

Focus on Energy Quadrennial V Planning Study Scenarios

The Focus on Energy Quadrennial V Planning Study will estimate potential energy, peak demand, and emissions impacts for six scenarios to inform program and policy planning for Quadrennium V of Focus on Energy. This document shows the design of the Planning Study's six scenarios.

Public Service Commission (PSC) of Wisconsin staff, the study consultant Cadmus, and the Focus on Energy Program Administrator APTIM developed draft scenarios to align with the study's objectives and research questions. We then presented this draft design to stakeholders and finalized the design after collecting and incorporating stakeholder feedback.

Program Scenario Design Approach

The Planning Study has four objectives:

- Provide insight into how focusing on emissions could impact potential savings
- Allow the PSC to assess the value of and effects of tradeoffs between programmatic interventions that emphasize demand reduction versus energy savings
- Understand the implications of potential energy, demand, and emission reduction potential for various customer segments, particularly income-qualified customers
- Contextualize study findings to inform program goals.

Program Prototypes

To meet these objectives the study team developed program prototypes for each of the study's measures. These prototypes are aligned with but not identical to the current Focus on Energy offerings. The study will explore the effects of assigning scenario budgets to simulate adoption, including or excluding measures from prototype programs, and including or excluding programs. Table 1 shows the study's prototypical programs, each program's measures (including measures currently offered and measures the study team introduced for this study), the building types and population segments that the programs serve, and the current Focus on Energy offerings to which the prototypes map. While most program prototypes are organized by sector, the Solar PV and New Construction programs cut across all sectors.

Table 1. Description of Focus on Energy Quad V Planning Study Scenario Program Prototypes

Program Name	Current Program Measures	New Measures	Building Type	Population Segment	Current Offering
Agriculture					
Agriculture	All agricultural measures (including HVAC and lighting measures for agricultural businesses)	Custom project, electrification applications	Any buildings associated with agricultural businesses	All agricultural customers	Agribusiness
Commercial					
Commercial Refrigeration,	Commercial refrigeration, Commercial cooking	Cooking electrification, Appliances	All commercial buildings (excluding the	All commercial customers	Commercial Refrigeration

Program Name	Current Program Measures	New Measures	Building Type	Population Segment	Current Offering
Cooking, and Appliances			agricultural and industrial sectors, and multifamily buildings)		
Commercial HVAC and Water Heat	All measures impacting HVAC and water heating end uses, including controls and building shell measures, as well as behavioral programs	Space heating electrification, commercial custom project			Commercial HVAC
Commercial Lighting	All commercial lighting and lighting control measures	None			Commercial Lighting
Commercial Processes	All commercial measures impacting the process end use (as well as miscellaneous measures such as pool heat, IT systems, and wastewater treatment)	None			Process Systems
Commercial Load Shifting	Load shifting measures	Thermostat load shift, thermal energy storage, and electric vehicle charging load shift			No existing program
Industrial					
Industrial	All measures impacting buildings in the industrial sector	Industrial electrification	All industrial buildings	N/A	Small, Medium and Large Industrial Customers programs
Residential					
Income Qualified	Building shell, HVAC, water heater measures, cooking electrification	None	Multifamily units, single-family dwellings, manufactured homes	Income qualified	Trade Ally Solutions, Instant Discount
Multifamily	All measures impacting multifamily buildings	None		Standard and income qualified	Multifamily
HVAC and Water Heating	HVAC, Water heating equipment (water heating and space heating electrification)	None			Trade Ally Solutions, Instant Discount, Direct to Customer
Appliances and Lighting	Thermostats, appliances, lighting, water flow measures (aerators, etc), pool pumps	Cooking electrification, electric vehicle chargers			Instant Discount and Direct to Customer

Program Name	Current Program Measures	New Measures	Building Type	Population Segment	Current Offering
Building Shell	Building shell measures (insulation, air sealing, windows, etc)				Trade Ally Solutions
Residential Load Shifting	All measures designed to shift load	Thermal and battery storage, electric vehicle /thermostat load shifting			No existing program
Solar PV					
Solar PV	Solar PV	None	All residential and commercial buildings	Will use adoption data from 2020 solar potential study	Renewable Rewards
New Construction					
New Construction	All measures focused specifically on improving new construction practices via Focus on Energy	None	All residential and commercial buildings		Residential and Commercial New Construction

Scenario Design Approach

The study team developed six draft scenarios, allocated budgets to each program prototype in each scenario, and suggested how each scenario's budget and measure allocations could change. The team considered that the baseline scenario (Scenario 0) should adhere as closely as possible to current program design to make impacts from other scenarios apparent against established and current practices. The team used current budget and program design assumptions to develop Scenario 0. For other scenarios, the team indicated how program design assumptions such as including new measures or changing budget or incentive assumptions could vary from the baseline.

Stakeholder Feedback and Scenario Adjustments

Cadmus presented the draft scenarios and prototypical program designs to stakeholders, received feedback, and adjusted the draft scenario design. Table 2 lists stakeholder comments and study team adjustments/responses.

Table 2. Stakeholder Feedback and Scenario Adjustments

Stakeholder Comment	Study Team Response / Scenario Adjustment
The draft Residential Appliance and Lighting budget is large, unless heating equipment attributed to appliances is included or it includes pre-ISA lighting spending. There are currently almost no lighting potential savings for residential lighting.	The draft proposal was based on previous quad allocations, which included large incentives budgets for lighting measures. For the final scenario, this budget allocation is reduced, shifting budget allocation to residential HVAC measures.
Can a doubling of Focus on Energy budget be combined with other priorities, such mitigating demand or decreasing emissions?	Adjusting multiple variables at a time can sometimes lead to difficulties in interpreting the scenario results.
An emerging priority is managing load growth. Can scenarios be designed to understand how load growth can be managed?	Each scenario can show the percentage of load reduction, compared to the baseline energy forecast (not to be confused with the baseline scenario). Each scenario, including the baseline and doubling of budget scenario can show this impact.
Can the study examine cost-effectiveness of the program and recommend how cost-effectiveness can be maximized?	The study can provide cost-effectiveness results for all prototypical programs, the portfolio overall, and each measure. The study will include a scenario that aims to include and prioritize the measures that are most cost-effective.

Final Scenario Design and Budget

After receiving all stakeholder feedback the study team finalized the study scenario design. Table 3 shows a high-level description of each scenario; Table 4 provides the highest level of detail for Scenario 0, the baseline scenario and then describes how each scenario will adjust the baseline assumptions by varying the following program attributes:

- Program or portfolio budgets
- Measure incentives
- Inclusion or exclusion of specific measures or programs

The baseline program budgets in Table 4 cover the entire four-year Quadrennial, which has an estimated total budget of \$432 million (including funds for incentives). Each program budget includes funding for measure incentives and for program administration, marketing, and other activities such as customer and trade ally outreach and technical support. While the baseline (Scenario 0) is mostly aligned with current offerings, it does include some measures that are not currently part of the portfolio, such as large residential appliances.

Table 3. Focus on Energy Quad V Planning Study Final Scenario Design Overview

Quad V Planning Study Scenario Descriptions Scenario Name/Scenario Description					
Scenario 0: Baseline/Status Quo	Scenario 1: Emission Reduction-Focused Program Design – baseline budget	Scenario 2: Summer and Winter Demand Reduction–Focused Program Design – baseline budget	Scenario 3: Electrification-Focused Program Design – baseline budget	Scenario 4: Double Focus on Energy Funding	Scenario 5: Cost-Effectiveness -Focused Program Design –baseline budget
Aligns Quad V with Quad IV program design as much as feasible. Distribution of budget based on 2021–2023 budget allocations. Incentives aligned with 2025 offerings	<ul style="list-style-type: none">• Maintain program level budgets from Scenario 0• Within each sector program (excluding New Construction and Solar PV), remove five measures with lowest emission reduction potential.• Increase incentives for five measures with highest emission reduction potential by 20%.• Include all study efficiency measures (except low emission-reduction measures)• Baseline economic conditions• Baseline measure adoption characteristics	<ul style="list-style-type: none">• Add residential, commercial, and industrial load-shifting programs with \$5,000,000 each for Quad V (4-year budget). Reduce budgets for other residential and commercial budgets by the same amount to maintain sector-level budgets from Scenario 0• After reviewing Scenario 0 results, remove ten measures with lowest summer electric peak reduction, ten measures with lowest winter peak reduction, and ten measures with lowest winter gas peak reduction potential• Increase incentives for ten measures with highest peak (summer/winter electric and winter gas) reduction potential by 20%• Reallocate incentive budgets from removed measures to incentive budgets for programs where incentives are increased.• Include all study efficiency measures (except low peak reduction measures)• Baseline economic conditions• Baseline measure adoption characteristics	<ul style="list-style-type: none">• Maintain sector-level budgets from Scenario 0• Add electrification measures and increase incentives for existing electrification measures by 20%• Baseline measure adoption characteristics	<ul style="list-style-type: none">• Double Focus on Energy budget compared to Scenario 0, double all program budgets• Increase all incentives by 25%• Baseline economic conditions• Baseline measure adoption characteristics• Baseline measure mix	<ul style="list-style-type: none">• Maintain program-level budgets from Scenario 0• Within each sector program (excluding New Construction and Solar PV) remove five measures with lowest cost-effectiveness results as per the modified Total Resource Cost Test• Increase incentives for five measures with highest cost-effectiveness results by 20%.• Include all study efficiency measures (except low cost-effectiveness measures)• Baseline economic conditions• Baseline measure adoption characteristics

Table 4. Detailed Focus on Energy Quad V Planning Study Final Scenario Design

SECTOR	PROGRAM NAME	Quad V Planning Study Scenario Descriptions Scenario Name/Scenario Description					
		Scenario 0: Baseline/Status Quo	Scenario 1: Emission Reduction-Focused Program Design – current budget	Scenario 2: Summer and Winter Demand Reduction–Focused Program Design – current budget	Scenario 3: Electrification-Focused Program Design – current budget	Scenario 4: Double Focus on Energy Funding	Scenario 5: Enhanced Cost- Effectiveness Scenario
Agriculture	Agriculture	Measures: All agricultural measures (including HVAC and lighting measures for agricultural businesses) Quad (4-year) Budget: <ul style="list-style-type: none">• Incentives = \$12,190,000• Non-incentives = \$5,560,000	<ul style="list-style-type: none">• Maintain Scenario 0 program budget• Review Scenario 0 results then:<ul style="list-style-type: none">• Remove five measures with lowest carbon reduction potential• Increase incentives for five measures with highest emission reduction potential by 20%• Baseline economic conditions• Baseline measure adoption characteristics	<ul style="list-style-type: none">• Maintain Scenario 0 program budget.• After reviewing Scenario 0 results, remove ten measures with lowest summer electric peak reduction, ten measures with lowest winter peak reduction, and ten measures with lowest winter gas peak reduction potential• Increase incentives for ten measures with highest peak (summer/winter electric and winter gas) reduction potential by 20%• Baseline economic conditions• Baseline measure adoption characteristics	<ul style="list-style-type: none">• Maintain Scenario 0 program budget• Add agricultural electrification measures with incentives 20% higher than for comparable energy efficiency measures• Baseline economic conditions• Baseline measure adoption characteristics	<ul style="list-style-type: none">• Double Scenario 0 program budget• Baseline economic conditions• Baseline measure adoption characteristics• Baseline measure mix	<ul style="list-style-type: none">• Maintain program level budget from Scenario 0• Remove five measures with lowest cost effectiveness results as per the modified Total Resource Cost Test• Increase incentives for five measures with highest cost effectiveness by 20%.• Baseline economic conditions• Baseline measure adoption characteristics
Commercial	Commercial Refrigeration, Cooking, and Appliances	Measures: Commercial refrigeration Quad (4-year) Budget: <ul style="list-style-type: none">• Incentives = \$6,860,000• Non-incentives = \$4,890,000	For each program: <ul style="list-style-type: none">• Maintain Scenario 0 program budgets• Review Scenario 0 results then:<ul style="list-style-type: none">• Remove five measures with lowest carbon reduction potential• Increase incentives for five measures with highest emission reduction potential by 20%• Baseline economic conditions• Baseline measure adoption characteristics	<ul style="list-style-type: none">• After reviewing Scenario 0 results, remove ten measures with lowest summer electric peak reduction, ten measures with lowest winter peak reduction, and ten measures with lowest winter gas peak reduction potential• Increase incentives for ten measures with highest peak (summer/winter electric and winter gas) reduction potential by 20%• Sector budget for Scenario 0 programs decrease to allow for load shifting program. Total Quad (4-year) Budget:<ul style="list-style-type: none">• Incentives = \$53,580,000• Non-incentives = \$38,150,000• Baseline economic conditions• Baseline measure adoption characteristics	<ul style="list-style-type: none">• Maintain Scenario 0 program budgets• Add commercial electrification measures to relevant programs• Electrification measures: incentives reflect program priority to encourage adoption (for example if a non-electrification heat pump receives a \$100 incentive, an electrification heat pump would receive a \$120 incentive)• Baseline economic conditions• Baseline measure adoption characteristics	For each program: <ul style="list-style-type: none">• Double Scenario 0 program budgets• Baseline economic conditions• Baseline measure adoption characteristics• Baseline measure mix	For each program: <ul style="list-style-type: none">• Maintain program level budgets from Scenario 0• Within each sector program remove five measures with lowest cost effectiveness results as per the modified Total Resource Cost Test• Increase incentives for five measures with highest cost-effectiveness by 20%.• Include all study efficiency measures (except low cost-effectiveness measures)• Baseline economic conditions• Baseline measure adoption characteristics
	Commercial HVAC and Water Heat	Measures: All measures impacting HVAC end uses, including controls and building shell measures Quad (4-year) Budget: <ul style="list-style-type: none">• Incentives = \$19,240,000• Non-incentives = \$13,690,000					
	Commercial Lighting	Measures: commercial lighting and lighting control measures Quad (4-year) Budget: <ul style="list-style-type: none">• Incentives = \$26,960,000• Non-incentives = \$19,200,000					
	Commercial Processes	All commercial measures impacting the Process end use (as well as miscellaneous measures such as pool heat and IT systems) Quad (4-year) Budget: <ul style="list-style-type: none">• Incentives = \$3,440,000• Non-incentives = \$2,450,000					

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	Load Shifting	Not included in Scenario 0	Not included in Scenario 1	Measures: Thermal energy storage, thermostat load shifting, EV charging load shift Quad (4-year) Budget: <ul style="list-style-type: none">• Incentives = \$1,000,000• Non-incentives = \$4,000,000	Not included in Scenario 3	Not included in Scenario 4	Not included in Scenario 5
Industrial	Industrial	Measures: measures impacting buildings in the industrial sector Quad (4-year) Budget: <ul style="list-style-type: none">• Incentives = \$56,760,000• Non-incentives = \$44,310,000	<ul style="list-style-type: none">• Maintain Scenario 0 program budget• Review Scenario 0 results then:<ul style="list-style-type: none">• Remove five measures with lowest carbon reduction potential• Increase incentives for five measures with highest emission reduction potential by 20%• Baseline economic conditions• Baseline measure adoption characteristics	<ul style="list-style-type: none">• After reviewing Scenario 0 results, remove ten measures with lowest summer electric peak reduction, ten measures with lowest winter peak reduction, and ten measures with lowest winter gas peak reduction potential• Increase incentives for ten measures with highest peak (summer/winter electric and winter gas) reduction potential by 20%• Increase incentives for ten measures with highest peak (summer/winter electric and winter gas) reduction potential by 20%• Baseline economic conditions• Baseline measure adoption characteristics	<ul style="list-style-type: none">• Maintain Scenario 0 program budget• Add industrial electrification measures• Baseline economic conditions• Baseline measure adoption characteristics	<ul style="list-style-type: none">• Double Scenario 0 program budgets• Baseline economic conditions• Baseline measure adoption characteristics• Baseline measure mix	<ul style="list-style-type: none">• Maintain program level budgets from Scenario 0• Within each sector program remove five measures with lowest cost effectiveness results as per the modified Total Resource Cost Test• Increase incentives for five measures with highest cost effectiveness by 20%.• Include all study efficiency measures (except low cost- effectiveness measures)• Baseline economic conditions• Baseline measure adoption characteristics
Residential	Income Qualified	Measures: Building shell, HVAC, water heater measures, space heating and cooking electrification Quad (4-year) Budget: <ul style="list-style-type: none">• Incentives = \$8,710,000• Non-incentives = \$4,010,000	<ul style="list-style-type: none">• Maintain Scenario 0 program budgets• Review Scenario 0 results then:<ul style="list-style-type: none">• Remove five measures lowest carbon reduction potential• Increase incentives for five measures with highest emission reduction potential by 20%• Baseline measure adoption characteristics• Baseline economic conditions		<ul style="list-style-type: none">• Maintain Scenario 0 program budgets• Add residential electrification measures to relevant programs, including measures introduced	For each program: <ul style="list-style-type: none">• Double Scenario 0 program budgets• Baseline economic conditions• Baseline measure adoption characteristics• Baseline measure mix	<ul style="list-style-type: none">• Maintain program level budgets from Scenario 0• Within each sector program remove five measures with lowest cost effectiveness results as per the modified Total Resource Cost Test
	HVAC and Water Heating	HVAC, Water heating equipment (water heating and space heating electrification) Quad (4-year) Budget: <ul style="list-style-type: none">• Incentives = \$38,110,000• Non-incentives = \$18,060,000					

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	Appliances and Lighting	Measures: thermostats, appliances, lighting, water flow measures (aerators, etc.), pool pumps Quad (4-year) Budget: <ul style="list-style-type: none">Incentives = \$9,909,000Non-incentives = \$4,581,000		<ul style="list-style-type: none">After reviewing Scenario 0 results, remove ten measures with lowest summer electric peak reduction, ten measures with lowest winter peak reduction, and ten measures with lowest winter gas peak reduction potentialIncrease incentives for ten measures with highest peak (summer/winter electric and winter gas) reduction potential by 20%Program budgets adjusted as per approach above. Sector budget for Scenario 0 programs decrease to allow for load shifting program. Total Quad (4-year) Sector Budget:<ul style="list-style-type: none">Incentives = \$53,580,000Non-incentives = \$38,150,000Baseline measure adoption characteristicsBaseline economic conditions			<ul style="list-style-type: none">Increase incentives for five measures with highest cost effectiveness by 20%.Include all study efficiency measures (except low cost-effectiveness measures)
	Building Shell	Measures: Building shell measures (insulation, air sealing, windows, etc.) Quad (4-year) Budget: <ul style="list-style-type: none">Incentives = \$13,910,000Non-incentives = \$6,390,000					
	Multifamily	Measures: all measures installed in existing multifamily buildings Quad (4-year) Budget: <ul style="list-style-type: none">Incentives = \$13,910,000Non-incentives = \$4,740,000					
	Load Shifting	Not included in Scenario 0	Not included in Scenario 1	<ul style="list-style-type: none">Measures: Thermal energy storage, thermostat load shifting, EV charging load shiftQuad (4-year) Budget:<ul style="list-style-type: none">Incentives = \$1,000,000Non-incentives = \$4,000,000	Not included in Scenario 3	Not included in Scenario 4	Not included in Scenario 5

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Solar PV	Solar PV	Measures: Solar PV Quad (4-year) Budget: <ul style="list-style-type: none">Incentives<ul style="list-style-type: none">Agricultural = \$1,734,130Commercial = \$9,468,039Industrial = \$981,645Residential = \$12,096,185Non-incentives = \$1,020,000	<ul style="list-style-type: none">Maintain Scenario 0 program budget incentivesBaseline economic conditionsBaseline measure adoption characteristics	<ul style="list-style-type: none">Maintain Scenario 0 program budget incentivesBaseline economic conditionsBaseline measure adoption characteristics	<ul style="list-style-type: none">Maintain Scenario 0 program budget incentivesBaseline economic conditionsBaseline measure adoption characteristics	<ul style="list-style-type: none">Double Scenario 0 program budgetsBaseline economic conditionsBaseline measure adoption characteristics	<ul style="list-style-type: none">Maintain Scenario 0 program budget incentivesBaseline economic conditionsBaseline measure adoption characteristics
New Construction	New Construction	Measures: All measures focused specifically on improving new construction practices via Focus on Energy Quad (4-year) Budget: <ul style="list-style-type: none">Incentives<ul style="list-style-type: none">Commercial = \$13,030,000Residential = \$10,180,000Multifamily = \$4,240,000Non-incentives = \$16,540,000	<ul style="list-style-type: none">Maintain Scenario 0 program budget and incentivesBaseline economic conditionsBaseline measure adoption characteristics	<ul style="list-style-type: none">Maintain Scenario 0 program budget incentivesBaseline economic conditionsBaseline measure adoption characteristics	<ul style="list-style-type: none">Maintain Scenario 0 program budget incentivesBaseline economic conditionsBaseline measure adoption characteristics	<ul style="list-style-type: none">Double Scenario 0 program budgetsBaseline economic conditionsBaseline measure adoption characteristics	<ul style="list-style-type: none">Maintain Scenario 0 program budget incentivesBaseline economic conditionsBaseline measure adoption characteristics