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Deferred Payment Loans for Energy Efficiency

Case Study of a Low- and Moderate-Income Home Improvement Financing Model and Potential Application to Energy Efficiency Projects

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Executive Summary

Energy efficiency can provide important benefits for low- and moderate-income households such as lower utility bills and healthier, more comfortable homes, but the upfront costs of efficiency improvements are often a barrier. Extending financing to these households can help overcome this barrier, but presents its own challenges, including the financial burden of monthly payments and the risk of incurring the repercussions of nonpayment.

The deferred payment loan model can give low- and moderate-income households access to energy efficiency without the financial burden of monthly payments while mitigating the risk of nonpayment. From a program sponsor perspective, when grant funds are limited or unavailable, the model provides certain advantages of both grants and financing. Like a grant, target recipients have minimal risk, but like a loan, funds can serve multiple participants since the funding can be revolved. Organizations in several parts of the country have employed the model to provide safe, healthy homes by paying for home repair and home improvement. Program administrators also use the model to offer homebuyers down payment assistance. The programs are generally offered by local governments, mission-driven non-profits, or Community Action Agencies (CAAs)—nonprofit or public groups funded by the U.S. Government’s Community Services Block Grant (CSBG) program, which addresses the causes and conditions of poverty.

This case study provides a detailed overview of the deferred payment loan program for home improvements known as the Home Repair Program run by the Opportunity Council, a CAA serving three counties in Washington State.¹ This case study also considers two other CAA-administered deferred payment loan programs – one in Wisconsin and another in Michigan – as well as the Washington State Department of Commerce’s new Home Rehabilitation Loan Program (HRLP) (modeled on the Home Repair Program, it demonstrates the potential to broaden availability of the model beyond CAA service territories).

The Home Repair Program offers 0% interest loans with no payments due until sale of the property, the proceeds from which give the borrower sufficient funds to repay the loan. With these loans, borrowers can finance a range of home repair costs such as for health and safety improvements, electrical wiring improvements, lead and asbestos abatement, and repair and replacement of major housing systems. To be eligible, one must own their home, live in the Opportunity Council’s three-county service territory, and earn no more than 80% of the area median income. The Home Repair Program also supports certain measures such as insulation and furnace replacement that might be included in energy efficiency financing programs. Analysis of the Opportunity Council’s loan repayment data shows that most participants eventually repay their loans, allowing the funds to revolve and serve future customers. Program administrators interviewed for this case study believe that establishing a deferred payment loan model specific to energy efficiency would be straightforward. The benefits for low- and moderate-income households, the similarities to energy efficiency offerings such as rebates and efficiency financing,² and the perceived straightforward transferability suggest that, where a sufficient source of upfront funding is available, the deferred payment loan model is a viable and appealing means to open access to energy efficiency for moderate-income households and low-income households without access to sufficient or timely grant funding (e.g., Weatherization Assistance Program, or WAP, funding).

¹ Opportunity Council service territory incorporates Island, San Juan, and Whatcom Counties; see: <https://www.opppo.org/service-area/>.

² For example, average loan sizes for the Home Repair Program are \$12,600 compared to \$13,500 for other efficiency financing programs. Averages are calculated from Opportunity Council program data and Deason, et al 2016.

1. Introduction

Energy efficiency can provide multiple benefits for low- and moderate-income households such as lower utility bills and healthier homes, but upfront costs can put these improvements out of their reach (SEE Action 2017). Financing can give these households access to energy efficiency, but this can create its own burdens and risks including ongoing payments and the consequences of nonpayment (e.g., damage to credit). The deferred payment loan financing model for energy efficiency could address these barriers, helping low- and moderate-income households afford energy efficiency while minimizing financial burden and risk. This case study highlights a deferred payment loan program for home improvements implemented by the Opportunity Council³ in Washington State. Other jurisdictions could potentially apply a similar approach to support access to energy efficiency improvements in low- and moderate-income households.

This case study provides a range of information on the deferred payment loan financing program run by the Opportunity Council known as the Home Repair Program. Specifically, this case study:

- Shows how the Opportunity Council model addresses two important challenges to energy efficiency financing in the low- and moderate-income sector: (1) the financial burden of installment payments, and (2) the consequences of nonpayment.
- Reviews the track record of Opportunity Council Home Repair Program participants with paying back their loans.
- Profiles two other deferred payment programs for additional context on the model.
- Discusses how the deferred payment model could be applied to finance energy efficiency improvements.

Berkeley Lab researchers based this case study on (1) interviews with program administrators at the Opportunity Council and other deferred payment loan programs; and (2) the researcher's analysis of loan payment data the Opportunity Council provided.

2. The Opportunity Council Home Repair Program

The Opportunity Council of Washington is a Community Action Agency (CAA)⁴ that the U.S. Government's Community Services Block Grant (CSBG) program supports to address the causes and conditions of poverty. It serves Island, San Juan, and Whatcom counties in northwest Washington State.⁵ The Opportunity Council employs a deferred payment loan model called the Home Repair Program to give low-income homeowners access to 0% interest financing for home improvements.⁶ Participating households do not have to make installment payments. The deferred payment model only requires loan repayment at the time of sale, when

³ The web homepage of the Opportunity Council is: <https://www.opcco.org>.

⁴ A CAA is a nonprofit or public group funded by the Community Services Block Grant (CSBG) program that was created by the Economic Opportunity Act of 1964 with the purpose of addressing the causes and conditions of poverty. Additional information is available at: <https://communityactionpartnership.com/about-us/> and <https://communityactionpartnership.com/mission-and-promise/>.

⁵ According to U.S. Census Bureau data, the counties making up Opportunity Council's service territory make up about 4.4% of the population of Washington.

⁶ Programs profiled in this case study serve low-income households but the model could be very helpful for moderate-income households as well. Low-income households may have access to grant funding that could pay for home efficiency improvements (grant funding should be a first solution for low-income households, with a low-risk financing solution like the deferred payment model used only if grant funding is unavailable or unavailable in a reasonable time period). Moderate-income households do not have access to the same grant funding as low-income households but many have the same challenges in affording the up-front costs of efficiency improvements.

the household typically will have cash on hand. This arrangement makes it more likely the borrower will be able to repay the loan and less likely that they will suffer negative consequences from nonpayment.

2.1. Home Repair Program overview and capital sources

The Opportunity Council has operated the Home Repair Program since 1992. The program is open to homeowners in the Opportunity Council service territory earning no more than 80% of area median income. The Opportunity Council will lend up to 80% of the combined loan-to-value ratio of the house, ensuring that participating owners retain at least 20% equity in their home. The arrangement includes a lien on the property. This lien is junior (i.e., subordinate) to any existing mortgages, although the Opportunity Council has the right to decline to be subordinated in the event the homeowner later seeks to secure other financing to the property. The Home Repair Program allows financing for a range of home repairs and remediation, such as health and safety improvements, electrical wiring improvements, lead and asbestos abatement, and repair and replacement of major housing systems (see Appendix A).⁷

As part of the applicant qualification process, the Opportunity Council undertakes the following steps:

- Ensures the house is:
 - In Opportunity Council service territory;
 - Owner occupied; and
 - Salvageable.
- Verifies the applicant makes under the maximum income allowed by the program.
- Checks that repair needs are related to durability and/or health and safety.
- Confirms that there is sufficient value in the home.⁸

The Opportunity Council has used different sources of capital to fund the Home Repair Program since its inception (see Table 1). By leveraging multiple funding sources, the Opportunity Council maintains an available pool of capital even though some loans take many years to revolve (see Section 2.3). In the early 1990s, it used competitive U.S. Department of Agriculture (USDA) Housing Preservation Grants (HPG).⁹ The USDA funds provided annual funding until the mid-1990s, when they became more competitive and less reliable for the purposes of the program. At that point, the Opportunity Council began looking to other funding; in particular, it turned to the Washington State Department of Commerce's HOME Investment Partnership Grant (HOME) and the Housing Trust Fund (HTF).¹⁰

Recipients must reimburse HOME and HTF annual funds to Washington State once Home Repair Program participants repay the Opportunity Council. Currently, the main source of the Home Repair Program's capital is direct Community Development Block Grants (CDBG)¹¹ from the Department of Housing and Urban Development (HUD)—which are distinct from the CSBG that funds overall Opportunity Council

⁷ Opportunity Council staff note that it is important to have a list of eligible measures, which gives program administrators an objective (rather than subjective) assessment to ensure all receive fair, equitable, and consistent treatment.

⁸ Opportunity Council usually uses the home's assessed value to confirm there is sufficient value to make the loan. Less often—if the assessed value is too low and seems out of line with the current market value of the home—they may do a drive-by appraisal (which comes with a cost, usually around \$500, whereas assessed values are publicly available at no cost).

⁹ USDA still offers Housing Preservation Grants, see <https://www.rd.usda.gov/programs-services/housing-preservation-grants>.

¹⁰ Information on the Washington State Department of Commerce's HOME Investment Partnership Grant is available at: <http://www.commerce.wa.gov/wp-content/uploads/2015/12/htf-home-handbook.pdf>. HOME is no longer an active program in Washington State. Information on the agency's Housing Trust Fund is available at: <https://www.commerce.wa.gov/building-infrastructure/housing/housing-trust-fund/>.

¹¹ HUD offers a number of CDBG programs aimed at building stronger, more resilient communities.

operations¹²—as well as previously lent, revolved funds. These funds have all supported loan capitalization and program operation, though the different pools of money have different rules and restrictions.

Table 1: Opportunity Council Home Repair Program primary program funding. Program loan capital has come from multiple sources.

Capital Source	Approximate Annual Amount	Type of Funding	Regularity
USDA HPG (federal)	~\$60,000	Grant	Annual (1992 to mid-1990s)
HOME, Housing Trust Fund (Washington State)	~\$400,000–\$500,000	HOME funds must be reimbursed	Annual (mid-1990s to 2000s)
HUD CDBG (federal)	~\$167,000	Grant	Every 3 years (2005 to present)
Revolved program funds	~\$60,000–\$100,000	Revolved HOME and HTF funds must be reimbursed, HUD and USDA funds do not)	Annual (mid-1990s to present)

Some loan terms may depend on the rules governing programs that provide the loan capital. For example, loans using HOME capital have a cap of \$40,000 whereas CDBG-funded loans have a cap of \$25,000. As lending to low-income and otherwise disadvantaged households can involve risk, the Home Repair Program has contingency reserves in case of unforeseen costs on any given project. These reserves come from donations, fee-for-service work, and unobligated, revolved loan funds (Quigley and White 2019).

2.2. Program administration and soft costs

Ten Opportunity Council staff members work on the Home Repair Program, each spending roughly 15% of their time on the program, so about 1.5 full time equivalent staff. Their roles include program manager, project coordinator, program eligibility determination, and home inspector.¹³ Beyond the capital costs of the projects themselves such as materials and contractor labor costs (Appendix A provides details on allowable costs), administrative, and other “soft” costs include:¹⁴

- Project coordination
- Title search
- Contract writing
- Inspections
- Property appraisal
- Income verification
- Outreach

The Opportunity Council collects fees from participants for some of these costs. Generally, all direct project costs as well as external costs (e.g., title search) are included in the loan. The Opportunity Council does not charge participants for any of its own costs.¹⁵

¹² CSBG funds are not used to fund the Home Repair Program.

¹³ Opportunity Council employs approximately 325 people who support multiple programs.

¹⁴ Other soft costs for a deferred payment loan program may include recording of deeds and liens, mileage, and scope of work (Johnson 2020).

¹⁵ The Truth in Lending Act (TILA) and Real Estate Settlement Procedures Act (RESPA) Integrated Disclosures (collectively known as TRID) allows a partial exemption from disclosure requirements for housing assistance loans provided the loan meets certain criteria, including that fees are no more than 1% of the principal amount (see: <https://blog.alta.org/2017/09/trid-allows-for-partial-exemption-for-housing->

2.3. Home Repair Program loan repayment experience

Using loan ledger data provided by the Opportunity Council, Berkeley Lab analyzed the repayment performance of its borrowers from program inception in 1992 through late 2018 (a total of over 400 borrowers, some of whom took out more than one loan). Because there is no specified loan term and participants are not required to make installment payments, these loans cannot go delinquent and Berkeley Lab cannot study loan delinquency. Instead, Berkeley Lab calculates the cumulative probability that a loan was repaid or written off over time.¹⁶ Figure 1 presents results and Appendix B contains technical details of the modeling.

As Figure 1 shows, the Home Repair Program data suggest that the majority of loans are eventually repaid and only a small share of loans are written off (declared as losses); however, a substantial share remain outstanding even after 20 years.¹⁷ The data suggest that any given loan has about a 25% likelihood of being repaid within seven years, about a 50% likelihood of being paid back within 20 years, and more than 60% likelihood of being repaid within 25 years. Conversely, the data show that a loan has less than a 10% likelihood to be written off even through a 25-year time horizon.

Loans not repaid or written off are still considered as outstanding, and the data suggest that a loan has a greater than 25% likelihood of still being outstanding after 25 years. There is greater uncertainty about loan repayment rates with regards to longer-lived loans (i.e., loans serving homes that aren't sold within 25 years of origination). The Home Repair Program has been running for 26 years in the period of analysis, and relatively few loans have reached the longer (i.e., 20 years and beyond) terms shown in Figure 1.

[assistance-loans.html](#)). Program administrators should take this into account when considering the soft costs to include in the loan and which to grant.

¹⁶ Some borrowers make payments before home sale. These tend to be one-time payments, presumably when capital became available to the homeowners for specific reasons. In one case a borrower seems to have voluntarily adopted a payment schedule, paying the same amount back each month. However, in a significant majority of cases, no payments were made prior to home sale. Berkeley Lab set partial payments aside for this analysis and instead estimated the odds that a loan is either fully paid off or written off.

¹⁷ Opportunity Council may write-off a loan if there is insufficient money to pay it back when the borrower sells their house. This could happen, for example if there is a significant decline in the market value of the home rendering the borrower unable to repay the loan. Loans may also be written off in other cases (e.g., fire, bankruptcy, or homeowner death).

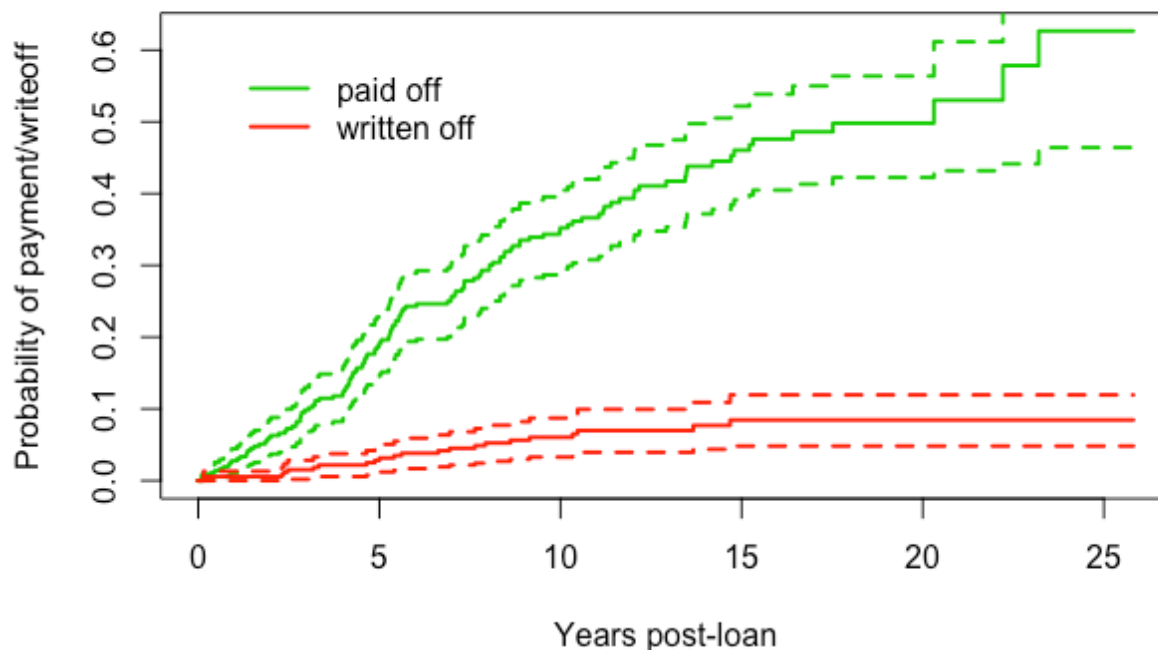


Figure 1. Cumulative odds that a loan is paid off or written off over time. Based on Opportunity Council data. Green lines represent loans that borrowers have repaid, red lines represent loans that the Opportunity Council has written off. Solid lines show the share of loans paid off or written off from the data; dashed lines are 95% confidence intervals assuming that the loans to date are a representative sample of other potential Opportunity Council loans.

Contextualizing the financial performance of a deferred payment loan program is challenging because the time periods involved are so long (as noted, over 25% of loans have not resolved after 25 years) and there are no interim performance indicators available. However, it is worth noting that consumer loans to credit-challenged populations often experience double-digit write-off rates, so the loss rates observed to date in the Opportunity Council program are not unusual. Appendix C contains detailed information on the Home Repair Program’s loan portfolio write-offs and losses, and on comparisons to the performance of other loan products.

More importantly, the deferred payment model offers a key advantage over a grant-based approach because most of the capital is eventually repaid and, depending on the source of capital, the Opportunity Council can subsequently re-lend to support other borrowers. A caveat is that some stakeholders contend that assistance to low-income communities should only focus on grant funding since grants do not add any financial obligation for participants (SEE Action 2017).¹⁸ Text Box 1 addresses ways low-income participants can be protected.

¹⁸ The Opportunity Council’s Ross Quigley notes that the deferred payment model could be very helpful for moderate-income households who may have challenges paying the up-front costs of efficiency improvements but do not have access to grant funding to pay for them.

Text Box 1. Considerations on protecting low-income participants

Some low-income stakeholders argue that in order to protect participants from abuse and the potentially very negative consequences of non-payment, programs should only use grant funding—not financing—to assist low-income households. Others point out that grant money is limited, in great demand, and not enough is available to execute all cost-effective energy efficiency improvements (SEE Action 2017). Given this tension, what follows are some questions that program sponsors should consider about this model to safeguard participants. These questions—and how the Opportunity Council handles these matters—include:

- *Recognizing that deferred payment loans can be very long-term, who will hold the loan?* For example, will the loan be held by a mission-driven organization, or can it be sold to a profit-driven entity? The Opportunity Council holds all the Home Repair Program loans. One subject matter expert giving input on this case study suggested that selling these loans should be prohibited.
- *Will the loan automatically subordinate to any new loan on the property, or will the program administrator retain the right to decline or accept subordination (i.e., accepting that, in nonpayment or partial payment situations, other creditors would be repaid first)?* Automatic subordination gives the homeowner more flexibility, but could put program dollars at greater risk. The Opportunity Council retains the right to deny or approve subordination. For example, if a participant attempted to secure financing for a second property using the participating home, the Opportunity Council may decline to subordinate their loan.
- *Will there be rules about occupancy or about transfer through inheritance?* Consider a case in which an elderly owner moves to a nursing home and, as a result, the loan does not come due. Similar to rules about subordination, the absence of these rules would give participating low-income households more flexibility. The Opportunity Council makes these decisions on a case-by-case basis, which can help ensure that the program loans keep to the intent of the program.
- *Is it possible that the improvements could increase the value of the house and therefore increase the household's property taxes?* If so, are there any steps that can be taken to mitigate the impact? The Opportunity Council does not have measures designed to prevent increased property taxes, but has no indication that their improvements have increased assessed property values (and therefore property taxes).¹⁹

¹⁹ Opportunity Council does not collect data to determine whether program improvements increase home sale prices. Even with the data, determining how the improvements impact home value would be challenging (e.g., distinguishing between changes due to market movements vs. changes due to program improvements). However, national data suggests that energy efficient homes sell for more and sell faster. Berkeley Lab will be further exploring the relationships between household energy efficiency and home sale prices in forthcoming work. See existing research on home value and energy-efficient homes online at: https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/Energy%20Efficiency%20for%20Real%20Estate%20Professionals%20non-editable_0.pdf.

3. Other deferred payment loan programs

In addition to the Home Repair Program, the Berkeley Lab team identified 12 other deferred payment loan initiatives with slightly differing models in six states across the country.²⁰ Eight of these programs focus on home improvements and four provide down payment assistance for home buyers. Among the entities running these other programs are local governments (the majority) but also CAAs, mission-driven non-profits, and state governments. While the Opportunity Council defers payment until sale of the home, some of these other deferred payment programs cap the deferral at a certain amount of time (e.g., 15 years), and include other stipulations (e.g., that payment comes due if the borrower moves from the house, even if the house is not sold).

This section details two other examples of deferred payment loan programs intended to make home improvements affordable to low-income households. These programs provide proof of concept that other jurisdictions can implement and sustain the deferred payment loan model over time.

3.1. Neighborhood Housing Services of Southwest Wisconsin's Home Improvement Loan Program

Neighborhood Housing Services of Southwest Wisconsin (NHSSW) is a non-profit organization offering a variety of housing services to rural households in Southwest Wisconsin. Since 1981, NHSSW has offered 0% interest, deferred payment loans for home improvements to keep homes “safe, healthy, sanitary and handicap accessible.”²¹ The program is open to insured owners of site-built homes in the NHSSW service territory who are current on their mortgage and property taxes, and make less than the county median income level. NHSSW places a lien on the home and requires no interim payments. The loan does not come due until the borrower sells the house or moves.

The NHSSW program draws on five different sources of capital, including HUD CDBG funds. As in the case of the Opportunity Council Home Repair Program, NHSSW must follow different regulatory rules depending on the source of capital. For example, if a loan through the NHSSW program uses CDBG funds, the project must bring the borrower's home up to code and remediate it for lead.

Between December 2018 and December 2019, the NHSSW program made 22 loans with approximately \$1.1 million of funding. Over its life, about 1% to 2% of participants have not repaid their loans. The amount that revolves back to NHSSW varies from year to year and can depend on the housing market; for example, in 2018, approximately \$300,000 returned to NHSSW, while in 2019, approximately \$110,000 returned (Johnson 2020).

3.2. Washtenaw County, Michigan, Office of Community and Economic Development

The Office of Community & Economic Development (OCED) is a CAA housed in the local government of Washtenaw County, Michigan. Since the 1980s, OCED has administered the Home Rehabilitation program. According to OCED, it designed the program to bring participants' homes “into compliance with common housing standards to provide safe, decent affordable housing.”²² For families making 80% or less of area

²⁰ The identified programs are as follows: Three in Michigan; two in Washington including one city-led and one state-led; two in Wisconsin, including one for home improvement and one for down payment assistance; one in Minnesota; one in Colorado that has ended; two in California, both for down payment assistance; and one in Texas for down payment assistance.

²¹ See: <https://www.nhsrwi.org/home-improvement-loan-program/>

²² The OCED webpage for its Home Rehabilitation Program: “Home Rehabilitation Program,” <https://www.washtenaw.org/748/Home-Rehabilitation-Program>.

median income (AMI), the Washtenaw program offers 0% interest loans up to \$25,000 with no payment obligations until the borrower sells the house. While the borrower remains in the home, OCED forgives one third of the obligation every 10 years (after 30 years, it forgives the entire obligation).

The Washtenaw program receives about \$300,000 to \$400,000 per year through HUD CDBG money to fund projects. OCED uses a separate part of the CDBG grant to pay for program administration. A portion of returned loan funds revolve, but OCED does not depend on that money to sustain the program. The program currently has around 500 outstanding loans and supports between 50 and 60 new projects per year. From start to finish projects may take as little as a month or as long as four months. Historically, the Washtenaw program has experienced one project per year in which the homeowner is unable pay (i.e., they sell the home and do not have sufficient funding to repay the loan). On average about 10 borrowers repay loans each year, bringing in between \$150,000 and \$200,000 that can later be re-used (Kraft 2020).

Text Box 2. Expanding beyond the three-county CAA service territory in Washington State

While the deferred payment loan model to date has been administered primarily via CAAs in their service territories, Washington State has implemented another version of the deferred financing model. Specifically, the Washington State Department of Commerce has launched a new statewide deferred payment loan program for rural low-income households called the Home Rehabilitation Loan Program (HRLP).²³ While based on the Opportunity Council's Home Repair Program, the HRLP has several key differences. One key difference is that the HRLP loan accrues interest, which can add significantly to the amount that must be paid off when the home is sold.²⁴

4. Benefits and drawbacks of the deferred payment loan model

As demonstrated by the Opportunity Council Home Repair Program and other case studies presented in Section 3, the deferred payment loan model offers a low-risk, successful way to give low- and moderate-income households access to needed funds for home improvements. Program administrators interviewed said that the deferred payment model should transfer to supporting low- and moderate-income household access to energy efficiency measures in an easy and straightforward way. However, the deferred payment loan financing model is not without certain drawbacks that should be understood upfront.

²³ Information on the Washington State Department of Commerce Home Rehabilitation Loan Program for rural low-income households is available at "New Home Rehabilitation Loan Program (HRLP) for Rural Low-Income Households," <https://www.commerce.wa.gov/growing-the-economy/energy/weatherization-and-energy-efficiency/rural-rehab/>.

²⁴ Other differences include qualifying applicants based the federal poverty level (as opposed to area median income) and basing home value on assessed value rather than appraised value. Given rising home values—which assessed values may not reflect—using assessed values could potentially result in an applicant lacking sufficient equity to qualify.

4.1. Benefits: Leveraging deferred payment loans for energy efficiency

As currently implemented, the Home Repair Program focuses on funding general home improvements. If focused on energy efficiency, the deferred payment loan model could offer several key benefits for serving low- and moderate-income households, including the following:

- The deferred payment model presents less risk of nonpayment than a typical energy efficiency loan, as payment comes due when the household has available cash (i.e., at the time of home sale). As discussed above, the ongoing financial burden, a key feature for low-income households, is eliminated because the model does not require installment payments.
- Participants can easily reduce utility bill costs. If the model was focused specifically on energy efficiency, it could provide an additional benefit of helping low- and moderate-income households save money on utility bills. The higher-than-average energy burdens and cash flow challenges of lower-income households highlight the importance of saving on utility bills (SEE Action 2017). Because of the deferred payment structure, almost any energy efficiency project would immediately improve a household's cash flow, often substantially.
- The model can stretch available efficiency program dollars. As the NHSSW program administrator noted, deferred payment home repair programs help low-income households live in safe, healthy homes when grant funding is either scarce or unavailable. Using the model to focus on energy efficiency could make homes more efficient by making efficiency grant money go farther. From a program sponsor and program administrator perspective, the model offers some of the advantages of both grants and loans. Although often capitalized with grants, the model can serve more households by revolving repayments over time.
- The program model might successfully reach and qualify low-income households, and it could offer efficiency alongside other low-income programs. CAAs, the entities that generally offer deferred payment loan programs for home improvement and repair, are well-suited to provide a suite of other services. Running programs through CAAs can be helpful for program promotion among low-income households and for income verification, as CAAs already interact with those households for other needs. Doing so also ensures low-income households can readily take advantage of other services available through the CAA.
- Program administrators have noted that maintaining loan records until property ownership changes requires less work and less expense than servicing loans on an ongoing basis, thereby lowering participant costs as well.

The deferred payment loan model is comparable to typical energy efficiency loans in many fundamental aspects. For example, the Opportunity Council's Home Repair Program and residential energy efficiency financing programs have similar average loan sizes (\$12,600 and \$13,500 respectively).²⁵ Moreover, the Home Repair Program supports some energy efficiency measures. For example, the Home Repair Program allows financing of new HVAC systems, duct work, and electrical improvements (see Appendix A for a list of eligible improvements through the Home Repair Program). The NHSSW program allows furnace replacement, insulation, and replacement of windows and doors.²⁶

²⁵ Averages are calculated from Opportunity Council program data and [Deason, et al 2016](#).

²⁶ See: <https://www.nhsrwi.org/home-improvement-loan-program/eligible-home-improvements/>.

4.2. Challenges and Drawbacks of the Deferred Payment Loan Model

The deferred payment loan model is not without challenges and drawbacks. Among these are the following:

- This model requires a stable, long-term organization, ideally with a separate, robust business line and program portfolio.
- Program sponsors/administrators must obtain sufficient funding to start and maintain the program. Since capital can take decades to revolve and the timing of repayments is uncertain, capital requirements (at program launch and potentially on an ongoing basis) are higher than for other program models. State energy offices with revolving loan funds capitalized through federal legislation such as the American Recovery and Reinvestment Act funding or legal settlements such as the Petroleum Overcharge Settlement funds could potentially use that money to support programs that use the deferred payment model.
- Given the uncertain repayment schedules and likely low interest rates (e.g., 0% in the case of the Opportunity Council program), this type of program is unlikely to interest private lenders.
- Because of the long payback periods, the model is not suitable as a pilot program. Thus, program sponsors cannot easily test the model out in their own jurisdictions.
- Only homeowners, not renters, can qualify for the program (though renters also cannot qualify for many other energy efficiency financing options).
- Grant funding sources used by existing deferred payment loan programs have rules and regulations that must be navigated (e.g., having to perform lead remediation).

As discussed above, the deferred payment model also offers unique benefits for low- and moderate-income households that may justify these drawbacks in many cases, and can be customized to ensure local needs and considerations are addressed.

5. Conclusion

This case study details a financing method that, if applied to energy efficiency, could make energy-saving upgrades affordable for low- and moderate-income households. Known as the deferred payment loan financing model, this method can help low- and moderate-income households adopt energy efficiency improvements to their homes while avoiding upfront costs, avoiding burdensome financing payments, and minimizing the risk that participants will not be able to repay the loan.

Specifically, this case study considers the deferred payment loan program called the Home Repair Program. This program is run by the Opportunity Council, a Community Action Agency (CAA) funded through the U.S. Government's Community Services Block Grant (CSBG) program and serving the three counties of Island, San Juan, and Whatcom in Washington State. The program has operated successfully for more than 25 years. As analysis in this case study demonstrates, most of the loaned capital has returned to the program to be re-loaned in the future.

Additionally, this case study profiles two other CAA-administered deferred payment loan programs to help low-income households afford home improvements. These include the Home Improvement Loan Program administered by the Neighborhood Housing Services of Southwest Wisconsin (NHSSW) and the Home Rehabilitation program administered by the CAA-housed Office of Community & Economic Development (OCED) of Washtenaw County, Michigan. All three CAA-run deferred payment loan programs have successfully employed this financing model in their three respective states (Washington, Wisconsin, and

Michigan) over several decades, demonstrating the model's longevity and its adaptability to different geographies. In addition to adaptability and longevity, the model's application by Washington State's new statewide HRLP shows interest in broadening availability of the model beyond single CAA service territories.

The deferred payment loan financing model may allow program sponsors and program administrators to serve more households with the same amount of investment, since funds from loan repayment can be used (where allowed) to fund new loans. Deferred payment loans offer this primary advantage of loans—i.e., that the funding revolves and can serve more customers—while simultaneously providing a primary advantage of grants: that they do not impose ongoing financial obligations on the borrower.

References

- Davies, John, David Finet and Vicky Lippiet (retired Opportunity Council staff). (November 5, 2019). Interview with Lawrence Berkeley National Lab.
- Deason, Jeff, Greg Leventis, Charles A. Goldman, and Juan Pablo Carvallo. (June 2016). *Energy Efficiency Program Financing: Where it comes from, where it goes, and how it gets there*.
- Deason, Jeff, Greg Leventis. (January 22, 2019). "Memo: results of Opportunity Council loan repayment analysis."
- Johnson, Violet, Neighborhood Housing Services of Southwest Wisconsin. (January 31, 2020). Interview with Lawrence Berkeley National Lab.
- Kraft, Aaron, Office of Community & Economic Development, Washtenaw County, Michigan. (January 14, 2020). Interview with Lawrence Berkeley National Lab.
- State of Washington Department of Commerce. (2019). Guidelines for the Low-Income Home Rehabilitation Revolving Loan Program (HRLP), July 1, 2019—June 30, 2021.
- State and Local Energy Efficiency Action Network (SEE Action). (2017). *Energy Efficiency Financing for Low- and Moderate-Income Households: Current State of the Market, Issues, and Opportunities*. Prepared by Greg Leventis, Chris Kramer, and Lisa Schwartz of Lawrence Berkeley National Laboratory.
- Quigley, Ross, Kyle White (Opportunity Council). (October 24, 2019; November 25, 2019). Interview with Lawrence Berkeley National Lab.

Appendix A: Eligible improvements in the Opportunity Council's Home Repair Program

The following is a list of hard costs that are eligible for the Opportunity Council's Home Repair Program. Washington's statewide Low-Income Home Rehabilitation Revolving Loan Program (State of Washington, 2019) uses the same list of eligible improvements.

1. Essential improvements to ensure occupant health and safety and building durability, which may include:
 - a. Rot removal and replacement
 - b. Foundation or structural improvements
 - c. Crawlspace excavation
2. Energy-related improvements, which may include:
 - a. Crawlspace excavation
 - b. Electrical wiring improvements
3. Lead-based paint and asbestos testing, hazard remediation, removal, or abatement, which may include:
 - a. Lead-based paint abatement and remediation (e.g., window and door replacement, strike, and friction repair or replacement)
 - b. Vermiculite and asbestos abatement
4. Improvements for handicapped persons per state and federal requirements
5. Repair or replacement of major housing systems (structural; electrical; plumbing; heating, ventilating and air conditioning; roof) and infrastructure (septic, sewer, water, foundation), which may include:
 - a. Roofing tear-off and roof replacement (including sheathing replacement)
 - b. Electrical improvements (panels, knob and tube wiring, aluminum wiring, insufficient electrical service)
 - c. Plumbing improvements
 - d. Heating, ventilating, and air conditioning work (new heating system, combustion safety issues, and duct systems)
 - e. Foundation or structural improvements
 - f. Rot removal and replacement
 - g. Crawl space excavation
6. Site improvements, including utility connections, as needed in keeping with local and state requirements.
7. Applicable state and local taxes on purchased items or services
8. Emergency storm repairs
9. Seismic retrofits
10. Radon mitigation, based on test results
11. Pest removal and prevention.

Appendix B: Technical details of loan repayment modeling

The statistical analysis conducted for this case study estimates the cumulative probability that a loan made by the Opportunity Council will be repaid or written off over time. This analysis is based on the Opportunity Council's loan ledger data. The data provided by Opportunity Council include the date of loan origination and the dates of all payments or write-offs. The loan data are right-censored: the dates the analysis observes are dates at which payments or forgiveness occur, but in many cases, neither event occurs before the end of the dataset. Survival modeling accounts for this right-censoring. Berkeley Lab estimated a Kaplan-Meier non-parametric model on the data using the `survfit` function in R.

In this approach, all loans begin as outstanding and can transition to either paid off or written off status. The analysis simplified the data in several ways. In cases in which two or more invoices for the same client had the same date, the analysis treated them as a single loan. When a single client had multiple loans and multiple repayments, the analysis assumes the first loan in time was paid off first. Finally, if more than half of a closed loan was forgiven, the analysis considers the entire loan forgiven. Conversely, if more than half of a closed loan was repaid, the analysis considered the entire loan repaid. These assumptions permitted a tractable quick analysis and affected few loans. The Berkeley Lab team is confident that these assumptions do not significantly affect the results.

The model does not account for differences in loan performance over time; it estimates the model on all the data without regard for when the loans were made. It should be noted that the Opportunity Council's Home Repair Program spanned the period of the 2008 housing crisis, so performance during those years is reflected in the modeled repayments. That said, future repayment and write-off patterns would be expected to differ if economic or other relevant conditions change.

Appendix C: Analysis of the Home Repair Program's loan portfolio write-offs and losses

The Home Repair Program loan portfolio had cumulative write-offs of about 8.3% over the 25 years of data available, meaning that about 8.3% of the loan principal issued (i.e., dollars, not number of loans) was written off. Annualized losses (write-offs divided by the average loan seasoning, or age, in the portfolio) are about 1%. Comparing the write-off rate of Home Repair Program loans to other loans is difficult, but our best attempts at doing so suggest that this loss rate is reasonable given the program characteristics.

Many factors that vary significantly in different loan portfolios can systematically influence loan performance (e.g., underwriting, security, borrower pool, what is eligible to finance) making it challenging to choose an appropriate comparator. Furthermore, conventional lenders generally charge a loan off after a borrower has not made payments for some time (often 120 days), but such write-offs will not occur in the deferred payment model because there are no payments to miss. Additionally, approximately 58% of all Home Repair Program loans, and about 30% of loans that reached 25 years of seasoning, were still outstanding in the period of analysis, allowing only a partial view of the program performance.

Home Repair Program loan write-offs are higher than annualized write-offs for residential real estate loans from Federal Reserve data over the time period of our Home Repair Program data (Q3 1992 through Q2 2018), which average about 0.5%. However, they are lower than annualized write-offs for non-credit card consumer loans over the same time period, which average about 1.2%. For additional information, refer to: <https://www.federalreserve.gov/releases/Chargeoff/chgallsa.htm>.

These loan pools may have higher average credit scores, higher income borrowers, and (in the case of real estate loans) more senior security. Other aggregates of consumer lending performance show significantly higher losses than observed in the Opportunity Council data. For example, Kroll Bond Rating Agency maintains a consumer loan performance index comprised of securitizations of loans made by online lending platforms.

In this index, annualized loss rates on Tier 3 consumer loans—i.e., loans to the most credit-challenged borrowers—have been above 13% every month since the index began in August 2016. Annualized loss rates on Tier 2 loans—to somewhat less credit-challenged borrowers—have been above 7% in every month and above 10% in 43 of 53 months through July 2016. For additional information, see: <https://www.krollbondratings.com/documents/report/34153/abs-auto-loan-indices-spreadsheet>.

Together these comparisons are evidence that Home Repair Program loans perform within the broad range of more conventional, market-rate loans.

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