U.S. Department of ENERGY | Office of State and Community Energy Programs

Launching a Measured Pathway Home Efficiency Rebates Program (IRA Section 50121)

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Introduction

This document provides guidance to states and territories ("states")[1] designing and launching a measured pathway for Section 50121 of the Inflation Reduction Act ("IRA") funded Home Efficiency Rebates program ("HOMES").[2] States can choose between implementing a measured pathway, a modeled pathway, or both approaches in their HOMES programs. The measured pathway represents a pay-for-performance based approach to calculating and distributing home efficiency rebates. Whereas the modeled pathway relies on projected energy savings, the measured pathway calculates rebates on actual, verified energy savings based on pre- and post-upgrade utility consumption data analysis.

Understanding the Measured Pathway Requirements

Key Requirements

Measured Home Efficiency Rebates is a program path within Section 50121, using a DOE approved open-source measurement and verification (M&V) methodology to measure home energy savings post-installation of the upgrades. The pathway provides rebates for homes or a portfolio of homes that achieve energy savings of at least 15%.[3] Measured energy savings at each site must be calculated in a manner that:

- Uses open-source advanced M&V software approved by DOE that includes capabilities for determining and documenting the weather-normalized energy use of a home or portfolio of homes before and after the implementation of home energy upgrades.[4]
- Defines, calculates, and reports energy savings for the purposes of the rebate threshold as kilowatt-hour (kWh) or kWh equivalent.
- Calculates actual home- or portfolio-level savings no less than nine months after the final installation in the home or portfolio. If measuring savings less than 12 months post-installation, the calculation must include at least one peak energy season and both peak seasons if in a dual-peaking climate.
- Collects and reports the data and information required in the Data & Tools Requirements Guide.
- Does not include generation technologies.

Additionally, states must:

- Ensure that no electrification rebates will be made for addresses that are in the process of receiving a rebate for measured savings (and vice versa), except for rebates for electric load service centers or electric wiring.[5]

[1] For the purposes of this document, "states" means, collectively or individually, the 50 states, the District of Columbia, the Commonwealth of Puerto Rico, the U.S. Virgin Islands, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands.
[2] See 42 U.S.C. 18795.
[3] See 42 U.S.C. 18795(c) and Program Requirements Sections 3.1.2.2 and 3.2.4.2. https://www.energy.gov/scep/articles/home-energy-rebate-programs-requirements-and-application-instructions
[4] See Measured Pathway Software Verification Procedures. https://www.energy.gov/scep/articles/home-efficiency-rebates-ira-section-50121-measured-pathway-software-verification
[5] See Program Requirements Section 3.1.2.

- Ensure that a single address cannot receive:[6]
  - Both a measured and a modeled rebate under 50121.
  - A rebate from both HOMES and Home Electrification and Appliance Rebates ("HEAR") for the same measure.

For low-income households, states must "provide an acceptable method for low-income households to not be required to use personal funds at the point of sale to pay for rebate-covered work,"[7] which means that the rebate must be deducted from the invoice. Since states cannot issue the rebate using DOE rebate funds until actual savings are calculated and verified, the state, or some other entity (such as an implementer, aggregator, or financial firm) must use other funds to pay that rebate to the homeowner or building owner.[8] For market-rate participants, that is, anyone at or above 80% of the area median income (AMI), states have more flexibility when designing their program. Yet to avoid having homeowners, building owners, and contractors waiting to receive their rebate until energy savings are measured and verified, program implementers, aggregators, or financial firms would step in to provide upfront payments based on estimated savings. These entities bear the risk[9] of recovering the rebate based on actual verified savings calculated 12-15 months after the retrofit.[10]

For measured energy savings projects, savings may be reported across a portfolio of homes. Entities such as aggregators, which must be approved by states to operate in their programs, may package predicted savings from individual homes or multifamily buildings into a portfolio. When reporting projects for a portfolio of homes to DOE, states must:

- Meet the energy savings minimum (15%) across the portfolio.[11]
- Report required data for each dwelling unit within the portfolio.
- Calculate the final rebate for each project within the portfolio based on the payment rate applied to the energy savings of each home.

Rebate Structure

In the measured pathway, final rebates are calculated based on a kWh or kWh equivalent payment rate or a portion of the project cost, as shown in Table 1. This differs slightly from the modeled pathway, where rebates are paid on a percentage of project costs or on a fixed amount based on whether energy savings are estimated to achieve 20% to 34% savings or greater than 35% savings.

Table 1. Measured Savings Rebate Levels[12]

Home Type	Measured Energy Savings	Income Level	Rebate Amount
Single-Family or Multifamily	15% or greater	<80% AMI	kWh, or kWh equivalent, payment rate equal to $4,000 for a 20% reduction of energy use for the average home or dwelling for the average multifamily building in the state or 80% of project cost

[6] See Program Requirements Section 3.1.2.
[7] See Program Requirements Section 3.1.5. https://www.energy.gov/scep/articles/home-energy-rebate-programs-requirements-and-application-instructions
[8] See Program Requirements Section 3.1.2.
[9] Entities do not get paid for projects that are dropped from a portfolio due to low energy savings. Entities could also benefit by receiving a higher rebate if the actual energy savings are greater than the estimated savings. In the narrative application, states must "[d]escribe what caps the state will place on contractor/aggregators in terms of savings exceeding the amount associated with the rebate provided to the homeowner." [See Program Requirements Section 3.1.7].
[10] See Using Aggregators to Deliver Home Efficiency Rebates. https://www.energy.gov/scep/articles/using-aggregators-deliver-home-efficiency-rebates
[11] Individual projects with less than 15% savings can be included in a portfolio if the overall portfolio savings is 15% or greater.
[12] Based on Table 3 in Program Requirements Section 3.1.2.2.

Home Type	Measured Energy Savings	Income Level	Rebate Amount
Single-Family or Multifamily	15% or greater	≥80% AMI	kWh, or kWh equivalent, payment rate equal to $2,000 for a 20% reduction of energy use for the average home or dwelling for the average multifamily building in the state or 50% of project cost

For low-income households under 80% AMI, states may increase the percentage of project costs that the rebate covers up to 100% upon approval from DOE.[13] The measured pathway does not specify a cap on the rebate; however, states may propose a monetary cap on the project costs to extend program reach and to safeguard against very large rebates in the case of high-cost, high-savings projects. For example, a state may specify that a low-income single-family project may be paid 100% of project costs up to a maximum amount of $20,000. Rebate amounts must never exceed 100% of project costs.

Per statute, the measured energy savings of the home or portfolio of homes must achieve 15% savings.[14] However, the payment rate is calculated based on a 20% reduction of energy use for the average home or dwelling in the average multifamily building in the state. Table 2 and Figure 1 illustrate how kWh payment rates are calculated for low income (less than 80% AMI) and market rate (80% AMI and greater) homes. For detailed rebate calculations and examples, see the HOMES Measured Path Incentive Payment Calculator.

Table 2. Example Measured Path Payment Rates

Home Type	Single-Family		Multifamily	
Income Level	Low-Income	Market Rate	Low-Income	Market Rate
Rebate Level (per statute)	$4,000	$2,000	$4,000	$2,000
Reduction of Energy Use (per statute)	20%	20%	20%	20%
Average Annual Home Usage (kWh, unique to each state)[15]	20,000	20,000	10,000	10,000
Resulting kWh Payment Rate ($/kWh saved)	**$1.00**	**$0.50**	**$2.00**	**$1.00**

$$Payment\ Rate = Rebate\ Level \div (Average\ Annual\ Home\ Usage \times 20\%)$$

Single-family, low-income kWh payment rate example from above:

$$\$1.00/kWh = \$4{,}000 \div (20{,}000\ kWh \times 20\%)$$

Figure 1. Calculating kWh Payment Rate

Once the payment rate is calculated, states will apply that value to the kWh (or kWh equivalent) savings for each project in the portfolio to calculate the rebate. States may choose to pay either the calculated rebate amount based on energy savings or the percentage of project costs as long as the rebate does not exceed project costs.

[13] See 42 U.S.C. 18795(c)(3).
[14] See 42 U.S.C. 18795(c)(2)(A)(iii), 18795(c)(2)(B)(iii), and 18795(c)(2)(C)(iii).
[15] Table uses proxy average annual home usages as an example. For specific average annual home energy uses to your state, see the HOMES Measured Path Incentive Payment Calculator. The calculator uses household energy consumption date from the 2020 Residential Energy Consumption Survey (RECS) provided by the U.S. Energy Information Administration (EIA).

Why Consider the Measured Pathway?

The measured pathway has several unique characteristics that may influence a state's decision to implement this path. Beyond traditional energy efficiency programs, this pathway may enable states to achieve broader policy objectives while maintaining program flexibility and accountability. The measured path:

- Enables states to structure rebates to:
  - prioritize projects that lower greenhouse gas (GHG) emissions,
  - reward energy savings during peak demand times, and/or
  - enhance grid reliability by targeting projects in grid-constrained locations.
- Provides accountability of public funding since rebates are paid out based on verified energy savings.
- Sets an energy savings threshold of 15% for a household or portfolio of homes (see HOMES Measured Path Incentive Payment Calculator for a detailed breakdown on how rebates are calculated).
- Offers a streamlined process for contractors with reduced effort for training since modeling does not need to align with BPI-2400.

As noted earlier, states may offer the modeled, measured, or both pathways simultaneously. States that choose to offer both pathways will have an opportunity to test different approaches and diversify risks, strike a balance between paying rebates based on estimated savings versus actual savings, and increase the market's flexibility to serve diverse participant and contractor needs. States should consider their market conditions and guard against redundant administrative costs from deploying both pathways.

Strategic Considerations for the Measured Pathway

Outline Key Strategic Objectives

States considering implementing a measured pathway program should begin by outlining their key strategic objectives for HOMES. Solicit input from key stakeholders to help define the program's goals and evaluate how the measured pathway aligns with those goals. Start by considering the following questions:

- ✓ ***What are your state's energy and climate goals****?* The measured pathway may allow for more accurate tracking and alignment of energy savings to time and location compared to the modeled pathway. If, for example, your state has ambitious peak load reduction goals, you may structure rebates to place higher values on savings that occur during peak demand times. For a more detailed discussion of prioritizing time, location, and GHG emissions, see the section below on Energy and GHG Value.
- ✓ ***Who is your target population?*** While serving low-income, multifamily, and disadvantaged communities is required, states can choose to prioritize these populations. If, for example, your state wants to focus on serving multifamily affordable housing, consider the unique characteristics of this sector and whether the measured or modeled pathway is a better fit. For the measured savings pathway, access to building energy data is necessary. You will need to think about how the pre- and post-retrofit energy use data will be collected and how savings will be verified. How this data is collected will depend on whether buildings are master-metered or units are individually metered. Exploring these issues may help guide your program design decisions. For a more detailed discussion of these considerations, see the Multifamily section below.

Assess Your Market

Next, states should assess their market for readiness to implement the measured pathway. This process will involve identifying how program stakeholders will collect required energy use data, thinking through the program stakeholder roles and responsibilities, mapping program workflows, evaluating the contractors' experience, and assessing the availability of funding or financing mechanisms to pay contractors at the time that installation is complete without having to wait for measured savings to be verified.

Accessing Metered Consumption Data

The foundation of a successful measured pathway program rests on your state's ability to collect metered consumption data from homeowners, utilities, program implementers, aggregators, or solutions such as Green Button or ENERGY STAR® Portfolio Manager. States should assess their relationship with utilities and their data infrastructure to consider methods for gaining access to the required 12 months of historical energy use data plus 9-12 months of post-retrofit data.

Begin by examining how utilities in your territory currently handle data sharing and energy efficiency programs. Do utilities in your state have modernized metering infrastructure, standardized data access protocols like Green Button, or existing partnerships with energy efficiency programs? The strength of these utility relationships and data systems may impact your program's success. If data sharing capabilities are limited in the region, reach out to aggregators and implementers to explore their capabilities to take on these responsibilities, as alternative approaches may be feasible.

Understanding current time-of-use rate structures and utility, state, federal, or other incentive programs will help you position the measured pathway effectively. By evaluating opportunities to braid funding,[16] current gaps and underserved populations, data access infrastructure for billing analysis, grid constraints and geography, and integration opportunities with demand response and grid modernization initiatives, states will be well positioned to make impactful decisions around what population segments and locations to target, project eligibility, incentive structures, and verification requirements.

For additional details on collecting metered consumption data, see the IRA Section 50121 Home Efficiency Rebates: Data Access Pathways Background and Plan Templates.

Consider Program Stakeholder Roles

The success of a measured pathway program depends on effective coordination between multiple entities, each playing distinct but interconnected roles. Building these relationships early in the program design phase helps ensure smooth implementation and sustainable operations.

When designing your stakeholder engagement strategy, consider how existing relationships can be leveraged and where new partnerships need to be developed. The following table outlines examples of stakeholder roles and responsibilities. Please note that this a general view and individual states and programs will likely vary from this.

Table 3. Stakeholder Roles and Responsibilities in the Measured Pathway

Stakeholder	Primary Role	Key Responsibilities
State Energy Office	Program Administrator	• Oversees program design and implementation • Establishes program rules and requirements • Manages federal funding and reporting • Monitors program performance • Ensures compliance with federal requirements

[16] See State Energy Office (SEO) Guide to Braiding and Stacking Federal Funds where braiding is defined as "the practice of using multiple separate funding sources, whether federal or non-federal, on a project simultaneously, while ensuring each funding source is isolated and tracked independently." https://www.energy.gov/scep/articles/seo-guide-braiding-and-stacking

Stakeholder	Primary Role	Key Responsibilities
Program Implementer or Aggregator[17]	Operational Management	• Processes applications and rebates • Manages contractor networks • Provides technical assistance • Trains and supports contractors in estimating project level savings • Tracks program metrics and analyzes data • Handles customer service • Bundles multiple projects into a portfolio • Manages contractor relationships • Provides upfront contractor payments • Assumes performance risk
Contractor	Project Execution	• Assesses homes and buildings and estimates savings • Installs improvements to quality standards • Documents work completed • Maintains required certifications • Ensures customer satisfaction
Homeowner or Building Owner	Program Participant	• Receives efficiency upgrades • Authorizes sharing of energy use data • Reports issues/concerns
Financial Partner (Optional)	Capital Provider	• Provides bridge financing • Manages payment flows • Assesses project risk • Supports program scaling
Utility (Optional)	Data Provider	• Provides customer usage data • Supports data access protocols • Coordinates with program staff • Shares program information

[17] May serve both implementer and aggregator roles.

Example Project Workflows

The following diagram shows the key likely steps of activities by key stakeholder.

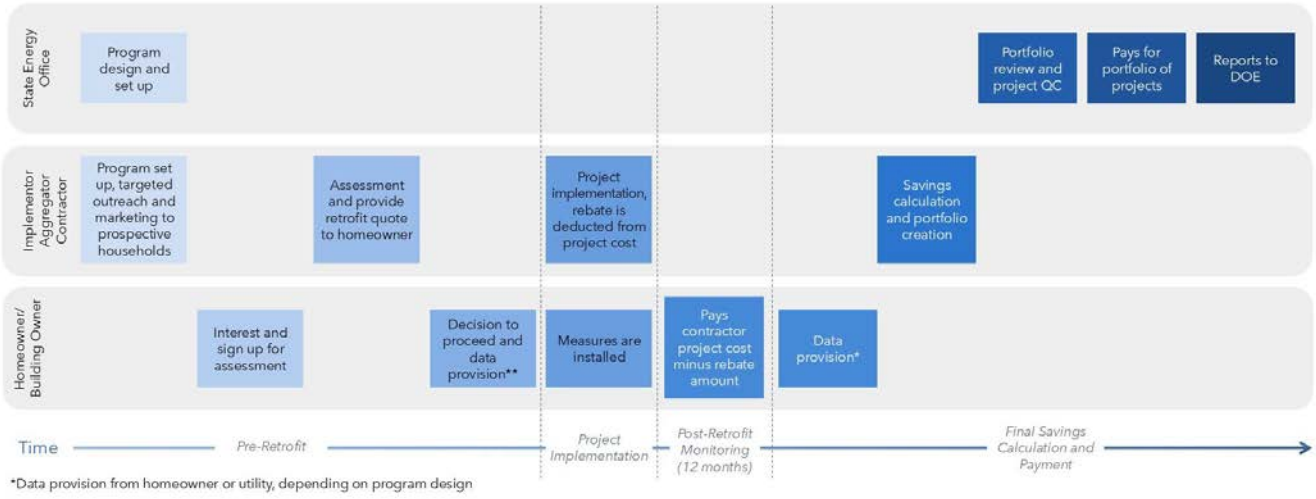

Figure 2. Example Project Workflows for the Measured Pathway[18]

Evaluating Contractor Readiness

Your contractor ecosystem will influence how quickly and effectively you can scale a measured rebates program. Without complex modeling, the measured pathway may open doors to a broader contractor base. This doesn't diminish the importance of contractor work quality and capabilities, but it can have the effect of making the program more accessible and equitable, particularly for smaller, diverse businesses.

Consider how your existing contractors operate: Do they have experience with performance-based programs? Understanding their business models and financial capacity is crucial, as the measured pathway's payment structure may require contractors to be comfortable with delayed rebate payouts based on a longer-term measurement and verification period. Conversely, contractors may seek out partnerships with an aggregator or financial partner that can carry those costs for them.

Financial Infrastructure Assessment

The success of your program hinges on having robust financial mechanisms to support the delayed verification period payment structure. As noted earlier, states cannot use DOE rebate funds to pay out measured rebates upfront to homeowners, building owners, or contractors until the post-retrofit utility data is collected and the savings are verified, typically 12-15 months after project completion. For pay-for-performance programs to run effectively and to scale, entities such as program implementers, aggregators, or financial partners (green banks, investors, etc.) use their own funds to pay rebates to homeowners, building owners, or contractors at the time of installation. These entities are then reimbursed by the state using DOE rebate funds once the measured savings data is analyzed and substantiated.

Traditional energy efficiency lenders, green banks, and private capital providers can play essential roles in bridging the timing gap between project completion and verified savings. States may evaluate potential financial partners based on their:

- Experience with energy efficiency financing
- Appetite for performance risk

[18] See Process Workflows developed by DOE and PNNL for more details. https://www.pnnl.gov/projects/rebate-tools/program-implementation#workflows

- Ability to provide bridge funding
- Interest in innovative financing structures

States that have existing relationships with green banks or active energy efficiency lenders may find it easier to implement the delayed payment structures needed for the measured pathway. Alternatively, program implementers and aggregators may bring established relationships with financial partners to help carry costs. States can also tap into other funding sources to help carry those costs as another viable option.

Other Implementation Considerations

Energy and GHG Value

Before diving into specific value streams, it's useful to understand your local utility landscape. Each utility commission or board typically has established goals around:

- Grid reliability and peak demand management
- Renewable energy integration
- Carbon reduction targets
- Environmental justice initiatives
- Rate stability requirements

The measured pathway offers unique advantages in aligning with these goals, as it provides verified performance data that utilities can rely on for their regulatory reporting and system planning.

Time-based factors

While traditional energy efficiency programs focus on total or annual savings, the timing of those savings can dramatically affect their total value to the grid, as well as participants, if they have time-of-use rates. Through the measured pathway's verification process, programs can document savings achieved during critical periods. This means that a 100-kWh reduction during a summer peak afternoon might be worth several times more than the same reduction at midnight. States can structure rebates, using weighted values or a higher kWh payment rate for peak time reductions, to incentivize retrofits that deliver savings when the grid needs them most.

Location-based factors

Grid infrastructure isn't uniform—some areas face capacity constraints, reliability challenges, or need expensive transmission upgrades. The measured pathway enables programs to target specific locations where verified energy savings may deliver the highest grid value by avoiding costly infrastructure costs.

Success here requires close utility coordination. Early engagement with utility planning departments helps identify high-value locations and quantify the benefits of these verified savings. States might consider creating "geo-targeting" overlays that increase incentives in priority areas.

GHG emission impacts

While both pathways may reduce GHG emissions, the measured pathway's temporal specificity enables more precise carbon accounting. Grid carbon intensity varies significantly throughout the day—for instance, savings during coal-heavy periods have different carbon impacts than during times of abundant renewable generation.

This precision creates opportunities for:

- Enhanced Environmental Reporting: Provide verified carbon reductions to support state climate goals.
- Carbon Market Participation: The detailed verification might support carbon credit generation.
- Grid Decarbonization Support: Target savings during high carbon periods.
- Environmental Justice Integration: Document emission reductions in priority communities.

Virtual Power Plant Integration

Virtual power plant (VPP) initiatives can be integrated with the measured pathway by providing a network of aggregated distributed energy resources that can manage peak demand via verified energy savings. For either the modeled or measured pathway, utilizing control technologies to reduce peak demand such as smart thermostats or CTA-2045 compliant water heaters may allow upgraded homes to participate in demand response events that can earn additional revenue to participants and lower regional power costs at the macro level.

Successful VPP integration requires close partnerships with utilities to ensure the right technologies compatible with existing demand response programs are implemented during the upgrade process.

Multifamily

Measuring actual savings in multifamily buildings presents unique opportunities and complexities. Measured verification may enable seamless integration with utility demand response initiatives and empirical validation to energy efficiency investments. However, the measured pathway faces unique verification challenges for multifamily properties. For whole building projects, it can be challenging in some markets to obtain the aggregated whole building utility data needed for measurement. Additionally, tenant turnover, shifts in building usage patterns, and aligning the upgrade areas with consumption data can complicate measurement.

In cases where multifamily homes are individually metered and individual units are upgraded, the measured pathway may be relatively straightforward and similar to single-family projects. Also, in cases where the entire building and common spaces have received an upgrade, whole building aggregated data may be effective at measurement.

Consumer Protection

Both the modeled and measured pathways of HOMES need to design and implement clear consumer protection protocols. Consumer protection through quality assurance (QA) is an essential component of protecting consumers and providing the highest quality consumer experience. Strong QA processes can protect households by providing independent oversight of the work performed by participating contractors to ensure that it meets program standards. States are required to submit a Consumer Protection Plan detailing their consumer protection strategy and practices.[19]

States should consider additional methods for consumer protection through the measured pathway. In addition to the Consumer Protection Plan required elements:

I. States can cap the allowable rebate amount that a contractor or aggregator would receive when actual savings exceed estimated savings. For example, states could establish a cap that would limit rebates to 20% above the rebate provided to homeowners. This cap encourages contractors to more accurately estimate savings.

II. States must monitor the energy savings reliability of models and tools. For more details on savings verification, see Measured Pathway Software Verification Procedures.

Next Steps

States considering the measured pathway should define their program's strategic objectives and assess the state of their energy efficiency market and its potential to successfully adapt and scale. The measured pathway may allow states to:

- test innovative approaches to whole-home efficiency upgrades,
- align rebate structures more closely to climate and energy goals, and

[19] See the Consumer Protection Plan Required Elements and Sample Responses for requirements. https://www.energy.gov/scep/articles/home-energy-rebates-ira-sections-50121-and-50122-consumer-protection-plan-required

- increase stakeholders' confidence in verified energy savings.

The DOE Home Energy Rebate Technical Assistance team is available to assist states as they design and implement their measured and/or modeled pathway HOMES programs. Please contact your Home Energy Rebates Project Officer to request technical assistance.

Supporting Resources

Measured Pathway Software Verification Procedures

IRA Home Energy Rebates: Data and Tools Requirements Guide

Home Energy Rebates: Program Design and Implementation

State, Territorial and Tribal Resources | Department of Energy

Home Energy Rebates Frequently Asked Questions

HOMES Measured Path Incentive Payment Calculator

Using Aggregators to Deliver Home Efficiency Rebates