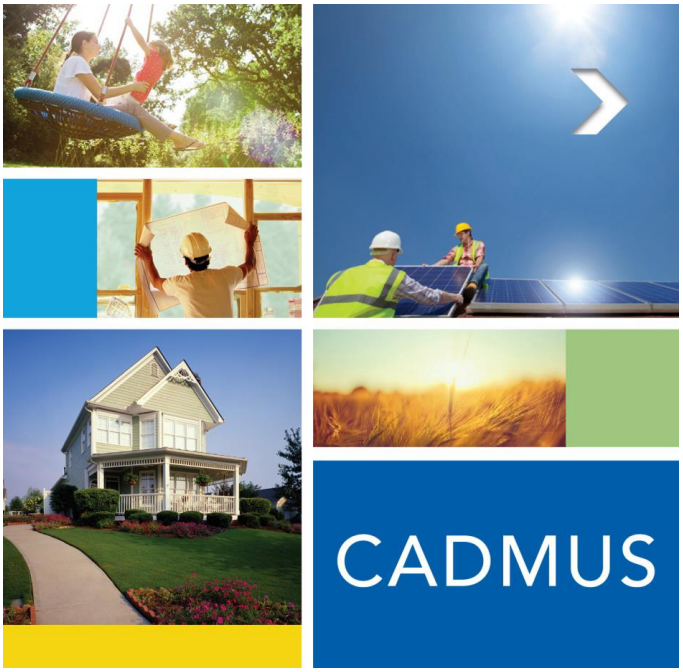


Multi-State Residential Retrofit Project: Process Evaluation Final

May, 2014

Prepared for:
National Association of State Energy Officials
2107 Wilson Boulevard, Suite 850
Arlington, VA 22201

The Cadmus Group, Inc.
An Employee-Owned Company • www.cadmusgroup.com

This page left blank.

Prepared by:
Linda Dethman
Ellen Rubinstein
Andrew Carollo
Ashley Fredi
Laura James
Cynthia Kan
Ben Mabee
Lauren Mattison
Elizabeth Metzler
Emily Miller
Cadmus/Energy Services Division
720 SW Washington Street, Suite 400
Portland, OR 97205
503.467.7100

This page left blank.

Table of Contents

Acknowledgements

Cadmus thanks the project steering committee and staff from the organizations below for their contributions to this evaluation. We also thank the additional parties who provided feedback, including program participants, auditors and contractors, lenders, appraisers, real estate professionals, and utility staff. Without their assistance, this evaluation would not have been possible.

Steering Committee Members

Alabama Department of Economic and Community Affairs

Earth Advantage

Massachusetts Department of Environmental Resources

National Association of State Energy Officials

Southeast Energy Efficiency Alliance

U.S. Department of Energy

U.S. National Energy Technology Laboratory

Virginia Department of Mines, Minerals and Energy

Washington State Department of Commerce

Washington State University Energy Program

Program Implementation Organizations

Community Alliance for Energy Efficiency

Conservation Services Group

Honeywell

Local Energy Alliance Program

Nexus Energy Center

Richmond Regional Energy Alliance

List of Abbreviations, Acronyms, and Websites

ADECA	Alabama Department of Economic and Community Affairs http://www.adeca.alabama.gov/Pages/default.aspx
AE	Advanced Energy www.advancedenergy.org
AlabamaWISE	Alabama Worthwhile Investments Save Energy http://www.alabamawise.org/
ARRA	American Recovery and Reinvestment Act of 2009 http://www.recovery.gov/About/Pages/The_Act.aspx
BBNP	Better Buildings Neighborhood Program http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/
BPI	Building Performance Institute http://www.bpi.org/
cafe^2	Community Alliance for Energy Efficiency http://www.cafe2.org/
CET	Center for EcoTechnology http://www.cetonline.org/
CHP	Community Housing Partners http://www.communityhousingpartners.org/
Commerce	Washington State Department of Commerce http://www.commerce.wa.gov/Pages/default.aspx
CSG	Conservation Services Group http://www.csgrp.com/
DFI	Washington State Department of Financial Intuitions http://www.dfi.wa.gov/
DMME	Virginia Department of Mines, Minerals and Energy http://www.dmme.virginia.gov/
DOE	U.S. Department of Energy http://energy.gov/
DOER	Massachusetts Department of Energy Resources http://www.mass.gov/eea/grants-and-tech-assistance/guidance-technical-assistance/agencies-and-divisions/doer/
Dominion Power	Dominion Virginia Power https://www.dom.com/dominion-virginia-power/
DRG	Discovery Research Group http://www.discoveryresearchgroup.com/
EECBG	Energy Efficiency and Conservation Block Grant Program http://www1.eere.energy.gov/wip/eecbg.html
EPS	Energy Performance Score http://www.energy-performance-score.com/
FOA	Funding Opportunity Announcement http://www.fedconnect.net/fedconnect/?doc=DE-FOA-0000251&agency=DOE

Home MPG	Home MPG, Mass Save® http://www.masssave.com/residential/offers/home-mpg
HPwES	Home Performance with ENERGY STAR® http://www.energystar.gov/index.cfm?fuseaction=hpwes_profiles.showsplash
HVAC	Heating, ventilation, and air conditioning
KCU	Kitsap Credit Union https://www.kitsapcu.org/
LEAP	Local Energy Alliance Program http://leap-va.org/
LEED	Leadership in Energy & Environmental Design http://www.usgbc.org/LEED/
MLS	Multiple Listing Service
MPG	Miles per gallon
Multi-State Project	Multi-State Residential Retrofit Project
NASEO	National Association of State Energy Officials http://www.naseo.org/
Nexus	Nexus Energy Center http://www.nexusenergycenter.org/
NOVA	Northern Virginia
PSCCU	Puget Sound Cooperative Credit Union http://www.psccu.org/
PSE	Puget Sound Energy http://pse.com/Pages/default.aspx
QA	Quality Assurance
REA	Regional Energy Alliance
REC	Rappahannock Electric Cooperative http://www.myrec.coop/res/index.cfm
RePower BI	RePower Bainbridge Island http://www.positiveenergybi.org/repowerbainbridge
RePower Kitsap	RePower Kitsap County (Washington) http://www.repowerkitsap.com/
RREA	Richmond Regional Energy Alliance http://www.rrea-va.org/
SEEA	Southeast Energy Efficiency Alliance http://www.seealliance.org/
SEP	U.S. State Energy Program http://www1.eere.energy.gov/wip/sep.html
TVA	Tennessee Valley Authority http://www.tva.gov/
VAEEC	Virginia Energy Efficiency Council http://www.vaeec.org/

WSU Energy Program	Washington State University Energy Program http://extension.wsu.edu/default.aspx

Executive Summary

Introduction

The Multi-State Residential Retrofit Project (Multi-State Project) is a residential energy-efficiency pilot program, funded by a competitive U.S. State Energy Program (SEP) award through the U.S. Department of Energy (DOE). The Multi-State Project operates under the auspices of the State Energy Offices in four states: Alabama, Massachusetts, Virginia, and Washington.[1] The states launched the three-year Multi-State Project in the fall of 2010, and contracted with the National Association of State Energy Officials (NASEO) to facilitate its steering committee and manage its process evaluation, conducted by Cadmus.

Operating in targeted communities in each state, the Multi-State Project sought to meet the following goals:

- Increase the number of home energy-efficiency retrofits.[2]
- Improve the conversion rates from home energy audits to retrofits.
- Increase the awareness and value of energy-efficient homes in the marketplace.
- Achieve deeper retrofits to maximize energy-saving opportunities per household.
- Develop self-sustaining markets for home energy retrofits.
- Create sustained market demand for energy-efficient homes.
- Identify successful strategies that other entities can adopt for similar program efforts.

The four states coordinating under this grant also chose to use the Energy Performance Score (EPS) auditing and home-energy scoring tool to achieve the following: make current energy use more transparent to homeowners; build trust in audit results; and present homeowners with compelling information about recommended energy-efficiency retrofits. As described in the state chapters, each state adapted the EPS, given local conditions and state-specific goals.

During the course of this three-year process evaluation, Cadmus worked closely with NASEO and the four states to collect information about the programs from many perspectives, including: State Energy Office staff, program implementers, homeowners,[3] auditors/contractors, real estate professionals, appraisers, lenders, and utility staff. The body of this report discusses: the project's context; its goals; the evaluation approach and methods; cross-cutting evaluation results; and results specific to each of the four states.

---

[1] The four State Energy Offices are: Alabama Department of Economic and Community Affairs (ADECA); Massachusetts Department of Energy Resources (DOER); Virginia Department of Mines, Minerals and Energy (DMME); and Washington State Department of Commerce (Commerce).

[2] The term "retrofit" describes home energy-efficiency improvements or upgrades.

[3] The report refers to homeowners who conducted audits but not retrofits as "partial participants" and to homeowners who conducted audits and retrofits as "full participants."

This Executive Summary provides an overview of each of the four state programs, describes key evaluation findings from the Multi-State Project, and presents overarching conclusions and recommendations, drawing upon results presented in Section 3, Cross-Cutting Lessons.

Overview of State Programs

Alabama

Alabama Worthwhile Investments Save Energy (AlabamaWISE) is a residential retrofit program serving the Huntsville and Birmingham areas. The Energy Division of the ADECA partnered with Nexus Energy Center (Nexus) to implement the AlabamaWISE program.

Through AlabamaWISE, Nexus offered:

- Home energy audits.
- Energy performance scoring.
- Rebates for energy-efficiency retrofits.
- A network of contractors, certified by the Building Performance Institute, Inc., (BPI) as qualified to undertake the retrofit work.

In addition, Nexus partnered with Abundant Power to offer a low-interest loan with attractive financing for the energy-efficiency retrofit work. Other instrumental project and multi-state partners included Earth Advantage and the Southeast Energy Efficiency Alliance (SEEA).

The Alabama program sought to achieve the following key goals:

- Use the knowledge and experience of partner states to establish a sustainable retrofit market in Alabama.
- Elevate the state's current retrofit markets to build momentum to permanently and sustainably transform the market for home energy improvements.
- Retrofit 2% of the homes in the state's targeted markets by 2013, resulting in measurable energy savings that scale up and persist over time.
- Foster the development of community-based, public-private partnerships for program delivery, lasting throughout the grant period and beyond.
- Utilize experience obtained and lessons learned in the Huntsville community (where AlabamaWISE first rolled out) to implement a successful program in Birmingham.

The Cadmus evaluation produced the following key findings related to the Alabama program:

- Nexus successfully leveraged its status as a local nonprofit to establish credibility in Huntsville and Birmingham.
- AlabamaWISE achieved high satisfaction levels among auditors/contractors, with eight out of 12 interviewed very satisfied with their program participation. Eighty-seven percent of full participants (81 of 93) were very satisfied with the contractor's retrofit work, and 98% (89 of 91)

reported that the contractor retrofitting their home could answer all of their questions. Additionally, 84% of partial participants (48 of 57) were very satisfied with their auditor's work.

- Auditors/contractors served as primary drivers for generating homeowner interest in the program, followed closely by Nexus program staff and by word-of-mouth recommendations.
- Homeowner surveys revealed that: partial and full participants had higher incomes than the general population in the target areas; participants most commonly pursued energy audits and retrofits to save money; and rebates served as critical drivers for the program.
- Alabama achieved considerable success in generating interest from real estate professionals for energy-efficiency training; and ADECA committed additional funding to hold these trainings in other parts of the state. Real estate professionals and appraisers, however, continue to wait for the energy-efficiency market to grow before they will actively promote it.

Nexus will continue to operate following the grant period, relying on a mix of revenue sources, including administrative fees from loans offered to program participants, foundation funding, and contractor fees.

Massachusetts

Home MPG is the residential-retrofit initiative offered by the Massachusetts DOER through the Multi-State Project. Home MPG operated in eight Western Massachusetts communities: the cities and towns of Belchertown, East Longmeadow, Hampden, Longmeadow, Monson, Springfield, Palmer, and Wilbraham. The initiative builds on the existing utility-sponsored residential-retrofit program, Mass Save®, which has successfully operated across the state for a number of years.

Home MPG uses the same basic program structure as Mass Save, including the following program elements: no-cost home energy audits; retrofits performed by qualified contractors; and financial incentives, rebates, and financing for energy-efficiency retrofits.

The initiative also includes the following new program components:

- Energy performance scoring, provided through home energy assessments and following completion of energy-efficiency retrofit work.
- Strategic marketing and outreach, including outreach to homeowners in the Home MPG area at numerous local events and targeted direct-mail campaigns.
- Use of thermal imaging on 40,000 homes to help homeowners "see" their home's inefficiencies and understand their energy use and potential cost-effective efficiency improvements.
- Increased incentive amounts for insulation and increased rebate amounts for selected high-efficiency heating, ventilation, and air conditioning (HVAC) and water heater technologies.
- Concierge service to provide homeowners with in-depth assistance when considering and selecting a new HVAC system.

The program was largely implemented by the two Mass Save implementation vendors, Conservation Services Group (CSG) and Honeywell, that conducted energy audits. DOER also hired the Pioneer Valley

Planning Commission (PVPC), based in the pilot area, to use its existing relationships with local organizations and municipalities to promote the Home MPG initiative through local events.

In addition to the program components listed above, Home MPG provided training for real estate professionals and appraisers to help them understand "energy performance" and how it can be integrated into the home sales and appraisal processes. Trainings included: background on Home MPG, asset ratings, legislation and policies designed to promote adoption of residential energy-efficient technologies, the energy performance score, building science, and high-performance homes. The Leading Edge Academy, a Massachusetts-based broker education school, conducted courses for real estate professionals; Earth Advantage conducted the appraiser trainings. Real estate professionals and appraisers who completed the training earned continuing education units for their participation. A subset of the appraisers attended an additional day of training and became the first "green' certified appraisers in Massachusetts.

The Home MPG initiative sought to achieve the following key goals:

- Achieve "more and deeper" retrofits than Mass Save has historically achieved in the pilot area.
- Promote consumer awareness of home energy performance in the pilot area by providing energy performance scores at home energy assessments and again after implementation of retrofits.
- By providing homeowners with better information and better access to information, improve the audit-to-retrofit conversion rate and persuade homeowners to implement more substantial retrofits than those historically completed through Mass Save.
- Through education and training for real estate professionals and appraisers, support a residential real estate market that appropriately values energy performance.

The Cadmus evaluation resulted in the following key findings for Massachusetts:

- Adding new energy scoring software to an existing program—Mass Save—presented early challenges, such that auditors had to duplicate much of their data entry, decreasing their productivity. Eventually, the two lead utility energy-efficiency program vendors integrated energy scoring into their existing auditing process.
- Participants reported that information on the scorecard helped them decide to make energy-saving improvements to their homes (39 of 58, or 67% found the information very useful).
- A minority of Home MPG participants knew the initiative offered exterior thermal images of their homes, and very few viewed their homes' images. Due to lack of data, Cadmus' evaluation could not analyze the effectiveness of thermal imaging in achieving "more and deeper" retrofits.
- Roughly 87% (61 of 70) of full participant homeowners said they increased their knowledge about how to save energy through their participation in Home MPG.
- Seventy-four percent (43 of 58) of full participant homeowners thought it would be useful to access an energy performance scorecard for homes they might purchase.

Massachusetts communities outside of the Home MPG area expressed interest in participating in the Home MPG initiative. The streamlined energy scoring process produced during the Multi-State Project will help facilitate future expansion, including the potential to create a statewide residential energy scoring program as part of Mass Save.

Virginia

DMME, in collaboration with its partners, oversaw the Virginia Residential Retrofit Pilot Project. Three non-profit organizations, known as Regional Energy Alliances (REAs), implemented the pilot:

- Community Alliance for Energy Efficiency (cafe^2) works in the City of Roanoke and the Town of Blacksburg.
- Local Energy Alliance Program (LEAP) works in Charlottesville and Arlington County in Northern Virginia (NOVA).
- Richmond Region Energy Alliance (RREA) works in the Richmond metropolitan area.

DMME partnered with SEEA to provide project management services to the REAs.

Virginia's program focused on developing the capacity of community-based REAs to pilot home energy labels, delivered through energy audits, and to: provide an innovative suite of financing options; facilitate retrofit adoption by participating homeowners; train the implementation workforce; measure and verify the results of installed home retrofit measures; and work with policy makers, utilities, and other stakeholders to support and ultimately grow the energy-efficiency industry in Virginia.

The REAs offered rebates for home energy audits, energy performance scoring, rebates for energy-efficiency retrofits, and a network of contractors certified by BPI to undertake the retrofit work. Earth Advantage trained auditors/contractors on the use of EPS software and trained real estate professionals and appraisers on the value of energy audits and energy-efficiency retrofits. Advanced Energy (AE) trained contractors on techniques and best practices for making energy-efficiency retrofits to homes.

The program implementers also offered financing mechanisms through local credit unions or other participating lenders, and established loan loss reserves. LEAP and RREA delivered retrofits under the federal Home Performance with ENERGY STAR (HPwES) retrofit model.

Additionally, while all REA programs included similar elements (such as partnerships and outreach to market actors, and homeowner financing and rebates for retrofits), their deployment approaches, experience levels, and target markets differed significantly.

The Virginia programs sought to achieve the following key goals:

- Increase retrofits to a 2% penetration rate in the target market areas during 2013.
- Permanently and sustainably transform the home energy improvement market by building capacity where retrofit markets were weak and by strengthening capacity where retrofits already were taking place.

- Develop a skilled network of auditors/contractors to adopt and implement standardized construction techniques and metrics.
- Foster self-sustaining, community-based, public-private partnerships (between the REAs and other organizations) to deliver the program during and beyond the grant period.
- Develop regulatory guidance to support a sustainable retrofit environment in Virginia.
- Establish a model that could be replicated by other Virginia communities to increase retrofits, create jobs, save energy, and reduce greenhouse gas emissions.

The Cadmus evaluation produced the following key findings related to the Virginia program:

- Established contractors, who expressed satisfaction with other home assessment software tools they had successfully used, showed greater resistance to using the EPS software than did newer contractors. Some auditors/contractors reported, however, that the EPS software helped them sell jobs.
- All programs increased business for auditors/contractors, but some auditors/contractors said more program marketing was needed**.**
- Many participants found the EPS Energy Analysis Report and scorecard useful and easy to understand.
- Among homeowners conducting an audit but not a retrofit (partial participants), cost presented the most-cited obstacle to making the recommended improvements to their homes.
- Partial and full participants were very satisfied with the performance and knowledge of the auditors/contractors they worked with through the program. The majority of full participants (45 of 55, or 82%) were very satisfied with the contractor services they received.
- Loans made a meaningful contribution to retrofit activity in some program areas. One-third of full participants (12 of 36) said the availability of program loans influenced their decision to complete a home retrofit.
- SEP funding increased the profile and level of local energy-efficiency activities. Two new REAs formed and may well continue to operate in regions where none previously existed. During the course of this project, the REAs were instrumental in forming the Virginia Energy Efficiency Council (VAEEC), a non-profit with a mission "to assess and support programs, innovation, best practices and policies which grow Virginia's energy efficiency industry and to provide a forum for stakeholder interaction."

Washington

RePower Kitsap, an energy-efficiency retrofit program covering large portions of Kitsap County, targeted single-family homes in the region. The Washington State Department of Commerce's (Commerce) SEP grant provided most of the program funding. RePower Kitsap also relied on infrastructure developed with funding from another DOE American Recovery and Reinvestment Act (ARRA) grant to Kitsap County. Commerce and the Washington State University Energy Program (WSU Energy Program) jointly oversaw the RePower Kitsap program.

RePower Kitsap coordinated with similar efforts in the area, RePower Bainbridge Island (BI) and RePower Bremerton. The RePower Kitsap program contracted with CSG (which won the federal grant for the RePower BI and RePower Bremerton programs) to oversee energy auditor and contractor coordination, program marketing, and implementation for RePower Kitsap.

As all three programs operated similarly, and many market actors participated in more than one RePower program, RePower Kitsap's effects were intertwined with the other two programs. During the course of the project, Commerce and WSU Energy Program realigned RePower Kitsap to better coordinate with RePower Bainbridge Island and to ensure the programs addressed unique—rather than overlapping—target markets.

The redesigned RePower Kitsap program offered the following features:

- *For-fee home energy assessments or referrals to a free home energy assessment*. Homeowners could obtain a thorough home energy assessment with EPS (for a reduced fee) or a free HomePrint™ assessment through a referral to Puget Sound Energy.
- *Trained trade allies.* RePower trade allies had to be licensed, insured, and trained to ensure they offered high-quality energy-efficiency services. Trade allies offering home energy assessments had to have a BPI-certified building analyst oversee each assessment and attend training and certification on the EPS audit tool delivered by the RePower program.
- *Incentives for energy-efficiency improvements*. Improvements eligible for RePower Kitsap incentives included: weatherization (e.g., air-sealing, insulation, duct sealing); and energy-efficient water heaters and HVAC systems. Homeowners with natural gas, electric, oil, propane, and wood heating systems were eligible for RePower Kitsap incentives. This differed from the local electric and gas utilities' programs, which offered incentives to customers with natural gas or electric heat, but not to the roughly 10% of Kitsap County customers heating their homes with oil, propane, or wood. In addition to focusing on gaps in utility incentives, RePower Kitsap's incentive structures encouraged deeper, multi-measure upgrades, serving as an alternative to standard utility practices of offering rebates for specific measures.
- *Energy-efficiency loans.* RePower Kitsap set up loan loss reserves to encourage two local credit unions—Kitsap Credit Union (KCU) and Puget Sound Cooperative Credit Union (PSCCU)—to offer homeowners loans for energy-efficiency improvements.

RePower Kitsap sought to achieve the following key goals:

- Achieve a retrofit rate of 2% of homes in the target area, equivalent to roughly 1,000 homes, by the program's third year of operation.
- Perform comprehensive whole-house upgrades in participating homes, reducing their energy consumption by an average of at least 20%.
- Create a knowledgeable and skilled retrofit workforce through training programs.
- Increase consumer demand for energy-efficient homes by educating real estate appraisers on the value of energy efficiency.

- Facilitate development of energy-efficiency financing programs.
- Engage with policy makers to create a regulatory environment that facilitated retrofits.
- Create a more sustainable county.

The Cadmus evaluation produced the following key findings related to the Washington program:

- RePower Kitsap's establishment of a local infrastructure enabling whole house retrofits, with local contractors teaming to install multiple types of measures, served as one of the program's greatest accomplishments. Program data indicated upgrades receiving Repower Kitsap incentives were more comprehensive than contractor or utility-supported upgrades not receiving RePower Kitsap incentives.
- RePower Kitsap influenced the local utility to adopt air-sealing measures as part of its eligible program measures, and air-sealing became standard practice for weatherization retrofits in the region.
- Contractors reported RePower positively affected their businesses, despite the economic downturn, as they added or retained staff, gained additional certifications, and/or added new service offerings.
- Auditors and contractors found EPS a good, descriptive benchmarking tool and reported customers found it helpful. Additionally, WSU Energy Program staff utilized EPS data to identify the most prevalent energy-efficiency issues and to restructure the program and its incentives to better address those issues.
- While local utilities ran several energy-efficiency programs prior to RePower's start, Repower filled a gap and realized the goals of: including oil- and propane-heated homes in its pool of eligible participants; and encouraging more comprehensive upgrades.
- Lenders reported the program's loan loss reserve motivated them to offer more attractive loan products than they would have otherwise. One lender offered lower starting interest rates and a less stringent credit review for its energy loan product.
- The RePower program-sponsored training offered the first exposure appraisers in the region had to green labels and energy-efficient homes.

Kitsap County staff and RePower stakeholders are actively planning the program's next stage, and WSU Energy Program has committed to providing interim operational services during the program transition and planning processes.

Cross-Cutting Lessons

This process evaluation also examined cross-cutting lessons drawn from the evaluation findings that are somewhat consistent across at least several of the four states.

All of the programs involved many stakeholders, including representatives from State Energy Offices, program implementers, DOE, auditors and contractors, and, in some cases, regional energy-efficiency organizations or other state agencies. The programs' start-up, implementation, and progress depended

on the strong coordination and regular communication among these entities, but establishing relationships, common viewpoints, and communication channels among these stakeholders took time and effort.

The states used the EPS auditing and home-energy scoring tool to help homeowners better understand and trust audit information and recommendations for energy-efficiency retrofits.[4] While the EPS scorecard and report received fairly strong ratings from participants, the results also suggested the scorecard versions the project used in each state could be improved.

Evaluation findings confirmed that trained and engaged auditors and contractors proved important to the programs' success, and knowing the programs worked with trained professionals motivated homeowners to pursue audits and retrofits. Roughly 85% of participant homeowners in Alabama, Virginia, and Washington stated that were "very satisfied" with the contractor services they received.[5] Market actors and positive word-of-mouth presented two primary ways that homeowners learned of programs. For example, in Alabama and Virginia, 71% and 57% of full participants, respectively, learned of the program through market actors or word-of-mouth.

Homeowner survey results revealed that participants had notably higher education and income levels than the general population in almost all program target areas. Homeowners expressed high satisfaction levels with their participation in the programs, with the proportion of full participants saying they were "very likely" to recommend the program to others ranging from 77% to 90%. This likely contributed to positive word-of-mouth marketing for the programs.

Participants in all four states cited saving money as their primary reason for pursuing energy audits and retrofits: 38% to 76% of full participant survey respondents reported saving money as the main reason they pursued a retrofit. Rebates served as a critical driver for many program participants: 42% to 71% of full participants said rebates were "very important" in their decision to undertake a retrofit, and RePower Kitsap observed that targeted incentives yielded more comprehensive upgrades. Most homeowners, however, did not install all recommended measures. They commonly selected a subset of recommended measures to do "enough" to save on their energy bills and, in some cases, to take the easiest actions.

Each state successfully integrated real estate professional and appraiser training into their programs. Overall, real estate professionals and appraisers reported positive experiences with the training and supported energy efficiency. Most training participants, however, were unlikely to actively promote energy efficiency unless they saw broader market trends to support it.

---

[4] Massachusetts' approach to the energy scorecard evolved over the course of the project, largely due to existing auditing software used by the utilities' energy-efficiency program vendors. See Section 6 for greater detail.

[5] The Massachusetts participant survey did not include comparable questions.

All of the programs sought to build demand for energy-efficient homes and to foster a sustainable retrofit workforce. In doing so, the states tailored their approaches to local conditions and employed a mix of strategies. In a number of the states, several positive indicators for sustainability have emerged, including: an expanded, networked, and able energy-efficiency work force, with improved skills and tools; an increased profile and level of energy efficiency in targeted communities; and greater efforts to work closely with other local organizations to attain funding and leverage resources.

Conclusions and Recommendations

Setting Program Goals

Conclusion*: **Program Targets Were Challenging to Meet.*** Despite making considerable progress, most of the programs (all except for Home MPG in Massachusetts) faced unrealistic audit and retrofit targets, given: their target audiences; innovative approaches; existing energy-efficiency infrastructures and experience; the challenging national economy; and a short, three-year time frame. Further complicating program start-up and implementation, programs that received funding from multiple sources were required to produce reports and respond to data requests from multiple entities. Designing and implementing a new energy-efficiency program is a challenging and time-consuming effort that involves many elements to work together. Even when start-up barriers, such as having a pool of trained auditors and contractors, are reduced, evaluations of pilot programs consistently find that program planners tend to overestimate the ability of pilot programs to meet ambitious goals within one-to-three year time frames.

Recommendation: When developing goals and timelines for a new program, program implementers should account for: the awareness, knowledge, interest, and capabilities of target audiences and market actors; the existing energy efficiency infrastructure (e.g., auditors and contractors); the implementers' capacity; the likelihood of collaborative partnerships in the community; and existing economic conditions. Additionally, program implementers should understand and plan for infrastructure that remains to be developed, and their program goals and timelines should reflect these conditions. With a new program or approach, for example, program implementers should build in a significant amount of time for establishing relationships and conducting stakeholder outreach before rolling out retrofit activities. The program timeline and targets should reflect potential hurdles, set reasonable targets, and track meaningful milestones other than retrofits and energy savings (e.g., changes in program awareness, expanded service provider networks, interest in energy efficiency, and faster uptake over time).

Conclusion: *Cross-State Comparisons Proved Difficult.* Making "apples-to-apples" comparisons across four state programs proved challenging given the many differences in program operations and elements. While sponsors typically, and desirably, tailor programs to their target areas and audiences, such tailoring can confound cross-state comparisons of some metrics. For example, because auditors and contractors took different approaches to reporting leads to the programs and to tracking completed audits and retrofits, the study could not compare audit-to-retrofit conversion rates across states. The different incentive levels, financing mechanisms, program designs, and marketing approaches used by

the programs also prevented meaningful comparisons of cross-state audit-to-retrofit rates and other metrics.

Recommendation: In initial meetings, sponsors should discuss and agree upon a small set of key performance metrics essential for comparisons across programs. Such discussions will require that sponsors understand each program's assumptions, requirements, and unique characteristics, as well as the circumstances that would hinder comparisons—such as how auditors and contractors report leads, audits, and retrofits.

Stakeholder Coordination

Conclusion: ***Strong State Energy Office/Implementer/Market Actor Partnerships Developed.*** Although coordination among the many parties involved with the programs initially proved challenging, the strong State Energy Office/implementer/market actor partnerships that developed resulted in a shared sense of cause. These partnerships, along with the collaborative relationships some programs forged with local government agencies and utilities, should benefit future program efforts and collaborative endeavors.

Recommendation: Program implementers should continue to regularly communicate with each other and to investigate further opportunities for growing the energy-efficiency market within their regions. Where applicable, implementers should continue to leverage the useful connections they have made with regional utilities, government agencies, and market actor associations.

Conclusion: ***Local Auditor/Contractor Networks Proved Essential to Success.*** Strong and local auditor/contractor networks provided the most likely channel for full participants to enter the programs in these states. Homeowner surveys indicated that knowing auditors'/contractors' affiliations with a local program and knowing auditors/contractors received special energy-efficiency training gave participants confidence to participate in the programs.

Recommendation: The programs should continue to build and support the contractor networks and to provide local endorsements and oversights. Strategies to maintain strong networks include: regularly informing contractors of program changes and opportunities, and providing opportunities for networking and feedback.

Conclusion: ***Local Knowledge Proved Crucial.*** Local implementers, engaging with their communities and understanding the characteristics of their target markets, served as key ingredients in the pilots' success.

Recommendation: When developing and implementing new programs, implementers' marketing and outreach materials should emphasize local connections by highlighting relationships with local organizations, spokespeople, localities, and market actors (e.g., auditors, contractors, real estate professionals, and appraisers).

Conclusion: ***Programs Proved Vulnerable to Staff Turnover.*** Relying on only a few staff members to fill all of the necessary program roles to run an audit and retrofit program—such as technical building science, marketing, and accounting knowledge—can leave the program vulnerable when staff leave the organization.

Recommendation: Program implementers should consider expanding staff levels and skills and/or networking and partnering with other organizations that can supply needed expertise. Organizations can share marketing, administrative, and financial services, as well as supplies, space, and other program support costs.

Market Actor Support and Training

Conclusion: ***Program Staff Provided Strong Support to the Contractor Networks.*** Auditors and contractors valued the accessibility of program staff to answer and resolve questions. The programs' contractor support, training, and networking opportunities succeeded in building skilled and collaborative residential energy-efficiency retrofit workforces in the targeted communities.

Recommendation: Program staff should continue to offer market actors technical and sales support and networking opportunities that encourage market actors to collaborate across their areas of expertise.

Conclusion: ***While Contractors Increased Their Skills, Additional Training is Needed.*** The programs made great strides in developing networks of skilled contractors. Some contractors, however, requested additional training on specific topics (e.g., sales training). In addition, there is room for quality improvements as contractor staff turns over and as program staff update retrofit and technical specifications.

Recommendation: Program staff should offer additional, in-person training sessions tailored to specific areas that auditors and contractors seek. Program implementers should solicit input from auditors and contractors about training topics, ensuring that trainings are well attended and continue to provide value. Trainings should also be designed to address quality assurance issues and provide updates about program changes. If quality assurance issues or program changes prove significant, the programs should consider training attendance as a requirement for program participation.

These services would ensure auditors and contractors receive complete and current program information and that the programs maintain their high-quality standards. They also would enable skill development, increase program buy-in, improve sales and depth of retrofits, and provide a networking forum.

Conclusion: ***Real Estate Professionals Are Interested in Energy Efficiency.*** The states included increasing the awareness and value of energy-efficient homes in the marketplace as long-term program goals. Real estate professional and appraiser training sessions provided an important first step in realizing this awareness goal, as the trainings introduced energy-efficiency topics to market actors influential in the home buying and selling processes. Almost all real estate professional and appraiser trainees spoke enthusiastically about their experiences and the potential applicability to their work. These market actors, however, do not yet actively use the knowledge gained from the training.

Recommendation: Program staff should explore options to build on their success in this area, perhaps through more targeted training or through practical steps to apply their knowledge, such as championing modifications to the MLS listings that recognize energy-efficient homes.

Conclusion: ***The Programs Exhibited Differences in Deploying the EPS Software***. In Alabama, Virginia, and Washington, different program designs, incentive structures, and program implementer approaches led to variability in how auditors and contractors used EPS software. Earth Advantage worked with the programs to set up the EPS software, based on each state's unique delivery model. In Massachusetts, the utility program implementation vendors already had auditors on staff and existing auditing software in use prior to Home MPG's roll-out. Based on discussions with DOER, the implementation vendors eventually incorporated energy scorecard generation capabilities into their own auditing software and utilized it relatively consistently. Across the four states, contractors used a variety of methods to present retrofit proposals to interested homeowners. They also incorporated varying formats and levels of detail in their reporting to program staff.

Recommendation: To ensure consistent delivery of the program to all participants and to ease analysis of program data, standardized data collection practices should be established, as should reporting templates for completed assessments and retrofits. To minimize burdens on auditors and contractors, the templates only should require essential information that cannot be obtained elsewhere. Auditors and contractors should be asked to provide feedback on the templates before finalization to ensure buy-in and clarity. Once the templates have been finalized, training should be offered on their use so market actors become familiar with the templates and program expectations and can ask questions.

Conclusion: ***Contractors Displayed Mixed Use of EPS Scorecards.*** Though some auditors and contractors in Alabama, Virginia, and Washington initially had concerns about the EPS software and did not fully embrace it, most ultimately agreed to use EPS as a part of participating in their respective programs. During the course of the programs, the auditors and contractors became better acquainted with the EPS software and appreciated the software enhancements Earth Advantage implemented.

Recommendation: The selection of program audit software and homeowner engagement tools must balance administrative, homeowner, and contractor needs. That said, after ensuring audit software accuracy, the highest priority should be placed on developing mechanisms that most effectively persuade homeowners to take efficiency actions. Consumer research and/or pilots that test homeowner engagement tools, such as energy scorecards, would provide details about how tools can be enhanced. Sharing homeowner enthusiasm for the scorecards with auditors/contractors, demonstrated through evaluations (such as this one), and through evaluation efforts specifically focused on homeowner responsiveness to the tools, could help persuade auditors/contractors to make greater use of auditing software and energy scorecards. Additionally, the programs should seek feedback from market actors and program implementers to ensure that the auditing software and homeowner engagement tools desired by customers also meet market actors' needs.

Program Marketing, Outreach, and Implementation

Conclusion: ***Program Marketing Strategies were Innovative and Effective.*** Evaluation findings showed that, while the programs operated on limited budgets, all developed creative, compelling, locally focused marketing and outreach efforts that supported market actors and attracted consumer attention. In addition, most participants were very satisfied with the services they received. This in turn created strong word-of-mouth marketing for the programs.

Recommendation: Emphasizing a local presence, helping auditors and contractors market and sell effectively, and ensuring contractors provide the high-quality services that generate positive program responses should continue to be central to the marketing efforts.

Conclusion: ***Financial Motivators Drove Homeowner Actions.*** Participants reported that financial considerations primarily drove their decisions: saving money was the primary motivator for seeking an audit and retrofit, and cost was the most common reason for not pursuing a retrofit or all recommended efficiency improvements. Convincing homeowners of the value of whole-house or multi-measure retrofit often proved challenging for contractors. While money remained foremost on most people's minds, other factors—such as improving home comfort, having more predictable energy bills, and ensuring energy for the future—influenced decisions.

Recommendation: Contractor training should address methods to sell whole-house retrofits. The training should help contractors explain the value proposition, both financial and non-financial (e.g., improved comfort in a drafty house) of whole-house retrofits to homeowners. In addition, since other factors sway customers, sales training should include elements that help contractors discover, through the sales process, the other "sweet spot" reasons (e.g., comfort, convenience, controlling utility bills, limiting waste) that persuade customers to take action.

Recommendation: Develop local testimonials and case studies, based on the experiences of satisfied participants, especially those whose homes have undergone "deep" retrofits, and use these materials as marketing collateral. Case studies should provide cost savings resulting from rebates, actual differences over time in participants' pre- and post-retrofit utility bills, and participant testimonials about other benefits.

Conclusion: ***Participating Homeowners Represented a Narrow Market Segment.*** The evaluation found the programs generally appealed to a narrow band of homeowners—those with higher-than-average incomes and higher-than-average education levels. Messages focusing on making costs more predictable as energy prices rise, reducing waste, and highlighting the availability of rebates and loans to reduce first-costs may resonate more with middle-income homeowners. Continued messaging about the improved comfort of retrofitted homes and the health benefits for occupants will also likely be important.

Recommendation: As the programs mature, program staff will need to reach a broader spectrum of homeowners, who may utilize different decision criteria. This will require changes in program design, from rebate levels and financing products to program marketing messages and delivery. Further consumer research and/or controlled, evaluable, pilot efforts could be used to explore barriers and alternative program and marketing designs. Other relatively low-cost outreach methods that have been effectively used in similar programs include: incorporating participant testimonials in program literature; distributing program information at community events; offering do-it-yourself loaner kits; making program information available at local government offices (e.g., government permitting departments, libraries); and offering tours of homes that have completed energy-efficiency retrofits through the program.

Conclusion: *Loans Enhanced the Programs' Credibility.* The availability of program-sponsored loans enhanced the programs' credibility, influenced one-third to one-half of retrofit decisions, and, for some homeowners, made the difference as to whether or not they could retrofit their homes.

Recommendation: Sponsors should continue offering loan programs with actively engaged, supportive participating lenders. As the efficiency industry around the country is now paying greater attention to offering loan programs, sponsors should track developments regarding energy-efficiency financing to determine if these new options would fit their programs.

Conclusion: *Scorecards Proved Helpful in Selling Energy Efficiency.* Contractors generally found scorecards and energy reports helped them sell energy-efficiency retrofits to homeowners, and most homeowner participants considered the scorecards and reports useful in illustrating steps they could take to save energy. Data from the Washington program show participants undertook more extensive upgrades and had a higher audit-to-retrofit conversion rate than customers who retrofitted their homes through other programs that used different reporting tools and did not include an energy scorecard. Research currently underway in Massachusetts seeks to determine if use of the scorecard and reporting tools increased audit-to-retrofit conversion rates or led to deeper retrofits there. Nonetheless, customer ratings suggested the scorecard and reporting tools could be improved.

Recommendation: Additional research activities should be pursued to determine whether the auditing software and scorecard tools are as effective as possible. Findings from these analyses should be used to inform program modifications, such as: new outreach approaches and marketing messages, changes to market actor trainings, or enhancements to program tools.

Program Sustainability

Conclusion: *Local Implementers Proved Important.* The presence of local implementers proved vital to the programs' success. Going forward, local program sponsors with an understanding of their target populations and ties to local organizations (e.g., trade ally groups, utilities, government agencies, non-profit, and private businesses) will continue to play a critical role in ensuring the programs' long-term operations.

Recommendation: Program staff should draw upon their understanding of their target markets' demographics and their relationships with other local organizations to develop/update sustainability plans that include: second-phase goals and targets, partnership opportunities, outreach approaches, incentive levels, and offerings.

Conclusion: *Program Funding and Rebates Were Critical to Inducing Participation.* The programs increased the profile and level of energy-efficiency activities in the targeted areas. Rebates attracted the attention of auditors, contractors, and homeowners and induced participation. Reductions in rebate funding, especially for these relatively young programs, will likely increase the difficulty of retaining market actors, recruiting new market actors and new homeowners, and encouraging participant homeowners to undertake more extensive retrofits.

Recommendation: Cultivation of local partnerships should continue, and efforts to seek funding and support from public and private sources—local, regional, and national—should be aggressively expanded. Pursuit of relationships with regional utilities should continue. Program staff also should consider innovative funding mechanisms, such as assessing contractor fees, to generate revenues for programs and to help ensure their continued operations.

1 Overview

1.1 Multi-State Project Overview

The Multi-State Residential Retrofit Project (Multi-State Project) is a residential energy-efficiency pilot program, funded by a competitive U.S. State Energy Program (SEP) award through the U.S. Department of Energy (DOE), that operates under the auspices of the State Energy Offices in four states: Alabama, Massachusetts, Virginia, and Washington.[6] The states launched the three-year Multi-State Project in the fall of 2010, and contracted with the National Association of State Energy Officials (NASEO) to facilitate the project's steering committee and manage the project's process evaluation.

The steering committee members include representatives from the participating State Energy Offices, NASEO, and the following key partner organizations: Earth Advantage; Southeast Energy Efficiency Alliance (SEEA); DOE; U.S. National Energy Technology Laboratory; and Washington State University Energy Program. The steering committee's role was to provide leadership, coordination, and oversight for the Multi-State Project.

Operating in targeted communities within each state, the State Energy Offices sought to use the Multi-State Project to:[7]

- Increase the number of home energy-efficiency retrofits.[8]
- Improve conversion rates from home energy audits to retrofits.
- Increase awareness and value of energy-efficient homes in the marketplace.
- Achieve deeper retrofits to maximize the energy-saving opportunities per household.
- Develop self-sustaining markets for home energy retrofits.
- Create sustained market demand for energy-efficient homes.
- Use the synergies inherent in a broad, multi-state effort to identify successful strategies that other entities can use to design effective residential retrofit programs.

To meet these goals, the four states and their partners developed new or enhanced mechanisms to help homeowners in targeted areas overcome one or more of the following barriers to making energy-efficiency improvements:

- Limited homeowner awareness, knowledge, and understanding about how to use energy efficiently at home and the benefits of saving energy.

---

[6] The four State Energy Offices are: Alabama Department of Economic and Community Affairs (ADECA); Massachusetts Department of Energy Resources (DOER); Virginia Department of Mines, Minerals and Energy (DMME); and Washington State Department of Commerce (Commerce).

[7] These goals pertain to the overall Multi-State Project. The states also identified other goals specific to their project and/or target community. The states' individualized goals are described in the state chapters below.

[8] The term "retrofit" describes home energy-efficiency improvements or upgrades.

- Lack of homeowner confidence that energy-efficiency investments will reduce energy bills and increase home value.
- Insufficient funds or financing options to pay for efficiency improvements.
- Lack of community history with or support for energy efficiency, such as limited or no utility and/or local government programs.
- Lack of market experience, such as having few trained energy auditors or weatherization contractors, or few real estate professionals who understand the value of energy efficiency.

The four State Energy Offices partnered with local program implementation organizations to design and implement this pilot project. Some State Energy Offices partnered with community-based nonprofits, while others implemented their programs through national and regional energy-efficiency organizations and/or their utility's energy-efficiency program providers. Since each program implementer operated within a unique context, each tailored its pilot program to local needs, target communities, and market conditions. The State Energy Offices in all four states provided oversight and support for program implementers.

The pilot programs in all four states shared an initial core delivery model that included the following elements:

- Energy Performance Score (EPS) audit and home energy rating tool. [9,10]
- Training market actors (e.g., auditors, contractors, real estate professionals, appraisers).
- Outreach and marketing to generate increased homeowner participation.
- Access to rebates and financing options for homeowners.
- Community-based partnerships.

---

[9] EPS is an energy label and report offered by Earth Advantage, which: "…provides a standardized estimate of a home's energy use and associated carbon emissions. The EPS allows for comparisons of one home's energy use to another, without the influence of varying occupant behavior. Homeowners can also use the label and report to compare the typical energy use of the house in its current state versus what it could be like after energy upgrades." For more information about EPS, see: http://www.energy-performance-score.com/ For this project, auditors and contractors used the EPS software tool to evaluate the estimated energy use of the home and to generate an EPS label and report, which were then provided to the homeowner. The EPS software tool is now available to the market in an updated version known as CakeSystems, available at http://cakesystems.com/ CakeSystems software can produce an EPS label and report, as well as other energy labels and reports.

[10] The Massachusetts program implementers (Conservation Services Group [CSG] and Honeywell) used EPS for the first several months of operation, then switched to comparable auditing software they developed internally. One Virginia implementer, Local Energy Alliance Program (LEAP), had used other audit tools prior to participating in this SEP-funded project. Subsequent to its participation, LEAP incorporated data from other tools to provide EPS reports to participants.

- Locally-focused program implementers.
- Coordination with other local partners, programs, and utilities.

Each state developed its unique program implementation approach, based on both the DOE Funding Opportunity Announcement (FOA)[11] requirements and the state's own implementation design choices. Specifically, the FOA sought: "plans that will result in a major increase in market penetration of existing whole-building retrofit activities and/or the establishment of a strong retrofit market in areas with little or no activity," where a "whole-building retrofit" was defined as having a pre-retrofit evaluation of major energy-consuming systems, a work scope and implementation plan that addresses the results of the pre-retrofit evaluation, and a post-retrofit evaluation of the building. Additionally, the FOA required a "minimum target of retrofitting at least 2 percent of the buildings of a defined market annually by 2013." The states agreed to collectively propose using the EPS software tool, energy label, and report to enhance residential retrofits.

After DOE awarded funding to the Multi-State Project and the programs moved into program design and implementation phases, the states refined the approach outlined in their initial proposal. As detailed in the state chapters below, the program sponsors, implementers, and contractors found that the FOA requirements and the initial pilot designs did not always align with conditions the programs faced once implementation was under way. Subsequently, program implementers made changes to the initial pilot designs based on input from key stakeholders who had not been involved with the project proposal, and on early implementation challenges that indicated some of proposal elements were not realistic. Thus the Multi-State Project, similar to other efforts of this type, evolved over time and attempted to balance the states' initial vision with the realities of program implementation.

As the state programs were all pilots, the four State Energy Offices were interested in obtaining early and regular feedback about the programs' operations so they could adjust and refine the programs as needed. The State Energy Offices and NASEO therefore issued a competitive Request for Proposals in the summer of 2011 and subsequently selected Cadmus to conduct a process evaluation of the Multi-State Project. The purpose of a process evaluation is to systematically document program operations and recommend improvements to increase the programs' efficiency and effectiveness, while maintaining high participant satisfaction.[12]

1.2 Organization of This Report

This report provides an overview of the Multi-State Project as well as results specific to each of the four states. The report begins by presenting the overall Multi-State Project evaluation context (Section 1.1), followed by an evaluation overview (Section 1.3), description of the evaluation methods employed (Section 2), and cross-cutting results (Section 3). Later sections present state-specific key evaluation

[11] The original FOA is available at http://www.fedconnect.net/fedconnect/?doc=DE-FOA-0000251&agency=DOE

[12] The purpose of an impact evaluation, in contrast, is to determine and document program benefits, such as energy and demand savings and non-energy benefits (e.g., avoided emissions, health benefits, and local economic development). An impact evaluation was not part of the scope of this study.

findings, conclusions, and recommendations for: Alabama (Sections 4 and 5), Massachusetts (Sections 6 and 7), Virginia (Sections 8 and 9), and Washington (Sections 10 and 11). The appendices provide all homeowner survey instruments and market actor interview guides used in this study.

1.3 Evaluation Overview

As initial steps in the process evaluation, Cadmus formalized and documented the overall program theory, logic model, and researchable issues. These elements, which evolved as the programs became operational and the implementers became more experienced, formed the basis for the evaluation. Each element is discussed below.

Program Theory

The core theory behind the Multi-State Project was that comprehensive and targeted information about home energy use and the benefits of investing in energy efficiency, coupled with a program delivery network of trusted sources, motivates single-family homeowners to consider and implement extensive energy retrofits.[13] The program theory also postulated that the pilot program activities would contribute to higher levels of sustained market demand and retrofit activities.

Drawing on this core theory, the State Energy Offices emphasized the following elements and assumptions in their program designs:

- ***EPS Tool.*** The EPS home energy auditing tool and scorecard was designed to make current energy use transparent to homeowners, build trust in audit results, and present homeowners with compelling information regarding energy-efficiency improvements.[14]
- ***Local or Regional Implementers.*** Homeowners are more likely to take action if they learn about energy audits and retrofits and can get their questions answered by trusted local or regional organizations.
- ***Access to Knowledgeable and Trained Professionals.*** The programs intended to build homeowner trust in market actors (auditors, contractors, real estate professionals, and appraisers) through training, making feedback about market actors accessible online, and quality assurance (QA) procedures.
- ***Access to Financing.*** Financing options (e.g., rebates and loans) are included in the programs to reduce high first-cost barriers. Providing easy and straightforward access to financing is expected to motivate homeowners to seek energy audits and make substantial energy-efficiency improvements to their homes.

---

[13] The Alabama, Virginia, and Washington programs place comparable emphasis on trusted sources and resources; the Massachusetts program primarily emphasizes the home energy scorecard and its unique thermal-imaging resource.

[14] In addition to an energy score and label based on the EPS, the Massachusetts program recommends energy-efficiency retrofits beyond those offered by the utility-sponsored Mass Save Program and provides some homeowners with thermal images of their dwellings. This information is intended to motivate homeowners to invest in substantial energy-efficiency retrofits.

- ***Home Appraisal.*** Homeowners are more likely to make energy-efficiency improvements if they believe the value of their homes will increase and if they perceive that local real estate professionals and appraisers incorporate such improvements into home-appraisal calculations.

Program Logic Model

Energy-efficiency program designers, evaluators, and implementers use logic models to map program actions to the expected program outcomes. When designing a program, the logic model development process provides an opportunity to think through the program "story" and logic to: explain why it will work; show how program progress will be measured; and link program assumptions to desired program goals. Once the program is operating, stakeholders can use logic models to confirm that a specific approach was tested and to help explain which activities influenced short- and long-term outcomes.

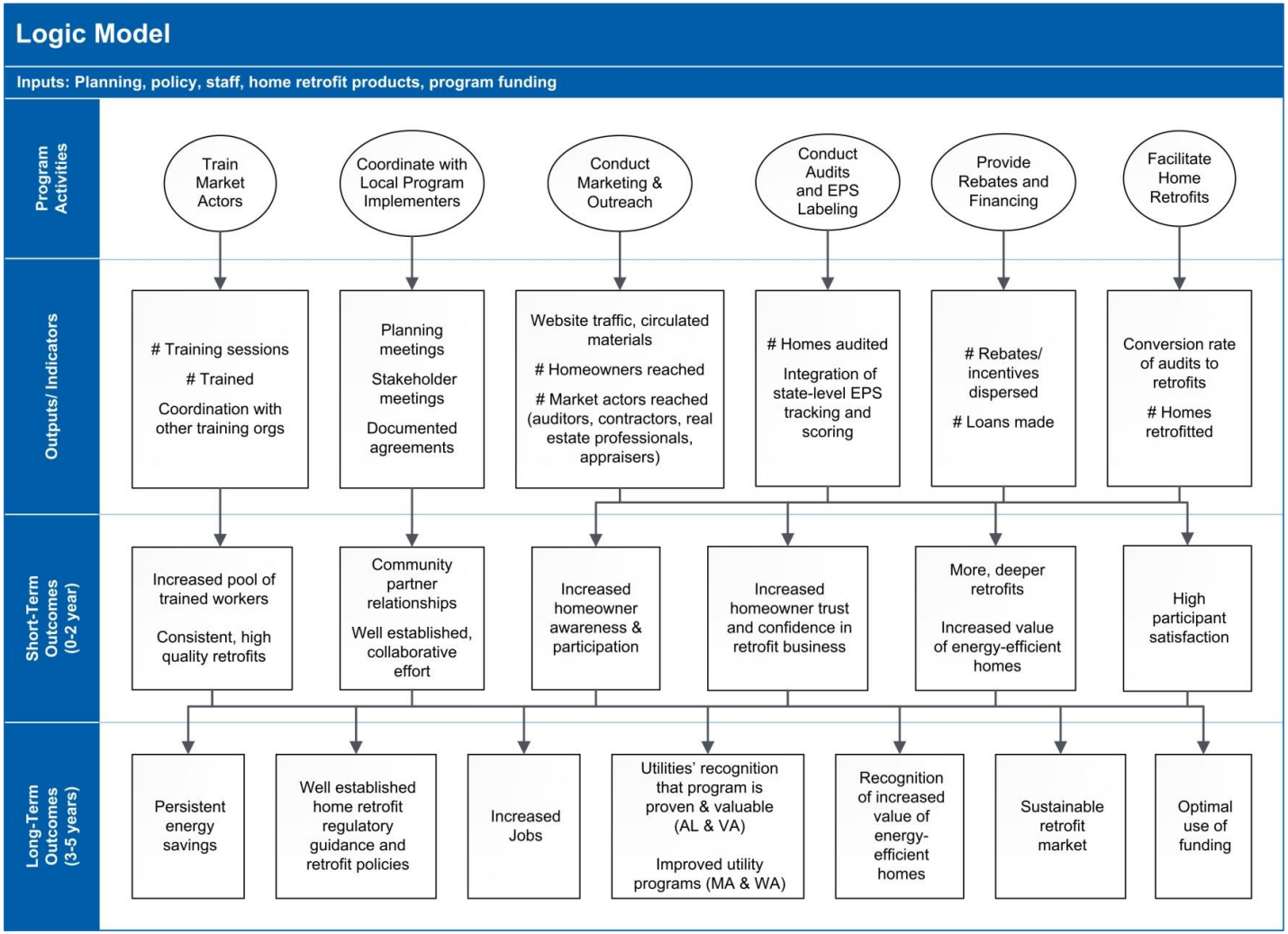
Logic models use various graphics to highlight key program features and to indicate logical linkages among activities, outputs, and outcomes. Logic models are tailored to program specifics and typically include the following five elements:

1. ***Inputs*** to the program, such as staffing and funding.
2. ***Activities*** the program undertakes.
3. ***Outputs/Indicators*** produced by program activities and used to assess the realization of short- and long-term outcomes.
4. ***Short-term outcomes*** resulting from outputs and occurring within the first two years.
5. ***Long-term outcomes*** resulting from outputs and occurring in three to five years.

Cadmus worked with NASEO and the steering committee to customize a standard logic model. The logic model, shown in Figure 1, identifies the relationships between program activities and expected results, and explicates the underlying program theory. To date, the model has been used to:

- Generate a shared understanding of the program's goals and objectives.
- Expand the understanding of barriers to program success.
- Identify program inputs (or resources), activities, outputs, and outcomes.
- Define appropriate program metrics to track and measure success.
- Identify evaluation and program activity issues that may need to be addressed.

Figure 1. Multi-State Residential Retrofit Project Logic Model



Researchable Questions

With input and oversight from the steering committee, Cadmus developed a set of researchable issues and associated indicators to address the following overarching questions:

- How effective are the programs and their respective components in generating numerous and deep[15] home energy retrofits?
- What insights can be drawn from successes and failures to inform other participants and future initiatives?
- What is needed to sustain the programs' energy-efficiency efforts going forward?

The following high-level, researchable issues formed the basis of the Multi-State Project evaluation:

- To what extent does the information provided by an EPS home energy audit encourage audit participants to undertake energy-efficiency retrofits? To undertake deep retrofits?
- To what extent does the web-based program tool facilitate homeowner and contractor participation at various stages of the program?
- To what extent are local/regional organizations effectively motivating homeowners to complete retrofits? To complete deep retrofits?
- To what extent is access to knowledgeable and trained industry professionals motivating homeowner investment in energy-saving home improvements? To what extent does it motivate investment in deep retrofits?
- To what extent does access to financial rebates and loans motivate or enable homeowners and contractors to undertake retrofits? To undertake deep retrofits?
- To what extent does homeowners' belief in the increased value of energy-efficient homes motivate them to undertake retrofits? To undertake deep retrofits?
- Are program efforts sustainable without continued federal funding?

Explanations of the specific evaluation activities Cadmus undertook to address these questions are provided in the Evaluation Methodology section.

1.4 Evaluability Issues

While similar in intent, the programs differed in key respects. The following differences, noted below and discussed in more detail in other areas of this report, created challenges for conducting a consistent evaluation across the four states:

- Differences in program design and implementation.
- Varying launch dates and ramp-up paces.

[15] DOE initially required *each* SEP-funded retrofit to achieve "deep" energy savings of at least 20%. Midway through the project, DOE changed the requirement, stating that the *portfolio* of "deep" retrofit projects needed to *average* at least 20% savings.

- Differences in context, including experience with energy efficiency, available resources, and infrastructure.
- Differences in homeowner and market actor energy-efficiency awareness and experience levels.
- Differences in data availability and format.
- Differences in preferences for the evaluation focus.

2 Evaluation Methodology

Cadmus began the process evaluation of the Multi-State Project in September 2011. The evaluation drew upon many primary and secondary data sources. This section describes the key sources of information and the methods used to collect the data that informs the evaluation. The data analysis results are discussed in subsequent sections of this report.

2.1 Program Materials and EPS Database Review

At the outset of the project, Cadmus reviewed all available written program materials—including program implementation plans, marketing materials, market research/characterization studies, training materials, enrollment forms, and websites—to refine our understanding of the states' retrofit programs within the Multi-State Project. These materials informed the evaluation research plan, as well as the development of the survey instruments and interview guides (described later in Section 2). Cadmus worked with Earth Advantage to understand the EPS auditing tool, software, and report (called the Energy Analysis Report) from program implementer, contractor, and homeowner perspectives.

2.2 Monitoring and Evaluation Plan

In the winter of 2012, Cadmus developed a monitoring and evaluation plan describing the activities we expected to undertake in evaluating the core Multi-State Project, as well as each state-level program. The plan drew on information Cadmus gathered through the program materials review, EPS database review, and initial discussions and interviews with steering committee members. In the plan, Cadmus discussed: the key research questions we sought to address through the evaluation; the data collection methods we expected to use; the analysis techniques we expected to employ; and our anticipated timeline for each task. The evaluation plan also described the feedback, data, and other information we would need to collect from steering committee members and other stakeholders during the course of the study.

Cadmus viewed the monitoring and evaluation plan as a living document, recognizing that our planned activities and timeline might need to be adjusted as the Multi-State Project unfolded. The programs did, in fact, face changing market opportunities, changing EPS tool needs, slower than expected homeowner uptake, and other challenges. Throughout this study, Cadmus, NASEO, steering committee members, and program implementers communicated regularly, enabling Cadmus to adapt the evaluation approach to meet changing or unanticipated conditions as the programs evolved. Where applicable, modifications made to the planned approach are described in the following sections.

2.3 Baseline Homeowner Survey

With the assistance of our market research subcontractor, Discovery Research Group (DRG), Cadmus conducted telephone surveys with the general population of homeowners in each targeted community in the winter of 2012.[16] We used this survey information to measure conditions in the targeted areas

[16] In Alabama and Virginia, where more than one community was targeted, Cadmus sampled respondents in proportion to the general population in each area.

prior to any influence of Multi-State Project activities and to inform the program implementers' marketing and outreach efforts. To assess differences between the general homeowner and participant homeowner populations, Cadmus later compared the baseline survey data with survey data from homeowners who participated in the programs.

Cadmus used information gathered through the Multi-State Project kick-off meeting and subsequent discussions and interviews with steering committee members to draft an initial version of the baseline survey instrument. We asked NASEO and the steering committee for feedback on the draft and incorporated their suggestions into a near-final version of the survey. Once DRG programmed the survey questions into their software system, they conducted a pre-fielding test (a "pre-test") of the survey instrument for one night. Cadmus and NASEO listened to the pre-test to verify that the survey flowed smoothly and to identify any questions—or ordering of questions—that required adjustments. After making a few minor changes based on the pre-test findings, Cadmus finalized the survey instrument, and DRG continued surveying homeowners in the targeted areas.

The baseline homeowner survey addressed the following topics:

- Awareness, knowledge, concern about, and experience with ways to save energy.
- Awareness and experience with energy-efficiency programs.
- Sources for energy-efficiency information.
- Intentions, motivations, and barriers to implementing energy efficiency.
- Value placed on energy efficiency when searching for a new home.
- Demographic and household characteristics.

Through DRG, Cadmus purchased homeowner contact lists in targeted program areas and selected candidate respondents through a landline random digit dial process. As shown in Table 1, the overall sample size across the four states was 293 completed surveys, a number slightly higher than the target. This overall sample size carried a margin of error of ±5% in 90 out of 100 similarly conducted surveys (90% confidence). Each state's sample size carried a margin of error of ±10% at the 90% confidence level. Appendix A provides the homeowner baseline survey instrument.

Table 1. Baseline Survey Targeted and Actual Completes

State	Target	Actual
Alabama	70	77
Massachusetts	70	74
Virginia	70	72
Washington	70	70
Total, All States	**280**	**293**

2.4 Process Flowcharts

Cadmus prepared process flowcharts to document the programs' steps from a program implementer's perspective. By documenting all of the major steps involved with each program, the flowcharts helped

ensure all program stakeholders had the same understanding of the program's operation. Process flowcharts can be useful for explaining the program to potential funders and new program partners, and for identifying where additional (or reduced) communication, outreach, homeowner or market actor support, or data tracking can be beneficial.

Cadmus developed draft process flowcharts using information obtained from program documents and the first two rounds of stakeholder interviews (described in the next section). We distributed the drafts to steering committee members and program implementers, and then held one or more meetings with stakeholders from each state to review, discuss, and refine the drafts. Once a state's stakeholders agreed that the process flowchart accurately represented their programs, we presented revised versions to NASEO and the steering committee.

Process flowcharts are, by design, living documents that change as programs evolve. With input from the steering committee and program implementers, Cadmus made several updates to the process flowcharts during the evaluation. We encourage stakeholders to continue updating the flowcharts as the programs mature and to use them as a tool to document and troubleshoot program processes.

2.5 Stakeholder Interviews

Cadmus conducted the first round of telephone interviews with steering committee members in the fall of 2011, shortly after the evaluation kick-off meeting. Drawing on information gathered from the kick-off meeting and from our review of the states' program implementation plans, Cadmus asked stakeholders for additional detail and clarification about their program's following elements:

- Goals.
- Geographic and demographic targets.
- Marketing plans.
- Expected roles of market actors and local partner organizations.
- Actual or expected rollout dates.
- Operational processes.
- Market actor trainings.
- Expected use of software tools (e.g., EPS), rebates, and financing.
- Data tracking systems.

As described, Cadmus used the information obtained from these initial interviews to develop the Multi-State Residential Retrofit Project Evaluation Plan (which we finalized in the winter of 2012).

Cadmus conducted follow-up interviews with steering committee members in the spring of 2012, asking many of the same questions from the previous fall. These spring 2012 interviews allowed Cadmus to understand: how the programs functioned after several months of operation; any new approaches the program implementers may have taken; and challenges they faced.

Although not formal interviews, Cadmus conducted conversations with all of the states' steering committee members and program implementers in the fall of 2012, as we developed the programs' process flowcharts. In most cases, the flowchart served as the first graphical depiction of a program's operation. As such, they triggered many discussions about how the programs actually ran—for example: the frequency and timing of contacts with homeowner participants; program components that were and were not feasible to undertake within the SEP grant period: and entities responsible for different types of data tracking. The flowcharts also identified areas where additional, near-term communication/ outreach or support might be beneficial in encouraging more homeowners to undertake home assessments or energy-efficiency retrofits.

Cadmus conducted a final round of stakeholder interviews—with both steering committee members and program implementers—in the summer and fall of 2013. Through these interviews, we gathered information about: how and why the programs had evolved; stakeholders' insights into the programs' successes, challenges, lessons learned, and recommended improvements; and stakeholders' plans for programs once the SEP grant period ends.

2.6 Partial and Full Participant Homeowner Surveys

Cadmus uses the term "partial participants" to distinguish homeowners completing an energy audit but not (yet) following through with a retrofit from "full participants"—homeowners completing an audit as well as a retrofit. DRG conducted telephone surveys with partial and full participant homeowners from August 2012 through June 2013 for the Alabama, Virginia, and Washington programs. Since DOER requested the evaluation assess the Home MPG program after the program's relaunch in the fall of 2012, and since the Home MPG initiative's emphasis differed from the other programs, Cadmus developed a separate full participant survey for Massachusetts.[17] DRG fielded the Massachusetts full participant survey in the fall of 2013.[18]

The initial evaluation plan called for two rounds of homeowner surveys, during the summer of 2012 and the spring of 2013. After program launch dates were delayed, and the numbers of partial and full participants increased at a relatively slow and steady rate, Cadmus proposed fielding the homeowner surveys on an ongoing basis. The steering committee agreed to this approach, which enabled us to obtain homeowner feedback just a couple months after their program participation, while the experience remained fresh in their minds.

Cadmus designed the partial and full participant surveys to assess: respondents' previous experiences with energy efficiency; awareness of program offerings; factors motivating or preventing participation; general experiences with the program; and the importance they placed on program components, such

[17] Cadmus also was directed to focus on full Home MPG participants and therefore did not field a partial participant survey in Massachusetts.

[18] DRG contacted participants only in the area where CSG served as Mass Save's program implementer; contact information for participants in the area where Honeywell served as implementer was not available during this study.

as access to knowledgeable industry professionals, rebates, financing, the EPS audit and rating tool, and the program operating under local control. Both surveys also queried respondents about: their general motivations for saving energy; how they learned of the program; the value they placed on energy efficiency when buying or selling a home; their homes' characteristics; and their demographics. Many core survey questions paralleled the baseline survey, allowing Cadmus to compare characteristics of program participants to those of the general population of homeowners in their areas.

In addition, the partial participant survey asked respondents about their intentions to undertake retrofits and any barriers they perceived. The full participant survey asked respondents about their selection of retrofit measures and, where applicable, any perceived barriers to implementing all of the measures recommended in their energy audit reports.

Cadmus presented draft partial participant and full participant surveys to NASEO and the steering committee. We used their feedback, along with findings from the survey pre-tests, to develop final versions of both surveys.

Cadmus worked with Earth Advantage to develop a system whereby each month Earth Advantage downloaded contact information from its database for partial participants who had finalized audits and full participants who had finalized retrofits. In some cases, auditors and contractors did not upload information to EPS (but rather submitted participant information to program implementers using different software). In those cases, Cadmus obtained the participants' contact information directly from program implementers. We cleaned EPS and program implementer-provided data by removing duplicate entries and records with clearly erroneous information, then forwarded these contact lists to DRG to use as the sample frame for fielding surveys. Cadmus signed nondisclosure agreements with all of the State Energy Offices, guaranteeing the security and confidentiality of the homeowner contact information.

DRG attempted to field complete surveys with all partial and full participants on the contact list each month. To minimize non-response bias for partial and full participant surveys, DRG made up to five attempts to contact each homeowner, including calling at different times of the day and on different days of the week. The partial participant survey included screening questions to determine whether respondents had already started retrofits. If the respondent had started but not completed a retrofit, DRG explained that they might call back after their retrofit's completion, thanked the respondent for their time, and ended the discussion. If the respondent had already completed a retrofit, DRG transferred the respondent to the full participant survey and asked that set of questions. DRG interviewers were trained to read questions *verbatim*, and they offered response options only when the survey instructed.

Table 2 shows the sample frame,[19] targeted number of completes, actual number of completes, and margin of error for the partial participant surveys; Table 3 shows comparable information for the full participant surveys.[20]

There are numerous reasons the number of targeted surveys were not completed, including: wrong or disconnected phone numbers, busy signals, no answers, calls that connected to answering machines, and respondent refusals. Response rates for full participants—who had lengthier and more engaged involvement with the programs—were considerably greater than for partial participants. Though response rates can vary widely from survey to survey, response rates fell well within the range of those Cadmus has experienced from comparable surveys fielded elsewhere.

Table 2. Partial Participant Survey Targeted and Actual Completions*

State	Sample Frame	Target	Actual	Margin of Error at 90% Confidence
Alabama	752	70	58	±10.4%
Virginia	720	70	97	±7.8%
Washington	523	70	30	±14.6%
Total	**1,995**	**210**	**185**	**±5.8%**

*As noted at the beginning of this Section, Massachusetts did not plan for a partial participant survey.

[19] Despite the best efforts of Cadmus and program sponsors, these sample frames may not reflect the total population of participants. Some program implementers opted to use auditing software or tracking systems other than EPS. In such cases, Cadmus worked with the program implementers to try to obtain contact information for as many partial and full participants as possible. The sample frames in this report include participants from the EPS data extracts Earth Advantage provided to Cadmus, combined with participants the program implementers' provided from their databases. The Washington program was even more complex: it allowed homeowners to obtain an audit through the local utility (Puget Sound Energy [PSE]) without informing RePower Kitsap County (RePower Kitsap) about the audit. Since Earth Advantage and the RePower Kitsap program implementer learned about PSE audit participants when they applied for a retrofit rebate, these RePower Kitsap full participants were never included in RePower Kitsap partial participant records, and therefore were not included in the sample frame.

[20] Cadmus set targets of 70 completed partial participant surveys and 70 completed full participant surveys per state. Given the small sample frames and the desired number of completes, we determined that a census approach (calling all potential respondents multiple times), rather than a random sample approach, provided the most robust strategy. As shown, despite strong efforts, the desired sample size was not always achieved. For each target audience, we show the margin of error at 90% confidence for each state and overall. Most error margins for individual states were less than ±11% (except Washington). Across all states, the margin of error fell between ±5% and ±6%. With either a random sample or census approach, a larger number of completed surveys leads to a smaller margin of error.

Table 3. Full Participant Survey Targeted and Actual Completions

State	Sample Frame	Target	Actual	Margin of Error at 90% Confidence
Alabama	364	70	96	±7.2%
Massachusetts	260	70	70	±8.4%
Virginia	148	70	55	±8.8%
Washington	57	70	11	±22.5%
Total, All States	**829**	**280**	**232**	**±4.6%**

Appendices B, C, and D provide the partial and full participant survey instruments.

2.7 Market Actor Interviews

Cadmus interviewed market actors from all key program categories, including auditors, contractors,[21] lenders, real estate professionals, appraisers, and utility staff.[22] Cadmus designed the interviews, which followed written guides but took a conversational tone, to engage market actors in providing in-depth feedback and insights about their individual experiences with the program.

As with the homeowner surveys, Cadmus gathered input on draft versions of each interview guide from NASEO and the steering committee, and revised the guides accordingly. Interviews in Alabama, Virginia, and Washington took place via telephone between late fall of 2012 and spring of 2013; the interviews in Massachusetts took place in the fall of 2013. We obtained contact information from the steering committee members and program implementers, and attempted to interview all market actors on each list by making up to five attempts, via e-mail and telephone, to contact each market actor.

Auditor and Contractor Interviews

Through the auditor and contractor interviews, Cadmus explored the following topics:

- How they heard about the programs and were recruited to participate.
- Their participation expectations.
- Training and other support they received through the programs.
- Their perceptions of EPS.
- Their perceptions of homeowner responses to the program.
- Challenges they faced in selling home energy assessments and retrofits.
- How, if at all, their business practices changed in response to the programs.

[21] In Alabama and Virginia, individuals and firms conducting home energy audits also performed energy-efficiency retrofits. Since they served as both auditors and contractors, Cadmus refers to these entities as "auditors/contractors" in the Alabama and Virginia sections of this report.

[22] Cadmus worked with stakeholders to determine the appropriate market actor interviews to conduct in each state.

- The sustainability of any new or changed business practices.
- Their overall perceptions of and satisfaction with the program

As shown in Table 4, Cadmus interviewed 46 auditors and contractors in four states.

Table 4. Auditor and Contractor Interview Completions

State	Sample Frame	Target	Actual
Alabama	18	10	12*
Massachusetts	9	5	6**
Virginia	38	24	26
Washington	8	8	2.5***
Total, All States	**73**	**47**	**46**

*These 12 market actors included two individuals who conducted audits and did not perform retrofits, one who performed audits and retrofits, one energy-efficiency product distributor, and eight contractors who retrofitted homes. Except where responses varied by market actor function, this group is collectively referred to as "auditors/contractors."

**All of the Massachusetts market actors Cadmus interviewed are auditors (i.e., we did not speak with any contractors in Massachusetts). In addition to the six auditors, Cadmus also spoke with one auditor supervisor. The supervisor's responses generally corroborated the auditors' opinions but did not substantively add to the auditor's responses. Thus, except where explicitly noted, the supervisor's responses are not included in the auditor interview findings described in the Massachusetts sections below.

***One of the contractors was only able to answer half of the interview questions.

Lender Interviews

The Alabama, Virginia, and Washington program implementers all offered loan products for energy-efficiency retrofits that were developed specifically for the programs participating in the Multi-State Project. We interviewed the sole participating lender in Alabama, all three participating lenders in Virginia (one lender per program implementer), and both participating lenders in Washington. The lender interviews provided insight into:

- Their prior experiences with energy-efficiency loans
- How they heard about and were recruited to participate
- Training and other support they received through the program
- How the program influenced their lending practices
- Whether they expect to continue offering similar loan products beyond the grant period
- Their overall perceptions of and satisfaction with the program

Real Estate Professional and Appraiser Interviews

Most of the programs include the active engagement of real estate professionals and appraisers to encourage them to recognize energy-efficient measures and home energy audit results in multiple listing services (MLS) and home valuations. To date, real estate professional and appraiser involvement in the programs has focused on training and education. The Alabama and Virginia programs offered home energy-efficiency trainings to real estate professionals in their target communities, and the

Alabama, Virginia, and Washington programs offered trainings for appraisers. In early 2014, Massachusetts conducted six real estate professional and appraiser trainings on the energy performance score, building science, and high-performance homes. [23] Cadmus confined our real estate professional and appraiser interviews to Alabama, Virginia, and Washington, given the timing of the interviews and the development of this evaluation report.

The real estate professional and appraiser interviews provided insight into:

- Their prior experiences with energy efficiency
- How they heard about the program
- Training and other support they received through the program
- Their perceptions of EPS
- How, if at all, the program affected their businesses
- Their overall perceptions of and satisfaction with the program

We used the lists of real estate professionals and appraisers who had completed trainings as our sample frame. The sample frame and the targeted and actual numbers of completed interviews by state are shown in Table 5. As evidenced by the lower-than-expected number of completed interviews, real estate professionals and appraisers proved to be especially difficult to reach. The low response rates may be due, at least in part, to their limited involvement in the programs to date.

Table 5. Real Estate Professional and Appraiser Interview Completions

State	Market Actor	Sample Frame	Target	Actual
Alabama	Real Estate Professionals	45	10	5
	Appraisers	42	10	5
Virginia	Real Estate Professionals	38	10	11
	Appraisers	91	10	15
Washington*	Appraisers	38	10	2

*Washington stakeholders opted to only include appraiser interviews as part of this study.

Utility Staff Interviews

Cadmus only interviewed utility staff in Washington.[24] During the interview, we discussed the utility's role in the RePower Kistap program, how it was influenced by the program, its experience with and perspective of the EPS scorecard and report, and how the end of the grant period affected its continuing involvement with RePower Kitsap.

[23] See Section 6.1 for additional information about the Massachusetts trainings.

[24] Cadmus also spoke briefly with two utility staff members in Virginia; these conversations generally confirmed that they had minor or no roles in the Virginia programs and that there were limited opportunities for partnerships. We did not attempt to contact utility staff in Alabama (since Nexus Energy Center, the Alabama program implementer, said the utility has no role in that program) or in Massachusetts.

The interview guides for auditors and contractors, lenders, real estate professionals and appraisers, and utility staff are provided in Appendices E through I.

3 Cross-Cutting Lessons

3.1 Lesson Topics

This section presents cross-cutting[25] lessons learned through this evaluation, and addresses the following topics:

1. Program goals
2. Stakeholder coordination
3. Implementer support for auditors/contractors
4. EPS audit and scorecard
5. Being local
6. Participant demographics and decision making
7. Trained auditors and contractors
8. Rebates and loans
9. Participant satisfaction
10. Energy efficiency in selling and buying homes
11. Program sustainability

1. Program Goals

One of the goals common to all four states was to increase the number of home energy-efficiency retrofits within their target areas. As shown in Table 6, the states collectively completed approximately 5,420 audits and 3,071 retrofits through the multi-state project.[26][27]

[25] Cross-cutting refers to lessons resulting from the research that are consistent across at least several of the four states, although some exceptions may exist.

[26] Massachusetts currently remains active in the field; by the end of the project the Massachusetts audit and retrofit totals will increase from the totals shown in this report.

[27] As each state counted audits and retrofits over a unique timeframe, using an independent tracking system, the state totals shown cannot be directly compared to one another.

Table 6. Program Achievements: Cumulative Values

State	Audits	Retrofits
Alabama*	933	795
Massachusetts**	3,228	1,314
Virginia***	1,259	356
Washington****	1,200+	606
Total	5,420+	3,071

*Alabama retrofits do not include an additional 735 retrofits completed by Nexus in Huntsville through EECBG. Sections 4 and 5 present separate Huntsville and Birmingham totals, a discussion of factors likely contributing to Alabama's high (85%) audit-to-retrofit conversion rate, and other state details.

**Massachusetts totals extend through December 2013, though the program's performance period ends on June 30, 2014. The retrofit total includes: all retrofits undertaken through Home MPG retrofits in the 20% energy-savings portfolio reported to DOE should be considered a subset of this total. For more detail, see Section 6.2.

***Virginia totals extend through the end of the performance period, September 30, 2013. The retrofits counted for Local Energy Alliance Program (LEAP), Charlottesville, did not include the approximately 1,100 additional retrofits LEAP performed through EECBG. For more detail, see Section 8.3.

****Washington audits include: EPS audits, HomePrint™ assessments delivered by RePower, and CSG Home Energy Checkups. The total number of audits should be considered an estimate as separate databases track the three sets of "audits," with some audits recorded in more than one database. Washington reported a range of 1,200 to 1,400 audits to DOE. Of the total 606 homes retrofitted, 124 received an EPS audit; the audit-to-retrofit conversion rate for homes receiving EPS audits was 40%. For more detail, see Section 10.2.

The number of audits and retrofits ramped up over the course of the project period in all four states. Several of the state chapters below include graphics illustrating this trend.

2. Stakeholder Coordination

All of the SEP-funded programs involved many stakeholders, including representatives from State Energy Offices, program implementers, DOE, auditors and contractors, and, in some cases, regional energy-efficiency organizations or other state agencies. The programs' start-up, implementation, and progress depended on strong coordination and regular communication among these entities, but establishing relationships, common viewpoints, and communication channels among these stakeholders took time and effort. Coordination emerged as a key topic in each round of stakeholder interviews. Lessons learned about coordination are discussed below.

- ***The multi-state steering committee, orchestrated by NASEO, became another stakeholder in the project and provided an important focal point for the four-state effort.*** Meeting monthly, and collaborating more often when needed, the steering committee worked together to establish common program goals, define an initial core delivery model, share successes, solve problems, facilitate strategy and information exchange, and oversee and provide input to evaluation activities.
- ***As stakeholder relationships strengthened, states overcame early administrative and implementation challenges***. For example, Massachusetts found that participating auditors and contractors had to duplicate much of their data entry for projects: they entered data once to generate EPS scorecards and reports, and once to record information in the implementer's own databases. DOER worked with the implementers to streamline the data entry process and to

modify their software so it could generate scorecards and reports similar to those produced by EPS.

In Virginia, programs in five communities operated under three implementation organizations—LEAP; the Richmond Regional Energy Alliance (RREA); and the Community Alliance for Energy Efficiency (cafe^2)—and under two oversight organizations—the Virginia Department of Mines, Mineral and Energy (DMME), and SEEA. From the start, the programs differed in their experience, administration, implementation, community demographics, funding levels, and other support resources. As staffing stabilized, the stakeholders established regular lines of communication and the implementers gained experience and a greater presence in their communities.

In Washington, RePower Kitsap established a local infrastructure enabling whole-house retrofits where none had previously existed. RePower staff accomplished this through a very conscious and intensive effort to build a collaborative local contractor network.

- ***The programs achieved varying levels of success integrating with utility conservation efforts.*** Alabama and Virginia achieved very limited success in partnering with large utilities or influencing the utilities' approaches to energy efficiency during the grant period. Large utilities in these states had little or no experience with energy efficiency, and the programs could not significantly change the utilities' offerings during their operations under the SEP grants.

  After several months of negotiations, Mass Save implementation contractors working under existing utility energy-efficiency programs agreed to add the scorecard generation capability to their existing software, as requested by Home MPG.

  RePower staff recognized an opportunity to enhance the utility's home retrofit program through the addition of a new air-sealing measure. They developed measure calculations and specifications, trained contractors, performed building diagnostics, conducted quality assurance reviews of early air-sealing projects, and supported evidence from the pilot that reinforced the utility's decision to add air-sealing to its list of eligible measures.

3. Implementer Support for Auditors and Contractors

As the primary market actors interacting with participating homeowners, effective auditors and contractors proved vital to each program's success. This section addresses implementer support for these market actors, largely based on results from stakeholder and auditor/contractor interviews.

- ***The ability to access existing pools of experienced auditors and contractors reduced hurdles in three of the four states, allowing those programs to become operational more quickly.*** In Massachusetts, Home MPG worked with a strong network of experienced home energy auditors/contractors already in place through Mass Save. Similarly, stakeholders in Virginia reported that auditors/contractors working in all program regions had sufficient business knowledge and technical skill to manage the type and level of work generated by the program. RePower Kistap market actors also generally had prior experience, at least through RePower Bainbridge and RePower Bremerton. In contrast, only one of 12 auditors/contractors in Alabama

reported being Building Performance Institute (BPI)-certified prior to becoming involved in AlabamaWISE, but several acquired certification after the program launched.

- ***Program-sponsored trainings are needed for program success, especially to help market actors adopt new retrofit skills and to be more effective energy-efficiency salespeople.*** Auditors in Home MPG's program reported the training sessions prepared them to discuss scorecards with homeowners. RePower Kitsap contractors said information conveyed through the training sessions enabled them to adopt new technologies—such as air sealing—and train their staff on best practices. While most auditors/contractors in Virginia also thought found the trainings useful and well done, they were less well received by those with more experience.

  The AlabamaWISE program did not require auditors/contractors to participate in program-sponsored trainings, and many did not attend the trainings offered. However, when some auditors/contractors specifically requested training in marketing and sales, program staff organized and offered two successful sales-focused sessions.

  During the course of their operation, the programs came to recognize that training should be an ongoing priority, and that training needs and goals would evolve over time. For example, after initial contractor training in Washington, the program provided additional training sessions as a quality control and quality assurance strategy. Despite having attended earlier trainings sessions and completing numerous retrofits, contractors continued to benefit from ongoing training.

- ***The programs positively affected auditor/contractor businesses, though many hoped for more help with marketing and leads.*** Most market actors found that the programs' marketing and provision of rebates boosted their businesses, helping them close sales with homeowners who otherwise would not have committed to audits or retrofits. Some contractors said the programs provided important marketing services that their firms could not afford and that marketing efforts helped improve audit-to-retrofit conversion rates. Some contractors reported they added or retained staff, gained additional certifications, and/or added new services to their offerings as a direct result of their participation. Still, some auditors/contractors said more marketing assistance would have increased potential audit and retrofit leads.

- ***Responsive, one-on-one assistance and networking opportunities boosted market actor interest and confidence. Program strengths also included providing professional program staff and offering a program that improved customer comfort and helped the environment.*** Auditors/ contractors reported that AlabamaWISE program staff were accessible and helpful in resolving their questions and issues. In Virginia, auditors/contractors appreciated that the program hired a trainer with a strong local reputation as its technical expert; they also appreciated ongoing training and networking sessions that allowed them to share tips and frustrations regarding energy-efficiency work. A RePower Kitsap contractor said the program's quality assurance process provided valuable feedback that made his staff aware of their shortcomings and improved their services.

  However, prior program experience elsewhere can affect market actor views: contractors in LEAP's NOVA program said the program's lower incentive levels, compared to similar programs they worked with in Maryland, made selling retrofits more difficult.

4. EPS Audit and Scorecard

The four states used the EPS auditing and home-energy scoring tool to help homeowners better understand and trust audit information and recommendations for energy-efficiency retrofits. This section presents auditor/contractor and homeowner views of EPS and other comparable tools.

- ***Differences in experience, business practices, and locations resulted in auditors and contractors providing mixed reviews in regard to adopting and using EPS.*** Some auditors and contractors who regularly used EPS said its scorecard and reporting graphics made it a useful selling tool. However, some also noted that the report could overwhelm customers; they suggested making the report more customizable based on each customer's needs. Auditors satisfied with their current home assessment software tools generally commented about the time and money required to switch to new tools. In some cases, contractors only used EPS when seeking to qualify for rebates.

  Since EPS is Internet-based, some contractors encountered problems due to unavailable or slow Internet access. Such problems could prolong the energy assessment process, delay the dissemination of audit results to program participants, and potentially affect homeowner decisions to take action on retrofits. In addition, in two states (Alabama and Virginia), auditors/contractors reported initial concerns with the accuracy of EPS. Several auditors/contractors noted that Earth Advantage responded to their concerns and adjusted the EPS software to better reflect their region's weather patterns. By 2013, program staff reported experiencing significantly fewer (and less severe) complaints about EPS.
- ***Some program staff noted that EPS can serve as a valuable administrative tool.*** Washington's program staff emphasized that EPS allowed them to track program progress and to collect characteristics about the housing stock the program served in the targeted areas. WSU Energy Program staff explained that EPS enabled them to identify the most prevalent energy-efficiency issues and to restructure the program to better address those issues. For example, by examining the Kitsap County EPS data set, program staff identified whole-house air leakage, duct leakage, and attic insulation as the most commonly deficient building components. Based on this finding, program staff targeted whole-house air sealing as an upgrade measure.
- ***While participants rated the EPS scorecard and report fairly highly, they also suggested the design of scorecard documents could be improved.*** Table 7 shows the proportion of partial and full participant "very easy to understand" and "very reliable" ratings hovered in the 50% to 60% range.[28]

[28] Cadmus' analysis suggests no consistent difference exists between partial participants and full participants.

Table 7. Participant Feedback about EPS' Ease-of-Understanding and Reliability

State	Partial	Full
EPS scorecard and report are very easy to understand		
Alabama	60% (n=47)	46% (n=67)
Virginia	61% (n=79)	48% (n=46)
Washington	64% (n=28)	56% (n=9)
EPS scorecard and report are very reliable		
Alabama	58% (n=45)	69% (n=51)
Virginia	72% (n=74)	50% (n=44)
Washington	61% (n=28)	60% (n=10)

Cadmus also surveyed full participants in Massachusetts who received the CSG scorecard and asked a similar question about how easy the scorecard was to understand. Additionally, Cadmus asked Massachusetts respondents how useful the scorecard was in helping them decide to make energy-savings improvements to their homes and how useful the post-retrofit scorecard was in understanding their home's energy use after making improvements. As shown in Table 8, roughly two-thirds of Home MPG participants found the scorecard very easy to understand and very useful in helping with energy-efficiency improvement decisions.

Table 8. Massachusetts Participant Feedback about Scorecard's Ease-of-Understanding and Usefulness

Question	Full
Very easy to understand	65% (n=54)
Very useful in helping decide on home energy-efficiency improvements	67% (n=58)
Very useful in helping understand post-retrofit energy use	81% (n=21)

- ***Some findings suggested EPS, when compared with a less expensive, simpler tool offered through the local utility, resulted in higher conversion rates and more extensive upgrades.*** In its final report to DOE,[29] WSU Energy Program stated that EPS resulted in a 40% audit-to-retrofit conversion rate, while the local utility's HomePrint assessment resulted in a 11.4% to 19.7% conversion rate. WSU Energy Program also estimated installation of an average of 2.5 measures per home through RePower Kitsap, in contrast to the average of 1.4 measures installed per home through utility-supported upgrades and the average of 1.1 measures per home installed by contractors without program support.

[29] See: *Final Report for the RePower Kitsap Demonstration Program Strengthening Energy Efficiency Retrofit Market Project*, prepared by Washington State University Energy Program, Award Number DE-EE0004447, March, 2014.

5. Being Local

The Multi-State Project theory postulated that homeowners would more likely take action if programs capitalized on being trusted, local organizations, based in the communities they served. Lessons learned about the importance of "being local" follow.

- ***Local identities enabled implementers to tailor successful implementation strategies.*** Implementers' understanding of their target markets and active engagement in their communities enabled them to: form good working relationships with auditor and contractor networks; partner with local government agencies; and market the program via word-of-mouth. In addition, their community presence allowed implementers to quickly recognize and build upon elements that worked well and drop elements that did not work.
- ***Knowing contractors were affiliated with a local organization often influenced homeowners to pursue audits and retrofits***. As shown in Table 9, most participants reported knowing the programs were locally run. Of those who knew of this, the majority of partial participants and nearly one-half of all full participants cited the programs' local status as a motivating factor in their decisions to participate.

Table 9. Participants' Awareness and Importance Placed on Programs' Local Status*

State	Partial	Full
Aware Program Locally Run		
Alabama	67% (n=58)	45% (n=96)
Virginia	86% (n=87)	81% (n=48)
Washington	90% (n=28)	70% (n=10)
Knowledge that Program Is Local Influenced Decision to Participate		
Alabama	54% (n=37)	44% (n=43)
Virginia	67% (n=86)	67% (n=45)
Washington	78% (n=27)	71% (n=7)

*This question was not included in the Massachusetts full participant survey.

- ***The presence of a local organization gave market actors added credibility.*** Many auditors and contractors said this credibility, coupled with the program rebates, helped them close sales with customers who otherwise might not have pursued home energy assessments or retrofits.

6. Participant Demographics and Decision Making

This section discusses lessons learned about who participated, why they participated, and potential gaps in services. These lessons primarily derive from homeowner survey results.

- ***Participants exhibited notably higher education and incomes levels than the general population in almost all program target areas, as shown in Table 10.*** These findings are consistent with results from residential energy-efficiency retrofit programs across the nation, especially during their early years and before they made special efforts to reach a more diverse set of households.

Table 10. General Population Compared to Partial and Full Participant Education and Income Levels

State	Baseline	Partial	Full
Education: Bachelor's degree or higher			
Alabama	38% (n=72)	73% (n=55)	58% (n=96)
Massachusetts	38% (n=72)	N/A	65% (n=69)
Virginia	58% (n=69)	85% (n=91)	78% (n=55)
Washington	42% (n=68)	57% (n=30)	70% (n=10)
Income ≥ $80,000 per year			
Alabama	23% (n=56)	58% (n=43)	55% (n=87)
Massachusetts	22% (n=55)	N/A	43% (n=56)
Virginia	54% (n=56)	43% (n=75)	70% (n=50)
Washington	36% (n=55)	52% (n=23)	29% (n=7)

- ***Participants in all four states most commonly pursued energy audits (Table 11) and retrofits (Table 12) to save money.*** These findings are consistent with marketing messages and evaluation results from similar programs elsewhere. Improving home comfort or health served as the second most common motivation for participants in three of the four states.

Table 11. Partial Participants' Motivations for Audits*

State	Save Money	Improve Home Comfort or Health	Was Free or Low-Cost	Help Environ-ment	Personal Recom-menda-tion	To Not Waste; Improve Efficiency	Increase Home Value	Other**
Alabama (n=58)	24%	16%	10%	0%	7%	7%	0%	36%
Massachusetts (n=69)***	55%	7%	3%	6%	1%	1%	6%	20%
Virginia (n=97)	38%	12%	6%	8%	3%	11%	3%	19%
Washington (n=30)	50%	10%	0%	7%	3%	0%	7%	23%

*Respondents were asked: "What was the main reason you decided to get an energy assessment of your home?"
**Key "Other" reasons were having more predictable energy bills and ensuring enough for future generations.
***Responses in Massachusetts are from full participants (rather than partial participants).

Table 12. Full Participants' Motivations for Retrofits*

State	Save Money	Improve Home Comfort or Health	Help Environ-ment	To Not Waste; Improve Efficiency	Increase Home Value	Make Bills More Predic-table	Other**
Alabama (n=95)	49%	21%	4%	2%	4%	2%	17%
Massachusetts (n=70)	76%	9%	0%	3%	0%	1%	11%
Virginia (n=48)	38%	29%	13%	4%	0%	2%	15%
Washington (n=10)	60%	30%	0%	0%	0%	0%	10%

*Respondents were asked: "What was the main reason you decided to make energy-saving improvements to your home?"
**The key "Other" reason was ensuring enough for future generations.

- ***Among partial participants, cost was the most-cited obstacle to making the recommended improvements to their homes (Table 13).*** Partial participants also noted inconvenience and challenges with contractors as impediments. Notably, about one-quarter of respondents in Alabama and Virginia could not identify barriers to retrofitting their homes.

Table 13. Partial Participants' Barriers to Retrofits*

State	Can't Afford It/ Too Expensive	Inconvenient/ Don't Have Time	Challenges with Contractors	None/No Major Challenges
Alabama (n=41)	41%	12%	12%	24%
Virginia (n=77)	49%	16%	4%	22%
Washington (n=20)	75%	15%	15%	0%

*Respondents were asked: "What major challenges, if any, do you think you will face in making the improvements listed in the home energy assessment report?" Multiple responses were allowed. Cadmus did not survey partial participants in Massachusetts.

- ***A minority of homeowners undertook all of the recommended retrofit measures.*** As shown in Table 14, the majority of full participant respondents in all states opted to implement "some" rather than "all" of the measures recommended through their audit reports. Contractors corroborated these findings, saying they found it hard to convince homeowners of the benefits of whole-house retrofits.

Table 14. Recommendations Full Participants Pursued in Their Home Retrofits*

State	All	Some	None
Alabama (n=86)	18%	80%	2%**
Virginia (n=54)	26%	74%	0%
Washington (n=10)	20%	80%	0%

*This question was not included in the Massachusetts full participant survey.
**Cadmus assumed participants who said they did not implement any of the *recommended* measures opted to implement measures other than those recommended by their auditor.

- ***Participants not pursuing all efficiency improvements said they selected some measures over others to minimize costs, to do "enough" to save on their energy bills, and, in some cases, to take the easiest actions (Table 15).***

Table 15. Full Participants' Reasons for Implementing Selected Measures*

State	Least Expensive Measures	Improvements Enough to Save on Energy Bill	Easiest Actions to Take
Alabama (n=71)	51%	14%	4%
Virginia (n=39)	64%	10%	8%
Washington (n=8)	38%	0%	25%

*Respondents were asked: "What were the key reasons you chose to follow just some of the recommendations from the assessment?" Multiple responses were allowed. This question was not included in the Massachusetts full participant survey.

7. Trained Auditors and Contractors

One key premise of the Multi-State Project was that convenient access to trained and engaged auditors and contractors would build homeowner trust and confidence in the program's offerings and work quality. As discussed below, trained professionals proved important to program success.

- ***Knowing the programs worked with trained professionals motivated homeowners to pursue audits and retrofits.*** When asked how important it was to know that their auditors or contractors received special energy-efficiency training, about 60% to 70% of partial participants said it was very important in deciding to pursue an audit, and one-half to three-quarters of full participants said it was very important in deciding to pursue a retrofit (see Table 16). In addition, the programs delivered on their promises of high-quality services: program participants awarded auditors and contractors very high satisfaction ratings, with 75% to 90% very satisfied with the market actors' ability to answer their questions and to perform the work. (For more information, see the "Participant Satisfaction" section below).[30]

Table 16. Percentages of Participants Who Thought Special Market Actor Training Was Very Important

State	Partial	Full
Alabama	70% (n=40)	52% (n=46)
Virginia	68% (n=73)	76% (n=41)
Washington	57% (n=21)	56% (n=9)

- ***Market actors and positive word-of-mouth drove program participation.*** As shown in Table 17 and Table 18, market actors were a primary way the programs attracted participants' attention. Many participants also learned of the programs via word-of-mouth, which likely was positive given other findings such as high customer satisfaction with the programs.

[30] The Massachusetts full participant survey did not include any of the questions in this section.

Table 17. How Partial Participants First Learned of Programs*

State	Market Actors	Word-of-Mouth	Internet	Local Organi-zation	Program Staff	Event	Other**
Alabama (n=58)	57%	14%	9%	9%	3%	0%	12%
Virginia (n=94)	12%	29%	16%	10%	6%	9%	26%
Washington (n=27)	26%	11%	7%	4%	0%	22%	30%

*Multiple responses were allowed, so totals may add to more than 100%.
**Other responses included utility bill inserts; radio, television, or newspaper advertisements; and others.

Table 18. How Full Participants First Learned of Programs*

State	Market Actors	Word-of-Mouth	Internet	Local Organi-zation	Program Staff	Event	Other**
Alabama (n=95)	56%	15%	6%	17%	3%	1%	7%
Virginia (n=51)	41%	16%	10%	10%	6%	4%	22%
Washington (n=11)	36%	36%	0%	9%	0%	0%	18%

* Multiple responses were allowed, so total may add to more than 100%.
** Other responses included utility bill inserts; radio, television, or newspaper advertisements; and others.

8. Rebates and Loans

Stakeholders in Alabama, Virginia, and Washington expected easy and straightforward access to rebates and loans to reduce first-cost barriers. The following lessons drew upon the states' homeowner survey results and market actor interviews.[31]

- ***Rebates, both those that helped cover audit costs and those that applied to energy-efficiency improvements, served as critical drivers for many program participants.*** As shown in Table 19, roughly 45% to 65% of partial participants in three states said they were much more likely to make energy-saving improvements to their homes due to the availability of rebates. Similarly, 42% to 71% of full participants said the rebate was very important in deciding to undertake a retrofit. Market actors in some states reported that program rebates resulted in more participation and more extensive retrofits than homeowners otherwise would have undertaken.

Table 19. Percentage of Participants for Whom Rebates Were Very Important

State	Partial	Full
Alabama	46% (n=24)	42% (n=85)
Virginia	65% (n=57)	65% (n=49)
Washington	50% (n=10)	71% (n=7)

[31] The Massachusetts full participant survey did not include any of the questions in this section.

- ***Decreased rebate levels directly linked to decreases in participation.*** Programs starting with relatively high rebates and subsequently decreasing them observed homeowner interest in the programs wane after the rebates were lowered.
- ***Loans made meaningful contributions to retrofit activities in some states/regions, but were not a primary driver of retrofits.*** Awareness among full participants of program-sponsored loans varied a great deal by state: 15% to 61% of full participants knew of the program loans, and 29% to 50% of those said the loans influenced their decision to undertake a retrofit. The lowest awareness of the program-sponsored loan offering (15%) occurred in Alabama, where the loan offering did not become available to AlabamaWISE participants until March 2013. Early program participants therefore did not know of this program component. Table 20 provides more details about full participant awareness and the influence of loans.

Table 20. Full Participant Awareness of Loan; Loan Very Important in Retrofit Decision

State	Percent Aware of Program-Sponsored Loans	Percent for Whom Loan Was Very Important
Alabama	15% (n=33)	29% (n=7)
Virginia	61% (n=46)	33% (n=36)
Washington	50% (n=10)	50% (n=4)

- ***Despite lower-than-anticipated loan volumes, financing enhanced the programs' credibility.*** Though the loan products generally experienced only modest uptake, stakeholders in some states reported the availability of program-sponsored loans as a critical factor for some homeowners. Low loan volumes may partly result from the weak national economy and homeowners' reluctance to take on additional debt.

9. Participant Satisfaction

Homeowner satisfaction provided an indicator of a program's potential to thrive: homeowner satisfaction spurred on implementers and market actors, and contributed to positive word-of-mouth among target audiences, which served as a crucial component of the programs' marketing efforts. This section presents findings about participant satisfaction at key points of their participation in the programs.[32]

- ***Participants largely expressed satisfaction with initial program phases—the sign-up process and wait times, both of which could create barriers to participation.*** Over 70% of all partial participants were very satisfied with the sign-up process, and most were very satisfied with the time between signing up and receiving their audits (Table 21).

[32] The Massachusetts full participant survey did not include any of the questions in this section.

Table 21.Percentage of Partial Participants Very Satisfied with Program Activities

State	Sign-In Process	Time Between Signing Up and Receiving Audit
Alabama	77% (n=56)	82% (n=57)
Virginia	80% (n=93)	74% (n=93)
Washington	73% (n=30)	63% (n=30)

- ***Almost all full participants were very satisfied with the contractor services they received and very few were dissatisfied (Table 22)***. These high ratings are likely a key contributor to positive word-of-mouth for the programs, providing reassurance to homeowners about another common concern—contractor performance.

Table 22. Percentage of Full Participants Very Satisfied with Retrofit Contractor's Services

State	Retrofit Services
Alabama	87% (n=93)
Virginia	82% (n=55)
Washington	88% (n=8)

- ***Given participants' high satisfaction with key program elements, it is unsurprising that most participants in Alabama, Virginia, and Washington would very likely recommend the program to others,*** as shown in Table 23.

Table 23. Percentage of Participants Very Likely to Recommend the Program to Others

State	Partial	Full
Alabama	63% (n=24)	77% (n=93)
Virginia	76% (n=59)	85% (n=46)
Washington	91% (n=11)	90% (n=10)

10. Energy Efficiency in Selling and Buying Homes

The Multi-State Project theory postulated that trained and knowledgeable real estate professionals and appraisers could, over time, educate homebuyers and sellers about energy efficiency and make it a more salient factor in home buying and selling. Stakeholder interviews and homeowner surveys addressed these topics.

- ***Where offered, program training attracted many residential real estate professionals, both due to market interest and need.*** Over 50 real estate professionals attended Earth Advantage's trainings for real estate professionals in each state where training was offered, and over 40 appraisers attended courses about appraising green homes in each of the states where training was available (Table 24). The real estate professionals and appraisers said they attended the trainings due to their lack of knowledge about green building and their interest in the topic as well as for continuing education credits they earned.

Table 24. Real Estate Professionals and Appraiser Training Attendees*

State	Real Estate Professional Training Attendees	Appraiser Training Attendees
Alabama	51	43
Massachusetts	93	58
Virginia	85	66
Washington	57	59

* Massachusetts conducted real estate professional and appraiser training in early 2014. Cadmus did interview any of the Massachusetts real estate professionals or appraisers who attended these trainings.

- ***Though trained real estate professionals and appraisers said they supported energy efficiency, most were unlikely to actively promote it unless they saw broader market trends to support it.*** Several interviewees explained that few ENERGY STAR or green-certified homes existed in their areas and thought their knowledge would prove more applicable to the new construction market or if green labeling becomes more popular.
- ***Homeowners in Massachusetts thought scorecards would be useful when buying a new home.***[33] When asked how useful it would be to see an energy performance scorecard for homes they might buy, 74% of full participant respondents in Massachusetts (43 of 58) said scorecards would be very useful.

11. Program Sustainability

All of the programs sought to build demand for energy-efficient homes and to foster a sustainable retrofit workforce. The states tailored their approaches to local conditions, employing a mix of the following strategies: building public-private partnerships, devising new tools to increase participation and achieve deeper retrofits, expanding regional energy alliances, coordinating with local utilities, developing workforce capacity, building homeowner demand, and training real estate professionals and appraisers.

- ***The states' strategies resulted in several positive sustainability indicators***. These indicators, applicable to all of the states, can be used to assess the programs' ongoing progress:
  - An increased profile and level of energy efficiency in targeted communities.
  - An expanded, networked, and able energy-efficiency work force, with improved skills and tools.
  - Greater efforts to work closely with other local organizations to gain funding and leverage resources, including expansion of rebates.
  - More collaboration with utilities on specific initiatives, improving their ability to work together on future energy-efficiency efforts.
  - Greater experience in delivering efficiency services and active efforts to maintain momentum created with multi-state project grants.

[33] Response rates to comparable questions in the other states were too small to provide meaningful results.

4 Alabama Program

4.1 Overview of the Alabama Program

Alabama Worthwhile Investments Save Energy (AlabamaWISE) is a residential retrofit program serving the Huntsville and Birmingham areas.[34] The earliest iteration of AlabamaWISE, known as HuntsvilleWISE, began as part of a Southeast Energy Efficiency Alliance (SEEA) Better Buildings Neighborhood Program (BBNP) initiative in the Huntsville region (as well as in specific communities in other states), which was funded through the Energy Efficiency and Conservation Block Grant Program (EECBG). Program stakeholders created the Nexus Energy Center (Nexus) to operate as the implementer of the HuntsvilleWISE program. The Multi-State Project State Energy Program grant was awarded to Alabama Department of Economic and Community Affairs (ADECA) at a later date.

Once ADECA received SEP funding from DOE to run a program similar to HuntsvilleWISE in a separate geographic area, ADECA selected Nexus to implement the broader AlabamaWISE program. ADECA'S Energy Division provided project management services to Nexus for the program's SEP-funded portion.

Through AlabamaWISE, Nexus offered:

- Home energy audits.
- Energy performance scoring.
- Rebates for energy-efficiency retrofits.
- A network of contractors, certified by the Building Performance Institute, Inc. (BPI) as qualified to undertake the retrofit work.

Nexus partnered with SEEA and ADECA to provide the following market actor training:

1. Earth Advantage trained auditors/contractors on the use of Energy Performance Score (EPS) software. Earth Advantage also trained real estate professionals and appraisers in both the Huntsville and Birmingham areas, enabling them to educate customers about the value of energy audits and energy-efficiency retrofits. As discussed in more detail below, this initial round of training resulted in further investment by ADECA in appraiser and real estate professional trainings throughout the state.
2. Advanced Energy (AE)[35] trained contractors on best practices for making energy-efficiency retrofits to homes and for sales techniques.

In addition, Nexus partnered with Abundant Power to offer a low-interest loan for energy-efficiency retrofit work. The loan product launched in March 2013, and made seven loans in its first few months.

---

[34] In the Huntsville area, the program serves Cullman, Lawrence, Limestone, and Morgan Counties as well as Madison County within the City of Huntsville. In the Birmingham area, the program serves Jefferson and Shelby Counties.

[35] ADECA provided the funding for AE's training sessions; SEEA managed the AE training contract.

4.2 Goals

The Alabama program sought to achieve the following key goals:

- Use the knowledge and experience of partner states to establish a sustainable retrofit market in Alabama.
- Elevate the state's current retrofit markets to build momentum to permanently and sustainably transform the market for home energy improvements.
- Retrofit 2% of the homes in the state's targeted markets by 2013, resulting in measurable energy savings that scale up and persist over time.
- Foster the development of community-based, public-private partnerships for program delivery, lasting throughout the grant period and beyond.
- Utilize experience obtained and lessons learned in the Huntsville community (where AlabamaWISE first rolled out) to implement a successful program in Birmingham.

Table 25 shows the Alabama program's results. The table displays cumulative totals of audits and retrofits for the full performance period. Year 3 retrofit target and actual amounts are also provided, as Alabama determined the Year 3 target through conversations with DOE and tracked progress towards this goal.

Table 25. Program Targets and Achievements: Alabama

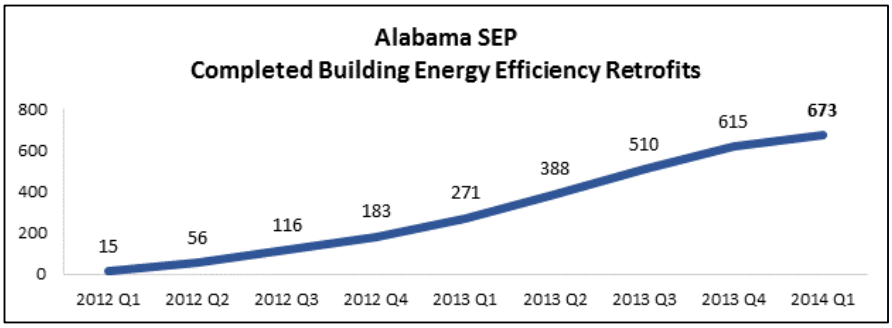
Alabama	Audits	Retrofits		
	Cumulative	Cumulative	Year 3*	
	Actual	Actual	Target	Actual
Huntsville	594	532**	400	100
Birmingham	339	263	600	427
Total	**933*** **	**795**	**1,000**	**527**

*AlabamaWISE's Year 3 ran from April 1, 2013, through March 31, 2014.
**The Huntsville retrofit total does not include an additional 735 retrofits completed by Nexus with funding through the EECBG program, as that was a separate funding source.
***Actual numbers of audits and retrofits are as of March 31, 2014.

Across the Huntsville and Birmingham regions, AlabamaWISE achieved an overall audit-to-retrofit conversion rate of 85%. This report explores the factors contributing to this extremely high conversion rate below.

Figure 2 shows the increase in the number of retrofits completed through the Alabama program over time.

Figure 2. Cumulative Number of Completed Retrofits in Alabama, by Quarter



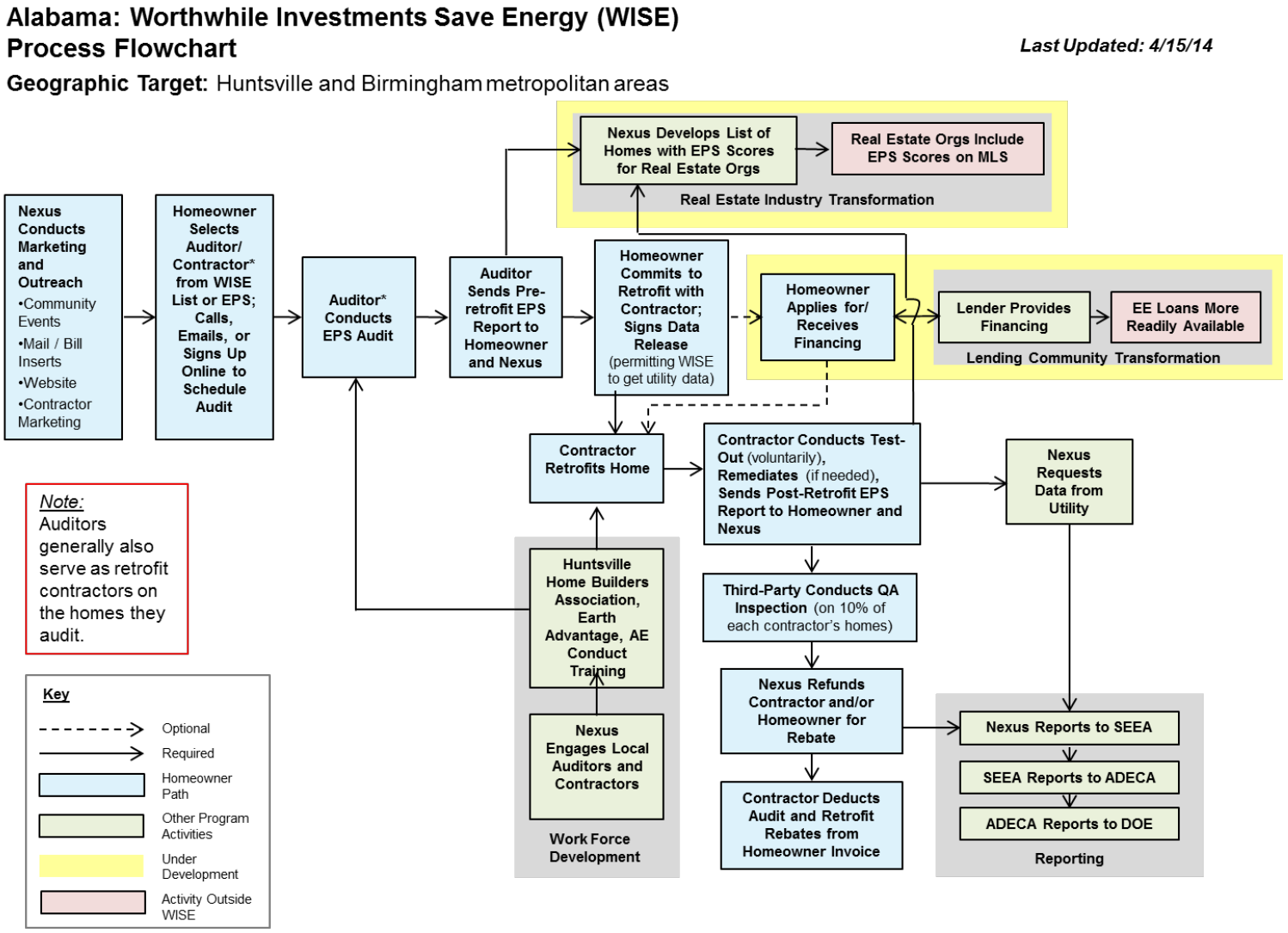
4.3 Process Flowchart

Figure 3 documents the process flow for the AlabamaWISE program.

The blue boxes show the program steps that directly involve participant homeowners. A homeowner first obtains an energy audit to identify opportunities for improving the efficiency of his home. After reviewing the audit findings and deciding to undergo a retrofit, the homeowner commits to the work with an AlabamaWISE trade ally, and applies for financing (if needed). After the retrofit work has been completed, the contractor may conduct a test-out audit demonstrating efficiency improvements to the home. Nexus conducts inspections of roughly 10% of the completed retrofit work to ensure program contractors perform high-quality work. To minimize program paperwork for the homeowner, the contractor subtracts program incentives for the audit and retrofit work from the invoice submitted to the homeowner.

Green boxes on the flowchart show the AlabamaWISE steps, such as auditor/contractor training and data sharing with the utility and SEEA, that do not directly involve participant homeowners.

Figure 3. Process Flowchart for AlabamaWISE



5 Alabama Findings, Conclusions, and Recommendations

5.1 Key Findings

This section presents the process evaluation findings based on document reviews, stakeholder and market actor interviews, and homeowner surveys for the AlabamaWISE program, operating under the Multi-State Project in Alabama. These findings, which address high-level program administration as well as the research questions described in Section 1.3, are organized by the following topics:

1. Coordination among Alabama stakeholders.
2. Implementer support for auditors/contractors.
3. Views of the EPS audit and scorecard.
4. The importance of being local.
5. Participant demographics, motivations, and barriers.
6. The importance of trained professionals.
7. Views on rebates and loans.
8. Participant satisfaction.
9. The importance of energy efficiency in selling and buying homes.
10. Program sustainability.

1. Coordination Among Alabama Stakeholders

The AlabamaWISE audit and retrofit program involved a number of stakeholders, including: ADECA, the Alabama SEP grant manager; Nexus, the program implementer; and SEEA and DOE, which provided project management and oversight. The program's start-up, implementation, and progress tracking depended on the coordination and regular communication among all these entities. Coordination emerged as a key topic Cadmus discussed with stakeholders during each round of interviews. The findings from these discussions follow.

- ***Program complexity, coupled with the number and newness of the implementation organizations, presented early administrative challenges.*** While Alabama offered a single program, funded by two DOE grants (and two administrators: ADECA for the SEP grant, and SEEA for the EECBG grant), the multiple oversight organizations—which all expected immediate retrofit results—caused unanticipated complications and delays to the program's launch. As ADECA contracted with SEEA to manage the Alabama program, ADECA had to coordinate with SEEA each time it sought to direct SEP funds to Nexus. At the time AlabamaWISE launched, SEEA had limited experience managing grants or projects as complex as the SEP and EECBG grants. To meet DOE requirements, SEEA devoted considerable time to reporting and accounting for funds. These administrative obligations, coupled with a high level of staff turnover in key positions during the early part of the grant period, and SEEA's concurrent management responsibilities for the SEP-funded program in Virginia, resulted in payment and processing delays that affected Nexus, ADECA, and participants expecting incentive payments.

Despite these early administrative challenges, AlabamaWISE benefited from the earlier experience of HuntsvilleWISE, which launched a few months earlier. By the time SEP funds were in place, Nexus had established a program structure and developed a contractor network that could be easily applied in the Huntsville and Birmingham regions covered by the SEP grant, speeding implementation in those areas.

- ***The program implementer experienced limited success in engaging Alabama utilities as partners.*** Nexus and ADECA sought to discuss AlabamaWISE with Alabama Power, Alagasco, and six Tennessee Valley Authority (TVA) distributors located within the program's target region. While the utilities expressed varying levels of interest and engagement, the initial discussions between AlabamaWISE program staff and utility staff generally were not productive. According to AlabamaWISE staff, Alabama Power and Alagasco were not accustomed to offering energy-efficiency services, and the concept proved too new to gain traction with utility representatives. In addition, the TVA distributors were accustomed to only offering efficiency programs designed by TVA. Although Nexus developed a relationship with one TVA distributor that initially appeared promising, the collaboration later dissolved due to the lack of a written agreement and the utility's frustration with changing DOE guidance.[36]

  Over time, however, the utilities increased their levels of engagement with AlabamaWISE staff. For example, Alagasco promoted a very active AlabamaWISE contractor (from the Birmingham area) through utility-bill inserts. Alabama Power and five of the six TVA distributors also helped with marketing the program. Additionally, AlabamaWISE real estate professional and appraiser trainings were held at Alabama Power facilities. Finally, in the last year of the SEP grant, Alabama Power and five of the six TVA distributors provided utility billing data to AlabamaWISE for use in DOE reporting.

- ***The federal grants carried heavy regulatory and reporting requirements that placed a significant burden on the program implementers.*** Nexus—a small, nimble organization—was created to implement the SEP- and EECBG-funded programs. Nexus grew from one to four staff members during the course of the grant period. As a new organization, Nexus could adapt to changing circumstances and grant requirements. With its small staff, however, Nexus program managers spent up to 50% of their time on reporting requirements. Although program stakeholders could quickly react to needed program changes, they found the grants restrictive and difficult to manage. In particular, they found the requirement to achieve deep retrofits (20% energy savings) in 2% of the targeted market each year—with very little ramp-up time—an unrealistic goal.

- ***The establishment of a financing option took much longer than program stakeholders expected, and it did not drive participation as much as anticipated.*** While early interviews with

[36] When AlabamaWISE entered into discussions with this TVA distributor, the utility was paying rebates for retrofits that resulted in at least 15% energy savings under an EECBG-funded program. When the separate, SEP-funded, AlabamaWISE program launched in another part of the utility's service territory, the rebate requirement was 20% energy savings. The utility found the inconsistency in program qualifications frustrating, and staff opted not to pursue participation in the SEP-funded program.

program stakeholders indicated their active pursuit of a financing option with area lenders as early as 2010, Abundant Power did not become a program lender partner until March 2013. Despite discussions with local banks, none elected to offer a loan product. While the Abundant Power 6% interest loan product did not dramatically increase participation, it offered a revenue source for the AlabamaWISE program, as two-thirds of the collected interest (4%) was collected by Nexus for program administration. The remaining 2% interest, as well as all loan origination fees, were collected by Abundant Power for administration of the loan fund.

2. Implementer Support for Auditors/Contractors

Auditors/contractors serve as the primary market actors interacting with participating homeowners. Knowledgeable, trained, supported, and satisfied auditors/contractors therefore proved vital to the program's success. This section addresses implementer support for auditors/contractors, and is largely based on the results of stakeholder and auditor/contractor interviews.

- ***Word-of-mouth generally offered the most effective means of auditor/contractor recruitment.*** Auditors/contractors learned of the program through a coworker, a competitor, or the Energy Huntsville Initiative.[37] Only two of 12 responding auditors/contractors reported having prior experience with energy-efficiency programs, with both having worked with a TVA program.
- ***Nexus partnered with auditors/contractors with varied levels of energy-efficiency experience, and encouraged at least three contractors to pursue BPI certification.*** Only one of 12 auditors/contractors reported being BPI-certified prior to becoming involved in AlabamaWISE. Three other firms had at least one staff person (and up to five in one case) acquire the certification to participate in the program. Two recently-certified contractors said they had intended to pursue BPI certification for some time, and the program finally convinced them to do so. One contractor added auditing services due to participation in the program.
- ***Auditors/contractors expected AlabamaWISE to drive leads to them, but contractors reported they generated their own leads. Nevertheless, affiliation with the program helped increase their business up to 20%.*** Though many auditors/contractors conducted energy retrofit work before the program started, all found that the program—through marketing and providing homeowner rebates—boosted their businesses to some degree. Auditors/contractors reported that Nexus played an educational role, presenting program information at home shows and advertising through social media, while auditors/contractors generated leads for the program. All contractors interviewed said the program generated modest leads, at best.

  Contractors reported that program marketing helped improve audit-to-retrofit conversion rates, and that Nexus provided important marketing services that their firms could not afford. The program's very existence and its rebates helped contractors close sales with customers who might not have committed in the absence of a rebate or a federally-sponsored program. For

[37] Through the Energy Huntsville Initiative, Huntsville Mayor Tommy Battle solicited volunteers from large and small businesses and from other organizations to leverage that city's relationship with Redstone Arsenal, a major local employer. This effort sought to reinforce energy independence and support energy-related economic development in Huntsville.

example, one contractor said the fact AlabamaWISE was sponsored by the state and implemented by a local organization served as "a reassurance to the customer." Another auditor noted that "AlabamaWISE gives auditors more credibility," and a contractor concurred that AlabamaWISE helped them get in the door.

- ***All auditors/contractors reported high satisfaction levels with the program.*** Eight of 12 auditors/contractors stated that, so far, they were very satisfied with their program participation. One of 12 reported being somewhat satisfied, and three of 12 interviewees did not respond to this question. Contractors voiced few complaints about the program. One contractor expressed dismay that many customers completed retrofit work step by step, and the grant's limited time period did not allow for a longer implementation process. Another contractor said the program's rebate structure made it difficult to present a sales pitch to customers. The program reimbursed customers for the entire cost of the audit ($350) if they achieved 20% energy savings, but the contractor said many customers found this concept difficult to grasp.
- ***Nexus did not require auditors/contractors to participate in program-sponsored training, though Nexus staff were available for questions and troubleshooting, as needed.*** The auditors/ contractors reported that Nexus primarily communicated program information through e-mail. Nexus did not make AlabamaWISE training sessions mandatory for auditors/contractors, and only one of 12 auditors/contractor interviewees recalled attending any kind of program training. (The training this respondent remembered focused on energy-efficiency financing).

  Nexus staff reported they received auditor/contractor and other market actor requests for sales training. During interviews conducted in the spring of 2013, Cadmus spoke to three auditors/ contractors who also hoped for some training in sales. Nexus responded by hosting two sales training sessions: the first in November 2012, and the second in mid-2013. AE conducted both workshops. As with the other program-sponsored training sessions, auditor/contractor attendance at the trainings was optional.

  For auditors/contractors who desired additional program assistance, Nexus provided one-on-one assistance on an as-needed basis. Contractors reported high levels of satisfaction with the one-on-one assistance. Auditors/contractors reported that Nexus was accessible for answering questions and helpful in resolving the issues that auditors/contractors discussed with program staff.
- ***A few contractors expressed dissatisfaction with the time and resources needed to process rebates for customers, but acknowledged that rebate-related work provided an important source of business.*** These contractors expressed frustration with the lack of transparency with Nexus's rebate processing status and the length of the reimbursement process. For example, one contractor reported that, once they submitted a rebate to Nexus on behalf of a customer, they did not receive any status updates, which made it difficult to manage customer expectations.

3. Views of the EPS Audit and Scorecard

The four states coordinating under this grant used the EPS auditing and home-energy scoring tool to: make current energy use more transparent to homeowners; build trust in audit results; and present homeowners with compelling information about recommended energy-efficiency retrofits. This section—which presents auditor/contractor and homeowner reactions to, perceptions of, and experiences with EPS—draws upon market actor and stakeholder interviews and homeowner surveys.

- ***Many auditors did not use EPS.*** Established auditors, who had been satisfied with other home assessment software tools they had used successfully, generally were reluctant to abandon their current systems. Only three of the 12 auditor/contractors respondents stated that they regularly used EPS. One auditor/contractor had not heard of EPS. Some auditors/contractors may have reported they were not familiar with EPS because Cadmus interviewed them shortly after they had joined the program, or because they were subcontractors who were responsible for a portion of a home's retrofit (e.g., window installations) and did not need to use EPS.
- ***Auditors who used EPS reported it was easy to use but lacked the detail of other products they previously used. They also reported the program's requirement to use EPS sometimes led to duplicated data entry.***[38]
- ***Auditors/contractors selectively entered project information into EPS.*** As one auditor reported: "I use my own reports and software for all of my audits. Only when I try to qualify for rebates do I use EPS…because of time." Another auditor noted he could walk into a home and know what needed to be done to achieve the 20% savings required by the grant. He then would use EPS so the homeowner could qualify for rebates.
- ***In all regions, auditors/contractors reported initial concerns with the accuracy of EPS, mostly due to its weather inputs. These concerns were addressed over time.*** At least one auditor/ contractor thought EPS was likely too conservative, rather than too generous, in its savings estimates. Several auditors/contractors noted that Earth Advantage responded to their concerns and improved the accuracy of the EPS software by adjusting it to better reflect southern weather patterns. By 2013, Nexus staff reported experiencing significantly fewer (and less severe) complaints about EPS.
- ***Many participants found the EPS Energy Analysis Report and scorecard easy to understand and useful.*** Roughly 60% of partial participants (28 of 47) and 46% of full participants (31 of 67) found the EPS scorecard and report very easy to understand.[39] The majority of partial

[38] The need for duplicated data entry could have been averted by enabling the auditors/contractors to electronically transfer data from their chosen software to the EPS software through an application programming interface (API); Earth Advantage has used an API in other jurisdictions. However, Alabama program staff did not employ this solution since the other software providers lacked incentive to set up an API, and AlabamaWISE did not require API capability of the other software vendors.

[39] DRG asked participants whether the report was very easy, somewhat easy, not too easy, or not at all easy to understand. Seventeen full participant respondents (25%) replied that they did not remember the scorecard or the report.

participants (33 of 55, or 60%) thought the report was very useful in showing the steps they could take to save energy, and 81% (38 of 47) thought the scorecard and report provided the right amount of detail.[40] Further, 58% of partial participants (26 of 45) and 69% of full participants (35 of 51) found the report and scorecard very reliable.

- ***Auditors/contractors said the EPS scorecard and report were helpful selling tools that could benefit from customization options.*** Two of the three auditors/contractors who regularly used EPS reported that the report's inclusion of pictures and fuel costs made it a useful selling tool. However, auditors/contractors noted the amount of information the report presented was overwhelming for some customers, and the report sometimes was too verbose. The auditors/contractors also said EPS was not sufficiently customizable. They would have appreciated an opportunity to generate EPS reports with varying levels of detail so they could provide more or less information based on each customer's needs. One auditor suggested that the software should allow them to use graphs in lieu text.[41]

4. The Importance of Being Local

The Multi-State Project theory postulated that homeowners would more likely take action if they could learn about energy audits and retrofits, get their questions answered, and obtain services through trusted local organizations. Cadmus asked homeowners about the importance of using local contractors, and also addressed this issue during stakeholder and market actor interviews. The findings are as follows.

- ***Nexus successfully leveraged its status as a local nonprofit to establish credibility in Huntsville and Birmingham.*** As members of the Huntsville community, Nexus staff understood the target market and were actively engaged in local energy networks that enabled development of the contractor network and word-of-mouth marketing. The Huntsville Energy Initiative, convened by the Mayor of Huntsville, provided a particularly effective means of establishing partnerships and recruiting auditors/contractors. One of the most active auditors/contractors who Cadmus interviewed learned of the program through these networking opportunities and then approached Nexus about joining the auditor/contractor network.
- ***Having one implementer for both the SEP- and EECBG-funded portions of the program minimized consumer confusion statewide and leveraged the existing program infrastructure.*** The EECBG-funded HuntsvilleWISE program began four months before the SEP grant. Program stakeholders initially planned to utilize the SEP funds in overlapping sections of the City of

[40] The full participant survey did not include these questions.

[41] EPS's required fields populated a four-page report: the scorecard (the front-and-back of one page); a summarized list of current conditions (one page); and a summarized list of recommended upgrades (one page). Though the report also included General and Detailed Notes pages, the software did not require auditors/contractors to enter data for these pages, so the length and level of detail of the report presented to the homeowner was largely at the discretion of the auditor/contractor. In early-2014, Earth Advantage added an optional short-form report to the Alabama software, enabling auditors/contractors to delete the optional Detailed Notes pages if they so desired.

Huntsville but, for administrative simplicity, decided to use the separate funding sources in separate geographic areas. To minimize confusion, the program appeared unified across these geographic areas. Early on, the program achieved awareness in the community, with 22% (17 of 77) of the baseline survey respondents stating they had heard of AlabamaWISE.

- ***Auditors/contractors served as primary drivers for generating homeowner interest in the program, followed closely by Nexus program staff, and by recommendations from family, friends, and neighbors.***[42] Approximately one-half of all participants learned of AlabamaWISE through auditors/contractors: 43% of partial participants (25 of 58 respondents) learned of AlabamaWISE directly through a participating auditor/contractor; 14% (8 of 58) through auditor/contractor advertising; and 14% (8 of 58) through word-of-mouth.

  Full participants learned of AlabamaWISE through similar marketing approaches: 45% of full participants (43 of 95 respondents) learned of the program directly from a participating auditor/contractor; and 11% of full participants (10 of 95) learned of the program through auditor/contractor advertising. Another 17% of full participants (16 of 95) learned about AlabamaWISE through a local organization; 15% (14 of 95) learned of it through word-of-mouth (e.g., a friend, family member, or neighbor).
- ***Nexus' small size and local connections helped it adapt quickly to changing circumstances.*** Program stakeholders reported making small changes to the program structure and rebate levels in response to feedback from participants and market actors. Nexus' flexibility allowed it to seamlessly make these changes. Further, to develop new program services, Nexus leveraged local events and collaborative meetings to generate new partners. For example, the Mayor's Huntsville Energy Initiative allowed Nexus to meet potential partners, such as The CornerStone Initiative, which delivers services to low-income residents. Nexus and The CornerStone Initiative currently are developing a single-family, energy-efficiency retrofit initiative, which program stakeholders hope will not only reach a population underserved by the program, but will also open up potential new funding opportunities.
- ***Knowing that contractors were affiliated with a local organization motivated homeowners to pursue audits.*** As discussed, many auditors/contractors said their affiliation with the program gave them additional credibility, and the rebates helped them close sales with customers who might not have participated in the program's absence. The presence of a local organization provided credibility to the program and motivated homeowners to participate. In Alabama, 67% of partial participants (39 of 58) and 45% of full participants (43 of 96) reported knowing the program was locally run. Roughly 54% of partial participants (20 of 37) and 44% of full participants (19 of 43) cited this as a motivating factor in their decision to participate.

5. Participant Demographics, Motivations, and Barriers

Knowledge of participant demographics can help program implementers understand whether a program is reaching its intended target audience. Similarly, comparing participant demographics to the

[42] Both partial and full participant respondents were permitted to provide multiple responses to questions about how they initially learned of AlabamaWISE; total percentages therefore may exceed 100%.

demographics of the general population can provide insights about how well participants represent the general population and what segments might be over- or underserved. Understanding homeowners' motivations to participate or not can be used to craft effective marketing and messages and can lead to productive changes in program designs that better serve homeowners. Findings related to participant demographics, motivations, and barriers primarily drew upon homeowner survey results.

- ***Both partial and full participants had higher incomes than the general population in the target areas.*** Table 26 illustrates differences between educational levels and incomes of partial and full participants and the general population based on baseline and participant surveys conducted with homeowners in the program regions.

Table 26. General Population Compared to Partial and Full Participant Education and Income Levels

Responses	Baseline	Partial	Full
Education	**n=72**	**n=55**	**n=96**
High school graduate or less	28%	5%	5%
Some college, associate's degree	35%	22%	37%
Bachelor's degree	17%	44%	35%
Graduate or professional degree	21%	29%	23%
Income	**n=56**	**n=43**	**n=87**
$80,000+ per year	23%	58%	55%

- ***Participants most commonly pursued energy audits (Table 27) and retrofits (Table 28) to save money.*** Improving their home's comfort or health was the second most common motivation for both partial and full participants. Recommendations from family and friends also commonly motivated participants to undertake audits.

Table 27. Homeowners' Motivations for Audits*

Responses	Partial (n=58)	Full (n=95)
Save money on energy bill	24%	29%
Improve the comfort or health of home	16%	15%
It was free or low-cost	10%	6%
Recommended by a friend/family member	7%	7%
Learn not to waste, improve efficiency of home	7%	4%
Make energy bills more predictable	2%	6%
Be more green or help the environment	0%	3%
Increase the value of my home	0%	1%
Other	34%**	27%***
Total	**100%**	**100%**

*Respondents were asked: "What was the main reason you decided to get an energy assessment of your home?" Respondents provided open-ended answers. The interviewer determined whether each response fit into a predetermined category and, if not, marked the response, "other," and recorded the response verbatim.
**"Other" main reasons that partial participants pursued an audit included: to receive a rebate (seven respondents); replace old equipment or upgrade their home (four respondents); and because of a contest or drawing (two respondents), among others.
***"Other" main reasons full participants pursued an audit included: the rebate (two respondents); and the idea of learning more about their house (one respondent), among others.

Table 28. Homeowners' Motivations for Retrofits*

Responses	Full (n=95)
Save money on energy bills	49%
Improve the comfort or health of home	21%
Be more green or help the environment	4%
Increase the value of my home	4%
Make energy bills more predictable	2%
Learn not to waste, improve efficiency of home	2%
Other**	17%
Total* **	**100%**

*Respondents were asked: "What was the main reason you decided to make energy-saving improvements to your home?" Respondents provided open-ended answers. The interviewer determined whether each response fit into a predetermined category and, if not, marked the response, "other," and recorded the response verbatim.
**A large majority of "Other" main reasons participants made energy-saving improvements included replacing old equipment or making upgrades to a home (14 respondents).
***Total may not sum to 100% due to rounding.

In contrast to these participant findings, 68% of Alabama homeowners responding to the baseline survey (52 of 76) strongly agreed with the statement: "I worry that the cost of energy for my home will go up" and 58% (44 of 76) strongly agreed that: "saving energy is a very high priority in our home." Among partial participants, approximately 47% (15 of 32) strongly agreed

with the statement: "I worry that the cost of energy for my home will go up"; and 38% (12 of 32) strongly agreed that: "saving energy is a very high priority in our home."

- ***Among homeowners conducting an audit but not a retrofit (partial participants), cost was the most-cited obstacle to making the recommended improvements to their homes (Table 29).*** Partial participants in all income categories frequently mentioned cost when asked about the challenges they expected to face in retrofitting their homes.[43] Respondents also noted inconvenience and challenges with contractors as impediments; however, roughly one-quarter of respondents did not report any barriers to retrofitting their homes.

Table 29. Partial Participant Barriers to Retrofits*

Responses	Partial (n=41)**
Can't afford it/too expensive	41%
Inconvenient, don't have the time, too busy	12%
Challenges with contractors	12%
Too hard to install/implement	5%
Home has challenges in its construction or age	2%
Other	2%
None/no major challenges	24%

*Respondents were asked: "What major challenges, if any, do you think you will face in making the improvements listed in the home energy assessment report?"
**Multiple responses allowed.

- ***Minimizing cost and selecting measures that provided "enough" of an improvement were full participants' most common explanations for why they chose to implement some recommended measures and not others (Table 30).***

Table 30. Full Participants' Reasons for Implementing Selected Measures*

Responses	Full (n=71)**
They were the least expensive measures to save energy	51%
These improvements would be enough to save money on energy bill	14%
I was planning to replace that equipment anyway	7%
They are the actions the contractor recommended	6%
I did not have the time and/or money to complete them all now	6%
They were the easiest actions to take	4%
These improvements would be enough to improve the comfort of home	3%
I wanted to stop wasting energy	3%
To get the largest possible rebate or tax credit	1%
These improvements would be enough to increase the value of my home	1%
Other	4%

*Respondents were asked: "What were the key reasons you chose to follow just some of the recommendations from the assessment?"
**Multiple responses allowed.

[43] Because of too few data points, Cadmus could not test for statistically significant differences in retrofit barriers among partial participants in different income categories.

- ***Contractors struggled to convince homeowners to undertake whole-house retrofits.*** Eighteen percent (16 of 86) of full participant respondents said they implemented all of the measures recommended in their audit report; 80% (70 of 86) said they implemented some of the measures; and 2% (2 of 86) said they did not implement any of the measures.[44] At least some of the difficulties contractors encountered in selling whole-house retrofits resulted from participants' interest in pursuing the least expensive recommended measures and measures that would be sufficient to result in some energy bill reductions (as previously discussed).

6. The Importance of Trained Professionals

One key premise of the Multi-State Project was that convenient access to trained and engaged market actors (e.g., auditors/contractors) would build homeowner trust and confidence in the program's offerings and work quality. As shown in the findings below, trained professionals proved to be an important program component.

- ***Knowing the program worked with trained professionals motivated homeowners to pursue audits and retrofits.*** When asked how important it was to know that their auditor/contractor received special energy-efficiency training, 70% of partial participants (28 of 40) said it was very important in deciding to pursue an audit, and 52% of full participants (24 of 46) said it was very important in deciding to pursue a retrofit. In addition, 69% (25 of 36) of full participants noted that knowing about the contractor's training gave them confidence in the contractor's knowledge, and 19% (7 of 36) said it gave them confidence in the quality of the contractor's work.
- ***Marketing through market actors (along with word-of-mouth) drove participant leads.*** As discussed, 57% of partial participants (33 of 58) initially learned of the program through auditors/contractors or their advertising. Similarly, 56% (53 of 95) of homeowners who completed retrofits were initially contacted about the program through an auditor/contractor or their advertising.

7. Views on Rebates and Loans

Alabama program managers and implementers expected easy and straightforward access to rebates and loans to reduce first-cost barriers, thereby motivating homeowners to seek energy audits and to make substantial energy-efficiency improvements to their homes. This section presents the study's findings regarding rebates and loans. The findings draw upon a combination of homeowner survey results and market actor interviews.

- ***Rebates are critical drivers of homeowner participation in the program, including reimbursement of the audit cost upon achieving 20% savings.*** In Alabama, 42% of full participants (36 of 85) considered the rebate very important in deciding to undertake a retrofit.

[44] Because respondents were screened at the outset of the full participant survey to verify they had made at least some energy-efficiency improvements to their homes after completing home energy audits, Cadmus assumed respondents who said they did not implement any of the recommended measures opted to implement measures other than those recommended by their auditor.

Forty-six percent of partial participants (11 of 24) said the rebates made making home improvements much more likely, and 42% (10 of 24) said rebates made this somewhat more likely.

- ***The loan product was not a primary driver of retrofits.*** Sixty-eight percent of partial participants (13 of 19) knew the program offered low-interest loans for energy-efficiency retrofits. Only one of 19 respondents (5%) said the availability of low-interest loans would make them much more likely to undertake a retrofit; 74% (14 of 19) said the availability of low-interest loans would *not* make them more likely to undertake retrofits.

  Only 15% of full participants (5 of 33) knew of the program loans, and 29% of those (2 of 7) said the loans influenced their decisions to undertake retrofits.

8. Participant Satisfaction

Homeowner satisfaction indicates whether homeowners perceived that the program ran smoothly, received the services—and level of services—they expected, and would likely recommend the program to others. This section draws on partial participant and full participant survey results to present evaluation findings about participant satisfaction.

- ***The majority of (but not all) partial and full participants would very likely recommend the program to others.*** Most participants were very satisfied with their program experiences, as shown in Table 31.

Table 31. Participant Likelihood to Recommend the Program to Others

Responses	Partial (n=24)	Full (n=93)
Very likely	63%	77%
Somewhat likely	25%	17%
Not too likely	13%	3%
Not at all likely	0%	2%
Total*	**100%**	**100%**

*Total may not sum to 100% due to rounding.

- ***Participants were largely satisfied with the sign-up process and wait times.*** A large majority (43 of 56, or 77%) of partial participants were very satisfied with the sign-up process. Most partial participants (47 of 57, or 82%) were very satisfied with the time between signing up and receiving their home energy audit, with 63% (34 of 54) of respondents saying it took less than two weeks.
- ***Partial and full participants were very satisfied with the performance and knowledge of the auditors/contractors they worked with through the program.*** The majority of full participants (81 of 93, or 87%) were very satisfied with the contractor's retrofit work, and a large majority of full participants (89 of 91, or 98%) reported that the contractor retrofitting their home could answer all of their questions. Additionally, every partial participant (57 of 57) reported that their auditor/contractor could answer all of their questions, and 84% (48 of 57) were very satisfied with their auditor's work.

9. The Importance of Energy Efficiency in Selling and Buying Homes

The Multi-State Project theory postulated that trained and knowledgeable real estate professionals and appraisers could, over time, educate homebuyers and sellers about energy efficiency and make it a more salient factor in home buying and selling. The Alabama program began this process by offering training sessions to real estate professionals and appraisers in the target areas. The findings addressing this topic are based on stakeholder interviews and homeowner survey results.

- ***Many professionals in the residential real estate community took part in program trainings.*** Forty-three appraisers attended courses about appraising green homes, and 51 real estate professionals attended Earth Advantage's Sustainability Training for Accredited Real Estate Professionals (S.T.A.R.).
- ***Program training provided an effective introductory education for real estate professionals and appraisers regarding energy efficiency and home audits.*** All 10 real estate professionals and appraisers interviewed said they elected to take the free course offered by AlabamaWISE because green building interested them, but they did not know much about it. However, participation in the training did not necessarily equate with greater awareness of the AlabamaWISE program.

  Following the course, only two of the interviewees said they knew of AlabamaWISE. One respondent, an appraiser, learned of AlabamaWISE by attending the course and eventually became a homeowner program participant. The second respondent, a real estate professional, had already participated in AlabamaWISE as a homeowner before attending the course.
- ***E-mails to appraisers and real estate professionals through local associations served as an effective means of recruitment.*** All nine appraisers and real estate professionals said they heard about the free course through e-mail. One appraiser who attended training in both Birmingham and Huntsville noted the Birmingham training provided more in-depth, hands-on training.
- ***The AlabamaWISE real estate professional and appraiser trainings helped initiate a broader effort in Alabama to engage these market actors.*** The real estate professional and appraiser trainings in Alabama funded through the Multi-State Project were very successful from Nexus' and ADECA's perspective, as the trainings often filled to capacity. Based on this interest, ADECA provided Nexus with additional funding—outside of the Multi-State Project—to organize another round of training.[45] Through a competitive process, Nexus selected Earth Advantage to deliver an additional six real estate professional and six appraiser trainings in regions of the state outside of the AlabamaWISE territory. These trainings, which also received strong attendance, ran from April through August 2013.
- ***Though these market actors supported energy efficiency, they continue to wait for the energy-efficiency market to grow before they will actively promote it.*** Participants appreciated the content of the course, but noted they thought it would take time for the concepts to take hold in the broader real estate community, and they had not yet applied the knowledge gained from the course. Many market actors said they thought their knowledge would prove more applicable

[45] ADECA's U.S. State Energy Program formula grant provided this funding.

to the new construction market than the existing home market. One appraiser said ENERGY STAR homes have become more common in Huntsville, and it is important for appraisers to be aware of these trends. He also noted that, at the time of the interview, not enough ENERGY STAR or certified energy-efficient homes existed to generate a meaningful source of comparable sales. Real estate professionals noted the MLS sometimes listed average utility bill costs or energy-efficiency features. Interviews with real estate professionals, however, indicated the industry inconsistently used "green" or "energy-efficient" in describing home features, and many interviewees incorrectly considered EPS equivalent to ENERGY STAR.

- ***A majority of homeowners would take energy costs into account when buying a new home.*** Nine of 12 (75%) homeowner participants who indicated they would likely shop for a new home in the next five years said they would likely to ask about the home's energy costs and energy efficiency.

10. Program Sustainability

One goal of the Alabama program was to permanently and sustainably transform the market for home energy improvements. Program stakeholders also sought to deliver the program through community-based public-private partnerships during and after the grant. The process evaluation findings related to sustainability are as follows.

- ***Though utilities could potentially drive energy efficiency in Alabama, they have not yet engaged in the market and, given the lack of regulatory direction, are unlikely to do so in the foreseeable future.*** AlabamaWISE serves customers of over half-a-dozen Alabama electric and gas utilities. Alabama Power offers a few energy-efficiency programs. Many TVA distributors qualify to offer TVA's energy-efficiency programs in their service territories, but they have been slow to implement the programs. AlabamaWISE hoped to develop stronger partnerships with utilities to implement and promote the program, but found it difficult to even obtain customer energy data until very late in the project.
- ***SEP funding increased the profile and level of local energy-efficiency activities.*** Receiving the SEP grant from ADECA enabled Nexus to add training for appraisers and real estate professionals, enhance its community outreach, and expand its geographic reach. The knowledgeable, trained, and program-supported auditors/contractors proved critical to many homeowners' decisions to undertake retrofits. The SEP funding also resulted in increased business for auditors/contractors.
- ***The AlabamaWISE program lacks a long-term funding source, though stakeholders are actively pursuing a few local partnerships and municipal funding possibilities.*** Program staff reported they endeavored to establish connections with the municipalities in which they work, hoping to receive future municipal funding. While, to date, no municipal budget has been allocated to Nexus, program staff recently developed a partnership with The CornerStone Initiative, a Huntsville organization focused on improving the comfort and reducing the operating costs of low-income multifamily dwellings. AlabamaWISE and The CornerStone Initiative created The Comfort Project, which currently works on retrofitting single-family homes.

5.2 Conclusions and Recommendations

During the course of this study, Cadmus collected information about the Alabama program from many perspectives—including State Energy Office staff, program implementers, homeowners, auditors/ contractors, real estate professionals, appraisers, lenders, and utility staff. While it is too early to assess whether the program achieved all of its desired short- and long-term outcomes (as identified in the Figure 1 logic model), Cadmus can assess the program's successes and challenges in seeking those goals. This section summarizes and synthesizes findings from the evaluation activities and provides key conclusions and recommendations for the Alabama program as it continues serving the state's residential retrofit market.

Program Targets

Conclusion: The program faced unrealistic audit and retrofit targets. Though meeting the targets would have been challenging under any circumstances, two factors made reaching them even more difficult: first, the Alabama program launched just as the economy was beginning to recover from a serious recession; and, second, minimal energy-efficiency infrastructure existed in the target regions.

Conclusion: Designing and implementing a new energy-efficiency program, especially those in regions where none have previously existed, is a challenging and time-consuming effort which involves the coordination of many stakeholders. Factors beyond the control of program designers and program implementers (such as local or regional economic conditions) can render the roll-out of a new program even more difficult. However, the SEP-funded portion of the program benefited from the earlier roll-out of the HuntsvilleWISE program, enabling a faster start-up.

Recommendation: When developing goals and timelines for a new program, account for: existing infrastructure (e.g., the presence of a trained workforce); infrastructure remaining to be developed; and the likelihood of collaborative partnerships in the community. The program timeline and targets should reflect these conditions.

Collaborative Partnerships

Conclusion: Although coordination among the many parties involved with the Alabama program initially hindered program operations, it eventually resulted in strong relationships and a sense of common cause among ADECA, SEEA, and Nexus. These strong relationships should prove beneficial when the parties coordinate future endeavors as funding and other resources become available.

Conclusion: The Alabama utilities, with little to no experience with energy-efficiency programs at the time of AlabamaWISE's inception, provided limited support for the program during the grant period. AlabamaWISE staff are unlikely to garner significant utility engagement and support for the program in the near term.

Recommendation: Program implementers should continue to regularly communicate with one another and with regional utilities to investigate further opportunities for growing the energy-efficiency market in Alabama. Implementers also should continue to leverage the fruitful connections they made with Mayor Battle's Energy Huntsville Initiative. While the Energy Huntsville Initiative was originally designed

to promote specific projects, its membership could potentially expand the Initiative's scope to act as a trade association, following the Virginia Energy Efficiency Council model. Such an expansion could position the Initiative to support programs, innovation, best practices, and policies around energy efficiency and to serve as an important regional stakeholder.

Conclusion: A strong auditor/contractor network proved key to program success. Auditors/contractors provided the most likely channel through which full participants entered the program.

Recommendation: Continue to build and support the contractor network and continue to keep them informed of program changes and opportunities.

Conclusion: The presence of Nexus, a local implementer, was important to the program's success. Nexus staff engaged with its community, connected with local energy-efficiency groups, and understood the demographics of its target market. Through their community connections, Nexus staff built a market actor network that became the primary recruitment tool for participants. Furthermore, the local "endorsement" of the contractor network instilled participants with confidence and motivated them to participate in the program.

Recommendation: When developing and implementing a new program, program implementers should leverage existing organizations, infrastructure, and connections as much as possible.

Conclusion: The start-up period specified in the grant did not sufficiently account for the infrastructure needed for Nexus to meet its targets within the specified timeframe.

Recommendation: Program implementers should understand and plan for infrastructure that still must be developed and reflect these conditions in the program goals and timeline. With a new program or approach, for example, program implementers should include a significant amount of time for building relationships, conducting stakeholder outreach, and training market actors (as Nexus did by encouraging auditors/contractors to pursue advanced certifications) before rolling out retrofit activities.

Conclusion: Relying on only one or two, or even four, staff to have all of the necessary skills—such as technical building science, marketing, and accounting knowledge—to run an audit and retrofit program that could render Nexus' ongoing presence tenuous.

Recommendation: Program implementers should consider expanding staff levels and skills, and/or networking and partnering with other organizations that can supply needed expertise. Organizations can share marketing, administrative, and financial services, as well as supplies, space, and other costs. Nexus could consider identifying future members of its Board of Directors based on opportunities for collaboration and cost-sharing that candidates offer.

Market Actors and Program Tools

Conclusion: Some contractors lacked formal program training since they chose not to attend the program's optional training sessions. Nevertheless, these contractors valued the accessibility of Nexus staff to answer and resolve questions.

Conclusion: Although Nexus offered two optional sales training sessions, several contractors who did not attend later expressed interest in sales training.

Recommendation: Program implementers should offer in-person training about the program (rather than depending on e-mail to communicate program rules and processes) and continue offering advanced energy-efficiency and sales training and/or "lunch and learn" sessions, perhaps through SEEA or expert subcontractors. Program implementers could solicit input from auditors/contractors about topics for these trainings to ensure they are well attended and continue to provide value. These services would enable attendees to: further develop their skills and expertise; increase their commitment and buy-in to the program; improve their ability to sell jobs and generate savings; and provide a forum in which to meet other program stakeholders. Furthermore, these services are necessary if Nexus pursues a contractor network fee.

Conclusion: Real estate professional and appraiser training provided an important introduction to energy-efficiency topics for market actors influential in the home buying and selling processes. Almost all real estate professional and appraiser trainees spoke enthusiastically about their experiences and the potential applicability to their work. The success of the AlabamaWISE trainings led to ADECA's offering additional real estate professional and appraiser trainings throughout the state. These market actors, however, did not actively engage in utilizing the knowledge gained from the training.

Recommendation: ADECA and Nexus should explore options to build on their success in this area to continue offering educational courses for real estate professionals and appraisers. Consider convening working groups of trained real estate professionals and appraisers to discuss methods for practically applying knowledge, such as modifications to the MLS listings to recognize energy-efficient homes.

Conclusion: Homeowners generally liked the EPS scorecard and report as well as the energy-efficiency information it conveyed.

Conclusion: EPS software was not used universally by all auditors/contractors, and some were not at all familiar with the EPS tool. Of those who used EPS, some used it selectively: auditors who had already previously invested in another software tool were reluctant to switch software tools and often used EPS only to ensure their clients would receive program rebates.

Recommendation: The selection of program audit and feedback tools must balance administrative, homeowner, and contractor needs. That said, after ensuring the tools' accuracy, the highest priority should be placed on developing mechanisms that most effectively persuade homeowners to take efficiency actions, as this provides the greatest benefit for all parties. Consumer research and/or pilots that test feedback options would provide details about areas that may need improvements. Sharing homeowner enthusiasm for the scorecards with auditors/contractors, demonstrated through evaluations (such as this one), and through evaluation efforts specifically focused on homeowner responsiveness to the tools, could help persuade auditors/contractors to make greater use of the tools.

Additionally, obtaining input from program implementers about the functionality they seek in tools and the amounts they will pay could help prioritize enhancements to current tools.

Conclusion: Since most auditors/contractors used EPS only when they expected a homeowner to qualify for and seek rebates, the project information stored in the AlabamaWISE EPS database is not representative of all homes "touched" by the program. At least two contractors stated they could easily "size up" a home visually to determine if it was a candidate for 20% savings, and that they did so early in the home assessment process. The contractors explained that, in dwellings where they saw potential for 20% or greater energy savings, they used EPS to record findings from the assessment, and they discussed the AlabamaWISE program with the home's owners. In dwellings where they did not see potential for at least 20% energy savings, the contractors said they were less likely to discuss the program with the homeowners: in such cases, the contractors often did not think trying to explain what they considered the program's complex reimbursement process was warranted.

Conclusion: The AlabamaWise program design caused auditors/contractors to use the EPS software modeling function only for homes they deemed likely to achieve the program target of 20% energy savings. This, in turn, contributed to the program's comparatively high audit-to-retrofit conversion rate.

Recommendation: Determine the program's objectives and define the program's reporting requirements during the program design phase. Then provide clear guidance to market actors about program requirements, conduct periodic checks to assess compliance, and make adjustments to program education, reporting requirements, and program tools as needed to improve compliance. Examples include:

- If the program seeks to assess the effectiveness of a software tool, establish program rules and procedures so the software receives the greatest exposure possible and attracts the greatest number of eligible users. More users will therefore be available to provide feedback.
- If a program objective is to gather home characteristics about as many eligible buildings as possible—and the data must be collected by people with varying backgrounds—design the simplest data collection tool possible that is capable of capturing the required data.
- If a program seeks to maximize its participation rate, establish program procedures that identify eligible individuals—and remove ineligible individuals—as early in the sign-up process as possible.

Recommendation: Exercise caution when comparing audit-to-retrofit conversion rates (and other metrics) across programs. Strive to understand each program's assumptions, requirements, and unique characteristics to determine whether an apples-to-apples comparison is appropriate

Marketing and Outreach

Conclusion: Participants learned about the program through contractors, local organizations, and friends and family, but ultimately chose to participate due to rebates.

Recommendation: Though rebates proved the ultimate "hook" to interest homeowners in undertaking retrofits, maintaining and growing an engaged and knowledgeable contractor pool remains critical to the program's ongoing success. Pursue the training opportunities discussed above, emphasizing sales training.

Conclusion: Evaluation findings showed that, while AlabamaWISE operated on a limited budget, it developed creative, locally focused marketing and outreach campaigns. The evaluation findings also indicated the program generally appealed to the targeted demographic: homeowners with higher-than-average incomes.

Recommendation: Nexus may need to alter its marketing messages if the organization hopes to attract a broader swath of homeowners in the targeted regions or in other regions. Messages focusing on controlling home energy costs as energy prices continue to rise, or highlighting the availability of rebates and loans to reduce first-costs, may resonate more with middle-income homeowners. Continued messaging about the improved comfort of retrofitted homes and the health benefits for occupants is also important.

Other relatively low-cost outreach methods that often have been effective in similar programs include: providing participant testimonials in program literature; distributing program information at community events; making program information available at local government offices (e.g., government permitting departments, libraries); providing do-it-yourself, energy-efficiency kits on loan at libraries; and offering tours of homes that completed energy-efficiency retrofits through the program.

Program Sustainability

Conclusion: Targeting customers with higher income levels may limit program growth. Partial participants consistently pointed to cost as a key barrier.

Recommendation: As AlabamaWISE matures, Nexus will likely wish to reach a broader spectrum of homeowners, who may have different decision criteria. This will require changes in program design, from rebate levels and financing products to program marketing messages and delivery. The programs could also consider staging retrofits by promoting lower cost measures to new participants, and later promoting more expensive measures (that may have greater savings potential) to earlier participants. Further consumer research and/or controlled, evaluable pilot efforts could be used to explore barriers and alternative program and marketing designs.

Conclusion: Rebate funding attracted the attention of auditors/contractors and homeowners. Cost was the most-cited reason partial participants did not plan to undertake retrofits and was the most-cited reason full participants chose not to implement all recommended measures. A reduction in rebate funding, especially for the relatively young AlabamaWISE, will likely make it more difficult to retain market actors, recruit new market actors and new homeowners, and encourage participant homeowners to undertake more extensive retrofits.

Conclusion: The program's lack of a sustainability plan puts it in a vulnerable position. While program staff have actively cultivated new partnerships and relationships with municipalities, efforts may need to expand to include private grants and other funding sources.

Recommendation: Continue cultivating local partnerships, such as The Comfort Project, and aggressively expand efforts to seek funding from private sources—local, regional, and national. Continue pursuing relationships with regional utilities.

6 Massachusetts Program

6.1 Overview of the Massachusetts Program

Home MPG is the residential-retrofit initiative offered by the Massachusetts Department of Energy Resources (DOER) in eight Western Massachusetts communities.[46] The initiative builds on the existing utility-sponsored residential-retrofit program, Mass Save, which has successfully operated across the state for a number of years.

Home MPG uses the same basic program structure as Mass Save, including the following program elements:

- No-cost home energy audits.
- Retrofits performed by qualified contractors.
- Financial incentives, rebates, and financing for energy-efficiency retrofits.

The initiative also includes these new program components:

- Energy performance scoring, provided during home energy assessments and following completion of energy-efficiency retrofit work.
- Strategic marketing and outreach, including outreach to homeowners in the pilot area at numerous local events and targeted direct-mail campaigns.
- Use of thermal imaging to help homeowners understand energy use and potential cost-effective efficiency improvements.
- Increased incentive amounts for insulation and increased rebate amounts for selected high-efficiency heating, ventilation, and air conditioning (HVAC) and water heater technologies.
- "Concierge" service to provide homeowners with in-depth technical assistance when they are considering and selecting a new HVAC system.[47]

Home MPG was largely implemented by the Mass Save implementation vendors: Conservation Services Group (CSG) conducted energy audits for homeowners in National Grid's service area,[48] and Honeywell conducted energy audits for homeowners in the Western Massachusetts Electric Company (WMECO) and Columbia Gas service areas. CSG also provided marketing assistance, primarily in the form of direct mail campaigns. DOER hired the Pioneer Valley Planning Commission (PVPC), founded in 1962 and based

---

[46] The following cities and towns are included in the Home MPG initiative: Belchertown, East Longmeadow, Hampden, Longmeadow, Monson, Springfield, Palmer, and Wilbraham.

[47] Home MPG staff began promoting the concierge service in June 2013, through homeowner mailings and auditors conducting energy assessments of participants' homes. Staff at the Center for EcoTechnology (CET) provided concierge service to homeowners by the phone or through site visits. As of March 31, 2014, 83 homeowners had partaken of Home MPG's concierge service.

[48] CSG subcontracts to the CET for Mass Save implementation in the Home MPG pilot area.

in the Home MPG area, to assist with program outreach. PVPC used its existing relationships with local organizations and municipalities to promote the Home MPG initiative through local events.

As part of Home MPG, DOER hired Sagewell, Inc. to perform thermal imaging on 40,000 homes in seven of the eight participating communities.[49] (DOER also provided an opt-out provision.) Homeowners had access to a secure website that stored the thermal images and analyses of their homes, allowing them to "see" their home's inefficiencies. Home MPG mailings to homeowners included information about how to access the images.

In addition to the program components discussed above, Home MPG provided training for real estate professionals and appraisers to help them understand "energy performance" and how it can be integrated into the sales and appraisal processes. Massachusetts considers real estate professional and appraiser education an important step toward integration of energy performance scores into the multiple listing service (MLS) and institutionalization of "energy performance" in the residential real estate market. In total, six trainings focused on the energy performance score, building science, and high-performance homes.

The Leading Edge Academy, a Massachusetts-based broker education school, conducted four courses that offered 93 real estate professionals two continuing education units. Earth Advantage offered two 2-day appraiser trainings for 58 appraisers, who earned 14 continuing education hours for their Massachusetts license renewal. Earth Advantage also offered a third-day appraiser certification course for 20 appraisers who became the first "green" certified appraisers in Massachusetts. Both sets of courses offered background on Home MPG, asset ratings, and legislation and policies that aim to promote adoption of energy-efficient technologies in the residential market.

6.2 Goals

The Home MPG initiative sought to achieve the following key goals:

- Achieve "more and deeper" retrofits than Mass Save has historically achieved in the Home MPG area.
- Promote consumer awareness of home energy performance in the initiative area by providing energy performance scores at home energy assessments and again after implementation of retrofits.
- Improve the audit-to-retrofit conversion rate and persuade homeowners to implement more substantial retrofits than have historically been completed through Mass Save, by providing homeowners with better information and better access to information.
- Through education and training for real estate professionals and appraisers, support a residential real estate market that appropriately values energy performance.

Table 32 shows the targeted and actual numbers of audits and retrofits conducted for the Massachusetts Home MPG pilot.

[49] Monson became a Home MPG community after the thermal imaging was conducted.

Table 32. Program-Specific Targets and Achievements: Massachusetts

Audits	Retrofits		
Cumulative	Cumulative		
Actual*	Actual* **	Number in 20% Savings Portfolio***	Target for 20% Savings Portfolio****
3,228	1,314	756	664

*Total numbers of audits and retrofits are through December 2013. The program still has several more months of its performance period: it is scheduled to end June 30, 2014.

**This is the number of retrofits that were conducted through the Home MPG initiative, including retrofits not counted in the 20% savings portfolio.

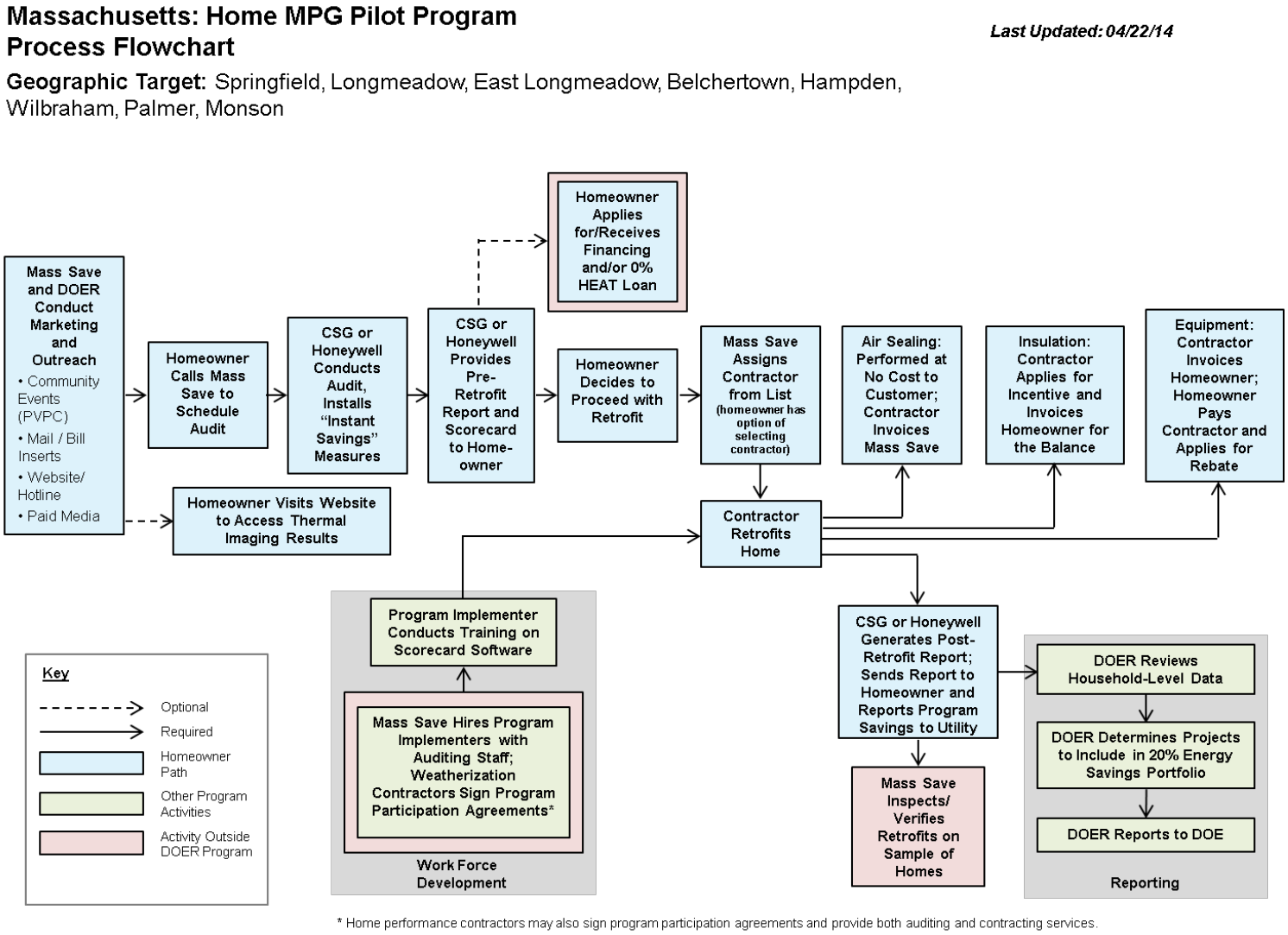
***DOER reported this total to DOE in accordance with DOE's requirement for 20% savings on a portfolio basis. This is the cumulative number of retrofits through December 31, 2013.

****Home MPG's target was based on the period between April 1, 2012, and March 31, 2014.

6.3 Process Flowchart

Figure 4 documents the Home MPG's process flow.

Figure 4. Process Flowchart for Home MPG



7 Massachusetts Findings, Conclusions, and Recommendations

7.1 Key Findings

This section presents the process evaluation findings from document reviews, stakeholder and market actor interviews, and homeowner surveys[50] for the Home MPG program operating under the Multi-State Project in Massachusetts. These findings, which address high-level program administration as well as the research questions described in Section 1.3, are organized by the following topics:[51]

1. Coordination among Massachusetts stakeholders.
2. Implementer support for auditors/contractors.
3. Views of the scorecard and thermal imaging.
4. Participant demographics and motivations.
5. The importance of trained professionals.
6. Views on the Home MPG bonus incentives.
7. The importance of energy efficiency in selling and buying homes.
8. Program sustainability.

1. Coordination Among Massachusetts Stakeholders

DOER implements the Home MPG initiative as an add-on to the existing Mass Save program run by Massachusetts utility companies and their implementers. Home MPG's start-up, implementation, and progress tracking therefore depended on coordination and regular communication among these organizations. Coordination emerged as a key topic discussed with stakeholders during each round of interviews. The findings from these discussions follow.

- ***Adding new software to an existing program—Mass Save—presented early challenges.*** When the pilot launched in the spring of 2012, the auditors used the Earth Advantage Energy Performance Score (EPS) software to generate scorecards for participants in the Home MPG area. However, requiring auditors to use EPS software presented significant challenges. Auditors from CSG and Honeywell, the lead utility vendors implementing the program, already used their respective companies' proprietary software, which included the capability to generate audit reports, among other functions. Since Home MPG required auditors to generate EPS scorecards and reports—in addition to continuing to record information in the CSG and Honeywell databases—auditors had to duplicate much of their data entry, thereby decreasing their productivity. Auditors reported they simply did not have sufficient time to meet their daily audit quotas while generating EPS reports for all audited homes in the Home MPG region.

[50] All Home MPG surveys were conducted with homeowners in the geographic regions served by CSG. National Grid is the electric provider in these regions. Contact information for homeowners in the geographic regions served by Honeywell was not available for this study.

[51] Several of the topics covered in the other states' chapters, namely the importance of being local, views on loans, and participant satisfaction, do not apply to Massachusetts' Home MPG pilot.

Recognizing this hurdle, DOER conferred with CSG and Honeywell to discuss ways to streamline the data entry process and to simplify the provision of scorecards. These discussions resulted in the implementers modifying their software to generate scorecards resembling the EPS scorecard. CSG launched its new software with integrated scorecards in October 2012; Honeywell followed suit in June 2013. DOER staff and CSG and Honeywell auditors reported that the new process was successful. DOER noted, however, that the early software challenges delayed the full launch of Home MPG.

- ***Coordination between DOER and the Mass Save implementers proved crucial and improved over the course of the initiative.*** DOER staff did not have experience working closely with the Mass Save program implementers at the outset of the Home MPG initiative. In fact, CSG and Honeywell were selected by the Massachusetts utilities as Mass Save program implementers after the Home MPG launch. Over the course of the initiative, as coordination and communication between DOER staff and program implementers was established and regularized, Home MPG implementation became smoother.
- ***The timing of Mass Save's residential redesign was an important factor in Home MPG's launch.*** The Mass Save residential program was undergoing major changes when Home MPG was scheduled to begin, which limited the availability of utility and implementer staff to work with Home MPG staff and caused delays in launching the Home MPG initiative. DOER staff believed the pilot would have benefited from closer and earlier involvement with the utilities and program implementers, but recognized that the timing of Mass Save's redesign presented challenges to such involvement.

2. Implementer Support for Auditors/Contractors

Auditors and contractors serve as the primary market actors interacting with participating homeowners. Knowledgeable, trained, supported, and satisfied auditors and contractors therefore proved vital to the success of the Home MPG initiative. Home MPG relied on Mass Save's experienced auditor and contractor networks to implement the program. Since an evaluation of auditors' and contractors' roles in the much larger Mass Save program was beyond the scope of this study, this evaluation focused on the program component unique to Home MPG: auditors' provision of energy scorecards for homeowner participants. The following findings are based on the results of stakeholder and auditor interviews.

- ***Participating auditors had energy-efficiency experience prior to working with Home MPG.*** As discussed, Home MPG worked in conjunction with the long-standing Mass Save program. A strong network of experienced home energy auditors and retrofit contractors was therefore in place prior to Home MPG's launch. All of the auditors Cadmus interviewed reported having been an energy auditor for at least a few years, and some said they had been in the industry much longer.
- ***Home MPG-sponsored trainings prepared auditors to discuss scorecards with homeowners.*** Most of the auditors Cadmus interviewed attended the training provided by Earth Advantage before Home MPG's launch, and also received some informal training from CSG or Honeywell on how to use the implementers' modified software. Most auditors reported the training they

received was useful in helping them explain the scorecard and answer homeowner questions. Three auditors elaborated that they learned more about the software as they used it in the field.

Only one auditor expressed concerns with the training, stating there was insufficient time to cover everything and technical difficulties prevented auditors from interacting directly with the software during the training, making it difficult to get the most out of a session. Another auditor suggested it would have been helpful if the training included information about the range of scores that could be expected for typical homes.

- ***Software modifications improved auditors' experiences with the program.*** As discussed, CSG and Honeywell modified their Mass Save auditing software, enabling it to produce Home MPG scorecards as well as Mass Save reports. Prior to these software modifications, auditors had to enter data into two separate software systems—the existing software used for Mass Save audits and Earth Advantage's EPS software—a process that proved quite time consuming. Two auditors specifically stated that the software modifications made their jobs easier (the others did not address this directly). As one auditor said:

  > Double data entry ate up a lot of time that I could have spent explaining more relevant information. It made me more effective to not have to do it twice, and it gives me more time to explain the score, which is really the priority anyway. It made my job better.

3. Views of the Scorecard and Thermal Imaging

At the outset of the Multi-State Project, steering committee members from Massachusetts, Alabama, Virginia, and Washington collaboratively chose to use the EPS reporting and home-energy scoring tool to: make current energy use more transparent to homeowners; build trust in audit results; and present homeowners with compelling information about recommended energy-efficiency retrofits. Although the Home MPG implementers later developed their own scorecards, DOER's goals for the scorecards remained the same. This section—which presents auditor and homeowner reactions to, perceptions of, and experiences with the scorecard—draws upon market actor and stakeholder interviews and homeowner surveys.

- ***Naming the program "Home MPG" mistakenly led some customers to think that higher home energy scores were better than lower scores.*** Several auditors whom Cadmus interviewed found the name "Home MPG" caused confusion among homeowners.[52] They explained that the acronym MPG (miles per gallon) is most commonly associated with automobiles, where higher ratings are better than lower ratings. With Home MPG, however, lower scores are most desirable. Auditors said the miles-per-gallon concept is counterintuitive to the initiative's energy performance scores and is easily misunderstood. For example, if an auditor tells homeowners their homes are "above average," homeowners may interpret this as good news when, in fact, it is preferable to have a below average Home MPG score.

[52] Two auditors proactively expressed concerns regarding the Home MPG name. After hearing these concerns, Cadmus explicitly asked a third auditor about the name: he agreed that Home MPG confused some of his customers.

- ***Auditors disliked spending extra time inputting scorecard-required data, even after software simplifications.*** Although auditors spent less time on data entry after the CSG and Honeywell software began generating scorecards, the auditors reported they still spent an additional 10 to 20 minutes per house entering the extra data required to produce a scorecard. One auditor further explained that some of the additional required inputs, such as roof reflectance and average window shading, were difficult to determine.
- ***Honeywell's Internet connection requirement resulted in delays in disseminating scorecards to homeowners.*** Honeywell's software system required auditors to connect to the Internet to produce Home MPG scorecards. Because Honeywell auditors could rarely access the Internet while on-site at participants' homes, they typically sent scorecards to homeowners after completing the audit, usually one day to two weeks following the audit.

  CSG auditors, on the other hand, did not require an Internet connection to produce scorecards, and they reported usually being able to present scorecards to homeowners at the time of the audit. Supporting this finding, 74% (37 of 50) of the CSG participants Cadmus surveyed reported that they received their scorecard on the day of the audit.

  Regardless of when they provided scorecards to homeowners, CSG and Honeywell auditors said they left homeowner participants with their phone numbers and e-mail addresses so homeowners could contact them (or their company's customer service staff) with questions about the scorecard.
- ***Most homeowners found the scorecard easy to understand.*** When asked how easy the energy performance scorecard was to understand, all of the homeowners who recalled receiving the scorecard[53] reported it was very easy (35 of 54 respondents, or 65%) or somewhat easy (19 of 54 respondents, or 35%) to understand.

  Despite these self-reported responses, one auditor noted some of his customers had difficulty understanding that the scores were independent of occupant behaviors: that is, the score would be the same regardless of how many people lived in the home. Another auditor thought adding designations such as "great," "good," and "bad" would make the home scores more understandable for participants.
- ***Auditors thought the scorecard provided the right amount of detail.*** Five out of the six auditors Cadmus interviewed reported that the scorecard provided an appropriate level of detail. One stated:

  > I do. I really do [like the scorecard]. It's one of the more nifty things I've seen in all my years doing this. I like it. It's simple and very straightforward.

  Nonetheless, two auditors recounted homeowners having difficulty grasping terminology presented on the scorecard, such as "Btus" and "carbon footprint." One auditor recommended adding graphics to the scorecard to assist homeowners with visualizing energy use reductions: for example, graphics depicting the amount of coal or oil homeowners would save. Another

[53] Eighty-four percent of homeowners (59 of 70) recalled receiving the scorecard as part of their home energy assessment.

auditor disagreed, stating that homeowners were interested in and concerned about their carbon footprint.

- ***Auditor feedback on the reliability of the scores varied.*** When asked whether they thought the scores were reliable, three auditors said yes, two said no, and another did not know.

  Although the homeowner survey fielded in Massachusetts did not include questions about score reliability,[54] one auditor volunteered that many of his customers told him their home energy score was reliable. Another auditor commented that only a few of his customers ever questioned the validity of their score.

- ***Participants reported that information on the scorecard helped them decide to make energy-saving improvements to their homes.*** When asked how useful the scorecard information was in helping them decide to make energy-saving improvements to their homes, 67% of participants (39 of 58) reported that the information was very useful; another 31% (18 of 58) stated that it was somewhat useful.

- ***In contrast to homeowner responses, auditors did not believe the scorecard motivated homeowners to follow through with retrofits.*** Auditor feedback on the scorecard's effectiveness contradicted homeowner reports. When asked whether scorecards were an effective means of motivating homeowners to undergo energy-saving retrofits, four out of six auditors said they did not. As one auditor said:

  > [The scorecard] can be a good tool to make people feel good about the improvements they will make, but money talks and the additional incentives are the big thing people are grasping onto.

  One of the remaining two auditors suggested the colorful appearance of the scorecard was "good," but could be more effective for homeowners if it: "…hit home with what is going on in their neighborhoods." He suggested, for example, that the scorecards show football fields filled with coal equivalent to the amount of energy a homeowner would be saving. The sixth auditor did not offer an opinion, but suggested asking homeowners this question directly.

  Despite these views about the scorecard, when asked for final thoughts about their experiences with the scorecard, one auditor stated he would, "like to see it go statewide, for everyone to have it." Two other auditors expressed the same sentiment when speaking about Home MPG overall.

- ***Of the few participants who recalled receiving post-retrofit scorecards, the majority found the scorecards useful in understanding their homes' energy use.*** Only 31% of the Home MPG survey respondents (22 of 70) that Cadmus surveyed said they received scorecards showing their homes' post-retrofit energy scores; another 33% (23 of 70) were not sure whether they had received new scorecards. Eighty-one percent (17 of 21) of participants who remembered receiving a post-retrofit scorecard found it very useful in helping them understand their home's improved energy use.

[54] To minimize the length of the Massachusetts homeowner survey, it did not include questions about score reliability.

- ***A minority of Home MPG participants knew the initiative offered exterior thermal images of their homes, and very few had viewed their homes' images.*** Ninety-one percent of full participant homeowners Cadmus surveyed (63 of 69) had heard of thermal imaging or infrared scanning. Of those, only 30% (18 of 61) knew a thermal image of their home might be available through Home MPG. Fewer still—only three homeowners—had viewed the thermal image of their home online. Two other homeowners had tried to view the thermal images of their home but found them unavailable.

  Of the three homeowners who viewed their home's thermal images, two reported it was very important in their decision to have a home energy assessment and to make energy-saving improvements. The third respondent said that seeing their thermal images was not too important in deciding to have an energy assessment; this respondent did not know how important viewing the thermal image was in their decision to make improvements.

  Cadmus asked participants who had not viewed a thermal image of their home's exterior how helpful they thought such an image would be. Sixty-three percent of these respondents (40 of 63) reported it would be very helpful, and 29% (18 of 63) said it would be somewhat helpful.

4. Participant Demographics and Motivations

Knowledge of participant demographics can help program implementers understand whether a program reaches its intended target audience. Similarly, comparing participant demographics to the demographics of the general population provides insights about how well participants represent the general population and what segments might be over- or underserved. An understanding of homeowners' motivations to participate or not participate can be used to craft effective marketing messages and can lead to productive changes in program designs to better serve homeowners. The participant demographics and motivations findings primarily drew upon homeowner survey results.

- ***Home MPG participants had higher education and incomes levels than the general population in the target areas.*** Table 33 illustrates the differences between education levels and incomes of Home MPG participants and the general population based on the baseline and participant surveys conducted with homeowners in the program regions.

Table 33. General Population Compared to Participant Education and Income Levels

Responses	Baseline	Home MPG Participants
Education	**n=72**	**n=69**
High school graduate or less	28%	16%
Some college, associate's degree	35%	19%
Bachelor's degree	17%	33%
Graduate or professional degree	21%	32%
Income	**n=55**	**n=56**
$80,000+ per year	22%	43%

- ***Participants most commonly learned of Home MPG through word-of-mouth.*** When asked how they initially learned about Home MPG, 32% of participants (20 of 62) reported hearing of the

program from friends, family members, neighbors, or co-workers. As shown in Table 34, participants also cited bill inserts (11 of 62, or 18%), the Internet (7 of 62, or 11%), and utility/program newspaper advertisements (6 of 62, or 10%) relatively frequently.

Table 34. How Homeowners Initially Learned About Home MPG

Responses	Participants (n=62)
Word-of-mouth	32%
Bill insert from utility	18%
Internet/website/Google	11%
Newspaper advertisement by utility/efficiency program	10%
Local organization	5%
Event	5%
Utility (source not specified)	5%
TV or radio advertisement by utility/efficiency program	3%
Advertising by a participating auditor/contractor	3%
Direct contact with a participating auditor/contractor	3%
Radio (sponsor not specified)	2%
Other	3%
Total	**100%**

- ***Participants most commonly pursued energy audits to learn how to save money on their energy bills.*** As shown in Table 35, the primary reason the majority of respondents (38 of 69, or 55%) chose to get an energy assessment of their home was to learn about ways to save money on their energy bills. Learning how to improve the comfort or health of their home (5 of 69, or 7%) was the second most common response. Respondents also cited: helping the environment (4 of 69, or 6%); learning how to make their energy bills more predictable (4 of 69, or 6%); and learning how to increase the value of their home (4 of 69, or 6%) as their main motivations for getting assessments. Home MPG's plans to pursue partnerships with real estate professionals align well with participant interest in using energy-efficiency improvements to increase the value of their homes.[55]

[55] One respondent, who gave a different primary reason for pursuing an audit, cited learning how to increase the value of her home as a secondary reason.

Table 35. Homeowners' Motivations for Audits*

Responses	Participants (n=69)
To learn ways to save money on energy bills	55%
To learn how to improve the comfort or heath of my home	7%
To learn ways to be more green or do my part to help the environment	6%
To learn how to increase the value of my home	6%
To learn how I can make my energy bills more predictable	6%
It was free or low-cost so I thought I'd give it a try	3%
To learn ways to reduce the country's dependence on foreign oil	1%
To learn how to not waste	1%
It was recommended to me by a friend, family member, or someone else I know	1%
Other	13%**
Total	**100%**

*Respondents were asked: "What was the main reason you decided to get an energy assessment of your home?" Respondents provided open-ended answers. The interviewer determined whether each response fit into a predetermined category and, if not, marked the response "other" and recorded the response verbatim.

**"Other" main reasons participants pursued an audit included: to get more insulation (two respondents); it seemed like the right thing to do (one respondent); to incorporate energy-saving recommendations into an already planned renovation (one respondent); it was time to get rid of the furnace (one respondent); and making improvements similar to those made on a previous home (one respondent).

- ***Participants most commonly made energy-saving improvements to save money on energy bills or to save energy.*** As shown in Table 36, the majority of participants (53 of 70, or 76%) made energy-saving improvements to save money on their energy bills or to save energy. Improving the comfort or health of their home (6 of 70, or 9%) was the second most common motivation for undertaking a retrofit.

Table 36. Homeowners' Motivations for Retrofits*

Responses	Participants (n=70)
To save money on energy bills/To save energy or oil	76%
To improve the comfort or heath of my home	9%
Because it was recommended in the Energy Performance Score report	4%
To not waste	3%
To make my energy bills more predictable	1%
Other	7%**
Total	**100%**

*Respondents were asked: "What was the main reason you decided to make energy-saving improvements to your home?" Respondents provided open-ended answers. The interviewer determined whether each response fit into a predetermined category and, if not, marked the response "other" and recorded the response verbatim.

**"Other" reasons participants made energy-efficiency improvement included: wanted to insulate the attic/thought heat was being lost through the attic (two respondents); because it was free (one respondent); and that they were planning to renovate anyway, so why not follow the recommendations (one respondent).

5. The Importance of Trained Professionals

Because auditors served as the primary market actors interacting with participating homeowners, their ability to adequately explain the scorecard to homeowners proved very important. This section addresses how auditors explained the scorecard to homeowners, provides homeowner feedback about how helpful auditors were in explaining the scorecards, and explains how real estate professionals perceived the training they received. The findings presented here draw upon auditor interviews, participant homeowner surveys, and program documentation. All participants Cadmus surveyed were National Grid customers who worked with the CSG implementation team.

- ***Engagement with homeowners varied by auditor.*** Auditors reported that the program training they received effectively prepared them to discuss the scorecard with homeowners. However, auditors customized their approaches to explaining the scorecard. One auditor, for example, said he usually explained the Home MPG initiative and the scorecard at the beginning of the audit. In contrast, another auditor said he liked to gauge the homeowner's interest before bringing up the scorecard. A third auditor stated he had never provided a scorecard at the time of an audit and never had an opportunity to explain the scorecard to a homeowner.
- ***Participant homeowners were pleased with CSG auditors' scorecard explanations.***[56] Of 84% of survey respondents (59 of 70) who recalled receiving a scorecard as part of their home energy assessment, 92% (54 of 59) said their energy specialist explained the scorecard to them. All of these homeowners said their energy specialists were very helpful (48 of 54, or 89%) or somewhat helpful (6 of 54, or 11%) in providing them with a good understanding of the scorecard information. Of the six homeowners who said their energy specialists were somewhat helpful, four reported they already understood the scorecard before talking with the energy specialist; the other two said they still did not fully understand the scorecard after talking with the energy specialist.

  Furthermore, 91% percent of participants who recalled approximately how much time the energy specialist spent explaining the scorecard to them felt the specialist took the right amount of time (42 of 46). Sixty-five percent of participants (30 of 46) reported the energy specialist spent more than 10 minutes explaining the scorecard.
- ***Homeowners' said they increased their knowledge about how to save energy through their participation in Home MPG.*** When asked how much their experience with the home energy assessment and retrofit processes increased their knowledge about how to save energy at home, 39% of participants (27 of 70) responded a lot, and 49% (34 of 70) said somewhat.
- ***Real estate professionals and appraisers found the training sessions useful, but needed additional training before they could confidently speak about high performance homes with customers.*** According to program documentation, 82% of real estate professionals who attended the trainings said the course material was "quite" or "extremely" useful in their real estate practices. For example, one attendee stated: "This course will change you how see

[56] All of the participants Cadmus surveyed were CSG customers. Thus, the evaluation does include customer feedback about Honeywell auditors.

homes, including your own. Knowledge of energy-efficiency trends in new construction and retrofitting existing homes as well as different standards for home energy ratings can add to your skills set as both a list agent and a buyer agent." All real estate professional attendees said they were interested in learning more and thought that with additional courses they would be able to confidently discuss high performance homes with their clients. Several organizations, including the Newton/Needham Chamber of Commerce and the Eastern Massachusetts Association of Realtors, have expressed interest in hosting additional training sessions to meet the needs of their communities.

Program materials also showed all of the appraiser attendees were very satisfied with the trainings: 100% said they would recommend the course to colleagues and others in the real estate field. Eighty-six percent said they were able to "apply course content to appraisal assignments in the field." One appraiser explicitly stated: "after this class I am able to view real estate listings with a different awareness."

6. Views on the Home MPG Bonus Incentives

- ***Auditors believed the Home MPG bonus incentives provided a strong retrofit motivator.*** Five of the six auditors interviewed found the Home MPG additional incentives very effective at encouraging audit participants to retrofit their homes. One auditor explained that his organization's customers pursued larger retrofit projects through Home MPG than they had previously. He specifically attributed this increased work to the Home MPG insulation incentives.[57] The auditor supervisor stated her organization had seen greater participation; she attributed customers' increased interest in implementing recommended efficiency improvements, at least in part, to Home MPG.

7. The Importance of Energy Efficiency in Selling and Buying Homes

- ***Homeowners thought scorecards would be useful when buying a new home.*** When asked how useful it would be to see an energy performance scorecard for homes they might buy, 74% of the participant respondents (43 of 58) said scorecards would be very useful. Additionally, 6% of participants (4 of 69) said learning how to increase the value of their home was their main motivation for getting a home energy audit (another participant cited increasing the value of their home as a secondary motivation for the audit).

[57] To minimize the survey length, the Massachusetts homeowner survey did not include questions specifically about Home MPG incentives.

8. Program Sustainability

By employing new tools and approaches in the Home MPG initiative, DOER sought to achieve "more and deeper" retrofits than Mass Save participants had historically implemented. At the time of this writing, DOER was still considering how the new tools introduced through Home MPG might be offered beyond the Home MPG initiative or be integrated into the Mass Save program. The process evaluation findings related to sustainability are as follows.

- ***Interest in several Home MPG components exists outside the pilot area.*** DOER staff reported that some communities not included in the initiative expressed interest in being able to offer a scorecard in their regions. In addition, auditors stated:

  > It's a good program. It would be great if some of this stuff applies to all audits.
  >
  > I really like the bonus rebates. Think they need to make those rebates available all across the state.
  >
  > I guess the main thing is the bonus rebates – it's big. That's nice. Shouldn't just be available in towns, should be all across state.

- ***Integrating scorecard capability into the program implementers' audit software is an important Home MPG outcome.*** Program staff believed incorporating the scorecard into CSG's and Honeywell's audit software was an important result of the Home MPG initiative. Because both CSG's and Honeywell's audit software gained scorecard capability during the Home MPG pilot, these program implementers could expand the scorecard's use beyond the Home MPG area. At the time of Cadmus' final stakeholder interviews, expanded use of the scorecard remained under discussion.
- ***DOER is exploring continued scorecard use.*** Program staff believed integrating the scorecard into CSG's and Honeywell's software is important in terms of the scorecard's potential future use in Massachusetts. They reasoned that, as the Mass Save implementation contractors for most of the state, CSG and Honeywell might be able to expand the scorecard's use beyond the pilot area.
- ***The potential benefits of using thermal imaging analysis in future home audit and retrofit programs cannot yet be determined.*** This evaluation gathered very little feedback about thermal imaging analysis in the Home MPG initiative. Until thermal imaging analysis becomes more widely used by homeowners and program implementers, its effectiveness in achieving "more and deeper" retrofits cannot be evaluated.

7.2 Conclusions and Recommendations

During the course of this study, Cadmus collected information about the Massachusetts program from many perspectives, including State Energy Office staff, homeowners, and auditors. While it is still too early to assess whether the program achieved all of its desired short- and long-term outcomes (as identified in the Figure 1 logic model), Cadmus can assess the program's successes and challenges in seeking those goals. This section summarizes and synthesizes findings from the evaluation activities' and provides key conclusions and recommendations for the Massachusetts program if it is to continue serving the state's residential retrofit market.

Program Targets

Conclusion: Home MPG exceeded its target numbers of audits and retrofits. As one of Home MPG's goals was to achieve "more and deeper" retrofits than had historically been completed through Mass Save, one must compare the Home MPG and Mass Save results to assess whether this goal has been realized.

Recommendation: Working collaboratively with representatives from Mass Save, Home MPG staff should analyze whether Home MPG realized a higher conversion rate or deeper energy savings than Mass Save.[58] Such a finding would indicate whether the additional tools offered through Home MPG could be useful in improving residential retrofit programs in Massachusetts and elsewhere.[59]

Conclusion: The relative importance of the Home MPG program elements (e.g., bonus incentives, information homeowners received on the energy performance scorecard, thermal imaging) in motivating retrofits remains unclear.

Recommendation: Home MPG staff should consider conducting focus groups with homeowners to explore the relative importance of the following elements in driving retrofits: incentives, energy scorecard information, thermal imaging information, and other program elements.

Recommendation: If focus groups determine that thermal imaging is likely to drive retrofits, program implementers should use results from the thermal imaging analyses in targeted marketing (i.e., to market Mass Save to customers whose homes are most in need of efficiency upgrades, based on the results of infrared imaging analyses) and make infrared images available to energy specialists prior to energy assessments.

Collaborative Partnerships

Conclusion: Since the Home MPG initiative required changes to the existing Mass Save auditing tools and procedures, coordination between DOER, the utilities, and the program implementers was essential to the successful deployment of Home MPG's tools. The timing of Mass Save's redesign resulted in coordination challenges for the Home MPG stakeholders and initially delayed Home MPG's operations. However, stakeholder coordination improved over the course of the initiative.

Recommendation: Program implementers should continue to regularly communicate with each other and to investigate further opportunities for growing the energy-efficiency market in Massachusetts.

---

[58] This analysis may be complicated by some of Home MPG's rebates being higher than those offered through Mass Save.

[59] Analysis indicating Home MPG had a higher conversion rate or resulted in deeper retrofits than Mass Save would mean a correlation exists between Home MPG's tools and improved program results. Additional analysis would be necessary to show that the improved results could be attributed to Home MPG tools and not to other factors (e.g., demographics differences in the participant populations).

Recommendation: When developing and launching a new initiative, the lead organization should begin coordination with other stakeholders as early as possible. The lead organization should also ask all parties to review, provide input, and agree on program plans.

Market Actors and Program Tools

Conclusion: The program's auditor training succeeded in preparing auditors for discussions about the Home MPG scorecard with program participants.

Recommendation: Home MPG staff should conduct additional training as new auditors are added or as the initiative expands to ensure these client-facing market actors are well equipped to explain the scorecard and answer homeowner questions.

Conclusion: The real estate professional and appraiser communities recognize the growing importance of home energy-efficiency and high performance buildings and are eager to learn more.

Recommendation: Home MPG staff should conduct sessions to train additional real estate professionals and appraisers on home energy-efficiency. Staff should also conduct more in-depth sessions for real estate professionals and appraisers who have taken the initial course and desire to become more knowledgeable and conversant on these topics.

Conclusion: Despite participants' reporting that the scorecard was easy to understand, the scorecard could be made more intuitive and user-friendly. Homeowner interest in and understanding of the technical concepts presented on the scorecard (e.g., Btus, carbon footprints) varied.

Recommendation: If implementers continue using the scorecard, Home MPG staff should consider conducting focus groups with homeowners to identify scorecard elements homeowners find most compelling (i.e., most persuasive in encouraging homeowners to pursue a retrofit) and whether additional, more compelling elements should be added. If information about Btu savings and carbon footprints prove compelling, the focus groups could explore potential approaches to improving homeowners' understanding of these concepts.

Conclusion: Auditors experienced favorable and unfavorable results using the energy performance scorecard.

Recommendation: Home MPG staff should consider conducting focus groups with auditors to explore their perceptions of the scorecard's content (including level of detail), usability, and reliability. The focus groups could also explore auditors' suggestions for improving the scorecard. Home MPG could provide dinner and a financial incentive to encourage auditor participation in the focus groups.

Recommendation: Home MPG should require or encourage implementation contractors to develop software systems (for scorecard-related information) that do not require auditors to connect to the Internet for data entry. This will enable auditors to provide scorecards to homeowners at the time of the audit, thereby facilitating contractor-homeowner discussions and potentially enhancing homeowner understanding of the scorecard.

Conclusion: Though supporting data currently remain very limited, thermal imaging may be an effective means of encouraging homeowners to pursue energy-saving retrofits.

Recommendation: Home MPG staff should consider conducting focus groups with participant and nonparticipant homeowners to gauge customer interest in, comfort with, and understanding of thermal imaging.

Marketing and Outreach

Conclusion: The name "Home MPG" misleadingly implies that high home energy scores, rather than low, are most desirable.

Recommendation: Home MPG staff could consider renaming the initiative, weighing the benefits of name recognition (since the initiative has been in operation for over a year) against the challenges of explaining that, counterintuitively, a low energy score is better than a high score. If staff opt to retain the initiative's name, auditor training should explicitly address this issue by offering suggestions about how auditors can explain "lower is better" (for Home MPG) to homeowners.

Alternatively, Home MPG staff could explore changing the metrics and graphics built into the CSG and Honeywell scorecards.

Conclusion: Word-of-mouth, utility bill inserts, the Internet, or newspaper advertisements served as the most effective means of advertising the initiative. Saving energy and saving money were the primary reasons homeowners decided to undertake energy assessments and make energy-saving improvements to their homes.

Recommendation: Home MPG staff should consider increasing program marketing at local events and highlighting the marketing materials' emphasis on the program's energy- and money-saving aspects. Furthermore, the initiative should maintain an engaged and knowledgeable auditor and contractor workforce and continue building a positive reputation through satisfied customers to sustain effective word-of-mouth advertising.

Conclusion: Honeywell auditors missed opportunities to engage homeowners and fully explain the scorecard since they could not generate scorecards at customer homes where Internet access proved unavailable.

Recommendation: Home MPG staff should work with Honeywell to further enhance the auditing software so that an Internet connection is not required to produce the scorecard. In addition, Home MPG staff should consider requiring program implementers to deliver scorecards to homeowners within a specified number of days after the audit and to follow up with homeowners via telephone or e-mail to ask whether homeowners have questions about the scorecard. Alternatively, Home MPG staff could consider requiring program implementers to deliver scorecards to homeowners at the time of the audit.

Recommendation: Home MPG staff should emphasize to program implementers the importance of engaging homeowners and fully explaining the scorecard to ensure consistent delivery of program messages during each audit.

Conclusion: Home MPG generally appealed to homeowners with higher-than-average incomes and education levels.

Recommendation: Consider altering the program's marketing messages to attract a broader range of homeowners. Messages focusing on lowering or maintaining home energy costs as energy prices continue to rise, or highlighting the availability of rebates and loans to reduce first-costs, may resonate more with middle-income homeowners. Messaging about the improved comfort of retrofitted homes and the health benefits for occupants could also prove effective.

Other relatively low-cost outreach methods that often have been effective in similar programs include: program literature containing participant testimonials; distributing program information at community events; making program information available at local government offices (e.g., government permitting departments, libraries); and offering tours of homes that completed energy-efficiency retrofits through the program.

Conclusion: Energy performance scorecards may be powerful tools for customers interested in buying a new home.

Recommendation: Home MPG staff should move forward with the real estate professional training planned for the spring of 2014 and pursue opportunities to work with the real estate professionals on integrating energy-efficiency information into the real estate marketplace.

Program Sustainability

Conclusion: CSG's and Honeywell's ability to integrate scorecards into their existing auditing software could facilitate offering a scorecard as part of existing home audits in parts of Massachusetts beyond the Home MPG area or as part of other energy-efficiency efforts (e.g., new homes programs, Massachusetts state's stretch code). In fact, DOER is currently exploring opportunities for integrating the scorecard into Mass Save and/or offering it beyond the current Home MPG area.

Conclusion: The additional time required for auditors to generate scorecards as part of home energy audits could inhibit future adoption of the scorecard.

Recommendation: DOER staff should pursue the additional evaluation activities previously suggested (e.g., analytical comparisons of Home MPG and Mass Save, homeowner focus groups, and auditor focus groups) to determine whether the tools introduced by Home MPG increased the audit-to-retrofit conversion rate and resulted in more substantial retrofits. If further evaluation shows the tools to be effective, DOER staff should continue working with the Massachusetts utilities and their implementers to: integrate the scorecard (along with suggested scorecard improvements identified by the focus groups) and increased incentives into the Mass Save program; streamline the scorecard generation process to reduce the impact on auditors' productivity; and/or expand Home MPG's geographic and programmatic scope.

8 Virginia Programs

8.1 Overview of Virginia Programs

The Virginia stakeholders designed their programs to transform the residential retrofit market in five communities: Charlottesville; Arlington County (in Northern Virginia [NOVA]); Richmond; Roanoke; and Blacksburg (the latter two in Southwest Virginia). Three nonprofit Regional Energy Alliances (REAs) operated these programs: the Local Energy Alliance Program (LEAP) in Charlottesville and NOVA; the Richmond Regional Energy Alliance (RREA) in Richmond; and the Community Alliance for Energy Efficiency (cafe^2) in Southwest Virginia. The Virginia Department of Mines, Minerals and Energy (DMME) and the Southeast Energy Efficiency Alliance (SEEA) provided project management services to the REAs.

The Virginia program implementers offered rebates for home energy audits, energy performance scoring, rebates for energy-efficiency retrofits, and a network of contractors certified by the Building Performance Institute, Inc., (BPI) qualified to undertake the retrofit work. Through contracts with DMME and SEEA, the REAs partnered with two organizations to provide market actor training:

1. Earth Advantage trained auditors/contractors on the use of Energy Performance Score (EPS) software. Earth Advantage also trained real estate professionals and appraisers, enabling them to educate customers about the value of energy audits and energy-efficiency retrofits.
2. Advanced Energy (AE)[60] trained contractors on techniques and best practices for making energy-efficiency retrofits to homes.

In addition, the program implementers offered financing mechanisms through local credit unions or other participating lenders. LEAP and RREA delivered retrofits under the federal Home Performance with ENERGY STAR (HPwES) retrofit model. In early 2014, Community Housing Partnerships, the sponsor of cafe^2, began managing a franchise of the Virginia HPwES program under the auspices of LEAP.

To assist the REAs' start-up, operations, and longer-term sustainability, DMME supplemented the SEP grant funds by providing an additional $90,000 for developing a homeowner engagement tool, $500,000 to establish three loan loss reserve funds, and $50,000 for a consultant to develop strategic sustainability plans for the REAs.

The original Virginia performance period ran from October 2010 until September 2013. While the REA activities ended by September 30, 2013, DMME received a performance period extension through the end of May 2014. This extension is being used to establish new SEP revolving loan funds, allowing remaining funds under the Multi-State Project to be used beyond the grant period.

[60] DMME provided the funding for AE's training sessions. SEEA managed AE's training contract and project.

8.2 Differences Among Virginia Programs

Some differences among Virginia's programs stemmed from the local implementers' prior experience with residential energy-efficiency efforts, as follows:

- LEAP, in operation since 2009, is an established REA that runs the Charlottesville program and had an existing residential retrofit organizational infrastructure in place at the beginning of the Multi-State Project. LEAP's establishment was largely due to a DOE Better Buildings Neighborhood Program (BBNP) award funded through the Energy Efficiency and Conservation Block Grant (EECBG) program. LEAP makes use of previously developed marketing channels, including a network of BPI-certified HPwES contractors, and had used home assessment and energy performance scoring tools prior to using the EPS during the Multi-State Project.
- The program in NOVA was established under the Multi-State Project SEP grant. An extension of LEAP's Charlottesville program, the NOVA program operates under the HPwES umbrella.[61]
- RREA—the REA operating in Richmond—was established as a result of the Multi-State Project grant. RREA was incorporated as a non-profit organization in June 2011 and is embarking on efforts within geographic areas where no prior energy-efficiency program infrastructure existed.
- cafe^2, the REA operating in Southwest Virginia, was established in 2011 as a result of the Multi-State Project grant. cafe^2 was spun off from a regional low-income weatherization program, Community Housing Partners (CHP), that has operated for more than 30 years. As with RREA's program, cafe^2's program operates in areas where an energy-efficiency program infrastructure (for a broad range of residential customers) had not previously existed.

The three REAs also strive to reach very different types of target markets. LEAP, in both Charlottesville and NOVA, covers an affluent, educated, and progressive customer base. LEAP Charlottesville operates in a college town, home to the University of Virginia. LEAP NOVA operates in a wealthy suburb of the greater Washington D.C. metro area. In contrast, RREA, located in Richmond, has a very conservative customer base. cafe^2, which operates in Roanoke and Blacksburg, generally reaches a less affluent and less educated customer base in Southwest Virginia.

Additionally, while all four programs include similar elements—partnerships and outreach to market actors (e.g., auditors/contractors, real estate professionals, appraisers, and lenders), homeowner financing for retrofits, rebates, stakeholder engagement (for example, with local governments and utilities), use of the EPS, and the overall process flow—their deployment approaches differ significantly. These differences become apparent when comparing their process flowcharts (presented below). Section 9 discusses differences in other program details.

---

[61] Although the Virginia stakeholders originally intended for a program to operate in the Tidewater area rather than in NOVA, DMME determined that the Tidewater REA did not have the capacity to undertake a program. With strong encouragement from DOE staff, DMME substituted NOVA for the Tidewater region. LEAP then stepped forward and expanded its reach into NOVA. DMME deemed LEAP an appropriate organization to establish and run the NOVA residential program, since LEAP already operated a DOE-funded commercial retrofit project in NOVA.

8.3 Goals

The Virginia programs sought to achieve the following key goals:

- Increase retrofits to a penetration rate of 2% within the target market areas during 2013.
- Permanently and sustainably transform the home energy improvement market by building capacity where retrofit markets were weak and by strengthening capacity where retrofits were already taking place.
- Develop a skilled network of auditors/contractors that adopt and implement standardized construction techniques and metrics.
- Foster self-sustaining, community-based, public-private partnerships (between the REAs and other organizations) to deliver the program during and beyond the grant period.
- Develop regulatory guidance to support a sustainable retrofit environment in Virginia.
- Establish a model that can be replicated by other Virginia communities to increase retrofits, create jobs, save energy, and reduce greenhouse gas emissions.

Table 37 shows the targeted and actual numbers of audits and retrofits for each of the Virginia programs.

Table 37. Program-Specific Targets and Achievements: Virginia

Program	Audits	Retrofits	
	Actual*	Target**	Actual*
LEAP, NOVA***	374	300	81
LEAP, Charlottesville	345	300	88****
RREA	320	330	101
cafe[2]	220	250	86
Total, All Virginia Programs	**1,259**	**1,180**	**356**

*These are the cumulative, actual numbers of audits and retrofits updated at the end of the Virginia program period (September 30, 2013).

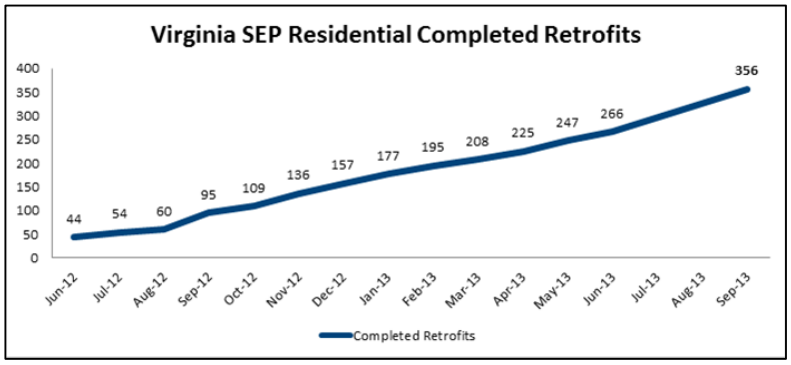
**These are the estimated numbers of retrofits the REAs thought they would be able to complete during the third year of program implementation. The targeted number of retrofits is lower than the 1,350 retrofits initially agreed upon by DOE and DMME.

***Some contractors working in LEAP NOVA recorded their completed audits and retrofits in software programs other than EPS. Consequently, the actual numbers of audits and retrofits shown here for LEAP NOVA are probably lower than the true numbers of audits and retrofits completed through SEP.

****This total only includes retrofits counted toward SEP; it does not include the roughly 1,110 additional retrofits LEAP counted toward BBNP. Including both SEP and BBNP retrofits, LEAP achieved a 3.6% market penetration rate. LEAP staff reported SEP funding played a role in the overall success of the Charlottesville-area program by supporting back office and other program infrastructure.

Figure 5 shows the increase in the Virginia programs' cumulative retrofits over time.

Figure 5. Cumulative Number of Completed Retrofits in Virginia, by Quarter



8.4 Process Flowcharts

Figure 6, Figure 7, Figure 8, and Figure 9 document the process flow of each Virginia program. The blue boxes in each figure show the program steps that directly involve participant homeowners. Although there are variations in implementation, the four programs follow roughly the same process. Homeowners first obtain energy audits to identify opportunities for improving the efficiency of their homes. After reviewing the audit findings and choosing to undergo a retrofit, homeowners select a program contractor (often the auditor and contractor are the same entity) to undertake the retrofit, and apply for financing (if needed). After completions of retrofit work, contractors conduct test-out audits, demonstrating efficiency improvements to the homes. The programs conduct inspections of a portion of the completed retrofit projects to ensure program contractors perform high-quality work. Homeowners then complete rebate forms or sign project completion forms, and program staff mail a rebate check to the homeowners.

The green boxes on the flowchart show the steps, such as auditor/contractor training and data sharing with the utility and SEEA, that do not directly involve participant homeowners.

Figure 6. Process Flowchart for LEAP in Charlottesville, Virginia

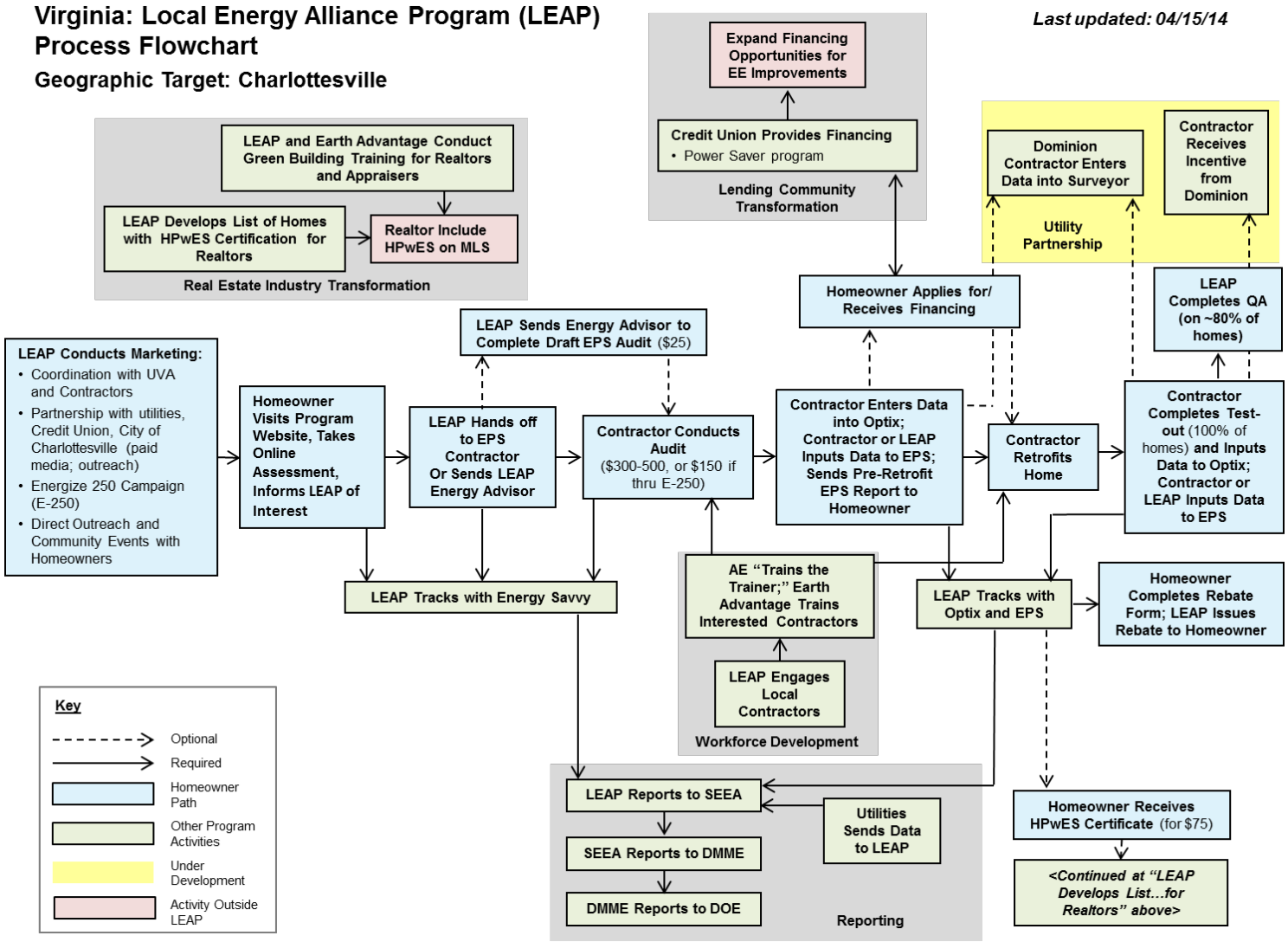


Figure 7. Process Flowchart for LEAP in Northern Virginia

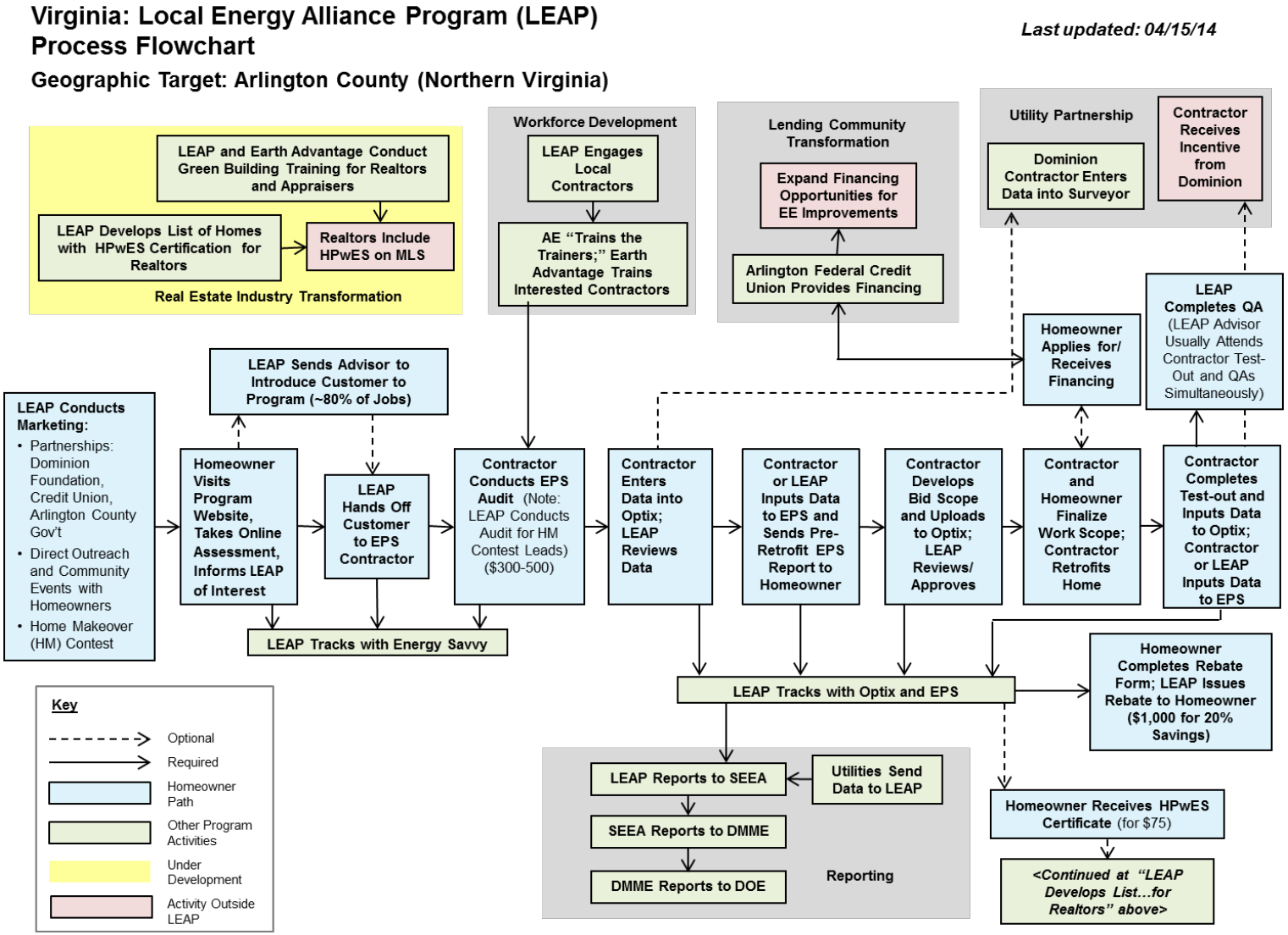


Figure 8. Process Flowchart for RREA in Richmond, Virginia

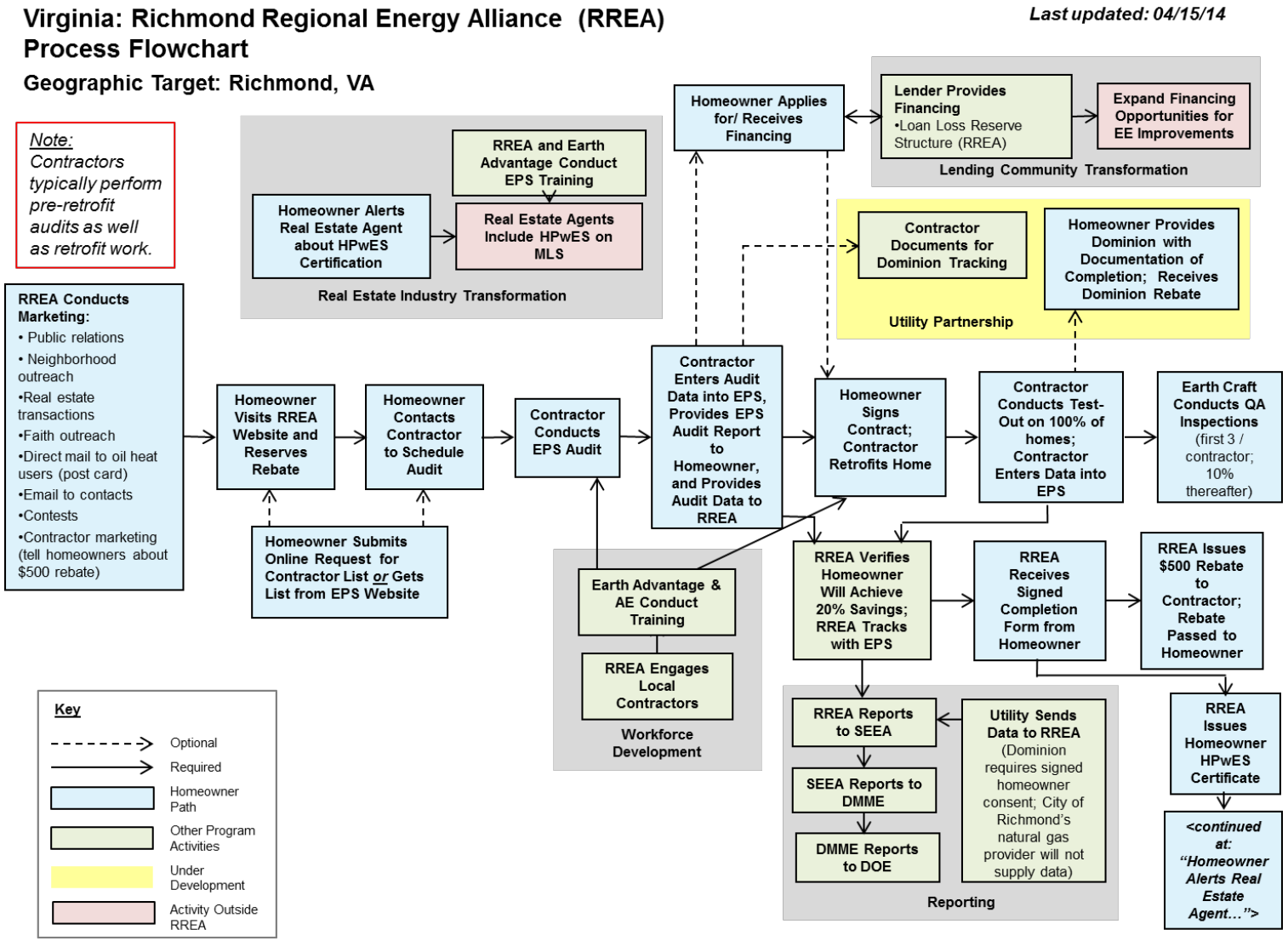
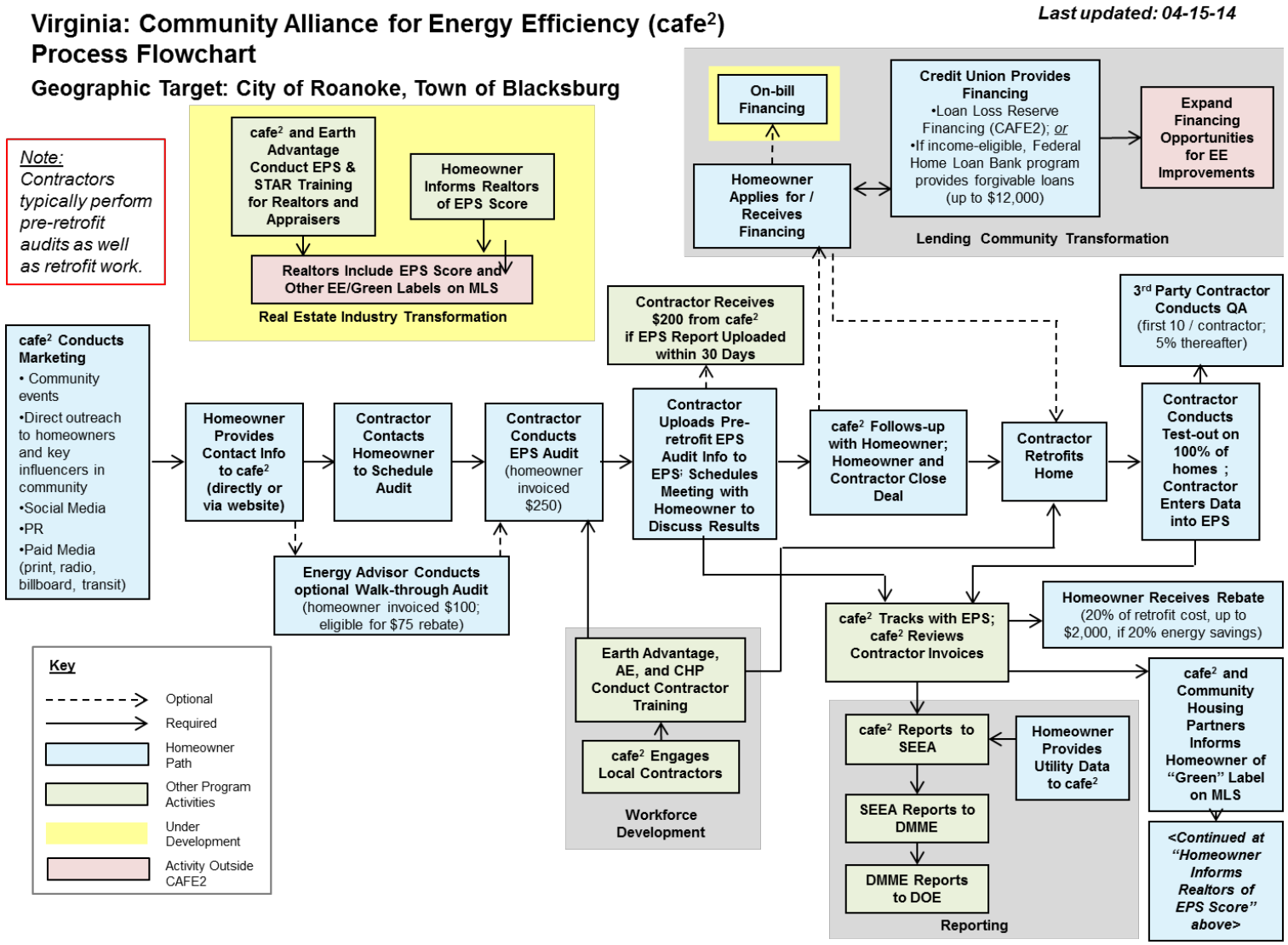


Figure 9. Process Flowchart for cafe^2 in Southwestern Virginia



9 Virginia: Findings, Conclusions, and Recommendations

9.1 Key Findings

This section presents the process evaluation findings from document reviews, stakeholder and market actor interviews, and homeowner surveys for the programs operating under the Multi-State Project in Virginia. These findings, which address high-level program administration as well as the research questions described in Section 1.3, are organized by the following topics:

1. Coordination among Virginia stakeholders.
2. Implementer support for auditors/contractors.
3. Views of the EPS audit and scorecard.
4. The importance of being local.
5. Participant demographics, motivations, and barriers.
6. The importance of trained professionals.
7. Views on rebates and loans.
8. Participant satisfaction.
9. The importance of energy efficiency in selling and buying homes.
10. Program sustainability.

1. Coordination Among Virginia Stakeholders

The four Virginia SEP-funded audit and retrofit programs involved many organizations, including: DMME, the Virginia SEP grant manager; three program implementers; and SEEA and the U.S. Department of Energy (DOE), which provided project management and oversight. The programs' start-up, implementation, and progress tracking depended on coordination and regular communication among these entities. Coordination emerged as a key topic in discussions with stakeholders during each round of interviews. The findings from these discussions follow.

- ***Program complexity, coupled with the number and newness of the implementation organizations, presented early administrative challenges.*** Through Virginia's SEP grant, DOE funded four programs that operated under three implementation organizations. Two of the implementers had recently formed, and the third had just been in existence for a few years. From the start, the programs differed in their administration, implementation, community demographics, level of funding, and other support resources.

  Further complicating the Virginia grant, DMME contracted with SEEA to manage the programs. SEEA, formed in 2007, is also a fairly new organization and, prior to managing the Virginia pilot programs under the Multi-State Project, had limited experience managing grants or projects as complex as the SEP grant. To meet DOE requirements, SEEA devoted considerable time to reporting and accounting for funds. These administrative obligations, coupled with a high level of staff turnover in key positions during the early part of the grant period and SEEA's concurrent management responsibilities for the SEP-funded program in Alabama, resulted in less-than-desired staff time to provide other types of oversight and support to the Virginia programs.

- ***Differences in implementer capacity and experience directly affected program outcomes.*** All three program implementers received very positive reviews from DMME and SEEA, though they had varying levels of experience, staffing, and other resources, and they took different approaches to program implementation. LEAP, with the most experience and the largest staff, completed more retrofits with their SEP grant funding than the other two implementers. However, LEAP's original staffing structure in NOVA, where LEAP was expanding and did not have a strong foundation, proved less effective. LEAP responded by reorganizing and hiring new staff to improve its efforts in NOVA.

  According to state and SEEA officials, the RREA and cafe^2 programs had roughly the same resources and distinguished themselves from one another based on their approach. In Richmond, the program director used more intensive marketing and boosted the program visibility by building community partnerships. For example, RREA organized an Earth Day challenge in which 16 local businesses participated. In Southwest Virginia, the cafe^2 director used a one-on-one approach and dedicated much less time and fewer resources to building local partnerships.

  While the original cafe^2 director was successful in personally persuading homeowners to participate, the number of cafe^2 retrofits was lower than those for LEAP and RREA. (However, cafe^2 hired a new director midway through the grant period and shifted the marketing and outreach approaches to more closely resemble those used by RREA).
- ***Some DOE requirements were challenging for program implementers to meet.*** All four programs struggled to interest homeowners in undertaking the deep retrofits needed to achieve the 20% energy use reduction per participating home that DOE initially required. Program implementers wanted to shape their programs to best assist participating contractors and homeowners, while SEEA's role was to ensure that projects met DOE requirements. Midway through the grant period, DOE acknowledged that the 20% savings per home requirement was difficult for many homeowners to achieve and redefined this requirement to allow for an average of 20% energy savings across all retrofit projects (i.e., DOE allowed for a portfolio average approach). Additionally, changes in program requirements during the grant period affected program operations as these changes had to be communicated to program partners even as these relationships were being formed.
- ***Some planned Multi-State Project approaches also presented challenges for program implementers.*** In their proposal to DOE, the four states planned to use EPS auditing and scoring software. However, auditors/contractors in some regions already had experience with other software tools and were reluctant to embrace a new product. DMME staff and program implementation staff spent considerable time debating the merits of these choices once the programs were operational and alternatives seemed more appealing. Despite these challenges, stakeholders reported that the relationships between SEEA, the program implementers, and DMME remained positive.
- ***Multiple sources of funding resulted in differences between implementers' and granting agencies' perspectives of success.*** One of DMME's and SEEA's objectives was to successfully

complete as many SEP-funded audits and retrofits as possible within program guidelines. LEAP also sought to complete large numbers of audits and retrofits, and simultaneously focused on using multiple funding streams to create a sustainable program after SEP funds expired. LEAP had to balance the SEP requirements with the requirements of their other grants. In addition, because LEAP had multiple funding sources, the organization was less dependent on SEP funds than the other Virginia program implementers and, in some cases, sought opportunities to align SEP requirements with its overall program model to enable more efficient operations. Although LEAP's greater resources and experience helped the organization complete the most retrofits among all of the Virginia programs, integrating LEAP's pre-SEP software tools and program approach into the SEP-funded approach also presented more challenges for DMME and SEEA.

- ***The program implementers generally had cordial relationships with local utilities, but had very limited success engaging large utilities as partners or affecting large utilities' approaches to energy efficiency within the grant period.*** Most Virginia utilities have not actively promoted energy efficiency and did not exhibit interest in participating in the SEP-funded efforts. In addition, the large investor-owned utilities hesitated to start programs they could not offer to their entire service territories and which they would not control.

  The Virginia utilities' lack of experience with energy-efficiency programs may have also led to their limited program design visions. American Electric Cooperative expressed some interest in participating, but required the utility to first file a plan with the Virginia State Corporation Commission. Virginia Tech Utilities spoke with cafe^2 about participating, but their legal structure prohibited them from handling rebate funds from another organization, and they did not know another way to participate. RREA looked for ways to engage its participating trade allies in the limited regional utility programs; as of June 2013, a single contractor was helping homeowners sign up for both the SEP and utility programs.

  Within a segment of LEAP's geographic region, Rappahannock Electric Cooperative (REC) offers free energy assessments and energy-efficiency measure rebates to help high-use residential members reduce their electric consumption. Independent of its work under the SEP grant, LEAP assists REC's program by providing marketing and outreach assistance, technical assistance, client management, and quality assurance. REC also paid LEAP to perform energy evaluations on its behalf.

- ***Program implementers made positive progress in working with a large utility partner immediately after the post-grant period.*** Dominion Virginia Power (Dominion Power), the major provider of electric service within Charlottesville and NOVA, launched its first energy-efficiency program in 2012, but the program did not appear to be connected to SEP activity. However, Dominion Power's residential program ramped-up following the grant performance period. Between mid-September 2013 and March 2014, LEAP performed 900 home energy checkups for Dominion Power. The rebate dollars LEAP receives for this activity are a key source of funding to help sustain the program over the next several years.

- ***The federal grants carried heavy regulatory and reporting requirements, which placed a significant burden on program implementers.*** The REAs are small organizations, with two of the three still in a start-up phase. Because they are just beginning to build their reputations and

relationships and learning to implement programs, they had to rapidly adapt to changing circumstances and early lessons learned.

Although the organizations were able to quickly react to needed program changes, they found the grants restrictive and difficult to manage. In particular, they found the requirement to achieve deep retrofits (20% energy savings) in 2% of the targeted market each year, with very little ramp-up time, an unrealistic goal. Early in the grant period, DOE provided technical assistance in the form of an Oak Ridge National Laboratory demographic study of the target areas. The study's findings enabled DMME (through an amendment to its contract with DOE) to redefine a smaller statewide target market with specific demographic and housing characteristics (i.e., households with moderate to high income and homes of moderate to high value), and the REAs could then target appropriate neighborhoods within their respective service areas. This made the program implementers' targets somewhat easier to achieve, though program implementation staff reported that all stakeholders (including DOE managers) acknowledged that the targets were still quite ambitious.

2. Implementer Support for Auditors/Contractors

Auditors/contractors serve as the primary stakeholders interacting with homeowners in Virginia's programs. Knowledgeable, trained, supported, and satisfied auditors/contractors were therefore vital to the programs' success. This section addresses implementer support for auditors/contractors and largely draws upon results of stakeholder and auditor/contractor interviews.

- ***Word-of-mouth generally offered the most effective means of contractor recruitment.*** In all project areas except NOVA, contractors learned of the programs through word-of-mouth. LEAP's Charlottesville program was the most successful of the four in recruiting contractors (even one RREA contractor became involved in the program through LEAP). However, due to existing relationships through other funding sources and previous program activity, LEAP generally did not need to actively solicit contractors.
- ***All program implementers partnered with auditors/contractors with energy-efficiency experience.*** Program stakeholders reported that auditors/contractors working in all program regions had sufficient business experience and technical skills to manage the type and level of work generated by the program. Contractors for both RREA and cafe[2] had a great deal of weatherization experience, though one RREA contractor had not previously used audit software. Although most LEAP contractors were also very experienced, LEAP worked with and provided additional training and oversight for some contractors who were newer to the energy-efficiency industry.
- ***Auditors/contractors thought program trainings were conducted well, but did always prove necessary or useful.*** Staff for all four Virginia programs instructed participating auditors/ contractors on program-specific rules and requirements and included tips for selling energy efficiency. The programs benefitted from AE support (funded by DOE, DMME, and SEEA) to train auditors/contractors on best practice installations for energy-efficient measures. In addition, LEAP hosted contractor networking events and training webinars. Auditors/contractors working

with the Charlottesville program reported that LEAP's highly advanced technical training was helpful.

Though auditors/contractors in the cafe[2] and RREA programs agreed the training sessions provided useful information and were conducted professionally, they generally reported they did not need technical training. Contractors in these two programs reported already being certified in BPI, Leadership in Energy and Environmental Design (LEED), and other accreditations, and had years of experience with energy efficiency.

- ***Charlottesville auditors/contractors benefited from targeted, local training and networking sessions.*** LEAP hired a local trainer with a strong reputation among local contractors as its technical expert. This organization provided ongoing training and networking sessions so that auditors/contractors could share tips and frustrations regarding energy-efficiency work. Charlottesville's larger network of contractors, with a greater range of experience than the other REAs, helped participants benefit from technical training and from sales and business management insights.
- **All programs increased business for auditors/contractors, but some auditors/contractors said more program marketing was needed.** Though many auditors/contractors conducted energy retrofit work before the programs began, they all reported that the programs—through marketing and providing homeowner rebates—boosted their business to some degree. The Virginia program implementers adopted similar marketing techniques, such as presenting program information at home shows and advertising in local publications and, except for contractors in NOVA, the market actors generally supported the marketing approach used by the program implementers. The REAs' Multi-State Project budgets included very limited marketing dollars, likely contributing to feedback from some contractors who thought more program marketing would have been beneficial.

  Auditors/contractors in the different regions perceived varying levels of program marketing success. LEAP Charlottesville auditors/contractors said program marketing efforts were very effective: one contractor even noted he reduced his own marketing because LEAP "had it covered." Contractors participating in the other programs, however, were disappointed with the programs' marketing efforts and with the number of leads those efforts generated. One contractor noted the leads resulted in smaller projects than he would have found himself. Another contractor said cafe[2]'s approach of intensively guiding every single customer through the process was too narrow and resulted in too few leads. This respondent thought a broader messaging campaign, with less hand-holding and reaching more people, would have been more effective. NOVA contractors said the program implementer should have done more or different marketing.

  Market actors also reported that program marketing helped improve audit-to-retrofit conversion rates, though again, the size of this "boost" varied by program. In Southwest Virginia, several contractors noted that they received a significant number of program leads, and they reported that about half their projects that received program rebates were initiated from program leads. One contractor, however, said the average project size from program-generated leads was roughly one-third the size of leads he generated himself.

NOVA contractors said the leads generated by the program were modest at best. One contractor, active in Maryland, noted he would not have any business in Virginia without LEAP, but the level of activity was insufficient to keep him in Virginia if the program ended. Nevertheless, auditors/contractors used the program for customers they found themselves, indicating that the program helped them close a sale.

Despite disappointments, some auditors/contractors expressed positive feedback about the programs' marketing support. Most contractors participating in RREA and cafe[2] programs reported being satisfied with the program implementers' performance and noted that energy efficiency was "a tough sell" in their areas.

- ***Most auditors/contractors reported high levels of satisfaction with the programs.*** The relatively small numbers of contractors in each program (fewer than five in cafe[2], approximately 10 each in RREA and LEAP NOVA, and over 30 in LEAP Charlottesville) made it easier for staff to keep in touch with them, communicate program design or rule changes, and take more time responding to contractor concerns. The prompt responses and active communication kept most contractors satisfied with the program, even where they disliked particular program aspects or questioned the programs' benefit to their businesses.

  NOVA was somewhat of an exception. For NOVA, LEAP recruited contractors who had participated in Maryland's home performance programs. While these contractors were very familiar with the Maryland programs and with the Maryland program implementer, they did not have previous knowledge of LEAP or its programs. Most of these contractors expressed some frustration with the LEAP NOVA program, seemingly because they compared it to their experience in Maryland, where more substantial rebates were offered. In the words of one contractor: "…our process is fine in Virginia, but the offers are much less [than in Maryland] and it is harder to get people to commit in the first place. That is why I don't do any marketing in Virginia. LEAP does it. I wouldn't have any work in Virginia without LEAP, but I could not have a business based on it…the biggest issue is they have these things you have to do and there is not enough scale to dedicate time to it."

3. Views of the EPS Audit and Scorecard

The four states coordinating under this grant chose to use the EPS auditing and home-energy scoring tool to: make current energy use more transparent to homeowners; build trust in audit results; and present homeowners with compelling information about recommended energy-efficiency retrofits. This section—which presents auditor/contractor and homeowner reactions to, perceptions of, and experiences with EPS—draws upon market actor and stakeholder interviews and homeowner surveys.

- ***Energy-efficiency contractors who had been using other home assessment software were more likely than newer contractors to resist using the EPS software.*** Contractors who had been satisfied with the other home assessment software tools they had been using were generally reluctant to change systems. In developing their proposal to DOE, the four states could use the EPS tools as a "one-size-fits-all" solution, but many auditors/contractors participating in Virginia did not readily adopt it. Though one contractor in Richmond, who had previously conducted audits manually, was happy to learn the EPS system, most other contractors did not want to

abandon the other auditing systems they had been using. However, some auditors/contractors reported that the EPS software did help them sell jobs.

Still, many auditors/contractors viewed their existing auditing tools as perfectly functional alternatives. This especially held true in NOVA, where market actors had no prior experience with the grant or with LEAP, but had considerable experience with energy efficiency. In other parts of the state, a few contractors did not want any software to help them recommend retrofit work scopes to homeowners; based on their experience, they said they could walk into a home and know what needed to be done to achieve the 20% savings required by the grant.

- ***In all regions, contractors reported initial concerns with the accuracy of EPS, mostly due to its weather inputs.*** These concerns were addressed over time. At least one contractor thought EPS was more likely too conservative rather than too generous in its savings estimates. Several contractors noted that Earth Advantage responded to their concerns and improved the accuracy of the EPS software by adjusting it to better reflect mid-Atlantic weather patterns. By 2013, the program implementers expressed significantly fewer and less severe complaints about EPS than they had previously.
- ***While many auditors/contractors ultimately agreed to use EPS to participate in the program, they did not fully embrace it.*** Most auditors/contractors reported they used only EPS' summary page in their presentations to clients. In Southwest Virginia, contractors reported they continued to use their own software to create presentations for customers and used the EPS system only because it was required for customer rebates. In some cases, instead of requiring the auditors/contractors to enter data into EPS themselves, LEAP transcribed data from other systems into EPS.
- ***Many participants found the EPS Energy Analysis Report and scorecard easy to understand and useful.*** Close to 61% of partial participants (48 of 79) and 48% of full participants (22 of 46) found the EPS report very easy to understand.[62] The majority of partial participants (79 of 95, or 83%) found the report very useful in showing the steps they could take to save energy, and 90% (73 of 81) thought the report and scorecard provided the right amount of detail.[63] Further, 72% of partial participants (53 of 74) and 50% of full participants (22 of 44) found the report and scorecard very reliable.

4. The Importance of Being Local

The Multi-State Project theory postulated that homeowners would more likely take action if they could learn about energy audits and retrofits, get their questions answered, and obtain services through trusted local organizations. Cadmus asked homeowners about the importance of using local contractors and also addressed this issue during stakeholder and market actor interviews. Our findings are as follows.

---

[62] DRG asked participants whether the report was very easy, somewhat easy, not too easy, or not at all easy to understand. Seven full participant respondents (15%) replied that they did not remember the scorecard or the report.

[63] The full participant survey did not include these questions.

- ***The programs' local identities enabled them to pursue many successful implementation strategies.*** For strategies on outreach, recruitment, leverage, and other aspects of implementation, program stakeholders relied heavily on the REAs' local identities and networks. REAs effectively used their local status in the following ways:
  - *Leveraging identity as local organization.* Locally based and managed operations meant the implementers already had ties to other businesses and organizations in the area, such as contractors, city government, and other nonprofits and entities. As members of the community, staff were somewhat familiar with their target markets from the outset. Eighty-six percent of partial participants (75 of 87) and 81% of full participants (39 of 48) reported knowing the program was locally run. In Virginia, 67% of both partial and full participants (58 of 86, and 30 of 45, respectively) found this a motivating factor in their decisions to participate. LEAP's lack of a long-standing local presence in NOVA likely contributed to some of the challenges experienced in that area.
  - *Forming a close relationship with auditors/contractors.* Some implementers had established relationships with their partner auditors/contractors prior to the SEP grant period. Additionally, some implementation staff had personal relationships with program contractors. These multilayered networks helped the program implementers more readily navigate the early challenges they faced, such as changes to program design. Due to their locally strong presence, communication occurred in two directions: in addition to programs reaching out to contractors, contractors could easily provide feedback to program staff (e.g., suggestions about making the programs more user-friendly).
  - *Marketing through word-of-mouth and face-to-face outreach and communications.* Community-level marketing and outreach offered the most readily accessible and lowest-cost option for all programs and, except for NOVA, this worked reasonably well. Program implementers used local events (such as the Home Makeover Contest), local radio, yard signs, online ads, and other community-based approaches. LEAP very successfully integrated its mission with other community activities, such as the Energize 250 campaign LEAP operated with the City of Charlottesville. cafe^2 also worked closely with the Town of Blacksburg and the City of Roanoke on residential energy-efficiency initiatives in Southwestern Virginia. In programs with fewer contractors, however, word-of-mouth proved less effective. In these cases, the implementers successfully marketed their programs by working with other organizations and employing a variety of media and materials about the program offerings.
  - *Having flexibility to adapt quickly to elements that worked well and dropping elements that did not*. As nonprofit organizations, all of the Virginia program implementers could shift course as needed without going through extensive approval processes. In a few cases, for example, the nonprofit program implementers shifted staff roles to best match their staff members' skills to program needs. In another instance, stakeholders outside of the program implementation organization applied pressure to a program implementation organization that resulted in a needed staffing change.

- *Forming relationships with key local stakeholders, such as city governments.* Engaging city governments as partners proved very helpful to the program implementers, since the cities offered outreach platforms such as city newsletters and specific mention by city officials. Partnering with city agencies also lent credibility to the programs.

5. Participant Demographics, Motivations, and Barriers

Knowledge of participant demographics can help program implementers understand whether programs reach their intended target audiences. Similarly, comparing participant demographics to the demographics of the general population provides insights about how well participants represent the general population and what segments might be over- or underserved. Understanding homeowners' motivations to participate or not can be used to craft effective marketing and messages and can lead to productive changes in program designs that better serve homeowners. Findings related to participant demographics, motivations, and barriers primarily drew upon homeowner survey results.

- ***Both partial and full participants had higher education—and full participants had higher incomes—than the general population in the target areas.*** Table 38 illustrates differences between educational levels and incomes of partial and full participants and the general population based on the baseline and participant surveys conducted with homeowners in the program regions.

Table 38. General Population Compared to Partial and Full Participant Education and Income Levels

Responses	Baseline	Partial	Full
Education	**n=69**	**n=91**	**n=55**
High school graduate or less	22%	5%	2%
Some college, associate's degree	20%	10%	20%
Bachelor's degree	19%	42%	27%
Graduate or professional degree	39%	43%	51%
Income	**n=56**	**n=75**	**n=50**
$80,000+ per year	54%	43%	70%

- ***Participants most commonly pursued energy audits (Table 39) and retrofits (Table 40) to save money.*** Comfort proved more important to homeowners who completed retrofits.

Table 39. Homeowners' Motivations for Audits*

Responses	Partial (n=97)	Full (n=47)
Save money on energy bill	38%	34%
Improve the comfort or health of home	12%	19%
Be more green or help the environment	8%	9%
It was free or low-cost	6%	0%
Learn not to waste, improve efficiency of home	6%	0%
Ensure future generations have enough energy	3%	4%
Recommended by a friend/family member	3%	2%
Increase the value of my home	3%	2%
Make energy bills more predictable	1%	0%
Other	18%**	30%***
Total	**100%**	**100%**

*Respondents were asked: "What was the main reason you decided to get an energy assessment of your home?" Respondents provided open-ended answers. The interviewer determined whether each response fit into a predetermined category and, if not, marked the response "other" and recorded the response verbatim.
**"Other" main reasons that partial participants pursued an audit included: an old or inefficient home (three respondents), the loan (three respondents), and the rebate (two respondents), among others.
***"Other" main reasons full participants pursued an audit included: wanted to make an already-planned equipment/system replacement more energy efficient (six respondents), the rebate (three respondents), and an old or inefficient home (two respondents), among others.

Table 40. Homeowners' Motivations for Retrofits*

Responses	Full (n=48)
Save money on energy bills	38%
Improve the comfort or health of home	29%
Be more green or help the environment	13%
Learn not to waste, improve efficiency of home	4%
Make energy bills more predictable	2%
Increase the value of my home	0%
Other**	15%
Total* **	**100%**

*Respondents were asked: "What was the main reason you decided to make energy-saving improvements to your home?" Respondents provided open-ended answers. The interviewer determined whether each response fit into a predetermined category and, if not, marked the response "other" and recorded the response verbatim.
**"Other" main reasons participants made energy-saving improvements included: old or inefficient home or one that "needed it" (four respondents), air conditioning or heating units that failed (two respondents), and decided to make an already planned equipment/system replacement more energy efficient (one respondent), among others.
***Total may not sum to 100% due to rounding.

In contrast to these participant findings, 59% (41 of 69) of Virginia homeowners responding to the baseline survey strongly agreed with the statement: "I worry that the cost of energy for my

home will go up;" 49% (35 of 72) strongly agreed that: "saving energy is a very high priority in our home."

- ***Among homeowners who conducted an audit but not a retrofit (partial participants), cost was the most-cited obstacle to making the recommended improvements to their homes (Table 41).*** Partial participants in all income categories frequently mentioned cost when asked about the challenges they expected to face in retrofitting their homes.[64] Close to one-quarter of respondents said they did not face any major challenges to undertaking a retrofit.

Table 41. Partial Participant Barriers to Retrofits*

Responses	Partial (n=77)**
Can't afford it/too expensive	49%
Inconvenient, don't have the time, too busy	16%
Too hard to install/implement	6%
Home has challenges in its construction or age	5%
Challenges with contractors	4%
Concern it will make the house uncomfortable	1%
Other	6%
None/no major challenges	22%

*Respondents were asked: "What major challenges, if any, do you think you will face in making the improvements listed in the home energy assessment report?"
**Multiple responses allowed.

- ***Minimizing cost, ensuring convenience, and selecting measures that provided "enough" of an improvement were full participants' most common explanations for reasons they chose to implement some recommended measures and not others (Table 42).***

[64] Because of too few data points, Cadmus could not test for statistically significant differences in retrofit barriers among partial participants in different income categories.

Table 42. Full Participants' Reasons for Implementing Selected Measures*

Responses	Full (n=39)**
They were the least expensive measures to save energy	64%
These improvements would be enough to save money on energy bill	10%
They were the easiest actions to take	8%
These improvements would be enough to improve the comfort of home	8%
To get the largest possible rebate or tax credit	3%
They are the actions the contractor recommended	3%
I was planning to replace that equipment anyway	3%
I wanted to do something to save the environment	3%
I wanted to stop wasting energy	3%
Other	10%

*Respondents were asked: "What were the key reasons you chose to follow just some of the recommendations from the assessment?"
**Multiple responses allowed.

- ***Contractors struggled to convince homeowners to undertake whole-house retrofits.*** Twenty-six percent (14 of 54) of full participant respondents said they implemented all of the measures recommended in their audit report, and the other 74% (40 of 54) said they implemented just some of the measures. At least some of the difficulties contractors encountered in selling whole-house retrofits resulted from participants' interest in pursuing the least expensive recommended measures and measures that would be sufficient to result in some energy bill reductions (as discussed).

6. The Importance of Trained Professionals

One key premise of the Multi-State Project was that convenient access to trained and engaged market actors (e.g., auditors/contractors) would build homeowner trust and confidence in the programs' offerings and work quality. As shown in the findings below, trained professionals proved to be an important program component.

- ***Knowing the programs worked with trained professionals motivated homeowners to pursue audits.*** When asked how important it was to know that auditors/contractors received special energy-efficiency training, 68% of partial participants (50 of 73) said it was very important in deciding to pursue an audit, and 76% of full participants (31 of 41) said it was very important in deciding to pursue a retrofit.
- ***Auditors/contractors served as primary drivers for the programs, followed closely by program implementation staff.***[65] Forty-one percent (21 of 51) of homeowners who completed retrofits were initially contacted about the program by an auditor/contractor or learned of the program

[65] Both partial and full participant respondents could provide multiple responses to questions about how they initially learned of the Virginia programs; therefore, total percentages may exceed 100%.

through auditor/contractor advertising.[66] In contrast, only 12% of partial participants (11 of 94) reported initially learning of the program through auditors/contractors or their advertising. Partial participants most commonly learned about the programs through word-of-mouth (i.e., a friend, family member, neighbor, or co-worker): 27 of 94, or 29% learned of the program in this way. These findings were supported by the contractor interviews.

7. Views on Rebates and Loans

Virginia stakeholders expected easy and straightforward access to rebates and loans to reduce first-cost barriers, thereby motivating homeowners to seek energy audits and to make substantial energy-efficiency improvements to their homes. This section presents the study's findings regarding rebates and loans. The findings drew upon a combination of homeowner survey results, stakeholder interviews, and market actor interviews.

- ***Rebates are critical drivers of the program.*** In Virginia, 65% (37 of 57) of partial participants said the existence of rebates made it much more likely they would make home improvements, and 65% of full participants (32 of 49) considered the rebates very important in deciding to undertake a retrofit. Contractors reported preferring that program implementers offer higher rebates, because the high rebates helped them sell bigger projects.
- ***Homeowner participation decreased as rebate levels decreased, possibly due to unrealistic market expectations after a period of high rebates.*** The programs started with high rebate levels, and program implementers observed that homeowner interest in the programs waned as rebate levels dropped (i.e., as the programs' grant funding was running out).
- ***Loans made a meaningful contribution to retrofit activity in some program areas.*** Seventy-seven percent of partial participants (67 of 87) were aware that the programs offered low-interest loans for energy-efficiency retrofits. Thirty-three percent (27 of 83) said the availability of low-interest loans would influence their decisions to undertake retrofits, and 45% (37 of 83) said the availability of the loans was not at all important.

  Twenty-eight of the 46 full participant respondents, or 61%, were aware of the program loans. One-third of full participants (12 of 36) said the availability of program loans influenced their decisions to complete a home retrofit.

  Both the Charlottesville and Richmond programs offered residential energy-efficiency loan products. UVA Community Credit Union, the Charlottesville lender, initially promoted a product that was developed with no external funding, and later promoted its federally subsidized PowerSaver loan. UVA Community Credit Union reported that the latter product was sufficiently successful to warrant continuing to offer it. However, the credit union did not provide any specifics in order to protect its market. Though rates on energy-efficiency loans are not necessarily as low as the rates on other products (such as home equity loans), their flexible terms and broad eligibility make them attractive to many homeowners. Stakeholders in that

[66] Thirty-five percent (18 of 51) learned of the program directly from a participating auditor/contractor, and 6% (3 of 51) learned about it from auditor/contractor advertising.

region considered the loans a critical factor for some customers who might not have pursued a retrofit without them.

- ***Though the loan products available in Richmond had only modest activity, staff thought that the projects financed through the program could not have been implemented without the program loan offering.*** These loans were offered by AFC First, who specializes in residential energy-efficiency lending. Like LEAP, RREA staff members have strong relationships with their lender, even though RREA's lender is based in Pennsylvania.
- ***While most stakeholders reported that the Charlottesville loan product only modestly helpful, they said the loans did not serve as a primary driver of retrofits.*** Stakeholders in the RREA program reported a similar experience with that program's loan product, though the program was smaller and made fewer loans.
- ***Lenders must see rapid uptake in a loan product to be willing to invest in it.*** The lender in NOVA started out actively engaged in the program, but, due to low uptake, the staff lost interest. Though the LEAP-lender relationship in NOVA remains positive, the lender has stopped dedicating time or attention to the program.
- ***Similarly, in Southwest Virginia, the program implementer set up a loan loss reserve, but eventually dissolved it due to a lack of interest in the loan product.*** However, they set up a new loan product in mid-2013; its effectiveness will not be known until after this evaluation is completed.
- ***Increased lender understanding of the retrofit program and its benefits can result in better terms for program participants.*** By working closely with the LEAP Charlottesville staff and gaining a thorough understand of their program and the potential for savings, the lender reduced its rates.

8. Participant Satisfaction

Homeowner satisfaction indicates whether homeowners perceived that programs ran smoothly, received the services—and the level of services—they expected, and would likely recommend the program to others. This section draws on the partial participant and full participant survey results to present evaluation findings about participant satisfaction.

- ***The majority of (but not all) partial and full participants would very likely recommend the program to others.*** Most participants were very satisfied with their program experiences, as shown in Table 43.

Table 43. Participant Likelihood to Recommend the Program to Others

Responses	Partial* (n=59)	Full (n=46)
Very likely	76%	85%
Somewhat likely	15%	9%
Not too likely	8%	2%
Not at all likely	0%	4%
Total*	**100%**	**100%**

*Total may not sum to 100% due to rounding.

- ***Participants were largely satisfied with the sign-up process and wait times.*** A large majority (74 of 93, or 80%) of partial participants were very satisfied with the sign-up process. Most partial participants (69 of 93, or 74%) were very satisfied with the time required between signing up and receiving their home energy audit, with 41% of those responding (38 of 92) saying it took less than two weeks.

  Eighty percent of full participants (28 of 35) were very satisfied with the time between their retrofit and receiving their final, post-retrofit home score, which 71% (24 of 34) said took less than one month.
- ***Full and partial participants were very satisfied with the performance and knowledge of the auditors/contractors they worked with through the programs.*** The majority of full participants (45 of 55, or 82%) were very satisfied with the contractor services they received. Almost all full participants (53 of 54, or 98%) reported that the contractor(s) retrofitting their home could answer all of their questions. The vast majority of partial participants (92 of 95, or 97%) also reported that their auditor was able to answer all of their questions, and 85% (81 of 95) stated they were very satisfied with their auditor's work.

9. The Importance of Energy Efficiency in Selling and Buying Homes

The Multi-State Project theory postulated that trained and knowledgeable real estate professionals and appraisers could, over time, educate homebuyers and sellers about energy efficiency and make it a more salient factor in home buying and selling. The Virginia programs began this process by offering training sessions to real estate professionals and appraisers in the target areas. The findings addressing this topic draw upon stakeholder interviews and homeowner survey results.

- ***Many professionals in the residential real estate community took part in program trainings.*** Sixty-six appraisers attended courses about appraising green homes, and 85 real estate professionals attended Earth Advantage's Sustainability Training for Accredited Real Estate Professionals (S.T.A.R.).
- ***Program training provided effective education for real estate professionals and appraisers on energy efficiency and home assessments.*** All three program implementers in Virginia sponsored energy-efficiency trainings for real estate professionals and appraisers to expand the market through a previously untapped channel. The trainings were two-day sessions, conducted by Earth Advantage staff and/or consultants, and intended to educate these market actors about

the value of energy audits and energy-efficiency retrofits. The trainings covered the history of green building, features of green homes and different certifications, and assessments of the market for green homes. They also suggested ways that real estate professionals could present green options to buyers.

Most real estate professionals reported attending the trainings due to their interest in the topics presented; appraisers generally said they attended to learn more about the growing green trend and to obtain continuing education credits. Both sets of attendees said they were very satisfied with the trainings. Several real estate professionals explained that the trainings enabled them to be more conversant about energy-related topics.

- ***Though these market actors supported energy efficiency, they continue to wait for the energy-efficiency market to grow before they will actively promote it.*** Some real estate professionals indicated they would discuss the retrofit programs with sellers, and, when asked, most agreed that the training provided an effective way to learn about energy efficiency so they could promote it to their clients. However, several also said they would not recommend that a seller improve a home's energy efficiency as a way to increase the sale price. Appraisers also stated that it remained difficult to set a value on energy-efficiency improvements due to the lack of comparable properties. In addition, they viewed their role as accurately reflecting the state of the market, not driving the market in a specific direction.
- ***The majority (five of seven, or 71%) of partial participants thought an energy scorecard would be very useful when buying a home.*** However, only 44% (four of nine) of partial participants thought an energy scorecard would be very useful when selling a home.[67]

10. Program Sustainability

One of the overarching goals of the Virginia programs was to permanently and sustainably transform the home energy improvement market. DMME and the Virginia program implementers sought to do this by building capacity where retrofit markets were weak and strengthening capacity where retrofits were already taking place. In addition to fostering the creation or expansion of the Virginia REAs, the program implementers have been striving to forge strong, supportive relationships with other local organizations (e.g., local contractors, government agencies, lenders, and utilities), develop workforce capacity, bolster homeowner demand for energy-efficient homes, and identify new sources of program funding. The process evaluation findings related to sustainability are as follows.

- ***Program implementers who work closely with other local organizations will likely have the greatest resources after the SEP grant period.*** More specifically, program managers and implementation staff all found it critical to engage with local governments. The most successful local program, LEAP Charlottesville, had some of the strongest ties to its contractors, lending partners, local government agencies, and other organizations of all the programs in Virginia.

[67] Since very few partial participants answered these questions, these findings may not be applicable to a broader group of partial participants. The full participant samples for these questions were too small to warrant reporting full participants' responses.

LEAP used its partnerships to augment its rebates, improve the skill base of the local workforce, and garner goodwill.

Working closely with RREA and cafe[2], LEAP has taken a leading role to gain additional funding from DMME to partially fund their operations after the Multi-State Project grant funds are expended. LEAP plans to franchise its programs to the other two program implementers. Together, the three implementation organizations have started building a statewide network to promote energy efficiency.

- ***Though utilities could potentially drive energy efficiency in Virginia, they have exhibited limited engagement in the market.*** Given the lack of regulatory direction, most utilities remain unlikely to significantly ramp-up their energy-efficiency investments in the foreseeable future. For the most part, the REAs had limited success engaging utilities during the Multi-State Project performance period. However, some partnered with smaller utilities in limited ways. For example, LEAP worked with REC to include an insert in customers' bills about the LEAP program. In several other instances, program staff members met with utilities over the course of the grant period. While utilities have been receptive to meeting with SEP program implementers and willing to talk about possible partnerships—ranging from joint marketing to on-bill financing—it seems doubtful that substantial utility resources will become available to the program implementers in the near future. The one positive exception is LEAP's partnership with Dominion Power, which started at the end of the grant period: LEAP is a participating contractor in Dominion Power's Home Energy Checkup program and completed 900 checkups as of the end of March 2014.
- ***Rebates largely drive the programs.*** Contractors noted that their primary interest in the programs was the ability to generate leads, and that leads dropped off after rebate levels fell. If rebates decrease substantially or are no longer available once grant funds end, program implementers may struggle to maintain community interest.
- ***SEP funding increased the profile and level of local energy-efficiency activities.*** Due to SEP activity in Virginia, two new REAs formed and may continue to operate in regions where none previously existed. LEAP, which offered energy-efficiency services prior to the SEP grants, has become stronger and more experienced due to the grant funding. A core component of all of the REAs' missions has been to promote energy efficiency, and all are actively looking for ways to maintain the momentum they created through SEP-funded activities. In addition to striving to maintain or grow audit and retrofit programs in their communities, the REAs have joined together to enhance the efficiencies of their operations and to begin building a more vigorous statewide energy-efficiency movement. In fact, the REAs have been instrumental in forming the Virginia Energy Efficiency Council (VAEEC) during the course of this project. VAEEC is a non-profit with a mission: "to assess and support programs, innovation, best practices and policies which grow Virginia's energy efficiency industry and to provide a forum for stakeholder interaction." VAEEC has a broad base of membership, including program implementers, utility representatives, and energy services contractors.

9.2 Conclusions and Recommendations

During the course of this study, Cadmus collected information about the Virginia programs from many perspectives—including State Energy Office staff, program implementers, homeowners, auditors/contractors, real estate professionals, appraisers, lenders, and utility staff. While it is still too early to assess whether the Virginia programs achieved all of their desired short- and long-term outcomes (as identified in the Figure 1 logic model), Cadmus can assess the programs' successes and challenges in seeking those goals. This section summarizes and synthesizes findings from the evaluation activities and provides key conclusions and recommendations for the Virginia programs as they continue serving the state's residential retrofit market.

Program Targets

Conclusion: The programs faced unrealistic audit and retrofit targets. Though meeting the targets would have been challenging under any circumstances, two factors made reaching them even more difficult: first, the Virginia programs were initiated just as the economy began to recover from a serious recession and, second, minimal energy-efficiency infrastructure existed in some of the target regions.

Conclusion: Designing and implementing new energy-efficiency programs, especially those in regions where none have previously existed, is a challenging and time-consuming effort that involves the coordination of many stakeholders. Factors beyond the control of program designers and program implementers (such as local or regional economic conditions) can render the roll-out of new programs even more difficult.

Recommendation: When developing goals and timelines for a new program, existing infrastructure (e.g., the presence of a trained workforce) should be accounted for, as should infrastructure remaining to be developed and exogenous factors. The program timeline and targets should reflect these conditions.

Collaborative Partnerships

Conclusion: Although coordination among the many parties involved with the Virginia programs initially hindered program operations, it eventually resulted in strong relationships and a sense of common cause among DMME, SEEA, and the REAs. These strong relationships should prove beneficial as the parties coordinate future endeavors as funding and other resources become available.

Recommendation: Program implementers should continue to regularly communicate with one another and to investigate further opportunities for growing the energy-efficiency market in Virginia.

Conclusion: A strong auditor/contractor network proved key to program success. Auditors/contractors provided the most likely channel through which full participants entered the program.

Recommendation: Continue to build and support the contractor network and to inform them of program changes and opportunities.

Conclusion: Local implementers who are engaged with their communities, have existing market actor networks, and understand the demographics of their target market, are important to the success of

community-based programs. For example, LEAP excelled in Charlottesville, where the organization was most familiar with the community and had a relatively strong local presence, but struggled with the program start-up in the NOVA market, where LEAP did not have an existing network.

Recommendation: When developing and implementing new programs, program implementers should leverage existing organizations and infrastructure, such as the presence of a trained workforce, as much as possible. Additionally, program implementers should understand and plan for infrastructure that still must be developed and reflect these conditions in the program goals and timeline. With a new program or approach, for example, program implementers should build in a significant amount of time for building relationships and conducting stakeholder outreach before rolling out retrofit activities.

Conclusion: Relying on only one or two staff to have all of the necessary skills—such as technical building science, marketing, and accounting knowledge—to run a successful audit and retrofit program made some of the Virginia programs vulnerable.

Recommendation: Program implementers should consider expanding staff levels and skills and/or networking and partnering with other organizations that can supply needed expertise. Organizations can share marketing, administrative, and financial services, as well as supplies, space, and other costs. Cadmus understands that the Virginia program implementers have started the early phases of proceeding along these lines. RREA, cafe^2, and LEAP are joining efforts to best take advantage of each organization's strengths: specifically, RREA and cafe^2 have signed a memorandum of understanding to implement HPwES as part of LEAP's HPwES sponsorship.

Market Actors and Program Tools

Conclusion: Contractors valued advanced technical training, marketing support, and networking opportunities. These services likely increased their commitment and buy-in to the program, as well as their ability to sell jobs and generate savings.

Recommendation: Program implementers should continue to offer advanced energy-efficiency training, perhaps through SEEA or expert subcontractors. Program implementers could solicit input from auditors/contractors about topics for these trainings to ensure the trainings are well attended and continue to provide value.

Conclusion: The EPS database helped DMME and SEEA maintain comparable project information across multiple programs. Furthermore, homeowners were generally positive about the EPS scorecard and report. Still, most auditors/contractors did not want to change their approaches, many had challenges or concerns with using EPS, and none of the auditors/contractors we interviewed in Virginia planned to continue using EPS after the Multi-State Project ends.[68]

[68] As of September 2013, the Virginia program implementers were revising their business models and program implementation plans. In future versions of the programs, some auditors/contractors may use CakeSystems software (the updated version of the EPS software tool provided by Earth Advantage).

Recommendation: The selection of program audit and feedback tools must balance administrative, homeowner, and contractor needs. That said, after ensuring the tools' accuracy, the highest priority should be placed on developing mechanisms that most effectively persuade homeowners to take efficiency actions, as this provides the greatest benefit for all parties. Consumer research and/or pilots that test feedback options would provide details about areas that may need improvement. Sharing homeowner enthusiasm for the scorecards with contractors, demonstrated through evaluations (such as this one) and through evaluation efforts specifically focused on homeowner responsiveness to the tools, could help persuade contractors to make greater use of the tools.

Program implementers should also strive to understand contactors' business models and endeavor to gather contractors' opinions when selecting or upgrading program software and reporting tools. Additionally, obtaining input from program implementers about the functionality they seek in tools and the amounts they will pay could help prioritize enhancements to current tools.

Marketing and Outreach

Conclusion: Evaluation findings indicated that, while all the Virginia REAs operated on limited budgets, they developed creative, locally-focused marketing and outreach campaigns. The evaluation findings also indicated the programs generally appealed to the targeted demographic: homeowners with higher-than-average incomes and higher-than-average levels of education.

Recommendation: The program implementers may need to alter their marketing messages to attract a broader swath of homeowners in the targeted regions or in other regions. Messages focusing on controlling home energy costs as energy prices continue to rise, or highlighting the availability of rebates and loans to reduce first-costs, may resonate more with middle-income homeowners. Continued messaging about the improved comfort of retrofitted homes and the health benefits for occupants is also important. If funding is available, increased rebates could also motivate homeowners in other demographics.

Other relatively low-cost outreach methods that often have been effective in similar programs and could be initiated or continued in Virginia include: incorporating participant testimonials in program literature; distributing program information at community events; making program information available at local government offices (e.g., government permitting departments, libraries); and offering tours of homes that completed energy-efficiency retrofits through the program.

Program Sustainability

Conclusion: Targeting customers with higher education and income levels may limit program growth. Partial participants consistently pointed to cost as a key barrier.

Recommendation: As the programs mature, implementers will likely wish to reach a broader spectrum of homeowners, who may have different decision criteria. This will likely require changes in program design, from rebate levels and financing products to program marketing messages and delivery. The programs could also consider staging retrofits by promoting lower cost measures to new participants, and later promoting more expensive measures (that may have greater savings potential) to earlier

participants. Further consumer research and/or controlled, evaluable pilot efforts could be used to explore barriers and alternative program and marketing designs.

Conclusion: Rebate funding attracted the attention of contractors and homeowners; a reduction in rebate funding, especially for young programs, will likely make it more difficult to retain market actors and to recruit new market actors and customers. Contractors in Virginia reported that program activity decreased significantly after rebates were reduced, and homeowners reported cost as their primary barrier to undertaking energy-efficiency retrofits.

Conclusion: DMME financial support going beyond the SEP grant monies was needed for the development of the homeowner engagement tool, the establishment of loan loss reserve funds, and the development of sustainability plans for the REAs.

Recommendation: The Virginia program implementers have already applied for additional grant funding to support program administration and strategic planning for several more years. Additionally, LEAP has formed a partnership with Dominion Power's Home Energy Checkup program, which allows LEAP to generate monies for sustaining its programs. LEAP also plans to experiment with contractor fees to generate revenue . All of these steps will help to secure funds that can be used for homeowner rebates and for continued program operation.

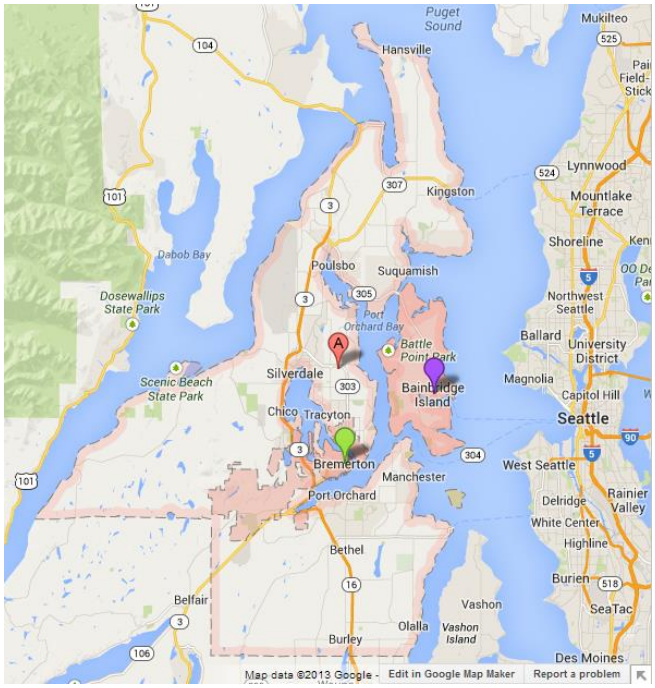
10 Washington Program

10.1 Overview of the Washington Program

RePower Kitsap, an energy-efficiency retrofit program covering large portions of Kitsap County, targeted owners of single-family detached homes and owners of detached multifamily dwellings with up to four living units (referred to here as single-family homes). The Washington State Department of Commerce's (Commerce) SEP grant provided most of the funding. RePower Kitsap also relied on infrastructure developed with funding from another DOE American Recovery and Reinvestment Act (ARRA) grant to Kitsap County. Commerce and the Washington State University Energy Program (WSU Energy Program) jointly oversaw the RePower Kitsap program.

As shown in Figure 10, Kitsap County is located across the Puget Sound from Seattle and has a total of approximately 71,000 single-family homes.[69] Of these homes, 12,100 are within the city of Bremerton (served by RePower Bremerton) and 7,300 are on Bainbridge Island (served by RePower Bainbridge Island [BI]). Puget Sound Energy (PSE) and Cascade Natural Gas (CNG) provide electric and gas services to Kitsap County and offer energy-efficiency incentive programs.[70]

Figure 10. RePower Kitsap, RePower BI, and RePower Bremerton Areas



[69] Census 2000 Summary File 3 (SF 3): Physical Housing Characteristics.

[70] Bainbridge Island is not part of CNG's service territory.

RePower BI launched in March 2011, followed by RePower Kitsap in August 2011 and RePower Bremerton in September 2011. The RePower Kitsap program contracted with CSG, which had been awarded the federal grant for the RePower BI and RePower Bremerton programs. This allowed the three programs to have a similar public face. CSG oversaw energy auditor and contractor coordination, program marketing and branding, a call center, application processing, and other elements of project implementation for the three RePower programs.

RePower Kitsap was originally intended to be available to all homeowners within Kitsap County, including those in the city of Bremerton and on Bainbridge Island. RePower Kitsap's original approach was limited to marketing, community outreach, training, and customer service; this approach did not include any cash incentives to participants. The program's designers intended this "driving demand model" to induce homeowners to obtain comprehensive Energy Performance Score (EPS) assessments at market prices and to perform whole-house upgrades without cash incentives, beyond those offered by local electric and gas utilities.

Independent of RePower Kitsap program funding, Kitsap County supported the delivery of EPS audits with a $350 incentive for test-in EPS audits through November 2012. Though Kitsap County's funding derived from a DOE ARRA grant, the County was an active stakeholder of the RePower program and the County incentivized EPS RePower audits. While RePower Kitsap's original program design did not include cash incentives for participant homeowners, the program did offer a financing mechanism that allowed participants to obtain a program-sponsored loan to cover the cost of energy-efficient retrofits.

Unlike RePower Kitsap approach, RePower BI's model included cash incentives to participants and placed a lesser emphasis on whole-house upgrades. These programmatic differences, coupled with RePower BI's and RePower Kitsap's overlapping market areas and shared implementation contractor (CSG), led program implementers to conclude that operating RePower Kitsap as originally planned was not feasible.

Consequently, in 2011, Commerce and WSU Energy Program realigned RePower Kitsap to better match the RePower BI program and obtained DOE's approval to redraw its target market to eliminate the overlap with RePower BI. RePower Kitsap's new target area included an eligible population of 51,700 single-family homes, shown in the area surrounding the red marker on Figure 10. Furthermore, RePower Kitsap implementers recognized they could not ask homeowners to pay the full price for EPS assessments because Kitsap County offered EPS incentives using unrelated ARRA funds.

The performance period for RePower BI and RePower Bremerton ended December 31, 2013. The performance period for RePower Kitsap originally ended September 2013, but Commerce later extended the DOE grant through the end of June 2014, with public facing elements of the program (e.g., retrofit rebates) concluding at the end of December 2013.

The redesigned RePower Kitsap program offered:

- **For-fee home energy assessments or referrals to a free home energy assessment**. Homeowners contacting RePower Kitsap could obtain a thorough home energy assessment with

EPS (for a fee) or a free HomePrint™ assessment[71] through a referral to PSE. The cost of EPS assessments started at $496 and then increased based on the size of the house. RePower Kitsap offered a limited-time $350 rebate to offset the home assessment cost.

- **Trained trade allies.** RePower trade allies are licensed, insured, and trained to ensure they offer high-quality, energy-efficiency services. Trade allies offering home energy assessments must have a BPI-certified building analyst oversee each assessment and attend certification and training on the EPS audit tool. Weatherization and heating professionals also must be BPI-certified or have a comparable certificate holder overseeing each RePower job.
- **Incentives for energy-efficiency improvements.** Improvements eligible for RePower Kitsap incentives included weatherization (e.g., air-sealing, insulation, duct sealing) and energy-efficient water heaters and HVAC systems. Homeowners with natural gas, electric, oil, propane, and wood heating systems are all eligible for RePower Kitsap incentives. This differs from the utility programs, which offer incentives to customers with natural gas or electric heat, but not to the roughly 10% of Kitsap County customers heating their homes with oil, propane, or wood.

  RePower Kitsap incentives were structured to encourage deeper upgrades than the utility programs by encouraging customers to install more measures. The 2013 program strategy sought to help homeowners qualify for the PSE whole house upgrade program, Home Performance with ENERGY STAR, which had not previously been actively marketed in Kitsap County.

  Program staff adjusted the incentives multiple times during the grant period to attract greater homeowner participation. In early 2013, when RePower Kitsap was slated to end in mid-2013, staff began offering a bonus incentive package to homeowners who attended special promotional events. Recipients could receive $800—double the normal incentive for installing two or more qualifying measures. RePower staff discontinued the bonus incentive in the summer of 2013 once they learned that DOE had granted a six-month extension to the program (i.e., once staff learned they would be expending the program's remaining resources over an additional six-month period). Adjusting again to then-current conditions, the program team relaunched the $400 RePower Reward in September 2013 for homeowners using a RePower contractor to install two or more qualifying measures.
- **Energy-efficiency loans.** RePower Kitsap partnered with two local credit unions—Kitsap Credit Union (KCU) and Puget Sound Cooperative Credit Union (PSCCU)—to offer loans for energy-efficiency improvements. The credit unions each received a loan loss reserve, enabling them to support more attractive lending products than they could have otherwise. The Kitsap County ARRA grant funded one loan loss reserve; Commerce's SEP grant funded the other. CSG provided training and technical support to the credit unions.

Originally, all participant homeowners received their retrofit incentive checks directly from the program. In the spring of 2013, however, RePower began sending incentive checks to the credit unions for participants taking out a program loan. The credit unions then applied the incentive payments to

[71] CSG is also a HomePrint™ Assessment provider for PSE

participants' outstanding loan balances. This service, which program staff say customers appreciated, required a significant amount of coordination between RePower staff and the lenders.

Since all three programs operated similarly, and many market actors participated in more than one RePower program, RePower Kitsap's effects can be difficult to separate from the effects of the other programs. Where the effects are intertwined, Cadmus refers to "RePower" more generically.

10.2 Goals

RePower Kitsap sought to achieve the following key goals: [72]

- Achieve a retrofit rate of 2% of homes in the target area, equivalent to roughly 1,000 homes, by the third year of program operation.
- Perform comprehensive whole-house upgrades in participating homes to reduce their energy consumption by at least 20%.
- Create a knowledgeable and skilled retrofit workforce through training programs.
- Increase consumer demand for energy-efficient homes by educating real estate appraisers on the value of energy efficiency.
- Facilitate development of energy-efficiency financing programs.
- Engage with policy makers to create a regulatory environment that facilitates retrofits.
- Create a more sustainable county.

Table 44 shows targeted and actual numbers of audits and retrofits for the Washington program, as of December 2013.

Table 44. Program-Specific Targets and Achievements: Washington RePower Kitsap

Audits (w/EPS)	Retrofits		
Cumulative	Cumulative	Year 3*	
Actual	Actual	Target**	Actual
306***	606	1,000	437

*RePower Kitsap's Year 3 ran from January 1, 2013 through December 31, 2013.
**The Year 3 retrofit target was established through conversations between RePower Kitsap sponsors and DOE.
***This is the total number of EPS audits only; it does not include PSE HomePrint™ assessments or CSG Home Energy Checkups.

Between 1,200 and 1,400 homes received an EPS audit, a PSE HomePrint™ assessment, a CSG Home Energy Checkup, or some combination thereof. Washington reported a range because EPS audits, PSE HomePrint™ assessments, and CSG Home Energy Checkups were tracked in separate systems, and some overlap occurred.

[72] *Washington State SEP/Better Buildings Implementation Plan*. April 28, 2011 version.

RePower Kitsap had a third year (2013 calendar year) goal of 1,000 retrofits. The program achieved 437 retrofits in 2013. Over the full performance period, RePower Kitsap produced 606 retrofits. Of these upgrades:

- RePower Kitsap directly influenced 277 projects (46%) (i.e., projects where RePower Kitsap provided a RePower Kitsap assessment, audit, or rebate). About 40% of these projects also involved a PSE incentive or assessment.
- PSE supported 161 (27%) upgrade projects where only PSE measure incentives or HomePrint™ rebates were recorded. RePower Kitsap marketing and outreach campaigns helped PSE achieve these results.
- Contractors reported 180 projects (30%) that occurred without RePower Kitsap or PSE incentives or audits. RePower Kitsap may or may not have influenced these projects. Some of these projects may have involved Cascade Natural Gas incentives.

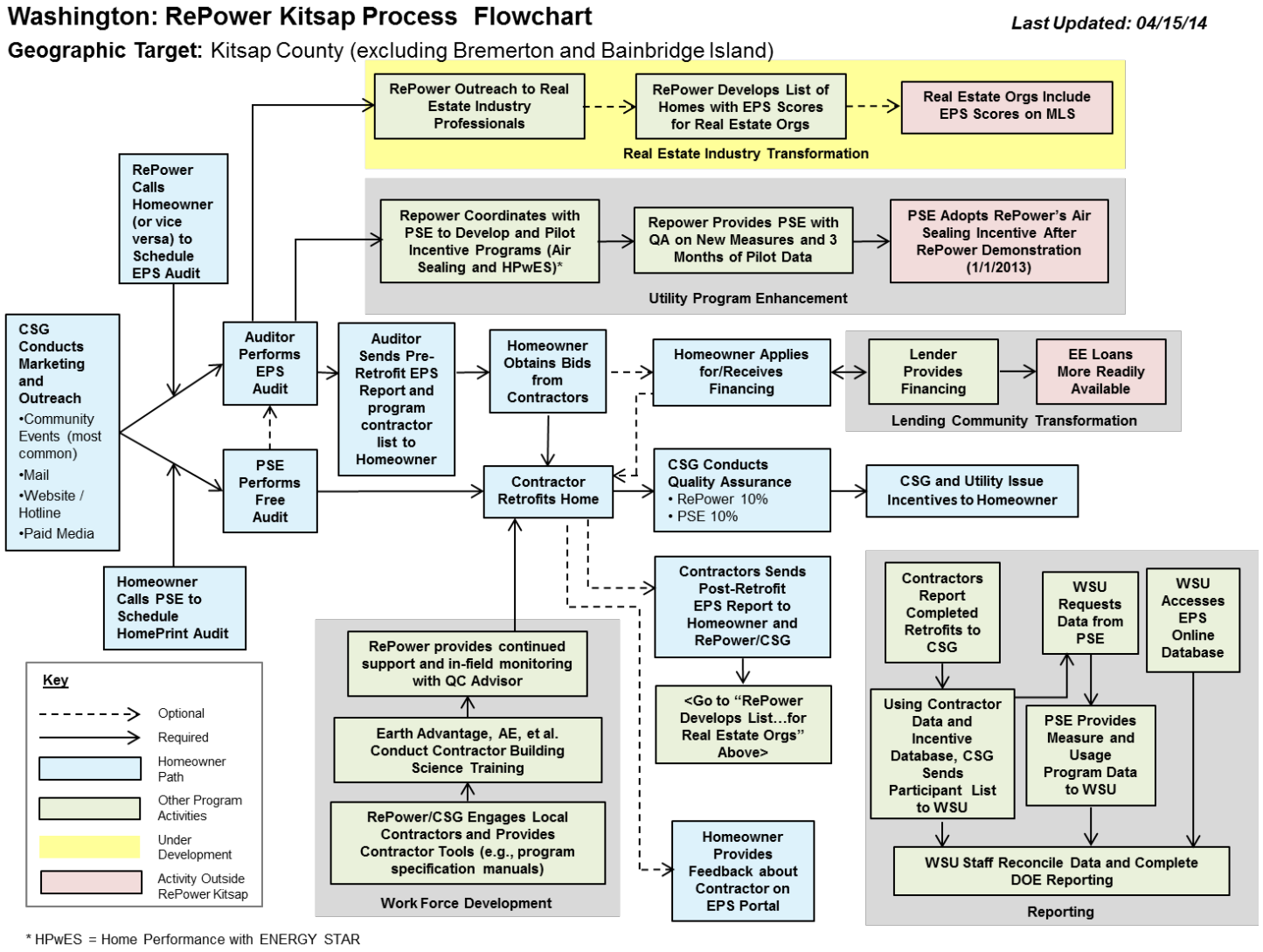
As of October 16, 2013, RePower BI completed 728 of 2,000 targeted retrofits (36%) and RePower Bremerton completed 431 of 1,000 targeted retrofits (43%).

10.3 Process Flowchart

Figure 11 documents the process flow for RePower Kitsap. The blue boxes show the program steps that directly involve participant homeowners. A participant first obtains an energy assessment or audit to identify opportunities for improving the efficiency of their home. Each participant can choose to receive a free HomePrint™ assessment offered through PSE, a more thorough EPS audit offered through RePower Kitsap, or potentially both. Once a participant reviews the home assessment findings and decides to undertake a retrofit, the homeowner obtains retrofit bids from RePower Kitsap's network of trade allies and applies for financing (if needed). After completing the retrofit work, the homeowner submits a reward application to the RePower Kitsap program.

The green boxes on the flowchart show the RePower Kitsap steps, such as contractor training and data sharing with PSE, that do not directly involve participant homeowners.

Figure 11. Process Flowchart for RePower Kitsap



11 Washington Findings, Conclusions, and Recommendations

11.1 Key Findings

This section presents the process evaluation findings from document reviews, stakeholder and market actor interviews, and homeowner surveys for the RePower Kitsap program, operating under the Multi-State Project in Washington. These findings, which address high-level program administration as well as the research questions described in Section 1.3, address the following topics:

1. Coordination among Washington stakeholders.
2. Implementer support for auditors/contractors.
3. Views on the EPS audit and scorecard.
4. The importance of being local.
5. Participant demographics, motivations, and barriers.
6. The importance of trained professionals.
7. Views on rebates and loans.
8. Participant satisfaction.
9. The importance of energy efficiency in home valuation.
10. Program sustainability.

1. Coordination Among Washington Stakeholders

The RePower Kitsap audit and retrofit program involved a number of stakeholders, including: Commerce, the Washington SEP grant manager; WSU Energy Program, which jointly oversaw RePower Kitsap's operation with Commerce; CSG, the RePower BI and RePower Bremerton DOE grant recipient and implementer of all three RePower programs; and PSE, the local utility running the (alternative) HomePrint™ assessment program. RePower Kitsap's start-up, implementation, and progress tracking depended on the coordination and regular communication among these entities. Coordination emerged as a key topic Cadmus discussed with stakeholders during each round of interviews. Findings from these discussions follow.

- ***RePower Kitsap's establishment of a local infrastructure enabling whole-house retrofits was one of the program's greatest accomplishments.*** Program and implementer staff reported that, prior to RePower Kitsap, local contractors viewed one another as competitors. They did not collaborate to provide complementary home retrofit services. Therefore, early RePower Kitsap projects were generally single-measure upgrades since few (if any) contractors had the capability to install multiple types of measures on their own (e.g., contractors specialized in HVAC or insulation/weatherization, but not both). This lack of collaboration presented a barrier to achieving the comprehensive whole-house retrofits (i.e., treating the home's mechanical systems [HVAC] and envelope together) that program staff sought to encourage.

  To address this issue, CSG and WSU Energy Program spent over six months building a collaborative contractor network. They hosted trainings, networking events, lunches (to obtain

feedback on program design), and monthly brown bag discussions to bring contractors together and build good will in the community. They also held two contractor appreciation events.

By 2013, CSG and WSU Energy Program's effect on the contractor community became apparent: more than 50% of all RePower Kitsap upgrade projects included multiple types of measures. In its final technical report to DOE,[73] Washington estimated that homeowners installed an average of 2.5 measures per home through RePower Kitsap, in contrast to the average of 1.4 measures homeowners installed per home through utility-supported upgrades, and the 1.1 measures per home contractors installed without program support. Furthermore, the number of homes in Kitsap County qualifying for Home Performance with Energy Star certification increased from fewer than two per year to 77 in 2013.

Program staff reported contractors teamed up to complete energy-efficiency retrofit projects and worked on establishing a local (West Sound Chapter) of Home Performance Washington, an organization promoting the whole-house energy retrofit industry, which is still in the organizational planning phase. In addition to working on establishing a Home Performance West Sound Chapter, two RePower contractors completed a train-the-trainer course for BPI Basic Weatherization at Olympic College.

- ***WSU Energy Program and CSG staff reported RePower Kitsap's other significant achievement: influencing PSE to adopt an air-sealing measure.*** RePower Kitsap staff recognized air sealing (and duct sealing) as key measures for retrofits of older, leaky buildings. Without proper air sealing, the full benefit of insulation and new HVAC systems cannot be realized. Furthermore, once a building's envelope has been properly sealed and insulated, its HVAC system often can be downsized when replaced, thereby using less energy and extending equipment life. Program staff reported that, prior to participating in RePower Kitsap, many contractors did not understand these concepts and did not communicate them to their customers.

  RePower staff saw an opportunity to raise awareness about air sealing and to influence local energy-efficiency practices by helping PSE incorporate air sealing into its home performance program. Seizing on the opportunity, RePower developed measure calculations and specifications, trained contractors to perform building diagnostics, conducted quality assurance reviews of early air-sealing projects, and shared three months' worth of air-sealing results with PSE.

  Due to this collaboration, PSE adopted air sealing as a new measure in 2013 and can rely on local, knowledgeable contractors to deploy air-sealing measures in homes. RePower staff also reported air sealing has become standard practice for weatherization projects in the region.

2. Implementer Support for Contractors

Retrofit contractors served as important RePower Kitsap stakeholders, interacting directly with participating homeowners. Therefore, knowledgeable, trained, supported, and satisfied contractors

[73] *Final Report for the RePower Kitsap Demonstration Program Strengthening Energy Efficiency Retrofit Market Project.* Washington State University Energy Program, Award Number DE-EE0004447. March, 2014.

proved vital to the program's success. This section, addressing implementer support for contractors, draws upon findings from stakeholder and contractor interviews.

- ***Contractors reported RePower positively affected their businesses, despite the economic downturn.*** Interviewed contractors said their primary motivations for participating were business survival and (potentially) expansion in a down economy. Through the trainings RePower offered and the new customer opportunities RePower created, the program met contractors' expectations. Program contractors said they added or retained staff, gained additional certifications, and/or added new services to their offerings as a direct result of participating in RePower Kitsap.
- ***RePower improved contractor staff's work quality and the overall quality of retrofits regionally.*** Contractors appreciated the RePower trainings, saying information conveyed through the sessions enabled them to adopt new technologies—such as air sealing—and train their staff on best practices. One contractor said RePower's QA process provided valuable feedback that made his staff aware of their shortcomings and improved their service. This contractor continued, saying RePower's QA processes improved the overall industry by removing poor-quality contractors.
- ***Auditors and contractors generally were pleased with participating in the program.*** Two auditors stated they appreciated the support and professionalism of RePower Kitsap. Several auditors liked participating due to the program's ability to improve customers' comfort while helping the environment. Another market actor appreciated that the program gave him an opportunity to discuss best practices with other contractors and to assist them with projects.
- ***Auditor and contractors suggested the program could be improved by streamlining reporting and rebate processing.*** Since homeowners could participate in RePower Kitsap as well as in one of the local utility's programs, a market actor noted he sometimes had to complete redundant paperwork (since each organization had its own set of required forms). Another respondent thought that streamlining the program documentation might enable participating homeowners to complete the program forms themselves, making RePower paperwork less burdensome to the contractors.
- ***Several auditors and contractors expressed concerns that, due to the program's grant-driven nature, jobs created by the program would disappear once the program grant was expended.*** These market actors thought RePower Kitsap would be prematurely discontinued.

3. Views on the EPS Audit and Scorecard

The four states coordinating under this grant chose to use the EPS auditing and home-energy scoring tool to: make current energy use more transparent to homeowners; build trust in audit results; and present homeowners with compelling information about recommended energy-efficiency retrofits. This section—which presents auditor/contractor and homeowner reactions to, perceptions of, and experiences with EPS—draws upon market actor and stakeholder interviews and homeowner surveys.

- ***Contractors experienced usability issues with the EPS software, especially in rural areas.*** While contractors found simple data points easy to enter into the EPS software, they said uploading

documents such as photos or attachments proved to be a very slow process, as each file had to be uploaded one at a time. The contractors reported:

- The auto-save function did not always work, and the EPS software sometimes crashed while in use, resulting in the loss of all the data they had entered.
- The contractors had to perform some manual calculations with the data because the tool did not automatically perform all of the computations they needed.[74]
- The tool is Internet-based, but contractors did not always have reliable Internet access when working in rural areas. Lack of an Internet connection prevented contractors from working with EPS while on site at customers' homes, thereby prolonging the energy assessment process.[75]

- ***Auditors and contractors thought EPS was a good descriptive benchmarking tool and said customers found it helpful.*** Both auditors and contractors said EPS proved useful for presenting assessment results to homeowners, benchmarking participant homes against average homes in the area, and attracting homeowners' interest in pursuing retrofits.

  However, some auditors said EPS was not the modeling tool they needed: they explained that EPS relies on averages and "steer[s] people toward cheaper fixes or incomplete home upgrades" rather than providing results modeled specifically for an individual customer's home. These auditors suggested that EPS would be a more powerful tool if it performed more customized modeling (though they did not discuss the additional data entry that would be required if EPS were to perform more customized modeling).

- ***Many RePower homeowner participants found the pre-retrofit EPS Report easy to understand and useful, but some participants found the post-retrofit report too complicated.*** Roughly 64% of partial participants (18 of 28) and 56% of full participants (five of nine) found the report and scorecard very easy to understand.[76] Almost all partial participants thought the scorecard and report provided the right amount of detail (27 of 28 respondents, or 96%), the majority thought they were very reliable (17 of 28, or 61%), and most thought they were useful in showing the steps homeowners could take to save energy (25 of 29, or 86%).[77] Sixty percent of the full participants (six of 10) found the scorecard and report very reliable.

  Program staff, however, heard complaints from full participants that the post-retrofit report was too long and complicated and that some of the recommended measures provided poor returns on their investments. Program staff recommended simplification of the post-retrofit report, with a focus on positive retrofit outcomes. Due to these customer comments, the program

[74] Earth Advantage designed the EPS software to collect the minimum amount of data needed to produce an accurate home energy score. Contractors who perform Manual J or other complex computations on the homes they audit must do so outside of the EPS software.

[75] One contractor reported that just uploading photos and infrared images to EPS commonly took from 1.5 to 5 hours.

[76] DRG asked participants whether the report was very easy, somewhat easy, not too easy, or not at all easy to understand.

[77] The full participant survey did not include all of these questions.

implementer chose to withhold audit reports from customers unless they were specifically requested and paid for by customers.

- ***EPS audits, coupled with HomePrint™ assessments as a "pre-screening" tool, proved more effective than HomePrint™ assessments alone in selling retrofit and more extensive upgrades.*** Homes receiving EPS audits realized notably higher audit-to-retrofit conversion rates than those receiving only HomePrint™ assessments or other checklist assessments. According to Washington's final technical report to DOE, of 606 upgrades reported to the program through December, 2013: [78]
  - 124 of the homes had received an EPS audit; homes receiving EPS audits had a 40% audit-to-retrofit conversion rate.
  - 103 of the homes had received a HomePrint™ assessment; homes receiving only HomePrint™ assessments had a conversion rate of 11.4%, and homes receiving both HomePrint™ assessments and EPS audits had a 19.7% conversion rate.[79]
  - 32 of the homes had received a CSG or other clipboard audit; these homes had a 27.8% conversion rate.
  - 340 of the homes had received contractor assessments; WSU Energy Program did not calculate a conversion rate for these homes.

  WSU Energy Program staff thought the higher conversion rates for EPS audits may be in part a result of the more intensive support and coaching provided to contractors who used the EPS software. Staff also though the higher EPS conversion rates could also be due to the fact that PSE HomePrint™ assessments and CSG Home Energy Checkups were often used to screen for homes with high potential that were more likely to benefit from a more comprehensive EPS audit; thus, homes with less savings potential, or where homeowners seemed less inclined to pursue retrofits, would be less likely to receive an EPS audit.
- ***WSU Energy Program's level of sophistication in using the full functionality of the EPS software system far outweighed that of the other states, and staff found EPS a valuable administration tool.*** WSU Energy Program staff reported EPS was very valuable for characterizing program-treated building stock. Staff explained that EPS enabled them to identify the most prevalent energy-efficiency issues and to restructure the program to better address those issues.

  For example, by examining the Kitsap County EPS dataset, program staff found whole-house air leakage, duct leakage, and attic insulation as the most commonly deficient building components. Based on this finding, program staff targeted whole-house air sealing as an upgrade measure.

  WSU Energy Program's analysis of EPS data and data from the Kitsap County Assessor's office also found the distributions of homes by construction date in the two datasets closely aligned (both showed roughly 70% of homes built after 1970). WSU Energy Program used the Assessor's

[78] Seven of the homes could not be categorized by assessment type due to insufficient information.

[79] Sixty percent of homes with completed upgrades where an EPS audit had been conducted also received a HomePrint™ assessment.

data—which included information about heating system types, but not heating fuel types—in combination with EPS data—which included information about heating fuel types—to determine that the county had a large number of aging and inefficient mechanical systems in need of upgrades.

The EPS reports also made the QA process more convenient for WSU Energy Program staff. Not only did the reports allow staff to review program data from the office, they also allowed staff to develop software scripts to automatically identify projects as good candidates for on-site QA review and to identify errors in contractor inputs. WSU Energy Program's analysis of the EPS data included logic testing for: extreme energy use values (measured in kWh equivalent); extreme energy intensity values (measured in kWh equivalent per square foot); extreme volumes relative to conditioned floor area values; heating equipment types with inaccurate distribution systems; extreme lighting fixture values; and total floor areas heated by all heating systems that summed to more or less than 100% of the actual floor area.

Additionally, reviewing the EPS data enabled WSU Energy Program to identify contractors requiring refresher education on combustion safety testing procedures. WSU Energy Program regularly revised the contractor training plan to address error trends that staff discovered through analysis of EPS data and through on-site QA findings.

Finally, WSU Energy Program found Earth Advantage's EPS data validation feature very helpful. For example, this feature prevented contractors from entering information about incompatible HVAC components, thus improving the quality of the EPS reports. WSU Energy Program and Earth Advantage worked collaboratively to develop data validation features in the software tool to address common data input errors. This increased the accuracy of EPS reports delivered to Kitsap County homeowners over the project period.

- ***Program staff reported some participants expressed disappointment with the modeled savings from air- and duct-sealing***. Program staff received a number of customer service inquiries asking why some upgrade investments yielded larger estimated savings than others: many of these were from homeowners who had implemented air- and duct-sealing and were disappointed when their post-retrofit EPS scores showed little improvement in the efficiency of their homes. Program staff were concerned that due this disappointment, the post-retrofit reports may have inadvertently discouraged homeowners from making further efficiency improvements.[80]

[80] WSU Energy Program provided funds for post-retrofit reports for a select period of time. Homeowners requesting and paying for post-retrofit reports could also receive them.

4. The Importance of Being Local

The Multi-State Project theory postulated that homeowners would more likely take action if they could learn about energy audits and retrofits, get their questions answered, and obtain services through trusted local organizations. Cadmus asked homeowners about the importance of using local contractors and also addressed this issue during stakeholder and market actor interviews. Cadmus' findings are as follows.

- ***Program staff realized their goal of filling energy-efficiency gaps left by local utilities' programs.*** While local utilities ran several energy-efficiency programs prior to the start of RePower, program implementers recognized several gaps in the utility offerings. Unlike the utilities (which could offer programs addressing only the types of fuels they sold), RePower was able to include oil- and propone-heated homes in its pool of eligible participants. RePower also succeeded in demonstrating the importance of including air-sealing measures in whole-house retrofit programs, resulting in PSE's inclusion of these measures among its home retrofit offerings throughout its service territory.
- ***Knowing that contractors were affiliated with a local program motivated homeowners to pursue audits and retrofits.*** Ninety percent of partial participants (25 of 28) and 70% of full participants (seven of 10) reported knowing the program was locally run. Of these respondents, 78% of partial participants (21 of 27) stated knowing the program was local helped persuade them to have a home energy assessment, and 71% of full participants (five of seven) stated knowing about the program's local status helped persuade them to undertake retrofits.
- ***Most participants learned of RePower Kitsap through local events, participating local auditors or contractors, and word-of-mouth.***[81] Approximately 26% of partial participants (seven of 27) reported first learning of the program from auditors or contractors (including their advertising). Partial participants also commonly learned about the program through local events (six of 27, or 22%) and by word-of-mouth (three of 27, or 11%).[82]

  Four of the 11 full participants (36%) learned of the program directly from a participating auditor or contractor, or from an auditor's or contractor's advertising. Another four (36%) learned about the program through word-of-mouth.[83]

5. Participant Demographics, Motivations, and Barriers

Knowledge of participant demographics can help program implementers understand whether a program reaches its intended target audience. Similarly, comparing participant demographics to the

---

[81] Both partial and full participant respondents were permitted to provide multiple responses to questions about how they initially learned of RePower Kitsap; total percentages therefore may exceed 100%.

[82] Of the remaining 11 other respondents: three (11%) reported learning of the program from a utility bill insert, two (7%) from the Internet, one (4%) from a local organization, one (4%) from a television or radio advertisement, one (4%) from a newspaper advertisement, and three (11%) from some other source.

[83] Of the remaining three other respondents: one (9%) reported learning of the program from a utility bill insert, one from a television or radio advertisement, and one from a local organization.

demographics of the general population provides insights about how well participants represent the general population and what segments might be over- or underserved. An understanding of homeowners' motivations to participate or not participate can be used to craft effective marketing and messages and can lead to productive changes in program designs that better serve homeowners. Participant demographics, motivations, and barriers findings primarily drew upon homeowner survey results.

- ***More partial and full program participants had graduate or professional degrees than the general population in Kitsap County.*** More partial participants also made more than $80,000 per year than the general population. Table 45 illustrates differences between educational levels and incomes of partial and full participants and the general population. The table uses findings from the baseline and participant surveys conducted with homeowners in the program region.

Table 45. General Population Compared to Partial and Full Participant Education and Income Levels

Responses	Baseline	Partial	Full
Education	**n=68**	**n=30**	**n=10**
High school graduate or less	20%	23%	10%
Some college, associate's degree	37%	20%	20%
Bachelor's degree	26%	20%	30%
Graduate or professional degree	16%	37%	40%
Income	**n=55**	**n=23**	**n=7**
$80,000+ per year	36%	52%	29%

- ***Participants most commonly pursued energy audits (Table 46) and retrofits (Table 47) to save money.*** Saving money was the most common main reason given for conducting audits, cited by 50% and 20% of partial and full participants, respectively. Improving the health or comfort of a home also served as a common motivator for both sets of participants, as did helping the environment. One partial participant and several full participants cited recommendations from friends or family members as motivators.

  Full participants undertook home retrofits primarily to save money and to improve the comfort or health of their homes.

Table 46. WA Homeowners' Motivations for Audits*

Responses	Partial (n=30)	Full (n=10)
Save money on energy bill	50%	20%
Improve the comfort or health of home	10%	0%
Be more green or help the environment	7%	10%
Increase the value of my home	7%	0%
Recommended by a friend/family member	3%	20%
Ensure future generations have enough energy	0%	0%
Learn not to waste, improve efficiency of home	0%	10%
It was free or low-cost	0%	0%
Make energy bills more predictable	0%	0%
Other	23%**	40%***
Total[†]	**100%**	**100%**

*Respondents were asked: "What was the main reason you decided to get an energy assessment of your home?" Respondents provided open-ended answers. The interviewer determined whether each response fit into a predetermined category and, if not, marked the response "other" and recorded the response verbatim.

**Most of the "other" main reasons partial participants pursed an audit were curiosity or to test the efficiency of the home (five respondents, or 17%). Additional reasons included: to receive a tax return (one respondent, or 3%) and to use the home as a voluntary "laboratory" (one respondent, or 3%).

***"Other" main reasons full participants pursued an audit were related to remodeling or equipment replacements (e.g., replacing a heating system or duct work—three respondents, or 30%), or establishing the efficiency of a recently purchased home (one respondent, or 10%).

Table 47. WA Homeowners' Motivations for Retrofits*

Responses	Full (n=10)
Save money on energy bills	60%
Improve the comfort or health of home	30%
Increase the value of my home	0%
Be more green or help the environment	0%
Learn not to waste, improve efficiency of home	0%
Make energy bills more predictable	0%
Other**	10%
Total* **	**100%**

*Respondents were asked: "What was the main reason you decided to make energy-saving improvements to your home?" Respondents provided open-ended answers. The interviewer determined whether each response fit into a predetermined category and, if not, marked the response "other" and recorded the response verbatim.

**The "other" reason given was that the respondent had little insulation and old/outdated components.

In contrast to these participant findings, 59% (40 of 68) of Kitsap County homeowners responding to the baseline survey strongly agreed with the statement: "I worry that the cost of energy for my home will go up"; 60% (42 of 70) strongly agreed that: "saving energy is a very high priority in our home." Among partial participants, approximately 45% (13 of 29) strongly agreed with the statement: "I worry that the cost of energy for my home will go up" and 59% (17 of 29) strongly agreed that: "saving energy is a very high priority in our home."

- ***Among homeowners conducting an audit but not a retrofit (partial participants), cost was the most-cited obstacle to making the recommended improvements to their homes, as shown in Table 48.*** Partial participants in all income categories frequently mentioned cost when asked about the challenges they expected to face in retrofitting their homes.[84]

Table 48. Partial Participant Barriers to Retrofits*

Responses	Partial (n=20)**
Can't afford it/too expensive	75%
Inconvenient, don't have the time, too busy	15%
Challenges with contractors	15%
Home has challenges in its construction or age	10%
My home is already pretty efficient	5%
Not confident I'll save energy/it will be worth it	4%
None/no major challenges	

*Respondents were asked: "What major challenges, if any, do you think you will face in making the improvements listed in the home energy assessment report?"
**Multiple responses allowed.

- ***Minimizing cost and ensuring convenience were full participants' most common explanations for why they chose to implement some recommended measures and not others (Table 49).***

Table 49. Full Participants' Reasons for Implementing Selected Measures*

Responses	Full (n=8)**
They were the least expensive measures to save energy	38%
They were the easiest actions to take	25%
These improvements would be enough to improve the comfort of home	13%
They were the actions respondent could achieve	13%
Other actions could create a vermin problem	13%

*Respondents were asked: "What were the key reasons you chose to follow just some of the recommendations from the assessment?"
**Multiple responses allowed.

- ***Contractors struggled to convince homeowners of the value of energy assessments and whole-house retrofits.*** The cost of the home assessment and retrofit services presented a barrier as homeowners did not understand the benefits. This is borne out by the 80% (eight of 10) of full participant respondents who said they implemented just some of the measures, versus the 20% (two of 10) who said they implemented all of the measures recommended in their audit report. As discussed, retrofit participants were interested in pursuing the least expensive recommended measures and measures that would be sufficient to result in some energy bill reductions. One contractor explained that many people in rural areas thought increasing their home's comfort

[84] Because of too few data points, Cadmus could not test for statistically significant differences in retrofit barriers among partial participants in different income categories.

meant: “adding another log to the fire.” Other contractors echoed the need to educate homeowners about tangible benefits, such as making financial sense or “not being chilly” in their retirement home.

6. The Importance of Trained Professionals

One key premise of the Multi-State Project was convenient access to trained and engaged market actors (e.g., auditors/contractors) would build homeowner trust and confidence in the programs’ offerings and work quality. As shown by the findings below, trained professionals proved to be an important program component.

- ***Many professionals in the residential auditor, contractor, and real estate communities took part in RePower trainings***. RePower offered 24 in-depth training events that were attended by over 230 builders, contractors, auditors, and stakeholders, including 57 real estate professionals, and 59 appraisers and home inspectors. The program also made BPI and Performance Tested Comfort Systems training and certification opportunities available to trade allies, resulting in 26 BPI or Performance Tested Comfort Systems certifications.
- ***Knowing the programs worked with trained professionals motivated homeowners to pursue audits and retrofits.*** When asked how important it was to know that their auditor or contractor received special energy-efficiency training, 57% of partial participants (12 of 21) said it was very important in deciding to pursue an audit, and 56% of full participants (five of nine) said it was very important in deciding to pursue a retrofit. The vast majority of partial participants (29 of 30, or 97%) reported their auditor could answer all of their questions, and 75% (25 of 30) stated they were very satisfied with their auditor’s work.

  The majority of full participants (eight of 11, or 73%) reported the contractor retrofitting their home could answer all of their questions. Eighty-eight percent (seven of eight) said they were very satisfied (as opposed to somewhat satisfied, not too satisfied, or not at all satisfied) with the retrofit contractor’s work.
- ***Auditor or contractor contacts and auditor/contractor advertising served as the program’s primary drivers.*** [85] As discussed, 26% of partial participants (seven of 27) reported initially learning of the program from auditors or contractors (including their advertising); four of the 11 full participant respondents (36%) learned about the program directly from an auditor or contractor, or from an auditor’s or contractor’s advertising.

[85] See Section 11.1.4 for detailed information about how participants learned about RePower Kitsap.

7. Views on Rebates and Loans

Program staff expected easy and straightforward access to rebates and loans to reduce first-cost barriers, thereby motivating homeowners to seek energy audits and make substantial energy-efficiency improvements to their homes. This section presents the study's findings on rebates and loans. The findings draw upon on a combination of homeowner survey results, stakeholder interviews, and market actor interviews.

- ***Rebates were significant program drivers.*** In Washington, 50% of partial participants (five of 10) said the existence of rebates made it much more likely they would make home improvements, and the other 50% (five of 10) said rebates made it somewhat more likely they would undertake energy-saving home improvements. Seventy-one percent of full participants (five of seven) found the rebate very important in their decision to undergo a home retrofit, one full participant (14%) found the rebate was somewhat important, and one full participant found the rebate not at all important.
- ***Program data indicated that upgrades receiving Repower Kitsap incentives were more comprehensive than contractor or utility-supported upgrades not receiving RePower Kitsap incentives.*** Initially, RePower Kitsap offered a $450 rebate—funded through a Kitsap County EECBG grant—on the cost of an EPS audit. Homeowners also could also access existing utility incentives. However, program staff determined that these incentives did not drive demand and did not result in comprehensive retrofits. With the program changes that staff implemented in late 2011, RePower Kitsap structured incentives to encourage installation of multiple (two or more) measures. As reported in Washington's final technical report to DOE: "The project established that upgrades with RePower Kitsap assessments and incentives were more comprehensive (2.5 measures and $5,690 total costs) and saved more energy (20.1 MMBTU per year) than contractor (1.1 measures, $5,100, and 12.1 MMBTU) or utility-supported upgrades (1.4 measures, $5,500, and 13.6 MMBTU)."
- ***Establishing and operating an energy-efficiency loan program requires a great deal of coordination.*** Pilot staff reported working with lawyers to draft contracts setting up credit enhancements and working with the state's lending regulator (the Department of Financial Institutions) to address the handling of grant monies and new loan products specifically for energy-efficiency improvements. In addition, the lenders required approvals from loan committees and internal legal staff. The lenders also needed training on how to interact with the RePower Kitsap and with retrofit contractors.
- ***Program-supported financing leveraged existing resources.*** Kitsap County developed an energy-efficiency loan program with KCU prior to RePower Kitsap's launch. Rather than develop its own loan program, RePower Kitsap initially opted to rely on the existing Kitsap County-KCU energy-efficiency loan program.
- ***Loan program viability was contingent on the lenders' active support.*** After KCU's internal energy-efficiency loan program champion left the organization, KCU's engagement in the offering tapered. In June 2012, Commerce and WSU Energy Program decided to add another

lender and selected PSCCU. As of September 3, 2013, the two credit unions had issued $690,000 in energy-efficiency loans to 71 homeowners.

RePower also initially sought to explore meter-based financing offerings,[86] but ultimately did not pursue these due to disinterest among local utilities.

- ***Both lending partners offered energy-efficiency loans due to their management's interest in serving the community or supporting the home performance industry.*** One lender, which once served as the credit union for PSE employees, already offered special products for energy-efficiency purchases.
- ***Credit union staff required training to understand items being financed.*** Offering loans for home energy upgrades proved relatively labor intensive and required lender staff to understand the different audit options and variances in incentives among the different RePower and utility programs. RePower staff provided training to lending staff and helped the lenders answer homeowner questions while processing loan applications.
- ***Lenders reported the loan loss reserve offered by the program motivated them to offer more attractive loan products than they would have otherwise.*** One lender offered lower starting interest rates and a less stringent credit review for their energy loan products (as shown in Table 50).[87] For this lender, the credit enhancement was a 5% reserve.[88]

Table 50. Lender A Loan Product Comparison

	Standard Energy Loan	RePower Kitsap Loan
Maximum Tenor (months)*	180	180
Maximum Amount	up to $35,000	up to $25,000
APR Range	4.49%–7.99%	4.25%–8.74%

* In this context, "tenor" is the initial term length of the loan.

The second lender offered a fixed 4.5% interest rate for an unsecured loan, regardless of the borrower's credit quality and loan tenor—a rate lower than its standard loan offering. This lender also offered home equity loans, which allowed a higher loan-to-value ratio and a lower interest rate than its normal products. For this lender, the credit enhancement was a 10% reserve. Table 51 shows the second lender's (Lender B) offerings.

[86] A meter-based financing offering repays a loan in association with the customer's utility account. Typically, the customer's energy bill includes a line item for the financing payment due, in addition to the other utility charges.

[87] This lender did not have a home equity requirement, but required a UCC filing on financed equipment.

[88] The reserve is a fraction of the loan principal, which the lender can access to cover losses. For example, a 5% reserve for a $100,000 loan portfolio would be $5,000.

Table 51. Lender B Loan Product Comparison

Unsecured Loans			Home Equity Loans (Owner Occupied)			
Maximum Tenor*	Regular Loan APR**	RePower Kitsap Loan APR	Maximum Loan-to-Value	Maximum Tenor*	Regular Home Equity APR**	RePower Kitsap Home Equity Loan APR
24	9.00%+	4.50%	80%	180	6.49%	4.00%
36	9.50%+	4.50%	100%	180	N/A	5.00%
48	10.00%+	4.50%				
60	10.50%+	4.50%				

*In months.
**Minimum APR.

- ***Loans meaningfully contributed to retrofit activity for a minority of participants.*** Sixty-two percent of partial participants (18 of 29) knew RePower Kitsap offered loans for energy-efficiency retrofits, and five of 29 respondents (17%) said the availability of loans would make them much more likely to complete a retrofit. Another six of the 29 respondents (21%) said the loan's availability was not at all important to them. Fifty percent of full participants (five of 10) knew of the program-sponsored loans, and one-half of those who were aware (two of four; one respondent did not reply) said the loans influenced their decisions to undertake a retrofit.
- ***Although the loan volume was lower than anticipated, financing enhanced the program's credibility.*** Commerce believed many participants used their existing credit lines to pay for their retrofits, rather than seeking credit with a different financial institution. Program implementation staff opined that loan activity was relatively low because Kitsap County residents were debt averse.
- ***RePower Kitsap lenders reported program referrals and contractors drove borrowing activity.*** Lenders observed limited responses to advertisements on their websites, and said the program was the primary driver for the energy-efficiency loans.

8. Participant Satisfaction

Homeowner satisfaction indicates whether homeowners perceived that the program ran smoothly, that homeowners received the services—and level of services—they expected, and that homeowners would likely recommend the program to others. This section draws on the partial participant and full participant survey results to present evaluation findings about participant satisfaction.

- ***Twenty-six of 30 partial participant respondents (87%) and nine of 10 full participant respondents (90%) said they would very likely recommend the program to others.*** Most participants were very satisfied with their program experiences.
- ***Participants were largely satisfied with the sign-up process and wait times.*** A majority (22 of 30, or 73%) of partial participants were very satisfied with the sign-up process. Most partial participants (19 of 30, or 63%) were very satisfied with the amount of time it took between

signing up and receiving their home energy audit, which 25% (seven of 28) said took less than two weeks and 46% (13 of 28) said took two to four weeks.

Five of six full participants (83%) were very satisfied with the time between their retrofit and receiving their final, post-retrofit home score, which four said took less than one month, and the other one said took one to three months.

- ***Seven of eight full participants (88%) were very satisfied with the contractor services for retrofitting their home.*** The other full participant respondent was somewhat satisfied. In addition, four of nine full participants noted that knowing about the contractor's training gave them confidence in the contractor's knowledge, and another four of nine said it gave them confidence in the quality of the contractor's work.

9. The Importance of Energy Efficiency in Home Valuation

The Multi-State Project theory postulated that trained and knowledgeable real estate professionals and appraisers could, over time, educate homebuyers and sellers about energy efficiency, and make it a more salient factor in home buying and selling. RePower Kitsap began this process by offering training sessions to real estate professionals and appraisers. Cadmus' findings on this topic draw upon stakeholder interviews.

- ***Many appraisers took part in RePower trainings.*** Fifty-nine appraisers attended courses about appraising green homes.[89]
- ***The RePower sponsored training offered the first exposure appraisers had to green labels and energy-efficient homes.*** The appraisers Cadmus spoke to did not have previous experience working with green homes before the training, though they had some awareness of the RePower Kitsap program because they reported seeing yard signs at homes in the area. None of the appraisers had experience with EPS, aside from the brief mention of the tool on one slide during the training.
- ***Appraisers were highly satisfied with the training.*** The appraisers reported that the program-sponsored training they attended was highly valuable and informative. One reported keeping the materials from the training as reference materials and referred to them often. Another reported the training sufficiently motivated them to improve the insulation and lighting in their own home.
- ***Appraisers reported seeing little activity in the energy-efficient home market.*** One reason appraisers cited when asked why they attended RePower trainings was to increase their business by working with energy-efficient homes. In the year following the training, however, appraisers said they had only worked with one or two energy-efficient homes. They said most green-labeled or efficient homes were new, and the owners were not interested in selling or moving from them, meaning appraisers would not have an opportunity to work with them (at

[89] RePower also sponsored two-day Sustainability Training for Accredited Real Estate Professionals (S.T.A.R.) sessions in the summer of 2013, after Cadmus completed this study's primary data collection. Thirty-two real estate professionals from the region attended the training.

least in the near-term). Appraisers noted that green-labels and energy-efficiency designations were listed in the local MLS, and they hoped to see more business from these homes in the future.

- ***In 2013, real estate industry interest in program-sponsored training significantly increased.*** Program staff reported little initial interest from appraisers and real estate professionals for training in sustainability. However, once they established a relationship with the Kitsap Association of REALTORS®—which helped promote the trainings—program staff easily filled the courses in the summer of 2013. RePower staff believed the increased interest in appraiser trainings resulted from the market's increasing recognition of RePower branding, coupled with the marketing support of the local real estate association. One implementation staff member said her favorite memory was seeing a Craigslist ad stating: "Home for rent, 2bed/2bath, RePower Certified,[90] cozy comfortable and energy efficient."

10. Program Sustainability

One of RePower Kitsap's overarching goals was to create a more sustainable county. To meet this goal, program stakeholders took steps to create a knowledgeable and skilled retrofit workforce, facilitated the development of home retrofit financing options, coordinated with regional utilities on the design and delivery of energy-efficiency programs, and educated regional real estate professionals and appraisers about the value of energy-efficiency.

The process evaluation found solid evidence to support the following results.

- ***RePower Kitsap developed an active, cooperative trade ally network where none had previously existed; the network is expected to support ongoing program activities.*** RePower staff reported that over one-half of all retrofit projects included multiple types of measures, requiring collaborations between contractors with different skills. In addition, several contractors worked collaboratively to establish the West Sound Chapter of Home Performance Washington to promote the whole-house energy retrofit industry locally.
- ***RePower and PSE staff collaborated on program outreach and energy-efficiency program offerings, forming a strong basis for working cooperatively on energy-efficiency efforts in the future.*** RePower and PSE energy-efficiency program staff established an effective working relationship and met biweekly to discuss areas of coordination. As a result, the groups worked together on: co-marketing at community events; conducting on-the-ground outreach; integrating a new measure (air sealing) into PSE's program offerings; sharing post-retrofit air-sealing results; and conducting on-site QA visits.
- ***Demand from local real estate professionals and appraisers in program-sponsored trainings is growing.*** Although early RePower-sponsored real estate professional and appraiser training sessions elicited minimal interest, more recent trainings filled shortly after registration opened. In fact, program staff chose to offer an additional training session to address the unexpectedly

[90] Although RePower does not actually certify houses, the wording of this advertisement reflects the local community's recognition of the RePower brand.

large demand. WSU Energy Program staff attributed the real estate community's increased interest in these trainings to RePower's continued engagement with the Kitsap County Association of REALTORS® and to the public's increasing recognition of the RePower brand.

At the time of this report, Kitsap County has committed to supporting the program in the future. Kitsap County staff and RePower stakeholders are actively planning the program's next stage, and WSU Energy Program has committed to providing interim operational services during the program transition and planning processes.

11.2 Conclusions and Recommendations

During the course of this study, Cadmus collected information about the RePower Kitsap program from many perspectives—including State Energy Office staff, program implementers, homeowners, auditors/contractors, real estate professionals, appraisers, lenders, and utility staff. While it is still too early to assess whether the program achieved all of its desired short- and long-term outcomes (as identified in the Figure 1 logic model), Cadmus assessed the program's successes and challenges in seeking those goals. This section summarizes and synthesizes findings from the evaluation activities and provides key conclusions and recommendations for the Washington program as it continues serving the state's residential retrofit market.

Program Targets

Conclusion: The program faced unrealistic EPS audit and whole-house retrofit targets. At its beginning, the RePower Kitsap program lacked some key infrastructure that could have helped the program reach its targets—primarily, a strong and skilled contractor network, and utility support for recommended retrofit measures.

Recommendation: Development of goals and timelines for a new program should account for existing infrastructure (e.g., the presence of a trained workforce), infrastructure remaining to be developed, and the likelihood of collaborative partnerships in the community. Program timelines and targets should reflect these conditions.

Collaborative Partnerships

Conclusion: Coordination with RePower Bainbridge and RePower Bremerton, neighboring programs that kicked-off several months before RePower Kitsap, provided a crucial foundation for RePower Kitsap. Co-branding and designing the three programs to include similar components allowed the programs' shared implementer to efficiently market and operate the programs while minimizing homeowner confusion.

Conclusion: RePower's demonstration of the importance and effectiveness of air sealing in whole-house retrofits directly influenced PSE's adoption of that measure in its retrofit program.

Recommendation: WSU Energy Program, CSG, CNG, and PSE should continue to regularly communicate to explore other opportunities to enhance whole-house retrofits in the area. For example, RePower Kitsap staff might work with its contractor network to identify additional energy-efficiency measures or outreach approaches that could be promoted and financially supported though PSE or CNG programs.

Market Actors and Program Tools

Conclusion: The program's contractor training, support, and networking opportunities succeeded in building a skilled and collaborative residential energy-efficiency retrofit workforce.

Recommendation: Program staff should continue to offer market actor support and networking to promote collaboration of market actors across different areas of expertise. Program staff should also continue to refer homeowners to qualified retrofit contractors.

Conclusion: While the program has made great strides in developing a network of skilled contractors, room exists for quality improvements as contractor staff turns over and as program staff updates upgrade specifications.

Recommendation: Staff should offer additional training sessions tailored to specific areas where auditors and contractors could further their knowledge and skill sets. Staff should also develop a prioritized list of upgrade measures and associated incentives, and clearly communicate these to retrofit contractors.

Conclusion: Contractors who did not use EPS presented retrofit proposals to interested homeowners in a variety of ways. They also incorporated varying formats and levels of detail in their program reporting to RePower staff. EPS proved useful as an administrative tool because it helped present and track retrofit projects in a consistent manner.

Recommendation: Standardized data collection practices should be established along with standardized reporting templates for completed assessments and retrofits. To minimize the burden on auditors and contractors, templates should require only essential information that cannot be obtained elsewhere (e.g., data not available through the assessor's database). Auditors and contractors should provide feedback on the templates before they are finalized to ensure buy-in and clarity. Once finalized, training should be offered so that market actors can ask questions and become familiar with the templates and program expectations.

Marketing and Outreach

Conclusion: Many homeowners did not understand RePower's messaging about why it makes financial sense to invest in a whole-house retrofit. A desire to save money largely drove participant homeowners.

Recommendation: Contractor training should be offered on how to sell whole-house retrofits. The training should help contractors explain the financial and non-financial benefits (e.g., improved comfort in a drafty house) of whole-house retrofits to homeowners.

Recommendation: Case studies, based on the experiences of satisfied participants, should be developed to use as marketing collateral. The case studies should provide actual differences in participants' pre- and post-retrofit utility bills as well as participant testimonials about increased home comfort and other benefits.

Conclusion: Most participants learned about the program through local events, participating local auditors or contractors, and word-of-mouth.

Recommendation: Program outreach should continue at local events related to sustainability or energy, maintaining and growing an engaged and knowledgeable contractor workforce, and building positive word-of-mouth through satisfied customers.

Conclusion: RePower Kitsap generally appealed to homeowners with higher-than-average incomes and higher-than-average education levels.

Recommendation: Alterations to the program's marketing messages should be considered to attract a broader swath of homeowners. Messages focusing on containing home energy costs as energy prices continue to rise or (as applicable) highlighting the availability of rebates and loans to reduce first-costs, may resonate more with middle-income homeowners. Messaging about the improved comfort of retrofitted homes and the health benefits for occupants also proves important and should be continued.

Other relatively low-cost outreach methods that often have been effective in similar programs include making program information available at local government offices (e.g., government permitting departments, libraries) and offering tours of homes that completed retrofits through the program.

Program Sustainability

Conclusion: Kitsap County will spearhead RePower's continued operation, with WSU Energy Program providing operational services during the program's transition period (to a second phase).

Recommendation: The presence of a local implementer can be vital to a program's success. Kitsap County staff should draw on their understanding of RePower's target market demographics as they devise the program's second-phase goals, outreach approaches, incentive levels, and offerings. The County should also leverage existing and cultivate new partnerships with other local government agencies, energy-efficiency groups, utilities, nonprofit organizations, trade ally groups, and others to expand the program's reach and available resources.

Conclusion: Attracting customers with higher-than-average education and income levels may limit program growth. Partial participants consistently pointed to cost as a key barrier.

Recommendation: During the planning and implementation of RePower's next phase, program implementers may wish to reach a broader spectrum of homeowners, who may have different decision criteria. This will likely require changes in program design, from rebate levels and financing products to program marketing messages and delivery. Further consumer research and/or controlled, evaluable, pilot efforts could be used to explore barriers and alternative program and marketing designs.

Conclusion: Anecdotal evidence suggests that participation can be influenced by rebates. For instance, homeowners did not pursue EPS audits when rebates did not offset the EPS audit costs. Future reductions in rebate funding will likely make it more difficult to retain market actors and to recruit new market actors and customers. Furthermore, homeowners reported cost as their primary barrier to undertaking energy-efficiency retrofits.

Recommendation: Program implementers should continue searching and applying for local, state, and national funding to support administration and strategic planning for RePower. Program staff should

also consider innovative funding mechanisms, such as assessing contractor fees, to generate revenue for the program and help ensure its continued operation.

Appendix A. Baseline Homeowner Survey Instrument (All States)

NASEO Multi-State Residential Retrofit Baseline Survey 3-14-12

Research Topics/Issues (from Evaluation Plan)	Questionnaire Items
Awareness, knowledge of saving energy	A1-A4, B3, B4
Concern about saving energy	C1 a, b ,c ,d, e
Personal responsibility for saving energy	C1 f, g
Intention to save energy	C1 h, i
Motivations to save energy	C2 a-g, P14
Experience with/actions to save energy	B1, B3-B6, P12-P13 (many sub-questions)
Awareness of/experience with energy-efficiency programs	P1–P9, P11
Information sources for saving energy	B2, P5, P11a, R4
Barriers to saving energy	P15
Value placed on energy efficiency when searching for a new home	R1-R3
Demographic and household characteristics	H1-H2, HC2, X2-X8

INTRODUCTION

May I speak with [CONTACT NAME]?

Hello, my name is [INTERVIEWER NAME] and I'm calling from [xxxx] on behalf of the [xxxx]. We are conducting an important study of households in [State] to better understand how people use energy at home. [If needed: This survey should take about 10 minutes.] This is not a sales call and your answers are confidential. May I please speak with an adult in your household who makes energy related decisions – such as the person who buys new appliances, gets the furnace fixed, or who pays the energy bills. [CONTINUE WITH CORRECT CONTACT]

H1. Do you own or rent your home? [DO NOT READ]

1. (Own)
2. (Rent) [THANK AND TERMINATE]
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

H2. [READ THE CHOICES SLOWLY SO RESPONDENT CAN CAREFULLY SELECT THE APPROPRIATE OPTION] Do you live in a ***detached*** single-family home, a duplex or townhome, a building with 4 or fewer units, a building with 5 or more units, a mobile home, or another type of building? [DO NOT READ]

1. (Detached single-family home)
2. (Duplex or townhome) [IF ALABAMA, THANK AND TERMINATE]

3. (Building with 4 or fewer units) [IF ALABAMA, THANK AND TERMINATE]
4. (Building with 5 or more units) [THANK AND TERMINATE]
5. (Mobile Home) [THANK AND TERMINATE]
6. (Other) [RECORD BUILDING TYPE:_____, THANK AND TERMINATE]
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

[VIRGINIA RESPONDENTS ONLY, SKIP TO H4D IF IN ARLINGTON COUNTY AND H4E IF IN CITY OUTSIDE OF ARLINGTON COUNTY]
H4. Our records show that you live in _____ [USE COUNTIES FOR ALABAMA AND WASHINGTON RESPONDENTS; USE CITIES FOR MASSACHUSETTS RESPONDENTS]. Is this correct? [DO NOT READ]
1. (Yes) [IF ALABAMA OR MASSACHUSETTS RESPONDENT, SKIP TO H5; IF WASHINGTON RESPONDENT, SKIP TO H4G]
2. (No) [IF ALABAMA RESPONDENT, SKIP TO H4A; IF MASSACHUSETTS RESPONDENT, SKIP TO H4C; IF WASHINGTON RESPONDENT, SKIP TO H4F]
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

[FOR ALABAMA RESPONDENTS ONLY]
H4a. What county do you live in? [DO NOT READ]
1. (Lawrence County, Alabama) [SKIP TO H5]
2. (Limestone County, Alabama) [SKIP TO H5]
3. (Madison, Alabama) [GO TO H4B]
4. (Morgan County, Alabama) [SKIP TO H5]
5. Jefferson County, Alabama) [SKIP TO H5]
6. (Shelby County, Alabama) [SKIP TO H5]
00. Other [THANK AND TERMINATE]
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

[TO CONFIRM MADISON COUNTY, ALABAMA RESPONDENTS LIVE WITHIN THE CITY OF HUNTSVILLE]
H4b. What city do you live in? [DO NOT READ]
1. (Huntsville, Alabama) [SKIP TO H5]
00. (Other) [THANK AND TERMINATE]
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

[FOR MASSACHUSETTS RESPONDENTS ONLY]
H4c. What city do you live in? [DO NOT READ]
1. (Belchertown, Massachusetts) [SKIP TO H5]
2. (East Longmeadow, Massachusetts) [SKIP TO H5]
3. (Hampden, Massachusetts [SKIP TO H5]
4. (Longmeadow, Massachusetts) [SKIP TO H5]
5. (Monson, Massachusetts) [SKIP TO H5]
6. (Palmer, Massachusetts) [SKIP TO H5]
7. (Springfield, Massachusetts) [SKIP TO H5]
8. (Wilbraham, Massachusetts) [SKIP TO H5]

00. (Other) [THANK AND TERMINATE]
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

[FOR VIRGINIA RESPONDENTS IN ARLINGTON COUNTY ONLY]
H4d. Our records show that you live in Arlington County, Virginia. Is this correct? [DO NOT READ]
1. (Yes) [SKIP TO H5]
2. (No)
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

[FOR VIRGINIA RESPONDENTS IN CITIES OUTSIDE OF ARLINGTON COUNTY]
H4e. What city or town do you live in? [DO NOT READ]
1. (Blacksburg, Virginia) [SKIP TO H5]
2. (Charlottesville, Virginia) [SKIP TO H5]
3. (Richmond, Virginia) [SKIP TO H5]
4. (Roanoke, Virginia) [SKIP TO H5]
00. (Other) [THANK AND TERMINATE]
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

H4f. What county do you live in? [DO NOT READ]
1. (Kitsap County, Washington)
00. Other [THANK AND TERMINATE]
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

[TO CONFIRM KITSAP COUNTY, WA RESIDENTS DO *NOT* LIVE IN THE CITY OF BREMERTON OR BAINBRIDGE ISLAND]
H4g. Do you live in the city of Bremerton? [DO NOT READ]
1. (Yes) [THANK AND TERMINATE]
2. (No)
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

H4h. Do you live on Bainbridge Island? [DO NOT READ]
1. (Yes) [THANK AND TERMINATE]
2. (No)
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

H5. How many years have you lived in your current home? [DO NOT READ]
1. (Less than 2 years)
2. (2 to 3 years)
3. (4 to 5 years)
4. (More than 5 years)
98. (Don’t know)
99. (Refused)

AWARENESS & KNOWLEDGE

I'd like to ask some questions about how you use energy at home. There are no right or wrong answers to any of these questions, so please just give me your best response. It is also fine to say you don't know how to answer any of these questions. [THROUGHOUT THE SURVEY, MAKE SURE RESPONDENTS HERE ARE FOCUSING ON ENERGY—THAT IS, ELECTRIC AND NATURAL GAS USAGE, NOT WATER. PLEASE DIRECT THEM BACK TO ENERGY USAGE IF THEY START TALKING ABOUT WATER USAGE.]

A1. How would you rate your knowledge about how to save energy in your home? Would you say you are ***very*** knowledgeable, ***somewhat*** knowledgeable, ***not too*** knowledgeable, or ***not at all*** knowledgeable, about saving energy in your home? [DO NOT READ]

4. (Very knowledgeable)
3. (Somewhat knowledgeable)
2. (Not too knowledgeable)
1. (Not at all knowledgeable)
98. (Don't know)
99. (Refused)

A2.If you had to say how energy efficient your current home is, would you say it is ***very*** energy efficient, ***somewhat*** energy efficient, ***somewhat energy inefficient***, or ***very energy inefficient***? If you don't know how to rate your home, feel free to let me know. [DO NOT READ]

4. (Very energy efficient)
3. (Somewhat energy efficient_
2. (Somewhat energy inefficient)
1. (Very energy inefficient)
98. (Don't know)
99. (Refused)

A3.

A4. I'm going to read you some names of energy related product labels or energy efficiency programs. Please tell me if you have or have not heard of each one before now. [Randomize list except Energy Star Most Efficient should always follow Energy Star] [DO NOT READ ANSWERS]

a.	Energy Star	1. Yes	2. No	8. DK	9. Refused
b.	Yellow EnergyGuide label	1. Yes	2. No	8. DK	9. Refused
c.	Home Performance with Energy Star	**[Add ratings for each item]**			
d.	MA only: Mass Save				
e.	AL only: AlabamaWISE Home Energy Program				
f.	WA only: RePower Kitsap				
g.	Energy Performance Score or EPS				

CONCERN, PERSONAL RESPONSIBILITY, INTENTION

C1. Now, I'd like you to rate how strongly you agree with each of the following statements. Please tell me if you Strongly agree (STA), Somewhat agree (SWA), Somewhat disagree (SWD). OR Strongly disagree (STD), with each statement. [RANDOMIZE "a" - "I" EXCEPT DO NOT ALLOW "H" AND "I" TO BE ASKED ONE AFTER THE OTHER (I.E., DISALLOW "H" THEN "I" AS WELL AS "I" THEN "H"]

a. I worry I won't be able to afford my energy bills. STA SWA SWD SWD DK REF

b. I worry that the cost of energy for my home will go up. **[Add ratings for each item]**

c. I am concerned that how I use energy at home affects the environment.

d. Saving energy is a very high priority in our home. **[Add ratings for each item]**

e. I worry how our use of energy affects climate change.

f. I feel it is my responsibility to use as little energy as I can to protect the environment.

g. If my energy bills go up, I am the one who is responsible in our household for reducing them.

h. I intend to take steps to cut my energy bills at my home during the next three months.

i. To reduce our home's impact on the environment, I intend to take steps to cut my energy use during the next three months.

MOTIVATIONS TO SAVE ENERGY

C2. Now, tell me how important each of the following reasons is for you to save energy at home. [RANDOMIZE]

a. To save money on your energy bills. Is that ***very*** important, ***somewhat*** important, ***not too*** important, or ***not at all*** important as a reason for you to save energy? [DO NOT READ]
   4. (Very important)
   3. (Somewhat important)
   2. (Not too important)
   1. (Not at all important)
   98. (Don't know)
   99. (Refused)

b. To be more green or to do my part to help the environment. Is that ***very*** important, ***somewhat*** important, ***not too*** important, or ***not at all*** important as a reason for you to save energy? [DO NOT READ]
   4. (Very important)
   3. (Somewhat important)
   2. (Not too important)
   1. (Not at all important)
   98. (Don't know)
   99. (Refused)

c. To make sure future generations have enough energy. Is that ***very*** important, ***somewhat*** important, ***not too*** important, or ***not at all*** important as a reason for you to save energy? [DO NOT READ]
   4. (Very important)
   3. (Somewhat important)
   2. (Not too important)
   1. (Not at all important)
   98. (Don't know)
   99. (Refused)

d. To reduce our dependence on foreign oil. Is that ***very*** important, ***somewhat*** important, ***not too*** important, or ***not at all*** important as a reason for you to save energy? [DO NOT READ]

4. (Very important)
3. (Somewhat important)
2. (Not too important)
1. (Not at all important)
98. (Don't know)
99. (Refused)

e. To not waste. Is that ***very*** important, ***somewhat*** important, ***not too*** important, or ***not at all*** important as a reason for you to save energy? [DO NOT READ]
4. (Very important)
3. (Somewhat important)
2. (Not too important)
1. (Not at all important)
98. (Don't know)
99. (Refused)

f. To make your bills more predictable. Is that ***very*** important, ***somewhat*** important, ***not too*** important, or ***not at all*** important as a reason for you to save energy? [DO NOT READ]
4. (Very important)
3. (Somewhat important)
2. (Not too important)
1. (Not at all important)
98. (Don't know)
99. (Refused)

g. To improve the comfort or health of your home. Is that ***very*** important, ***somewhat*** important, ***not too*** important, or ***not at all*** important as a reason for you to save energy? [DO NOT READ]
4. (Very all important)
3. (Somewhat important)
2. (Not too important)
1. (Not at all important)
98. (Don't know)
99. (Refused)

ENERGY BEHAVIORS

Now I'd like to ask you a few specific questions about energy use in your home.

B1. When you buy new appliances or equipment that use energy, do you always, sometimes, rarely or never consider the amount of energy they use? [DO NOT READ]
1. (Always)
2. (Sometimes)
3. (Rarely)
4. (Never)
98. (Don't Know)
99. (Refused)

[ASK B2 IF B1<3]
B2. How do you try to find out if one appliance or equipment model uses less energy than the others? [MULTIPLE RESPONSE] [DO NOT READ; RECORD VERBATIM IF RESPONSE DOES NOT MATCH CATEGORIES]
1. (EPA ENERGY STAR label)

2. (Yellow ENERGY Guide label)
3. (Sales staff)
4. (Store website)
5. (Manufacturer website)
6. (ENERGY STAR website)
7. (State government website)
8. (Electric/gas utility company)
9. (Friend/word of mouth)
10. (AlabamaWISE Home Energy Program)
11. (Mass Save)
12. (RePower Kitsap)
00. (Other, specify)_____
98. (Don't Know)
99. (Refused)

B3. Have you ever heard of compact fluorescent light bulbs, or "CFLs?" [DO NOT READ]
1. (Yes)
2. (No)
98. (Don't Know)
99. (Refused)

[ASK B4 IF B3>1]
B4. Compact fluorescent light bulbs—also known as CFLs—usually have a glass tube bent into a spiral shape, resembling soft-serve ice cream, and they fit in a regular light bulb socket. Before today, were you familiar with these types of bulbs? [DO NOT READ]
1. (Yes)
2. (No)
98. (Don't Know)
99. (Refused)

[IF B4>1, SKIP TO P1]

B5. Do you currently have any CFLs installed in your home? [DO NOT READ]
1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[IF B5>1, SKIP TO P1]

B6. About how many CFLs do you currently have installed in your home? Your best estimate is fine.
[READ OPTIONS ONLY IF PROMPTING IS NEEDED.]
00. (None)
01. (1 to 5)
02. (6 or more)
98. (Don't know)
99. (Refused)

PROGRAM AWARENESS AND EXPERIENCE

P1. Are you aware of governmental agencies or electric and gas utilities that have programs to help you save energy at home? [DO NOT READ]

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[IF P1=2, skip to P11a]

P2. Have you ever received a rebate or a tax credit because you bought energy saving products or equipment? You might have gotten this rebate for buying energy saving lights, appliances, or electronics. [DO NOT READ]

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

P3. Has an energy specialist ever come to your home to assess how you use energy at home and then told you ways you can save energy and reduce your bills? [DO NOT READ]

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[IF P3>1, skip to P11a]

P4. When did you have this energy assessment? Was it . . . .

1. In the past 6 months
2. In the past 12 months
2. 1 to 3 years ago
3. More than 3 years ago
98. (Don't know)
99. (Refused)

P5. How did you learn about having a home energy assessment done? [DO NOT READ; RECORD VERBATIM IF RESPONSE DOES NOT MATCH CATEGORIES)

1. (Bill insert from utility)
2. (TV or radio advertisement by utility/efficiency program)
3. (Newspaper advertisement by utility/efficiency program)
4. (Direct contact with program staff)
5. (Word of mouth—e.g., from a friend, family member, neighbor, or co-worker)
6. (Internet/Website/Google)
00. (Other, specify)_____
98. (Don't know)
99. (Refused)

P6. About how much did you pay for your home assessment? Was it . . .

1. No cost/free [SKIP TO P8]
2. Less than $250
3. $251 to $400
4. $401 to $600
5. More than $600
98. (Don't know)
99. (Refused) [SKIP TO P8]

P7. Did you receive a rebate of subsidy from any source to cover or reduce the cost of your energy assessment? [DO NOT READ]

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

P8. How would you rate the usefulness of the home energy assessment in helping you take steps to save energy at home? Would you say the assessment was ***very*** useful, ***somewhat*** useful, ***not too*** useful, or ***not at all*** useful ? [DO NOT READ]

4. (Very useful)
3. (Somewhat useful)
2. (Not too useful)
1. (Not at all useful)
98. (Don't know)
99. (Refused)

P9.Why do you say (insert rating)? _____

P10.

P11. Were you able to follow *all* of the recommendations from the assessment, *some* of the recommendations from the assessment, or none of the recommendations? [DO NOT READ]

1. (All)
2. (Some)
3. (None)
98. (Don't know)
99. (Refused)

P11a. How useful would you find a scorecard that told you about your home's current energy use, its carbon emissions, the steps you can take to save energy, and how much you could save after taking those energy saving steps? Would you find the scorecard ***very*** useful, ***somewhat*** useful, ***not too*** useful, or ***not at all*** useful? [DO NOT READ]

4. (Very useful)
3. (Somewhat useful)
2. (Not too useful)
1. (Not at all useful)
98. (Don't know)
99. (Refused)

P12. Please tell me which of these steps you have taken to help you save energy in your home. Just tell me a quick yes or no for each one. Have you [installed] [DO NOT READ RESPONSES]

a. A thermostat ***programmed*** to heat and cool efficiently Yes No DK Ref Came with home
b. A ***high efficiency*** water heater to save on heating water **[Add ratings for each item]**
c. A low-flow showerhead and/or faucet aerator to reduce hot water use
d. A ***high efficiency*** heating or cooling system, such as a furnace or heat pump
e. ***More or better*** insulation in the attic, below floors, or in crawl spaces to stop too much air flow
f. ***High efficiency*** windows and/or doors to stop heat loss or gain
g. ***ENERGY STAR rated*** appliances such as a refrigerators, freezers, and clothes washers
h. ***ENERGY STAR rated*** electronics such as computers, televisions, and cable boxes

And how about these steps. . . Have you… . **[Add ratings for each item]**

i. Installed a solar hot water system or solar electric PV panels
j. Installed ceiling fan
k.
l.
m. Installed caulking or weatherstripping around doors or windows to prevent drafts
n. recycled a second refrigerator

P13. And which of these actions do you consistently take to cut your energy use?

Yes No DK REF **[Add ratings for each item]**

a. [ASK P13A ONLY IF P12A ≠ "YES"] Manually adjust thermostat setting at night, when away, or seasonally
b.
c. Get maintenance or a tune up on heating or cooling equipment
d. Turn off lights when not in use
e.
f. Use the sleep feature on computers and other electronics
g. Unplug electronic devices, adapters or chargers when not in use
h.

P14. [If P12 or P13 has at least one YES answer] What are the one or two most important reasons you took the steps you did to save energy at home? [Do not read: ALLOW MULTIPLE RESPONSES; RECORD VERBATIM IF RESPONSE DOES NOT MATCH CATEGORIES]

1. (They were the easiest actions to take)
2. (I wanted to save money on my bill)
3. (They were the lowest cost options for saving energy)
4. (I got the largest possible rebate or tax credit)
5. (I wanted to improve the comfort of my home)
6. (I was planning to replace the equipment anyway)
7. (I wanted to do something to save the environment)
8. (I wanted to stop wasting energy)
9. (Other, specify)_____

98. (Don't know)
99. (Refused)

P15. What are the most important obstacles you face in trying to save more energy in your home? [Do not read: ALLOW MULTIPLE RESPONSES; RECORD VERBATIM IF RESPONSE DOES NOT MATCH CATEGORIES]

1. (Nothing left to do)
2. (Don't know what to do/don't have the right information)
3. (Home has challenges in its construction or age)
4. (Can't afford it/too expensive)
5. (Too hard to install/implement)
6. (Inconvenient, don't have the time, too busy)
7. (Not confident I'll save energy/it will be worth it)
8. (Afraid it will make us uncomfortable)
9. (Challenges with contractors)
10. (Just not that important to do)
11. (Other, specify) _____

98. (Don't know)
99. (Refused)

HOMEBUYING

[IF H5>3, skip to C1]

Since you've been in your home only a few years, I'd like to know more about how energy fit into your choice of homes.

R1. When you were considering what homes to buy, did you ask about how much the energy costs were or how energy efficient they were? [DO NOT READ]

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[IF R1>1, skip to HC1]

R2. Where did you get information about the energy costs or energy efficiency of the homes? [MULTIPLE RESPONSE] [DO NOT READ; RECORD VERBATIM IF ANSWER DOES NOT MATCH CATEGORIES]

1. (Realtor)
2. (Seller)
3. (Past utility bills)
4. (Friends or family)
5. (Inspector)
00. (Other, specify)
98. (Don't know)
99. (Refused)

R3. When you were deciding which home to buy, did knowing about its energy costs or level of energy efficiency have no influence, some influence, or a great influence on your final choice? [DO NOT READ]

1. (No influence)
2. (Some influence)
3. (Great influence)
98. (Don't know)
99. (Refused)

R4. [If R3 >1] If every home that you looked at came with a scorecard that rated how energy efficient that home was, from not at all efficient to very efficient, and also told you what your energy costs were likely to be in the future, would you have found that type of information very useful, somewhat useful, not too useful, or not at all useful in helping you choose a home? [DO NOT READ]

4. (Very Useful)
3. (Somewhat useful)
2. (Not too useful)
1. (Not at all useful)
98. (Don't know)
99. (Refused)

HOME CHARACTERISTICS

Now I have a couple of general questions about your home.

HC1.

HC2. When was your house built? If you don't know exactly, an estimate is fine. [READ LIST ***IF*** NECESSARY]

1. 1939 or earlier
2. 1940 to 1959
3. 1960 to 1979
4. 1980 to 1989
5. 1990 to 1999
6. 2000 to 2004
7. 2005 or later
98. (Don't know)
99. (Refused)

DEMOGRAPHICS

We're almost finished. I just have a few questions about your household to make sure we're getting a representative sample of residents in your area.

X2.

X2a. Do you expect to move out of your current home within the next five years? [DO NOT READ; IF RESPONDENT SAYS THEY PLAN TO LIVE IN THEIR CURRENT HOME FOR THE REST OF THEIR LIFE, RECORD AS "NO"]

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

X3.

X3a. Including yourself, how many of the people currently living your home year-round are in each of the following age groups?

1. Less than 18 years old _____(Record number)
2. 18-64 _____(Record number)
3. 65 or older _____(Record number)
99. (Refused)

X4. Which category best describes your annual household income before taxes in 2011? Please just stop me when I get to the right category.

1. Less than $20 thousand per year
2. 20 to less than 30,000 per year
3. 30 to less than 40,000 per year
4. 40 to less than 50,000 per year
5. 50 to less than 60,000 per year
6. 60 to less than 70,000 per year
7. 70 to less than 80,000 per year
8. 80 to less than $100,000 per year
9. 100K to less than $150,000 per year
10. More than $150,000 per year
11. Don't know
12. Refused

X5. What is the last grade of school you completed? [READ CODES 1-6 **IF NECESSARY**]

1. 12^{th} grade or less (no diploma)
2. High school graduate (includes equivalency)
3. Some college, no degree
4. Associate's degree
5. Bachelor's degree
6. Graduate or professional degree
98. (Don't know)
99. (Refused)

X6. What is your ethnicity or racial heritage? (Do not read list, but ***if*** necessary: White, African American, Arab American, Hispanic, Asian, or something else?)

1. (White)
2. (African American/Black)
3. (Native American/American Indian/Alaska Native)
4. (Asian)
5. (Native Hawaiian or Other Pacific Islander)
6. (Hispanic/Spanish-American)
7. (Arab American)
8. (Mixed/bi-racial/two or more races)
9. (Other, SPECIFY)
98. (Don't know)
99. (Refused)

X7. What is the primary language spoken in your home? (DO NOT READ LIST)

1. (English)
2. (Spanish or Spanish Creole)
3. (Chinese – Mandarin)
4. (Chinese – Cantonese)
5. (Tagalog)
6. (Vietnamese)
7. (Korean)
8. (Russian)
9. (Japanese)
00. (Other, SPECIFY _____)
98. (Don't know)
99. (Refused)

X8. Do you have a computer with Internet access at home?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

Thank you for your time today. That's all the questions I have.

Appendix B. Partial Participant Survey Instrument (Alabama, Virginia, Washington)

10/17/12, Revised 6/11/13

Research Topic	Partial Participant Survey Question
General experience with program; motivations for participating	10-12, 16a, 22-25, 52a-52c
Importance of program website	17-21
Importance of EPS scorecard and report	27a-31a, 61, 65
Importance of program delivery by local organization	14, 14a
Importance of access to knowledgeable industry professionals	34-37, 43-45
Intention to implement recommendations	8-9
Perceived barriers to implementation	46-48
Importance of access to rebates and loans	49-52
Previous experience with energy efficiency	53
Knowledge about energy efficiency	56, 57
General motivations to save energy	59
Value placed on energy efficiency in home buying	60, 62
Home characteristics & demographics	66-74

KEY

[BOLD RED CAPITALS] – Instructions for programmer

[BOLD GREEN CAPITALS] – Instructions for interviewer

[Blue highlighting] – Data to be pulled from sample

(Response options in parentheses) – Do not read

Questions in blue text – Blue text is for Cadmus' reference, questions should not be treated any differently from questions in black.

INTRODUCTION

Hello, may I speak with [CONTACT NAME]?
[FOR ALL PROGRAMS] My name is [INTERVIEWER NAME]. I am calling about the [program name] program--a program that helps residents in your area save energy at home. I am part of an independent team hired to talk with people who had a home energy assessment through the program. Your feedback

is essential for making sure that [program name] delivers the best possible services to homes in your area.

I would like to assure you I am not selling anything and that your answers are completely confidential. **[IF NEEDED]** Your answers will be combined with answers from everyone who responds to this survey. Your individual name or answers will never be made public.

[IF NEEDED] I work for Discovery Research Group and we are part of an independent team evaluating the [program name] program. [Program name] provided us with your contact information through a highly secure system and it will only be used for research purposes. Your information will not be given or sold to any other parties.

[IF NEEDED] This survey should take about 10 minutes.

[IF NEEDED] If you have any questions or would like to verify any of the information I just provided, please feel free to contact **[PROVIDE APPROPRIATE CONTACT INFORMATION FOR PROGRAM NAME]**:

State	Program Name	Name	Phone Number	Email Address
AL	AlabamaWISE Home Energy	Daniel Tait	(256) 539-6272	daniel@nexusenergycenter.org
MA	Mass Save Home MPG	TBD	TBD	TBD
VA	LEAP, Charlottesville	Lesley Crowther Fore	(434) 227-4666	lesley.fore@leap-va.org
	LEAP, Arlington	Mike Hogan	(202) 222-5426	michael@leap-va.org
	Richmond Region Energy Alliance	Bill Greenleaf	(804) 525-7657	bill.greenleaf@rrea-va.org
	cafe^2 (Café Squared)	Mason Cavell	(540) 260-3494	mcavell@cafe2.org
WA	RePower Kitsap	Yvonne Kraus	(206) 866-0212	yvonne.kraus@csgrp.com

1. Our records show that in [month of audit] you had a home energy assessment through the [program name] program. Are you the person in your household who is most familiar with the assessment?
    1. (Yes) **[SKIP to Q6]**
    2. (No, somebody better to talk to) **[SKIP to Q5]**
    98. (Don't know)
    99. (Refused) **[THANK AND TERMINATE]**

2. You or someone in your house may have called [program name] or signed up through a contractor or on the Internet to get an assessment of how much energy your home uses. Do you remember this?
    1. (Yes)
    2. (No) **[SKIP TO Q4]**
    98. (Don't know) **[SKIP TO Q4]**
    99. (Refused) **[THANK AND TERMINATE]**

3. Are you the best person in your household to talk to about the assessment?
   1. (Yes) **[SKIP TO Q6]**
   2. (No)
   98. (Don't know)
   99. (Refused) **[THANK AND TERMINATE]**

4. Is there someone else in your household who might be better to talk with about the assessment?
   1. (Yes)
   2. (No) **[THANK AND TERMINATE]**
   98. (Don't know) **[THANK AND TERMINATE]**
   99. (Refused) **[THANK AND TERMINATE]**

5. May I speak to that person and have his/her name?
   1. (Yes) **[TRANSFER TO A NEW CONTACT, RECORD NAME, AND REPEAT INTRODUCTION. IF NOT AVAILABLE, ESTABLISH A GOOD TIME TO CALL BACK.]**
   2. (No) **[THANK AND TERMINATE]**
   98. (Don't know) **[THANK AND TERMINATE]**
   99. (Refused) **[THANK AND TERMINATE]**

6. Have you made any energy-saving improvements to your house based on the recommendations in the home energy assessment?
   1. (Yes)
   2. (No) **[SKIP TO Q8]**
   98. (Don't know) **[THANK AND TERMINATE]**
   99. (Refused) **[THANK AND TERMINATE]**

7. Are these energy-saving improvements currently in progress or has the work already been completed?
   1. (Completed)
   2. (In progress) **[TELL RESPONDENT WE MAY CALL THEM BACK AT A LATER DATE TO ASK ABOUT THEIR EXPERIENCES WITH THE PROGRAM. THEN THANK AND TERMINATE]**
   98. (Don't know)
   99. (Refused)

7a. After the energy-saving improvements to your home were completed, did you receive a new Energy Performance Scorecard showing your home's energy use before and after the retrofit?
   1. (Yes, received a new energy assessment report) **[REROUTE RESPONDENT TO PARTICIPANT SURVEY AND BEGIN WITH INTRODUCTION BEFORE Q6]**
   2. (No, have not yet received a new energy assessment report) **[REROUTE RESPONDENT TO PARTICIPANT SURVEY AND BEGIN WITH INTRODUCTION BEFORE Q6]**
   98. (Don't know)
   99. (Refused)

8. Do you plan to make any energy-saving improvements to your house based on the recommendations in the home energy assessment?
   1. (Yes)
   2. (No) **[SKIP TO INTRO BEFORE Q10]**

98. (Don't know) **[SKIP TO INTRO BEFORE Q10]**
99. (Refused) **[SKIP TO INTRO BEFORE Q10]**

9. How soon do you plan to make these energy-saving improvements? Would you say…
    1. The improvements are already in progress **[TELL RESPONDENT WE MAY CALL THEM BACK AT A LATER DATE TO ASK ABOUT THEIR EXPERIENCES WITH THE PROGRAM. THEN, THANK AND TERMINATE]**
    2. You plan to make improvements within the next 6 months
    3. You plan to make the improvements within the next year
    4. You haven't decided yet if you will make the improvements to your home
    98. (Don't know)
    99. (Refused)

PROGRAM EXPERIENCE

Now I have some questions about your recent home energy assessment.

10. How did you learn about [program name] program? **[ALLOW MULTIPLE RESPONSES]**
    1. (Bill insert from utility)
    2. (TV or radio advertisement by utility/efficiency program)
    3. (Newspaper advertisement by utility/efficiency program)
    4. (Direct contact with program staff)
    5. (Local organization)
    6. (Event)
    7. (Word of mouth—e.g., from a friend, family member, neighbor, or co-worker)
    8. (Internet/Website/Google)
    9. (Advertising by a participating auditor/contractor)
    10. (Direct contact with a participating auditor/contractor)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

11. What was the main reason you decided to get an energy assessment of your home?
    1. (To learn ways to save money on energy bills)
    2. (To learn ways to be more green or do my part to help the environment)
    3. (To learn ways to ensure future generations have enough energy)
    4. (To learn ways to reduce the country's dependence on foreign oil)
    5. (To learn how to not waste)
    6. (To learn how I can make my energy bills more predictable)
    7. (To learn how to improve the comfort or heath of my home)
    8. (To learn how to increase the value of my home)
    9. (It was free or low-cost so I thought I'd give it a try)
    10. (It was recommended to me by a friend, family member, or someone else I know)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

12. Are there any other reasons **[READ IF NEEDED: "…you decided to get an energy assessment of your home]**? **[ALLOW MULTIPLE RESPONSES]**
    1. (To learn ways to save money on energy bills)

2. (To learn ways to be more green or do my part to help the environment)
3. (To learn ways to ensure future generations have enough energy)
4. (To learn ways to reduce the country's dependence on foreign oil)
5. (To learn how to not waste)
6. (To learn how I can make my energy bills more predictable)
7. (To learn how to improve the comfort or heath of my home)
8. (To learn how to increase the value of my home)
9. (It was free or low-cost so I thought I'd give it a try)
10. (It was recommended to me by a friend, family member, or someone else I know)
11. (None; no other reasons)
97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
98. (Don't know)
99. (Refused)

13.

14. Are you aware [program name] is a locally run program?
1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[ASK IF Q14=1]

14a. Did having a local program help persuade you to have an energy assessment your home?
1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

15.

16.

16a. How did you sign up for a [program name] home energy assessment?
1. (Program website)
2. (Email to program staff)
3. (Phone call with program staff)
4. (Through an auditor/contractor)
97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
98. (Don't know)
99. (Refused)

[SKIP IF Q16a=1]

17. Have you visited the [program name] website?
1. (Yes)
2. (No) **[SKIP TO Q22]**
98. (Don't know) **[SKIP TO Q22]**
99. (Refused) **[SKIP TO Q22]**

18.

19. Did you find the information you needed when you visited the website?
1. (Yes) **[SKIP TO Q21]**

2. (No)
98. (Don't know) **[SKIP TO Q21]**
99. (Refused) **[SKIP TO Q21]**

20. What information were you unable to find on the website? **[RECORD RESPONSE VERBATIM]**

[ASK IF Q16a=1]

21. Would you say it was very easy, somewhat easy, not too easy, or not at all easy for you to find the sign-up screen on the website?
    1. (Very easy)
    2. (Somewhat easy)
    3. (Not too easy)
    4. (Not at all easy)
    98. (Don't know)
    99. (Refused)

22. Would you say you were very satisfied, somewhat satisfied, not too satisfied, or not at all satisfied with the sign-up process for the home energy assessment?…
    1. Very satisfied **[SKIP TO Q24]**
    2. Somewhat satisfied **[SKIP TO Q24]**
    3. Not too satisfied **[SKIP TO Q24]**
    4. Not at all satisfied **[SKIP TO Q24]**
    98. (Don't know) **[SKIP TO Q24]**
    99. (Refused) **[SKIP TO Q24]**

23.

24. About how much time passed between when you began the sign-up process and when your assessment was completed?
    1. Less than 2 weeks
    2. 2-4 weeks
    3. More than 4 weeks
    98. (Don't know)
    99. (Refused)

25. Were you very satisfied, somewhat satisfied, not too satisfied, or not at all satisfied with that amount of time?
    1. Very satisfied
    2. Somewhat satisfied
    3. Not too satisfied
    4. Not at all satisfied
    98. (Don't know)
    99. (Refused)

26.
27.
27a. As part of the home energy assessment, you should have received a 2-page Energy Performance Scorecard showing your home's energy use. Would you say the Energy Performance Scorecard was…
    1. Very easy to understand

2. Somewhat easy to understand
3. Not too easy to understand
4. Not at all easy to understand
98. (Don't know)
99. (Refused)

28.

28a. What did you think about the level of detail the Energy Scorecard provided? Did it provide…

1. Too much detail
2. The right amount of detail
3. Not enough detail
98. (Don't know)
99. (Refused)

28b. You should also have received a ***report*** with a more detailed energy analysis of your home and a list of the steps you could take to save energy. Would you say this report was…

1. Very easy to understand
2. Somewhat easy to understand
3. Not too easy to understand
4. Not at all easy to understand
98. (Don't know)
99. (Refused)

28c. And what did you think about the level of detail in the report? Did it provide…

1. Too much detail
2. The right amount of detail
3. Not enough detail
98. (Don't know)
99. (Refused)

29. Would you say the home energy assessment ***report*** was very useful, somewhat useful, not too useful, or not at all useful in showing you the steps you could take to save energy in your home?

1. (Very useful)
2. (Somewhat useful)
3. (Not too useful)
4. (Not at all useful)
98. (Don't know)
99. (Refused)

30.

30a. Would you say the results of the 2-page Energy Performance Scorecard and the more detailed report are very reliable, somewhat reliable, not too reliable or not at all reliable?

1. Very reliable **[SKIP TO Q31a]**
2. Somewhat reliable
3. Not too reliable
4. Not at all reliable
98. (Don't know)
99. (Refused) **[SKIP TO Q31a]**

31. Why do you say that the scorecard and report results are **[Q30a]**? **[RECORD RESPONSE VERBATIM]**

31a. Was the Home Energy Scorecard very helpful, somewhat helpful, not too helpful, or not at all helpful in letting you to compare the efficiency of your home to the efficiency of other homes in your area?

1. (Very helpful)
2. (Somewhat helpful)
3. (Not too helpful)
4. (Not at all helpful)
98. (Don't know)
99. (Refused)

32.
33.

Now I have a few questions for you about the auditor who visited your home.

34. Was your auditor or energy specialist able to answer your questions?

1. (Yes) **[SKIP TO Q36]**
2. (No) **[SKIP TO Q36]**
98. (Don't know) **[SKIP TO Q36]**
99. (Refused) **[SKIP TO Q36]**

35.

36. How satisfied are you with the work of the auditor or energy specialist who did your assessment? Were you …?

1. Very satisfied **[SKIP TO Q43]**
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied
98. (Don't know)
99. (Refused) **[SKIP TO Q43]**

37. Why do you say you are **[Q36]** with the auditor's work? **[RECORD RESPONSE VERBATIM]**
38.
39.
40.
41.
42.
43. Are you aware that the auditors who participate in [program name] receive special training about how to make homes more efficient?

1. (Yes)
2. (No) **[SKIP TO Q46]**
98. (Don't know) **[SKIP TO Q46]**
99. (Refused) **[SKIP TO Q46]**

44. Was knowing your auditor received special training in energy efficiency very important, somewhat important, not too important, or not at all important in deciding to undertake a home energy assessment?
    1. Very important
    2. Somewhat important
    3. Not too important **[SKIP to Q46]**
    4. Not important at all **[SKIP to Q46]**
    98. (Don't know) **[SKIP to Q46]**
    99. (Refused) **[SKIP to Q46]**

45. Why do you say knowing about the auditor's training was **[Q44]** to you? **[ALLOW MULTIPLE RESPONSES]**
    1. (The program is backed by an organization I trust)
    2. (It gives me confidence in the auditor's knowledge)
    3. (It gives me confidence in the quality of the auditor's work)
    4. (It gives me confidence that the auditor is trustworthy/not just trying to make a sale)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

[ASK IF Q8=2]

46. What are the main reasons you do ***not*** plan to make energy-saving improvements to your home based on the recommendations in the assessment? **[ALLOW MULTIPLE RESPONSES; RECORD VERBATIM IF RESPONSE DOES NOT MATCH CATEGORIES]**
    1. (Home has challenges in its construction or age)
    2. (Can't afford it/too expensive)
    3. (Too hard to install/implement)
    4. (Inconvenient, don't have the time, too busy)
    5. (Not confident I'll save energy/it will be worth it)
    6. (Afraid it will make us uncomfortable)
    7. (Challenges with contractors)
    8. (Just not that important to do)
    9. (My home is already pretty efficient)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

47.

[ASK IF Q8=1]

48. What major challenges, if any, do you think you will face in making the improvements listed in the home energy assessment report? **[ALLOW MULTIPLE RESPONSES; RECORD VERBATIM IF RESPONSE DOES NOT MATCH CATEGORIES]**

1. (Home has challenges in its construction or age)
2. (Can't afford it/too expensive)
3. (Too hard to install/implement)
4. (Inconvenient, don't have the time, too busy)
5. (Not confident I'll save energy/it will be worth it)
6. (Afraid it will make us uncomfortable)
7. (Challenges with contractors)
8. (Just not that important to do)
9. (My home is already pretty efficient)
10. (None/no major challenges)
97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
98. (Don't know)
99. (Refused)

49. Are you aware that [program name] offers loans for financing home energy retrofits?
    1. (Yes)
    2. (No) **[READ: "[program name] DOES OFFER LOANS TO FINANCE ENERGY-SAVING IMPROVEMENTS"]**
    98. (Don't know) **[READ: "[program name] DOES OFFER LOANS TO FINANCE ENERGY-SAVING IMPROVEMENTS"]**
    99. (Refused) **[READ: "[program name] DOES OFFER LOANS TO FINANCE ENERGY-SAVING IMPROVEMENTS"]**

50. Does the availability of program loans make it much more likely, somewhat more likely, or not at all more likely that you will make energy-saving improvements to your home?
    1. (Much more likely)
    2. (Somewhat more likely)
    3. (Not at all more likely)
    98. (Don't know)
    99. (Refused)

51. Are you aware that [program name] offers rebates to cover some of the costs of making energy-saving improvements to your home?
    1. (Yes)
    2. (No) **[READ: "[program name] DOES OFFER REBATES FOR ENERGY-SAVING IMPROVEMENTS TO YOUR HOME"]**
    98. (Don't know) **[READ: "[program name] DOES OFFER REBATES FOR ENERGY-SAVING IMPROVEMENTS TO YOUR HOME"]**
    99. (Refused) **[READ: "[program name] DOES OFFER REBATES FOR ENERGY-SAVING IMPROVEMENTS TO YOUR HOME"]**

52. Does the availability of rebates make it much more likely, somewhat more likely, or not at all more likely that you will make energy-saving improvements to your home?
    1. (Much more likely)
    2. (Somewhat more likely)
    3. (Not at all more likely)
    98. (Don't know)
    99. (Refused)

52a. Overall, would you say you were very satisfied, somewhat satisfied, not too satisfied, or not at all satisfied with the home energy assessment?

1. (Very satisfied)
2. (Somewhat satisfied)
3. (Not too satisfied)
4. (Not at all satisfied)
98. (Don't know)
99. (Refused)

52b. Why do you say you were **[Q52a]** with the home energy assessment? **[RECORD RESPONSE VERBATIM]**

52c. Are you very likely, somewhat likely, not too likely, or not at all likely to recommend [program name] to others?

1. (Very likely)
2. (Somewhat likely)
3. (Not too likely)
4. (Not at all likely)
98. (Don't know)
99. (Refused)

PREVIOUS HOME ASSESSMENT EXPERIENCE

53. Was the home energy assessment you had through [program name] the only assessment you have had for your current house?

1. (Yes) **[SKIP TO INTRODUCTION BEFORE Q56]**
2. (No) **[SKIP TO INTRODUCTION BEFORE Q56]**
98. (Don't know) **[SKIP TO INTRODUCTION BEFORE Q56]**
99. (Refused) **[SKIP TO INTRODUCTION BEFORE Q56]**

54.
55.

ENERGY EFFICIENCY KNOWLEDGE

Now I'd like to ask some more general questions about how you use energy at home. There are no right or wrong answers to any of these questions, so please just give me your best response. It is also fine to say you don't know how to answer any of these questions.

[THROUGHOUT THE NEXT SEVERAL SECTIONS, MAKE SURE RESPONDENTS ARE FOCUSING ON ENERGY—THAT IS, ELECTRIC AND NATURAL GAS USAGE, NOT WATER. PLEASE DIRECT THEM BACK TO ENERGY USAGE IF THEY START TALKING ABOUT WATER USAGE.]

56. Would you say you are very knowledgeable, somewhat knowledgeable, not too knowledgeable, or not at all knowledgeable, about saving energy in your home?

1. (Very knowledgeable)
2. (Somewhat knowledgeable)
3. (Not too knowledgeable)
4. (Not at all knowledgeable)
98. (Don't know)

99. (Refused)

57. Would you say your experience with the home energy assessment increased your knowledge about how to save energy at home a lot, somewhat, not much, or not at all?
    1. A lot
    2. Somewhat
    3. Not much
    4. Not at all
    98. (Don't know)
    99. (Refused)

CONCERN & PERSONAL RESPONSIBILITY

58.

MOTIVATIONS TO SAVE ENERGY

59. Now please tell me if each of the following reasons to save energy are very important, somewhat important, not too important, or not at important to you. **[RANDOMIZE]**

    a. To save money on your energy bills. Is that ***very*** important, ***somewhat*** important, ***not too*** important, or ***not at all*** important?
        1. (Very important)
        2. (Somewhat important)
        3. (Not too important)
        4. (Not at all important)
        98. (Don't know)
        99. (Refused)

    b. To be more green or to do my part to help the environment. **[READ IF NEEDED: Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?]**
        1. (Very important)
        2. (Somewhat important)
        3. (Not too important)
        4. (Not at all important)
        98. (Don't know)
        99. (Refused)

    c. To make sure future generations have enough energy. **[READ IF NEEDED: Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?]**
        1. (Very important)
        2. (Somewhat important)
        3. (Not too important)
        4. (Not at all important)
        98. (Don't know)
        99. (Refused)

    d. To reduce our dependence on foreign oil. **[READ IF NEEDED: Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?]**
        1. (Very important)
        2. (Somewhat important)
        3. (Not too important)
        4. (Not at all important)

98. (Don't know)
99. (Refused)

e. To not waste. **[READ IF NEEDED: Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?]**
   1. (Very important)
   2. (Somewhat important)
   3. (Not too important)
   4. (Not at all important)
   98. (Don't know)
   99. (Refused)

f. To make your bills more predictable. **[READ IF NEEDED: Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?]**
   1. (Very important)
   2. (Somewhat important)
   3. (Not too important)
   4. (Not at all important)
   98. (Don't know)
   99. (Refused)

g. To improve the comfort or health of your home. **[READ IF NEEDED: Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?]**
   1. (Very all important)
   2. (Somewhat important)
   3. (Not too important)
   4. (Not at all important)
   98. (Don't know)
   99. (Refused)

HOME BUYING

Now I have a few questions about how your energy assessment might affect buying and selling your home.

60. First, do you have any definite plans to move from your current home within the next five years? **[IF RESPONDENT SAYS THEY PLAN TO LIVE IN THEIR CURRENT HOME FOR THE REST OF THEIR LIFE, RECORD AS "NO"]**
   1. (Yes)
   2. (No) **[SKIP TO INTRODUCTION BEFORE Q66]**
   98. (Don't know) **[SKIP TO INTRODUCTION BEFORE Q66]**
   99. (Refused) **[SKIP TO INTRODUCTION BEFORE Q66]**

61. Do you think the Energy Performance Scorecard would be very useful, somewhat useful, not too useful, or not at all useful in helping to sell your home?
   1. Very useful
   2. Somewhat useful
   3. Not too useful
   4. Not at all useful
   98. (Don't know)
   99. (Refused)

62. Do you have any definite plans to buy another home within the next five years?
    1. (Yes)
    2. (No) **[SKIP TO INTRODUCTION BEFORE Q66]**
    98. (Don't know) **[SKIP TO INTRODUCTION BEFORE Q66]**
    99. (Refused) **[SKIP TO INTRODUCTION BEFORE Q66]**

63.
64.
65. And how useful would it be for you to see an Energy Performance Scorecard for the homes you might buy? Would it be…
    1. Very useful
    2. Somewhat useful
    3. Not too useful
    4. Not at all useful
    98. (Don't know)
    99. (Refused)

HOME CHARACTERISTICS & DEMOGRAPHICS

We're almost finished. I just have a few questions about your household to make sure we're getting a representative sample of residents in your area.

66. Do you live in a detached single-family home, a duplex or townhome, a building with 4 or fewer units, or another type of building?
    1. (Detached single-family home)
    2. (Duplex or townhome)
    3. (Building with 4 or fewer units)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

67. How many years have you lived in your current home?
    1. (Less than 2 years)
    2. (2 to 3 years)
    3. (4 to 5 years)
    4. (More than 5 years)
    98. (Don't know)
    99. (Refused)

68. When was your home built? If you don't know exactly, an estimate is fine. **[READ CODES 1-7 IF NECESSARY]**
    1. 1939 or earlier
    2. 1940 to 1959
    3. 1960 to 1979
    4. 1980 to 1989
    5. 1990 to 1999
    6. 2000 to 2004
    7. 2005 or later
    98. (Don't know)

99. (Refused)

69. Including yourself, how many of the people currently living your home year-round are in each of the following age groups?
    1. Less than 18 years old _____ **(Record number)**
    2. 18-64 _____ **(Record number)**
    3. 65 or older _____ **(Record number)**
    98. (Don't know)
    99. (Refused)

70. Which category best describes your annual household income before taxes in 2011? Please just stop me when I get to the right category.
    1. Less than $20 thousand per year
    2. 20 to less than 30,000 per year
    3. 30 to less than 40,000 per year
    4. 40 to less than 50,000 per year
    5. 50 to less than 60,000 per year
    6. 60 to less than 70,000 per year
    7. 70 to less than 80,000 per year
    8. 80 to less than $100,000 per year
    9. 100K to less than $150,000 per year
    10. More than $150,000 per year
    11. (Don't know)
    12. (Refused)

71. What is the highest level of education you completed? **[READ CODES 1-6 IF NECESSARY]**
    1. 12th grade or less (no diploma)
    2. High school graduate (includes equivalency)
    3. Some college, no degree
    4. Associate's degree
    5. Bachelor's degree
    6. Graduate or professional degree
    98. (Don't know)
    99. (Refused)

72. What is your ethnicity or racial heritage? **[DO NOT READ LIST, BUT IF NECESSARY: WHITE, AFRICAN AMERICAN, ARAB AMERICAN, HISPANIC, ASIAN, OR SOMETHING ELSE?]**
    1. (White)
    2. (African American/Black)
    3. (Native American/American Indian/Alaska Native)
    4. (Asian)
    5. (Native Hawaiian or Other Pacific Islander)
    6. (Hispanic/Spanish-American)
    7. (Arab American)
    8. (Mixed/bi-racial/two or more races)
    97. (Other) [SPECIFY; RECORD RESPONSE VERBATIM]
    98. (Don't know)
    99. (Refused)

73.

74. Do you have a computer with Internet access at home?
    1. (Yes)
    2. (No)
    98. (Don't know)
    99. (Refused)

75. **[RECORD GENDER, DO NOT ASK]**
    1. Female
    2. Male

Thank you for your time today. Your input is very valuable and will help [program sponsor] with this program in the future.

Appendix C. Full Participant Survey Instrument (Alabama, Virginia, Washington)

NASEO Multi-State Participant Homeowner Survey
For Alabama, Virginia, and Washington
10/17/12, Revised 6/11/13

Research Topic	Participant Survey Question
General experience with program, motivations for participating	6-6b, 7, 9a-11, 33-34
Importance of program website	7a-7c, 40-44
Importance of EPS scorecard, report, and audit	7d1-9, 28-30, 70, 74
Importance of program delivery by local organization	6c, 6d
Satisfaction with, and Importance of access to, knowledgeable industry professionals	36-39, 45-47
Selection of retrofit measures and barriers to implementation	23-26
Importance of access to rebates and loans	48-60
Previous experience with energy efficiency	62
Knowledge about energy efficiency	65-66
General motivations to save energy	68
Value placed on energy efficiency in home buying	69, 71
Home characteristics & demographics	75-84

KEY

[BOLD RED CAPITALS] – Instructions for programmer and/or interviewer

[BOLD GREEN CAPITALS] – Instructions for interviewer

[Blue highlighting] – Data to be pulled from sample or information provided by Cadmus

(Response options in parentheses) – Do not read

Questions in blue text – Blue text is for Cadmus' reference, questions should not be treated any differently.

INTRODUCTION

Hello, may I speak with [CONTACT NAME]?

[FOR ALL PROGRAMS] My name is [INTERVIEWER NAME]. I am calling about the [program name] program--a program that helps residents in your area save energy at home. I am part of an independent team hired to talk with people who had a home energy assessment and then made energy-saving improvements through the program. Your feedback is essential for making sure that [program name] delivers the best possible services to homes in your area.

I would like to assure you I am not selling anything and that your answers are completely confidential. **[IF NEEDED]** Your answers will be combined with answers from everyone who responds to this survey. Your individual name or answers will never be made public.

[IF NEEDED] This survey should take about 10 minutes.

[IF NEEDED] I work for Discovery Research Group and we are part of an independent team evaluating the [program name] program. [Program name] provided us with your contact information through a highly secure system and it will only be used for research purposes. Your information will not be given or sold to any other parties.

[IF NEEDED] If you have any questions or would like to verify any of the information I just provided, please feel free to contact **[PROVIDE APPROPRIATE CONTACT INFORMATION FOR PROGRAM NAME]**:

State	Program Name	Name	Phone Number	Email Address
AL	AlabamaWISE Home Energy	Daniel Tait	(256) 539-6272	daniel@nexusenergycenter.org
MA	Mass Save Home MPG	TBD	TBD	TBD
VA	LEAP, Charlottesville	Lesley Crowther Fore	(434) 227-4666	lesley.fore@leap-va.org
	LEAP, Arlington	Mike Hogan	(202) 222-5426	michael@leap-va.org
	Richmond Region Energy Alliance	Bill Greenleaf	(804) 525-7657	bill.greenleaf@rrea-va.org
	cafe^2 (Café Squared)	Mason Cavell	(540) 260-3494	mcavell@cafe2.org
WA	RePower Kitsap	Yvonne Kraus	(206) 866-0212	yvonne.kraus@csgrp.com

1. Our records show that you had some energy-saving improvements, also called a retrofit, made to your home through the [program name] program around [month of audit]. Are you the person in your household who is most familiar with this retrofit?
    1. (Yes) **[SKIP to Q6]**
    2. (No, somebody better to talk to) **[SKIP to Q5]**
    98. (Don't know)
    99. (Refused) **[THANK AND TERMINATE]**

2. You or someone in your household may have had a home energy assessment and then later had a contractor install energy-saving measures in your home. Do you recall retrofitting your home to make it more energy efficient?
    1. (Yes)
    2. (No) **[SKIP TO Q4]**
    98. (Don't know) **[SKIP TO Q4]**
    99. (Refused) **[THANK AND TERMINATE]**

3. Are you the best person in your household to talk to about the retrofit?
    1. (Yes) **[SKIP TO Q6]**
    2. (No)
    98. (Don't know)
    99. (Refused) **[THANK AND TERMINATE]**

4. Is there someone else in your household who might be better to talk with about the retrofit?
    1. (Yes)
    2. (No) **[THANK AND TERMINATE]**
    98. (Don't know) **[THANK AND TERMINATE]**
    99. (Refused) **[THANK AND TERMINATE]**

5. May I speak to that person or have his/her name?
    1. (Yes) **[Transfer to new contact, record name, and repeat introduction. If not available establish good time to call back.]**
    2. (No) **[THANK AND TERMINATE]**
    98. (Don't know) **[THANK AND TERMINATE]**
    99. (Refused) **[THANK AND TERMINATE]**

PROGRAM EXPERIENCE

First, I have some questions about your experience with the [program name] program, where you had an energy assessment and got help obtaining an energy saving retrofit for your home. By "retrofit," I mean the energy-saving changes and improvements you made to your home.

6. How did you initially learn about [program name]?
    1. (Bill insert from utility)
    2. (TV or radio advertisement by utility/efficiency program)
    3. (Newspaper advertisement by utility/efficiency program)
    4. (Direct contact with program staff)
    5. (Local organization)
    6. (Event)
    7. (Word of mouth—e.g., from a friend, family member, neighbor, or co-worker)
    8. (Internet/Website/Google)
    9. (Advertising by a participating auditor/contractor)
    10. (Direct contact with a participating auditor/contractor)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

6a. What was the main reason you decided to get ***an energy assessment*** of your home?

1. (To learn ways to save money on energy bills)
2. (To learn ways to be more green or do my part to help the environment)
3. (To learn ways to ensure future generations have enough energy)
4. (To learn ways to reduce the country's dependence on foreign oil)
5. (To learn how to not waste)
6. (To learn how I can make my energy bills more predictable)
7. (To learn how to improve the comfort or heath of my home)
8. (To learn how to increase the value of my home)
9. (It was free or low-cost so I thought I'd give it a try)
10. (It was recommended to me by a friend, family member, or someone else I know)
97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
98. (Don't know)
99. (Refused)

6b. Are there any other reasons **[READ IF NEEDED: "…you decided to get an energy assessment of your home]**? **[ALLOW MULTIPLE RESPONSES]**

1. (To learn ways to save money on energy bills)
2. (To learn ways to be more green or do my part to help the environment)
3. (To learn ways to ensure future generations have enough energy)
4. (To learn ways to reduce the country's dependence on foreign oil)
5. (To learn how to not waste)
6. (To learn how I can make my energy bills more predictable)
7. (To learn how to improve the comfort or heath of my home)
8. (To learn how to increase the value of my home)
9. (It was free or low-cost so I thought I'd give it a try)
10. (It was recommended to me by a friend, family member, or someone else I know)
11. (None; no other reasons)
97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
98. (Don't know)
99. (Refused)

6c. Are you aware [program name] is a locally run program?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[ASK IF Q6c=1]

6d. Did having a local program help persuade you to retrofit your home?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

6e.

6f.

7. How did you sign up for a [program name] home energy assessment?

1. (Program website)

2. (Email to program staff)
3. (Phone call with program staff)
4. (Through an auditor/contractor)
97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
98. (Don't know)
99. (Refused)

[SKIP IF Q7=1]

7a. Have you visited the [program name] website?

1. (Yes)
2. (No)
98. (Don't know)
99. (Refused)

[ASK IF Q7=1 OR Q7a=1]

7b. Did you find the information you needed when you visited the website?

1. (Yes) **[SKIP TO Q7d]**
2. (No)
98. (Don't know) **[SKIP TO Q7d]**
99. (Refused) **[SKIP TO Q7d]**

7c. What information were you unable to find on the website? **[RECORD RESPONSE VERBATIM]**

7d.

7d1. As part of the home energy assessment, you should have received a 2-page Energy Performance Scorecard showing your home's energy use. Would you say the Energy Performance Scorecard was…

1. Very easy to understand
2. Somewhat easy to understand
3. Not too easy to understand
4. Not at all easy to understand
5. (Don't remember scorecard)
98. (Don't know)
99. (Refused)

7d2. You should have also received a report with a more detailed energy analysis of your home and a list of the steps you could take to save energy. Would you say this report was…

1. Very easy to understand
2. Somewhat easy to understand
3. Not too easy to understand
4. Not at all easy to understand
5. (Don't remember report)
98. (Don't know)
99. (Refused)

7e.

[ASK IF Q7d1 < 5 OR Q7d2 < 5]

7e1. Would you say the [**IF Q7d1 < 5 READ:** 2-page ***Energy Performance Scorecard]*** [and] [**IF Q7d2 < 5 READ:** more detailed report] [were/was] very important, somewhat important, not too important, or not at all important ***in deciding to retrofit your home***?

1. Very important
2. Somewhat important
3. Not too important
4. Not at all important
98. (Don't know)
99. (Refused)

7f.

[ASK IF 7d1 < 5 OR 7d2 < 5]

7f1. Would you say that the results of the [**IF Q7d1 < 5 READ:** 2-page Energy Performance Scorecard] [and] [**IF Q7d2 < 5 READ:** more detailed report] [were/was] very reliable, somewhat reliable, not too reliable, or not at all reliable?

1. Very reliable **[SKIP TO Q7h]**
2. Somewhat reliable
3. Not too reliable
4. Not at all reliable
98. (Don't know) **[SKIP TO Q7h]**
99. (Refused) **[SKIP TO Q7h]**

[ASK IF 7d1 < 5 OR 7d2 < 5]

7g. Why do you say the [**IF Q7d1 < 5 READ:** scorecard] [and] [**IF Q7d2 < 5 READ:** report] results were **[Q7f1]**? **[RECORD RESPONSE VERBATIM]**

[SKIP IF Q7d1 ≥ 5]

7h. And was seeing ***your home's energy score, compared to the average scores of homes in your state***, very, somewhat, not too, or not at all important ***in deciding to retrofit your home***?

1. Very important
2. Somewhat important
3. Not too important
4. Not at all important
98. (Don't know)
99. (Refused)

8. Overall, would you say you were very satisfied, somewhat satisfied, not too satisfied, or not at all satisfied with ***the home energy assessment***?

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not at all satisfied
98. (Don't know)
99. (Refused)

9. Why do you say you are **[Q8]** with the home energy assessment? **[RECORD RESPONSE VERBATIM]**

9a. Are you very likely, somewhat likely, not too likely, or not at all likely to recommend [program name] to others?

1. (Very likely)
2. (Somewhat likely)
3. (Not too likely)
4. (Not at all likely)
98. (Don't know)
99. (Refused)

Now I have some questions about the energy-saving improvements you made to your home.

10. What was the main reason you decided to ***make energy-saving improvements*** to your home? **[DO NOT READ]**

1. (Because it was recommended in the Energy Performance Score report)
2. (To save money on energy bills)
3. (To be more green or do my part to help the environment)
4. (To ensure future generations have enough energy)
5. (To reduce the country's dependence on foreign oil)
6. (To not waste)
7. (To make my energy bills more predictable)
8. (To improve the comfort or heath of my home)
9. (To increase the appraised value of my home)
97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
98. (Don't know)
99. (Refused)

11. Are there any other reasons **[READ IF NEEDED: "…you decided to make energy saving improvements"]**? **[ALLOW MULTIPLE RESPONSES]**

1. (Because it was recommended in the Energy Performance Score report)
2. (To save money on energy bills)
3. (To be more green or do my part to help the environment)
4. (To ensure future generations have enough energy)
5. (To reduce the country's dependence on foreign oil)
6. (To not waste)
7. (To make my energy bills more predictable)
8. (To improve the comfort or heath of my home)
9. (To increase the appraised value of my home)
10. (None; no other reasons)
97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
98. (Don't know)
99. (Refused)

12.
13.
14.
15.
16.
17.
18.
19.
20.
21.
22.

23. Did your home energy retrofit include *all*, some, or none of the energy saving recommendations made in the home energy assessment?
    1. (All)
    2. (Some) **[SKIP TO Q25]**
    3. (None) **[SKIP TO Q26]**
    98. (Don't know) **[SKIP TO Q28]**
    99. (Refused) **[SKIP TO Q28]**

24. What were the key reasons you chose to follow all of the recommendations from the assessment? **[ALLOW MULTIPLE RESPONSES]**
    1. (To get the largest possible rebate or tax credit) **[SKIP TO Q28]**
    2 (They are the actions the contractor said I should take) **[SKIP TO Q28]**
    3. (I was planning to replace that equipment anyway) **[SKIP TO Q28]**
    4. (To improve the comfort of my home) **[SKIP TO Q28]**
    5. (To increase the value of my home) **[SKIP TO Q28]**
    6. (To save money on my energy bill) **[SKIP TO Q28]**
    7. (To do something to save the environment) **[SKIP TO Q28]**
    8. (To stop wasting energy) **[SKIP TO Q28]**
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]** **[SKIP TO Q28]**
    98. (Don't know) **[SKIP TO Q28]**
    99. (Refused) **[SKIP TO Q28]**

25. What were the key reasons you chose to follow just some of the recommendations from the assessment? **[ALLOW MULTIPLE RESPONSES]**
    1. (They were the easiest actions to take) **[SKIP TO Q28]**
    2 (They were the least expensive measures I could take to save energy) **[SKIP TO Q28]**
    3. (To get the largest possible rebate or tax credit) **[SKIP TO Q28]**
    4. (They are the actions the contractor said I should take) **[SKIP TO Q28]**
    5. (I was planning to replace that equipment anyway) **[SKIP TO Q28]**
    6. (These improvements would be enough to improve the comfort of my home) **[SKIP TO Q28]**
    7. (These improvements would be enough to increase the value of my home) **[SKIP TO Q28]**
    8. (These improvements would be enough to save money on my energy bill) **[SKIP TO Q28]**
    9. (I wanted to do something to save the environment) **[SKIP TO Q28]**
    10. (I wanted to stop wasting energy) **[SKIP TO Q28]**

97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]** **[SKIP TO Q28]**
98. (Don't know) **[SKIP TO Q28]**
99. (Refused) **[SKIP TO Q28]**

26. You said that you recently did an energy efficiency retrofit, but that you did *not* follow any of the recommendations from the home assessment. Why didn't you follow any of the recommendations? **[RECORD RESPONSE VERBATIM]** **[SKIP TO Q28]**

27.

28. After the retrofit was done, did you receive a new Energy Performance Scorecard showing your home's energy use before and after the retrofit?
    1. (Yes)
    2. (No) **[SKIP TO TEXT BEFORE Q36]**
    3. (Don't remember getting a new scorecard) **[SKIP TO TEXT BEFORE Q36]**
    98. (Don't know) **[SKIP TO TEXT BEFORE Q36]**
    99. (Refused) **[SKIP TO TEXT BEFORE Q36]**

29. How helpful would you say the ***new scorecard*** is in understanding your home's ***energy use after the retrofit***? Is it…
    1. Very helpful
    2. Somewhat helpful
    3. Not too helpful
    4. Not at all helpful
    98. (Don't know)
    99. (Refused) **[SKIP TO Q33]**

30. Why do say you the new scorecard is **[Q29]**? **[RECORD RESPONSE VERBATIM]**

31.
32.
33. About how much time passed between the completion of your home energy retrofit and when your final Energy Performance Score arrived? Was it…
    1. Less than a month
    2. 1-3 months
    3. 3-6 months
    4. More than 6 months
    98. (Don't know)
    99. (Refused)

34. Were you very, somewhat, not too, or not at all satisfied with the amount of time it took to get your new score?
    1. Very satisfied
    2. Somewhat satisfied
    3. Not too satisfied
    4. Not at all satisfied
    98. (Don't know)
    99. (Refused)

35.

Now I'd like to talk with you about the contractor who did the retrofit work on your home.

36. Was the contractor who retrofitted your home able to answer your questions?
    1. (Yes) **[SKIP TO Q38]**
    2. (No)
    98. (Don't know)
    99. (Refused)

37. Did he or she follow up or refer you to appropriate resources for any questions they couldn't answer?
    1. (Yes)
    2. (No)
    98. (Don't know)
    99. (Refused)

38. How satisfied are you with the work the contractor did to retrofit your home? Were you…
    1. Very satisfied **[SKIP TO Q45]**
    2. Somewhat satisfied
    3. Not too satisfied
    4. Not at all satisfied
    98. (Don't know)
    99. (Refused) **[SKIP TO Q45]**

39. Why do you say you are **[Q38]** with the contractor's retrofit work? **[RECORD RESPONSE VERBATIM]**

40.
41.
42.
43.
44.

45. Are you aware that the contractors who participate in [program name] receive special training about how to make homes more energy efficient?
    1. (Yes)
    2. (No) **[SKIP TO TEXT BEFORE Q48]**
    98. (Don't know) **[SKIP TO TEXT BEFORE Q48]**
    99. (Refused) **[SKIP TO TEXT BEFORE Q48]**

46. Was knowing your contractor received special training in energy efficiency very important, somewhat important, not too important or not at all important in deciding to have your retrofit done?
    1. Very important
    2. Somewhat important
    3. Not too important **[SKIP to TEXT BEFORE Q48]**
    4. Not important at all **[SKIP to TEXT BEFORE Q48]**
    98. (Don't know) **[SKIP to TEXT BEFORE Q48]**
    99. (Refused) **[SKIP to TEXT BEFORE Q48]**

47. Why do you say that knowing about the contractor's training was **[Q46]** to you? **[ALLOW MULTIPLE RESPONSES]**
    1. (The program is backed by an organization I trust)
    2. (It gives me confidence in the contractor's knowledge)
    3. (It gives me confidence in the quality of the contractor's work)
    4. (It gives me confidence that the contractor is trustworthy/not just trying to make a sale)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

FUNDING FOR RETROFIT PROJECTS

Now I'd like to ask you a few questions about some financial aspects of your energy efficiency retrofit.

48. People pay for their retrofits through a variety of means. Did you take out a loan to pay for all or part of your retrofit?
    1. Yes
    2. No
    98. (Don't know)
    99. (Refused)

[ASK ONLY IF Q48=1]

49. Do you get a loan offered through [program name] or a loan outside of [program name]?
    1. (A low-interest loan offered through [program name])
    2. (A loan outside of [program name])
    98. (Don't know) **[SKIP TO Q58]**
    99. (Refused) **[SKIP TO Q58]**

[ASK ONLY IF Q49≠1]

50. Were you aware that [program name] offers loans for financing home energy retrofits?
    1. (Yes)
    2. (No)
    98. (Don't know)
    99. (Refused)

[ASK ONLY IF (Q49=1 OR Q50=1)]

51. Did the availability of a [program name] loan influence your decision to complete a home energy retrofit?
    1. (Yes)
    2. (No) **[SKIP TO Q53]**
    98. (Don't know) **[SKIP TO Q53]**
    99. (Refused) **[SKIP TO Q53]**

[ASK ONLY IF Q49=1]

52. If [program name]'s loans had not been available, would you have…
    1. Made the same energy-saving improvements anyway
    2. Made fewer energy-saving improvements
    3. Not made any energy-saving improvements

98. (Don't know)
99. (Refused)

[ASK ONLY IF Q49=1]

53. How satisfied were you with the terms of the loan the program offered? Were you…
    1. Very satisfied **[SKIP TO Q57]**
    2. Somewhat satisfied **[SKIP TO Q57]**
    3. Not too satisfied **[SKIP TO Q57]**
    4. Not at all satisfied **[SKIP TO Q57]**
    98. (Don't know) **[SKIP TO Q57]**
    99. (Refused) **[SKIP TO Q57]**

54.
55.
56.

[ASK ONLY IF (Q48=2 OR Q49=2) AND Q50=1]

57. Why didn't you use the financing offered through the program?
    1. (Didn't need a loan)
    2. (Found a better loan offer somewhere else)
    3. (Didn't have a good experience looking into the loan available through the program)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

58. Did you receive a rebate from [program name] toward the cost of your home retrofit?
    1. (Yes)
    2. (No) **[SKIP TO Q62]**
    3. (Yes, but have not received it yet)
    98. (Don't know) **[SKIP TO Q62]**
    99. (Refused) **[SKIP TO Q62]**

59. Was getting a rebate very important, somewhat important, not too important, or not at all important in deciding to retrofit your home?
    1. (Very important)
    2. (Somewhat important)
    3. (Not too important)
    4. (Not at all important)
    98. (Don't know) **[SKIP TO Q60]**
    99. (Refused) **[SKIP TO Q60]**

59a. Why do you say that getting a rebate was **[Q59]** in deciding on the retrofit? **[RECORD RESPONSE VERBATIM]**

60. How satisfied were you with the amount of the rebate you received for your retrofit? Were you…
    1. Very satisfied
    2. Somewhat satisfied
    3. Not too satisfied
    4. Not at all satisfied

98. (Don't know)
99. (Refused)

61.

PREVIOUS HOME ASSESSMENT EXPERIENCE

62. Was the home energy assessment you had through [program name] the only assessment you have had for your current house?
    1. (Yes) **[SKIP TO INTRODUCTION BEFORE Q65]**
    2. (No) **[SKIP TO INTRODUCTION BEFORE Q65]**
    98. (Don't know) **[SKIP TO INTRODUCTION BEFORE Q65]**
    99. (Refused) **[SKIP TO INTRODUCTION BEFORE Q65]**

63.

64.

ENERGY EFFICIENCY KNOWLEDGE

Now I'd like to ask some more general questions about how you use energy at home. There are no right or wrong answers to any of these questions, so please just give me your best response. It is also fine to say you don't know how to answer any of these questions.

[THROUGHOUT THE NEXT SEVERAL SECTIONS, MAKE SURE RESPONDENTS ARE FOCUSING ON ENERGY—THAT IS, ELECTRIC AND NATURAL GAS USAGE, NOT WATER. PLEASE DIRECT THEM BACK TO ENERGY USAGE IF THEY START TALKING ABOUT WATER USAGE.]

65. Would you say you are very knowledgeable, somewhat knowledgeable, not too knowledgeable, or not at all knowledgeable, about saving energy in your home?
    1. (Very knowledgeable)
    2. (Somewhat knowledgeable)
    3. (Not too knowledgeable)
    4. (Not at all knowledgeable)
    98. (Don't know)
    99. (Refused)

66. Would you say your experience with the home energy assessment and retrofit process increased your knowledge about how to save energy at home a lot, somewhat, not much, or not at all?
    1. A lot
    2. Somewhat
    3. Not much
    4. Not at all
    98. (Don't know)
    99. (Refused)

CONCERN & PERSONAL RESPONSIBILITY

67.

MOTIVATIONS TO SAVE ENERGY

68. Now please tell me if each of the following reasons to save energy are very important, somewhat important, not too important, or not at all important to you. **[RANDOMIZE]**

a. To save money on your energy bills. Is that ***very*** important, ***somewhat*** important, ***not too*** important, or ***not at all*** important?
   1. (Very important)
   2. (Somewhat important)
   3. (Not too important)
   4. (Not at all important)
   98. (Don't know)
   99. (Refused)

b. To be more green or to do my part to help the environment. **[READ IF NEEDED: "Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?"]**
   1. (Very important)
   2. (Somewhat important)
   3. (Not too important)
   4. (Not at all important)
   98. (Don't know)
   99. (Refused)

c. To make sure future generations have enough energy. **[READ IF NEEDED: "Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?"]**
   1. (Very important)
   2. (Somewhat important)
   3. (Not too important)
   4 (Not at all important)
   98. (Don't know)
   99. (Refused)

d. To reduce our dependence on foreign oil. **[READ IF NEEDED: "Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?"]**
   1. (Very important)
   2. (Somewhat important)
   3. (Not too important)
   4. (Not at all important)
   98. (Don't know)
   99. (Refused)

e. To not waste. **[READ IF NEEDED: "Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?"]**
   1. (Very important)
   2. (Somewhat important)
   3. (Not too important)
   4. (Not at all important)
   98. (Don't know)
   99. (Refused)

f. To make your bills more predictable. **[READ IF NEEDED: "Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?"]**
   1. (Very important)
   2. (Somewhat important)

3. (Not too important)
4. (Not at all important)
98. (Don't know)
99. (Refused)

g. To improve the comfort or health of your home. **[READ IF NEEDED: "Is that *very* important, *somewhat* important, *not too* important, or *not at all* important?"]**
1. (Very all important)
2. (Somewhat important)
3. (Not too important)
4. (Not at all important)
98. (Don't know)
99. (Refused)

HOME BUYING

Now I have a few questions about how your retrofit might affect buying and selling your home.

69. First, do you have any definite plans to move from your current home in the next five years? **[IF RESPONDENT SAYS THEY PLAN TO LIVE IN THEIR CURRENT HOME FOR THE REST OF THEIR LIFE, RECORD AS "NO"]**
1. (Yes)
2. (No) **[SKIP TO INTRODUCTION BEFORE Q75]**
98. (Don't know) **[SKIP TO INTRODUCTION BEFORE Q75]**
99. (Refused) **[SKIP TO INTRODUCTION BEFORE Q75]**

70. Do you think the Energy Performance Scorecard would be very useful, somewhat useful, not too useful, or not at all useful in helping to sell your home?
1. Very useful
2. Somewhat useful
3. Not too useful
4. Not at all useful
98. (Don't know)
99. (Refused)

71. Do you have any definite plans to buy another home within the next five years?
1. (Yes)
2. (No) **[SKIP TO INTRODUCTION BEFORE Q75]**
98. (Don't know) **[SKIP TO INTRODUCTION BEFORE Q75]**
99. (Refused) **[SKIP TO INTRODUCTION BEFORE Q75]**

72.
73.
74. And how useful would it be for you to see an Energy Performance Scorecard for the homes you might buy? Would it be…
1. Very useful
2. Somewhat useful
3. Not too useful
4. Not at all useful
98. (Don't know)
99. (Refused)

HOME CHARACTERISTICS & DEMOGRAPHICS

We're almost finished. I just have a few questions about your household to make sure we're getting a representative sample of residents in your area.

75. Do you live in a detached single-family home, a duplex or townhome, a building with 4 or fewer units, or another type of building?
    4. (Detached single-family home)
    5. (Duplex or townhome)
    6. (Building with 4 or fewer units)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

76. How many years have you lived in your current home?
    1. (Less than 2 years)
    2. (2 to 3 years)
    3. (4 to 5 years)
    4. (More than 5 years)
    98. (Don't know)
    99. (Refused)

77. When was your home built? If you don't know exactly, an estimate is fine. **[READ CODES 1-7 IF NECESSARY]**
    1. 1939 or earlier
    2. 1940 to 1959
    3. 1960 to 1979
    4. 1980 to 1989
    5. 1990 to 1999
    6. 2000 to 2004
    7. 2005 or later
    98. (Don't know)
    99. (Refused)

78. Including yourself, how many of the people currently living your home year-round are in each of the following age groups?
    1. Less than 18 years old _____ **[RECORD NUMBER]**
    2. 18-64 _____ **[RECORD NUMBER]**
    3. 65 or older _____ **[RECORD NUMBER]**
    98. (Don't know)
    99. (Refused)

79. Which category best describes your annual household income before taxes in 2011? Please just stop me when I get to the right category.
    13. Less than $20 thousand per year
    14. 20 to less than 30,000 per year
    15. 30 to less than 40,000 per year
    16. 40 to less than 50,000 per year
    17. 50 to less than 60,000 per year

18. 60 to less than 70,000 per year
19. 70 to less than 80,000 per year
20. 80 to less than $100,000 per year
21. 100K to less than $150,000 per year
22. More than $150,000 per year
23. (Don't know)
24. (Refused)

80. What is the highest level of education you completed? **[READ CODES 1-6 IF NECESSARY]**
    7. 12th grade or less (no diploma)
    8. High school graduate (includes equivalency)
    9. Some college, no degree
    10. Associate's degree
    11. Bachelor's degree
    12. Graduate or professional degree
    98. (Don't know)
    99. (Refused)

81. What is your ethnicity or racial heritage? **[DO NOT READ LIST, BUT IF NECESSARY: WHITE, AFRICAN AMERICAN, ARAB AMERICAN, HISPANIC, ASIAN, OR SOMETHING ELSE?]**
    9. (White)
    10. (African American/Black)
    11. (Native American/American Indian/Alaska Native)
    12. (Asian)
    13. (Native Hawaiian or Other Pacific Islander)
    14. (Hispanic/Spanish-American)
    15. (Arab American)
    16. (Mixed/bi-racial/two or more races)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

82.

83. Do you have a computer with Internet access at home?
    3. (Yes)
    4. (No)
    98. (Don't know)
    99. (Refused)

84. **[RECORD GENDER, DO NOT ASK]**
    1. Female
    2. Male

Thank you for your time today. Your input is very valuable and will help [program name] to improve the program.

Appendix D. Full Participant Survey Instrument (Massachusetts)

9/5/13

Research Topic	Participant Survey Question
General experience with program, motivations for participating and making improvements	6-8, 28, 29
Understandability and usefulness of the EPS scorecard	9-11, 17-21
Effectiveness of energy specialists	12-16
Usefulness of thermal imaging	22-27
Knowledge about energy efficiency	30, 31
Home characteristics & demographics	32-37

KEY

[BOLD RED CAPITALS] – Instructions for programmer and/or interviewer

[BOLD GREEN CAPITALS] – Instructions for interviewer

[Blue highlighting] – Data to be pulled from sample

(Response options in parentheses) – Do not read

Questions in blue text – Blue text is for Cadmus' reference, questions should not be treated any differently.

INTRODUCTION

Hello, may I speak with [CONTACT NAME]?

My name is [INTERVIEWER NAME] and I'm calling on behalf of the Massachusetts Department of Energy Resources to get feedback on Home MPG.

[IF NEEDED] Home MPG is a special initiative within the Mass Save program that helps Massachusetts residents save money on their energy bills.

We are talking with people who had a home energy assessment and then made energy-saving improvements through Home MPG. Your feedback is essential for making sure that the Home MPG program delivers the best possible services to homes in your area.

I would like to assure you I am not selling anything and that your answers are completely confidential. If you would rather not answer any of the questions, just let me know and we will move on.

[IF NEEDED] Your answers will be combined with answers from everyone who responds to this survey. Your individual name or answers will never be made public.

[IF NEEDED] This survey should take about 10 minutes.

[IF NEEDED] I work for Discovery Research Group and we are part of the Home MPG program evaluation team. The Home MPG program provided us with your contact information through a highly secure system and it will only be used for research purposes. Your information will not be given or sold to any other parties.

[IF NEEDED] If you have any questions or would like to verify any of the information I just provided, please feel free to contact Alissa Whiteman at (617) 626-7384 or alissa.whiteman@state.ma.us.

SCREENING

1. Our records show that you had a home energy assessment around [month, year of audit] and then made some energy-saving improvements, also called a retrofit, to your home through the Home MPG program. Are you the person in your household who is most familiar with the assessment?
    1. (Yes) **[SKIP to Q10]**
    2. (No, somebody better to talk to) **[SKIP to Q5]**
    98. (Don't know)
    99. (Refused) **[THANK AND TERMINATE]**

2. You or someone in your household may have had a home energy assessment and then later had a contractor make improvements such as adding insulation or replacing your heating equipment. Do you recall the assessment and the home energy improvements?
    1. (Yes)
    2. (No) **[SKIP TO Q4]**
    98. (Don't know) **[SKIP TO Q4]**
    99. (Refused) **[THANK AND TERMINATE]**

3. Are you the best person in your household to talk to about the assessment?
    1. (Yes) **[SKIP TO Q10]**
    2. (No)
    98. (Don't know)
    99. (Refused) **[THANK AND TERMINATE]**

4. Is there someone else in your household who might be better to talk with?
    1. (Yes)
    2. (No) **[THANK AND TERMINATE]**
    98. (Don't know) **[THANK AND TERMINATE]**
    99. (Refused) **[THANK AND TERMINATE]**

5. May I speak to that person or have his/her name?
    1. (Yes) **[Transfer to new contact, record name, and repeat introduction. If not available establish good time to call back.]**
    2. (No) **[THANK AND TERMINATE]**
    98. (Don't know) **[THANK AND TERMINATE]**
    99. (Refused) **[THANK AND TERMINATE]**

PROGRAM EXPERIENCE

First, I have some questions about your experience with the home energy assessment and energy saving retrofit. By "retrofit," I mean the energy-saving changes and improvements you made to your home.

6. How did you initially learn about Home MPG?
    1. (Bill insert from utility)
    2. (TV or radio advertisement by utility/efficiency program)
    3. (Newspaper advertisement by utility/efficiency program)
    4. (Direct contact with program staff)
    5. (Local organization)
    6. (Event)
    7. (Word of mouth—e.g., from a friend, family member, neighbor, or co-worker)
    8. (Internet/Website/Google)
    9. (Advertising by a participating auditor/contractor)
    10. (Direct contact with a participating auditor/contractor)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

7. What was the main reason you decided to get an energy assessment of your home?
    1. (To learn ways to save money on energy bills)
    2. (To learn ways to be more green or do my part to help the environment)
    3. (To learn ways to ensure future generations have enough energy)
    4. (To learn ways to reduce the country's dependence on foreign oil)
    5. (To learn how to not waste)
    6. (To learn how I can make my energy bills more predictable)
    7. (To learn how to improve the comfort or heath of my home)
    8. (To learn how to increase the value of my home)
    9. (It was free or low-cost so I thought I'd give it a try)
    10. (It was recommended to me by a friend, family member, or someone else I know)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

8. Are there any other reasons **[READ IF NEEDED: "…you decided to get an energy assessment of your home]? [ALLOW MULTIPLE RESPONSES]**
    1. (To learn ways to save money on energy bills)
    2. (To learn ways to be more green or do my part to help the environment)
    3. (To learn ways to ensure future generations have enough energy)
    4. (To learn ways to reduce the country's dependence on foreign oil)
    5. (To learn how to not waste)
    6. (To learn how I can make my energy bills more predictable)
    7. (To learn how to improve the comfort or heath of my home)
    8. (To learn how to increase the value of my home)
    9. (It was free or low-cost so I thought I'd give it a try)
    10. (It was recommended to me by a friend, family member, or someone else I know)
    11. (None; no other reasons)

97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
98. (Don't know)
99. (Refused)

9. The specialist who conducted your home energy assessment should have provided you with an energy performance scorecard and report that analyzed your home's energy use and listed the steps you could take to save energy. Do you recall getting the ***scorecard*** as part of your home energy assessment?
    1. (Yes) **[SKIP TO Q11]**
    2. (No)
    98. (Don't know)
    99. (Refused)

10. The scorecard is part of an initiative called Home MPG. It provides an energy performance score for your home, similar to the miles per gallon ratings for cars. It shows the score for you house as is, and what your score is expected to be after you make recommended energy-saving improvements to your home. Do you remember seeing this scorecard of your home?
    1. (Yes)
    2. (No) **[SKIP TO Q19]**
    98. (Don't know) **[SKIP TO Q19]**
    99. (Refused) **[SKIP TO Q19]**

11. How did you receive the scorecard? Did the home energy specialist give it to you at the end of the assessment, did you access it from the Home MPG website after the assessment, or did you receive it some other way?
    1. (Received day of assessment)
    2. (Via the Home MPG website sometime after the assessment)
    3. (Both day of the assessment and later from the Home MPG website)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

12. Did your energy specialist review the scorecard with you?
    1. (Yes)
    2. (No) **[SKIP TO Q17]**
    98. (Don't know) **[SKIP TO Q17]**
    99. (Refused) **[SKIP TO Q17]**

13. About how much time did your energy specialist spend going over the scorecard with you?
    1. Less than 5 minutes
    2. 5 to 10 minutes
    3. More than 10 minutes
    98. (Don't know) **[SKIP TO Q15]**
    99. (Refused) **[SKIP TO Q15]**

14. Would you say that was the right amount of time, too little, or too much?
    1. (Too much time)
    2. (The right amount of time)
    3. (Not enough time)

98. (Don't know)
99. (Refused)

15. How helpful was the energy specialist in giving you a good understanding of the information in the scorecard? Would you say…?
    1. Very helpful **[SKIP TO Q17]**
    2. Somewhat helpful
    3. Not too helpful
    4. Not at all helpful
    98. (Don't know) **[SKIP TO Q17]**
    99. (Refused) **[SKIP TO Q17]**

16. Do you say the energy specialist was **[RESPONSE FROM Q15]** because you already understood the scorecard before talking with the energy specialist, or because you still didn't fully understand the scorecard after talking with the specialist, or for some other reason?
    1. Already understood the scorecard before talking with the energy specialist
    2. Still didn't fully understand the scorecard after talking with the energy specialist
    97. Other **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

17. Would you say the energy performance scorecard was…
    1. Very easy to understand
    2. Somewhat easy to understand
    3. Not too easy to understand
    4. Not at all easy to understand
    98. (Don't know)
    99. (Refused)

18. And overall, how useful was the information shown on the scorecard in helping you decide to make energy-saving improvements to your home? Would you say that the information shown on the energy performance scorecard was very useful, somewhat useful, not too useful, or not at all useful in your decision to make the improvements?
    1. Very useful
    2. Somewhat useful
    3. Not too useful
    4. Not at all useful
    98. (Don't know)
    99. (Refused)

19. After the improvements were done, did you receive an updated Energy Performance Scorecard showing your home's new energy performance score and comparing it to your home's score before making the improvements?
    1. (Yes)
    2. (No) **[SKIP TO Q21]**
    98. (Don't know) **[SKIP TO Q21]**
    99. (Refused) **[SKIP TO Q21]**

20. How useful would you say the updated scorecard was in understanding your home's energy use after making the improvements? Was it…
    1. Very useful
    2. Somewhat useful
    3. Not too useful
    4. Not at all useful
    98. (Don't know)
    99. (Refused)

[ASK IF Q9, Q10, OR Q19=1]

21. And in the future, how useful would it be for you to see an energy performance scorecard for homes you might buy? Would it be…
    1. Very useful
    2. Somewhat useful
    3. Not too useful
    4. Not at all useful
    98. (Don't know)
    99. (Refused)

Now I'd like to ask you some questions about a special tool energy auditors sometimes use called thermal imaging or infrared scanning. Thermal imaging uses a special camera that shows different temperatures in different colors. It can help to identify areas of a home where adding insulation could help save energy. Thermal imaging cameras cannot see through walls or windows.

22. Have you ever heard of thermal imaging or infrared scanning?
    1. (Yes)
    2. (No) **[SKIP TO Q27]**
    98. (Don't know) **[SKIP TO Q27]**
    99. (Refused) **[SKIP TO Q27]**

23. Are you aware that thermal images of the outside of your home are available through Home MPG for some houses in your area?
    1. (Yes)
    2. (No) **[SKIP TO Q27]**
    98. (Don't know) **[SKIP TO Q27]**
    99. (Refused) **[SKIP TO Q27]**

24. Have you viewed a thermal image of the outside of your house online?
    1. (Yes)
    2. (I tried but one was not available) **[SKIP TO Q27]**
    3. (No) **[SKIP TO Q27]**
    98. (Don't know) **[SKIP TO Q27]**
    99. (Refused) **[SKIP TO Q27]**

25. How important would you say seeing the thermal image was in your decision to have a home energy assessment? Would you say it was very important, somewhat important, not too important, or not at all important?
    1. (Very important)
    2. (Somewhat important)

3. (Not too important)
4. (Not at all important)
98. (Don't know)
99. (Refused)

26. Would you say seeing the thermal image was very important, somewhat important, not too important, or not at all important in deciding to make the energy saving improvements to your home?
    1. Very important **[SKIP TO TEXT BEFORE Q28]**
    2. Somewhat important **[SKIP TO TEXT BEFORE Q28]**
    3. Not too important **[SKIP TO TEXT BEFORE Q28]**
    4. Not at all important **[SKIP TO TEXT BEFORE Q28]**
    98. (Don't know) **[SKIP TO TEXT BEFORE Q28]**
    99. (Refused) **[SKIP TO TEXT BEFORE Q28]**

27. Based on this description of a thermal image, how helpful do you think it would be to see a thermal image of the outside of your house? Would it be… **[IF NEEDED, SAY AGAIN, "Thermal imaging or infrared scanning uses a special camera to take a picture of the outside of a house. The picture shows the temperatures of different parts of the house, and it can help to find areas where there may be air leakage or missing insulation."]**
    1. (Very helpful)
    2. (Somewhat helpful)
    3. (Not too helpful)
    4. (Not at all helpful)
    98. (Don't know)
    99. (Refused)

Now I have some questions about the energy-saving improvements you made to your home.

28. What was the main reason you decided to make energy-saving improvements to your home? **[DO NOT READ]**
    1. (Because it was recommended in the Energy Performance Score report)
    2. (To save money on energy bills)
    3. (To be more green or do my part to help the environment)
    4. (To ensure future generations have enough energy)
    5. (To reduce the country's dependence on foreign oil)
    6. (To not waste)
    7. (To make my energy bills more predictable)
    8. (To improve the comfort or heath of my home)
    9. (To increase the appraised value of my home)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

29. Are there any other reasons **[READ IF NEEDED: "…you decided to make energy saving improvements"]? [ALLOW MULTIPLE RESPONSES]**
    1. (Because it was recommended in the Energy Performance Score report)
    2. (To save money on energy bills)
    3. (To be more green or do my part to help the environment)
    4. (To ensure future generations have enough energy)
    5. (To reduce the country's dependence on foreign oil)

6. (To not waste)
7. (To make my energy bills more predictable)
8. (To improve the comfort or heath of my home)
9. (To increase the appraised value of my home)
10. (None; no other reasons)
97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
98. (Don't know)
99. (Refused)

ENERGY EFFICIENCY KNOWLEDGE

Now I'd like to ask some more general questions about how you use energy at home. There are no right or wrong answers to any of these questions, so please just give me your best response. It is also fine to say you don't know how to answer any of these questions.
[THROUGHOUT THE NEXT SEVERAL SECTIONS, MAKE SURE RESPONDENTS ARE FOCUSING ON ENERGY—THAT IS, ELECTRIC AND NATURAL GAS USAGE, NOT WATER. PLEASE DIRECT THEM BACK TO ENERGY USAGE IF THEY START TALKING ABOUT WATER USAGE.]

30. Would you say you are very knowledgeable, somewhat knowledgeable, not too knowledgeable, or not at all knowledgeable, about saving energy in your home?
    1. (Very knowledgeable)
    2. (Somewhat knowledgeable)
    3. (Not too knowledgeable)
    4. (Not at all knowledgeable)
    98. (Don't know)
    99. (Refused)

31. Would you say your experience with the home energy assessment and retrofit process increased your knowledge about how to save energy at home a lot, somewhat, not much, or not at all?
    1. A lot
    2. Somewhat
    3. Not much
    4. Not at all
    98. (Don't know)
    99. (Refused)

HOME CHARACTERISTICS & DEMOGRAPHICS

We're almost finished. I just have a few questions about your household to make sure we're getting a representative sample of residents in your area.

32. Do you live in a detached single-family home, a duplex or townhome, a building with 4 or fewer units, or another type of building?
    1. (Detached single-family home)
    2. (Duplex or townhome)
    3. (Building with 4 or fewer units)
    97. (Other) **[SPECIFY; RECORD RESPONSE VERBATIM]**
    98. (Don't know)
    99. (Refused)

33. When was your home built? If you don't know exactly, an estimate is fine. **[READ CODES 1-7 IF NECESSARY]**
    1. 1939 or earlier
    2. 1940 to 1959
    3. 1960 to 1979
    4. 1980 to 1989
    5. 1990 to 1999
    6. 2000 to 2004
    7. 2005 or later
    98. (Don't know)
    99. (Refused)

34. Including yourself, how many of the people currently living your home year-round are in each of the following age groups?
    1. Less than 18 years old _____ **[RECORD NUMBER]**
    2. 18-64 _____ **[RECORD NUMBER]**
    3. 65 or older _____ **[RECORD NUMBER]**
    98. (Don't know)
    99. (Refused)

35. Which category best describes your annual household income before taxes in 2012? Please just stop me when I get to the right category.
    1. Less than $20 thousand per year
    2. 20 to less than 30,000 per year
    3. 30 to less than 40,000 per year
    4. 40 to less than 50,000 per year
    5. 50 to less than 60,000 per year
    6. 60 to less than 70,000 per year
    7. 70 to less than 80,000 per year
    8. 80 to less than $100,000 per year
    9. 100K to less than $150,000 per year
    10. More than $150,000 per year
    98. (Don't know)
    99. (Refused)

36. What is the highest level of education you completed? **[READ CODES 1-6 IF NECESSARY]**
    1. 12th grade or less (no diploma)
    2. High school graduate (includes equivalency)
    3. Some college, no degree
    4. Associate's degree
    5. Bachelor's degree
    6. Graduate or professional degree
    98. (Don't know)
    99. (Refused)

37. **[RECORD GENDER, DO NOT ASK]**
    1. Female
    2. Male

Thank you for your time today. Your input is very valuable and will help the Home MPG program to improve the program.

Appendix E. Auditor and Contractor Interview Guides (Alabama, Virginia, Washington)

Auditor Interview Guide

Respondent Name and Title:_____ **Date of Interview:**_____

State/Program:_____

Interviewer: _____

Key:

Black text = primary questions	**Red text = secondary questions**

Table 1. Mapping of Researchable Issues to Survey Questions

Researchable Issue	Questions
Have auditors changed their business practices due to participation in the program? Are they selling the same services outside of the program?	1-9
How do auditors hear about and get recruited into the program?	10-12
What benefits did they expect from the program? Have they realized those benefits?	13, 38
What training and support did auditors receive? Why/how have they used their program training to expand their services? What additional training or information would be beneficial?	14-20
Do auditors find the EPS tool is easy to use? Do they trust the EPS results?	21-22, 25, 27, 30, 31, 33-34
How smoothly is the pre-retrofit audit and reporting process working?	23-24, 26, 28
How do homeowners respond to the EPS reports and scores?	29, 30.a, 32
What challenges do auditors face in selling home energy assessments to clients?	35
What is auditors' level of satisfaction from participation in the program?	36-37, 39-41

Table 2. Program Fill-Ins (for questions below) and Contact Information

State / Region	Program Name	Contact (if respondent has questions)		
		Contact Name	Contact Phone #	Contact Email
AL	AlabamaWISE	Daniel Tait	256-539-6272	daniel@nexusenergycenter.org
MA	Mass Save Home MPG			
VA / Arlington County	LEAP--Charlottesville	Cynthia Adams	434-825-0232	cynthia@leap-va.org
VA/ Charlottesville	LEAP—Arlington	Mike Hogan	202-222-5426	michael@leap-va.org
VA / Richmond	Richmond Region Energy Alliance	Bill Greenleaf	804-525-7657	bill.greenleaf@rrea-va.org
VA / Southwest	Café2 (Café Squared)	Mason Cavell	540-260-3494	mcavell@cafe2.org
WA	RePower Kitsap	Yvonne Kraus	206- 866-0212	yvonne.kraus@csgrp.com

[Questions will likely not be asked verbatim, but will be tailored as needed.]

Introduction

Hello, my name is _____ and I'm calling from the Cadmus Group. Our company has been hired to evaluate the **[program name]** program that provides energy assessments and resources such as rebates and financing that encourage residents in your region to make energy-efficiency improvements to their homes.

We are interviewing energy assessors like you who have participated in **[program name]** so that we get a picture of how the program is working from the assessor/auditor perspective. Since you are directly involved in **[program name]**, your feedback is very important in helping us understand the aspects of the program that are working well and the areas that could be improved.

All of our interview findings will be reported anonymously, so none of your replies can be connected to you or your company. Do you have any questions before we begin?

[IF NEEDED: this interview will take approximately 15 to 20 minutes.]

[IF NEEDED: Your name and contact information were provided to us by [contact name] at [program name]. You can contact [contact name] at [phone number and email address] should you have any questions about this interview or Cadmus' role in evaluating [program name].

First I'd like to know a little about you and your company.

1. How long have you been an energy auditor/assessor?
2. How long has your company been in operation?
3. What is your role in the company?
4. What services did your company provide prior to joining the program?
5. Does your company participate as a trade ally with any other energy efficiency programs?
6. Has your home energy assessment work increased since you joined the program? By how much?
7. Did you begin offering new services (related to the program) once you became a trade ally for the program?
8. How many employees do you have today?
    a. Did you hire additional staff as a result of your involvement with the program?
    b. (If yes), how many?
9. Professional credentials and certifications:
    a. What kind of licenses or certifications did you (and others at your company) have prior to becoming a program trade ally?
    b. Did your firm need to acquire additional certifications or licenses in order to participate in the program?
    c. If yes, have these certifications been beneficial to your company outside of the program?

Program Recruitment

Now I'd like to know about how you became involved with the program.

10. How did you first learn about **[program name]**?
11. How were you recruited into the program?
12. What do you think are the best ways to recruit auditors/energy assessors into the program?
13. What motivated your company to participate in **[program name]**?

Program Training and Support

14. What **[program name]**-sponsored training did you attend/receive? **[Probe: Who conducted the training—e.g., Earth Advantage Institute, Advanced Energy, or another organization? Was training geared specifically to auditors, or was it intended for a broader audience?]**
15. (If not covered in Earth Advantage surveys) Did the training session(s) cover the information you expected they would cover?
16. How well did the training session(s) prepare you for:
    a. Understanding the program steps and requirements?
    b. Answering customer questions about the program?
    c. Submitting the required tracking information and/or reports about your homeowner clients?
17. Were there any topics not covered by the training that you would like the program to provide?
18. Where do you go if you have questions about the program?
    a. Have these resources been able to answer all your questions?
    b. What support (aside from training) have you requested from the program?
19. Do you use **[program name]**'s Website?
    a. For what purpose?
    b. Do you have any suggestions for enhancing or improving **[program name]**'s Website?
20. Is there any additional support that you would like to see offered to energy assessors/auditors?

EPS Audits, Reports, and Scores

21. As you know, **[program name]** requires the use of the EPS auditing and reporting software. Did you ever use EPS before you participated in **[program name]**? **[Only respondents in WA and VA—NOVA are likely to have had prior experience with EPS.]**
22. What other auditing software packages have you used?
23. Have you completed any EPS audits for **[program name]**?
    a. [If no] Why not?
    b. [If no] Do you expect to become more active in the program in the near future? When?
    c. [If no] Under what circumstances would you become more active in the program? **[Skip to question #38 in the next section]**
24. How soon after a homeowner schedules an appointment with you are you typically able to conduct the audit?
25. How easy or difficult is it for you to enter data into EPS compared with other software programs you have used?
26. How long does it take to input data directly into the EPS software?
    a. (If auditor has used other auditing software) Does it take more or less time to complete an EPS audit and homeowner report than it takes using other software packages?
27. How easy or difficult is it for you to extract information you need from EPS:
    a. For your own calculations?
    b. To generate reports and scores to present to client homeowners?
28. How soon after you conduct a home assessment/audit do you provide the EPS report to the homeowner?
    a. Do you email the reports and scores to homeowners or send them hard copies in the mail?
    b. Do you provide a way for homeowners to contact you after you send the reports/scores?
    c. Do you explain the reports and scores to homeowners, or wait for them to ask you with questions?
29. Are there any parts of the report that homeowners often ask follow-up questions about?
30. Do you think EPS reports provide an adequate level of detail / are they sufficiently comprehensive?
    a. What feedback have you heard from homeowners?
31. Do you think EPS reports and scores are reliable?
    a. How does the reliability of EPS reports and scores compare to the reliability of other systems you have worked with?
    b. What feedback have you heard from homeowners?
32. What other feedback on EPS reports/scores have you heard from homeowners?
    a. What are their motivations for getting a home energy assessment/audit?
    b. Do they find the EPS reports useful?
    c. Do you think the EPS reports help to motivate homeowners to undertake energy-efficiency home retrofits? Why or why not?
33. Did you have to change your auditing or reporting processes in order to integrate EPS?
    a. (If yes) What changes did you need to make?
    b. Are the EPS audits more or less comprehensive than other audits you have conducted?
34. Do you expect to continue using EPS when **[program name]** ends? Why or why not?
35. What are your biggest challenges in selling home energy assessment/audit services?
    a. Do the program offerings (e.g., EPS, audit rebates, auditor training) adequately address those challenges?

Overall Experience

36. What do you like about participating in **[program name]**?
37. What do you dislike about participating in **[program name]**?
38. Has the program met your expectations so far? Why or why not?
39. What improvements could **[program name]** make?
40. (If applicable) How does your experience with **[program name]** compare to your experience working with other programs?
41. Is there anything else you would like to tell me about your experience with the program, including additional feedback on the EPS software and how it could be improved?

Those are all of my questions. Thank you for your valuable feedback.

Contractor Interview Guide
For Alabama, Virginia, and Washington

Respondent Name and Title:_____ **Date of Interview:**_____

State/Program:_____

Interviewer: _____

Key:

Black text = primary questions	**Red text = secondary questions**

Table 1. Mapping of Researchable Issues to Survey Questions

Researchable Issue	Questions
Have contractors changed their business practices due to participation in the program? Are they selling the same services outside of the program?	1-9
How do contractors hear about and get recruited into the program?	10-12
What benefits did they expect from the program? Have they been realized?	13, 39
What training and support did contractors receive? Why/how have they used their program training to expand their services? What additional training or information would be beneficial?	14-20
How smoothly is the retrofit sign-up process working? How do contractors develop project scopes?	21-24
How do contractors successfully convert audits into retrofits?	25-27, 29
How does the retrofit reporting process work?	28
Do contractors find the QA process constructive?	30
Do contractors find the EPS tool is easy to use? Do they trust the EPS results?	31-34, 36
Do contractors find EPS helpful in getting homeowners to invest in energy-efficiency?	35
What is contractors' level of satisfaction from participation in the program?	37-38, 40-42

Table 2. Program Fill-Ins (for questions below) and Contact Information

State / Region	Program Name	Contact (if respondent has questions)		
		Contact Name	Contact Phone #	Contact Email
AL	AlabamaWISE	Daniel Tait	256-539-6272	daniel@nexusenergycenter.org
MA	Mass Save Home MPG			
VA / Arlington County	LEAP--Charlottesville	Cynthia Adams	434-825-0232	cynthia@leap-va.org
VA/ Charlottesville	LEAP—Arlington	Mike Hogan	202-222-5426	michael@leap-va.org
VA / Richmond	Richmond Region Energy Alliance	Bill Greenleaf	804-525-7657	bill.greenleaf@rrea-va.org
VA / Southwest	Café2 (Café Squared)	Mason Cavell	540-260-3494	mcavell@cafe2.org
WA	RePower Kitsap	Yvonne Kraus	206- 866-0212	yvonne.kraus@csgrp.com

[Questions will likely not be asked verbatim, but will be tailored as needed.]

Introduction

Hello, my name is _____ and I'm calling from the Cadmus Group. Our company has been hired to evaluate the **[program name]** program that provides energy assessments and resources such as rebates and financing that encourage residents in your region to make energy-efficiency improvements to their homes.

We are interviewing contractors like you who have participated in **[program name]** so that we get a picture of how the program is working from the contractor perspective. Since you are directly involved in **[program name]**, your feedback is very important in helping us understand the aspects of the program that are working well and the areas that could be improved.

All of our interview findings will be reported anonymously, so none of your replies can be connected to you or your company. Do you have any questions before we begin?

[IF NEEDED: this interview will take approximately 15 to 20 minutes.]

[IF NEEDED: Your name and contact information were provided to us by [contact name] at [program name]. You can contact [contact name] at [phone number and email address] should you have any questions about this interview or Cadmus' role in evaluating [program name].

First I'd like to know a little about you and your company.

1. How long have you been a contractor? How long has your work included energy-efficiency retrofits?
2. How long has your company been in operation?
3. What is your role in the company?

4. Did your company perform any energy-efficiency or home retrofit services prior to joining the program? What were they?
5. Does your company participate as a trade ally with any other energy efficiency programs?
6. Has your energy-efficiency retrofit work increased since you joined the program? By how much?
7. Did you begin offering any new services (related to the program) once you became a trade ally for the program?
8. How many employees do you have today?
    a. Did you hire additional staff as a result of your involvement with the program?
    b. (If yes) How many?
9. Professional credentials and certifications:
    a. What kind of licenses or certifications did you (and others at your company) have prior to becoming a program trade ally?
    b. Did your firm need to acquire additional certifications or licenses in order to participate in the program?
    c. If yes, have these certifications been beneficial to your company outside of the program?

Program Recruitment

Now I'd like to know about how you became involved with the program.

10. How did you first learn about **[program name]**?
11. How were you recruited into the program?
12. What do you think are the best ways to recruit contractors into the program?
13. What motivated your company to participate in **[program name]**?

Program Training and Support

14. What **[program name]**-sponsored training did you attend/receive? ? **[Probe: Who conducted the training—e.g., Earth Advantage Institute, Advanced Energy, or another organization? Was training geared specifically to contractors working on energy-efficiency retrofits, or was it intended for a broader audience?]**
15. (If not covered in Earth Advantage surveys) Did the training session(s) cover the information you expected they would cover?
16. How well did the training session(s) prepare you for:
    a. Understanding the program steps and requirements?
    b. Answering customer questions about the program?
    c. Providing homeowners information about the program's rebates and financing opportunities?
    d. Submitting the required tracking information and/or reports about your homeowner clients?
17. Were there any topics not covered by the training that you would like the program to provide?
18. Where do you go if you have questions about the program?
    a. Have these resources been able to answer all your questions?
    b. What other support (aside from training) have you requested from the program?
19. Do you use **[program name]**'s Website?
    a. For what purpose?
    b. Do you have any suggestions for enhancing or improving **[program name]**'s Website?
20. Is there any additional support that you would like to see offered to contractors?

Retrofit Process

21. Have you initiated any retrofits for **[program name]**?
    a. [If yes to question# 21] How are you typically contacted about potential energy-efficient retrofits (e.g., by the program or by interested homeowners)?
    b. [If yes to question #21] What information from EPS do you have at that point (e.g., pre-retrofit EPS report, pre-retrofit EPS score, retrofit recommendations)?
    c. [If yes to question #21] What steps do you take when you learn about a homeowner's interest in a retrofit?
    d. [If yes to question #21] How quickly after learning about the homeowner's interest are you able to follow up?
    e. [If yes to question #21] Do you do any reporting to **[program name]** at this stage?
    f. [If no to question #21] Why not?
    g. [If no to question #21] Do you expect to become more active in the program in the near future? When?
    h. [If no to question #21] Under what circumstances would you become more active in the program? **[Skip to question #39 in the "Overall Experience" section]**
22. How do you develop the project scope that you present to the homeowners?
    a. Do you review the EPS report? [Note that the EPS will be discussed in more detail below]
23. Do you include program rebates and financing in your bids for the retrofits through the program?
    a. (If applicable) Is this standard practice or only for the program?
    b. Do you think the **[program name]** financing has an effect on homeowners' decisions to undertake retrofits, or on the size of their projects?
24. What percent of your program-related bids have homeowners accepted?
25. Have you completed any retrofits for **[program name]**? [If no, skip the remainder of this section]
26. What successful strategies have you used to move customers from completing an audit to completing a retrofit? Can you tell me a success story about how you sold a retrofit?
27. Once you have a signed contract for the work from the homeowner, how long does it usually take to complete a retrofit job?
28. What happens after you complete the retrofit?
    a. Conduct a post-retrofit audit?
    b. Enter post-retrofit data into EPS?
    c. Provide post-retrofit EPS report and score to homeowner?
    d. Assist homeowner in completing rebate application form?
    e. Notify **[program name]** of the retrofit's completion?
    f. Other reporting about the completed retrofit?
29. What are your biggest challenges to selling retrofits?
    a. Do the program offerings (EPS, rebates, financing, sales training, building science education) adequately address those challenges?
    b. Can you think of anything **[program name]** could do to help you sell more retrofits?
30. Have you been through the project QA/QC process?[If yes, ask follow-up questions]
    a. How long after the retrofit was completed did you learn that a QC inspection would be performed?
    b. How did you learn about the QA inspection results?
    c. Did you receive constructive feedback on your work?
    d. What was the process for remedying any problems that were identified through the QA inspection?

EPS Audits, Software and Reports

31. Did you ever use EPS before you participated in **[program name]**? **[Only respondents in WA and VA—NOVA are likely to have had prior experience with EPS.]**
32. How easy or difficult is it for you to enter data into EPS compared with other software programs you have used?
33. How easy or difficult is it for you to extract information you need from EPS? How does this compare to other software programs you have used:
    a. For your own calculations?
    b. To generate reports and scores to present to client homeowners?
34. Do EPS reports provide the right information and level of detail to meet your needs?
    a. Do they provide an adequate picture of the retrofit work needed?
    b. Do you think EPS reports and scores are reliable?
35. How effectively do you think EPS reports and scores convey information to homeowners? Do you think EPS reports and scores help to motivate homeowners to undertake energy-efficiency home retrofits? Why or why not? How does this compare to other software programs you have used?
36. Have you experienced any challenges (not already mentioned) in using EPS?

Overall Experience

37. What do you like about participating in **[program name]**?
38. What do you dislike about participating in **[program name]**?
39. Has the program met your expectations so far? [Why or why not?]
40. What improvements could **[program name]** make?
41. (If applicable) How does your experience with **[program name]** compare to your experience working with other energy efficiency programs?
42. Is there anything else you would like to tell me about your experience with the program?

Those are all of my questions. Thank you for your valuable feedback.

Appendix F. Auditor Interview Guide (Massachusetts)

Respondent Name and Title:_____ **Date of Interview:**_____

State/Program:_____

Interviewer: _____

Table 1. Mapping of Researchable Issues to Survey Questions

Researchable Issue	Questions
Are the auditors selling the same services outside of the program?	Not applicable for MA
How do auditors hear about and get recruited into the program?	Not applicable for MA
What benefits did they expect from the program? Have they realized those benefits?	Not applicable for MA
What training and support did auditors receive? Why/how have they used their program training to expand their services? What additional training or information would be beneficial?	4-8
Do auditors find modified software easy to use? Do they trust the results?	9, 12-13, 16-17
How smoothly is the pre-retrofit audit and reporting process working?	10-11
How do homeowners respond to the new audit reports and scores?	14-15
What challenges do auditors face in selling home energy assessments to clients?	Not applicable for MA
What is the auditors' level of satisfaction from participation in the program?	18-20

[Questions will likely not be asked verbatim, but will be tailored as needed.]

INTRODUCTION

Hello, my name is _____ and I'm calling from the Cadmus Group on behalf of the Mass Department of Energy Resources. Our company has been hired to evaluate the Mass Save Home MPG initiative that is operating in the Springfield area.

We are interviewing the Mass Save energy specialists who have participated in Home MPG so that we get a picture of how the program is working from your perspective. Since you are directly involved in Home MPG, your feedback is very important in helping us understand the aspects of the initiative that are working well and the areas that could be improved.

Do you have any questions before we begin?

[IF NEEDED:** This interview will take approximately 10 to 15 minutes.**]

***[IF NEEDED:** Your name and contact information were provided to us by**[CET Jae MacCauley or Lisa Kohler; Honeywell: Steve Finnegan or Tom Swalec]**. You can contact Alissa Whiteman at 617-626-7384*

*or alissa.whiteman@state.ma.us should you have any questions about this interview or Cadmus' role in evaluating the Home MPG initiative.**]***

BACKGROUND

First I'd like to know a little about you and your company.

1. How long have you been an energy auditor?
2. And how long have you been at **[CET/Honeywell]**?
3. How long have you been conducting Mass Save home energy assessments?

PROGRAM TRAINING AND SUPPORT

4. [If respondent has been conducting Mass Save audits since at least the summer of 2011] Did you attend a training about the audit tool and scorecard that was sponsored by Earth Advantage during the summer of 2011?
5. Have you been trained by **[CSG/CET or Honeywell]** on using the scorecard?
6. Did your training include information about how to explain the scorecard to homeowners?
    a. How useful was the training in helping you explain the Home MPG scorecard to homeowners?
    b. Was there any information or detail about the scorecard you would have liked to know more about before you were in the field (i.e., before you began showing and explaining the scorecard to homeowners)?
7. How well did the training session(s) prepare you for the types of questions homeowners ask you about the scorecard?
    a. Have you been able to answer all of the questions homeowners have asked you about the scorecard?
    b. Are there questions you have not had sufficient background to answer?
    c. What do you do when you are unable to answer homeowner questions?
8. Where do you go if you have questions about the scorecard? Have these resources been able to answer all your questions?

AUDITS, REPORTS, SCORES

9. I understand that the software was modified in **[CSG: October 2012; Honeywell: June2013]**for the Home MPG initiative. Can you tell me about those changes and how they have affected your auditing work?
    a. Have the recent modifications to the auditing software had an impact on the quantity of data you are required to enter? If so, how?
    b. Have the recent modifications to the auditing software had an impact on how you enter required information? If so, how?
    c. Did you have to change your auditing or reporting processes based on the recent software modifications? (If yes) What changes did you need to make?

d. Does it take additional time for you to enter additional information and generate the scorecard (beyond the time you typically spend on an audit)?

10. For approximately how many homes have you completed energy assessments and provided scorecards using the modified software?***[Note: we'll separately ask the lead vendors for their total numbers]***
11. How soon after you conduct a home energy assessment do you provide the report and scorecard to the homeowner?
    a. Do you provide the report and scorecard at the time of the assessment? If so, in what form? Or, if they are provided at a later time, do you email the reports and scores to homeowners or send them hard copies in the mail?
    b. Do you provide a way for homeowners to contact you after you send the reports/scores?
    c. How do explain scorecard to homeowners? Do you initiate the discussion, or do you wait for them to ask you questions?
12. Do you think the scorecard provides an adequate level of detail? Do you think the report provides an adequate level of detail?
13. Do you think the scores (shown on the scorecards) are reliable?
14. What responses or feedback about the new scorecard have you heard from homeowners?
    a. Do they find the scores useful?
    b. Do they think the scorecard provides the right amount of detail, or too much or too little?
    c. Do they think the scorecards are reliable?
    d. Are there aspects of the scorecard that homeowners commonly ask follow-up questions about?
    e. Have you heard any other feedback from homeowners about the scorecard?
15. How effective do you think the scorecard is in motivating homeowners to follow through with retrofits after their home energy audits? Why?
16. Do you have any suggestions for how the scorecard could be improved?
17. Is there anything else you would like to tell me about your experience with the scorecard?

OVERALL EXPERIENCE

18. What do you like about participating in the Home MPG initiative?
19. What do you dislike about participating in Home MPG?
20. Do you have any other comments about Home MPG or the scorecard?

Those are all of my questions. Thank you for your valuable feedback.

Appendix G. Lender Interview Guide

Respondent Name and Title:_____ Date of Interview:_____

Interviewer: _____ Program/State:_____

Duration of interview (# of minutes): _____

Table1. Mapping of Researchable Issues to Interview Questions

Researchable Issue	Questions
What prior experience do lenders have with energy-efficiency loans? How do lenders hear about and get recruited into the program?	3-7
What are lenders' objectives for participating?	7a, 17
What support did lenders receive?	8, 10-11
What is lenders' perception of homeowner and auditor/contractor knowledge of and satisfaction with the program?	12-15
Has the program influenced their lending practices?	9, 16, 18-23
Do lenders expect to continue offering similar loan products beyond 2013?	24, 27
What is lenders' level of satisfaction from participation in the program?	25-26, 28

Table2. Program Fill-Ins (for questions below) and Contact Information

State / Region	Program Name	Contact (if respondent has questions)		
		Contact Name	Contact Phone #	Contact Email
AL	AlabamaWISE	Daniel Tait	256-539-6272	daniel@nexusenergycenter.org
MA	Mass Save Home MPG	TBD	TBD	TBD
VA/ Arlington County	LEAP—Arlington	Mike Hogan	202-222-5426	michael@leap-va.org
VA / Charlottesville	LEAP-- Charlottesville	Cynthia Adams	434-825-0232	cynthia@leap-va.org
VA / Richmond	Richmond Region Energy Alliance	Bill Greenleaf	804-525-7657	bill.greenleaf@rrea-va.org
VA / Southwest	Café2 (Café Squared)	Mason Cavell	540-260-3494	mcavell@cafe2.org
WA	RePower Kitsap	Yvonne Kraus	206- 866-0212	yvonne.kraus@csgrp.com

[Questions will likely not be asked verbatim, but will be tailored as needed.]

Introduction

Hello, my name is _____ and I'm calling from the Cadmus Group. We've been hired to get feedback from you about your work with **[program sponsor]**'s program that provides energy

assessments and resources such as financing to encourage residents in your region to make energy-efficiency improvements to their homes.

Your feedback will be used to make sure the program works for lenders.

[Note that since there is generally only one lender per program, we cannot tell the respondents that their information will be reported anonymously].

Do you have any questions before we get started?

[IF NEEDED: this interview will take approximately 15 to 20 minutes.]

[IF NEEDED: Your name and contact information were provided to us by [contact name] at [program name]. You can contact [contact name] at [phone number and email address] should you have any questions about this interview or Cadmus' role in evaluating [program name].

Respondent and Bank/Credit Union Information and Initial Interest

First I'd like to know a little about you and your company.

1. What is your role at **[bank/credit union]**? (Note: the questions below will best be answered by the manager who set up the loan program, not the loan officer who interacts with homeowners.)
2. What do you consider to be the geographic market area of your **[bank/credit union]**? Does the energy efficiency loan program expand your geographic market area or product offerings?
3. Prior to participating in **[program name]**, was your **[bank/credit union]** actively providing loans for heating, ventilation, and air conditioning (HVAC) projects? Was it actively providing loans for home weatherization or other home improvements?

Energy Efficiency Knowledge & History

4. What special products does **[bank/credit union]** offer to support energy efficiency home retrofits or the purchase of a green-labeled home?
5. Before your partnership with **[program name]**, did any staff members at **[bank/credit union]** ever receive training about energy efficiency and how it relates to residential lending?
6. **[Skip for RePower Kitsap]** Are the loan products offered under the **[program name]** specifically designed for the program?

[Note for RePower Kitsap:

- **Kitsap Credit Union product was developed for RePower Bainbridge/Bremerton, then picked up by RePower Kitsap;**
- **Puget Sound Cooperative Credit Union offers a loan product specific to energy efficiency programs with loan loss reserves, though the product is available to customers outside of Kitsap County]**

Program Knowledge and Support

7. How did **[bank/credit union]** get involved with lending for **[program name]**?
    a. What motivated **[bank/credit union]** to get involved in energy efficiency lending for the **[program name]**? **[Probe for details]**
    b. Do you see offering energy efficiency loans primarily as an opportunity to serve your existing customers or primarily as an opportunity to add new customers?
    c. How effective was **[program name's]** outreach approach in engaging your institution? If needed: What (other) approaches would work better?

8. What support or training did the program provide to **[bank/credit union]** employees once you agreed to be a program affiliated lender? (e.g., training sessions, one-on-one conversations with **[program name]** staff, etc.)
    a. How well did **[program name]** provide you with a good understanding of its steps and requirements? Would you suggest any improvements?
    b. How effective were those efforts in helping you submit the required tracking information and/or reports about your **[program name]** clients?
9. Do you have any written information about the program-related loan products that you could share with me (e.g., brochure, fact sheet)?
10. Where do you go if you have questions about **[program name]**? Have these resources been able to answer all your questions?

Program Influence

11. Who markets the energy efficiency loans (e.g., internal or external public relations or marketing departments, contractor referrals)? Would you recommend any other approaches to raise awareness about these special loan products?
12. What percentage of your customers are aware of energy efficiency financing **[program name]** when they come to you? How did they learn about the program?
    a. What, if any, are their most significant gaps in knowledge about energy efficiency financing?
13. What percentage of customers do your loan officers inform about the **[program name]** loan products?
    a. What customer profile do you find is most interested in the **[program name]** loan products?
    b. What are some of your successful strategies to selling the **[program name]** loan products?
14. What feedback – both informal or through customer research -- do you have from customers about their satisfaction with these energy efficiency loans?
15. Do you interact at all with auditors and contractors participating in the program? (If yes) What feedback do you get from them about the loans being offered?

Program Loans

Now I have a few questions about the **[program name]** loan products.

16. In what ways do the **[program name]** loan products differ from other loan products you offer for home improvements or HVAC upgrades (e.g., security [secured vs. unsecured], interest rate, term, minimum/maximum loan amount, eligibility criteria)?
17. Do you think this loan product met a previously unmet customer need?
18. How were underwriting standards developed for the energy-efficiency loan product? **[Probe: energy bill savings; quality of energy efficiency loan borrower vs. quality of general population borrower]**
19. Did **[program name]** offer you some form of credit enhancement? **[Probe: loan loss reserve and/or interest rate buy down]**
    a. **[If yes]** Did the credit enhancement influence **[bank/credit union]**'s decision to participate (i.e., due to the increased security)?
    b. Did it influence the terms your institution was willing to offer to customers?
    c. **[If yes]** What performance information would you need to feel comfortable offering these terms without any credit enhancements? What if your competitors started doing this?

20. **[Ask if the loan products offered under [program name] were *not* specifically designed for the program--see response to Q6; skip for RePower Kitsap]**:
    a. Why didn't **[bank/credit union]** design loan products specifically for **[program name]**? Did you have existing products that you are now making available to **[program name]** participants? What are they?
    b. Have you seen an increase in homeowners pursing these loans due to **[program name]**?
    c. Have you seen an increase in homeowners pursing these loans outside of **[program name]**? (If yes) Why do you think this is happening?
21. How many loan applications from **[program name]** homeowner participants have been received?
    a. Does this volume of **[program name]** applicants meet your expectations?
    b. How many have you approved (and how many turned down)?
    c. Did any homeowners withdraw after being approved for the loan? **[If yes, why do you think they withdrew?]**
    d. How does the percentage of **[program name]** applications you've accepted differ from the percentage of applications **[bank/credit union]** typically accepts for comparable loans? (If the percentages are different) Why do you think the **[program name]** loan acceptance rate is different? **[Probe for differences in borrower credit quality]**
    e. How have the energy-efficiency loans performed relative to similar products (e.g., on-time loan payments)? Why do you think this is?
    f. Have you had any defaults?

[If the numbers requested above are not available at the time of the interview, ask if respondent can provide in a follow-up email. Then, at conclusion of interview, email respondent thanking them again for their time and reminding them to send this information.]

22. If **[program name]** participants do not qualify or do not like the terms of the program loans, do you offer them other loan products?
23. What are the most common reasons for not approving a program loan application (e.g., bad credit, insufficient income, technical difficulties with the loan application)? How do these reasons compare to reasons for not approving other home loan applications?

Overall Experience

24. Do you have plans to continue to offer special energy efficiency loan products after the **[program name]** funding ends later this year? Why or why not?
    a. [If yes]
        i. How will these products be the same/different from products you currently offer?
        ii. Are there specific market or other conditions that need to exist for you to keep offering these loan products?
    b. **[If no]** Under what conditions would you continue providing energy efficiency loans?
25. What have been your main lessons learned from partnering with **[program name]**?
26. Overall, is **[bank/credit union]** satisfied with their partnership with **[program name]**?
27. What are the main local and regional factors that affect the energy efficiency loan market?
    a. Has **[program name]** influenced these factors?
    b. What could be done to encourage more energy efficiency loan products?
28. Is there anything else you would like to tell me about your experience with **[program name]**?

Those are all of my questions. Thank you for your valuable feedback.

Appendix H. Real Estate Professional and Appraiser Interview Guide

Respondent Name and Title:_____ Date of Interview:_____

Interviewer: _____ Program/State:_____

Duration of Interview (# minutes): _____

Table 1. Mapping of Researchable Issues to Interview Questions

Researchable Issue	Questions
What prior experience do real estate professionals and appraisers have with energy-efficiency? How do real estate professionals/appraisers hear about and get recruited into the program?	4-5
What are real estate professionals/appraisers objectives for participating?	6
What training and support did real estate professionals/appraisers receive? Why? How have they used this training to expand their services? What additional training or information would be beneficial?	7-11
Do real estate professionals/appraisers find the EPS tool is easy to use? Do they trust the EPS results? How do they value EPS scores/labels?	12-14
Are homeowners aware that EPS scores/labels and other energy-efficiency information may affect the appraised value of their homes? How do real-estate professionals and appraisers communicate energy-efficiency information and EPS scoring to homebuyers?	15-17
Have real estate professionals/appraisers changed their business practices due to participation in the program? Do they expect to continue offering the same services beyond 2013?	17b, 18-21
What are real estate professionals'/appraiser's levels of satisfaction from participation in the program?	22-25

Table 2. Program Fill-Ins (for questions below) and Contact Information

State / Region	Program Name	Contact (if respondent has questions)		
		Contact Name	Contact Phone #	Contact Email
AL	AlabamaWISE	Daniel Tait	256-539-6272	daniel@nexusenergycenter.org
MA	Mass Save Home MPG	N/A	N/A	N/A
VA/ Arlington County	LEAP—Arlington	Mike Hogan	202-222-5426	michael@leap-va.org
VA / Charlottesville	LEAP--Charlottesville	Cynthia Adams	434-825-0232	cynthia@leap-va.org
VA / Richmond	Richmond Region Energy Alliance	Bill Greenleaf	804-525-7657	bill.greenleaf@rrea-va.org
VA / Southwest	Café2 (Café Squared)	Mason Cavell	540-260-3494	mcavell@cafe2.org
WA	RePower Kitsap	Yvonne Kraus	206- 866-0212	yvonne.kraus@csgrp.com

[Questions will likely not be asked verbatim, but will be tailored as needed.]

Introduction

Hello, my name is _____ and I'm calling from the Cadmus Group. Our company has been hired to talk with **[real estate professionals/appraisers]** like you who have worked with **[program name]** so that we get a picture of how the program is working from your perspective. Since you have attended a **[for real estate professionals, read "S.T.A.R.;"[91] for appraisers, read "Appraising Green Homes"[92]]** training session or worked with the program's Energy Performance Score system, your feedback is critical to understanding how to make the program work better for you.

Do you have any questions before we begin?

[IF NEEDED: this interview will take approximately 15 to 20 minutes.]

[IF NEEDED: Your name and contact information were provided to us by [contact name] at [program name]. You can contact [contact name] at [phone number and email address] should you have any questions about this interview or Cadmus' role in evaluating [program name].

Real Estate/Appraiser Information, Initial Interest, and Recruitment

First I'd like to know a little about you and your company.

1. What services does your company offer?
2. What is your role at **[real estate/appraisal firm]**?
3. What do you consider to be the geographic area of your **[real estate/appraisal firm]?**

[91] Respondent may know the "S.T.A.R." training as the "Sustainability Training for Accredited Real Estate Professionals."
[92] The Appraising Green Homes program is often abbreviated as the "AGH training."

4. How did you get involved with **[program name]**? **[Note: if training was first touch point, Earth Advantage Institute (EAI), which conducted the training, likely did most of the outreach.]**
    a. What motivated **[real estate/appraisal firm]** to get involved in **[program name]**? **[Probe for details]**
    b. How effective was **[program name's]** outreach approach in engaging your organization? If needed: What (other) approaches would work better?
    c. How well did **[program name]** provide you with an understanding of the program's requirements? Would you suggest any improvements?

EE Knowledge & History

5. **[For real estate professionals]** Before working with **[program name]**, did your firm offer any services specifically tailored to clients who wanted to buy or sell an energy-efficient home?

   [For appraisers] Before working with **[program name]**, did your firm give any special consideration to homes with energy-efficient or green home features? **[If possible, probe to distinguish between respondent's experience with energy efficiency scores or labels--like EPS or HERS--and respondent's experience with home certifications –like ENERGY STAR or EarthCraft.]**

    a. **[If yes]** What previous experience did you have with energy efficient homes? **[Probe: Other energy efficiency programs? Green labeling (e.g., EPS or HERS)? Certification programs (e.g., ENERGY STAR, EarthCraft)? Get specific names if possible.]**
    b. Are any of your firm's staff specifically trained about energy-efficient home features, or energy-efficient/green home scores or labels **[for appraisers, read *"and how to account for them in home appraisals*"]?**
    c. **[If yes to 5b]** Did they receive any special credentials or recognition after completing the training?
       [Note: EAI will soon be offering appraisers in AL, VA, and WA who previously attended the 2-day AGH course a 3rd day of training. Appraisers will be able to earn the Certified Residential Green Appraiser designation through the additional day of training.]
    d. **[If yes to 5b]** Does your firm plan to offer or support more energy efficiency or green home training sessions?
6. What are your firm's objectives for participating in **[program name]**?
    a. Do you think expertise in energy-efficient/green home scores/labels is a business opportunity? How?
        i.
    b. What demand, if any, have you seen from homeowners for energy-efficient/green home scores/labels?

Program Training and Support

7. What type of training did you attend/receive from **[program name]**?
8. How effective was the training in giving you a sound understanding of **[program name]'s** purpose and goals?
9. How effective was the training in giving you a good understanding of the Energy Performance Score and labeling system?
    a. How would you describe the Energy Performance Score to a **[for real estate professionals, read "client;" for appraisers read, "lender?"]** I will refer to Energy Performance Score as "EPS" for the remainder of this interview.

b. How well did the training prepare you to answer client questions about the program and EPS?
c. **[For real estate professionals]** How well did the training equip you to help clients buy/sell energy-efficient homes?
d. **[For appraisers]** How well did the training better equip you to account for energy-efficient home features in your appraisals?

10. How could the training be improved? How should it be expanded?
    a.
11. Where do you go if you have questions about **[program name]**, or the EPS score/label?
    a. How well have these resources answered your questions?

EPS Score/Label and Program Influence

12. Did you work with EPS scores or labels before you participated in **[program name]**?
13. Have you worked with EPS scores or labels since you attended the **[program name]** training?
14. Is the MLS in your area capable of including EPS scores/labels or energy-efficient features in its listings?
    a. (If yes) When did the MLS gain this capability?
    b. (If no) How do you learn that a home has an EPS score/label?
    c. What other, if any, EE or green building scores/labels/certifications does your local MLS list?
15. What benefits come from a home having an EPS-score/label?
    a. How useful is the score/label?
16. **[For real estate professionals working with home buyers only; Skip if Q13=No]** How informed are clients about energy efficiency and EPS-scored/labeled homes when they come to you?
    a. How often do buyers express interest in energy-efficient homes without your prompting them?
        i. If ever: How helpful are the scores/labels in attracting buyers to specific properties?
    b. Do they think EPS scores/labels affect the value of homes?
    c. How often do you tell buyers about a home's EPS score or label without being asked?
    d. What do you tell your clients about EPS?
    e. How easy is it for you to explain the EPS score and label to your clients?
    f. What questions or feedback do you most commonly hear about EPS?
    g. What motivates buyers to buy an EPS-scored/labeled home? What are some of your successful sales strategies?
    h. How many EPS-scored/labeled homes have you helped clients buy?
17. **[For real estate professionals working with home sellers only; Skip if Q13=No]** How often do you suggest to home-sellers that they obtain an EPS score/label for their home before listing it?
    a. If ever: How have they responded to this suggestion? Do you know of any specific situations where getting an EPS score/label has influenced home sellers to make energy-efficiency retrofits?
    b. Do you market homes you are selling with EPS-scored/labeled homes any differently from how you market homes without the label?
    c. How many EPS-scored/labeled homes have you helped clients sell?
18. **[For appraisers; Skip if Q13=No]** How many EPS-scored/labeled homes have you appraised?
    a. How do your appraisals of EPS-scored/labeled home differ from your appraisals of non-scored/labeled homes (e.g., features you note on the appraisal, % adder you apply to a home's value)?

b. How do high/low EPS scores affect home appraisals?

Sustainability

19. Has **[program name]** helped you integrate energy efficiency into your home **[buying and selling/ appraisal]** business? How?
20. Has working with **[program name]** enabled you to expand your services in any way (e.g., by distinguishing yourself or your firm for your energy efficiency knowledge)?
    a. Do you have plans to continue to use EPS as part of your business approach throughout 2013 and beyond? Are there specific market or other conditions that need to exist for you to continue:
        i. (For real estate professionals) … discussing the EPS or other energy efficiency/green home scores or labels with your clients?
        ii. (For appraisers) … incorporating the EPS or other energy efficiency/green home scores or labels in your appraisals?
21. What are the major local and regional factors affecting energy-efficient home sales and the appraisal market?

Overall Experience

22. What have been the benefits of working with **[program name]**?
23. What would you improve about working with **[program name]**?
24. Did you receive an EPS for your own home?
25. Is there anything else you would like to tell me about your experience with **[program name]**?

Those are all of my questions. Thank you for your valuable feedback.

Appendix I. Utility Staff Interview Guide

Respondent Name and Title:_____ Utility Company: _____

Interviewer: _____ Program/State:_____

Date of Interview:_____ Duration of Interview (# minutes): _____

Table 1. Mapping of Researchable Issues to Interview Questions

Researchable Issue	Questions
What is utility's experience with and role in the pilot (design, implementation, data sharing, reporting)?	2-5, 13-15
What is utility's experience with and perspective on EPS?	6-8
How has the utility been influenced by the pilot program(s)?	9-11
How will the ending of the ARRA grant(s) affect the utility?	12

Table 2. Program Fill-Ins (for questions below) and Contact Information

State / Region	Program Name	Contact (if respondent has questions)		
		Contact Name	Contact Phone #	Contact Email
AL	Worthwhile Investments Save Energy (AlabamaWISE)	Daniel Tait	256-539-6272	daniel@nexusenergycenter.org
MA	Mass Save Home MPG	N/A	N/A	N/A
VA/ Arlington County *	LEAP—Arlington	Mike Hogan	202-222-5426	michael@leap-va.org
VA / Charlottesville	LEAP--Charlottesville	Cynthia Adams	434-825-0232	cynthia@leap-va.org
VA / Richmond*	Richmond Region Energy Alliance	Bill Greenleaf	804-525-7657	bill.greenleaf@rrea-va.org
VA / Southwest*	Café2 (Café Squared)	Mason Cavell	540-260-3494	mcavell@cafe2.org
WA	RePower Kitsap	N/A	N/A	N/A

[Questions will likely not be asked verbatim, but will be tailored as needed.]

Introduction

Hello, my name is _____ and I'm calling from the Cadmus Group. Our company has been hired to evaluate **[program sponsor]**'s program that provides energy assessments and other resources such as

marketing and financing/rebates to encourage residents in your region to make energy-efficiency improvements to their homes.

We are interviewing utility staff that have partnered with **[program name]** about their experiences with the program and any influence **[program name]** may have had on your energy efficiency initiatives.

Do you have any questions before we begin?

[IF NEEDED: this interview will take approximately 15 to 20 minutes.]

[IF NEEDED: Your name and contact information were provided to us by [contact name] at [program name]. You can contact [contact name] at [phone number and email address] should you have any questions about this interview or Cadmus' role in evaluating [program name].

Utility Information and Initial Interest

First I'd like to know a little about you.

1. What is your role at **[utility]** **and how do you work with [program name]**?
2. How did you first learn about and get involved with **[program name]**?
3. What objectives does **[utility]** have for working with **[program name]**? ***[Probe for details]***
4. What is your understanding of **[program name]**'s:
    a. Purpose
    b. Target market? (for WA, emphasize it is Kitsap County minus Bremerton and Bainbridge Island)
    c. Communication and coordination between the program and **[utility]** on these topics (as appropriate; probe how the coordination of each topic went for **[utility]**):
        i. The initial design of **[program name]**
        ii. Day-to-day operations and if/how **[program name]** works in concert with any **[utility]**-sponsored programs
        iii. Sharing/transfer of customer energy usage and other data
        iv. Reporting (does **[utility]** receive **[program name]** reports; does **[utility]** contribute to **[program name]** DOE or other reports?)

Audits

Now I'd like to ask you some more specific questions about **[program name]**'s program offerings.

5. **[WA ONLY]** Homeowners that participate in the RePower Kitsap program have the option of receiving a PSE HomePrint audit and an Energy Performance Score (EPS) audit. Are you familiar with both of these services?
6. Are you familiar with the Energy Performance Score (EPS) auditing software and reports **[program name]** is using?
    a. If so, has **[program name]** shared EPS audit results with **[utility]**?
    b. If so, how useful has this information been to **[utility]**?
    c. [If not helpful] What would make the EPS audit results more useful to **[utility]**?
    d. How adequate is the level of detail in the EPS reports?
    e. How reliable to you think the EPS reports and scores are?
    f. What feedback have you heard from other **[utility]** staff and/or homeowners about EPS reports/scores?

7. **[WA ONLY]** How effective do you think the EPS report is in encouraging homeowners to retrofit their homes? How does this compare to HomePrint's effectiveness in encouraging homeowners to retrofit their homes?

[Program Name]'s Influence on [Utility]'s Energy-Efficiency Offerings

8. **[WA ONLY]** RePower Kitsap staff] mentioned that they have been sharing data from their program and, starting in 2013, PSE adopted RePower Kitsap's air sealing measure.
    a. Is this correct?
    b. If so: Prior to RePower Kitsap's efforts with air sealing, was PSE planning to incorporate the air sealing measure into its energy-efficiency programs?
    c. Why did PSE decide to adopt this measure?
    d. What influence did RePower Kitsap's efforts have on PSE's adoption of this measure?
    e. What information did the RePower Kitsap share with you about air sealing?
    f. What types of assistance, if any, did **[program name]** provide PSE to support this measure (e.g., QA, contractor training)?
    g. Did PSE make any other changes because of RePower Kitsap?
9. **[WA ONLY]** When did PSE launch its Home Performance (HPwES) with ENERGY STAR program? How does HPwES coordinate and interact with RePower Kitsap? **[Probe for specifics regarding timing of program implementation, measures included, rebates, quality assurance, etc.]**
10. As you may know, the US DOE financial support for **[program name]** and the grant period will end in 2013. What effect, if any, do you expect this to have on **[utility]**'s energy-efficiency efforts?

Overall Experience

11. What would you say are the benefits of working with **[program name]**?
12. What lessons were learned from working with **[program name]?**
13. Is there anything else about your experience with **[program name] that you'd like to touch on at this point**?

Those are all of my questions. Thank you for your valuable feedback.