California Joint Utilities Financing Research: Existing Programs Review

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Pacific Gas and Electric, Southern California Edison, Southern California Gas, and San Diego Gas & Electric

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CADMUS

Prepared by:
Laura James
Pat McGuckin
Althea Koburger
Carol Mulholland

Cadmus: Energy Services Division

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CADMUS

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Acronym	Definition
ARRA	American Recovery and Reinvestment Act of 2009
BBM	BetterBuildings for Michigan
BEF	Business Energy Financing
BPI	Building Performance Institute, Inc.
C&I	Commercial and Industrial
CEEF	Commercializing Energy-Efficiency Financing
CEEF	Connecticut Energy Efficiency Fund
CEWO	Clean Energy Works Oregon
CFL	Compact fluorescent light bulbs
CHUEE	China Utility-Based Energy Efficiency Finance Program
CJGNY	Green Jobs Green New York
CL&P	Connecticut Light & Power Company
DECC	Department of Energy & Climate Change
DEP	Department of Environmental Protection
ECO	Energy Company Obligation
ECSC	The Electric Cooperatives of South Carolina
EFS	Energy Finance Solutions
EM&V	Evaluation, Measurement, and Verification
ESCO	Energy service company
EUC	Energy Upgrade™ California
EVI	Economic Value Initiative
FAE	Forced air electric
FCU	Federal Credit Union
GDFC	Green Deal Financing Company
GEF	Global Environmental Facility
GHG	Greenhouse gas
HEECP	Hungarian Energy Efficiency Co-Financing Program
HELP	Home Energy Loan Program
HERO	Home Energy Renovation Opportunity
HERS	Home Energy Rating System
HMH	Help My House
HPwES	Home Performance with ENERGY STAR®
HPXML	Home Performance-Related Data Transfer
HVAC	Heating, ventilation, and air conditioning
IEG	Independent Evaluation Group
IFC	International Finance Corporation
IIP	Institute for Industrial Productivity
IOU	Investor-owned utility
LLR	Loan loss reserve
MSUFCU	Michigan State University Federal Credit Union
NGO	Non-Governmental Organization
OBF	On-bill financing

Acronym (cont'd.)	Definition
PACE	Property Assessed Clean Energy
PAYS	Pay As You Save
PG&E	Pacific Gas and Electric Company
PLC	Public limited company
QIV	Quality installation verification
RCPA	Regional Climate Protection Authority
REDLG	Rural Economic Development Loan and Grant
RFP	Request for proposal
RGGI	Regional Greenhouse Gas Initiative
RIA	Research Into Action, Inc.
RIM	Ratepayer impact measure
RUS	Rural Utility Service
SBEA	Small Business Energy Advantage
SCE	Southern California Edison Company
SCEIP	Sonoma County Energy Independence Program
SDG&E	San Diego Gas & Electric Company
SME	Small and medium enterprise
SoCalGas	Southern California Gas Company
TRC	Total resource cost
UCC	Uniform Commercial Code
UCT	Utility cost test
UI	United Illuminating Company
USDA	U.S. Department of Agriculture
WHEEL	Warehouse for Energy Efficiency Lending
WRCOG	Western Riverside Council of Governments

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EXECUTIVE SUMMARY

The California investor-owned utilities—Pacific Gas and Electric (PG&E), Southern California Edison (SCE), Southern California Gas (SoCalGas), and San Diego Gas & Electric (SDG&E), referred to collectively as the IOUs or Joint Utilities—are designing seven energy efficiency financing pilot programs at the California Public Utilities Commission's (CPUC's) direction. To help inform the pilot design process and subsequent evaluation efforts, the IOUs engaged Cadmus to conduct a comprehensive review of 15 existing financing programs representing noteworthy program models across the United States and around the globe. The work was commissioned in large part in order to help bring the evaluation, measurement, and verification (EM&V) staffs of the Joint Utilities up to speed in a rapid fashion with the current "best practices" observable in the marketplace, based on the emphasis being placed on the rapid roll-out of the pilots across California. The IOUs and Cadmus collaborated on selecting the programs to review and on establishing 10 subject areas for the research.

The 15 programs profiled in this document represent a broad range of program designs. Three programs—Western Riverside Council of Governments' Home Energy Renovation Opportunity (HERO), Midwest Energy's How$mart, and Michigan Saves—offer both commercial and residential financing. The Chinese and Hungarian programs were planned for short duration and are now closed. The programs are listed in Table 1.

Table 1. Programs Reviewed

Residential Programs
• Clean Energy Works Oregon
• Help My House (South Carolina)
• HERO (Western Riverside Council of Governments, California)
• Illinois On-Bill Finance (OBF) Program
• Keystone Home Energy Loan Program (Pennsylvania)
• Mass Save HEAT Loan
• Michigan Saves Home Energy Loan Program
• Midwest Energy How$mart (Kansas)
• NYSERDA On-Bill Recovery (New York)
• Windsor Efficiency PAYS (California)
• Green Deal (United Kingdom)
• Power Smart Residential Loan Program (Manitoba, Canada)
Commercial Programs
• HERO (Western Riverside Council of Governments, California)
• Michigan Saves Business Energy Financing
• Midwest Energy How$mart (Kansas)
• United Illuminating Small Business Energy Advantage (Connecticut)
• China Utility-based Energy Efficiency Program
• Hungary Energy Efficiency Credit Fund

Cadmus and the IOUs selected the 10 subject areas for their specific relevance to the IOUs' pilot programs (see Table 2).

Table 2. Subject Areas Researched

Subject Areas	
1. Program Results	6. Project Eligibility
2. Financing Offer	7. Contractor Network
3. Overlapping Programs	8. Process and Impact Evaluation
4. Borrower Eligibility	9. Program Cost-Effectiveness
5. Long-term Loan Performance	10. Keys to Success

In addition to reviewing each program's website, Cadmus reviewed existing program documents, evaluations, policy reports, and other publicly available resources. With each program, we had questions that could not be answered with the publicly available sources. To fill in these gaps, we reached out via phone or e-mail and conducted interviews with staff from each of the 15 programs. We created a profile for each program and then analyzed our findings to identify common program features, typical obstacles and solutions, and keys to success. The key findings from our analysis are presented below.

Key Findings

Program Results

Various programs used different metrics to measure success. Most focused primarily on loan volume and total number of participants (see Figure 1 and Figure 2). Programs also monitored criteria such as energy savings, job creation, greenhouse gas emissions reduction, as well as other metrics, as secondary goals. The programs in China and Hungary are an exception to this, since their primary goal was to reduce greenhouse gas emissions. Program volume is impacted by market size, years in operation, target sector, and more. It is important to note that the volumes shown are not for the most recent year of operation. They are instead an average calculated by dividing the total number of projects by the years in operation. New programs often take time to ramp up, and the figures reflect that in general. The largest of the programs is also the oldest. The exception is the HERO Residential program, which is the second largest after only two years.

Figure 1. Average Projects per Year since Program Inception – Residential

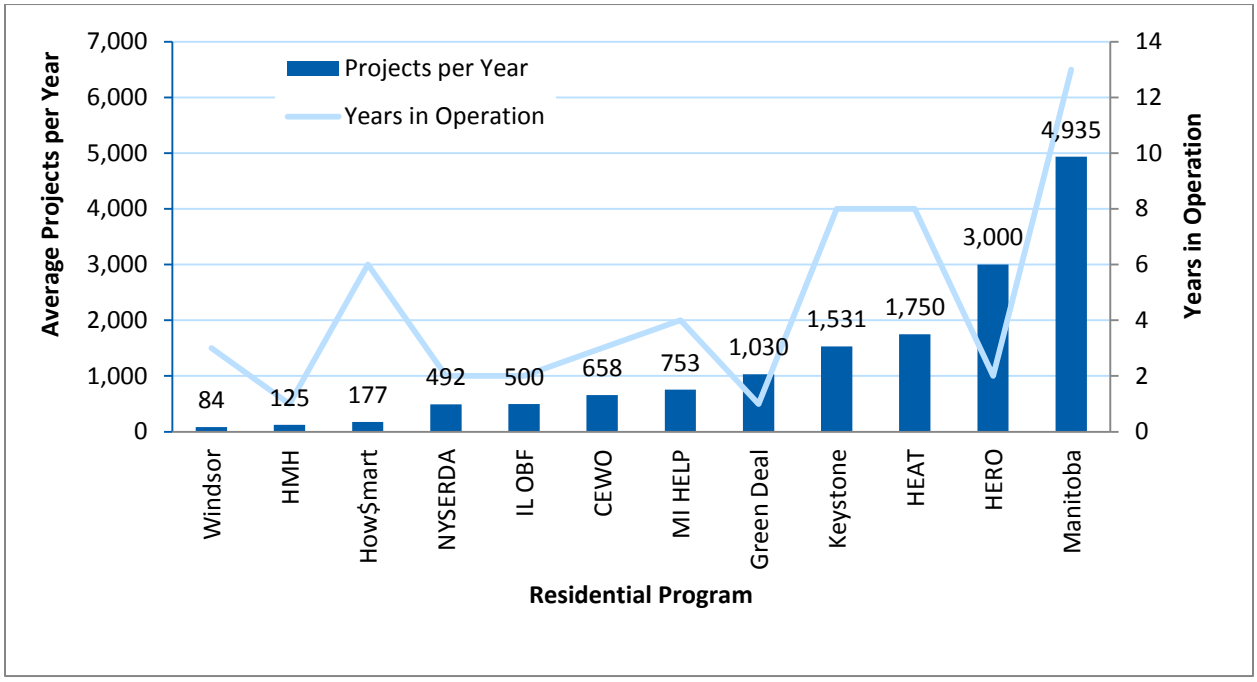
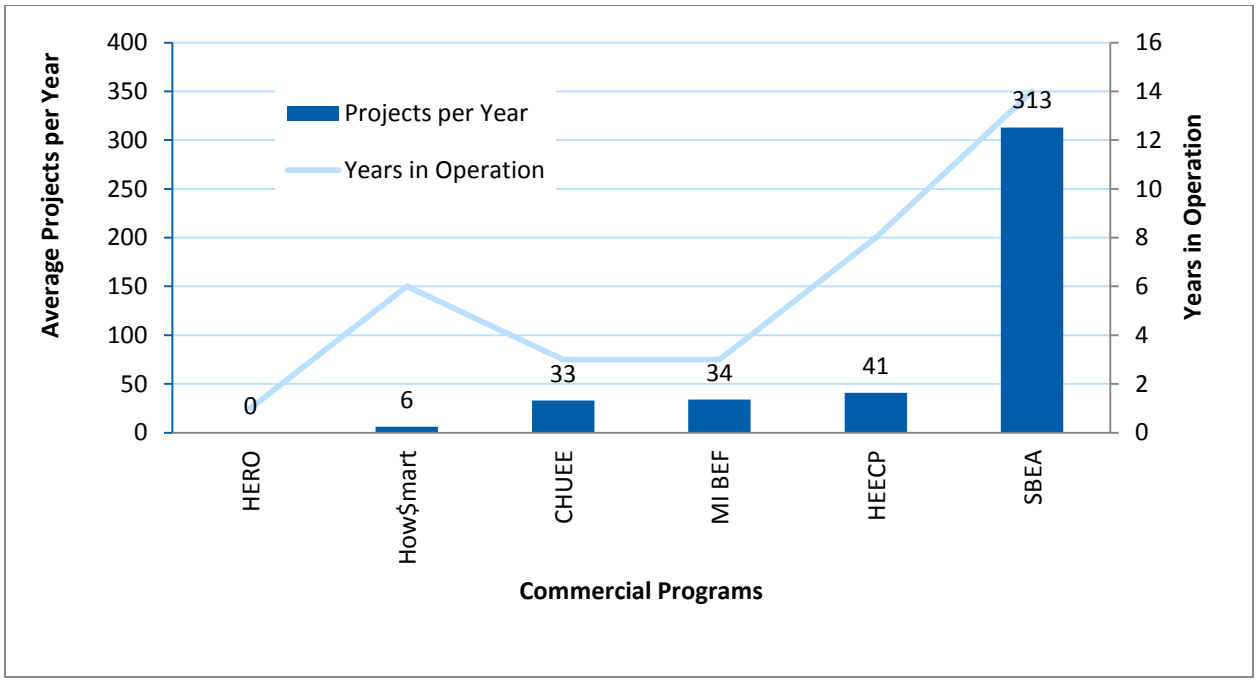


Figure 2. Average Projects per Year since Program Inception – Commercial[1]



[1] HERO Commercial reported in late 2012 after one year in operation that they had over $20 million in projects in the pipeline, but the first one was not yet complete.

Financing Offer

- Interest rates ranged from 0% to 9%. The most successful program, Manitoba Hydro's Power Smart, is in the middle of the pack at 4.8%. Market-based rates do not appear to be a deterrent to success.
- The maximum loan tenor (i.e., the duration of a loan) ranged from four years to 25. Most programs were in the 10 to 15 years range. Deeper retrofits tend to have longer payback periods, so longer tenors are often necessary in order to reduce the size of the monthly loan payments and allow for positive or neutral cash flow (i.e., the average energy savings exceed or are equal to the loan payments).
- Maximum loan amounts varied widely. On the residential side, the maximum varied from $2,500 (Windsor PAYS) to $200,000 (HERO PACE). Commercial maximum loan amounts ranged from $100,000 to $600,000, and two of the international programs – China and Hungary – had no maximums. On the residential side, larger maximum loan amounts correlated to larger average loan sizes.
- Commercial loan programs are not necessarily more complex than residential loan programs, but they are more diverse. Programs ranged from supporting multi-million dollar retrofits with complicated underwriting requirements to single-measure equipment upgrades underwritten based on the customer's utility bill payment history. For Midwest Energy's How$mart in particular, there are only slight variations between the residential and commercial programs.
- Loan loss reserves (LLRs) have been a popular tool to push financing markets to offer more options for energy efficiency retrofits, by reducing the risk to lenders associated with learning a new and evolving market. LLRs may be achieving their goal. Clean Energy Works Oregon (CEWO) reached an agreement with its lenders to dissolve the LLR as of January 1, 2014. All lenders agreed to continue to offer special financing for program participants, with the same rates and tenors as when the LLR was in place. It will be interesting to track how the financial offerings evolve over the next few years.

Overlapping Programs

- Most program managers believed they had better results from offering both financing and rebates than either alone. For instance, participation in United Illuminating's Small Business Energy Advantage (SBEA) program dropped to zero when the rebate funding briefly ran out. Once monies were replenished and rebates were resumed, the uptake returned. In addition to increasing overall participation, financing may benefit programs by helping customers take on larger projects than they would have without financing. Michigan Saves found that projects that took advantage of both rebates and financing were twice as large as projects without financing.

Borrower Eligibility

- Programs with lower minimum credit scores, structured to be available to those with less robust credit, nevertheless appear to primarily serve customers with higher credit scores. The average FICO credit score for both Michigan Saves' HELP and NYSERDA's on-bill program participants is

approximately 750, though the minimum accepted score ranges from 640-680. This gap does not appear to be the result of a lack of demand from people with worse credit. Roughly 40% of Michigan Saves applicants are denied, many for credit scores below the minimum requirement or for having insufficient income to cover additional debt. This finding is important in relation to the California pilots since an expressed goal of the pilots is to structure the offerings to be accessible to mid to low income customers as well as attractive for the involved financial institutions.

Long-Term Loan Performance

- Default rates across all programs were very low. Despite different loan terms and underwriting criteria, default rates were consistently reported as being around 1% or less.

Eligibility of Measures and Projects

- Financing programs are generally not subject to the same cost effectiveness and evaluation rigor as rebate programs, which may afford program managers greater flexibility. In Manitoba, for instance, the legislature mandated that all new furnaces sold through retail markets be high efficiency (AFUE 92 or better). As a result, the baseline efficiency was so high that rebates on furnaces could not be made cost-effective. However, the financing program is not subject to cost-effectiveness tests and can still help customers manage the upfront cost of high-efficiency furnaces.
- Audits are not necessarily required to achieve deep retrofits. The HERO program has the largest average loan size of the residential programs reviewed and relies on prescriptive measures rather than requiring audits.

Contractor Network

- Managers of nearly all programs believed that the contractors' role as a sales channel was critical to customer uptake. The Mass Save HEAT Loan was an exception. HEAT program staff reported that most leads come through their website or call center, and are then distributed to contractors for follow-up and fulfillment.

Process and Impact Evaluation

- None of the programs we reviewed have evaluated the relative and incremental impact of financing versus the offering of only traditional rebates. The HEAT program sponsors (the Massachusetts IOUs) are required by their regulators to evaluate how HEAT loans affect other programs. Cadmus will conduct this evaluation for National Grid but the project has not yet started.

Program Cost-Effectiveness

- None of the programs formally evaluate freeridership, spillover, or cost-effectiveness. How$mart program managers believe the program minimizes freeridership by requiring that the most cost-effective measures be included in each project.

Keys to Success

- When asked about best practices and lessons learned, no two programs gave similar answers. While our analysis revealed a number of keys to success, the wide variety of program types makes it difficult to identify industry-wide best practices.
- Credit enhancement is a key tool for initially attracting lender interest. Once lenders are engaged in a successful program, however, they may accept a reduction or elimination of the enhancement. CEWO has eliminated its LLR; MI HELP has increased its leverage over time; and HEECP reduced its loan guarantee from 50% to 35% while increasing participation.
- In SBEA's turn-key program, customers have to do "virtually nothing", an important feature for busy business owners.
- With a tariff model, UCC filings are needed to ensure that property buyers are notified of the tariff obligation.
- Streamlining the process keeps costs down and increases interest from customers and contractors.
- Manitoba Hydro and Windsor PAYS report that the required level of customer service is very high. Manitoba Hydro has reduced costs by streamlining its program, but customer service remains expensive.
- Keystone HELP and Michigan Saves HELP both found that very low interest rates were effective but unnecessary, and both decided that program funds were better spent on cash incentives. On the other hand, SBEA and HEAT have had remarkable success with 0% financing.
- NYSERDA is streamlining by automating project and loan approval. It also hopes to automate data collection with the Building Performance Institute's new Home Performance-Related Data Transfer (XML).
- SBEA nearly doubled program uptake by doubling the maximum loan tenor from 24 months to 48 in order to reduce monthly loan payment size. Many projects had previously not been able to meet the program's bill neutrality[2] requirement.
- NYSERDA's OBR program is considering a *pari passu*[3] approach to partial loan payment in order to provide secondary market investors with greater security.
- China found that the lender partner that marketed to existing customers fared much better than the lender partner that tried to draw in new business by promoting the loan guarantee.

[2] Bill neutrality refers to a requirement that the average monthly energy savings are sufficient to cover the cost of the loan payments.

[3] Instead of applying partial payments to the utility charges first, the payments would be applied proportionally to both the utility charges and the loan charges.

Additional Comments

- Program design is dramatically impacted by the kind of transaction—reactive or proactive—being targeted. Reactive transactions are driven by an urgent need to replace equipment, such as an air conditioner, that has failed. Proactive transactions are driven by a desire to act that is seldom urgent. The choice of contractor network, minimum and maximum loan amount, interest rate, loan tenor, evaluation method, and other variables for a program that targets reactive transactions may be very different than for a program targeting proactive customers.
- Program integration (i.e., across rebate offerings and financing opportunities) will have a major impact on the overall energy efficiency success derived. The scope of the research presented here was focused primarily on the design of the financing option itself, rather than looking at how to best integrate financing into existing program infrastructures. Integration will be key to attracting private financial institutions to the pilots. For more background on program integration, see ACEEE's "New Lessons on Driving Demand for Energy Efficiency Financing" (2014) at www.aceee.org/sites/default/files/publications/researchreports/f1401.pdf. Research into the integration strategies of the top three or four most successful programs may be worthwhile.
- In the post-ARRA world, the pace of new development in energy efficiency program design may be slowing down, although typical bellwether states such as California, New York, Massachusetts, and Illinois continue to lead with evolving strategies. In contrast, financing program evaluation has been slow to develop but now seems poised to accelerate. Program administrators are anticipating the need to measure the impact of these programs and their cost-effectiveness relative to traditional incentive programs.
- The HERO Residential program has grown rapidly in two years to include 55 California communities in 6 counties and expects to add 55 communities in 10 more counties in 2014. In February, 2014, the program announced that $104 million in AA-rated bonds were issued, secured by 5,890 PACE assessments levied on 5,627 properties located in Riverside County. The average assessment is $18,273. Developments are being followed closely.

SUMMARY MATRICES

To facilitate cross-program comparison, we compiled basic information from each program into a series of matrices. Within each, U.S. Based programs are listed first, followed by international programs. The matrices appear in the following order:

- Residential Part I: Region, Start Date, Interest Rate, Tenor, Loan Amount, Secured/Unsecured
- Residential Part II: On-bill/Transferable, Borrower Eligibility, Credit Enhancements/Rate Reductions, Results

- Commercial Part I: Region, Start Date, Interest Rate, Tenor, Loan Amount, Secured/Unsecured
- Commercial Part II: On-bill/Transferable, Borrower Eligibility, Credit Enhancements/Rate Reductions, Results

Residential: Part I

Program	Region	Start Date (End Date)[4]	Interest Rate		Tenor (years)		Loan Amount		Secured/ Unsecured
			Min	*Max*	*Min*	*Max*	*Min*	*Max*	
U.S.-based Programs									
Clean Energy Works Oregon Financing	Oregon	January 2011	3.8%	6.0%	1	20	$1,000	$30,000	UCC or property lien
Help My House	South Carolina	June 2011 (February 2012)	2.5%	2.5%	Not defined	10	Not defined	$15,000 (approx.)	Unsecured
HERO (Western Riverside Council of Governments)	California	December 2011	6.0%	8.3%	5	20	$5,000	15% of property value, to $200,000	Secured by tax lien
Illinois Energy Efficiency Loan Program	Illinois	June 2011	5.0%	5.0%	3	10	$500	$20,000	Unsecured
Keystone Home Energy Loan Program - Unsecured Financing	Penn-sylvania	2006	3.0%	9.0%	1	10	$1,000	$15,000	Unsecured
Mass Save HEAT Loan	Massa-chusetts	May 2006	0.0%	0.0%	Not defined	7	$500	$25,000	Lien if over $15,000
Michigan Saves Home Energy Loan Program (HELP)	Michigan	2010	5.0%	7.0%	1	10	$1,000	$30,000	Unsecured
Midwest Energy How$mart On-Bill Financing	Kansas	September 2008	3.0%	3.0%	Not defined	15	Not defined	$15,000 (approx.)	UCC filing
NYSERDA On-Bill Recovery Residential Financing Program	New York	January 2011	3.5%	3.5%	5	15	$1,500	$25,000	Property lien
Windsor Efficiency PAYS	Windsor, California	October 2012 (June 2014)	0.0%	0.0%	5	15	Not defined	$2,500	Unsecured
International Programs									
Green Deal	United Kingdom	January 2013	7.7%	9.3%	10	25	Not defined	£10,000 (US$ 16,538)	Unsecured
Power Smart Residential Loan Program	Manitoba, Canada	March 2001	4.8%	4.8%	Not defined	5 (15 for furnace/ boiler)	Not defined	CA$7,500 (US$ 6,668)	Unsecured

[4] Where applicable, the program end date is shown in parentheses. This also applies to the corresponding column in the Commercial: Part I matrix.

Residential: Part II

Program	On-Bill/ Transferable	Borrower Eligibility	Credit Enhancements and Rate Reductions	Results		
				Total Projects	Total Loan Volume	Average Loan Amount
U.S.-based Programs						
Clean Energy Works Oregon Financing	On-bill some areas; not transferable	FICO 590+	LLR of 10% through 2013, then none. 0.25% to 0.5% rate discount for on-bill.	2,633	$33.4 million	$12,694
Help My House	On-bill; transferable	Bill payment history	Used grant funds as loan capital to offer 2.5% rate.	125	$960,500	$7,684
HERO (Western Riverside Council of Governments)	Not on-bill; transferable through property tax	Limited debt and payment history	Tax lien takes priority over mortgages.	Over 6,000 (est.)	Over $104 million	$18,300 (est.)
Illinois Energy Efficiency Loan Program	On-bill; not transferable	FICO 640+	Utility guarantee.	1,000 (est.)	Unknown	Unknown
Keystone Home Energy Loan Program - Unsecured Financing	Not on-bill	FICO 640+	LLR of 5% until Dec. 31, 2013, then subordinate investor funds of 20%.	12,250	$89.5 million	$7,310
Mass Save HEAT Loan	Not on-bill	Set by lenders; varies	Uses funds from public benefit charge to buy down interest rate to 0%.	Over 18,000	Nearly $155 million	$8,400 (est.)
Michigan Saves Home Energy Loan Program	Not on-bill	FICO 640+	LLR of 5%.	3,011	$24.8 million	$8,241
Midwest Energy How$mart On-Bill Financing	On-bill; transferable	Bill payment history	Uses grants, mission-related investments, and utility funds to offer low rate.	1,028	$6.1 million	$5,948
NYSERDA On-Bill Recovery Residential Financing Program	On-bill option; transferable if on-bill	FICO 640+ or bill payment history	Receive funds through the Regional Greenhouse Gas Initiative, federal grants, and utilities to buy down rate.	1,096	$11.5 million	$20,308
Windsor Efficiency PAYS	On-bill; transferable	Bill payment history	Sonoma County Water Authority repays losses; buys down rate to 0% (federal grant funds)	195 single-family	$332,400 (Includes some multi-family projects)	Unknown
International Programs						
Green Deal	On-bill; transferable	Credit score (scoring specific to program)	Green Deal Finance Company provides low cost (6.7%) capital.	548	Unknown	Unknown
Power Smart Residential Loan Program	On-bill; not transferable	Bill payment history	No credit enhancements. Utility issues 4.8% loans with its own capital.	64,156	CA$263 million (US$239 million)	CA$4,700 (US$4,179)

Commercial: Part I

Program	Region	Launch Date	Rate		Tenor		Loan Amount	
			Min	*Max*	*Min*	*Max*	*Min*	*Max*
U.S.-based Programs								
HERO (Western Riverside Council of Governments)	California	December 2011	5.0%	8.0%	Not defined	20	$5,000	15% of property value, to $600,000
Michigan Saves Business Energy Financing (BEF)	Michigan	April 2012	5.9%	Not defined	2	5	$2,000	$250,000
Midwest Energy How$mart On-Bill Financing	Kansas	September 2008	4.5%	4.5%	Not defined	10	not defined	$15,000 (approx.)
Small Business Energy Advantage	Connecticut	Summer 2000	0.0%	0.0%	Not defined	4	$500	$100,000
International Programs								
China Utility-Based Energy Efficiency Finance Program (CHUEE)	China	2006 - 2009 (closed as planned)	Not defined	Not defined	Not defined	Not defined	$500,000	$12 million
Hungarian Energy Efficiency Co-Financing Program (HEECP)	Hungary	1997 – 2005 (closed as planned)	Not defined	Not defined	Not defined	Not defined	Unknown	$500,000

Commercial: Part II

Program	Secured/ Unsecured	On-Bill	Credit Enhancements and Rate Reductions	Results		
				Total Projects	Total Loan Volume	Average Loan Size
U.S.-based Programs						
HERO (Western Riverside Council of Governments)	Secured by tax lien	No	Tax lien takes priority over mortgages	Unknown	Unknown	Unknown
Michigan Saves Business Energy Financing (BEF)	UCC filing	No	10% LLR, funded by ARRA grant	67	$1.8 million	$21,380
Midwest Energy How$mart On-Bill Financing	UCC filing	Yes	None	32	$200,000 (estimated)	$6,300
Small Business Energy Advantage (SBEA)	Unsecured	Yes	LLR	4,075	$34.6 million	$10,000 (estimated)
International Programs						
China Utility-Based Energy Efficiency Finance Program (CHUEE)	Secured	No	75% loan guarantee	98	$512 million	$5.7 million (estimated)
Hungarian Energy Efficiency Co-Financing Program (HEECP)	Secured	No	50% loan guarantee, later reduced to 35%	331	$55 million	$300,000 (estimated)

ANALYSIS

Introduction

The California investor-owned utilities—Pacific Gas and Electric (PG&E), Southern California Edison (SCE), Southern California Gas (SoCalGas), and San Diego Gas & Electric (SDG&E), referred to collectively as the IOUs or Joint Utilities—are designing seven energy efficiency financing pilot programs at the direction of the California Public Utilities Commission (CPUC). The pilots span multiple markets and program types as follows:

1. Single Family Loan Program (SFLP)
2. Energy Finance Line-Item Charge (EFLIC) - PG&E only
3. Master Metered Multifamily Financing Program (MMMFP)
4. Small Business On-Bill Repayment (OBR) with Credit Enhancement (CE)
5. Lease Providers with CE On-Bill
6. Lease Providers with CE Off-Bill
7. Medium and Large Business and Institutions OBR without CE

The IOUs engaged Cadmus to research how existing energy-efficiency financing programs have addressed certain issues of program design, implementation, and evaluation that are of particular interest to the IOUs. The work was commissioned in large part in order to help bring the EM&V staffs of the Joint Utilities up to speed in a rapid fashion with the current "best practices" observable in the marketplace, based on the emphasis being placed on the rapid roll-out of the pilots across California. We worked with the IOUs to develop a research framework consisting of the specific programs and subject areas to study.

In Methodology, we list the 15 programs and 10 subject areas, and describe the research process. In the next section, Findings, we present an analysis of trends across programs, unique ideas, and key lessons learned. Following the analysis, we present the individual program profiles, which include detailed information on each program.

Methodology

Cadmus worked with the IOU team to identify 15 current financing programs to review—10 programs in the United States and five international programs—based on the following criteria:

- Relevance to the California pilots
- Sufficient publicly available results for the program to be evaluated
- Market diversity (residential, commercial, different program models)

After the IOU team approved the list of programs, Cadmus requested two changes that the IOU team approved. These were to add the Mass Save® HEAT Loan program (HEAT) in place of the Windsor Efficiency PAYS® (Windsor PAYS) program, and then to reinstate the Windsor PAYS program in place of the international program in Thailand, for which insufficient information was found to be available.

Three programs—Michigan Saves, Midwest Energy How$mart, and HERO—have loan products available for both commercial and residential customers. Michigan Saves offers the Home Energy Loan Program (HELP) for residential customers and Business Energy Financing (BEF) for commercial customers. How$mart operates under one name, but has slightly different financing options available for residential and commercial customers. HERO is best known as a residential program, but also offers a separate commercial program. Because we did not distinguish which we intended to review in our framework, we reviewed both products from each organization. The programs in China and Hungary were planned for short duration and are now closed. Table 3 and Table 4 list the details of the final selection covering 18 programs—12 residential and six commercial. We refer readers to the acronym list presented immediately following the Table of Contents for assistance in digesting this information.

Table 3. Residential Programs Reviewed

Program Title	Acronym	Implementer	Region	Program Type
U.S. Programs				
Clean Energy Works Oregon	CEWO	Nonprofit	Oregon – IOU territory	LLR
Help My House	HMH	Cooperative utilities	South Carolina - utility territory	OBF
HERO (Residential)	HERO Residential	Local governments	California – currently in 55 cities in 6 counties[5]	PACE
Illinois OBF Program	Illinois OBF	IOU	Illinois - IOU territory	OBF
Keystone HELP	Keystone	Nonprofit	Pennsylvania - statewide	LLR/secondary investors
Mass Save® HEAT Loan	HEAT	Nonprofit	Massachusetts - IOU territory	Interest rate buydown
Michigan Saves℠ HELP	MI HELP	Nonprofit	Michigan - statewide	LLR
Midwest Energy How$mart OBF (Residential)	How$mart	Cooperative utility	Kansas - utility territory	OBF
NYSERDA On-Bill Recovery Financing Program	NYSERDA OBR	Utilities	New York - statewide	OBR
Windsor Efficiency PAYS® OBF	Windsor PAYS	Municipal water department	California – Town of Windsor	OBF
International Programs				
Green Deal	Green Deal	Government of United Kingdom	United Kingdom – England and Wales	OBF
PowerSmart OBF (Manitoba Hydro)	Manitoba OBF	State-owned utility	Manitoba, Canada - utility territory	OBF

[5] HERO expects to expand to 110 cities in 16 counties in 2014.

Table 4. Commercial Programs Reviewed

Program Title	Acronym	Implementer	Region	Program Type
U.S. Programs				
HERO (Commercial)	HERO Commercial	Local governments	California - Riverside and San Bernardino Counties	PACE
Michigan Saves℠ Business Energy Finance	MI BEF	Nonprofit	Michigan - statewide	LLR
Midwest Energy How$mart OBF (Commercial)	How$mart	Cooperative utility	Kansas - utility territory	OBF
Small Business Energy Advantage (The United Illuminating Company)	SBEA	IOU	Connecticut - IOU territory	OBF, interest buy-down
International Programs				
China Utility-based Energy Efficiency Program	CHUEE	NGO	China - nationwide	Loan guarantee
Hungary Energy Efficiency Credit Fund	HEECP	NGO	Hungary - nationwide	Loan guarantee

Cadmus and the IOU team identified 10 key issues to be investigated across each program. These issues are not intended to provide a full picture of each program, but rather to address areas of specific interest to the IOUs. The guiding questions that we developed to address these issues are comprehensive and address topics related to design, implementation, evaluation, and results of each program. Table 5 presents the 10 subjects and guiding questions.

Table 5. Research Questions

Issue		Guiding Questions
1.	**Financing offer**	What are the interest rates, tenors, and maximum loan amount of the financing products? What credit enhancements or lender security are available?
2.	**Overlapping incentive programs**	What overlapping incentives are offered? How does the financing integrate with the incentive program(s)? How has the addition of financing to an existing energy-efficiency program affected overall participation? Are incentives being replaced with financing, and is that the long-term vision?
3.	**Eligibility of borrowers**	What criteria are used to establish borrower creditworthiness? How does the average borrower score on these criteria? What other eligibility requirements are there?
4.	**Long-term loan performance**	What is the cumulative default rate? What collection procedures are in place (for example, disconnection)? At what point is a loan considered in default? If the program is on-bill, is repayment "tied to the meter" (tariff)?
5.	**Eligibility of measures and projects**	What criteria are used to establish project eligibility (e.g., bill neutrality, approved contractor) and measure eligibility (large number of options or few, and are renewables included)?

Table continues on next page

Issue		Guiding Questions
6.	**Contractor network**	Does the program have a dedicated contractor network? What are the requirements for contractors? Is the network shared with other programs? Do program managers believe the network is a key element of program success?
7.	**Process and impact evaluation strategies**	What metrics, data collection methods, and researchable questions have program managers used to evaluate the financing program(s)?
8.	**Calculation of program cost-effectiveness**	How does the program evaluate cost-effectiveness? Does the program evaluate any freeridership or spillover from the program? How does the financing program "relate" to other loan products already in the market; are they considered "competition" or does the program willingly spill over to these other products?
9.	**Program results**	What are the financing program's results, and over what period of operation? Include metrics such as number of participants, average amount loaned, etc.
10.	**Keys to program success/lessons learned**	What do program managers believe are the critical elements of the financing program that have enabled it to succeed? What did not succeed / lessons learned?

Once the basic framework was in place, Cadmus researched each program on the Internet, using program documents, previous evaluations, third-party studies related to energy efficiency and financing, and other sources. For all programs, some data were not available online. We reached out to each program via e-mail or phone and were able to communicate directly with each program.

To facilitate the IOUs' immediate need for information on savings attribution strategies to inform a white paper required to be filed by the CPUC on December 2, 2013, Cadmus first completed research on attribution for all programs and submitted a memo with the results in November 2013. We then completed research on the remaining subjects from November 2013 to February 2014. This report presents the results, including the research described in the November 2013 memo.

Findings

For this evaluation, we selected primarily mature programs that have been in operation for a number of years, in order to gain from their experience in developing "best practices" over time. We deliberately chose programs with a variety of approaches to design. Programs also differed in purpose, geography, and scale. Our analysis attempted to note any differences in program implementation and achievements based on their individual program designs and to identify possible trends across programs. In order to present an accurate picture of each program we profiled, we chose programs with enough implementation experience to have "learned lessons" and stable program design, except in a few cases where there was a compelling reason to include a newer program. These newer programs include the HERO program in California and the Green Deal program in the UK.

The older programs, including several that were launched thanks to funding from the American Reinvestment and Recovery Act (ARRA), are reaching a state of maturity where it would be possible to investigate whether programs are performing as intended, and whether individual features function as

expected. With a selection of 15 programs that is deliberately diverse, we cannot make decisive statements about the effectiveness of specific program features, but the range of programs represented in this report does illustrate the range of what is possible in financing. At the same time, our findings also point to areas where programs may not be operating as expected, or may be operating better than expected.

Program Results

How have programs performed?

Program results vary widely, even among similar programs. The most prolific residential program measured by number of projects and dollar amount loaned is far and away Manitoba Hydro's residential loan program. This program has completed 64,000 projects and CA$263 million (about US$241 million) in loan volume over 13 years. This is all the more remarkable considering it is a residential loan program and the average loan is just CA$4,700 (about US$4,300). Manitoba Hydro serves approximately 238,000 residential customers.

The second most active program, HERO Residential, is also noteworthy, having completed over 6,000 projects across six counties in just two years. In February, 2014, the program announced that $104 million in AA-rated bonds were issued, secured by 5,890 PACE assessments levied on 5,627 properties located in Riverside County. The average assessment was $18,273 per project, indicating a large average project size relative to other residential programs.

Among commercial programs, the large commercial and industrial projects in China resulted in the largest amount financed, with $512 million loaned out for just 98 projects in three years. One of the criticisms of the China program was that not enough small commercial and small industrial operations were able to participate. Hungary was more successful at targeting smaller businesses, with $55 million distributed over 331 projects in eight years. The average loan was $280,967.

In the United States, SBEA has been used primarily for small projects, with 4,075 participants and $34.6 million in loans over 14 years. The average project is $8,490. HERO Commercial was nearing completion of its first project in late 2012 after one year in operation and had $20 million in projects in the pipeline. The HERO Commercial program declined to provide more current information except to say that they continue to fund applications and now have a larger pipeline.

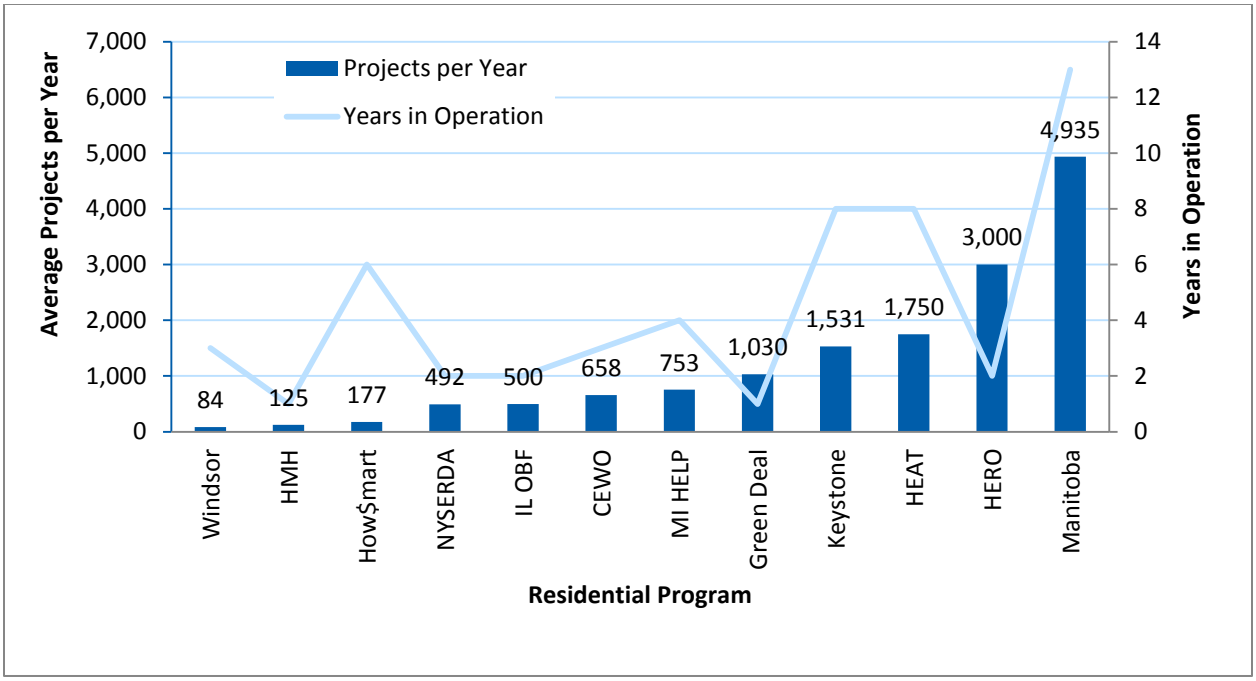
All of the programs Cadmus reviewed are considered successful, but results vary widely due to many factors, such as the population, eligibility for the financing offer as well as rebate incentive, and length of time in operation. Small programs, in terms of geographic footprint and eligible population, have much lower activity levels than larger programs, as one would expect. Population figures were not available to determine the proportion of eligible customers served by each program.

SBEA staff report the program has impacted 25% of its commercial meters. Manitoba Hydro's program has also impacted a large portion of its customers, with approximately 12% of its customers having financed at least one project and many having financed multiple projects. The program's success is due

in part to its longevity, but the program also has the highest annual activity rate of any program we researched. At nearly 5,000 projects per year on average, it easily outdistances the next most active program, the HERO Residential program in California, though HERO is growing rapidly. Green Deal in the United Kingdom has completed over 1,000 retrofits in its first year, but the program has a very large footprint. (There are nearly 60 million people in England and Wales.)

Figure 3 shows the average projects per year for the residential programs. The numbers are impacted by market size, years in operation, target sector, and more. For example, the Windsor program is available only to the residents of that town with a population of approximately 28,000, while the Manitoba program is available to its 238,000 residential customers.

Figure 3. Average Projects per Year since Program Inception – Residential

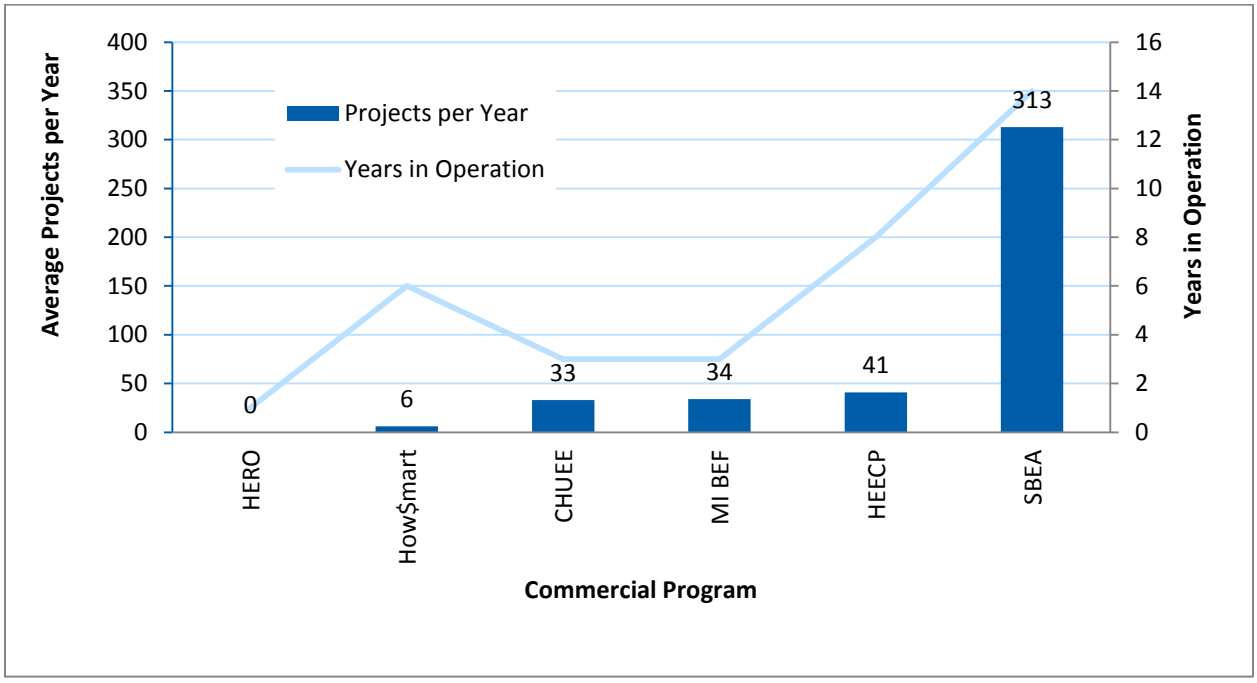


It is important to note that these numbers are not for the most recent year of operation. They are instead an average calculated by dividing the total number of projects by the years in operation. New programs often take time to ramp up, and Figure 3 reflects that in general. The largest of the programs is also the oldest. The exception is the HERO program, which is the second largest after only two years. Year-by-year numbers for the programs were not readily available, but the numbers for more recent years of operation would typically be larger than the numbers above. For example, the HEAT program completed over 3,400 projects in 2010, four years after the program started.

Figure 4 shows the average annual participation for the commercial programs. As with the residential program, these average values reflect the full history of the program, including ramp-up years. With the exception of SBEA, commercial projects saw lower participation rates than any of the residential

program. This is in part due to the fact that most programs have fewer potential commercial customers than residential customers. Projects may also take longer to complete.

Figure 4. Average Projects per Year since Program Inception – Commercial[6]

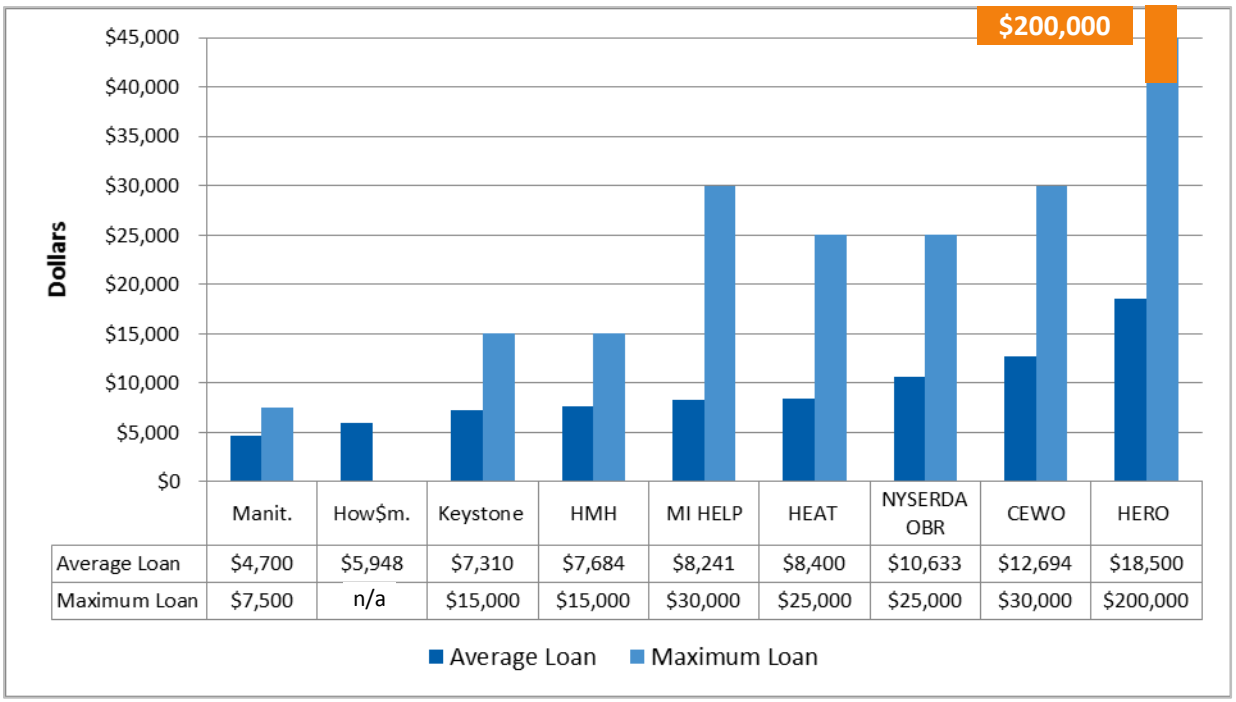


Another measure of performance is the size of the average loan, since this is an indicator of energy savings achieved through the project. Among the residential programs, HERO loans are the largest—around $18,300 on average, with a maximum loan of 15% of the property value up to $200,000.[7] **Average loan size appears to be correlated to maximum allowed loan amount, as Figure 5 shows.**

[6] HERO Commercial reported in late 2012 after one year in operation that they had over $20 million in projects in the pipeline, with the first project nearing completion.

[7] Cadmus was not able to determine the average loan size of Windsor Efficiency PAYS program, but given the loan cap of $2,500, this program likely has the smallest average loan size. We were also unable to determine the average loan size for Green Deal or Illinois OBF.

Figure 5. Average Loan Size and Maximum Allowed Loan Amount[8]



	Manit.	How$m.	Keystone	HMH	MI HELP	HEAT	NYSERDA OBR	CEWO	HERO
Average Loan	$4,700	$5,948	$7,310	$7,684	$8,241	$8,400	$10,633	$12,694	$18,500
Maximum Loan	$7,500	n/a	$15,000	$15,000	$30,000	$25,000	$25,000	$30,000	$200,000

We cannot know the nature of the relationship between maximum and average loans without more detailed information. The relationship is not exact, and may lag behind any changes to the financing offer. For example, both the HEAT program and MI HELP have adjusted their maximum loan rate within the last two years. In addition, only two of nine MI HELP lenders currently offer the $30,000 maximum loan; the remainder continue to offer the $20,000 maximum, which itself was increased the previous year from an original maximum of $12,500.

Financing Offer

What are the details of the financing products?

All of the residential programs featured in this report are built around their respective standardized loan product, with tenors, interest rate, maximum loan amounts, and other features of the loan specified by the program. Four of these programs—CEWO, MI HELP, HEAT, and Green Deal—have multiple lender partners and allow each lender some discretion relative to certain aspects of the loan. The remaining programs all work with a single lender or issue the loans themselves.

Four of the commercial programs we reviewed—How$mart, SBEA, HERO Commercial, and MI BEF—had standardized loan products. However, the two international commercial programs did not specify rates, tenors, or any other details of the loan products. Because these programs did not control for these

[8] How$mart does not have a maximum loan amount, but loans are required to have a monthly payment lower than the average monthly savings.

details, nor were they addressed in the program evaluations, we do not feature the two international programs in this section of our analysis.

Rates: Interest rates for the residential programs ranged from 0% to 9.3% (Table 6). For programs near 9%, the rate is likely to be below some private sector tools, such as credit cards, but may not be lower than other available financing, such as personal loans or financing available from equipment manufacturers. A few programs do allow rates to range according to specified conditions.

The largest gap is within the Keystone program, which offers a 3% rate for Whole Home loans and higher rates, up to 9%, for prescriptive measure and equipment loans. Whole Home loans are supported with a partial interest rate buydown and a loan loss reserve (LLR) fund. HEAT also offers an interest rate buy down of the total interest charge, so that the customer pays 0% interest.

Simplicity in the financing terms is a marketing tool for some programs. Seven residential programs are able to market a flat rate, and two programs market 0%. **While the two programs that offer 0% have successful uptake, a rate this low is not a noticeable trend among programs, nor does it appear necessary for success.**

Table 6. Residential Program Interest Rates

Program	Minimum Interest Rate	Maximum Interest Rate
HEAT	0.0%	0.0%
Windsor PAYS	0.0%	0.0%
HMH	2.5%	2.5%
Keystone	3.0%	9.0%
How$mart	3.0%	3.0%
NYSERDA OBR	3.5%	3.5%
CEWO	3.8%	6.0%
Manitoba	4.8%	4.8%
Illinois OBF	5.0%	5.0%
MI HELP	5.0%	7.0%
HERO	6.0%	8.3%
Green Deal	7.7%	9.3%

For the commercial programs the rates were slightly lower, ranging from 0% to 8%. SBEA and How$mart have a fixed single rate of 0% and 4%, respectively. MI BEF rates start at 5.9% and increase with no program-set maximum. HERO Commercial loans range from 5% to 8%.

Tenors: Residential loan tenors ranged from five to 25 years. Eight programs use a maximum tenor of 10 or 15 years. Manitoba Hydro and HEAT Loan have shorter tenors, five and seven years, respectively (though Manitoba Hydro allows longer tenors for boiler replacement projects). Green Deal offers the longest tenor, 25 years, followed by 20 years for HERO Residential and CEWO.

Commercial loan tenors had an even wider range, with SBEA at four years, MI BEF at five years, and How$mart at 10 years. HERO has the longest option, 20 years, perhaps reflecting the strong security provided by the PACE assessment.

Loan Amount: Five of the residential programs, as well as the commercial program SBEA, have minimum levels under $1,000: Windsor PAYS and How$mart have no minimum amount, and HEAT, Illinois OBF, Manitoba OBF, and SBEA allow down to $500. Minimum loan amounts for the remaining programs range from $1,000 to $5,000. HERO, which offers Property Assessed Clean Energy (PACE) loans, has the highest minimum loan amount, $5,000, for both residential and commercial loans. How$mart and HMH did not have set minimum or maximum loan amounts.

Generally, a smaller minimum loan amount allows people to finance a single item, such as a water heater or refrigerator. These programs put less emphasis on a whole-building approach and are more likely to have smaller average loan sizes.

Eight residential programs have maximum loan amounts that range from $15,000 to $30,000. HERO offers loans of 15% of the property value up to $200,000. This program will potentially allow an even larger loan if the project undergoes special review by program staff. Many programs with higher maximum loan amounts also focus more heavily on a whole-home approach. This includes requiring an audit, having complementary rebate programs that offer large incentives for weatherization and HVAC measures, and having a contractor network with advanced certification required for participation.

Only two residential programs had maximum loan amounts below $15,000. Manitoba Hydro's program offers up to a maximum of CA$7,500 (US$6,770). The Windsor PAYS program offers up to $2,500. This program was designed to fill a special gap in that it is below the minimum loan amounts required by the Sonoma County PACE financing program. (Windsor is located in Sonoma County.) Both of these programs are also among those that have the lowest minimum thresholds. These programs are designed to enable smaller loans.

HEAT represents a hybrid approach. In 2010, Mass Save both lowered the minimum HEAT loan amount from $1,000 to $500 and raised the maximum from $15,000 to $25,000. In addition to encouraging "micro-loans" from $500-$1,000, HEAT is actively promoting a whole-home approach to retrofits.

Commercial programs generally offer larger loans. SBEA will lend up to $100,000 and MI BEF up to $150,000. HERO Commercial allows loans up to $600,000 (but not more than 10% of property value) and will go above that amount if the property value supports it and it receives approval from the Western Riverside Council of Governments (WRCOG).

Neither CHUEE nor HEECP had a standardized loan product, so neither program controlled the loan size. While CHUEE attempted to target smaller projects, the average loan size was $5.2 million. HEECP was more successful at targeting mid-size businesses, with an average loan size of just under $300,000 (note that this represents significantly more spending power in Hungary than in the United States).

How$mart does not list a maximum amount for either its residential or commercial financing, but its average loan size across both markets is under $6,000.

Risk Mitigation/Rate Reduction: Three of the residential loans reviewed in this report are secured and eight are unsecured. HEAT loans over $15,000 and some CEWO loans (if the lender chooses) are secured with a lien on the property. All NYSERDA OBR loans are secured with a subordinate mortgage.

Several programs have mechanisms in place to protect the lender or investor without subjecting the borrowers to security requirements. Illinois OBF loans are covered by a utility guarantee to reimburse the lender for any losses. HERO loans create a tax obligation that has seniority over a mortgage in the event of foreclosure. MI HELP, Keystone, and CEWO have all used loan loss reserves (LLRs). **CEWO recently reallocated its LLR fund after lenders agreed that program loans had demonstrated their good performance and that the extra protection was no longer necessary.**

Keystone is converting some of its LLR funds into subordinate debt. In January 2014, Keystone began using a new system of warehousing loans, through the Warehouse for Energy Efficiency Lending (WHEEL), a national initiative to enable a secondary market for energy-efficiency loans. WHEEL operates as a "warehouse" for the loans made through the Keystone loan programs. The loans are held in this warehouse until they can be bundled and sold on to other investors. Keystone purchases a portion of these loans itself as a subordinate investor, using what were formerly LLR funds from the Pennsylvania Department of Environmental Protection. Remaining investors (currently Citigroup and the Pennsylvania Treasury) purchase 40% shares in the warehouse, respectively, as senior investors. Senior investors are made whole first, and losses are absorbed by the subordinate investor.

In order to make interest rates more affordable for consumers, some programs buy down the market rate. HEAT and SBEA buy the rate all the way down to 0%, using funds collected through a public-benefit charge on the utility bills of large IOU customers in those states, as well as other sources. Other programs source low-cost capital in order to keep rates down. The How$mart and HMH programs received federal grants through the U.S. Department of Agriculture (USDA). Manitoba Hydro is able to use its own proceeds from the sale of excess power from its generation facilities.

Table 7 shows security, on-bill payment, credit enhancements, and rate reductions for all programs.

Table 7. Residential Program Security Details

Program	Secured/ Unsecured	On-Bill	Credit Enhancements and Rate Reductions
CEWO	Lender may file UCC form or property lien	In some areas	LLR of 10% until December 31, 2013, then none. Rates range from 3.75% to 5.99%. On-bill customers are eligible for a 0.25% to 0.5% rate discount.
Green Deal	Unsecured	Yes	Green Deal Finance Company provides low cost (6.7%) capital.
HEAT	Secured by lien on property for amounts over $15,000	No	Uses funds from public benefit charge to buy down interest rate to 0%.
HERO	Secured by tax lien	No	Tax lien takes priority over mortgages.
HMH	Unsecured	Yes	Used grant funds as loan capital to offer 2.5% rate.
How$mart	UCC filing	Yes	Uses grants, mission-related investments, and utility funds to offer 3.0% rate.
Illinois OBF	Unsecured	Yes	Utility guarantee.
Keystone	Unsecured	No	LLR of 5% until Dec. 31, 2013, then subordinate investor funds of 20%.
Manitoba OBF	Unsecured	Yes	No credit enhancements. Utility issues 4.8% loans with its own capital.
MI HELP	Unsecured	No	LLR of 5%.
NYSERDA OBR	Subordinate lien on property	Yes	No credit enhancement. Receive funds through the Regional Greenhouse Gas Initiative, federal grants, and utilities to buy down rate.
Windsor	Unsecured	Yes	Sonoma County Water Authority will repay losses and buys down rate to 0% using funds from a federal grant.

Commercial programs operate under a variety of security and risk mitigation strategies. SBEA offers loans that are unsecured by property and backed by nothing but the threat of disconnection...though that can be a significant stick. United Illuminating issues loans directly through its SBEA program and relies on an LLR from the Connecticut Energy Efficiency Fund (CEEF). Unlike the other LLRs described in this report, the SBEA LLR covers 100% of the outstanding balance of a defaulted loan.

How$mart and MI BEF programs file a UCC lien against the equipment financed. Technically, this allows the equipment to be repossessed in the case of default. However, both programs primarily rely on the UCC filing as a means to ensure notification to any potential buyers that the property cannot be sold until the lien is removed. Repossession might be possible (though often unlikely) for equipment such as new heating, ventilation, and air conditioning (HVAC) but not for other common measures like insulation.

How$mart has some added security because loans transfer to subsequent owners of the property; if an owner goes bankrupt, the next owner assumes the remaining payments along with benefiting from the

improvements. MI BEF loans are supported by an LLR that offers partial recovery of losses capped at 10% of the loan pool.

HEECP and CHUEE were designed to target much larger, more complex projects than the other programs profiled in this report. Both HEECP and CHUEE used partial loan guarantees to engage partner lenders. CHUEE offered a guarantee of 75% for the duration of the program. HEECP started the program by offering a 50% guarantee, and as the program gained momentum it was able to reduce the guarantee to 35%. Table 8 lists the security requirements of the commercial programs.

Table 8. Commercial Program Security Details

Program	Secured/Unsecured	On-Bill	Credit Enhancements and Rate Reductions
HERO Commercial	Secured by tax lien	No	Tax lien takes priority over mortgages
How$mart	UCC filing	Yes	None
MI BEF	UCC filing	No	10% LLR, funded by ARRA grant
SBEA	Unsecured	Yes	LLR
HEECP	Secured	No	50% loan guarantee, later reduced to 35%
CHUEE	Secured	No	75% loan guarantee

Both residential and commercial loan products benefit from other features that are likely to increase repayment rates. For example, all loans could benefit from the energy savings. NYSERDA and the Windsor PAYS programs take this further by requiring that the average monthly savings be greater than the average payment. Both of these loans are also repaid on the utility bill. NYSERDA staff reported that investors viewed on-bill surcharges as favorable, because the customer has a high incentive to pay, especially if the utility can disconnect for nonpayment.

Overlapping Incentive Programs

What overlapping incentives are offered, and how are they integrated with financing?

Some financing programs are offered together with large cash incentives, either from the same provider (i.e., utility) or a partner program. For CEWO, NYSERDA, and the Michigan Saves programs, the cash incentives are viewed as the primary assistance, and program managers view financing as a secondary tool to help customers move forward. SBEA, HEAT, and Illinois OBF are also offered jointly with utility rebates, but there is no evidence that these programs view financing as secondary. Several rebates are offered through the Energy Upgrade California™ program and other programs in the HERO counties, and HERO is cross-marketed with these programs to the extent possible given the different geographic footprints.

- CEWO is a unique example of a program that offers cash incentives and financing. Customers must achieve at least 15% energy savings to be eligible for the program. Smaller rebates are available through the Oregon Home Performance with ENERGY STAR® (HPwES) program as well

as other, less restrictive programs, but customers do not have financing assistance through those programs.

- NYSERDA offers a 10% cash back incentive and multiple financing programs, including the on-bill recovery (OBR) program reviewed in this report, as part of its HPwES program. This incentive is only available for measures that are not rebated by a utility, so most projects are not eligible.
- Michigan Saves, which operates the HELP and BEF programs, does not offer cash rebate incentives. However, by making utility rebate-eligible measures eligible for financing, and by allowing any measures identified through an audit, it coordinates closely with prescriptive, custom, and HPwES rebate programs.
- HEAT loans are available in conjunction with utility rebates (up to $2,000) for whole home upgrades, high-efficiency heating, water heaters, lighting, and other rebate programs.
- Illinois OBF will finance projects that leverage rebates from different utilities, if a customer does not receive gas and electric service from the same utility.
- SBEA uses a complete turnkey approach that provides rebates up to 50% of the project cost as part of the same program that offers financing.

Other programs view their financing options as the primary, or only, incentive available in their area. These programs are strong examples of robust financing programs with little rebate support.

- Keystone is unusual in that, like NYSERDA, it sponsors the HPwES program for Pennsylvania. However, Keystone does not offer cash incentives. Pennsylvania utilities offer some rebates, but they are modest relative to other areas and not marketed consistently with the Keystone HELP financing.
- Manitoba Hydro similarly offers few rebates. Its financing programs are the primary assistance available to Manitoba Hydro residential customers.
- How$mart, operated by a cooperative utility, and HMH, operated by an association that represents the cooperative utilities in South Carolina, are both the only financial incentives available to their customers.
- Neither of the international commercial programs, CHUEE and HEECP, operates in coordination with a rebate program.

Energy advisor services and free or discounted audits are another benefit available to customers in conjunction with many financing programs. In several cases, the audit is required for the customer to be eligible for financing and is intended to give the customer, as well as the lender, greater assurance that the project will save energy and utility costs. All HPwES programs, such as those implemented by NYSERDA OBR and Keystone, require a comprehensive audit as part of the project. The Windsor PAYS program, as well as the Green Deal program, not only require an audit but also expect the project to save more in utility bills than the cost to install.

Some programs, such as the residential and commercial How$mart programs and CEWO, offer a free assessment as the entry into the program. CEWO customers receive a free audit and are under no obligation to move forward. How$mart customers must pay $200 for the audit if they do not move forward with the most cost-effective recommended measures.

The Illinois OBF program is an example of a low-cost audit. The $50 audit is offered by three of the participating utilities, but it is not required for the customer to participate in either rebate or financing programs.

Commercial programs do not require a standardized review comparable to the residential sector's Building Performance Institute, Inc. (BPI), audit, but they do often require technical review. SBEA offers customers a no-cost assessment with no obligation. How$mart offers energy assessments for free if the customers pursue recommended measures. MI BEF does not require an assessment but does recommend one. MI BEF allows greater measure flexibility and additional incentives for customers who have an assessment performed.

Like rebates, regulatory requirements such as building codes, equipment standards, and emissions regulations can also affect people's behavior.

- In China, the government passed new pollution restrictions that forced several companies to make major overhauls to their facilities. Though not coordinated with the regulations, CHUEE was launched shortly after the new, stricter regulations went into effect. Not surprisingly, several participants in the program, such as cement factories, were heavy polluters.
- The Manitoba legislature recently mandated that only furnaces with an annual fuel utilization efficiency (AFUE) rating of 92 or higher can be permitted for installation. Manitoba Hydro participated in writing and helped move the law through the legislature because it results in energy savings across the province. A side effect of the law is that high-efficiency furnaces no longer save enough energy over the AFUE 92 baseline to be cost-effective measures for rebate programs. Because Manitoba Hydro's financing program is considered rate-payer neutral, the utility can still allow furnaces as eligible measures for financing and, therefore, still offer financial assistance to people making an upgrade.

How has available financing affected participation in related incentive programs?

Most program managers interviewed for this report thought that financing had a beneficial impact on participation in existing rebate programs, but none had any statistics to prove their hypothesis. A NYSERDA program manager stated his impression that while rebates were better able to capture people's attention, financing was necessary to "close the deal." Other programs, like CEWO, use financing and rebates in different ways for marketing flexibility. The basic financing offer is a benefit for all qualified participants equally, while tiered rebates encourage deeper savings. HERO program managers specifically mentioned that they would be interested in collaborating more closely with the utilities in order to quantify this effect.

Michigan Saves recently concluded implementation of a federal grant program that allowed it to experiment with combinations of rebates and financing and to collect data on the results. **The program found that projects that took advantage of both rebates and financing were twice as large as projects paid for in cash.** While not conclusive, this implies that having access to financing might encourage deeper retrofits than rebates alone. However, Michigan Saves does not receive data from utilities and does not know to what extent its program has impacted uptake of existing utility rebates or the size of rebate-supported projects.

Are rebates being phased out in favor of financing?

In the last few years, some policymakers have pointed out that financing programs using private sector capital and leveraged by an LLR could be more cost-effective than a rebate program. This would arguably be a more responsible approach to spending public or utility dollars than rebate programs. If financing programs proved successful, rebates could perhaps even be phased out.

Several of the programs reviewed in this report are operated by nonprofit organizations that receive government grants. Of these, CEWO, MI HELP, MI BEF, and NYSERDA are organizations that were started or enhanced by grants through the American Recovery and Reinvestment Act of 2009 (ARRA). (Keystone HELP used state government funds for a similar purpose.) ARRA placed a great deal of emphasis on using public money as efficiently as possible, in particular as a way to leverage private market funds.

Though all are considered successful programs, no program reviewed in this report is considering replacing its existing rebate programs with solely financing. In cases where the utility is not the financing program sponsor, the fact that utilities are unable to count savings from a financing program is a major barrier to phasing out rebates. **Perhaps more importantly, several program managers reported that the combination of financing and rebates appeared to be more effective than either method alone, as noted in the preceding section.**

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

Among the residential programs we reviewed, there are two general approaches to underwriting residential loans:

- **Credit score:** Relies primarily on the customer's FICO credit score, as well as debt-to-income ratios, bankruptcy history, and other factors commonly seen in underwriting for personal loans.
- **Utility bill history:** Relies primarily on the customer's utility bill pay history, though occasionally incorporates other factors such as debt-to-income ratio or mortgage payment history.

Six of the residential programs rely primarily on credit scores to underwrite loans. Minimum scores range from 590 to 640, although some MI HELP lenders will not accept anything below 680. These programs all have additional criteria, including maximum debt-to-income ratios, rules about existing liens, and bankruptcy history. However, credit score is the most common reason for denying an application. Green Deal does not use credit scores and relies on a less restrictive review of credit history.

How$mart, HMH, Windsor PAYS, and Manitoba Hydro all evaluate customers based primarily on their utility bill payment history. How$mart simply approves any customer who is current on their utility bill. Other programs require the customer to have made no late payments for a period ranging from the last six to 12 months. Manitoba Hydro runs a credit report on applicants in order to determine their debt-to-income ratio, but it does not use the credit score.

NYSERDA allows customers to choose if they want to be underwritten based on credit score or bill pay history. HERO bases eligibility on mortgage and tax payments, as well as other criteria including debt-to-income ratio and bankruptcy history.

For commercial programs, underwriting is more varied and often depends on the size of the loan. Underwriters use these methods:

- Credit score (for small businesses)
- Utility bill payment history
- Project cash flow

MI BEF is the only commercial program that checks the owner's credit score and then only if the business is not a corporation.

Two commercial programs use utility bill history. SBEA reviews the past six months of bill pay history. How$mart requires that borrowers be current on their utility bill, but it does not review history. As with the residential program, HERO Commercial reviews mortgage and tax payment histories, in addition to other criteria. The details of the requirements differ between the two HERO programs.

The international commercial programs, CHUEE and HEECP, tended to consider much larger projects than the domestic commercial programs. In both of these programs, the market moved from requiring extensive real and personal property as guarantees to basing project eligibility on the cash flow to be generated through the project. Most loans were made to the ESCOs working with business clients, and these ESCOs are considered creditworthy.

How does the average borrower score on these criteria?

Many programs we reviewed did attempt to accommodate less credit-worthy customers. **However, typical borrowers in credit-score driven programs for which we received data far exceeded the minimum criteria and would probably not have difficulty obtaining credit through other sources.** For instance, although NYSERDA's minimum acceptable score is 640, customers who choose credit score underwriting have an average credit score of 752. Those who choose bill-pay underwriting have an average credit score of 728 (NYSERDA pulls credit reports for both groups). Similarly, CEWO's Craft3 lender partner, which operates in the Portland metro area, accepts credit scores as low as 590, but has an average score of about 750.

For the MI HELP program, which also sets its minimum credit score at 640, the average credit score is 757, and about 60% of applicants are approved. The average credit score among denied applicants is

632. Keystone program managers did not provide an average credit score but did indicate that the average approval rate is 65%.

Green Deal approval rates are not published, but the program designed its approval criteria to be at a level that 80% of homeowners in Britain can pass.

Average performance data is available only for credit scores. Program managers do not track average values for bill pay history; approved customers simply meet the criteria or do not.

For commercial programs, SBEA was the only one for which applicant statistics were available. Program managers stated their approval rate is 94%, and about 50% of approved clients move forward.

What other eligibility requirements are there?

Programs have applicant requirements that go beyond the underwriting requirements.

- Most residential programs are limited to single-family homes.
- Five residential programs require that the borrower be the property owner (MI Saves, CEWO, HEAT, NYSERDA, and HERO). Green Deal, How$mart, HMH, and Windsor PAYS are open to tenants, as those programs are tied to the meter.
- Some commercial programs exclude publicly owned property.
- For any program that is either funded through ratepayer dollars or that incorporates on-bill payment or another utility service, the applicant must be a utility customer.
- CEWO requires that the home to be upgraded was built before 1993.
- Keystone is limited to households making $250,000 or less.

Long-term Loan Performance

What is the cumulative default rate?

Default rates for unsecured energy-efficiency programs have proven to be lower than other unsecured debt. Though the reason is not precisely known, it may be related to customers having additional cash available from saving on utility bills. It may also relate to the type of borrower that chooses to invest in energy efficiency. This report uses the typical definition of default rate as the percentage of total loans that have been written off as uncollectible.[9]

Keystone is at a 1.28% cumulative default rate. Michigan Saves is at 1.10%. Manitoba Hydro, HEAT, and How$mart are below 1%. CEWO had charged off just one loan as of 2010. HERO Residential is at 3% delinquent loans, not all of which are likely to result in default. For the newer programs, including the Illinois OBF program, Windsor PAYS, and Green Deal, the default rate is not yet available.

[9] In other circumstances, the default rate may describe the percentage of the loan volume that is written off each year. This definition is used, for example, by the credit card industry. It will generally be a lower number than the cumulative rate used by most, but not all, energy-efficiency programs.

It should be noted that cumulative default rates may be lower than the ultimate default rate over the life of the loans. Cumulative rates are often calculated across an entire portfolio of loans and are therefore an average of new loans and old. Older loans are more likely to have defaulted than newer ones, so the default rate for older loans is usually higher than the cumulative average. Also, if a program makes 10-year loans and has only been in operation for seven, the ultimate default rate for the earliest loans is still unknown. Information on the ultimate default rate of energy efficiency loans is not readily available in the industry.

Commercial programs have fared even better than residential programs. Among the commercial programs we studied, SBEA has a lower than 1% cumulative default rate after more than 10 years of implementation. How$mart is also below 1%. China and Hungary had registered no defaults in the two years following the close of each program. Michigan Saves did not have data on the default rate for its commercial program.

What collection procedures are in place?

Though many of the program loans are unsecured, there are means for the lenders to recoup losses in the event of default. On-bill programs, including SBEA, Manitoba, NYSERDA, Illinois OBF, How$mart, HMH, Windsor PAYS, and the Green Deal program in the United Kingdom, allow for disconnection of power in the event the customer does not make the monthly payments. Most programs have well-defined procedures for pursuing shutoff and do not initiate that process for 90 to 120 days after the account becomes past due.

HERO loans are technically not loans; the property owner agrees to pay an annual property tax obligation for a specific period of time in return for receiving funding for the project. The local tax collector can foreclose in the event of nonpayment.

On-bill loans vary as to whether or not they transfer with sale of the property. NYSERDA allows prospective buyers to demand the loan be paid in full, but it is not mandatory. Illinois OBF, Manitoba Hydro, and CEWO require that the loan be paid off. The two cooperative programs, How$mart and HMH, as well as SBEA and Green Deal, allow the loan to transfer. How$mart uses a UCC-1 filing to ensure the buyer is notified of the obligation. HERO Residential and HERO Commercial, as is common for most PACE programs, allow the loan to transfer to successive owners, though buyers may insist on repayment as part of the negotiations when a property is sold.

An important feature for SBEA and Green Deal is that tenants are eligible and are obligated to make the payments for the tied-to-the-meter loans only so long as they are responsible for paying the utility bill.

At what point is a loan considered to be in default?

Most loans are declared in default after 90 to 120 days. At this point, the loan will likely be written off. Also around this point, the utility may disconnect service if it is an on-bill loan. The lenders may make a claim against a loss reserve if one is available. CEWO is a special case in that loans are not considered in default until 180 days after the last payment.

Because HERO Residential and Commercial loans are tied to property taxes, which are assessed on an annual basis, its calendar for default is longer. The program determines which loans are in default once a year, following the annual property tax deadline.

How$mart is unique in terms of collections. Midwest Energy regards the financing as a surcharge, not a loan, and any payments as equivalent to service charges. Therefore, the utility can pursue the missed payments but not the remaining balance of the loan.

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

Seven residential programs, and How$mart and SBEA among the commercial programs, require an audit to determine if a project qualifies for financing. In addition, Keystone requires an audit for its whole-home unsecured loan. HEAT, CEWO, and How$mart provide free audits, though How$mart may charge $200 if the customer does not move forward with any measures. Generally, any measure that an audit determines would be cost-effective is eligible for financing. Projects must be cost-effective over the life of the measure, which means that during the product's expected life the energy savings will compensate for the cost of the measure. How$mart also requires customers to install more cost-effective measures first, such as air sealing or insulation, before purchasing less cost-effective measures such as a new furnace or air conditioner.

Windsor PAYS has adopted the more restrictive PAYS model, where the loan payments must be less than 75% of the average monthly savings. Windsor PAYS facilitates projects under this conservative model by allowing unusually long tenors for small loans—as many as 15 years for up to $2,500. SBEA and Green Deal also require savings to exceed costs.

Other programs simply compile a list of eligible measures. HERO is notable for its extensive prescriptive list of eligible measures of more than 150,000 products. Products are added to the list only if they have been evaluated by a reputable source, usually an industry trade group or utility, to verify their performance. Michigan Saves maintains a list of prescriptive measures for both the HELP and BEF programs but will also allow most measures identified in an audit.

What criteria are used to establish measure eligibility?

All but one program allows standard energy-efficiency measures such as air sealing, insulation, high-efficiency HVAC, and other measures. Windsor PAYS, which is focused primarily on water conservation, allows only some energy measures such as compact fluorescent light bulbs (CFLs). Commercial programs add controls, motors, air compressors, and other commercial technology.

Programs that determine measure eligibility through an audit will generally allow high-efficiency windows if the entire project meets a particular payback threshold. MI HELP, BEF and HEAT loans will allow solar hot water but not solar photovoltaic (PV), while HERO allows both. About 35% of HERO projects have included solar PV as a measure.

MI HELP, BEF and Keystone have special provisions for geothermal heat pumps. In Michigan, the heat pump must be a replacement, as no fuel switching (between natural gas and electric) is allowed. In Pennsylvania, customers have special loan options for geothermal heat pumps.

Manitoba Hydro deliberately designates measures as eligible for financing that are not deemed cost-effective from the utility perspective and therefore are not eligible for rebates. These include windows, solar PV, and high-efficiency furnaces.

Big commercial projects, such as those implemented in Hungary and China, are highly customized. Most were designed by energy service companies to generate more savings than the estimated payments.

Contractor Network

Does the program have a dedicated contractor network?

All residential and commercial programs reviewed in this report, with the exception of CHUEE and HEECP, have a dedicated network of contractors. Both CHUEE and HEECP focused on a small group of ESCOs that engaged with the program model, but there was no formal relationship between the program and the ESCOs. Contractor networks can be classified under three models—broad, technical, and restricted—as shown in Table 9.

Table 9. Contractor Network Models

Network Model	Description	Examples
Broad	• Minimal requirements for contractors, designed to allow as many contractors as possible to participate. • Accepts unlimited contractors on a rolling basis. • Benefits the program in that contractors are primary marketers; the more contractors, the more marketers. • The program has limited control of quality of workmanship.	• How$mart residential and commercial • HERO residential and commercial (also allows self-install in some cases) • Illinois OBF • Manitoba Hydro
Technical	• Requires advanced technical certification, such as the BPI Building Analyst certification. • Accepts unlimited contractors on a rolling basis. • Benefits the program by ensuring qualified contractors, without limiting geographic reach of the program; allows program to promote the advanced qualifications of its contractors. • Restricts the program in that technical requirements and additional paperwork will limit contractor participation. In addition the program faces higher costs to maintain the network.	• NYSERDA OBR • Michigan Saves HELP and BEF (also maintains "broad" network of contractors without advanced certification, that have limited access to program) • Keystone HELP (also maintains "broad" network of contractors without advanced certification, that have limited access to program) • Green Deal • HEAT Loan (also maintains a "broad" network of contractors for customers who work with a Mass Save Energy Specialist for the assessment)
Restricted	• Program sets required criteria, such as for a technical network, and then allows contractors to compete through a bidding process. Contractors may compete based on experience, capacity, geographical reach or other characteristics. • Accepts limited number of contractors, through bidding or application at select times. • Benefits the program in that a small group of "elite" contractors is easy to manage and performs well. The small number of participating contractors ensures the program is a valuable opportunity for the selected companies, which encourages these contractors to perform well in order to maintain their position. • May result in contractors elevating their prices, as they have limited competition. Restricts the opportunities to build experience in the industry as a whole. Makes it more difficult for a large program to have multiple contractor partners in all areas.	• CEWO (50 contractors across the eligible territory) • SBEA (15 contractors in the United Illuminating Company territory) • Windsor PAYS (also maintains a network of secondary contractors on a "broad" contractor model, to work under supervision of the single lead contractor) • HMH (20 contractors selected for the pilot; would likely move to a less restrictive model in a future program)

What are requirements for contractors?

All programs that use contractor networks require that contractors sign an agreement to abide by program rules; contractors are then designated "in-network." All programs except How$mart and HMH also require that contractors be licensed by the state and hold appropriate insurance. According to the How$mart program manager, not checking licenses saves on administrative costs. The programs that maintain a "broad" network of contractors do not require any special training or certification for authorized contractors.

As Table 9 shows, several programs set technical certification requirements for contractors to participate. Most of these requirements state that contractors must employ staff who are certified through BPI as Building Analysts and capable of performing an audit to BPI standards. MI HELP is unique in that it accepts other technical certifications as equivalent to BPI, such as the Weatherization Assistance Program Inspector training or ResNET Home Energy Rating System Rater certification. Requiring advanced technical certification is a requirement of the HPwES programs, such as NYSERDA and Keystone (MI HELP coordinates closely with a HPwES program in Michigan). MI HELP and Keystone allow non-BPI contractors but only allow those contractors with additional weatherization certification to perform energy audits and install any recommended weatherization measures.

Broad and technical model networks accept contractor applications on a rolling basis. For technical model networks, maintaining up-to-date records and managing contractor communication and quality assurance can be challenging.

Network management is easier for restrictive programs, which generally have a smaller pool of contractors who quickly become adept at program processes and policies. In addition, the periodic bidding process presents an opportunity to review contractor qualifications. SBEA selects contractors periodically via a request for proposal (RFP) process and review contractor performance on a quarterly basis. CEWO holds open enrollment whenever necessary to ensure the desired number of contractors. HMH and Windsor also had a limited pool of contractors, recruited specifically for the pilot.

Is the network shared with other programs?

For most programs that have defined networks, participation does not give the contractor access to supporting incentive rebate programs. In some cases, such as How$mart, there simply are no other programs available. In other cases, such as NYSERDA HPwES, contractors register with NYSERDA for its financing and incentives, but they must register with each utility separately to offer the utility incentives. One exception is Manitoba Hydro, where contractors submit one application for all Power Smart programs; however, the incentives available through the Power Smart programs are limited.

Do program managers feel the network is a key element of program success?

The great majority of programs noted that the contractor network is a critical marketing arm and vital to the success of the program. Evaluation reports of CHUEE and HEECP, programs that did not develop formal contractor networks, noted that certain ESCOs that learned about the program became strong advocates and drove projects to the program without having any special affiliation.

HEAT is an unusual case, in that program managers report the majority of leads come through the call center and are distributed to the contractor network. The network is therefore important for accomplishing the work, but they are not a significant marketing driver for this program. In HMH, the utilities directly recruited participants to the program and did not rely on contractors, so contractors were less critical at the pilot stage. This approach was practical given the limited number of targeted participants.

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

Most, but not all, of the programs have received either a process or an impact evaluation by an outside party at some point in their history, but none are evaluated regularly.

Illinois state law requires a statewide OBF evaluation, which Cadmus will conduct in 2014. However, because financing and rebates are considered part of the same program, Illinois OBF program evaluators will not assess the relative impacts of each. NYSERDA likewise rolls incentives and financing into one program. While NYSERDA program staff indicates they are interested in the relative behavior impacts of rebates versus financing, these impacts are not currently part of their planned evaluations of the HPwES program.

Upcoming evaluations may reveal more about the precise impact on performance attributable to financing versus other programs. For example, Cadmus will soon be evaluating the HEAT Loan program as part of the National Grid evaluation process, with a particular focus on the impact of these loans on their other incentive programs. NYSERDA OBR program managers have expressed interest in evaluating the relative impact of financing versus cash incentives in the future.

What metrics and researchable questions have program managers used to evaluate the program?

For each program evaluated, the primary metrics of interest are the total number of loans and total amount loaned; however, most of the programs evaluated had no specific annual targets for these metrics (the grant-funded and pilot programs are the exception). Most programs track savings in some form and in some cases outside evaluators have examined savings impacts, but none of the programs are required to meet a particular savings goal. In addition to loans, CEWO tracks greenhouse gas emissions avoided, money contributed to the economy, and job creation attributable to its projects. HERO program managers have commissioned a customized computer model that allows them to calculate the estimated program impact in terms of energy savings, greenhouse gas emission reductions, financial savings, job creation, and local economic benefit. Green Deal tracks greenhouse gas emission reductions, utility bill savings, and other social metrics like job creation, in addition to energy savings.

NYSERDA is evaluating components of its programs in stages. To date, evaluations have assessed market conditions, barriers to participation, and financing versus cash payment, among other metrics. Contractor surveys conducted in 2012 found that roughly one-third of customers used cash, one-third

used a Green Jobs Green New York (GJGNY) loan product (several are offered, in addition to the NYSERDA OBR loan profiled in this study), and the remaining one-third used credit cards or some other kind of non-program financing. Residential surveys found that customers still noted the high costs of retrofits as one of the primary barriers to participation.

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?

At the time of writing, none of the programs we reviewed had evaluated whether financing was cost-effective on its own. While utilities often are required to evaluate cost-effectiveness of rebate programs, they are often exempted from evaluating this aspect of financing programs. Nonprofit and government-managed programs, because they are not regulated, are not generally required to evaluate cost-effectiveness, and rarely do so.

Among the programs we reviewed, NYSERDA does expect to investigate cost-effectiveness, though it does not yet have a plan for that evaluation. Midwest Energy periodically does its own internal evaluation using the TRC test and the utility cost test, but it does not publish the results. HMH hired an evaluator to determine the rate-payer impact of its pilot program so each cooperative could decide whether or not to continue the program. While the program did result in a negative rate impact, primarily because South Carolina utilities are not expected to experience any demand pressure for several years, several cooperatives chose to move forward with the program because it was viewed as an overall benefit to members.

Does the evaluation attribute savings across programs or determine freeridership or spillover?

No programs have yet attempted to evaluate savings among complementary rebate and financing programs. This is only a potential issue for programs that offer rebates as well as financing; NYSERDA OBR, SBEA, CEWO, Illinois OBF, Manitoba OBF, and HEAT Loan fall into this category. The other programs offer financing only. The program administrators for the HEAT Loan (the IOUs that sponsor the program in Massachusetts) have commissioned a process evaluation that will quantitatively determine the relative impact of the HEAT Loan and rebate programs on customer behavior. Cadmus will conduct this evaluation in 2014.

As most organizations do not evaluate cost-effectiveness of financing programs, they do not need to evaluate freeridership or spillover. Ameren Illinois, for the Illinois OBF program, will determine the freeridership rate only, and Cadmus will perform that evaluation also. SBEA does not measure freeridership or spillover, but program managers think the generous benefits of the model likely do not result in much spillover. On the other hand, Midwest Energy managers noted that they believe the program design, which requires customers to install the most cost-effective measures first, likely minimizes most freeridership.

How does the program relate to other loan products already in the market?

This question was difficult for many program managers to answer. None thought the program was intended to directly compete with private financing products. Program managers generally believed their program fell into one of two categories: 1) filling a market gap; or 2) transforming the market.

Programs that fill a gap are intended to reach a unique population or make financing available in a unique way that is not available through existing products. This category includes all of the IOU programs, both HERO programs, and Windsor PAYS.

Other organizations designed their programs to achieve market transformation. As with programs that are designed to fill a market gap, market transformation programs enable financing that would not otherwise be available. However, these programs also intend to encourage or induce private actors to provide similar services. Often this is pursued by using a LLR or other mechanism to leverage private-sector funds. Programs funded with federal grant money (ARRA money in particular) or nongovernmental organization (NGO) grants, fall into this category: NYSERDA, CEWO, Keystone, MI HELP and MI BEF, Green Deal, and both HEECP and CHUEE.

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

Program managers have a long list of success stories and lessons learned that range from very specific points of process to larger policy questions. Some of the more noteworthy are:

- SBEA testified before the U.S. Congress that their turn-key approach has been a foundation of the program since 1993. Participants achieve significant savings with virtually zero cash impact and while taking almost no action.
- On-bill loans tied to the meter are important for businesses, since so many are tenants. Roughly 80% of the participants in SBEA are renters.
- HEAT Loan sets the pricing for eligible measures. This prevents program-authorized contractors from elevating prices to capture some of the rebate value.
- Using a risk mitigation tool like credit enhancement (loan guarantee or loss reserve) is critical to encourage lenders to take an interest in a new kind of program. Once lenders are engaged and recognize the program is a success they may be willing to accept a reduction or even elimination of the credit enhancement. MI HELP has increased its leverage by reducing the size of both residential and commercial LLRs after the respective pilot concluded for each program. CEWO has eliminated its LLR, and HEECP was able to reduce its loan guarantee from 50% to 35% and still increase participation.
- The How$mart model minimizes freeridership and keeps program savings high by requiring that customers install the most cost-effective measures first.

- More than just risk mitigation is required to persuade lenders to enter the energy-efficiency market. Programs also need to offer some mechanism to help lenders evaluate the technical merits of individual projects. To do this, some programs use prescriptive eligible measures or ensure a qualified contractor is in charge of each project and held accountable through quality assurance protocols. For the more complex engineering involved in large commercial projects, lenders require not only a loan guarantee but also technical due diligence on the engineering claims backing the project.

What key lessons have program managers learned?

Not all of the programs profiled in this report were immediately successful or were successful in everything they attempted. Programs have struggled to overcome barriers to participation and improve program design and performance. The key lessons learned are noted below.

- NYSERDA is working to streamline its program by automating project and loan approval. It also hopes to better automate data collection by employing the new Home Performance-Related Data Transfer (Home Performance XML or HPXML) standard developed by BPI.
- SBEA found that it nearly doubled program uptake by moving from a 24 months maximum tenor to 48 months. The program requires that average energy savings equal or exceed the monthly payment. The increase in loan tenor helped reduce the monthly payment and thereby expanded the pool of eligible projects.
- NYSERDA's on-bill recovery program is considering moving to a *pari passu* approach for partial payments, meaning that any partial payments would be split proportionally between the loan payment and the utility payment until both were satisfied. This would offer potential secondary investors greater security as compared to an approach that puts the utility payment first.
- Keystone HELP and Michigan Saves both experimented with very low interest rates. Michigan Saves brought its rate all the way down to 0% for a limited time. Both programs found this was effective but unnecessary for their residential market; program funds were better spent providing a reasonable interest rate plus cash incentives. (On the other hand, HEAT and SBEA have had remarkable success with 0% financing.)
- Windsor PAYS and Manitoba Hydro have both found over the course of their programs that the level of customer service required is very high. Manitoba Hydro has put a great deal of effort into streamlining its program and has seen the overall administrative cost fall over time; however, the customer service component remains expensive.
- China found that the lender partner that marketed to existing customers fared much better than the lender partner that tried to draw in new business by promoting the loan guarantee.

Additional Comments

- Program design is dramatically impacted by the kind of transaction—reactive or proactive—being targeted. Reactive transactions are driven by an urgent need to replace equipment, such as an air conditioner, that has failed. Proactive transactions are driven by a

desire to act that is seldom urgent. The choice of contractor network, minimum and maximum loan amount, interest rate, loan tenor, evaluation method, and other variables for a program that targets reactive transactions may be very different than for a program targeting proactive customers.

- Program integration will have a major impact on program success. The scope of the research presented here was focused primarily on the design of the financing option itself, rather than looking at how to best integrate financing into existing program infrastructure. Integration will be key to attracting private financial institutions to the pilots. For more background on program integration, see ACEEE's "New Lessons on Driving Demand for Energy Efficiency Financing" (2014) at www.aceee.org/sites/default/files/publications/researchreports/f1401.pdf. Research into the integration strategies of the top three or four most successful programs may be worthwhile.
- The HERO Residential program has grown rapidly in two years to include 55 California communities in 6 counties and expects in 2014 to add 55 communities in 10 more counties. In February, 2014, the program announced that $104 million in AA-rated bonds were issued, secured by 5,890 PACE assessments levied on 5,627 properties located in Riverside County. The average assessment is $18,273. Developments are being followed closely.
- In the post-ARRA world, the pace of development in program design may be slowing down, although typical bellwether states such as California, New York, Massachusetts, and Illinois continue to lead with evolving strategies.
- Financing program evaluation has lagged design. We found little about the savings impact of energy efficiency financing programs. Program managers often do not formally track critical metrics such as energy savings, and when they do, they seldom use the information to evaluate the program's effectiveness. Most programs have not been held accountable for meeting targets. Important questions remain to be answered, including:
  - Does the combination of rebates and financing result in deeper retrofits?
  - Do financing programs serve the market segments they are intended to serve?
  - How is the perception of energy efficiency financing by lenders changing as a result of energy efficiency financing programs?
  - Is there any difference in the performance of loans based on bill payment history versus those based on credit score?
  - Are programs filling market gaps or displacing private-sector financing?
  - Do audits result in deeper retrofits? Do they improve the energy savings of incented projects relative to prescriptive measure-based programs?
  - What types of marketing have been successful?
  - What level of freeridership do financing programs experience? What program features increase freeridership? What features reduce it?

- Evaluation efforts seem poised now to accelerate. Program administrators are anticipating the need to measure the impact of these programs and their cost-effectiveness relative to traditional incentive rebate programs.

PROGRAM PROFILES

The individual program profiles are presented in this section, beginning with the residential and residential/commercial programs, and then the commercial programs. Three programs combine residential and commercial products—HERO Residential and Commercial PACE, Michigan Saves BEF and HELP, and Midwest Energy Residential and Commercial How$mart OBF—and are presented with the residential group. Within each section (residential and commercial) U.S.-based programs are listed first, in alphabetical order, followed by programs based in other countries.

Each profile is organized by topic and subtopic, in a consistent order. Tables referencing features of the financing offer are standardized to allow for easy comparison among programs. The table presenting program results is not standardized, as programs measure their results using different metrics, and standard information was not available for all programs.

RESIDENTIAL and RESIDENTIAL/COMMERCIAL PROGRAMS

Clean Energy Works Oregon

Program	Clean Energy Works Oregon Financing
Type of Implementer	Nonprofit
Region	Oregon
Coverage	Energy Trust of Oregon territory[10]
Target Market	Residential
Program Start Date	January 2011

Clean Energy Works Oregon (CEWO), an independent nonprofit, promotes whole-home energy upgrades that lead to home energy savings of 15% or greater. CEWO serves the ratepayers of the major investor-owned utilities (IOUs) in the state, covering most of the population of Oregon and small areas in Washington state, and it receives some funding through the Energy Trust of Oregon, which manages the ratepayer surcharge fund in Oregon.[11]

CEWO works with third-party lenders and other partners to provide financing and cash incentives for whole-home energy retrofits to single-family homes. Customers receive a free comprehensive audit directly from CEWO and can also access cash incentives up to $2,000. In certain counties, customers can opt for on-bill repayment with a participating lender. Customers do not have to use program financing in order to access cash incentives.

The current program was launched following a pilot in the Portland metro area, known as "Clean Energy Works Portland." The pilot, which targeted 500 homes, was funded in part with ARRA money.

[10] Territory of NW Natural, Portland General Electric, Pacific Power, and Cascade Natural Gas in Oregon and the territory of NW Natural in Washington state.

[11] Unless otherwise noted, all information is from the Clean Energy Works Oregon website: http://www.cleanenergyworksoregon.org

Financing Offer

What are the interest rates, tenor, lender security, and other details of the financing products?

Table 10. Key Details of the CEWO Program

Rate	3.75% to 5.99% depending on region, lending institution, amount of loan, and whether or not the customer has set up automatic bill payment from that lending institution (0.25%–0.5% lower rate for automatic bill pay)
Tenor	1 – 20 years
Loan Amount	$1,000–$30,000, with the maximum loan amount determined by estimated savings (15% = $10,000, 20% = $20,000, 30% = $30,000)
Conditions	• No-money-down financing means participating contractors cannot require a portion of the cost as an upfront cash payment. • Loans may be unsecured, or secured with a lien on the property or a UCC-1 filing, according to the lenders preference. • On-bill payments available from NW Natural, Pacific Power and Portland General Electric (PGE) in Multnomah, Washington, and Clackamas counties. • The loan must be paid in full upon sale of the property.

What credit enhancements are available to participating lenders?

CEWO has used funds from several federal and state grants to fund a loan loss reserve (LLR) pool. The program offers lenders a 10% loss reserve for loans made through December 2012. A recent change to the program was that the LLR fund is no longer available for loans made after January 1, 2013. Going forward, all loans through the program are general consumer loans. Program managers decided that, given the very low default rate, the LLR was not necessary to program lenders. Lenders indicated they would continue participating without the LLR, either because they wanted a green lending program or because they recognized the past good performance of the loans.[12]

Overlapping Incentive Programs

What overlapping incentives are offered?

CEWO, through a partnership with the Energy Trust of Oregon, provides tiered rebates up to $2,000 based on the modeled energy savings for each home. The minimum rebate is available for estimated energy savings of at least 15%, which is also the minimum estimated savings a project must achieve to access financing through the program. Home remodels with higher levels of estimated energy savings (20% or 30%) get higher rebates.

The program also provides customers with a free comprehensive audit completed by a program energy advisor, with no requirement to move forward with any retrofit measures.

[12] Cyr, S., CEWO Chief Financial Officer, personal communication, January 14, 2014.

Outside of CEWO, Energy Trust of Oregon offers rebate programs for customers who are not interested in meeting the 15% energy savings threshold of the CEWO program. These include a Home Performance with ENERGY STAR® program and prescriptive rebates for individual measures. Generally, these rebate amounts are much lower than for the CEWO program. Customers cannot apply for both CEWO and Energy Trust rebates for a single project or measure.

How does the financing integrate with the incentive program(s)?

Any customer eligible for CEWO financing is also eligible for at least the minimum incentive from CEWO, though customers can access incentives without accessing the financing. Energy Trust rebates are offered outside the CEWO program and have lower requirements for energy savings. Some are prescriptive.

Is financing intended to eventually replace cash incentives?

CEWO does not plan to replace rebates with financing. The CEWO rebate and financing incentives are designed to have different and complementary influences on customer behavior. The financing options do not vary by project and are available to all participants. CEWO rebates allow the program to encourage more comprehensive energy retrofits by providing a larger cash incentive for higher levels of savings.

How has available financing affected participation in related incentive programs?

The tiered rebate structure is meant to encourage customers to pursue deeper energy savings than through financing alone. The CEWO program has not evaluated the incremental effects of rebate versus financing on the level of customer participation.[13]

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

During the pilot phase, the minimum credit score was 590, and all loans were secured through a lien on the property. For the larger program since 2000, lender criteria may include income, credit score, or utility bill payment history. Credit scores vary by lender, but the lowest minimum score is 590, available through Craft3 which operates in the Portland metro area.

How does the average borrower score on these criteria?

The program does not provide detailed results on its application history, since many lenders do not share credit score information with CEWO. Craft3, a CDFI lender partner in the Portland, OR metro area (and also the sole lender that participated in the pilot), will lend to applicants with credit scores as low

[13] U.S. Department of Energy. Better Buildings Neighborhood Program. *Spotlight on Portland, Oregon: Use Incentives to Get Attention and Encourage Deep Savings.* June 2012. http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/pdfs/cewo_incentives_case_study.pdf

as 590. However, the average score of the Craft3 customers who have completed a project has been approximately 750.[14]

What other eligibility requirements are there?

All applicants must meet the following criteria:

- Home is in Benton, Clackamas, Clatsop, Columbia, Crook, Deschutes, Hood River, Jackson, Josephine, Jefferson, Klamath, Lake, Lane, Marion, Multnomah, Polk, Tillamook, Washington, or Yamhill counties.
- Borrower is owner and property is borrower's primary residence.
- Property to be improved was built before 1993.
- Single-family, detached structure (mobile homes, townhouses, or other multifamily dwellings are not yet eligible).
- Gas or electric meter belonging to NW Natural, Pacific Power, Portland General Electric, or Cascade Natural Gas.

Long-Term Loan Performance

What is the cumulative default rate?

As of mid-2011, the program had registered one uncollectible loan, a default rate of 0.002%.[15] As of September 2013, Craft3 (the primary lender) showed a 2% default rate, and Southern Oregon Federal Credit Union (FCU) and Pacific Crest FCU had default rates of 0%. An overall default rate was not available, since the other lenders had not provided any updated default information.[16]

What collection procedures are in place?

Lenders pursue their own collections, including in the case of loans serviced through the utility bill.

Is the loan transferable upon sale of the property?

All loans must be paid off in full upon sale of the property.

At what point is a loan considered to be in default?

A loan is considered to be eligible for repayment from the LLR after it is delinquent 180 calendar days. The lender may claim 90% of the outstanding amount plus interest due. Lenders must show that they have exercised their best efforts to collect on the loan to be eligible.

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[14] Cyr, S., CEWO Chief Financial Officer, personal communication, January 14, 2014.

[15] Bell, Catherine, Steven Nadel, and Sara Hayes. Research Report E118: "On-Bill Financing for Energy Efficiency Improvements: A Review of Current program Challenges, Opportunities, and Best Practices." American Council for an Energy-Efficient Economy (ACEEE). December 8, 2011. Accessed January 8, 2014. http://www.aceee.org/research-report/e118

[16] Cyr, S., CEWO Chief Financial Officer, personal communication, January 14, 2014.

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

Customers must receive the free home energy audit from a CEWO energy advisor in order to participate in the program. Borrowers must implement sufficient recommendations from the audit to achieve at least a 15% reduction in energy use.

What criteria are used to establish measure eligibility?

The auditor uses the comprehensive audit to identify potential projects for the homeowner. Measures installed often include insulation, air sealing, duct sealing, and new HVAC systems. Windows are allowed for projects that reduce energy use by at least 30%. The program does not currently allow solar generation or water heating measures.[17]

Loan funds can be applied to the cost of non-energy improvements, if they are part of an overall home retrofit where the energy improvements are 50% or more of the total project cost.[18]

Contractor Network

Does the program have a dedicated contractor network?

The CEWO program maintains a list of authorized contractors posted on its website. There are 56 authorized contractors.

Since the program considers the contractors work to be key in marketing energy-efficiency improvements on behalf of contractors, CEWO has begun charging a $150 fee per application for all homeowners who enter the program through the CEWO website. For contractors who market and bring in their own customers, there is no fee.[19]

What are requirements for contractors?

The program is more intently focused on economic and job-creating potential than many other energy-efficiency programs. CEWO requires that participating contractors pay what it refers to as "family-supporting" wages, hire local workers, and provide training from designated institutions. In addition, contractors must be participating Energy Trust trade allies, be qualified as Home Performance with ENERGY STAR contractors through the Energy Trust,[20] and employ staff who are certified through the Building Performance Institute, Inc. (BPI).

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17 Cyr, S., CEWO Chief Financial Officer, personal communication, January 14, 2014.

18 U.S. Department of Energy. Better Buildings Neighborhood Program. *Spotlight on Portland, Oregon: Use Incentives to Get Attention and Encourage Deep Savings*. June 2012. http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/pdfs/cewo_incentives_case_study.pdf

19 Cyr, S., CEWO Chief Financial Officer, personal communication, January 14, 2014.

20 The Energy Trust of Oregon assesses and qualifies contractors on behalf of the U.S. Department of Energy.

Is the network shared with other programs?

CEWO limits the number of authorized contractors but periodically opens the network to new applications as needed. Contractors for CEWO must be trade allies who are registered through the Energy Trust of Oregon.[21]

Do program managers feel the network is a key element of program success?

Program managers have reported that they consider "trusted" trade allies key to the program's success.

Process and impact evaluation strategies

Does the program undergo third-party evaluation?

At the U.S. Department of Energy's request, CEWO has participated in third-party evaluations with Research Into Action (RIA) and with Nexant with regard to its implementation of a Department of Energy grant. Additionally, on its own behalf, CEWO has performed focus group and consumer research with Mind the Gap (a Portland-based company) to study two groups of homeowners: those who got an audit and did not go forward with the program and on those who did.[22]

What metrics and researchable questions have program managers used to evaluate the program?

Formal evaluations focused on lessons learned and program outcomes. The internal research, performed with Mind the Gap, has focused on addressing barriers to participation and soliciting feedback to improve the program.[23]

CEWO has three primary objectives for its program: increased energy efficiency in single-family residential properties, sustainable economic development and job growth in the energy-efficiency sector, and improved equity by encouraging opportunities for women and minorities in energy-efficiency businesses.

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness, including the method used?

CEWO is not a regulated entity and is not required to demonstrate cost-effectiveness. The program self-reports its impact on energy savings, as well as its economic impact and job creation.[24]

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21 Energy Trust of Oregon. "Become a Trade Ally: Requirements." Accessed December 5, 2013. http://energytrust.org/trade-ally/join/requirements/

22 Cyr, S., CEWO Chief Financial Officer, personal communication, January 14, 2014.

23 Ibid.

24 Clean Energy Works Oregon. *Clean Energy Works High Road Outcomes: New Faces, Career Pathways and Increasing Influence.* September 2012. http://www.cleanenergyworksoregon.org/wp-content/uploads/2012/09/HighRoad_Short_090612.pdf

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

CEWO does not offer multiple programs. In addition, because it is not required to evaluate cost-effectiveness, CEWO does not measure freeridership or spillover.

How does the financing program relate to other loan products already in the market?

Like many programs originally funded through the American Recovery and Reinvestment Act of 2009 (ARRA), CEWO's goal is to enable the energy-efficiency sector, including the energy-efficiency financing industry, to offer more sophisticated services that encourage more comprehensive energy-efficiency upgrades. The program also offers sales and technical training and promotes high standards for training and wages for contractors. All elements of the program are designed to spill over into the rest of the energy-efficiency sector.

Program Results

What are the program results to date?

Table 11 presents program results from January 2011 through September 2013. These results include all projects that CEWO considers completed under the current program, some of which were started during the pilot.[25]

Table 11. Program Results for CEWO

Number of loans	2,633[26]
Loan Volume	$33.4 million
Average Loan	$12,694

According to the CEWO website, other notable results are:

- Average energy savings of 30% per home
- Over $25 million in contractor revenue through CEWO projects (not all projects are financed)
- Over 1,000 people employed full-time, part-time, or temporarily, with an average wage of $20 an hour
- 55% of work completed by women and minorities

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

CEWO has found that offering special higher rebates for a limited time will repeatedly attract new interest. It has also found that this interest is not sensitive to the actual dollar amount of the higher

[25] Cyr, S., CEWO Chief Financial Officer, personal communication, January 14, 2014.

[26] 2,633 of a total of 3,203 total CEWO projects utilized the financing option

rebates. CEWO saw a similar level of interest in response to a bonus of $1,700 in 2011 as to a bonus of $500 in 2012.[27]

The program was able to minimize the additional burden of on-bill collections for the utilities by requiring that the lender partner take back collections on loans that are in default. Any loan that has chronic late payments, or has more than three months of unpaid bills, is taken off-bill, and the lender assumes direct responsibility for collections.[28]

What did not succeed, and what lessons have program managers learned?

As CEWO made the transition to a full-scale project in 2011, it applied customer and stakeholder feedback from the pilot to better meet customer needs. It loosened the acceptance criteria, added windows to the approved energy-efficiency upgrade options (in certain cases), raised the maximum loan by 50% to $30,000 to allow for more remodel options, and added instant rebates to make projects more affordable.

The program also recruited additional lenders—a single partner was involved in the pilot—and shifted the focus of the program away from on-bill payments.

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[27] U.S. Department of Energy. Better Buildings Program. *Spotlight on Portland, Oregon: Use Incentives to Get Attention and Encourage Deep Savings*. June 2012. http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/pdfs/cewo_incentives_case_study.pdf

[28] American Council for an Energy-Efficient Economy (ACEEE). *On-Bill Financing for Energy Efficiency Improvements.* December 2011. http://www.aceee.org/research-report/e118

Help My House Loan Pilot Program (KW Savings)

Program	Help My House
Type of Implementer	Nonprofit
Region	South Carolina
Coverage	Multiple cooperative territories in South Carolina
Target Market	Residential
Program Dates	June 2011 – February 2012 (pilot)

The Help My House (HMH) Loan Pilot program provided on-bill financing (OBF) for energy-efficiency measures in 125 homes over eight months. The program was a joint effort of Central Electric Power Cooperative, Inc., the wholesale power provider to the 20 retail electric cooperatives in South Carolina, and The Electric Cooperatives of South Carolina (ECSC), the state trade association representing the co-ops as a marketing and public policy partner.

Central and ECSC jointly applied for and won a grant from the U.S. Department of Agriculture (USDA) Rural Economic Development Loan and Grant (REDLG) program.[29] The grant was issued as a 0% loan to fund the program, which the co-ops will eventually have to pay back using payments on the program loans.[30] The two entities designed a financing program and formed KW Savings, a nonprofit organization, to administer loan funds for the eight cooperatives that chose to participate.

The HMH program was precipitated by the South Carolina OBF Law, Act #141 of 2010,[31] which included several provisions that made the program possible. Among these were legalizing on-bill repayment, transfer of the loan with the sale of the property, and disconnection for nonpayment of the loan.

Following the completion of the pilot program, six co-ops chose to continue offering HMH loans independently with their own funds (the programs are still marketed as HMH). Aiken Electric Cooperative secured a loan from the USDA similar to the pilot program loan and has made energy-efficiency improvements to over 80 homes through its OBF program. Other co-ops have expressed interest in continued participation in HMH if additional USDA funds become available.

The USDA Rural Utilities Service (RUS) has recently implemented a new Energy Efficiency and Conservation Loan Program that will provide loans to co-ops for system upgrades and on-bill financing. ECSC plans to apply for funds through this program for 2014.[32]

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[29] Smith, M., and L. Smith. *Help My House Loan Pilot Program: Program Design and Results.* Central Electric Power Cooperative and Electric Cooperatives of South Carolina. June 2013. http://www.cepci.org/assets/HelpMyHouseBrochure_June2013.pdf

[30] Cross, J., Policy Associate, Environmental and Energy Study Institute, personal communication, January 7, 2014.

[31] South Carolina Legislature. http://www.scstatehouse.gov/billsearch.php?billnumbers=1096&session=118&summary=B

Financing Offer

What are the details of the financing product?

Table 12. Key Details of the Help My House Program

Rate	2.5%
Tenor	10 year
Loan Amount	There was no cap on loan amount, but the largest loan through the pilot was approximately $15,000. Loan amounts were determined by participants' ability to repay loans within 10 years with a comfortable buffer.
Conditions	Repaid through utility bill surcharge.

Does the program offer credit enhancements?

Loan capital was provided by the grant, instead of lending institutions, so there was no need for a credit enhancement.

Overlapping Incentive Programs

What overlapping incentives are offered?

Small incentives are offered by some co-ops, but there were no large incentive programs offered to all residents eligible to participate in the program. Unlike many other states where financing options are available, South Carolina does not have a Home Performance with ENERGY STAR® or similar whole-home incentive program.

How does the financing integrate with the incentive program(s)?

The financing program did not integrate with any incentive programs.

Are incentives being replaced with financing, and is that the long-term vision?

The financing program is not viewed as an alternative to incentives.

What has the addition of financing to an existing energy-efficiency program done in terms of overall participation?

The financing program largely operated in areas where no other incentives were available. Of 200 customers screened for financing, 125 eventually completed the program, which exceeded by 25 the original participation target.[33]

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[32] Cross, J., Policy Associate, Environmental and Energy Study Institute, personal communication, January 7, 2014.

[33] Smith, M., and L. Smith. *Help My House Loan Pilot Program: Program Design and Results.* Central Electric Power Cooperative and Electric Cooperatives of South Carolina. June 2013. http://www.cepci.org/assets/HelpMyHouseBrochure_June2013.pdf

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

The HMH program was marketed only to select high-energy-use customers of participating cooperatives. Each participating co-op was responsible for screening its applicants. Applicants were considered eligible based on at least 12 months of positive utility bill payment history. None of the co-ops checked credit scores.[34]

How does the average borrower score on these criteria?

Approximately 200 prospective participants, generally selected for high energy use, underwent initial checks to reach 125 approved participants. Some of those who underwent the initial checks decided not to participate in the program before being approved, but some were declined because of their bill payment history. Cadmus was unable to obtain exact numbers.[35]

What other eligibility requirements are there?

Only electrically heated homes were eligible. Each co-op targeted members with above-average energy use. Both renters and homeowners were eligible for the pilot program.

Long-Term Loan Performance

What is the cumulative default rate?

One participating home burned down, and KW Savings wrote off the loan. All other participants were in good standing as of December 2013.[36]

What collection procedures are in place?

The South Carolina OBF Law allows the utility to disconnect for nonpayment.[37]

Is the loan transferable upon sale of the property?

Per the South Carolina OBF Law, the utility may tie the loan obligation to the meter, rather than the customer, allowing the loan to transfer when the property is sold.[38]

At what point is a loan considered to be in default?

Each co-op follows its individual procedures for disconnection for nonpayment.

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34 Keegan, Patrick. *Help My House Program Final Summary Report, 2013*. Prepared for Central Electric Power Cooperative, Columbia, S.C., and The Electric Cooperatives of South Carolina, Cayce, S.C. http://www.cepci.org/assets/HelpMyHouseFinalSummaryReport_June2013.pdf

35 Cross, J., Policy Associate, Environmental and Energy Study Institute, personal communication, January 2014.

36 Ibid.

37 Cross, John-Michael. "South Carolina Co-ops Release Results of 'Help My House' Energy Efficiency Pilot." The Environmental and Energy Study Institute. July 20, 2013. http://www.eesi.org/south-carolina-co-ops-release-results-help-my-house-energy-efficiency-pilot-20-jul-2013

38 Ibid.

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

The program required both an audit to Building Performance Institute, Inc., standards to identify eligible measures and a test-out audit to ensure work was completed to program standards. The pre- and post-installation tests are required by the South Carolina OBF Law.[39]

What criteria are used to establish measure eligibility?

The program allowed any measure identified as cost-effective (including financing costs) by an auditor using REM/Design™ software. The following measures were considered the most likely to pass the test:

- Insulation under floors and in crawl spaces
- Attic insulation
- Air sealing
- Tune-ups for existing HVAC systems
- Sealing ductwork
- Replacing forced air electric (FAE) systems, which are often referred to as "resistance strip heat" in South Carolina, with efficient heat pumps
- Heat pump replacement[40]

Contractor Network

Does the program have a dedicated contractor network?

The South Carolina OBF Law requires that utilities offering an OBF option provide a list of qualified contractors to customers upon request. KW Savings worked with the co-ops to solicit bids from prospective contractors and then to qualify a list of 16 contractors as eligible to work through the HMH program. The program contracted with Advanced Energy to train auditors and contractors.[41]

What are requirements for contractors?

Contractors signed an agreement to hold all necessary permits, licenses, and insurance, and they agreed that their payment would be subject to a test-out audit of the project. Contractors also attended a two-day training seminar before participating in the program.

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39 Keegan, Patrick. *Help My House Program Final Summary Report.* 2013. Prepared for Central Electric Power Cooperative, Columbia, S.C., and The Electric Cooperatives of South Carolina, Cayce, S.C. http://www.cepci.org/assets/HelpMyHouseFinalSummaryReport_June2013.pdf

40 Smith, M., and L. Smith. *Help My House Loan Pilot Program: Program Design and Results.* Central Electric Power Cooperative and Electric Cooperatives of South Carolina. June 2013. http://www.cepci.org/assets/HelpMyHouseBrochure_June2013.pdf

41 Keegan, Patrick. *Help My House Program Final Summary Report.* 2013. Prepared for Central Electric Power Cooperative, Columbia, S.C., and The Electric Cooperatives of South Carolina, Cayce, S.C. http://www.cepci.org/assets/HelpMyHouseFinalSummaryReport_June2013.pdf

Is the network shared with other programs?

The network is not affiliated with any other programs.

Do program managers feel the network is a key element of program success?

For the pilot, the contractor network was not critical for marketing. The co-ops identified the potential customers directly. However, participants of the pilot program were expected to get bids from the list of eligible contractors, and some contractors were more active than others; one contractor completed 35 of the 125 efficiency projects. Program managers believed that the quality performance of the contractors was an important part of the pilot program's success. The contractors were all pleased with the pilot program, and they expressed hopes that the pilot would expand into a full program.[42]

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

The program commissioned a third-party impact evaluation upon completion of the pilot. The primary purpose of the evaluation was to determine the total savings and impact on ratepayers.

What metrics and researchable questions have program managers used to evaluate the program?

KW Savings, manager of the HMH program, commissioned an evaluation of the pilot loan program in 2013.[43] The evaluation used billing analysis to quantify the energy and demand savings resulting from the 125 projects in the pilot.

Rather than assess the program's cost-effectiveness from the program manager's perspective, the evaluation considered only the potential rate impact on co-op members. The evaluation sought to determine if the co-op's reduced revenue from the energy savings could be offset by the savings from a delayed need to purchase higher-priced power as demand increases.

The results showed that the pilot program's demand savings were not sufficient to affect the projected energy cost for co-op members. In addition, the study found that because the demand for electricity had dropped dramatically as a result of economic disruptions that began in 2008, the co-ops are not expected to face demand pressure for several years.

However, the report notes that cost-effectiveness is not the only justification for continuing to offer the HMH program. Co-op members' high satisfaction with the program is sufficient to justify its continued operation.

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[42] Cross, J., Policy Associate, Environmental and Energy Study Institute, personal communication, January 7, 2014.

[43] Keegan, Patrick. *Help My House Program Final Summary Report.* 2013. Prepared for Central Electric Power Cooperative, Columbia, S.C., and The Electric Cooperatives of South Carolina, Cayce, S.C.

Program Cost-Effectiveness

How does the program evaluate cost effectiveness?

The HMH program did not evaluate cost-effectiveness. However, KW Savings managers commissioned an evaluation of the pilot program, which assessed the impact of savings as well as the potential rate impact on members should the pilot be continued.

The co-ops believe that as the program continues they will need to recoup an interest rate of 5% (for administrative costs and a comfortable loan loss reserve [LLR]) to make the program manageable.[44]

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

No other programs are offered, so attribution of savings is unnecessary. The pilot evaluation did not consider any other efficiency programs offered by the co-ops nor did it address freeridership or spillover.

How does the program relate to other loan products already in the market?

Three elements—low interest rate and on-bill repayment, utility oversight of the contractor and measures, and energy-efficiency education—make this loan product distinctly different than any other option available to customers.

Program Results

What are the program results to date?

Error! Reference source not found. provides results for the completed pilot, which operated from June 2011 to February 2012.

Table 13. Program Results for Help My House[45]

Number of projects[46]	125
Loan Volume	$960,500
Average Loan	$7,684 average
Average Payback	6.6 years

Participants reduced electricity by 34%, on average (11,000 kWh per year). The program found that the average participant will save $8,500 over 15 years (about $47 per month).[47]

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[44] Cross, J., Policy Associate, Environmental and Energy Study Institute, personal communication, January 7, 2014.

[45] Cross, John-Michael. "South Carolina Co-ops Release Results of 'Help My House' Energy Efficiency Pilot." The Environmental and Energy Study Institute. July 20, 2013. http://www.eesi.org/south-carolina-co-ops-release-results-help-my-house-energy-efficiency-pilot-20-jul-2013

[46] Completed by February 2012.

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

The homes involved in the pilot were all-electric, high-energy use homes that were identified and targeted by the co-ops. As a result, the HMH program achieved significant positive savings for the participants, who saved an average $288 dollars in the first year.[48]

The co-ops found that HMH is a program that makes sense for their customers on a larger scale, as long as costs are covered by interest. Customer satisfaction is very important to the co-ops, and 96% of participants were satisfied or very satisfied with the program.[49]

What did not succeed, and what lessons have program managers learned?

The post-installation audits were an important part of this program. Initially, there was a gap in understanding between how contractors were performing and what the co-ops expected. At the start of the pilot, contractors often had to return once and sometimes twice to complete work in order to pass the test-out process. By the end of the pilot, contractors had learned the co-ops' expectations for completed projects.[50]

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47 Ibid.

48 Keegan, Patrick. *Help My House Program Final Summary Report. 2013*. Prepared for Central Electric Power Cooperative, Columbia, S.C., and The Electric Cooperatives of South Carolina, Cayce, S.C. http://www.cepci.org/assets/HelpMyHouseFinalSummaryReport_June2013.pdf

49 Cross, J., Policy Associate, Environmental and Energy Study Institute, personal communication, January 7, 2014.

50 Ibid.

HERO (Western Riverside Council of Governments)

Program	**HERO™**
Type of Implementer	Government agency
Region	California
Coverage	At launch: 17 cities in Riverside County Current: 55 communities in 6 California counties, including Riverside (continued expansion planned for 2014)
Target Market	Residential and Commercial
Program Start Date	December 2011

The Western Riverside Council of Governments (WRCOG) launched the HERO Program (originally known as the Home Energy Renovation Opportunity Program) in September (commercial) and December (residential) 2011 in 17 cities within Riverside County. The program has expanded to San Bernardino and four other counties and is now available in 55 communities. It has announced expansion to 110 communities in 16 counties in 2014. In February, 2014, the program announced that $104 million in AA-rated bonds were issued, secured by 5,890 PACE assessments levied on 5,627 properties located in Riverside County. The average size of those assessments was $18,273.[51]

Property Assessed Clean Energy (PACE) is a nation-wide program model that allows municipalities, or other entities that levy taxes, to establish special financing districts. Homeowners join the district voluntarily and in return are given access to loans for energy-efficiency or renewable-energy retrofits. The municipality sells bonds to fund the projects and then recovers the money through the property tax assessment. PACE loans have at least two advantages over traditional financing products. 1) The strong security provided by the property tax lien and the long terms possible with municipal bonds allow the city to offer very long tenors, up to 20 years, and therefore more manageable payments. 2) Because the loan is not based on credit scores, it is available to a broader cross-section of residents.

The property assessment mechanism has been used for years to fund special projects. However, residential PACE programs received resistance from the U.S. Department of Housing and Urban Development Federal Housing Administration, which wanted to protect the senior lien position for its mortgages. Most residential PACE programs closed in 2010 and 2011. The HERO Program is one of the few residential PACE programs that have been established since then.[52] Renovate America administers the residential program for WRCOG and Samas Capital administers the commercial program.

[51] http://www.structuredfinancenews.com/news/deutsche-bank-leads-first-pace-backed-abs-248013-1.html.

[52] Unless otherwise noted, all information is from the HERO™ Program website: https://www.heroprogram.com/

Financing Offer

What are the details of the financing product?

Table 14. Key Details of the WRCOG HERO Program[53]

Rate	Residential: 5.95% to 8.25% depending on tenor Commercial: 5% to 8% depending on tenor
Tenor	Residential: 5, 10, 15 or 20 years Commercial: up to 20 years
Loan Amount	$5,000 minimum. Maximum is generally not to exceed 15% of the property market value, up to $200,000 for residential and $600,000 for commercial projects.
Conditions	• Paid through property taxes • Interest is tax deductible • If property is sold, loan can transfer to new owner • Committee can approve loans for projects over the maximum loan amount

Does the program offer credit enhancements?

The program sponsor, WRCOG, funds the program with bonds raised specifically for this program. No credit enhancements are necessary.

Overlapping Incentive Programs

What overlapping incentives are offered?

Homeowners can still receive any rebate offered by their local utility, city, county, or other entity. Several areas that are HERO-eligible overlap with major California utilities. HERO financing does not impede the rebate process in any way.

How does the financing integrate with the incentive program(s)?

HERO is meant to complement existing energy- and water-efficiency programs. It is designed to be simple and flexible in order to maximize the participation in existing programs. The HERO list of eligible measures is extensive and overlaps utility-eligible measures in most cases. The program also coordinates marketing with utility programs.

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53 Kaatz, J. Anders, S. *Residential and Commercial Property Assessed Clean Energy (PACE) Financing in California.* California Center for Sustainable Energy. 2013. http://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/PACE%20in%20California.pdf

Is financing intended to eventually replace cash incentives?

The WRCOG has not historically offered rebates, and so HERO does not replace any rebates from that organization. HERO is unlikely to displace utility rebate programs, as WRCOG is a non-utility entity with no oversight from the CPUC.

How has available financing affected participation in related incentive programs?

HERO does not track how many of its customers use utility rebate programs, but staff are interested in this information and open to future partnerships that might support data tracking.[54]

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

HERO financing is available to residential and commercial property owners in many cities and counties across the State of California. Customers first determine their eligibility by entering their ZIP code at the HERO Program website.

Underwriting is not based on credit score. Any homeowner who meets the following criteria is eligible for HERO financing:

- Mortgage plus HERO financing cannot exceed 90% of the property value
- No more than one late mortgage payment over the preceding 12 months
- No more than one late tax payment over the preceding three years
- No bankruptcy in preceding two years
- No outstanding liens on the property
- Mobile homes are eligible in some cases.

The key criteria for commercial eligibility are:

- Mortgage plus HERO financing cannot exceed 90% of property value
- Obtain consent from mortgage lender
- No late tax payments in preceding three years
- Current on all property-secured debt for preceding six months
- No owner or company bankruptcy for the preceding seven years
- No outstanding liens on the property
- Demonstrate sufficient income to meet payment obligations

All individual property owners must sign for the loan if the property is not owned by a corporation. Commercial loans are limited to 10% of the property value.

[54] Fulton, J., HERO Business Analyst, Renovate America, personal communication, December 2013.

How does the average borrower score on these criteria?

By definition, all borrowers meet the criteria.

What other eligibility requirements are there?

There are no additional eligibility requirements.

Long-Term Loan Performance

What is the cumulative default rate?

The percentage of delinquencies is less than 3% through December 2013.[55]

What collection procedures are in place?

Nonpayment of the loan portion of the tax bill will result in the same collection procedures that are applied to nonpayment of property taxes, including fines and ultimately foreclosure. HERO financing is subordinate to other non-*ad valorem* property taxes and *pari passu* to general property taxes.[56]

Is the loan transferable upon sale of the property?

The program loans are repaid through property taxes, and therefore the loan obligation can transfer when the property is sold. However, in some cases a buyer's lender has required the PACE obligation loan to be paid off in full before agreeing to finance the purchase.[57]

At what point is a loan considered to be in default?

WRCOG will determine no later than October 1 of each tax year whether or not a property is delinquent. Specific criteria for delinquency are not noted.[58]

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

Borrowers first apply to the program. Once they have been approved for the loan, the project must include only eligible measures, and these measures must be installed by a participating contractor.

What criteria are used to establish measure eligibility?

The HERO Technical Review Panel, part of WRCOG, maintains a prescriptive list of over 150,000 products in 50 categories that are eligible for financing; this list includes measures to save energy, save water, and generate renewable energy. Custom products can also be approved for financing if the borrower can demonstrate the product meets the program-defined criteria for conservation or renewable-energy generation measures.

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55 Fulton, J., HERO Business Analyst, Renovate America, personal communication, December 2013.

56 Ibid.

57 WRCOG sample financing documents. Accessed on 12/9/13. https://9662473e561b2ca15fec-e991096dabe6d2069d3f005000c6b73d.ssl.cf2.rackcdn.com/WRCOG_SampleHEROFinancingDocs.pdf.

58 Ibid.

The Technical Review Panel uses recent legislation, as well as a number of government and industry databases, to establish a list of eligible distributed-generation, energy-efficiency, or water-efficiency improvements that are fixed to the real property and that satisfy these principles:

- Contribute to real electricity production, or energy or water savings
- Deliver features and function desired by property owners
- Be broadly available, nonproprietary technology
- Be measured and verified in a standard single-family residential property by a creditable testing source
- Be in new condition[59]

Contractor Network

Does the program have a dedicated contractor network?

WRCOG maintains a registry of contractors eligible to perform work under the program.

What are requirements for contractors?

Contractors must be registered with the HERO Program in order to perform program work. Registered contractors must be properly licensed and bonded with the California Contractors State License Board, have signed an agreement to abide by program policies, and have received orientation on the program process. There are currently over 900 contractors registered with WRCOG.[60]

Is the network shared with other programs?

No.

Do program managers feel the network is a key element of program success?

Contractors are the primary vehicle for marketing to customers and, as such, are critical to program success.[61]

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

The program has not been evaluated by an outside party.

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[59] Fulton, J., HERO Business Analyst, Renovate America, personal communication, December 2013.

[60] PR Newswire. "HERO Financing Program Approved in San Bernardino County." May 29, 2013. Accessed January 8, 2014. http://www.prnewswire.com/news-releases/hero-financing-program-approved-in-san-bernardino-county-209366381.html

[61] Fulton, J., HERO Business Analyst, Renovate America, personal communication, December 2013.

What metrics and researchable questions have program managers used to evaluate the program?
The HERO Program mission is to maximize energy and water savings for participants, economic benefits to participating communities, and environmental benefits of the program to the state and beyond. There are no quantitative targets set in connection with this mission.

The program evaluates its own performance against its stated mission. HERO developed its own software modeling tool, the HERO Economic Value Initiative (EVI). EVI combined elements of existing government and private sector modeling tools, including the Southern California Planning Model and U.S. Department of Energy Home Energy Saver Pro. The modeling tool generates a report that includes potential energy savings, greenhouse gas reduction, financial savings, job creation impact, and local economic impact for every project completed through the HERO Program.

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?
The program determines its cost-effectiveness by ensuring that 100% of the program administration and marketing cost is covered through interest and fees to participants and investors so that communities bear no part of the cost.[62]

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?
The program does not formally evaluate either freeridership or spillover. Program staff notes that, because 100% of the HERO Program's administrative and marketing costs are borne by the participants and investors, the community is not actually subsidizing anything, with the exception of the small risk of defaults. Relative to a traditional cash incentive program, there is no "free ride" to be had.[63]

Staff members also note that while they do not measure spillover, they view the program as raising awareness in energy efficiency, which probably results in more people purchasing more efficient energy and water systems.

How does the program relate to other loan products already in the market?
HERO is meant to be an additional option for people, not the only option.[64] It is not intended to be in competition with any private-market financing.

Program Results

What are the program results to date?
In the 25 months since the HERO program first started, $200 million dollars have been allocated and an additional $300 million has been approved. Most of that went into Riverside County, but $110 million

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62 Fulton, J., HERO Business Analyst, Renovate America, personal communication, December 2013.

63 Ibid.

64 Ibid.

worth of applications have been approved in San Bernardino County.[65] We estimate this represents approximately 16,000 approved projects, based on $300 million in approved funding and an average assessment of $18,300.

In February 2014 the program issued $104 million in AA-rated bonds secured by 5,890 PACE assessments levied on 5,627 properties located in Riverside County. The average assessment was $18,273[66]. Given the time that it takes to assemble individual assessments into a bond offering, we estimate that there are currently over 6,000 assessments in place in Riverside County alone.

Error! Reference source not found. presents the results for the HERO Residential program

Table 15. Program Results for WRCOG HERO (Residential)

Number of Approved Applicants	16,000 (estimated)
Loan Volume Approved	$300 million
Average Loan Size	$18,300 (estimated)
Number of Completed Projects	Over 6,000 in Riverside County (estimated)
Loan Volume (Completed Projects)	Over $104 million

Distributed generation projects make up approximately 35% of HERO residential projects; the majority of these projects involve rooftop solar.[67]

HERO Commercial was nearing completion of its first project in late 2012 after one year in operation and had $20 million in projects in the pipeline.[68] The HERO Commercial program declined to provide more current information except to say that they continue to fund applications and now have a larger pipeline.

[65] http://cleantechnica.com/2014/02/14/hero-pace-financing-poised-move-california/#7BYcCx1yrWy6wjvA.99

[66] http://www.structuredfinancenews.com/news/deutsche-bank-leads-first-pace-backed-abs-248013-1.html.

[67] Kaatz, Joe, and Scott J. Anders. *Residential and Commercial Property Assessed Clean Energy (PACE) Financing in California.* Prepared for the California Center for Sustainable Energy and the University of San Diego Energy Policy Initiatives Center. March 2013. http://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/PACE%20in%20California.pdf

[68] Ibid.

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

The program has robust information systems that help it run smoothly for customers and contractors and can quickly produce detailed information on program performance. The automation of program administration also keeps costs low.[69]

What did not succeed, and what lessons have program managers learned?

The program is very new, and it is continuing to assess lessons learned.[70]

[69] Fulton, J., HERO Business Analyst, Renovate America, personal communication, December 2013.

[70] Ibid.

Illinois Energy Efficiency Loan Program

Program	Illinois Energy Efficiency Loan Program
Type of Implementer	Joint IOU initiative
Region	Illinois
Coverage	Statewide
Target Market	Residential (single-family and multifamily)
Program Start Date	June 2011

In 2009, the State of Illinois passed legislation mandating that the large investor-owned utilities (IOUs) in the state implement an on-bill financing (OBF) program. Five Illinois IOUs participated:

- Ameren Illinois – natural gas and electricity provider
- Commonwealth Edison (ComEd) – electricity provider
- Nicor Gas – natural gas provider
- North Shore Gas – natural gas provider
- Peoples Gas – natural gas provider

AFC First, a national energy-efficiency lender, implements the program for each utility. Programs are managed jointly, though each is separately branded and specific eligibility requirements vary by utility. A central website, ILEnergyLoan.com, provides information and pre-approval services for all five programs.

AFC First provides interim loan capital and then bundles and sells loans to secondary markets to generate additional loan capital. After just two years, the Ameren Illinois program is fully subscribed up to its $5 million lending cap and is currently suspended. Financing options for Nicor Gas customers are expected to become available in the coming months.[71]

Financing Offer

What are the interest rates, tenor, lender security, and other details of the financing products?

Table 16. Key Details of the Illinois OBF Loan

Rate	Single-family: 4.99% Multifamily: 5.99%
Tenor	3, 5, or 10 years
Amount	Single-family: $500 to $20,000 Multifamily: $150,000
Conditions	No upfront cash payment required

[71] Unless otherwise noted, all information is from the Illinois Energy Efficiency Loan website: http://www.ilenergyloan.com

What credit enhancements are available to lender partners??

The utilities guarantee repayment to AFC First for each loan. Any default by a customer is covered by the utility and therefore ultimately passed on to ratepayers. Because the utility is the entity being underwritten for the loan, the low rate actually reflects each utility's corporate cost of capital.

Overlapping Incentive Programs

What overlapping incentives are offered?

All of the participating utilities, with the exception of Nicor Gas, offer some kind of overlapping cash incentive program, but the details vary by utility and largely depend on the type of fuel saved by the measure. The OBF program allows customers to combine measures eligible from both their gas and electric utility and to complete projects under one loan.

How does the financing integrate with the incentive program(s)?

The rebate and financing programs are cross-marketed, and customers are encouraged to participate in both financing and all rebate programs that are available to them.

Is financing intended to eventually replace cash incentives?

Customers are encouraged to apply for both financing and rebates, and there is no official plan to elevate one over the other. The OBF program was implemented to ensure that customers had as many options as possible to finance energy-efficiency improvements.[72]

How has available financing affected participation in related incentive programs?

No data is yet available. The evaluation for the 2013 program year will not determine the effect participation in the OBF program has had on related incentive programs.

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

The following basic underwriting criteria are applied to loan applications for all five utilities:

- Credit score of 640 or higher
- Debt-to-income and income verification for larger loans
- Utility account in good standing
- No bankruptcy, foreclosure, or repossession within the past seven years

How does the average borrower score on these criteria?

Sources consulted for this report could not provide this information.

[72] Communication from Cadmus staff, evaluators for Ameren Illinois OBF program. December 2013.

What other eligibility requirements are there?

The borrower must be the property owner and a customer of a participating utility. Single-family homes, condominiums, and residential buildings with up to four units are eligible under the residential program. Starting on December 31, 2013, small commercial customers who own residential buildings with no more than 50 units also became eligible.

Long-Term Loan Performance

What is the cumulative default rate?

The default rate has not been published. The program is very new and likely to have a very low cumulative default rate.

What collection procedures are in place?

The borrower's monthly payment will appear as a line item on the month bill. All payments are applied first to the electric bill and then to the loan payment. Any payments in excess of the amount shown as due will be applied to electric service, not the loan, unless the customer contacts AFC First directly.

If the borrower underpays the loan amount, the utility will follow the same procedure that it would for an unpaid utility bill. The utility may apply late fees and termination of utility service.[73]

Is the loan transferable upon sale of the property?

The loan is not transferable with the property, and the full balance of the loan is due if the borrower sells the property.

At what point is a loan considered to be in default?

Sources consulted for this report could not provide this information.

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

Projects must be installed by an approved contractor, except in the case of appliances. Eligible appliances must be purchased at a participating retail location. ComEd, the only utility that considers ENERGY STAR® refrigerators and clothes washers eligible, also requires that customers participate in the Home Performance with ENERGY STAR (HPwES) program.

What criteria are used to establish measure eligibility?

Measures eligible for financing vary by utility and depend on the fuel type conserved. For example, electric utilities allow central air conditioners, while natural gas utilities allow gas furnaces. Utilities will allow customers to combine measures across utilities and to apply for financing for a project that saves both electricity and gas.

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[73] Illinois Energy Efficiency Loan Program. "FAQs." Last updated 2013. Accessed December 30, 2013. http://www.ilenergyloan.com/comed/faqs.php

Measures are also required to be either already approved for incentives under an existing utility energy-efficiency program or bill neutral. Bill neutral is defined as energy-cost savings over the life of the measure that equal or exceed the cost to install measure.

Most customers, by accessing incentives at both their electric and gas utility, can install most standard weatherization, HVAC, and water-heating measures.

Contractor Network

Does the program have a dedicated contractor network?

AFC First maintains a central contractor network, but each utility website links directly to a list of contractors who operate in its territory.

What are requirements for contractors?

For the OBF program, contractors must apply to AFC First. Contractors are required to demonstrate the following qualifications:

- Minimum three years in business, history of financial stability, and evidence of $50,000 net worth or compensating factors
- Satisfactory company and personal credit histories
- Satisfactory Better Business Bureau rating
- Satisfactory customer and trade references
- Overall reputation for a high level of service and workmanship
- Proof of appropriate insurance and licenses

Is the network shared with other programs?

Contractors who belong to the network can do work under the financing program for any of the five utilities, assuming they have the appropriate licenses. However, contractors must apply to each utility separately to perform work under the specific utility's rebate programs. All financed measures are eligible for rebates, so this requires contractors to sign up with all utilities in their area.

Do program managers feel the network is a key element of program success?

Utility staff reported that the contractor network is important for success.

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

Each utility evaluates its program performance separately. Ameren Illinois is planning a detailed evaluation for the coming year.

What metrics and researchable questions have program managers used to evaluate the program?

The Ameren Illinois evaluation will:

- Assess savings impact but will not divide saving among programs.
- Implement customer surveys that include a battery of questions to determine whether or not the OBF program has facilitated customers' installation of measures, but will not assess the influence of the OBF program relative to available rebates.[74]

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?

In Illinois, the total resource cost (TRC) test applies to the normal energy-efficiency portfolio. However, OBF is outside the energy-efficiency portfolio and not legally required to pass any cost-effectiveness test at the program level. As a result, the IOUs are not planning to measure the cost-effectiveness of the OBF program.[75]

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

The evaluation of the energy-efficiency program will not allocate savings between rebate and OBF programs. The evaluation plan calls for customer surveys that will identify the rate of freeridership but will not be used to determine spillover.

How does the financing program relate to other loan products already in the market?

According to Ameren Illinois evaluators, the Illinois OBF loan is not designed to compete with existing financial products nor is it designed to drive the market in a new direction. Rather it is intended to fill a possible gap in the financial market to make financing more available for energy-efficiency projects.

Program Results

What are the program results to date?

Table 17 presents estimated program results for the 2013 program year.[76]

Table 17. Program Results for Illinois OBF Loan

Number of Projects	1,000 (2013 est.)
Denied (or withdrawn) Applications	2,000

[74] Communication from Cadmus staff, evaluators for Ameren Illinois OBF program. December 2013

[75] Ibid.

[76] Ibid.

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

The utility with the most eligible measures (Ameren) was the first one to become fully subscribed. Ameren's loans were the majority (73%) of the completed loans by July 2013.

What did not succeed, and what lessons have program managers learned?

The OBF program is in an early stage of implementation, and there has been no documentation of lessons learned at this point.

Keystone Home Energy Loan Program - Unsecured Financing

Program	Keystone Home Energy Loan Program - Unsecured Financing
Type of Implementer	State government
Region	Pennsylvania
Coverage	Statewide
Target Market	Residential
Program Start Date	2006

Keystone Home Energy Loan Program (HELP), sponsored by the Pennsylvania Treasury Department, is a state-wide loan program that offers multiple loan products, both secured and unsecured, for residential energy-efficiency projects. This report will focus on the program's unsecured products.[77]

Since its inception in 2006, Keystone HELP relied on a modified loan loss reserve (LLR) and investment capital from the Pennsylvania Treasury Department. The program implementer, AFC First, used its own capital to make loans, which it then sold directly to the Treasury.

If a loan defaulted, AFC First bought back the loan and relied on a partial recovery from a 5% LLR provided by the Pennsylvania Department of Environmental Protection (DEP). Under this scenario, AFC First and Treasury were protected, but Keystone HELP was ultimately limited by the amount of capital that Treasury had available for this type of investment.

Historically a leader in innovative design for energy-efficiency lending, Keystone HELP is adopting a new program structure in 2014. The program will become one of the first to partner with the national Warehouse for Energy Efficiency Lending (WHEEL).

Beginning in 2014, AFC First will still use its own funds as interim loan capital, but it will sell to WHEEL instead of directly to the Treasury. The Pennsylvania Treasury and Citigroup, as investors in WHEEL, will be the primary purchasers of Keystone loans. However, instead of buying whole loans, they will each buy 40% shares of bundled loans. To support this structure, the Pennsylvania DEP will use what was previously its LLR fund as subordinate investor funds, purchasing the remaining 20% of the bundled Keystone loans.[78] Loans will be held by WHEEL until they are sold on to secondary markets. Funds from the sales to secondary markets will feed back into the program.

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[77] Unless otherwise noted, all information is from the Keystone HELP website. http://www.keystonehelp.com/

[78] State & Local Energy Report. "Keystone HELP." May 14, 2013. Accessed January 21, 2014. http://stateenergyreport.com/2013/05/14/keystone-help

Financing Offer

What are the details of the financing product?

The Keystone HELP program offers multiple loan products for both whole-home (multiple measures) and single-measure projects. Special loan products are provided for geothermal heat pumps, which are markedly more expensive than other home energy-efficiency equipment but which also produce significant savings and can provide a reasonable payback period.

All whole-home loans require a comprehensive energy audit performed by a Building Performance Institute, Inc. (BPI)-certified contractor, and are intended to cover multiple measures. Prescriptive single-measure loans are available for equipment that is rated at or higher than ENERGY STAR® certifications.

Table 18. Key Details of the Keystone HELP Loan

Loan Product	Interest Rate	Loan Amount	Maximum Tenor	Conditions
Whole-home loans (energy audit required)				
Unsecured	2.99%	$1,000 to $15,000	10 Years	Loans above $7,500 available only to those with credit score of 680 or higher.
Loans for single-measure projects (no audit required)				
Advanced Performance Equipment Loan (unsecured)	7.99%	$1,000 to $15,000	10 Years	$250,000 maximum household income limit
ENERGY STAR Equipment Loan	8.99%	$1,000 to $15,000	10 Years	• No points, fees, costs, or pre-payment penalties • $250,000 maximum household income limit
Geothermal Equipment Loan*	4.99%	$1,000 to $15,000	10 Years	Other rates and tenor may be available

* There is an optional additional loan for geothermal "tax credit anticipation."

What credit enhancements does the program offer lenders?

The Pennsylvania DEP used grant funds from the U.S. Department of Energy to provide a LLR fund of 5% of the outstanding loan volume. AFC First was allowed to recover a portion of any losses from the fund. Starting in 2014, the Pennsylvania DEP will use these grant funds to participate in WHEEL as a subordinate investor. The Pennsylvania DEP will purchase 20% of bundled loans from AFC First, but it will not receive a return until the senior investors' claims are satisfied.[79]

[79] Krasja, P., CEO of AFC First, personal communication, January 6, 2014.

Overlapping Incentive Programs

What overlapping incentives are offered?

The EnergyWorks program, an initiative funded by the U.S. Department of Energy BetterBuildings funds, offers reduced interest rates through an interest-rate buydown to homeowners in southeast Pennsylvania. EnergyWorks is expected to be fully subscribed by 2014.[80]

Pennsylvania utilities are required to achieve certain energy-efficiency targets, and all offer rebate programs in order to meet those targets. Available rebates vary by utility and are primarily prescriptive in design. AFC First, and not the utilities, is the Home Performance with ENERGY STAR (HPwES) sponsor for Pennsylvania.

How does the financing integrate with the incentive program(s)?

Keystone HELP financing is not strongly integrated with the utility incentive programs. However, some utilities will cross-market Keystone HELP loans by mentioning the program on websites and in other media.[81]

Is financing intended to eventually replace cash incentives?

Keystone HELP does not offer rebates nor does it leverage any rebate programs in its marketing approach. Utilities must offer programs to meet their energy savings targets, but none have expressed interest in offering financing options to customers.[82]

How has available financing affected participation in related incentive programs?

This is not applicable to Keystone HELP, because there is no baseline rebate program offered statewide or in coordination with financing.

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

For most loans, the program requires borrowers to have a minimum credit score of 640, with exceptions for the self-employed. The maximum loan amount is also dependent on credit score, with loans up to $15,000 available only to those with a credit score higher than 680.

The customer debt-to-income ratio must be below 50% in all cases. In addition, the program reviews customer history for bankruptcy, unpaid collections, foreclosure, and other credit concerns. In some cases, AFC First will require income verification.[83]

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[80] EnergyWorks. “Commercial.” No date. Accessed January 8, 2014. http://www.energyworksnow.com

[81] Krasja, P., CEO of AFC First, personal communication, January 6, 2014.

[82] Ibid.

[83] Keystone HELP internal program reports provided to Cadmus, January 2014.

How does the average borrower score on these criteria?

Over the last three years, about 70% of borrowers have had credit scores above 720, and about 9% of borrowers have had credit scores between 640 and 680.[84]

What other eligibility requirements are there?

For all loan products, the borrower must be the homeowner, and the property to be improved must be a one- to two-unit building.

For all loans, borrowers must have an income no greater than $250,000 per year.[85]

Long-Term Loan Performance

What is the cumulative default rate?

The cumulative default rate for the unsecured loan volume is 1.8%.[86] Loans with shorter tenor (36 months or less) and loans to borrowers with higher credit scores perform the best.

What collection procedures are in place?

Because the loans are not coordinated with the utility, Keystone HELP does not have the option of disconnecting utility service. Loans are considered in default after a payment is late by more than 30 days. AFC First employs its standard loan collection practices for defaulted loans, which involve outreach to the customer and filing a judgment 90 to 120 days after the loan first goes into default.[87]

Is the loan transferable upon sale of the property?

Keystone HELP is not an on-bill financing program. All loans are personal loans to the borrower and cannot be transferred with sale of the property.

At what point is a loan considered to be in default?

Loans are considered in default after they are 90 days past due.[88]

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

All whole-home projects must be completed by a BPI-Certified Keystone HELP Contractor and/or a BPI-Certified Energy Auditor, and measures must be recommended through a comprehensive audit.

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84 Keystone HELP internal program reports provided to Cadmus, January 2014.

85 Krasja, P., CEO of AFC First, personal communication, January 6, 2014.

86 Keystone HELP internal program reports provided to Cadmus, January 2014.

87 Ibid.

88 Welks, Keith, and Peter Krajsa. "Pennsylvania's Keystone HELP." U.S. Department of Energy. January 28, 2010. PowerPoint presentation. Website: http://www.nga.org/files/live/sites/NGA/files/pdf/1004ENERGYWORKSHOPWELKS.PDF

Single-measure projects must be installed by an approved Keystone HELP contractor, who must hold appropriate licenses and insurance but does not need to be BPI-certified.

What criteria are used to establish measure?

Measure criteria vary by loan product. Whole-home loans require that two or more measures be installed. Geothermal heat pumps can be financed only through a geothermal loan.

Measure categories for other products include:

- Heating and cooling
- Window and door
- Air sealing and insulation

Contractor Network

Does the program have a dedicated contractor network?

AFC First manages contractor recruitment, screening, and training, and it maintains a very large contractor network. The program has trained over 1,600 contractors since its inception, and currently maintains a network of over 1,500 participating contractors.[89,90] AFC First puts a high priority on engaging contractors and providing them with continuing training and educational opportunities in sales techniques, business practices, and technical specializations.

What are requirements for contractors?

The program has three tiers of authorized contractors: Approved, Trained and Certified.

- At the most basic level, **Approved Contractors** have been screened for licensing and insurance, as well as ethical business practices. These contractors are eligible to perform single-measure installations appropriate to their trade licenses.
- **Trained Contractors** are Approved Contractors who have received training in building science but are not BPI-certified. These contractors can perform work on a whole-home project if the project is overseen by a Certified Auditor.
- **Certified Contractors** are authorized to perform work on all types of projects. They have BPI certification or accreditation, though they do not necessarily have BPI Building Analyst certification.
- **Certified Auditors** are certified contractors who do have BPI Building Analyst certification or are BPI-accredited.

[89] Welks, Keith, and Peter Krajsa. "Pennsylvania's Keystone HELP." U.S. Department of Energy. January 28, 2010. PowerPoint presentation. Website: http://www.nga.org/files/live/sites/NGA/files/pdf/1004ENERGYWORKSHOPWELKS.PDF

[90] State & Local Energy Report. "Commercial." May 14, 2013. Accessed January 8, 2014. http://stateenergyreport.com/2013/05/14/keystone-help

In 2014, Keystone HELP will implement a policy requiring all contractors who do not have BPI Building Analyst certification to complete the Home Performance 101 course offered through AFC First.

Is the network shared with other programs?

Keystone HELP does not coordinate its contactor network with any other programs.

Do program managers feel the network is a key element of program success?

The contractor network is the primary, and essentially only, driver of the program. Keystone HELP does not have a line item for direct marketing in its budget, although it does provide contractors with marketing materials and training. AFC First has placed a great emphasis on growing its contractor network and developing contractor skills.[91]

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

The program has not received third-party evaluation of process or savings impacts.

What metrics and researchable questions have program managers used to evaluate the program?

Keystone HELP has frequently published performance results about loans issued, customer profiles, and contractor education on several occasions. However, the program does not have set goals except to generate "as many loans as possible" and meet its sponsors' objectives of making energy efficiency more affordable and increasing energy-efficiency investments in Pennsylvania homes.[92]

While Keystone HELP does not have specific energy-savings targets nor does it report energy savings, it does monitor the energy-savings impact using deemed savings values for measures installed.[93] It also has not commissioned an outside evaluation of savings achieved by the program as a whole. The EnergyWorks program in the Philadelphia area has performed more detailed data tracking and reporting as a requirement of the grant funds from the U.S. Department of Energy, which includes some information about Keystone HELP loans.

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?

Keystone HELP is not affiliated with any utility and is not subject to a cost-effectiveness requirement.

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91 Pennsylvania Treasury and Bostonia Partners, LLC. "Keystone HELP (Home Energy Loan Program): Proposal to Sell $25 Million Residential Energy Efficiency Loans." July 2010. PowerPoint Presentation.

92 Krasja, P., CEO of AFC First, personal communication, January 6, 2014.

93 Ibid.

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

Keystone HELP does not evaluate the impact of the financing on other energy-efficiency programs nor does it evaluate freeridership or spillover effects.

How does the program relate to other loan products already in the market?

The objective of the Keystone HELP loans is to make energy efficiency more affordable for more homeowners. Keystone HELP loans are designed to have lower interest rates and longer tenor than conventional loan products, thereby making monthly payments more affordable. Several of the loans are unsecured, meaning homeowners do not need to have equity in their home in order to qualify. These loans do not compete with traditional financing products but are meant to fill a gap that traditional products did not cover.

Program Results

What are the program results to date?

Table 19 shows basic program statistics through November 2013.[94]

Table 19. Program Results for the Keystone HELP Program

Year	Loan Count	Loan Volume	Average Loan Amount
2011	1,853	$14,750,399	$7,960
2012	1,433	$12,051,418	$8,410
2013	1,657	$14,934,998	$9,013
Total	**4,943**	**$41,736,815**	**$8,444**
Total Since 2006	***12,250***	***$89,544,737***	***$7,310***

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

According to program staff, one of the most critical elements for success of the Keystone HELP program has been its ability to respond quickly to market conditions. Despite not having strict quantitative targets, the program is widely regarded as extremely successful.

In the view of Keystone HELP staff, one of their accomplishments is that over the course of its nearly eight-year history the program has demonstrated relatively seamless coordination by multiple government agencies, a private lender, and numerous other organizations. It has done this in part

[94] Keystone HELP internal program reports provided to Cadmus, January 2014.

because it does not have restrictive mandates that impede its ability to provide loan products that are both attractive to consumers and designed to increase energy efficiency.[95]

What did not succeed, and what lessons have program managers learned?

Keystone HELP has experimented in the past with different incentive structures. Based on its experience, buying down the interest rate to extremely low levels is effective but not necessary. It has found that it is equally effective—if not even more attractive and cheaper for the program—to set a reasonable interest rate and put program funds toward offers such as making the first three to six monthly payments on the customers' behalf.[96]

Program managers originally intended to sell packaged loans into established bond markets in order to raise additional capital. However, after marketing the bundled loans, they found that the aggregate loan volume was too small, and the product was not well-enough understood, to attract buyers.

Until recently, rather than issuing bonds, Keystone HELP has relied on its established good performance to simply sell off bundled loans to banks and other investors. The program held its first sale in April 2013 and transferred $31.3 million in loans to three separate banks.[97] In 2014, it will move to the WHEEL model, which Keystone HELP staff helped design.

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95 Krasja, P., CEO of AFC First, personal communication, January 6, 2014.

96 Krasja, P., CEO of AFC First, personal communication, January 6, 2014.

97 State & Local Energy Report. "Commercial." May 14, 2013. Accessed January 8, 2014. http://stateenergyreport.com/2013/05/14/keystone-help

Mass Save HEAT Loan Program

Program	HEAT Loan
Type of Implementer	Utility sponsors and Mass Save
Region	Massachusetts
Coverage	Service territories of Mass Save utility sponsors[98]
Target Market	Residential
Program Start Date	May 2006

Mass Save®, a joint initiative of the Massachusetts Department of Energy Resources and the Massachusetts investor-owned gas and electric utilities (IOUs), provides a variety of energy-efficiency programs for residential and commercial property owners. All programs are implemented by the individual sponsoring utilities, which each also maintain their own contractor networks. The Mass Save label, launched in response to the Green Communities Act adopted by the Massachusetts legislature in 2008[99], provides consistent branding and a common program framework, as well as marketing and administrative support, for energy efficiency programs statewide.

HEAT Loan, in addition to several other state-wide programs, was launched prior to the approval of the Mass Save brand. After the Mass Save program was approved, the utility sponsors re-branded the program as the Mass Save HEAT Loan program.

Funding for the HEAT Loan program, as well as other programs in the Mass Saves portfolio of programs, comes from:

- the social benefit charge added to electric bills;
- a similar charge known as the Energy Efficiency Reconciliation Factor that is applied to electric bills in proportion to the users potential benefit from energy efficiency programs;
- the Regional Greenhouse Gas Initiative; and
- forward capacity markets as managed by ISO New England.

This funding is used to administer the program and provide the interest rate buydown.[100]

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98 Participating utilities are Cape Light Compact, New England Gas, National Grid, NSTAR, Unitil, and Western Massachusetts Electric Company.

99 Halfpenny, Christina, F. Gundal, C. White, J. Livermore, D. Baston, P. Mosenthal. Mass Save: A New Model for Statewide Energy Efficiency Programs. Massachusetts Department of Energy Resources. Presented at the 2012 ACEEE Summer Study on Energy Efficiency in Buildings, 2012. Accessed online February 28, 2014. http://www.aceee.org/files/proceedings/2012/data/papers/0193-000169.pdf

100 *Staying on Top: Energy Efficiency Continues to Deliver Benefits to Massachusetts Residents and Businesses.* Massachusetts Energy Efficiency Advisory Council. November 2013. http://www.mass.gov/eea/docs/doer/energy-efficiency/ma-advisory-council-2012-report.pdf

Mass Save works with partner lenders to offer HEAT loans to residential customers who are implementing high-efficiency measures. The program features a free comprehensive home energy assessment performed by a Mass Save technician and financing at 0% to the customer.[101]

Financing Offer

What are the interest rates, tenor, lender security, and other details of the financing products?

Table 20. Key Details of the HEAT Loan

Rate	0%
Tenor	Up to 7 years
Loan Amount	$500 to $25,000
Conditions	• Work must be installed within 90 days of receiving the check from the lender. • The program encourages loans up to $15,000 to be unsecured, but lenders may place a lien on the property at their discretion.

The program has over 50 participating lenders, all local or state-level banks and credit unions. The program does not work with national lenders.[102] A contracted third party provides quality assurance at a statewide level.

Does the program offer credit enhancements?

The HEAT Loan Program does not offer credit enhancements to lenders, but it does buy the interest rate down to 0%. The starting interest rate for the buydown is prime +1%, with a floor of 5%. To date, rates have stayed around 5%.[103]

Overlapping Incentive Programs

What overlapping incentives are offered?

Utilities offer rebates for individual measures that may be part of a retrofit financed by a HEAT loan. Incentives range from $50 for refrigerator recycling and up to $2,000 for insulation. Incentives are co-marketed with financing. Weatherization and HVAC measures require the same home energy assessment required for financing.

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101 Unless otherwise specified, all information is from the program website: http://www.masssave.com/residential/offers/heat-loan-program

102 Avers, Elise, and I. Finlayson. *HEAT Loan Overview.* Massachusetts Department of Energy Resources. 2012. http://www.naseo.org/data/sites/1/documents/committees/financing/notes/2012-05-03-HEAT_Loan_Overview.pdf

103 Ibid.

How does the financing integrate with the incentive program(s)?

During the home energy assessment, the Energy Specialist will help identify which of the incentive programs offered through Mass Save are available for the customer, including the HEAT Loan. Mass Save is designed to streamline the available programs and facilitate customer understanding and access.

Is financing intended to eventually replace cash incentives?

The Commonwealth of Massachusetts has offered financing together with incentives since 2006. According to its 2013-2015 energy-efficiency plan, Massachusetts focuses on increasing customer education, enhancing whole-home approaches, and applying market segmentation. This entails developing additional financing tools for new market segments and may result in changing rebate levels. There is no explicit plan to replace rebates with financing.[104]

How has available financing affected participation in related incentive programs?

This information is not yet available. The program sponsors plan to investigate this question as part of an upcoming evaluation in 2014.[105]

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

Participating lender banks complete loan approvals, and requirements for underwriting vary by lender. Some lenders offer loans secured with a lien on the property to buyers with lower credit scores.

How does the average borrower score on these criteria?

Program representatives were unable to provide this information, since it is judged by the individual lending organizations and not collected by the HEAT Loan Program.[106]

What other eligibility requirements are there?

Customer creditworthiness is subject to the lender's discretion and varies by lender. To be eligible, the customer must have completed the assessment process and have received approval from the HEAT loan administrator. Then the customer takes the appropriate loan authorization form to the lender and begins the underwriting process.

Long-Term Loan Performance

What is the cumulative default rate?

The cumulative default rate (as of 2011) was less than 0.75%.[107]

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[104] Mass Save. 2013–2015: Massachusetts Joint Statewide Three Year Electric and Gas Energy Efficiency Plan. November 2012. http://www.mass.gov/eea/docs/doer/energy-efficiency/statewide-electric-and-gas-three-year-plan.pdf

[105] Cadmus. *National Grid Home Energy Services HEAT Loan Assessment: Evaluation Plan.* November 2013. [Not publicly available]

[106] Huckabee, L., Massachusetts Department of Energy Resources, personal communication, January 27, 2014.

What collection procedures are in place?

Lenders apply their own collection procedures. Procedures vary by lender.

Is the loan transferable upon sale of the property?

HEAT loans are not repaid through the utility bill.

At what point is a loan considered to be in default?

Conditions for default are determined by the lender. The program pays the entire buy-down upfront once the loan is closed. The program is not involved in handling loan defaults.[108]

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

The project must be identified through a home energy assessment conducted by a Mass Save-authorized contractor and must consist of measures the program has determined are eligible. The measures must also be implemented by a program-authorized contractor. Do-it-yourself installations are not eligible for the HEAT loan.

What criteria are used to establish measure eligibility?

The program has specified that the following measures are eligible for financing, if they are recommended through a home energy assessment.

- Attic, wall and basement insulation
- High efficiency heating systems
- Central air conditioning and air source heat pumps
- Ductless mini-split heat pumps
- High efficiency domestic hot water systems
- Solar hot water systems
- 7-day digital and Wi-Fi thermostats
- ENERGY STAR®-qualified windows

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[107] Avers, Elise, and I. Finlayson. *HEAT Loan Overview.* Massachusetts Department of Energy Resources. 2012. http://www.naseo.org/data/sites/1/documents/committees/financing/notes/2012-05-03-HEAT_Loan_Overview.pdf

[108] Huckabee, L., Massachusetts Department of Energy Resources, personal communication, January 27, 2014.

Contractor Network

Does the program have a dedicated contractor network?

Each participating utility maintains its own list of program-authorized contractors, categorized as Energy Specialists, Independent Implementation Contractors, or Home Performance Contractors.

- **Energy Specialists** are authorized to conduct home energy assessments.
- **Independent Implementation Contractors** are authorized to implement measures identified through a home energy assessment.
- **Home Performance Contractors** are authorized to perform both the assessment and the work recommended through the assessment.

What are requirements for contractors?

Training and certification requirements vary depending on the category of contractor. All contractors must be trained in quality installation verification (QIV), have a Massachusetts Home Improvement Contractor license, Construction Supervisor license, a Lead Safe certificate, and a Combustion Safety certificate. Contractors must also allow background checks on staff, maintain up-to-date insurance (as required by the program administrator), and sign a participation agreement with the specific program administrator.

Is the network shared with other programs?

Contractors must register separately for each program and must register separately for each utility sponsor.

Do program managers feel the network is a key element of program success?

The network of contractors is important in performing program work, but it is not key to outreach or marketing. While the contractors have the option to reach out to customers to drive their business, the majority of jobs originate with the HEAT Loan call center, which then passes leads to contractors.[109]

Process and Impact Evaluation Strategies

What metrics, data collection methods, and researchable questions have program managers used to evaluate the financing program(s)?

The program administrators will evaluate the HEAT Loan Program in 2014. A sample of the proposed researchable questions includes:

- To what degree does the HEAT Loan Program impact behavior concerning other incentives, such as equipment or recycling program rebates?
- Do HEAT Loan participants install a larger proportion of audit recommendations than other participants?

[109] Huckabee, L., Massachusetts Department of Energy Resources, personal communication, January 27, 2014.

- Are there opportunities for improving the loan process?
- How are contractors promoting the loan?
- Does the availability of the loan affect contractor pricing?

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?

While the utilities evaluate the cost-effectiveness of their rebate program portfolios, the HEAT Loan program is considered a supplemental offering that is not subject to the same requirements.

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

The HEAT Loan Program is often combined with the whole-home or heating system rebate programs, and in these situations the savings would be totally attributed to the installation programs. Those various programs are evaluated for net-to-gross and thus evaluated for freeridership and spillover.[110]

How does the financing program relate to other loan products already in the market?

Many Massachusetts banks look at the HEAT loan as both a smart loan product and a business development tool. The loan is considered low risk in some respects, as Mass Save buys down the interest rate with an upfront payment. The loan is also a good way for banks to build relationships with new customers.[111]

Program Results

What are the financing program's results to date?

Error! Reference source not found. presents the program results from May 2006 through December, 2012.[112]

Table 21. Program Results for the HEAT Loan Program

Participants	Over 18,000
Loan Volume	Nearly $155 million
Average Loan	Approximately $8,400 (est.)
Loan Acceptance Rate	87%

[110] Huckabee, L., Massachusetts Department of Energy Resources, personal communication, January 2014.

[111] Ibid.

[112] *Staying on Top: Energy Efficiency Continues to Deliver Benefits to Massachusetts Residents and Businesses.* Massachusetts Energy Efficiency Advisory Council. November 2013. http://www.mass.gov/eea/docs/doer/energy-efficiency/ma-advisory-council-2012-report.pdf

Keys to program success/ lessons learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

This program is unique in that Mass Save sets pricing for eligible measures, and participating contractors must agree to that price list. This relieves customers from having to solicit multiple bids.

Additionally, program staff noted that the HEAT Loan Program has benefited from being implemented in a state with a very mature energy-efficiency program portfolio. Customers and energy efficiency related service providers already have a high awareness of energy efficiency. The market is confident that the state support will continue, and service providers are willing to invest in state programs. However, because of the well-established framework already in place at the instigation of the HEAT Loan Program, which has since grown dramatically, it is difficult to pinpoint the precise impact of the HEAT Loan program.

What did not succeed, and what lessons have program managers learned?

The original HEAT Loan had a minimum loan amount of $1,000 and a maximum of $15,000. In 2010, in an effort to reach a larger portion of the market, the program lowered the minimum loan size to $500 and increased the maximum loan amount to $25,000 (with additional security required for loans above $15,000). The lowered threshold for loans allowed customers to finance more single-measure projects, such as high-efficiency appliances. Meanwhile the increased ceiling allowed increasingly comprehensive projects.[113] Annual reports on HEAT Loan achievements have noted that the average loan size has been steadily increasing since 2009.[114]

HEAT Loan participation was slow in the first years of implementation. Uptake spiked in 2008 when the Home Energy Solutions rebates increased dramatically to 75% of project cost up to $2,000. Uptake spiked again in 2010-2011 when a major new marketing approach was launched, including the relatively new Mass Save branding, and the changes in the loan minimum and maximum amounts.[115]

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[113] Darling, Tom. *Mass Save Residential HEAT Loan – Summary Results 2006-2010.* Massachusetts Department of Energy Resources. 2011. http://www.mass.gov/eea/docs/doer/energy-efficiency/heat-loan-summary.pdf

[114] *Staying on Top: Energy Efficiency Continues to Deliver Benefits to Massachusetts Residents and Businesses.* Massachusetts Energy Efficiency Advisory Council. November 2013. http://www.mass.gov/eea/docs/doer/energy-efficiency/ma-advisory-council-2012-report.pdf

[115] Eccle, B., Conservation Resources Group, personal communication, May 2013.

Michigan Saves℠ Home Energy Loan Program and Business Energy Financing Program

Program	Home Energy Loan Program (HELP), Business Energy Financing (BEF)
Type of Implementer	Nonprofit
Region	Michigan
Coverage	Statewide
Target Market	Residential, commercial
Program Start Date	Residential 2010, commercial 2011

Michigan Saves℠, a registered 501(c)(3) organization, was launched in 2010 as the product of a grant from the Michigan Public Service Commission to create a statewide energy-efficiency financing program. Under the original grant, Michigan Saves established its own structure and governance, launched the Home Energy Loan Program (HELP), and dedicated funds to a loan loss reserve (LLR) fund.[116]

Successive grants have allowed Michigan Saves to expand HELP and launch the Business Energy Financing (BEF), a commercial program. Though Michigan Saves relied on grant funding to cover startup costs and establish LLRs, the organization does not receive a dedicated stream of funding from any government or foundation. Ultimately, Michigan Saves hopes to be self-sustaining through interest from the LLR, as well as mechanisms such as participation fees paid by participating lenders and contractors that have not yet been put in place.

The mission of Michigan Saves is to strengthen and develop the energy-efficiency sector in Michigan by making energy efficiency easier and more affordable.

Financing Offer

What are the details of the financing product?

Table 22. HELP Loan Product

Rate	7% (4.25% and 4.99% available in select cases)
Tenor	Loan tenor is one year for every $1,000 up to $4,999. For loans $5,000 and higher, 10-year tenor is an option.
Loan Amount	$1,000 to $30,000
Conditions	• No pre-payment penalty • Maximum loan amount varies by lender

[116] Unless otherwise noted, all information is from the Michigan Saves website. www.MichiganSaves.org

Table 23. BEF Loan Product

Rate	Begin at 5.9%; scale up depending on credit and project (1.99% available for food industry through special grant)
Tenor	2 – 5 years
Loan Amount	$2,000 to $250,000
Conditions	Where possible, loan tenor is structured so that monthly payment is less than average monthly savings.

Does the program offer credit enhancements?

Michigan Saves supports both the residential and commercial programs with an LLR. The details of the fund are presented in **Error! Reference source not found.**.

Table 24. LLR Funds and Leverage by Program[117]

Program	Total Fund	Leverage*
HELP	$3.4 million	20:1
BEF	$5.0 million	10:1

* Leverage is the portion of a lender's total loan volume that is reserved for the lender at any given point in time, and represents the maximum the lender can claim for any and all losses.

Lenders can access the fund to recover a portion of their losses in the event there is a default. The LLR allows lenders to apply lower interest rates and set more lenient underwriting criteria to serve more customers. Two company-affiliated credit unions felt the LLR justified rates from 4.25% to 4.99%, for customers with credit scores of at least 680 and 640-679, respectively.

Another residential lending partner, the Michigan State University Federal Credit Union (MSUFCU), has reported that the LLR permits them to offer more lenient underwriting for Michigan Saves projects.[118]

Overlapping Incentive Programs

What overlapping incentives are offered?

Generally, Michigan Saves does not offer any cash-based incentives of its own, but it does coordinate closely with the major investor-owned utilities (IOUs) and large municipal utilities to make sure the financing programs interact easily with utility incentive programs. Contractors are trained in available rebates as well as the financing program, and the majority of eligible measures overlap.

The program has recently expanded to incorporate an employer-outreach model. Michigan Saves has accepted two new lenders, both company-affiliated credit unions for large employers (to date, credit

[117] Schroeder, T., Operations Manager, Public Sector Consultants, personal communication, December 2013. Michigan Saves contracts with Public Sector Consultants for all personnel, management and implementation services.

[118] Ibid.

unions for Herman Miller and Dow have joined).[119] The credit unions offer a special low rate (4.25% to 4.99%), which is packaged with additional incentives from the employers such as free audits for the first few customers. Each company has hired a single contractor to service their employees, and in return the contractor is offering free audits to customers. Dow is supplementing available rebates with 25% off the cost of insulation, and has developed a website to market the program.[120] The contractor implementing the program reports that they have done over 300 audits, with a 40% conversion rate, but the program has not independently tracked results.

From 2010 to 2013, Michigan Saves operated a U.S. Department of Energy-funded program known as the BetterBuildings for Michigan (BBFM) in select cities around the state. This program offered enhanced rebates above utility rebates and added an interest rate buy-down to the HELP loan.

Through another grant targeted to the food-retail industry, Michigan Saves has implemented special limited-time offers for BEF projects. Using these grant funds, BEF buys down the financing rate to 1.99% and offers a cash incentive of $4,000 (formerly $2,000) to commercial food retail businesses that achieve a 20% reduction in energy use. Non-food retail businesses can access the cash incentive if they achieve the 20% energy use reduction, but they are not eligible for the interest rate buy-down. The grant program is scheduled to end in March 2014.[121]

How does the financing integrate with the incentive program(s)?

Both financing programs are designed to interact easily with both prescriptive and audit-based utility rebate programs. HELP and BEF each have a list of prescriptive measures that can be financed without a home energy assessment; however, both programs encourage an assessment and will approve any measure identified by the assessment as cost-effective.

Is financing intended to eventually replace cash incentives?

Michigan Saves does not have a funding structure that allows it to offer rebates. It is designed to focus on financing products and to support the rebate programs offered by area utilities. Because utilities do not receive energy savings credit toward their annual goals from projects financed by Michigan Saves (unless the utility provides a rebate), it is unlikely that these utilities will phase out their rebate programs.

How has available financing affected participation in related incentive programs?

Michigan Saves does not track which of its participants also use utility rebates. However, the BBM program allowed Michigan Saves to collect data on projects that use financing and rebates versus

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[119] Schroeder, T., Operations Manager, Public Sector Consultants, personal communication, March 2014.

[120] http://dowenergysavings.com

[121] Schroeder, T., Operations Manager, Public Sector Consultants, personal communication, December 2013.

rebates only. Nearly 3,000 projects used financing and incentives through BBM, and these projects were on average almost twice as large as projects that did not use financing.[122]

Michigan Saves staff has also noted that, as the program increased the maximum loan amount, customers have completed larger and more comprehensive projects.

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

For both HELP and BEF, Michigan Saves evaluates borrowers using standard credit history. Depending on the lender, the minimum credit score is 640 or 680, and the debt-to-income ratio must be 0.5 or less. Lenders also review recent bankruptcies and outstanding judgments.

How does the average borrower score on these criteria?

Under HELP, the average borrower has a credit score of 757 and average self-reported income of $75,570. Michigan Saves has an approval rate of 60% of all applications. Denied applicants have an average credit score of 632 and an average self-reported income of $57,730.[123]

The leasing company that underwrites the commercial program does not release any data on application history.[124]

What other eligibility requirements are there?

For HELP, the borrower must be the homeowner, and the property must be a single-family home used as a primary residence.

HELP works primarily with credit unions, which are often geographically bound by their charters. For this reason, customers can select only from the program lenders that operate in his or her area, not from the whole list of program lenders. HELP has sufficient lender partners so that all areas of the state are covered by at least one lender.

Commercial applicants must be either private business owners or nonprofits. Michigan Saves prefers but does not require that the owner be the borrower. Any organization anywhere in the state can apply to Ervin Leasing Company, the sole lender for BEF. Ervin Leasing acts as a full service lender, and offers financing for all eligible improvements, including weatherization improvements.

Long-Term Loan Performance

What is the cumulative default rate?

The HELP rate of default is 1.1% over the life of the program.

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[122] Schroeder, T., Operations Manager, Public Sector Consultants, personal communication, December 2013.

[123] Michigan Saves internal program tracking documents, shared with Cadmus on December 13, 2013.

[124] Schroeder, T., Operations Manager, Public Sector Consultants, personal communication, December 2013.

BEF has not registered any defaults to date.

What collection procedures are in place?

For both HELP and BEF, each lender agrees to apply its standard collections procedure to Michigan Saves loans.

Is the loan transferable upon sale of the property?

Neither HELP nor BEF is offered as an on-bill program.

At what point is a loan considered to be in default?

For HELP, loans are considered in default and eligible for a LLR claim once they are 90 days past due. The lender is entitled to a portion of any funds recovered after that point and is encouraged to apply its normal collection procedure even after the loan loss claim has been processed.

For BEF, loans are considered in default once they are 90 days past due.[125]

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

For both HELP and BEF, the project must be completed by an authorized contractor.

For the BEF program, where possible, the tenor is structured so that the monthly payment is less than average monthly savings.

What criteria are used to establish measure eligibility?

For HELP, Michigan Saves will allow any measures deemed cost-effective by an audit. It also maintains a list of prescriptive measures that largely correspond to the measures rebated by the major IOUs. Michigan Saves has added certain measures based on contractor requests and specific software models that demonstrate the measures are cost-effective. An example of one such measure is the geothermal heat pump for customers switching from propane or heating oil.

For BEF, all equipment that is demonstrated as cost-effective by a comprehensive audit with modeling is eligible for financing. Customers also have the option to choose from the list of prescriptive measures that do not require a comprehensive audit.

Contractor Network

Does the program have a dedicated contractor network?

Both HELP and BEF require that customers work with a contractor authorized by the program. There are separate networks for residential and commercial work. Contractors may belong to both, but all must

[125] Schroeder, T., Operations Manager, Public Sector Consultants, personal communication, December 2013.

apply separately to each. As of November 2013, HELP, the residential program, had 289 authorized contractors, and BEF, the commercial program, had 159 authorized contractors.[126]

What are requirements for contractors?

To become authorized, contractors must possess valid licenses and insurance and must also possess Building Performance Institute, Inc. (BPI), or similar certification accepted by Michigan Saves. Contractors must complete program training and sign an agreement to abide by the rules of the program, including the quality assurance policy.

Is the network shared with other programs?

Michigan Saves recommends that its contractors also register with the utilities in their area, and this is commonly done. It is not, however, a requirement, and the network is not affiliated with any other programs.

Do program managers feel the network is a key element of program success?

The contractor network is designed to be the primary driver of both the residential and the commercial programs.[127]

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

Michigan Saves has commissioned process evaluations for each of its programs but it has not adopted a regular schedule for evaluation. [128,129]

What metrics and researchable questions have program managers used to evaluate the program?

Michigan Saves does not have established targets for loan volume or energy savings.

Program staff collect information on customers, measures financed, and loans. Through their lender partners, they also track applicant credit scores and default rates and monitor these values internally to keep tabs on program progress. Staff track measures financed through each loan and use deemed savings values to determine energy savings impact, but these are not formally evaluated.

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?

Michigan Saves is an independent nonprofit that, aside from an initial startup grant from the Michigan Public Service Commission, does not receive ratepayer funds. As such, it is not a regulated entity and is

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126 Michigan Saves internal tracking documents shared with Cadmus on December 13, 2013.

127 The Evaluation Center, Western Michigan University. *Michigan Saves Statewide Process Evaluation.* Michigan Saves. 2011.

128 Schroeder, T., Operations Manager, Public Sector Consultants, personal communication, December 2013.

129 Cadmus. *Michigan Saves Business Energy Financing Final Evaluation Report.* Michigan Saves. 2013.

not required to demonstrate the cost-effectiveness of its programs according to the usual tests for utility analysis, such as total resource cost (TRC) or utility cost test (UCT).

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

Michigan Saves does not assess freeridership or spillover to or from utility rebate programs.

How does the program relate to other loan products already in the market?

HELP is designed to provide an option for people who might not otherwise have access to affordable credit. Because it is a financing product focused on energy efficiency and offered by a nonprofit third-party entity, it is meant to be a sales tool that gives contractors greater legitimacy when approaching customers about energy-efficiency projects. It is not meant to replace other financing products.[130]

Similarly, BEF is intended to make credit more accessible to businesses that might not otherwise have access to credit at all. Like HELP, BEF is contractor-driven and is considered to be a special product unlike traditional financing products (and therefore is not in competition).

Program Results

What are the program results to date?

The following tables present results of the HELP and BEF programs as of October 31, 2013.[131] Bear in mind that HELP was launched in 2010, and BEF in 2011.

Table 25. HELP Program Results

Total Participants	3,011
Loan Volume	$24.8 million
Average Loan Size	$8,241

Table 26. BEF Program Results

Total Participants	67
Loan Volume	$1.8 million
Average Loan Size	$21,380

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

The LLR was helpful in attracting lenders to a new program that was different from anything the lenders had done before.

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130 Ibid.

131 Schroeder, T., Operations Manager, Public Sector Consultants, personal communication, December 2013.

HELP, the residential program, involves nine different lenders but processes all loan applications through a central call line. This greatly simplifies the process for contractors, because they do not have to keep track of which lenders operate in what territory. In addition, the call center offers approval decisions within a few minutes, allowing contractors to get customers approved "at the kitchen table," a feature that makes HELP more attractive to contractors.

The credit unions in Michigan have a very active state association, the Michigan Credit Union League, that has served a vital role in championing HELP and encouraging its members to participate.

Working with Ervin Leasing was essential to launching the BEF program, as more traditional lenders were unable to provide affordable options for businesses. Because Ervin Leasing already offered credit for equipment purchases, similar to what Michigan Saves proposed, the learning curve was much shallower for all parties. [132]

What did not succeed, and what lessons have program managers learned?

There is some concern for both HELP and BEF about what the loan volume will be when these programs are offered at traditional rates. The volume of loans through HELP has declined significantly after the BBM program ended; this program accounted for 35% to 40% of HELP loans.

In addition, the grant that supports the buy-down and cash incentive through BEF is nearly over. Approximately 80% of the loans obtained through BEF have been bought down to 1.99%.[133]

[132] Ibid.

[133] Schroeder, T., Operations Manager, Public Sector Consultants, personal communication, December 2013.

Midwest Energy How$mart® On-Bill Financing

Program	How$mart On-Bill Financing
Type of Implementer	Utility cooperative
Region	Kansas
Coverage	Midwest Energy service territory
Target Market	Residential and commercial
Program Start Date	September 2008

Midwest Energy is an electric and natural gas cooperative in Kansas. It serves 50,000 electric and 42,000 natural gas customers.

The cooperative offers the How$mart® on-bill financing (OBF) program to encourage the installation of comprehensive upgrades that have been identified through an audit. Midwest Energy pays the initial cost of the measures directly then recoups this cost as a surcharge on the customer's bill. The surcharge is designed to never exceed 90% of the projected energy savings associated with the improvements. The How$mart program is offered, with slightly different interest rates, to both residential and commercial customers (see financing details below).

An unusual feature of this program is that customers are required to install the most cost-effective measures first. For example, many customers apply to the program to finance a measure such as a new air-conditioner, but the program requires they first install measures, such as insulation, that have a greater impact on energy efficiency. With this requirement, the program feels it achieves deeper energy savings and virtually eliminates freeridership.[134]

[134] Unless otherwise specified, all information is from Volker, M., Director of Regulatory & Energy Services, Midwest Energy, personal communication, November 2013 through January 2014.

Financing Offer

What are the details of the financing product?

Table 27. Key Details of the How$mart Program[135]

Rate	Residential: 3.0%	Commercial: 4.5%
Tenor	Residential: 15 years (max)	Commercial: 10 years (max)
Loan Amount	The program does not set maximum and minimum loan amounts.	
Conditions	For both: • No penalty for paying off early. • Midwest Energy will file a Uniform Commercial Code (UCC) form with the county's Register of Deeds for all How$mart® obligations.	

What credit enhancements are available to participating lenders?

The How$mart program does not partner with third-party lenders. It issues the project funds directly and recovers the cost through a utility bill surcharge. The Kansas Housing Resources Corporation provided 50% of the loan capital at 0% interest until 2009.[136] Now, the program has captured low-cost sources such as the U.S. Department of Agriculture (USDA) Rural Economic Development Loan and Grant (REDLG) fund. The program also plans to apply for a grant from a new USDA Rural Utility Service (RUS) program called the Energy Efficiency and Conservation Program as another source of low-cost funding.

Overlapping Incentive Programs

What overlapping incentives are offered?

Customers must sign up for an audit from a Midwest Energy professional auditor. If the customer moves forward with the measures recommended by the audit, the audit is free. If not, the customer may be charged up to $200.[137]

Midwest Energy does not offer any overlapping incentive programs nor does it coordinate with any programs offered by other entities.

How does the financing integrate with the incentive program(s)?

This is not applicable, as the co-op does not offer cash incentives.

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135 How$mart. *How$mart® Q&A Sheet*. 2012. Website: http://www.mwenergy.com/documents/howsmart/QA.pdf

136 Brown, Matthew, and Beth Conover. *Recent Innovations in Financing for Clean Energy.* Prepared for Southwest Energy Efficiency Project. October 2009. Accessed December 16, 2013: http://www.swenergy.org/publications/documents/Recent_Innovations_in_Financing_for_Clean_Energy.pdf

137 Energy Services Bulletin, July, 2011: Midwest Energy program makes energy efficiency affordable. http://ww2.wapa.gov/sites/Western/es/pubs/esb/Documents/July2011/jul111.htm

Is financing intended to eventually replace cash incentives?

This is not applicable, as the co-op does not offer cash incentives.

How has available financing affected participation in related incentive programs?

How$mart managers view the different components of the program—audits, retrofitting, and financing—as turn-key and not separable. There is no cash incentive baseline with which to compare, but this program has completed a large number of retrofits and continues to be popular even without cash incentives.

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

The program is available to Midwest Energy electric and/or gas customers in good standing, which is defined as current on all utility payments. The program does not check credit scores, since the cooperative does not perform checks for traditional utility service. The program is considered part of Midwest Energy's utility service and is offered under the same terms and conditions.

How does the average borrower score on these criteria?

By definition, all successful applicants are current on all utility bills.

What other eligibility requirements are there?

The borrower may be either a homeowner or a tenant. Tenants must have written approval from a landlord to make improvements to the property.[138]

Long-Term Loan Performance

What is the cumulative default rate?

The default rate is estimated at 1%. However, How$mart staff note that the program is effective in convincing customers to become up to date on their utility bills so that they are able to participate. In this sense, managers feel the "default rate is negative."

What collection procedures are in place?

Midwest Energy considers financing a surcharge and not a loan. As such, if a customer is behind on payments, this is considered uncollectible utility revenue, not default. The utility has specific terms and conditions it must follow to pursue uncollectible revenue, which apply to How$mart charges as well as electricity charges.

[138] How$mart. *How$mart® Q&A Sheet*. 2012. Website: http://www.mwenergy.com/documents/howsmart/QA.pdf

Midwest Energy has the authority to disconnect power in the event of nonpayment in the same manner that it would for nonpayment of other energy services.[139] However, only the amount in arrears is collectible once the utility initiates collection procedures, not the entire balance of the surcharge.

Is the loan transferable upon sale of the property?

If the property is sold, the payment obligation will be transferred to the new owner. The UCC-1 filing ensures that the new owner is notified of the surcharge before sale of the property. In two cases, the utility has had to charge off the balance of a surcharge due to foreclosure. But in the majority of cases of property transfer, the utility has been able to negotiate and has either been paid the remaining balance by the seller or the bank, or the prospective new owner has agreed to accept the How$mart charge.

At what point is a loan considered to be in default?

The utility does not give the monthly service charge priority over the surcharge. It considers the total as a single, full payment owed to the utility. There is no set number of days upon which the financing—which is not a loan—is considered uncollectible utility revenue.

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

The project must be installed by either a contractor who has signed a master agreement with Midwest Energy or the customer. Customers must include the measures with the best energy-savings potential in their projects. For example, a customer may be required to install insulation before a heating or cooling system in order for the project to be eligible. The project cost in relation to energy savings must be such that the monthly surcharge is no more than 90% of the average monthly savings over the lifetime of the surcharge (15 years is most common).

What criteria are used to establish measure eligibility?

Any measure is eligible as long as it has been demonstrated to be cost-effective by the required comprehensive audit.

Contractor Network

Does the program have a dedicated contractor network?

Participating contractors must sign an agreement with Midwest Energy. The agreement specifies only that the contractor will abide by the rules of the program, install measures approved by the utility, and perform the installation according to code.

What are requirements for contractors?

In order to avoid additional costs, the program does not review contractor licenses and insurance; however, contractors are required to follow any local professional standards and adhere to the work

[139] McCarthy, Kenneth E. Financing Energy Efficiency and Renewable Energy Programs in Other States. Connecticut Office of Legislative Research. November 18, 2009. http://cga.ct.gov/2009/rpt/2009-R-0416.htm

agreement (called a conservation plan by the How$mart program) developed in coordination with the auditor and the customer. The work is subject to a post-retrofit audit.

Is the network shared with other programs?
The network is not shared with other programs.

Do program managers feel the network is a key element of program success?
The utility considers the contractor network the primary sales force.

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?
The program has not been evaluated by a third party.

What metrics and researchable questions have program managers used to evaluate the program(s)?
The How$mart program has been reviewed by several researchers for independent analyses, but it has not commissioned a formal process or impact evaluation. The program managers monitor energy savings through billing analysis, and they conduct surveys to monitor customer satisfaction. Because they implement the program directly, there is no implementation partner to evaluate.

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?
How$mart is not required to demonstrate cost-effectiveness. Program managers occasionally review the results of ratepayer impact measure (RIM) and total resource cost (TRC) tests, but the results are informal and only for internal reference. Program managers also regularly monitor traditional cost-effectiveness, which they define as the discounted cash flow of the program costs compared to the energy bill savings.

The program requires that participants install only measures that are deemed cost-effective in an energy audit,[140] and it also requires that participants install the most cost-effective measures first. Therefore, every project passes the program's participant test (that is, that installing the measures lowers the participant's bill).

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?
The utility has no requirement to assess freeridership or spillover. Because customers are required to install measures with more energy-saving potential first, program managers believe freeridership is kept at a minimum.

[140] See comments under project eligibility to see requirement of surcharge versus energy savings

How does the program relate to other loan products already in the market?

The program does not consider its financing product to be a loan, in that the customer is not taking on additional debt. Rather, the program offers a service and collects a fee as a surcharge on the customer's utility bill.[141] For this reason, the utility does not view the program as a competitor of traditional financing programs.

Program Results

What are the program results to date?

The results below reflect the accomplishments achieved since the program's launch in September, 2008 through December, 2013.

Table 28. Residential Results for the How$mart Program[142]

Number of projects	1,028
Loan Volume	$6.1 million
Average Loan	$5,948

The typical How$mart charge on a residential monthly bill is $42, with an estimated savings of $49.[143]

Table 29. Commercial Results for the How$mart Program[144]

Number of projects	32
Loan Volume	$200,000 (estimated)
Average Loan	$6,300

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

Because the program requires customers to install the measures with the most potential for energy savings first, program managers believe they maximize the benefit to both the utility and the customer.

The utility considers the simplicity of the program a critical element of its success. There are no income qualifications or excessive documentation to be filled out, and the auditors provide a great deal of useful education to the customers.

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141 Brown, Matthew, and Beth Conover. *Recent Innovations in Financing for Clean Energy.* Southwest Energy Efficiency Project. October 2009. Accessed December 16, 2013: http://www.swenergy.org/publications/documents/Recent_Innovations_in_Financing_for_Clean_Energy.pdf

142 Results as of December 31, 2013; Volker, M., Midwest Energy, personal communication, January 2014.

143 Kahn, Michael W. "A Fresh idea for Energy Efficiency." Electric Co-op Today. February 1, 2012. Accessed December 16, 2013. http://www.ect.coop/special-reports/ceo-closeup/Midwest-energy-efficiency-how-smart-program/39098

144 Results as of December 31, 2013; Volker, M., Midwest Energy, personal communication, February 2014.

What did not succeed, and what lessons have program managers learned?

The program initially experienced issues with notification when a retrofitted home was sold. That problem was solved by filing UCC-1 forms; though not a lien, the filing ensures that buyers are made aware of the obligation on the property.[145]

As with many energy-efficiency programs, How$mart initially had too many people signing up for an audit and then not following through with any retrofit. In order to ensure that only customers who were really interested in making improvements signed up, the program implemented a $200 fee to people who use the audit but do not take out a loan.[146]

A program representative noted that the entire audit process is expensive, and program costs for these financing offerings are "daunting." However, the representative noted that the post-retrofit audits are necessary quality assurance, and the program provides an important service to cooperative members.

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145 Kahn, Michael W. "A Fresh idea for Energy Efficiency." Electric Co-op Today. February 1, 2012. Accessed December 16, 2013. http://www.ect.coop/special-reports/ceo-closeup/Midwest-energy-efficiency-how-smart-program/39098

146 Brown, Matthew, and Beth Conover. *Recent Innovations in Financing for Clean Energy.* Prepared for Southwest Energy Efficiency Project. October 2009. Accessed December 16, 2013: http://www.swenergy.org/publications/documents/Recent_Innovations_in_Financing_for_Clean_Energy.pdf

NYSERDA On-Bill Recovery Residential Financing Program

Program	**On-Bill Recovery Residential Financing Program**
Type of Implementer	Public benefit corporation
Region	New York
Coverage	Statewide
Target Market	Residential
Program Start Date	January 1, 2012

The Green Jobs Green New York (GJGNY) legislation, passed by the New York State Assembly in 2009, directed NYSERDA to establish multiple financing and cash incentives for single-family, multifamily, and small business market sectors. NYSERDA created the on-bill recovery (OBR) residential financing program in 2011, which it implements as part of its Home Performance with ENERGY STAR® (HPwES) program.

NYSERDA's funding comes primarily from the Regional Greenhouse Gas Initiative (RGGI) as well as portions of a one-time grant from the U. S. Department of Energy that had been used to establish sustainable credit enhancement funds.

The OBR program, the second financing option to be included in NYSERDA's HPwES program, offers customers a convenient way to pay for upgrades through several products and incentives. The program aims to further innovate in the future by selling these bill-pay-based loans into a secondary market as a bundled security. OBR loans are originated by Energy Finance Solutions (EFS) and serviced by Concord Servicing Corporation.

While OBR options are available for NYSERDA's residential and commercial customers, this study addresses only the residential option.[147]

[147] Unless otherwise noted, all information in this profile is from: Pitkin, Jeff. "Green Jobs Green New York and On-Bill Recovery Financing Brief." NYSERDA. October 2013. http://www.ncsl.org/documents/energy/jeffpitkin.pdf

Financing Offer

What are the details of the financing product?

Table 30. Key Details of the NYSERDA OBR Program[148]

Rate	3.49%
Tenor	5, 10, or 15 years (cannot exceed life of measures)
Loan Amount	$1,500 to $25,000
Conditions	• 5-, 10-year tenor have $25,000 maximum; 15-year tenor has $13,000 maximum • Monthly payment cannot be more than 1/12 of the estimated yearly savings

Does the program offer credit enhancements?

Because NYSERDA uses its own funds, no credit enhancement is necessary. NYSERDA used $75 million in grant and RGGI funds to establish a revolving loan fund that provides capital for the OBR program. NYSERDA securitizes and sells the OBR loans in order to grow the fund and "revolve" it more rapidly.

Overlapping Incentive Programs

What overlapping incentives are offered?

The NYSERDA HPwES program allows 10% cash back as well as multiple financing options, including the OBR program described here. Additional incentives are available from NYSERDA for low-income participants.

The individual utilities also offer their own rebates, primarily for equipment upgrades.[149]

How does the financing integrate with the incentive program(s)?

The NYSERDA financing and the utility rebates are co-marketed. NYSERDA cash incentives are intended for those few measures for which the utilities do not offer incentives. Customers cannot access both a utility and a NYSERDA incentive for the same measure, although they can combine utility incentives and NYSERDA financing for the same measure.[150]

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[148] Pitkin, Jeff. "Green Jobs Green New York and On-Bill Recovery Financing Briefing." NYSERDA. July 2011.

[149] The law required that the following utilities participate in the OBR program: Central Hudson, Con Edison, Long Island Power Authority, National Grid (upstate New York customers only), New York State Electric and Gas Corporation, Orange & Rockland, Rochester Gas and Electric.

[150] Ahearn, J., NYSERDA Program Manager, personal communication, January 2014.

Is financing intended to eventually replace cash incentives?

Program staff members consider incentives and financing together to be the most effective approach to generating interest in the OBR program.[151]

How has available financing affected participation in related incentive programs?

NYSERDA staff have witnessed that offering incentives in combination with financing seems to be the best marketing approach. The incentives are viewed as an "interest-generator," while the financing helps close deals for energy-efficient projects that might not otherwise happen. About 35% of HPwES projects take advantage of the financing.[152]

In addition, program data shows that financed projects tend to be larger than non-financed projects, especially for on-bill loans. Both the traditional unsecured loan and the on-bill loan projects are larger than HPwES projects that do not use financing, and the OBR-financed projects average about $1,000 higher than the unsecured loan projects.[153]

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

The program allows for two types of borrower eligibility. The first type, or "Tier 1," are loans that are bundled and sold on the secondary market. Borrowers submit to a standard credit review, requiring the following:

- Minimum credit score of 640
- Debt-to-income ratio less than 0.5
- No bankruptcies in previous seven years
- No outstanding judgments greater than $2,500

Tier 2 loans use customer bill-pay history. Applicants must comply with these criteria:

- Be current on mortgage for previous 12 months
- Be current on utility bill for at least two consecutive months in each of two previous years
- Have a debt-to-income of 0.7 or less (100% allowed if customer qualifies for low-income subsidies)
- Have had no bankruptcies in past five years
- Have no outstanding judgments over $2,500

[151] Ahearn, J., NYSERDA Program Manager, personal communication, January 2014.

[152] Ibid.

[153] Ibid.

Tier 2 loans are held in the revolving loan fund until their performance can be demonstrated, after which NYSERDA plans to bundle and sell them on the secondary market.

How does the average borrower score on these criteria?

Table 31. Average Credit Score for NYSERDA

	Tier 1	Tier 2
Average credit score	752	728

Both Tier 1 and Tier 2 borrowers can apply for either the unsecured or the OBR loan product. The average loan size for the OBR projects is about $1,000 higher than the unsecured project, across both tiers.[154]

What other eligibility requirements are there?

The borrower must be a customer of a utility participating in the OBR program.

Long-Term Loan Performance

What is the cumulative default rate?

In September 2013, OBR delinquency rates were 8.13% for Tier 1 and 5.4% for Tier 2. This was significantly higher than for the unsecured product, which had delinquency rates of 1.29% for Tier 1 and 4.23% for Tier 2.

Charge-offs for loans are much lower. After 21 months of operation, charge-offs of total dollars issued (not number of transactions) are 0.50% for Tier 1 and 0.59% for Tier 2. Charge-offs for the more established unsecured program are 0.39% for Tier 1 and 1.45% for Tier 2.

What collection procedures are in place?

The borrower is subject to termination of service for nonpayment. Payment of the loan installment is subordinate to the utility collection for services.

Is the loan transferable upon sale of the property?

The loan is recorded through a "program declaration" instead of a lien on the property. This ensures that the potential buyer is aware of the loan. The buyer is allowed to require settlement of the loan prior to the property sale but may also take on the loan through the sale if desired.

At what point is a loan considered to be in default?

The loan is subordinate to the utility service payment. After 90 days of nonpayment of the loan portion of the monthly bill, the loan is considered in default. [155]

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[154] Ahearn, J., NYSERDA Program Manager, personal communication, January 2014.

[155] Ibid.

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

Projects must consist of measures identified in an audit that can generate annual cost savings greater than 12 monthly loan payments. Projects must be completed using a program-authorized contractor.

What criteria are used to establish measure eligibility?

Measures must be identified through a comprehensive audit and have included a broad array of HVAC, building shell measures including windows, water heating measures, and kitchen and home appliances.

Contractor Network

Does the program have a dedicated contractor network?

The HPwES program has a network of authorized contractors.

What are requirements for contractors?

To be an affiliated contractor, a business must possess Building Performance Institute, Inc. (BPI), certification or accreditation.

Is the network shared with other programs?

NYSERDA maintains its own HPwES contractor network. The utilities do not maintain lists of registered contractors for their prescriptive rebate programs, and they do not require that a contractor participate in the NYSERDA programs.[156]

Do program managers feel the network is a key element of program success?

GJGNY legislation ensured that the energy-efficiency programs in New York operate with an eye toward developing the energy-efficiency market sector and generating "green" jobs for contractors and related professionals.

The program offers incentives to contractors who sell HPwES work, though the project does not need to be financed for the contractor to qualify. Additional incentives are available for contractors who subcontract work to other businesses, which encourages contractors to develop relationships with other businesses and to package multiple measures for customers.

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

The program has commissioned a process evaluation from a third-party evaluator.

What metrics and researchable questions have program managers used to evaluate the program?

In 2012, NYSERDA conducted the first evaluation of the programs launched in compliance with GJGNY.[157] The evaluation consisted of a process evaluation and market characterization of NYSERDA's

[156] Ahearn, J., NYSERDA Program Manager, personal communication, January 2014.

residential programs. The report used contractor surveys to establish baseline market conditions for HPwES project financing. It also included surveys with participant, nonparticipant, and low/moderate income customers to investigate any barriers to entry.

Contractors reported that roughly one-third of their customers used cash, one-third used a GJGNY loan product (several are offered), and the remaining one-third used credit cards or some other kind of financing. Residential surveys found that customers still noted the high costs of retrofits as one of the primary barriers to participation. The report did not include an analysis of the cost-effectiveness of loans or a quantitative analysis of their impact on participation.

The NYSERDA GJGNY Annual Report for 2013 reports that NYSERDA plans three major third-party evaluation efforts for 2013.[158] These include a jobs impact assessment for the GJGNY portfolio, an evaluation of the community-based organization outreach program, and a process evaluation and market characterization for the small business initiative that is similar to the study of residential programs conducted in 2012.

NYSERDA staff reported that they are in the early stages of evaluation planning for 2014 and beyond.[159] Program staff and stakeholders are interested in determining the relative effect of the financing programs on customer behavior, but do not have a plan in place to evaluate it.

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?

NYSERDA has not evaluated the OBR program for cost-effectiveness. The program is scheduled to receive an interim evaluation in 2014, but that effort will not include an analysis of cost-effectiveness or impact on HPwES participation.

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157 NMR Group. *Process Evaluation and Market Characterization and Assessment*. Prepared for NYSERDA. September 2012. Accessed online February 2014: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CDIQFjAB&url=https%3A%2F%2Fwww.nyserda.ny.gov%2FEnergy-Data-and-Prices-Planning-and-Policy%2FProgram-Planning%2FGJGNY-Planning%2F-%2Fmedia%2FFiles%2FEDPPP%2FProgram-Evaluation%2F2012ContractorReports%2F2012-GJGNY-MCA-Report.pdf&ei=aVENU6i4DtDvoASS5IDICg&usg=AFQjCNEiDY93zolkRWSCx3H7WdbTqH1glw&sig2=6P0niV104oJS7-mxjsuwLg&bvm=bv.61965928,d.cGU&cad=rja

158 Green Jobs – Green New York 2013 Annual Report, NYSERDA, October 2013. Accessed January 23, 2014. http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CDEQFjAB&url=http%3A%2F%2Fwww.nyserda.ny.gov%2FPublications%2FProgram-Planning-Status-and-Evaluation-Reports%2F-%2Fmedia%2FFiles%2FEDPPP%2FPlanning%2FGJGNY%2FAnnual-Report-GJGNY%2F2013-gjgny-annual-report.pdf&ei=dLfhUsK4G8yGoQTYuYHgCQ&usg=AFQjCNHh5DFuQUjxqLu4x2PIneqQ4PoIng&sig2=HERatOISRtXJ1AQpwQzjGg&bvm=bv.59930103,d.cGU&cad=rja

159 Ahearn, J., NYSERDA Program Manager, personal communication, January 2014.

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

In addition to OBR, NYSERDA is offering other financing programs funded from grants and the RGGI auctions along with its usual ratepayer-funded incentive programs. NYSERDA is interested in the particular savings contribution of each program, but it has not yet addressed the question of attribution.

To date, financing and rebate programs have been evaluated separately. All savings from affiliated projects are reported for each program, with a footnote that savings may be duplicated across reports and across programs.

How does the program relate to other loan products already in the market?

NYSERDA views the loan programs as options for consumers. Consumers should use whatever option works best for them. If they make an energy-efficiency upgrade and take advantage of available incentives, the utility will be able to count the savings. [160]

Program Results

What are the program results to date?

Table 32 shows program results from January 2012 to Sept. 30, 2013.[161]

Table 32. Program Results for NYSERDA OBR Program

	Tier 1	Tier 2	Total
Number of projects	983	113	1,096
Loan Volume	$10,451,920	$1,093,284	$11,545,204
Average Loan	$10,633	$9,675	$20,308

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

NYSERDA staff have noted several areas of the program design where improvements could still increase program uptake. For 2014, staff are addressing the issue of delays in approving products due to bulky, difficult–to-use modeling software.

NYSERDA is one of a handful of programs around the country that is currently working with software providers to implement programs whose output matches the Home Performance-Related Data Transfer (Home Performance XML or HPXML) format developed by BPI and other partners. Improving the

[160] Ahearn, J., NYSERDA Program Manager , personal communication, January 2014.

[161] Pitkin, Jeff. *BetterBuildings Residential Network Financing Peer Exchange Call Series: Lessons from On-Bill Financing and Repayment Programs.* NYSERDA. October 2013.

software will allow NYSERDA to automate and speed up the application process so that the project can be approved when the contractor is in the customer's home.

Staff are also working with the lenders to improve loan approval time. EFS, the underwriter for the OBR program, is developing a new online portal that will allow customers to obtain pre-approval directly and then, when the contractor is in the customer's home, will allow the contractor to issue loan documents after project approval.

Staff expect these changes to make the program more popular with contractors, who are critical drivers of the program.[162]

What did not succeed, and what lessons have program managers learned?

Bundling loans for sales to secondary investors has been a major capital generator for the OBR program. Though starting with a revolving loan fund of $50 million, the program now has a $75 million capacity following the first round of sales of program loans. Staff members expect this option to continue to allow the program to grow in the future.

However, program staff have noted that the on-bill loans could be viewed as more valuable by investors if the loans were not entirely subordinated to the monthly service charge on the utility bill. If customer payments were divided in *pari passu* between service charges and loan payments, investors could be even more assured of regular payments. This is an issue NYSERDA may address in the future.[163]

[162] Ahearn, J., NYSERDA Program Manager, personal communication, January 2014.

[163] Ibid.

Windsor Efficiency PAYS

Program	Efficiency PAYS
Type of Implementer	Municipal utility
Region	Windsor, California
Coverage	Town of Windsor residential water customers
Target Market	Residential
Program Start Date	October 2012 – June 2014[164]

The Windsor Efficiency PAYS® program (Windsor PAYS), available to water utility customers in the Town of Windsor, was designed to encourage both water and energy conservation. Launched in October of 2012, the city designed the program using a $665,000 grant from the U.S. Department of Energy BetterBuildings Neighborhood Program given to the Sonoma County Regional Climate Protection Authority (RCPA) for an on-water-bill financing pilot.[165] While all water utilities in Sonoma County were eligible to apply for funding, the Town of Windsor was the only utility the decided to move forward with a pilot.

The program helps participants afford the costs of water- and energy-saving measures by providing no-upfront-cost financing that is paid back by a bi-monthly on-bill surcharge, with the savings achieved on utility bills intended to be greater that the surcharges collected.

Windsor PAYS fills a gap in the energy-efficiency financing market for projects up to $2,500. Projects larger than $2,500 are already covered under the Sonoma County Property Assessed Clean Energy (PACE) program.[166]

The program is designed to be self-funding. The Town uses a "water enterprise fund" capitalized from Windsor's General Capital Improvement fund, to pay invoices from contractors and other costs. Residents pay back their financing, which includes the cost of measures, the certification fee, and a program activity charge, through a surcharge added to their water bill to cover program costs.

PAYS is a trademarked program that requires that the monthly cost of the measures financed cannot exceed 75% of the estimated monthly savings. Therefore, the transaction is immediately cash-positive for the borrower.[167]

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[164] Cadmus. *Process Evaluation for Tariffed On-Water-Bill Pilot.* Prepared for Los Angeles County. 2013. (Cadmus reviewed the Town of Windsor program as an activity in the scope of the evaluation for Los Angeles County.)

[165] Ibid.

[166] Ibid.

[167] Unless otherwise noted, all information in this profile is from the PAYS program website: http://residential.sonomacountyenergy.org/lower.php?url=windsor-pays

Financing Offer

What are the details of the financing product?

Table 33. Key Details of the Windsor Efficiency PAYS Program[168]

Rate	An "activity fee" of 7% of the project cost is incorporated in the customer's monthly surcharge using an APR-like formula. There is no monthly interest rate.
Tenor	5, 10 or 15 years depending on the measure
Loan Amount	Up to $2,500
Conditions	• No upfront payment, except for certain co-pay measures • No liens

Does the program offer credit enhancements?

For any defaults, the Sonoma County Water Agency (SCWA) has created a $250,000 reserve fund to cover losses, to which the Town of Windsor may submit bad debt for reimbursement.[169]

Overlapping Incentive Programs

What overlapping incentives are offered?

The Town of Windsor does not offer other incentive programs, but its program areas overlap with that of both the Sonoma County Energy Independence Program (SCEIP) and the Energy Upgrade™ California (EUC) incentives through PG&E which services Windsor. The SCEIP is a PACE program, which allows customers to finance the cost of major retrofits of at least $2,500. The EUC Home Upgrade and Advanced Home Upgrade programs offer incentives for major retrofits that achieve high savings targets, such as a 15% reduction in airflow for air sealing or insulating to at least R-30. Higher incentives, up to $4,500, are available for residents whose homes achieve a 45% reduction in overall energy use.[170]

How does the financing integrate with the incentive program(s)?

The Windsor PAYS program accommodates much smaller projects than those targeted by the SCEIP and EUC (under $2,500). While program incentives do not overlap, the various programs are all promoted on the SCEIP website.

Is financing intended to eventually replace cash incentives?

This pilot program was designed to fill a gap in the financing market for smaller projects. It does not offer cash incentives.

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168 Cadmus. *Process Evaluation for Tariffed On-Water-Bill Pilot.* Prepared for Los Angeles County. 2013.

169 Ibid.

170 Energy Upgrade California Home Upgrade website, Sonoma County page. Accessed December 16, 2013. https://energyupgradeca.org/county/sonoma/incentives#h-ic=1192408142&p-ic=1&per-ic=10

How has available financing affected participation in related incentive programs?

The sponsoring organization, RCPA, does not offer a rebate program, and it did not have one in place before the financing option was launched. The Windsor PAYS program may have impacted the uptake of the EUC rebates in the Windsor area, but the program does not track this activity.

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

Credit rating does not impact customers' eligibility to participate in the program; however, customers must be current with their water bill and continue to remain in good standing as long as they are participating in the program.

How does the average borrower score on these criteria?

By definition, all borrowers are current on their water bills.

What other eligibility requirements are there?

The borrower must be a resident of the Town of Windsor, California. Both homeowners and renters may participate, as long as the participant is responsible for paying both water and Pacific Gas and Electric (PG&E) energy bills and with permission of the property owner.

Long-Term Loan Performance

What is the cumulative default rate?

The program has not had any loans default to date. The program coordinator considers this to reflect the fact that the program is still very new at the time of this review.[171]

What collection procedures are in place?

The finance surcharge is subordinate to the water and sewer charges. If the customer fails to pay off the entire bill (bills are sent bi-monthly), the utility has the authority to disconnect service according to the Sonoma County Water Agency's standard procedure.[172]

Is the loan transferable upon sale of the property?

The repayment is tied to the property. If a customer moves, he or she must pay off the balance of any compact fluorescent light bulbs (CFLs) — it is suggested they be taken when the customer moves. The remainder of the surcharge (if any remains) becomes the obligation of the new resident. If the property is rented, the landlord is required to disclose the reason for the surcharge to renters because it will become the new renter's responsibility.

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[171] Piazza, P., Water Conservation Program Coordinator, Town of Windsor, personal communication, February 2014.

[172] Cadmus. *Process Evaluation for Tariffed On-Water-Bill Pilot.* Prepared for Los Angeles County. 2013.

At what point is a loan considered to be in default?

When the account is 31 days past due, it is considered delinquent. A collection notice is sent on day 41 and, if there is no response by day 47, the Town of Windsor may submit the bad debt to the Sonoma County Water Agency for reimbursement.[173]

Eligibility of Measures and Projects

What criteria are used to establish project?

A Windsor PAYS program Certified Contractor must perform the installation in order for the project to be eligible. The measures to be installed, as a package, must meet the 0.75 cost-to-savings ratio required by PAYS.

What criteria are used to establish measure eligibility?

The customer will work with a contractor to determine eligibility for upgrade measures, based on the customer's water and power usage. Eligible measures for the program include:

- Basic Package: low-flow toilets, low-flow showerheads, faucet aerators
- Basic Plus Measures: drought-resistant landscaping, high-efficiency clothes washer, CFLs
- Co-pay Measures (additional upgrade measures requiring some upfront payment): high-efficiency refrigerator, on-demand hot water recirculation pump, luxury clothes washer/dryer, enhanced drought-resistant landscaping.

Contractor Network

Does the program have a dedicated contractor network?

The program used an RFP process to hire a lead contractor, and also maintained an open network of Certified Contractors that could install appliances or landscaping improvements. The lead contractor is responsible for assessing the customer's property to determine appropriate measures. The lead contractor also installs plumbing and hot water upgrades and CFLs, and refers the customer to a program-authorized "secondary contractor" if applicable. Secondary contractors are most likely appliance vendors or landscaping contractors, as those are the measures eligible through the pilot that are not installed by the lead contractor. Secondary contractors may also install indoor measures, and perform any work that exceeds the lead contractor's capacity. A limited number of contractors joined the pilot.[174]

What are requirements for contractors?

The lead contractor had to submit a competitive proposal, and agree to meet special insurance and marketing requirements. "Secondary contractors" only had to sign a contractor agreement, agreeing to

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[173] Ibid.

[174] Cadmus. *Process Evaluation for Tariffed On-Water-Bill Pilot.* Prepared for Los Angeles County. 2013.

adhere to all program protocols, and provide certificates of insurance that meet the Town of Windsor's standards.[175]

Is the network shared with other programs?

The program maintains its own network of contractors, and that network is not leveraged by any other programs.

Do program managers feel the network is a key element of program success?

The Windsor PAYS program was designed for contractors to take on the majority of marketing for the program. So far, contractors have been reluctant to engage their own resources in marketing the program, despite language to that effect in the program agreement. The program manager believes that the low number of participating contractors contributes to the problem. There is little competition, and therefore no sense of urgency to learn how to better incorporate the program into their existing business models.[176]

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

The RCPA hired Cadmus to perform a process evaluation of the Windsor PAYS pilot program in early 2013, but the program does not have any plans for another third-party evaluation.[177]

What metrics and researchable questions have program managers used to evaluate the program?

The process evaluation focused on the response from partners, customer satisfaction, potential for spillover effects, and capturing lessons learned from the experience.[178]

The RCPA did not commission an impact analysis.

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?

The Town of Windsor is investigating how to evaluate cost-effectiveness. They are debating issues such as the useful life of several of the measures. There is less data available for some of the Windsor PAYS measures than the energy saving measures in other programs.[179]

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175 Ibid.

176 Piazza, P., Water Conservation Program Coordinator, Town of Windsor, personal communication, February 2014.

177 Ibid.

178 Cadmus. *Process Evaluation for Tariffed On-Water-Bill Pilot*. Prepared for Los Angeles County. 2013.

179 Piazza, P., Water Conservation Program Coordinator, Town of Windsor, personal communication, February 2014.

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

The Town of Windsor does not offer other programs that would overlap with Windsor PAYS, so there is no need to attribute savings. The program does not plan to evaluate freeridership or spillover.

How does the program relate to other loan products already in the market?

According to the program coordinator, the Windsor PAYS program does not compete with private sector loan products. The program does not consider the financial assistance available through Windsor PAYS to be a loan because the purpose is not to recover interest off the loan, and the money distributed is repaid through a surcharge on the utility bill, not a separate servicer.[180]

Program Results

What are the program results to date?

Table 34 shows the number of completed projects for single family homes, as well as the total loan volume (which includes multi-family projects). Average loan size was not available. The data in the table covers the period October 2012 through January 2014.

Table 34. Windsor PAYS Program Performance[181]

Number of Projects	195 homes (single-family)
Loan Volume	$332,400 (Includes some multi-family projects)
Average Loan	Unknown (number of multi-family projects unknown)

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

The 2013 evaluation found that while several utilities in Sonoma County were interested in pursuing a PAYS pilot program, not all had the resources to do so. Only two were able to put together a potential program design, one of which was the Town of Windsor Water utility. The second utility was unable to move their program forward because they did not have sufficient staff time, financial resources, or IT/billing infrastructure. Windsor had all of these, in addition to political support from the utility's decision makers. [182]

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180 Data provided by P. Piazza, Water Conservation Program Coordinator, Town of Windsor.

181 Ibid.

182 Cadmus. *Process Evaluation for Tariffed On-Water-Bill Pilot*. Prepared for Los Angeles County. 2013.

What did not succeed, and what lessons have program managers learned?

Staff at the Sonoma County Water Agency, which oversaw the town of Windsor water utility's implementation of the pilot, was surprised at the number of hours they were required to dedicate to the program, even for this small pilot exercise.[183] Additionally, the program coordinator noted that, in a program where contractors are expected to take on the responsibility for marketing, it is important to involve as many contractors as possible. He noted that their first contractor did not start performing the contractually obligated marketing activities until a second contractor came on board and provided competition.[184]

[183] Ibid.

[184] Piazza, P., Water Conservation Program Coordinator, Town of Windsor, personal communication, February 2014

Power Smart™ Residential Loan Program (Manitoba Hydro,Canada)

Program	Power Smart Residential Loan Program
Type of Implementer	Utility
Region	Manitoba, Canada
Coverage	Manitoba Hydro customers
Target Market	Residential
Program Start Date	March 2001[185]

The Manitoba Hydro Power Smart Residential Loan program allows customers to finance home energy-efficiency improvements using on-bill repayment. It is one of several financing options that Manitoba Hydro offers to its customers, in addition to the Affordable Energy Program for lower income households, a pay-as-you-save (PAYS) financing program, the Energy Finance Plan Loan for upgrading electrical systems, and the Earth Power Loan for geothermal heat pumps and solar water heaters. [186]

The Power Smart Residential Loan allows Manitoba Hydro customers to bundle multiple upgrades (such as insulation, windows and doors, and heating equipment) as long as they meet or exceed recommended levels, but unlike the PAYS program, it does not require a specific savings-to-cost ratio.

Instead of partnering with local financial institutions, Manitoba Hydro uses its own capital, originating and servicing the loans internally. Manitoba Hydro has been able to design programs that are "revenue neutral" for the utility, in that costs of capital and administration are covered primarily through the interest collected on the loan portfolio. Costs are kept low by using the corporate interest rate to borrow money and through Manitoba Hydro's long experience administering the program, which streamlines operations.

Per Manitoba Bill 11, the Winter Heating Cost Control Act of 2006, the Power Smart Residential Loan program interest rates are also subsidized through a fund generated by sales of excess electricity.[187]

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185 Morrison, Lois. "Manitoba Hydro Power Smart: Financing Energy Efficiency." PowerPoint presentation. Manitoba Hydro. 2012. Accessed January 7, 2014. http://questcanada.org/sites/default/files/publications/4-A%20Lois%20Morrison,%20Manitoba%20Hydro.pdf

186 Unless otherwise noted, all information is from the Manitoba Hydro website: http://www.hydro.mb.ca/customer_services/financial_programs/energy_finance_plan.shtml

187 Vernaus, P., Manitoba Hydro Residential Marketing Specialist, personal communication, November 2013.

Financing Offer

What are the details of the financing product?

Error! Reference source not found. describes the terms of the loan.

Table 35. Key Findings of the Manitoba Hydro Power Smart Residential Loan Program

Rate	Fixed at 4.8% per cent for the first 5 years, then subject to change
Tenor	The maximum tenor is 5 years; 15 years allowed for high-efficiency natural gas furnace or boiler.
Loan Amount	Up to CA$7,500 (US$ 6,668)
Conditions	• On-bill repayment is required. (The loan is through the utility, so there is no third party to manage servicing the loan.) • Up to CA$5,500 (US$4,891) of the loan may be put toward the purchase of a high efficiency natural gas furnace. • The minimum loan is CA$500 (US$445). • The minimum monthly payment is CA$15 (US$13). • No down payment is required.

Does the program offer credit enhancements?

The utility uses its own capital so no credit enhancement is necessary.

Overlapping Incentive Programs

What overlapping incentives are offered?

Manitoba Hydro cross-promotes the loan program with the Power Smart Home Insulation Program.

How does the financing integrate with the incentive program(s)?

For eligible projects, customers can receive both a cash incentive and a loan to cover the remaining cost. In this case, all of the savings for the rebate-eligible measures are claimed by the incentive program.[188]

Is financing intended to eventually replace cash incentives?

As cost-recovery programs do not impact ratepayers, Manitoba Hydro can allow financing for measures for which it cannot offer rebates. In Manitoba, the provincial government mandated in 2009 that all new furnaces installed be 92% AFUE or higher, and therefore furnace rebates are no longer cost-effective for the utility. They are, however, eligible for financing. Windows and solar photovoltaic panels are also measures that can be financed but for which there is no rebate.

[188] International Energy Agency. *Energy Provider-Distributed Energy Efficiency, Case Study.* 2013. http://www.iea.org/publications/insights/EnergyProviderDeliveredEnergyEfficiency_WEB.pdf

How has available financing affected participation in related incentive programs?

According to Manitoba Hydro staff, the Power Smart Residential Loan Program has resulted in increased participation in the Home Insulation Program.[189] A recent review of the program noted that Power Smart programs providing rebates for insulation and high-efficiency HVAC were actively cross-promoted with the financing program upon their launch in 2005 and 2006. This resulted in high levels of participation in all three programs, an experience that program staff believe helped earn contractor loyalty, even though the insulation program is reduced and the HVAC program is no longer offered.[190]

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

Manitoba Hydro runs a credit check to determine the customer's debt-to-income ratio, which must be less than 60%, and reviews bill payment history. Customers must be current on 10 of the last 12 months. Any customers who are not current on their account may pay their arrears and become eligible to participate.[191]

How does the average borrower score on these criteria?

Average debt-to-income ratio is unknown. All customers must meet the bill pay review.

What other eligibility requirements are there?

The borrower must be the owner of the property to be improved. Manitoba Hydro conducts a title check to confirm the applicant is the owner.

Long-Term Loan Performance

What is the cumulative default rate?

Loan default rate has remained at around 0.4% over the last several years.[192]

What collection procedures are in place?

Manitoba Hydro can disconnect service for nonpayment of the energy bill, which includes the monthly loan payment. The utility can move to disconnect after 120 days of nonpayment, and in some cases, it has the power to enforce via disconnection.[193]

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189 International Energy Agency. *Energy Provider-Distributed Energy Efficiency, Case Study.* 2013. http://www.iea.org/publications/insights/EnergyProviderDeliveredEnergyEfficiency_WEB.pdf

190 Ibid.

191 Vernaus, P., Manitoba Hydro Residential Marketing Specialist, personal communication, January 2014.

192 International Energy Agency. *Energy Provider-Distributed Energy Efficiency, Case Study.* 2013. http://www.iea.org/publications/insights/EnergyProviderDeliveredEnergyEfficiency_WEB.pdf

193 Vernaus, P., Manitoba Hydro Residential Marketing Specialist, personal communication, January 2014.

Is the loan transferable upon sale of the property?

The Power Smart Residential Loan is an on-bill payment financing measure. Loan payment is the responsibility of the owner of the house and not of a tenant. The loan is not transferable and becomes due immediately upon sale of the property.

At what point is a loan considered to be in default?

If a customer declares bankruptcy, or an outstanding balance is deemed uncollectible (generally after 120 days of nonpayment), the loan is also considered in default or uncollectible.

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

Customers work with a qualified contractor to determine if a project is eligible for financing, and contractors will assist with the loan application. No audit is necessary, and audit modeling is not a justification for including a measure that is not listed as eligible by Manitoba Hydro.

What criteria are used to establish measure eligibility?

Measures must meet levels and specifications predetermined by Manitoba Hydro. Any of the following upgrades can be included in a project, provided they meet the program criteria:

- Windows and doors
- Residential space heating equipment (central air conditioning is not eligible)
- Insulation
- Air leakage sealing
- Ventilation
- Residential water heating equipment

Contractor Network

Does the program have a dedicated contractor network?

The program requires contractors to be authorized. Manitoba Hydro does not list eligible contractors on its website, but almost 2,000 contractors and vendors have signed a Participant Supplier Agreement. The agreement requires companies to abide by program rules and submit to periodic quality-assurance checks. The program does not mandate specific training or certification.

What are requirements for contractors?

There are no requirements for contractors beyond signing the agreement.

Is the network shared with other programs?

Contractors register to be part of all Power Smart programs with the same Participant Supplier Agreement.[194]

Do program managers feel the network is a key element of program success?

According to program staff, contractors are viewed as absolutely critical to the program's success. The program is not marketed directly to customers except through contractors.

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

The utility evaluates its program internally.

What metrics and researchable questions have program managers used to evaluate the program?

The finance programs are evaluated for cost-recovery status and energy-savings impact. Claimable savings from finance programs are very small, as the most common measure—heating systems—does not yield claimable savings due to existing regulation.

Since the primary performance target for all financing program is cost-recovery, all expenses are tracked and matched against interest revenue for each program. Annual participation targets and total loan amounts are estimated in order to establish the interest rate that will achieve cost-recovery.

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?

Manitoba Hydro is a quasi-state agency. It is not a regulated investor-owned utility. Like many non-regulated utilities, it is not required to demonstrate cost-effectiveness. The program administrators consider Power Smart a cost-recovery program; it is revenue-neutral in that it is funded through means other than ratepayer funds.[195]

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

Manitoba Hydro does not evaluate freeridership in the financing program, nor does it evaluate the incremental impacts of the financing program on participation in other programs. The utility does perform an evaluation for its incentive programs but not for programs deemed "cost-recovery."

When a customer participates in both an incentive and a financing program, the incentive program claims the savings.

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[194] Vernaus, P., Manitoba Hydro Residential Marketing Specialist, personal communication, January 2014.

[195] Ibid.

How does the program relate to other loan products already in the market?

Financing is considered part of the marketing strategy for the larger Power Smart suite of programs, which include cash incentive programs. The financing products are a sales tool for contractors and give customers confidence that their energy-efficiency goals can be met. In addition, the program offers the convenience of one-stop shopping (rebates and loan in the same place) and billing, and they may be the only financing options for some customers who would not qualify for other products.

Traditional financing products do not offer any awareness or assurances about energy-efficiency upgrades, so Manitoba Hydro does not view them as competitive products. This is fortunate, as Manitoba Hydro, as a crown corporation, cannot legally compete with any private entity.[196]

Program Results

What are the program results to date?

Error! Reference source not found. shows the cumulative program results from March 2001 to July 2013.[197]

Table 36. Program Results for the Manitoba Hydro Residential Loan Program

Number of Projects	64,156
Loan Volume	CA$263 million (US$239 million)
Average Loan	CA$4,700 (US$4,179)
Program Expenditures	CA$796,000 (US$707,744)
Energy Saved (GWh)	7.7
Gas Saved (m^3)	14.6

The Power Smart Residential Loan consistently meets the targets for participation, dollar value loaned, and cost-recovery.

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

According to a representative from Manitoba Hydro, three keys to success have been:

- Over 2,000 retailers/contractors registered to deliver Power Smart financing.

[196] Morrison, Lois. "Manitoba Hydro Power Smart: Financing Energy Efficiency." PowerPoint presentation. Manitoba Hydro. 2012. Accessed January 7, 2014. http://questcanada.org/sites/default/files/publications/4-A%20Lois%20Morrison,%20Manitoba%20Hydro.pdf

[197] Manitoba Power. *2011-2012 Power Smart Annual Review.* November 2013. http://www.hydro.mb.ca/projects/development_plan/bc_documents/pub_095b_attachment_2.pdf

The contractors are the marketing force for the program. The greater the volume of contractors, the greater the participation. By keeping the program simple and contractor requirements minimal, the program has been able to build a large contractor network.

- Convenient on-bill monthly payments.

  The on-bill option is a convenience for customers. Manitoba Hydro provides its customers with a single source for products and services, rebates, and financing, then arranges the loan payment on the bill the customer is familiar with and pays monthly.

- Cost-recovery based interest rates.

  Using the corporate rate for capital keeps interest rates reasonably low. The cost-recovery design gives the program a great deal of flexibility that would be lost if the program tried to switch to an incentive model and offer a rate buy-down.[198]

What did not succeed, and what lessons have program managers learned?

Manitoba Hydro has indicated that managing defaults is key to maintaining low rates, so it regularly corrects its algorithms to spot any potential default indicators in customer billing data.[199]

Additionally, the utility has learned that the customer-contractor relationship means customer service must be high. Although Manitoba Hydro is not legally responsible for contractor errors (part of the Participant Supplier Agreement), it is often involved in the dispute resolution process.[200]

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198 Vernaus, P., Manitoba Hydro Residential Marketing Specialist, personal communication, January 2014.

199 International Energy Agency. *Energy Provider-Distributed Energy Efficiency, Case Study.* 2013. http://www.iea.org/publications/insights/EnergyProviderDeliveredEnergyEfficiency_WEB.pdf

200 Ibid.

Green Deal Program

Program	Green Deal
Type of Implementer	National government
Region	United Kingdom
Coverage	England, Wales, Scotland
Target Market	Residential
Program Start Date	January 28, 2013

The Green Deal program, launched January 28, 2013, provides customers with on-bill financing for energy-efficiency improvements to their homes. The primary Green Deal program operates in England and Wales. A separate program, Green Deal Scotland, operates under a similar design to the program in England and Wales. The Northern Ireland Assembly has not decided how to use its share of Green Deal funds.

The Green Deal was created as one measure to address market failures and barriers to implementation of cost-effective energy-efficiency measures and, in doing so, to help mitigate high energy bills and greenhouse gas emissions. Under the direction of the Department of Energy & Climate Change (DECC), the program was designed to encourage competition among Green Deal providers (partner lenders) to drive participation and encourage larger energy-efficiency projects than would otherwise be affordable for U.K. citizens.

To facilitate this, in 2012, DECC organized the Green Deal Financing Company (GDFC), a not-for-profit consortia of private companies that provides a £244 million (US$403 million) line of credit for Green Deal lenders at a special low rate. This resource helps to keep down the cost of financing for the program.[201]

Green Deal operates according to a "golden rule" that mandates that average utility bill savings exceed the monthly cost to install the financed measures, similar to the pay-as-you-save PAYS® program in the United States. The program is offered on-bill, with the utility making payments directly to the lender.

[201] Unless otherwise noted, all information is from these websites: www.greendealsavingsltd.co.uk and http://www.greendealscheme.co.uk/.

Financing Offer

What are the details of the financing product?

Table 37. Key Details of the Green Deal Program

Rate	7.67% to 9.3%
Tenor	10 to 25 years
Loan Amount	Up to £10,000 (US$ 16,538)
Conditions[202]	• The project must undergo an assessment to ensure it meets program requirements. • Customers may obtain multiple quotes from Green Deal providers, but once a quote is accepted, a contract will be put in place outlining repayment terms. • For tenants, permission must be obtained from the property owner.

Does the program offer credit enhancements?

The GDFC is a nonprofit that lends to Green Deal providers at a 6.96% interest rate. Green Deal providers establish their own interest rates when lending to Green Deal customers.[203]

By integrating financing repayment with the utility bill, the Green Deal program is able to capitalize on the fact that utility bills have a lower rate of default than unsecured consumer loans. Because of this, Green Deal providers can offer widely-accessible funding to Green Deal customers.

Overlapping Incentive Programs

What overlapping incentives are available?

The U.K. government mandated the Energy Company Obligation (ECO) at the same time it instituted the Green Deal program. ECO is a mandate to energy providers to offer incentives to low-income households and for particularly expensive energy efficiency measures that do not meet the Green Deal golden rule standard (that is, average monthly savings would not exceed the average monthly cost to install the measure.)

Energy providers in the United Kingdom are offering programs independently to meet the ECO regulation, and consumers and providers have noted that it is not easy to navigate between the financing and incentive programs. The British government therefore is temporarily offering cash back incentives for households that have a Green Deal assessment and energy-efficiency measures installed by a Green Deal installer. Customers do not have to commit to Green Deal financing to receive the cash back incentive.

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202 Department of Energy & Climate Change. "Final Stage Impact Assessment for the Green Deal and Energy Company Obligation." November 6, 2012.

203 Green Deal Oversight & Registration Body. *Green Deal Finance*. Website accessed February 5, 2014. http://gdorb.decc.gov.uk/providers/green-deal-finance

How does the financing integrate with the incentive program(s)?

Customers can combine benefits from the Green Deal and ECO and government programs. Many Green Deal providers and installers market all benefits side by side. However, customers and installers have found the incentive programs easier to use, and uptake of rebates has been much higher than uptake of financing.

Are incentives being replaced with financing; and is that the long-term vision?

There is no plan to replace the ECO incentives with financing. The Green Deal and ECO programs are intended to be complementary.

How has available financing affected participation in related incentive programs?

Green Deal has had only limited participation in its first year. It is unclear if the program has had an effect on the customer's project size.

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

Borrowers must pass a GDFC credit check, which differs from a standard credit check used for traditional private-sector financing. The credit check is set up to have much less stringent requirements for credit history, such that at least 80% of households would be eligible for the loan.[204] In addition, if borrowers are more than UK£200 (US$331) behind on their utility bill, the utility can flag to the lender that additional credit checks are needed. This rule is intended to allow those most in need of utility bill reductions to take advantage of the program, without adding risk to utilities or lenders.

How does the average borrower score on these criteria?

The program anticipates that approximately 83% of households will pass GDFC credit checks. [205]

What other eligibility requirements are there?

Residents of England, Scotland, and Wales are eligible to participate in Green Deal. Residents of Northern Ireland are not yet eligible to participate.

Long-Term Loan Performance

What is the cumulative default rate?

Due to the fact that the completed projects have only recently begun making repayments, there is currently no data on defaults.[206] However, one of the main rationales for the "golden rule" was to assure investors that the risk of default would be similar to that of electricity bills (i.e., very low).[207]

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[204] LEAP. Green Deal FAQs. Accessed February 6, 2014. Website: http://www.myleapproject.org/energy-advice/green-deal/green-deal-faqs

[205] The Green Deal Finance Company. "Our Finance: The Facts." Website updated 2014. Accessed January 2, 2014. http://www.tgdfc.org/ourfinance

What collection procedures are in place?

The person paying the electric bill at a property financed by Green Deal is responsible for repaying the Green Deal loan. Loans are repaid on bill, and the utility company remits payment to the lender. Customers can have their power disconnected for nonpayment on the loan, but energy suppliers must offer options to customers who are struggling to pay their bills regardless of their participation in Green Deal. Shutting off power supply to households will always be an option of last resort.

Is the loan transferable upon sale of the property?

Repayment of Green Deal loans is "tied to the meter," and the obligation to pay transfer to the new owner upon sale of the property. In addition, tenants are eligible participants. If the tenant moves out, the obligation falls on the landlord.

Landlords or sellers are required to show a copy of the Energy Performance Certificate to prospective tenants or homebuyers. This certificate provides details of the improvements made to the home and how much still needs to be repaid.

At what point is a loan considered to be in default?

A loan is considered to be in default under the same conditions that an energy bill would be considered to be in default.[208]

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

Prospective Green Deal participants must first have a home assessment performed by an authorized Green Deal assessor. Green Deal lenders use the results of the assessment to determine if the project will follow the program's golden rule and therefore be eligible for funding.[209]

What criteria are used to establish measure eligibility?

There are 45 measures eligible for financing through Green Deal. Measures need to follow the golden rule and they must be non-portable. For example, efficient light bulbs are not eligible for the Green Deal because they could be moved to a different property.

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206 Prior-Boardman, P., Executive Director, Green Deal Consortia Ltd., personal communication, January 22, 2014.

207 Department of Energy & Climate Control. "The Green Deal and Energy Company Obligation: Consultation Document." November 2011.

208 Macauley, D., Business Development Mgr, Green Deal Consortia, personal communication. February 2014.

209 The Green Deal Finance Company. "Our Finance: The Facts." Website updated 2014. Accessed January 2, 2014. http://www.tgdfc.org/ourfinance

Eligible measures include a wide variety of heating and insulation measures as well as non-portable lighting systems and renewables such as micro-wind generation and solar photovoltaic panels.[210] Examples include:

- Cavity wall, under-floor, roof, and duct insulation
- High performance external doors
- Air source and ground source heat pumps
- Biomass boilers
- Heating/hot water controls
- Radiant/solar water heating

Contractor Network

Does the program have a dedicated contractor network?

The Green Deal uses a network of contractors who fulfill three roles: assessors, providers, and installers. Green Deal assessors perform energy assessments on prospective customers' homes and recommend potential energy-efficient measures. Green Deal providers offer financing for eligible measures and Green Deal installers install the approved measures. Authorized companies may act in any or all of these roles.

What are requirements for contractors?

Contractors must be authorized by either the United Kingdom Accreditation Service (assessors) or British Standards Institution (installers).

Is the network shared with other programs?

The network is not shared with other programs, but there is considerable overlap with ECO programs. Most Green Deal installers are also offering ECO services.

Do program managers feel the network is a key element of program success?

As noted by program representatives, the small and medium enterprises (SMEs) delivering the program work have not only competed with public limited companies (PLCs) in taking advantage of green growth markets, they have helped create local jobs and stimulate the economy.[211]

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

The DECC plans to perform process and impact evaluations of the Green Deal program in 2015 and 2017.

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[210] British Gas. "Products included in Green Deal." Website updated 2013. Accessed January 2, 2013. http://www.britishgas.co.uk/smarter-living/save-energy/green-deal/products-included-in-green-deal.html

[211] Prior-Boardman, P., Executive Director, Green Deal Consortia Ltd., personal communication, January 22, 2014.

The Green Deal underwent a series of stakeholder consultations prior to its official launch in January 2013. This culminated with an impact assessment, which identified policy objectives and goals, alternative policy options, the target market, and the estimated impacts of the Green Deal and ECO.[212] The assessment also identified program changes that had been made in response to the original proposal, which had been put forth for review in November of 2011. This included increasing consumer protection (through a revised policy on impartiality and protections for lower-level energy users) and an extended list of eligible measures (from 30 to 45 measures), among others.

What metrics and researchable questions have program managers used to evaluate the program?

The upcoming impact evaluation will assess the program's effect on energy consumption, carbon emissions, and "fuel poverty" (the idea that high utility bills contributes to household poverty). The process evaluation will assess how the Green Deal is delivered to understand where adjustments to its implementation may be necessary.

The DECC also publishes monthly reports detailing the numbers of installed measures through the Green Deal and ECO programs.

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?

The program is not required to demonstrate cost-effectiveness. The program's primary objective is to reduce greenhouse gas emissions and to relieve the burden of high energy bills for participants.

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

The program does track participation in both the financing and incentive programs, but it is not evaluating the relative impact of different benefits on household behavior. The government has considered "how customers respond to differing levels and types of incentives, made available by the government's incentive fund" as a research question for future studies, but it has not indicated when or how it will approach the question.[213]

At this point in the program, freeridership and spillover are not evaluated, since the program does not need to meet cost-effectiveness requirements for approval. As stated by one program representative, they are more concerned at this stage with gaining wider acceptance and participation; once the program is more established a deeper evaluation may be warranted.[214]

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213 Department of Energy & Climate Control. "The Green Deal and Energy Company Obligation: Government Response to the November 2011 Consultation." November 2011.

214 Macauley, D., Business Development Mgr, Green Deal Consortia, personal communication, February 2014.

How does the financing program relate to private-sector loan products already in the market?

The goal of Green Deal is to move the market toward easier acceptance of energy efficiency, by overcoming market barriers related to the upfront cost of measures and the lack of consumer understanding.

Program Results

What are the program results to date?

Error! Reference source not found. presents results for the Green Deal program from its inception January 2013 through November 2013.

Table 38. Program Results for Green Deal[215]

Number of Assessments	117,454
Number of Installed Projects	548
Green Deal Plans in Process	1,478[216]

IN November 2013, the program had an additional 1,020 projects underway but not yet complete. The DECC set an initial target of signing up 10,000 homes in 2013 and 14 million homes by 2020.[217] Some critics are claiming that the disparity between the number of assessments and completed projects is evidence that households are not finding the program attractive in its current form.[218]

What other data is tracked in regard to the program impact?

The DECC is attempting to identify the impact that the Green Deal and ECO programs have on different market segments, and households for which utility bills represent a significant expense.

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215 Department of Energy & Climate Change. Domestic Green Deal and Energy Company Obligation in Great Britain, Monthly Report. December 19, 2013. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267957/Monthly_Statistical_Release_-_Green_Deal_and_Energy_Company_Obligation_in_Great_Britain_-_19_December_2013.pdf

216 Of the 1,478 plans in process, 448 were "new" (quote accepted), 572 are categorized as "pending" (the loan agreement is signed but measures have not been installed yet), and 458 were "live" (all measures installed).

217 This estimate appears to have been revised downwards over the past year, replaced with the less specific term "millions of households."

218 Wright, Oliver. "Exclusive: Government's 'Green Deal' energy efficiency scheme is so 'complex' it deters homeowners from signing up." The Independent. October 9, 2013. http://www.independent.co.uk/environment/green-living/exclusive-governments-green-deal-energy-efficiency-scheme-is-so-complex-it-deters-homeowners-from-signing-up-8869770.html

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

Despite the fact that many people feel the program is not delivering (in its current form) as well as it might, the number of Green Deal assessments per month continued to rise through the end of 2013.[219] Program representatives attribute customer interest to recent energy price hikes, as well as to the financing plan that eliminates upfront costs.[220]

What did not succeed, and what lessons have program managers learned?

Green Deal was launched at a national scale just eight months after the launch of seven city-wide pilot efforts.[221] The result has been a very rocky ramp-up period, with obvious consumer interest evident in the number of audits completed but very little uptake of the financing package. (ECO incentive programs have been much more successful, installing over 330,000 measures in the first year.) In hindsight, the Green Deal program might have benefitted from a staged launch, starting at pilot scale and expanding slowly as design issues were identified and addressed.

Additionally, Green Deal is currently undergoing another cycle of program changes, based on lessons learned. While still in process, the review is focusing on the following areas:[222]

- Adjusting what can be borrowed under the current golden rule process
- Investigating "blending" the Green Deal, ECO, and new subsidy schemes to help customers get the best possible deal
- Minimizing the number of home visits involved in the assessments, installations, and final audits
- Improving customer support
- Providing clear information about the different government-sponsored schemes available

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219 Prior-Boardman, P., Executive Director, Green Deal Consortia Ltd., personal communication, January 22, 2014.

220 Ibid.

221 Business Green staff. "Seven cities to host Green Deal pilot projects." Business Green. September 21, 2012. Accessed online Dec. 16, 2013: http://www.businessgreen.com/bg/news/2207288/seven-cities-to-host-green-deal-pilot-projects

222 Prior-Boardman, P., Executive Director, Green Deal Consortia Ltd., personal communication, January 22, 2014.

COMMERCIAL PROGRAMS

Small Business Energy Advantage (The United Illuminating Company)

Program	Small Business Energy Advantage
Type of Implementer	IOU
Region	Connecticut
Coverage	United Illuminating service territory
Target Market	Small commercial
Program Start Date	United Illuminating launched the SBEA program in 1993. In 2000, the program added a financing option.[223] (This profile addresses the period from 2000 to the present.)

One of the longest-running energy-efficiency financing programs in the United States, the Small Business Energy Advantage (SBEA) program is administered by The United Illuminating Company (UI) and funded by the Connecticut Energy Efficiency Fund (CEEF). Another utility, Connecticut Light & Power (CL&P), also offers a SBEA program; the two programs are similar in design but administered separately by their respective utility sponsors.[224]

UI's SBEA program offers both cash incentives and interest-free loans to businesses that complete eligible energy-efficient retrofit projects on their property. The program has served more than 25% of UI's small business customers since 2000, making it one of the most successful energy-efficiency financing programs in the United States, measured by percentage of customers impacted.[225]

Financing Offer

What are the details of the financing product?

Table 39. Key Details of the UI SBEA Program

Rate	0%
Tenor	Up to 48 months
Loan Amount	$500 - $100,000
Conditions	Loan cap determined by customer peak kW usage for many measures.

[223] Gandhi, Nikhil. "On-Bill Financing of Small Business Energy-Efficiency: An Evolving Success Story." Paper presented at ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, Calif. 2008. http://aceee.org/files/proceedings/2008/data/papers/5_382.pdf

[224] Unless otherwise specified, all information is from the Energize Connecticut (CT™) website: http://www.ctenergyinfo.com/about/CEEF

[225] O'Conner, D., SBEA Program Manager, United Illuminating, personal communication, November 2013.

What credit enhancements are available?

UI provides the loan capital. CEEF buys the rate down to 0% from 6.3%, and provides a loan loss reserve (LLR) of 1%.[226] UI can recover 100% of losses from the LLR fund, pending a review by Connecticut's Public Utilities Regulatory Authority, as long as the default rate remains below 1%.[227]

Overlapping Incentive Programs

What overlapping incentives are offered?

SBEA reimburses contractors for an energy assessment, and it will cover 30% to 50% of the cost of energy-efficiency retrofit projects. The higher incentives are reserved for projects that install two or more measures and achieve higher savings.

UI also offers rebates outside the SBEA program for businesses that do not require financing.

How does the financing integrate with the incentive program(s)?

As long as the project meets program criteria, businesses can receive incentives without financing if they do not qualify for the loan or do not need financing. UI does offer other prescriptive incentives for customers that do not qualify for the SBEA program. Customers cannot access rebates from multiple programs for the same measure.

Is financing intended to eventually replace cash incentives?

Program staff report that their experience shows that incentives plus financing is the most compelling package. Over the last several years, 98% of SBEA participants have taken advantage of financing. However, during a three-month period when funds were unavailable to support cash incentives, staff saw program activity drop to nothing.[228]

UI is working with Connecticut's Clean Energy Finance and Investment Authority to explore other opportunities for financing energy-efficiency projects, which includes a commercial variation of the Property Assessed Clean Energy (PACE) program.[229] This program style was first implemented in California (the CaliforniaFIRST program).

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[226] O'Conner, D., SBEA Program Manager, United Illuminating, personal communication, November 2013.

[227] Borrelli, Sheri. "Hearing on Financing Efficient Buildings." Testimony to the U.S. Senate Committee on Energy and Natural Resources. June 28, 2012. Accessed December 27, 2013. http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=c2ef48af-369c-4528-b888-7b8584db035a

[228] O'Conner, D., SBEA Program Manager, United Illuminating, personal communication, November 2013.

[229] Borrelli, Sheri. "Hearing on Financing Efficient Buildings." Testimony to the U.S. Senate Committee on Energy and Natural Resources. June 28, 2012. Accessed December 27, 2013. http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=c2ef48af-369c-4528-b888-7b8584db035a

How has available financing affected participation in related incentive programs?
The SBEA program has been in existence for so long that there is no relevant baseline.

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?
Customers must have been in good standing with their utility bills for the most recent six months.[230]

How does the average borrower score on these criteria?
Currently, 94% of applicants qualify for the program.[231]

What other eligibility requirements are there?
Participants of the SBEA program must have an average peak demand between 10 kW and 200 kW. Their peak demand use determines the maximum amount they can borrow.

Participants of certain CEEF programs (Energy Conscious Blueprint program, Natural Gas Energy Efficiency program, and C&I Efficiency Loan program) are not eligible for loans through SBEA.

Long-Term Loan Performance

What is the cumulative default rate?
The default rate for SBEA is less than 1%, just $341,000 as of 2012.[232]

What collection procedures are in place?
Unknown.

Is the loan transferable upon sale of the property?
Approximately 80% of UI's SBEA program customers are tenants. Loans completed through the program are "transferrable and assumable."[233]

At what point is a loan considered to be in default?
Unknown.

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230 Borrelli, Sheri. "Hearing on Financing Efficient Buildings." Testimony to the U.S. Senate Committee on Energy and Natural Resources. June 28, 2012. Accessed December 27, 2013. http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=c2ef48af-369c-4528-b888-7b8584db035a

231 Ibid.

232 Ibid.

233 Ibid.

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

Assessments and retrofit work must be performed by an authorized contractor. The energy savings of SBEA projects should offset the customer's payments. Only retrofits to existing buildings are eligible for SBEA incentives. UI offers other programs for new construction.

What criteria are used to establish measure eligibility?

A wide variety of energy-efficiency retrofit measures are eligible for financing through SBEA. The primary categories for eligible measures include lighting, HVAC, and refrigeration. Other eligible measures are variable frequency drives and air compressors. Customers receive greater incentives for projects that include multiple measures, up to a maximum of 50% off the total project cost.

Contractor Network

Does the program have a dedicated contractor network?

The SBEA program relies on a network of authorized contractors selected through a request for proposal (RFP) process. The list is small relative to other programs, with only 15 authorized contractors as of December 2013. UI reviews each contractor's performance on a quarterly basis.[234]

What are requirements for contractors?

Contractors are selected through an RFP process. The top applicants are selected to join the program.

Is the network shared with other programs?

Contractors apply to both CL&P and UI jointly. They are authorized at the SBEA program level, and can submit projects to both UI and CL&P.

Do program managers feel the network is a key element of program success?

The contractors are the primary drivers of the program. Given the RFP process, small network, and high volume, the program is a lucrative opportunity for contractors. By keeping the pool small, UI can more easily maintain oversight and communications and be assured that contractors will compete to maintain their status in the program.

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

The program has been evaluated over its history, but it does not receive regular evaluations.

What metrics and researchable questions have program managers used to evaluate the program?

The program has been the subject of multiple evaluations over its history, and these reports have differed in their approach. In 2005, UI commissioned a process evaluation that studied the SBEA

[234] O'Conner, D., SBEA Program Manager, United Illuminating, personal communication, November 2013.

program's strengths and weaknesses, barriers to participation, potential markets, and possible program improvements.

A 2007 evaluation conducted by Cadmus analyzed the gross impact of the entire SBEA program, at the state level, and broke out the results by the two utilities, UI and Connecticut Light & Power (CL&P).[235]

Calculation of Program Cost-Effectiveness

How does the program evaluate cost-effectiveness, including the method used?

A third-party evaluator periodically reviews the SBEA program to determine its cost-effectiveness and net-to-gross ratio. The evaluator reviews the program as a whole and does not analyze the on-bill financing separately from cash incentives.[236]

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

The combination of cash incentive and 0% financing is far more affordable than any competing offers on the market, and therefore it is possible that large numbers of customers use the 0% financing despite the availability of other financing products. At the same time, the large numbers of customers participating in the SBEA program likely generate notable spillover effects. Regardless, the program evaluations do not address freeridership or spillover.

How does the program relate to other loan products already in the market?

The cash-plus-financing offer is unique compared to other financing options in the area. This is a long-standing program used by the utility to generate a high level of energy-efficiency retrofits. It is not meant to affect the rest of the financing market.

Program Results

What are the program results to date?

Error! Reference source not found. presents program results from 2000 to 2012.[237]

Table 40. Program Results for the United Illuminating SBEA Program

Number of projects	4,075
Loan Volume	$34.6 million

[235] Cadmus. *Connecticut Small Business Energy advantage Impact Evaluation Report Program Year 2007.* Prepared for Connecticut Energy Conservation Management Board, The Connecticut Light & Power Company, and The United Illuminating Company. 2009. Accessed December 16, 2013. http://library.cee1.org/sites/default/files/library/8832/CEE_Eval_CTSBEA2007ImpactEvaluationReport_24Aug2009.pdf

[236] O'Conner, D., SBEA Program Manager, United Illuminating, personal communication, November 2013.

[237] Borrelli, Sheri. "Hearing on Financing Efficient Buildings." Testimony to the U.S. Senate Committee on Energy and Natural Resources. June 28, 2012. Accessed December 27, 2013. http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=c2ef48af-369c-4528-b888-7b8584db035a

Average Loan	About $10,000

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

The turn-key approach has been the SBEA's trademark since its inception in 1993 and is also its major strength. High incentives and readily accessible, no-hassle financing at 0% interest ensures that the program is not perceived as a financial burden to customers. The financing is structured so savings offset the financing payments almost immediately.

A small network of contractors is well-versed in the program and can effectively guide customers through the process and complete installations. The program offsets up to half the installation cost, and will finance the remainder of the cost, with no upfront payment. The loan term is can be extended up to 48 months, so that payments are offset by savings, leaving a customer's savings account and cash flow virtually unaffected. Customers therefore can participate with very little hassle and few difficult choices.[238]

Program staff views the on-bill feature, combined with tying the loan to the meter, as key to the program's success. Over 80% of the SBEA program's participants are tenants. Allowing them to pass the loan on to the next tenant should they need to change space makes the investment less risky.[239]

Early in the program, the loan term was limited to 24 months. This controlled the cost of interest rate buy-downs for the program, but restricted the measures that would qualify, which reduced the level of interest from potential participants. The program found that when it extended the tenor of the loan from 24 to 48 months, and therefore lowered the monthly payments dramatically, participation nearly doubled.[240]

What did not succeed, and what lessons have program managers learned?

The initial 24-month maximum loan term was too short and reduced customer uptake.

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238 Gandhi, Nikhil, "On-Bill Financing of Small Business Energy-Efficiency: An Evolving Success Story." Paper presented at ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, Calif. 2008. http://aceee.org/files/proceedings/2008/data/papers/5_382.pdf

239 Borrelli, Sheri. "Hearing on Financing Efficient Buildings." Testimony to the U.S. Senate Committee on Energy and Natural Resources. June 28, 2012. Accessed December 27, 2013. http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=c2ef48af-369c-4528-b888-7b8584db035a

240 Bell, Catherine, Steven Nadel, and Sara Hayes. Research Report E118: "On-Bill Financing for Energy Efficiency Improvements: A Review of Current Program Challenges, Opportunities, and Best Practices." American Council for an Energy-Efficient Economy (ACEEE). December 8, 2011. Accessed December 16, 2013. http://aceee.org/research-report/e118

China Utility-based Energy Efficiency Finance Program (IFC)

Program	China Utility-Based Energy Efficiency Finance Program (CHUEE)
Type of Implementer	International Finance Corporation (IFC)
Region	China
Coverage	China, but primarily Beijing
Target Market	Commercial-Industrial
Implementation Period	2006 - 2009 (closed as planned)

Although called a utility-based program, the original model was abandoned early in program implementation. Instead, the China Utility-Based Energy Efficiency (CHUEE) Finance Program worked with large private lenders and dozens of energy service companies (ESCOs) and equipment dealers to promote energy-efficiency financing.[241]

One of the primary goals of the US$215.5 million program was to help develop China's business financial markets to enable them to accommodate energy-efficiency financing more effectively. Chinese lending has tended to be heavily secured by fixed assets, with very short loan tenors. The program wanted to establish a process for underwriting projects that would generate a cash flow and provide a precedent for offering longer tenors that could make projects more affordable.

The program established a specific department for energy-efficiency lending in two participant banks, enhanced relationships between those banks and ESCOs, and built capacity in ESCOs for selling energy-efficiency projects and assisting customers to obtain financing. The program has dealt primarily with large companies.

[241] Unless otherwise noted, all information is from: Independent Evaluation Group (IEG). *Assessing the Impact of China's Utility-Based Energy Efficiency Finance Program, Energy Efficiency Finance.* 2010. http://www.ifc.org/wps/wcm/connect/5c3df8804939016881f4ad849537832d/IEG-CHUEE-EE-Finance-Eng.pdf?MOD=AJPERES

Financing Offer

What are the details of the financing product?

Table 41. Key Details of the CHUEE Program

Rate	Varied by project, not defined by the program
Tenor	Varied by project, not defined by the program
Loan Amount	Project size range: US$500 thousand to US$12 million[242]
Conditions	Projects were required to be approved by program staff, who performed a technical evaluation of the proposal on behalf of the financial institution.

Does the program offer credit enhancements?

International Finance Corporation (IFC), the private sector arm of the World Bank Group, offered a partial loan guarantee to participating lenders. For the first 10% of the lender's outstanding loan volume, IFC covered 75% of any loss. For the remainder of the loan volume, IFC covered 40% of any losses and the lenders the remaining 60%.

Overlapping Incentive Programs

What overlapping incentives are offered?

Several opportunities were available in the market during the period of CHUEE implementation, including additional loan guarantee programs from ICF and individual government grants from the Chinese government. No systematized incentive or financing program overlapped entirely with the CHUEE program.

How does the financing integrate with the incentive program(s)?

This program focused exclusively on financing. As the projects financed tended to be large and complex, each incorporated CHUEE financing with other funding elements, some of which included grants or other subsidized financing.

Is financing intended to eventually replace cash incentives?

Replacing cash incentives with financing was not an objective of this program.

How has available financing affected participation in related incentive programs?

There were no incentive programs that overlapped consistently with the CHUEE market. However, the program did have an impact on customer behavior. Some participants claimed they completed larger projects sooner as a result of obtaining financing. The program financing also enabled smaller companies to implement projects when they otherwise would not have done so at all.

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[242] Kyte, Rachel. *Clean Technology and Energy Efficiency: IFC's Support for Market Transformation*. 2009. International Finance Corporation (IFC). http://www.jbic.go.jp/wp-content/uploads/topics_ja/2009/04/2237/ifc.pdf

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

The program provided banks with technical assistance to develop systems for underwriting energy-efficiency projects that were based more on the proposed cash flow to be generated and the value of equipment to be purchased than on the creditworthiness or fixed assets of the borrower.

Several banking practices were introduced through the program, such as mortgages on equipment, engineering due diligence, risk-weighted interest rates, establishing bank loss reserves and debt service reserves for individual loans, and decentralizing loan approval authority based on a systematized underwriting approach.

How does the average borrower score on these criteria?

The average underwriting criteria, and the average creditworthiness of borrowers, was not reported by evaluators.

What other eligibility requirements are there?

The participating lenders applied their own requirements for lending.

Long-Term Loan Performance

What is the cumulative default rate?

The base-case estimated default rate used to design the program was 4%; nevertheless, by 2010, the default rate remained at 0%. The overall commercial default rate in China in 2010 was 1.14%.[243]

What collection procedures are in place?

Each lender applied its own standard collection procedures.

Is the loan transferable upon sale of the property?

CHUEE loans were standard commercial loans, tied to the receiving individual or corporation. They were not tied to property, and they were not transferrable.

At what point is a loan considered to be in default?

Terms of default were set by the lender partners and not subject to program oversight.

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

Projects were developed by ESCOs, leasing companies, and other equipment providers, with technical support provided by the IFC. The IFC offered sales and financing support to ESCOs and engineering due diligence support to the lenders.

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[243] Institute for Industrial Productivity. *Case Study A: China Utility-Based Energy-Efficiency Program (CHUEE).* 2012. Prepared by Aequero. http://www.iipnetwork.org/IIP-FinanceCaseStudy-A-CHUEE.pdf

What criteria are used to establish measure eligibility?

Projects were designed to generate a cash flow through energy-efficiency savings that would allow the project to be financed. Each project was custom-designed. There were no prescriptive measures.

Contractor Network

Does the program have a dedicated contractor network?

The program worked with over 135 ESCOs; some completed multiple projects through the program while others did not do any. The evaluation estimated that an ESCO that participated in the program had a 31% greater chance of securing financing for a particular project than one that did not. However, these participating ESCOs did not constitute a partner network in that they did not engage in any agreement with the program, other than securing financing for individual projects.

Is the network shared with other programs?

Not applicable.

Do program managers feel the network is a key element of program success?

Not applicable.

What are requirements for contractors?

Not applicable.

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

The evaluation branch of the IFC, the Independent Evaluation Group (IEG), conducted an extensive review of the CHUEE program, including an assessment of the program design, implementation, and achievements relative to goals.

What metrics and researchable questions have program managers used to evaluate the program?

The central evaluation question for the CHUEE program was if it had made a difference in catalyzing financing for energy efficiency projects that contributed to a reduction in greenhouse gas (GHG) emissions. This is a different goal than most programs in the United States, which are geared more directly toward reducing electricity and natural gas consumption.

The evaluation also went beyond the GHG-reduction question to assess if the program made a difference in the market for sustainable energy-efficiency finance in China. The evaluation focused on the effects of these three entities on the energy-efficiency industry:

- Financial institutions that adopt and sustain energy-efficiency financing on a commercial basis
- Market players offering technical services
- Enterprises participating in the CHUEE program

The evaluators used engineering simulations to determine both the level of reduction of GHG emissions due to the projects and the private energy savings that accrued to participants.

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?

The program did not evaluate cost-effectiveness. Although originally designed to work with utility partners, the model was altered early in the implementation phase and had no direct involvement from utilities. Cost-effectiveness is not a requirement for IFC programs.

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

The program has not evaluated freeridership as it is commonly defined in the United States. However, the IEG's assessment determined that 9% of the beneficiaries would not have moved forward with their projects at all without the loans guaranteed by the CHUEE program. This 9% was made up entirely of the small companies with poor access to credit that were the original intended targets of the program. The report further indicated that 68% of recipients would still have moved forward with some parts of their projects, but they would have done less work, or delayed aspects of the project, if they had not received the program loans.

The program was implemented at a time when the Chinese government was acting decisively in favor of energy efficiency, both by making incentives available and by imposing new regulatory standards. This probably increased the level of freeridership, because it may have been relatively easy for companies to get some other kind of assistance if the CHUEE program loans had not been available or they may have been required to proceed regardless.

How does the program relate to other loan products already in the market?

The goal of the program was to make energy-efficiency lending a more established and better understood industry and to encourage more activity in this area outside the program. Spillover was a direct goal of the program design.

Program Results

What are the financing program's results, and over what period of time of operation?

The IEG evaluation noted the following results as of June 2009.

Table 42. Program Results for CHUEE Program

Number of Projects	98
Loan Volume	US$512 million
Average Loan	US$5.7 million

The IEG evaluation report notes that banks would likely have developed energy-efficiency lending without the program, as the government had placed a clear priority on energy efficiency in the country

in general. However, one participant bank, the Industrial Bank, grew its energy-efficiency lending at twice the rate of nonparticipant banks. A second bank, the Bank of Beijing, was already involved in programs to develop its energy-efficiency portfolio before participation with CHUEE, and the effect of this program on its overall energy-efficiency lending is less clear.

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

According to a review by the IIP, CHUEE demonstrated three key elements for success: [244]

- ***"The implementation of CHUEE has allowed the IFC to trigger a sustainable investments circle [in China]."*** The loan guarantee was able to get banks' attention as the program was starting up. Also the program's focus on marketing and technical training, both for complex underwriting and energy efficiency, allowed the program to expand. Following CHUEE, the IFC launched a separate program with new funding that was able to attract a greater number of lender partners, based on CHUEE's success.
- ***"Government support and market readiness are important."*** While other foreign organizations have had trouble working in China in the past due to a complex regulatory environment, the IFC obtained government buy-in through several rounds of discussion as the CHUEE program was being designed.
- ***"Flexibility in the program design and careful selection of private sector partners played an important role in meeting the program objectives. "*** This lesson was learned early on in the program, when it became apparent that the gas utilities selected to participate had no incentive for offering programs to attract new customers. The program modified its design to work with customers, contractors, and lenders, and it was ultimately successful in achieving its primary desired output—to increase the energy efficiency of Chinese industrial operations, and thereby reduce greenhouse gas emissions.

What did not succeed, and what lessons have program managers learned?

Selection of the private sector partners is critical. Program managers found that the loan guarantee was not enough to increase banking activity in energy-efficiency projects. Some banks were not interested because the target market for financing was not a market they typically approached, projected project size was either too big or too small, and some lenders did not offer a reason.

The performance of the CHUEE program's two banking partners was very different, and that may have been a result of how each bank approached marketing. The Industrial Bank used the program to keep existing customers, so it marketed to its current clients. The Bank of Beijing, which struggled more to generate business through the program, used the program to lure new customers.

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[244] Institute for Industrial Productivity. *Case Study A: China Utility-Based Energy-Efficiency Program (CHUEE).* Prepared by Aequero. 2012. http://www.iipnetwork.org/IIP-FinanceCaseStudy-A-CHUEE.pdf

The program was not successful in engaging smaller business. Its original intent was to direct 60% of funding to loans smaller than US$200,000, but in practice the program has a US$5.7 million average loan amount.

The program did not have an exit plan that transferred full responsibility for developing the sector to private businesses. The program's participant banks relied heavily on technical assessments by the program staff. The availability of foreign consultants paid by third parties such as the IFC probably impeded the development of internal engineering due diligence capacity by participating lenders.

Hungary Energy Efficiency Co-Financing Program (IFC)

Program	Hungarian Energy Efficiency Co-Financing Program (Phase I and II) (HEECP)
Type of Implementer	Nongovernmental organization
Region	Hungary
Coverage	Hungary
Target Market	Commercial, including multifamily housing
Program Start Date	1997 – 2005

The Hungarian Energy Efficiency Co-Financing Program (HEECP) was a pioneering financing program launched in 1997. Implemented jointly by the International Finance Corporation (IFC) and the Global Environmental Facility (GEF), the HEECP was intended to create a foundation for commercial sector energy-efficiency financing in Hungary. As is standard for international development projects, the HEECP was operated for a pre-determined 4-year period (in this case, extended once), and then shut down. Based on HEECP's success, rather than fully close the program, IFC chose to merge the program with its Commercializing Energy Efficiency Financing (CEEF) program in 2005. CEEF was basically the same program model but expanded to six countries in eastern Europe, including Hungary. This report covers the period from 1997-2005, the years the program was exclusively operated in Hungary.

The program provided partial loan guarantees, as well as technical assistance to partner lenders and project managers, primarily energy services companies (ESCOs). In the initial phase, the program worked with just two partner lenders, but this was increased to six in the second phase and represented 95% of the energy-efficiency market in the country at the time.

According to a 2008 evaluation by the World Bank, as a result of HEECP Hungary has developed a vibrant energy-efficiency financing sector, with relatively low interest rates and sophisticated lending products.[245]

[245] Unless otherwise noted, all information is from Taylor, Robert P., Chandrasekar Govindarajalu, Jeremy Levin, Anke S. Meyer, and William A. Ward. *Financing Energy Efficiency: Lessons from Brazil, China, India and Beyond.* World Bank. 2008. https://openknowledge.worldbank.org/bitstream/handle/10986/6349/425290PUB0ISBN11OFFICIAL0USE0ONLY10.pdf?sequence=1

Financing Offer

What are the interest rates, tenor, lender security, and other details of the financing products?

Table 43. Key Details of the HEECP

Rate	Varied, lender partners provided capital and set rate
Tenor	Varied, lender partners provided capital and set tenor
Loan Amount	Loan guarantee capped at US$500,000
Conditions	Varied, set by lender partners

Does the program offer credit enhancements?

The HEECP was based on a loan guarantee, capped at a percentage of the loan. IFC initially offered a 50% guarantee for loans for eligible projects, with a maximum guarantee of $500,000. In 2001, the guarantee percentage was reduced to 35%.

The partial guarantee was intended to alleviate some risk, while retaining the lenders' incentive to issue responsible loans and employ effective billing and collection systems. In the initial phase, the program also offered a "first loss reserve," which would cover a portion of the losses incurred by the partner lenders after the guarantee. The reserve was set at 5% of the portfolio.

Overlapping Incentive Programs

What overlapping incentives are offered?

No overlapping incentives were offered by IFC or GEF. Other incentives may have been available from other organizations, but these were not cross-marketed with the loan guarantee.

How does the financing integrate with the incentive program(s)?

Not applicable; the program did not include cash incentives.

Is financing intended to eventually replace cash incentives?

The program was offered for a limited time and has ended.

How has available financing affected participation in related incentive programs?

Not applicable; there was no energy-efficiency program baseline. Uptake of the loan guarantee product was considered successful, and the HEECP is viewed by the international development community as having achieved market transformation: "HEECP provided [technical assistance]…for development and establishment of five specialized financial products. These products have yielded a substantial sustained pipeline of new investment supports by HEECPs partner [financial institutions]…with only a portion of the transactions utilizing the guarantee… Banks are hunting for energy efficiency projects on their own,

are requesting lower levels of collateral and down-payments as they become increasingly familiar with the risks of such projects, and are, at times, financing projects based on cash flow alone."[246]

Borrower Eligibility

What criteria are used to establish borrower creditworthiness?

Underwriting criteria was determined by each participating financial institution, and each conducted its own underwriting and due diligence.[247]

How does the average borrower score on these criteria?

The average borrower profile is not known, but the loans became available to a wider group of borrowers as the program progressed. This broader access was a result of lenders relaxing collateral requirements and basing underwriting more on the potential cash flow of the project.

What other eligibility requirements are there?

The program excluded non-private borrowers and primarily targeted commercial facilities.

Long-Term Loan Performance

What is the cumulative default rate?

The program had no defaults as of 2008.[248]

What collection procedures are in place?

Lenders employed their standard collection procedures.

Is the loan transferable upon sale of the property?

Loans were often secured by the property, but these were not tied to the meter. Loan obligations were not transferrable.

At what point is a loan considered to be in default?

Default status was determined by the agreement between the lender and the IFC. In case of a default, a loss reserve payment was to be released immediately by IFC to the lender.

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246 Taylor, Robert P., Chandrasekar Govindarajalu, Jeremy Levin, Anke S. Meyer, and William A. Ward. *Financing Energy Efficiency: Lessons from Brazil, China, India and Beyond, p174-175.* World Bank. 2008. https://openknowledge.worldbank.org/bitstream/handle/10986/6349/425290PUB0ISBN11OFFICIAL0USE0ONLY10.pdf?sequence=1

247 GreenMax Capital Advisors. *Lessons Learned from Energy Efficiency Finance Programs in the Building Sector:* Prepared for the European Climate Foundation. March 12, 2009. http://www.europeanclimate.org/documents/LessonslearnedfromEEfinance-v2.pdf

248 GreenMax Capital Advisors. *Lessons Learned from Energy Efficiency Finance Programs in the Building Sector:* Prepared for the European Climate Foundation. March 2009. http://www.europeanclimate.org/documents/LessonslearnedfromEEfinance-v2.pdf

Eligibility of Measures and Projects

What criteria are used to establish project eligibility?

Each project was customer-designed for the borrower's facilities. Most projects were implemented by an ESCO or similar contractor, and often the expected cash flow was incorporated into the underwriting for the project.

What criteria are used to establish measure eligibility?

Initially, the HEECP focused on gas boiler replacements. As the program evolved, it expanded to allow lighting, motors, HVAC, automated controls, co-generation systems, and a wide array of other measures for commercial and industrial use, and it also allowed residential and public sector properties to be retrofitted.

Most projects were structured as ESCO transactions so that analysis of the energy savings—and some assurance it would be achieved—was built into the project. Each project was highly customized, and prescriptive criteria were not established.

The program employed a supervisory committee, made up of IFC employees, to review each transaction and approve each loan guarantee agreement. The program worked with dedicated staff in two to six (the number varied over the duration of the program) of the largest banks in Hungary.

Contractor Network

Does the program have a dedicated contractor network?

The HEECP evolved to focus on ESCOs and contractors as key parties to the transaction, allowing them to minimize transaction costs and allowing lenders to rely on energy use analysis conducted by the contractor. However, these companies were not screened or organized as a marketing channel.

What are requirements for contractors?

The program did not develop specific requirements for contractors.

Is the network shared with other programs?

The program did not develop a network.

Do program managers feel the network is a key element of program success?

Program managers found that ESCOs were the most receptive to the program and best able to bring projects to the program.

Process and Impact Evaluation Strategies

Does the program undergo third-party evaluation?

HEECP was examined as part of the evaluation of the CEEF Program in 2010. CEEF evolved out of HEECP and operated in several countries in Eastern Europe.[249]

What metrics and researchable questions have program managers used to evaluate the program?

The ICF and GEF evaluated HEECP and later the CEEF. Evaluations were form-based reports that primarily focused on total investment "triggered by the fund," loan funds disbursed, IFC guarantee funds committed, and the proportion of guarantee funds to loan funds.[250]

For the third-party evaluation of the spin-off CEEF programs conducted in 2010, the assessment focused on assessing energy savings and impact on greenhouse gas emissions and on the level of participation of financial institutions.[251]

Program Cost-Effectiveness

How does the program evaluate cost-effectiveness?

The program, which was not implemented by a regulated utility, did not evaluate cost-effectiveness.

Has the organization attributed savings across multiple programs or evaluated freeridership or spillover?

There were no other programs implemented with the HEECP. The implementer did not assess freeridership or spillover.

How does the program relate to other loan products already in the market?

The objective of the program was to establish and strengthen the commercial energy-efficiency financing sector in Hungary. Spillover, and ultimately market transformation, was a desired outcome of the program.

Program Results

What are the program results to date?

The HEECP was implemented in two phases, marked by significant increases in the funding available to the program. From the first to the second phase, participation increased significantly despite a reduction in the guarantee percentage from 50% to 35%.

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249 Danish Management Group. *Final Process and Impact Evaluation: Commercializing Energy Efficiency Finance (CEEF) and Hungary Energy Efficiency Co-Financing Program (HEECP)*. February 2010.

250 World Bank program evaluation form for HU04 Hungarian Energy Efficiency Co-Financing Program. No date. Accessed January 8, 2014. http://www.isisrome.com/data/mure_pdf/general/HUN10.PDF

251 Danish Management Group. *Final Process and Impact Evaluation: Commercializing Energy Efficiency Finance (CEEF) and Hungary Energy Efficiency Co-Financing Program (HEECP).* February 2010.

Results for HEECP from 1997 to 2005 are shown in **Error! Reference source not found.**.

Table 44. Program Results for HEECP

Number of projects	331 projects
Loan Volume	US$55 million
Average Loan	US$280,967*

* Calculated based on total portfolio and number of individual borrowers.

Elements for Success and Lessons Learned

What do program managers feel are the critical elements of the financing program that have enabled it to succeed?

Technical assistance involving both the development of financing packages and an explanation of the cash flow potential of energy efficiency were critical to the program's success. The lessons learned, in particular by lenders, during the first phase allowed the market to build and begin to generate its own demand, paving the way for increased results with a reduced loan guarantee incentive in the second phase.

Lenders employed strict collateral requirements at the beginning of the HEECP, even with the loan guarantee. They typically required the ownership of leased assets and drawing rights on the ESCOs' bank accounts and borrower collateral and on the borrower's corporate bank accounts. By the end of the program, underwriting placed more emphasis on the cash flow generated by the project, and lenders reduced their collateral requirements.

Lending institutions were heavily engaged in the program and supported it with strong marketing efforts. Program managers saw this as critical to the program's rapid and sustained success.

What did not succeed, and what lessons have program managers learned?

The HEECP was initially intended to address a wide variety of potential borrowers, from homeowners to small business owners to industrial facilities. In the end, the program focused its efforts on bringing ESCOs, leasing companies, and other actors with specialized knowledge of building and equipment efficiency into the program, most of which served the larger commercial/industrial properties within Hungary.

As these partners had a relatively high need for financing, they developed expertise in managing and marketing the financing process as well. This streamlining of operations helped transactions close more quickly, leading to greater program success.