

U.S. DEPARTMENT OF ENERGY BUILDING TECHNOLOGIES OFFICE

BTO Peer Review: Remotely

Remote Home Energy Assessments



Project Summary

OBJECTIVE, OUTCOME, & IMPACT

Remotely facilitates greater adoption of home energy assessments by utilizing innovative smartphone technology. Remotely relieves the shortcomings of traditional home energy assessments making the process more cost effective, expedient, and accessible for all.

TEAM & PARTNERS

PI is Veronique Bugnion, Carolyn Sarno Goldthwaite and Jake Barnet lead commercialization efforts, Samuel Harris and Signetron provide software development

Project partners include the Northeast Energy Efficiency Partnership (NEEP), the Southeast Energy Efficiency Alliance (SEEA), Green Building United, Signetron



Performance Period: Aug 2023 - July 2025 DOE Budget: \$1.15M, Cost Share: \$0

Milestone or Metric Number	Anticipated Month of Completion	Performance Metric	Success Value	Assessment tool/method	Verification Process	Metric Justification
1	9	Complete window algorithm to allow "multiplying" windows facing the same direction	Algorithm completed	System testing	Project team will test app measurements against actuals	User ease-of-use
2	9	Manual J-load calculations working off audit results	Working calculations	Test cases	Validation of estimates by NEEP	Engage HVAC vendors
3	9	Specification document for Remotely for codes requirements for LA/PR	PDF Document delivered	Review of PDF Document	Review by SEEA/LA/PR	Engages code officials
4	9	Remotely for iPad	Install from App Store	System testing	Test app and validate measurements	Extends interoperab lity



Decarbonizing the built environment starts with energy assessments

- Energy assessments are time consuming, invasive and expensive
- The assessor workforce is limited



As a consequence, the US vastly under-assesses its built environment

- The concept of a shareable "digital twin" of a home's energy attributes does not exist
- A cost effective remote assessment complements in-home assessments for many energy improvement projects



The Remotely DOE SBIR Project

Remotely is a **remote home energy assessment tool**, Remotely, a project supported by the U.S. Department of Energy's Small Business Innovation Research (SBIR) program

- Remotely is app based
- Leverages augmented reality and LIDAR

The DOE created the **Home Energy Score Program** as a standardized metric to measure and compare homes' energy efficiency

 This can be thought of as a "home's miles per gallon" 1-10 rating

The passage of the **Inflation Reduction Act** presents an unprecedented opportunity to leverage federal incentives for cost saving home energy retrofits







OR VISIT: CLEARLYENERGY.COM/REMOTELY



Remotely - Alignment & Impact



Home Energy Score – The Remotely application leverages the Department of Energy's Home Energy Score program. By facilitating greater adoption of the HES program, Remotely serves to meet residential weatherization and electrification goals.



Increased Accessibility – Through the use of innovative remote assessment technology, Remotely reduces home energy assessment costs, increases expediency of the assessment process, and enables assessments in rural areas where they are not viable/remote areas to a holistic home energy assessment.



Rebates & Incentives – Portions of the IRA HER/HEAR program require BPI 2400 certified assessments which starts with the same data collection process. Portions of the IRA HEAR program require post install QA/QC data collection.



Remotely is a **smartphone based application** that uses innovative technologies to more efficiently estimate a home's energy footprint

- Remotely can also be used to document installations and unlock incentives
- Remotely can be used on single family homes as well as condos and mobile homes, however, the application cannot be used for large multifamily properties

Remotely seeks to remedy the shortfalls of traditional home energy assessments, **high costs**, an **underserved assessor** workforce, and a time consuming process







Remotely - Demo Video

Augmented reality uses the phone's gyroscope to track the phone's position, orientation and location in space. It has been available since iOS 11 on all iphones. The augmented reality feature of Remotely was developed by our project partner Signetron

LIDAR uses light to measure the space. It is present on iphone pro and select few Android models. Accuracy and speed of measurements increase with LiDAR



Remotely Demonstration Video



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Remotely Data Management





Pilot Programs



Approved Home Energy Assessor - Remotely can be used by an approved Home Energy Score assessor to generate an official Home Energy Score (HES) - Green Building United project partner



Contractor/Inspector - Remotely can be used by a contractor or home inspector to expedite the assessment process and generate HPXML. The assessment can be spot checked by an approved DOE home energy score assessor for an unofficial score



Homeowner - Remotely can be used by homeowners from the comfort of their own home to generate a provisional home energy score - Pilot with the City of Berkeley



RVI Residential Code Compliance - Remotely can be used to perform residential remote virtual inspections to facilitate regional code compliance - Pilot with State of Louisiana



Program Management - Remotely can be used in the field as a tool to perform pre and post assessments of home energy retrofits (solar, weatherization, electrification) to ensure program compliance and unlock incentives - Pilot with Inclusive Property Capital

In almost all cases, Remotely will be white labelled to work with partner organizations



City of Berkeley

The City of Berkeley has a mandatory time of sale Home Energy Score program

The City plans on requiring upgrades from a checklist within two years of the sale of a home

Remotely will allow free, self-generated, un-official, preassessment by homeowner to evaluate measures that can increase score and help meet the checklist requirements

REMOTELY FOR BESO ENERGY ASSESSMENTS: A VIRTUAL

How to Measure

tome Area

HOME ENERGY SCORE

The City of Berkeley's BESO program requires residential homeowners to conduct an energy assessment of their home. The traditional process of scheduling an in-home visit from a certified Home Energy Score provider can be costly and timeconsuming.

THE REMOTELY APP STREAMLINES THE SCORING PROCESS BY LOWERING COSTS AND INCREASING HOMEOWNER ENGAGEMENT.



VIRTUAL REALITY

The Remotely app uses smartphone technology, including augmented reality spatial measurements of windows and finished areas, to facilitate the collection of residential energy audit data. Homeowners and certified providers alike can generate a Home Energy Score and see personalized recommendations for home energy improvements.

With Remotely, there is no need for expensive visits that take weeks to schedule. Remotely waits users from data collection to program reporting, Home Energy Score generation, and recommendations for home improvements. Contractors receive a standardized summary of the home characteristics in HPXML format to use for advanced system sizing.



Inclusive Prosperity Capital (IPC) - SMARTE

Inclusive Prosperity Capital works to facilitate clean energy financing for home energy retrofit projects

ClearlyEnergy has partnered with IPC to digitize their Solar / Battery storage and Weatherization / Energy Efficiency installation checklists using the Remotely application

As a program management tool for IPC, Remotely serves too:

- Share data between installation contractor and QA inspector
- Perform QA/QC for home energy retrofits
- Expedite data collection and archival process

Move on from pdf's to the digital age!



Remote Virtual Inspection - Energy Code

- Energy Codes to Remotely
 - Additional data and and QA/QC collection requirements needed for energy code compliance
- Remotely data collection buildout
- Pilot testing will take place in Louisiana - IECC 2021 Amended





Remotely - Outstanding Development

- Android Version- Out this month!
- **BPI 2400** Remotely can be used by a contractor or inspector to expedite the assessment process. Then the assessment can be spot checked by an approved DOE home energy score assessor.
- **AACA Manual J** leveraging EnergyPlus peak load estimate as proxy to start



Thank you

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Project Execution

	FY2023			FY2024			FY2025					
Planned budget		\$ 199,903			\$616,043			\$533,792				
Spent budget		\$ 19	9,903		\$453,961							
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Past Work												
Q1 Milestone: Refine Data Measurements												
Current/Future Work		-				-	-	-				
Q4 Milestone: Load Calculation for System Sizing						•						
Q4 Milestone: OCR Development												
Q1 Milestone: System Interoperability and Multilingual Capability												
Q2 Milestone: Common Activities and Field Testing												
Q2 Milestone: Stakeholder Guided Enhancements												
Q2 Milestone: Additional Data Collection												

• Deployment of load calculation for system sizing has been delayed because of,



Project Execution - Go/No Go Milestones

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The plan for "Manual J" plan is to initially use peak loads from EnergyPlus

ClearlyEnergy - Remotely Team



Veronique Bugnion Co-Founder & CEO

Carolyn Sarno Goldthwaite Vice President, Customer Engagement



Jake Barnet Energy & Climate Analyst



Samuel Harris Software Developer



