

From Energy Efficiency to Demand Impacts: In search of viable offerings.

As the need for demand mitigation increases, how can utilities and program administrators extend energy efficiency portfolios to increase demand impacts? ILLUME helped FOCUS ON ENERGY® discover energy efficiency measures that expand demand response benefits to support utility partner efforts in Wisconsin.



The Challenge

Utilities are looking for quick solutions to solve for a series of urgent problems: storms, extreme temperatures, and supply and demand imbalances. Energy efficiency (EE) measures that save energy during utility system peak times may provide an opportunity for EE programs to mitigate demand through improvements in technology, a higher penetration of intermittent renewable generation, and an improved understanding of demand management.



The Results

What characteristics make energy efficiency programs well-suited for deeper demand reductions? Our load shaping research helped Focus on Energy identify examples of how other utilities have leveraged EE offerings to expand demand response (DR) impacts, potential DR opportunities within Focus on Energy's existing EE portfolio, and ideas of how to explore these opportunities. Here's a preview of notable findings in our final report:

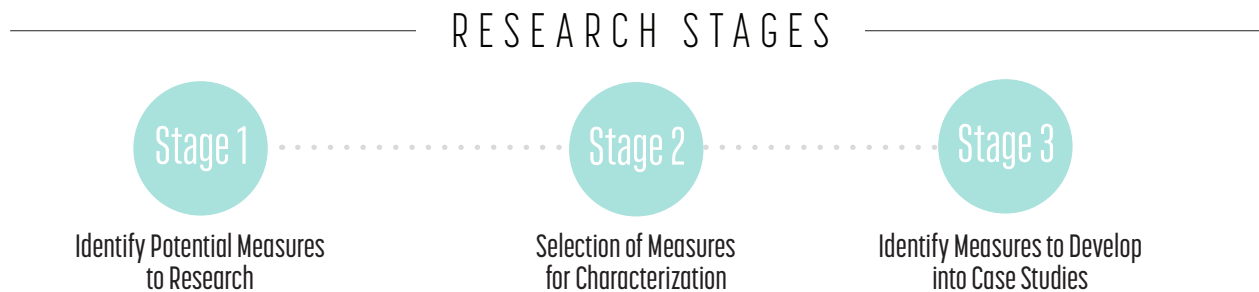
Smart thermostats, heat pump water heaters, energy recovery ventilators, certain efficient kitchen equipment—and other readily available measures in Focus on Energy's portfolio—save coincident summer demand and may be well suited to play a larger role in near-term summer DR efforts. Focus on Energy provides incentives for EE measures that save energy during Wisconsin's typical peak summer times.

Smart thermostats represent the most immediate opportunity to administer an integrated energy efficiency and demand response measure. Examples of programs currently supporting smart thermostats as an integrated EE and DR measure include Xcel Energy's DR program in Wisconsin which channels customers to combine DR rebates with Focus on Energy's EE rebates. Utilities can also use an integrated EE/DR smart thermostat strategy to test out and create learnings that can be applied to other emerging opportunities, such as residential heat pump water heaters.

There is opportunity for Wisconsin customers to receive greater benefits from some EE measures already supported by Focus on Energy via supplemental funding, education, coordination, and/or support from utilities or entities interested in demand savings. For example, customers with smart thermostats installed through Focus on Energy may be unaware of the DR opportunities from their utility. Providing education about and combining these initiatives could help drive participation in both EE and DR programs.

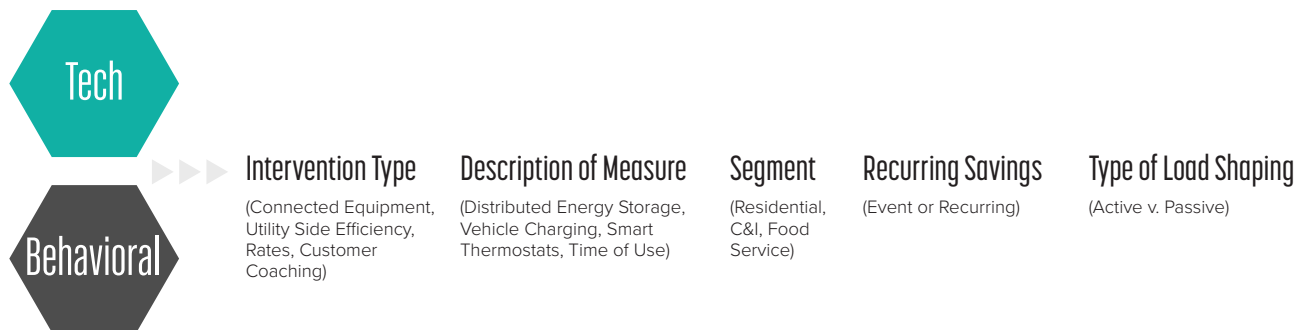
How We Did It

ILLUME and the Focus on Energy team used a staged approach to identify where and how load shaping opportunities intersect to build upon current and emerging energy efficiency opportunities in Wisconsin. At each stage, the team conducted deeper research as we narrowed through a list of more than 40 measures, ultimately resulting in four viable case studies.



Stage 1: Identify Potential Measures to Research. ILLUME and the Focus on Energy team reviewed more than 40 measures that provides energy savings during summer peak times before selecting those that best satisfied the specific needs of Focus on Energy. These included measures such as distributed energy storage, commercial EV charging, and heat pumps and energy recovery ventilators.

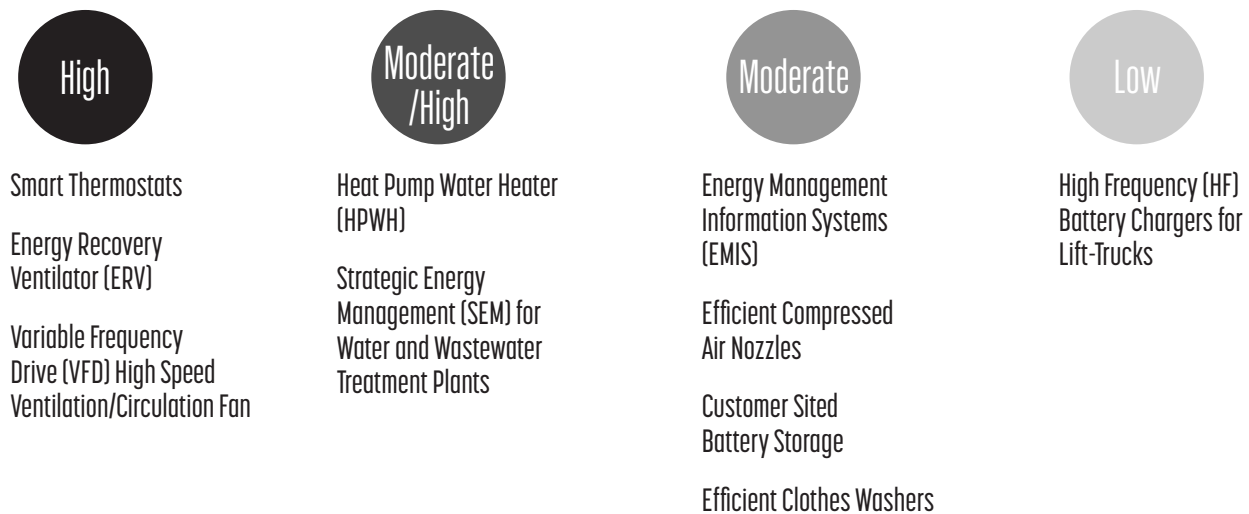
To narrow this list of technology and behavioral measures our team looked across criteria such as:



Stage 2: Select Measures for Characterization. After seeking stakeholder input on the above measures, ILLUME and the Focus on Energy team reviewed recent participation data and selected ten measures for characterizations using priorities and limitations such as:

- Prioritizing measures that save annual energy as well as energy at key times
- Providing measures with a mix of applicable sectors, including commercial, industrial, single family (SF) residential, and multifamily (MF) residential
- Prioritizing measures already included in the Wisconsin Technical Resource Manual (TRM)
- Prioritizing technology-based interventions over behavioral interventions

Top 10 Recommended Measures and Potential for Future Research (Ranked from highest to lowest potential)



Stage 3: Identify Measures to Develop into Case Studies. To select potential measures into a list of four viable case studies, ILLUME employed further criteria like whether these measures represent moderate or high demand savings potential and determine if reports, program design descriptions, and other information were readily available to produce a case study.

Which Case Studies Passed our Viability Test?

Smart thermostats as a measure to provide integrated EE and DR in Wisconsin could support adoption of smart thermostats (delivering annual energy savings) and enable utility programs to deliver load shifting with the newly adopted smart thermostats

Heat pump water heaters as a measure to deliver integrated EE/DR (but that is less mature than smart thermostats), to deliver coincident demand savings, and with potential to provide load management for an electrifying end-use

Customer sited battery storage as a potential future offering to deliver demand savings at key times

Strategic energy management for water and wastewater treatment plants as a measure to deliver integrated EE/DR and coincident demand savings

Testing for Viability

To determine the potential for energy efficiency measures to deliver deeper demand impacts, our team further tested each offering by answering rigorous questions to better understand technology improvements, penetration of renewable generation, and the program's understanding of demand management.

What is the potential for future savings?

Where does this measure sit relative to industry trends and challenges?

What are other market actors and players?

What is the potential for adoption?

What is the potential for market penetration?

What are the policy considerations?

The Takeaway

While traditional EE programs help manage peak demand through efficiency measures, there is a larger role for EE programs to mitigate future demand at critical times to the benefit of customers and the utility. These programs possess the infrastructure and market knowledge to prioritize technologies, affect adoption rates, and monitor their progress which makes them well suited to administer these directives. Through targeted research, utilities and program administrators can uncover a wealth of knowledge to further assess strategies for enhancing programs to achieve greater demand savings, explore their list of potential demand savings opportunities, and gain greater clarity on the value of additional demand savings.



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