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Innovative Financing Pilot

Additional submitted attachment is included below.

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September 29, 2016

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Via https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=16-OIR-02
California Energy Commission
1516 9th Street
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RE: Renew Financial's Comments on Docket #: 16-OIR-02 Regarding the Potential to Establish an Innovative Financing Pilot to Realize the Objectives of SB 350

Renew Financial supports the California Energy Commission's efforts to identify and overcome barriers to implementing SB 350. We are pleased to submit this document divided into three sections: Introduction; 2) Formal Comments and 3) Supporting Documentation.

I. Introduction

Renew Financial is one of the nation's leading clean energy finance companies. Our comments are based on many years' experience partnering with state and local governments to offer financing programs for energy efficiency, water conservation and renewable energy. We innovated the first PACE financing program in Berkeley, California in 2008 and, together with Pennsylvania and Kentucky, created the Warehouse for Energy Efficiency Loans (WHEEL). In 2015, the inaugural WHEEL transaction established residential energy efficiency loans as a new asset class and was recognized by Environmental Finance as the Energy Efficiency Deal of the Year. We currently administer energy financing programs in California, Connecticut, Florida, Illinois, Kentucky, Maine, Ohio, Pennsylvania and New York.

Clean Water State Revolving Funds

The Water Quality Act of 1987, which amended the Clean Water Act of 1977, established in every state and Puerto Rico a Clean Water State Revolving Fund (CWSRF). The CWSRFs are fully capitalized, and they have broad authority to fund a wide range of projects and activities that improve or protect water quality. Historically, CWSRFs have focused most of their efforts on wastewater treatment facilities, but recent precedents in New York and Pennsylvania have opened the door for CWSRFs to support investments in energy efficiency, renewable energy, water conservation and infrastructure for electronic vehicles. California has one of the largest and most sophisticated CWSRFs in the country, but it does not yet support non-traditional activities that would reduce greenhouse gas emissions and mitigate the effects of global climate change.

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II. Formal Comments

We have one recommendation related to CEC's implementation of SB 350.

Recommendation: An Innovative Financing Pilot to Maximize CWSRF Potential

Pilot Overview

For the purpose of implementing SB 350, in particular Section 2, item 2, which calls for the doubling of energy efficiency savings by 2030; Section 7, which calls for increased understanding of the barriers to access for low-income customers to energy-efficiency and renewable energy; and Section 8, which calls for the implementation of a comprehensive program to achieve greater savings in California's residential building stock—we respectfully recommend that the California Energy Commission (CEC) establish a financing partnership pilot among CEC, the State Water Resources Control Board (SWRCB), the California Advanced Energy and Advanced Transportation Authority (CAEATFA) and the Governor's Office of Planning and Research (OPR). The purpose of the financing pilot is to maximize the existing financing capacity of California's Clean Water State Revolving Fund, which, under existing Federal and State law and regulations, has the authority to finance energy efficiency, renewable energy and other pollution-reduction activities consistent with the objectives of SB 350. However, although the CWSRF has both the capacity and the authority to support SB 350's objectives—as well as an existing process by which eligible applicants can apply for financial support—the CWSRF has neither the mandate nor the personnel necessary to review and approve the types of projects and activities called for in SB 350. To this end, we recommend that OPR lead the multi-agency financing pilot and, with the benefit of CEC's and CAEATFA's existing resources and expertise, provide the CWSRF with additional operational capacity so that it can review and approve at least two critical activities that advance the objectives of SB 350.

Pilot Activities

We recommend at least two pilot activities:

Activity 1: A statewide residential energy efficiency and water conservation program based on the Warehouse for Energy Efficiency Loans (WHEEL)

WHEEL is a proven, award-winning, CWSRF-based program that has already demonstrated its ability to serve low and moderate income homeowners through a broader market-based approach. It has also been approved by US EPA as an eligible use of CWSRF authority. (In Section III, please see attached reports from Energy Programs Consortium and the U.S Environmental Protection Agency.)

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Additionally, in Pennsylvania, Kentucky, New York and Florida, WHEEL has demonstrated its ability to achieve energy-saving and pollution reduction goals in the traditionally hard to reach residential sector. Based on that experience, we project California's WHEEL program could achieve *at least* the following reductions in fewer than two years[1]:

Reductions	18-24 Months
Electricity (KWHs)	9.5 million
Natural Gas or other heating fuels (therms)	647,000
GHGs (tons)	6,100
Sulfur Dioxide (pounds)	1,657
Nitrous Oxides (pounds)	7,729
Water (gallons)	118 million

In addition to substantial energy and water savings, other benefits would include:

- Reduction of a broad range of nonpoint source pollutants and greenhouse gas emissions, including those listed above
- Reduced wastewater flow to treatment plants
- Protection of critical California water bodies like Lake Tahoe and the Delta
- Job creation
- Lower utility bills for participating homeowners

Why Activity 1 is Important

Activity 1 is important for two main reasons. The first reason is that it supports multiple SB 350 priorities at once, especially those detailed in Sections 2, 7 and 8. The second reason Activity 1 is important is that its implementation will establish critical cross-agency linkages and multiple project eligibilities in a way that almost no other pilot activity could. If CEC eventually decides to expand the Innovative Financing Pilot, it will need these eligibilities and cross-agency linkages to be established, understood and functioning well. For example, with the project eligibilities and cross-agency linkages established by Activity 1, CEC could subsequently leverage existing CWSRF authorities to support the following:

1. An e-bus system for commuters in the Central Valley
2. Electronic vehicles for police, firefighters and first responders
3. A first of its kind financing program that enables renters and LMI homeowners to purchase shares in "solar gardens"
4. Building upgrades for energy efficiency and water conservation in every sector
5. Additional projects and activities that mitigate the effects of global climate change

[1] These estimates are based on performance data from WHEEL programs in Pennsylvania, Kentucky, New York and Florida and the following assumptions: 1) Deployment of $100 million of capital through loans to individual homeowners, of which ~ $20M would be invested by the CWSRF; 2) Half of the $100 million would go toward energy efficiency improvements, and the other half would go toward water conservation improvements, which lead to different nonpoint source pollutant reductions.

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Activity 2: The development of a fast-track financing approval process for energy upgrades to low-income multi-family housing

Efficiency upgrades for low-income multi-family housing are typically very difficult to finance. The CWSRF has several tools at its disposal that could overcome some of the most common challenges, but building owners, project developers and investors would find it nearly impossible to navigate the CWSRF's existing application process: it was designed to support the development and improvement of wastewater treatment facilities.

Why Activity 2 is Important

Activity 2 is important for two main reasons. The first reason, similar to Activity 1, is that it supports multiple SB 350 priorities. The second reason Activity 2 is important is that it will establish a process by which the CWSRF's thirty-year old application process can be modified to accommodate specific SB 350 priority activities. For example, CEC could subsequently establish a fast-track application process for the following:

1. Waste-to-fuel projects that convert waste grease collected at wastewater treatment facilities into biodiesel
2. Any of the projects or activities mentioned above that become possible as a result of Activity 1

A Note on CAEATFA

CAEATFA is a critical partner because their participation could make it easier for the CWSRF to leverage private capital, which is an important policy objective.

Conclusion

The Innovative Financing Pilot proposed here could help to maximize the climate change-mitigating potential of California's Clean Water State Revolving Fund. As a result of the pilot, CEC and its stakeholders will be able to leverage private capital in new ways and support hundreds of projects and activities that might not be possible otherwise.

III. Supporting Documentation

1. Energy Programs Consortium, *Energy Efficiency Loans for Low and Moderate Income Households: The Warehouse for Energy Efficiency Loans as a Case Study (WHEEL),* 2016.
2. U.S. Environmental Protection Agency, *State Revolving Loan Fund Support of Energy Efficiency and Renewable Energy Projects: Exploring Opportunities and Innovations*, Workshop Summary, February 19, 2016.

ENERGY PROGRAMS CONSORTIUM

Energy Efficiency Loans for Low and Moderate Income Households: The Warehouse for Energy Efficiency Loans (WHEEL) as a Case Study

September 2016

About the Report

This report was prepared as part of a multiyear project (Residential Energy Finance and the LMI Market) to develop the market for residential energy efficiency and renewable energy loans to increase the number and rate of the retrofits they facilitate. The development and implementation of the Warehouse for Energy Efficiency Loans (WHEEL) program was a key component of this effort.

The project brings together key actors in finance, public energy program design and implementation, including banks and other financial institutions, state, local and utility energy programs, foundations, key intermediaries and contractors. The next step is to bring these actors together more formally by establishing a steering committee to oversee the next stage of our project, specifically to develop market research data to help guide the further development of WHEEL as well as complementary programs across all states.

The report was prepared for Energy Programs Consortium by Cassandra Lovejoy.

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About Energy Programs Consortium

The Energy Programs Consortium (EPC) is a nonprofit based in Washington DC that is focused on developing innovative energy finance programs and multi-state partnership programs among state energy offices. Key initiatives include the development of the Warehouse for Energy Efficiency Loans (WHEEL), a multi-state energy efficiency loan program for single-family homes that in June 2015 was the first group of unsecured residential energy efficiency loans to be packaged and sold in the secondary financial market ("securitized"). EPC's is also working as a technical assistance provider for the U.S. Department of Energy and the World Bank and is developing an analysis for the ClimateWorks Foundation on options for developing a model similar to WHEEL in other countries.

Introduction

Energy efficiency (EE) and energy affordability have been integral to the mission of the Energy Programs Consortium (EPC) since its inception. Since 2010, EPC has worked in collaboration with the Pennsylvania Treasury and Renew Financial to develop and implement an unsecured residential energy efficiency loan and secondary market program (Warehouse for Energy Efficiency Loans, or "WHEEL"). The WHEEL project is groundbreaking because it brings together states, foundations, and the private sector as a multistate public-private-philanthropic partnership sharing resources to support an important societal goal – to help increase the retrofit of the nation's single family housing stock and thereby reduce greenhouse gas emissions.

One of the goals of the WHEEL program is to make energy efficiency accessible to low and moderate income (LMI) families. The WHEEL program does this by accepting into the program homeowners with Fair Isaac Corporation (FICO) credit scores as low as 640 if their debt-to-income ratio (DTI) does not exceed 50%, without any other income requirement or limitation.

WHEEL is also unique in its dedication to transparency and access to data. Historically, data on residential energy efficiency loans, particularly data related to LMI borrowers, have been difficult to collect. The WHEEL team believes that transparency is necessary for the energy efficiency loan market to develop and grow because it provides certainty for lenders and requires accountability from loan programs. The purpose of this paper is to begin the conversation about the viability of a residential energy efficiency loan product in the LMI market, the types of loans that LMI homeowners want, and how energy efficiency loan programs can effectively target LMI borrowers.

Key Findings

1) WHEEL and other state-sponsored EE loan programs offer significant benefits to all households including below market interest and strong consumer protections. In particular they benefit LMI households because they often have to resort to high interest credit cards to pay for HVAC (heating, ventilating, and air conditioning) and other reactive improvements.

2) There is a common perception that the LMI market is small and suffers disproportionally from subprime credit. In fact the market is more complex. The Work Number database reports that approximately 52% of individuals making $60,000 or less have credit scores above 640. In addition, WHEEL data show no correlation between income and FICO score among program participants. Considering that the American Community Survey estimates 37 million families earning less than $60,000 annually owned their homes as of 2013 (49% of all homeowners)[1], Energy efficiency loan programs that only reach higher income homeowners are missing out on a substantial part of the market.

[1] American Community Survey 2013

3) While the WHEEL program does not specifically target borrowers by income, the majority of loans were taken out by middle and lower income families. In the first WHEEL securitization, 52% of borrowers reported annual incomes of less than 120% of area median income (AMI), including 23% below 80% AMI.

4) While some homeowners financed up to as many as nine energy efficiency measures with a single WHEEL loan, the average borrower invested in two measures, usually HVAC and companion measures such as insulation. In total, 50.8% of borrowers used the loans to fund two or fewer measures, and 71.5% of borrowers invested in three or fewer measures, rather than pay for a whole house retrofit.

5) LMI households invested in different measures than their higher income counterparts, and in fewer measures, which could have implications for program targeting and outreach. For example, LMI households were more likely to invest in furnace and boiler replacement while higher income families were more likely to invest in heat pumps.

6) Despite the fact that higher income borrowers did not invest in many more measures than LMI families, they took out larger loans and spent more per measure. This may be partially explained by higher income borrowers having larger houses and therefore requiring larger, more expensive equipment.

Identifying the LMI Market

There is no one agreed-upon definition of "low and moderate income" at the state or federal level. Different state and federal programs use different definitions depending on their program goals and demographics. There are two main benchmarks for income in the U.S.: the federal poverty guideline (FPG) and area median income (AMI).

The federal poverty guideline, published annually by the U.S. Department of Health and Human Services, is a modified version of a metric calculated by the U.S. Census Bureau to determine whether or not a family is in poverty. Many assistance programs use FPG to set income eligibility cutoffs. The FPG is tiered by family size. For example, one of the income eligibility options for the Low Income Home Energy Assistance Program (LIHEAP) is 150% FPG. The 2016 FPG for a three-person household is $20,160, which means that a family of four making 150% of that, $30,240, is potentially eligible to receive LIHEAP benefits. FPG is valuable for programs that want to provide the same dollar amount of assistance to families across the nation.

State Median Income (SMI) and Area Median Income (AMI) are two similar benchmarks for income levels calculated by the U.S. Census Bureau. These indicators provide an estimate of the median income of a state or community. The SMI and AMI are considered to be a more accurate indicator of someone's economic well-being within their community since they take into consideration economic factors on a state and local level. Some federal programs use SMI or AMI for income eligibility in lieu of, or in addition to, FPG. For example, LIHEAP offices may use 60% SMI as the cutoff for income eligibility

instead of 150% FPG. In Pennsylvania, 2016 SMI was $68,300. A family living in Pennsylvania is potentially eligible for LIHEAP if their income is 60% of that, or $40,980. Table 1 provides a crosswalk of SMI and FPG levels and the income amounts to which they refer. Highlighted cells indicate eligibility levels of well-known federal programs.

Table 1

Income Measure Comparison			
Income Level	FPG 2016 (Family of 3)[2]	SMI 2016 Pennsylvania[3]	Notes
$20,160	100%	30%	HHS Poverty Guideline
$26,208	130%	38%	USDA SNAP Eligibility
$30,240	150%	44%	HHS LIHEAP Eligibility
$34,150	169%	50%	HUD CDBG "Low Income"
$40,320	200%	59%	DOE Weatherization Eligibility
$40,980	203%	60%	HHS LIHEAP Eligibility
$54,640	271%	80%	HUD CDBG "Moderate Income"
$68,300	339%	100%	SMI in Pennsylvania
$80,640	400%	118%	ACA Premium Tax Credit Limit
$81,960	407%	120%	HUD CDBG "Medium Income"

Colloquially, "low income" refers to families that are eligible for benefit programs such as LIHEAP and the Supplemental Nutrition Assistance Program (SNAP). As mentioned above, the LIHEAP statute allows states to use 150% FPG or 60% SMI, whichever is greater, as the income cutoff for the program. SNAP, which is in the Department of Agriculture (USDA), requires recipients have a household income of less than 130% FPG. The Community Development Block Grant (CDBG), a program in the Department of Housing and Urban Development (HUD), defines low income as households under 50% AMI.

"Moderate income," however, is not as clearly defined. Sometimes it refers generally to the middle class, in which case it could include households up to 200% AMI to cover a broad band of households in the middle of a locality's income range. Other times it refers to those households that are above the "low income" threshold, but that still are not financially secure. CDBG, one of the few federal programs with a definition of "moderate income," defines it as between 50% and 80% AMI. The program then defines "medium income" as between 80% and 120% AMI.

For the purposes of this report, "low income" will be defined as below 60% of the median income in the county in which the family lives according to the U.S. Census Bureau in 2016, or 60% AMI. "Moderate income" will be defined as households between 60% and 80% AMI. To put that in perspective, 80% AMI in Pennsylvania is an annual household income of $54,640. Our data indicate that there is a shift in behavior between those above and below 80% AMI in the types of energy efficiency measures they invest in, with families over 80% AMI tending to install measures similar to those in higher income brackets.

[2] Using data from 2010-2014, the U.S. Census estimates the average household size to be 2.63 people.
[3] SMI can vary widely between states. For example, the 2016 SMI in Maryland is the highest in the country at $89,500 while Mississippi has the lowest SMI at only $48,900.

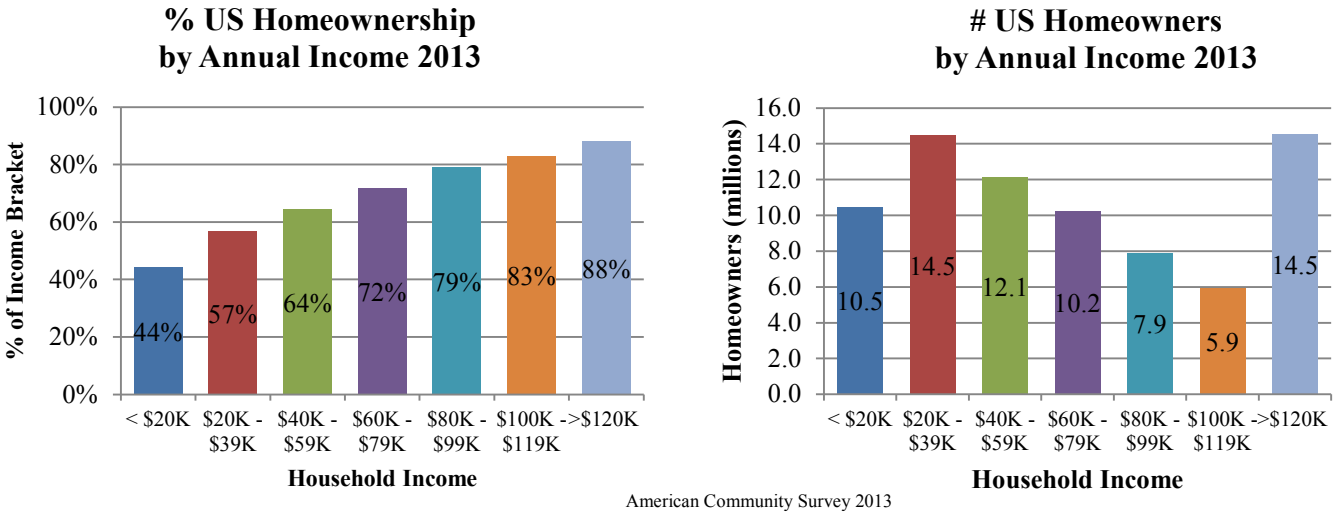
Characteristics of LMI Households

LMI homeowners are as diverse as the rest of the U.S. population in terms of housing, finances, and energy use patterns. However, there is evidence that LMI households differ from higher income families in some aspects that are important to EE lending.

Home Ownership

While it is true that lower income families are less likely to own their homes than their wealthier counterparts, home ownership is still well over 50% for most income brackets. Figure 1 shows U.S. homeownership by income in 2013. The lowest three income brackets approximately track our 80% AMI definition of LMI households (in 2009, 80% AMI in Pennsylvania was $51,040). Combined, 54.5% of those families own their homes.

Figure 1



American Community Survey 2013

In fact, the LMI market is as large as that of higher income brackets. According to the Census Bureau's American Community Survey, 37 million families earning less than $60,000 annually owned their homes as of 2013 (49% of all homeowners), while 38.6 million (51%) homeowners made more than $60,000. Energy efficiency loan programs that only make sense for higher income homeowners are therefore missing out on a very substantial part of the market.

Housing Age and Size

LMI families live in older and less energy efficient housing. On average, 72% of LMI families live in homes that are more than 30 years old as compared to 50% for higher income families[4]. These homes are more likely to have older and less energy efficiency appliances, HVAC systems and are generally in more need of insulation and air ceiling and other improvement that could increase the energy efficiency of their homes.

[4] U.S. Energy Information Administration, Residential Energy Consumption Survey 2009.

LMI households are generally smaller than those of higher income families. The average house for a family under $60,000 is 1,602 square feet, while families making $60,000 or more live in an average of 2,621 square feet[5].

Energy Cost

Home energy costs represent a greater burden to lower income families than to those with higher incomes because these families are more likely to have older and less energy efficient homes and lower overall incomes. As a result, these households spent a greater share of their incomes on home energy. In 2014, for example, average energy burden for LIHEAP-eligible families (up to 150% of poverty) was 10% of their annual income, almost four times the rate for non-low income households (2.4%). Of even greater concern, about one-third of lower income households have an energy burden greater than 15% of income and one in six have an energy burden greater than 25% of income[6]. As a result, EE upgrades can have a significant impact on the monthly budget of an LMI family. For that reason, low-interest EE loans may be even more attractive to LMI homeowners than to higher income families.

Creditworthiness of LMI Families

Many in the energy efficiency community are under the impression that LMI borrowers are not creditworthy and therefore not eligible for EE loans. However, according to the Work Number database, 52% of consumers with incomes at or below $60,000 have Equifax Risk Scores greater than 640[7]. This indicates that a large portion of the LMI sector is creditworthy and should not be excluded from EE loan programs.

LMI Households and Energy Efficiency Loans

There is a common assumption in the energy community that LMI households are not good candidates for finance programs. The belief is that they are generally not homeowners, do not have good credit and that those and other obstacles make it more trouble than it is worth to provide anything approaching market rate loan products to LMI families. As discussed above, while not all LMI families are good candidates for EE loans, a significant portion of the LMI market includes creditworthy homeowners who could achieve appreciable savings by implementing EE upgrades.

While these families are creditworthy, they are often on tight budgets and cannot afford to pay out-of-pocket for energy efficiency efforts so a low-interest loan may be the best solution. However, such loans are not readily accessible for many LMI homeowners, particularly when their furnace brakes in the middle of winter and they need a replacement that day. Historically, LMI homeowners have put such emergency purchases on a credit card, which can charge interest upwards of 24%.

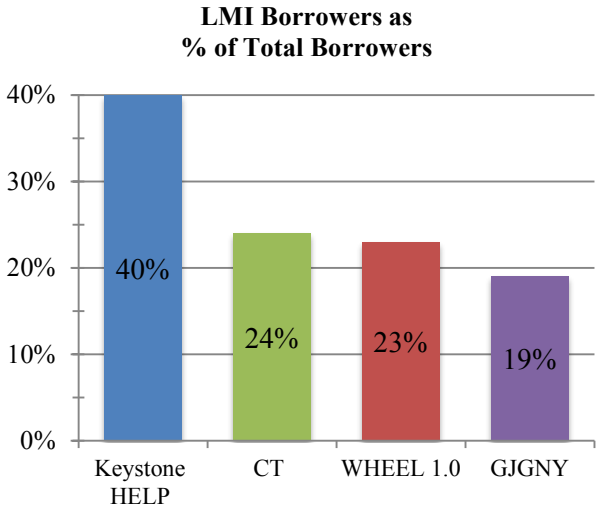
State-sponsored energy efficiency loan programs may offer a better alternative. WHEEL and other state-sponsored EE loan programs offer significant benefits to all households including below market interest

[5] U.S. Energy Information Administration, Residential Energy Consumption Survey 2009.
[6] LIHEAP Home Energy Notebook 2014.
[7] The Work Number is a database maintained by Equifax Workforce Solutions to provide income and employment verification. The database includes the employment and income information for more than 5,000 employers in the U.S.

Figure 2

and strong consumer protections. However, not all EE programs are designed the same. Some programs for example, uses the borrower's house as collateral, which may not be attractive to LMI borrowers for whom their home one of their only assets. Others require loan sizes of $15k or larger, which may be out of reach for an LMI homeowner in an energy crisis. Furthermore, many state loan programs have long approval processes that are unattractive to contractors and too arduous for families in immediate need of a new furnace or other appliance.

WHEEL, on the other hand, is uniquely suited to meet homeowners, specifically LMI borrowers, where they are. The minimum loan size is $2,500 and the loan term is 10 years, terms that are much more attainable for LMI families. WHEEL loans are also unsecured so a family that participates in WHEEL does not risk losing their home if they are unable to repay the loan. Furthermore, states that offer WHEEL loans provide subordinate capital that acts as a loan guarantee, making it possible for lenders to offer the loans at rates significantly lower than other unsecured products such as credit cards.



As mentioned above, there is little publicly available data on uptake of energy efficiency loans in LMI households. However the programs that do report LMI data figures provide a positive picture of the LMI market. As you can see in Figure 2, some state EE programs have had success attracting LMI borrowers. Some of these programs, such as Keystone HELP, offered incentives for low income borrowers such as interest rate buy downs, while others such as WHEEL and Green Jobs Green New York (GJGNY) did not offer additional subsidies for LMI borrowers. While these data are a good start, much more information is needed on LMI participation in EE loan programs order to ensure a robust market.

Case Study: Warehouse for Energy Efficiency Loans (WHEEL)

The Warehouse for Energy Efficiency Loans (WHEEL) project provides state and local governments ("sponsors") a turnkey financing solution for unsecured residential energy efficiency loans that can be tailored to their specific needs and objectives. The WHEEL program includes a broad universe of measures that sponsors can choose to offer in their states or regions, and standard loan terms across all WHEEL sponsors allow the loans to be packaged for sale on the secondary market ("securitized"). The first WHEEL securitization included loans from Pennsylvania, Kentucky, and Ohio. Since then, New York and Florida have joined; WHEEL 2.0 includes loans from Pennsylvania, Kentucky, New York and Florida, with others on track to join before the second securitization is completed.

WHEEL and Low Income Borrowers: The WHEEL program requires a minimum FICO score of 640 and a maximum borrower debt-to-income ratio (DTI) of 50% for all borrowers, regardless of the

state in which they live, but does not otherwise have any income requirement or limitation[8]. There are relevant differences in the programs that may impact low-income uptake, such as the fact that the Florida program is piloting with rural co-ops, which may serve more low-income homeowners, or the fact that some housing agency sponsors have a mandate to serve lower-income borrowers and may limit their funds to support only such borrowers.

WHEEL Data Summary

The first loan portfolio from WHEEL includes 2,079 loans[9] from Pennsylvania, Kentucky and the greater Cincinnati area. The loans were issued between June 2006 and September 2015 and range in size from $1,452[10] to $15,000. Because the concept of WHEEL was generated in Pennsylvania as a way to free up capital in their Keystone HELP program, and this was the first securitization of WHEEL loans, the vast majority of the loans (93.5%) were from that state. Of the remaining loans, 6.4% were from Kentucky and four loans were from Ohio.

Table 3

Measures Included in WHEEL Loans		
Measure Group	# Loans	% Loans
Air/Ventilation Systems	67	3.2%
Boiler Replacement	234	11.3%
Building Envelope	65	3.1%
Central Air Replacement	549	26.4%
Ducts	44	2.1%
Furnace Replacement	652	31.4%
Heat Pump	597	28.7%
Insulation	627	30.2%
Other	483	23.2%
Thermostat	98	4.7%
Water Heater replacement	127	6.1%
Window Improvement	232	11.2%

The loans included 58 measures installed in borrowers' homes. For the purposes of this analysis, the measures have been sorted into 13 groups: Air/Ventilation Systems, Boiler Replacement, Building Envelope, Central Air, Ducts, Furnace Replacement, Heat Pump, Insulation, Kitchen Appliance Replacement, Other, Thermostat, Water Heater, and Window Improvements.

Table 2 shows the measure groupings by frequency and rate of their inclusion in WHEEL loans. Many loans included more than one measure, so individual loans may be represented multiple times in the chart if they included multiple measures. The full list of measures and their groupings can be found in Appendix A.

WHEEL Measures by Income

WHEEL loans were not developed to target any one income bracket. Because the loan approval is based on credit score with no income requirement, LMI borrowers were eligible for the loans if they met the credit and debt-to-income ratio requirements. Within the confines of the credit requirements, states in WHEEL are able to provide additional subsides to make the loans more affordable for LMI borrowers.

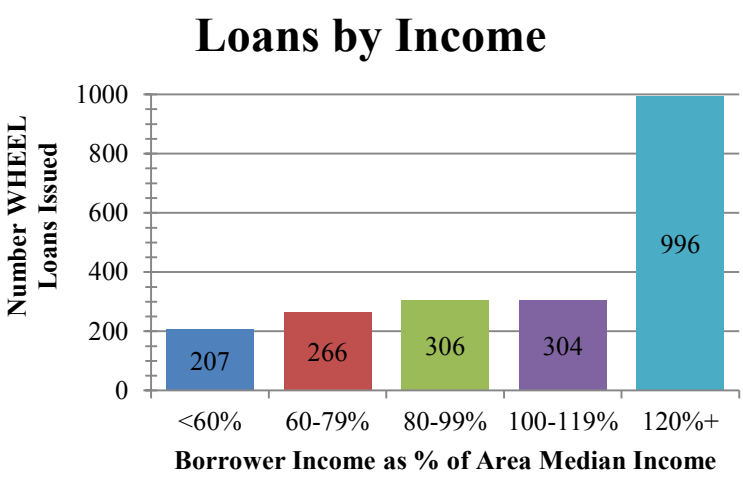
While the WHEEL program does not specifically target by income, the majority of loans are taken out by middle and lower income families. In the first WHEEL securitization, 52% of borrowers reported annual

[8] WHEEL income data are self-reported by the borrowers and are not necessarily verified with paystubs. However, the incentive if any would be to inflate income to qualify for a larger loan.
[9] The dataset used for this report includes the full portfolio of loans, not all of which were included in the securitization.

incomes of less than 120% of AMI, including 23% below 80% AMI[11]. In this section, we will take a close look at the differences between LMI households and those in higher income brackets.

The characteristics of the loans when grouped by income were in some ways surprising. For example, we originally believed that higher income borrowers would be more likely to pay for additional measures through the WHEEL loan once they committed to it. We did not find this to be the case overall.

Figure 3



As Table 2 demonstrates, regardless of the income level, WHEEL borrowers paid for an average of about two measures per loan. However, we did find some differences within the margins of those averages. According to the data, 55% of low income borrowers took out loans covering only one measure while only 40% of those in the highest income group borrowed for only one measure. Conversely, 31% of the highest income tier took out loans covering two measures while only 18% of those in the lowest tier did so. All income groups took out loans covering three or more measures at about the same rate.

This suggests that higher income borrowers were more likely than other borrowers to fund one upgrade in addition to the primary purpose of the loan, perhaps a companion measure that make sense to complete at the same time, but were not any more inclined than other borrowers to do whole house retrofits or roll other unrelated energy efficiency upgrades into the loan.

Table 2 also demonstrates that regardless of how many measures they paid for, higher income borrowers took out larger loans and spent more per measure. There are a few possible explanations for the additional cost per measure. First, higher income families are likely to have larger houses and therefore require larger appliances in the case of furnaces, heat pumps, water heaters, and boilers, and more materials and labor in the case of insulation. Second, higher income families might opt for higher-end appliances and materials that cost more. Unfortunately, the data do not include information on house size or brand/quality of measures installed, so no definite conclusion may be reached as to the reason for these families are taking out larger loans and spending more per measure.

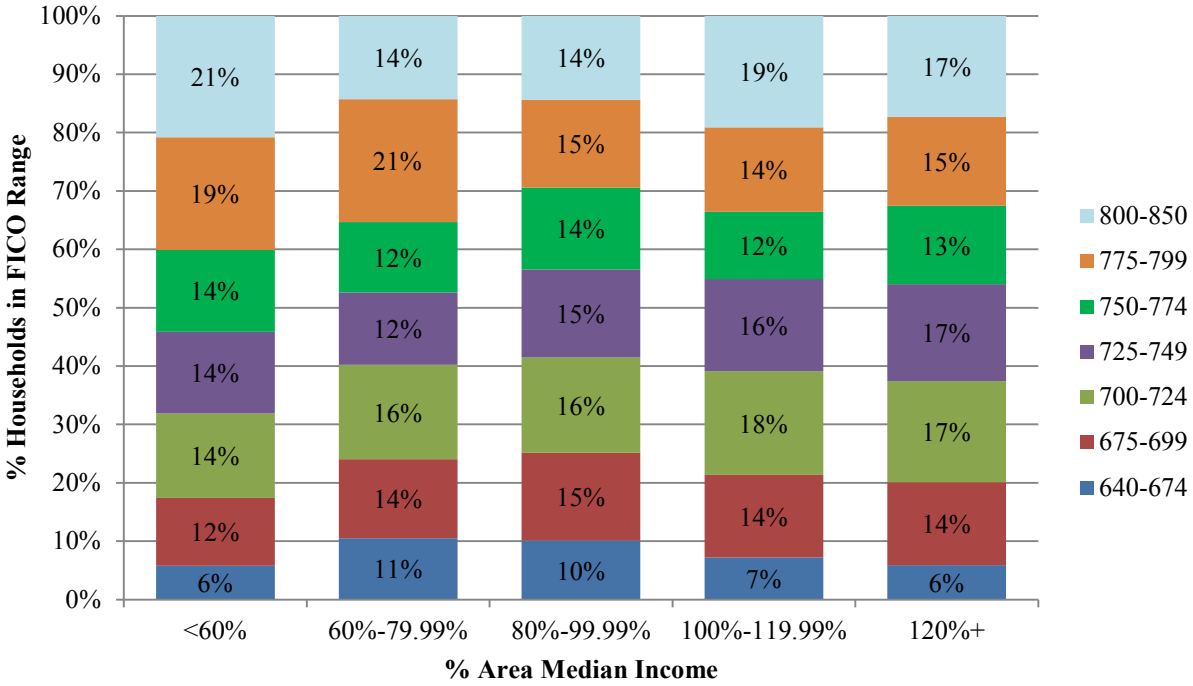
[11] Percent of AMI is calculated using U.S. Census family median income at the county level. Family median income excludes single-person households, which is appropriate for this dataset since a representative of the WHEEL Program Administrator who developed the Keystone HELP program indicated that historically nearly 2/3 of the loans included co-borrowers. Unfortunately, we were not able to obtain information on the percentage of loans in this dataset that contained co-borrowers. Previous WHEEL reports used median household income, which includes single-person households and is therefore significantly lower than family median income; this is why previous reports indicated 10% LMI rather than the 23% LMI reported here using the more appropriate income category.

Table 2

Comparing WHEEL Loans by Income (%AMI)			
Income Level (AMI)	Average # Measures	Avg. Principal Amount	Avg. Cost / Measure
<60%	1.96	$7,257	$4,897
60%-79.9%	2.10	$7,879	$4,967
80%-99.9%	1.90	$8,053	$5,391
100%-119.9%	1.90	$8,464	$5,688
120%+	2.11	$9,739	$6,137

We also found that the borrower's income an FICO scores were not related. Regardless of income, borrowers had approximately the same distribution of FICO scores. Notably, 21% of the lowest income borrowers had FICO scores between 800 and 850, the most of any income grouping. In addition, only 18% of the lowest income borrowers had FICO scores under 700, the fewest of any income grouping. While the data are confined to the WHEEL program and are necessarily skewed towards individuals with higher FICO scores (since WHEEL requires a minimum of a 640 FICO score), they do provide anecdotal evidence that an individual's income is not predictive of his creditworthiness.

Figure 4



The data also show that income has an effect on the types of measures borrowers select. To look at this question, we examined the subset of 917 loans (44% of the portfolio) that included only one energy efficiency measure. Since these loans have only one measure, there is no question as to the primary purpose for the loan, avoiding questions about which measures are integral to the WHEEL loan and

which, if any, are add-ons. Isolating the one-measure loans also gives us an opportunity to investigate which measures are likely to be done by themselves and which are likely to be done alongside others.

As shown in Figure 4, there were appreciable differences in the measures low and medium income borrowers invested in compared to higher income borrowers. These households were more likely to replace a heat pump or do central air, and less likely to do insulation, boiler replacement, or furnace replacement. In fact, heat pumps were almost half of the single-measure loans in the highest income category, while they represented just over a quarter of the low and moderate income loans. Conversely, furnace replacement was done by a quarter of the single-loan low income households, while they only represented 11% of loans in the highest income bracket.

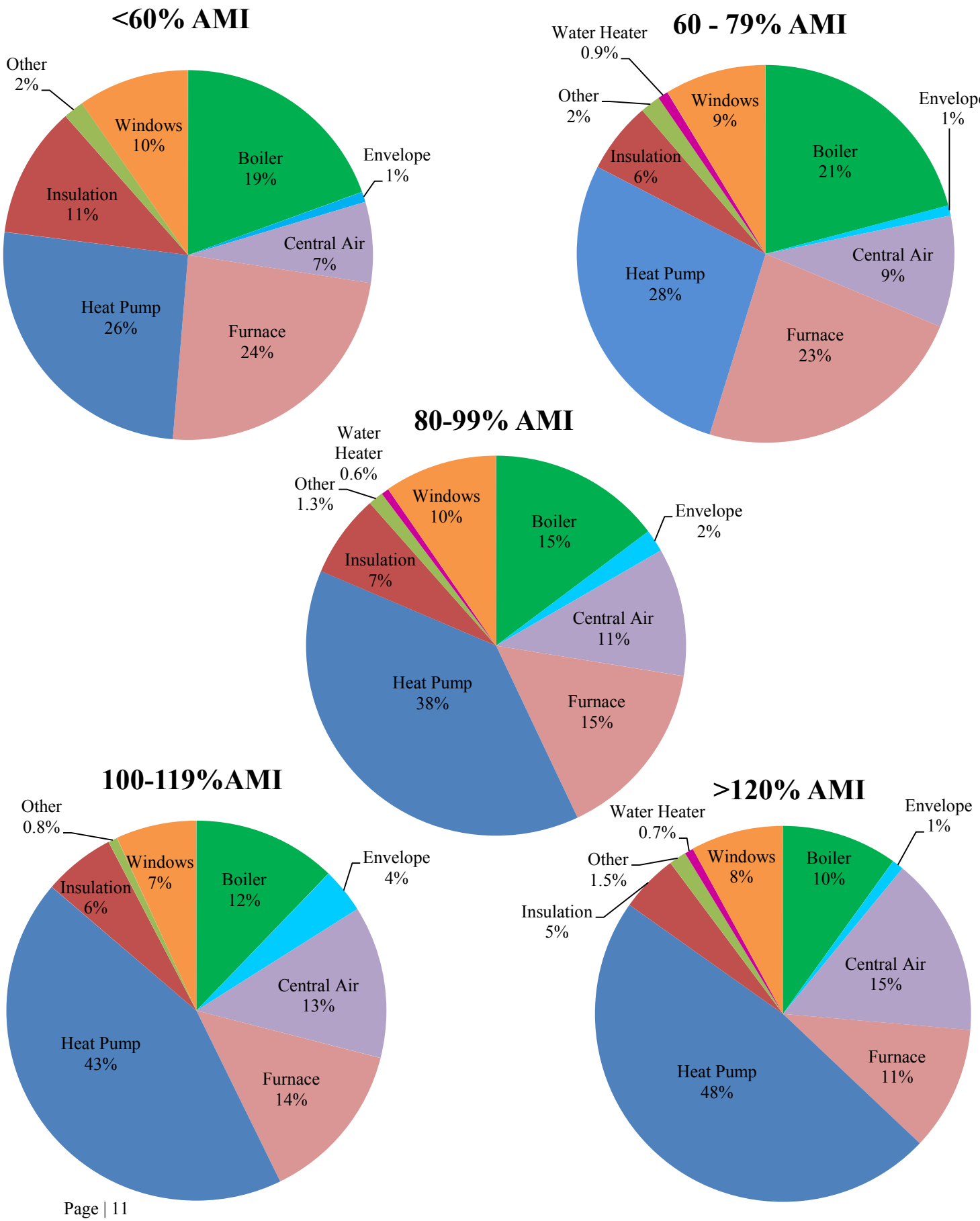
There were also differences in the measures that were more likely to be done in single-measure loans. Sixty-two percent of heat pumps were done as single measure and 53% of all boiler replacements. Other measures were rarely done by themselves, including air/ventilation systems, ducts, insulation, thermostats and water heaters.

We also found an interesting correlation between central air and furnace replacement. They were found to be done together about 70% of the time[12] regardless of income bracket. This is noteworthy because it alone explains two-thirds of the measure-per-loan difference between high and low income borrowers. According to the RECs data, higher income families are more likely to have central air. All of this together suggests that since all borrowers combined central air and furnace replacement at similar rates, there is only a 6% difference in the rate of low and high income borrowers taking out single-measure loans. The rest of the gap that appears in the data is likely due to the fact that higher income borrowers are more likely to have central air in their homes.

[12] The only higher correlation was between air/ventilation systems and insulation. 97% of air/ventilation system work was done alongside insulation.

Figure 5

Measure Frequency by Income



Next Steps

This report is the first in a series of papers that will identify strategies to increase residential retrofits through finance programs with a special focus on helping low and moderate income households take full advantage of available programs.

Specific areas of research could include:

1) Analysis of the creditworthiness of homeowners by income, including general characteristics of homeowners with scores of at least 640 (assets, cars, bank accounts, debt), to determine the appropriate loan products to offer borrowers in that market sector.

2) Analysis of homeowner behavior by income including decision-making patterns, demand for whole-house retrofits vs. reactive measures, reaction to interest rate changes, and barriers to using finance for energy efficiency investments.

3) Analysis of barriers for contractors to working in low and moderate income neighborhoods and models for targeting utility and other incentives to address these barriers.

In addition, more work needs to be done across the board in energy efficiency to ensure loan programs collect and make available data on their borrowers including income, creditworthiness, default rates, and other factors that could help deepen our understanding of the penetration of various loan programs in different market sectors, and how new and existing programs may be tailored to improve their reach in target sectors.

APPENDIX A - Measures Included in WHEEL 1.0 Loan Portfolio

Air/Ventilation Systems
- ERV
- Fireplace Insert
- Ventilating Fans

Boiler Replacement
- Gas Boiler
- Oil Boiler
- Oil Boiler to Gas/Propane Boiler
- Other Boiler
- Propane Boiler

Building Envelope
- Cool Roof
- Door Improvement
- Roof
- Rubber Roofing

Central Air
- Central Air Package System
- Central Air Split System

Ducts
- Duct Re-Design
- Duct Sealing
- Return Duct Ext

Furnace Replacement
- Electric Baseboard to Gas/Propane Furnace
- Electric Furnace to Gas/Propane Furnace
- Gas Furnace
- Oil Furnace
- Oil or Propane Furnace to Gas Furnace
- Other Furnace
- Propane Furnace

Heat Pump
- Air Source Heat Pump
- Ductless Heat Pump
- Fuel Furnace and Ducted Split AC to ASHP
- Fuel Furnace and Ducted Split AC to GSHP
- Geothermal Heat Pump
- Ground Source Heat Pump

Insulation
- Above Grade Wall Insulation
- Air Sealing
- Attic Insulation
- Attic Knee Wall Insulation
- Basement Wall Insulation
- Crawlspace Wall Insulation
- Duct Insulation
- Floor above Uncond. Basement Insulation
- Floor above Uncond. Crawl Space Insulation
- Rim Joist Insulation
- Vaulted Ceiling Insulation

Kitchen Appliance Replacement
- Refrigerator Replacement
- Stove

Thermostat
- Programmable Thermostat Installation

Water Heater
- Water Heater - Storage Tank Cond Space
- Water Heater - Storage Tank Uncond Space
- Water Heater - Tankless Cond Space
- Water Heater - Tankless Uncond Space
- Water Heater - Tankless Gas Whole Home
- Water Heater - Storage Gas High Efficiency

Window Improvements
- Window Improvement

Other
- Ceiling Fan
- Electrical
- Health & Safety
- Other
- Pellet
- Plumbing
- Utility Gas Line Extension
- Wood

State Revolving Loan Fund Support of Energy Efficiency and Renewable Energy Projects: Exploring Opportunities and Innovations

Workshop Summary
February 19, 2016

USEPA Clinton North Building
1200 Pennsylvania Avenue
Washington, DC

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EXECUTIVE SUMMARY

The Environmental Protection Agency invited partners with expertise in finance, energy efficiency, renewable energy, and low and moderate income communities to join EPA's Office of Water and Office of Air and Radiation staff in exploring how EPA might support clean energy by leveraging the State Revolving Loan Funds (SRFs).

EPA's purpose in hosting the meeting was to focus on the intersection of SRFs and financial markets for residential clean energy—energy efficiency and renewable energy (EE/RE)—and to identify new opportunities to use of SRFs to expand EE/RE. Of particular concern to EPA was understanding how SRF financial tools can help low and moderate income (LMI) communities participate in the benefits of EE/RE.

The workshop clarified the tremendous potential of state Clean Water SRFs (CWSRFs) to unlock capital to support residential clean energy projects. Great opportunity exists to use SRF investment and guarantee authorities as a gateway to expanded use of SRF financing tools for clean energy projects. The models provided by New York and Pennsylvania, innovators in utilizing CWSRFs to support residential EE/RE deployment, are ripe for replication and expansion. Low income communities are in a prime position to benefit from this approach.

The most critical takeaway was the need to market the opportunity CWSRFs offer for EE/RE. There was a consensus that a primary driver for engaging state CWSRFs should be the clear articulation to state SRF administrators of EPA's support for state creativity and innovation in applying SRF tools to EE/RE projects. To build on the forward momentum coming out of the workshop, the group identified four primary strategic opportunities to pursue:

1. Clear articulation to state SRF administrators of EPA's support for state creativity and innovation in applying SRF tools to EE/RE as a catalyst for increasing state CWSRF EE/RE activity.
2. Replication and expansion of models developed in New York and Pennsylvania.
3. Use of SRF guarantee and investment authority as gateway to expanding SRF impact to EE/RE.
4. Recognition that hardship communities are in a prime position to benefit from expanded application of SRF tools to EE/RE projects.

This meeting summary is organized around these key opportunities. After describing these highlights, the report outlines a set of next steps discussed by meeting participants for EPA and partners to consider.

KEY OPPORTUNITIES

1. CLEAR ARTICULATION TO STATE SRF ADMINISTRATORS OF EPA'S SUPPORT FOR STATE CREATIVITY AND INNOVATION IN APPLYING SRF TOOLS TO EE/RE AS A CATALYST FOR INCREASING STATE CWSRF EE/RE ACTIVITY.

From the opening remarks to the discussion sessions, EPA staff repeatedly made clear the agency's interest in helping states to creatively apply the full range of SRF capabilities to support EE/RE outcomes. A primary mechanism employed by EPA to support state CWSRF's in exploring innovative applications of SRF tools for EE/RE has been responding to questions about whether specific EE/RE projects might be classified as eligible and encouraging states to make additional applications for guidance. There was a robust discussion about the challenge of getting state SRF administrators and EE/RE partners to request guidance without better articulation of EPA's support and better communication to state partners of EPA's position. Shifting to a more direct articulation to state SRF administrators of EPAs support of SRFs using financing tools to secure EE/RE benefits would have a greater impact on CWSRFs exploring and ultimately using this opportunity. Over the course of the day as this issue continued to be raised, EPA staff reiterated their support for creativity in applying SRF tools. EPA made the point that it does not expect the SRF programs to be the most conservative funder. The original purpose of the SRF was to fund areas the capital market wasn't funding and to take appropriate risks on public benefit projects that only public money is willing to take. The opportunities presented at the intersection of water and energy match that original objective. EPA's preference is for states to fully consider the broad range of CWSRF eligibilities in meeting their respective needs and avoid missing opportunities for positive environmental impact by being too conservative about deploying SRF resources for eligible project investments.

EPA acknowledged that the SRFs have evolved to look beyond lending on traditional water-treatment projects, to broader opportunities that can deliver both water and energy objectives.

SRF FINANCIAL STRENGTH AND FLEXIBILITY.

The SRF programs have a long history of strong and consistent performance, negligible default rates, and large working balances. These attributes create value beyond the direct ability to loan or grant funds for water infrastructure projects. EE/RE projects have a more limited track record in the market and are often misunderstood by capital-market actors, banks, and potential partners in the SRF community.

When the financial strength of SRFs is married to strong EE/RE opportunities, it becomes possible to overcome many of the challenges to securing affordable capital. For example, the strong credit history and AAA ratings SRFs enjoy can help secure lower-cost capital by offering a guarantee mechanism to secure large packages of residential or community scale EE/RE projects that are currently less acceptable to the markets.

The large fund balances, including the program float, are already used by SRFs to build the fund through the investment mechanism. The Water Resources Reform and Development Act of 2014 (WRRDA) further expanded this ability. When SRFs invest in EE/RE opportunities they are able to ensure that fund capital is growing and delivering additional mission-consistent environmental benefits. Directed use of the investment function get both sides of the balance sheet working for the SRF program in a positive way.

Participants emphasized the need to educate state SRF administrators on the variety of financial tools and support mechanisms that they can bring to EE/RE activities and partners. Critical to gaining support from state SRF

administrators is helping them recognize that using the CWSRF guarantee authority is not a zero-sum game: guarantees do not replace or displace the CWSRF's ability to make loans for clean water infrastructure projects. Using the guarantee authority is instead an opportunity to expand the positive impact of SRFs.

NOTE ON SRF ELIGIBILITY

The Drinking Water SRF and Clean Water SRF programs provide low-cost or no-cost financing for communities building water quality projects. The Drinking Water SRF (DWSRF) provides financing for infrastructure directly related to drinking water supply, while the Clean Water SRF (CWSRF) funds activities that protect, maintain, and improve water quality. Under the DWSRF program only water systems are eligible recipients, and only projects directly tied to water systems (i.e., to source protection, treatment, transmission and distribution, finished water storage, consolidation, and creation of new systems) are considered eligible projects. Due to the eligibility constraints of the DWSRF, the greatest potential for creative use of SRFs to support residential EE/RE falls under the CWSRF programs. Most of the discussion of innovative use of SRFs at the meeting therefore related to the CWSRFs. See Appendix D for additional detail on SRF eligibility and financial tools.

During the discussion of support for low income communities there was a specific suggestion to focus on energy demands within the broader drinking water system such as reducing leaks in the distribution system. With further exploration, and recognizing the statutory constraints, DWSRFs may find more potential to creatively and deeply support clean energy. A workshop explicitly focused on the DWSRF is a possible next step.

2. REPLICATION AND EXPANSION OF MODELS DEVELOPED IN NEW YORK AND PENNSYLVANIA.

New York and Pennsylvania provided the group with two successful models for how the CWSRF can be leveraged to meet a clear demand to finance residential energy efficiency. There was a recognition among participants that the New York and Pennsylvania models could be broadly promoted to state-level CWSRF administrators as well as EE/RE partners. While there may be other viable approaches, these two models stood out as implementation ready at the meeting. These models could be widely replicated in their current form, or used by states as a starting point for further innovations more tailored to their circumstances.

THE NEW YORK MODEL

New York's model combined the nonpoint source eligibility of the CWSRF and the CWSRF *guarantee authority* to support its sister agency NYSERDA in bundling and selling bonds backed by unsecured home energy efficiency loans. Bond proceeds were used to recapitalize the residential energy efficiency loan pool.

NYSERDA came to the CWSRF because they had determined that capital market access would be too expensive and inefficient without SRF guarantee support. NYSERDA had sought to raise $10 million, they had agreed to over-collateralize the bond financing with $14 million in loan payments and pledge a $9 million grant from DOE as security. Only one rating agency was willing to give their bonds a rating (BBB), while two others refused to rate them. The rating agencies couldn't decide whether these were asset-backed securities or municipal securities, deemed existing loan performance data inadequate, refused to credit QECB subsidy payments, and required accelerated amortization. By contrast, the guarantees provided by New York's CWSRF quickly secured an AAA rating for a $24 million NYSERDA bond offering with terms and pricing identical to traditional CWSRF transactions in the capital markets.

Critical to this model is New York's identification of atmospheric deposition as a nonpoint source (NPS) in its 319 Nonpoint Source Management Plan. Since residential energy efficiency decreases power plant emissions, and thereby decreases atmospheric deposition, New York was able to support securitizing NYSERDA's residential loan portfolio as an eligible project, allowing it to utilize the CWSRF financial tools, including the guarantee authority.

Other states wishing to follow this model must first make the connection between their energy-related project and water quality management under their state's NPS management plan, also called a 319 plan. Such projects are then eligible to use SRF funds to implement NPS management plans established under section 319 of the Clean Water Act (CWA). In addition to atmospheric deposition, other non-point sources frequently identified in 319 plans that are easily connected to energy projects include resource extraction, climate, and hydrological impacts. In addition to residential energy efficiency projects, other energy projects, including solar projects, green roofs, and micro grids, are potential allowable project types under the 319 NPS eligibility, so long as the state's 319 NPS management plan specifies a connected NPS management issue.

THE PENNSYLVANIA MODEL

Pennsylvania plans to use its CWSRF *investment authority* to help support residential energy and water efficiency through the Keystone HELP program. Like many other SRF programs, PENNVEST has sufficient program liquidity to allocate a portion of its short term investment balances to consider supporting Keystone HELP. Keystone HELP is a home improvement financing program, offering residential energy and water efficiency loans. Keystone HELP is a private entity jointly funded by PENNVEST, Citigroup, and the Pennsylvania State Treasurer. Keystone HELP approached PENNVEST with this opportunity, one that was well defined and packaged to allow PENNVEST to invest SRF funds in a simple and direct manner, with clarity on the risks and rewards. The need for intermediaries such as Keystone HELP to carefully develop and package EE/RE opportunities and bring them to SRFs was raised several times during the day. It is critical to understanding the challenges to replicating successful models such as New York and Pennsylvania.

By using the investment authority, PENNVEST, unlike New York, is committing funds from the CWSRF to the residential efficiency program. PENNVEST is making this investment the same way it invests in other assets, with the advantage that it is mission-consistent, delivering both a financial return and environmental benefits.

OPPORTUNITIES TO EXPAND THE NY & PA MODELS

Both the New York and Pennsylvania models focus on residential energy efficiency loans. Participants suggested that the most obvious way to expand these models would be to include residential loans for solar and to consider broadening from loans for single-family homes to financing for EE/RE in multi-family homes. A natural next step after expanding the residential project types and markets is to develop models that serve the commercial sector.

The success of any of these models depends upon partners in EE/RE developing and presenting clear opportunities to SRF programs. Given the complexity and level of expertise needed to succeed in developing these pipelines and to work with individual state SRFs, the idea of creating a multi-state SRF investment trust was discussed. Participants suggested that an investment trust could provide a platform for participating states to balance excess capacity and capital needs. This idea generated a great deal of interest from participants as a potential next step. Such a vehicle might also act as the "intermediary" agency for states that do not otherwise have an intermediary to organize and package projects and investments. This idea was not fully fleshed out during the meeting, and could be more comprehensively researched and developed.

KEY PARTNERS AND INTERMEDIARIES ARE NEEDED TO DELIVER PACKAGED PROJECTS

The NYSERDA guarantee and the PENNVEST investment were made possible by two critical elements:

1. An intermediary entity that brought the EE/RE opportunity in as a package; and
2. The state SRF programs were sophisticated, knowledgeable, and active partners with their fellow state agencies and private stakeholders.

To sell a project or program for investment to an SRF, all the parties need to be organized and deliver a simple investment option. Anything that involves a multitude of small loans requires an intermediary such as NYSERDA or Keystone HELP to group those loans and manage them.

The structure of SRFs and eligibility requirements make it natural for an intermediary to assume the responsibility of developing a pipeline of EE/RE projects at the state or interstate level. At the state level there may be natural intermediaries, such as NYSERDA in New York or green banks in other states.

The success of these projects requires that the full range of partners—including the state SRFs, the intermediaries, and key stakeholders such as the state energy offices, public service commissions, IUP scoring entities, and environmental advocates—be well educated on the legality and positive impact of EE/RE projects in terms of their financial and environmental benefits. SRFs need to communicate to stakeholders the positive benefits of these projects.

3. USE OF SRF GUARANTEE AND INVESTMENT AUTHORITY AS GATEWAY TO EXPANDING SRF IMPACT TO EE/RE.

Using the guarantee authority to support EE/RE projects with water quality benefits offers a low risk/low cost "gateway" for SRF programs and environmental stakeholders who have concerns about SRF's activities in EE/RE limiting or displacing their ability to support traditional water-quality infrastructure. Based on the CWSRFs long history and strong balance sheets, capital markets recognize them as a secure investment. When SRFs apply their guarantee authority they offer this credit-worthiness to projects that would otherwise incur higher costs of capital without necessarily having to back it with any capital set-aside. For New York, the markets did not require that any funds be set-aside and the guarantee for NYSERDA did not affect the CWSRFs ability to provide capital for other projects. This is a critical message to share: that the SRF financial strength and rating can, on its own, be leveraged, through the guarantee authority, without a capital restriction or outlay.

A significant advantage of using the investment authority is that CWSRF investments are not constrained by needing to meet project eligibility. This removes the requirement to have the 319 program plan specifically connect the energy project and the water impact. The investment authority is therefore more appropriate for states that feel comfortable that they have sufficient liquidity, and that the investment would not crowd other projects on their Intended Use Plan. It is also a strong option when the soundness of the investment is very clear, making it comparable to any SRF investment in terms of risk, while adding the benefit of mission-consistent use of SRF capital. In the case of Keystone HELP, there are very strict underwriting criteria set by Fannie and Freddie for these loans, and a 10-year track record with performance and default rate data which made it possible to evaluate and feel secure about the quality of the investment.

4. RECOGNITION THAT HARDSHIP COMMUNITIES ARE IN A PRIME POSITION TO BENEFIT FROM EXPANDED APPLICATION OF SRF TOOLS TO EE/RE PROJECTS.

The CWSRF financing tools offer the same potential benefits to low and moderate income (LMI) communities as other EE/RE projects. The principal issue in ensuring that these benefits are realized is overcoming the barriers uniquely faced by LMI communities in participating in financing programs. A key here is engaging intermediaries who understand this market and are willing to work with partners to build the pipeline of fully packaged opportunities to allow SRF programs to apply their financial tools.

LMI communities are actually in prime position to benefit from the two models identified for replication. Contrary to common misconceptions, 46% of LMI (200% of poverty line) are homeowners. In most cases an LMI family's home is their only major investment. This puts LMI families at a disadvantage when it comes to residential energy efficiency loans, because they must be even more careful and risk adverse. But LMI families have additional incentive to participate in energy efficiency programs, because energy bills are a higher proportion of their income. Given the financial sensitivities LMI families have in relation to their homes, the intermediaries in these communities must be clearly identified as entities who have a comprehensive understanding of this market (i.e. Green Bank, Local Housing Finance Agencies, Community Development Financial Institutions). The partnerships with SRFs to support EE/RE loans in these communities may actually offer the benefit of a more tailored loan product from a reliable, dependable government partner. In Keystone HELP 40% of the borrowers are LMI, and the WHEEL program has 10% of its loans with LMI borrowers. Predatory lending and use of high-interest credit card debt in this community could be minimized if SRF-backed programs designed in partnership with, and administered by, knowledgeable local partners were available and publicized.

Outside of residential energy efficiency loans, opportunities may exist through shared projects that financially benefit LMI communities. Community-shared solar and micro grids were offered as potential community-scale projects that could have benefits for LMI communities. In addition, significant investments in the water infrastructure itself have particularly valuable benefits for LMI communities.

Ultimately the success of ensuring that LMI communities enjoy the benefits of expanded SRF support for EE/RE requires that those partners in EE/RE working to develop pipelines of projects that can be packaged and presented to the SRF programs for financing partner with organizations that understand this market and will help build these pipelines in ways that maximize participation and benefit to LMI communities. Continuing to prioritize the LMI lens and including LMI-knowledgeable partners in efforts moving forward, will be critical to seeing the benefits of SRF EE/RE financing by LMI communities. In turn, if we are to meet CO2 reduction goals it becomes imperative to design affordable financing options for LMIs to capture this significant reservoir of CO2 reductions.

PRELIMINARY NEXT STEPS

The following are preliminary next steps for EPA and other champions (such as those who came together at this meeting) to initially consider implementing as the agency develops a work plan to seize on the four primary opportunities identified and continue the momentum generated at this meeting:

- Release the eligibility draft for the CWSRF and DWSRF as soon as possible, to clearly articulate its support for the creative use of public funds for EE/RE work.
- Aggressively market and promote circulation of the eligibility draft to all SRFs and to leading EE/RE partners (including low-income advocates).
- Record videos of Jim Levine (NY) and Paul Marchetti (PA) so their great stories and specific mechanisms used in New York and Pennsylvania can be shared on websites and spread rapidly.
- Continue to convene broad multidisciplinary partners at the national level to spur the innovation cycle. If EPA is unable to do this directly, partners should identify an organization to house an on-going learning network and support future gatherings.
- Organize champions and intermediaries at the state level to provide education on SRF opportunities and eligibility.
- Develop specific educational tools to help SRFs, EE/RE partners, and environmental advocates understand the financial tools.
- Find and work with actors who understand the particular barriers to developing pipelines of eligible energy projects that serve low income and moderate income communities. Build a “roadmap” and tools for communities to use to ensure LMI communities are included in SRF innovation models.
- Research and further develop the concept of a Multi-State SRF Investment trust that might allow state SRFs to balance capacity and capital needs. Such an entity’s ability to act as an intermediary and packager of projects and investments for states without intermediaries could be investigated.
- Bring together a work group to further discuss DWSRF opportunities and issues.

APPENDIX A – MEETING ATTENDEES LIST

U.S. EPA STAFF

George **Ames**	Chief, *CWSRF Branch*
Kiri **Anderer**	Acting DWSRF Team Lead, *Drinking Water Protection Division*
Joel **Beauvais**	Deputy Assistant Administrator, *Office of Water*
Ron **Bergman**	Chief, *Drinking Water Protection Division*
Sonia **Brubaker**	Program Manager, *Water Infrastructure and Resiliency Finance Center*
Elizabeth **Corr**	Associate Division Director, *Drinking Water Protection Division*
Jim **Gebhardt**	Director, *Water Infrastructure and Resiliency Finance Center*
Janet **McCabe**	Assistant Administrator, *Office of Air & Radiation*
David **McKay**	ORISE Fellow, *Water Infrastructure and Resiliency Finance Center*
Jacob **Moss**	Acting Deputy Director, *Climate Protection Partnerships Division*
Sheila **Platt**	CWSRF Team Lead, *CWSRF Branch*
Andrew **Sawyers**	Director, *Office of Wastewater Management*
Raffael **Stein**	Division Director, *OWM Municipal Support Division*

SUBJECT MATTER EXPERTS

Teveia **Barnes**	Executive Director, *California Infrastructure and Development Bank*
Jim **Barrett**	Chief Economist, *American Council for an Energy Efficient Economy*
Colin **Bishopp**	Vice President, *Renew Financial*
Adrienne **Booker**	Municipal Advisor, *Ehlers*
Adam **Carpenter**	Regulatory Analyst, *American Water Works Association*
Michael **Curley**	Visiting Scholar, *Environmental Law Institute*
Steve **Grossman**	Executive Director, *Ohio Water Development Authority*
Bert **Hunter**	EVP & CIO, *Connecticut Green Bank*
Jim **Levine**	Assistant General Counsel-Finance, *New York Power Authority*
Cassandra **Lovejoy**	Program Manager, *Energy Programs Consortium*
Paul **Marchetti**	Executive Director, *PENNVEST*
Kerry **O'Neill**	Managing Director, *Connecticut Green Bank*
Rima **Oueid**	Policy Advisor, *U.S. Department of Energy*
Jeffrey **Schub**	Vice President, *Green Capital Coalition*
Thomas **Walz**	Multifamily Energy Production Manager, *Maryland Dept. of Housing & Community Development*

APPENDIX B – AGENDA AND LIST OF PRE-MEETING PREPARATORY MATERIALS

MEETING AGENDA

SRF Support of Energy Efficiency and Renewable Energy Projects
USEPA Clinton North Building, Room 5530
1200 Pennsylvania Avenue
February 19, 2016

Meeting objectives: ***To jump-start innovation and fresh thinking about:***

- *Innovative ways and means for the SRF programs to support EE/RE*
- *Innovative ways and means for the SRF programs to support EE/RE opportunities in hardship communities (as defined by states)*
- *Effective marketing and outreach techniques to expand SRF assistance to EE/RE*

8:30 a.m. **Welcome and Introductions**

Joel Beauvais, Deputy Assistant Administrator, Office of Water, EPA

Janet McCabe, Acting Assistant Administrator, Office of Air and Radiation, EPA

9:00 a.m. **Review Meeting Purpose and Logistics, *Naomi Mermin, Facilitator***

9:15 a.m. **Innovations in SRF Funding of EE/RE: Defining the Opportunities: Panel and Discussion**

Introduction*, James Gebhardt, Director, Water Infrastructure and Resiliency Finance Center, EPA*

Energy Efficiency and Clean Energy: What are the key barriers to scaling and what financing tools are needed – why did we start looking to SRFs?
James R. Levine, Assistant General Counsel, New York Power Authority

The Drinking Water SRF & EE/RE: Barriers and Opportunities,
Kiri Anderer, Acting DWSRF Team Leader, Drinking Water Protection Division, EPA

The Clean Water SRF & EE/RE: Barriers and Opportunities,
George Ames, Chief, Clean Water State Revolving Fund Branch, EPA

Group Discussion Questions:

- What are the primary areas of innovation available to SRFs? Expand/challenge panelists kick off list.
- What are the most promising types of financial and technical assistance for EE/RE efforts that the SRF programs offer (or could offer)? Types, terms and conditions, new sources.
- What lessons have been learned about what it takes to identify, market and ultimately harness the funding support of SRF programs for EE/RE?
- Who are the critical partners needed to make innovations work?
- As we answer these questions – note how regional diversity of water/energy systems and differences in system size effect the answers. Consider how these innovations may overcome challenges or present unique opportunities to support hardship communities.

10:15 a.m. **Group prioritization of opportunities to workshop: Which are the most promising opportunities for states to use the SRF programs to support EE/RE?**

10:30 a.m. *10-minute break*

10:40 a.m. **Workshop Sessions: Promising Innovations**
We will divide into cross disciplinary teams. Each team will tackle 1-2 priority innovations identified by the morning's discussion, reporting back to the group on an innovation plan which includes a clear articulation of each EE/RE opportunity workshopped, identifies the mechanism of support (i.e. primary finance/technical assistance tools), the key partners, strategies to overcome barriers, and options for effective marketing.

11:30 a.m. **Workshop Report Back**
Teams will present innovation plans, group will offer constructive feedback.

12:30 p.m. *Lunch (on your own; nearby options list to be provided)*

1:45 p.m. **Hardship Communities – Framing the Challenges and Identifying the Opportunities**
Kerry O'Neill, Managing Director, Connecticut Green Bank
Cassandra Lovejoy, Program Manager, Energy Program Consortium

Discussion Questions:

- What types of EE/RE projects are best suited to hardship communities?
- What are the primary financing barriers to EE/RE projects/programs in these communities?
- Are loans for EE/RE projects in hardship communities realistic? Under what circumstances?
- How can DWSRF set-asides be used to help these communities?
- How can EPA leverage the SRF programs to scale up EE/RE in hardship communities?
- Who are the necessary partners to do EE/RE in these communities on a large scale (i.e., across multiple communities)?

2:45 p.m. *15-minute break*

3:00 p.m. **Recap and Distill: Hardship Communities**

- What are the primary opportunities for states to use the SRF programs to support EE/RE efforts in hardship communities that are emerging from this discussion?
- How, when, and to whom could EPA most effectively market or disseminate these opportunities?

3:30 p.m. **Wrap Up**:

- Review meeting objectives, did we meet them?
- What were the most promising ideas coming out of today's session?
- Were there areas that needed to be better covered or more time given to the discussion?

4:00 p.m. *Adjourn*

EPA will prepare a summary of the discussion for review by participants.

PRE-MEETING PREPARATORY MATERIALS

1. "CWSRF 101: An Introduction to EPA's Clean Water State Revolving Fund." *Clean Water State Revolving Fund.* (March 2015) – PowerPoint presentation
2. "The Drinking Water State Revolving Fund: Background Information." *Clean Water State Revolving Fund.* (February 2016) – PowerPoint presentation
3. "The Newest Player in the Climate Change/Renewable Energy Game: EPA's $100+ Billion Clean Water State Revolving Fund." *Michael Curley and Lindsay Haislip*. (April 2014)
4. "Informal Memo from the National Housing Trust: Target Programs to Serve Low-Income Multifamily Housing." *National Housing Trust.* (August 2015)
5. "Using Financing to Scale Up Energy Efficiency: Work Plan Recommendations for the SEE Action Financing Solutions Work Group." *Lawrence Berkeley National Laboratory and Harcourt, Brown, and Carey.* (July 2013) – excerpts from a PowerPoint presentation

APPENDIX C – PARTICIPANT FEEDBACK SUMMARY

SUMMARY

The meeting was well received. The highest value for most attendees was the convening itself, i.e. bringing this broad group of experts together and having an opening conversation. Additional high value outcomes identified by participants included learning about the breadth of possible opportunity, getting a better but still preliminary understanding of the possible finance tools, project types and the potential players. Universally participants wanted to go deeper and to have follow up conversations and next steps. The specifics of what they wanted to go more in depth on or follow up on varied directly with the multi-disciplinary nature of the group. Several people wanted more specific information on SRF program mechanics, EPA guidance on SRF program eligibility and connection to partners at the state level. Others still want more information on what a "project" looks like, which SRF financing tools are best matched to EE/RE opportunities, how the existing finance models work, and how they are justified as SRF eligible.

What was the most valuable part of the day?

Opening session which precipitated a very robust conversation.

Understanding that there is (potentially/likely) flexibility in:

-eligibility, circulate that draft!

-capital capacity, either *direct funding* indirect (i.e. guarantees) and "interagency" capability.

There are third parties that are available to stimulate the use of SRFs to address EE/RE in the states.

Getting to see the big picture, get me out of the weeds.

Learn what questions people had about SRFs. Hearing what states are doing, or want to be doing.

Open sharing.

Learned a lot about guarantees and investment authorities.

Learning about the different programs. It was also interesting to learn many states have the same hurdles.

Things under the tree.

Hearing how different state SRF's think about their role, responsibilities and constraints, as well as to hear EPA posture on this concept.

Learning about NY & PA models and micro-grid possibility.

For me exposure to energy issues and alternative potential projects – e.g. micro grids and shared solar.

Breakout sessions and the report outs were very informative.

Jim Levine's story.

Getting all these people into a room together.

Good mix of perspectives led to a rich discussion. Clear opportunities.

What could have been done better? Were there issues needing more time on?

More time, opportunity to re-direct based on audience reactions.

More time on technical aspects of the SRF could have been useful to understanding the benefits and limitations of the SRFs.

More emphasis on Penn and other models beyond NY. Less emphasis on disadvantaged communities.

N/A

Focus was on financing and activities at individual house level, rather than water systems as a whole. How to market EE/RE to states could have been discussed more.

Figuring out next steps.

Too much emphasis on one or two states versus others and potential barriers. Essentially no discussion of EE/RE in the water sector, which I believed would be the main focus.

Follow up meeting

Wished we could have pushed EPA staff more to understand what they are willing to do to support this.

Drilling into states and different answers to leveraging/capacity concerns, different models.

How to package a program to bring to an SRF for funding, particularly when dealing with individual homeowners.

Consider self-introductions at beginning. Each person's interests

N/A

I think we could have benefited from more SRF participation.

Targeted discussion of marketing opportunity.

Feedback for the facilitator:

Great Job!!

Some of the comments seem to be drifting off target- so maybe jump in a bit sooner to "redirect"

Good Job.

Excellent job keeping the conversation going and keeping us on track. You had control but weren't disruptive.

Kept conversation focused and on time.

We need more baseline information bringing such disparate groups together. Should have prepared remarks given, even if abbreviated.

I like your openness to allowing a free flow of thoughts AND keep us on track time wise.

Concise reiteration of things said.

All great! Very helpful to have facilitator.

Great job!

Honestly I can't think of how you could have done this better.

An assistant doing the postings would be helpful.

Good job keeping on time and focused on the important issues.

Introductions at the start of the day.

Other /Additional comments

Share information on on-going recent developments

What can EPA do to help? Share info on emerging models as they become public, e.g., Pennsylvania.

APPENDIX D – ESSENTIAL POINTS ON SRF ELIGIBILITY AND FINANCIAL TOOLS

There are 51 state SRF programs (50 states and Puerto Rico), with a wide variety of structures and states ultimately determine the priority and focus of their programs, within the parameters of the authorizing statue and additional state and local legal requirements that may exist.

The Drinking Water and Clean Water State Revolving Funds (SRFs) programs provide low-costs or no-cost financing for communities building water quality projects. The Drinking Water SRF (DWSRF) provides financing for infrastructure directly related to drinking water supply, while Clean Water SRF (CWSRF) funds activities that protect, maintain and improve water quality. Under the DWSRF program only water systems are eligible recipients and only projects directly tied to water systems (i.e. to source protection, treatment, transmission and distribution, finished water storage, consolidation and creation of new systems) are considered eligible projects.

In the CWSRF, while the most common type of project is the construction or upgrade of a wastewater treatment systems, there is greater flexibility on the types of recipients and projects which can receive assistance from the fund.

Due to the eligibility constraints of the DWSRF, the greatest potential for creative uses of SRFs to support energy efficiency and renewable energy falls under the Clean Water SRF programs. The majority of focus on innovative use of SRFs at the meeting therefore related to the CWSRFs eligibilities and financial mechanisms.

OPPORTUNITIES FOR EE/RE IN THE DWSRF

The DWSRF promotes and funds energy efficiency and renewable energy measures at drinking water facilities. There remains significant potential to increase adoption of new energy efficient technologies (inline micro hydroelectric power, VFDs, solar powered mixers) to increase the energy efficiency and clean energy systems deployed at drinking water facilities. Greater marketing of the existing energy efficiency and renewable options to eligible recipients (i.e. water systems) during project development is the most obvious direction for EPAs support to DWSRFs.

ELEVEN CWSRF PROJECT ELIGIBILITIES

A project must meet criteria of one of these eligibilities to receive CWSRF assistance:

1. **Constructing Publicly owned treatment works (POTW)** (section 212).
2. **Non-point source** (section 319) Implementation of a non-point source management plan under the non-point source management program (319). Areas of particular value to include in 319 to build aligned EE/RE projects while also supporting clean water are atmospheric deposition, resource extraction, climate, and hydrologic.
3. **National Estuary Program** (section 320) includes broad authority to fund stormwater.
4. **Decentralized waste water systems** that treat municipal waste water or domestic sewage. This includes water quality projects at landfills when the landfill is required to have a NPDES permit and is publicly owned and all municipally owned landfills.
5. **Stormwater.** These include traditional pipe, storage, and treatment systems. It can also include green infrastructure, such as green roofs, infiltration basins, curb cuts and landscaped swales, and wetland protection and restoration. *If stormwater projects are not specifically required by a National Pollutant*

Discharge Elimination System (NPDES) permit, the project may be funded under section 319 nonpoint source authority. Land is eligible (section 212) if it will be an integral part of the treatment process, including when rights of way are used to address stormwater, and when the land is integral to the stormwater best management practice (BMP).

6. **Reducing the demand for POTW capacity through water conservation, efficiency and reuse.** For example, the installation of publicly owned water meters, plumbing fixture retrofits or replacement and gray water recycling in public buildings, and water efficient landscape irrigation equipment at public facilities are eligible. Publicly owned stormwater treatment and reuse is eligible.
7. **Watershed Pilot projects** (section 122).
8. **Energy Efficiency for POTWs.** Power Consumption: Certain capital costs to power POTWs are eligible. This may include energy efficient pumps, backup generators and other energy utilizing capital necessary to meet the water quality purpose of the POTW. Planning activities, such as energy audits, that have a reasonable prospect of resulting in a capital project are eligible. In addition, the pro-rata share of capital costs of offsite publicly owned clean energy facilities that provide power to a POTW are eligible. b. Power Production: Capital costs of energy generated onsite by a POTW are eligible. This includes clean energy, such as wind and solar, as well as methane capture from digesters.
9. **Reusing or recycling wastewater, storm-water, or subsurface drainage water.**
10. **Security measures at POTWs.**
11. **Technical Assistance.** To owners and operators of small and medium sized publicly owned treatment works to a. plan and develop projects eligible for funding and b. assist treatment works in achieving compliance.

CWSRF can provide assistance to eligible projects/activities using the following financial tools:

1. **Loans** (at or below market interest rate).
2. **Buy or refinance local debt**.
3. **Pledging fund assets to secure SRF bonds where the proceeds are deposited in the fund.**
4. **Guarantee or purchase insurance for:**
    a. local debt obligations
    b. loans of sub-state revolving funds
5. **Pay administrative expenses.**

In general, the State will establish, maintain, invest, and credit the fund with repayments, such that the fund balance will be available in perpetuity for eligible activities under the Clean Water Act.