Via Electronic Submission

March 3, 2023

The Honorable Jennifer Granholm
Secretary of Energy
1000 Independence Avenue, SW
Washington, DC 20585
E-mail: IRAHomeRebates@hq.doe.gov

RE: DE-FOA-0002981

Dear Secretary Granholm:

Thank you for the opportunity to respond to the Request for Information (RFI) in DE-FOA-0002981 regarding the Inflation Reduction Act Home Efficiency & Electrification Rebate Programs.

This RFI provides an important opportunity to provide insights and feedback **on behalf of the Flex Coalition**. The Flex Coalition is an informal coalition and project of Smart-On-Smart, a 501(c)(3) non-profit dedicated to providing policy-driven solutions, research, and education at the intersection of energy efficiency, renewable energy, and demand flexibility with the goal of advancing a smart, resilient, and clean energy future. The Flex Coalition comprises the nation's leading demand flexibility providers—companies who are helping turn homes and buildings into Virtual Power Plants (VPPs) to promote grid reliability, greenhouse gas reduction, and energy equity. Participating companies in the Flex Coalition include Baker Electric Home Energy, BlocPower, Bright Power, ecobee, Energy Solutions, EnergyHub, Generac Grid Services, Grid Point, Leap, Northern Pacific Power, OhmConnect, Quilt, Recurve, Sealed, and Sunrun. The Flex Coalition is pleased that the following organizations and industry leaders have also signed on to submit these comments: Franklin Energy, New Buildings Institute, Rainforest Automation, See Change Institute, and A Hight on Homes LLC.

Demand flexibility, which encompasses energy efficiency, demand response, and behind-the-meter generation and storage, is fundamental to the success of building decarbonization and electrification. We need to be able to "flex" demand to take advantage of the cleanest, least-cost energy supply resources and alleviate peak demand periods that strain the grid and require carbon-intensive and expensive peaker plants. As we electrify our economy —thereby increasing annual kWh consumption—we must use demand flexibility to manage kW peaks to keep ratepayer costs down, ensure reliability, and open opportunities for renewable energy. Utilities maintain power plants to meet peak loads, and it is these system peaks that drive system costs.

The Flex Coalition believes the Home Efficiency Rebate Program (referred to in this response as the HOMES program, per IRA Sec. 50121) presents an historic opportunity to advance

performance-based demand flexibility in homes across America through one of two HOMES rebate approaches, the measured savings approach.

The measured savings approach provides flexibility and encourages innovation to pursue the highest energy-savings impact measures, using real-world tested methodologies and metrics to provide delivered savings. Measured performance approaches have been standard practice for demand response programs for many years, and they are a proven effective approach to simultaneously reducing greenhouse gas emissions, improving grid reliability, and providing energy bill savings and other benefits to customers.

The following comments focus on supporting the measured savings approach for the HOMES Rebate Program, and address the following key points:

1. The HOMES measured savings approach will be a successful means of implementing the HOMES Rebate program because measured performance is already a successful approach to program implementation. There are numerous examples of successful measured performance programs, noted in these comments, that can serve as a model.
2. The HOMES measured savings approach should leverage existing tools and methods that are already in use. Standardized, transparent measurement protocols should be used across all programs.
3. The HOMES measured savings approach should provide appropriate flexibility to support innovation in a competitive marketplace. The purpose of measured performance is to focus on market-based solutions to energy savings and it is critical that the market have the flexibility to incorporate technology, data, and program innovation which is sure to emerge as a result of these rebates.

The following response to the RFI was developed collaboratively and should not be attributed solely to any of the organizations listed. Many of these companies will be submitting separate comments that highlight individual organization priorities, and we encourage DOE to review each submission.

Below, please find our responses to selected questions contained in DE-FOA-0002981.

RFI Comments

A. Respondent Contact Information

Name: Sabine Rogers
Organization: Flex Coalition, a project of Smart-on-Smart
Organization Type: 501(c)(3) non-profit
Phone number: 802-338-0268
Email address: sabine@smartonsmart.org

D. Designing Programs for Maximum Impact

17. What evaluations of similar programs exist that can provide lessons learned and recommendations for effective program guidance, support, and best practices?

Evaluations of measured home performance programs have demonstrated positive results. Franklin Energy implemented a measured home performance program with PG&E from 2019 to 2022. Results presented at an industry forum demonstrated high realization rates and delivered significant peak electric savings. Franklin Energy has achieved over 100% realized savings rate (compared to 27% for the predicted program it replaced). Measurement creates an incentive to be accurate, and Franklin Energy was able to use the data generated from measuring past projects to calibrate prediction. Accuracy is enhanced when there is performance data and aligned incentives.

Additionally, measured savings approaches to demand-side management program evaluation have been standard practice for demand response programs for many years. Hundreds of utilities and their third-party evaluators have relied on whole-home meter data for the measurement of energy savings for all manner of utility-managed demand response programs.[1] Moreover, grid operators including NYISO, ISO-NE, PJM, MISO and all major North American ISO/RTOs leverage meter data provided by aggregators (via electric distribution companies or third-party multi-device-level metering[2]) to calculate performance and monetary settlement for load resources participating in capacity, energy or ancillary services markets (e.g., PJM economic CBL). Residential and C&I load management programs at CenterPoint, Oncor and Con Edison each rely on utility-owned meter data for generating DR performance and payment results. Additionally, the ERCOT Emergency Response Service (ERS) provides regression-based and control group-based settlement options for participating aggregators, both of which rely on distribution service provider-owned meter data for aggregator settlement. Because there are multiple approaches for addressing measured energy savings, DOE should allow flexibility while standardizing the measurements that are needed for issuing the rebates.

19. What data should program administrators and DOE collect throughout the program for the purposes of evaluation? What evaluation protocols should program administrators and DOE put into place before program implementation begins?

The Flex Coalition strongly urges DOE to prioritize keeping the HOMES measured savings pathway simple. State Energy Offices (SEOs) must have the flexibility to collect required data from each project, and DOE should specify minimum project data requirements. However, it is crucial to ensure these program requirements are limited to only the most essential, both to

[1] The 2022 program evaluation for Entergy New Orleans Smart Energy Programs is one example of measured savings evaluation for demand response programs: https://flexcoalition.org/wp-content/uploads/2023/02/PY11-ENO-Energy-Smart-Portfolio-EMV-Report34.pdf

[2] As an example of utilizing measured savings to measure energy performance, Sunrun, a coalition company member, has a VPP operating in the ISO-NE capacity market. All metering is done from the battery inverter without reference to the utility metering at the retail delivery point. This example could be a part of a measured approach.

preserve flexibility for aggregators and SEOs and to avoid creating unnecessary burdens that would hamper the impact of these programs.

To that end, the Flex Coalition believes the following information from measured savings projects should be provided to program administrators to demonstrate that the projects were completed and the savings achieved:

- Project location and customer identifier
- Determination of income and/or DAC eligibility
- Project scope listing the measures installed
- Proof of installation
- A minimum of 13 months' worth of pre-project energy data
- Projected energy savings
- Actual measured energy savings based on utility meter data

The intent of the measured pathway is to allow the aggregators to flexibly deploy different energy-saving and greenhouse gas-reduction strategies in exchange for assuming the risk of poor energy realization, and to focus on those market-based approaches that will encourage homeowners to undertake the energy efficiency upgrades.

The measured approach embeds open-source, auditable evaluation that provides near real-time feedback to allow for continuous monitoring and evaluation. Adjustments and improvements to the program can be made rapidly, ensuring programs can reach their desired goals. Embedded open-source measurement and verification should be used for both the modeled and measured pathways. Since measured results are the basis of the rebate, DOE could conduct an audit of reported results for additional statistical impact.

F. Opt-In Tools, Resources, Technical Assistance, and Partnerships

32. DOE may invest in tools and resources that states, territories, and Indian Tribes can elect to use to implement their programs. Program components could include (i) systems to track or process rebates, transactions, and improvements; (ii) systems to verify income eligibility; (iii) software to model and optimize savings; (iv) systems and/or forms for data collection; (v) model program templates program administrators can adopt in their application; (vi) stakeholder engagement guidance and resources; (vii) standardized datasets and APIs, and (viii) program marketing, education and branding.

a. Which of these should be prioritized?
b. Are any of these not needed?
c. Are other components needed?

The Flex Coalition urges the prioritization of software to model and optimize savings. DOE has already made substantial investments in developing open-source Advanced Measurement & Verification (AM&V) tools such as the OpenEEmeter, and the GRIDmeter for comparison groups. DOE should provide further support, education, and encouragement to states to utilize these tools to quantify the bill savings and energy impacts from measured and modeled

pathways. These tools are housed at Linux Foundation Energy, the world's leading open-source foundation. OpenEEmeter is available under an Apache2 license, meaning any party can use it without restriction.

In addition, we recommend that DOE provide program administrators with the following templates:

- Template RFP language for measured savings program implementation
- Template RFQ language between program administrators and aggregators

The measured savings pathway has the most potential for market transformation as it uses the market as means of successful implementation, but it is also the most novel program design and program administrators will benefit from DOE providing best practices from the field and guidance for finding experienced implementers and available tools.

33. What existing systems and tools can DOE, states, territories, Indian Tribes, program administrators, aggregators, and/or financiers leverage to implement the Home Energy Rebate programs?

Established systems and tools that are already in use for pay-for-performance/measured energy efficiency programs can be leveraged to implement the HOMES measured savings pathway. Under the measured approach, the market and aggregators will bring the tools, lifting the burden from the states to develop or leverage their own tools and systems.

Both the OpenEEmeter and GRIDmeter methods and code base are already developed, tested, and utilized by regulators and utilities and are open-source under an Apache2 license, allowing unrestricted use. DOE was instrumental in funding the development of these methods and code and should urge SEOs, program administrators, and aggregators to utilize them in implementing HOMES. Measurement should be standardized across programs and SEOs. Just like a kWh, yard, or gallon of gas, we need weights and measures and standard transparent, open-source math. **DOE should specify the OpenEEmeter as a standard weight and measure for this program to ensure useful data is generated and enable a consistent addressable market.** This is an appropriate role for DOE and would advance the entire demand-side industry.

Open source tools spur innovation and support new opportunities to develop advancements in the marketplace and provide tailored options to states. For example, BlocPower's BlocMaps tool which aggregates open source data has also been a useful tool for utilities and cities to understand the current energy use of buildings and toggle between energy efficiency solutions to achieve GHG reductions.

H. Estimating and Measuring Energy Savings

40. For the Home Efficiency Rebates, how should DOE support program implementers in selecting, developing and implementing the modeled and/or measured energy efficiency path? What factors will drive decisions to implement a modeled program, a measured program or both programs?

The statute requires that states provide a plan for both the modeled and measured pathways, thus DOE should support opportunities for states to provide one or both options. Access to utility data and software tools will be critical to both pathways and DOE should provide states the flexibility to use the tools in the marketplace that best meet their needs. In addition, DOE should provide states with the option to add either a modeled or measured approach at a later time should their access to data and tools make one pathway more optimal.

The measured approach is a highly effective program model with the following key elements and benefits:

- ***Pay for Performance means incentive dollars are going toward delivered performance:*** Incentives for the measured approach are paid based on actual measured savings for a portfolio of homes that achieves a minimum of 15% energy savings. This "pay for performance" concept allows for the market to build around business models that work for saving energy. Companies can design, manage, and finance home weatherization and electrification projects, and focus their work on where they get the best energy savings with the measures and marketing that attracts the most customers.
- ***Aggregators take on the risk:*** Incentives for the measured approach are paid by program implementers to "aggregators" that provide retrofit resources to a portfolio of homes. The aggregator takes on project performance risk based on their predictions of actual energy and GHG reductions that will be paid for by the SEO. If projects do not perform, aggregators are on the hook (not taxpayers) and homeowners still receive their incentives.
- ***Consumers still get upfront payments:*** While aggregators are paid on actual energy savings performance of a portfolio of projects, households that complete projects receive upfront incentives from the aggregator, ensuring a "point of sale" discount or other value proposition (lower financing costs, additional measures, etc.).
- ***Automatic evaluation:*** The measured approach embeds open-source auditable evaluation that provides near real-time feedback. This allows for continuous monitoring and evaluation, reducing M&V costs and supporting ongoing program adjustments and improvements to ensure program goals are met.
- ***Value savings based on time, location, or greenhouse gas emissions:*** The measured approach allows programs to incentivize savings that occur when and where they provide the most value to the grid and/or the biggest carbon reductions (e.g. incentivizing reduced energy consumption during peak demand periods).

In order to ensure the successful implementation of the measured savings approach by State Energy Offices ("SEOs"), DOE should provide the following guidelines to SEOs:

- ***Prioritize the measured path:*** DOE should support the development of guidelines and tools that allow states to make the investments necessary to stand up the measured path as quickly as possible. Because much of program administration is focused on ensuring accurate energy savings and the burden of program design is on the aggregator to develop what will work in the marketplace to achieve the desired energy savings, the measured approach dramatically reduces overall program administrative soft costs.

- ***Support access to utility data:*** Per statute, DOE shall publish guidelines for utility data sharing. This should be prioritized at DOE so that states can work to swiftly incorporate accurate utility data models into their programs in a secure and easy manner.
- ***Enable data aggregator flexibility:*** Data is critical to the measured (as well as modeled) path. In order to ensure consumer accessibility, DOE should draft SEO guidelines that provide program implementers flexibility to access whole home energy data from a wide variety of sources, including utilities, third-party data providers, customer utility bills and delivery records, and/or in-home devices and sensors.
- ***Build a competitive market:*** DOE and SEOs should work to encourage innovation in a competitive marketplace so that an ongoing market for energy efficiency upgrades continues past the end of the HOMES funding.

In implementing the modeled approach, DOE should approve modeling software that can be calibrated with historical energy data and is equivalent to BPI2400, as required in the statute. Modeling can only be done accurately when an accurate historical baseline is established and the elements of a building can be easily included in the home improvement. In addition, the Flex Coalition recommends that DOE require that programs using a modeled approach also conduct measurements to publicly report savings impacts. It is common practice to conduct measurement and verification of energy efficiency programs. However, it often occurs at the end of program cycles, and the analysis is designed for compliance instead of process improvement or payment. The best practice today is to implement open-source and standardized embedded advanced measurement and verification (AM&V) to support program adaptation and improvement as it is being deployed.

42. What recommended methodologies or standards could be used by states/programs to calculate energy savings and associated impacts, such as greenhouse gas emissions reductions? What software is used to implement that methodology? What are the key inputs and features?

The Flex Coalition recommends that open source methodologies such as CalTRACK and open source software such as OpenEEmeter are used by program administrators to calculate energy savings and associated impacts, including peak energy reductions and greenhouse gas emissions reductions. Open source methodologies and software will also enable homes that participate in the HOMES program to become part of large Virtual Power Plant ("VPP") networks, with price signals being sent to aggregators based on peak energy consumption times for each state / territory. (See the Flex Coalition measured savings approach page for examples of existing measured home performance programs that use these methodologies and software.)

In addition, the Flex Coalition recommends that DOE should provide program administrators with standard accuracy metrics to determine methodology and software qualification, standards that aggregators should be able to meet, especially:

- Fractional Savings Uncertainty ("FSU") that calculates the confidence interval of energy savings in a population of projects.

J. Data Access and Sharing

49. What should DOE consider when drafting energy usage data sharing guidelines?

The Flex Coalition supports secure, reliable, and simple access to customer energy usage data, and portability for customer-approved third-party energy service providers, to enable data-driven and performance-measured demand flexibility solutions. We also support access to privacy-protected non-participant data to enable comparison groups for measurement, determination of eligibility, and customer segmentation.

The Flex Coalition believes DOE should ensure that energy usage data is easily accessible to implement the measured savings pathway. This means that DOE must enable multiple pathways for gathering energy data across households. Pathways that demand flexibility providers currently use to capture household data include, but are not limited to:

- ***Utility Companies****:* Electronic Data Interchange (EDI) which includes monthly energy usage data.
- ***Third Party Data Providers:*** Utility data management tools provided by companies like Arcadia and UtilityAPI.
- ***Energy Bills:*** Energy bills and fuel delivery records provided by consumers.
- ***Load Monitors:*** Non-utility devices which can meter whole-home load such as SPAN or Sense.
- ***Device Level Metering:*** device-level energy consumption data from internet-connected devices such as smart thermostats, connected water heaters, heat pumps and other distributed energy resources that are engaged to provide whole-house energy use data.
- ***Wireless Sensors:*** Sensors that can collect and report whole-house usage data from homes.

The Flex Coalition also supports the proposed data portability guidelines from Mission:data that serve to fulfill the IRA's requirement to "develop and publish guidelines for States relating to residential electric and natural gas energy data sharing":
http://www.missiondata.io/s/20230209-Missiondata-DOE-data-portability-guidelines_final.pdf

K. Compliance and Quality Assurance

53. What data should DOE and program administrators collect to ensure their ability to conduct effective quality assurance and/or quality control?

For the measured savings approach, where incentives are aligned around delivered measured results, the program administrators can limit their required site-level data and focus primarily on savings performance, via billing and project verification data because if savings are not

delivered, they are not paid for. This information should be auditable after the fact. Additionally, this data can be used proactively to identify outlier contractors and projects early in the process.

N. Open Response

60. What evaluations, research, reports, or other resources can help inform DOE's program guidance?

The Flex Coalition has compiled resources and real-world examples of the measured savings approach here: https://flexcoalition.org/measured-savings-approach/.