



Delivering Energy Efficiency to Middle Income Single Family Households

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Research Question & Methods



How can programs motivate and enable middle income single family households to seek out comprehensive energy upgrades?

Research Methods:

- ✓ Interviews with more than 35 program administrators, policy makers, researchers, and other experts
- ✓ Case studies of programs—insights from more than 30 programs and 4 longer case studies
- ✓ Review of relevant reports and presentations on the characteristics of middle income American households
- ✓ Analysis of relevant demographic, housing, energy use, and financial data

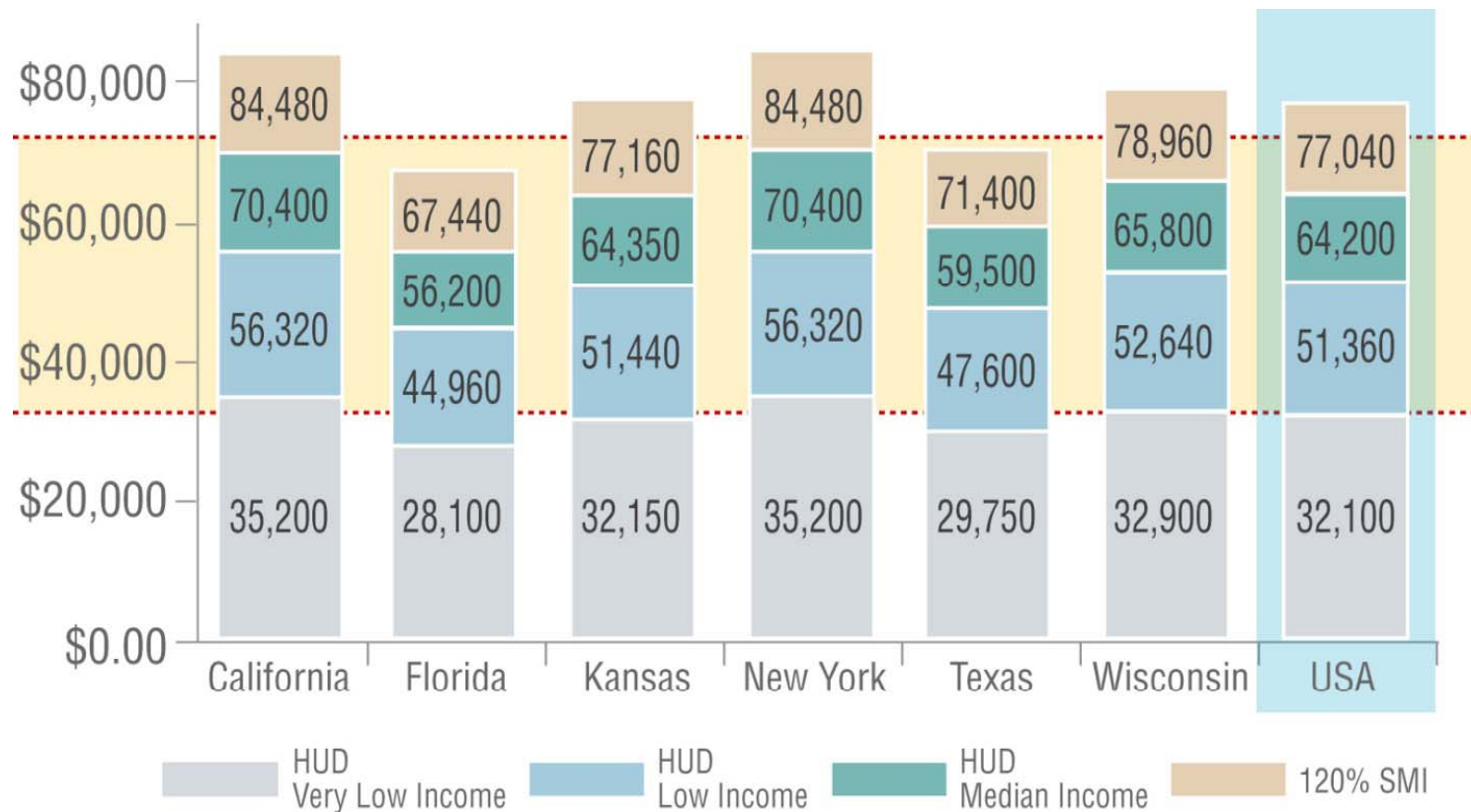
Download the report and other resources at:

<http://middleincome.lbl.gov/>

Defining Middle Income (MI) Households



We define “middle income” as the middle third of U.S. households by income, who earn \$32,500 to \$72,500 annually (see shaded area between red dotted lines). Our definition overlaps HUD’s “Low and Median Income” designation in many states.



Why MI Energy Efficiency Matters



- Middle income households use 1/3 of residential energy—reducing this energy use can deliver public and private benefits
 - Public benefits: reducing power system costs, easing grid congestion and avoiding emissions of greenhouse gases and other pollutants
 - Private benefits: lower energy bills, increasing the structural integrity of homes, improving health and comfort, and reducing exposure to rising energy prices
- Middle income households pay the taxes and utility bill payer charges that fund public energy efficiency programs
 - Higher income households better positioned financially to take advantage of programs that promote comprehensive home energy upgrades and require substantial household investment
 - It is important that benefits of these programs be distributed more broadly—especially given the saving potential in middle income homes

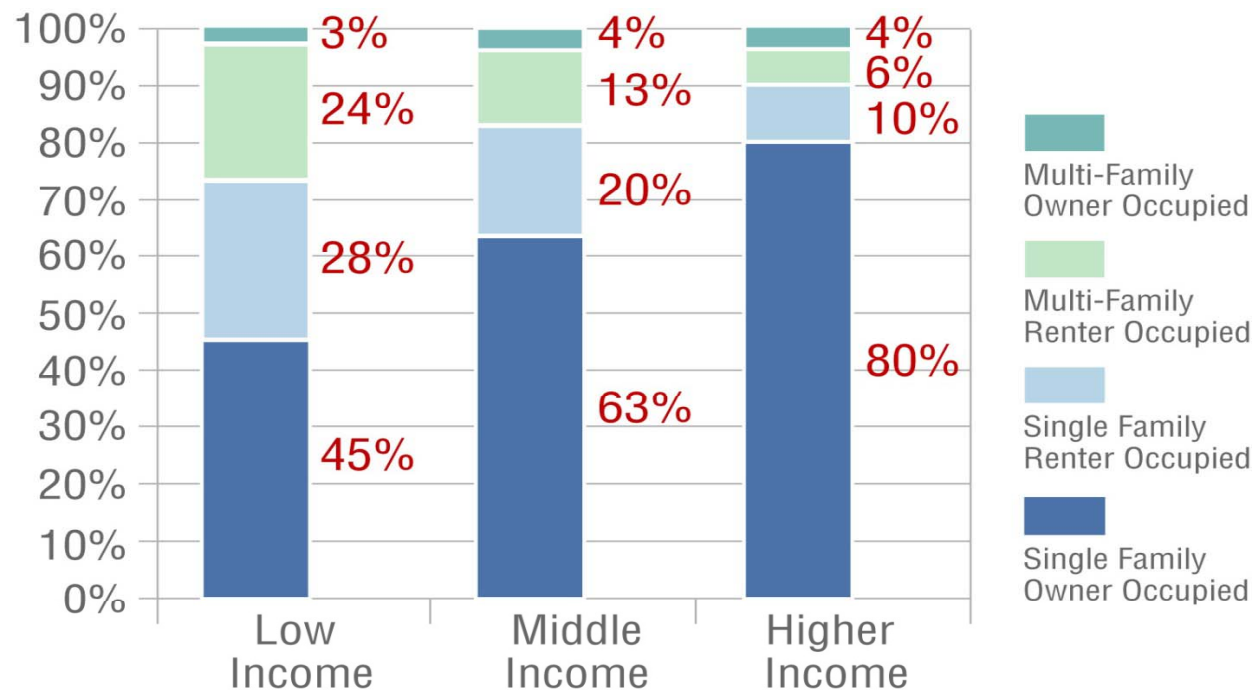


Targeting Middle Income Households



Most middle income (MI) households live in, and own, single family homes—single family homes are the focus of this report*

- 83% of MI households live in single family homes
- 67% of MI households own their homes or apartments



* Single family homes include mobile homes and 1-4 unit dwellings

Source: U.S. Census. 2010 Current Population Survey.

MI Household Characteristics



- Families make up nearly 80 percent of middle income households. The remaining 20 percent are men and women living alone in roughly equal numbers. About a third of middle income households have children.
- The typical middle income householder is a high school graduate or has some college but no degree. About 26 percent have a bachelor's degree or higher.
- Typical occupations for middle income householders are in nursing, teaching, truck driving, retail sales and office work. Middle income earners are ubiquitous at the middle and lower levels of government, law offices, banks, doctors' offices and accounting firms.
- Take-home pay is about 60 percent of wages or salary after average withdrawals for taxes, Social Security, Medicare, and other insurance.
- Of the 38.5 million MI households, nearly 60 percent are living on \$32,500 to \$52,500 annually, the bottom half of the MI range.

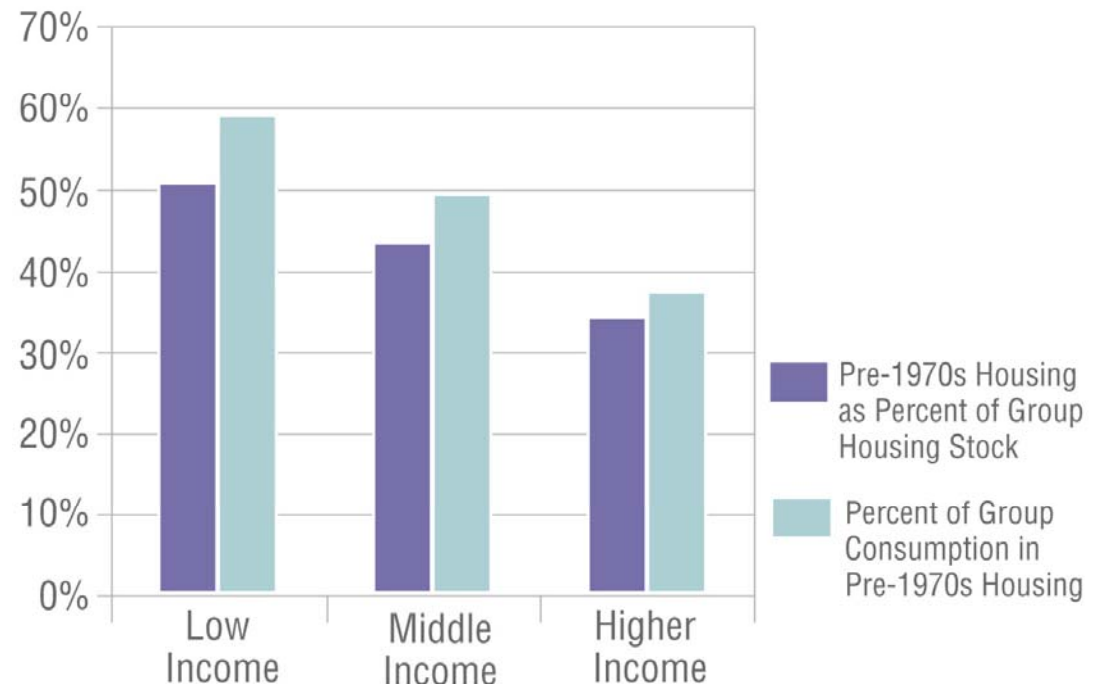


MI Homes are Older & Occupied Longer



MI homes are, on average, older than the homes of higher income households; and residents tend to stay longer.

- Homes built before the 1970s pre-date modern residential building energy codes and are associated with higher energy use and costs per square foot. These homes can be good candidates for home energy improvements.
- Middle-income single family households typically live in a house for a decade or more. This tendency to hold onto homes for longer than their higher income peers suggests that energy efficiency may be appealing as an investment in home value and comfort.

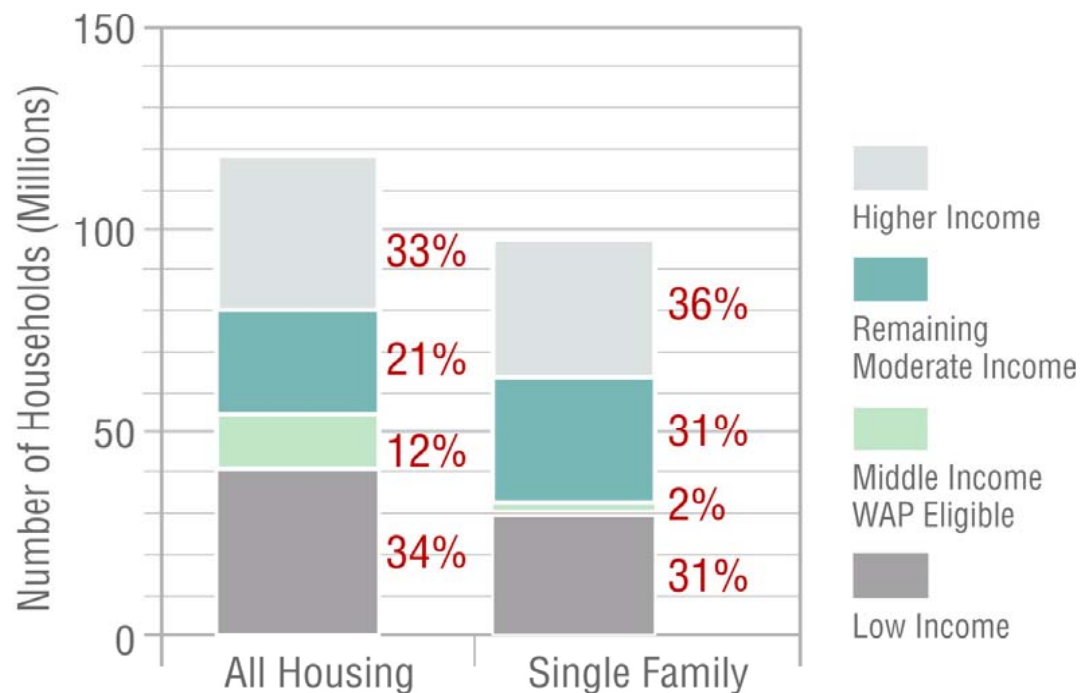


MI Households & Energy Assistance



Most middle income households do not qualify for energy assistance programs like the Weatherization Assistance Program (WAP)*. They are offered the same incentives for energy efficiency programs as their higher income peers.

- 36% of all MI households qualify for WAP, but they are concentrated in multi-family rental units.
- Just 6% of single family households qualify for WAP



* The Department of Energy's Weatherization Assistance Program offers low income households free basic weatherization improvements.

Source: U.S. Census. 2010 Current Population Survey.

Energy Costs



- Based on current fuel prices, we estimate that middle income households will spend about \$80 billion on residential energy in 2011.
- Households with incomes at the national median (within our middle income definition) reported home energy costs of about \$1,900 in 2010 (Bureau of Labor Statistics 2011).
- Total home energy cost remains a small fraction of gross income – about 4 percent – but is quite significant compared to other household spending. For a median-income household, energy spending is equivalent to:
 - More than 55% percent of spending on food at home
 - 65% of healthcare spending
 - Nearly 1.4 times spending on clothing



Home Improvements



- Millions of MI households are performing some type of home improvements every year. From 2008 to 2009, they spent \$83.6 billion (Census 2009).
- About \$18.2 billion of these MI home improvements – roughly 22 percent – were "potentially energy-related" (Census 2009).
 - Potentially energy-related improvements include installation, replacement or repairs to insulation, roofing, central heating or central air conditioning systems.
 - More than half of this spending – about \$10.2 billion – was on roofing repairs, additions and replacements.
 - The only expenditure that we can assert explicitly reflects an intent save energy (or meet building codes that reflect that intent) is insulation, which makes up \$1 billion of this energy-related home improvement spending.
- Total private, potentially energy-related spending by MI households is more than twice the almost \$8 billion in utility bill payer-funded spending on energy efficiency programs for all sectors in 2008 and 2009 (CEE 2008, 2009).
- The magnitude of investments in home improvements suggest that programs can deliver efficiency gains by “nudging” households into selecting better materials and high-efficiency equipment and then incentivizing add-ons, such as air sealing.



Driving MI Demand for Energy Improvements is Challenging



“Many people would rather pay more per month on their utility bills than have a \$6,000 loan hanging over their heads at a time that they are really concerned about keeping their jobs amid the weak economic outlook.”

- Todd Conkey, Wisconsin Energy Conservation Corporation

- How can we motivate homeowners – and middle income single family homeowners in particular – to *want* to invest in energy upgrades?
- Financial strain and the risk of investing in a product with benefits that are perceived to be uncertain make energy efficiency a tough sell for MI households.
 - MI households face an array of challenges—for many, energy use is not a high priority.
 - Energy upgrades have both perceived and real performance risks—how does a customer know they will save money or increase the value of their home?



Opportunities for Reaching MI Households

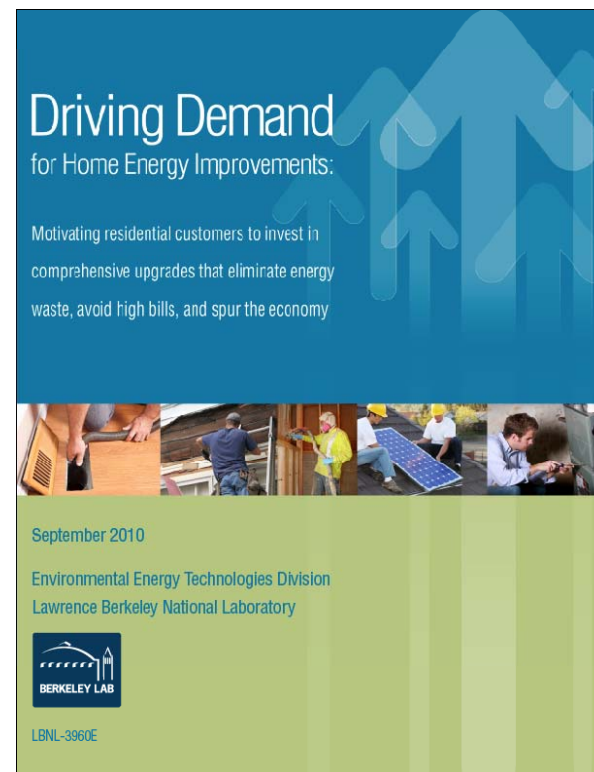


General strategies outlined in LBNL report,
“Driving Demand for Home Energy Improvements”

www.drivingdemand.lbl.gov

Tailored Strategies for MI households:

- Reduce the Cost of Upgrades
- Reduce Participant Risks
- Use Trusted Messengers
- Solve a Problem that Households Recognize
- Make it Easy, but Not Too Easy



Driving Demand: Reduce the Cost of Upgrades



- It may not be realistic to expect MI households to make \$5,000 to \$15,000 proactive efficiency investments.
- Alternative models:
 - Start with the Basics
 - Do the basics today (e.g. air sealing, duct sealing, insulation) at a cost of \$2,000 - \$4,000 and encourage more efficient choices when households make future replacements (e.g. furnace, water heater, air conditioner, windows).
 - Prescriptive Paths
 - Offering a standard set of measures expected to save energy across a range of properties can reduce the need for full energy assessments and tailored proposals – at lower cost to households and programs.
 - Do-It-Yourself Improvements (DIY)
 - Account for 27% of total MI home improvement spending.



Yard sign from Bainbridge Island, WA

Driving Demand: Reduce Participant Risks



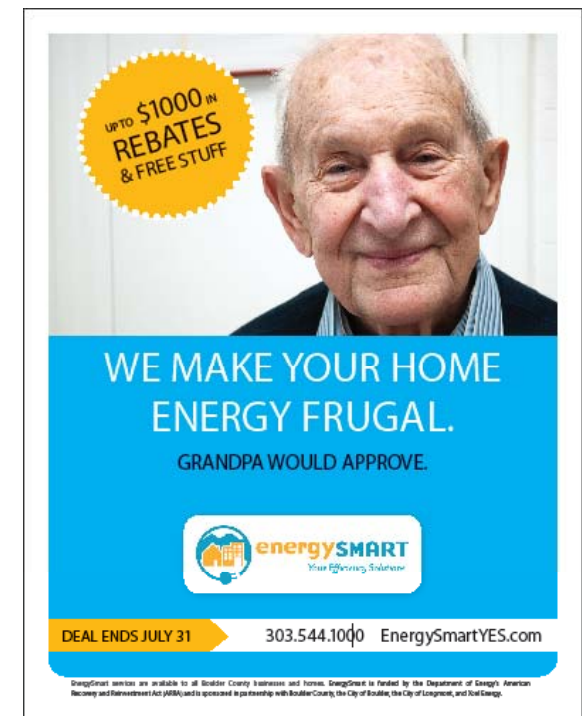
- MI households are generally more vulnerable to losses than their higher income peers.
- Risk reduction strategies:
 - Increase Financial Incentives
 - Some programs tier financial incentives based on household income.
 - In New York MI households are offered a 50 percent rebate on project costs through the state's Assisted Home Performance with ENERGY STAR® program compared to a 25% rebate for higher income households.
 - Flexible Loan Terms
 - Loan terms can be set and adjusted to ensure energy savings exceed loan payments.
 - Performance Guarantees
 - Programs should consider piloting performance guarantees to assess their costs and impacts on demand and household behavior.



Driving Demand: Use Trusted Messengers



- Leverage existing social networks and trusted sources of information to overcome uncertainty about energy efficiency.
 - These messengers will often vary across and within income groups.
- Trusted sources of information:
 - Local non-profits
 - Several programs targeting MI households are working with, or are sponsored by, locally well-known non-profit housing agencies and community development financial institutions (CDFIs).
 - Friends, neighbors, relatives
 - In Wisconsin, more households learned about the state's income-qualified Targeted Home Performance with ENERGY STAR® program by word of mouth from friends, neighbors or relatives than any other source.



Program advertisement from Boulder County, CO

Driving Demand: Solve a Problem that Households Recognize



- Use focus groups and surveys to find and test messages that most resonate with your target audience
- Messages that may resonate with MI households:
 - “Maintain the value of your home”
 - “Replace aging/broken equipment”
 - “Solve health, safety and structural issues”
 - “Save Money by Reducing Energy Bills”

An advertisement with a light blue background. The text reads: "THE KIDS CAN'T WAIT TO SKATE ON THE ROOF again THIS WINTER". Below this, it says: "Get ahead of ice dams and water damage. Community Energy Services has help for those darn ice dams." At the bottom, there are two logos: "One-Stop Community Energy Services" and "cee Center for Energy and Environment".

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One-Stop
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cee
Center for Energy and Environment

Driving Demand: Make it Easy, but Not Too Easy



- Offering simple, seamless, streamlined services is particularly important for MI households.
 - Programs should consider packaging incentives, minimizing paperwork, and pre-approving contractors.
 - Energy advisors can help to ease participation, but they can be expensive.
- While an easy process is vital, making program elements free (such as the initial energy assessment) may attract “tire kickers” who take the first step but never make improvements.

**“In our target income range, households
can become passive very quickly.”**

- Becca Murphy , Indianapolis Neighborhood Housing Partnership

Addressing Building Issues



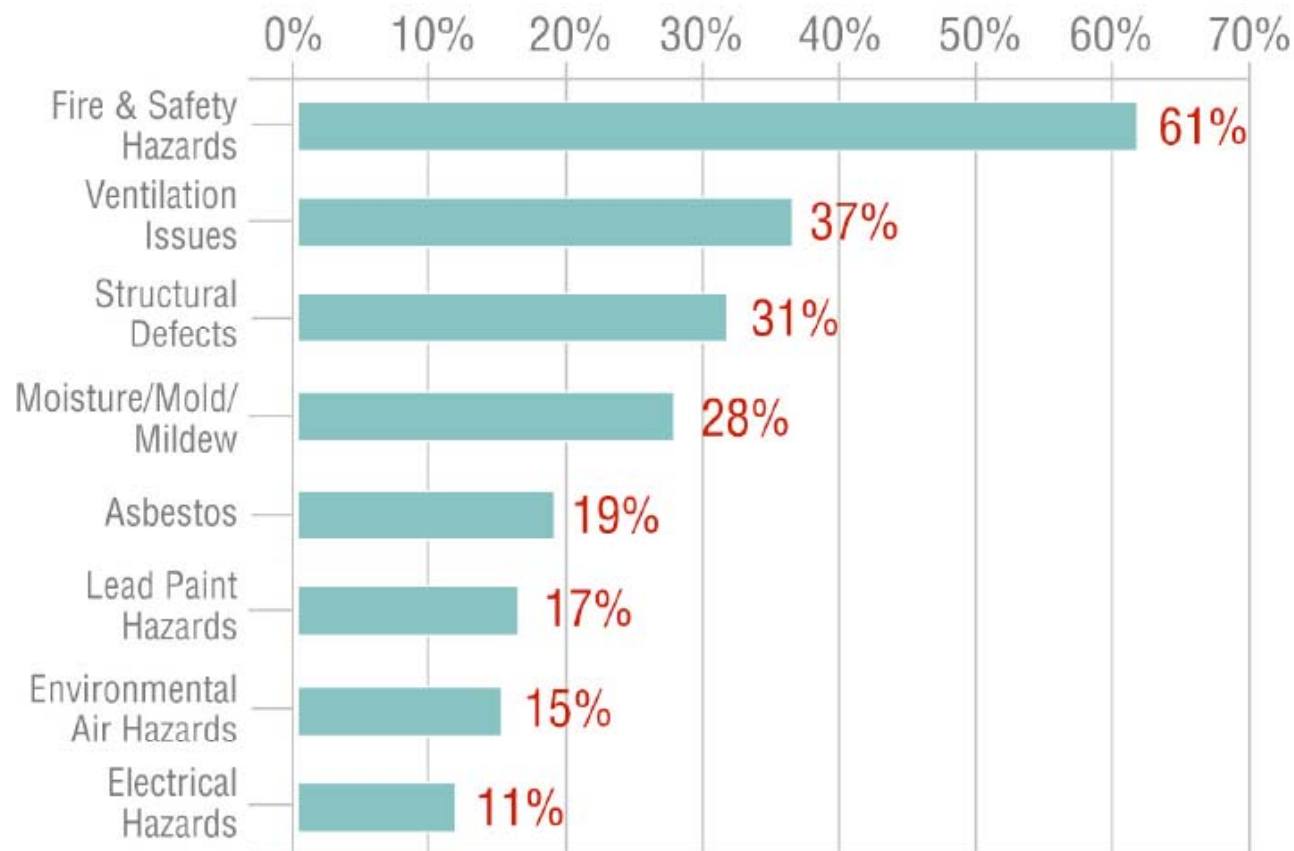
- Many MI households have building structure and maintenance issues that can reduce their property value and adversely affect the health and safety of their occupants.
 - Households are often aware of these problems, but in an uncertain economy, they are either reluctant or unable to afford fixes before problems turn into emergencies.
 - Some issues must be addressed before making EE upgrades.
- Addressing these issues as part of energy efficiency program delivery can attract more participants and address important structural and safety risks.
 - Allow non-energy measures in energy efficiency financing
 - Leverage weatherization contractors
 - Network of over 1,000 WAP organizations may have skills and experience relevant to these issues.
 - Coordinate funding from multiple sources (see slide 20)



Examples of Building Issues



The prevalence of selected health and safety issues in homes inspected in 12 Green & Health Homes Initiative (GHHI) pilot cities.



Coordinate Funding from Multiple Sources



- Many barriers to energy savings and potential public benefits – reduced health and safety issues, improved housing quality, preservation of tax base, and economic development – are targets of other programs and funding sources.
- Streamlining existing funds and services can reduce intervention costs and enhance benefits for households by presenting the homeowner with multiple services in a single package.
- We highlight two examples in this report:
 - The Weatherization Rehabilitation and Asset Preservation (WRAP) Project, a pilot led by the Energy Programs Consortium that coordinated the delivery of WAP and housing rehabilitation services for low and middle income homeowners in 11 communities.
 - Green & Health Homes Initiative, which bundles weatherization services with home health services (such as lead hazard reduction and indoor allergen reduction) to implement a comprehensive assessment, intervention, and education program,



Green & Healthy Homes Initiative™

Opportunities & Challenges of Coordination

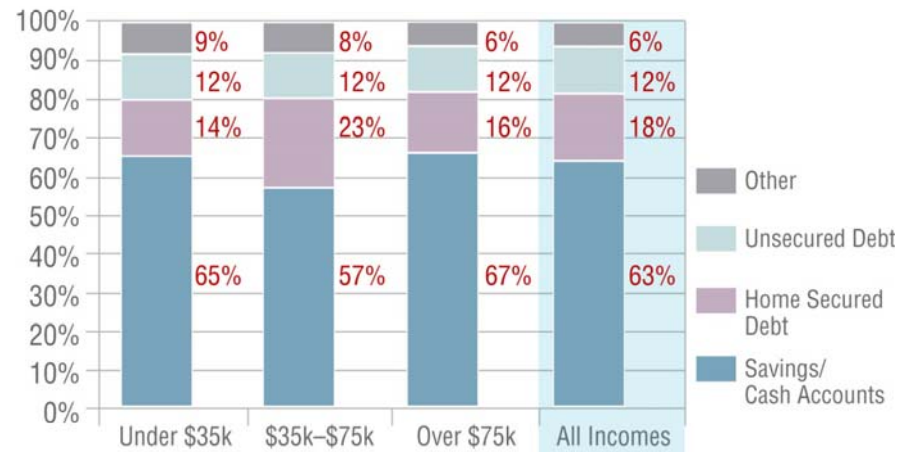


- **Pilot results suggest:**
 - Coordinating services from multiple sources can reduce the burden on participants, and potentially increase participation rates.
 - Low and middle income households may be willing and able to cost share for home improvements – in the WRAP program more than 60% of participating households got a blend of free WAP improvements and rehab measures (for which they had to pay) – and approximately 50% of overall project funding came from loans taken by program participants.
- **However, there were challenges to effective coordination, including:**
 - **Varying program delivery procedures and standards.** Programs often have different procedures for inspecting homes, certifying inspectors, data collection and reporting.
 - **Varying eligibility criteria.** Federal, state and local social service programs often have different income eligibility criteria and income verification procedures.
 - **Varying spending deadlines.** Social services program funding expenditure deadlines vary, which left some pilot organizations unable to line up housing rehabilitation financing in time for eligible households to access expiring WAP funding.
 - **Turf Wars.** Conflicts between agencies and staff – typically over who got credit for work done – were common, suggesting a need for a coordinating body or authority.

Financing to Address Upfront Costs



- The upfront cost of home energy improvements is a significant barrier to investment - energy upgrades for just 1/3 of the 32 million MI single family households would require \$30-\$100 billion.
- MI households have historically invested in maintaining and improving the value of their homes, but now face many limitations in financing (see figure):
 - While 57% of MI home improvement projects were paid for in cash in 2001, the recession has since depleted household savings.
 - MI households were more likely than any other income group to pay for home improvements using use home as security, which was also depleted for many households during the recession.



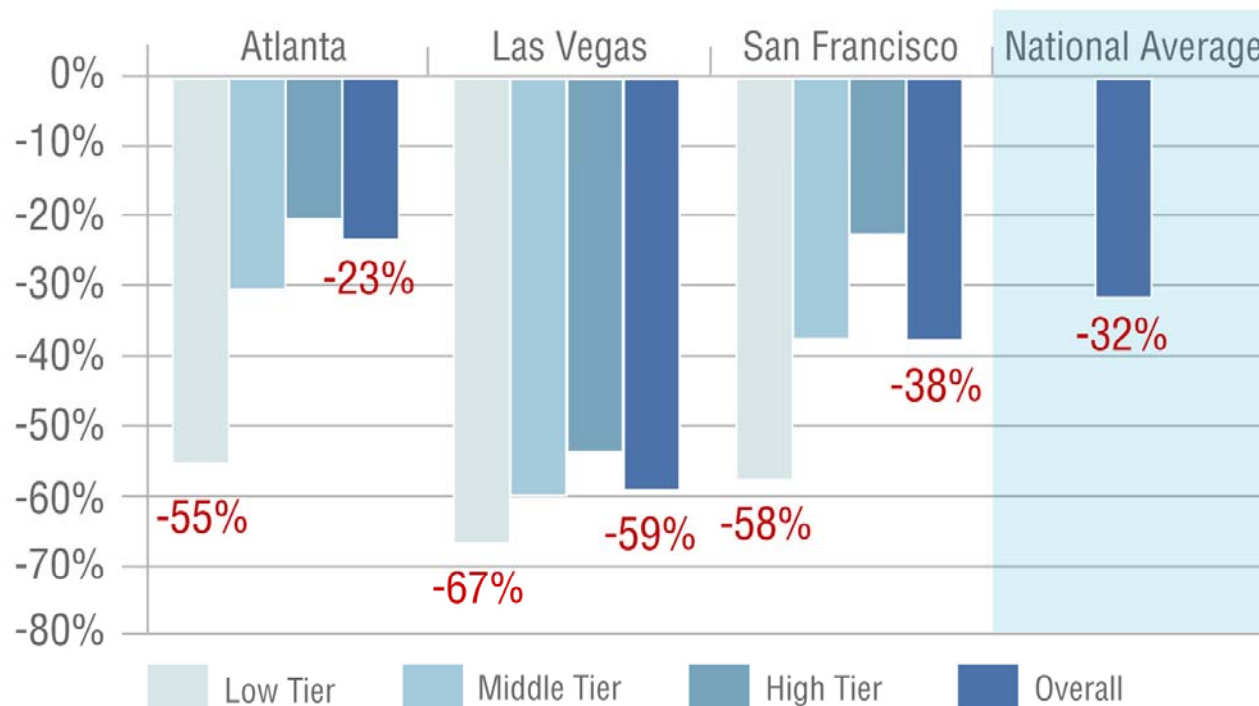
Home Improvement Financing Patterns by Income in 2001

Home Values Have Declined Dramatically



Single family home values—the primary vehicle for MI home improvement financing—have declined by 32% since the housing market’s 2006 peak.

- This data masks more dramatic regional declines in housing values and the concentration of these price declines in low and middle value properties – those most likely to be owned by middle income Americans.



Qualifying for Credit



At the same time that access to home-secured financing has declined, the largest energy efficiency loan programs are rejecting 20-50% of applicants.

- MI households are rejected at higher rates than higher income households

Keystone HELP loan application, approval, funding and loan size rates (by income) – January 2010-August 2011

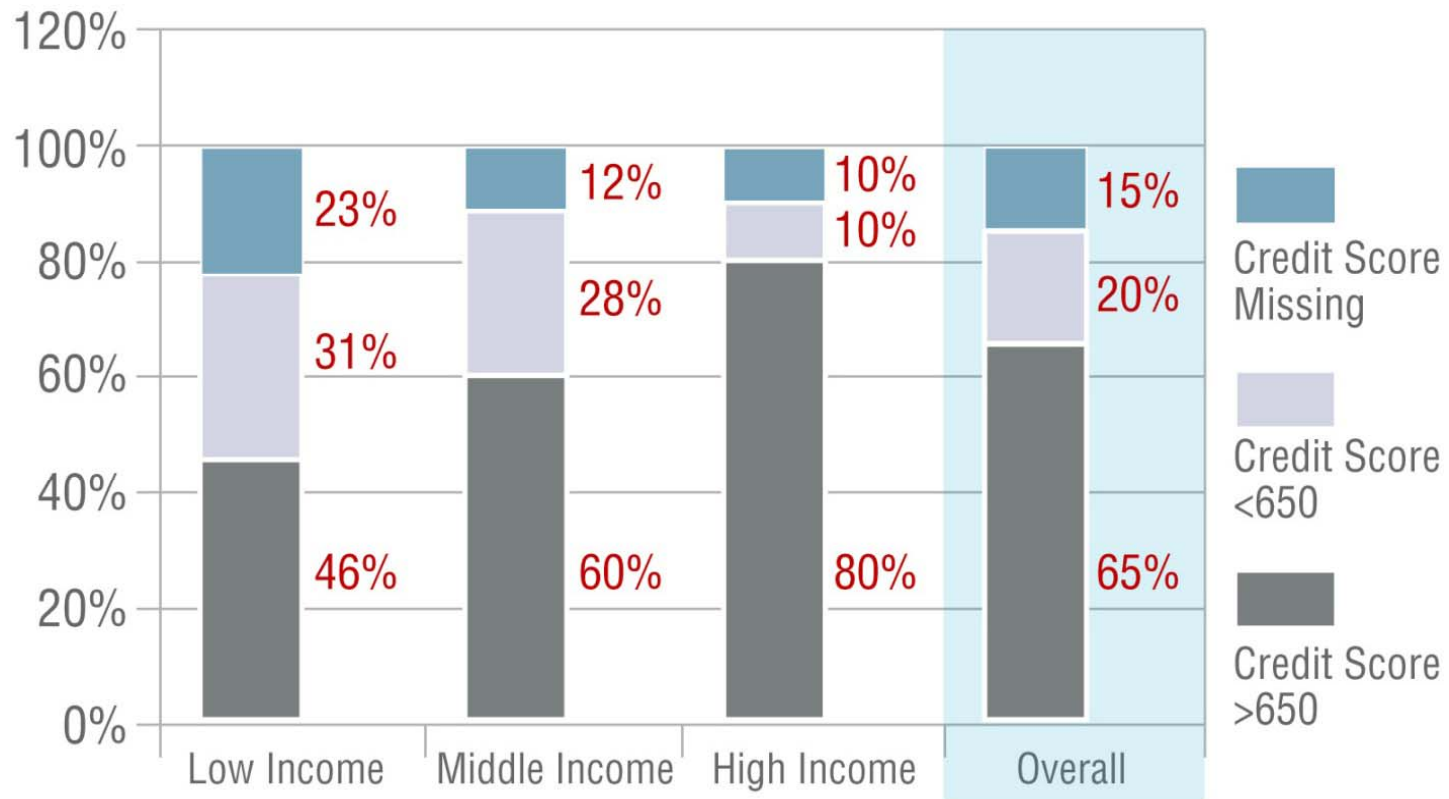
Household Income	# Applications (% of Total Applications)	Applications Approved (Approval Rate %)	Loans Funded (Approval → Loan Conversion Rate %)	Average Loan Size
<80% AMI	~4,000 (40%)	~1,720 (43%)	~1,000 (58%)	~\$7,500
≥80%AMI	~6,000 (60%)	~4,140 (69%)	~3,000 (73%)	~\$9,500

Qualifying for Credit



Credit scores are a key metric for lenders in evaluating creditworthiness.

- Although credit scores do not explicitly take income into account, MI households are likely to have lower credit scores than their wealthier peers.



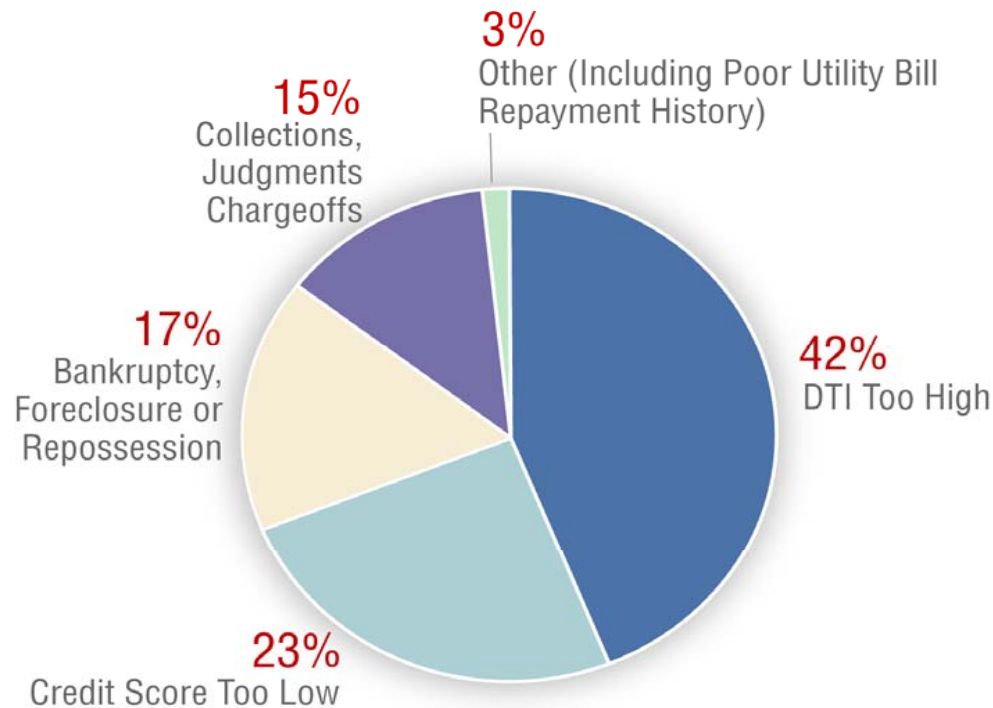
Source: Due to data limitations, for the purposes of the credit score analysis we use household income of \$30,000 to \$70,000 to define middle income. Credit score data from Energy Programs Consortium; based on analysis of TransUnion credit data from Intellidyn.

Qualifying for Credit



Loan underwriting may also include maximum debt-to-income (DTI) ratios—excessive DTIs are often responsible for more loan application rejections than credit scores .

Reasons for application rejection in NYSERDA's residential energy efficiency loan program November 2010-October 2011



Increasing Access to Capital



Middle income households need new ways of accessing affordable credit if they are to make home energy upgrades.

- But underwriting criteria exist for a reason—to ensure that those who get access to financing can and will repay it.
- Care needs to be taken with regard to who is given access to credit and what claims are made about the benefits of energy improvements.

Strategies that may increase MI household access to capital include:

- Credit Enhancements
- Alternative Underwriting
- Innovative Financing Tools

Credit Score and Corresponding Delinquency Projections

FICO Score Range	Delinquency Projection (% Likelihood)
300-499	87
500-549	71
550-599	51
600-649	31
650-699	15
700-749	5
750-799	2
800-850	1

Source: Transunion 2011

Credit Enhancements



- Credit enhancements (e.g. loan loss reserves, subordinated debt, guarantees) reduce lender risk by sharing in the cost of losses in the event of loan default.
- Innovative energy efficiency financing programs are using credit enhancements to expand capital access.
 - The Recovery Act-funded Milwaukee & Madison, WI, program has expanded capital access by structuring a loan loss reserve that allows the cities' financial partner, Summit Credit Union, to recover more funds from the loan loss reserve for each loan default by lower credit quality customers.*

FICO Score Range	% of Each Loss Covered By LLR	% of Each Loss Absorbed by Credit Union
690+	70%	30%
650-689	80%	20%
610-649	90%	10%
540-610	95%	5%

*Loan loss reserves are structured so that a lender must absorb a fixed portion of each loan default to ensure it is appropriately motivated

Alternative Underwriting



- To expand financing to “riskier” borrowers, some programs also are using alternative underwriting criteria to identify creditworthy borrowers who don’t meet traditional lending standards.
- The programs piloting alternative underwriting criteria are typically using utility bill repayment history in lieu of, or in conjunction with, more traditional creditworthiness metrics (e.g. DTI, credit score).
- Early results are promising, but these approaches must be assessed over time based not just on how many additional loans are made but whether such loans exhibit strong repayment trends that justify approving these borrowers.



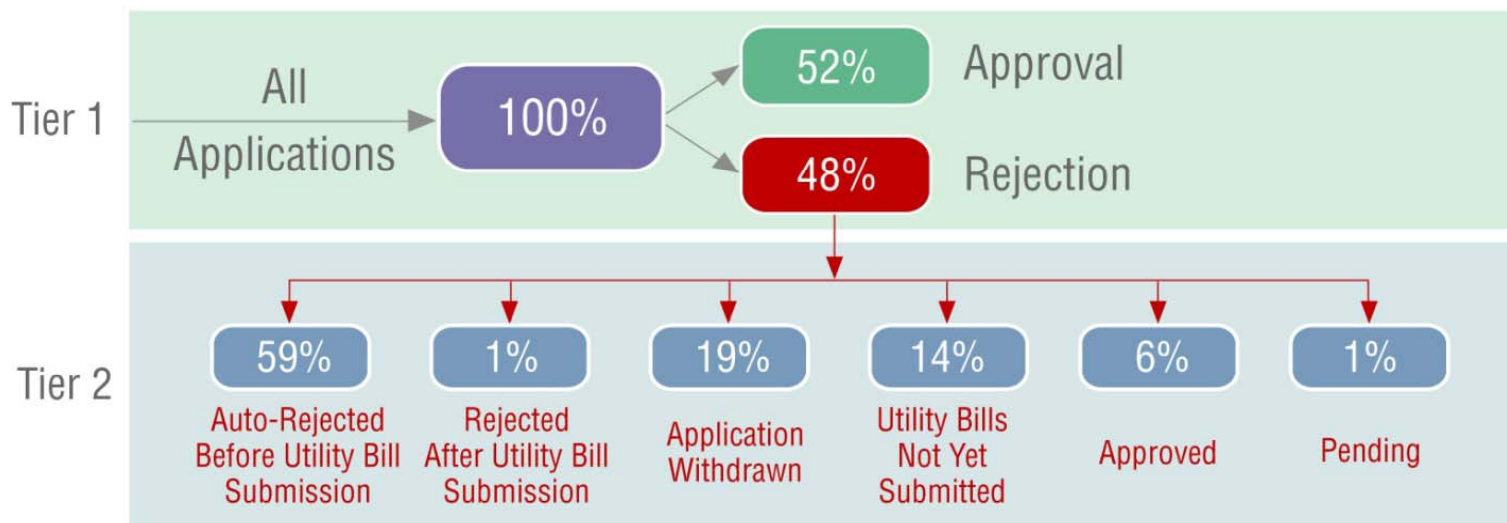
Alternative Underwriting



The Green Jobs-Green New York initiative uses a 2-tiered underwriting process to expand efficiency financing access.

- For households that don't meet traditional lending standards (Tier 1), utility bill repayment history may be used in lieu of a low credit score or high DTI.
- Loan approval rate has increased by ~3%, but may ultimately increase by >10%.

Summary of GJGNY loan application process and data November 2010 - October 30, 2011



Innovative Financing Tools



- **On-Bill Financing**
 - Many households have long histories of paying utility bills regularly. On-bill repayment may reduce loan delinquency and increase household willingness to finance energy improvements.
 - In some cases, nonpayment can trigger utility shut-off, an additional security against non-payment.
- **Loans paid off at property transfer (Deferred Loans)**
 - Some MI households (e.g. fixed income) do not have the capacity to make consistent loan payments. A common practice among housing agencies is to attach a lien to the property that must be paid off when the property is sold or otherwise transferred.
- **Paycheck-Deducted Financing**
 - Loans are repaid through regular, automatic deductions from an employee's paycheck.
 - The Clinton Climate Initiative is piloting a model in which a credit union provides the loan capital and paycheck deductions are automatically transferred to the credit union. The security of the payroll deduction allows the credit union to do more lenient underwriting and offer more attractive terms than for traditional unsecured loans.

Delivering EE to Renters



- One-third of middle income households are renters, and the majority of these renters occupy single family dwellings (20 percent of all middle income households are single family renters).
- Renters are extremely difficult to reach, especially if they pay the utility bills, creating split incentives for EE investment.
- Some options for reaching renters:
 - Financing that is tied to the meter such that the tenant pays for the financing as a line item on her utility bill and if she moves, the subsequent tenant assumes the responsibility to pay for the remainder of the financing.
 - Building labeling may provide an investment incentive to rental property owners. Labels make the energy costs of a home visible to prospective renters, and have the potential to differentiate efficient properties. In so doing, the market may apply a price premium (or owners may be rewarded with more stable tenancy) to the efficient homes.
 - Minimum performance standards may be necessary to require basic efficiency improvements to rental properties. In 2011, the City of Boulder, CO adopted a series of SmartRegs ordinances that require all single family and multifamily rental properties to meet a minimum energy efficiency standard by January 2019.



The Role of Policy



Robust public policies that bring additional focus and funding to bear on reducing MI household energy use are necessary to complement program design, outreach, and financing strategies.

Policy options include:

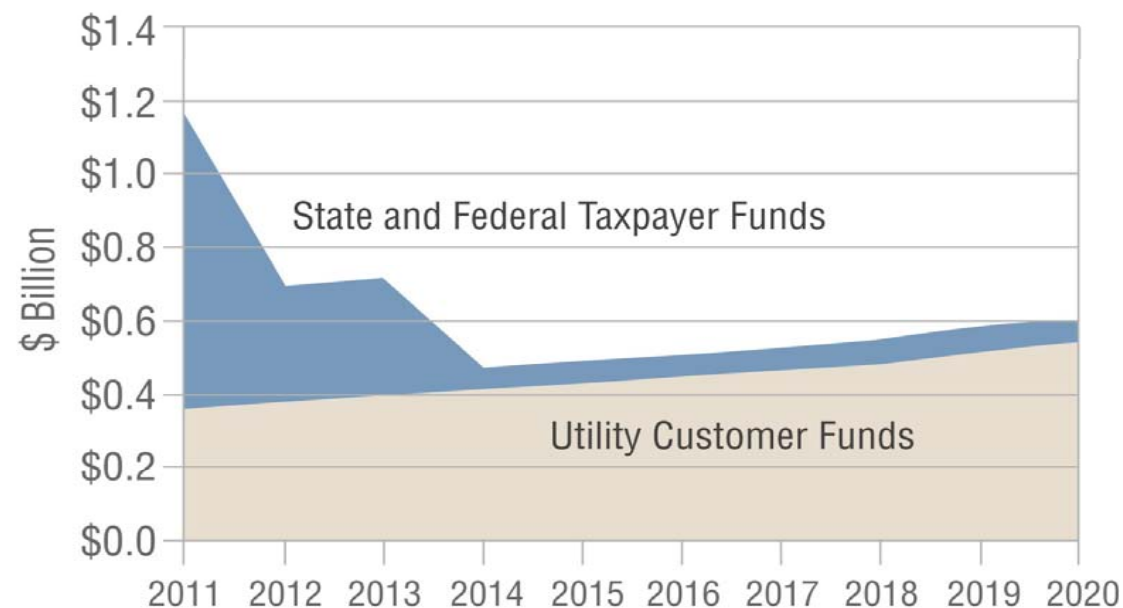
- Energy Savings Targets
- Cost Effectiveness Policies
- Codes and Standards
- Labeling, Disclosure and Upgrade Regulations



Energy Savings Targets



- More than half of states have energy savings targets (e.g. energy efficiency resource standards, statutory requirements for utilities to pursue all cost-effective energy efficiency).
- Utility customer-funded programs and state and federal government EE programs are expected to spend \$7.7 billion on non-low income multi-measure home energy efficiency programs in the next decade.



Cost Effectiveness Policies



Most states with utility customer-funded energy efficiency programs place primary weight on the total resource cost test (TRC) in the program screening process, which includes a limited set of non-energy benefits that residential energy upgrades deliver.

Alternative approaches include:

- **Measuring cost effectiveness on a portfolio basis**
 - Evaluating programs at the portfolio level allows administrators to pursue efficiency across sectors, including in hard-to-reach markets like middle income households.
- **Balancing program screening decisions across multiple cost effectiveness tests**
 - Programs can be evaluated with multiple cost effectiveness tests to bring a broader array of values into consideration.
- **Valuing non-energy benefits**
 - Public health, safety, equity and economic development could be considered as explicit policy goals of energy efficiency programs.
- **Exempting project components from testing**
 - Necessary, non-energy costs such as mold remediation could be exempted from cost effectiveness testing.

Codes and Standards



- Building energy codes, and appliance, lighting and equipment standards can contribute substantially to efficiency among middle income households
- Codes and standards can drive efficiency among households located in regions where no substantial energy efficiency programs are offered, as well as households who won't invest in comprehensive energy upgrades but will replace failed heating systems or buy a new computer.
 - While progress has been made on code implementation, it is critical for the development of a robust residential energy efficiency market that these codes are enforced.
- Standards can also introduce efficiency into the design of goods that are largely untouched by efficiency programs or consumer choice, such as set-top boxes leased to consumers by cable and satellite companies.

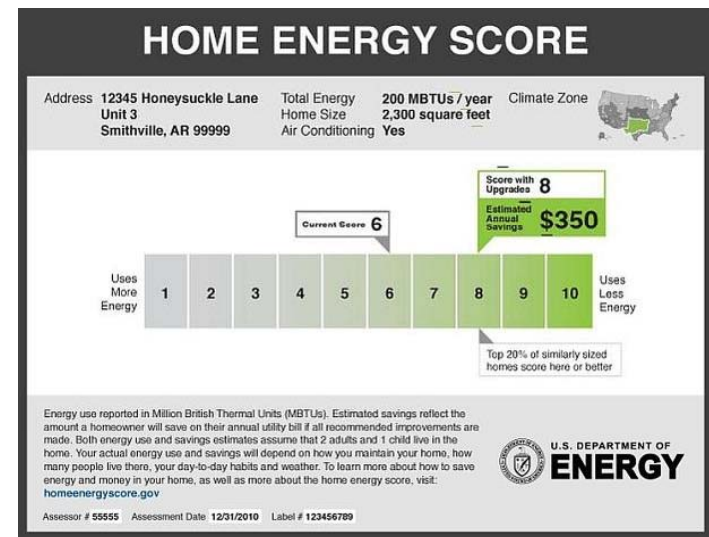
Building Energy Labeling & Disclosures



- Labeling & disclosure can build a more efficient marketplace by making the full costs of operating a home more transparent to renters, homeowners and lenders.

- While uncertainty remains around the impacts of energy use disclosures and labels on demand for energy improvements and energy efficient properties, these initiatives reduce the risk that households will be exposed to high, unexpected energy expenses.

- These tools create greater market recognition of efficiency's private benefits and build the foundation for the implementation of regulations as these disclosures can be transitioned into minimum energy performance standards.



Energy Upgrade Regulations



- Existing energy performance regulations leverage key transaction points to trigger building owner regulation compliance. These intervention points include:
 - Time of property sale or transfer
 - Time of property rental
 - Time of obtaining a building permit for remodeling
- As regulations are implemented, care needs to be taken to ensure that financing options and incentives are sufficient to mitigate middle income household risk in meeting these obligations.
 - Augmenting voluntary programs with regulations may allow policymakers and program administrators to redirect and target limited public funds toward increased support for the most financially vulnerable low and middle income households.



Conclusion



- It is important to recognize that progress is being made on delivering energy efficiency to the residential sector. Many residential energy efficiency program administrators are reducing their reliance on lighting and appliance rebates and increasing their emphasis on more comprehensive home energy upgrade program offerings.
- This study describes a number of financing tools, program delivery models, and outreach strategies that show some promise in overcoming the barriers to serving middle income households.
- However, these approaches are not enough to be effective at the requisite scale for addressing broad public policy goals – instead, these approaches should be seen as potential complements to robust public policies that provide access to energy efficiency for all market segments.



Resources



For the full report, webinars,
policy briefs and other
information, please visit:

<http://MiddleIncome.lbl.gov>

