# FUTURE FOCUS

# Transitional/Emerging Priority Roadmap
# Final Implementation Report

**DATE: DECEMBER 31, 2025**

**REPORT CONDUCTED BY: ENERGY SOLUTIONS**

# ACKNOWLEDGEMENTS

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For more information on this research project, contact futurefocus@focusonenergy.com.

# FUTURE FOCUS

Future Focus reviews new program ideas, measures, and delivery methods and tests new participation opportunities for future expansion and inclusion in the Focus on Energy program portfolio. The initiative supports energy efficiency and renewable energy research and reviews new and emerging energy efficient technologies. This report is supported through the Future Focus' Focus Emerging Technology Accelerator, Environmental & Economic Research and Development Program, and Pilot Programs.

# KEY TERMS

| Term | Definition |
|---|---|
| **AC** | Air conditioning |
| **CBO** | Community Based Organization |
| **DOE** | Department of Energy |
| **DR** | Demand response |
| **EE** | Energy efficiency |
| **EERD** | Environmental & Economic Research and Development |
| **EM&V** | Evaluation, Measurement, and Verification |
| **EPA** | Environmental Protection Agency |

| Term | Definition |
|---|---|
| **ESJ** | Equality and social justice |
| **EV** | Electric vehicle |
| **GHG** | Greenhouse gas |
| **GWP** | Global Warming Potential |
| **HP** | Heat Pump |
| **KPI** | Key Performance Indicator |
| **LMI** | Low-to-moderate income |
| **MT** | Market Transformation |
| **MT Assessment** | Market Transformation Assessment Study |
| **NZE** | Net Zero Energy |
| **Planning Study** | Quadrennial V Planning Study |
| **PSC** | Public Service Commission |
| **Quad Plan** | Quadrennial Plan |
| **Roadmap Report** | Transitional/Emerging Priority Roadmap Implementation Report |
| **SEER** | Seasonal Energy Efficiency Rating |
| **SEERA** | Statewide Energy Efficiency and Renewables Administration |
| **SEM** | Strategic Energy Management |
| **SME** | Subject Matter Expert |
| **TOU** | Time-Of-Use |
| **TRC** | Total Resource Cost |
| **TRM** | Technical Resource Manual |
| **U.S.** | United States |

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# ORGANIZATION OF REPORT

This *Transitional/Emerging Priority Roadmap Implementation Report* is organized into three primary sections, in addition to the Executive Summary and Appendices.

**Background**: Provides context on the Focus on Energy program and explains the genesis of this research project.

**Research Methodology**: Describes the overall project approach and how the research was conducted. It outlines the methodologies applied, the original research questions, and each phase of the research process.

**Conclusion and Recommendations**: Includes the rationale for interventions excluded from detailed implementation plans, intervention sequencing plan, recounts lessons learned and highlights key takeaways. It also provides recommendations to guide future efforts.

Finally, the **References** and **Appendices** compile the reports and resources consulted during the research, along with supplemental materials generated throughout the process.

# EXECUTIVE SUMMARY

## Project Background

In support of the Wisconsin Public Service Commission (PSC) directives for Focus on Energy current Quadrennial Plan IV (Quad IV), and in preparation for the Quadrennial Planning Process V (Quad V), Focus on Energy commissioned a research effort to support investigation and analysis into the Environmental & Economic Research and Development (EERD) research categories, including:

- targeted emissions reductions,
- extending the value of energy efficiency,
- assessing the landscape of decarbonization goals, and
- proactive market transition.

The objective was to analyze how the Focus on Energy program could evolve to meet transitioning priorities and to develop a roadmap of actionable interventions to guide Focus on Energy into the next phase of service to Wisconsin. These efforts culminated in the creation of this *Transitional/Emerging Priority Roadmap Implementation Report* (Roadmap Report).

This Roadmap Report was developed through 2025 and is designed to complement parallel research efforts including the Quadrennial V Planning Study (Planning Study)[1] and the Market Transformation Assessment Study (MT Assessment).[2] The Planning Study provides quantitative analysis of the potential annual energy savings, peak demand reduction, greenhouse gas mitigation, and cost-effectiveness of specific program measures, while the MT Assessment provides analysis of the market transformation potential for a finite number of priority technologies. In contrast, this Roadmap Report emphasizes a multi-criteria analysis of energy, load shifting, greenhouse gas (GHG), equity, and programmatic impacts of a holistic set of program interventions in order to support the transition from the current Focus on Energy program to meet the evolving needs of the Quad V and beyond. Collectively, these reports provide the PSC and Focus on Energy stakeholders' robust analysis and detailed recommendations to support continued program impacts for energy savings and beyond.

[1] "Quad V Planning Study," Focus on Energy, focusonenergy.com/about/quad-v-planning-study

[2] assets.focusonenergy.com/production/inline-files/Focus-MT-Potential-Phase-I-Report.pdf

## Research Methodology

The research team established a data-driven, structured approach to address the research categories established by Focus on Energy. This approach resulted in a comprehensive assessment of potential measures and interventions for Focus on Energy to consider in order to prioritize a subset for in-depth implementation plans as well as draw study conclusions. The research team and Focus on Energy recognized the need for a tactical implementation plan rather than just a high-level strategy that did not provide near-term opportunities for impact. As such, the research team employed both a top-down and bottom-up analytical approach, organized into the four phases as depicted in Figure 1.

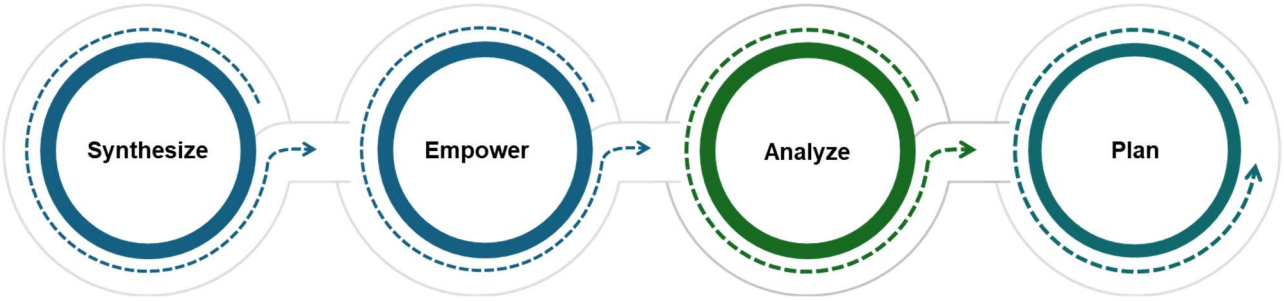


*Figure 1: Research Methodology Phases*

The ***Synthesize*** phase of the project initiated the research with a two-pronged approach; the first prong examined the background of the Focus on Energy program and associated Wisconsin policy goals, including enabling legislation, the history of the Quadrennial cycles, and other energy and climate policy reports in Wisconsin. The second prong developed a detailed measure database where energy efficiency, emissions-reduction, and load shifting technologies were characterized to inform the opportunities for Focus on Energy programs to play a larger role in cost-effectively reducing energy use, carbon emissions, as well as support load shifting. The analysis included detailed sector and end-use analysis of sources of energy and GHG emissions within the state, both at current levels and projected into the future. The measure database included information on impact potential, technology strategy, non-energy benefit, and barriers to adoption for each measure.

The ***Empower*** phase of the project built upon the foundational research from the previous phase to identify tactics—referred to as interventions—to overcome identified barriers. The research team worked closely with Focus on Energy and the PSC to develop a suite of potential interventions to achieve the impacts quantified through the Synthesize phase. The interventions were refined through an iterative process, initially casting a wide net to ensure completeness while systematically working through the larger list to screen for viability. The interventions were documented in a comprehensive database, ultimately culminating in a list of 43 interventions. These interventions were characterized in detail, including the time horizon for implementation, whether it had direct or enabling impacts, how the intervention would

achieve the desired outcomes, and the mechanics of implementing including cost and difficulty.

In the ***Analyze*** phase, the research team defined evaluation criteria and systematically rated the interventions to arrive at a consistent analytical score for each intervention. The criteria included impact (GHG emissions reduction, energy savings, and load shifting potential), equity (benefits and flags), implementation difficulty, cost, and other benefits not otherwise captured. The goal of the Analyze phase was not only to assess all interventions that were under consideration, but also to identify the priority interventions that the research team would develop into more detailed implementation plans. The research team utilized a weighted system to allow for future adjustments of the criteria to inform decision making and program needs as priorities continued to evolve. The research team built a Tableau Dashboard including all interventions to facilitate engagement and allow for real time re-weighting of criteria to explore how it changed the ranking. The dashboard was utilized in a workshop with Focus on Energy and PSC to ultimately arrive at 14 priority interventions that would be further developed into detailed implementation plans, listed in Table 1.

Finally, during the ***Plan*** phase, the research team developed detailed implementation plans for the 14 priority interventions, adapting the existing Focus on Energy implementation plan template. The implementation plans covered a wide swath of activities, from evolving current Focus on Energy programs in order to increase energy efficiency, load shifting, or potentially GHG reductions, to developing new programs and pilots for the program to consider. The implementation plans are results of this research and may not ultimately be pursued by Focus on Energy, however the detailed plans outline program mechanics including recruitment, incentive budgets, trade ally management strategies, and evaluation considerations; these plans are intended to provide Focus on Energy structured support as the program evolves.

*Table 1: Summary of Priority Interventions (Further Developed into Implementation Plans)*

| | Intervention Name | | Intervention Name |
|---|---|---|---|
|  | Launch a new program focused on **residential AC to heat pump conversions** |  | Implement a program that focuses on **residential demand response** technologies |
|  | **Midstream agriculture programs** focused on reducing barriers to adoption and scaled deployment of agriculture energy efficiency measures |  | Develop a **code compliance program** while building traction for additional codes and standards program opportunities, including building performance standards |
|  | Create a **data center program** to mitigate expected growing intensive energy impacts |  | Ramp up **strategic energy management (SEM) program** activities focused on strategic opportunities |

| | Intervention Name | | Intervention Name |
|---|---|---|---|
|  | Implement a **cross-cutting behavioral program** that targets the "sensitive intervention points" in program offerings |  | Develop a **residential advisor service** |
|  | Implement a cross-cutting program focused on **non-residential demand flexibility** |  | **Update cost-effectiveness testing requirements** to support broader policy objectives |
|  | Expand on existing research to develop a program focused on increasing **workforce education and training** for high-impact technologies |  | Develop a targeted **zonal-focused program** |
|  | Implement an **industrial efficiency midstream program** |  | Implement **net-zero new construction program** |

## Recommendations and Lessons Learned

Not every viable intervention of the 43 evaluated was ultimately selected for an implementation plan. While the team initially expected that potential benefits, costs, and implementation difficulty would be the primary considerations for prioritizing interventions, as the project progressed, it became evident that the timeliness of a tactical implementation plan was also a critical factor in its prioritization. Some interventions, including some with high analytical scores, were ultimately deprioritized for an implementation plan because, at the time this report was developed, Focus on Energy and the PSC determined that such a plan would not be useful within the program's purview for the foreseeable future. For the interventions not pursued for implementation plans, descriptions of the intervention and rationale on why it was not selected was documented by the research team.

**While the team initially expected that potential benefits, costs, and implementation difficulty would be the primary considerations for prioritizing interventions, as the project progressed, it became evident that the timeliness of a tactical implementation plan was also a critical factor in its prioritization.**

While not all interventions are feasible to pursue at this time, identifying the barriers to feasibility and clarifying the necessary conditions for change proved to be a valuable project outcome. For example, there are numerous opportunities for Focus on Energy to expand efforts that both increase energy savings and advance emerging priorities. To enable sufficient progress in future quadrennial periods, however, the formal evolution of the Focus on Energy program framework

must begin soon. Many actions can be initiated now to maintain momentum, but clear directives will ultimately be required to authorize additional program activities that currently fall outside Focus on Energy existing scope.

All implementation plans include near-term activities that Focus on Energy can pursue, however full-scale deployment of a program may be a medium- or longer-term activity. The individual implementation plans speak not only to how the intervention could look when fully implemented but also address next steps and preparatory actions, such as coordination, research, planning, or piloting. The research team identified interventions that are strong candidates for pilot programs before full-scale implementation, including demand response, zonal, workforce training, and code compliance pilot programs.

Seven interventions were identified to be candidates for near-term implementation as they had medium to high energy savings and grid benefits, medium to low implementation cost and difficulty, and either have an implementation plan or have been designated as ready to implement through discussions with Focus on Energy.

Eight interventions were identified to be suitable for mid-term actions, all of which either had full implementation plans or were included within other implementation plans. These interventions have medium to high grid benefits, medium to high GHG reduction potential, and low to medium implementation cost and implementation difficulty which contributed to their being selected as mid-term interventions. Figure 2 depicts the intervention timing.

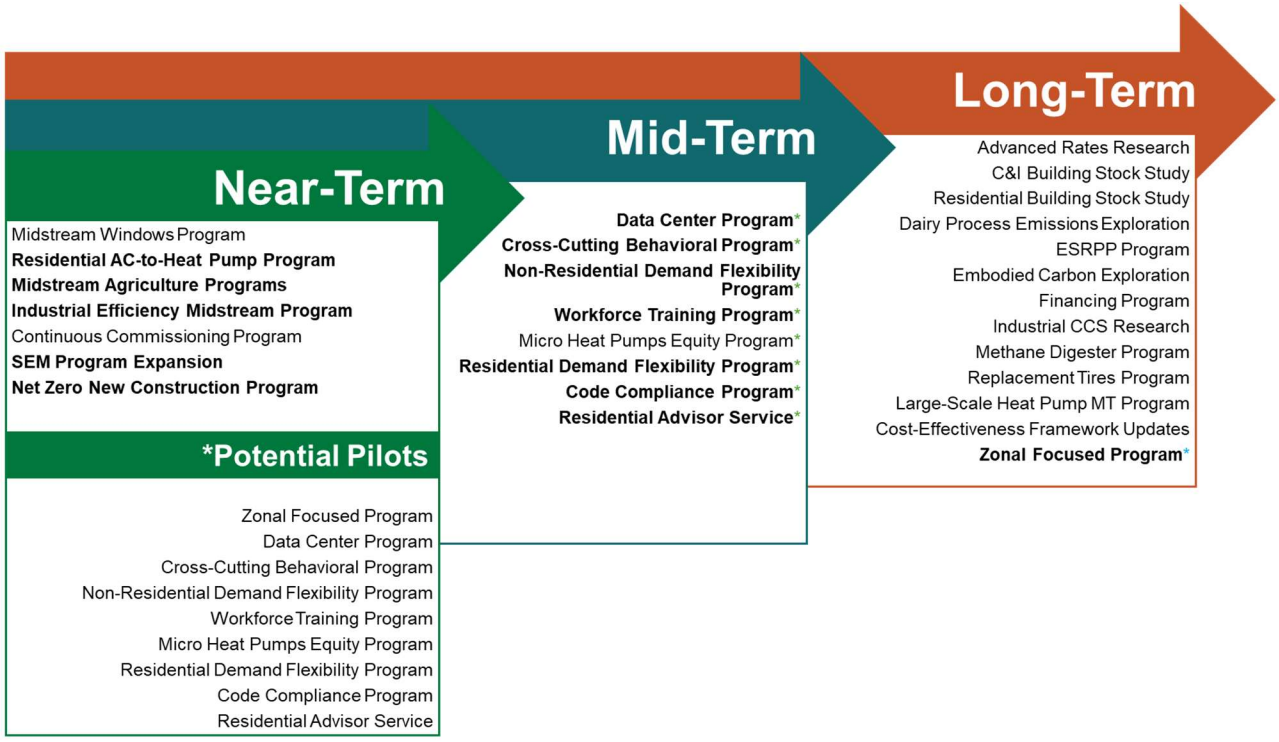


*Figure 2: Intervention Time Horizon and Potential Pilots*

Through this process, the research team also discovered that some interventions identified as having the greatest impact potential were determined to be infeasible in the near term, such as supporting development of advanced rates or transportation electrification and load flexibility for electric vehicle charging. A reassessment of programmatic scope through Quad V, future orders, or further policy refinement could enable Focus on Energy to advance activities most closely aligned with emerging priorities such as emissions reductions or grid benefits. Similarly, if Focus on Energy were granted broader authority to pursue holistic market transformation, as explored in the MT Assessment, the program could support larger-scale market transformation activities. Paramount to any substantial shifts, however, is the continued prioritization of ratepayer benefits and the core programmatic objective of delivering value to Wisconsin. The prioritized implementation plans demonstrate ways to expand impact while remaining firmly within the current boundaries of the Focus on Energy Program.

Overall, the research team concludes that there are ample opportunities to pursue interventions that steer toward emerging priorities while still operating within the current structure. In addition to the 14 prioritized interventions, this research identified numerous additional feasible activities that may be pursued as Wisconsin's policy landscape continues to evolve, such as promoting adoption of efficient replacement tires, develop a market transformation program focused on large scale heat pump deployment, or developing a financing program focused on technologies with high upfront costs but operational savings.

Ongoing planning and strategic consideration will be essential to consistently achieve both long- and short-term objectives. This process will likely require continued evolution of the Focus on Energy program, with updates to its structure and delivery mechanisms to meet emerging needs. At the same time, the team found significant opportunities to build on the established framework, leveraging existing program strengths while integrating new approaches. Doing so will position Focus on Energy to remain effective, resilient, and responsive to evolving energy and equity priorities.

# BACKGROUND

The Focus on Energy program was initially established in 1999, and has had several pivotal events since then, with highlights shown in Figure 3.


*Figure 3: Timeline of Focus on Energy Proceedings*

In 1999, Wisconsin Statute § 196.374 established Focus on Energy and its mandate to support energy efficiency development in Wisconsin. The key enabling language from § 196.374 reads as follows:

"*The purpose of the programs under this paragraph shall be to help achieve environmentally sound and adequate energy supplies at reasonable cost, consistent with the commission's responsibilities under Wisconsin Statute § 196.025 and the utilities' obligations under this chapter. The programs shall include, at a minimum, all the following:*

a. *Components to address the energy needs of residential, commercial, agricultural, institutional, and industrial energy users and local units of government.*
b. *Components to reduce the energy costs incurred by local units of government and agricultural producers, by increasing the efficiency of energy use by local units of government and agricultural producers.*
c. *Initiatives and market strategies that address the needs of individuals or businesses facing the most significant barriers to creation of or participation in markets for energy efficient products that the individual or business manufactures or sells or energy efficiency services that the individual or business provides.*
d. *Initiatives for research and development regarding the environmental and economic impacts of energy use in this state.*
e. *Components to implement energy efficiency or renewable energy measures in facilities of manufacturing businesses in this state that are consistent with the implementation of energy efficiency or renewable energy measures in manufacturing facilities to enhance their competitiveness, the retooling of existing facilities to manufacture products that support the green economy, the expansion or establishment of domestic clean energy manufacturing operations, and creating or retaining jobs for workers engaged in such activities."*[3]

[3] Wisconsin State Legislature, §196.374 (2) (a) (2.), docs.legis.wisconsin.gov/statutes/statutes/196/374

In 2005, Wisconsin Act 141 transferred oversight of the Focus on Energy program from the Department of Administration to the Public Service Commission (PSC).[4] This Act requires electric and natural gas utilities to develop energy efficiency and renewable resource programming, leading to the creation of the Statewide Energy Efficiency and Renewable Administration (SEERA). It also directs municipal utilities and retail electric cooperatives to fund energy efficiency efforts, giving them the option to participate in Focus on Energy or operate their own programming. Since 2010, the PSC has issued Quadrennial (Quad) plans to review and set priorities for four-year periods. Additional details on the Quad planning processes are in Appendix A: Qualitative Landscape Details.

The Quadrennial Planning Process IV (Quad IV),[5] finalized in 2022, established the Focus on Energy current portfolio of energy efficiency and renewable resource initiatives for 2023–2026. In the Quad IV final decision, the PSC stated:

> *"The Commission finds it reasonable that Focus should play a larger role in cost-effectively reducing carbon emissions and that Quad IV should serve as a transitional period during which the program continues to emphasize energy savings but also seeks to make measurable progress toward a transition to greater emphasis on reducing carbon emissions."*[6]

The Quadrennial Planning Process V (Quad V) is currently underway and will be issued in 2026. The PSC has identified the following priorities for the Quad V planning study:[7]

- Estimate the avoided emissions potential from programming.
- Incorporate load shapes to improve the accuracy of peak demand reduction estimates.
- Analyze customer segment implications.
- Assess opportunities to expand program electrification.
- Evaluate the influence of the Inflation Reduction Act (IRA) incentives on energy efficiency and electrification in Wisconsin.
- Contextualize findings to guide and inform future program goals.

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[4] Wisconsin Act 141, 2005, docs.legis.wisconsin.gov/2005/related/acts/141.

[5] Public Service Commission of Wisconsin, Quadrennial Planning Process IV, Docket 5-FE-104, apps.psc.wi.gov/APPS/dockets/content/detail.aspx?id=5&case=FE&num=104

[6] Public Service Commission of Wisconsin, Quadrennial Planning Process IV Final Decision, Docket 5-FE-104, 22, apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=453081, 7.

[7] "Quad V Planning Study," Focus on Energy, focusonenergy.com/about/quad-v-planning-study.

**Research Categories:**

**Targeted emissions reductions extending the value of energy efficiency, assessing the landscape of decarbonization goals, and proactive market transition.**

In support of PSC directives for the current quadrennial cycle and in preparation for the Quad V planning process, the research team investigated the Environmental & Economic Research and Development (EERD) research categories of **targeted emissions reductions**, **extending the value of energy efficiency**, **assessing the landscape of decarbonization goals**, and **proactive market transition**. The goal was to provide insight and actionable interventions to advance Focus on Energy into the next phase of service for Wisconsin. The research team's efforts culminated in the creation of this Transitional/Emerging Priority Roadmap Implementation Report (Roadmap Report).

This Roadmap Report is designed to complement the two studies defined for Quad V: the Quadrennial V Planning Study (Planning Study)[8] and the Market Transformation Assessment Study (MT Assessment).[9] The Planning Study provides quantitative analysis of the potential annual energy savings, peak demand reduction, greenhouse gas mitigation, and cost-effectiveness of specific program measures to support establishing realistic targets for the upcoming four years, while the MT Assessment identifies long-term opportunities for market transformation initiatives (MTIs) and advises Focus on Energy on how to prioritize them. In contrast, this Roadmap Report emphasizes a multi-criteria analysis of energy, load shifting, greenhouse gas (GHG), equity, and programmatic impacts of a holistic set of program interventions in order to support the transition from the current Focus on Energy program to meet the evolving needs of the Quad V and beyond. Together, this collective body of research provides the PSC and Focus on Energy with reliable data and actionable insights that can be combined to enhance the program's value and impact in the Quad V and beyond.

[8] Ibid.

[9] Cadmus, Focus on Energy Market Transformation Assessment Study, https://assets.focusonenergy.com/production/inline-files/Focus-MT-Potential-Phase-I-Report.pdf

# RESEARCH METHODOLOGY

At the onset of this project, the research team established a list of research questions and a systematic approach to tackle them. The initial research questions that the research team set out to answer were:

## Research Questions

1. What is the current **policy**, **regulatory**, and **programmatic** landscape for the Focus on Energy program and within the state of Wisconsin? What are the potential programmatic changes required to advance the Public Service Commission (PSC)'s priorities and inform program goals? What are the current barriers to these changes?
2. What are the primary opportunities for Focus on Energy programs to play a larger role in **cost-effectively reducing carbon emissions**? What are the underlying barriers to existing policies? What are the tactics to overcome these barriers?
3. What are the **benefits and values** of programs unaccounted for in the existing energy efficiency framework within which Focus on Energy currently operates? What opportunities does Focus on Energy have to transition and adopt an updated framework to achieve long-term market effects?
4. What does Focus on Energy **risk** by not evolving to meet the needs of the next Quadrennial Planning Process?
5. How can the **existing energy efficiency and renewable energy portfolio** align with the goals of stakeholders throughout Wisconsin? What are feasible policies and regulatory considerations that Focus on Energy can implement?
6. How can Focus on Energy **proactively** plan for market transformation and adapt the existing portfolio of programs to long-term market effects? What near-, medium-, and long-term steps should Focus on Energy consider to successfully advance these objectives?

The research team established a data-driven, structured approach to address these questions, develop detailed implementation plans for priority interventions, as well as draw study conclusions. A comprehensive assessment was necessary to ensure that the study focused on the highest-impact opportunities, while certain questions required detailed granularity and narrow research. Additionally, the research team recognized the need for tactical implementation planning to provide near-term opportunities for impact in addition to high-level strategies. As such, the research team employed both a top-down and bottom-up analytical approach, organized into the four phases depicted in Figure 4.

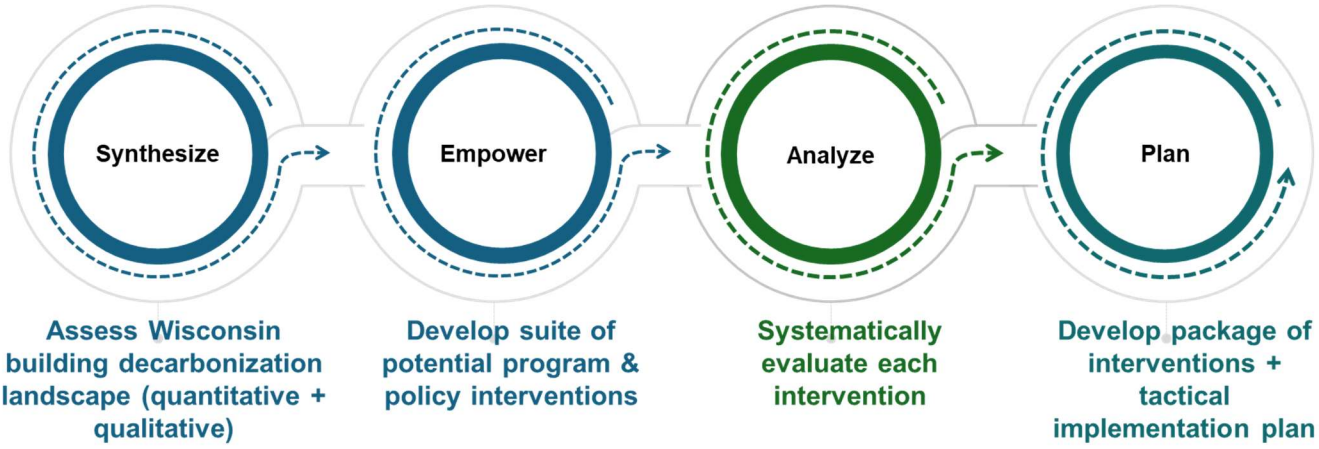


*Figure 4: Research Methodology Phases and Summary*

## Synthesize: Documenting the Landscape

The research team began the Synthesize phase of the project by pursuing a two-pronged research approach. The first prong examined the background of the Focus on Energy program and associated Wisconsin policy goals; additional details can be found in Appendix A: Qualitative Landscape Details. The second prong developed a detailed measure database where energy efficiency and emissions-reduction technologies were characterized; additional details can be found in Appendix B: Measure List.

### Qualitative Landscape Review

The qualitative review included a comprehensive assessment of existing research and policies within Wisconsin that must be understood and accounted for to overcome barriers and enable the implementation of interventions. It established a baseline understanding of existing policies and programs in the state and provided necessary context around any proposed interventions. To define parameters that Focus on Energy must consider when establishing or revising new or existing initiatives, the research team reviewed:

- The legislation establishing the Focus on Energy program[10]
- Prior and ongoing Quadrennial Planning Studies I-IV[11]
- Governor Tony Evers' 2019 Executive Order #38[12]

[10] Wisconsin Statute (Wis. Stat.) § 196.374, 1999

[11] Additional details in Appendix A: Qualitative Landscape Details

[12] State of Wisconsin Office of the Governor, "Executive Order 38 of August 16, 2019, Relating to Clean Energy in Wisconsin," evers.wi.gov/Documents/EO 038 Clean Energy.pdf.

Executive Order #38 established the Office of Sustainability & Clean Energy (OSCE) and charged OSCE with several responsibilities, including achieving the goal of 100% carbon-free electricity by 2050, as well as ensuring that Wisconsin fulfills the carbon reduction goals established in the 2015 Paris Climate Accord. The issuance of this Executive Order has resulted in OSCE's development of the 2022 Clean Energy Plan (CEP) and the 2023, 2024, and 2025 CEP Progress Reports.[13]. These reports focused on four overarching key pathways to accomplish Executive Order #38: **Accelerate Clean Energy Technology Deployment**, **Maximize Energy Efficiency**, **Modernize Buildings and Industry**, and **Innovate Transportation**. The research team reviewed this body of work to provide additional context to understand Wisconsin's efforts to reduce GHG emissions and accelerate clean energy goals.

**The OSCE reports focused on four overarching pathways to accomplish Executive Order #38:**

**Accelerate Clean Energy Technology Deployment, Maximize Energy Efficiency, Modernize Buildings and Industry, and Innovate Transportation.**

Additionally, the research team reviewed materials generated by Focus on Energy, including:

- Appendix A of Focus on Energy 2015-2018 Quadrennium Economic Impact Analysis[14]
- 2020 Residential New Construction Baseline Study[15]
- 2021 Residential New Construction Market Effects memo[16]
- 2025 Focus on Energy Market Transformation Assessment Study Phase I Report[17]
- Annual Focus on Energy program evaluations[18]

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[13] State of Wisconsin: *Wisconsin Clean Energy Plan*, 2022: osce.wi.gov/Documents/SOW-CleanEnergyPlan2022.pdf; *Wisconsin Clean Energy Plan Progress Report*, 2023: osce.wi.gov/PublishingImages/Pages/Forms/EditForm/Clean Energy Plan 2023 Progress Report.pdf; *Wisconsin Clean Energy Plan Progress Report*, 2024: osce.wi.gov/Documents/2024 Clean Energy Plan Progress Report.pdf; *Wisconsin Clean Energy Plan Progress Report*, 2025: osce.wi.gov/Documents/2025 Clean Energy Plan Progress Report.pdf

[14] This report detailed impacts of Focus on Energy projects based on participant location (i.e., rural vs. non-rural). Cadmus, *Focus on Energy 2015–2018 Quadrennium Economic Impact Analysis* (2020), assets.focusonenergy.com/production/WI Focus 2015-18 Quad_Econ Impacts_final.pdf.

[15] Cadmus, *2020 Residential New Construction Baseline Study* (2022), assets.focusonenergy.com/production/Focus-on-Energy-2020-Residential-Baseline-Study-Report.pdf.

[16] Cadmus, *Focus on Energy Residential New Construction Market Effects* (2021), focusonenergy.com/evaluation-reports/residential-new-construction-market-effects.

[17] Cadmus, *FOCUS ON ENERGY® Market Transformation Assessment Study* (2025), assets.focusonenergy.com/production/inline-files/Focus-MT-Potential-Phase-I-Report.pdf.

[18] "Evaluation Reports," Focus on Energy, focusonenergy.com/evaluation-reports.

The research team also studied two decarbonization reports commissioned by Clean Wisconsin,[19] Wisconsin's Roadmap to Net Zero by 2050 and the Economic impacts of decarbonization in Wisconsin published in 2022.[20,21]

These reports and resources were reviewed and digested by the research team to anchor understanding of the landscape before embarking on a thorough research process. By conducting a comprehensive, systematic review of the landscape in which Focus on Energy operates, the research team laid the groundwork for effective, implementable interventions that support broader project goals. Additional summaries of the specific resources reviewed in this phase can be found in Appendix A: Qualitative Landscape Details.

## Measure Characterization

The second prong of the Synthesize phase helped inform the opportunities for Focus on Energy programs to play a larger role in cost-effectively reducing energy use, carbon emissions, as well as support load shifting. The research team analyzed Wisconsin's energy use and emissions in 2025, as shown in Figure 5, to identify areas of opportunity for impact across the state. The analysis included detailed sector and end-use analysis of sources of energy and GHG emissions within the state, both at current levels and projected into the future assuming policy goals are achieved regarding carbon emissions reductions in the electricity sector.

[19] cleanwisconsin.org/our-work/wisconsins-roadmap-to-net-zero-by-2050/

[20] Evolved Energy Research, Clean Wisconsin, and Renew Wisconsin. *Wisconsin's Roadmap to Net Zero by 2050*, 2022. gridlab.org/netzerowi/

[21] Cambridge Econometrics. *Economic impacts of decarbonization in Wisconsin,* 2022 gridlab.org/wp-content/uploads/2022/10/The-economic-impact-of-decarbonizing-Wisconsin-Sept-2022-final.pdf

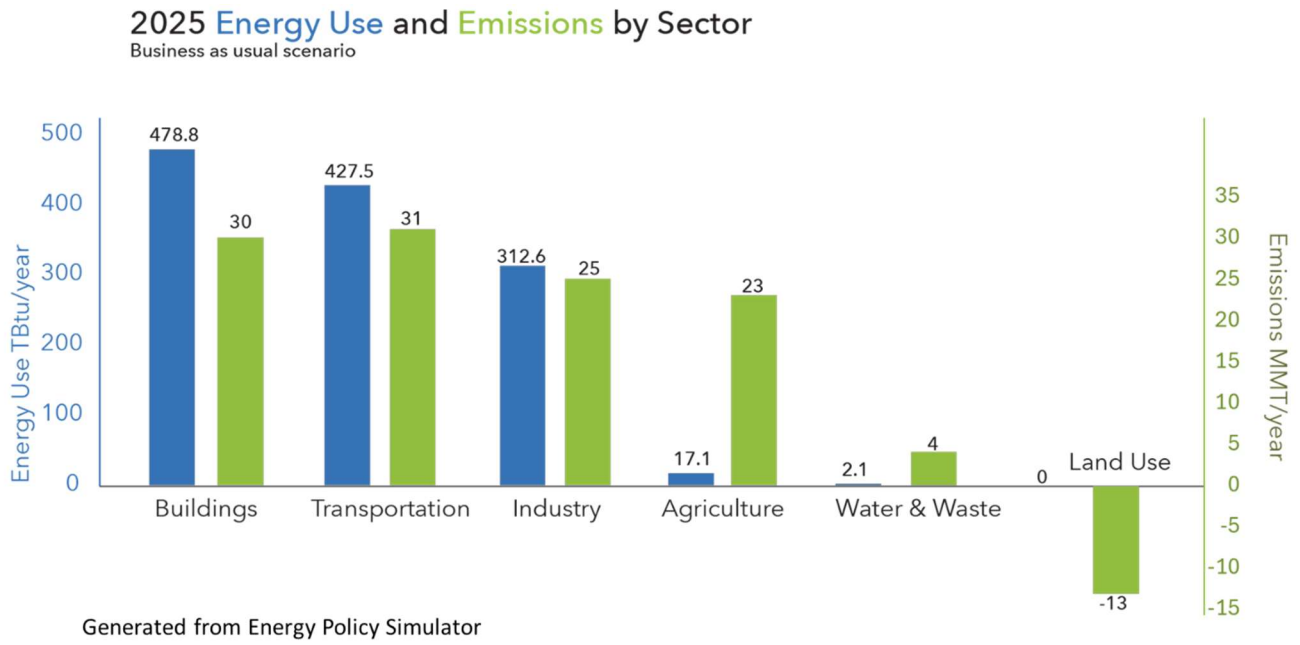



*Figure 5: 2025 Wisconsin Energy Use and Emissions*[22]

Working backwards from the sources of energy use and GHG emissions, the research team developed a database which catalogues and synthesizes information about efficient, non-emitting, and in many cases load shifting technologies and practices—known as measures—as well as barriers to their adoption. The full list and descriptions of measures can be found in Appendix B: Measure List. To characterize measures and prepare for intervention design, the research team performed the following activities:

- Analyzed measures for energy savings, emissions reductions, and load flexibility.
- Assigned parameters and attributes to support measure implementation into the Intervention Database (developed in the next phase).
- Solicited information from internal subject matter experts (SME) to support accurate characterization of measures.
- Identified barriers that informed which interventions are most likely to succeed.

The measure database is organized into five primary sections:

1. **Customer Segments and End Use**: This section specifies which utility customer segments or sectors a measure belongs to as well as the end-use application (i.e. Heating and Cooling, Envelope, etc.).

[22] Data sourced from the Energy Policy Simulator, energypolicy.solutions/simulator/wisconsin/en. Negative emissions from the Land Use sector reflect carbon sink through natural working lands.

2. **Technology Strategy**: Specifies whether a technology/measure has impacts through energy efficiency, demand flexibility, fuel switching or other factors.
3. **Impact Potential**: Rates the energy saving and GHG emissions reduction potential; details on calculation methodology in Appendix C: Detailed Description of Measure Database Methodologies.
4. **Non-Energy/Other Benefits**: Captures non-energy benefits (NEBs) not captured elsewhere in the database (directly or indirectly) and which could be reliably assessed. Ambient air quality, utility bill savings, employment benefits, and peak demand reduction are intentionally omitted as they are captured elsewhere.
5. **Key Barriers**: Assesses the barriers to adoption of a measure, ranging from technology to market to policy; details on barrier assessment methodology in Appendix C: Detailed Description of Measure Database Methodologies.

Across the measures, the most common barriers to adoption included end-user awareness, cost effectiveness, upfront cost, and infrastructure; these barriers are shown in Figure 6 with the number of measures having high, medium, or low ranking of those barriers depicted. Total Resource Cost (TRC) cost-effectiveness was only rated for measures that had that information available.

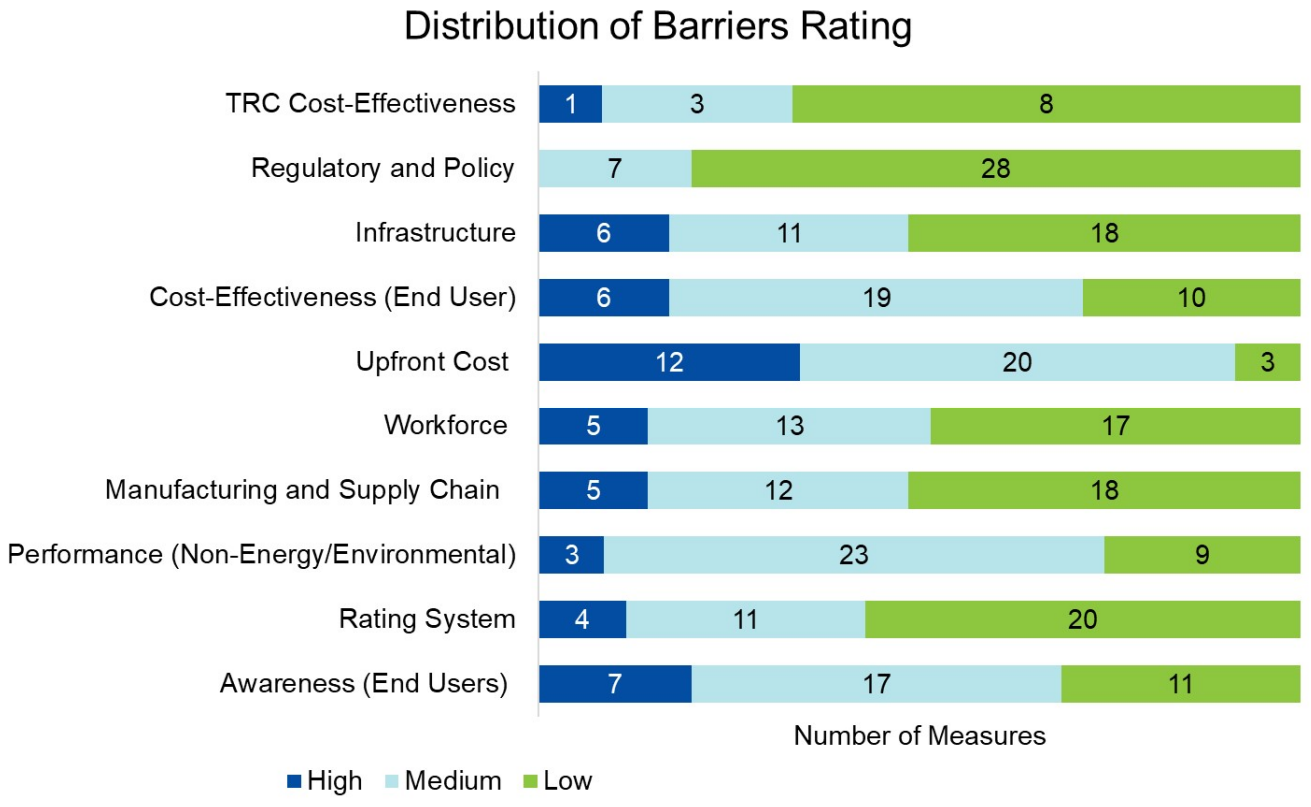



*Figure 6: Barrier Distribution of Measures*

In addition to measure characterization, the measure database included supplemental tabs detailing customer segments, sectors, background savings, and analysis. These elements provide the quantitative foundation for the next phase of the project, which focuses on identifying and prioritizing program interventions to deploy these measures to support a realistic and impactful plan.

## Empower: Develop Suite of Interventions

Once the initial Synthesis phase of this study was completed, the research team shifted to the Empower phase to identify tactics or interventions to overcome identified barriers and increase adoption of the identified measures. The research team worked closely with Focus on Energy and the PSC to develop a suite of potential interventions to achieve the impacts quantified through the Synthesis phase. The interventions were documented in a comprehensive database, ultimately culminating in the interventions listed in Table 3 and the priority interventions that were further developed into detailed implementation plans for Focus on Energy.

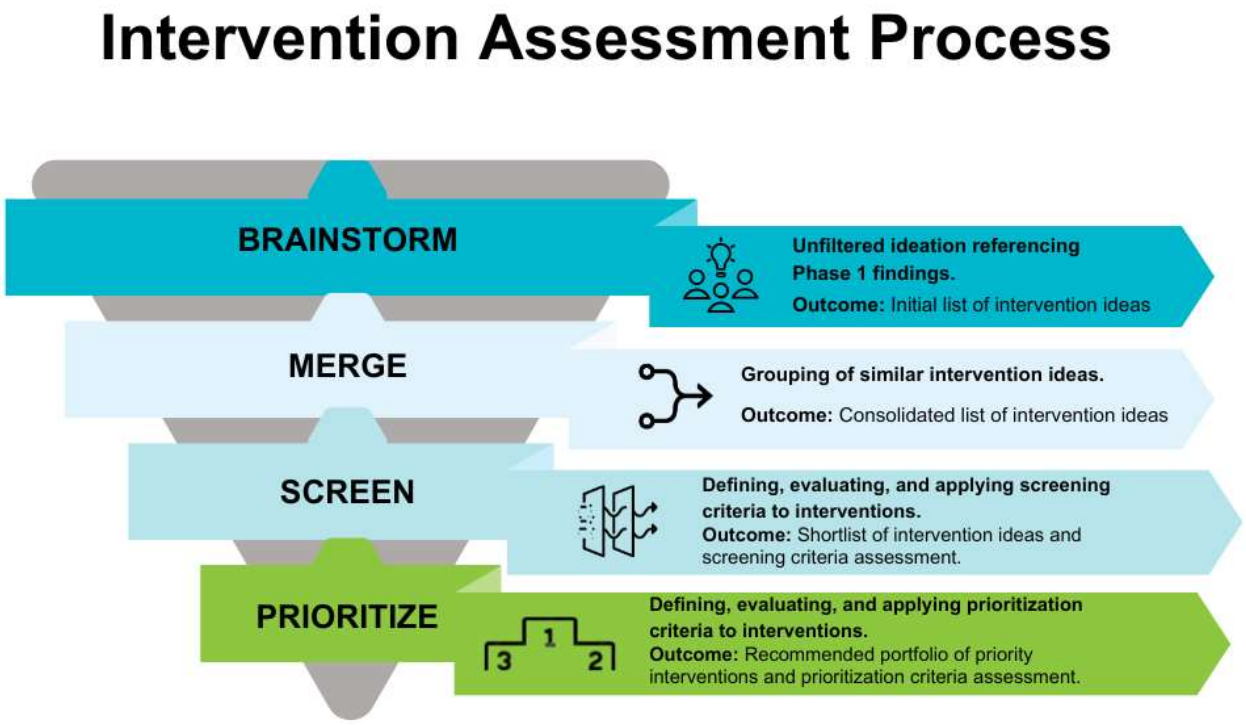



*Figure 7: Intervention Assessment Process*

The intervention database characterizes the research team's list of high-impact interventions and highlights innovative approaches that expand beyond Focus on Energy traditional energy efficiency programmatic scope. To develop the list of interventions, the research team followed an iterative process of brainstorming, merging, and screening potential options before

prioritization, as illustrated in Figure 7 and further detailed in Appendix D: Detailed Description and Classification Attributes of Interventions.

The initial list of interventions was informed by existing efforts conducted by Focus on Energy and other stakeholders during current and past Quadrennial Planning Processes to determine the most impactful actions for Wisconsin. The research team began by extracting interventions from a list generated through the MT Assessment and compiling them into a spreadsheet. The team then added to that list through consultation with internal SMEs and Focus on Energy staff to add new interventions.

Centralizing all ideas into a single spreadsheet allowed contributors to provide information, comments, questions, and concerns while ensuring inputs were tracked consistently. During the initial brainstorming period, the team did not concentrate on potential duplication, levels of granularity, or whether an idea fell within Focus on Energy direct authority. Instead, the emphasis was on generating a comprehensive baseline of potential interventions to refine subsequent iterations.

Once generated, the comprehensive list of interventions was further refined through the intervention assessment process, as depicted in Figure 7. The research team's initial categorization of intervention ideas focused on grouping proposals by implementation type, such as policy or program. Each intervention was then assessed using a granularity rating scale from 1 to 5, where 1 represented a very broad and general concept, and 5 represented a very specific and narrow intervention, as shown in Table 2.

*Table 2: Granularity Rating Scale*

| Category | Example brainstorm intervention |
|---|---|
| **1. Very broad** | Support demand response adoption |
| **2. Broad** | Expand transportation programs |
| **3. Intermediate** | Support advanced rate development and adoption |
| **4. Specific** | Deploy educational marketing campaigns about use of specific technologies |
| **5. Very specific** | Micro Heat Pump Pilot Deployment for Low Income Households |

In consultation with Focus on Energy, a granularity rating between 3 (Intermediate) and 4 (Specific) was identified as the target range for viable interventions, reflecting moderately specific options where a potential program could be developed, and a transition of Focus on

Energy's portfolio could be strategically sequenced. Subsequent screening and merging exercises determined which interventions could be consolidated and whether the merged interventions contained distinct information worth retaining for further review. The research team's iterative process refined and modified the interventions list, resulting in an initial set of recommended interventions to present to Focus on Energy. To narrow down the interventions list, the team implemented the following actions, further detailed in Appendix D: Detailed Description and Classification Attributes of Interventions.

- Removed or consolidated duplicative ideas that shared one or more keywords.
- Developed screening or "knockout" criteria for the initial assessment. Interventions failing at least one criterion were flagged for further review and potential exclusion. The knockout criteria were:
    - Granularity ratings of 1 or 5, indicating that an intervention was either too specific or too broad
    - Not an intervention (e.g., one-off concepts or technologies rather than actionable interventions for Focus on Energy)
    - Requirement for a new Wisconsin law or updates to existing legislation
    - Incomplete or unclear description, which were then refined and re-evaluated

This set of screening resulted in a set of 43 interventions, which the research team then characterized in the initial intervention database, described further in Appendix D: Detailed Description and Classification Attributes of Interventions. Each intervention was assigned a unique identifier to support tracking and organization of research. The database was organized into five primary sections as depicted in Figure 8, with eight distinct evaluation criteria which were assessed in the Analyze: Evaluating Options phase.

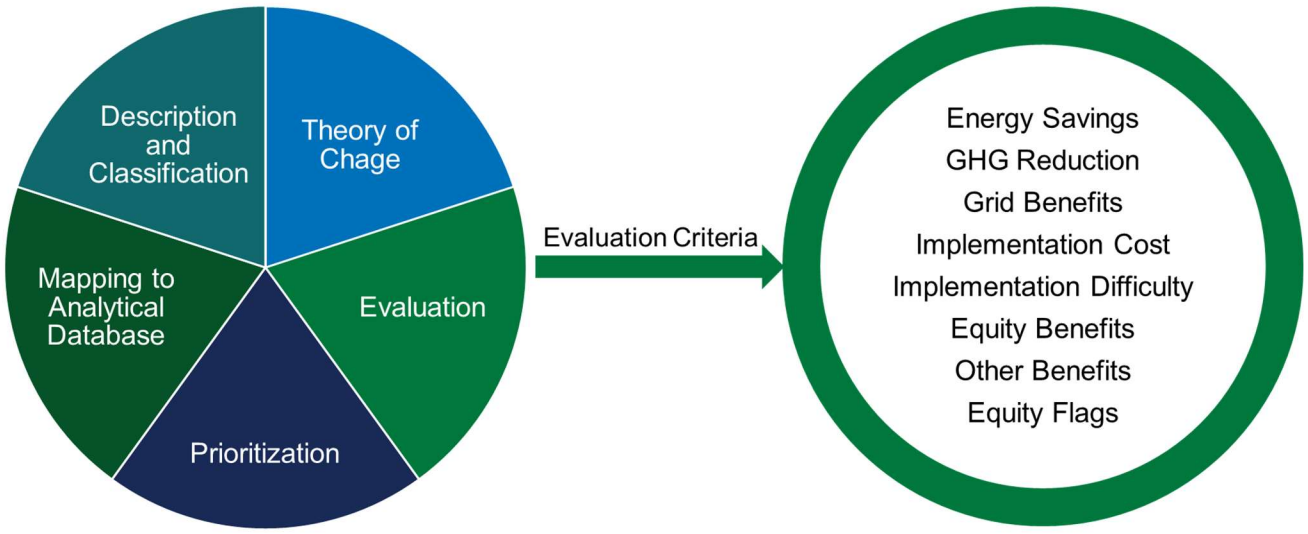



*Figure 8: Intervention Database Structure*

To strengthen the analysis, the research team consulted internal SMEs who provided detailed reviews of each intervention. SMEs were asked to assess intervention characteristics, including:

- Type, such as program, policy, approach, or research
- Time horizon of expected impacts: near-term or long-term
- Whether the intervention was direct (has the primary purpose of increasing technology adoption through the action of the intervention) or enabling (has the primary purpose of supporting the ability for subsequent actions to increase technology adoption of one or more interventions)
- The theory of change for how the intervention would achieve the desired outcomes
- Information on the scaling potential and strength of enablement
- Other benefits to Wisconsin
- Implementation cost and difficulty

In the subsequent Analyze phase of research, interventions were evaluated and ultimately prioritized for development into more robust implementation plans.

## Analyze: Evaluating Options

In order to support the evolution of the Focus on Energy program and portfolio of offerings, the research team analyzed the potential interventions collectively with Focus on Energy and PSC. The goal of the Analyze phase was not only to assess all interventions that were under consideration, but also to identify the priority interventions that the research team would develop into more detailed implementation plans for Focus on Energy. The implementation plans are research products and may not ultimately be pursued by Focus on Energy, however the detailed plans will support a deeper understanding of potential program evolutions under emerging priorities.

To start the analysis of interventions, the research team assembled a rubric (Figure 9) to assess each evaluation criterion and assigned default criteria weights. These weights were intentionally designed to be flexible, allowing Focus on Energy to adjust them in the future. The goal was to ensure that the weighting framework remained evergreen as program priorities evolve and could be updated as needed either during the Analyze phase or after the completion of this research.

| Criterion Name | Criterion Weight | % Criterion Weight | Criterion Levels | Most Favorable | Intermediate | Least Favorable |
|---|---|---|---|---|---|---|
| Energy Savings | 3 | 18% | Level Name | High | Medium | Low |
| | | | Level Score | 1 | 0.5 | 0 |
| GHG Reduction | 2 | 12% | Level Name | High | Medium | Low |
| | | | Level Score | 1 | 0.5 | 0 |
| Grid Benefits | 3 | 18% | Level Name | High | Medium | Low |
| | | | Level Score | 1 | 0.5 | 0 |
| Equity Benefits | 2 | 12% | Level Name | High | Medium | Low |
| | | | Level Score | 1 | 0.5 | 0 |
| Equity Flags | 2 | 12% | Level Name | Low | Medium | High |
| | | | Level Score | 1 | 0.5 | 0 |
| Implementation Cost | 2 | 12% | Level Name | Low | Medium | High |
| | | | Level Score | 1 | 0.5 | 0 |
| Implementation Difficulty | 2 | 12% | Level Name | Low | Medium | High |
| | | | Level Score | 1 | 0.5 | 0 |
| | | | | Most Favorable | Least Favorable | |
| Other Benefits | 1 | 6% | Level Name | Yes | No | |
| | | | Level Score | 1 | 0 | |

*Figure 9: Evaluation Criteria Rubric*

The research team analyzed each of the eight criteria to evaluate and prioritize interventions. Additional details on the process for intervention analysis are in Appendix D: Detailed Description and Classification Attributes of Interventions.

To rate the **energy savings** and **GHG reduction** potential of each intervention, the research team first estimated its *programmatic* potential (i.e., the portion of the relevant technical energy saving and GHG reduction potential that the intervention might plausibly achieve). Based on this estimate, each intervention was assigned a rating of low, medium, or high. For some interventions, the research team could not quantify the programmatic energy-savings potential and/or programmatic GHG reduction potential due to limited data. In other cases, interventions were deemed to have a diffuse effect on the target technical potential. In these situations, ratings were determined by SMEs' professional judgment.

**Grid benefits** represented an intervention's potential contributions to the grid, including but not limited to load flexibility, peak demand reduction, and targeted reductions in grid infrastructure. Each intervention received a grid benefits rating of low, medium, or high based on SMEs' expertise.

Following a similar process, interventions' **equity benefits** and **equity flags** were rated as low, medium, or high, reflecting both positive impacts and potential concerns for Communities of Focus and low- to moderate-income (LMI) households.

Unlike the other evaluation criteria, **Other Benefits** were rated as "Yes" or "No." Interventions providing benefits beyond energy savings, GHG reduction, grid benefits, and equity benefits were rated "Yes;" those without were rated "No." Examples of Other Benefits include improvements in indoor and ambient air quality, comfort, job creation, and resilience.

For **implementation cost**, the research team used the average annual budget required for each intervention and assigned ratings of low, medium, or high based on predetermined cost ranges.

Finally, each intervention's **implementation difficulty** was rated as low, medium, or high based on mechanical or political challenges expected to be faced when implementing the intervention.

Table 3 presents all 43 interventions and their ratings, with those highlighted in green under the "Score/Plan" column indicating the interventions that ultimately advanced to implementation plans. As can be seen in Table 3, a high analytical score was significant but not the only determining factor for an intervention to be selected for an implementation plan.

*Table 3: Table of intervention ratings, with interventions advancing to the next phase highlighted in green under the "Score/Plan" column.*

| ID | Name | Energy Savings | GHG Reduction | Grid Benefits | Equity Benefits | Other Benefits | Equity Flags | Cost | Difficulty | Score/ Plan |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | EV & EV Infrastructure Exploration | Med | Med | Med | Med | Yes | Low | Low | High | 77 |
| 2 | Midstream Windows Program | Med | Med | Med | Med | Yes | Low | Med | Low | 85 |
| 3 | Advanced Rates Research | High | High | High | High | Yes | Med | Med | High | 100 |
| 4 | Residential AC to Heat Pump Conversions | Med | Med | Med | Med | Yes | Low | Med | Low | 85 |
| 7 | Midstream Agriculture Programs | Low | Low | Low | Med | No | Low | Med | Low | 46 |
| 8 | Bundled Measures with Residential Envelope Program | Med | Med | Low | High | Yes | Low | Med | Med | 73 |
| 9 | C&I Building Stock Study | Low | Low | Low | Low | No | Low | Med | Med | 31 |
| 10 | Residential Building Stock Study | Low | Low | Low | Med | No | Low | Med | Med | 38 |
| 11 | Data Center Program | Med | Med | High | Low | No | Low | Med | Med | 73 |
| 12 | Pilot-to-Program Pipeline | Low | Low | Low | Low | No | Low | Med | Med | 31 |
| 13 | Dairy Process Emissions Exploration | Low | Med | Low | Med | No | Low | Low | High | 46 |
| 14 | Cross-Cutting Behavioral Program | Low | Low | Med | Low | No | Low | Low | Med | 50 |
| 15 | ESRPP Program | Low | Low | Low | Low | No | Low | Med | Med | 31 |
| 16 | Community Solar Program | Med | Med | Med | Med | Yes | Low | High | Med | 69 |
| 17 | Focus on Energy Goal Expansion | Low | Med | Med | High | Yes | Med | Low | High | 65 |
| 18 | Embodied Carbon Exploration | Low | Med | Low | Low | No | Low | Low | High | 38 |
| 19 | Non-Residential Demand Flexibility Program | Low | Med | High | Low | No | Low | Med | Med | 62 |
| 20 | Workforce Training Program | Med | Med | Low | Med | Yes | Low | Med | Med | 65 |
| 21 | Financing Program | High | High | Med | Med | No | Low | Med | High | 81 |
| 22 | Targeted Equity Improvements | Low | Low | Low | High | No | Low | Med | Med | 46 |
| 23 | Public Data Reporting | Low | Low | Low | Low | No | Low | Med | Med | 31 |
| 24 | Industrial CCS Research | Low | Low | Low | Low | No | Med | Low | Low | 38 |

| ID | Name | Energy Savings | GHG Reduction | Grid Benefits | Equity Benefits | Other Benefits | Equity Flags | Cost | Difficulty | Score/ Plan |
|---|---|---|---|---|---|---|---|---|---|---|
| 25 | **Industrial Efficiency Midstream Program** | High | Med | Med | Low | No | Low | High | Med | 65 |
| 26 | **Locational High Impact Bundles Program** | Med | Med | Med | High | Yes | Med | Med | Med | 77 |
| 27 | **Methane Digester Program** | Low | Med | Low | Med | No | Med | High | High | 23 |
| 28 | **Micro Heat Pumps Equity Program** | Low | Med | Low | High | Yes | Med | Med | Med | 54 |
| 29 | **DR Midstream Program** | Low | Med | High | Low | No | Low | Med | Low | 69 |
| 30 | **Code Compliance Program** | High | High | Med | Med | Yes | Low | Med | Med | 96 |
| 31 | **Meter Data Insights Program** | Med | Med | Low | Low | No | Low | High | High | 35 |
| 32 | **Behavioral Peak Reduction Program** | Low | Low | Med | Low | No | Low | Med | Low | 50 |
| 33 | **Replacement Tires Program** | Low | Med | Low | Med | Yes | Low | Med | Med | 54 |
| 35 | **Continuous Commissioning Program** | Med | Low | Low | Low | No | Low | Low | Low | 58 |
| 36 | **SEM Program** | Med | Med | Med | Low | Yes | Low | Low | Low | 85 |
| 37 | **Residential Advisor Service** | Med | Med | Low | Low | Yes | Low | Low | Med | 65 |
| 38 | **Large-Scale Heat Pump MT Program** | High | High | Med | Med | Yes | Med | High | Med | 81 |
| 39 | **Smart Building Automation Program** | Med | Med | Med | Low | Yes | Low | Med | Low | 77 |
| 40 | **Thermal Energy Network Pilot** | Low | Med | Low | Low | Yes | Low | Med | Med | 46 |
| 41 | **Beneficial Electrification Criteria Updates** | Med | Med | Med | Low | Yes | Med | Low | High | 62 |
| 42 | **Cost Effectiveness Framework Updates** | Med | High | Med | Low | Yes | Med | Low | High | 69 |
| 43 | **Water Efficiency Program** | Med | Med | Low | Med | Yes | Low | Low | Low | 81 |
| 44 | **Zonal Focused Program** | Med | Med | High | Med | Yes | Med | High | High | 65 |
| 45 | **Industrial Emerging Tech R&D Program** | Med | Med | High | Low | Yes | Low | Med | Med | 81 |
| 46 | **Net Zero New Construction Program** | Med | Med | Med | Med | Yes | Med | High | Med | 62 |

To convert each intervention's rating for the eight evaluation criteria into scores, the research team deployed the rubric depicted in Figure 9. The ratings were first converted to unweighted scores; next, weights were assigned to each criterion (ranging from 1 to 3). To finalize the weighting approach, the team examined five scenarios to see how analytical scores shifted across interventions:

- Scenario A: Other Benefits rated at 1, all other benefits-related criteria weighted at 2; difficulty-related criteria weighted at 3.
- Scenario B: All criteria weighted at 2.
- Scenario C: All criteria weighted at 2, except Energy Savings (3) and Other Benefits (1).
- Scenario D: All criteria weighted at 2, except GHG Reduction (3) and Other Benefits (1).
- Scenario E: All criteria weighted at 2, except for Energy Savings (3), Grid Benefits (3), and Other Benefits (1).

The research team presented the strategic rationale behind the weighting to Focus on Energy, along with the assessment of the impacts of the five above weighting scenarios on analytical scores and, consequently, the top interventions. After discussion, Focus on Energy selected Scenario E as the default weighting approach; Scenario E was chosen because its weights reflect the program's core emphasis on Energy Savings, the emerging priority of Grid Benefits, and the limited relevance of Other Benefits in this research project. Therefore, the research team applied Scenario E weights as default to determine analytical scores. Once interventions were fully characterized and evaluation criteria were rated, the interventions were imported into a Tableau dashboard to facilitate engagement and refinement to determine priorities. The criteria rating in Tableau defaulted to the ratings from Scenario E, however the Tableau dashboard allowed for real-time re-weighting of criteria to explore how it changed the ranking as shown in Figure 10. The dashboard included sorting and filtering options across intervention attributes to facilitate the selection of criteria weights and display the resulting top interventions.

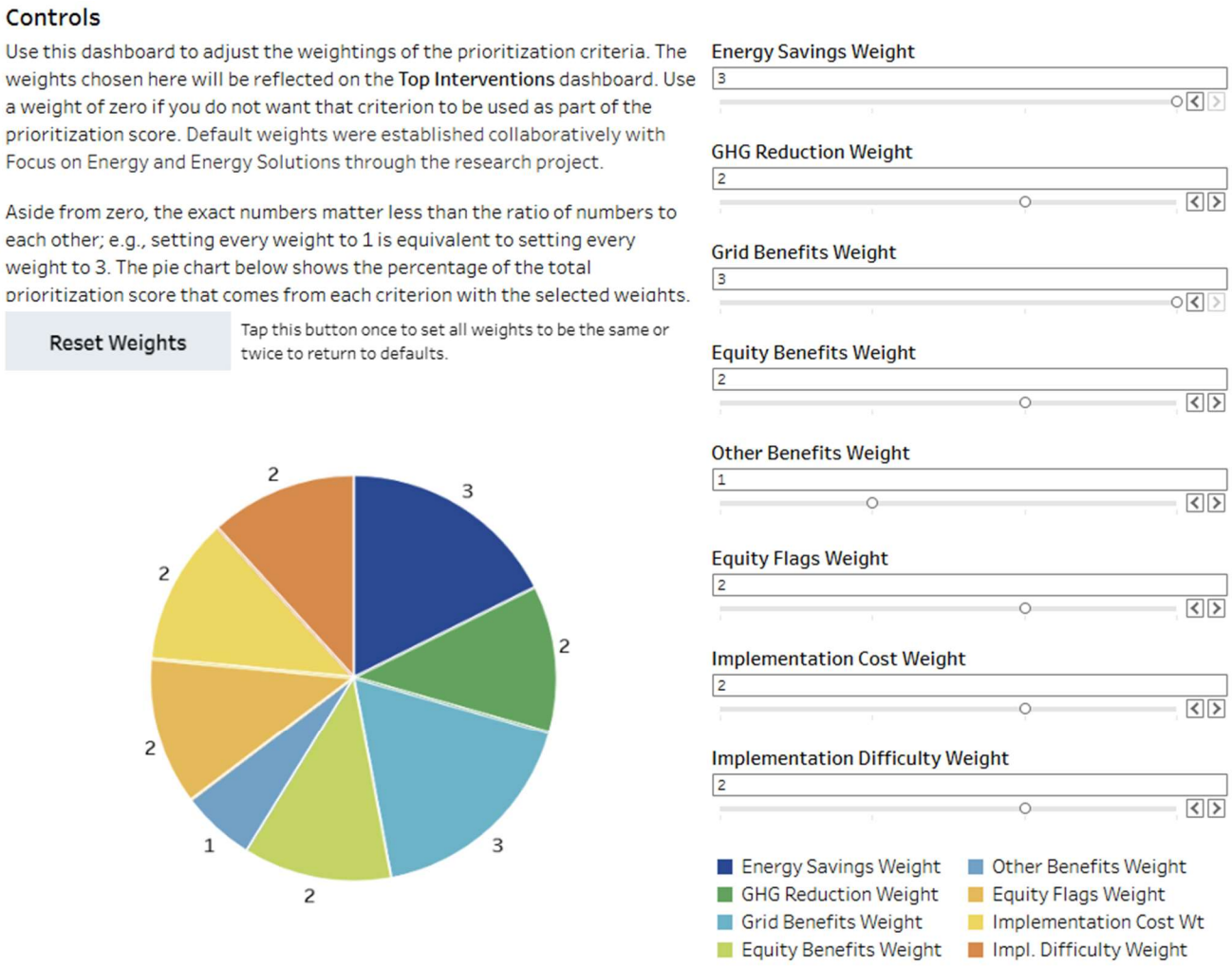



*Figure 10: Tableau Dashboard Criteria Weighting Controls*

Using evaluation ratings, analytical scores, and strategic judgment, the research team developed preliminary recommendations for which interventions should advance to detailed implementation plan development, with the goal of arriving at approximately twelve priority interventions that would be further developed. To narrow the list, professional insights were solicited to provide context that analytical scores alone could not capture, ensuring alignment with the Focus on Energy broader portfolio. Feedback was also collected from Focus on Energy and the PSC on all 43 interventions. The research team utilized an iterative process to sort the interventions into groupings of those more or less likely to proceed to full implementation plans.

The research team held a two-session workshop with Focus on Energy and PSC representatives to review the intervention groups, utilizing the Tableau dashboard with real-time sorting and filtering to facilitate discussion, as shown in Figure 11.


*Figure 11: Tableau Dashboard Intervention Rating View*

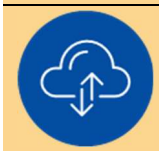
Participants were invited to share their perspectives on both the grouping and the interventions overall. For example, for the interventions grouped by the research team as likely to proceed to full implementation plans, the research team asked PSC and Focus on Energy staff whether interventions that may have been rated highly through the analysis should nevertheless be considered lower priority for implementation plan development. This was the case for several interventions that were either already underway by Focus on Energy or required a shift in program structure that was not yet in place in order to achieve impact and therefore a detailed tactical implementation plan would be premature. For the interventions rated unlikely to proceed, participants were asked whether any interventions should still remain under

consideration or if the group could collectively agree to not pursue those interventions further through this research.

The research team emphasized that developing an implementation plan does not commit Focus on Energy to launching a program. Instead, implementation plans are intended to provide structured support as the program evolves. A central theme of the workshop was whether an implementation plan would be useful at this time for each intervention.

After incorporating participant feedback, the research team selected 14 interventions as top priorities for the implementation development, as shown in Table 4.

*Table 4: Top Interventions*

| | Intervention Name | Time Horizon | Direct or Enabling Impact |
|---|---|---|---|
|  | Launch a new program focused on residential AC to heat pump conversions | Near term | Direct |
|  | Midstream agriculture programs focused on reducing barriers to adoption and scaled deployment of agriculture energy efficiency measures | Near term | Direct |
|  | Create a data center program to mitigate expected growing intensive energy impacts | Near term | Direct |
|  | Implement a cross-cutting behavioral program that targets the "sensitive intervention points" in program offerings | Long term | Enabling |
|  | Implement a cross-cutting program focused on non-residential demand flexibility | Near term | Direct |
|  | Expand on existing research to develop a program focused on increasing workforce education and training for high-impact technologies | Near term | Direct |
|  | Implement an industrial efficiency midstream program | Near term | Direct |

| | Intervention Name | Time Horizon | Direct or Enabling Impact |
|---|---|---|---|
|  | Implement a midstream program that focuses on demand response technologies; note that in discussion, this intervention was modified to focus on residential opportunities. | Near term | Direct |
|  | Develop a code compliance program while building traction for additional codes and standards program opportunities, including building performance standards | Long term | Enabling |
|  | Ramp up strategic energy management (SEM) program activities focused on strategic opportunities | Near term | Direct |
|  | Develop a residential advisor service | Near term | Direct |
|  | Update cost-effectiveness testing requirements to support broader policy objectives | Long term | Enabling |
|  | Develop a targeted zonal-focused program | Near term | Direct |
|  | Implement net-zero new construction program | Near term | Direct |

## Plan: Development of Implementation Plans

**In several cases, the implementation plans adapted successful program models from other jurisdictions that subject matter experts had direct experience with and customized them for Focus on Energy.**

For the final phase of research, the research team launched fourteen parallel research efforts to develop tactical implementation plans for each of the priority interventions. The research team followed the structure of Focus on Energy program implementation plans as a template to ensure all necessary program elements and design considerations that could be recommended at this time were included. This research resulted in the development of 14 distinct implementation plans prepared for Focus on Energy. These implementation plans were developed with a combination of secondary research and SME support. In several cases,

the implementation plans adapted successful program models from other jurisdictions that SMEs had direct experience with and customized them for Focus on Energy. The implementation plans worked within the current Focus on Energy program structure while also identifying opportunities for future enhancements or program designs that could be pursued under a different set of goals in a future Quad Plan. The programmatic and policy landscape research anchored these recommendations while the quantitative analysis supported the interventions as being high impact.

Each implementation plan contained a summary of intervention as well as information regarding eligible customers, incentive structures, program design and delivery, trade ally management, quality and risk management, and performance metrics in detail as applicable. Each intervention plan received multiple rounds of revision and review from Focus on Energy and the PSC to ensure feasibility.

# Conclusions and Recommendations

A primary output from this research was the development of 14 implementation plans prepared for Focus on Energy. Each intervention selected for plan development represents the highest near-term priority actions for Focus on Energy and the PSC, with each intervention plan including detailed tactical recommendations for implementation. In addition to these plans, the research team made a number of observations and recommendations through the research process summarized in this section.

## Interventions Not Pursued for Implementation Plans

Not every viable intervention was ultimately selected for an implementation plan. The original goal was to arrive at approximately twelve interventions, though as the process progressed; 14 were ultimately selected out of the full list of 43. Some interventions, including some with high analytical scores, were ultimately deprioritized for an implementation plan because, at the time this report was developed, Focus on Energy and the PSC determined that such a plan would not be useful within the program's purview for the foreseeable future.

Table 5 summarizes the 28 interventions not prioritized for additional characterization through an implementation plan and provides rationale for why they were not selected. Appendix E: Interventions Not Prioritized for Implementation Plans provides additional detail and background on the interventions not prioritized. The justification for these decisions varied; some interventions were ultimately bundled with others in the final implementation plan development. Some of the interventions were ranked highly, but were ultimately deprioritized either because:

- There was overlap from existing Focus on Energy activities such that a detailed implementation plan was not necessary for the intervention to proceed, or

- The implementation plan was determined to fall too far outside of the current Focus on Energy framework for an implementation plan at this time to be useful.

While those interventions may be prime candidates for pilot efforts, as discussed in Pilot and Preparatory Opportunities, a full implementation plan was deprioritized for this research project. There were also several lower-ranking interventions that were ultimately selected for implementation plans based on their ability to be deployed in the near term and the benefit that a detailed implementation plan could provide. For the intervention listed in Table 5, many may warrant future investigation.

*Table 5: Interventions Deprioritized for Implementation Plans and Reasoning*

| **Explore opportunities to implement EV and/or EV infrastructure programs (1)** | **Implement a midstream windows program (2)** |
|---|---|
| For this research project, transportation initiatives were deprioritized because the Focus on Energy program has not historically included transportation. However, future opportunities may arise to revisit this topic if it aligns with Quad V or subsequent quadrennial directives. | While the program's potential impact was high, Focus on Energy is already exploring offering windows and determined that a standalone intervention for this measure was not worth pursuing for this research project. |
| **Work with stakeholders such as PSC and the WI utilities to support advanced rates development (3)** | **Develop a program bundling residential envelope with other cost-effective EE measures (8)** |
| While an important issue for Wisconsin, this intervention was determined to be outside of Focus on Energy purview. | The concept driving this intervention was incorporated into several implementation plans. |
| **Conduct a commercial and industrial building stock characterization study to support future programs and data efforts (9)** | **Conduct a residential building stock characterization study to support future programs and data efforts (10)** |
| While there was general support for both the data collection effort and ensuring its availability, this intervention was not selected for further development because of its high cost and low immediate impact. | While there was general support for both the data collection effort and ensuring its availability, this intervention was not selected for further development due to the high cost and low immediate impact. |
| **Create a pilot-to-program pipeline that expands the definitions of "success" for pilot projects and increases priority of innovative projects (12)** | **Explore opportunities for Focus on Energy to run programs that mitigate dairy process emissions (13)** |
| Focus on Energy already operates under a "test and learn" model and a dedicated pilot manager to oversee and refine pilot activities, so this intervention was deemed duplicative | While the GHG impact potential for this intervention was rated Medium, workshop discussions determined that it falls outside Focus on Energy purview. |
| **Join the Energy Star Retail Products Platform (ESRPP) by launching a WI program (15)** | **Implement a community solar program (16)** |
| As Focus on Energy has previously participated in ESRPP, workshop discussions concluded that a dedicated implementation plan would be necessary. | Due to policy limitations and the utility-by-utility approach needed to implement community solar programs, an intervention plan was not pursued. Workshop discussions concluded that creating a |

| | |
|---|---|
| | community solar program would be outside of Focus on Energy purview. |
| **Work with key stakeholders to expand the goals of the Focus on Energy program (including updating or developing new metrics and Key Results Areas) (17)** | **Explore opportunities for Focus on Energy to run embodied carbon programs to reduce carbon in building materials (18)** |
| While the general consensus held that the intervention was important, challenges with implementation led to the decision not to pursue a dedicated implementation plan. | After further consideration, this intervention was deemed outside of Focus on Energy current purview and presented various implementation challenges. |
| **Develop a financing program focused on technologies with high upfront costs but operational savings (21)** | **Implement targeted improvements across existing and new programs to increase access for LMI and Communities of Focus (22)** |
| Although the benefits of a financing program were recognized, an implementation plan was not pursued as it was determined that Focus on Energy would be only one of many entities required to create such a program. | After discussions with PSC and Focus on Energy, it was determined that a baseline analysis had already been completed. As a result, aspects of this intervention were incorporated across existing implementation plans. |
| **Increase public data reporting of program activities and impacts, initially focusing on residential contractor-driven technologies (23)** | **Explore opportunities for industrial carbon capture and sequestration (CCS), such as through a market study (24)** |
| Although the intervention was generally supported, the costs and challenges of successful implementation were flagged. As a result, a dedicated implementation plan was not developed. | However, the prioritization analysis indicated that this intervention would have a limited impact; therefore, it was not advanced into an implementation plan. |
| **Develop a program that takes a locational approach to offering impactful residential technology bundles, with a focus on increasing equitable access (i.e., Communities of Focus) (26)** | **Implement a methane digester renewable generation program (27)** |
| Implementation challenges for this intervention as a stand-alone program were identified, and as a result, no dedicated implementation plan was developed. The concept was included within several other implementation plans. | The prioritization analysis showed that this intervention would have a limited impact; therefore, it was not advanced to an implementation plan. |
| **Implement a program focused on peak reduction through behavioral means (32)** | **Develop a program to extract insights from meter data to optimize energy savings measure offerings and associated benefits (31)** |
| This intervention idea was merged into the cross-cutting behavioral intervention. | Workshop discussions raised challenges with implementing this intervention, and it was not advanced into an implementation plan. |
| **Implement a program focused on deploying micro heat pumps (i.e., room heat pumps or packaged terminal heat pumps) in equity communities (28)** | **Implement a midstream program focused on promoting adoption of efficient replacement tires (33)** |

| | |
|---|---|
| Room heat pumps are included in the scope of the dedicated Market Transformation report currently underway in Wisconsin, so this intervention was incorporated into the AC-to-heat pump implementation plan. | Although this intervention offers significant GHG-reduction potential through reduced gasoline use, its electricity benefits are limited. Furthermore, because this the transportation sector is historically outside the scope of Focus on Energy programming, an implementation plan was not pursued. However, there may be future opportunities to revisit this topic if it aligns with Quad V or subsequent quadrennial directives. |
| **Ramp up programming in continuous commissioning services (35)** | **Develop a market transformation program focused on large scale heat pump deployment (using TECH Clean CA as a model) (38)** |
| Although significant energy savings were identified, a stand-alone implementation plan was ultimately determined to not be a priority as it was similar to existing programs. | Despite its potential, this intervention was identified as too large an undertaking at this time; therefore, the implementation plan was deprioritized. |
| **Boost smart building automation program offerings (39)** | **Launch a thermal energy network pilot program (40)** |
| Ultimately, elements of this intervention were incorporated into the demand response-focused implementation plans. | Given the Focus on Energy program role as a non-utility program administrator and previous study of the opportunity in Wisconsin, a TENs pilot was determined to be out of scope for Focus on Energy. |
| **Update beneficial electrification evaluation and program criteria (41)** | **Implement a program focused on water saving measures (43)** |
| Elements of this intervention were incorporated into the cost-effectiveness implementation plan. | Through further discussion, it was determined that this strategy had been trialed in Wisconsin; therefore, additional implementation planning was deemed unnecessary. |

## Intervention Timing and Sequencing

While the team initially expected that potential benefits, costs, and implementation difficulty would be key considerations for prioritizing interventions, as the project progressed, it became evident that timeliness of an intervention plan was also a critical factor in its prioritization. The year 2025 has been marked by significant political and economic change, as well as ongoing advances in research, especially within Wisconsin with both the MT Assessment and Quad V Plan being developed in parallel with this research effort. Consequently, the priority interventions were selected not only by the formal evaluation criteria but also by their time sensitivity, ensuring that interventions most in need of tactical implementation planning were advanced. For example:

**It became evident that timeliness of an intervention plan was also a critical factor in its prioritization.**

Data centers: Assessing programmatic opportunities for data center load management programs is especially timely because there are multiple hyperscale data centers that have been proposed for development in Wisconsin

Demand flexibility: Expected electric load growth and electric affordability challenges make demand flexibility programs especially valuable for Wisconsin, as demand flexibility can reduce the need for new electric infrastructure and the associated costs for ratepayers.

Code compliance: Assessing opportunities for a code compliance program is especially timely because of the new commercial energy code taking effect amid uncertainty regarding federal funding for codes work.

AC-to-heat pump: Assessing programmatic opportunities to scale heat pumps for customers who are replacing air conditioners is a promising near-term strategy that may pave the way for greater heat pump adoption in the future for customers that are switching from on-site combustion to electricity.

Within the prioritized interventions, the research team analyzed both direct and enabling interventions. The direct interventions included in the implementation plans are high-impact and not currently blocked by preceding activities. In contrast, some enabling interventions require additional actions to fully realize their benefits, for example:

Code compliance partially enabling more codes and standards activities: A code compliance program can deliver benefits independently and falls within Focus on Energy current authority. However, it is only one of many steps needed to unlock deeper savings potential associated with program support for codes and standards activities. To achieve this broader impact, a set of additional Commission activities would be required to enable Focus on Energy to engage in work adjacent to policy advocacy.

Cost-effectiveness frameworks partially enabling new emissions-focused programs: Cost-effectiveness framework updates can unlock more savings in existing programs without relying on other enablers. However, if Focus on Energy expands into new emissions-focused programs—such as transportation or embodied carbon—changes to the cost-effectiveness framework would be necessary but not sufficient to successfully implement those new programs; Commission action or clarification would likely be needed to confirm these measures fall within Focus on Energy purview. As discussed in the cost-effectiveness framework implementation plan, updating cost-effectiveness frameworks is very technically complex and requires stakeholder engagement, so it is important for Wisconsin to continue investigating framework updates that can better align program activities with state priorities.

The relationships among the priority interventions are illustrated in Figure 12, with enabling interventions requiring additional steps to achieve their outcome. All implementation plans include near-term activities that Focus on Energy can pursue; however full-scale deployment of a program may be a medium- or longer-term activity.

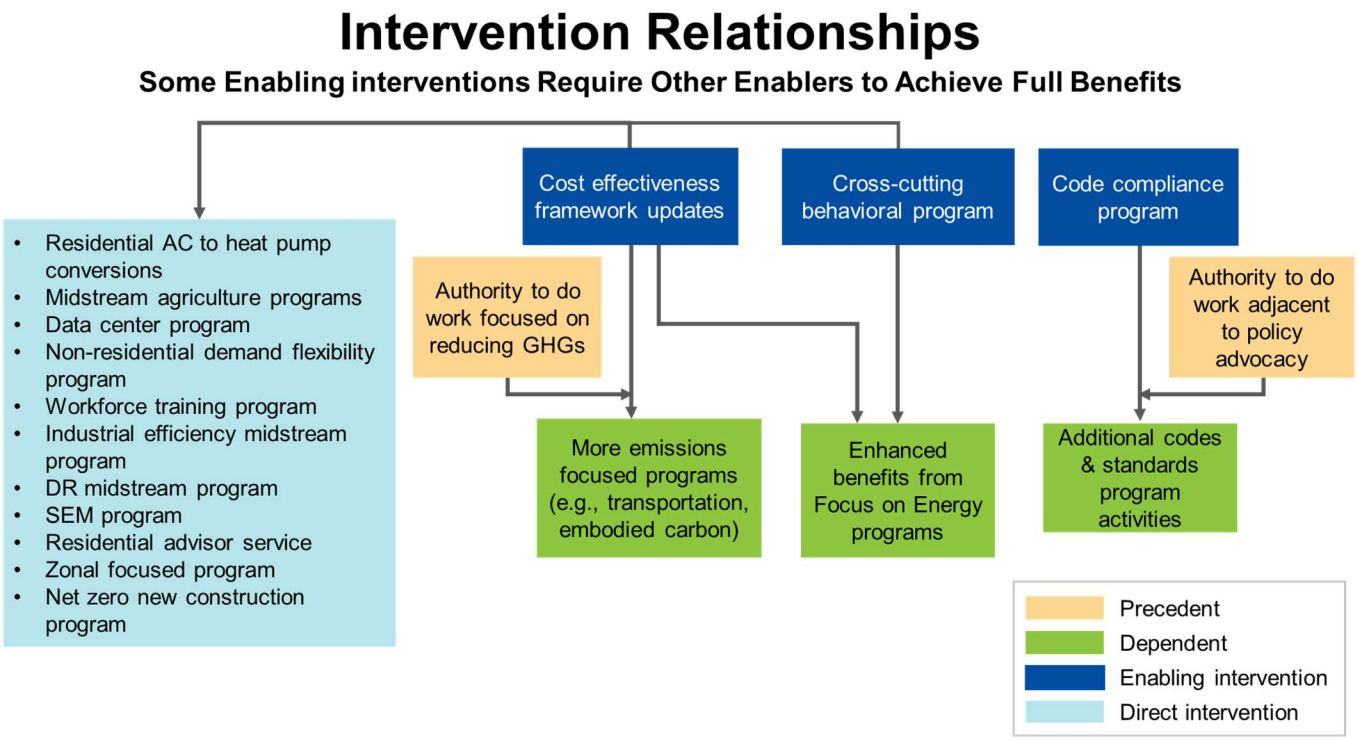



*Figure 12: Priority Intervention Relationships Map*

To better understand the sequencing between interventions, the research team categorized interventions into three distinct categories of near-term, mid-term, and long-term as shown in Figure 13, as well as those that may be good candidates for pilots explored in Pilot and Preparatory Opportunities. Bolded interventions had full implementation plans developed for Focus on Energy. By assigning each intervention to an appropriate time bin, this exercise helps distinguish which intervention can deliver immediate benefits, which require additional development or coordination before they can take effect, and which represent longer-range opportunities. It should be noted that not all 43 interventions on the list were included in this time categorization.

Seven interventions were identified to be candidates for near-term implementation as they had medium to high energy savings and grid benefits, medium to low implementation cost and difficulty, and either have an implementation plan or have been designated as ready to implement through discussions with Focus on Energy.

Eight interventions were identified to be suitable for mid-term actions, all of which either had full implementation plans or were included within other implementation plans. These

interventions have medium to high grid benefits, medium to high GHG reduction potential, and low to medium implementation cost and implementation difficulty which contributed to their being selected as mid-term interventions.

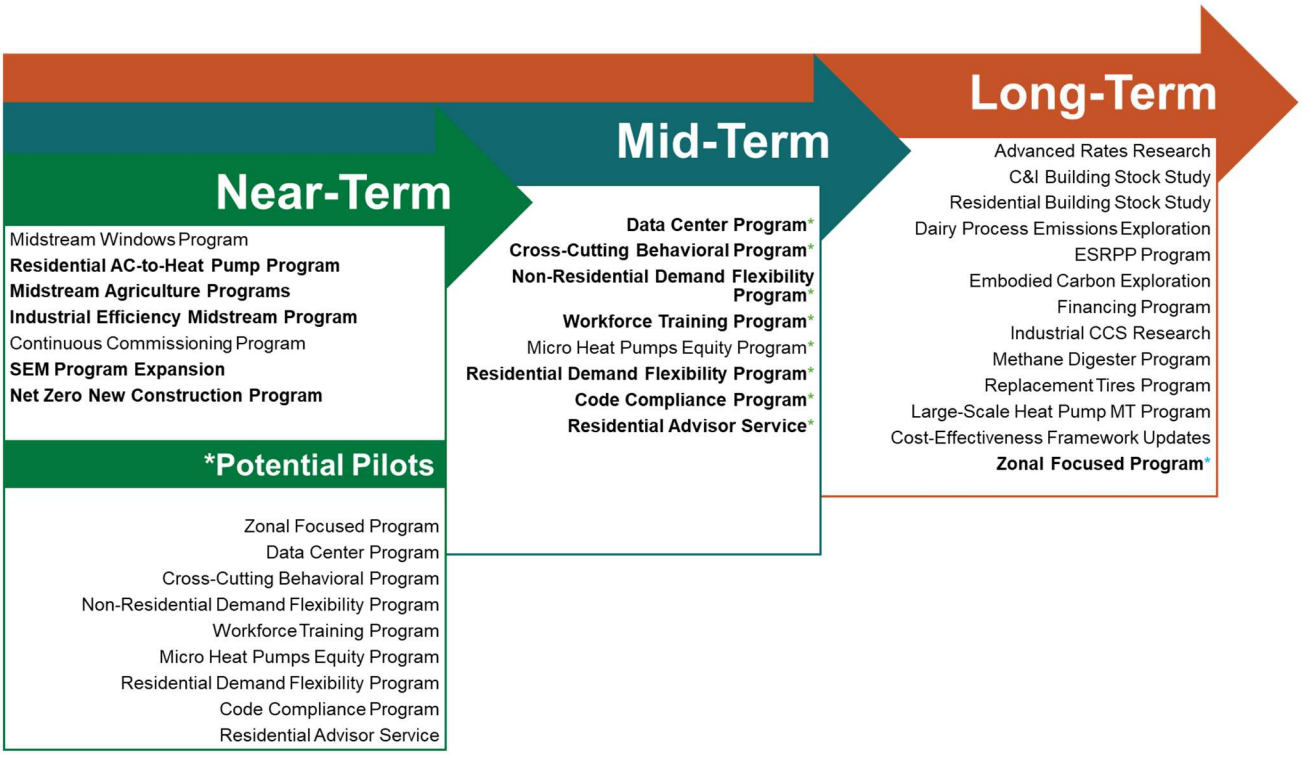



*Figure 13: Intervention Time Horizon and Potential Pilots*

Finally, the research team categorized thirteen interventions to be suitable for long-term actions: medium to high GHG reduction potential and low rating in most benefit criteria such as energy savings, grid benefits, equity benefits, etc. were the most influential factors in placing these interventions in long-term category.

## Pilot and Preparatory Opportunities

The individual implementation plans speak not only to how the intervention could look when fully implemented but also address next steps and preparatory actions, such as coordination, research, planning, or piloting as appropriate. Across the implementation plans, there are opportunities for Focus on Energy to take a “stage gate” approach: taking initial steps and then determining whether and how to proceed. The most common types of preparatory actions identified in the implementation plans are:

- Coordination with existing, related programs
- Engagement with external entities, such as market actors, the PSC, utilities, and EM&V experts

- A targeted study, including in some cases measure development
- Launching a pilot

In addition to identifying time bins for various intervention in Figure 13, the research team identified interventions that are strong candidates for pilot programs before full-scale implementation. These were selected based on the program structure, such as whether it would naturally be appropriate to deploy in a limited manner initially before launching full scale, and/or whether there are implementation considerations that may benefit from being tested in a smaller deployment before launching at scale. While two of the interventions that were identified for pilot programs were near-term, the majority of interventions suitable for pilot programs were either mid-term or long-term. Specific pilot opportunities were further defined within implementation plans.

In the medium term, Focus on Energy may wish to pursue an additional tranche of enabling interventions identified through this research. These would unlock the most impactful opportunities over one or two quadrennial cycles, positioning Focus on Energy to pursue deeper savings and broader benefits as program priorities evolve. The full list of interventions highlights several enabling strategies that may be appropriate to reconsider in the medium term such as exploring ways to support vehicle electrification or advanced rate design.

## Overarching Recommendations and Lessons Learned

In addition to the recommendations contained in each implementation plan, the research team identified several higher-level recommendations and lessons learned. While not all interventions are feasible to pursue at this time, identifying the barriers to feasibility and clarifying the necessary conditions for change proved to be a valuable project outcome. For example, there are numerous opportunities for Focus on Energy to expand efforts that both increase energy savings and advance emerging priorities.

To enable sufficient progress in future quadrennial periods, the formal evolution of the Focus on Energy program framework must begin soon. Many actions can be initiated now to maintain momentum, but clear directives will ultimately be required to authorize additional program activities that currently fall outside Focus on Energy existing scope. Through the Roadmap Report development process, the research team also discovered that some interventions identified as having the greatest impact potential were determined to be infeasible in the near term. A few examples include:

- Advanced rates, such as time of use (TOU) or electrification rates, could be highly impactful in enabling load shifting and long-term beneficial electrification. However, multiple barriers currently prevent Focus on Energy from supporting advanced rates, including logistical, technical, and institutional challenges.

- Transportation electrification and load flexibility for EV charging is another example of a high-impact intervention deemed infeasible for near-term action. The research team found significant technical potential for emissions reductions and grid benefits, but transportation remains out of scope for the program. The Focus on Energy program was established when transportation energy was almost entirely outside the regulated utilities' scope and customer base. As vehicle electrification continues to gain traction, transportation efficiency and load flexibility are expected to emerge as topics meriting further consideration.

Similarly, if Focus on Energy were granted broader authority to pursue holistic market transformation, as explored in the MT Assessment, the program could support larger-scale market transformation activities. Paramount to any substantial shifts, however, is the continued prioritization of ratepayer benefits and the core programmatic objective of delivering value to Wisconsin. The prioritized implementation plans demonstrate ways to expand impact while remaining firmly within the current boundaries of the Focus on Energy Program.

A reassessment of programmatic scope through Quad V, future orders, or further policy refinement could enable Focus on Energy to advance activities most closely aligned with emerging priorities such as emissions reductions, grid benefits, and equitable outcomes. Overall, the research team concludes that there is a wealth of new and emerging opportunities for the Focus on Energy program to prepare for the future. While Wisconsin's statewide goals are ambitious and while changes will be necessary for Focus on Energy to fully support achieving those goals, there remain ample opportunities to pursue interventions that steer toward emerging priorities while still operating within the current structure. In addition to the prioritized interventions, this research identified numerous additional feasible activities that can be pursued as Quad V directives emerge and Wisconsin's policy landscape continues to evolve.

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# APPENDIX A: QUALITATIVE LANDSCAPE DETAILS

## Quadrennial planning processes and Evolving Goals

The first Quadrennial Planning Process (Quad I) was finalized in 2010.[23] It focused on two distinct phases: broader policy issues including the purpose and basis of Focus on Energy program goals, the short-term rate impacts on consumers, and the timeline for reporting, and programmatic issues and budgetary measures such as program evaluation process, how to quantify energy savings, how to determine projected load, establishing annual targets, and funding split between statewide programs vs. voluntary utility programs. This first Quadrennial Planning Process covered Focus on Energy programming from 2011-2014. The only mention of emissions in the PSC's investigation is that emission reductions are concomitant of energy efficiency and renewable resource programs.

Quadrennial Planning Process II,[24] which was finalized in 2014, covered Focus on Energy programming from 2015–2018 and centered around whether statutorily mandated decisions made during the first Quadrennial Planning Process should be revisited. Additionally, the Quadrennial Planning Process II specifically requested feedback from stakeholders regarding issues that were not initially covered during the first Quadrennial Planning Process including the appropriate planning horizon for finalizing goals. Issues discussed and evaluated in Quadrennial Planning Process II can be split into five overarching categories:

- Goals and priorities
- Cost-effectiveness of programs
- Renewable energy
- Energy-water nexus, and;
- Other (e.g., re-examining rate mitigation impact strategies).

Emissions reductions were mentioned regarding Focus on Energy ongoing efforts to track emission reductions in addition to energy savings.[25]

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[23] Public Service Commission of Wisconsin, Quadrennial Planning Process I, Docket 5-GF-191, 2010, apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=141173.

[24] Public Service Commission of Wisconsin, Quadrennial Planning Process II, Docket 5-FE-100, apps.psc.wi.gov/APPS/dockets/content/detail.aspx?id=5&case=FE&num=100

[25] "*The Commission finds it reasonable that the Focus program continue to be used to better position the state of Wisconsin to cost-effectively meet federal carbon standards, with energy savings as the primary goal of the program and continued tracking of emissions reductions*." See Public Service Commission of Wisconsin, Quadrennial Planning Process II Final Decision, Docket 5-FE-100, 2014, http://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=215245, 4.

Quadrennial Planning Process III,[26] finalized in 2018, covered Focus on Energy programming from 2019–2022 and centered around four items that determined its scope: goals and priorities, the cost-effectiveness of programs, renewable energy, and other matters including pilots for behavioral programs, data accessibility, and utility voluntary programs. Emissions reductions were mentioned with regard to Focus on Energy ongoing efforts to track emission reductions and the PSC's emphasis on Focus on Energy overall program goals of reductions in energy use and peak demand.[27]

Quadrennial Planning Process IV,[28] which was finalized in 2022, covered Focus on Energy current slate of energy efficiency and renewable resource programming from 2023–2026. It focused on policies and priorities that the PSC wants Focus on Energy to adhere to, implementation decisions (where assessing Wisconsin's market transformation potential is mentioned), cost-effectiveness, budget issues, and updating Focus on Energy goals and targets. In the Quadrennial Planning Process IV final decision, the PSC explicitly mentioned that emissions reductions are a component that Focus on Energy must work toward, in addition to developing cost-effective programming and assisting Wisconsin with meeting its clean energy goals.[29]

The Quadrennial Planning Process V is ongoing; the PSC has stated its list of priorities for the upcoming planning study.[30] These priorities are:

- An estimation of avoided emissions potential from programming
- Incorporating load shapes to improve peak demand reductions, through understanding of customer segment implications
- Assessing all opportunities to expand program electrification,
- Understanding how energy efficiency and electrification incentives offered via the Inflation Reduction Act (IRA) could impact Wisconsin and;

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[26] Public Service Commission of Wisconsin, Quadrennial Planning Process III, Docket 5-FE-101, apps.psc.wi.gov/APPS/dockets/content/detail.aspx?id=5&case=FE&num=101

[27] "*The Commission finds it reasonable to continue to establish goals for Focus based on reductions in energy use and peak demand, with more emphasis on energy use savings and resulting emission reductions*." See Public Service Commission of Wisconsin, Quadrennial Planning Process III Final Decision, Docket 5-FE-101, 2018, apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=343909, 6.

[28] Public Service Commission of Wisconsin, Quadrennial Planning Process IV, Docket 5-FE-104, apps.psc.wi.gov/APPS/dockets/content/detail.aspx?id=5&case=FE&num=104

[29] "*The Commission finds it reasonable that Focus should play a larger role in cost-effectively reducing carbon emissions and that Quad IV should serve as a transitional period during which the program continues to emphasize energy savings but also seeks to make measurable progress toward a transition to greater emphasis on reducing carbon emissions.*" See Public Service Commission of Wisconsin, Quadrennial Planning Process IV Final Decision, Docket 5-FE-104, 22, apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=453081, 7.

[30] "Quad V Planning Study," Focus on Energy, focusonenergy.com/about/quad-v-planning-study.

- Contextualization of these findings to inform future program goals.

## Executive Order #38 and Office of Sustainability & Clean Energy (OSCE)

Governor Tony Evers' Executive Order #38 was issued in 2019. Executive Order #38 established the Office of Sustainability & Clean Energy (OSCE) and establishes Wisconsin's goal of achieving 100% carbon-free electricity by 2050. Executive Order #38 charges OSCE to:

- Ensure Wisconsin fulfills the carbon reduction goals in the 2015 Paris Climate Accord,
- Develop a clean energy plan to assist the state in meeting its carbon-free goal,
- Promote clean energy workforce training,
- Help Wisconsin foster clean energy business developments,
- Develop several new standards (i.e., energy efficiency, sustainability, and renewable energy) for existing state facilities.[31]

The issuance of this Executive Order has resulted in OSCE's development of the 2022 Clean Energy Plan (CEP) and the 2023 and 2024 CEP Progress Report.[32] These reports focused on four overarching key pathways to accomplish Executive Order #38: **Accelerate Clean Energy Technology Deployment**, **Maximize Energy Efficiency**, **Modernize Buildings and Industry**, and **Innovate Transportation**. Cataloguing the different actions taken over the last three years has allowed the research team to further understand the current landscape.

The research team also reviewed Wisconsin's Priority Climate Action Plan, also known as the Emissions Reduction Roadmap,[33] published April 2024, to understand which types of policies, practices, and technologies the state emphasized in its EPA Climate Pollution Reduction Grant process and the state's multi-sector approach to reducing GHG emissions. The Roadmap covered emissions-intensive sectors—transportation, buildings, agriculture, distributed renewable energy, and industry—and how Wisconsin identifies low-income disadvantaged communities, the state's GHG inventory, and six overarching emissions reduction measures to implement by 2050. The measures listed in the Emissions Reduction Roadmap are:

- Industrial Efficiency, Electrification, and Decarbonization

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[31] State of Wisconsin Office of the Governor, "Executive Order 38 of August 16, 2019, Relating to Clean Energy in Wisconsin," evers.wi.gov/Documents/EO 038 Clean Energy.pdf.

[32] State of Wisconsin: *Wisconsin Clean Energy Plan*, 2022: osce.wi.gov/Documents/SOW-CleanEnergyPlan2022.pdf; *Wisconsin Clean Energy Plan Progress Report*, 2023: osce.wi.gov/PublishingImages/Pages/Forms/EditForm/Clean Energy Plan 2023 Progress Report.pdf; *Wisconsin Clean Energy Plan Progress Report*, 2024: osce.wi.gov/Documents/2024 Clean Energy Plan Progress Report.pdf.

[33] Wisconsin Department of Administration Office of Sustainability and Clean Energy, *Wisconsin Emissions Reductions Roadmap* (2024), epa.gov/system/files/documents/2024-03/wi-emission-reduction-roadmap.pdf.

- Building Electrification and Retrofitting
- Clean Transportation, Fuels, and Infrastructure
- Transit Planning and Expansion
- Distributed Renewable Energy; and
- Agriculture and Soil Solutions

The Department of Administration is identified as the implementing agency for most measures. Under this grant, OSCE is also developing a Comprehensive Climate Action Plan (CCAP) that is expected to be released by the end of 2025.[34]

## Public Service Commission – Office of Energy Innovation (PSC OEI)

The research team reviewed information related to the projects that the PSC OEI earmarked in 2024, with nearly $200 million in combined funding from the BIL and the IRA from 2023-2025. In addition, the team examined the PSC OEI's and Focus on Energy ongoing support for improving energy efficiency to Wisconsin's agricultural sector in 2024 through the deployment of technologies that target greenhouse gas (GHG) emissions through operational efficiencies (e.g., heaters, grain dryers, etc.). The PSC OEI's Rural and Agriculture Propane program, for example, utilizes funding to incentivize farmers to purchase and install more energy-efficient propane equipment (e.g., boilers, water heaters, refrigeration heat recovery units, etc.) and provides agricultural customers with access to dedicated energy advisors.

## Focus on Energy Research and Reports

The 2025 Focus on Energy Market Transformation Assessment Study Phase I Report was reviewed to gain insights on the potential opportunities for Focus on Energy to invest in market transformation (MT) programs which look to make impact across a multi-year time horizon, and have been defined as a "reduction in market barriers due to a market intervention, as evidenced by a set of market effects, that lasts after the intervention has been withdrawn, reduced or changed".35,36 An MT program aims to fundamentally shift a market towards greater energy efficiency as standard practice; MT focuses on addressing systemic barriers such as product availability, cost, or consumer awareness, to accelerate the adoption of efficient technologies or practices beyond individual incentives. By comparison, a resource

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[34] Wisconsin Office of Sustainability and Clean Energy, CEP Progress Report, September 2025, osce.wi.gov/Documents/2025 Clean Energy Plan Progress Report.pdf

[35] Cadmus, *FOCUS ON ENERGY® Market Transformation Assessment Study* (2025), assets.focusonenergy.com/production/inline-files/Focus-MT-Potential-Phase-I-Report.pdf.

[36] energystar.gov/partner-resources/utilities-eeps/prog-design-res/market-trans, definition cited to eta-publications.lbl.gov/sites/default/files/lbnl-39058.pdf

acquisition (RA) program must demonstrate immediate and quantifiable energy savings to achieve savings targets typically measured on an annual basis or accumulated over a set time horizon. The goal of the Focus on Energy MT study was "to support future PSC decisions regarding investment in market transformation initiatives (MTIs) and the appropriate emphasis for Focus on Energy to place on MTIs in the next quadrennium." The study examined 86 opportunities from various organizations and regions to evaluate their compatibility with Wisconsin's current energy landscape. The study presented 18 opportunities for Focus on Energy to review that fall into three distinct categories: heat pump technologies, building performance improvements, and other electrification beyond heating and cooling end uses. The research team reviewed all options considered within this Phase I report, both those that were considered viable for a market transformation program as well as those that were discussed but ultimately determined to not be ideal options for Focus on Energy. This report was also reviewed heavily to inform the quantitative database development.

The research team reviewed Focus on Energy 2021 Residential New Construction Market Effects memo.[37] Focus on Energy New Residential Construction Offering has significantly influenced the efficiency of construction features in non-program affiliated homes, thereby encouraging the overall residential construction industry to become more efficient. Participation in the program impacted both participant and neighborhood building energy consumption.[38] However, these consumption impacts were either diminished or nonexistent in neighborhoods without program participants.

The 2020 Residential New Construction Baseline Study allowed the research team to better understand Focus on Energy longest running program offering, the model used by the program evaluator to qualify savings of homes participating in the program, and understand the previous recommendations made to improve the program.[39] Key differences from 2017 to 2020 highlighted by the Study were that central air conditioning SEER ratings were higher, and that LEDs make up a greater percentage of lighting options. The Study also noted that for the average home: home size decreased, was less airtight, and larger varieties of fuel types were used.

Reviewing Appendix A of Focus on Energy 2015-2018 Quadrennium Economic Impact Analysis assisted the research team in understanding the impacts of Focus on Energy projects

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[37] Cadmus, *Focus on Energy Residential New Construction Market Effects* (2021), focusonenergy.com/evaluation-reports/residential-new-construction-market-effects, 2.

[38] The memo notes that "*statewide billing data for new homes shows that nonprogram homes constructed in in zip codes with little to no program activity consumer 8% more energy than nonprogram homes built in the same zip code as program homes*."

[39] Cadmus, *2020 Residential New Construction Baseline Study* (2022), assets.focusonenergy.com/production/Focus-on-Energy-2020-Residential-Baseline-Study-Report.pdf.

based on participant location (i.e., rural vs. non-rural).[40] While a 60-40 budget split between business and residential implementation and administration has been part of the Focus on Energy program since the beginning, in the Quadrennium III proceedings, there were separate rural budgets, averaging about $8M annually and included both incentive and non-incentive dollars. In the Quadrennium IV proceedings, rural was no longer a separate budget and instead was a KPI (spend 33% of incentives in rural ZIP codes), which can also be applied to spending on administration, implementation, and EM&V.[41]

The annual program evaluations,[42] conducted by The Cadmus Group, also provided insights in the overall performance of the Focus on Energy programs, including program offerings, measures, participation surveys, and cost-effectiveness.

## Other Studies of Note

The research team studied two decarbonization reports commissioned by Clean Wisconsin,[43] Wisconsin's Roadmap to Net Zero by 2050 and the Economic impacts of decarbonization in Wisconsin published in 2022.[44,45]

The Roadmap to Net Zero by 2050 report developed seven modeled scenarios to evaluate potential policy actions and key uncertainties that Wisconsin might face in meeting the 100% clean electricity and economy-wide net zero goals outlined in Executive Order #38. Clean energy policies, without adding demand side electrification and efficiency measures, achieve only 25% of the emission reductions needed. The report indicates that achieving this goal will require Wisconsin to make significant investments in generation (i.e., solar, wind, storage, hydrogen, etc.), act early on transitioning vehicles and buildings to electricity, expand transmission capacity and planning, and continue efforts to retire the state's coal fleet.

The Economic Impacts of Decarbonization in Wisconsin report examines how different levels of investment in low- and zero-carbon power generation and demand-side technologies could impact the state's economy by 2050. This analysis was considered within the context of the

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[40] Cadmus, *Focus on Energy 2015–2018 Quadrennium Economic Impact Analysis* (2020), assets.focusonenergy.com/production/WI Focus 2015-18 Quad_Econ Impacts_final.pdf.

[41] Additional details provided by Focus on Energy administrator.

[42] "Evaluation Reports," Focus on Energy, focusonenergy.com/evaluation-reports.

[43] cleanwisconsin.org/our-work/wisconsins-roadmap-to-net-zero-by-2050/

[44] Evolved Energy Research, Clean Wisconsin, and Renew Wisconsin. *Wisconsin's Roadmap to Net Zero by 2050*, 2022. gridlab.org/netzerowi

[45] Cambridge Econometrics. *Economic impacts of decarbonization in Wisconsin,* 2022 gridlab.org/wp-content/uploads/2022/10/The-economic-impact-of-decarbonizing-Wisconsin-Sept-2022-final.pdf

statutory obligation related to §196.374 enabling legislation for "*creating or retaining jobs for workers."* This transition will require substantial changes to Wisconsin's existing power sector's capacity to meet the increasing demand for electrification in the transportation and building sectors. Key findings from the report that the research team wants to highlight are:

- Decarbonizing the electricity supply in Wisconsin will lead to small economic gains of up to 0.5% of Gross State Product by 2050.
- Economy-wide decarbonization through clean energy generation and demand-side energy and emissions reductions could lead to significant economic benefits.
- Transitioning away from fossil fuels and increasing energy efficiency results in up to a 3% increase in Gross State Product and 68,000 jobs by 2050.
- Job creation would scale across the state's economy according to the scale of climate action necessary.
- Wisconsin's transition to low- and zero-carbon generation would build on existing trends (e.g., shutting down coal-fired power plants by 2035).

# APPENDIX B: MEASURE LIST

| ID | Technology/Measure Name | Technology/Measure Description | End-Use |
|---|---|---|---|
| 1 | Advanced Motors | Advanced motors are highly efficient electric motors that have industrial and commercial applications. They use more efficient components such as fans and advanced controls to achieve high efficiency. | Motor Systems |
| 2 | Air-Source Heat Pumps (Res) | Air-Source Heat Pumps (ASHPs) transfer heat between inside a home and the outside air, providing both space heating and cooling to a building. ASHPs are among the most energy-efficient technologies for delivering space conditioning, as they require significantly less energy than both natural gas-powered furnaces, electric resistance heaters, and standard air conditioners paired with a gas furnace or electric heat. | Heating & Cooling |
| 3 | Battery Storage (Behind-the-Meter) | Battery storage systems may be installed on buildings across sectors (e.g., residential, commercial, industrial) and are usually paired with solar PV or other renewable energy sources. Battery storage provides benefits such as optimizing time-of-use, increasing consumption of solar energy during times of day when generation is low, and reducing transmission and distribution losses. One example of battery storage technology is portable energy storage systems utilizing second-life EV batteries. | Solar & Storage |
| 4 | Building Automation System (BAS) | This measure refers to equipping buildings with a centralized, automated systems that controls and optimize the operation of different components of buildings including HVAC system, lighting, hot water, etc. The BAS helps reducing energy use and GHG emissions of buildings. | Envelope /Whole Building |
| 5 | Efficient Boilers (Space Heating) | This measure refers to high-efficiency boilers used for space heating in buildings. | Heating |
| 6 | Efficient Manufactured Homes | Efficient manufactured homes are designed and built to be energy efficient. Manufactured homes are built at or above ENERGY STAR certification levels and in accordance with the Manufactured Home Construction and Safety Standards, established by the U.S. Department of Housing and Urban Development. | Envelope/ Whole Building |
| 7 | Efficient Pumping (Agriculture) | This measure refers to the bundle of technologies that result in more efficient pumping, such as variable frequency drive | Motor Systems |

| ID | Technology/Measure Name | Technology/Measure Description | End-Use |
|---|---|---|---|
| | | (VFD) milk pumps, variable speed pumps, VFD vacuum pumps for the dairy industry, etc. | |
| 8 | Efficient Residential Clothes Washers | This measure refers to technologies and strategies to improve the energy efficiency of residential clothes washers, such as improving efficiency levels of various clothes washer types (e.g., top-loading) to align with ENERGY STAR levels. | Appliance/ Plug Load |
| 9 | Efficient Rooftop Units (AC + HP) | A Rooftop Unit (RTU) is a self-contained HVAC system that is installed on the roof of a building. RTUs are energy efficient due to having higher SEER/IEER/COP ratings or use of technologies such as variable speed fans and economizers. | Heating & Cooling |
| 10 | Efficient Street Lighting | This measure refers to the use of LEDs for street lighting. | Lighting |
| 11 | Efficient Ventilation/ Circulation Fans (Agriculture) | This measure refers to high efficiency ventilation and circulation fans used in the agricultural sector. | Motor Systems |
| 12 | Electric Light and Medium Duty Fleet Vehicles | This measure refers to promotion of the adoption of light and medium duty fleet vehicles for intra-city transportation and transit. | Transportation |
| 13 | Electric Passenger Vehicles | This measure refers to promotion of the adoption of light duty battery electric vehicles (BEVs). | Transportation |
| 14 | Electric Vehicle Chargers in Multifamily and Light Commercial Lots | This measure refers to the installation of EVSEs in multi-family parking lots and light commercial parking lots to promote the adoption of BEVs. | Transportation |
| 15 | Fans and Blowers | This measure refers to high-efficiency fans and blowers. | Motor Systems |
| 16 | Food Service Equipment Electrification | This measure refers to the electrification of commercial food service equipment. | Cooking |
| 17 | Gas Absorption Heat Pumps | Gas heat pumps use a thermodynamic process through combusting gaseous fuels (like natural gas) to transfer heat. Gas heat pumps are highly efficient even in very cold | Heating & Cooling & Water Heating |

| ID | Technology/Measure Name | Technology/Measure Description | End-Use |
|---|---|---|---|
| | | temperatures and can be used for space heating and cooling as well as water heating. | |
| 18 | Heat Pump Dryers | Heat pump dryers are energy-efficient clothes dryers that extract heat from the air (instead of generating heat by natural gas or electricity) and reuse the heated air to dry clothes. Heat pump dryers use much less energy than traditional clothes dryers. | Appliance/ Plug Load |
| 19 | Heat Pump Water Heaters (Commercial) | Heat Pump Water Heaters (HPWHs) use electricity to move heat between locations rather than using fuel to directly generate heat. HPWHs can be more energy efficient than conventional water heaters. | Water Heating |
| 20 | Heat Pump Water Heaters (Residential) | Heat Pump Water Heaters (HPWHs) use electricity to move heat between locations rather than using fuel to directly generate heat. HPWHs can be more energy efficient than conventional water heaters. | Water Heating |
| 21 | High-Performance Windows | Energy-efficient windows reduce heat loss and optimize heat gain. Several strategies or technologies can be employed in high performance windows, such as low-e storm window, double- or triple-pane windows, interior insulated shades, etc. | Envelope/ Whole Building |
| 22 | High-Temperature Heat Pumps | High-temperature heat pumps (HTHPs) provide higher output temperatures (typically above 176°F) for industrial and commercial applications and provide high-efficiency heating. | Industrial Process |
| 23 | Induction Cooktops and Ranges | Induction cooktops and ranges use electromagnetic features to heat cookware instead of heating the cooktop surface itself. Induction cooktops are more efficient than traditional cooktops, as ~90% of the energy transfers to the cookware. | Cooking |
| 24 | Industrial Direct Electrification (Non-HP) | Radio frequency heating, electric arc furnaces, electric infrared heaters, electrochemical process change, microwave heating, electric induction melting, plasma melting, electrolytic reduction | Industrial Process |
| 25 | Industrial Thermal Energy Storage | Industrial thermal energy storage refers to systems that absorb and store energy during low demand (off-peak) periods using different media such as water. Examples of thermal storage systems include sensible heat storage, latent heat storage, and thermochemical storage. | Industrial Process |

| ID | Technology/Measure Name | Technology/Measure Description | End-Use |
|---|---|---|---|
| 26 | Infiltration Reduction/Envelope | This measure refers to the bundle of technologies and strategies which reduce air leakage from building envelope cracks, gaps, and openings. Examples include weatherstripping, foam sealants, caulking, use of air curtains, improving envelope tightness, and appropriately-sized HVAC systems which prevent indoor air pressure imbalance. | Envelope/ Whole Building |
| 27 | Low Embodied Carbon Construction | This measure refers to technologies and strategies that can reduce the embodied carbon of construction, such as the use of low-carbon building materials (e.g., steel, concrete, insulation, etc.), using local materials that reduce the need for transportation, and optimizing building design. | Envelope/ Whole Building |
| 28 | Low Rolling Resistance Replacement Tires | Low rolling resistance tires reduce rolling resistance. Consequently, they improve the fuel efficiency of traditional vehicles and extend the battery range of electric vehicles, and therefore lead to overall reduced energy consumption. This measure focuses on tires replaced during a vehicle's lifetime (as opposed to being installed as a vehicle's original tires). | Transportation |
| 29 | Low-Flow Water Fixtures (e.g., showerheads, faucet aerators) | Low-flow water fixtures include bathroom and kitchen aerators as well as showerheads designed to use less water while maintaining the same performance. These fixtures reduce water consumption and energy used for water treatment, distribution, and heating. | Water Heating |
| 30 | Luminaire Level Lighting Control (LLLC) | Luminaire Level Lighting Control (LLLC) refers to advanced lighting systems in which each lighting fixture has built-in controls (i.e., sensors and load controllers). LLLCs save energy by optimizing lighting outputs through reducing maximum light output, occupancy sensing, and daylight sensing. | Lighting |
| 31 | Packaged Terminal Heat Pumps (PTHP) | Packaged Terminal Heat Pumps (PTHPs) are heat pumps that are installed through the wall. PTHPs are good candidates for buildings (both residential and commercial) that do not have duct work. Also, PTHPs provide individual control for each unit. | Heating & Cooling |
| 32 | Real-Time Steam Trap Monitoring | Steam traps are automatic valves that remove condensate, air, and other non-condensable gases while preventing or minimizing steam loss. Real-time steam trap monitoring systems improve efficiency of steam systems by continuous | Industrial Process |

| ID | Technology/Measure Name | Technology/Measure Description | End-Use |
|---|---|---|---|
| | | monitoring of steam traps, allowing for the immediate detection and diagnosis of failures of steam traps. | |
| 33 | Retrofit for Existing Fossil Fuel Equipment (Dryers, Boilers, Furnaces) | This measure refers to retrofits to improve the efficiency of existing fossil fuel equipment before the end of life, including (but not limited to) non-modulating dryer retrofits (for natural gas commercial dryers), dryer moisture sensor retrofits, hydronic heating plumbing system flushing, boiler chemical descaling, chemical additive for boilers, dynamic air balancing, economizer inspection and upgrade, adsorbent air cleaning system, and furnace filter whistle. | Appliance/ HVAC |
| 34 | Solar PV (Behind-the-Meter) | Solar photovoltaic systems are installed on buildings across sectors (e.g., residential, commercial, industrial) to generate electricity for on-site consumption. Excess electricity can be sent to the electrical grid. | Solar & Storage |
| 35 | Variable Refrigerant Flow (VRF) | Variable refrigerant flow (VRF) heat pumps heat and cool buildings by optimizing the amount of refrigerant based on demand in each building zone. | Heating & Cooling |
| 36 | Natural Gas-Fire Combined Heat and Power (NG-CHP) | NG-CHP is a technology that produces electricity and thermal energy at high efficiencies using natural gas. With on-site power production, losses are minimized and heat that would otherwise be wasted is applied to facility loads in the form of process heating, steam, hot water, or even chilled water. | Heating & Cooling |
| 37 | Low GWP Refrigerant Cooling Systems | Air conditioning or refrigeration systems that operate using low-GWP refrigerants instead of traditional refrigerants. | Heating & Cooling |
| 38 | Methane Leakage Detection | Reducing methane leakage through detection and repair. | Heating & Water Heating |

# APPENDIX C: DETAILED DESCRIPTION OF MEASURE DATABASE METHODOLOGIES

This appendix provides background and details on the methods used to characterize the technology measures within the measure database.

Energy Savings Potential Measure energy savings potential column rates measures according to their stock-wide annual technical potential--i.e., if the measure were applied to the entire stock where it is technically feasible. The energy savings potential of a measure is estimated relative to a baseline technology or practice. The available data sources (either publicly available or provided by Focus on Energy) are used to estimate the potential and determine the rating. The following guideline is used to determine the rating:

- If the energy savings potential of a measure is readily available from the data sources or can be easily estimated, it is used for the rating.
- If the energy savings potential of a measure is not readily available:
    - The baseline energy use of the sector or subsector that a measure belongs to is identified. Further, a percent reduction (due to adoption of the measure) is applied to the baseline energy use to roughly estimate the energy savings potential of the measure and determine its rating.
- In case the baseline energy use of the sector or subsector is not available, a measures energy savings potential is rated based on expert judgement.

A few points are considered when rating the energy savings potential:

- When making an expert judgment or doing a back-of-the-envelope calculation, energy savings potential (technical potential) was considered as a function of 1) baseline statewide energy consumption in WI, 2) per-unit energy savings (%) of a technology or measure.
- Because the ratings are relative, a measure that is already rated can be found to make a comparison. For example, if Measure A is “Low” and it is expected that the savings from Measure B to be similar to or smaller than the savings from Measure A, Measure B would be rated as “Low”.
- For measures that the energy savings potential is estimated, the following bins are used for rating:
    - High: ≥ 2 TBtu
    - Medium: 0.1 – 2 TBtu
    - Low: < 0.1 TBtu

## GHG Emissions Reduction Potential

The GHG emissions reduction potential column rates measures according to their stock-wide annual technical potential, assuming a low-carbon grid. The GHG reduction potential of a measure is estimated relative to a baseline technology or practice. The available data sources (either publicly available or provided by Focus on Energy) are used to estimate the potential and determine the rating. The following guideline is used to determine the rating:

- If the GHG emissions reduction potential of a measure is readily available from data sources or can easily be estimated, it is used for the rating.
- If the GHG emissions reduction potential of a measure is not readily available in data sources:
    - The GHG emissions reduction potential of the sector or subsector that a measure belongs to is used to make an educated guess about the potential of the measure and determine its rating.
    - The baseline GHG emissions of the sector or subsector that a measure belongs to are identified. Further, a percent reduction (due to adoption of the measure) is applied to the baseline GHG emissions to roughly estimate the GHG reduction potential of the measure and determine its rating.
- In case the GHG emissions reduction potential or baseline GHG emissions of the sector or subsector are not available, a measures potential is rated based on expert judgement.

A few points are considered when rating the GHG emissions reduction potential:

- Electric efficiency measures (e.g., efficient lighting) are not rated “High” because of a very decarbonized grid.
- Electric efficiency measures are rated “Low” unless they are among the highest impact electric efficiency measures, in which case they are rated “Medium”.
- Measures that are rated as “High” are mostly high-impact electrification measures.
- For measures that the GHG emission reduction potential are estimated, the following bins are used for rating:
    - High: ≥ 1 MMT CO2e
    - Medium: 0.1 – 1 MMT CO2e
    - Low: < 0.1 MMT CO2e

## Barriers Assessment Matric

| Barrier | Barrier Description | Low | Medium | High |
|---|---|---|---|---|
| ***Awareness (End Users)*** | Adoption may be hindered because end users do not know about the measure and its benefits. | **Most** end users are aware of the measure and its benefits. | **Some** end users are aware of the measure and its benefits. | **Few** end users are aware of the measure and its benefits. |
| ***Rating System*** | Adoption may be hindered if there is not an adequate system to rate the energy /environmental performance of the technology (e.g., energy efficiency test method). | There is an **adequate** system for rating energy/ environmental performance. | There are **some** issues with the rating system, which make it harder to assess energy/ environmental performance **to some extent.** | There is no rating system or the system has **major limitations** that make it **much more difficult** to assess energy/ environmental performance. |
| ***Performance (Non-Energy/ Environmental)*** | Adoption may be hindered if the actual or perceived performance (e.g., energy services, features, ease of use) of the measure is worse than competing technologies. Do not consider energy/ environmental performance in this category. | The measure performs well and is widely considered to **perform well.** | There are some concerns about performance but they are **not widespread or not significant.** | Concerns about performance are both **widespread and significant**. |
| ***Manufacturing and Supply Chain*** | Adoption may be hindered because of manufacturer or distributor practices or dynamics (e.g., product availability, component/materials supply, stocking). | Access to the measure is **not significantly impeded** by manufacturing or supply chain factors. | **Major modifications** would be needed to Focus on Energy current mTRC cost-effectiveness test for this measure to be cost-effective. | Manufacturing or supply chain factors make it **much more difficult** for many end users to access the measure. |
| ***Workforce*** | Adoption may be hindered because of insufficient workforce (e.g., builders, electricians) awareness or capacity. | Workforce factors are **not significantly impeding** measure adoption. | Workforce factors are impeding measure adoption **to some extent**. | Workforce factors make measure adoption **much more difficult** for many end users. |

| Barrier | Barrier Description | Low | Medium | High |
|---|---|---|---|---|
| ***Upfront Cost*** | Adoption may be hindered due to higher upfront costs, relative to competing technologies. | The upfront cost of the measure is **similar** to that of competing technologies. | The incremental upfront cost of the measure is **higher** than competing technologies but unlikely to be a significant financial burden for many end users. | The incremental upfront cost of the measure is likely to create **significant financial burden** for many end users. |
| ***Cost-Effectiveness (End Users)*** | Adoption may be hindered because the overall financial impact of the measure is not attractive, relative to competing technologies, considering both upfront costs and operating costs, without subsidy. | The measure is expected provide net financial benefits over the measure lifetime **for the vast majority or all** end users. | The measure is expected to provide net financial benefits over the measure lifetime **for some end users** but not all. | The measure is **not expected to provide net financial benefits** for most end users over the measure lifetime. |
| ***Infrastructure*** | Adoption may be hindered due to insufficient supporting infrastructure (e.g., electrical infrastructure, large-scale digital systems). | There are **not significant** infrastructure barriers. | Infrastructure barriers impede end user measure adoption **to some extent**. | Infrastructure barriers make measure adoption **much more difficult** for end users. |
| ***Regulatory and Policy*** | Adoption may be hindered due to regulations or other policy (e.g., permitting requirements) that actively make it more difficult to adopt the measure. | There are **not significant** regulatory/policy barriers that actively hinder adoption (although policy changes could accelerate adoption). | Regulatory/policy barriers impede adoption **to some extent**. | Regulatory/policy barriers make adoption of the measure **much more difficult.** |
| ***Total Resource Cost (TRC) Cost-Effectiveness*** | Adoption may be hindered due to the Total Resource Cost (TRC) cost-effectiveness as determined by Focus on Energy current mTRC cost-effectiveness test. Measures are "TBD" if | The measure **is expected to be cost-effective** under Focus on Energy current mTRC cost-effectiveness test. | The measure is expected to be **cost-effective in certain situations** or would **generally be cost-effective with modest modifications** to Focus on Energy | **Major modifications** to Focus on Energy current mTRC cost-effectiveness test would be needed for this measure to be cost-effective. |

| Barrier | Barrier Description | Low | Medium | High |
|---|---|---|---|---|
| | they have not been assessed as part of past Quad Potential Studies. Building electrification measures are rated as "TBD" because past Quad Potential Studies only assessed within-fuel measure adoption, not fuel substitution. | | current mTRC cost-effectiveness test. | |
| ***Other*** | Adoption may be hindered for other reasons, not covered by the previous barrier types. Examples include safety, environmental harms, and split incentives. | Other barriers are **not significant.** | Other barriers exist and impede adoption **to some extent**. (Describe) | Other barriers are a **major deterrent** to measure adoption. (Describe) |

# APPENDIX D: DETAILED DESCRIPTION AND CLASSIFICATION ATTRIBUTES OF INTERVENTIONS

This appendix outlines and describes the parameters, attributes, and evaluation criteria used in the intervention assessment process. In the assessment process, each field (i.e., parameters, attributes, and evaluation criteria) was used to allow for comparison across interventions. The following descriptions apply to the attributes.

## Overarching attributes

Intervention Name

- Description: A short but sufficiently descriptive name for each intervention. All acronyms are spelled out.
- Type of response: Open text

Intervention Details

- Description: A detailed description of the intervention, which will inform the implementation plan if the intervention is selected.
- Type of response: Open text

Intervention Type

- Description: A general classification of the intervention (e.g., program or policy). It can be used in the prioritization stage to create a balanced portfolio of interventions.
- Type of response: Single selection from a picklist

Time Horizon

- Description: This attribute reflects the likely timing of when an intervention could be implemented. It can be used in the prioritization stage to help create a balanced portfolio of interventions.
- Type of response: Single selection from a picklist
    - Near term: Significant impact achieved in years 2027-2030
    - Long term: Significant impact achieved beyond 2031
    - Unclear or non-applicable

## Attributes to Clarify Theory of Change

### Direct or Enabling

- Description: This attribute distinguishes between two types of impact (i.e., direct impact and enabling) that an intervention can have.

- Direct interventions have the primary purpose of increasing technology adoption through the action of the intervention.
    - An example of direct interventions is a midstream tires program.
- Enabling interventions (also known as indirect interventions) have the primary purpose of supporting the ability for subsequent actions to increase technology adoption of one or more interventions.
    - Enabling interventions may also generally improve the Focus on Energy program implementation across the portfolio.
    - Examples of enabling interventions include updating cost-effectiveness tests and advocating for Focus on Energy to implement EV/EV infrastructure programs.
- Type of response: Single selection between direct and enabling

**Theory of Change**

- Description: This attribute briefly summarizes the chain of causation for interventions that have a more complex or multi-step/multi-pronged theory of how they will generate impact.
- Type of response: Open text

## Mapping attributes

**Affected Measures**

- Description: This attribute describes the technologies or measures affected by the intervention.
- Type of response: Multiple responses based on the list of measures from the Analytical Database

**Affected Customer Segments**

- Description: This attribute describes the customer segments (e.g., building, industry, transportation, etc.) affected by a particular intervention.
- Type of response: Multiple responses based on the list of customer segments from the Analytical Database. Customer segments will be carried through for all measures affected by the intervention.

**Affected End-Use Categories**

- Description: This attribute describes the end-use categories affected by the intervention.
- Type of response: Multiple responses based on the list of categories from the Analytical Database. End-use categories will be carried through for all measures affected by the intervention.

**Affected Technology Adoption Barriers**

- Description: This attribute describes the technology adoption barriers addressed by an intervention. In other words, this attribute addresses which adoption barriers could be resolved by a particular intervention.
- Type of response: Multiple responses based on barriers in the technology adoption barriers matrix from the Phase 1 Analytical Database.

**Affected Interventions**

- Description: This attribute describes the other interventions that will be affected by the implementation of the intervention. This attribute will only be populated for enabling (indirect) interventions, where the purpose of the intervention is to enable other interventions.
- For example, updates to cost-effectiveness tests might be needed to enable certain types of programs that are not possible under the current cost-effectiveness tests.
- Type of response: Multiple responses from the list of interventions

## Attributes or parameters to Support Evaluation Criterion

**Scale Potential**

- Description:
    - For direct interventions, this attribute represents the portion of the target technical potential that could be realistically affected, given the constraints to scale intrinsic in the intervention. If this intervention were implemented for a sustained period, with funding in alignment with the assumed Implementation Cost, how much of the overall market and technical potential would this intervention achieve? This attribute can be used to discount the technical potential to estimate the programmatic potential.
    - For enabling interventions, this attribute describes the scale potential of the enabled intervention.
    - For example, if the intervention is advocating to be able to run EV programs, the scale potential would reflect the scale potential of those enabled EV programs.
- Type of response: Single selection of Low/Medium/High/Not applicable from picklist

**Strength of Enablement**

- Description: For enabling interventions, this attribute represents how necessary and sufficient the intervention is in enabling the target interventions to achieve their potential. This attribute can be used to discount the programmatic potential of direct interventions addressed by an enabling intervention to estimate the portion of that programmatic potential that is attributable to the enabling intervention.
- Type of response: Single selection of Low/Medium/High/Not applicable from picklist

## Intermediate Attributes or Parameters to Support Evaluation Criterion

In addition to Scale Potential and Strength of Enablement, the research team identified several intermediate attributes and parameters to assist in rating evaluation criteria. These attributes and parameters will be included in the draft Intervention Database but not in the final Intervention Database. Below is the list of attributes and parameters:

- Scale Potential Adjustment Factor
- Strength of Enablement Adjustment Factor
- Overall Adjustment Factor for Technical Potential
- Target Energy Savings Technical Potential (TBtu)
- Target GHG Reduction Technical Potential (MMT CO2e)
- Target Grid Benefits Technical Potential
- Programmatic Energy Savings Potential (TBtu)
- Programmatic GHG Reduction Potential (MMT CO2e)
- Intervention Targets Benefits to Equity Communities
- Potential Benefits to Equity Communities
- Potential Equity Concerns
- Approximate Average Annual Implementation Cost

## Evaluation Criteria

### Energy Savings

- Description: This criterion represents the long-term energy savings potential that could be achieved by an intervention. Distributed generation is included in this criterion because it also reduces net electricity demand. The detailed methodology to assess this criterion is described in the methodology document.
- Type of response: Single selection of Low/Medium/High/Not applicable from picklist

### GHG Reduction

- Description: This criterion represents the long-term GHG emissions reduction potential that could be achieved by an intervention, assuming a very decarbonized grid. Similar to Energy Savings, the detailed methodology to assess this criterion is described in the methodology document.
- Type of response: Single selection of Low/Medium/High/Not applicable from picklist

### Grid Benefits

- Description: Like Energy Savings and GHG Reduction, this criterion represents the programmatic potential attributable to the intervention. Examples of factors included in

the evaluation of Grid Benefits are increased load flexibility, peak demand reduction, and/or any interventions that are specifically designed to reduce gas or electric infrastructure costs (e.g., enabling pruning of the gas distribution grid).

- Where applicable, time series electricity consumption data from ResStock and ComStock will inform the assessment.
- When assigning a rating for Grid Benefits, the research team will also consider anticipated load growth from rapidly growing loads, such as from electrification and data centers.
- Type of response: Single selection of Low/Medium/High/Not applicable from picklist

**Equity Benefits**

- Description: This attribute lists the intervention's anticipated benefits to equity communities (i.e., Communities of Focus and low-to-moderate income (LMI) households). Equity Benefits evaluates the extent to which the intervention will affect equity communities (given the target customer segments and eligibility criteria) and result in health, comfort, resilience, and financial benefits. Equity Benefits will consider both the intensity of the benefits per affected customer and the total number of customers the intervention could plausibly reach. Equity Benefits may also consider improvements to distributional and procedural equity resulting from the implementation of the intervention.
- Type of response: Single selection of Low/Medium/High/Not applicable from picklist Low/Medium/High, and accompanying open text box detailing specific equity benefits

**Other Benefits**

- Description: This attribute describes other important, unique benefits not captured by or naturally associated with the rated Energy Savings, GHG Reduction, Grid Benefits, or Equity Benefits.
- Type of response: Single selection of Yes/No from picklist.

**Equity Concerns**

- Description: This attribute describes potential negative impacts on equity communities if the intervention is implemented. Equity Concerns account for the extent to which the intervention will negatively impact equity communities (given the target customer segments and eligibility criteria), particularly in the areas of health, comfort, resilience, and finance. Equity Concerns will consider both the intensity of the negative impact per affected customer and the total number of customers the intervention could plausibly affect. Equity concerns may also include negative distributional impacts and any procedural equity concerns intrinsic to the intervention.
- Type of response: Single selection of Low/Medium/High/Not applicable from picklist, and accompanying open text box to outline equity concerns

**Implementation Cost**

- Description: This criterion represents the average annual program budget (including incentives) required to implement the intervention.
- Type of response: Single selection of Low/Medium/High/Not applicable from picklist

**Implementation Difficulty**

- Description: This criterion represents factors other than cost that would make the intervention more difficult to successfully execute, such as implementation complexity or institutional barriers.
- Type of response: Single selection of Low/Medium/High/Not applicable from picklist

## Attributes or Parameters to Support Prioritization

**Evaluation Criterion Notes**

- Description: This attribute contains concise notes on key points relating to the evaluation criteria.

**Analytical Score**

- Description: Evaluation criterion ratings (i.e., low, medium, high) are translated to unweighted scores. Further, they are weighted based on criterion weights and then summed to produce an overall analytical score.

**Overall Priority**

- Description: This attribute reflects the overall priority of the intervention relative to other interventions, taking into account the analytical score, portfolio-level balance, and other strategic considerations.
    - The overall priority will not be purely based on the prioritization score. Instead, the analytical score will be one input informing a holistic, strategic decision ultimately made by Focus on Energy, with support from Energy Solutions, on which interventions to prioritize.
    - In addition to the overall analytical score, Overall Priority will consider portfolio-level considerations, such as the aggregate cost, aggregate difficulty, and balance across various dimensions (e.g., a balance of direct and enabling interventions). Focus on Energy may choose to use certain criteria for screening, such as screening out any interventions rated as “High” for equity concerns. Ultimately, the Tableau dashboards will aid in this holistic decision-making.
- Type of response: Single selection of Low/Medium/High/Not applicable from picklist

# APPENDIX E: INTERVENTIONS NOT PRIORITIZED FOR IMPLEMENTATION PLANS

## Explore opportunities to implement EV and/or EV infrastructure programs (1)

This intervention involves collaboration between the PSC and WI utilities that currently offer EV-related programs. The goal is to reach an agreement that allows Focus on Energy to directly support EV adoption, while remaining aligned with the program's existing authority.

Through this partnership, Focus on Energy and the utilities would identify areas of alignment to ensure the programs complement each other. Potential initiatives could include expanding access to charging infrastructure, reducing the upfront cost of new or used EVs, and managing load growth through smart charging strategies.

For this research project, transportation initiatives were deprioritized because the Focus on Energy program has not historically included transportation issues. However, future opportunities may arise to revisit this topic if it aligns with Quad V or subsequent quadrennial directives.

## Implement a midstream windows program (2)

This intervention consists of implementing a midstream program to promote high-efficiency/triple-pane windows and/or commercial window improvements. Complementing existing efforts with windows, this new program would focus on providing incentives to increase the stocking and distribution of high-efficiency windows.

While the program’s potential impact was high, Focus on Energy is already exploring offering windows and determined that a standalone intervention for this measure was not worth pursuing for this research project.

## Work with stakeholders such as PSC and the WI utilities to support advanced rates development (3)

"Advanced rates" refer to new tariffs that better align the economics of regulated energy (gas and electricity) with current priorities. These rates may include supporting the alignment of electricity demand with hours when electricity has the lowest marginal supply cost and/or greenhouse gas emissions intensity.

Electrification rates, such as "heat pump rates" or "EV rates," have been deployed in other jurisdictions. They are designed to support the transition to electric end-uses while also

encouraging load management. EV rates, in particular, can help establish charging behavior or smart charging to avoid peak demand periods.

This intervention would have Focus on Energy take an active role in working with the PSC to support the development of these rate options, which may be initially piloted. Such rates encourage managed energy behavior and help protect both consumers and the grid from potential cost increases.

While an important issue for Wisconsin, this intervention was determined to be outside of Focus on Energy purview.

## Develop a program bundling residential envelope with other cost-effective EE measures (8)

This intervention consists of developing a program to enable proactive envelope improvements in existing homes. The goal is to support near-term reductions in energy use and ensure that homes are "heat pump ready" in terms of weatherization, so that installed heat pumps are appropriately sized.

While measures such as air sealing and insulation may be challenging to implement at scale cost-effectively, they become more viable when coupled with other, more cost-effective improvements. In this way, the overall portfolio of improvements is expected to be more cost-effective.

Examples of direct install measures include faucets, showerheads, and solar technologies. This measure could also include a collection of panel information to help homeowners assess whether they may want to start planning for panel upgrades, particularly if future technologies such as EVs are likely to be installed.

The concept driving this intervention was incorporated into several implementation plans.

## Conduct a commercial and industrial building stock characterization study to support future programs and data efforts (9)

This intervention would collect, synthesize, and publish key C&I building inventory data in a centralized database. The intent is to create a comprehensive resource that captures critical information about the building stock.

Collected data would include building type, vintage, square footage, existing equipment, customer income, renter/owner, customer demographics, energy use, climate zone, and ESJ-designated areas.

The collected data, along with supporting visualizations, could be used to justify prioritizing and investing in particular program strategies. Once compiled, summary tables and visualizations could be developed to address specific program and policy questions.

While there was general support for both the data collection effort and ensuring its availability, this intervention was not selected for further development because of its high cost and low immediate impact.

## Conduct a residential building stock characterization study to support future programs and data efforts (10)

This intervention would collect and synthesize key residential building inventory data in a database. The goal is to create a comprehensive resource that captures critical information about the housing stock.

Collected data would include building type, vintage, square footage, existing equipment, customer income, renter/owner, customer demographics, energy use, climate zone, and ESJ-designated areas.

For ESJ-designated areas or equity communities, the data would also track how building characteristics and measure adoption rates differ across the state.

Once the data is compiled, summary tables and visualizations could be developed to address specific program and policy questions.

While there was general support for both the data collection effort and ensuring its availability, this intervention was not selected for further development due to the high cost and low immediate impact.

## Create a pilot-to-program pipeline that expands the definitions of "success" for pilot projects and increases priority of innovative projects (12)

This intervention would create a “pilot-to-program pipeline”: a concerted effort to ensure pilots are intentionally designed and supported with the infrastructure needed to evolve into full programs when appropriate.

Pilots that transition into full programs would include a dedicated launch plan for each successful pilot. These plans would incorporate evaluation strategies and long-term cost-effectiveness to ensure sustainability.

To support this transition, Focus on Energy would establish a technology transfer team and detailed planning processes. This would ensure pilots have the resources required to launch

and sustain operations successfully, recognizing that the skills needed for launch management differ from steady-state program management.

However, this intervention was not selected for an implementation plan. Focus on Energy already operates under a “test and learn” model and a dedicated pilot manager to oversee and refine pilot activities.

## Explore opportunities for Focus on Energy to run programs that mitigate dairy process emissions (13)

This intervention would develop a framework and methodology to integrate GHG reduction measures, such as manure lagoon capping, tillage practices, and improved manure handling, into existing or future dairy programming.

It would be supported by an educational campaign highlighting emissions-reduction opportunities in dairy farming. To establish savings baselines, Focus on Energy would need to work with stakeholder groups, including PSC staff.

Funding for this program could be coupled with USDA NRCS (United States Department of Agriculture Natural Resources Conservation Service) funding. While the GHG impact potential for this intervention was rated Medium, workshop discussions determined that it falls outside Focus on Energy purview.

## Join the Energy Star Retail Products Platform (ESRPP) by launching a WI program (15)

This intervention would have Focus on Energy enroll in the ENERGY STAR® Retail Products Platform (ESRPP), which requires launching a midstream retail program to increase stocking and sales of high-efficiency products.

The program would also involve a significant data collection effort to monitor change over time and assess progress.

However, prioritization analysis showed that this intervention would have a limited impact. Moreover, because Focus on Energy has previously participated in ESRPP, workshop discussions concluded that a dedicated implementation plan would be necessary.

## Implement a community solar program (16)

This intervention would create a community solar program that could include funding dedicated to equity-focused community participants. It may also define requirements for renewable energy credit (REC), subscription rules, and third-party ownership of projects.

However, due to policy limitations and the utility-by-utility approach needed to implement community solar programs, an intervention plan was not pursued. Workshop discussions concluded that creating a community solar program would be outside of Focus on Energy purview.

## Work with key stakeholders to expand the goals of the Focus on Energy program (including updating or developing new metrics and Key Results Areas) (17)

Some initiatives and interventions, particularly those related to GHG reductions and market transformation, may not readily fit within a traditional energy efficiency framework.

To accommodate these efforts, this intervention would have Focus on Energy collaborate with stakeholders to develop a framework that explores possibilities both within current statutes and through regulatory or legislative updates needed to expand program goals.

This intervention would be a cross-cutting, multi-year effort to align the program's broader initiatives with its mission. While the general consensus held that the intervention was important, challenges with implementation led to the decision not to pursue a dedicated implementation plan.

## Explore opportunities for Focus on Energy to run embodied carbon programs (18)

This intervention would have Focus on Energy invest in programs to reduce carbon in building materials, develop a methodology to integrate embodied carbon into existing or future programming, and potentially integrate embodied carbon into Wisconsin's building code.

The effort would begin with an educational campaign to raise awareness of embodied carbon in Wisconsin. Focus on Energy would then collaborate with the PSC to establish savings baselines and conduct a circular-economic analysis of the state's supply of building materials.

After further consideration, this intervention was deemed outside of Focus on Energy current purview and presented various implementation challenges.

## Develop a financing program focused on technologies with high upfront costs but operational savings (21)

This intervention would develop financing programs to cover the upfront costs of adopting clean energy technologies. These programs would be financed by the expected operational savings over the duration (i.e., the Effective Useful Lives) of the installed equipment.

Several financing options were considered, offering different paths to market for the Commercial and Residential sectors. Commercial Property Assessed Clean Energy (C-PACE) and Commercial On-Bill Financing (OBF) are readily available today, while comparable residential offerings are still under development.

Although the benefits of a financing program were recognized, an implementation plan was not pursued. It was determined that Focus on Energy would be only one of many entities required to create such a program.

## Implement targeted improvements across existing and new programs to increase access for LMI and Communities of Focus (22)

This intervention would conduct a baseline analysis to understand the current reach of Focus on Energy program offerings in LMI communities and Communities of Focus, and to identify barriers to participation.

This analysis would be used to determine areas of opportunity, outline potential improvements, and prioritize program changes. Any improvements would be developed in partnership with equity communities and include processes to incorporate community feedback.

Possible program enhancements could include localized contractor training, targeted outreach, and bundling or connecting complementary services.

After discussions with PSC and Focus on Energy, it was determined that a baseline analysis had already been completed. As a result, aspects of this intervention were incorporated across existing implementation plans.

## Increase public data reporting of program activities and impacts, initially focusing on residential contractor-driven technologies (23)

This intervention would require public reporting of program metrics, beginning with the residential sector and emerging or contractor-driven technologies. Metrics would include installation and labor costs, along with other measures that vary by technology.

By making this data publicly available, the intervention promotes transparency of project information. This transparency would empower customers to make informed decisions, provide contractors with insights that could catalyze competition and reduce costs, and enable stakeholders to conduct analyses that optimize future policy-making and programmatic decisions.

Although the intervention was generally supported, the costs and challenges of successful implementation were flagged. As a result, a dedicated implementation plan was not developed.

## Explore opportunities for industrial carbon capture and sequestration (CCS), such as through a market study (24)

This intervention would explore opportunities for industrial carbon capture and sequestration (i.e., capturing CO2 emitted from industrial activities and either storing it or utilizing it in other processes to prevent its release into the atmosphere).

It could include commissioning a market study to investigate current or emerging technologies that are potentially viable in Wisconsin, and to assess their cost-effectiveness or feasibility.

However, the prioritization analysis indicated that this intervention would have a limited impact; therefore, it was not advanced into an implementation plan.

Develop a program that takes a locational approach to offering impactful residential technology bundles, with a focus on increasing equitable access (i.e., Communities of Focus) (26)

This intervention would create a program targeting Communities of Focus that have been underserved by other initiatives. The program would identify homes that are strong candidates for challenging installations, such as heat pumps, and use advertising channels to build presence in neighborhoods. This approach would encourage uptake of program offerings that can be delivered more efficiently when multiple homes are addressed in a single contractor visit.

By concentrating efforts in these areas, the intervention would increase both uptake and equitable access to heat pumps in communities where they are typically underused.

However, implementation challenges with Focus on Energy were identified, and as a result, no dedicated implementation plan was developed.

## Implement a methane digester renewable generation program (27)

This intervention would expand Wisconsin's existing methane digester program using a model similar to statewide solar programs, but adapted for methane digesters and renewable natural gas.

The proposed expansion would include targeted marketing and outreach to incentivize the installation of methane digesters on dairy farms and other applicable commercial and industrial buildings. It would also provide incentives and financing opportunities to support adoption.

The prioritization analysis showed that this intervention would have a limited impact; therefore, it was not advanced to an implementation plan.

## Implement a program focused on deploying micro heat pumps (i.e., room heat pumps or packaged terminal heat pumps) in equity communities (28)

This intervention would develop a program to increase equity in community access to micro heat pumps. When deployed and operated appropriately, micro heat pumps can benefit customers with limited control over their heating and cooling methods and costs (e.g., renters) by improving comfort and lowering electricity bills.

The program could also account for refrigerant type, encouraging the use of low-GWP refrigerants. In addition, it would include a localized assessment of building stock, bill analysis, and customer education to ensure participants receive the greatest potential benefits.

Because room heat pumps are included in the scope of the dedicated Market Transformation report currently underway in Wisconsin, this intervention was combined with the AC-to-heat pump implementation plan.

## Develop a program to extract insights from meter data to optimize energy savings measure offerings and associated benefits (31)

This intervention would develop a program that leverages existing utility data to prioritize sites for installations.

Because the sector and scope of this intervention are open-ended, the next step would be to determine which sectors and measures are most appropriate and applicable for the program's scope. The program would be limited to building sectors where Focus on Energy has access to direct meter data or utility data.

Workshop discussions raised challenges with implementing this intervention, and it was not advanced into an implementation plan.

## Implement a program focused on peak reduction through behavioral means (32)

This intervention would use behavioral and social prods to encourage both existing and potential Focus on Energy customers to shift their electricity consumption away from peak demand times, thereby reducing strain on Wisconsin's power grid.

This program would build upon existing Focus on Energy studies that identified opportunities for demand response and peak reduction to secure energy savings and reduce grid stress. It could be modeled after California's Flex Alert program, which has successfully encouraged residents to reduce electricity demand during peak events and extreme weather, helping prevent grid emergencies.

The program could pursue either a mass-market approach for statewide reach or a more localized, customizable campaign to target peak-demand reduction in specific regions of Wisconsin at certain times of the year (e.g., mid-summer in Northern Wisconsin).

This intervention idea was merged into the cross-cutting behavioral intervention.

## Implement a program focused on replacement tires (33)

This intervention would implement a midstream program focused on replacement tires, transforming the market by encouraging adoption of efficient (i.e., low-rolling-resistance) models. While cars are typically sold with efficient tires, replacement tires are often less efficient, which can negatively impact vehicle fuel economy (i.e., MPG).

Efficient tires can improve performance by 1-3% per mile driven. Because replacement tires may not carry incremental cost compared to baseline products, their cost-effectiveness is excellent.

Although this intervention offers significant GHG-reduction potential through reduced gasoline use, its electricity benefits are limited. Furthermore, because this effort centers on energy efficiency in the transportation sector, an area historically outside the scope of Focus on Energy programming, an implementation plan was not pursued.

However, there may be future opportunities to revisit this topic if it aligns with Quad V or subsequent quadrennial directives.

## Ramp up programming in continuous commissioning services (35)

This intervention would create a program to fine-tune building systems and ensure that facilities operate at optimal performance.

The program would address problems that develop over a building's life, such as aging equipment or changes in how occupants use spaces. It would deploy energy specialists during retro-commissioning to identify equipment operating inefficiently, systems requiring replacement or adjustment, and other opportunities for operational improvements.

Following the energy specialist’s assessment, customers would receive a prioritized list of recommended energy-saving improvements for their buildings, providing clear guidance on which measures to implement first.

Although significant energy savings were identified, this intervention was ultimately not included in an implementation plan.

## Develop a market transformation program focused on large scale heat pump deployment (using TECH Clean CA as a model) (38)

This intervention would establish a holistic market transformation program that includes workforce education and training, incentives, consumer marketing, and data reporting.

While the program would ultimately encourage adoption of a range of technologies, the initial focus would be on heat pumps. This program could also account for refrigerant type, promoting the use of low-GWP refrigerants.

By expanding the trained workforce, relevant technologies would eventually become the default solution. Incentives would help reduce the barrier of upfront costs, while public reporting of data would enable transparency, empowering customers to make informed decisions, enabling contractors to leverage information that fosters competition and reduces costs, and providing stakeholders with insights to optimize future policy-making and programmatic decisions.

Despite its potential, this intervention was identified as too large an undertaking at this time; therefore, the implementation plan was deprioritized.

## Boost smart building automation program offerings (39)

This intervention would catalog smart building automation options and develop measures and customized pathways to incentivize adoption among customers.

Examples include the installation of building energy management systems, supervisory control systems, sub-system controls (e.g., HVAC or lighting), and load flexibility and demand response automation equipment. This intervention would prioritize the equipment compliant with predefined communication protocols (e.g., OpenADR, CTA-2045, AHRI standards for DR) and those with demand management capabilities.

In addition, the program would offer incentives for retro-commissioning and ensure existing systems are reviewed for opportunities to add hardware or software that improves automation. Customers would also be incentivized to connect with utility or grid operators and demand response providers, enabling installed building automation systems to deliver dispatchable load flexibility.

Ultimately, elements of this intervention were incorporated into the demand response-focused implementation plans.

## Launch a thermal energy network pilot program (40)

This intervention would launch a pilot program for thermal energy networks (TENs). TENs—specifically networked geothermal systems—enable multiple buildings and homes to connect to a shared thermal resource. Instead of each building installing its own borefield, a common borefield and energy loop would be installed, allowing consumers to connect in a manner similar to other utility infrastructure.

This shared loop would provide thermal energy to highly efficient ground-source heat pumps within homes or businesses. The technology could also support the future of gas utilities, enabling them to build and maintain these systems while gradually phasing out traditional gas networks.

This pilot program, along with an associated market potential study and analysis, would help develop this business model. However, given the Focus on Energy program role as a non-utility program administrator and the previous completed by Marquette University, a TENs pilot was determined to be out of scope for Focus on Energy.

## Update beneficial electrification evaluation and program criteria (41)

Some measures or interventions, such as electrification, may not pass traditional Benefit Cost Analysis tests like TRC and UCT.

To more accurately capture both the costs and benefits of these interventions, this measure would implement a cost-effectiveness framework capable of analyzing costs and benefits over the intervention's lifetime. Alternatively, the measure could consider separate frameworks for Resource Acquisition programs rather than Electrification or other emerging technology measures/initiatives.

Elements of this intervention were incorporated into the cost-effectiveness implementation plan.

## Implement a program focused on water saving measures (43)

This intervention would create a program to deeply incentivize water-efficient savings measures, facilitated through a partnership between plumbers and gas, water, and electric utilities.

For example, plumbers could be provided low-flow showerheads at no cost to keep on hand, or they could be included in a new resident welcome package from the utility associated with the resident's water heater.

However, through further discussion, it was determined that this strategy had been trialed in Wisconsin; therefore, additional implementation planning was deemed unnecessary.