Public Service Commission of Wisconsin

Summer Strand, Chairperson
Kristy Nieto, Commissioner
Marcus Hawkins, Commissioner

4822 Madison Yards Way
P.O. Box 7854
Madison, WI 53707-7854

September 10, 2024

To the Parties:

Re: Quadrennial Planning Process IV 5-FE-104

Comments Due:	Address Comments To:
Monday, September 30, 2024 - 1:30 pm	**5-FE-104** Public Service Commission P.O. Box 7854 Madison, WI 53707-7854
This docket uses the Electronic Records Filing system (ERF). For help with ERF, please contact PSCRecordsMail@wisconsin.gov	

The Commission memorandum concerning Focus on Energy's role in promoting beneficial electrification and consideration of a fuel neutral savings goal for Focus on Energy is being provided to the parties for comment. Comments must be received by 1:30 on Monday, September 30, 2024. **Please indicate in the title of your comment that you are commenting on: Promoting Beneficial Electrification and Consideration of Fuel Neutral Savings Goal**. Party comments must be filed using the Commission's ERF system. The ERF system can be accessed through the Public Service Commission's website at https://psc.wi.gov. Members of the public may file comments using the ERF system or may file an original in person or by mail at the Public Service Commission, 4822 Madison Yards Way, P.O. Box 7854, Madison, WI 53707-7854.

Please direct questions about this docket or requests for additional accommodations for persons with a disability to the Commission's docket coordinator, Jolene Sheil at (608) 266-7375 or Jolene.Sheil@wisconsin.gov.

Sincerely,

Joe Fontaine
Administrator
Division of Digital Access, Consumer, and Environmental Affairs

MH:JF:bs DL:02016814

Attachments: Goal Structure and Beneficial Electrification Memo
Attachment A – APTIM Electrification Memo 2024-4-1

PUBLIC SERVICE COMMISSION OF WISCONSIN

Memorandum

September 10, 2024

FOR COMMISSION AGENDA

TO: The Commission

FROM: Joe Fontaine, Administrator
Tara Kiley, Deputy Administrator
Joe Pater, Director, Office of Energy Innovation
Mitch Horrie, Performance Manager, Focus on Energy
Jolene Sheil, Portfolio Manager, Focus on Energy
Division of Digital Access, Consumer and Environmental Affairs

RE: Quadrennial Planning Process IV 5-FE-104

Suggested Minute:
The Commission directed the Division of Digital Access, Consumer and Environmental Affairs to draft an Order consistent with its discussion.

Promotion of Beneficial Electrification and Consideration of a Fuel Neutral Savings Goal

Introduction

In its Final Decision of November 14, 2022, the Commission set the goals, priorities, and measurable targets for the fourth quadrennial period (Quad IV) of Focus on Energy (Focus), from 2023 to 2026. (PSC REF#: 453081.) The Commission's decisions in Quadrennial Planning Process IV (QPP IV) considered strategies to define Focus' role in supporting electrification activities and align Focus performance goals and program offerings with decarbonization goals, among other topics. The following Commission decisions from QPP IV are most relevant to this memorandum:

- **Order Point #3**: *Focus shall continue not to claim savings and other benefits from directly supporting beneficial electrification where fuel switching from unregulated fuels to electricity provided by a participating utility occurs through its own programs and*

offerings. This Order Point reflects the Commission's statutory interpretation that Focus cannot directly support and claim the benefits associated with fuel switching from unregulated fuels to electricity, because providers of unregulated fuels do not pay into the Focus program and therefore savings achieved by their customers are not eligible for support by the program. However, this Order Point remains relevant to discussions of beneficial electrification because fuel switching from unregulated fuels to electricity is more cost-effective than switching from natural gas to electricity at current fuel prices. Residential space heating electrification is a key strategy in aligning energy efficiency programming with decarbonization goals. Single family residential customers offsetting their propane furnace heating load with a ducted electric heat pump is among the top opportunities for heat pump adoption in Wisconsin.[1]

- **Order Point #4**: *Focus shall use Quad IV as a transitional period to position the program to take on a larger role in promoting beneficial electrification statewide.* This Order Point is relevant because developing new strategies to fulfill this Commission directive may require additional clarification of its objectives to ensure alignment.
- **Order Point #1**: *Focus should play a larger role in cost-effectively reducing carbon emissions and 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*. This Order Point is relevant because achieving reductions in energy consumption by switching certain end

[1] Slipstream, Center for Energy and Environment, and Elevate. July 2023. Planning for Wisconsin Air Source Heat Pump Market Transformation. Supported by Wisconsin's Energy Innovation Grant Program (EIGP), Agreement Number: EIGP-2021-36.(PSC REF#: 472912).

uses of energy from fossil fuels to electricity (i.e., electrification) provides one strategic path for energy efficiency programs seeking to align with decarbonization goals.

- **Order Point #2**: *The Evaluation Work Group (EWG) shall develop recommendations to operationalize enhanced measurement and tracking of the program's carbon emissions reduction impacts for the purpose of program evaluation and performance tracking.* This Order Point is relevant because measurement of the program's emissions reduction impacts using credible data and methods is important in advancing the Commission's priority in Order Point #1.
- **Order Point #9:** The Commission directed staff to establish an overall millions of Btu (MMBtu) savings goal with minimum performance requirement thresholds for electric kilowatt-hours (kWh) and natural gas therm savings set at 90 percent of fuel-specific goals. This Order Point is relevant because electrification inherently increases a customer's electricity consumption while reducing its fossil fuel consumption. While the outcome of beneficial electrification as currently defined by Focus is a net reduction in energy consumption on a fuel neutral basis, pairing fuel-specific targets with a directive to take on a larger role in promoting beneficial electrification can lead to certain administrative complications in managing toward fuel-specific savings goals.

The Program Administrator, APTIM, in consultation with Commission staff, has identified several operational considerations encountered in formulating an approach to carrying out Order Point #4's directive to position Focus to take a larger role in supporting beneficial electrification. The purpose of this memorandum is to present the Commission with an analysis of those issues, drawing relevant connections to the other Order Points stated above, and seek additional clarity on the Commission's priorities for Quad IV and V. Receiving further direction

in year two of the quadrennium can allow the program to better align with the Commission's objectives for the remainder of Quad IV and more effectively prepare for further Commission review of the issue in 2026 as part of Quadrennial Planning Process V (QPP V).

The issues presented for the Commission's consideration in this memorandum are organized as follows:

1. Establishing the objective(s) and priorities for Focus in assuming a larger role in promoting beneficial electrification; and
2. Assessing the alignment of Focus' portfolio savings goal framework with the Commission's objective for the program to assume a larger role in promoting beneficial electrification, along with other operational efficiency considerations.

Background

The QPP IV Phase I staff memorandum of March 8, 2022, presented an analysis of efforts underway in other states to increase the role of energy efficiency programs in emphasizing electrification opportunities as means to align energy efficiency and decarbonization goals. (PSC REF#: 432286.) States throughout the country continue to enact policies designed to strengthen energy efficiency programs' role in both saving energy and cutting greenhouse gas (GHG) emissions.[2] Certain principles are common among states that are prioritizing the role of energy efficiency programs as a component in the overarching strategy to achieve decarbonization goals. These principles focus on achieving both energy and non-energy benefits from the perspectives of program participants and society. The term beneficial electrification may be used when describing initiatives aimed at achieving these benefits. Alternative terms have also been adopted, as will be discussed further later in this memorandum.

The Regulatory Assistance Project (RAP) defines beneficial electrification as meeting one or more of the following conditions without adversely affecting the other two: 1) saves

[2] https://www.aceee.org/blog-post/2023/07/leading-states-embracing-climate-forward-efficiency.

consumers money over the long-run, 2) enables better grid management, and 3) reduces negative environmental impacts.[3] Similarly, the Beneficial Electrification League (BEL) defines beneficial electrification as including the application of electricity to end-uses where doing so satisfies at least one of the following conditions, without adversely affecting the others: 1) saves consumers money over time, 2) benefits the environment and reduces GHG emissions, 3) improves product quality or consumer quality of life, and 4) fosters a more robust and resilient grid.[4] The Environmental and Energy Study Institute (EESI) takes the position that electrification is considered beneficial when it achieves at least one of the following conditions without harming the others: 1) saving money, 2) reducing emissions, 3) improving quality of life, and 4) strengthening the grid.[5] Finally, the American Council for an Energy Efficient Economy (ACEEE) defines beneficial electrification as strategies that provide three forms of societal benefits: reduced energy consumption (total source Btus), lower consumer costs, and reduced GHG emissions. [6]

Alternative terms to beneficial electrification have been adopted by states and industry organizations as these entities sought to clarify their objectives for programmatic initiatives. Minnesota's 2021 Energy Conservation and Optimization (ECO) Act establishes the term "efficient fuel-switching" rather than beneficial electrification as a means of clarifying the objectives of the legislation. The ECO Act requires that an efficient fuel switching project satisfy each of the following criteria to be approved in a utility's Conservation Improvement Program: 1) result in a net decrease in source energy consumption on a fuel-neutral basis;

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[3] Farnsworth, D., Shipley, J., Lazar, J., and Seidman, N. (2018, June). *Beneficial Electrification: Ensuing Electrification in the Public Interest.* Montpelier, VT: Regulatory Assistance Project

[4] Beneficial Electrification League. *What is Beneficial Electrification?* Accessed from: https://be-league.org/

[5] The Environmental and Energy Study Institute (EESI). June 15, 2022. *New Beneficial Electrification Toolkit Provides a Roadmap for Utilities and their Customers*. https://www.eesi.org/press-releases/view/new-beneficial-electrification-toolkit-provides-a-roadmap-for-utilities-and-their-customers.

[6] https://www.aceee.org/sites/default/files/electrification-dc.pdf.

2) result in net reduction in GHG emissions over its lifetime; 3) is cost-effective, considering the costs and benefits from the perspective of the consumer-owned utility, participants, and society; and 4) improves utility's system load factor.[7] The "efficient fuel-switching" term adopted in Minnesota is fuel-agnostic, meaning that programs may support fuel switching between any two forms of fuel, so long as the aforementioned criteria are achieved. The Northeast Energy Efficiency Partnerships (NEEP) defines "strategic electrification" as "powering end uses with electricity instead of fossil fuels in a way that increases energy efficiency and reduces pollution, while lowering costs to customers and society, as part of an integrated approach to deep decarbonization".[8]

Reduction in negative environmental impacts is the benefit category common to industry beneficial electrification definitions. It is also a required outcome in Minnesota's ECO Act "efficient fuel-switching" definition and NEEP's "strategic electrification" definition. Strategies that save energy and reduce GHG emissions are consistent with the Commission's duty in Wis. Stat. § 196.374(2)(a)2 to give priority to programs that avoid adverse environmental impacts from the use of energy, and with the Commission's QPP IV decisions to further explore Focus' role in supporting decarbonization.

Focus on Energy Policy Manual: Fuel Switching and Beneficial Electrification

Focus maintains a Policy Manual whose purpose is to provide a reference for various parties interacting with the program-on-program policies and procedures.[9] The Policy Manual is updated annually to perform such functions as clarifying existing program implementation and administrative policies and procedures or, adding definitions, policies, or procedures to address

[7] Minn. Stat. § 216B.2403, subd. 8.
[8] Northeast Energy Efficiency Partnership. *Strategic Electrification.* Accessed from: https://neep.org/equitable-home-and-building-decarbonization-leadership-network/strategic-electrification.
[9] https://focusonenergy.com/administrative-resources.

new administrative or implementation issues. All changes to the Policy Manual are reviewed by the Focus Compliance Agent and approved by Commission staff before they are adopted.

The Focus Policy Manual includes a definition of beneficial electrification. The Focus Program Administrator relies on the definition to guide the design and implementation of programs in pursuit of beneficial electrification as a policy objective. The Focus Policy Manual currently adopts the ACEEE definition of beneficial electrification, which requires beneficial electrification projects to result in each of the following outcomes: 1) reduced energy consumption (total source Btus), 2) lower consumer costs, and 3) reduced GHG emissions.

The Focus Policy Manual also maintains a fuel switching policy that is distinct from the program's beneficial electrification definition. The Focus fuel switching policy is written as follows:

> *Fuel switching projects may qualify for Incentives provided the project results in a decrease in overall MMBtu at the Customer's site and that the fuel to which the Customer is switching is purchased from a participating Focus on Energy Utility.*[10]

There are key distinctions between the Focus beneficial electrification definition and the Focus fuel switching policy. These distinctions are illustrated in Table 1 and are discussed in detail in the next sections of the memorandum. First, the Focus beneficial electrification definition and fuel switching policy consider reductions in energy consumption resulting from projects at different locations- reductions related to fuel switching are measured at the customer site, whereas beneficial electrification measures energy reductions at the source where the energy is generated, such as a utility generation facility. (The source-site distinction is explained in further detail later in this memorandum.) Next, projects must result in lower consumer costs and

[10] Focus on Energy Policy Manual. Published: December 1, 2023, Effective: January 1, 2024. https://assets.focusonenergy.com/production/inline-files/2024/FOCUS-2024-Policy-Manual-Final.pdf.

reduced GHG emissions to be considered *beneficial electrification*; however, the Focus *fuel switching policy* does not consider either outcome in determining whether a project qualifies for a program incentive. Consistent with Order Point #3 from QPP IV cited above, both beneficial electrification and fuel switching projects cannot account for the savings or other benefits when customers switch from an unregulated fuel to electricity provided by a participating utility. Currently, Focus does not routinely screen projects for the beneficial electrification definition criteria when determining program eligibility, whereas the fuel switching criteria are considered in determining program eligibility project-by-project.

Table 1. Focus Beneficial Electrification and Fuel Switching Criteria

Criteria	Focus Beneficial Electrification Definition	Focus Fuel Switching Policy
Reduced *Source* Energy Consumption	X	
Reduced *Site* Energy Consumption		X
Lower Consumer Costs	X	
Reduced GHGs	X	
Must switch to a fuel provided by a participating utility		X
Cannot consider savings and other benefits in switching from unregulated fuels to electricity provided by a participating utility	X	X

The Focus *fuel switching policy* has undergone updates over the past few years as market opportunities to achieve energy savings through such projects have become more prevalent. Prior to recent updates, the Focus *fuel switching policy* was narrow in scope to support program incentives for customers wishing to switch from electric resistance to natural gas for water and space heating. This version of the policy emphasized the cost benefits of emphasizing projects that switched customers from electric resistance heating to natural gas, due to the high unit costs of heating with electric resistance. Continued advances in heat pump technologies, including

improvements in cold climate performance, along with a growing consumer interest in heat pumps, has driven recent updates to the Focus fuel switching policy to enable program opportunities to offer heat pumps in fuel switching scenarios.

There have been two revisions to the Focus *fuel switching policy* in recent years. The first revision occurred in the 2021 Policy Manual. With this revision, the fuel switching policy was updated to be less specific to the applications eligible for fuel switching. The updated version also removed language that justified fuel switching by considering the efficiency achieved at the generation source. The 2021 fuel switching policy was written as follows:

> *Fuel switching projects may qualify for incentives provided the project results in a decrease in overall MMBtu at the customer's site, is cost-effective, and that the fuel to which the Customer is switching is purchased from a participating Focus on Energy Utility.*

The policy was further revised in the 2023 Policy Manual update to remove the requirement that fuel switching projects are cost-effective to be eligible for an incentive. The justification for this revision was a lack of clarity as to whether a project was required to be cost-effective from the customer perspective (i.e., result in reduced energy bills or meet a certain payback period threshold), from a modified total resource cost perspective (Focus' primary cost-effectiveness test as determined by the Commission), or by some other measure of cost-effectiveness (e.g., meets a savings cost of acquisition threshold aligned with the Program Administrator's goals). The revised, current fuel switching policy is written as follows:

> *Fuel switching projects may qualify for Incentives provided the project results in a decrease in overall MMBtu at the Customer's site and that the fuel to which the Customer is switching is purchased from a participating Focus on Energy Utility.*[11]

[11] Focus on Energy Policy Manual. Published: December 1, 2023, Effective: January 1, 2024. https://assets.focusonenergy.com/production/inline-files/2024/FOCUS-2024-Policy-Manual-Final.pdf.

Objectives and Definitions for Beneficial Electrification and Fuel Switching

APTIM delivered a memorandum to Commission staff on April 1, 2024, outlining areas it identifies as needing further guidance from the Commission in support of operationalizing the Quad IV directives that Focus position itself to take on a larger role in promoting beneficial electrification statewide (Order Point #4) and more generally play a larger role in cost-effectively reducing carbon emissions (Order Point #1). APTIM's memorandum to staff is attached to this memorandum (Attachment A). Clarification of the Commission's priorities for beneficial electrification are sought to ensure the program is appropriately aligned with the Commission's objectives. The sections below discuss the criteria that typically define beneficial electrification and how they are currently addressed in Focus.

Reducing Costs

Statute defines an energy efficiency program to be offered by Focus as, "a program for reducing the usage or increasing the efficiency of the usage of energy by a customer." Wis. Stat. § 196.374(1)(d). The definition of energy efficiency program does not explicitly state that there must be a reduction in energy costs.

The Commission's determination in QPP IV that Focus cannot claim savings from projects switching from unregulated fuels to electricity (Order Point #3) limits the scenarios under which the program can incent electrification projects that can reliably satisfy a criterion requiring lower annual energy costs for the participating customer. At current energy prices, switching from unregulated fuels to electricity as a heating source is commonly more cost-effective for customers than switching from natural gas to electricity.[12] According to APTIM, no

[12] Center for Energy and Environment and Elevate Energy. October 2021. *Focus on Energy EERD Report: Air Source Heat Pumps in Wisconsin Multifamily and Single-Family Applications.* https://s3.us-east-1.amazonaws.com/focusonenergy/staging/inline-files/2021/EERD_ASHP_Project-Final_Report.pdf.

electrification measures currently offered by Focus consistently align with a criterion requiring electrification to result in lower utility bills statewide, including for gas to electric conversions.

The current Focus definition of beneficial electrification states that an electrification strategy is beneficial if it results in lower consumer costs. Unlike the term "cost-effective", which can be interpreted as the ratio of benefits to costs from any number of perspectives (e.g., total resource cost, participant, society, utility), lower consumer costs can be more directly interpreted to represent lower costs from the perspective of the consumer undertaking the project. Accordingly, APTIM interprets this requirement to mean that an electrification project must result in lower annual energy costs for the participating customer. Notably, the definitions from BEL and RAP cited above assume a longer-view of consumer cost savings than APTIM's interpretation, considering the impact on consumer costs "over the long run" or "over time" without specifying how those impacts are to be calculated.

Residential customers switching from natural gas to an electric air-source heat pump (ASHP) for space heating is the primary electrification measure offered in the Focus portfolio.[13] Heat pump water heaters (HPWHs) replacing natural gas water heaters also occurs, but program participation for these measures has been negligible compared to ASHPs. In scenarios where a household receives a program incentive to install an ASHP replacing a natural gas furnace and central air-conditioner, Focus claims 681 lifecycle MMBtu of savings after accounting for both the increase in electric usage and decrease in natural gas usage.[14] By comparison, Focus claims 168 lifecycle MMBtu of savings for each residential customer receiving a rebate to replace an existing natural gas furnace with the most efficient furnace offered by the program.

[13] According to program data, the number of ASHP replacing natural gas projects has increased more than 300 percent since 2021.
[14] The Cadmus Group. *Wisconsin Focus on Energy 2024 Technical Reference Manual*. January 7, 2024. https://assets.focusonenergy.com/production/inline-files/Focus-on-Energy-2024-TRM.pdf.

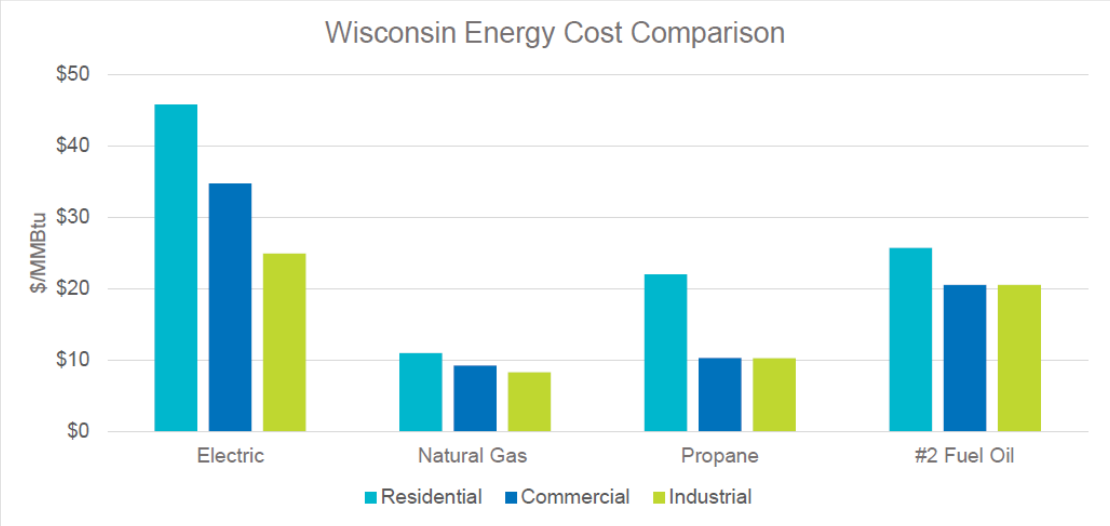
Although installation of a heat pump results in higher energy savings, APTIM notes in its memorandum that natural gas to ASHP electrification is unlikely to decrease, and may increase, the participant's annual operating costs for meeting its space heating needs at current energy prices; as illustrated in Figure 1, electricity is currently more than four times more expensive than natural gas per MMBtu for residential customers in Wisconsin.

Several factors determine the precise impact on a specific customer's utility bills, including the efficiency of the equipment being replaced, utility rates, operational parameters (e.g., outdoor switchover temperature in dual-fuel applications), and building envelope characteristics. Research performed for Focus estimates a range of potential impacts to average customers' annual utility costs in scenarios where a customer switches from natural gas furnace to dual-fuel heat pump.[15] The Center for Energy and Environment's (CEE's) analysis found that at statewide average gas and electric rates, customers' heating costs may decrease by five dollars annually when controls are set to switch from ASHP to backup natural gas furnace when outdoor temperatures drop below 45 degrees Fahrenheit. However, when the switch to backup natural gas heat occurs at lower outdoor temperatures (i.e., the customer relies on the ASHP to serve more of its annual heating load), annual heating costs increase. CEE's analysis estimates customers' annual heating costs may increase by an average of $155 when utilizing ASHP for space heating down to outdoor temperatures of five degrees Fahrenheit.[16] Additional analysis performed by APTIM has found that at current rates, customers of several of the state's largest investor-owned utilities are unlikely to realize reduced energy costs at any switchover

[15] Dual-fuel heat pump refers to an application where a customer uses a combination of electricity (ASHP) and fossil fuel (e.g., natural gas furnace) to meet the full heating load of the building.
[16] Center for Energy and Environment and Elevate Energy. October 2021. *Focus on Energy EERD Report: Air Source Heat Pumps in Wisconsin Multifamily and Single-Family Applications.* https://s3.us-east-1.amazonaws.com/focusonenergy/staging/inline-files/2021/EERD_ASHP_Project-Final_Report.pdf.

temperature due to the size of the difference between their higher electric and lower natural gas rates.

Figure 1. Wisconsin Energy Cost Comparison[17,18,19,20,21,22]



APTIM identifies other considerations with respect to the current requirement that beneficial electrification projects result in reduced costs for the participating customer. The example provided in APTIM's memorandum (see Attachment A) contemplates a scenario where a non-residential customer pursues a project within its manufacturing process replacing a gas-fired heat source with an electric source. The project results in energy savings on a fuel-neutral basis (i.e., reduction in natural gas Btu is greater than the increase in electric Btu) but the

[17] U.S. Energy Information Administration. *Wisconsin State Electricity Profile.* https://www.eia.gov/electricity/state/wisconsin/xls/wi.xlsx.
[18] U.S. Energy Information Administration. *Wisconsin Natural Gas Prices*. https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SWI_a.htm.
[19] U.S. Energy Information Administration. *Weekly Wisconsin Propane Residential Prices.* Average of 2023 weekly residential propane prices. https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=W_EPLLPA_PRS_SWI_DPG&f=W.
[20] U.S. Energy Information Administration. *Weekly Wisconsin Propane Wholesale/Resale Price.* Average of most recent year wholesale prices assumed to be representative of larger users of propane. https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=W_EPLLPA_PWR_SWI_DPG&f=W.
[21] U.S. Energy Information Administration. *Weekly Wisconsin No. 2 Heating Oil Residential Price*. Average of most recent year. https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=W_EPD2F_PRS_SWI_DPG&f=W.
[22] U.S. Energy Information Administration. *Weekly Wisconsin No. 2 Heating Oil Wholesale/Resale Price*. Average of most recent year wholesale prices assumed to be representative of larger users of No. 2 heating oil.

customer's energy bill increases because electricity is more expensive per Btu than natural gas. The customer may have been motivated to perform this retrofit to reduce its GHG emissions and realize non-energy cost savings such as improved product quality (less waste), improved production speed (less time to produce same amount of product), increased production capacity, and increased safety (which can lead to lower insurance costs). However, since the project did not result in lower consumer costs of energy, it would not be considered a beneficial electrification project under the current Focus definition.

In its memorandum to Commission staff (Attachment A), APTIM takes the position that it would be beneficial to clarify more specifically how customer costs should be addressed in defining beneficial electrification projects. APTIM suggests the Commission could provide more flexibility for supporting beneficial electrification projects by establishing reduced consumer costs as an optional requirement that is not required when other conditions are satisfied, or broadening the definition to consider reductions in non-energy costs that may benefit the customer, such as improved business operations. For example, APTIM's example of a non-residential customer motivated to electrify for reasons other than solely reducing utility costs may become more commonplace if companies increasingly pursue fuel switching projects to meet corporate sustainability goals.

Reducing Emissions

Beneficial electrification has been adopted as a strategy by jurisdictions seeking to align energy efficiency programs with decarbonization goals. Each of the industry definitions of beneficial electrification presented in the Background section of this memorandum identifies emissions reduction (or avoiding negative environmental impacts) as a criterion. Focus' working definition of beneficial electrification states that an electrification strategy is beneficial if it

results in reduced GHG emissions. As mentioned above, this criterion is consistent with the Commission's duty in Wis. Stat. § 196.374(2)(a)2 to give priority to programs that avoid adverse environmental impacts from the use of energy.

A project's lifecycle emissions impact depends on its effective useful life (EUL) and the emissions intensity of the grid over time (e.g., pounds of CO_2 per megawatt-hour of electricity generated). Modeling performed by University of California – Davis estimates an ASHP installed in the Midwest in 2024 will achieve about a 15 percent reduction in carbon emissions over its lifetime relative to a high efficiency gas furnace. The percent reduction will increase in future years as fossil fuel generation sources are retired and carbon-free sources of generation make up a greater portion of the electric power generation mix.

Focus does not currently have a process in place to estimate project-level emissions impacts. Emissions impacts (tons of CO_2 avoided) are currently estimated at the portfolio level after total energy savings are verified by the Evaluator using the U.S. Environmental Protection Agency's (U.S. EPA's) AVoided Emissions and geneRation Tool (AVERT).[23] Portfolio-level emissions benefits are calculated by multiplying the avoided emissions impacts derived from AVERT by the market-based value of avoided carbon emissions approved by the Commission. (PSC REF#: 487366.) These benefits are incorporated into Focus' portfolio-level cost-effectiveness assessments, consistent with the Commission's primary cost-effectiveness test.

A guiding principle for any program's cost-effectiveness test is that the costs and benefits it measures should be aligned with the policy goals and priorities of the program. APTIM's memorandum notes that in directing the program to transition to a greater emphasis on reducing carbon emissions and take on a larger role in promoting beneficial electrification statewide, the

[23] https://www.epa.gov/avert.

Commission may wish to consider whether there are more appropriate metrics or cost-effectiveness testing frameworks to apply. A review of the appropriate portfolio cost-effectiveness test and carbon value are typically included in the scope of each quad planning process.

Reducing Energy Consumption

Reductions in energy consumption can be measured at the source of generation or at the customer site. Reductions in site energy consumption measures the change in the amount of energy consumed at the customer's location and is measured by changes in the amount of metered consumption reflected on a customer's utility bill. Source energy consumption refers to the total amount of energy used to power a building and includes all transmission, delivery, and production losses that occur between the source of generation, such as a utility generation facility, and the use of the energy at the site.

The U.S. EPA considers source energy as "the most equitable unit of evaluation for comparing different buildings to each other."[24] The U.S. EPA maintains national source-site ratios for its ENERGY STAR® Portfolio Manager tool to convert site energy to source energy.[25] For electricity purchased from the grid, U.S. EPA estimates that the use of one unit of energy at the customer site is associated with the use of 2.8 units of energy at the source.

Currently, the Focus *fuel switching policy* identifies projects that result in a decrease in overall energy consumption at the *customer site* as eligible for program incentives. By contrast, the program's *beneficial electrification* definition, aligned with the ACEEE definition, considers projects that achieve a reduction in *source* energy consumption to be beneficial. Considering the

[24] https://www.energystar.gov/buildings/benchmark/understand-metrics/source-site-difference
[25] U.S. EPA ENERGY STAR Portfolio Manager. August 2023. Technical Reference: Source Energy. https://portfoliomanager.energystar.gov/pdf/reference/Source%20Energy.pdf.

impact of electrification on source energy consumption also aligns with the Minnesota ECO Act "efficient fuel switching" definition requiring an efficient fuel switching project to "result in a net decrease in source energy consumption on a fuel-neutral basis".[26] NEEP's strategic electrification definition emphasizes the use of electricity instead of fossil fuels in a way that increases energy efficiency. It is unclear if NEEP's definition considers energy efficiency at the generation source, customer site, or both. Industry definitions of beneficial electrification from RAP, BEL, and EESI do not include reduction in energy consumption as a distinct outcome.

The Program Administrator has identified challenges in operationalizing initiatives that consider reductions in energy consumption at different points in the process. In general, Focus measures site energy reductions for the measures it offers, and does not typically consider reductions in energy consumption at the generation source. However, it may be noted that the Commission has found it reasonable for Focus to claim energy savings that reduce energy consumption at locations other than the customer's site in certain circumstances when emerging policy priorities have called to question how the program should account for their benefits in practice. In its Final Decision of September 5, 2014, the Commission determined it is appropriate for the program to offer incentives for water saving measures that also reduce the energy involved with supplying water to and/or treating wastewater from homes and businesses, and direct staff to develop methods to estimate the amount of water-related energy savings. (PSC REF#: 215245.) Since that decision, Focus has claimed the site-level energy savings as well as the associated reduction in source energy involved in supplying water and/or treating wastewater for water saving measures it incentivizes, such as faucet aerators. Calculated

[26] Minnesota uses source energy to assess fuel-switching projects. Source energy is defined as "the total amount of primary energy required to delivery energy services, adjusted for losses in generation, transmission, and distribution, and expressed on a fuel neutral basis.
https://www.revisor.mn.gov/bills/text.php?number=HF164&type=ccr&session=ls92&version=0.

reductions in water use are multiplied by a kWh per thousand gallons (kgal) factor to derive the energy saved from water and wastewater utilities claimed by the program.[27]

APTIM's memorandum (Attachment A) states that a reduction in source energy appears to be a more holistic consideration and better aligned with broader decarbonization efforts compared to considerations of site-level energy use. As mentioned above, significant reductions in site-level energy consumption (fuel-neutral) are achieved through space heating electrification in Wisconsin. Source energy consumption impacts depend on the types of generation resources supplying the grid. Research performed by CEE explored the source energy use of ASHPs under different grid conditions.[28] This research found that in northern climates ASHPs are significantly more efficient than natural gas furnaces at the customer site and only modestly more efficient at the generation source under current (2018) grid conditions. CEE further concludes that "as the share of renewables grows, source energy benefits will increase." Therefore, while considering source generation impacts may be a more holistic approach aligned with decarbonization goals, these impacts are dependent on grid conditions that are exogenous to Focus. Further analysis would be required to fully assess source energy reductions of electrification from program offerings.

Under current grid conditions, certain fuel switching measures are capable of achieving greater source energy reductions than others. APTIM's memorandum adds that prioritizing source energy consumption could have broader implications for the role of natural gas combined

[27] Focus currently claims 3.89 kWh per kgal water saved by relevant projects. This factor is derived from data reported by Wisconsin wastewater utilities to the Wisconsin Department of Natural Resource's Compliance Maintenance Annual Report (CMAR) and from Wisconsin water utility benchmarking data prepared by the State Energy Office.

[28] Edwards, J., et. al. Center of Energy and Environment. *Brrr! The Outlook for Beneficial Electrification in Heating Dominant Climates*. Presented at 2018 ACEEE Summer Study. https://www.mncee.org/sites/default/files/report-files/Brrrrr%E2%80%A6%21-The-Outlook-for-Beneficial-Electrification-in-Heating-Dominant-Climates.pdf.

heat and power (CHP) systems in the Focus portfolio. Natural gas-fired CHP is a type of distributed generation whereby the customer combusts natural gas to generate electricity on site to meet its electric demand while also recovering the waste heat from this process and converting it to useful thermal energy, usually in the form of steam or hot water. A CHP unit allows the energy consumed at the customer site to be produced more efficiently compared to conventional electricity generation.[29] By locating the source of electricity generation at the customer site, the customer can capture and use heat that would otherwise be wasted during the generation process and electricity losses occurring in the transmission and distribution system are minimized. Consequently, CHP systems installed in the near term also result in lower GHG emissions compared to separate heat and grid-sourced power. Discussions with APTIM indicate there may be a growing market for natural gas CHP in Wisconsin, but its role in Focus is limited when only site-level consumption impacts are considered.[30] Notably, natural gas-fired CHP is not considered an electrification measure, however it may be considered a fuel switching measure.

Maintaining the program's existing priority for site-level energy savings may make it appropriate to consider revising Focus current source-based beneficial electrification definition to consider an electrification project beneficial when it results in a reduction in net energy consumption at the customer site. On the other hand, confirming an emphasis on the source-level energy impacts of beneficial electrification and/or fuel switching may merit the development of an agreed upon methodology to calculate reductions in source energy that the program could use to test for this criterion. This would require administrative resources on the part of the Program Administrator, Evaluator, and Commission staff to develop this guidance.

[29] According to the EPA nearly two-thirds of energy is wasted during conventional separate power and heat generation. U.S. EPA. *What is CHP?* Accessed from: https://www.epa.gov/chp/what-chp#:~:text=CHP%20is%20a%20technology%20that,water%2C%20or%20even%20chilled%20water..

[30] The Inflation Reduction Act offers a 30 percent Investment Tax Credit for qualifying CHP systems.

Grid Impacts

Beneficial electrification definitions from energy efficiency groups cited in the Background section of this memorandum (ACEEE and NEEP) do not include a criterion that considers impacts to the electric grid. By contrast, non-energy efficiency industry group definitions of beneficial electrification cited in this memorandum (RAP, BEL, EESI) include considerations that beneficial electrification does not introduce negative impacts to the electric grid. Minnesota's ECO Act criteria for efficient fuel switching includes the requirement that fuel switching projects improve a utility's system load factor.[31] There is not consistent language regarding the grid resiliency benefits of beneficial electrification among the definitions cited in this memorandum, and each characterizes these benefits broadly.[32]

Focus' ACEEE-based definition of beneficial electrification does not address grid impacts, but it may be noted that Focus' statutory duties include, under Wis. Stat. §196.374(3)(b)1, to give priority to programs that promote energy reliability and adequacy. Defining the appropriate meaning and metrics for a criterion considering the grid impacts of electrification would require additional consideration before Focus could implement the criterion in practice. Until clarity of its meaning is determined, the program would be challenged to assess whether an electrification project reliably satisfies this criterion. Moreover, it may be more challenging for a statewide, third-party administered program to assess grid impacts compared to utility-run programs where activities can be more directly integrated into utility-level grid planning and analysis.

[31] Minnesota's requirement that efficient fuel switching improve a utility system's load factor may be an administratively challenging option for a statewide energy efficiency program serving more than 100 individual utilities, each with different load profiles.

[32] RAP's definition of beneficial electrification, for example, requires beneficial electrification projects enable better grid management. Projects involving the installation of technologies with load management capabilities (e.g., electric HVAC paired with Wi-Fi enabled controls) could be interpreted as enabling better grid management.

Summary

The preceding sections provide context for the types of benefits that may be considered in adopting a definition of beneficial electrification. Throughout the sections, staff differentiate Focus' current criteria for *beneficial electrification* from its eligibility requirements for *fuel switching*, where appropriate. With these distinctions, staff seek to contextualize the operational considerations identified by APTIM that impact how and to what degree it can advance the Commission's priority for the program to take on a larger role in promoting beneficial electrification statewide under current market and economic conditions. The discussion highlights how Focus' support for a growing ASHP market is contributing to shifting consumer preferences and providing opportunities for customers to electrify their homes. However, the dominant electrification measure in the Focus portfolio (ASHPs replacing natural gas for space heating) does not reliably meet the program's current beneficial electrification definition criterion to reduce consumer costs because electricity is more expensive per Btu than natural gas.

The Commission's objectives for beneficial electrification will inform the initiatives the program pursues as it formulates its approach to advancing the Commission's directive to take on a larger role in promoting beneficial electrification statewide. Additional Commission guidance can provide clarity for the Program Administrator to ensure that future program operations are appropriately aligned with the Commission's priorities. Staff present the Commission with decision alternatives intended to clarify the objectives the program should prioritize in carrying out Order Point #4 and positioning the program to take on a larger role in promoting beneficial electrification statewide.

Commission Alternatives – Lower Consumer Costs

Cost considerations are discussed throughout this memorandum both in terms of their role in industry definitions of beneficial electrification and challenges encountered by Focus in providing electrification offerings that reliably result in reduced utility costs. The Commission may find it appropriate to include a reduction in consumer costs as a priority criterion defining the Focus definition of beneficial electrification. In doing so, it may also wish to provide guidance on the appropriate definition of consumer costs to aid the program in ensuring its initiatives are properly aligned with the Commission's priorities for beneficial electrification. Alternatively, the Commission may wish to take no action on providing guidance on an interpretation of the definition of consumer costs for purposes of a Focus beneficial electrification definition at this time.

If the Commission determines that lower consumer costs are requirement of beneficial electrification for Focus, APTIM's memorandum to Commission staff recommends considering whether this criterion should be broadly interpreted to enable greater flexibility in the types of projects that meet the definition. Alternative One below provides the Commission with the option to expand the definition of lower consumer costs beyond just annual energy costs to also include considerations of non-energy costs. These non-energy costs may include monetizable benefits realized by the customer as a result of electrifying. APTIM's memorandum identifies improvements in business productivity and safety as examples of the types of monetizable outcomes that could be considered. The program would need to devote resources toward defining the parameters for the types of costs it would consider when assessing whether an electrification project results in lower consumer costs when the term is interpreted consistent with Alternative One.

Alternative Two would maintain the current interpretation that the lower consumer costs criterion of the Focus beneficial electrification definition means lower annual energy costs. This interpretation may be preferred if the Commission wishes to clarify that reductions in annual energy costs are a priority outcome of Focus beneficial electrification initiatives. A requirement that beneficial electrification projects result in lower utility bills limits the currently available opportunities to advance the Commission's beneficial electrification directive due to disparities in costs for electricity and natural gas across the state. Cost savings from space heating electrification may be more likely in certain participating utility territories where the combination of electric and natural gas rates are conducive to this outcome. In other participating utility territories, it is likely that space heating electrification will result in increased utility costs. Focus may be challenged to administer beneficial electrification strategies statewide when the intended outcomes of these offerings would not be consistently realized by all utility customers throughout the state.

Clarifying that lower annual energy costs are a priority of Focus beneficial electrification strategies would not prohibit the program from incenting electrification projects that do not satisfy this condition. As noted above, the Focus fuel switching policy does not require fuel switching projects result in lower energy costs to be eligible for program incentives. However, clarifying this priority for beneficial electrification projects may compel the program to develop processes to screen projects for this outcome to more closely monitor the program's ability to align with the Commission's priorities and fulfill its directive to position the program to take on a larger role in promoting beneficial electrification statewide.

Alternative One: Lower consumer costs shall be broadly interpreted and may consider both energy and non-energy costs over a project's lifetime.

Alternative Two: Lower consumer costs shall be interpreted as lower annual energy costs.

Alternative Three: Take no action.

Commission Alternatives - Beneficial Electrification Definition

The alternatives below present the Commission with options for selecting a beneficial electrification definition aligned with its priorities for Focus as it pursues strategies to advance the QPP IV directive that Focus take on a larger role in promoting beneficial electrification statewide. The definitions presented represent combinations of criteria drawing from industry and jurisdictional definitions and from the discussion in this memorandum and APTIM's memorandum to Commission staff (Attachment A).

Alternative One represents an option to maintain Focus' current, ACEEE-based beneficial electrification definition. With a selection of Alternative One, the Commission would clarify that electrification strategies that result in reduced source energy consumption, GHGs, and consumer costs are beneficial and are aligned with its priorities for Focus. A beneficial electrification definition consistent with Alternative One would apply an interpretation of lower consumer costs consistent with the Commission's guidance above. With Alternative One, the Commission would prioritize beneficial electrification projects for their total source Btu reduction impacts. This may be appropriate if it finds merit in APTIM's position stated in its memorandum that source energy appears to be a more holistic consideration and better aligned with broader decarbonization efforts. Prioritizing the source Btu impacts of beneficial electrification may compel Focus to allocate resources to develop an approach to assess projects'

ability to achieve these reductions, and establishing this definition now could allow Focus staff to initiate those efforts in preparation to inform further Commission consideration of beneficial electrification in Quadrennial Planning Process V decisions in 2025 and 2026.

Alternative Two is similar to Alternative One except that it prioritizes beneficial electrification strategies' site-level energy consumption impacts rather than total source energy consumption impacts. The Commission may find Alternative Two appropriate if it prefers to align the Focus beneficial electrification definition criterion for reducing energy consumption with Focus' longstanding practice of prioritizing energy savings at the customer site. Considering the site-level energy savings of beneficial electrification also aligns with the Focus fuel switching policy which requires fuel switching projects to result in a decrease in overall energy consumption (Btu) at the customer site. Considering the site-level Btu reductions of beneficial electrification rather than reductions at the source is not likely to compel the program to develop an approach to assess projects' source energy consumption impacts. Emphasizing site-level Btu reductions in Focus' beneficial electrification definition would not align with certain industry organizations (ACEEE) and jurisdictions (Minnesota) that have identified source energy consumption as priorities in their definitions of beneficial electrification and efficient fuel switching, respectively.

Alternative Three is an option to modify Focus' ACEEE-based *beneficial electrification* definition to align it with the program's *fuel switching policy* by directing the program to prioritize electrification projects for their ability to achieve overall (Btu) energy consumption reductions at the customer site while also achieving reductions in GHGs when a customer fuel switches from a fossil fuel to electricity.[33] While reducing GHG emissions is not an explicit

[33] Consistent with the Commission's decision in QPP IV, reductions in unregulated fuel consumption and associated benefits would continue not to be claimed by Focus.

condition of the Focus *fuel switching policy*, all projects that save energy result in lower emissions. Like with the Focus *fuel switching policy*, reduced consumer costs would not be required to meet the definition of *beneficial electrification* under Alternative Three. Therefore, any decision in the section directly above clarifying the meaning of lower consumer costs for purposes of interpreting a beneficial electrification definition for Focus would not be applicable to a beneficial electrification definition consistent with Alternative Three in this section.

A beneficial electrification definition consistent with Alternative Three is a more flexible definition compared to Alternatives One and Two because it would not require the program to consider whether electrification projects result in lower consumer costs - a criterion that has been identified as challenging to reliably satisfy for electrification projects incented by Focus under current conditions. Focus has demonstrated an ability to quickly scale up residential ASHP adoption in fuel switching scenarios over the last few years. With Alternative Three, it may be reasonable to expect this trajectory to continue or accelerate because ASHP fuel switching measures currently eligible for program incentives under the fuel switching policy would continue to be eligible and the program would have clarity from the Commission that those measures are also aligned with its priorities for beneficial electrification. If and when such growth occurs, APTIM will need to monitor and manage the cost-effectiveness impacts. Negative electric savings in these scenarios exert downward pressure on cost-effectiveness that may not be offset by the benefits from positive natural gas savings and emissions reductions accounted for in the current Focus cost-effectiveness framework.

Under Alternative Four the Commission may consider redefining its QPP IV beneficial electrification directive by emphasizing "beneficial fuel switching" instead of beneficial electrification. This would be similar to the approach and terminology adopted in Minnesota as

that state sought to differentiate its programs from more traditional beneficial electrification definitions in pursuit of its policy priorities, adopting a fuel-agnostic definition supports fuel switching that is either electrification (gas to electric) or not electrification (electric to gas) to achieve the desired outcomes. Adopting the term beneficial fuel switching may add flexibility to the types of technologies and applications the program can pursue in aligning with the Commission's directive to continue to emphasize energy savings while it also seeks to make measurable progress toward a transition to greater emphasis on reducing carbon emissions.

Alternative Four may be preferred if the Commission finds it appropriate to take a fuel-agnostic position in setting the Commission's priorities for strategies that achieve energy savings and align with decarbonization goals. APTIM's memorandum (Attachment A) recommends considering whether "beneficial fuel switching" is a more effective term to apply to achieve the same goals of beneficial electrification while enabling Focus to better support a range of energy-saving decarbonization technologies, including natural gas-fired CHP. As with Alternative One, emphasizing reductions in source energy consumption with a selection of Alternative Four may compel Focus to develop an approach to assess projects for their ability to achieve this outcome, and providing this direction now could enable staff to begin developing this approach in advance of Quad Plan V decisions.

Under Alternative Five, the Commission could consider staff's analysis of the criteria appearing in beneficial electrification industry definitions as well as stakeholder comments received to create a customized beneficial electrification definition for Focus consistent with its discussion. Alternative Five may be appropriate if the Commission concludes that none of the four preceding alternatives fully align with the Commission's objectives in directing Focus to

take on a larger role in promoting beneficial electrification statewide, or the Commission desires to develop a definition that integrates components from multiple alternatives.

Alternative One: Status Quo. In consideration of the Commission's directive for Focus to position itself to take on a larger role in promoting beneficial electrification statewide, beneficial electrification shall be defined as strategies that:

- Reduce energy consumption (total source Btu)
- Lower consumer costs
- Reduce greenhouse gas emissions

Alternative Two: In consideration of the Commission's directive for Focus to position itself to take on a larger role in promoting beneficial electrification statewide, beneficial electrification shall be defined as strategies that:

- Reduce energy consumption (total site Btu)
- Lower consumer costs
- Reduce greenhouse gas emissions

Alternative Three: In consideration of the Commission's directive for Focus to position itself to take on a larger role in promoting beneficial electrification statewide, beneficial electrification shall be defined as strategies that:

- Reduce energy consumption (total site Btu)
- Reduce greenhouse gas emissions

Alternative Four: The Commission revises its Quad IV directive for Focus to take on a larger role in promoting beneficial electrification statewide to a directive for Focus to take on a larger role in promoting *beneficial fuel switching* statewide. Beneficial fuel switching shall be defined as strategies that:

- Reduce energy consumption (total source Btu)
- Lower consumer costs

- Reduce greenhouse gas emissions

Alternative Five: In consideration of the Commission's directive for Focus to position itself to take on a larger role in promoting beneficial electrification statewide, beneficial electrification shall be defined as strategies consistent with the Commission's discussion.

Commission Alternatives – Additional Beneficial Electrification Issues

The decision alternatives below represent additional beneficial electrification issues the Commission may determine are worthy of further consideration on their own terms or in the context of the decisions made above based on the information presented in the staff memorandum and APTIM's memorandum to staff (Attachment A). A full analysis of the issues presented in the decision alternative below were beyond the scope of this memorandum. However, the Commission may wish to provide its guidance on appropriate next steps and priorities for further analysis going forward.

Cost-effectiveness considerations (Alternative One) are discussed throughout the memorandum in the context of the potential impacts of electrification on portfolio cost-effectiveness and the alignment of beneficial electrification objectives with Focus' cost-effectiveness framework. Key performance indicators (KPIs) for beneficial electrification (Alternative Two) were not discussed in-depth in this memorandum, however, in establishing clarity of the Commission's priorities for beneficial electrification, it may also want to consider appropriate performance metrics to assess the program's ability to achieve those priorities as part of the scope of Quad V planning. The Commission's recent consideration of KPIs to address its priorities to improve program services for underserved customers is an example in setting measurable targets to advance its priorities for program outcomes that extend beyond energy savings. (PSC REF#: 506180.) Finally, considerations of the grid impacts of electrification

were discussed in the Grid Impacts section of this memorandum. The Commission may find that additional information and stakeholder input is necessary before determining the appropriate grid impact criterion of beneficial electrification for Focus.

The Commission may find it appropriate to direct staff to conduct further investigation into certain topics presented in the decision alternatives below, either through the efforts of the EWG or during the scoping phase for QPP V. The scoping phase of QPP V is anticipated to occur in late-2025. This phase will seek public comment on the appropriate topics for staff analysis and Commission consideration during QPP V. The Commission's past practice has involved identifying topics to incorporate into the next quadrennial planning process in advance of that effort's scoping phase. For example, the Commission found it appropriate to include five priority areas identified in its *Roadmap to Zero Carbon Investigation* (PSC Docket 5-EI-158) in the scope for QPP IV (PSC Docket 5-FE-104) prior to that effort's scoping phase. (PSC REF#: 421399.)

Alternative One: The Evaluation Work Group shall examine the appropriateness of the current Focus on Energy cost-effectiveness framework in assessing beneficial electrification initiatives and provide guidance for the Commission's consideration prior to scoping for QPP V.

Alternative Two: Commission staff shall request public comment on appropriate key performance indicators for beneficial electrification as part of scoping for QPP V.

Alternative Three: Commission staff shall request public comment for how Focus should consider grid impacts of beneficial electrification as part of scoping for QPP V.

Alternative Four: Take no action.

Fuel Neutral Portfolio Savings Goal Framework

The Commission's transitional priority directing Focus to take on a larger role in promoting beneficial electrification has relevant connections to the portfolio savings goal framework established by the Commission in QPP IV. Electrification involves replacing technologies that use fossil fuel with technologies powered by electricity. In doing so, electricity usage increases while fossil fuel usage decreases. This dynamic can introduce challenges in managing toward fuel-specific goals. In adding new uses of electricity, electrification projects result in a net reduction to the kWh electric savings achieved by the program as a whole. Conversely, electrification projects that switch usage from natural gas increase the natural gas savings (in therms) achieved by the program.

The QPP IV Phase I staff memorandum presented a discussion of the concept of a fuel neutral savings goal as one approach adopted in other states to support alignment with decarbonization objectives. (PSC REF#: 432286.) Fuel neutral savings goals allow programs to encourage electrification projects that result in net reductions in overall energy consumption and mitigate administrative challenges of managing toward fuel-specific targets. Within this framework, net positive energy savings are claimed toward a fuel neutral savings goal. Any increase in kWh usage that results from switching from fossil fuel to electricity are tracked and accounted for in calculating net impacts but do not count against a fuel-specific goal. The Commission elected in QPP IV to maintain the goal structure historically in place for Focus, a hybrid structure which sets a fuel-neutral overall savings goal but also sets minimum requirements for electric and natural gas savings. In the context of its decisions above to provide guidance on a future approach to beneficial electrification, the Commission may want to also consider revisiting the structure of these goals.

Fuel Neutral Goal Background

Wisconsin Stat. § 196.374(3)(b)1 directs the Commission to set or revise the goals, priorities, and measurable targets for Focus at least every four years. Focus' enabling statute does not specify requirements to set fuel-specific savings goals. Since Quad II of Focus, the Commission has established overall energy savings goals for the program expressed in lifecycle MMBtu. Underlying the MMBtu savings goal are fuel-specific savings targets, referred to as minimum performance requirements (MPRs). In Quad II (PSC REF#: 215245), Quad III (PSC REF#: 343909), and Quad IV of Focus (PSC REF#: 453081), the Commission set fuel-specific MPRs requiring the Program Administrator to achieve 90 percent of the quadrennium fuel-specific savings targets, with the remaining 10 percent of the overall MMBtu goal to be achieved from either fuel converted to MMBtu. Fuel-specific targets ensure the program is motivated to achieve certain minimum levels of savings by fuel and delivers a portfolio of offerings to achieve these targets. Past Commission decisions have determined this framework affords the Program Administrator an appropriate level of flexibility to adapt to changing market factors in pursuit of its goals. (PSC REF#: 215245.)

Wisconsin Stat. § 196.374(5m)(a) requires the Commission ensure that, "on an annual basis, each customer class of an energy utility has the opportunity to receive grants and benefits under energy efficiency programs in an amount equal to the amount that is recovered from the customer class." Approximately 75 percent of contributions to Focus are collected through electric rates and 25 percent collected through natural gas rates. The Commission's historical practice of setting fuel-specific goals has been, in part, to ensure equity between natural gas and electricity customers is maintained, and limit risks of cross-subsidization of program funds wherein funds collected from customers of one source are directed to achieve savings in usage of

the other source. (PSC REF#: 215245.) Increased use of electrification measures could increase potential cross-subsidization by increasing the share of projects wherein ratepayer contributions from electric operating revenues are used to fund program offerings that reduce natural gas consumption while adding electric load.

APTIM's contract with the Statewide Energy Efficiency and Renewables Administrative (SEERA) requires that fuel-specific MPRs and the quadrennial MMBtu goal are achieved for the Program Administrator to be eligible for a performance bonus. (PSC REF#: 457108.) The Program Administrator may be assessed a penalty for failure to achieve at least 94 percent of the Quad IV MMBtu goal, regardless of whether fuel-specific MPRs were achieved. The Commission's Quad IV savings goals are shown in Table 2.

Table 2. Quad IV Savings Goals

Fuel	Quad IV Savings Goal	MPR (90% of Quad goal)
Electric Savings (kWh)	31,676,270,000	28,508,643,000
Natural Gas Savings (therms)	776,085,000	698,476,500
Overall MMBtu	185,692,431	N/A

The Commission has been presented with options for setting lower MPR thresholds in the past. During Quad III, Commission staff presented the Commission with the option to lower MPRs to allow the Program Administrator greater flexibility to adapt to changes in market conditions that were emerging during the COVID-19 pandemic. (PSC REF#: 421795.) The Commission found it appropriate to take no action, determining it was too early to adjust the MPR in response to pandemic impacts that were still unfolding. (PSC REF#: 423549.) MPR thresholds lower than 90 percent of the fuel-specific targets were also presented for the Commission's consideration during Phase II of QPP IV. In its QPP IV final decision of November 14, 2022, the Commission determined maintaining the MPRs from past quadrennia was reasonable. (PSC REF#: 453081.)

Quad IV Fuel-Specific Savings Goals Considerations

Variability in the price of electricity and natural gas can impact customers' motivation to invest in energy efficiency. As energy prices increase, customers may be more motivated to conserve. Conversely, decreases in energy costs may lead customers to place less priority on reducing their usage. Significant fluctuations in energy costs from the time program savings goals are set may lead to shifting customer interests and impact the program's ability to achieve its fuel-specific savings targets.

The Quad IV therm goal illustrates the impact of variability in the market price of natural gas on a fuel-specific savings target for Focus. The Quad IV therm savings goal is significantly lower than therm savings goals set for prior quadrennia. The Commission's acceptance of a lower therm goal in Quad IV was supported by the Quad III update to Focus' natural gas avoided energy costs.[34] Avoided costs of natural gas in Quad III were more than 30 percent less than the values observed in Quad II of Focus. (PSC REF#: 447232.) As the avoided cost of natural gas decreases, in theory customers are less motivated to save therms and those measures that save natural gas become less cost-effective, all else equal. The Quad IV update to Focus' natural gas avoided costs showed a continuation of the downward trend, though less pronounced compared to the change from Quad II to Quad III.[35]

Despite the lower avoided costs and savings target, lifecycle therm savings achieved in 2023 (the first year of Quad IV) were the highest they have been since 2018. This high level of therm savings in 2023 was preceded by the one of the lowest annual levels of therm savings the

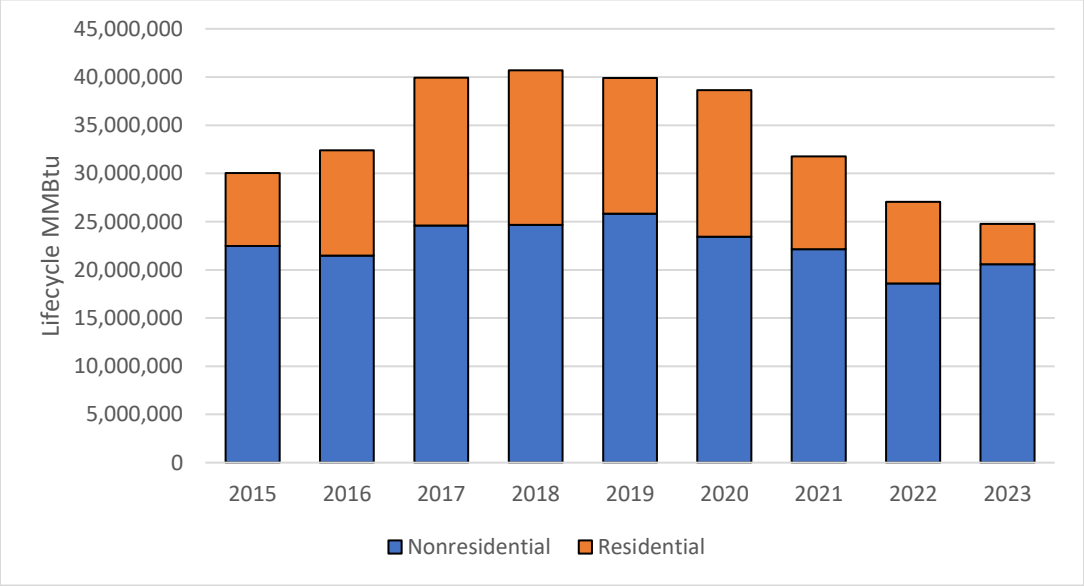
[34] Avoided energy costs are costs the utility avoids by implementing an energy efficiency measure, program, or practice. Most cost-effectiveness tests used by energy efficiency programs, including Focus, count avoided costs as program benefits. Focus' avoided cost values are based on observed market prices of fuel and adjusted in future years using industry forecasts.

[35] *Focus on Energy Calendar Year 2023 Evaluation Report. Volume III Appendices*. Appendix I. May 17, 2024. https://assets.focusonenergy.com/production/inline-files/Evaluation_CY_2023_Vol-III_Appendices_final.pdf.

program has achieved since it began consistently tracking and reporting savings.[36] The year-over-year change in portfolio therm savings from 2022 to 2023 (+53 percent) is largely attributed to projects completed under the Large Industrial program. Project delays caused by supply chain disruptions and staffing shortages during the COVID-19 pandemic caused a number of Large Industrial projects with significant savings that were expected to complete in Quad III to reach completion in Quad IV. As a result of the significant therm savings in 2023, the Program Administrator is halfway towards achieving its Quad IV therm savings target after just the first year of the quadrennium.

Program data shows portfolio electric savings have been steadily decreasing in recent years (Figure 2). This is particularly evident in the residential sector where LED lighting has been removed from the residential portfolio as Federal rules prohibiting the manufacture and sale of inefficient lighting have taken effect. At their peak in 2017, savings from LEDs represented approximately 80 percent of all residential electric lifecycle savings. (PSC REF#: 447232.)

Figure 2. Focus on Energy Lifecycle Electric Savings by Year



Source: Focus Annual Evaluation Reports

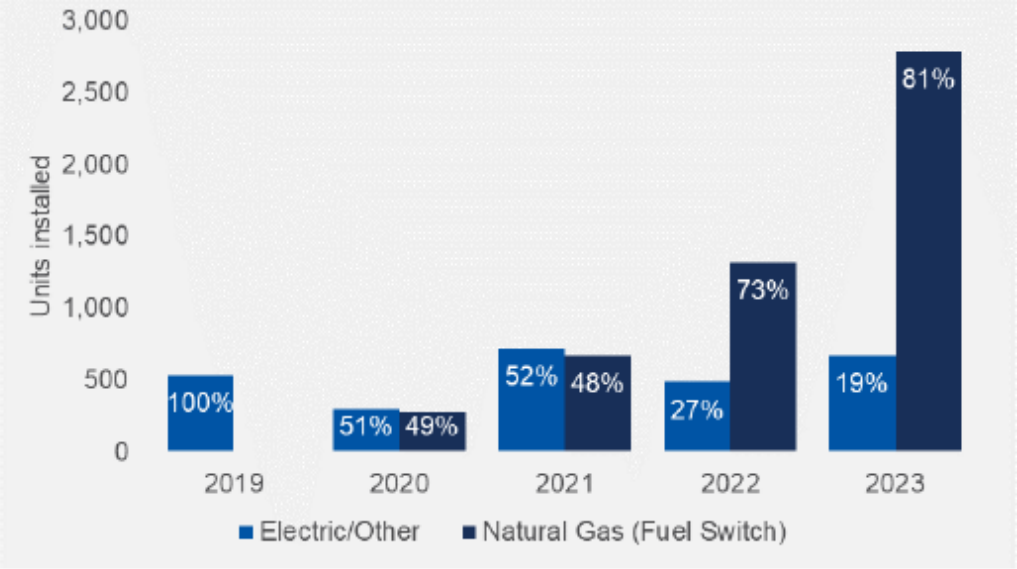
[36] Portfolio therm savings achieved in 2022 were the lowest they had been since 2011.

Difficulty achieving electric savings has been compounded in recent years due to the impacts of negative electric savings resulting from electrification projects. Residential heat pump installations in scenarios involving fuel switching are having observable impacts on Focus' progress in achieving its Quad IV kWh goal. In these scenarios, the program claims the reductions in natural gas usage, however it must also account for the added electric usage exerting negative pressure on achievement of the program's kWh savings goal. In 2023, natural gas to electric ASHP projects resulted in -275 million lifecycle kWh savings. These negative savings equate to 3.9 percent of the annualized portfolio electric savings goal. APTIM projects that by 2026, the final year of Quad IV, negative kWh savings from natural gas to electric ASHP projects will account for 7.5 percent of the annualized portfolio electric savings goal.

Customer adoption of ASHPs has been increasing rapidly over the past three years. Prior to the recent revisions to the Focus fuel switching policy the program did not incent residential customers to install ducted ASHPs replacing natural gas heating. The program introduced a dual-fuel ASHP rebate in April 2021.[37] Cold-climate ASHP rebates were added to the portfolio in 2023.[38] In 2021, about half of the residential ASHP participants had electric, propane, or fuel oil as their baseline heating fuel and half had a natural gas baseline.[39] By comparison, in 2023 only 19 percent of residential ASHP participants had electric, propane, or fuel oil as their baseline (Figure 3). Moreover, the number of ASHPs installed by the program increased from about 1,400 in 2021 to nearly 3,500 in 2023.

[37] *Focus on Energy Calendar Year 2021 Evaluation Report, Volume II Program Evaluations*. May 20, 2022. https://s3.us-east-1.amazonaws.com/focusonenergy/staging/inline-files/Eval-Rep-CY-2021-Vol-02.pdf.
[38] *Focus on Energy Calendar Year 2023 Evaluation Report, Volume II Program Evaluations*. May 17, 2024. https://assets.focusonenergy.com/production/inline-files/Evaluation_CY_2023_Vol-II_final.pdf.
[39] In scenarios where the participant's baseline fuel is electric, propane, or fuel oil, the program claims electric energy savings relative to a less efficient ASHP.

Figure 3. Residential Air-Source Heat Pump Participation (CY 2019-CY 2023)[40]



Source: CY 2019-CY 2023 Focus on Energy SPECTRUM Data
Note: Heat pumps have been offered under multiple residential programs in recent years; Installations shown here are not specific to the Trade Ally Solutions Program but illustrate broader statewide adoption trends

Quad IV Fuel Neutral Goal Considerations

Adopting a purely fuel neutral goal would not result in the program ceasing to measure, track, and report fuel-specific impacts. Focus has developed a robust process for quantifying and tracking energy savings by fuel. These processes would continue to be supported even if a fuel neutral goal were adopted. Tracking and reporting fuel-specific metrics are valuable in assessing the program's performance, setting program performance goals, and are required to calculate program cost-effectiveness.

In managing toward separate, fuel-specific goals, the Program Administrator must ensure measures and their associated incentive levels are appropriately balanced in pursuit of its MPR targets. A fuel neutral goal would allow the Program Administrator to prioritize measures based on their net savings impacts regardless of the type of fuel that is reduced. The administrative

[40] *Focus on Energy Calendar Year 2023 Evaluation Report, Volume II Program Evaluations*. May 17, 2024. https://assets.focusonenergy.com/production/inline-files/Evaluation_CY_2023_Vol-II_final.pdf.

flexibility that may accompany a fuel neutral goal could improve the program's ability to adapt to shifting program priorities. A fuel neutral goal by itself would not necessarily lead to the Program Administrator devoting more resources to fuel switching measures. All else equal, the Program Administrator would continue to be motivated to dedicate resources toward programs and offerings capable of achieving its energy savings goals with the budget available. In addition, the downward pressure of negative electric savings on portfolio cost-effectiveness would continue to be a consideration on the role of electrification within the Focus portfolio under the current cost-effectiveness framework. The Program Administrator would need to continue to monitor these impacts as it strives to deliver a portfolio that achieves net cost-effectiveness.

Energy market shifts that occur after program savings goals are established can influence customer motivation to participate in the program and introduce administrative challenges. This scenario occurred in Quad III when the Commission found it reasonable to reduce the Quad III savings goals during the middle of the quadrennial period, in response to changes in electricity and natural gas markets that were observed after the Quad III savings goals were initially established. (PSC REF#: 423549.) A fuel neutral goal may enable Focus to partner with participants to complete projects that realize both energy and bill savings in the context of current market and economic conditions. This approach may improve a participant's experience with the program relative to a scenario where program goals are less adaptable to energy market conditions.

Changes to national standards or codes within a quadrennium such as the enforcement of the Energy Independence and Security Act's (EISA's) update to national lighting standards that went into effect in mid-2023 (the first year of Quad IV of Focus) can also impact the program's

ability to achieve its goals. A fuel neutral goal may improve the program's ability to adapt to these changes and shift toward other cost-effective measures regardless of the fuel saved.

Economic conditions that impact availability of skilled labor and/or materials can also impact its ability to achieve savings goals. In the event of supply chain disruptions for equipment that saves one type of fuel, a fuel neutral goal may allow the program to shift incentives toward projects that save another fuel.

The Commission may consider whether a purely fuel neutral goal may interfere with the its duties under Wis. Stat. 196.374(5m)(a) to ensure each customer class has the opportunity to receive grants and benefits equal to the amount that is recovered by the class. The Commission may find that this component of the statute restricts the contributions recovered through one fuel's rates to fund program offerings that reduce usage for that fuel. However, in practice, Focus does not design its offerings to track the flow of utility contributions and program incentives by fuel in pursuit of its quadrennial savings goals. Alternatively, the Commission may consider that since most customers that pay into Focus do so through both their electric and natural gas rates, there is minimal concern of cross-subsidization because these customers would have opportunities for program grants and benefits related to reducing usage or demand of either fuel.[41] A customer served by participating gas and electric utilities may consider their contributions to the program, and therefore the benefits available to them, in total and not specific to any fuel. In addition, under current program policy, customers that pay into the

[41] There are limited scenarios of customers paying in to Focus through a single fuel. These include: 1) customers relying on delivered fuels that are served electricity by a participating electric utility, 2) customers served by a participating natural gas utility and non-participating electric cooperative, 3) customers served by a participating electric utility and non-participating natural gas utility (Florence Utilities customers), 4) all electric customers served by a participating electric utility.

program only through their electric rates or only through their natural gas rates are only eligible for program incentives that encourage a reduction in their usage of that fuel.

In addition to considering a fully fuel neutral goal, the Commission may consider whether maintaining but relaxing the Quad IV MPRs by fuel may be a reasonable to balance increasing administrative flexibility while also ensuring minimum levels of savings by fuel are achieved. Savings achievements after the first year of Quad IV indicate the program is well ahead of pace to meet its therm MPR. Should the program achieve therm savings in 2024 that are similar to savings achieved in 2023, the Program Administrator will have satisfied its therm MPR halfway through the quadrennium. The Program Administrator is on pace to achieve its Quad IV kWh MPR by the final year of the quadrennium.

Commission Alternatives – Fuel Neutral Savings Goal

With the decision alternatives below, the Commission can choose to maintain the savings goal framework established during QPP IV or make revisions to its QPP IV decisions for how the Focus savings goals are set for Quad IV. Staff are not proposing changes to the Quad IV savings goal values for the Commission's consideration at this time. Therefore, in opting for Alternative One and any of the Sub-Alternatives, the overall MMBtu and fuel-specific goals set during QPP IV (see Table 2) would remain in effect, unless otherwise directed by the Commission. Selecting Alternative One, sub-Alternative A would maintain the current goal structure and values in Table 2. A decision to revise the MPRs (Sub-Alternatives B through E) would result in changes to the MPR values in Table 2 above consistent with the percentage selected. Similarly, should the Commission find Alternative Two appropriate, staff propose that the overall fuel-neutral MMBtu goal shown in Table 2 remain in effect. Finally, should the

Commission find Alternative Three appropriate, staff propose that the fuel-specific goals shown in Table 2 remain in effect.

A full analysis of potential adjustments to the Quad IV savings goal values was beyond the scope of this memorandum. Staff anticipate there will be opportunity to assess the appropriateness of the Quad IV savings goals in the near term to account for issues that may include: budget carryover from Quad III to Quad IV that was not factored into Quad IV savings goals, IRA Home Energy Rebate programs impacts, and increases in investor-owned utility contributions during the second half of Quad IV.

Alternative One: Status Quo. The Quad IV energy savings goal shall be an overall MMBtu goal with minimum performance requirement thresholds for kWh and therm savings.

Sub-Alternative A: Status Quo. Minimum performance requirement thresholds shall be set at 90 percent of fuel-specific goals.

Sub-Alternative B: Minimum performance requirement thresholds shall be set at 80 percent of fuel-specific goals.

Sub-Alternative C: Minimum performance requirement thresholds shall be set at 70 percent of fuel-specific goals.

Sub-Alternative D: Minimum performance requirement thresholds shall be set at 60 percent of fuel-specific goals.

Sub-Alternative E: Minimum performance requirement thresholds shall be set at another percent consistent with the Commission's discussion.

Alternative Two: The Quad IV energy savings goal shall be an overall MMBtu goal without fuel-specific savings targets. The program shall continue to track and report kWh and therm savings.

Alternative Three: Eliminate the overall MMBtu goal and keep specific kWh and therm goals in Quad IV.

Alternative Four: Other action consistent with the Commission's discussion.

JF: TK:JP:MH:JS:bs DL: 02008196

Key Background Documents:

QPP IV Phase I Memorandum
QPP IV Final Decisions

Attachments:

Attachment A - APTIM Memorandum of 4/1/24

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MEMORANDUM

Date: 4/1/2024
To: Mitch Horrie, Wisconsin Public Service Commission
Cc: Lisa Stefanik, Erin Soman, APTIM
From: Rick Berry, APTIM
Re: Issues Relating to PSC Order #4: Focus taking a larger role in promoting beneficial electrification statewide

OVERVIEW

Order #4 in the Quad IV Planning Final Decision instructs Focus to "use Quad IV as a transitional period to position the program to take on a larger role in promoting beneficial electrification statewide." This document seeks to identify and explain current and prospective issues relating to Focus pursuing a larger role in achieving the goal of this order. The contents follow as such:

- Define terms.
- Establish existing conditions.
- Document barriers to further support, including an actual example.
- Possible conflict with other Quad IV Directives.

INTRODUCTION AND DEFINED TERMS

There are a variety of definitions of beneficial electrification (BE). The Environmental and Energy Study Institute (EESI) states "Electrification is considered beneficial when it achieves at least one condition *(without harming the others*): saving money, reducing emissions, improving quality of life, or strengthening the grid."[1] The Regulatory Assistance Project (RAP) defines BE as meeting "one or more of the following conditions without adversely affecting the other two: 1) saves consumers money over the long run, 2) enables better grid management; and 3) reduces negative environmental impacts."[2] The Focus on Energy Policy Manual (Policy Manual) currently defines BE as strategies that "provide three forms of societal benefits: reduced energy consumption (total source BTUs), lower consumer costs, and reduced greenhouse gas emissions (GHG)."[3] While definitions vary, generally three tenets are involved: reducing costs, reducing emissions, and increasing efficiency.

Minnesota uses the term "efficient fuel-switching" in their 2021 Energy Conservation and Optimization (ECO) Act. The ECO Act requires that an efficient fuel-switching project:

- result in a net decrease in source energy consumption on a fuel-neutral basis.
- result in a net reduction of GHG emissions over its lifetime.
- is cost-effective, considering the costs and benefits from the perspective of the consumer-owned utility, participants, and society.
- improves utility's system load factor.

[1] *New Beneficial Electrification Toolkit Provides a Roadmap for Utilities and their Customers.* EESI. June 15, 2022. https://www.eesi.org/press-releases/view/new-beneficial-electrification-toolkit-provides-a-roadmap-for-utilities-and-their-customers
[2] *Beneficial Electrification: Ensuring Electrification in the Public Interest.* June 19, 2018. Regulatory Assistance Project. https://www.raponline.org/knowledge-center/beneficial-electrification-ensuring-electrification-public-interest/
[3] 2024 Focus on Energy Policy Manual. 2024 Focus on Energy Policy Manual - Final.pdf (sharepoint.com)

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Using the term "fuel-switching" instead of electrification could allow the flexibility to support other decarbonization technologies that are not currently eligible for Focus on Energy, such as natural gas-fired combined heat and power or equipment using certain forms (colors) of hydrogen fuel.

Recommendation 1. Establish or confirm the definition of beneficial electrification.

> **PA Position.** The definition should include clauses for a reduction in source energy use and reduction in GHG emissions. A cost savings requirement is problematic if its overly restrictive. We have a limited ability to predict the future of energy prices with respect to one another (e.g., will the Δ$/Btu change over time? In which direction?). A grid resilience clause seems appropriate.

Recommendation 2. Consider whether "beneficial fuel-switching" is a more effective term to use to achieve the same goals as BE.

> **PA Position.** Using "fuel-switching" instead of electrification gives flexibility and may help strengthen the adaptability of the program in the event that other energy-saving decarbonization technologies become more popular.

Recommendation 3. Establish the goal, or purpose, of pursuing beneficial electrification in Wisconsin.

> **PA Position.** Presumably, the goal for BE is decarbonizing. Stating as much will be useful in guiding future administrative actions and program design.

REDUCING COSTS

The Administrator currently interprets "lower consumer costs" to mean lower annual energy costs. Currently, electricity is more expensive (per Btu) than natural gas (NG), propane, or fuel oil in Wisconsin.[4, 5, 6] For a project to result in lower energy costs, the electric technology needs to incur an efficiency increase sufficient enough to overcome the increase in per-Btu energy costs. Due to limitations on claiming delivered fuel savings, reducing energy costs is currently a barrier for promoting BE in Wisconsin. To address this barrier, the 2023 Policy Manual fuel-switching language was updated to remove the cost savings requirement.[7]

[4] Wisconsin State Electricity Profile. EIA. https://www.eia.gov/electricity/state/wisconsin/xls/wi.xlsx
[5] 2022 Annual Average. Wisconsin Natural Gas Prices. EIA https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SWI_a.htm
[6] Average of 2023 weekly residential propane prices. Wisconsin Propane Prices. EIA. https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=W_EPLLPA_PRS_SWI_DPG&f=W
[7] *Fuel switching project may qualify for Incentives provided the project results in a decrease in overall MMBtu at the Customer's site~~, is cost effective,~~ and that the fuel to which the Customer if switching is purchased from a participating Focus on Energy Utility.*

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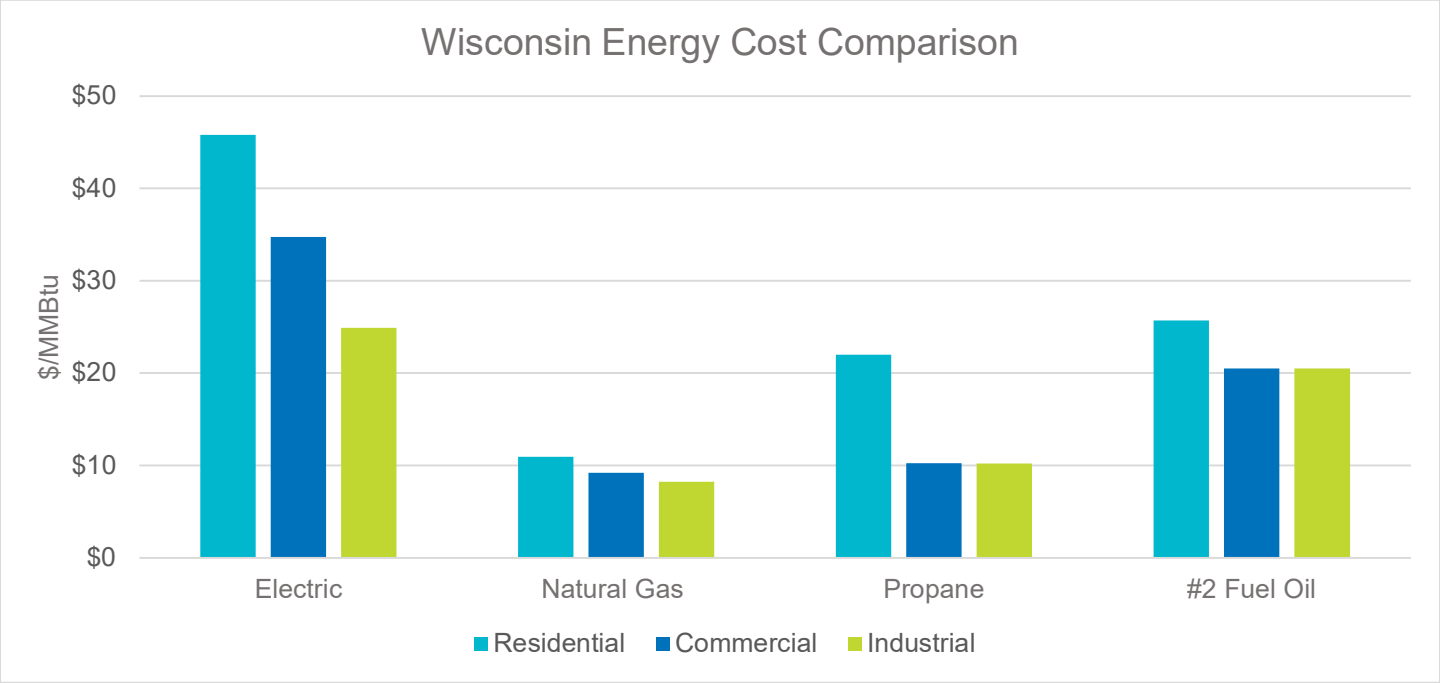

Figure 1. *Wisconsin Energy Cost Comparison ($/mmBtu)*

The values presented in Figure 1, represent average statewide costs and show electricity is more than twice as expensive as other fuels in all sectors. However, there are local conditions that could result in more favorable electrification scenarios. For example, Medford Electric Utility offers one of Wisconsin's lowest residential electric rates ($0.0771/kWh; about half the state average).[8] These conditions would favor adoption of electrification technologies like residential air-source heat pumps.

The inability to claim propane or heating oil savings, means Focus can't target scenarios with smaller Δ$/Btu, which would be more likely to achieve energy cost savings. These are the customers who stand to benefit the most from BE. Currently, Focus offers a smaller incentive for these projects claiming electric-only savings for these projects.

In non-residential sectors, energy cost savings may not occur from electrification projects because heat pumps (and their associated efficiency gains) may not be appropriate for the application. For example, using electric induction to replace a gas-fired heat source in a brazing process. The customer may choose to do this for other reasons, such as improved product quality (less waste), improved production speed (less time), increased production capacity, and increased safety (less insurance). If these considerations are monetizable, it's unclear whether they could be included as "cost savings"? If cost savings is a requirement for BE, determining what cost savings are appropriate for Focus to consider in meeting this requirement will be necessary.

Recommendation 4. If customer cost savings is a requirement of BE's definition, confirm whether an exception is granted to that requirement and under what circumstances. Additionally, define the parameters for what types of costs apply to criteria.

[8] Medford Electric Utility Residential Service (Rg-1). Effective July 1st, 2023. Does not factor in any effects of Power Cost Adjustment Clause. https://apps.psc.wi.gov/RATES/tariffs/viewfile.aspx?type=electric&id=3510

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PA Position. Requiring cost savings will be a barrier for Focus support. If a cost savings clause is in the BE definition, efforts should be made to reduce its impact (e.g., make it optional, intentionally vague, broad in scope). Decarbonizing is not often done for cost concerns.

Recommendation 5. Consider reversing Order #3 that prohibits Focus from claiming the savings and benefits of BE to customers of delivered fuels.[9] If there is no exception made to customer cost savings, delivered fuels customers may represent the only scenarios that provide cost savings to customers.

PA Position. Focus on Energy should be allowed to support those customers that stand to gain the most (economically) from BE. Other states and utilities are targeting these customers while Focus is prohibited from serving them. While there is no explicit prohibition of serving delivered fuels customers, the inability to claim the benefits and savings from those efforts means the program struggles to justify using funds for that purpose.

REDUCING EMISSIONS

Wisconsin primarily relies on natural gas and coal fuels for electricity generation, resulting in the tenth highest emission rate (1,178 lb CO2e/MWh) in the US.[10] For reference, residential natural gas usage has an emission rate of 400-500 lb/MWh. To reduce emissions, electrification must involve an increase in efficiency that is sufficient to overcome the increase in emission factor compared to residential natural gas usage.

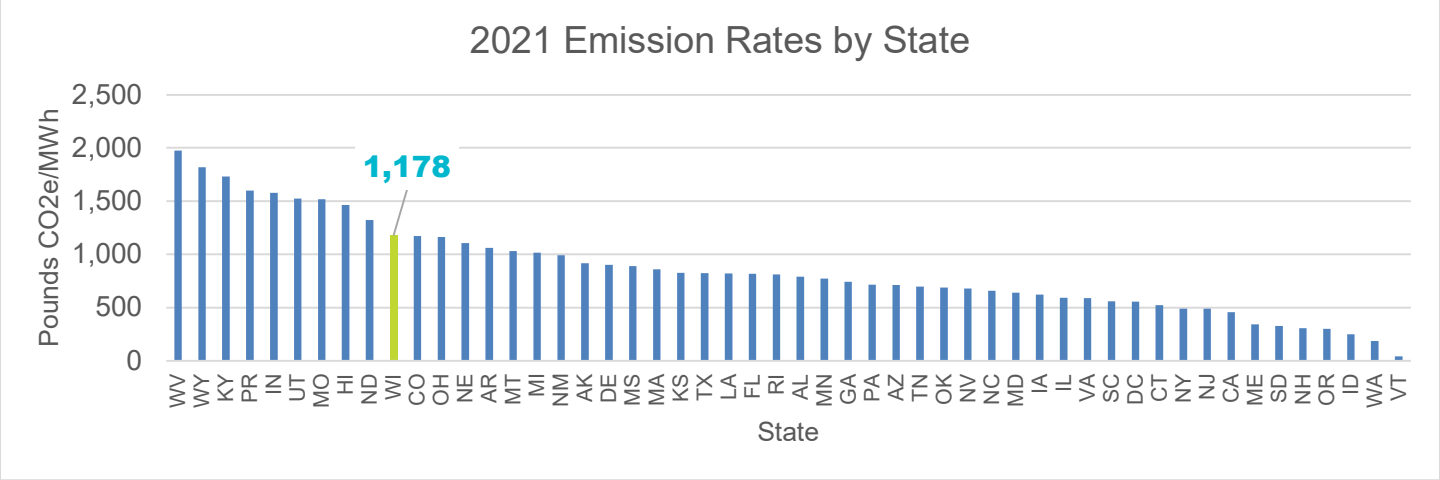

***Figure 2**. 2021 Emission Rates (from Electricity Generation) by State. Source: 2022 eGRID data.*

[9] Focus shall continue not to claim savings and other benefits from directly supporting beneficial electrification where fuel switching from unregulated fuels to electricity provided by a participating utility occurs through its own programs and offerings.
[10] 2022 eGRID Data. State annual CO2 equivalent total output emission rate (lb/MWh); STC2ERTA. Released January 30, 2024. https://www.epa.gov/egrid/download-data

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However, this will change throughout Quad IV as three of Wisconsin's ten largest power plants are coal-powered and scheduled to close.[11] In the Strategic Energy Assessment 2028, Wisconsin's total carbon emissions will be reduced by 58% in 2028 (from baseline 2022 levels), if all additions and retirements are implemented as planned.[12]

Modeling by University of California - Davis estimates an ASHP installed in the Midwest in 2024 will achieve about a 15% carbon reduction over its lifetime.[13] That percentage will increase to an approximately 30% reduction for ASHPs installed in future years, as the generation mix becomes less carbon-intensive over time.

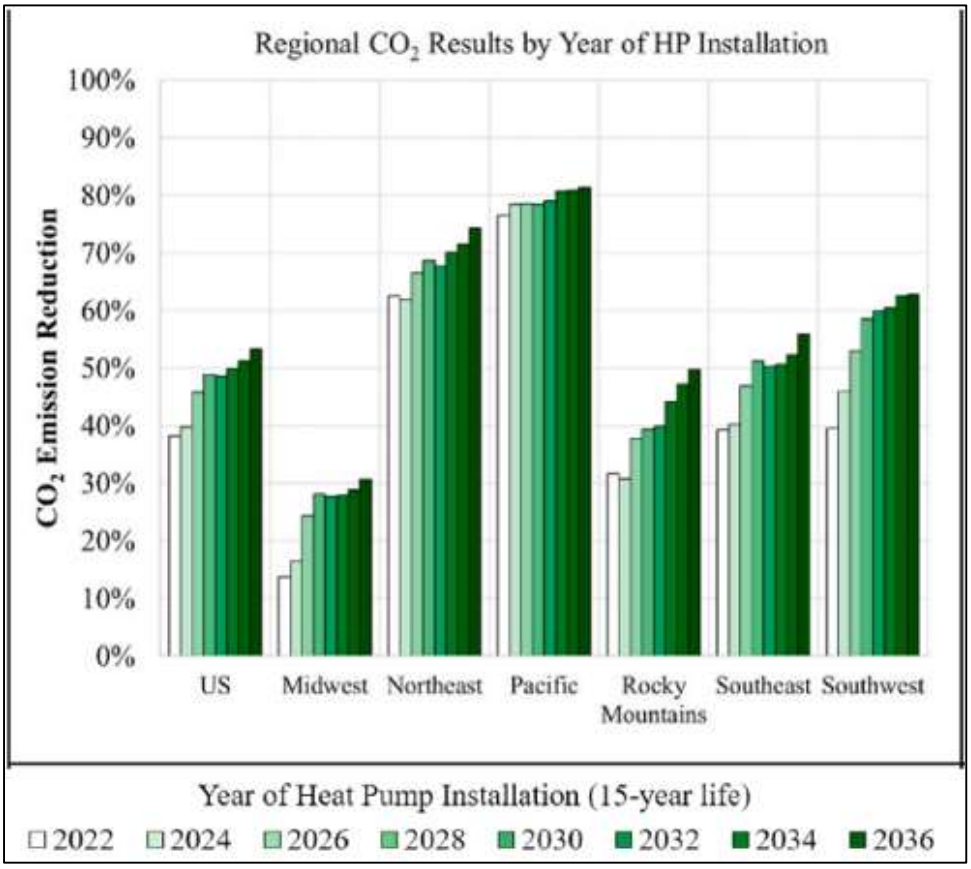

Figure 3. *Regional average emission (CO2) reductions by year of heat pump installation. Source: Greenhouse gas emission forecasts for electrification of space heating in residential homes in the US, Energy Policy.*

[11] "We Energies' Oak Creek plants will close in 2024 and 2025. Columbia Energy Center — the state's largest coal plant, co-owned by WEC and Alliant — will close by 2026. Weston Unit 3 — co-owned with Dairyland Power Cooperative — will close by 2031." Energy News Network. https://energynews.us/2023/11/14/wisconsin-coal-plants-are-closing-but-ratepayers-are-still-on-the-hook/#:~:text=We%20Energies'%20Oak%20Creek%20plants,Cooperative%20%E2%80%94%20will%20close%20by%202031.

[12] Strategic Energy Assessment 2028. Public Service Commission of Wisconsin. November 2022. Docket 5-ES-111, PSC Reference Number 451939. https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=451939

[13] Theresa Pistochini, Mitchal Dichter, Subhrajit Chakraborty, Nelson Dichter, Aref Aboud, *Greenhouse gas emission forecasts for electrification of space heating in residential homes in the US*, Energy Policy, Volume 163, 2022, https://doi.org/10.1016/j.enpol.2022.112813.

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Recommendation 6. If emission reduction is a goal of BE, additional research on Wisconsin-specific emissions factor forecasting may be needed.

PA Position. Cadmus produced emissions forecasts in its 2019 Greening the Grid research. EWG should meet to pursue agreement on an approach and forecast. This forecast should be updated periodically (annually, biennially, etc.) to reflect changes to Wisconsin's electric generation mix.

REDUCED ENERGY CONSUMPTION

Historically, Commission staff, utilities, and Focus on Energy have taken the position that a project must save energy at the site (i.e., the customer must save the Btus). This is reflected in the Policy Manual's requirement that fuel switching projects must result in a "…decrease in overall MMBtu at the Customer's site…". Additionally, Wisconsin statute appears to use site energy when it defines Focus as "…a program for reducing the usage or increasing the efficiency of the usage of energy by a customer…".

Conversely, the Policy Manual uses **source** energy in its BE definition "…three forms of societal benefits: reduced energy consumption *(total source BTUs).*" If a reduction in source energy is specified to achieve *beneficial* electrification, a calculation protocol would need to be specified to outline verification . A reduction in source energy would appear to be a more wholistic consideration and better aligned with the general broader decarbonization efforts.

For reference, Minnesota uses source energy to assess fuel-switching projects, defined as "the total amount of primary energy required to deliver energy services, adjusted for losses in generation, transmission, and distribution, and expressed on a fuel-neutral basis."[14]

The decision to use source energy could also impact whether NG-fired combined heat and power could be justified as a decarbonization tool. The US EPA states that CHP "can reduce emissions in sectors that are hard to decarbonize."[15]

Recommendation 7. Clarify whether site or source energy should be considered for BE projects.

PA Position. Source energy should be considered. This would also potentially enable Focus on Energy to better support CHP.

Recommendation 8. If source energy is to be used in the BE definition and applied as a criterion, an agreed upon calculation methodology will be needed to test for reductions in source energy. This decision could also impact whether NG-fired combined heat and power could be justified as a decarbonization tool.

PA Position. Review other state or program protocols on this and discuss with EWG.

[14] 3.10 "Efficient fuel-switching improvement" means a project that: "(2) results in a net increase in the use of electricity or natural gas and a net decrease in source energy consumption on a fuel-neutral basis;" Minnesota's Energy Conservation and Optimization Act of 2021.

[15] CHP Can Reduce Emissions in Sectors That Are Hard to Decarbonize." US EPA. https://www.epa.gov/chp/chps-role-decarbonization#three

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EXISTING CONDITIONS

CURRENT STATE OF ELECTRIFICATION IN FOCUS ON ENERGY

Electrification occurs in Focus on Energy primarily through the adoption of residential air-source heat pumps (ASHPs). Fuel-switching heat pumps can replace natural gas, propane, or heating oil fuels with electric, but reductions to delivered fuels cannot be claimed as savings.[16] Figure 4 summarizes the annual participation of these measures, distinguishing between electrification measures and non-electrification measures.

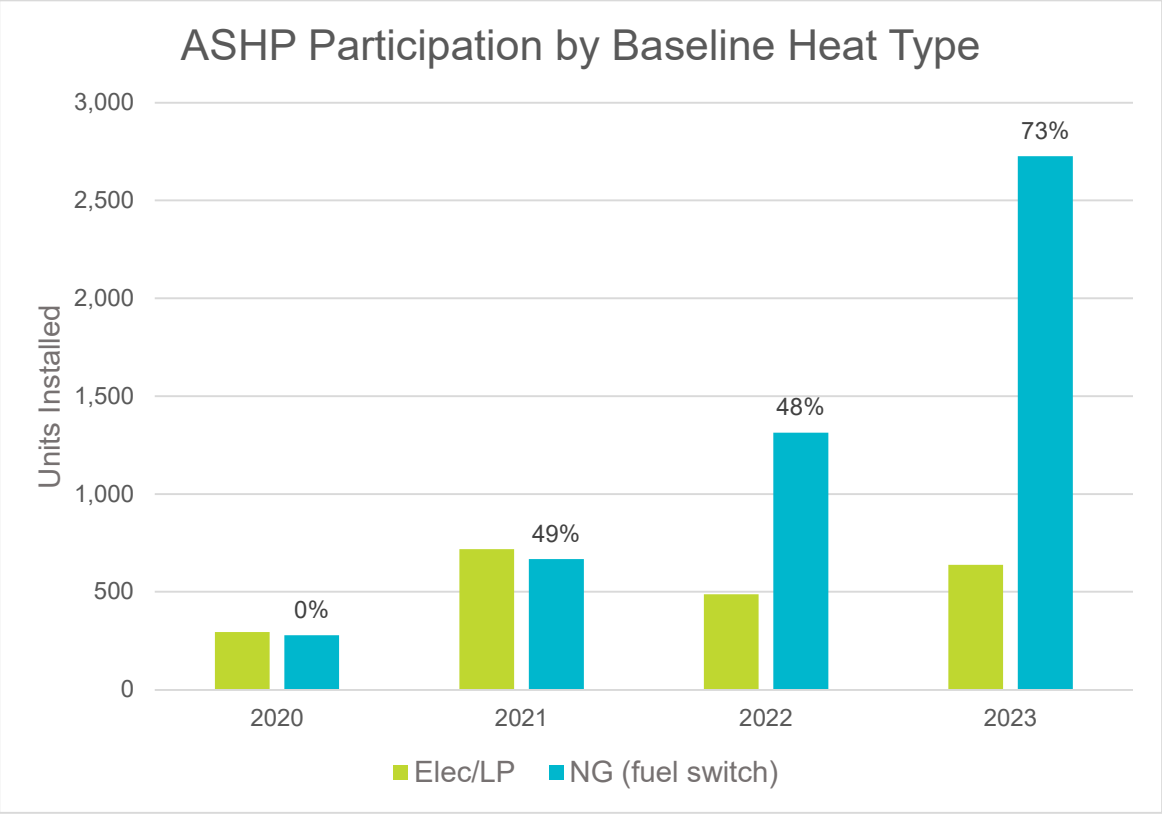

***Figure 4**. Residential ASHP Participation by Baseline Heat type.*

[16] Quad IV Order #3: *Focus shall continue not to claim savings and other benefits from directly supporting beneficial electrification where fuel switching from unregulated fuels to electricity provided by a participating utility occurs through its own programs and offerings.*

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Currently, Focus' air-source heat pump participation serves those customers who stand to benefit the least (i.e., NG heat baseline). Though operating costs are unlikely to decrease (and may increase), NG-to-ASHP projects dominate Focus's ASHP participation. Of these fuel-switching ASHP projects, over half involve customers switching to a higher than average electric usage rate.[17] Replacing electric baseboard heat with ASHP technology is not discussed in this memo since it is not fuel switching and thus not considered beneficial electrification.

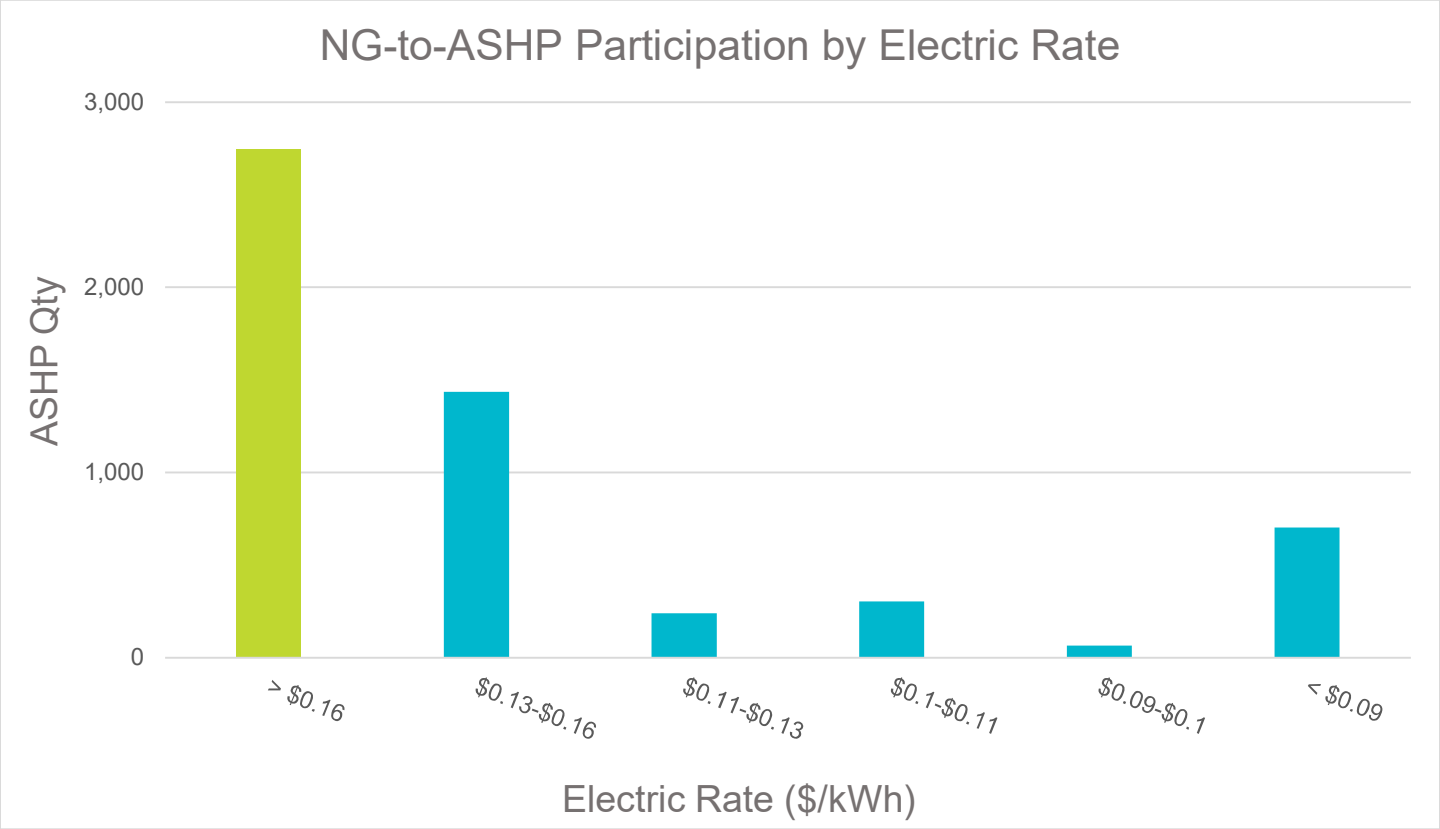

Figure 5. *Note: Data is from 2019 to present. There were 5,499 total ASHPs replacing NG heating. The highest bin (We Energies, MGE) represents 50% of all fuel-switching ASHPs. The lowest bin is almost exclusively Xcel's customers.*

[17] Based on residential service energy charges published at https://apps.psc.wi.gov/RATES/tariffs/default.aspx. Accessed January 2024.

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BARRIERS TO PROMOTION

FUEL-SWITCHING SAVINGS IMPACT ON FUEL-SPECIFIC GOAL ACHIEVEMENT

Focus on Energy has fuel-specific goals.[18] Under current structure, Focus on Energy claims positive gas savings and negative electric savings (representing the increase in electric load) for fuel-switching ASHP measures. The impacts of this are presented in Figure 6.

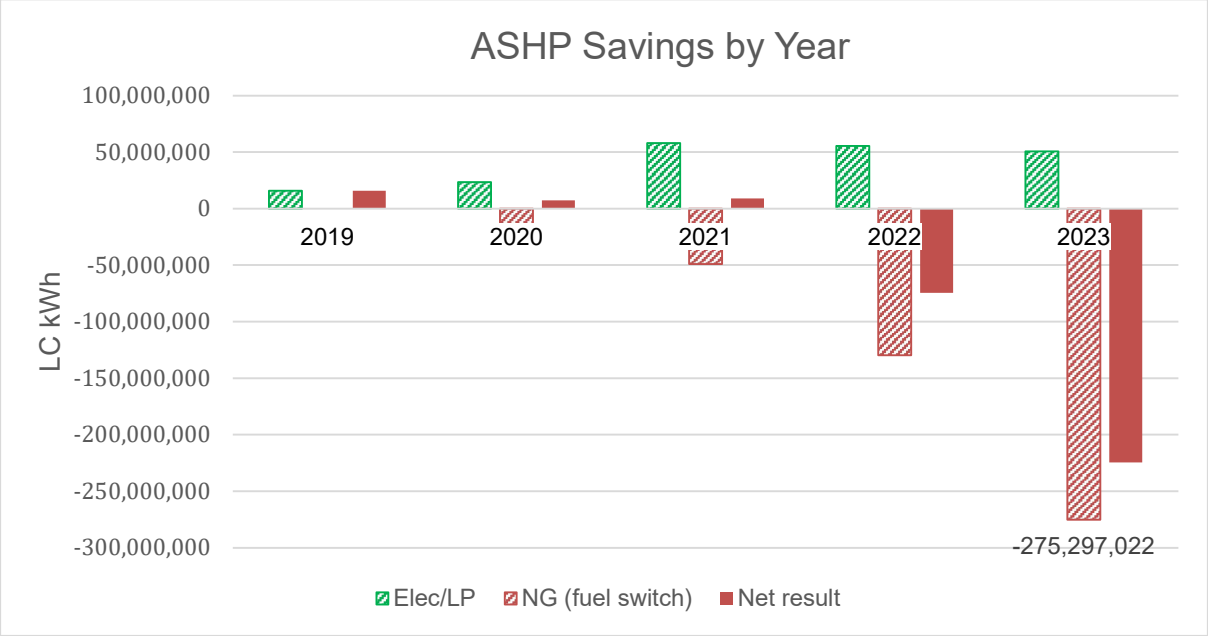

Figure 6. *Annual BE Penalties Over Quad IV (% of Annualized kWh MPR)*
Note: This chart reflects all electrification measures (ASHP, GSHP, mini-splits, etc.)
** includes massive GSHP project in 2024*
*** Assumes 25% annual growth in heat pumps; current growth is >200%*

The annualized LC kWh goal of Focus is approximately 7.1B LC kWh.[19] The negative impact of NG-to-ASHP projects in 2023 is -275M LC kWh, which equates to 3.9% of the annualized portfolio electric savings goal. Increasing ASHP participation will increase the amount of electric penalties the portfolio will need to overcome to achieve its electric goal (Figure 7). With declining savings opportunities in non-residential lighting, Focus (and EE programs nationwide) will need to rely on less cost-effective measures to replace them. This difficulty will be exacerbated as electrification penalties become larger portions of the portfolio goal.

[18] 31,676,270,000 lifecycle (LC) kWh for the Quad. The minimum requirement of 90%

[19] 31,676,270,000 LC kWh * 90% MPR / 4 years = 7,127,163,000 LC kWh per year

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POSSIBLE ALTERNATIVES TO CURRENT FUEL-SPECIFIC SAVINGS GOALS

Here is a list of possible alternatives to Focus's current goal structure.

1. **Adopt a fuel-neutral goal.** Converting the BE savings to net Btu allows for proper accounting of energy savings and creates less "funny math" issues than converting the net Btu reduction into kWh.

2. **Convert BE savings to net kWh.** This removes the fuel-specific penalty and avoids overemphasizing BE as in Option #1, though the result becomes more abstract. Illinois currently does this through their law.[20] The statutory language is written in a way that treats dual-fuel utilities (e.g., Ameren Illinois) as two separate utilities, but allows them to integrate their programs.[21] Utility programs in Minnesota operate similarly, per MN statute.[22]

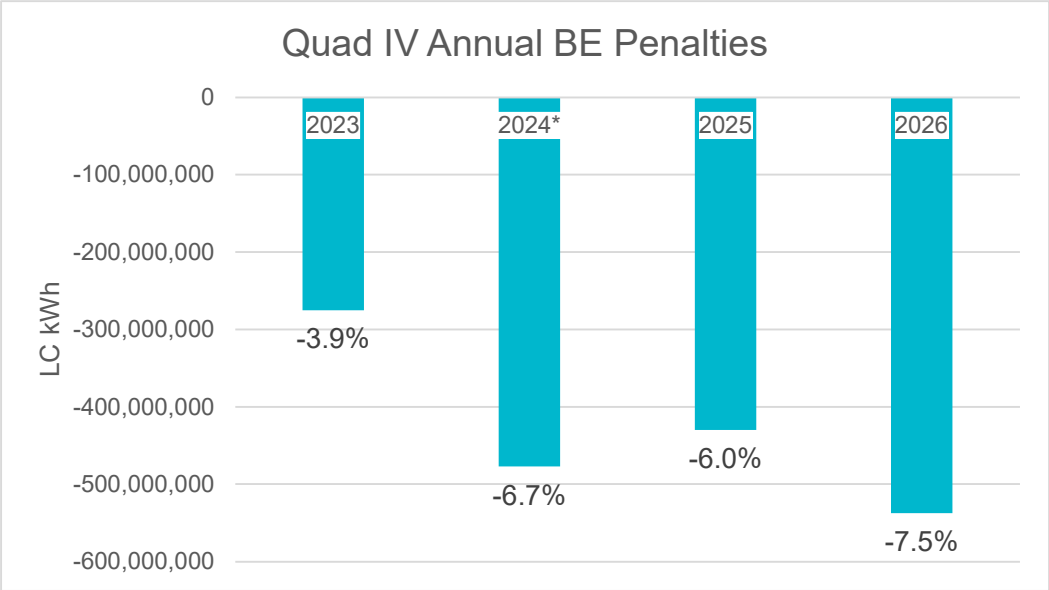

***Figure 7**. Annual BE Penalties Over Quad IV (% of Annualized kWh MPR). This chart reflects all electrification measures (ASHP, GSHP, mini-splits, etc.)*

[20] 220 ILCS 5/8-103B(b-27))v. "(b-27) Beginning in 2022, an electric utility may offer and promote measures that electrify space heating, water heating, cooling, drying, cooking, industrial processes, and other building and industrial end uses that would otherwise be served by combustion of fossil fuel at the premises, provided that the electrification measures reduce total energy consumption at the premises. The electric utility may count the reduction in energy consumption at the premises toward achievement of its annual savings goals. The reduction in energy consumption at the premises shall be calculated as the difference between: (A) the reduction in Btu consumption of fossil fuels as a result of electrification, converted to kilowatt-hour equivalents by dividing by 3,412 Btus per kilowatt hour; and (B) the increase in kilowatt hours of electricity consumption resulting from the displacement of fossil fuel consumption as a result of electrification. An electric utility may recover the costs of offering and promoting electrification measures under this subsection (b-27).

[21] Verified via 9/15/23 email with Zach Ross, Director at Opinion Dynamics.

[22] 29.24 "The net benefits from an efficient fuel-switching improvement that is integrated with an energy efficiency program approved under this section may be counted toward the net benefits of the energy efficiency program, if the department determines the primary purpose and effect of the program is energy efficiency." Minnesota's Energy Conservation and Optimization Act of 2021.

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3. **Create a category of BE penalties that are exempt from goal-attainment accounting.** The BE measures or projects could be identified in SPECTRUM. Their associated negative kWh and kW would not count toward goal attainment but would count in cost-effectiveness testing. This would remove the penalty for BE but may overemphasize BE as a result. Is this desirable?

4. **Substantially decrease the fuel-specific minimum performance requirements.** Penalties would still count but the added flexibility would allow gas savings to backfill the void created by penalties. While this deals with the issue indirectly, it may support other challenges (e.g., changing fuel/energy prices, market trends, etc.).

5. **Adopt a non-energy savings goal for BE measure with a dedicated budget.** This could help to distinguish BE efforts from more traditional energy efficiency programs.

Recommendation 9. Design Focus on Energy savings goals that do not conflict with BE.

> **PA Position.** A fuel-neutral goal is likely the most elegant solution. It avoids abstract conversions of energy savings units (i.e., kWh penalty + gas savings à net kWh savings), it aligns well with a potential energy savings clause in the BE definition and gives Focus flexibility.

EVALUATING WITHIN COST-EFFECTIVENESS TESTS

Beneficial electrification is a means to reduce carbon levels and also minimize the resulting worldwide temperature increase. This is the primary reason to pursue BE and is consistent with statutory language that says Focus should "help achieve environmentally sound energy supplies at a reasonable cost..."[23] However, it's not clear that the benefits of this approach are being captured in cost-effectiveness testing.

Recommendation 10. Determine whether existing cost-effectiveness tests are appropriate for assessing BE programs and their ability to achieve the goals of BE. Identify more appropriate metrics or testing protocols, if necessary.

> **PA Position.** Review other state's evaluation of BE program efforts and discuss in EWG.

VALUING CARBON

To align the evaluation of BE efforts with the outcomes they intend (climate change mitigation via decarbonization), the social cost of carbon (SCC) should be used in cost-effectiveness testing. SCC is a wholistic valuation of decarbonization.

Recently, the Commission approved increasing the cost of carbon from a static $15/ton to a $24.77/ton value with a 7% escalation rate.[24] This increase in value of carbon is helpful in evaluating the primary objective of BE: decarbonization. However, the updated carbon value is still reflective of a market value and not representing the purported benefits of BE. The SCC previously recommended by the US EPA was $61/tCO2.[25] However, in November 2023 the EPA released new estimated climate benefits, ranging from $120-$390/metric ton of CO_2, using a new set of Social Cost of Greenhouse Gas

[23] https://docs.legis.wisconsin.gov/document/statutes/196.374(2)(a)2.
[24] https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=475940
[25] $55 per metric ton (at a 3% discount rate) = $61 per US ton. *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*, Table A-1. Interagency Working Group on Social Cost of Greenhouse Gases, United States Government. February 2021. https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

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(SC-GHG) estimates.[26] In their latest report, the EPA defines SC-GHG as "…the monetary value of the net harm to society from emitting a metric ton of that GHG into the atmosphere in a given year." The report goes on to say *"In principle, the SC-GHG is a comprehensive metric that includes the value of all future climate change impacts (both negative and positive), including changes in net agricultural productivity, human health effects, property damage from increased flood risk, changes in the frequency and severity of natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. The SC-GHG, therefore, also reflects the societal net benefit of reducing emissions of the GHG by a metric ton. The SC-GHG is the theoretically appropriate value to use when conducting benefit-cost analyses of policies that affect GHG emissions."*

These new estimates incorporate recent research, peer review, and responses to public comments. A SCC value of ~$190 per metric ton CO_2 ($209/US ton CO_2) would emphasize the benefits of supporting BE.

For perspective, updating to the latest SCC value in the 2022 Focus on Energy evaluation would increase the portfolio-level mTRC score from about 2.4 to greater than 6.

Recommendation 11. Consider updating the market cost of carbon to a social cost of carbon.

> **PA Position.** Use the most recent SC-GHG (~$190) as recommended by the U.S. EPA. This estimate reflects the wholistic value and purpose of BE (decarbonization).

UNDERSTANDING THE RESULTS

Some of the current and proposed means of assessing Focus efforts may paint BE efforts in a negative light. BE is fairly different from and seeks different outcomes than typical Focus programs. Evaluating the value and determining the success of a new approach may require new metrics. A few metrics that may be problematic include:

- **Fuel-specific savings:** current BE measures result in large positive gas savings and large negative electric savings.
- **Winter Peak kW:** Pursuit of ASHPs will result in substantial additional electric loads in the winter (e.g., going from 0 kW to ≥ 2 kW, per ASHP).
- **Time-Varying Value (TVV) of Energy Savings:** As the Regulatory Assistance Project (RAP) noted during their TVV research, an additional electric load may present as negative TVV.
- **mTRC:** The current primary cost-effectiveness test (mTRC) does not reflect the primary benefit (climate change mitigation) of BE.

DEALING WITH THE UNEXPECTED

Beneficial electrification projects are likely to take new and unique forms. In 2023, Focus on Energy received an inquiry from a customer about Focus on Energy rebates to support an industrial heat pump.[27] However, several issues presented when confronted with the details of this project:

- Has a **negative initial incremental cost** since the gas dryer requires an odor control system the heat pump system does not (lower drying temperatures do not result in similar odor issues) resulting in a lesser first-cost.

[26] EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances. November 2023. US EPA. https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf

[27] This particular application involved a replacing a gas-fired sludge dryer with an industrial heat pump. The preliminary LC savings estimate is 6,800,000 LC therms, -60,000,000 LC kWh, and a net +475,280 LC mmBtu savings.

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- It's unclear how attribution would be handled in a case where the incremental measure cost (IMC) is negative, but the incremental lifecycle cost is positive. If the project driver is decarbonization, does the presence of other pressures (corporate sustainability report, GHG goal, etc.) present Focus attribution concerns?

- Results in **increased energy cost** since electric is currently more expensive than gas (+$120K/yr).
  - Should Focus promote projects where energy costs increase? This technically occurs with current ASHP projects; is it different when it's a larger scale project?
  - Is this an attribution issue if a customer completes the project in pursuit of carbon savings, in spite of increased energy costs?

- **Conflicts with our custom IMC incentive cap** since IMC is negative (incentives are capped at 50% of project cost). What criteria might limit an incentive if there is no initial IMC to overcome? Should net present value (NPV) be considered as a lifecycle incremental cost?
  - If so, this conflicts with typical energy efficiency project considerations (i.e., higher IMC, lower lifecycle costs). Is that inconsistency a problem?

- Results in **substantial Negative kW and LC kWh savings** (-60M LC kWh) when electric savings are becoming harder to generate. There is some reason to be concerned that these types of projects may become more popular in the near future.
  - The presence of fuel-specific goals pushes the Administrator to consider external factors (i.e., Focus electric savings status) when deciding whether to pursue a project like this. If BE is something that Focus will promote more in the future, BE achievements will need to be measured by something other than fuel-specific savings.

If the guidance on BE were better understood (and didn't conflict with administrator KPIs), it would be easier to determine the outcome of this nuanced project example. As it stands now, this is not a project the Administrator or an Implementer would choose to support.

Recommendation 12. EWG to review whether any attribution issues arise from BE projects. Possible concerns include a customer completing a project *despite* an increase in cost savings, the prevalence and influence of a decarbonization goal, or negative incremental cost situations.

POSSIBLE CONFLICT WITH OTHER QUAD IV DIRECTIVES

This section is meant to note areas where BE appears to conflict with Quad IV Directives and could be an issue if those Directives were prioritized in Quad V.

BE ADDS PEAK DEMAND

Orders #11 and #13 imply that Focus may have a greater emphasis on peak demand (summer and winter) savings in the future. It's worth stating that BE projects add electric load. In the case of ASHPs, full electrification can add significant winter peak demand (~2 kW per home; rough estimate). A dual-fuel heat pump scenario would presumably reduce the winter electric peak demand of these ASHP installations by operating gas-fired furnaces during the coldest times of the year. In this sense, the furnaces are acting as energy storage or demand-shedding devices.

Non-residential electrification would also likely have significant impacts on peak kW. The aforementioned industrial heat pump project could produce a 340 kW increase in demand (rough estimate; -3M kWh / 8,760 h). These projects would not likely be a frequent occurrence, but they present volatility in Focus' ability to generate peak demand savings.

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Recommendation 13. Establish guidance on whether Focus should emphasize full-electrification or dual-fuel ASHP installations.

PA Position. Utilities and subject matter experts should guide this discussion with the EWG.

SUMMARY

This memo seeks to summarize issues associated with Focus on Energy promoting BE and propose next steps to resolve them. The following figure attempts to put these steps into visual context with respect to recommended task order sequence and to suggest the primary owner of each task.

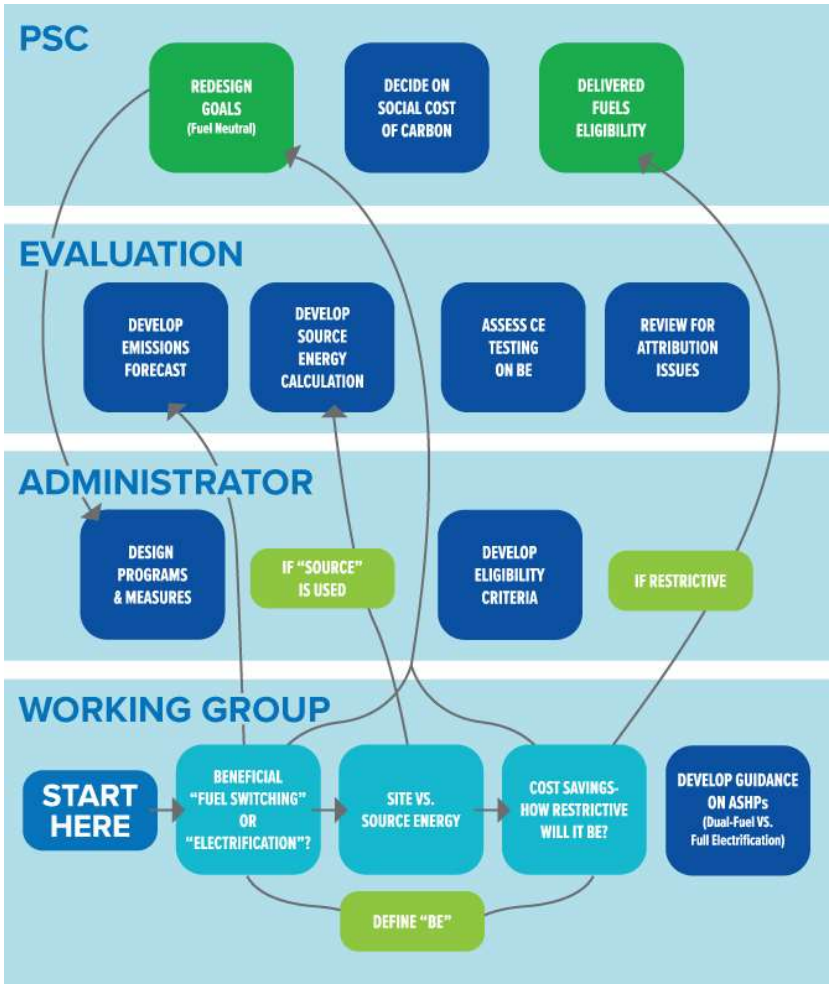

Figure 8. *Recommended approach and steps.*