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Scaling Energy Efficiency in the Heart of the Residential Market: Increasing Middle America's Access to Capital for Energy Improvements

Middle income American households – broadly defined here as the middle third of U.S. households by income – are struggling. Energy improvements have the potential to provide significant benefits to these households – by lowering bills, increasing the integrity of their homes, improving their health and comfort, and reducing their exposure to volatile, and rising, energy prices. Middle income households are also responsible for a third of U.S. residential energy use, suggesting that increasing the energy efficiency of their homes is important to deliver public benefits such as reducing power system costs, easing congestion on the grid, and avoiding emissions of greenhouse gases and other pollutants.

While middle income Americans have historically invested in improvements that maintain and increase the value of their homes, they have seen an important source of financing – the equity in their properties – evaporate at the same time that their access to other loan products has been restricted. A number of energy efficiency programs are deploying credit enhancements, novel underwriting criteria, and innovative financing tools to reduce risks for both financiers and borrowers in an effort to increase the availability of energy efficiency financing for middle income households. While many of these programs are income-targeted, the challenges, opportunities, and emerging models for providing access to capital may apply more broadly across income groups in the residential sector.

Challenges to Accessing Capital

The upfront cost of comprehensive home energy improvements is a barrier to investment. Many middle income households need financing to overcome this barrier – and capital access has plummeted in the wake of the recession.

Using Home Equity to Finance Home Improvements

Middle income homeowners have historically invested in improving their homes. In 2001, these households accounted for almost a third of all home improvements made in the U.S., and they financed more than 35 percent of their home improvement investments (Guerrero 2003).[1] Compared to other households that financed improvements, middle income households were more inclined than other income groups to finance home improvements by borrowing against housing equity – two thirds of their financing was home-secured (see Figure 1).[2]

This is both good and bad news. The good news is that middle income households have historically invested in home improvements, and many (57 percent) have not needed financing to do so. The bad news is that the recession

[1] In 2001, middle income households spent an average of $8,700 when using home-secured financing to pay for home improvements (Guerrero 2003). The level of home improvement spending impacted homeowner financing patterns. For improvements of $5,000 to $20,000, middle income households used home secured financing for 22% of expenditures, less than their overall average, but 10% more than their wealthier peers for the same expenditure range (Guerrero 2003).
[2] Home-secured financing includes home equity loans, home equity lines of credit and cash out refinancing. Unsecured financing includes unsecured loans and credit cards.

This Policy Brief is an excerpt from the report: "Delivering Energy Efficiency to Middle Income Single Family Households." For the full report and other resources visit: http://middleincome.lbl.gov

has eroded household savings – suggesting that more households will need financing to make improvements – at the same time that housing wealth, the primary asset against which middle income households borrow, has declined.

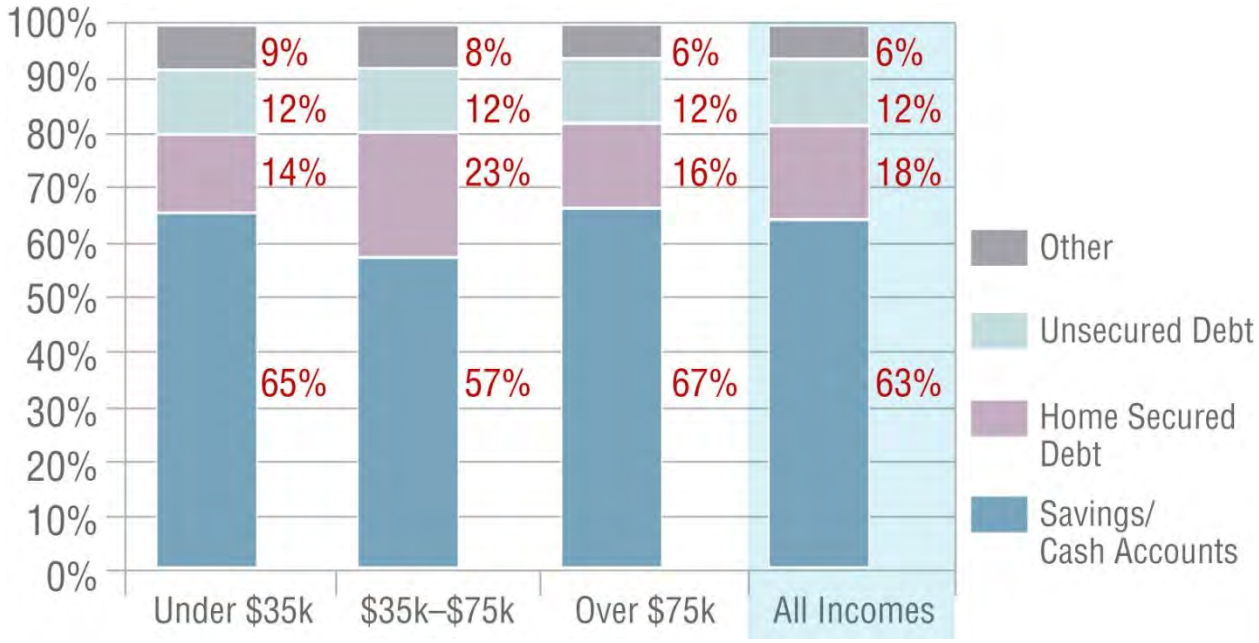

Figure 1. Home improvement financing patterns by income in 2001 (Guerrero 2003)

The Housing Collapse

A number of factors contributed to the enormous speculative housing bubble in the mid-2000s (Lansing 2011). By 2007, primary residences accounted for approximately one third of U.S. household assets. For middle income households, these primary residences represented an even greater share of their assets – almost 50 percent (Bucks 2009). [3] The financial crisis and ensuing recession have since caused a sharp decline in housing values across the United States. Single family home prices have declined by 32 percent from the housing market's 2006 peak and carried household wealth down as well (see Figure 2) (S&P 2011).

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.[4] For example, the Case-Shiller Home Price Index indicates that low tier properties in Atlanta have lost 55 percent of their value since peaking at the end of 2006 – almost double the average 23 percent property value decline in the city over that time (see Figure 2). [5,6] In other words, not only did middle income households have more of their wealth invested in their

[3] The Federal Reserve Board data uses percentile of income. We use the 40th-70th percentiles ($29,680 to $79,100) to approximate middle income. In 2007, the overall average primary residence asset value as a percentage of wealth was 31.8 percent across all income groups, versus 48.4 percent for middle income households.
[4] The median middle income home value in 2007 was $150,000 (U.S. Census). Assuming a value decline of approximately one third, this median value is likely to be approximately $100,000 today. This value falls into the low tier of the 3-tiered Case-Shiller housing value pricing index across all of the index's 20 major metropolitan statistical areas (MSAs) except for Phoenix (where properties under $95,901 are in the low tier).
[5] In Atlanta, as of June 2011, low tier properties are those valued under $130,356, middle tier are those valued $130,357-$241,832 and high tier are those valued over $241,832.
[6] Case-Shiller Seasonally-Adjusted Home Price Tiered Index Data. June 2011

primary residences heading into the recession, but their primary residences have lost a greater percentage of their value than those of their wealthier peers.

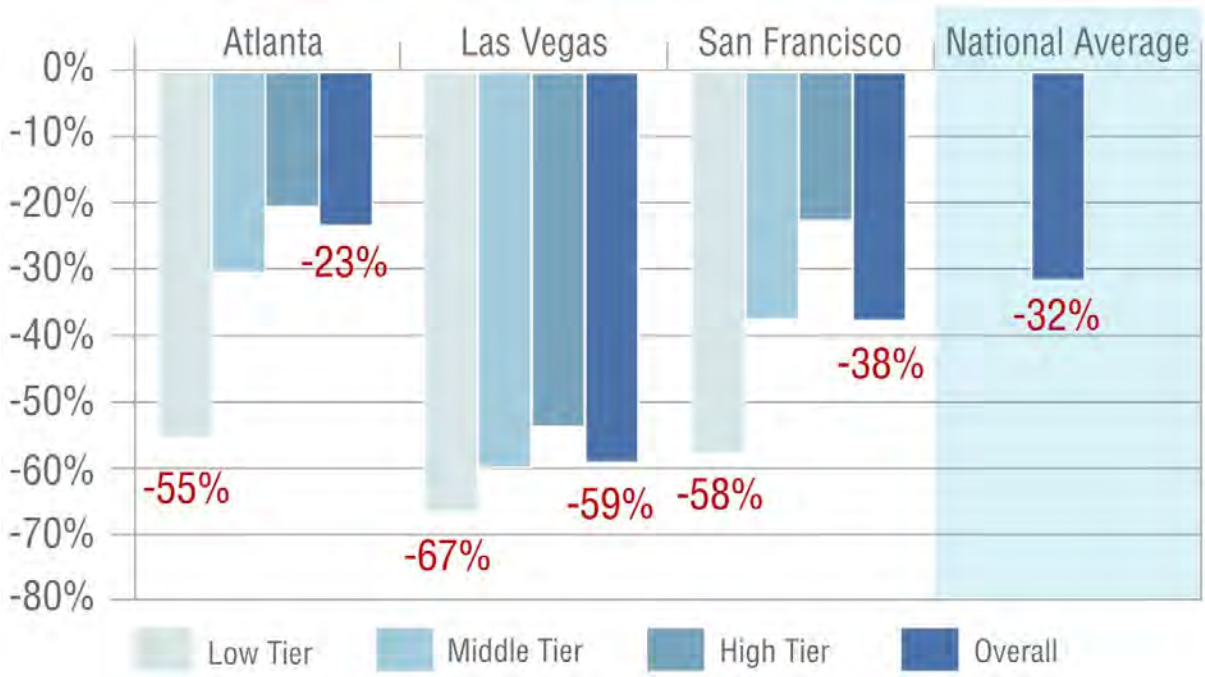

Figure 2. Case-Shiller 20-City Composite Home Price Index of single family home values January 2007 to June 2011 in three major U.S. cities, tiered by initial property value[7] (S&P 2011)

While property values (across tiers) nationally have returned to 2003 levels,[8] it would be incorrect to assume that the housing decline has only set middle income families back eight years. Many homeowners took advantage of rising property values by borrowing aggressively against their growing equity – leaving them with significant debt burdens that are, for some, larger than their home values. In fact, more than a quarter of all single family residential properties (13.3 million households) are now underwater or have near negative equity (<5% equity) (Corelogic 2011). This negative equity is concentrated regionally – the top five states have 38 percent of all negative equity properties.[9] It is reasonable to assume that many of these underwater properties are owned by middle income Americans – these households took on significant debt to purchase and improve properties, are more vulnerable to financial stress during a recession, and lost more of their home's value than their wealthier peers. These underwater households are more likely to behave like renters, under-investing in improving and maintaining their homes.

The news is not all bad though. While a majority of families across income groups have recently experienced declines in income and wealth – and middle income households have been hit harder than their wealthier peers – a large minority of the middle income population has maintained or increased their levels of wealth. From 2007 to 2009, most families (63 percent) experienced wealth declines – for those whose wealth declined, the median loss was substantial, 45 percent (Bricker 2011). However, more than a third of households (37 percent) have not

[7] *Ibid.* In Las Vegas, Low Tier properties are those valued under 118,226, Middle Tier are $118,226- $178,664 and High Tier are those valued over $178,664). In San Francisco, Low Tier properties are those valued under $325,457, Middle Tier are $325,457-$601,276 and High Tier are those valued over $601,276.
[8] *Ibid*
[9] *Ibid.* The top five states are Nevada (60 percent underwater), Arizona (49 percent underwater), Florida (45 percent underwater), Michigan (36 percent underwater) and California (30 percent underwater).

experienced wealth declines or have seen only small changes in wealth. This makes it difficult to make universal conclusions about the state of middle income household finances. While many households are unquestionably suffering – and are likely unwilling or unable to make significant investments in energy efficiency without substantial financial incentives – a large minority of middle income households may be able to invest.

Household Savings & Employment

Many American households feel insecure about their economic futures. Uncertainty about future earnings is high – in 2007, 31.4 percent of all families (across income groups) reported that they did not have a good idea of what their income would be for the next year (Bucks 2009). This uncertainty may well be even higher today as the U.S. unemployment rate has almost doubled since mid-2007. In 2009, almost nine percent of middle income households were unemployed while another 5.5 percent were underemployed (workers that take part-time jobs due to lack of available of full-time jobs) (Sum and Khatiwada 2010).[10]

For those households who have a reasonable expectation of future earnings, the recession has decreased their expectations of annual income growth from around two to three percent before the recession to less than half a percent in its wake – the lowest level in more than 30 years (Dunne and Fee 2011). Lower future earnings expectations are a function of both the recession and longer term trends – over the last 30 years, wages have not kept up with worker productivity gains.[11] Uncertainty and pessimism about future earnings are making households increasingly cautious with their finances as many households report higher levels of desired savings to buffer themselves from economic and other emergencies (Bricker 2011). These homeowners are likely to make fewer proactive home improvements, like energy upgrades, in favor of preserving limited savings and access to credit for unforeseen hardships.

Qualifying for Credit

For those middle income households motivated to pursue energy efficiency, access to low-cost capital is often a significant barrier to investment. Many of the largest energy efficiency loan programs have application decline rates in the 30 to 50 percent range. Household ability to obtain secured financing has declined as housing prices have eroded and lenders have tightened underwriting standards and credit limits (NAR 2011).[12] Similar tightening trends are occurring in unsecured lending as personal creditworthiness has weakened and lenders have responded by increasing the minimum credit scores required to qualify for financing products and reducing the amount of overall credit available to each qualified borrower. Many households turn to high interest credit cards to finance expenditures as their options dwindle. These high-cost financing products are ill-suited to energy improvements – particularly those for which the motivation is to save money – as they worsen the payback period of these investments.

Since 2009, approximately 10,000 households have applied for financing through Pennsylvania's Keystone Home Energy Loan Program (HELP)[13]. About 40 percent of these households earn 80 percent of AMI or less, suggesting

[10] As of Q2 2011, the unemployment and underemployment rates have dropped by approximately 0.5 percent across income groups.
[11] For a detailed discussion on wage stagnation, visit the Employment Policy Research Network: http://www.employmentpolicy.org/sites/www.employmentpolicy.org/files/field-content-file/pdf/Mike%20Lillich/EPRN%20WagesMay%2020%20-%20FL%20Edits_0.pdf
[12] Requirements to obtain conventional mortgages have been tightened, with the average credit score rising to about 760 in the current market from nearly 720 in 2007; for FHA loans the average credit score is around 700, up from just over 630 in 2007.
[13] Keystone HELP offers unsecured loans and loans secured by a subordinate lien mortgage at various interest rates. The specific offering depends on the measures financed and loan size. Underwriting includes a minimum credit score of 640, no bankruptcy,

that many middle income households are attracted to the program.[14] However, the program's early experience shows that middle income households are more difficult to serve – 57 percent of households earning ≤ 80 percent AMI do not meet the program's underwriting standards compared to 31 percent for households earning >80 percent AMI (see Table 1).[15]

In addition to this higher rejection rate, fewer lower income households move forward with financing than their wealthier peers (58 percent of approved households earning ≤ 80 percent AMI fund loans compared to 73 percent of higher income households) – supporting the idea that, for many reasons, even when financing is available, it is more difficult to motivate middle income households to invest. Still, this data shows some promise as these middle income households account for about a quarter of all Keystone HELP loan volume.

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

Table 1. Keystone HELP loan application, approval, and loan size rates by income, January 2010 to August 2011. (AFC First)

According to the Indianapolis Neighborhood Housing Partnership (INHP), the homeowners that they serve typically have little access to anything but credit card financing – often at annual rates from 15 to 25 percent, so INHP's new EcoHouse Project's mid-single digit fixed-interest rate loans[16] are an attractive tool for enabling energy improvements among households who are otherwise unlikely to be able to access affordable financing. With relatively lenient underwriting standards including credit scores as low as 580,[17] INHP is able to accommodate a wider range of applicants.[18]

Credit scores estimate an individual's likelihood of repaying certain types of debt relative to one's peers. Credit scores are a key metric for most lenders in evaluating consumer creditworthiness. Because credit scores are relative measures, a large shift in bill payment trends, like that caused by the recession, has triggered an increased likelihood of loan default for each "band" or range of credit scores. In other words, a credit score of 720 today reflects a higher estimated risk of loan non-payment than a credit score of 720 in 2005. For example, in the case of VantageScore,[19]

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foreclosure or repossession in the last seven years, no outstanding collections, judgments or tax liens exceeding $2,500 and a 50 percent maximum DTI.

[14] 80 percent State Median Income (SMI) in PA is $39,600 – suggesting that despite variance of AMI across regions in the U.S., many households who apply for Keystone HELP meet our middle income definition.

[15] Program underwriting is based on these criteria: Minimum FICO Score 640; no Bankruptcy, Foreclosure, Repossession in past seven years; no Unpaid Collection Accounts, Judgments, Tax Liens >$2,500

[16] Loan interest rates are based on U.S. Treasuries. In July 2011, interest rates on secured loans were 5.97 percent and on unsecured loans were 6.66 percent.

[17] Households with credit scores as low as 580 can qualify for secured financing through INHP's EcoHouse Project loan program. Most national lending products require a minimum credit score of 640 to 680.

[18] For more information on the Indianapolis Neighborhood Housing Partnership EcoHouse Loan Program, see the Policy Brief posted here: http://middleincome.lbl.gov/

[19] VantageScore is a one of a number of consumer credit risk scores that use credit data and analytics as one measure of consumer creditworthiness. Many score models exist in the marketplace (others, like Fair Isaac (FICO) are mentioned elsewhere in this report). However the score values from one model are not comparable to the values of other score models – that is, a 650 score from one model is not comparable to a score value of 650 from a different model.

the delinquency rate on a new loan issued to a person with a 720 score between 2008 and 2010 is expected to be twice as high as on a new loan issued between 2003 and 2005 (see Table 2).

VantageScore	Loan Delinquency Rate		Delinquency Rate Increase
	2003-2005	2008-2010 (Anticipated)	% increase in rates btw 2003-2005 and 2008-2010
591-610	21.50%	25.44%	***3.9%***
611-630	17.11%	21.18%	***4.1%***
631-650	13.63%	17.81%	***4.2%***
651-670	10.90%	14.62%	***3.7%***
671-690	8.24%	11.74%	***3.5%***
691-710	5.99%	9.74%	***3.8%***
711-730	4.27%	8.11%	***3.8%***
731-750	3.21%	6.64%	***3.4%***
751-770	2.22%	5.28%	***3.1%***
771-790	1.67%	4.29%	***2.6%***
791-810	1.15%	3.33%	***2.2%***
811-830	0.80%	2.57%	***1.8%***
831-850	0.49%	1.78%	***1.3%***
851-870	0.38%	1.40%	***1.0%***
871-890	0.24%	0.90%	***0.7%***
891-910	0.19%	0.63%	***0.4%***
911-930	0.19%	0.53%	***0.3%***

Table 2. Changes in VantageScore loan delinquency rates for new loans originated from 2003-2005 compared to loans originated from 2008-2010 (anticipated).[20] (VantageScore)

Although credit scores do not explicitly take income into account, middle income households are likely to have lower credit scores than their wealthier peers (see Figure 3). These lower scores may be in part due to creditworthiness and in part due to the way in which scores are calculated, notwithstanding issues about how middle income households manage their credit. For example, a key factor in calculating credit scores is one's ratio of credit utilization to credit availability – many middle income households have less overall credit availability than their wealthier peers, often causing their credit utilization rate to be higher and their credit scores to be lower. This lower credit access may be a function of many things, including lower absolute levels of home equity and post-recession reductions in the maximum loan sizes lenders offer to customers. In other words, income implicitly impacts some credit scores – even in cases of identical loan repayment histories, middle income households may be assigned lower credit scores than their wealthier peers.

[20] Credit score models, including the VantageScore model, do not predict absolute delinquency rates. Rather, these models predict the "likelihood" of default for each consumer whose score falls within the indicated range.

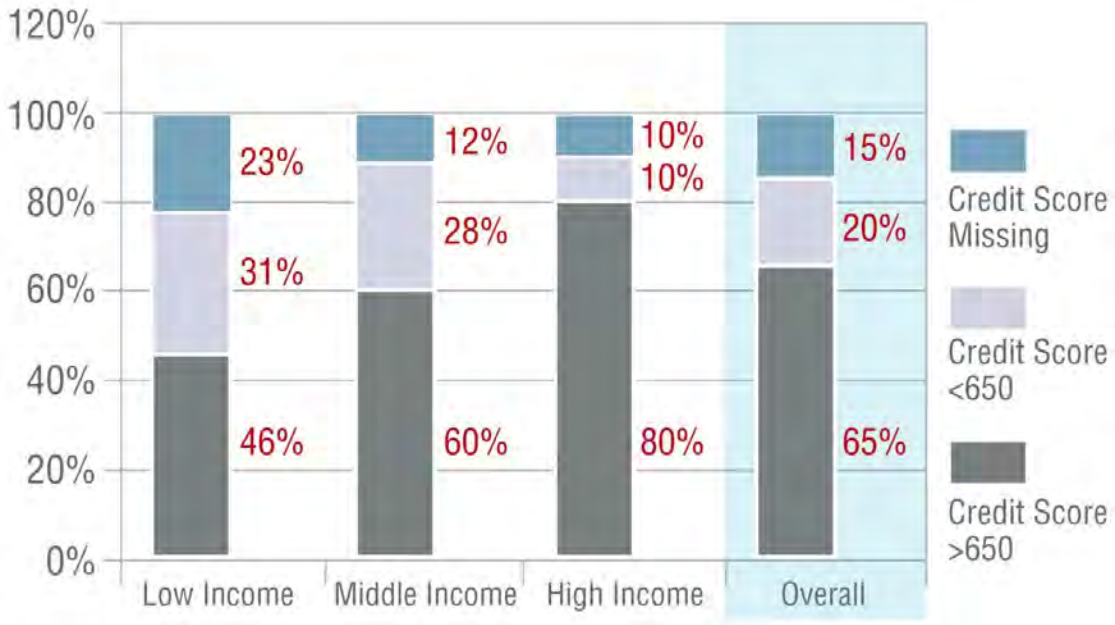

Figure 3. Homeowner credit scores above and below 650 by income in Q4 2010[21] (Energy Programs Consortium)

Most lenders use credit scores as just one of several metrics for evaluating consumer creditworthiness. Underwriting standards for loan products, including those for home improvements, frequently include both a minimum credit score and a maximum debt-to-income (DTI) ratio.[22] A Federal Reserve Board study found that more than 20 percent of all households with home-secured debt had net DTI ratios higher than 40 percent, suggesting that as many as one in five households may not qualify for financing programs that include a maximum DTI underwriting requirement (Bucks 2009).[23] These numbers are higher among middle income households – more than one in three middle income households (35 percent) had net DTIs exceeding 40 percent.[24]

Program experiences to date suggest that maximum DTI underwriting requirements are significant barriers to capital access. For example, NYSERDA has declined more loan applications because household DTI ratios exceed the allowable limit than for any other reason. Forty-three percent of NSYERDA's loan application declines (17 percent of loan applicants) have been caused by excessive DTI ratios while just 23 percent of declines were triggered by low household credit scores (See Figure 4). Major credit events like bankruptcy, foreclosure, repossession and outstanding collections account for more loan denials (33 percent) than low credit scores – these loan applicants will be very difficult to serve moving forward.

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[21] 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.

[22] The debt-to-income (DTI) ratio is a measure that reflects a household's ability to service its existing debt with current gross income. A household with a DTI ratio of 50 percent has annual debt service payments that equal 50 percent of the household's annual gross income. A maximum DTI is intended to ensure that borrowers have sufficient cash flow to make loan interest and principal payments.

[23] The Federal Reserve Board study's net DTI ratio calculation is not directly comparable to the way in which energy loan programs calculate DTIs. This calculation considered income net of taxes while loan underwriters use gross (e.g. before tax) income. These numbers may, therefore, overstate the problem. However, middle income households typically face lower effective tax rates than their higher income peers, suggesting that the gap between middle and higher income households with excessive DTI ratios may be larger than these numbers show.

[24] This includes both owners and renters.

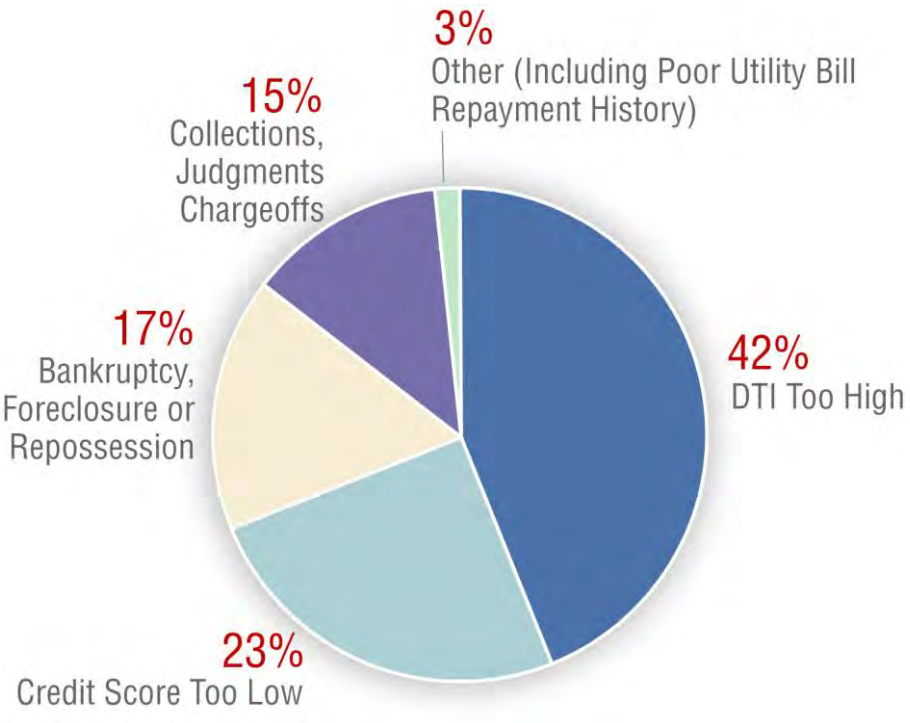

Figure 4. Reasons for application rejection in NYSERDA's residential energy efficiency loan program November 2010-October 30, 2011 (NYSERDA)

FICO Score Range[25]	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

Table 3. Credit score and corresponding delinquency projections. (Transunion 2011 *in* SEE Action Financing WG).

Opportunities for Increasing Access to Capital

Middle income households clearly need new ways of accessing affordable credit if they are to make home energy upgrades. However, it is important to acknowledge that there can be negative consequences to promoting loans and other products to particularly vulnerable segments of the population. Especially if programs are not ensuring savings, care needs to taken with regard to who is given access to credit and what claims are being made about the benefits of energy improvements.

[25] These scores are not directly comparable to the VantageScore scores previously referenced, due to different credit calculation methodologies.

Underwriting criteria exist for a reason – to ensure that those that get access to financing are willing and able to make required monthly payments. For credit scores, the majority of middle income homeowners (60 percent) have scores of 650 or higher. For those with scores below 650, default risk skyrockets – the projected delinquency rate on unsecured loans more than doubles from 15 to 31 percent for individuals with FICO scores from 600-650 compared to their peers in the 650-700 score band (see Table 3).[26] This raises important questions about how to expand energy efficiency financing – particularly in the absence of certainty that the dollar value of energy savings will be sufficient to cover the full cost of the improvements over the measure's expected lifetime. Debt to income constraints raise similar issues – households with high DTIs are unlikely to have significant cash flow buffers at their disposal should energy improvements not deliver sufficient energy bill reductions to offset financing costs.

With those precautions acknowledged, there are ways that capital can be made more accessible and affordable in appropriate ways, and with prudent safeguards. This section describes options for using credit enhancements, alternative underwriting criteria, and other financing mechanisms that might better serve middle income households.

Credit Enhancements

By reducing lender risk, publicly-supported credit enhancements can leverage these limited public monies and attract additional capital for residential loans.[27] Credit enhancements are used to reduce a lender's risk by sharing in the cost of losses in the event that loans default. These enhancements can take the form of loan loss reserves (LLRs), subordinated debt, and guarantees.[28] LLRs, often funded with ARRA or utility-customer funds, are the most commonly used credit enhancement, and they are frequently deployed to reduce borrowing costs or extend borrowing terms for program participants that would likely qualify for other (more expensive) loan products. Rather than simply lowering interest rates, a few innovative programs are using credit enhancements to incentivize their financial partners to offer energy improvement loans to households who would otherwise not have to access capital. Indianapolis is using a large LLR – with 50 percent[29] of losses covered – to households in its target income demographic,[30] and the cities of Madison and Milwaukee used part of their DOE Better Buildings grant to structure a $3 million LLR to expand access to their loan product. This five percent loss reserve reduces the lender's losses in the event of loan defaults and supports a loan pool of up to $60 million. It has been structured so that the cities' financial partner, Summit Credit Union, can recover more funds from the LLR on each loan default for lower credit quality consumers. Typically, a lender must absorb a fixed portion of each loss from any single loan to ensure it is appropriately motivated to lend responsibly. By allowing lenders to collect a greater percentage of their loss on loans to customers with low credit scores, the two cities were able to lower the minimum qualifying credit score to 540 – well below typical loan product eligibility (see Table 4).

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[26] One reason for this significantly higher default rate among lower credit score customers may not be lack of creditworthiness, but instead that these households are only offered high interest rate loan products that are more difficult to pay off.

[27] Loan loss reserves (LLRs) (see next footnote) reduce lender risk by providing first loss protection in the event of loan defaults. For example, a 5 percent LLR allows a private lender to recover up to 5 percent of its portfolio of loans from the LLR. A $20 million fund of private capital would need a $1 million public LLR (5 percent coverage), leveraging each public dollar 20 to 1. On any single loan default, the LLR often pays only a percent of the loss (often 80 percent) to ensure the lender is incentivized to originate loans responsibly.

[28] Loan loss reserves are held in an account and protect a lender against a specific level of loan losses. Subordinated debt stakes are similar to LLRs – instead of being held in an account, subordinated debt is lent out to customers, and the subordinated debt stake absorbs all losses up to a specified level. Loan guarantee protection can vary depending on the agreement, but can cover all or part of a lender's losses.

[29] In comparison, most LLRs for Recovery Act-funded programs have covered 5 to 10 percent of a portfolio's losses.

[30] INHP is targeting 80 percent of its EcoHouse lending to households at or below 80 percent of AMI and the remaining 20 percent to households earning between 80 percent and 120 of of AMI. 120 percent of AMI for Indianapolis household of four is $79,200.households and 80% AMI for an Indianapolis household of four is $52,800.

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%

Table 4. Milwaukee/Madison-Summit Credit Union loan loss reserve agreement. (Wisconsin Energy Conservation Corporation)

One issue that this type of arrangement raises is whether the lender will continue to be appropriately motivated to responsibly underwrite loans. In the Milwaukee/Madison case, this concern is mitigated by Summit Credit Union's demonstrated commitment to responsible lending to low and moderate income households. Summit's Chief Lending Officer, Dan Milbrandt, pointed out that expanding access to financing is difficult and that it takes effort on the part of the credit union to understand applicants' credit situations and figure out where, on the margin, less creditworthy households are willing and able to take on debt. "You have got to be willing to move beyond automated underwriting. There is a gray area, and Summit has experience examining mitigating factors so that we can responsibly lend to less credit qualified customers."

Alternative Underwriting Criteria

Rather than using credit enhancements to expand financing to "riskier" borrowers, a number of energy efficiency financing programs are deploying alternative underwriting criteria to identify creditworthy borrowers that do not meet traditional lending standards. NYSERDA's recently-launched Green Jobs-Green New York (GJGNY) initiative is using a Two-tiered underwriting process to expand access to financing for its Home Performance with ENERGY STAR© (HPwES) program.[31] Tier One underwriting uses standard credit score (minimum 640)[32] and DTI (maximum 50 percent) metrics to evaluate creditworthiness; 48 percent of applicants are rejected for this financing. NYSERDA is trying to reduce this decline rate with its Tier Two standards that offer households with low FICO scores or high DTIs a second opportunity to qualify for GJGNY financing (see Table 5 for a description of Tier Two underwriting standards). For those households with FICO scores below 640, NYSERDA Tier Two standards increase the maximum DTI to 55 percent and use utility bill repayment history in lieu of credit score to assess creditworthiness. For households with a FICO score above 680 that were rejected from Tier One because they had a DTI ratio above 50 percent, Tier Two standards increase the maximum DTI to 70 percent and use utility bill repayment history.[33]

[31] Households earning less than 80 percent of AMI are eligible for NY's AHPwES program, which provides a 50 percent rebate up to $5,000.
[32] Minimum FICO score is 640, unless self-employed – minimum 680 if self-employed for at least 2 years, or minimum 720 if self-employed less than two years.
[33] There are many ways to calculate debt to income (DTI) ratios. Most programs use gross income. It is not clear, therefore, that a 70 percent DTI maximum is a meaningful metric for assessing creditworthiness (e.g. many households pay close to a third of gross income in taxes, suggesting that this metric might exclude very few households as debt service could include 100 percent of household net income). NYSERDA already assesses DTI ratios as part of its Tier 1 evaluation, but programs considering a different underwriting process should consider this issue.

Since its November 2010 launch, over $7.8 million has been loaned to 908 households through the GJGNY initiative, of which 48 loans ($417,888) have been issued to households qualifying under the new Tier Two standards. Tier Two underwriting criteria have increased access to capital on the margin, increasing NYSERDA's overall loan application approval rate by over two percent. This increase may underestimate the impacts of using utility bill repayment history as a means of assessing creditworthiness – a multi-step application process appears to have been a significant hurdle for many potential Tier Two participants and NYSERDA only launched the "High DTI" underwriting criteria in July 2011[34] (See Figure 5 for a summary of NYSERDA's GJGNY loan application data).

<table>
<tr><th colspan="2">Eligibility Requirements</th><th>Participant Benefits</th></tr>
<tr><td colspan="2"><u>Tier 1</u>
FICO≥640 DTI≤50%</td><td rowspan="2">3.99% financing
Up to $25,000 (3.49% with Automated Clearinghouse (ACH) payment)</td></tr>
<tr><td><u>Tier 2 (Problem = Low FICO)</u>
FICO≤640
DTI≤55%
Strong Utility Bill & Mortgage Repayment History</td><td><u>Tier 2 (Problem = High DTI)</u>
FICO≥680
50≤DTI≤70%
Strong Utility Bill & Mortgage Repayment History</td></tr>
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Table 5. New York's Green Jobs-Green New York financing underwriting criteria. (NYSERDA)

NYSERDA has already made several changes to the Tier Two underwriting criteria since the initiative launched in 2010, which is indicative of the flexibility that is essential to experiment with increasing access to financing. One key challenge has been gaining access to customer utility bills for Tier Two consideration. Many programs around the country have struggled to access customer utility bills. In NYSERDA's case, better access to utility billing information is important to deploying alternative underwriting criteria.

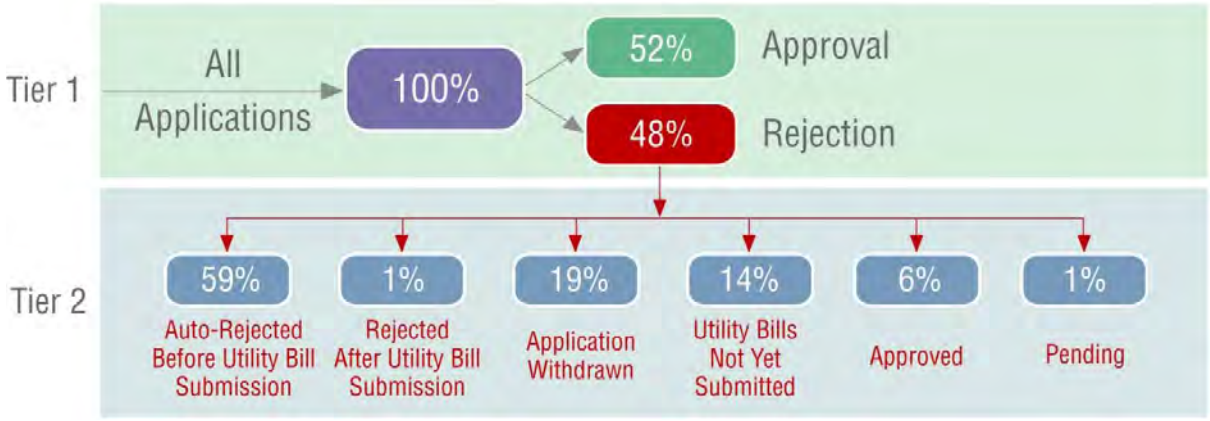

Figure 5. Summary of NYSERDA's GJGNY loan application process and data (November 2010 to December 2011) (NYSERDA)

[34] GJGNY requires that applicants not qualified under Tier One but not initially disqualified from Tier Two for reasons unrelated to utility bill repayment history (e.g. recent bankruptcy, high DTI) to proactively submit utility bills. This step has been a barrier as more than 80 percent of applicants have failed to follow-up with bill submission. While the overall loan application approval rate increased by just 2.6 percent, this may underestimate the impacts of using utility bill repayment history as other underwriting criteria and the multi-step application process appear to be barriers. For example, if 84 percent (the rate of loan approval for applicants that submitted utility bills) of all households not automatically disqualified from the Tier Two track (e.g. those that failed to submit their utility bills) had been approved, GJGNY's approval rate would have increased by 16 percent.

Other programs, including Midwest Energy and Clean Energy Works Oregon (CEWO), also use utility bill repayment history to evaluate creditworthiness. CEWO's underwriting process is notable for its low cost – while it includes a credit score check, instead of analyzing an applicant's DTI, CEWO examines utility bill repayment history. Using utility bill repayment history in lieu of DTI's significantly reduces loan underwriting expenses, and because more households in many programs are rejected for financing due to high DTIs than low credit scores, it may be an effective approach. The early data are promising – CEWO's application decline rate is just 10 percent since the program's 2009 launch – well below that of other energy efficiency loan programs. CEWO's financing partner, Craft3 (formerly known as Enterprise Cascadia), has dispersed dispersed $14.7 million for 1,180 loans as of January 31, 2012.[35]

These initiatives are relatively new, so it is too early to draw firm conclusions about whether these criteria will be effective at identifying households who can afford to take on debt to invest in energy improvements.[36] While there is reason for some skepticism about the predictive power of utility bill repayment history on loan performance,[37] if on-time utility bill payment turns out to be a good borrower risk assessment tool, it has the potential to increase financing access – and is especially appealing if loan repayments are made on the utility bill as the CEWO program offers. Using on-bill repayment is likely to reduce loan delinquencies, especially where nonpayment can result in disconnection (which is not the case for CEWO).

Innovative Financing Tools

In addition to making standard loan products more accessible, a number of new financial products may be more effective at serving middle income households. Here, we highlight four of these financing tools: OBF loan products that are paid off when properties transfer, employer-offered financing that is deducted from paychecks, and property assessed clean energy (PACE).

On-Bill Financing (OBF)

On-bill financing is a tool through which a customer's utility bill is used to collect loan payments for energy improvements. Utilities or third parties can provide the up-front capital for the energy upgrades and the loan can be structured as an unsecured consumer loan, a secured loan, or can be attached to the meter (as opposed to the individual).[38] Some utilities have expressed reservations about performing lending functions in-house, suggesting that third party-funded on-bill models in which financial institutions have core lending responsibilities (e.g.

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[35] Thus far three loans have defaulted totaling $39,674 in charge-offs. Their current criticized assets equal 3.87 percent of the outstanding portfolio, including watch list assets at 2.89 percent and problem assets at 0.98 percent. However, it is also important to note that most applicants – both those declined and those approved – have strong credit scores, most above 700.

[36] Ultimately, the viability of these alternative underwriting approaches must be assessed not based on how many loans additional loans are made, but whether such loans exhibit payment performance that justifies approving borrowers who would otherwise not qualify for financing.

[37] Households are uniquely motivated to pay utility bills to ensure that their power stays on. This motivation may not hold for unsecured loans, where the penalty for non-payment is a credit score reduction.

[38] If the repayment obligation is attached to a household's utility meter (meter attached), the obligation to pay the loan can stay with the property if a tenant or homeowner moves. In some programs, nonpayment of the bill can trigger utility shut-off of service, a powerful customer incentive to make interest and principal payments.[38] Because of this enhanced security, a household's credit characteristics become less importing to underwriting. However, the same consumer protections that guard against utility service cancellation in the event of utility bill nonpayment also protect on-bill financing borrowers from meter shutoff in the event of loan nonpayment. Some utility commissions have expressed support for facilitating the convenience and messaging of on-bill repayment but are not inclined to support meter attachment which could lead to service disconnection. The extent to which meter-attached financing might influence real estate transactions properties also remains an open question.

managing credit risk, hedging interest rate risk) and utilities manage customer interactions (e.g. demand creation, quality assurance).

Because many households have long histories of paying their utility bills regularly, some financial experts believe that on bill repayment will reduce loan delinquency. On-bill financing for energy improvements is the most integrated with the savings those improvements are expected to deliver – which may help to alleviate consumer reluctance to take on debt to pay for them. Midwest Energy in Kansas operates a meter-attached residential loan program. If an individual doesn't pay their bill and leaves the property, only the late payments at that point are uncollectible. Any remaining monthly payments transfer to the next customer at that meter. Over three years, the Midwest Energy program has issued about 600 loans for a total of more than $3.3 million in funding, and to date less than one percent of loans have been uncollectible (in line with the uncollectible rate of their other utility revenue).

Loan products that are paid off when properties transfer (Deferred Loans)

Some middle income households simply do not have the financial capacity to make consistent principal and interest payments on debt. This is especially true when the financed improvements lead to uncertain cash flow, or if building rehab needs to be funded in addition to energy upgrades, increasing net monthly payments. There are many housing and economic development agencies around the country that will fund home improvements through deferred loans – often health and safety-related rehab for fixed income seniors that have equity in their homes. No monthly payments are required, but a lien is attached to the property that must be paid off when the property is sold or otherwise transferred.

The Opportunity Council in Washington uses these deferred loans for repairs needed before free weatherization services to low income families. In Camden, New Jersey the city is using Recovery Act funds to create a revolving loan fund to offer residents a home energy upgrade, paid for with a deferred loan. The Wyoming Energy Savers (WES) loan program offers both amortized and deferred loans based on participant income.[39] Those households earning less than 50 percent of AMI qualify for deferred loans, while those households earning 50-80 percent of AMI qualify for amortizing loans.[40] Income-qualified households who are current on their mortgage are eligible for loans up to $15,000 for a list of pre-approved measures including heating equipment and weatherization measures. Deferred loans are offered at 3 percent interest due at time of home property transfer or sale.[41] One key disadvantage to this product type is that borrowed funds are likely to revolve very slowly.

Paycheck-Deducted Loans

Paycheck-deducted financing involves repaying a loan through regular, automatic deductions from an employee's post-tax paycheck. The Clinton Climate Initiative (CCI) is piloting a program called the Home Energy Affordability Loan (HEAL) in Arkansas,[42] which allows employees of participating companies to finance energy upgrades with repayment through a payroll deduction. Originally, the model entailed CCI providing technical assistance for companies to make energy efficiency improvements to their own facilities. These companies would then put a portion of the savings from these improvements into a revolving loan fund for employees. The employer-assisted

[39] An amortizing loan is one in which loan principal is paid down over the course of the loan. A deferred loan is one in which principal and/or interest payments are postponed for a specific period of time or until a specific trigger (e.g. property transfer).
[40] Depending on the county, 50 percent of AMI ranges from $33,700 to $47,450 for families of 4, and 80 percent of AMI ranges from $53,900 to $64,200.
[41] For more information, visit http://www.wyomingcda.com/files/WESDes.pdf
[42] The Clinton Climate Initiative plans to replicate the program in other states beginning in 2012. More information on the program is available here: www.clintonfoundation.org/what-we-do/clinton-climate-initiative/cci-arkansas.

model is still available, but CCI found that employee demand for financing was larger than the energy savings companies were realizing, and some companies have policies that preclude lending to employees. CCI developed a second model in partnership with local credit unions, in which a credit union, rather than the employer, provides the loan capital and loan repayment is deducted through payroll and automatically transferred to the credit union. For one pilot with the largest hospital in Arkansas, the hospital's credit union is offering 5.75 percent interest for up to three years for unsecured loans to employees who have worked at the hospital for at least three years. The loans are unsecured, but the payroll deduction allows the credit union to do lighter underwriting and offer a lower interest rate than they would otherwise offer for standard unsecured loans.[43] Beyond this security, some experts believe that households may be more likely to pay these loans because they are offered through — or are supported by — their employer, and they want to be seen as responsible employees and members of the company's social community.

Property Assessed Clean Energy (PACE)

For those middle income households who have equity in their homes, PACE may be a promising financing tool if it gets past the current regulatory hurdles. PACE programs place tax assessments in the amount of the improvement on participating properties, and property owners pay back this assessment on their property tax bills. Like other property taxes, these assessments are treated as senior liens – which makes them very secure. PACE is debt of the property, which suggests that underwriting need not be based on a borrower's personal creditworthiness (and that the financing can be transferred with the property) – potentially getting around the credit score and debt-to-income issues highlighted in this chapter. Residential PACE currently faces significant regulatory hurdles, which have largely eliminated its use around the country, pending court rulings or federal legislation.[44]

Loan Pool Aggregation versus Loan Pool Separation

As energy efficiency markets scale, and billions of dollars of private capital become necessary to meet household demand, program administrators and/or their financial partners will likely need to sell energy efficiency loans to "secondary market" purchasers.[45] One important issue to consider as energy efficiency financing markets scale is whether, before being sold into secondary markets, pools of loans made to lower credit quality households should be separated from pools of loans issued using "conforming" underwriting standards to higher credit quality households.[46] Some experts suggest that blended pools of loans, in which strong credits mitigate the risk of weaker credits, will be necessary to deliver attractive loan capital to middle income households at scale. These experts argue that credit enhancements should be deployed to reduce investor risk until a sufficient data set has been accumulated to evaluate the risk of these blended pools.

Others suggest that separate pools are more appropriate, because conforming loan pools would be easier to sell into secondary markets and because these pools would attract the lowest-cost capital available – enabling programs and financial institutions to pass on low-cost financing to these higher-credit households. They suggest that less creditworthy households should be offered public funding or that their loans should be heavily credit-enhanced if sold to private investors. The path forward may, ultimately, be a function of what risks secondary market investors are willing to bear, and whether policymakers deem the credit enhancements necessary to incentivize greater risk-

[43] In some states, a direct lender or employer deduction from the paycheck may not be legal as employees must maintain personal control over their income. These states include: Illinois, Indiana, New Hampshire, New Jersey, New York, Washington, D.C. and West Virgina. However, this is generally viewed as a technical obstacle, and customers may voluntarily setup automated paycheck allocations to personal accounts, which are then automatically transferred to lenders or employers

[44] For more information, visit http://www1.eere.energy.gov/wip/pace.html

[45] A secondary market is a market into which previously issued financial instruments (e.g loans, stocks, bonds) can be sold.

[46] A conforming loan is a loan whose structure (e.g. security, term) and underwriting criteria (e.g. minimum credit score) meet specific guidelines. The bellweather of conformity for energy efficiency loans is the Fannie Mae Energy Loan.

taking to be a reasonable use of limited public monies. Today, it is not clear that demand is at the requisite scale that developing secondary market access should be a national priority. Local, often socially-interested financial institutions (e.g. credit unions, CDFIs, coops) are often offering more attractive loan terms to customers than regional and national lenders (and holding these loans on their balance sheets).[47]

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[47] These financial institutions often see energy efficiency lending as serving their social missions. In addition, efficiency lending often offers them a low-cost marketing tool, which warrants attractive lending terms. In Austin, Texas, Velocity Credit Union approved, funded and cross-sold energy efficiency loans at a higher rate than its other lending products. For more information, visit LBNL's policy brief on Austin Energy's Home Performance with ENERGY STAR© program: http://eetd.lbl.gov/ea/emp/reports/ee-policybrief_032211.pdf