Ready, Set, Go! Lessons Learned and Innovative Approaches to Capture the Benefits of the Transformational IRA Programs

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ABSTRACT

The Inflation Reduction Act (IRA) Home Energy Rebates programs, funding both deep home energy efficiency retrofits and electrification, present a momentous opportunity to broadly expand access to home energy retrofits across the U.S. These programs are driven by diverse and ambitious objectives, aiming to curtail consumer energy costs, reduce emissions, foster workforce development, and uplift underserved communities. It also offers evaluators a once-in-a-career opportunity to research and learn from a suite of programs never before implemented at the same time and at this scale.

Standard evaluations will be insufficient to support the transformative change these programs seek. To support genuine and enduring transformation, we must integrate the wisdom gleaned from previous and existing federal programs. Equally crucial is the need for innovative, explorative, and impactful research to gauge the program's impact on homeowners, especially those who are energy burdened.

This paper describes the DOE evaluation strategy based on an initial prioritization of those opportunities. DOE is committed to conducting robust evaluation on the programs through traditional studies and through leveraging its unique role to convene and amplify the lessons learned from states. This strategy is designed to allow for program improvement as the programs are implemented, not just after, providing the opportunity for midcourse correction.

Yet, DOE can only scratch the surface of opportunity being provided to the industry to conduct deep, meaningful research. States, policy makers, implementers, and stakeholders should all support and contribute to supporting evaluations that will improve programs and continue us forward in ensuring all households are efficient, comfortable, and resilient.

Introduction

The Inflation Reduction Act (IRA), passed on August 16, 2022, included $8.8 billion made available to states, territories, and Tribes to provide federally funded home energy rebate programs to residential households. The goal of these programs is to enable Americans to make their homes more energy efficient, upgrade to efficient electric appliances, and reduce their energy bills. The Department of Energy (DOE) estimates that these historic rebates in home energy efficiency and electrification could save households across the U.S. up to $1 billion annually.[1]

The Home Energy Rebates programs consist of two separately funded programs, each with their own goals and consumer experience. The Home Efficiency Rebates (commonly known

[1] Biden-Harris Administration Announces State And Tribe Allocations For Home Energy Rebate Program | Department of Energy

as HOMES) program allocates $4.5 billion dollars for whole-home energy efficiency retrofits. Households are eligible for rebates by achieving at least 20% estimated energy savings or 15% actual energy savings. The Home Electrification and Appliance Rebate (HEAR) program allocates $4.3 billion to upgrade to efficient electric equipment and appliances. In addition, federally recognized Tribes are allocated an additional $225 million for the HEAR program.[2]

Following public meetings and a Request for Information made available in January 2023, DOE released the final state and territory Home Energy Rebates Program Requirements and Application Instructions[3] (Program Guidance) on July 27, 2023. At nearly 100 pages, the Program Guidance includes the rules and requirements states and territories must follow when developing, implementing, and reporting results from their Home Energy Rebates programs.

Recognizing this unique opportunity, DOE prioritized evaluation of the HOMES and HEAR programs in three ways: first, by committing that DOE will conduct impact, process, and market effects evaluation on the HOMES and HEAR programs; second, by requiring that states must also participate in those DOE-led evaluations; and third, by highly encouraging states to conduct their own evaluations and providing technical assistance and support in the development of their evaluation strategies. States that choose to conduct their own evaluations are exempt from participating in the DOE evaluations but may choose to and are encouraged to continue to participate.[4] States conducting their own evaluation are required to submit an Evaluation Plan to DOE within three months of program launch and are expected to deliver initial findings within 18 months[5] of program launch. To support development of state-led evaluations, the DOE issued Recommendations for Evaluations. This document provides an overview of principles, recommended evaluation methods, and references for states to leverage when developing their own evaluations.[6]

Unique Research Opportunities Arising from Home Energy Rebates Programs

The Home Energy Rebates programs will begin to roll out in the summer of 2024 and are expected to be fully launched across the country in 2025. Implementing a suite of similar programs across 56 states and territories, nearly simultaneously, provides a once-in-a-generation opportunity to collect and evaluate data and report on accomplishments, successes, and barriers on a national scale.

In addition to the scope and scale of programs that will be rolled out across the country, there are several unique aspects of the HOMES and HEAR programs that represent an opportunity from both a program and a research perspective, as follows:

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[2] Tribal Home Electrification and Appliance Rebates Program | Department of Energy

[3] Home Energy Rebate Programs Requirements and Application Instructions | Department of Energy

[4] See Program Requirements and Application Instructions, sections 3.1.6.4 and 4.1.7

[5] The DOE team selected this timeframe recognizing the need to balance having a sufficient number of completed projects for a robust evaluation while still ensuring that evaluations are completed quickly enough to inform program improvements.

[6] Inflation Reduction Act Home Energy Rebates: Evaluation Recommendations | Department of Energy

- **Commitment to low-income and disadvantaged communities.** The HOMES programs are strongly focused on supporting low- and moderate-income households and disadvantaged communities. First, states are required to allocate a portion of total rebate funding to low-income households that is consistent with the percentage of low-income households within their state[7] for both the HOMES and HEAR programs. Second, the entirety of the $4.4 billion HEAR program is only available for households making less than 150% of area median income. This focus provides an opportunity for robust research focused on understanding how and when these programs reduce customer bills, the extent to which they improve the lives of people within disadvantaged communities, and how research can be conducted using thoughtful, collaborative approaches.
- **Focus on multifamily.** Multifamily housing is also a focus of the HOMES programs, with states required to allocated at least 10% of the rebate funds to low-income multifamily households.[8] The barriers for multifamily energy efficiency and electrification programs are well documented, and programs often struggle with issues around tenant/owner split incentives, access to consumption data, and access to tenants. DOE evaluation efforts have an opportunity to leverage large samples of national property owners and tenants to provide insights for current and future programs. Findings should enable effective programs for this customer segment.
- **Electrification with HEAR.** Efforts to mitigate the impacts of climate change will require electrifying residential loads. However, many existing programs are managed by utilities who may be discouraged, or prohibited, from promoting fuel switching. Therefore, electrification program and research experience is relatively nascent. The focus of the HEAR program on encouraging the installation of electric appliances provides an opportunity to learn about customer perceptions of electric appliance alternatives, characteristics of projects with substantial customer bill savings, and greenhouse gas (GHG) savings associated with these projects, particularly in disadvantaged communities.
- **Deep, measured retrofits with HOMES.** Another important aspect of the IRA is its focus on comprehensive retrofits within the HOMES programs. The statute identifies two paths for deep retrofits—modeled and measured—with minimum savings thresholds of 20% and 15% respectively. These challenging goals for savings are paired with relatively stringent requirements for energy savings estimation, either a calibrated engineering model consistent with BPI-2400 (modeled path) or measurement of actual energy savings one year after project completion (measured path). These paths provide opportunities to research the results from widespread deployment of these savings estimation approaches, with an additional layer of focus on the ability of these programs to achieve the high savings thresholds while meeting income and equity goals.

[7] https://www.energy.gov/scep/articles/home-energy-rebate-programs-requirements-and-application-instructions

[8] https://www.energy.gov/scep/articles/home-energy-rebate-programs-requirements-and-application-instructions

Learning from the Past

When developing the DOE Evaluation Strategy, the Home Energy Rebates team sought to build on lessons from existing programs, past programs, and other federal entities implementing programs on a national scale.

The energy efficiency program evaluation community has over 40 years of experience evaluating utility energy efficiency programs, leading to a robust body of work and an established set of standard methods. This library of methods and findings can be leveraged for the HOMES program evaluation. For example, impact evaluation methods for evaluating meter and performance-based programs will be particularly useful, as will methods to evaluate calibrated engineering models. Evaluation literature also has effective methods for evaluating time-based and location-based savings as well as GHG savings and bill savings. Additionally, established process evaluation methods ensure we understand customer and market actor experiences to improve programs over time.

There are aspects of traditional utility evaluations that are less transferrable to the Home Energy Rebates programs. For example, the IRA did not contemplate cost effectiveness, while utility-run energy efficiency program evaluations often focus on verifying savings to support calculations of cost effectiveness consistent with requirements of state and public utility commissions. In addition, the HOMES programs encourage the braiding and coordination of multiple funding sources and require reporting of total (gross) savings associated with completed projects, regardless of combined funding. Therefore, research into attribution and net-to-gross research is not needed for DOE purposes.

Because the HOMES programs emphasize understanding the experiences of and benefits to disadvantaged communities, we expect evaluation will focus on the services provided to low- and moderate-income families. Although there are many instances of deep, thoughtful research into disadvantaged communities, it remains an area of evaluation where standard practice has not provided insights required to radically improve program reach. It can be costly to conduct culturally competent research designed and implemented in collaboration with the communities being served by programs.

The DOE approach also integrates lessons learned from previous evaluations of federal programs, including the Evaluation of the Better Buildings Neighborhood Program (BBNP), a component of the American Recovery and Reinvestment Act of 2009 (ARRA). The ARRA programs were designed to support job growth via energy efficiency investment across the U.S. The programs implemented during ARRA varied in scope, budget, and objectives. Data collection requirements were also limited, without consistent data fields and data structure across programs. The programs were evaluated through a phased omnibus approach, where DOE would amalgamate results and present a combined set of findings and recommendations. The evaluation period for BBNP encompassed about three years (Q4 2010–Q3 2013) and included results from 41 grantees and almost 100,000 projects. However, the diversity of program approaches and the complexity of a single omnibus evaluation effort resulted in a study that (1) was likely too late in delivery to have an influence on program design and implementation and (2) lacked statistically significant findings on program details.

The Home Energy Rebates team solicited input from those involved in the ARRA evaluation efforts and designed a strategy that:

- Shifts from a single omnibus evaluation to more timely and nimble approaches to collecting and sharing results; and

- Develops robust data requirements and structured data collection tools to allow for statistically significant results.
- Allows for longitudinal review of results and progress towards market transformation objectives, reflecting the benefit of the Home Energy Rebates programs providing data for up to eight years (through 2031).

DOE Evaluation Principles

In developing the Home Energy Rebates Evaluation Plan, the team focused on the following core principles:

- **Recognize and leverage the role of DOE.** The DOE plays a crucial role in ensuring that States meet federal funding regulations, program design rules, and data reporting requirements. However, DOE plays no direct role in delivering these federal rebates to American households. To provide value, DOE will leverage its ability to act on a national scale across nearly 100 consecutively occurring programs; scanning for programmatic achievements and innovation, facilitating collaboration across states, and amplifying the voices of those with lessons to share.
- **Focus on timely, actionable feedback.** DOE expects that much of the funding, particularly in the HEAR program, could be expended in the initial years of the program. With no guarantee of additional funds, it is imperative that evaluation results are timely and are shared with states early in the program lifecycle, to support adaptive management and continuous improvement. To keep to date, DOE envisions a series of rapid, narrowly scoped evaluation efforts. This approach will shorten the window from data collection to results shared, increasing the opportunity for program improvements and more effective deployment of remaining funds.
- **Encourage and Facilitate Collaboration.** DOE won't be able to evaluate all program deployments, all priorities, in all states and territories. Additionally, the best research often comes from the local jurisdiction most closely connected to residents, program design elements, and community priorities. Therefore, to fully learn from these programs, DOE will establish a collaborative Community of Learning, where states, market actors, public institutions, and others are joining in to evaluate various aspects of the Home Energy Rebates programs.
- **Focus on Priorities.** The Home Energy Rebates programs were designed to support key priorities: reaching low-income and disadvantaged communities, lowering energy burden, growing a qualified workforce, and supporting the transition to the clean energy economy. Additionally, the Home Energy Rebates programs have identified the following program-specific goals:
  - Provide increased rebates to low- and moderate-income families.
  - Increase access to consumer energy consumption data.
  - Establish a stable and successful model for whole-home single family and multifamily retrofits.
  - Enhance consumer protection.

Through their program design, states will layer in their own state policies and goals. With so many potential objectives, evaluation scopes would quickly expand beyond available budgets. Limited evaluation budgets require focusing on the outcomes for which the Home Energy

Rebates programs have a logical and measurable role. To inform this prioritization, DOE developed a program logic model.

DOE Evaluation Strategy

Developing and executing the Home Energy Rebates evaluations requires thoughtful planning, identifying priority areas of research, identifying key data needed to be collected through states, and creating a manageable and affordable scope of work. DOE has begun this planning process, and this section describes DOE's current evaluation strategy, which is expected to be an evolving approach. This flexibility is needed as the state programs are not yet fully designed or launched and it is important to adjust the strategy over time to ensure that evaluation resources are spent on the most valuable activities.

Overall, DOE plans to spend approximately $10–$20 million dollars over the IRA program period conducting evaluations and supporting a Community of Learning. The core components of the Evaluation Plan are described below. In general, DOE evaluations will focus on national-level results, conducting research by program type and attempting to segment by resident type and analogous delivery types wherever possible. It is unlikely that DOE will segment results by state, although DOE plans to conduct deep dive evaluations for specific topics and communities.

Community of Learning

While the foundations of the programs are the same, each state will integrate their own program objectives and varied approaches to implementation. Some states may coordinate closely with utilities; others will limit their programs only to multifamily or low-income households. States may choose to braid funds with other federal programs or partner with neighboring states to create a regionally similar program.

The IRA provides an opportunity to rapidly learn from and improve energy efficiency and electrification programs, as we expect to have up to 56 nearly identical and concurrently run programs implemented across the United States. This situation will allow states and territories to share successes and learn from each other in real time.

The Home Rebates programs, as currently created by IRA, will only run as long as federal funds are available. It is expected that some states will expend funds quickly. If the goal of evaluation is to improve existing programs, DOE and the states do not have the luxury of time and must perform evaluation in a manner that is responsive, flexible and timely. The earlier we can share insights and results, the more likely we are able to not only improve programs but potentially influence policy as well.

As states launch and implement their programs, DOE intends to create a Community of Learning platform, offering states the opportunity to share successes, barriers, lessons learned and recommendations with their colleagues. DOE will leverage ongoing communications and relationships with the states, as well as reported program data, to unearth and amplify significant findings in support of real-time continuous improvement while programs are still running.

DOE expects to begin these low-cost engagements in 2024, with an initial cadence of bi-monthly webinars. While the details of these engagements are still being developed at the time of this paper, DOE anticipates a combination of DOE-led discussions and presentations by states focused on specific topics. Though still in development phase, DOE is considering the following as initial potential topics for the community of learning:

- Successes and barriers to program development and launch
- Keys to successful integration with existing programs, with specific focuses on multi-family, Low-moderate income households, and disadvantaged communities
- Engagement with contractors, retailers, and distributors
- Effective targeting and marketing strategies
- Customer experience
- Case studies and highlights of unique and innovative program models

Impact Evaluation

Impact evaluations[9] determine and document the benefits of an energy efficiency program and are a vital component in measuring the savings impact of the Home Energy Rebates programs. Types of savings evaluated could include energy (electricity, natural gas, delivered fuels), customer bill savings, and GHG savings.

For Home Energy Rebates, impact evaluations will establish reliable estimates of savings due to the programs and provide recommendations for improvements into the savings estimation process. This is especially true for the HOMES-Measured and HOMES-Modeled paths, where rebates are based on estimated future energy savings. It is important to understand and verify these savings to ensure that customers are receiving expected benefits. It is also important to understand if the high bar of 15–20% whole-home actual energy savings is achievable on a broad scale.

The achievement of energy savings is central to Home Energy Rebates programs delivering on their core priorities of reductions in energy burden and GHGs. Therefore, DOE plans to calculate objective, retrospective estimates of energy savings, bill savings, and GHG savings. This effort will also identify opportunities to improve savings estimates and identify strategies to obtain additional benefits from programs. Impact evaluation is also particularly important for the HOMES-Measured and HOMES-Modeled pathways. Therefore, DOE will focus its limited resources on the following types of impact evaluation activities:

- **HOMES-Modeled –**Due to the importance of the effectiveness of calibrated modeling for HOMES-Modeled pathway, DOE plans to review a sample of calibrated models to provide feedback to states and general lessons learned to improve reliability of calibrated models. The goal of this will be to ensure that models are estimating savings reliably and

[9] Energy Efficiency Program Impact Evaluation Guide

consistent with statute and program requirements. DOE plans to evaluate both multifamily and single-family projects. DOE also plans to conduct impact evaluation on savings on projects that were unable to conduct calibrated modeling (e.g., lack of delivered fuel data, occupancy changes) and will consider adding a statistical pre-post usage analysis of modeled homes to improve models and ensure bill and GHG savings are accurate.

- **HOMES-Measured – Statistical Analysis:** For Measured-path projects, evaluations will re-run statistical models to ensure that savings are reliable and consistent with statute and program requirements.

DOE plans to conduct early impact evaluations once a large enough sample of projects is reported to DOE to provide fast feedback back to programs and the market regarding reliability and improvements of approaches.

Process Evaluation

Process evaluations focus on understanding program approaches and the experiences of participants and program partners (e.g., retailers, contractors, and aggregators). Process evaluations assess participant and program partner awareness, motivations, barriers, and program experience, converting findings into recommendations to improve the effectiveness of program operations. The insights gained from process evaluations help programs identify opportunities for improvement and document successful practices that should be continued.

For Home Energy Rebates programs, process evaluations will provide insight into how a program is functioning, what is working well, and any remaining barriers or challenges, and then provide recommendations for how to improve the effectiveness of the program. DOE will conduct high-level process evaluation activities to understand the program experience for vendors, contractors, homeowners, building owners, and others involved in the program. DOE plans to conduct research to ensure programs are operating effectively to maximize likelihood of achieving desired long-term market effects. DOE plans to have an intentional focus on understanding what is working and not working and leveraging lessons learned to bring positive change to people's lives, with a core focus on equity and disadvantaged communities.

- **Market Actor Process Evaluation:** DOE plans to gain program insights and recommendations for improvement from a limited set of key market actors, such as contractors and trade allies (auditors, installers, program staff, retailers, aggregators).
- **Deep Dive Evaluations:** DOE plans to conduct a limited set of deep dive evaluations, likely focused on a limited set of equity and workforce objectives.

Like impact evaluation, DOE plans to conduct early process evaluations once enough programs are launched and have been in the field with the goal of providing fast feedback back to DOE, states and program partners.

Market Effects

Market effects research estimates changes in a market's structure or function that reflects increased adoption of an efficient product or service resulting from a market intervention. Because of the connected nature of states and markets, DOE plans to conduct market effects analyses at the national level. States may develop plans to estimate market effects as part of their Market Transformation Plan, especially if the state has unique or robust objectives related to market effects.

The DOE team participated in a series of workshops to develop a logic model and identify key potential outcomes, particularly as they related to market effects and transformative change in policy and market environments. There are two main paths towards transformative market change. In the first, DOE and the states are influenced by the data obtained from program execution. These data support a variety of policy advancement and encourage a sustained shift in how energy efficiency and electrification are approached. Data improves confidence among key players and informs grid planning. Better understanding of benefits normalizes electrification and home energy retrofits. In the second path, the information and technical assistance provided to key market participants (e.g., construction, real estate, financing, and the trades) increases confidence in the benefits and profitability of energy efficiency and electrification. This confidence encourages increased investment and changes practices in retail, construction, and financing. These changes expand access to products and services that support energy efficiency and electrification. These changes are sustained over time and reflect on-going valuation of benefits for efficient, electrified homes. Table 1 provides the market-focused outcomes and lists potential indicators that may be used to assess progress towards these outcomes.

Table 1. Initial market structure outcomes and potential indicators

Topic	Potential Indicators
Short-term	
Verified benefits and infrastructure provide transparency and data to market and increase confidence among policy makers and private market participants.	Policy makers report using data from Rebate programs to inform priorities and decisions.
	Policy documents refer to data from Rebate programs.
	Private market investments (retail, trades, financing, construction, and similar) report being influenced by program data or experience.
	Market studies indicate that national or regional investments in new products, services, or business lines reflect experience with the Rebate program funding.
Mid-term	
Federal/state/local policies advance electrification and energy efficiency and inform grid planning.	Federal standards incorporate data from Rebate program implementation.
	Codes or local incentives encourage efficient, electric construction and retrofits.
	Utilities report integrating information from Rebate program implementation into grid planning efforts.

Topic	Potential Indicators
Supply and assortment of energy efficiency and electric products are improved, at lower costs. Home energy performance is accessible to the real estate market.	Retail/wholesale product lines indicate the average efficiency of retrofit equipment is improving.
	Sales data indicate expanded supply of efficient or electrification products.
	Pricing data indicate that efficient products are increasingly affordable.
	Local real estate platforms include disclosure of energy features.
	Energy performance is incorporated into home value (by real estate sector or by homebuyers).
Long-term	
Electrification and home retrofits are considered common solutions.	State and local policies encourage sustained attention on efficiency of housing stock.
	Homeowners understand the value of efficiency or electric investment in their homes and report increased levels of intention to pursue.
Retail assortment is permanently changed. Financial products increasingly incorporate home performance.	Jurisdictions adopt home energy scores.
	Data support appraisal incorporation of energy performance.

Market effects analyses will involve documenting baseline levels of retrofits, workforce participation, and sales of efficient electric appliances. An important constituent for market effects is the changes state and local leaders report in their own jurisdictions, including permanent inclusion of efficiency in the real estate market, local codes, and homeowner sentiment.

State Evaluation Opportunities

Guided by the logic model and priorities, the DOE team identified additional potential research activities and objectives that could be undertaken for the Home Energy Rebates programs. However, due to the limited funds allocated to DOE's administration of the Home Energy Rebates programs, DOE must rely on states and other program stakeholders to lead these high-value research efforts. In this section we describe key research objectives and questions DOE recommends research taken on by others in the industry who recognize the unique opportunity to evaluate these programs.

Impact Evaluation

The opportunities for impact evaluation are tremendous. The following represents some key research topics for impact evaluations of Home Energy Rebates for consideration by states and market actors.

- State- and community-specific impacts of energy savings by customer type (e.g., multifamily, low-income, moderate income), by fuel type and as a percent of household consumption.
- Accuracy and drivers of program-estimated energy savings and bill savings.
- Characteristics of households and projects that have the highest and lowest energy and bill savings.
- Recommended approaches for improving savings estimates.
- HEAR savings and bill impact estimation.[10]
- HOMES-Modeled: comparison of actual post-installation savings to estimated savings.
- Peak capacity impacts, including winter and summer peak reductions or increases due to the program.
- Locational impacts.
- GHG impacts.
- Valuation of non-energy impacts.
- Assessment of impacts and characteristics of projects for disadvantaged communities, Tribal communities, and low- and moderate-income residents.

Process Evaluation

Objectives and key research topics for process evaluations of Home Energy Rebates programs (all program types) are as follows:

- State and community-specific process evaluation findings, such as:
  - Program management effectiveness.
  - If program activities are advancing equity and reaching underserved populations.
  - Effectiveness and ease of use of data collection and reporting systems to track measures installed, participation, and preliminary energy savings.
  - Program-partner effectiveness in delivering services to participants and potential participants.
  - Marketing, outreach, and education activities' effectiveness in identifying eligible homes, encouraging participation, and communicating the value of home energy upgrades.
  - Participant experiences with the program and affiliated contractors.
  - Level of engagement from community partners, including community-based organizations and labor groups.
  - If the supply of qualified workforce is sufficient or increasing.
  - The likelihood of the program achieving its goals and objectives as currently designed and implemented.
- Deep dives of program priorities, including low-income, multifamily and disadvantaged communities.
- Comprehensive surveys of market actors and program participants.
- Effectiveness of program education and outreach strategies.
- Program impacts on workforce trainings and availability of qualified contractors, specifically in disadvantaged and rural communities.

[10] https://www.nrel.gov/news/press/2024/benefits-of-heat-pumps-detailed-in-new-nrel-report.html

Market Effects Evaluation

Federal entities, states, implementers, vendors, contractors, and other stakeholders all anticipate and expect these programs to effect the market. To measure these effects, DOE recommends stakeholders conduct research on the following topics:

- Evidence of market change occurring outside of direct program activities that indicate broader market influence.
- Contractors or other market partners carrying program messaging and upgrades to non-program households.
- New local or regional policies that support similar work outside of direct IRA funding.
- New or enhanced financing mechanisms for non-program projects.
- Identification of upgraded homes on multiple listing services.
- Adoption of program-developed tools by other programs.

Deep Dive Research

In addition to standard evaluation research, DOE has identified critical program components where programs have underserved priority markets and struggle to succeed. A focused effort to collect information and share findings could benefit and enhance all existing and future programs. These areas of deep dive research opportunities are as follows.

Equity focus area. Equity research often requires special attention to data collection activities, including recruitment methods, representativeness, and ethnographic research tools. Intentional efforts to recruit specific perspectives into data collection activities are often required to understand expected and unexpected benefits and challenges for specific communities. Key research areas and objectives could include:

- How the program is advancing equity and improving the lives of disadvantaged homeowners, and the extent to which it is occurring.
- How the program has engaged and supported a qualified, diverse workforce. Identification of opportunities to increase effectiveness.
- Specific methods the program uses to reach and serve underserved communities and effectiveness of those methods.

Program partners and qualified workforce. Programs will need to partner with implementers, contractors, retailers, and other market actors to effectively deliver equipment upgrades and whole-home retrofits. Focused research should be conducted to better understand how effective programs are in recruiting, collaborating, and supporting key market actors and other partners. Recommended research topics and objectives are as follows:

- Assessments of sufficiency and gaps in availability of skilled contractors.
- Program effectiveness in efforts to recruit and train contractors.
- Effectiveness of trainings offered that result in high-quality program delivery.
- The extent to which contractors understand and effectively communicate program opportunities and how that information is received and understood by consumers.
- How homeowners identify and select qualified contractors.

- The extent to which retailer partners are stocking and promoting qualified products.
- Accessibility of participating retail channels and Point-of-Sale discounts.
- Availability and range (number, style, feature set) of qualified products offered.
- Timeline from initial participant interest to completion of installation.

Program efforts to target and educate homeowners. To successfully recruit participants, programs must effectively target, educate, and engage households and building owners. The following research topics and objectives are recommended:

- Barriers that continue to prevent homeowners from acting.
- Motivating factors for households who chose to move forward.
- Participant and potential participant awareness of the program opportunity, including other state or local programs or tax credits for which they might qualify.
- The extent to which households understand the risk of increased electricity bills associated with electrification projects.

Homeowner experience monitoring. Evaluations should strive to provide deeper insights into homeowner experiences through additional survey research, focus groups, or other methods that reveal the customer journey and identify opportunities for improvement. This research should consider the full range of participant experience, as follows:

- Elements of confusion that remain for households engaged with the program.
- Availability of contractors and/or program representatives to address remaining questions and concerns.
- Challenges that emerge in deciding what upgrades to pursue, completing the upgrades, and operating the home after project completion.
- Household perceptions of contractor competence, trustworthiness, and reliability.
- Participant satisfaction with the performance of their homes (or equipment) 6 to 12 months after installation.
- Household observations of utility bill impacts.
- Recommendations from participants to improve the overall program experience.

Evaluation Risks and Barriers

Although there are substantial opportunities for evaluation, there are also substantial risks or barriers that DOE and states must consider when developing evaluation plans, including data collection challenges, estimating energy consumption, limited budgets, optimal timing, and overall coverage.

Data collection. As a component of the Program Guidance, DOE included requirements for data collection and reporting.[11] From an analysis and evaluation perspective, these data will provide a rich data set of information to understand trends and identify achievements, gaps, and opportunities. However, these data requirements represent expectations that many market actors, including retailers, auditors, contractors, program implementers, and states, will successfully

[11] https://stage.energy.gov/scep/articles/ira-home-energy-rebates-data-and-tools-requirements-guide

collect data throughout the process. The effort involved to collect, centralize, and provide data to DOE could represent a risk or barrier.

Household energy consumption. Obtaining individual household energy consumption is also a potentially significant barrier to program uptake, particularly for the HOMES program where the use of home-specific energy consumption data for either estimating or measuring actual savings is required by statute.[12] In addition, states choosing to evaluate their HEAR programs may also need to collect billing data across a sample of participants. However, most state energy offices do not have direct access to energy consumption data and most utilities across the U.S. are not required to share data without explicit consent of the household. Even then, consumption data may be difficult to obtain and challenging to clean, format, and utilize. The impact evaluations conducted by DOE will face similar challenges and will rely heavily on states, utilities, implementers, and consumers to collaborate.

Budget limitations. As mentioned above, the vast and varied list of program goals and desired outcomes across stakeholders could lead to an exceptionally complex and costly evaluation plan. As shown below in Figure 1, the multiplying effect of multiple programs, implemented across multiple program actors and received by an array of household types all attempting to achieve multiple program objectives, quickly becomes a research scope that includes hundreds of focus areas.

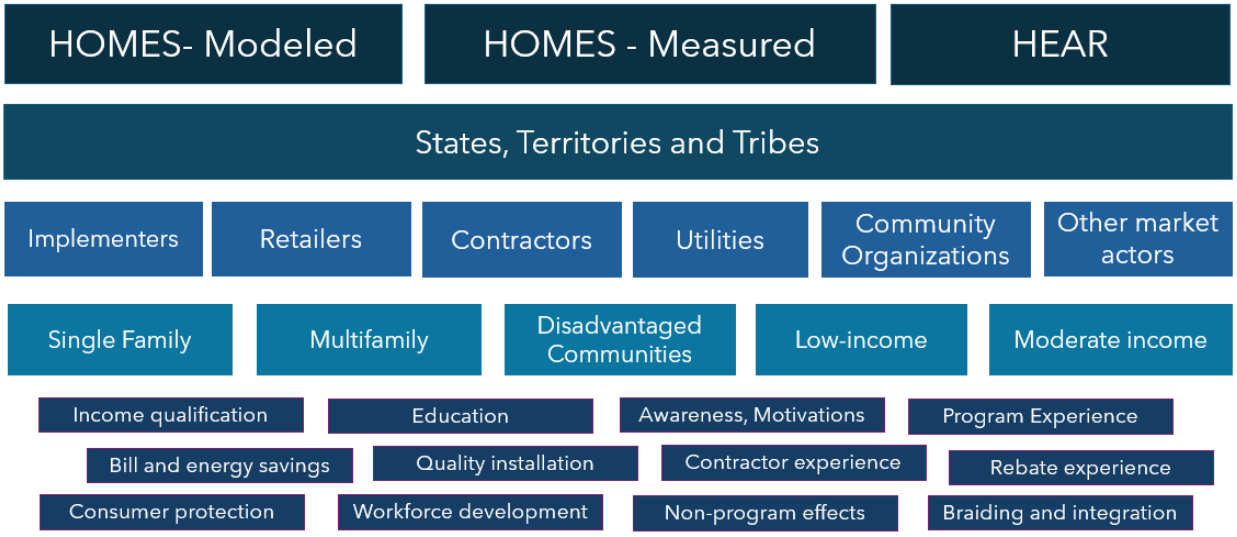

Figure 1: Considerations in research planning.

By law, DOE is allowed to spend up to 3% of total Home Energy Rebates program funding on administration, oversight, and evaluation of state programs. This includes all program development support, technical assistance, tools and systems, monitoring, reporting, and evaluation costs. Effectively evaluating all core program objectives across both programs and all states would likely exceed the available budget for evaluation. States are also likely to face similar budget challenges as statute limited total administrative and overhead expenses to 20% of

[12] Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022 | Congress.gov | Library of Congress

their total funding, which needs to cover all aspects of program design, implementation, and reporting.

Additionally, as DOE contemplates an effective evaluation strategy that provides timely feedback, it is complex and potentially impossible to design a fast evaluation approach that provides thoughtful deep understanding of each unique program pathway, delivery type, region/state, market actor, and resident type (e.g., multifamily, Tribal, disadvantaged community, low-income, moderate-income, etc.).

Conclusion

The IRA Home Energy Rebates programs offer the unprecedented opportunity to improve the homes and lives of hundreds of thousands of Americans across the country. It also offers evaluators a once-in-a-career opportunity to research and learn from a suite of programs never before implemented all at the same time and at this scale. DOE is committed to conducting robust evaluation on both the HOMES and HEAR programs through both traditional studies and through leveraging its unique role to convene and amplify the lessons learned from states. Yet DOE can only scratch the surface of opportunity being provided to the industry to conduct deep, meaningful research on the households and communities that need these improvements the most. States, policy makers, implementers, and stakeholders should all support and contribute to supporting evaluations that will improve programs and continue us forward in ensuring all households are efficient, comfortable, and resilient.

Resources

- EERE Program Evaluation | Department of Energy
- Strategic Evaluation Planning | Department of Energy
- Why Evaluate: Making Informed Decisions | Department of Energy
- What and When to Evaluate | Department of Energy
- Impact Evaluation Process | Department of Energy
- EERE Guide for Managing Program Evaluations
- Model Energy Efficiency Program Impact Evaluation Guide (epa.gov)
- Energy Efficiency Program Impact Evaluation Guide
- Guidebook for Energy Efficiency Evaluation, Measurement, and Verification
- Uniform Methods Project for Determining Energy Efficiency Program Savings
- Project Manager's Guide to Managing Impact and Process Evaluation Studies (energy.gov)
- Evaluator's Resources - IEPEC
- M&V Guidelines: Measurement and Verification for Federal Energy Projects