (CEE).

This report is made possible through data shared by electric and natural gas utilities across Minnesota, as well as by Heating, Air-conditioning & Refrigeration Distributors International (HARDI), Encentiv Energy, and the Residential Energy Services Network (RESNET). ETA also benefits from technical support and collaboration with the Northwest Energy Efficiency Alliance (NEEA), whose market transformation program provided a foundational model for ETA.

Table of Contents

List of Tables

List of Figures

EXECUTIVE SUMMARY

Minnesota's Efficient Technology Accelerator (ETA) reached a major program milestone: for the first time since launch, ETA is reporting statewide energy savings, cost-effectiveness, and emissions reductions resulting from its market transformation initiatives. This delivers on the ETA's statutory objectives and sets ETA on a path to grow into a lasting, cost-effective energy efficiency resource for Minnesota utilities and customers.[1]

ETA is designed to accelerate the deployment of emerging and innovative energy efficient technologies. By strategically providing market support in key markets — working with manufacturers, distributors, contractors, utilities, and regulators — ETA strengthens supply chains, lowers long-term costs, and enables sustained energy savings that benefit all Minnesotans.

In addition to generating savings directly attributable to ETA, the program plays a critical supporting role for traditional utility Energy Conservation and Optimization (ECO) rebate programs. By improving product availability, increasing contractor familiarity, working across utilities to align incentive specifications, and developing market-facing tools and training, ETA increases participation in existing rebate programs. These market improvements lead to "co-created savings" that are claimed through individual utility ECO programs and incremental to savings associated with ETA, strengthening the overall performance of Minnesota's conservation portfolio.

The near- and long-term savings benefits of market transformation require investment and a strategic vision for the state's energy planning. ETA is funded through an assessment by the Department of Commerce on the state's investor-owned utilities (IOUs) and voluntary contributions from utilities with fewer than 30,000 customers. The 2025 ETA budget was **$10.1 million**. This amount reflects CEE's costs for implementing the program and the Department of Commerce's costs for administering the contract, providing support for the program, and hiring an evaluation contractor for ETA.

After two years of active market deployment, ETA reports its first quantified impacts, demonstrating measurable progress toward the statutory goals of cost-effective energy savings, customer bill savings, and greenhouse gas reductions. Key accomplishments include:

- First-year savings of approximately **4,252 MWh** (electric efficiency), **229 Dth** (natural gas efficiency), and **58,109 MMBtu** (efficient fuel-switching) across ETA initiatives
- Projected lifetime emissions reductions exceeding **85,000 tons of CO_2** from installed measures
- Statewide distributor sales data show a clear market shift in the heat pump market, ETA's longest running initiative. While total central AC sales declined from ~92k in 2021 to ~52k in 2025, ducted ASHP adoption accelerated. **Ducted ASHPs share of the cooling**

[1] Minnesota Statute §216B.241, subdivision 14

market grew from 3% in 2021 to 17% in 2025, demonstrating strong growth despite an overall contracting market.

A summary of the key accomplishments from 2025 are shown in Table 1. The table includes savings for the residential ASHP initiative, high-performance windows installed in new construction, and luminaire-level lighting controls. Savings for retrofit high-performance windows, next gen rooftops, and codes and standards will be included in future reports.

Table 1. Minnesota Efficient Technology Accelerator's 2025 Statewide Impact

Statewide Impact	Peak kW at Gen	MWh Savings at Gen	Dth Savings	MMBtu	tons CO2
First Year					
Energy Efficiency Impacts	752	4,252	229	N/A	648
Efficient Fuel-Switching Impacts	N/A			58,109	4,348
Lifetime					
Energy Efficiency Impacts	N/A	47,330	8,255	N/A	7,576
Efficient Fuel-Switching Impacts	N/A			1,045,958	78,262

Consistent with statutory goals, ETA has made progress toward the goal of delivering cost-effective energy savings for Minnesota. In 2025, ETA generated **$4.2 million net benefits from efficient fuel-switching measures.** While the natural gas and electric energy efficiency segments did not result in positive net benefits, they are expected to in the coming years. Taken together, these early results indicate ETA is on track to achieve portfolio-wide cost-effectiveness and customer bill savings within eight years of launch.[2]

In addition, market progress indicators for ETA's mature initiatives show increasing product availability, improved contractor familiarity, growing market share, and declining barriers, key signals that the portfolio is positioned for sustained savings growth in the coming years.

[2] Based on historical experience of similar regional programs, ETA anticipated reaching cost-effectiveness within approximately eight years of launch; current results suggest ETA is progressing toward that benchmark. Source: Center for Energy and Environment. Proposal to Implement the Minnesota Efficient Technology Accelerator, Docket No. E,G999/CIP-21-548, at 8 (Apr. 15, 2022).

COMPLIANCE WITH RULES AND STANDARDS

ETA submits this 2025 Status Report in compliance with the Minnesota Department of Commerce ("the Department") Rules and the Deputy Commissioner's Decisions. This section provides information responsive to Minnesota Statutes §216B.241 and addresses the requirements and conditions established in the Deputy Commissioner's July 1, 2022, decision approving the META proposal and directing its implementation by Center for Energy and Environment.[3]

Statutory Requirements

Expected ETA Benefits

Minnesota Statute outlines key benefits ETA is expected to provide:[4]

- Cost-effective energy savings for Minnesota utilities
- Bill savings for Minnesota utility consumers
- Enhanced employment opportunities in Minnesota
- Avoidance of greenhouse gas emissions

Statewide energy savings from measures installed in 2025 and the Minnesota test benefit/cost ratio and net benefits are shown in Table 2. Table 2 also shows the estimated avoided lifetime greenhouse gas emissions.

This report quantifies energy savings for Residential ASHPs, High-Performance Windows (new construction), and Luminaire-Level Lighting Controls. Savings estimates for ETA depend on the availability of reliable statewide sales data. While we were able to obtain representative data for these markets, we were not able to secure sufficient data for the High-Performance Windows retrofit market or the Next Gen Rooftop Unit market for this report. ETA is actively working to fill these gaps and expects to include savings for these initiatives in future annual reports.

ETA will not claim energy savings for the Codes and Standards initiative until future energy codes are adopted for which ETA is actively involved in the code development process. ETA anticipates that savings will be claimed for this initiative in 2028 or 2029.

Additional cost–benefit analysis and the allocation of benefits to the funding utilities are shown in Appendix A. Additional commentary on enhanced employment opportunities is provided later in the report.

[3] Minnesota Department of Commerce, Division of Energy Resources. Decision Approving Proposal to Implement the Minnesota Efficient Technology Accelerator, Docket No. E,G999/CIP-21-548 (July 1, 2022).

[4] 216B.214 Subd.14a

Table 2. ETA 2025 Statewide Cost-Effectiveness

	Electric Energy Efficiency	Natural Gas Energy Efficiency	Efficient Fuel Switching
First-Year Energy Savings	4,252 MWh at gen	229 Dth	58,109 MMBtu
Demand Savings	752 kW at gen	N/A	N/A
Lifetime Savings	47,330 MWh at gen	8,255 Dth	1,045,958 MMBtu
Lifetime avoided GHG emissions	549 tons CO2	7,027 tons CO2	78,262 tons CO2
Cost Effectiveness			
Minnesota Test Net Benefits	-$485,429	-$2,315,698	$4,179,016
Minnesota Test Benefit/Cost Ratio	0.87	0.03	1.41

Consistent with statutory goals, ETA is on track to deliver cost-effective energy savings for utilities. Based on historical experience with similar regional programs, ETA anticipated reaching cost-effectiveness within approximately eight years of launch; current results suggest ETA is progressing toward that benchmark earlier than expected.[5]

Similarly, ETA is on track to deliver customer bill savings. The electric and natural gas efficiency segments already result in bill savings. ASHPs, the only EFS measure reporting savings in 2025, can reduce bills when properly installed and paired with appropriate rates, but may increase bills if systems are not correctly programmed at installation or are paired with less favorable rates. The ETA ASHP Initiative is actively working to address these challenges by supporting improved rate design and contractor best practices that mitigate bill impacts. As these efforts take effect and the adoption of efficient technologies increases, overall portfolio bill savings are expected to become positive (see ASHP section for further details and current progress).

ETA is already achieving GHG emissions reductions, with an overall reduction of more than 85,000 tons of CO_2. GHG emissions reductions are expected to increase in future years as ETA continues to accelerate the adoption of efficient technologies.

ETA's activities that lead to enhanced employment activities are discussed further in the *Enhanced Employment Opportunities* section.

Additionally, ETA continued to contribute to co-created savings by supporting utility programs with technical expertise, analysis, contractor training, educational resources, and facilitating the alignment of ECO programs and rebates.

[5] Center for Energy and Environment. Proposal to Implement the Minnesota Efficient Technology Accelerator, Docket No. E,G999/CIP-21-548, at 8 (Apr. 15, 2022).

Utility Contributions

Public utilities with over 30,000 customers must participate in ETA and contribute to the approved program budget through annual deposits proportional to the utility's gross operating revenue from sales in Minnesota.[6] A participating utility must not be required to contribute more than the following percentages of the utility's spending on its broader Energy and Conservation Optimization plan.

- 2 percent in the initial two years of ETA
- 3.5 percent in the third and fourth years
- 5 percent thereafter

ETA satisfied the statutory requirement related to utility assessments by submitting a compliance filing detailing the Department-approved 2024–2026 budgets and the corresponding assessment amounts for each participating utility.[7]

Minnesota Statute also clarifies that other utilities may choose to participate in ETA. ETA submitted a compliance filing in December 2025 that outlines a process for utilities with less than 30,000 customers to fund and receive energy savings from ETA initiatives, which was ultimately approved by the Department.[8]

The total contribution in 2025 per utility is shown in Table 3.

[6] 216B.241 Subd. 14(h).
[7] Center for Energy and Environment, Compliance Filing for the Minnesota Efficient Technology Accelerator: 2024–2026 Budgets and Utility Assessments, Docket Nos. E,G999/CIP-21-548; E002/G002/CIP-23-92; E015/CIP-23-93; E017/CIP-23-94; G008/CIP-23-95; G011/CIP-23-98 (Dec. 21, 2023).
[8] Department's February 18, 2026, Decision.

Table 3. 2025 ETA Assessment by Utility

ETA Assessment Allocated to ETA Funders	Cost Recovered in 2025
Gas	
CenterPoint Energy	$2,084,884
Minnesota Energy Resources	$550,617
Xcel Energy Gas	$1,119,468
Subtotal	***$3,754,969***
Electric	
Minnesota Power	$509,013
Otter Tail Power	$209,801
Xcel Electric	$5,493,115
Great River Energy	$121,500
Missouri River Energy Services	$31,000
Southern Minnesota Municipal Power Agency	$19,000
Subtotal	***$6,383,429***
Total	**$10,138,398**

Other Regulatory Requirements

In 2022, the Minnesota Department of Commerce approved Minnesota's Efficient Technology Accelerator (ETA).[9] Key requirements outlined in the Deputy Commissioner's Decision and how ETA meets each requirement is summarized in the following.

Program governance and oversight

ETA must operate under the oversight of the Department of Commerce and in coordination with participating utilities through a defined governance structure. This structure must include a Coordinating Committee with authority to approve annual work plans, budgets, and initiative stage transitions.

Throughout 2025, ETA met regularly with the Department to discuss workplans, budgets, decisions to bring to the Coordinating Committee, and other general governance topics. ETA established and maintained a Coordinating Committee with voting authority to approve annual workplans and budgets and to advance initiatives through a defined stage-gate process. The Coordinating Committee met ten times in 2025.

Annual work plan and budget approval

ETA must submit an annual workplan and budget to the Department for review and approval prior to implementation. Annual budgets must remain within statutory spending limits tied to

[9] Minnesota Statutes §216B.241, subdivision 14.

participating utilities' Energy Conservation and Optimization (ECO) budgets, and ETA must track expenditures to ensure funds are used only for approved activities.

ETA submitted its 2025 workplan and budget for Department review on October 11, 2024. The plan was approved on December 12, 2024. Program expenditures for 2025 remained within statutory limits tied to participating utilities' ECO budgets, and budget updates were communicated through regular reporting to the Department.

Energy savings, evaluation, and allocation reporting

ETA must calculate energy savings and net benefits at the statewide level using Department-approved methodologies. Savings must be allocated to participating utilities in proportion to their funding contributions, and ETA must implement safeguards to prevent double counting of savings with traditional ECO programs.

ETA prepared and submitted Energy Savings and Market Evaluation Plans for each initiative, which were reviewed and approved by the ETA Coordinating Committee through the stage-gate process.[10] Where methodologies are not fully specified in those plans, additional detail on savings and net benefit calculations is provided in Appendix B.

Statewide energy savings and net benefits for 2025 are calculated at the initiative level, aggregated by impact (e.g., electric energy efficiency, natural gas efficiency, efficient fuel-switching), and allocated to participating utilities based on their funding contributions. To avoid double counting with utility ECO programs, ETA collected rebate data from all utilities who indicated via a survey that they offer rebates for overlapping measures and, where applicable, subtracted those rebate-supported units from the statewide totals. Additional detail on this process is provided in Appendices B.

Cost-effectiveness and performance tracking

ETA must track initiative performance and assess cost-effectiveness using Department-approved tests, including the Societal Cost Test, the Utility Cost Test, and a statewide Ratepayer Impact Test.

The statewide cost–benefit results for ETA are shown in Appendix A. The primary cost-effectiveness test for Minnesota ECO programs is the Minnesota Test. Consistent with Department guidance, ETA also reports results for the Societal, Utility, and Ratepayer Impact Measure (RIM) tests; however, the RIM test is not recommended as a standalone metric for evaluating ETA. Across many ECO programs, including those with strong Minnesota Test net benefits, the RIM test often produces a benefit-cost ratio below 1. This outcome reflects structural limitations of the RIM test, which treats participant benefits such as bill savings and rebates as costs rather than benefits. In particular, customer bill savings are counted as lost

[10] ETA uses a structured stage-gate process to guide initiatives from early concept development through market deployment and long-term monitoring, with defined decision points to assess market readiness, savings potential, and alignment with statutory goals. Progression between stages requires review and approval by the ETA Coordinating Committee, ensuring initiatives advance based on evidence, performance, and stakeholder input.

utility revenue, which depresses RIM results even when customers experience meaningful bill reductions.

Independent evaluation

ETA must cooperate with a Department-procured independent evaluator and provide access to program data and analyses.

The Department contracted with Michaels Energy to conduct an independent, multi-year review of ETA. The review covers ETA implementation beginning with program launch in January 2023 and will include an evaluation of ETA's statutory compliance, market progress, energy savings methodologies, and cost-effectiveness.

In 2025, ETA met multiple times with Michaels and provided extensive program documentation to support the independent review. Beginning in September 2024 and continuing through 2025, CEE responded to formal data and documentation requests by providing portfolio governance materials, annual workplans, initiative-level market transformation plans, Energy Savings and Market Progress Evaluation Plans, savings methodologies, Salesforce CRM reports, market research datasets, rebate and sales data, and supplemental analyses. ETA continues to support the ongoing independent review process, which will culminate in a summative five-year evaluation.

Stakeholder engagement and transparency

ETA must engage utilities and stakeholders on initiative selection, program design, and evaluation methods.

ETA engaged utilities, manufacturers, distributors, contractors, evaluators, and other stakeholders through advisory committees, working groups, workshops, and regular check-ins. Stakeholder feedback informed initiative design, incentive alignment, evaluation approaches, and ongoing program improvements. Specifically, ETA has an evaluation committee made up of the funding utilities to discuss evaluation methods and the coordinating committee governs initiative selection and reviews program design prior to initiative launch. More details on initiative specific engagement are provided in the following sections.

INITIATIVES IN MARKET DEPLOYMENT

In 2025, Minnesota's Efficient Technology Accelerator (ETA) further built Minnesota's market transformation efforts that will accelerate the deployment of emerging, energy efficient technologies in the state. We continued Market Deployment of initiatives for a diverse range of products, with applications spanning residential heating to commercial lighting, benefiting natural gas and electric utility customers. In our second annual report, we highlight key programmatic accomplishments and market progress indicators in line with our program logic models, which define the long-term strategies and theory of market change.

The report is organized by Market Transformation Initiative (MTI) stage. There are four basic stages in the life cycle of an ETA initiative:

- **Concept Development:** Scan and assess a broad pipeline of emerging MT opportunities and select the optimal opportunities to pursue.
- **Program Development:** Conduct detailed planning as well as market and product research to prepare an initiative for successful launch.
- **Market Deployment:** Deploy market intervention strategies in close collaboration with key market actors to accelerate the adoption of ETA technologies.
- **Long-term Monitoring and Tracking:** Monitor the market, estimate savings, and periodically assess need for market re-entry.

Figure 1: Efficient Technology Accelerator Initiative Stages

In 2025, the ETA program had five MTIs in the Market Deployment phase. This phase includes the greatest investment of resources to create an initial market lift and momentum to start the exponential growth curve for the product or practice identified in each MTI. The five MTIs included in the 2025 Status Report along with the date they started in Market Deployment are as follows.

- Residential Air Source Heat Pumps (Jan 2024)[11]
- High-Performance Windows (Jan 2024)
- Luminaire-Level Lighting Controls (Jan 2024)
- Next Gen Rooftop Units (April 2024)
- Codes and Standards Advancement (November 2024)

The ETA market transformation program employs a strategic process of intervening in markets of chosen technologies to enact lasting change with the end goal of saving energy for the benefit of all Minnesotans. This process is outlined at the beginning of initiatives in three foundational documents. The Market Characterization Report, Market Transformation Plan, and Savings and Evaluation Plan can all be found on the ETA Research & Data webpage.[12] The Market Transformation Plan outlines the long-term strategy to achieve a transformed market — each year, the initiative team takes a critical path focusing on near-term activities and actions that will help us reach our end goal.

In 2025, the ETA program made significant strides, expanding our networks through mapping the markets and engagement with key mid-stream market actor segments; developing and delivering training to support technology practitioners and installers; refining and improving technology value propositions; enhancing customer tools and resources; facilitating collaboration and alignment across utility programs; and forging partnerships with manufacturers and engaging nationally to increase visibility and focus on these emerging technologies. Additionally, ETA made tremendous progress on helping advance residential and commercial code updates set to take effect in 2028, which will help the state reach the aggressive code advancement goals set forth in statute. These strides in code advancement will also move the MTIs forward by finding ways to lock some of these technologies in code and achieving a transformed market. The strategic efforts and progress made in 2025 propelled ETA deeper into market impacts and for the first time, evidence exists of quantifiable changes in market conditions and a pathway to cost-effective energy savings.

Residential Air Source Heat Pumps

ETA's residential air source heat pump (ASHP) initiative is focused on accelerating the adoption of dual fuel, centrally ducted ASHPs in existing buildings. This application can replace central air conditioners and displace a portion of heating from propane or natural gas furnaces.

Currently, an estimated two-thirds of single-family Minnesotan households heat their homes with gas furnaces and cool with AC and could instead meet a portion of their home heating needs and continue to cool by replacing their AC with an ASHP. This initiative has the potential to reduce Minnesota's residential heating and cooling energy use by roughly 35%. This initiative

[11] The ASHP Collaborative is unique among ETA initiatives in that activities were funded voluntary by utilities since January 2020, so although the "official" ETA market launch was 2024, the initiative had been active in the market for four years by that point.

[12] https://www.etamn.org/research-data

has an end goal of making ASHPs the standard choice for home heating and cooling by 2035 in homes currently conditioned with central AC and furnace.

2025 marked the first release of an ASHP State of the Market Report, which is a market research report detailing perceptions and progress from multiple market actors. This report heavily informed the activities deployed in 2025 and indicates where there is positive market change occurring due to market support strategies. This section covers the activities deployed in 2025 and market impacts measured through sales data and market research findings. The residential ASHP initiative has been in the market longer than any initiative in the ETA portfolio. As a result, time-series data is available to assess impacts, so the ASHP section includes sections highlighting activities and impacts. The other four initiatives report on activities, and, as time-series data is available, those initiatives will include impacts sections as well.

Residential ASHPs Market Activities

The ASHP initiative has seven market support strategies that are outlined in the initiative's long-term Market Transformation Plan. In the following, we describe progress made within six of the market support strategies that were under development in 2025. The seventh strategy involves codes and standards, which is the longest-term strategy, and we anticipate progress and development there in the 2026 calendar year.

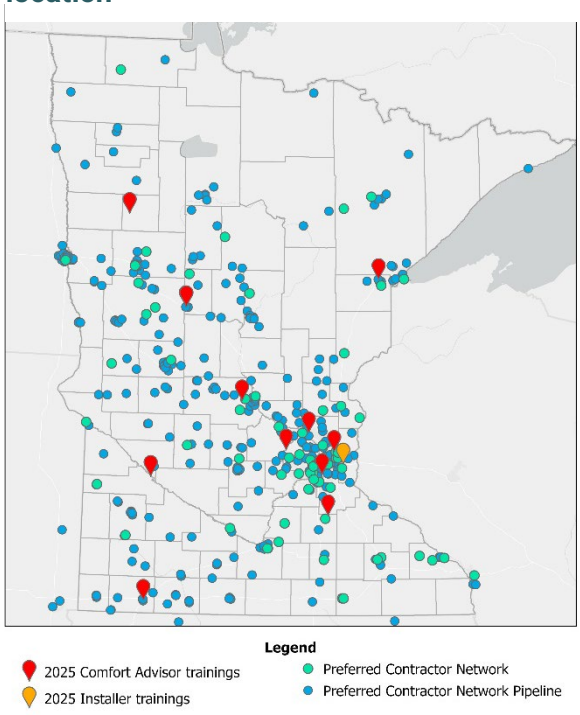
1. Build contractor champions

Lack of contractor experience and buy-in has been a predominant market barrier since beginning work in the ASHP market in 2020. The ASHP initiative has continued deployment of several activities in 2025 to support the increase of contractors that champion ASHP technology.

Figure 2: ETA ASHP Training, Spring 2025

- **Developed and deployed 9 contractor training events** in 2025 with ~360 attendees, of which ~270 were installation contractors. The training format was in-person classroom style and covered key considerations for heat pump energy performance and maximizing customer benefits.
- **Developed and updated new training resources** for expanded training offerings. With additional grant funding for the Minnesota Residential Heat Pump Training Program, the ASHP Team developed and piloted a new two-day, hands-on training for ASHP installers focusing on quality installation techniques and equipment commissioning. Additionally, the team updated and enhanced the Comfort Advisor Training, including an e-learning course available for contractors to take online at their own pace.
- **Expanded the Preferred Contractor Network** by adding 12 new contractors, bringing total membership to 73. The network is intended to allow contractors dedicated to heat pump technology to differentiate their business to customers and to promote installation quality and customer satisfaction.
- **Continued to offer Department of Energy's "Energy Skilled" certification** for both Comfort Advisors and Installers on training curriculum to provide additional benefit to contractor participants and continued to offer North American Technician Excellence certification and Preferred Contractor Network eligibility.

Figure 3: ASHP contractor engagement by location



- **Shared State of the Market survey results** with contractors to give them actionable insights into ASHP customers' sales experience, equipment satisfaction, and their own role in influencing a customer decision.
- **Developed resources to support contractors** in enhancing their ASHP business, including the Heating and Cooling Savings Estimator, continuous guidance on tax credits and rebates in a changing landscape, and a monthly newsletter with high engagement (34% open rate, 26% click rate).

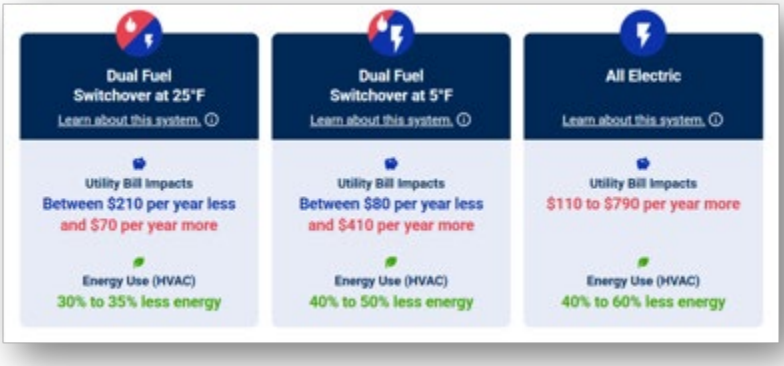
2. Develop customer tools and resources with articulated value proposition

With four years of contractor support underway and indications that contractors and the market are well poised to serve customers, a remaining barrier identified in 2025 is low customer awareness and lack of demand for the technology. A homeowner survey conducted among Minnesotans in 2024 revealed that 75% of respondents knew nothing or very little about heat

pumps. The initiative continued efforts around understanding customer needs and finding ways to drive awareness through trusted market partners.

- **Applied research findings** on barriers and motivations around heat pump adoption and messaging strategies for homeowners, both as a general population and homeowners with recent heat pump installations. These findings were applied to marketing messaging and contractor training, and informed homeowner-facing resource development priorities.
- **Became a hub of collaboration among industry partners** by convening industry actors (utilities, distributors, and state and local government representatives) together for two in-depth meetings of 50+ attendees. These meetings relayed timely heat pump technology updates, identified opportunities for ongoing collaboration including customer awareness building, and aligned actors across the state and broader region to increase heat pump installations.
- **Developed and launched an ASHP operating cost web tool[13],** the Heating and Cooling Savings Estimator, to allow homeowners to see what the bill impacts might be of switching from their legacy heating and cooling system to an ASHP. This tool improved on the previous cost of heat tool, with more options to individualize results to better reflect the homeowner's needs.

Figure 4: Example Heating and Cooling Savings Estimator Results



- **Expanded consumer awareness toolkit** for market partners including messaging, FAQs and marketing templates. These resources are designed for contractors, utilities, and state/local governments to increase customer awareness. Expansion included an incentive stack graphic and flyer, MN State Fair Eco Experience materials, and current guidance on changes to federal tax incentives.
- **Organized an ASHP Marketing Cohort and coordinated two cohort marketing campaigns** with cohort participants from 16 organizations across the state. The marketing campaigns were held in early summer and early fall to highlight the cooling and heating benefits of an ASHP as the season's transition. Outside of the marketing campaigns, the cohort shared customer messaging practices and available resources and discussed current marketing challenges and solutions.

[13] https://www.mnashp.org/savings-estimator

- **Enhanced the program website** that serves as a central hub for heat pump technology and attracted 17k new users to the MN ASHP Collaborative website.[14] The website has distinct resource sections for homeowners (such as blogs and the estimator tool), contractors (such as training registration and technical tools), local governments and statewide organizations (such as marketing content), and distributors (such as training resources).

3. Work with utilities, state, and other programs to align incentives

In 2025, an important pillar of the ASHP initiative was to build alignment across the numerous rebate sources available in the market including utility programs, tax credits, and federal rebates under development. Aligning incentives maximizes the potential for customers to stack incentives and reduce first costs, allows contractors to track program details more easily and more confidently promote rebates, and motivates distributors to more readily stock qualifying products that meet all program criteria. The team did the following to enhance utility engagement and incentive alignment.

- **Engaged with utilities to support ASHP programs,** which included 25 meetings and engagements with SMMPA, Otter Tail Power, Xcel Energy, MRES, Great River Energy, CenterPoint Energy, and Minnesota Power. The team tracked and communicated updates on product specification trends from ENERGY STAR, the Consortium for Energy Efficiency, and future Save Energy Minnesota programs and brought that to Minnesota utilities, as well as encouraged idea sharing and alignment on incentive program design.
- **Developed and shared an incentive alignment memo and meeting** to recommend alignment considerations ahead of the new triennial cycle.
- **Developed an ASHP 2024 market report** for participating utilities. The team collected, aggregated, and analyzed utility rebate data to better understand market trends and provide insight for utility programs.

4. Work with distributors and manufacturers to encourage appropriate stocking and promotion

The team also engaged market partners upstream of contractors to optimize conditions for ASHP market growth.

- **The team engaged seven distributor companies** to plan training, communicate market shifts, provide support, and promote ASHP technology. Across all seven distributor partners, the team had 39 unique meetings and calls to advance the program's goals. Distributors are one of the core market audiences and the team prioritizes distributor engagement to support overall program goals.
- **Solicited feedback on equipment specifications** ahead of the utility incentive alignment work. Distributors shared that some equipment specifications in rebate programs severely limit the number of qualifying products and may lead contractors and

[14] https://www.mnashp.org/

homeowners to pursue other equipment options. Utilities were receptive to this feedback when presented back by the collaborative.

- **Supported distributor dealer events** by presenting and tabling at distributor dealer meetings throughout the year. The team provided support for seven distributor-hosted contractor meetings, reaching over a thousand contractor participants.

Distributor Showcase: Auer Steel

The MN ASHP Collaborative has partnered with distributors to share insights, strategies, and support with partners in the market. Recently, Auer Steel, an HVAC distributor that collaborates with the ASHP team, commented on the impact the ASHP Collaborative program has had on their business.

> *"The Minnesota Air Source Heat Pump Collaborative has been a tremendous partner to Auer Steel over the years. Our organizations are closely aligned around expanding heat pump adoption in Minnesota, supporting homeowner education, and promoting the installation practices that are essential to HVAC system performance. The heat pump resources they continue to develop for both contractors and homeowners strengthen our shared goal of giving the industry the tools and knowledge needed for long-term customer satisfaction and ongoing sales growth. Building on the progress we've already seen with residential heat pumps, we're excited to partner with the Next Gen RTU initiative and help advance dual-fuel rooftop systems in the years ahead."*
>
> - Laura Tofte, Director of Marketing and Communications, Auer Steel

- **Shared training resources** directly with distributors. In partnership with funding from the MN State Heat Pump Training Grant, the ASHP team shared white-labeled (unbranded) Comfort Advisor course materials and faciliatation guides to allow distributors to incorporate the curriculum into their own training program. Additionally, the team shared and managed an incentive program for distrubutors to purchase hands-on training equipment for their in-house training.

5. Provide support and collaboration to utilities and regulators to adopt beneficial heat pump rates; support implementation of rates and awareness

The team works with utilities to support the adoption of beneficial heat pump rates that improve the operating economics for homeowners.

Continued supporting the adoption of Xcel Energy's Electric Space Heating Rate in the Xcel Energy Residential Time-of-Use Rate Design (Docket No. E002/M-23-524).[15] The revised electric space heating rate improves operational costs for ASHP customers in comparison to other fuel types thereby increasing the value proposition for ASHPs as an AC replacement. Support included recommendations for customer support staff training, conversation flowcharts, sharing feedback on rate enrollment experiences, and continued promotion of the rate in contractor and homeowner communications.

We are working to build on the success of the Xcel Energy electric space heating rate by engaging with other high-potential utilities to work toward increased availability of special electric rates that benefit heat pump adoption. In late 2025, we held a meeting to discuss opportunities and provide data and information on potential approach pathways.

6. Support manufacturer product development to improve functionality for load flexibility

Load flexibility is an increasingly important topic for our partners, as ASHP technological advancements and utility load control programs need to be compatible for utilities to continue to manage equipment in their load control programs. The ASHP Collaborative works with manufacturers to ensure compatible equipment has available documentation for utility staff and contractors, as well as with national partners to be involved in national standard work.

- **Built and maintained a qualifying products list for load management compatibility[16],** in close collaboration with Great River Energy. The list allows contractors to reference which ASHPs have been tested and are proven compatible with utility load management programs and access wiring diagrams for correct installation of variable speed systems. This work required close collaboration with manufacturers to determine capability, access wiring diagrams, and test equipment. By maintaining this list, customers have better access to technology that will allow utility control and access to improved electric rates.
- **Joined the AHRI 1380-202x Small Working Group** to contribute to updating the demand response standard for variable-capacity ASHP systems. Through this committee work, we initiated a landscape analysis of the components needed to develop a dual fuel ASHP load-flexibility pilot or field study aligned with the capabilities of the forthcoming standard update. This effort will expand the load-flexibility options available to utilities — particularly for communicating systems not included in the limited qualified products list previously noted — since many ASHP systems cannot participate in traditional direct load-control demand response programs.

[15] https://www.edockets.state.mn.us/documents?doSearch=true&dockets=23-524

[16] https://www.mnashp.org/ashp-models-compatible-load-management-controllers

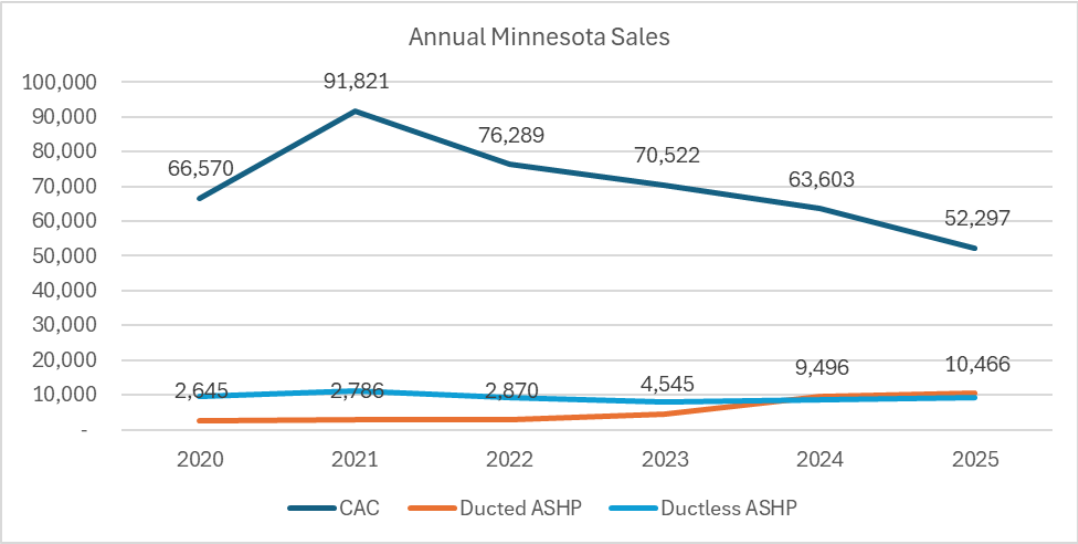
ASHP Initiative Market Impacts

The ASHP initiative has been deploying market strategies since 2021 prior to the launch of ETA and therefore has the most time-series data to show impact in terms of market progress indicators, metrics used to measure successful impact on key market segments, and market share. For 2025, this section is only presented for ASHPs due to the time-series data present and will be included for additional initiatives in future years as impacts can be identified through data collected. Data presented comes from both market research and available sales data.

ETA purchases data from Heating, Air-conditioning & Refrigeration Distributors International (HARDI), the North American HVAC distributor association to understand sales trends over time. This data represents a portion of statewide sales, and an extrapolation method is applied to obtain statewide sales estimates by categories shown in the following**. Overall, these data show that ducted heat pump market share jumped dramatically in 2024 and 2025.** Additionally, ducted heat pump sales were historically lower than ductless sales in the Minnesota market and in 2023, that gap began to close. For 2024 and 2025, ducted sales surpassed ductless sales in the state for the first time. This marks significant achievement in sales trends as the core focus of the ASHP initiative is to lift sales of the ducted heat pump market for homes that have centrally ducted furnace and AC systems.

This is likely due in part to the new rebates and tax credits. Additionally, the jump in market share was partly due to the robust training and education helping contractors understand how to design dual fuel systems that displace natural gas furnace heating. Rebates and tax credits alone would not overcome this barrier because contractors are sensitive to increasing operational costs and the robust modeling and education work lifted this ducted heat pump segment. This growth in the Minnesota heat pump market is especially remarkable considering the overall HVAC and AC market have significantly declined as evidenced in Figure 4 and Table 5. This decline is likely due to inflation, high interest rates, A2L refrigerant changeover, and tariffs, which have been pushing the overall HVAC market toward existing equipment repair instead of system replacement. This sentiment has been broadly communicated to the heat pump team at both the distributor and manufacturer levels.

Figure 5. Minnesota Residential Heat Pump and Central AC Sales



Source: HARDI Unitary Market Intelligence powered by CoMetrics

Table 4. Minnesota ASHP Market Share

	CAC	Ducted ASHP	Ducted ASHP Market Share
2020	66,570	2,645	4%
2021	91,821	2,786	3%
2022	76,289	2,870	4%
2023	70,522	4,545	6%
2024	63,603	9,496	13%
2025	52,297	10,466	17%

Source: HARDI Unitary Market Intelligence powered by CoMetrics

In addition to the sales data showing the trend of increased ducted heat pump market share, there are other indicators of market progress that can be gleaned from the State of the Market report released in 2025.

- At the onset of the program, contractor awareness and heat pump favorability among contractors were noted as key barriers. However, after five years of training contractors, evidence suggests that these barriers have been reduced. In a broad population contractor survey, **most contractors (89%) indicated they have at least some experiences with heat pumps**, and almost half have a lot of experience. Additionally, **70% of contractors hold a favorable opinion of heat pump technology**, with 44% saying they held very favorable opinions. Almost all those with a lot of experience (98%) held favorable opinions of heat pump technology.
- Specifically, there **are notable differences in positive heat pump opinions for contractors who engaged directly with the ASHP Collaborative**. We asked questions about whether ASHPs were beneficial for different application types (for cooling, for primary heat, and for electric, natural gas, and propane heated homes) in both a training

survey and a broad contractor population survey. When comparing results from those who attended training to that of the broader population, electric and cooling applications had high approval in both populations (higher than 90%). **However, belief in the benefits of the other applications (natural gas, propane, and primary heating) was considerably higher among those attending training** (14 to 30 percentage points higher).

- When looking at survey results from customers who have installed heat pumps and received a rebate in the last three years, evidence suggests **the key customer base may be shifting, and contractors, especially those interacting with the Collaborative, are a key leverage point for heat pump installation.** A reduction in the year-over-year proportion of customers specifically looking to buy heat pumps, coupled with growing interest in benefits like reliability and noise reduction and increasing sales, suggest the customer base is expanding beyond the innovator and early adopter segments. Instead, contractors, especially those who have engaged with the Collaborative through training or the PCN, are suggesting heat pumps to potential customers who may not know about them; **73% of people who were not looking specifically for a heat pump had them installed by a contractor who was interacting with the Collaborative.** Additionally, two-thirds of surveyed customers who received a rebate used a contractor who was interacting with the Collaborative, indicating the robust reach of the Collaborative and support to utility rebate programs.

High-Performance Windows

Windows are the least efficient element of the building envelope — as the nation moves to decarbonize its buildings, it will be imperative to improve this weak link. Windows comprise only 8% of the typical home's building envelope area but account for up to 45% of envelope heat transfer. For this initiative, we classify high-performance windows (HPWs) as those with a U-Factor of 0.22 or less, which aligns with the ENERGY STAR Version 7.0 Northern zone prescriptive specification.

This initiative focuses on residential-style windows and focuses initially on the new construction market to increase demand signals to manufacturers, which will in turn increase production, availability, affordability, and promotion of HPWs, positioning them to be competitive in the retrofit market.

The HPW initiative completed its second year in Market Deployment in 2025. Activities and accomplishments are described in the following, organized by the market support strategies that were our priority for 2025.

Figure 6. HPW demonstration site with co-installed continuous exterior insulation (CEI), Minneapolis, MN

1. Implement product demonstrations to understand challenges and benefits, increase familiarity, and clarify value propositions

As a technology with low market share in Minnesota (approximately 4%[17]), there is a lack of experience of the positive benefits of HPWs in the state. In the early stage of the program, we are funding demonstrations of HPWs in affordable housing and new construction to demonstrate the value of the technology and create case studies to promote it.

- **Completed HPW pilots** including new construction homes with Twin Cities Habitat for Humanity with Andersen windows, Fergus Falls Habitat for Humanity with Vector Windows, and retrofits including a Minneapolis affordable multifamily building, and a duplex that co-installed continuous exterior insulation through Quarve Contracting.
- **Advocated for the use of high-performance windows** in a technology highlight with Sustainable9 in partnership with Housing First MN. Through this event, we provided marketing materials and a champion highlight with Sustainable9 outlining the HPW value proposition.

2. Collaborate with and empower builders, manufacturers, architects, contractors, and utilities to embrace HPW promotion, value engineering, and market opportunities

In 2025, the team engaged broadly with the MN HPW market and initiated market engagement by participating in 76 meetings and engagements across 11 manufacturers, 10 builders, 2 contractors, 3 energy raters, and 4 homeowners and 13 additional outreach and meetings with all other market actors. Through this outreach, the team identified the most likely partners and high-value opportunities to pursue in 2025.

Figure 7. HPW demonstration site with Twin Cities Habitat and Andersen Windows, Maplewood, MN

3. Support manufacturers in developing more cost-optimized, affordable HPW options

Created cost-optimized window manufacturer incentive, or golden carrot strategy, with 200% leveraged funds from Nicor Gas IL and Xcel CO, opening extensive collaboration plans for 2026. Working with window manufacturers headquartered in MN (2x) and CO (1x), this work decouples performance features to provide optimal cost on performance for affordable home builders, volume builders, etc. This work enables in-kind efforts from the manufacturers and

[17]https://neea.org/resource/high-performance-residential-windows-market-share-study/

their partners and provides manufacturing improvements and worker upskilling opportunities in MN.

4. Engage utilities and local entities to incorporate HPW into program offerings, incentives, and policies

Supported development of utility rebate programs through TRM optimization and utility program engagement. Additionally, supported utility implementation of their newly launched HPW rebate programs through individual outreach to provide subject matter programmatic support, ad hoc support throughout the year, and four market advisory committees consisting of utility stakeholders to align and increase success of ECO programs including retrofit rebates and incorporation into new construction above-code programs.

5. Develop marketing materials, tools, resources, and market research to raise awareness of HPW

To enable effective communication, engagement, and outreach as described, the team built foundational communication strategies and tools.

- **Conducted contractor market research**[18] including a survey with 39 residential window contractors and 10 semi-structured interviews, showing high familiarity (82%) with HPW. Although HPWs still represent a small portion of the market, 44% of contractors have seen sales growth in the last five years, and 51% expect growth in the next five years.
- **Expanded program brand presence and messaging**. This included expanding the initiative marketing strategic plan and the program website.[19] The marketing plan included expanded messaging guides for core audiences from 2024.
- **Influenced increased ENERGY STAR ad spend in MN** through the development of new ECO programs. ENERGY STAR directed increased ad spend in markets with utility rebates during the second annual Windows Social Media Campaign.

6. National engagement and collaboration on above code programs, tax credits, tools, resources, and data

In addition to engagement within MN, the team engaged nationally to promote advancement of the HPW product category.

- **Continuing national thought leadership through the Partnership for Advanced Windows (PAWS)**, a national effort with the goal of promoting advancement and adoption of HPWs. The steering committee consists of five members from ETA, PNNL, and Energetics. The HPW team was involved in PAWS through participation in the steering committee, leadership group, co-leading the utility working group, and participation in the communications and outreach working group.

[18] https://www.etamn.org/windows-market-insights-reports-residential-windows-contractors
[19] https://www.wisewindowhub.org/

- **Led planning for and hosted a manufacturer-builder event**[20] at the EEBA Performance builder conference in St. Paul through PAWS[21], bringing together manufacturers offering HPW and performance builders interested in using them.
- **Analyzed new construction data to understand emerging trends and opportunities** in new construction. Provided insights over time into market share and helped the team prioritize builder outreach by gaining visibility into which builders have the highest proportion of high-performance homes.

Manufacturer Showcase: Vector Windows

ETA with sponsors Nicor Gas IL and Xcel Energy CO are partnering with three window manufacturers to advance cost-optimized triple pane windows. One of these Minnesota-based manufacturers, Vector Windows, recently commented on the impact of the equipment upgrades planned to bring triple pane production in-house:

> *"Vector Windows is proud to work with ETA to continue advancing energy-saving solutions that offer customers elite performance at a great value. Through ongoing advancements, we're able to deliver these benefits at a more affordable price while continuing to pursue innovations that enhance efficiency, quality, and long-term sustainability."*
>
> - Vector Windows

[20] https://paws.energy/event/window-maker-builder-meet-up/
[21] https://www.linkedin.com/posts/partnership-for-advanced-window-solutions_paws-highperformancewindows-eeba2025-activity-7374886896964931584-D_pe/

Luminaire-Level Lighting Controls

The LLLC initiative strives to advance the adoption of luminaire-level lighting control (LLLC) systems to bring lasting change to the Minnesota lighting market and ultimately make these systems standard practice for commercial buildings. LLLCs represent an advanced approach to lighting efficiency by integrating sensors and individual luminaire control capabilities. The key benefits of LLLC include significant energy savings through control strategies such as high-end trim, motion sensing, and daylight harvesting, which collectively can save on average 63% of the energy consumed by a traditional lighting system.

While lighting has long been a key opportunity for electric energy savings, widespread market adoption of efficient solid-state lighting shifts the opportunities for savings from loads to controls. Even though LLLCs have reached a level of maturity in the market, LLLCs have only made up a very small proportion of lighting installations in Minnesota (1% of projects).

The LLLC initiative uses a multi-faceted approach that equips the market with practical know-how, incorporates efforts to bolster demand, and addresses the market barriers that have significantly inhibited the pace and scale of LLLC uptake throughout Minnesota. The LLLC initiative has eight long-term market support strategies that are outlined in the initiative's Market Transformation Plan, which are designed to allow the team to adapt over time. In the following, we highlight the primary strategies the team focused on in 2025.

1. Develop, leverage, and deliver training and educational tools for market actors and consumers

Lack of awareness of product, value proposition, and energy savings potential has been a predominant market barrier since inception. In 2025, an important pillar was to revamp the training strategy to support a broader approach by leveraging external subject matter experts and established resources used successfully by NEEA, Ameren Illinois, and others. In total, the various training events were attended by over 550 individuals. Training updates and events included the following:

- **Built LLLC demonstration boards** for six common LLLC systems providing workshop attendees with hands-on experience with various systems. These demo boards were provided to five local manufacturer representative agencies as training and sales resources and became a key part of the LLLC workshops.
- **Held five hands-on workshops targeting contractors** in St Paul, Minneapolis, Duluth, Elk River, and Rochester that were led by our partner Fernhill Shopworks. Manufacturer representative agencies provided product demonstrations utilizing the demo boards. A total of 101 individuals were trained — an increase of 72 over the 2024 training events.
- **Delivered two training sessions** on lighting control code requirements to 177 attendees in partnership

Figure 6: LLLC Hands-on Workshop

with the Department of Labor and Industry as part of the University of Minnesota's Annual Institute for Building Officials conference.

- **Launched the NXT Level online training platform** as an educational training resource for lighting professionals to deepen their knowledge of lighting principles and advanced lighting controls. The platform offers two levels of self-paced training that focus on LLLCs and other lighting techniques.
- **Partnered with Xcel Energy** to deliver training to their trade allies and customers as part of their annual event that included approximately 190 attendees. We partnered with the five manufacturer reps who used the demo boards to provide demonstrations of their respective LLLC systems.

LLLC Hands-on Workshop Showcase

Hands-on training proved highly effective in building confidence and interest in luminaire-level lighting controls. Participants gained firsthand experience operating multiple LLLC systems and engaging directly with manufacturers and peers.

Participant feedback highlighted strong value:

> *"This session provided an excellent introduction to LLLC technologies. I appreciated the small group interactions with each vendor."*
>
> *"LLLC technology is new to me. This was a great overview of what they are and how to leverage them."*
>
> *"Entirely worth my time investment. I walked away with at least six gold nuggets and I'm always happy if I get just one nugget at these kinds of events."*

The workshop format also generated follow-on opportunities:

- Manufacturer representatives, initially skeptical, reported the hands-on approach was a valuable use of time for engaging contractors and customers.
- One major contractor requested two additional on-site sessions, reaching approximately **60 employees and key customers**.
- After participating, **Xcel Energy** incorporated the LLLC demo boards into its annual training event.

2. Develop tools and resources to promote LLLCs and build awareness among customers and market actors

Another major focus in 2025 was to expand the tools and resources to promote LLLCs and raise awareness of its value proposition for the market.

- **Launched the LLLC Initiative website** to promote the adoption of LLLCs among building owners, property managers, lighting designers, and installers with technical guides, training, and resources to simplify the decision-making process, incentive opportunities, and installation of LLLCs.
- **Created a comprehensive tool kit of resources** to communicate the benefits and articulate the value propositions of LLLCs. This included creating guides on selecting the right system, sequence of operations, primary control strategies, an overview on MN lighting control code requirements, LLLC value proposition, and myth busters. We also leveraged several tools created by NEEA, including a short video explaining LLLCs.

3. Collaborate with local market actors to raise awareness and promote the benefits of LLLCs

In 2025, the initiative shifted its outreach focus to the existing building and retrofit market and the market actors that serve this space.

- **Built alliances with five manufacturers' representative agencies** as they are a direct link between LLLC manufacturers, distributors, contractors, and lighting designers. The initiative provided a demonstration board for each of their LLLC lines to be used as a training and sales tool with their customers and for our initiative's workshops.
- **Launched a distributor jumpstart effort** with Evergreen Energy Partners to review the landscape of lighting distributors and develop a strategic plan for targeted outreach focusing on distributors and/or branches with the greatest potential for adoption.
- **Completed research with 11 lighting designers** to gain a better understanding of their experience and perceptions of lighting controls. While they reported a basic awareness of LLLC technology, there is still a need for further education to help overcome a widespread practice of "value engineering" LLLCs out of project specifications.

4. Collaborate with MN utilities on program opportunities, incentive alignment and promotion

The LLLC Initiative continued to collaborate with utilities to promote the initiative activities, seek opportunities to partner on trainings and explore ways to build alignment with rebate specifications for LLLCs across utilities.

- **Engaged with Minnesota utilities to promote the LLLC initiative,** which included 36 engagements, to provide updates and lessons learned and partner on outreach activities and training events. This included expanding our reach to include Great River Energy, Rochester Public Utilities, and Connexus.
- **Conducted research and developed a rebate alignment memo** with recommendation to better align LLLC rebate specifications and structure ahead of the new triennial cycle.
- **Launched the LLLC Market Advisory Strategy Commitment** and held the first two meetings. The first meeting was for utilities to connect with each other and understand existing programs. At the second meeting, we presented the results from the first round of the new hands-on workshops along with presenting the results from the Supply Chain Market Mapping research and Lighting Designer research.

5. Collaborate with national partners to strive for consistency and share strategies and best practices

The LLLC initiative continued to collaborate with national partners to ensure it is staying on top of the most current data and trends with LLLCs, to learn about best practices, and to strive to maintain a consistent message aligned with industry standards and terminology.

- **Actively collaborated with the Design Lights Consortium (DLC**) as a participant in their new Program Manager Working Group focused on controls and the Technical Working group to advance quality and consistency among lighting control systems.
- **Continued to engage with national partners** to collaborate on program strategies, lessons learned and standardization across the industry. Regular meetings were held with NEEA and Ameren Illinois, whose experience had a direct impact on the success of the demonstration boards, revamped training, and collateral development.

6. Demonstrate LLLC technology and showcase the results

Demonstration projects continue to play a vital role in highlighting the real-world benefits, such as energy and cost savings of LLLC technology. They help develop installer experience and comfort with LLLC and case studies and educational materials that effectively showcase the value of LLLC.

- **Kicked off three demonstration projects** with organizations to observe the planning, installing, and programming of LLLC systems. Each project has provided a unique perspective as one was for a retrofit project in a union's office space, one was for a utility's renovated call center and office, and one was for renovation at a school.
- **Published two case studies** that highlight the experience, benefits, and lessons learned on local LLLC projects to help promote adoption of LLLCs.
- **Published a Performance Report** presenting the results of the first two demonstration sites completed in 2024 to better understand an LLLCs systems performance and potential energy savings. The findings highlighted the importance of early planning and collaboration and demonstrated that proper programming of the LLLCs is crucial to maximizing energy savings and ensuring optimal performance.

Next Gen Rooftop Units

The Next Gen Rooftop Unit (RTU) initiative strives to advance the performance of next gen RTUs to meet the growing demand for energy efficient and sustainable building solutions and establish next gen RTU technology as the preferred choice for commercial buildings in Minnesota. The Next Gen RTU initiative promotes dual fuel heat pump RTUs and energy recovery ventilators (ERVs).

In the state of Minnesota, there are approximately 21,000[22] buildings that rely on RTUs for space conditioning, which represents 80% of the state's commercial buildings. The average age

[22] Ibid.

of these units is 13 years, which means they are approaching the end of their expected 15-year lifetime and are operating below federal minimum standards for efficiency. This presents a huge opportunity for energy savings because commercial HVAC accounts for more than 60% of the energy used in Minnesota's commercial buildings.

The Next Gen RTU initiative has seven long-term market support strategies that are outlined in the initiative's Market Transformation Plan, designed to allow the team to adapt over time. In the following, we highlight the primary strategies the team focused on in 2025.

1. Develop and deliver training and educational tools for market actors

An important pillar of the Initiative in 2025 was to launch a comprehensive training program. The curriculum initially focused on training contractors on the benefits of next gen RTU technology, then was expanded to include installer training that was rolled out in the fall. The team also started conducting lunch and learns with contractors and engineering firms to raise awareness of next gen RTU technology in smaller settings.

- **Conducted 3 trainings and 15 lunch and learns** that included contractors, sales representatives, engineers, key account managers, and building owners. Participation at these events ranged from 5–30 attendees per training.
- **Developed training on next gen RTU technology startup** as startup was found to be the main barrier to quality next gen RTU installation. One training was conducted with the new curriculum and attendees reported more confidence in next gen RTU installation.
- **Supplemented partner-hosted trainings with lunch and learns** that led to increased market awareness and future training and partnership opportunities. Market actors were quick to welcome hour-long mid-day trainings in place of hosting a half-day training workshop. These shorter trainings welcomed larger audiences and led to more partnerships with key market actors.

Figure 8: Demonstrating maintenance measures for ERVs integrated into RTUs

2. Develop tools and resources to raise awareness and to encourage participation in the Next Gen RTU Initiative

Also in 2025, another key focus was to expand the toolkit of resources focused on building owners and contractors. These resources were designed to raise awareness, reduce market biases, and build confidence in next gen RTU technology.

- **Developed an installation checklist and quick reference guide** to provide contractors with easy access to key tips and tricks from our training if they run into an issue during installation.

- **Developed an HVAC decision tree** for building owners to decide when next gen RTU technology is the right solution for them or when they should look at alternate solutions.
- **Created an ERV FAQ page** to answer some often-asked questions about ERV installation, energy savings, and maintenance.
- **Created a video module showing the cleaning and servicing of an ERV wheel** to fight the misconception that ERVs are hard to clean. This video has been well received by the market and has been shared with local distributors and other energy efficiency organizations who requested the resource.

3. Collaborate with local market actors to raise awareness and promote the value proposition

Regular engagement with local market actors strategically supports the initiative's ability to overcome market barriers related to lack of awareness and product availability. These partnerships drive demand and create better, more widely available products.

- **Ongoing market engagement** consisting of 228 unique engagements across 189 organizations. Organizations include architecture and engineering firms, distributors, industry associations, manufacturers, and contractors.
- **Met quarterly with 3 distributors** of RTUs (Auer Steel, Stevens Supply, and Trane Sales Reps.) and less frequently with additional RTU distributors to learn market trends and market needs, including the need for additional training related to startup and more information on maintenance.
- **Met quarterly with 5 major manufacturers of RTUs:** Carrier, Daikin, Lennox, Rheem, and Trane. From these quarterly meetings we learned about product development plans, timeline for product rollouts, and where manufacturers see sales of products.

4. Collaborate with MN utilties on program opportunities

The Next Gen RTU initiative continued to collaborate with MN utilities keep them informed on what we are seeing in the local market, explore opportunities to collaborate on trainings, rebate alignment, and commercial rate option promotion.

- **Engaged with Minnesota utilities to promote the Next Gen RTU initiative,** which included 22 engagements, to provide updates and lessons learned and partner on outreach activities and training events. This included partnering with Xcel Energy to deliver training to their trade allies and customers as part of their annual event that included approximately 190 attendees. In 2025, we also expanded this collaboration to include Great River Energy, Rochester Public Utilities, and Connexus.
- **Conducted research and developed a rebate alignment memo** with recommendations to better align rebates ahead of the new triennial cycle.
- **Launched the RTU Market Advisory Strategy Commitment** and held the first two meetings. The first meeting was for utilities to connect with each other and understand existing programs. At the second meeting, the DOE presented their commercial HVAC challenge, which focuses on improving performance of heat pump RTUs.

5. National collaboration to strive for consistency and share strategies and best practices

Continued partnership with national organizations amplifies the unique needs of Minnesota's climate to national HVAC communities, while allowing us to learn from one another and create clear market signals.

- **Continued collaboration with national energy efficiency partners** (including NEEA, CalMTA, VEIC, and NICOR Gas) to align specifications and standards to drive consistency in the market.
- **Helped establish a committee focused on heat pump RTUs** at Consortium for Energy Efficiency and helped lead committee goals. This group is working to establish a qualified products list and set recommendations for rebates based on standards that will change in 2029.
- **Partnered with NREL to support monitoring DOE challenge units** in Minnesota, which also allows our team to partner with national account customers headquartered in Minnesota. Through this partnership, we can also give early feedback on new specifications and receive early product data, which allows us time to understand how new products will impact the Minnesota market.
- **Partnered with PNNL to observe site installations of heat pump RTUs** to strengthen our installation trainings and PNNL's commercial installer training program, which sets us up if an accreditation for commercial contractor training becomes available through PNNL.

Key Connection Point for RTU Market Actors

Over the course of 2025, the Next Gen RTU team became known as a key point of connection for RTU innovation.

- Manufacturers, including Daikin and Lennox, identified the Next Gen RTU team as a key source to find RTU rebate trends, both locally and nationally.
- The DOE engaged the team to connect with Minnesota utilities and corporations to understand the MN market and find research partnerships.
- PNNL has consistently turned to the team for insight on contractor behavior and installation barriers, including contracting us to provide installation observations.

By being a point of connection between different industry partners, the team can help align national goals to reflect the goals in Minnesota. This creates more pressure on the market to meet these goals with product development plans as manufacturers turn their sights toward dual fuel heat pump RTUs, cold climate heat pump RTUs, and ERVs.

6. Demonstrate next gen RTU technology and showcase the results

Demonstration projects and field studies showcase the tangible benefits, such as energy and cost savings, associated with next gen RTU technology. These support compelling case studies and educational resources that show the local market that this technology is viable for the Minnesota climate.

- **Signed 5 Partner Agreements** to conduct demo sites. All five sites include heat pump RTUs. One also has an integrated ERV. Three of the sites had equipment installed in 2025, with the remainder expected in 2026. Data monitoring for the three installed units is ongoing for the 2025–2026 heating season.
- **Published a case study on heat pump RTUs** that showcased the successful installation on a Minneapolis office building and had key insights into how controls strategies and regular maintenance impact efficiency of RTUs.
- **Supported the publication of modeling research** in partnership with NEEA and NICOR Gas that produced results of RTU measures and their efficacy in various climates across the U.S., reaffirming the need for ERV measures in Minnesota's cold climate.

Codes and Standards Advancement

The Codes and Standards initiative increases statewide energy efficiency by supporting the adoption of stronger energy codes and influencing federal appliance standards through stakeholder engagement, technical assistance, compliance support, and more.

As part of the Codes and Standards Initiative, a collaborative called the **MN Advanced Energy Code Partnership** (the Partnership) was formed. This group is led by ETA and includes the Department of Labor and Industry (DLI), the Department of Commerce, the University of Minnesota, and multiple nationwide consultants. The Partnership works together to develop code advancements that are cost-sensitive, market ready, data supported, and collaboratively developed. By raising the baseline through codes and standards, long-term efficiency gains are locked in across future construction activities.

Minnesota has historically adopted national model energy codes with weakening amendments, limiting energy savings potential. Recent legislation has reset expectations by establishing aggressive mandates for advanced energy codes that significantly increase energy efficiency:

- **Commercial code**: 80% reduction in annual net energy use by **2036** (compared to ASHRAE 90.1-2004)
- **Residential code**: 70% reduction in annual net energy use by **2038** (compared to 2006 IECC)

However, no additional resources were allocated to DLI, the adopting agency, to pursue these efficiency levels, creating a clear gap in technical capacity and stakeholder coordination. These gaps are directly addressed by the Partnership.

2025 was a significant year for codes work in Minnesota, as the state led the Technical Advisory Group (TAG) process for commercial and residential energy codes. The TAG is a critical step in Minnesota's code development process as it is an opportunity for community

members to bring forward code change proposals and for the TAG members to evaluate all proposals. TAG members also evaluate changes between the current code and proposed model code.

The Partnership engaged heavily in this process in 2025 by sitting on both TAGs and bringing forward code change proposals to advance and improve the energy efficiency of the code. The Codes and Standards initiative has eight long-term market support strategies that are outlined in the initiative's Market Transformation Plan, designed to allow the team to adapt over time. In the following, we highlight the primary strategies the team focused on in 2025. Notably, the team focused heavily on the codes process and does not intend to focus on standards changes in the next couple years.

1. Develop Minnesota code amendments for each code cycle and provide technical assistance and conduct research

Advancing residential energy codes

Throughout the 2025 Residential Energy Code TAG process, the Partnership brought forward six code change proposals. **The focus of these code change proposals was to ensure equity across all compliance pathways.** Through technical analysis and research, the team identified an efficiency gap between the prescriptive path and the compliance pathways. Failing to address this gap would have resulted in the potential for less efficient construction from builders with access to modeling and third-party raters compared to those following the prescriptive pathway.

At the end of this process the TAG recommended the adoption of the 2024 IECC model code with strengthening amendments that helped ensure equity across the code pathways. If adopted as recommended, this will lead to significant energy savings compared to the current code and support progress toward the state's long-term energy-use reduction targets. **This would be the first residential energy code update in Minnesota in over 10 years and the first model code adoption with strengthening amendments, both notable milestones that the Partnership played a key role in achieving.**

Advancing commercial energy codes

As part of the Commercial Energy Code TAG, **The Partnership brought forward 12 code change proposals, all which were supported by the TAG**. Some of the most impactful proposals include a reduction in the allowable air leakage rate, redefining when an ERV is required in a commercial building and increasing efficiency requirements for fenestration, furnaces[23], and ERVs. The Partnership conducted technical analyses to verify that each proposal met the guiding principles listed above. While the Construction Code Advisory Council (CCAC) has yet to review the TAG recommendations for the Commercial Energy Code, there was strong support for these amendments. This indicates that the next adopted Minnesota Commercial Energy Code will be a significant step forward in achieving the state's efficiency goals.

[23] Furnace efficiency is offered as a tradeoff option to meet requirement due to federal preemption.

Collectively, the work of the Partnership in the 2025 code development process established a strong foundation for meeting the state's statutory goals. The Partnership brought forward many of the efficiency improvements within each TAG and was a strong voice in favor of increasing efficiency, while also managing cost, ensuring market readiness and bringing data to each discussion.

3. Effectively engage stakeholders to inform strategy and increase buy-in

Frequent engagement with a wide range of stakeholders was critical to the progress made in the code development process in 2025. Throughout the year, ETA met with 164 unique external stakeholders on behalf of the Partnership over the course of 113 meetings. In addition to these conversations, ETA hosted the first annual ETA Forum, which focused on energy codes and attracted over 100 attendees. Finally, the Partnership was represented in person at each of the 14 Residential Energy Code TAG meetings, 13 Commercial Energy Code TAG meetings, and two CCAC meetings, giving the team the chance to engage with TAG members, CCAC members, and other attendees.

Each of these conversations and connections were thoughtfully considered and frequently impacted the proposals brought forward. Impacts ranged from further data analysis or collection to address specific concerns, amending the proposal, following up with other stakeholders or considering new ideas. All resulted in well-crafted, impactful proposals that ultimately received strong support.

> "Minnesota's Efficient Technology Accelerator program has been a key partner to help our agency analyze energy code changes, ensure codes meet legislative goals, advance energy efficiency and maintain affordability for Minnesotans."
>
> – Greg Metz, State Building Official, Minnesota Department of Labor and Industry

4. Coordinate with compliance and other related efforts

Targeted support for code compliance is critical to ensuring energy savings from code improvements are achieved in practice. Through the BuildUp MN program, the Partnership has engaged with code officials, design teams, and contractors to support compliance with the 2024 Commercial Energy Code through an online resource hub and targeted, role-based training. Compliance support activities were closely coordinated with the Minnesota Energy Codes Support Program, implemented by Shums Coda Associates on behalf of Minnesota utilities, to avoid duplication.

In 2025, BuildUp MN completed several key activities including:

- **Launched an online resource hub.** The BuildUp MN website was developed and launched in early 2025, serving as a home for technical resources and a platform to share energy code training opportunities.

- **Developed and published six code resources.** We created six tools and resources that simplify the code and break down requirements in plain language. The resources range from high-level overviews to in-depth guides, depending on the role and knowledge level of the target user.
- **Delivered six trainings to over 400 attendees.** Role-based training curriculum was developed for plan reviewers and architects and delivered in different formats and at industry events throughout the year. Highlights included a presentation at the Minnesota Conference on Architecture, a webinar delivered alongside the Minnesota Energy Codes Support Program, and several sessions at the Annual Institute for Building Officials.

Compliance engagement is also useful in establishing relationships with key market actors, which can help build buy-in for code changes, and understanding current design challenges and construction market dynamics, which can inform energy saving code change proposals for future code advancement work. In 2025, compliance support focused entirely on the Commercial Energy Code because a new version went into effect in 2024, while the Residential Energy Code has not been updated since 2015. In the future, the Partnership's compliance scope will expand to include the next Residential Energy Code, once it is finalized and adopted.

5. Provide technical support to Tribal Nations

Tribal Nations located within Minnesota are sovereign nations, thus not subject to Minnesota State Building Codes. To ensure these communities also reap the benefits of energy codes, the Partnership completes outreach and offers technical support to interested Tribal Nations. Work in 2025 focused on outreach and relationship building, as well as conducting research to understand the current state of energy code adoption and enforcement mechanisms across Minnesota Tribal Nations, which vary widely. For example, many tribes do not have a building code, which makes adopting an energy code impractical.

The Partnership worked directly with two Tribal Nations in 2025. We worked with Prairie Island Indian Community to help staff evaluate residential and commercial energy codes, including options above and beyond Minnesota codes that would drive new construction on Tribal land toward the community's net zero goals. We also developed a scope of work with the Fond du Lac Band of Lake Superior Chippewa focused on reviewing and updating their existing energy codes and supporting the setup of a permitting and plan review process for code enforcement that we hope to kick off in 2026. We continue discussions with two other Tribal Nations, Mille Lacs Band of Ojibwe and Leech Lake Band of Ojibwe, who do not currently have staff capacity to work with us on energy codes, but hope to in the future.

Initiatives in Program Development

The Program Development stage involves detailed planning and testing to prepare a concept to successfully launch as a market transformation initiative. The result of this stage is a Market Characterization Study, a fully developed Market Transformation Plan, and an Energy Savings and Evaluation Plan. At the end of 2025, one initiative was in the Program Development stage.

Gas Heat Pumps

The Gas Heat Pump (GHP) initiative remains in the program development phase where the goal is to track product readiness and stay informed on new products to recommend for eventual ETA market deployment. The market is advancing slowly as we observed several entities such as Fortis BC, Peoples Gas, and Nicor Gas launch small-scale pilots involving commercial combination units in multifamily facilities, to test performance and identify local market needs. These combi units appear to be gaining the most traction in the market but overall, the GHP market continues to evolve slowly. In 2025, the team focused on the following strategies.

- **Continued monitoring the state of the market** focusing on tracking product readiness and connecting with involved parties, including NEEA, the Consortium of Energy Efficiency, Nicor Gas, and others, to stay informed on new products, commercialization timelines, understanding market opportunities, and beneficial application types.
- Became a **member of the North American Gas Heat Pump Collaborative** (NAGHPC) and participated in multiple residential and commercial subcommittee meetings focused on collaboration at the North American level. This included participating meetings with manufacturers including Robur, ANSEI Yanmar, and Vicot/Homy. The NAGHPC also launched a national market characterization study that should help inform the direction of GHP efforts. Results are expected in Q1 2026.
- While **attending the AHR Expo** in February, the team met with both Robur and ANESI, GHP manufacturers, to deepen our relationships and discuss product development and availability along with market trends.
- **Continued collaborating** with CenterPoint Energy around potential support ETA could provide in planning and supporting pilots through the Natural Gas Innovation Act's (NGIA) programs.

Exploring New Technologies and Approaches

ETA is constantly exploring new technologies and approaches through our concept development activities. The goal of ETA's concept development stage is to develop a broad pipeline of emerging technologies to consider for future Efficient Technology Accelerator initiatives or for other future ECO programs. Not every emerging technology is suitable for a market transformation approach, so we collaborate closely with utilities and other stakeholders that work on bringing new technologies into ECO, so that ETA efforts can be leveraged for ECO when a particular technology would not be appropriate for ETA.

Key activities in 2025 included:

Emerging Technology Committee Collaboration

The Emerging Technology Committee meets quarterly to provide strategic input on ETA's emerging technology portfolio and to identify opportunities for collaboration and partnership. In Q1, members completed a survey to help shape ETA's 2025 emerging technology focus areas. In Q2, committee members shared planned research activities for 2025, enabling discussion of alignment opportunities and potential joint efforts. Additionally, ETA conducted one-on-one meetings with members to better understand their emerging technology priorities and explore targeted collaboration opportunities. In Q3 and Q4, ETA shared research findings, gave an overview of emerging tech assessments, and debriefed on successes and challenges for the year.

Expand Emerging Technology Pipeline and Assess ET Concepts

A central focus of 2025 was strengthening and expanding the pipeline of emerging technology concepts, while evaluating new ideas for potential advancement within ETA's portfolio. Over the course of the year, the emerging technology inventory grew to 119 total concepts, including 65 new ideas identified in 2025. ETA conducted research and an assessment of 39 of these concepts.

Each concept was evaluated using the following criteria:

- ETA portfolio alignment
- Energy savings potential
- Performance, program, and market readiness
- Market opportunities and barriers
- Equity opportunities and impact
- Applicability or fit as a market transformation initiative

This assessment functions as a stage-gate within the concept development process and helps determine which concepts warrant further investment. Table 5 summarizes the applications for the concepts assessed in 2025.

Table 5. Emerging Technology Assessment Applications

ET Assessment Applications	Count
HVAC	14
Building Envelope & Efficiency	6
Water Efficiency & Thermal Recovery	5
Systems Optimization, Controls, & Platforms	8
Products	3
Energy Storage & Advanced Materials	3
Total:	**39**

Launched Three Field Research Studies

A priority for 2025 was launching ETA's first field research. Over the course of the year, ETA successfully launched three small-scale field research studies. This progress was possible, because we remained opportunistic and leveraged timely, cost-effective, and local opportunities with strong potential for long-term impact. Below is a summary of the technologies currently being studied.

- **Large Commercial HVAC – Flow ANSWR CO2 Heat Pump.** The Flow ANSWR CO_2 heat pump is designed to replace large commercial HVAC systems, including chillers and boilers. This system uses CO_2 as a refrigerant, which has a significantly lower global warming potential than conventional refrigerants and represents a forward-looking alternative to current market options. This study seeks to verify the performance and energy savings of this technology, evaluate the barriers and opportunities of CO_2 as a refrigerant, and understand potential applications of this technology.
- **EcoSnap** produces ductless heat pumps designed for streamlined, rapid installation. By simplifying the installation process, the technology may reduce project costs and expand viable applications for ductless heat pumps. This study will evaluate the installation benefits and document the installation process, assess application opportunities and benefits, and verify system performance.
- **Residential End-Use Monitoring.** This study will collect high-resolution field data on residential electric end uses in 10 single-family homes. The resulting dataset will be used to characterize residential electric load shapes and peak demand impacts, validate advanced metering infrastructure (AMI) data, and develop a detailed dataset to support end-use disaggregation and modeling. These insights will help inform the potential benefits and system impacts of future emerging technologies affecting residential electric end uses.

Generating Equitable Impacts

It is the goal of ETA to reach and benefit all Minnesotans. This includes balancing residential with commercial and industrial customer impact; working in rural and urban areas; ensuring equitable outcomes for low-income and disadvantaged communities to the extent possible; and enhancing employment opportunities and upskilling workers within the sectors ETA serves.

The ETA market deployment portfolio advanced the following efforts to increase equitable outcomes within ETA initiatives.

- **Collaborated with Weatherization Assistance Programs (WAP).** The ASHP and HPW initiatives have worked closely with the state's WAP program team to incorporate these technologies into WAP program offerings. This was achieved through technical assistance to define program design and assess technology cost-effectiveness. It also included training and engagement with the WAP network (state technical assistance staff, CAP agencies, and CAP providers) support, training, and assistance to incorporate ASHPs and HPWs into existing programs.
- **Promoted affordable and accessible products.** The ASHP and HPW initiatives take a product strategy that includes focus on entry-level, affordable products that have beneficial energy efficiency outcomes. This can be achieved by prioritizing energy performance and decoupling high-end features and materials that might bring energy efficient products to a higher price point. For ASHPs, the initiative has a Tier 1 specification that outlines products with entry-level pricing and encourages utilities to offer incentives on this product tier. For HPW, the initiative offered a manufacturer prize to spur the development of offer entry-level or builder-grade window products with high-performance glazing to ensure there are affordable, high-performance products available in the market. The initiative awarded a prize to three major manufacturers that have committed to release this product in 2026 and collaborate on promotion and drive sales of this new product category that will help all Minnesotan's access affordable high-performance windows products.
- **Showcased the benefits of entry-level products for income-qualified housing.** The HPW initiative is focused on demonstrating entry-level products in Minesota homes in 2024 and 2025. Through this effort, the team is working to demonstrate the product in affordable housing projects to showcase the technology and its benefits in the income-qualified housing segment.
- **Engaged community-based organizations working with underserved populations.** The ASHP initiative has been building a coalition of market partners to advance the heat pump market. As part of this coalition, the team has focused on engaging with community-based organizations (CBOs) to engage underserved populations.
- **Pursued demonstration projects with geographic diversity that serve their communities.** The Next Gen RTU initiative is conducting demonstration projects with a

small business in Mankato, a faith community in Duluth, and a fire station in Saint Paul. These sites were chosen as both representative of different regions of our state but also as leaders in their community who could show the benefits that next gen RTUs have for their diverse needs. Our work partnering with small and medium-sized businesses has also allowed us to advocate for those communities' needs on a national level, providing feedback to DOE's Commercial HVAC campaign.

- **Sought out partnerships with disadvantaged business enterprises across the state**. The LLLC initiative continued to partner with an array of disadvantaged business enterprises; Flannery Construction (a woman-owned business focusing on disadvantaged communities) has emerged as a key contracting partner, producing leads for potential demonstration projects including Little Earth Neighborhood Early Learning Center. The initiative also continued to expand its geographical reach on demonstration projects with current projects in Eagan, Bemidji, and Fridley, and in discussion with project teams on a hospital in north-central Minnesota and a data center in northeast Minnesota.
- **The commercial teams continued to support diversity-focused industry associations.** The LLLC and Next Gen RTU initiatives continued to participate in a variety of diversity-focused industry associations including the Association of Women Contractors – MN, National Association of Minority Contractors – Upper Midwest, and the National Association of Women in Construction – MSP Chapter, and regularly attended and supported their events. Team members also participated as a panelist on women in the intelligent building space hosted by Dunwoody College of Technology and put on in collaboration between the Building Intelligence Group and National Association of Women in Construction in March.
- **Partnering with Tribal Nations on building energy codes** — The Codes and Standards initiative completed outreach and offered technical support to interested Tribal Nations. This work helps ensure that these communities also reap the benefits of better energy codes. In 2025, the Codes initiative worked with two Tribal Nations and helped their staff evaluate residential and commercial energy codes. For one Tribe, we looked at options that went above and beyond the Minnesota code because a better energy code can help drive new construction standards to levels that would help meet the community's net zero goals.

Enhanced Employment Opportunities

One of the core objectives of ETA is enhanced employment opportunities. This has been primarily achieved via upskilling the workforce and increasing product sales and availability. Emerging technologies present business and job opportunities for Minnesotans and ETA acts as a bridge between technology advancement and the markets that will adopt and deploy them. ETA initiatives almost always include some form of upstream engagement with manufacturers, distributors, and installers. The goal of this engagement is to first deeply collaborate and understand barriers to adoption of new technologies and subsequently to deploy effective strategies to overcome those barriers, supporting businesses and professionals to be on the cutting edge of technology. This is often achieved by providing opportunities for market actors

to gain experience with new technologies and receive relevant training and support to adopt new technologies. This allows these market actors to offer the best solution to their customers. By providing this market support, ETA is enhancing employment opportunities in the state.

Across the ETA portfolio, these are the key approaches that enhanced employment opportunities:

- **ASHPs –** The ASHP initiative, having been in the market longer than any other ETA initiative, has substantially supported distributors and contractors to adopt this technology into their business models. The high levels of 2025 training and engagement (9 trainings to over 270 contractors and an installer network of 73 qualified contractors) include business intelligence on demand, pricing, market opportunity, and business case that has helped forward-thinking distributors and contractors gain knowledge and experience with this technology. This has positioned them as market leaders and has been a strong area of business growth over the past three years. The initiative has seen an evolution in contracting companies remaining competitive by offering technology that comes along with lucrative rebates, enhanced comfort, and in some cases bill savings.
    - In conversations, distributors have communicated that the deep investment in ASHP technology has been beneficial for their MN market share and business growth, and that the Collaborative has been instrumental.
    - The Collaborative focuses on providing resources and training to increase knowledge and experience with heat pumps, which in turn leads to more heat pump business. In a broad contractor survey, those with a lot of heat pump experience were much more likely to say that heat pumps are very important to their business (64% vs 11%) and indicate that they saw ducted sales increase over the last few years (80% to 25%).
- **HPWs –** The HPW initiative made strides in 2025 to bring more affordable high-performance windows to the Minnesota market and to equip Minnesota-based manufacturers to produce and supply those windows. This was accomplished through a manufacturing challenge described in an earlier section. This challenge and funding opportunity offered an incentive for manufacturers to invest in local production of triple-pane windows at a more affordable price point that has a high level of interest and demand in the new construction market. In addition to the manufacturer RFP, these additional tactics all support enhanced employment opportunities in Minnesota.
    - Engaged with 12 residential home builders throughout the year to understand interest in HPWs and provide data and modeling to show the impact of HPWs in new construction home performance. This allows builders to reach higher incentives and consider a pathway that has less operational complexity than other measures, ideally streamlining the building and subcontracting process.
    - Engaged four new construction energy raters to explore how HPWs can have an outsized impact on new home performance and the role energy raters can play in advising new construction home builders to decide on where to invest in energy efficiency within their home specifications.

- **LLLCs –** The LLLC initiative provided the market with several activities focused on enhancing employment opportunities through upskilling including:
    - Built demonstration boards for six common LLLC systems that were incorporated into the LLLC trainings, providing contractors with hands-on experience on the ease of operating different LLLC systems.
    - Developed resources to provide market actors with the tools they need to understand LLLCs and how to effectively sell their value to their customers.
    - Launched a first-of-its-kind opportunity in Minnesota for lighting practitioners to access industry-leading training that supports real-world success. This online training builds the skills and confidence needed to specify, sell, and install quality lighting projects, including LLLCs.
- **Next Gen RTUs –** The Next Gen RTU initiative provided the market with several activities focused on enhancing employment opportunities through upskilling including:
    - As part of our in-depth contractor training, we focused on providing real-life examples and insights and provided contractors with strategies to drive business growth, identify upselling opportunities, and include hands-on activities.
    - Developed a how-to training video that walks contractors through the basics of servicing and cleaning an ERV wheel to maintain system performance and energy savings.
    - Based on feedback from contractors that attended the general trainings, we developed controls training for contractors focused on making controls more approachable, practical, and worth their time, showing how it can reduce callbacks, improve performance, and take the guesswork out of startup.

Preparing the Workforce of the Future

The Next Gen RTU and LLLC initiatives partnered with Dunwoody College of Technology to conduct a half-day training for 183 construction management students interested in learning about new energy efficient technologies currently entering the market. The training focused on how these products can be spec'd early in the design phase of new construction and large-scale remodeling projects.

The Next Gen RTU initiative also conducted a one-hour lunch and learn for approximately 45 incoming Dunwoody students who were undecided on which HVAC area of focus they were going to pursue. This presentation introduced the students to energy efficient HVAC equipment and the benefits of energy savings.

- **Codes Advancement –** A key component of the Codes Advancement initiative is compliance training and resource development. As outlined in the codes initiative

section, the compliance activities focused on educating code officials, design teams, and contractors using the following methods.

- **Launched BuildUp MN resource hub.** Created and launched a central website in early 2025 for technical resources and energy code training opportunities.
- **Published six code resources.** Developed six tools that translate code requirements into clear, plain-language guidance for different audiences.
- **Delivered six trainings to over 400 attendees.** Built role-based trainings for plan reviewers and architects and presented at key events, including the Minnesota Conference on Architecture, a joint webinar with the Energy Codes Support Program, and several sessions at the Annual Institute for Building Officials.

Collaboration and Co-Created Savings

In addition to the market transformation goal established through the ETA program, a secondary benefit of ETA is that enhancing market conditions for selected technologies will have a positive and beneficial impact on existing utility programs and the overall performance of the ECO portfolio.

There are utility ECO rebates associated with each ETA technology, and through its market support efforts, ETA drives participation in these rebates and increases energy savings. In market transformation this is called co-created savings that will be claimed through the individual utilities' ECO programs and is separate from the savings that will be claimed by ETA. ETA strives to coordinate closely with utility program managers to maximize the combined efforts of these initiatives.

In 2025, the ETA market deployment portfolio made the following strides in bolstering the utility programs.

- **Facilitated knowledge sharing and incentive alignment across utilities.** The ETA teams, across all technologies and sectors, worked to promote knowledge sharing and alignment across utility incentives. This alignment helps product distributors better plan for purchasing and carrying inventory that qualifies for incentives, creates an easier environment for installation contractors to navigate, and allows customers to better track available incentives. In 2025, there was particular traction in continued alignment for ASHP utility rebates.
- **Provided data-driven input and analysis to the TRM advisory committee.** The ETA team engaged with the TRM advisory committee to add a high-performance window measure that simplifies the energy savings calculations for utilities, extends the measure life, and helps utilities justify and potentially increase their HPW rebates. This measure was incorporated into the TRM published January 1, 2026.[24]

[24] Minnesota Department of Commerce. (2026). Technical reference manual (Version 5.0). https://mn.gov/commerce-stat/trm/releases/5.0.pdf

- **Promoted utility programs.** Each initiative has mechanisms to promote utility programs to the market and customers as well as meetings and processes to allow utilities to collaborate, share information, and provide lessons learned across utility ECO programs.
- **Initiatives provide ad hoc support to utilities across the state in support of healthy and effective ECO programs.** This support can include technical assistance, product specification assistance, and market and contractor training assistance.
- **Strengthened the market upstream of selected technologies to aid in transforming the market.** In addition to the long-term goal, near-term incremental market improvements and reduction of barriers also bolster utility program performance.

CONCLUSION

In 2025, Minnesota's Efficient Technology Accelerator (ETA) reached a pivotal milestone by demonstrating measurable, statewide energy savings, and emissions reductions for the first time. These results confirm that ETA is fulfilling its statutory purpose[25]: accelerating the adoption of emerging and innovative energy efficient technologies that are not yet fully addressed through traditional Energy Conservation and Optimization (ECO) programs, while delivering cost-effective benefits for Minnesota utilities and customers.

The accomplishments documented in this report show that ETA's market transformation approach is working as intended. By addressing key market barriers, such as limited product availability, lack of contractor familiarity and experience, and low customer awareness and demand, ETA enables sustained market adoption. In doing so, ETA complements and strengthens existing ECO rebate programs by increasing participation and improving market readiness, generating additional "co-created savings" that enhance the overall performance of Minnesota's conservation portfolio.

ETA's early progress toward cost-effectiveness further reinforces the value of this approach. While market transformation programs are designed to deliver increasing returns over time, ETA's 2025 results indicate the program is on track to achieve portfolio-wide cost-effectiveness ahead of its original timeline. Continued growth in market adoption, combined with anticipated savings from the Codes and Standards Advancement initiative beginning in 2028, is expected to further improve cost-effectiveness and lock in long-term energy savings for Minnesotans.

Equally important, ETA has established itself as a statewide platform for collaboration, aligning utilities, state agencies, manufacturers, contractors, and national partners around shared market goals. This collaborative model has enabled ETA to respond adaptively to market conditions while maintaining accountability to statutory objectives, including delivering benefits broadly across customer classes and supporting long-term reductions in energy use and emissions.

Looking forward, ETA is well positioned to continue advancing the statutory goals by scaling savings from initiatives currently in Market Deployment and developing a strong pipeline of future market transformation opportunities. As residential and commercial energy code updates take effect and market adoption accelerates, ETA's early investments are expected to yield increasing returns in the form of durable, cost-effective energy savings and customer benefits. With measurable impacts now underway and strong market momentum established, ETA will remain a critical resource supporting Minnesota's energy efficiency, affordability, and climate goals in the years ahead.

[25] Minnesota Statutes §216B.241, subdivision 14.

APPENDICES

A. ETA Cost-Benefit Analysis

B. ETA Technical Assumptions

ETA Portfolio-Level Summary

Year 2025

Net ETA Units	LLLC	HPW	ASHP Tier 1	ASHP Tier 2
Statewide Units	2,902	2,129	1,106	8,272
Quantity of utility rebated units	579	1,485	165	7,329
Baseline	1,381	594	466	539
ETA Claimed Units	**1,521**	**644**	**640**	**943**

Statewide Impact	Peak kW at Gen	kWh at Gen	Dth	MMBtu	tons CO2
First Year					
Energy Efficiency Impacts	752	4,252,052	229	N/A	648
Efficient Fuel Switching Impacts	N/A	-7,911,301	82,883	58,109	4,348
Lifetime					
Energy Efficiency Impacts	N/A	47,329,826	8,255	N/A	7,576
Efficient Fuel Switching Impacts	N/A	-142,403,421	1,491,899	1,045,958	78,262

First Year Savings Allocated to ETA Funders	Efficiency			EFS
	Peak kW at Gen	kWh at Gen	Dth	MMBtu
Gas				
CenterPoint Energy	-	-	127	9,484
Minnesota Energy Resources	-	-	34	2,572
Xcel Gas	-	-	68	4,971
Electric				
Minnesota Power	62	348,964	-	3,723
Otter Tail Power	27	144,826	-	2,183
Xcel Electric	649	3,745,893	-	27,093
Great River Energy	10	8,813	-	5,759
Missouri River Energy Services	3	2,219	-	1,450
Southern Minnesota Municipal Power Agency	2	1,336	-	873
Sum	**752**	**4,252,052**	**229**	**58,109**

First Year Emissions Savings Allocated to ETA Funders	tons CO2	
	EE	EFS
Gas		
CenterPoint Energy	8	710
Minnesota Energy Resources	2	192
Xcel Gas	5	372
Electric		
Minnesota Power	52	279
Otter Tail Power	22	163
Xcel Electric	557	2,027
Great River Energy	1	431
Missouri River Energy Services	0	108
Southern Minnesota Municipal Power Agency	0	65
Sum	**648**	**4,348**

ETA Assessment Allocated to ETA Funders	Natural Gas Energy Efficiency	Electric Energy Efficiency	EFS	Total Cost
Gas				
CenterPoint Energy	$ (1,325,451)	$ -	$ (759,433)	$ (2,084,884)
Minnesota Energy Resources	$ (350,051)	$ -	$ (200,566)	$ (550,617)
Xcel Gas	$ (711,694)	$ -	$ (407,774)	$ (1,119,468)
Subtotal	$ (2,387,196)	$ -	$ (1,367,773)	$ (3,754,969)
Electric				
Minnesota Power	$ -	$ (300,140)	$ (208,873)	$ (509,013)
Otter Tail Power	$ -	$ (123,709)	$ (86,092)	$ (209,801)
Xcel Electric	$ -	$ (3,239,022)	$ (2,254,093)	$ (5,493,115)
Great River Energy	$ -	$ (447)	$ (121,053)	$ (121,500)
Missouri River Energy Services	$ -	$ (114)	$ (30,886)	$ (31,000)
Southern Minnesota Municipal Power Agency	$ -	$ (70)	$ (18,930)	$ (19,000)
Subtotal	$ -	$ (3,663,502)	$ (2,719,927)	$ (6,383,429)
Sum	**$ (2,387,196)**	**$ (3,663,502)**	**$ (4,087,700)**	**$ (10,138,398)**

ETA Portfolio-Level Summary

Year 2025

Natural Gas Energy Efficiency

Costs below include all costs used in the cost-benefit analysis (assessment allocated to EFS, incremental cost, etc.).

Statewide Natural Gas Efficiency CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
	All values are in 2025 USD (NPV)			
Benefits	$ 71,498	$ 71,498	$ 33,995	$ 33,995
Costs	$ (2,387,196)	$ (2,421,647)	$ (2,387,196)	$ (2,433,103)
Net Benefits	$ (2,315,698)	$ (2,350,149)	$ (2,353,201)	$ (2,399,108)
Benefit/Cost Ratio	0.03	0.03	0.01	0.01

Gas Efficiency Minnesota Test Net Benefits Allocated to ETA Funders	Cost	Benefits	Net Benefits
CenterPoint Energy	$ (1,325,451)	$ 39,698	$ (1,285,753)
Minnesota Energy Resources	$ (350,051)	$ 10,484	$ (339,567)
Xcel Gas	$ (711,694)	$ 21,316	$ (690,379)
Sum	**$ (2,387,196)**	**$ 71,498**	**$ (2,315,698)**

Electric Energy Efficiency

Statewide Electric Efficiency (EE) CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
	All values are in 2025 USD (NPV)			
Benefits	$ 3,178,073	$ 3,178,073	$ 2,532,275	$ 2,532,275
Costs	$ (3,663,502)	$ (3,798,459)	$ (3,663,502)	$ (6,442,796)
Net Benefits	$ (485,429)	$ (620,386)	$ (1,131,228)	$ (3,910,522)
Benefit/Cost Ratio	0.87	0.84	0.69	0.39

EE Minnesota Test Net Benefits Allocated to ETA Funders	Cost	Benefits	Net Benefits
Minnesota Power	$ (300,140)	$ 262,102	$ (38,038)
Otter Tail Power	$ (123,709)	$ 111,102	$ (12,607)
Xcel Electric	$ (3,239,022)	$ 2,766,620	$ (472,402)
Great River Energy	$ (447)	$ 27,255	$ 26,808
Missouri River Energy Services	$ (114)	$ 6,861	$ 6,747
Southern Minnesota Municipal Power Agency	$ (70)	$ 4,133	$ 4,063
Sum	**$ (3,663,502)**	**$ 3,178,073**	**$ (485,429)**

Efficient Fuel Switching

Statewide Efficient Fuel Switching (EFS) CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
	All values are in 2025 USD (NPV)			
Benefits	$ 14,406,421	$ 14,406,421	$ 7,768,906	$ 23,954,380
Costs	$ (10,227,404)	$ (21,976,783)	$ (8,474,418)	$ (18,965,699)
Net Benefits	$ 4,179,016	$ (7,570,363)	$ (705,512)	$ 4,988,681
Benefit/Cost Ratio	1.41	0.66	0.92	1.26

EFS Minnesota Test Net Benefits Allocated to ETA Funders	Cost	Benefits	Net Benefits
Gas			
CenterPoint Energy	$ (1,669,142)	$ 2,351,169	$ 682,027
Minnesota Energy Resources	$ (452,719)	$ 637,704	$ 184,985
Xcel Gas	$ (874,994)	$ 1,232,525	$ 357,531
Electric			
Minnesota Power	$ (655,220)	$ 922,949	$ 267,729
Otter Tail Power	$ (384,281)	$ 541,303	$ 157,021
Xcel Electric	$ (4,768,517)	$ 6,716,980	$ 1,948,462
Great River Energy	$ (1,013,660)	$ 1,427,851	$ 414,191
Missouri River Energy Services	$ (255,157)	$ 359,417	$ 104,260
Southern Minnesota Municipal Power Agency	$ (153,714)	$ 216,523	$ 62,809
Sum	**$ (10,227,404)**	**$ 14,406,421**	**$ 4,179,016**

Air-Source Heat Pumps

Year 2025

Input Summary

Analysis Year (also NPV year)	2025
Lifetime (years)	18
T&D Loss Factor (Energy)	8.22%
T&D Loss Factor (Demand)	8.22%

ETA Units	Tier 1	Tier 2
Statewide Sales in 2025	1,106	8,272
Baseline sales (2022)	466	539
Qty of utility rebated units in 2025	165	7,329
ETA 2025 Units	640	943

Per Project Summary	Tier 1	Tier 2	
Incremental Capital Cost (per project)	4,072	9,742	
Energy Efficiency Impacts			
Annual Per-Unit kWh savings at customer	1.1	65.9	kWh/unit/year
Peak Demand Savings (kW) at customer	0.0	0.1	PCkW/unit
Annual Per-Unit Dth Saved	0.0	0.0	Dth/unit/year
Efficient Fuel Switching Impacts			
Annual unit kWh savings at customer	-2,946	-5,701	kWh/unit/year
Annual Unit Dth Saved	35	64	Dth/unit/year
Annual MMBtu savings	25	44	MMBtu/unit/year

Statewide Cost	
Annual Initiative Cost	$ 1,531,803
Electric EE cost allocation	0.4%
Gas EE cost allocation	0.0%
EFS cost allocation	99.6%

	Electric EE Allocation Factor	Gas EE Allocation Factor	EFS Allocation Factor
Gas			
CenterPoint Energy		55.5%	16.3%
Minnesota Energy Resources		14.7%	4.4%
Xcel Gas		29.8%	8.6%
Electric			
Minnesota Power	9.1%		6.4%
Otter Tail Power	5.3%		3.8%
Xcel Electric	65.9%		46.6%
Great River Energy	14.0%		9.9%
Missouri River Energy Services	3.5%		2.5%
Southern Minnesota Municipal Power Agency	2.1%		1.5%
Sum	100.0%	100.0%	100.0%

Statewide Impact	Peak kW at Gen	kWh at Gen	Dth	MMBtu	tons CO2
First Year					
Energy Efficiency Impacts	71	62,867	0	214.5	10.3
Efficient Fuel Switching Impacts	0	-7,911,301	82,883	58,109	4,348
Lifetime					
Energy Efficiency Impacts	N/A	1,232,962	0	4,207	186
Efficient Fuel Switching Impacts	N/A	-142,403,421	1,491,899	1,045,958	78,262

First Year Savings Allocated to ETA Funders	Efficiency		EFS	tons CO2	
	Peak kW at Gen	kWh at Gen	MMBtu	EE	EFS
Gas					
CenterPoint Energy	-	-	9,484	-	710
Minnesota Energy Resources	-	-	2,572	-	192
Xcel Gas	-	-	4,971	-	372
Electric					
Minnesota Power	6.4	5,697	3,723	0.9	279
Otter Tail Power	3.8	3,341	2,183	0.5	163
Xcel Electric	46.7	41,461	27,093	6.8	2,027
Great River Energy	9.9	8,813	5,759	1.4	431
Missouri River Energy Services	2.5	2,219	1,450	0.4	108
Southern Minnesota Municipal Power Agency	1.5	1,336	873	0.2	65
Total	**71**	**62,867**	**58,109**	**10.3**	**4,348**

Air-Source Heat Pumps

Year 2025

Efficient Fuel Switching	Minnesota Test	Societal Test	Utility Test	RIM Test
	All values are in 2025 USD (NPV)			
Electric System Impacts				
Generation Capacity	$ -	$ -	$ -	$ -
Transmission and Distribution Capacity	$ -	$ -	$ -	$ -
Energy Generation / Marginal Energy	$ (5,010,754)	$ (5,010,754)	$ (4,300,704)	$ (4,300,704)
Market Price Effects	$ (50,108)	$ (50,108)	$ (43,007)	$ (43,007)
Ancillary Services	$ (50,108)	$ (50,108)	$ (43,007)	$ (43,007)
Renewable Portfolio Standard Compliance	$ -	$ -	$ -	$ -
Environmental Compliance	$ -	$ -	$ -	$ -
Subtotal	$ (5,110,969)	$ (5,110,969)	$ (4,386,718)	$ (4,386,718)
Gas System Impacts				
Commodity Cost	$ 6,632,798	$ 6,632,798	$ 5,623,300	$ 5,623,300
Variable O&M	$ 67,586	$ 67,586	$ 57,300	$ 57,300
Demand	$ 2,370,341	$ 2,370,341	$ 2,009,580	$ 2,009,580
Environmental Compliance	$ 92,859	$ 92,859	$ 78,726	$ 78,726
Market Price Effects	$ -	$ -	$ -	$ -
Subtotal	$ 9,163,585	$ 9,163,585	$ 7,768,906	$ 7,768,906
Environmental Externalities and Non-Energy Impacts				
Carbon + Criteria Benefit (electric)	$ (1,028,736)	$ (1,028,736)	N/A	N/A
Gas Environmental Externality	$ 5,242,836	$ 5,242,836	N/A	N/A
Other Fuels Environmental Externalities	$ -	$ -	N/A	N/A
Electric Non-Energy Benefits	$ -	$ -	N/A	N/A
Gas Non-Energy Benefits	$ -	$ -	N/A	N/A
Other Fuels Benefits	$ -	$ -	N/A	N/A
Subtotal	$ 4,214,100	$ 4,214,100	$ -	$ -
Participant Impacts				
Electric Bill	N/A	N/A	N/A	$ 16,185,474
Gas Bill	N/A	N/A	N/A	$ (10,491,282)
Incremental Capital	N/A	$ (11,749,379)	N/A	N/A
Participant Rebates and Incentives	N/A	N/A	N/A	N/A
Incremental O&M	N/A	N/A	N/A	N/A
Subtotal	$ -	$ (11,749,379)	$ -	$ 5,694,193
Utility Program Costs				
Utility Program Costs	$ (1,522,627)	$ (1,522,627)	$ (1,522,627)	$ (1,522,627)
Utility Performance Incentives	$ -	$ -	$ -	$ -
Subtotal	$ (1,522,627)	$ (13,272,006)	$ (1,522,627)	$ (1,522,627)

Statewide Efficient Fuel Switching (EFS) CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
Benefits	$ 14,406,421	$ 14,406,421	$ 7,768,906	$ 23,954,380
Costs	$ (7,662,332)	$ (19,411,710)	$ (5,909,345)	$ (16,400,627)
Net Benefit (Cost)	$ 6,744,089	$ (5,005,290)	$ 1,859,561	$ 7,553,753
Benefit/Cost Ratio	1.88	0.74	1.31	1.46

Air-Source Heat Pumps

Year 2025

Statewide Electric Efficiency CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
	All values are in 2025 USD (NPV)			
Electric System Impacts				
Generation Capacity	$ 118,004	$ 118,004	$ 100,915	$ 100,915
Transmission and Distribution Capacity	$ 13,163	$ 13,163	$ 11,210	$ 11,210
Energy Generation / Marginal Energy	$ 50,468	$ 50,468	$ 43,427	$ 43,427
Market Price Effects	$ 1,685	$ 1,685	$ 1,443	$ 1,443
Ancillary Services	$ 1,685	$ 1,685	$ 1,443	$ 1,443
Renewable Portfolio Standard Compliance	$ -	$ -	$ -	$ -
Environmental Compliance	$ -	$ -	$ -	$ -
Subtotal	$ 185,003	$ 185,003	$ 158,439	$ 158,439
Gas System Impacts				
Commodity Cost	$ -	$ -	$ -	$ -
Variable O&M	$ -	$ -	$ -	$ -
Demand	$ -	$ -	$ -	$ -
Environmental Compliance	$ -	$ -	$ -	$ -
Market Price Effects	$ -	$ -	$ -	$ -
Subtotal	$ -	$ -	$ -	$ -
Environmental Externalities and Non-Energy Impacts				
Carbon + Criteria Benefit (electric)	$ 9,409	$ 9,409	N/A	N/A
Gas Environmental Externality	$ -	$ -	N/A	N/A
Other Fuels Environmental Externalities	$ -	$ -	N/A	N/A
Electric Non-Energy Benefits	$ -	$ -	N/A	N/A
Gas Non-Energy Benefits	$ -	$ -	N/A	N/A
Other Fuels Benefits	$ -	$ -	N/A	N/A
Subtotal	$ 9,409	$ 9,409	$ -	$ -
Participant Impacts				
Electric Bill	N/A	N/A	N/A	$ (149,996)
Gas Bill	N/A	N/A	N/A	N/A
Incremental Capital	N/A	$ (43,372)	N/A	N/A
Participant Rebates and Incentives	N/A	N/A	N/A	N/A
Incremental O&M	N/A	$ -	N/A	N/A
Subtotal	$ -	$ (43,372)	$ -	$ (149,996)
Utility Program Costs				
Utility Program Costs	$ (5,634)	$ (5,634)	$ (5,634)	$ (5,634)
Utility Performance Incentives	$ -	$ -	$ -	$ -
Subtotal	$ (5,634)	$ (5,634)	$ (5,634)	$ (5,634)

Statewide Electric Efficiency (EE) CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
Benefits	$ 194,413	$ 194,413	$ 158,439	$ 158,439
Costs	$ (5,634)	$ (49,006)	$ (5,634)	$ (155,629)
Net Benefit (Cost)	$ 188,779	$ 145,407	$ 152,805	$ 2,809
Benefit/Cost Ratio	34.51	3.97	28.12	1.02

High Performance Windows - New Construction

Year 2025

Input Summary

Analysis Year (also NPV year)	2025	
Statewide Sales in 2025	2,129	
Baseline sales (2020-2023 avg sales)	594	
Qty of utility rebated units in 2025	1,485	
ETA 2025 Units	644	
Lifetime (years)	36	
T&D Loss Factor (Energy)	8.22%	
T&D Loss Factor (Demand)	8.22%	
Incremental Capital Cost (per unit)	$54	
Per project Summary		
Energy Efficiency Impacts		
Annual Per-Unit kWh savings at customer	0.90	kWh/unit/year
Peak Demand Savings (kW) at customer	0.00	PCkW/unit
Annual Per-Unit Dth Saved	0.36	Dth/unit/year
Efficient Fuel Switching Impacts		
Annual MMBtu savings	0.00	MMBtu/unit/year
Statewide Cost		
Annual Initiative Cost	$ 644,315	
Electric EE cost allocation	0.93%	
Gas EE cost allocation	99.07%	
EFS cost allocation	0%	

	Electric EE Allocation Factor	Gas EE Allocation Factor
Gas		
CenterPoint Energy		55.5%
Minnesota Energy Resources		14.7%
Xcel Gas		29.8%
Electric		
Minnesota Power	8.2%	
Otter Tail Power	3.4%	
Xcel Electric	88.4%	
Sum	100.0%	100.0%

Statewide Impact	Peak kW at Gen	kWh at Gen	Dth	Tons CO2
First Year				
Energy Efficiency Impacts	0	633	229	15.2
Efficient Fuel Switching Impacts				
Lifetime				
Energy Efficiency Impacts	N/A	22,805	8,255	549
Efficient Fuel Switching Impacts				

First Year Savings Allocated to ETA Funders	Peak kW at Gen	kWh at Gen	Dth	Tons CO2
Gas				
CenterPoint Energy	-	-	127	8.38
Minnesota Energy Resources	-	-	34	2.21
Xcel Gas	-	-	68	4.50
Electric				
Minnesota Power	-	52	-	0.01
Otter Tail Power	-	21	-	0.00
Xcel Electric	-	560	-	0.13
Sum	-	633	229	15.24

High Performance Windows - New Construction

Year 2025

Statewide Electric Efficiency CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
	All values are in 2025 USD (NPV)			
Electric System Impacts				
Generation Capacity	$ -	$ -	$ -	$ -
Transmission and Distribution Capacity	$ -	$ -	$ -	$ -
Energy Generation / Marginal Energy	$ 748	$ 748	$ 559	$ 559
Market Price Effects	$ 7	$ 7	$ 6	$ 6
Ancillary Services	$ 7	$ 7	$ 6	$ 6
Renewable Portfolio Standard Compliance	$ -	$ -	$ -	$ -
Environmental Compliance	$ -	$ -	$ -	$ -
Subtotal	$ 763	$ 763	$ 570	$ 570
Environmental Externalities and Non-Energy Impacts				
Carbon + Criteria Benefit (electric)	$ 123.04	$ 123.04	N/A	N/A
Other Fuels Environmental Externalities	$ -	$ -	N/A	N/A
Electric Non-Energy Benefits	$ -	$ -	N/A	N/A
Other Fuels Benefits	$ -	$ -	N/A	N/A
Subtotal	$ 123.04	$ 123.04	$ -	$ -
Participant Impacts				
Electric Bill	N/A	N/A	N/A	($2,422)
Incremental Capital	N/A	($325)	N/A	N/A
Participant Rebates and Incentives	N/A	N/A	N/A	N/A
Incremental O&M	N/A	$0	N/A	N/A
Subtotal	$0	($325)	$0	($2,422)
Utility Program Costs				
Utility Program Costs	($6,017)	($6,017)	($6,017)	($6,017)
Utility Performance Incentives	$0	$0	$0	$0
Subtotal	($6,017)	($6,341)	($6,017)	($8,438)

Statewide Electric Efficiency (EE) CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
Benefits	$886	$886	$570	$570
Costs	($6,017)	($6,341)	($6,017)	($8,438)
Net Benefit (Cost)	($5,131)	($5,455)	($5,447)	($7,868)
Benefit/Cost Ratio	0.15	0.14	0.09	0.07

High Performance Windows - New Construction

Year 2025

Statewide Natural Gas Efficiency CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
		All values are in 2025 USD (NPV)		
Gas System Impacts				
Commodity Cost	$33,638	$33,638	$24,606	$24,606
Variable O&M	$343	$343	$251	$251
Demand	$12,021	$12,021	$8,793	$8,793
Environmental Compliance	$471	$471	$344	$344
Market Price Effects	$0	$0	$0	$0
Subtotal	$46,472	$46,472	$33,995	$33,995
Environmental Externalities and Non-Energy Impacts				
Gas Environmental Externality	$25,026	$25,026	N/A	N/A
Other Fuels Environmental Externalities	$0	$0	N/A	N/A
Gas Non-Energy Benefits	$0	$0	N/A	N/A
Other Fuels Benefits	$0	$0	N/A	N/A
Subtotal	$25,026	$25,026	$0	$0
Participant Impacts				
Gas Bill	N/A	N/A	N/A	($45,907)
Incremental Capital	N/A	($34,451)	N/A	N/A
Participant Rebates and Incentives	N/A	N/A	N/A	N/A
Incremental O&M	N/A	$0	N/A	N/A
Subtotal	$0	($34,451)	$0	($45,907)
Utility Program Costs				
Utility Program Costs	($638,298)	($638,298)	($638,298)	($638,298)
Utility Performance Incentives	$0	$0	$0	$0
Subtotal	($638,298)	($672,749)	($638,298)	($684,206)

Statewide Natural Gas Efficiency CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
Benefits	$71,498	$71,498	$33,995	$33,995
Costs	($638,298)	($672,749)	($638,298)	($684,206)
Net Benefit (Cost)	($566,800)	($601,252)	($604,303)	($650,211)
Benefit/Cost Ratio	0.11	0.11	0.05	0.05

Luminaire-Level Lighting Controls

Year 2025

Input Summary

Analysis Year (also NPV year)	2025	
Statewide Sales in 2025	2,902	in total kW of systems installed
Baseline sales (2021-2023 avg sales)	1,381	in total kW of systems installed
Qty of utility rebated units in 2025	579	in total kW of systems rebated
ETA 2025 Units	1,521	in total kW of systems installed
Lifetime (years)	11	
T&D Loss Factor (Energy)	8.22%	
T&D Loss Factor (Demand)	8.22%	
Incremental Capital Cost (per project)	$60	

Per project Summary

Energy Efficiency Impacts

Annual Per-Unit kWh savings at customer	2,527	kWh/unit/year
Peak Demand Savings (kW) at customer	0.41	PCkW/unit
Annual Per-Unit Dth Saved	0.00	Dth/unit/year

Efficient Fuel Switching Impacts

Annual MMBtu savings	0.00	MMBtu/unit/year

Statewide Cost

Annual Initiative Cost	$	1,421,824
Electric EE cost allocation		100%
Gas EE cost allocation		0%
EFS cost allocation		0%

	Electric EE Allocation Factor
Gas	
CenterPoint Energy	
Minnesota Energy Resources	
Xcel Gas	
Electric	
Minnesota Power	8.2%
Otter Tail Power	3.4%
Xcel Electric	88.4%
Sum	100.0%

Statewide Impact	Peak kW at Gen	kWh at Gen	Dth	Tons CO2
First Year				
Energy Efficiency Impacts	681	4,188,551		622
Efficient Fuel Switching Impacts				
Lifetime				
Energy Efficiency Impacts	N/A	46,074,058		6,842
Efficient Fuel Switching Impacts				

First Year Savings Allocated to ETA Funders

	Peak kW at Gen	kWh at Gen	Dth	Tons CO2
Gas				
CenterPoint Energy	-	-	-	-
Minnesota Energy Resources	-	-	-	-
Xcel Gas	-	-	-	-
Electric				
Minnesota Power	56	343,215	-	51
Otter Tail Power	23	141,464	-	21
Xcel Electric	602	3,703,872	-	550
Sum	681	4,188,551	-	622

Luminaire-Level Lighting Controls

Year 2025

Statewide Electric Efficiency CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
		All values are in 2025 USD (NPV)		
Electric System Impacts				
Generation Capacity	$ 732,118	$ 732,118	$ 665,716	$ 665,716
Transmission and Distribution Capacity	$ 79,607	$ 79,607	$ 72,274	$ 72,274
Energy Generation / Marginal Energy	$ 1,740,364	$ 1,740,364	$ 1,590,158	$ 1,590,158
Market Price Effects	$ 24,725	$ 24,725	$ 22,559	$ 22,559
Ancillary Services	$ 24,725	$ 24,725	$ 22,559	$ 22,559
Renewable Portfolio Standard Compliance	$ -	$ -	$ -	$ -
Environmental Compliance	$ -	$ -	$ -	$ -
Subtotal	$ 2,601,539	$ 2,601,539	$ 2,373,266	$ 2,373,266
Environmental Externalities and Non-Energy Impacts				
Carbon + Criteria Benefit (electric)	$ 381,236	$ 381,236	N/A	N/A
Other Fuels Environmental Externalities	$ -	$ -	N/A	N/A
Electric Non-Energy Benefits	$ -	$ -	N/A	N/A
Other Fuels Benefits	$ -	$ -	N/A	N/A
Subtotal	$ 381,236	$ 381,236	$ -	$ -
Participant Impacts				
Electric Bill	N/A	N/A	N/A	$ (2,626,877)
Incremental Capital	N/A	$ (91,260)	N/A	N/A
Participant Rebates and Incentives	N/A	N/A	N/A	N/A
Incremental O&M	N/A	$ -	N/A	N/A
Subtotal	$ -	$ (91,260)	$ -	$ (2,626,877)
Utility Program Costs				
Utility Program Costs	$ (1,421,824)	$ (1,421,824)	$ (1,421,824)	$ (1,421,824)
Utility Performance Incentives	$ -	$ -	$ -	$ -
Subtotal	$ (1,421,824)	$ (1,421,824)	$ (1,421,824)	$ (1,421,824)

Statewide Electric Efficiency (EE) CBA	Minnesota Test	Societal Test	Utility Test	RIM Test
Benefits	$ 2,982,775	$ 2,982,775	$ 2,373,266	$ 2,373,266
Costs	$ (1,421,824)	$ (1,513,084)	$ (1,421,824)	$ (4,048,701)
Net Benefit (Cost)	$ 1,560,950	$ 1,469,690	$ 951,442	$ (1,675,435)
Benefit/Cost Ratio	2.10	1.97	1.67	0.59

APPENDIX B. ETA TECHNICAL ASSUMPTIONS SUMMARY

The purpose of this Appendix is to summarize the key equations and assumptions used to calculate annual energy savings and benefits for the Efficient Technology Accelerator (ETA) program. It also provides additional detail on how energy savings are calculated for ETA, including any deviations from the Energy Savings and Market Evaluation Plans. This document complements the Energy Savings and Market Evaluation Plans developed for each initiative.

1. Core Equations

To calculate ETA energy savings for the state of Minnesota, we rely on the following key data points.

1. **Statewide sales** derived from a dataset representing a subset of the Minnesota market and a market share estimate used to scale statewide sales
2. **Quantity of utility rebated units** for ECO programs that overlap with ETA
3. **Per-unit energy savings** for the technology which generally aligns with the Minnesota Technical Reference Manual (TRM)

Using this data, ETA energy savings are calculated as follows.

Statewide Sales = Subset Sales ÷ Market Share

ETA Units = Statewide Sales − max(Quantity of utility rebates, Baseline Sales)

ETA Savings = ETA Units × Per-Unit Energy Savings

ETA Units represent the portion of sales attributable to the ETA initiative, determined by subtracting the greater of utility-rebate-driven sales or baseline sales from total statewide sales. ETA Savings are calculated by multiplying these ETA Units by the expected energy savings per unit.

Baseline sales are defined as sales occurring before ETA strategies begin to influence the market, frozen at a moment in time. As outlined in the Energy Savings and Market Evaluation Plans, ETA uses a simplified approach by only claiming savings above the initial frozen baseline (the baseline). More information on the baseline period selected for each initiative, and the rationale for those choices, is provided in the following sections.

In early years, utility rebate participation may fall below this baseline. In such cases, there is no need to subtract utility savings since they are already covered by the baseline. However, once utility rebates exceed the baseline, ETA will subtract utility-reported savings rather than the baseline. This approach, which requires a comparison with Energy Conservation and Optimization (ECO) rebate programs, ensures that ETA only claims energy savings that are incremental to those reported by other ECO programs.

This document provides an overview of the data sources, assumptions applied to the data, and calculation approaches used to determine and allocate ETA savings.

2. Air Source Heat Pumps

2.1 Statewide Sales

Sales data of ducted air source heat pumps (ASHPs) are obtained from HARDI (https://hardinet.org/). For Minnesota, HARDI estimates they have sales data from HVAC distributors who account for over 50% of sales in the state. The sales data provided by HARDI is then extrapolated to the entire state using an estimate of market share.

Annual sales are provided to CEE for the following categories:

- Tier 1: HSPF2 ≥ 7.5 and < 8.1; SEER2 ≥ 14.3 and < 15.2
- Tier 2: HSPF2 ≥ 8.1; SEER2 ≥ 15.2

2.2 Baseline Sales

The baseline represents statewide ASHP sales in 2022. This aligns with the baseline proposed in the Energy Savings and Market Evaluation Plan. The year 2022 was selected as the baseline since it is the year before the ETA ASHP initiative progressed from the Program Development stage to the Market Deployment stage.

2.3 Utility Rebate Data

ETA compiles annual rebate data for ducted ASHPs from electric and gas utilities across Minnesota. Rebates are categorized by efficiency tier using the same thresholds applied to statewide sales data.

When efficiency information is missing, the rebates are allocated between Tier 1 and Tier 2 using statewide sales ratios from HARDI (i.e., share of Tier 1 and Tier 2 sales relative to total Tier 1 + Tier 2 sales).

In some cases, customers may receive rebates from both their electric and natural gas utilities. To prevent double-counting rebates, we estimate how many customers receive rebates for their ASHP system from both their electric and natural gas utilities.

For example, to identify potential overlaps between CenterPoint Energy and Minnesota Power customers, we compare the serial numbers the utilities provided and subtracted duplicate systems.

Serial numbers are not available for all rebates paid to Xcel Energy customers. However, a filter unique to Xcel Energy rebate data — confirmed by Xcel Energy as a reliable way to identify

customers in CenterPoint Energy territory — allows us to estimate the number of Xcel Energy rebates paid to CenterPoint Energy customers.

2.4 Per-Unit Savings

Per-unit savings are drawn from the Minnesota TRM v4.2 ASHP calculator tool (Appendix G). Values are climate-zone weighted using 2020 RECS housing data.

Table B1. Climate Zones and Weights (2020 RECS housing data)

Climate Zone	Weight
Zone 1	0.091
Zone 2	0.337
Zone 3	0.572

The weights are calculated based on the number of single-family households with centrally ducted gas/propane heat and central AC in each climate zone, using EIA 2020 Residential Energy Consumption Survey (RECS) data.[1]

Table 2 shows the efficiency specifications assumed for Tier 1 and Tier 2 ducted ASHPs. Specifications are the same as noted in the Energy Savings and Market Evaluation plan, except for using natural gas instead of propane for the Tier 2 fuel type input. The Energy Savings and Market Evaluation Plan stated:

> Energy savings are not currently being ascribed based on fuel type as we will not know the fuel type for homes in which ASHPs are installed. However, natural gas and propane-heated homes have the same level of MMBtu savings per unit, so this is not imperative. As we receive data, we plan to monitor this approach's results and adjust our allocations and analysis as needed over time.

While the fuel replaced and assumed to be the backup does not impact the MMBtu savings calculated, it does impact the benefits claimed since the commodity cost, customer cost, and other key multipliers required for the cost–benefit analysis vary between natural gas, propane, and other delivered fuels. Assuming the ASHPs replace propane results in higher estimated benefits than a natural gas backup because propane has a higher commodity cost, customer cost, and emissions multiplier.

The utility ECO rebate programs assume ASHPs replace a range of heating systems including natural gas, propane, and fuel oil systems. For the 2025 annual report, we use a conservative approach and assume Tier 1 and Tier 2 ASHPs replace natural gas systems. For future annual reports, we plan to collect additional data to better estimate the statewide distribution of supplemental fuels for Tier 1 and 2 ducted ASHPs.

[1] RECS Data: https://www.eia.gov/consumption/residential/data/2020/

Table B2. ASHP Efficiency Specifications

Parameter	Tier 1	Tier 2	Notes
HSPF2	7.5	8.1	Minimum for ETA tiers
SEER2	14.3	15.2	Minimum for ETA tiers
Switchover Temp (°F)	30	15	Reflects expected operating limits
Supplemental Fuel	Natural Gas	Natural Gas	Aligns with cost-effectiveness assumptions
Baseline AC Efficiency	15.0	15.0	Consistent with MN TRM v4.1

Using the assumptions above and the Minnesota TRM V4.2 Appendix G, we calculate the following per-unit energy impacts.

Table B3. ETA ASHP Initiative Per-unit Energy Savings

Metric	Tier 1	Tier 2
Gas Savings (Dth)	35	63
Electric Heating Gain (kWh)	-2,946	-5,561
Electric Cooling Savings (kWh)	1	66
Net MMBtu Savings	25	44
Peak Demand (kW)	0.0012	0.0682

Negative kWh reflects higher electric consumption from heating load.

3. High-Performance Windows New Construction

3.1 Statewide Sales

Energy savings for the high-performance windows (HPW) in the 2025 annual report are limited to the new construction market as the initiative is initially focused on new construction, and Minnesota-specific sales data are readily available for this market but not for the retrofit market.

Statewide HPW sales for new construction are estimated using the Residential Energy Services Network (RESNET) New Construction Database and the U.S. Census Bureau's Building Permit Survey (BPS). RESNET provides home energy rating data from HERS - Home Energy Rating System assessments and is used to estimate the number of newly constructed homes with HPWs. The data set includes detailed performance data for newly constructed single-family and duplex homes, including U-value and window area. The BPS provides data on permitted residential construction, including location, building type, unit counts, and permit valuation.

Use of RESNET data for statewide estimates was identified in the Energy Savings and Market Evaluation Plan. Although the Ducker report was also referenced, it is not used here because it relies on regional, rather than Minnesota-specific, data and no longer provides consistent annual data at the needed level of detail.

Additional benefits of using the RESNET and Building Permit Survey (BPS) datasets include:

- Relies on observed Minnesota specific data rather than estimates of homes.
- Represents a substantial portion of new construction homes, providing meaningful statewide coverage.
- Data from BPS and RESNET is available in real time — yearly and monthly.

The percentage of Minnesota homes represented in RESNET is calculated for a given year by dividing the number of in-scope RESNET-rated homes by the number of residential new construction permits issued (per BPS). In-scope homes include single-family and duplex buildings.

% of MN Homes in RESNET = # in-scope RESNET-rated homes / # BPS permits

RESNET data includes total window square footage and average window U-value for the whole home. HPW square feet are then converted to number of windows by dividing sq. ft. by the TRM-recommended window area of 15 sq. ft. This count of RESNET HPWs is then scaled to statewide sales using the share of Minnesota homes represented in RESNET.

Statewide Sales = RESNET HPWs ÷ % of MN Homes in RESNET

3.2 Baseline Sales

The HPW baseline is the average of 2020–2023 sales, selected to smooth volatility in new construction activity and reflect market conditions prior to ETA intervention. ETA claims incremental savings only for sales above this baseline.

The use of a 2020–2023 average as the baseline represents a deviation from the Energy Savings and Market Evaluation Plans, which specified 2023 as the baseline year. This adjustment was made because the new construction market is highly sensitive to broader macroeconomic conditions — such as interest rates, labor availability, and material costs — which can drive significant year-to-year variability.

Using a four-year average helps smooth short-term volatility and provides a more stable baseline. This is particularly important given that the 2020–2023 period was marked by atypical market conditions associated with the COVID-19 pandemic, including supply chain disruptions and related market distortions. As a result, a multi-year average offers a more representative benchmark of underlying market activity prior to ETA's impact.

3.3 Utility Rebate Data

Residential new construction window rebate activity is collected from utilities annually and standardized to align with HPW definitions and TRM sizing assumptions.

Utilities that indicated they offer rebates for new construction HPWs include:

- CenterPoint Energy
- Minnesota Energy Resources
- Minnesota Power
- Xcel Energy

The data is filtered to only include homes with HPWs. In certain cases, the number of windows is provided; in other cases, the total window area (square feet) is provided. When the window area is provided, the total window area is divided by 15 square feet per window, in accordance with the TRM, to estimate the number of windows.

3.4 Per-Unit Savings

HPWs were not a measure in the TRM at the time the Energy Savings and Market Evaluation Plan was finalized, but the plan did state:

> If the TRM adopts a high-performance window measure, the initiative may switch to using TRM data for energy savings.

Energy savings per HPW (new construction) reported in this annual report are based on *MN TRM v4.2 – Residential Envelope, High-Performance Windows*. We reference values shown in Table 1 on page 158 of the TRM.

Table B4. TRM V4.2 New Construction – Summary kWh and Dth Energy Savings per 3' x 5' (15 SF) HPW over current MN Energy Code, by equipment type and Heating/Cooling

	Electric Heating (furnace or resistance) and Electric Cooling (AC)		Gas Heating (furnace or boiler) and Elec Cooling (AC)		Gas Heating (furnace or boiler) and no mechanical cooling		Electric Heating and Cooling (ASHP primary, elec resist at approx 30 F switchover)	
Climate Zone	**kWh Savings**	**Dth Savings**	**kWh Savings**	**Dth Savings**	**kWh Savings**	**Dth Savings**	**kWh Savings**	**Dth Savings**
Zone 1	85.8	0	0.0	0.43	0.0	0.43	86.7	0.00
Zone 2	84.4	0	0.0	0.40	0.0	0.40	78.0	0.00
Zone 3	82.9	0	0.0	0.36	0.0	0.36	69.3	0.00

Unit-level impacts vary by climate zone and heating system. Savings used for ETA are climate-weighted and normalized using RESNET heating system distribution for new construction. The resulting per-unit energy savings is:

Table 5. ETA HWP New Construction Initiative Per-unit Energy Savings – 2025

Metric	Savings per window
Gas Savings (Dth)	0.356
Electric Savings (kWh)	0.9
Peak Demand (kW)	0

These values are used to calculate statewide savings by multiplying the number of HPW windows by the unit savings per window.

Unit kWh savings per year = number of HPW windows x kWh savings per window

Unit Dth savings per year = number of HPW windows x Dth savings per window

4. Luminaire-Level Lighting Controls

4.1 Statewide Sales

LLLC sales are provided by Encentiv Energy[2], which accounts for a subset of the Minnesota market. This data is collected through surveys of manufacturers that have agreed to share their sales information with Encentiv. However, not all manufacturers selling to Minnesota participate, so the dataset represents only a subset of the total market.

CEE contracted Fernhill Shopworks to estimate the fraction of statewide LLLC sales captured by Encentiv. Fernhill Shopworks estimated the Encentiv dataset represents 37% of the LLLC sales in Minnesota. This fraction is used to estimate statewide LLLC sales for a given year.

4.2 Baseline Sales

The baseline represents statewide annual LLLC sales for 2021 through 2023. The Energy Savings and Market Evaluation Plan proposed 2022 as the baseline year but also noted we may consider an average of the past three years if available to account for anomalies in single year data. Annual sales numbers varied between 2021 and 2023, so an average of all three years was selected to smooth out the year-to-year fluctuations. 2024 sales were excluded from the average period because market activity was influenced by ETA activity in that year.

4.3 Utility Rebate Data

Each year, ETA requests rebate data from utilities across the state. Because LLLC energy savings depend heavily on the wattage of the fixtures on which they are installed, all calculations are expressed in terms of kWh and kW saved, rather than per unit.

Utilities vary in how they report data to ETA. Some provide estimated kWh and kW savings directly for their LLLC programs, while others report only the total connected load (kW) of the

[2] https://www.encentivenergy.com/

installed LLLC systems. In cases where only connected load is provided, ETA estimates the corresponding kWh and kW savings using standardized assumptions and calculation methods.

In-scope rebates are defined as those where the lighting control type is either “LLLC” or “NLC” (networked lighting control). This is because some utilities do not have an LLLC specific rebate but do allow customers that install LLLCs to apply for an NLC rebate. As a result, the NLC rebate count overestimates the number of customers that install an LLLC and apply for a rebate. When calculating energy savings, ETA aggregates kW/kWh savings from both LLLC-specific rebates and NLC rebates. By subtracting all NLC rebates, we are being conservative in our estimation of ETA energy savings since we're likely subtracting rebates for non-LLLC systems.

Additional market research could provide more insight into the percentage of NLC rebates that may be LLLCs — future energy savings calculations may be modified to incorporate any relevant findings.

4.4 Per-Unit Savings

The per-unit energy savings for the LLLC initiative align with what was proposed in the Energy Savings and Market Evaluation Plan. Savings for the LLLC initiative are based on the *MN TRM v4.2 “C/I – Lighting Controls”* algorithm (p. 283). Because Encentiv sales data do not identify building type, “other/unknown” TRM inputs (0.63) are used where building-type specificity is required.

To estimate baseline savings for existing buildings (SF_old), we combine 2018 CBECS lighting control prevalence with TRM savings factors. The resulting statewide average baseline factor is 0.117, calculated as a weighted sum of control types (e.g., occupancy sensors, daylight harvesting, personal/task tuning, or no controls). Assuming post-installation savings of 0.63, retrofit savings are:

$$SF_{retrofit} = 0.63 - 0.117 = 0.513$$

For new construction, state energy code requires occupancy + daylight controls, aligning with TRM’s 2+ control category (baseline = 0.38). Resulting incremental savings are:

$$SF_{new} = 0.63 - 0.38 = 0.250$$

Because Encentiv sales do not distinguish retrofit vs. new construction, we apply a combined value assuming 1% annual new construction market growth, yielding:

$$SF_{adj} = 0.510$$

Cooling interaction savings are then applied using HVAC adjustment factors from the TRM, weighted by commercial floor area cooling prevalence (87% conditioned / 13% unconditioned).

Cooling kWh interaction factor:

- Conditioned space factor: 1.095

- Unconditioned space factor: 1.000
- Weighted average: (1.095 × 0.87) + (1.000 × 0.13) = 1.082

Cooling kW interaction factor:

- Conditioned space factor: 1.254
- Unconditioned space factor: 1.000
- Weighted average: (1.254 × 0.87) + (1.000 × 0.13) = 1.22

These combined factors represent average cooling savings across commercial buildings and are applied to lighting kWh and kW savings in the analysis.

The resulting energy savings per unit are as follows.

Table B6. ETA LLLC Initiative Per-unit Energy Savings

Metric	Savings per kW installed
Gas Savings (Dth)	0
Electric Savings (kWh)	2527
Peak Demand (kW)	0.411

5. Cost Benefit Analysis Inputs and Assumptions

ETA statute requires the calculation and allocation of net benefits and energy savings. Net benefits are used for assessing program cost-effectiveness and as inputs for calculating utility financial incentives.

ETA net benefits are calculated based on the primary cost-effectiveness test (Minnesota Test) and other secondary approved cost-effectiveness tests (Societal, Utility, and Ratepayer Impact Tests). Consistent with the approved filing, we do not calculate participant net benefits.[3]

As described in the filing, ETA net benefits calculations differ from other ECO programs in several key respects, including:

- ETA net benefits are calculated on a statewide basis versus for one utility territory.
- ETA net benefits are allocated based on financial contribution to ETA.

Since ETA is a statewide program, ETA will use statewide multipliers in place of the utility inputs when available. When a statewide multiplier is not available, ETA uses the load weighted

[3] The participant test is designed to assess cost-effectiveness from a participant's perspective, considering rebates provided by the program. As described in the filing, this test is not as meaningful for ETA initiatives (which may intervene in the market prior to a technology being cost-effective and do not provide rebates). Center for Energy and Environment. "Minnesota Efficient Technology Accelerator Program Proposal" (2022). Submitted to Minnesota Department of Commerce, Division of Energy Resources. Docket No. E,G999/CIP-21-548.

average of the ETA funder inputs. Table B7 summarizes the key utility inputs and data sources for the ETA electric net benefits calculations. In the table, all inputs except the T&D System Losses are calculated based on the ETA funder load (less CIP exempt sales) weighted average.

Table B7. Electric Utility-specific Net Benefits Inputs

Input	Value
T&D System Losses %	8.22% [4]
Residential Retail Rate ($/kWh)	$0.1517/kWh
C&I Electric Retail Rate ($/kWh)	Summer: $0.07676/kWh Winter: $0.07684/kWh
CIP Utility Discount Rate %	5.42%
T&D Capacity Avoided Cost ($/peak kW)	Dependent on lifetime and install year
Energy Gen./Marginal Energy ($/kWh)	
Carbon & Other Criteria Pollutants Benefits (short ton/kWh)	

All the natural gas utility-specific net benefits inputs are based on the ETA funder customer load weighted average.

Table B8. Natural Gas Utility-specific Net Benefits Inputs

Input	Value
Residential Retail Rate ($/Dth)	$8.43/Dth
C&I Retail Rate ($/Dth)	$6.85/Dth
Demand Cost ($/Dth/yr)	$161.53/Dth
Variable O&M	$0.05/Dth
CIP Utility Discount Rate	5.42%

[4] Deputy Commissioner's Decision – CIP Electric Utilities Cost-Effectiveness Review, Docket No. E999/CIP-18-783, May 20, 2019.