



# Consumer Financing of Beneficial Electrification Products in Maine

## A Review of National Best Practices, On-Bill Financing, and Comparative Analysis of Financing Options

Prepared for:



Maine Public Utilities Commission

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Michael Simmons

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**Prepared by:**



**Dunsky Energy + Climate Advisors**

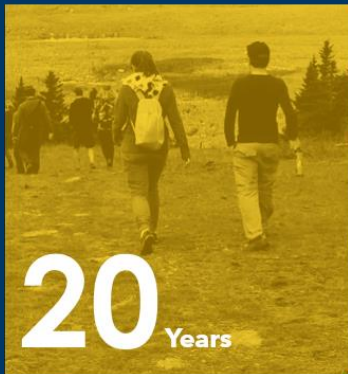
50 Ste-Catherine St. West, suite 420

Montreal, QC, H2X 3V4

[www.dunsky.com](http://www.dunsky.com) | [info@dunsky.com](mailto:info@dunsky.com)

+ 1 514 504 9030

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# Executive Summary

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## Context

This report, commissioned by the Maine Public Utility Commission (MPUC), is in response to the enactment of LD 1724, the “Beneficial Electrification Policy Act”, which mandates the creation of a study on cost-effective consumer financing for beneficial electrification products. Beneficial electrification involves deploying electric technologies to replace fossil fuel-based systems, aiming to reduce greenhouse gas emissions and overall energy consumption. Overcoming barriers to beneficial electrification measures, such as upfront costs, is crucial - and will require a mix of both incentives and financing.

Consumer financing programs can play a pivotal role in overcoming these barriers. These programs vary in design, primarily via their repayment vehicles and credit enhancement tools. Repayment vehicles differentiate traditional loan programs (like soft loans) from on-bill lending programs, where consumers repay their loans through their monthly utility bill.

## Approach and Key Findings

The national best practices review of this study included desktop research and interviews with program administrators of a variety of consumer financing programs, including on-bill programs, soft loans, and third-party financing mechanisms such as Energy Service Agreements (ESAs). Several themes emerged from this work, including a range of different approaches to **eligibility** criteria (both in types of technologies included and consumer eligibility), relative consensus in basic **consumer protection** measures such as approved contractor networks, a desire to balance **cost-effectiveness** with inclusion of beneficial electrification measures, and competing views on recourse for non-payment.

The on-bill lending review looks more specifically at the three types of on-bill lending programs: **on-bill financing programs**, in which utility funds are used for the program, **on-bill repayment programs**, where capital is sourced from third-parties such as private lenders or from public capital, and **tariff on-bill programs**, where cost recovery is tied to the meter, rather than the individual. Programs differ in terms of their underwriting criteria, consumer protection measures, and other design elements. The on-bill lending review also involved interviews with stakeholders within the Maine electricity system to better understand administrative challenges and regulatory changes that would be required to implement an on-bill lending program in the state.

The comparative analysis of this report evaluates each financing mechanism against a set of criteria, including the ability of the program to address barriers faced in key markets and for key technology types, potential sources of capital, administrative cost and complexity, consumer protection measures, underwriting criteria, cost-effectiveness considerations, and fit with Maine’s existing system. Key themes from the analysis emerged:

- Strong adherence to **cost-effectiveness** is inversely related to **addressing barriers for key technology types**, as stringent cost-effectiveness makes costlier beneficial electrification measures ineligible, particularly for those outside of energy efficiency;

- **Capital sources**, particularly for on-bill programs, have a major impact on **underwriting criteria**, as utilities can be more flexible with underwriting criteria when they are taking on the risk of the loan or using public capital (rather than a private capital source). This can in turn improve **eligibility for low-income groups** and others that would be unlikely to qualify for a traditional loan;
- **Consumer protection measures** can vary from program to program, but there is a high degree of similarity between program types;
- **Administrative cost and complexity** grows when utilities or other entities are required to build new capacity or function outside of their existing mandates, but can be reduced by relying on external entities with existing expertise.

## Recommendations

These findings informed a final set of **recommendations for future consideration when developing a consumer financing program in Maine**. These recommendations seek to leverage existing strengths and successes to benefit from consumer trust, limit implementation and administrative challenges for utilities, and properly balance cost-effectiveness, consumer protection, and program accessibility and eligibility with risk.

**Recommendation 1:** If the State wishes to pursue an on-bill lending program, on-bill repayment is likely the best program design method.

Efficiency Maine Trust, through its Green Bank, offers a number of consumer financing options that has earned the entity a positive reputation amongst consumers in the state regarding energy efficiency upgrades. Any on-bill program should aim to capitalize on this success by involving Efficiency Maine Trust, potentially as the program administrator if feasible. On-bill repayment (OBR) programs offer the most flexibility in terms of capital sourcing and administration models, and would be best suited to ensuring Efficiency Maine is able to play a key role in program administration.

**Recommendation 2:** Prioritize work with utilities to develop a mechanism for billing for loan repayment.

Additionally, utilities reported a high degree of perceived administrative complexity and capacity challenges with any type of on-bill program. Particularly, creating a line item to bill for loan repayment was noted as a potential bottleneck to moving forward with an on-bill lending program from some utilities. They also expressed concern with models where they would be responsible for sourcing or providing capital, as commonly is the case with OBF and TOB programs. Ensuring early action is taken to create a billing mechanism would be essential to timely program development.

**Recommendation 3:** In an on-bill lending program, design should consider cost-effectiveness, but should not adhere strictly to bill neutrality.

Strict adherence to bill neutrality or cost-effectiveness tests for consumers may result in fewer eligible measures available to consumers, particularly as it relates to measures outside of traditional energy efficiency. Leniency with cost-effectiveness will ensure that a full suite of measures can be considered.

**Recommendation 4:** An on-bill lending program should seek to use alternative underwriting criteria to screen for eligibility.

Alternative underwriting criteria allows program administrators to consider aspects like bill repayment history in lieu of traditional criteria such as credit scores. This practice can increase risk for the lender, but can greatly expand program access – particularly for low-to-moderate income (LMI) groups – and can increase program volume, especially for those who would be unlikely to receive a personal loan from a traditional financial institution (i.e. improve additionality and impact of the program).

**Recommendation 5:** Consider leniency when developing recourse for non-repayment of loans.

While many programs utilize shut-offs for non-repayment of loans, evidence suggests that this does not meaningfully impact default rates. Alternative recourse should be considered when developing an on-bill lending program.

**Recommendation 6:** Seek sources that may be able to provide credit enhancements, such as loan reserves or guarantees.

Credit enhancements, such as loan loss reserves, loan loss guarantees, and interest rate buy-backs, are a useful tool to reduce lender risk, which can provide comfort with moving forward with some of these access-expanding recommendations. If capital sourcing can be found, inclusion of a credit enhancement could allow the program additional flexibility in program design.

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A blue-tinted photograph of a winding road in a rural landscape. In the background, a wind turbine is visible on a hill. The road curves through the landscape, and there are some road signs on the right side. The overall scene is serene and open.

# CHAPTER ONE

## Introduction

# 1. Introduction

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This report was created for the Maine Public Utility Commission (MPUC), and follows the enactment of LD 1724, “An Act to Enact the Beneficial Electrification Policy Act”.<sup>1</sup> Section 9 of the Act states the following:

*“The Public Utility Commission shall conduct a study on **how to cost-effectively provide consumer financing of beneficial electrification products**, including products for energy efficiency, home or business energy storage, electric vehicle charging equipment and other distributed energy products through methods **including, but not limited to, on-bill financing** by standard-offer service providers or competitive electricity providers, or through some combination thereof. The study must provide analysis of the relative advantages and disadvantages of each financing method considered by the commission compared to existing and planned offerings of other finance initiatives in the State, including but not limited to the offerings of the Efficiency Maine Trust, the Maine State Housing Authority and the Finance Authority of Maine. The study must also review **consumer protection provisions** used by other jurisdictions that permit on-bill financing.”*

This report consists of a **review of national best practices of consumer financing models** for beneficial electrification, considering several priority areas for the State of Maine, including sources of capital, repayment mechanisms, origination and underwriting criteria, application to rural and low-to-moderate income groups, application of credit enhancements, customer protection features, and cost-effectiveness requirements.

As well, the report includes an overview of **on-bill lending programs** specifically, as well as a **comparative analysis** of various financing measures considered against a set of beneficial electrification priorities. Finally, **recommendations** for the development of a potential consumer financing program are considered.

## 1.1 Beneficial Electrification

Beneficial electrification refers to the strategic deployment of electric-powered, energy efficient technologies to replace fossil fuel-based systems, with the goal of reducing greenhouse gas emissions and energy consumption. Beneficial electrification measures may include adoption of energy-efficient technologies (ground or air-source heat pumps, electric water heaters, demand-reduction technology, etc.), electric vehicles, solar photovoltaic (PV) cells, and energy storage. Adoption of beneficial electrification measures are central to achieving emissions reductions in the buildings sector and meeting Maine’s ambitious climate goals.

### 1.1.1 Overcoming Barriers to Beneficial Electrification

Given that home and building owners must buy-in to beneficial electrification in order to achieve widespread success, there can be a number of barriers for consumers in driving

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<sup>1</sup> P.L. 2023, Chapter 328

adoption. **Access to financing** can address some of these barriers, which can provide increased opportunity for beneficial electrification at the consumer level.

### Barriers to beneficial electrification

**Financial barriers:** High upfront costs and scarce low-cost funding options make accessing beneficial electrification products challenging. Furthermore, longer term lengths often required for electrification projects creates risks for traditional lenders they may not be willing to take on.

**Process barriers:** It is difficult for renters to access loans due to transferability issues and split incentives between tenants and landlords. Additionally, traditional loan products often have strict lending criteria that limits access to low/medium-income consumers.

**Practical barriers:** Even when homeowners have access to capital, they may choose between competing projects (e.g. prioritizing cosmetic renovations over electrification). Additionally, there may be a lack of knowledge of electrification products among key actors and thus lack of supply.

### How financing can address barriers

**Financing provides the capital homeowners need by covering the full upfront cost of the project.** By spreading upfront costs over time, consumers are more easily able to manage payments and often balance the energy savings with additional monthly financing costs.

**Holistic financing programs can address multiple gaps in existing market interventions** through flexible underwriting and easy repayment and transferability (e.g., tied to the property instead of owner of the building).

**There is an opportunity to pair energy upgrades with other home renovations that improve comfort, health and safety, home value** and other considerations. As demand increases for these upgrades through financing programs, supply and knowledge will also improve.

However, financing is not the only tool to overcome barriers to beneficial electrification adoption: addressing the cost barrier for home and building owners **requires a strategic mix of rebates or incentives and financing options**. Ensuring the coexistence of both mechanisms is essential to maximize the adoption of beneficial electrification measures. While financing can help reduce the requirement for upfront capital, rebates or incentives are key to improving the business case of beneficial electrification products at point-of-sale and can ensure cost-effectiveness from the consumer's perspective. They also tend to be attractive to LMI households, who are more likely to be ineligible for financing due to underwriting criteria or other process barriers.

**Combining rebates with inclusive consumer financing can create an economic case** for both businesses and consumers without the necessary upfront capital to afford beneficial

electrification measures. For instance, a study done for the California Public Utilities Commission to assess the impact of an energy efficiency financing product revealed that **27% of surveyed participants would not have undertaken upgrades if the financing program was not available.**<sup>2</sup>

## 1.2 Application to Maine

### 1.2.1 Maine Won't Wait

The “**Maine Won't Wait**” climate plan for the State was established in July 2021, and represents Maine's strategy to address climate change and transition to a more sustainable future. The plan has a number of key priorities, including carbon neutrality by 2045, expanding renewable energy sources, and bolstering energy efficiency and beneficial electrification in buildings. Ambitious targets include the weatherization of 17,500 homes by 2025 and the deployment of 100,000 heat pumps by 2025, a goal that has already been surpassed. A new target has been set to install an additional 175,000 heat pumps by 2027.

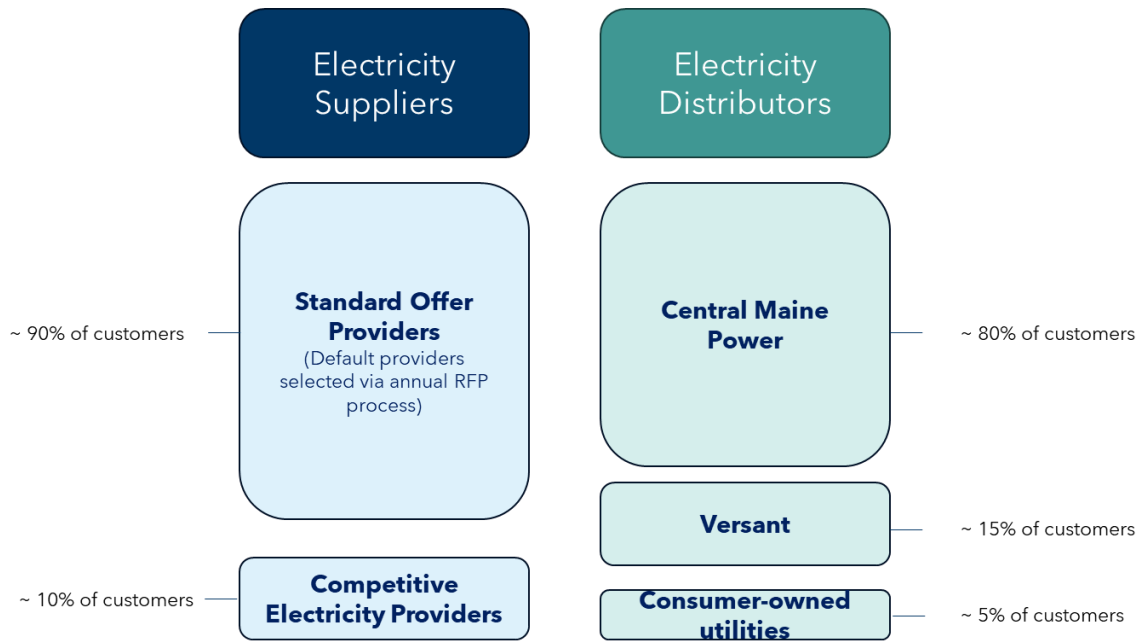
To meet these goals, it will be imperative that a suite of programs – including incentives, financing, and other measures to reduce barriers to adopt – be put in place to encourage adoption of beneficial electrification measures.

### 1.2.2 Electricity Landscape and Stakeholders in Maine

The state's electricity delivery needs are primarily served by two transmission and distribution (T&D) utilities, Central Maine Power Company (CMP) and Versant Power (Versant), though there are some smaller consumer owned utilities that also provide T&D to consumers. Maine has introduced retail competition to its electricity suppliers; however, currently, only approximately 10% of residential customers have chosen **Competitive Electricity Providers (CEP)**, with much of the population remaining with a **Standard Offer Provider (SOP)**. Consumers receive their electricity bill from their designated **T&D utility**, which includes consolidated costs for supply, transmission, distribution, and other charges. Some CEPs may choose to bill customers directly rather than billing customers through the T&D utility.

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<sup>2</sup> Opinion Dynamics, Dunskey Energy + Climate Advisors, Ridge & Associates. [Residential Energy Efficiency Loan Assistance Pilot: Final Impact Evaluation Report.](#)



**Figure 1-1: Electricity landscape in Maine**

Importantly, SOPs are selected via an annual RFP process and are responsible for supplying electricity to a designated percentage of the load, rather than serving individual customers directly. CEPs sometimes choose to bill customers directly, though they typically opt to bill through the T&D utility. For this reason, it would be challenging to directly involve SOPs and CEPs in an on-bill lending program, as they often do not directly participate in billing customers. Rather, an on-bill lending program would implicate the transmission and distribution utilities (CMP, Versant, and the consumer owned utilities) who manage consolidated billing for consumers.

**Efficiency Maine Trust** plays a central role in pursuit of Maine’s climate action plan, including driving the adoption of beneficial electrification. Their mandate to reduce energy costs and improve energy efficiency is closely tied to the goals of any potential consumer financing program for beneficial electrification.

Efficiency Maine Trust delivers triennial plans to drive adoption of high-efficiency heat pumps, battery electric vehicles and plug-in hybrid electric vehicles, and has a number of current programmatic offerings, including residential programs, commercial programs, and targeted low-income assistance programs.

In addition to incentives, Efficiency Maine Trust also offers a **Home Energy Loan** program, which provides loans of up to \$7,500 to income-eligible homeowners at a low interest rate (5.99%), and a Commercial Property Assessed Clean Energy (C-PACE) program, which facilitates energy efficiency loans via property tax assessment. These loans, along with other financing offerings for energy projects, are offered through the **Efficiency Maine Green Bank**.

### 1.2.3 Special Considerations

Given the geography and demographics of the State, there are some special considerations when determining the parameters and design of a potential consumer financing program. Maine is considered **the most rural state in the United States**, with 40% of the population living in one of Maine’s eleven rural counties.<sup>3</sup> Many of the homes and businesses in these counties rely on home heating oil to heat homes, which can pose additional affordability challenges for residents considering beneficial electrification.

As well, mobile and manufactured homes make up a higher proportion of the housing stock than other northeastern states, representing about 8% of units.

Maine also has a slightly higher proportion of **homeowners to renters** than the national average, though still maintains a sizeable rental sector, making up 27% of housing units.<sup>4</sup> The median annual income of renters (\$34,000) is lower than homeowners (\$72,000) in Maine.

## 1.3 Consumer Financing Programs

There are several elements to consider when designing a consumer financing program for beneficial electrification, though key elements include the **repayment vehicle, the source of capital, origination and general loan administration, and credit enhancements**.

This report primarily considers repayment vehicles (which differentiate traditional lending programs from on-bill lending programs, C-PACE programs, and other alternative lending programs). These elements are elaborated on throughout this report in the National Best Practices Review and the On-Bill Lending Assessment, and are then used to define program types and sub-types to be analyzed as part of the comparative analysis. Each are essential to ensuring success of any consumer financing program design.

See table 1-2 below for a description of the key program design elements.

**Table 1-2: Key program design elements**

Program Design Element	Description
<b>Repayment Vehicle</b>	Repayment vehicles (i.e. the methods by which the consumer repays the loan) influence factors such as program eligibility and accessibility, volume, and risk profile. For example, on-bill financing can offer ease-of use and expanded eligibility, while soft loans can also expand access to capital and lower borrowing costs.
<b>Source of Capital</b>	Whether capital comes from public or private funds, utility ratepayer or shareholder funds, or a mix of these, directly impacts the accessibility of financing programs and can also impact key eligibility measures such as underwriting criteria. Public funds can be more flexible and cheaper, but they are

<sup>3</sup> Maine Center for Disease Control & Prevention. "[Rural Health in Maine](#)". Accessed April 2024.

<sup>4</sup> Maine State Housing Authority. [Housing in Maine: An Overview](#). Prepared by: Daniel Brennan, MaineHousing Director.

	typically limited. Over the long term, it may be advisable to use public funds strategically to attract private investment, due to limited availability of public funds to capitalize programs indefinitely.
<b>Origination and General Loan Administration</b>	Designing an accessible and user-friendly loan origination process is crucial, encompassing application processing, underwriting, and fund disbursement. Equally important is determining which entities are responsible for origination and general day-to-day administration tasks such as customer support, payment processing, and loan management, to ensure satisfaction and program appeal.
<b>Credit Enhancements</b>	Credit enhancement tools can be included as part of a consumer financing program to reduce risk to the lender. With lower risk, the lender is encouraged to then provide more attractive loan terms, including longer term lengths, lower interest rates, or more flexible underwriting terms.

A blue-tinted photograph of a winding road in a rural landscape. In the background, a wind turbine is visible on a hill. The road curves through the landscape, with white dashed lines marking the lanes. The overall scene is serene and open.

# **CHAPTER TWO**

## **National Best Practices Review**



## 2. National Best Practices Review

A variety of barriers exist at the consumer level that slow or reduce uptake of beneficial electrification measures. Consumer financing programs, if designed appropriately, can help consumers overcome some of these barriers – particularly financial barriers – which in turn drives adoption of beneficial electrification and energy efficiency projects. There are various forms of consumer financing programs that exist in jurisdictions with similar goals to Maine. One of the main differentiators between program models is their **repayment vehicle** and if they offer **credit enhancement**.

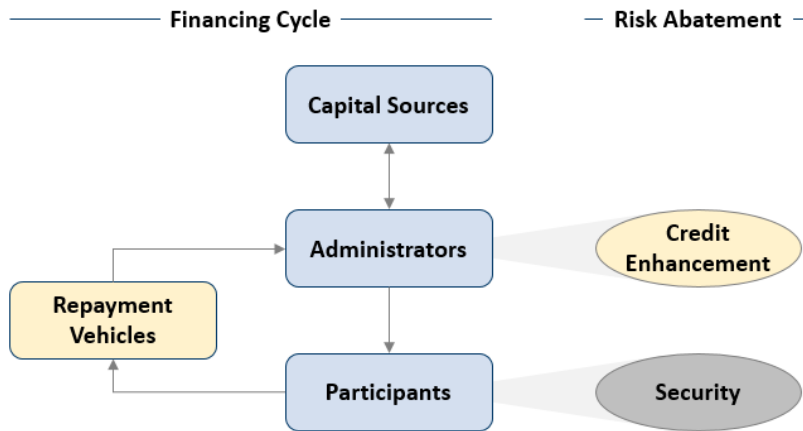


Figure 2-1: Consumer financing model components

### 2.1.1 Repayment Vehicles

Repayment vehicles refer to the method that the consumer uses to repay their loans to program administrators or third-party capital sources. Typically, repayment vehicles are either **direct repayment** to the program administrator or loan originator (in the case of a traditional loan program) or through the consumer’s **utility bill** (the cornerstone of on-bill lending programs). In some third-party financing mechanisms, repayments are **tied to energy savings**.

Table 2-1: Summary of repayment vehicles included in report

Repayment Vehicle	Description
<b>On-Bill Lending Programs</b>	Financing program where utility or private lender supplies capital to a customer to help fund beneficial electrification or energy efficiency projects and is repaid <b>through an existing utility bill</b> . Various sub-types of on-bill lending programs exist, including on-bill financing, on-bill repayment, and tariff on-bill, which are each expanded upon in Chapter 3.

<b>Soft Loans</b>	Preferential loans provided by government or quasi-public institutions (e.g. Green Banks). Preferential terms may include lower interest rates, longer loan terms, etc. These are repaid <b>directly to the lender</b> .
<b>Third-party mechanisms (ESAs, equipment leases, PPAs)</b>	Private or public sector financing tools used for energy efficiency or beneficial electrification products. Repayments for ESAs are set as a portion of demonstrated energy savings and are off-balance sheet for the borrower. They are primarily used for the commercial, public, or multi-family residential sectors. Power purchase agreements (PPAs) are used for renewable energy (e.g. solar, wind) and are a contractual agreement that agrees to sell an amount of energy generated by a renewable asset. Equipment leases are like financing; however, ownership of the asset can stay with the leasing entity, and thus often maintenance and repairs are included throughout the term.

## 2.1.2 Credit Enhancements

There are a variety of credit enhancement tools that can be included as part of a consumer financing program, each of which works by reducing risk to the lender. With lower risk, the lender is encouraged to then provide more attractive loan terms, including longer term lengths, lower interest rates, or more flexible underwriting terms. Credit enhancements require additional capital, but can ensure that programs offer more attractive loan terms than a typical commercial or personal loan through a traditional lender. Common credit enhancements include **interest rate buy-downs**, **loan guarantees**, and **loan reserves**.

**Table 2-2: Summary of credit enhancement types**

	<b>Description</b>	<b>Benefit to Consumers</b>	<b>Challenges</b>
<b>Loan Loss Reserve (LLR)</b>	A reserve is set aside to provide partial risk coverage to lenders in the event of loan defaults.	Lenders may approve loans to consumers with riskier profiles (i.e. lower credit scores or other eligibility considerations), improving access.	May not directly lower borrowing costs for all consumers
<b>Loan Guarantee</b>	The entirety of the lender's potential losses are covered by a third-party (usually the state).	Lenders may approve loans to consumers with riskier profiles (i.e. lower credit scores or other eligibility considerations), improving access.	Requires significant access to capital, does not directly lower borrowing costs for consumers. Guarantor's risk is unconstrained
<b>Interest Rate Buy-Down (IRB)</b>	A third-party (state or other entity) provides capital to buy down the interest rate on the loan.	Lower monthly payment for the consumer, which may make the loan more attractive.	Does not improve access to loans, can be costly

## 2.2 Program Design Considerations

Outside of repayment vehicles and credit enhancement tools, there are a number of other important design considerations when creating a consumer financing program. These may include the **source of capital**, the **underwriting and eligibility criteria**, **consumer protection** measures, and **cost-effectiveness** requirements. Depending on the priorities and goals of the program, program design can be adjusted to create the best conditions for success.

### 2.2.1 Capital Sources

To provide financing, programs need to source capital that can then be lent out to program users for beneficial electrification projects.

**Private capital** would typically come from a traditional financial institution, credit union or other lender. Using private capital may add challenges, as the program administrator may need to take on the risk of paying back the funds to the lender and take on additional costs to do so, depending on the terms of the agreement.

**Public capital** may be available for beneficial electrification financing programs at the state, regional or federal level. For example, the Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort among 11 northeast states to cap and reduce power sector carbon emissions, and currently provides funding to NYSERDA's beneficial electrification loans program. Many programs also use funds from the US Department of Agriculture (USDA) Rural Energy Savings Program (RESP), which provides zero-percent loans repayable over 20 years. Utilities that provide services or power to rural areas are eligible to apply to RESP. Public capital may also come from quasi-governmental institutions, like Efficiency Maine Trust's Green Bank.

In the case of an on-bill financing program, **ratepayer funds** may also be used as a source of capital. This differs from on-bill repayment programs, in which a third-party (private lenders) funds are used to fund projects. This model can give the utility more flexibility and control of eligibility and underwriting terms, which can help improve access to groups who would typically not qualify for a loan from private lenders.

However, using ratepayer funds or public funds has raised some concerns from utilities in Maine. These utilities feel that, depending on the loan structure, leveraging public funds could increase a utility's weighted debt load, which could impact rates for all ratepayers.

In the medium to long term, this impact can be balanced by the potential of many beneficial electrification products to reduce overall load (if energy efficiency related), which can defer investments in energy infrastructure upgrades and therefore lower utility costs. However, depending on program design, eligible measures, and consumer uptake, overall load may not be reduced as a result of the program. See Section 2.2.4 below for a more detailed analysis of the impact of beneficial electrification on electricity load.

Additionally, effective program design that promotes high levels of customer participation is crucial; the greater the participation, the more customers can benefit from bill reductions, which can offset the potential rate increases.

Many programs blend public, private, and ratepayer funds. For example, a program might utilize private lenders for the loans while covering program administration costs and

providing a credit enhancement using ratepayer or public funds. **Over the long term, strategically using public funds to attract private investment, such as through credit enhancements, may be advisable due to the limited availability of public funds to indefinitely capitalize programs.**

## 2.2.2 Eligibility and Underwriting Requirements

Program administrators use a range of approaches to underwriting, which can be grouped into four categories:

1. **Traditional underwriting standards:** Traditional metrics used in the market such as requiring a minimum credit score, maximum debt-to-income (DTI) ratio, and maximum loan-to-value (LTV) ratio.
2. **Expanded underwriting standards:** Uses traditional metrics such as credit score and DTI ratio but relaxes standards (i.e. allows lower credit score customers and/or higher maximum DTI and LTV ratios) to improve eligibility.
3. **Alternative underwriting standards:** Alternative metrics such as utility bill repayment history and shut-off notice history. This is the main approach used for on-bill lending programs.
4. **Hybrid underwriting standards:** A blend of traditional and alternative underwriting standards are used; for example, requiring a minimum credit score and strong utility bill repayment history.

Striking a balance between increasing access and mitigating risk is a crucial aspect of underwriting. Programs that use traditional underwriting reject applications eight times more on average than programs that rely on utility payment history, which significantly limits the program eligibility and by extension, impact. Requiring credit scores can also add additional administrative complexity to the process and requires in-house capacity to assess loan qualifications. Using alternative underwriting standards can help streamline the process for approval and reduces friction during the application process.

### Is it necessary for on-bill programs to include the threat of service disconnection?

Many on-bill programs apply the threat of utility service disconnection as recourse for non-payment from borrowers. However, it has been observed that programs incorporating the possibility for disconnection do not experience significantly different default rates than those without such threats. On-bill programs in general have low default rates, which suggests that regardless of the possibility of disconnection, consumers being able to repay their financing through their utility bill helps deliver access at low risk to the borrower. Consumers may not differentiate between the on-bill charge and other utility charges, leading to similar default rates to general utility non-payment rates.<sup>5</sup>

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<sup>5</sup> State and Local Energy Efficiency Action Network. (2014). [Financing Energy Improvements on Utility Bills: Market Updates and Key Program Design Considerations for Policymakers and Administrators](#). Prepared by: Mark Zimring, Greg Leventis, Merrian Borgeson, Peter Thompson, Ian Hoffman and Charles Goldman of Lawrence Berkeley National Laboratory.

Further, the risk of disconnection introduces several potential risks for residents, utilities, and program administrators, particularly for programs that aim to make financing available for lower-income customers and underserved communities. While some may view including disconnection as necessary to attract low-cost private capital, several alternatives exist that can help reduce the cost of capital. These include encouraging competition amongst private lenders to lower interest rates, requiring autopay on bills, standard loan collection processes, and implementing credit enhancements like interest rate buy downs or loss reserves.<sup>6</sup>

### 2.2.3 Consumer Protection Measures

Consumer protection features are designed to safeguard customers from fraudulent or unfair practices in the marketplace. For example, nearly all available consumer financing programs require consumers to install pre-approved eligible measures (e.g. high efficiency HVAC or DHW) and some require energy savings-to-investment ratios of greater than 1 (see below). This creates certainty for the consumer that the increased cost of paying for the measure over time will be outweighed by the cost savings brought by decreased energy use.

Another widespread consumer protection practice is the requirement for borrowers to use contractors from a pre-approved network in order to ensure that contractors are educated about the program, properly trained to install and maintain equipment, and not involved in fraudulent schemes or misleading advertisement about the available measures or financing.

Program administrators may also choose to set caps on what the contractors can charge for installation and the cost of the equipment. Some programs may also require that the contractor is responsible for maintenance and repairs over the financing term for further consumer protection.

Some programs go further and require assurance of performance for installed measures through energy audits or annual measurement and verification to guarantee savings for their customers and waive payment requirements of measures that do not meet standards promised upon installation.

### 2.2.4 Cost-Effectiveness

Cost-effectiveness is important in ensuring program funds are directed to projects that yield energy savings, but it's crucial to strike the right balance to ensure accessibility and encourage wider eligibility of beneficial electrification measures. Strict adherence to a high cost-effectiveness target, particularly over a short loan period, may significantly reduce the number of eligible measures that a program is able to offer to participants.

Not all programs include cost-effectiveness tests on an individual customer basis, but many have internal standards for cost-effectiveness which impact their lists of eligible measures. Some programs go further and specify minimum efficiency required for measures.

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<sup>6</sup> Chris Kramer, Consultant to The Connecticut Energy Board. (2014). [Disconnection and On-Bill Repayment](#).

Programs that include cost effectiveness tests typically look for **a savings-to-investment ratio (SIR) of at least 1**. The SIR is a metric used to compare the present value of the energy savings generated by the project over its lifetime to the initial investment required for implementation of the measure. A higher SIR indicates that the project or measure is more cost-effective, as the present value of the projected savings outweighs the initial investment.

Using the SIR as a tool can be limiting, as it primarily focuses on quantifiable costs and energy savings but does not consider other benefits of beneficial electrification outside of cost, such as improved air quality, a safer environment, and greenhouse gas emissions reductions.

Cost-effectiveness tests can be important to ensure consumer affordability and acceptance. However, it is more challenging to offer a variety of beneficial electrification measures and maintain a requirement that all eligible measures meet an SIR of at least 1. **This is a key differentiator between programs that strictly focus on energy efficiency (e.g. programs that aim to conserve energy use) and programs that seek to include a wide suite of beneficial electrification measures.** Energy efficiency measures, by definition, will reduce household or building energy consumption, corresponding to lower electricity supply charges. However, beneficial electrification measures outside of energy efficiency - including installation of new energy systems like solar PV, or installation of an electric vehicle charger - can create additional energy demand, which can lead to higher monthly utility supply charges. To design a program that meaningfully includes beneficial electrification measures outside of energy conservation, it is unlikely that requiring an SIR of at least 1 is feasible.

Note that in some instances, beneficial electrification will result in a customer switching from a gas-fuelled appliance to an electric appliance (for example, switching from a furnace to a heat pump). While this is likely to increase the costs of their electricity bill, the customer would be expected to generate savings in their overall energy costs due to larger savings resulting from reduced gas use.

Requiring SIR for program eligibility can also create additional administrative complexity and risk, particularly if programs do not have a pre-set list of eligible measures that meet the SIR requirement. Contractors may be required to take on the risk of ensuring that measures meet the prescribed SIR metric, which may result in promotion of more conservative measures that contractors feel confident will meet the requirements.

The SIR requirement of at least 1 is closely related to **bill neutrality**, which requires energy savings to be at least equal to costs of monthly loan payments. As discussed in the section above, bill neutrality can oftentimes be seen as a consumer protection measure, particularly for LMI consumers where ability to pay back the loan is paramount. Programs that include incentives or rebates could consider ensuring that the additional upfront capital provided allows measures to meet an SIR of 1 for LMI individuals.

### Is it important for on-bill programs to require bill neutrality?

Bill neutrality is often included as a program requirement for eligible measures for consumer financing programs **(1)** it may act as a consumer protection; **(2)** may help ration program funding to projects that deliver the most energy savings; and **(3)** may help drive increased adoption of the program.

However, requiring **bill neutrality can constrain consumer adoption instead of increasing it**. For example, in NYSERDA's programs, 70% of loans have gone to the Smart Energy Loan - which does not require bill neutrality - while 30% has gone to the On-Bill Recovery program which requires an SIR greater than 1.

Bill neutrality can also overlook other important factors that may be important to the customer, such as inclusion of key beneficial electrification measures, and may limit the overall impact of the program. Relying on metrics that assess ability to pay as a customer protection, rather than bill neutrality, can mitigate this risk.

**Comparative studies show that strict bill neutrality requirements can result in market penetration issues, and does not appear to have a major impact on default rates.**

## 2.3 Review of Best Practices

As part of this study, relevant financing programs for beneficial electrification in comparative jurisdictions were analyzed to identify and describe best practices. Programs were assessed via both desktop research and interviews with program administrators. A full list of programs evaluated is available in the appendix of this report.

### 2.3.1 Program Evaluation Criteria

The best practices review considered the following details for included programs:

- **Capital sources:** private and public sources of capital, including where ratepayer moneys are used.
- **Repayment mechanisms:** structures including on-bill lending and other facilities.
- **Origination and underwriting:** how programs attract and deem consumers eligible for loans.
- **Application to rural and low-income groups:** special eligibility criteria for underserved communities.
- **Application of credit enhancements:** use of tools such as loss reserves or loan guarantees to introduce flexibility.
- **Customer protection features:** assuring savings and ability to pay for potential customers.
- **Cost effectiveness requirements and assessments:** if applicable, how the program deems measures cost effective.

### 2.3.2 Review by Program

Below is a sample of programs included in the national best practices review. The full review can be accessed through the companion document, *Interim Report: National Best Practices Review*.

Programs included in this review varied greatly in design factors, including:

- **Geography:** Most programs existed at the state-level, though some had a smaller regional focus.
- **Scale:** Some programs, particularly those with a longer history, had deployed significant capital, while smaller pilot programs were also included.

- Target demographic and sector: Some programs focused on one of either the commercial or residential sector, while others included streams for both; there were also differences in requirements for inclusion of LMI groups in program funding.

### 2.3.2.1 Program: NYSERDA On-Bill Recovery Loan & Smart Energy Loan

This program was launched in 2011 and has issued over 41,000 loans to date, totalling over \$520 million in financing. The program includes three different products, including tariff on-bill financing, traditional loans, and bridge loans.<sup>7</sup> Most loans have been through their Smart Energy Loan (~70% of loans) and On-Bill Recovery Loan (~30% of loans). The cost-effectiveness requirement for the On-Bill Recovery loan has shifted borrowers to favor the Smart Energy Loan. The program focuses on the residential sector, but also offers loans to multi-family homes and small businesses.

**Table 2-3: NYSERDA On-Bill Recovery Loan and Smart Energy Loan Details**

<b>Capital source</b>	Regional Greenhouse Gas Initiative (RGGI)
<b>Repayment mechanism</b>	Tariff On-Bill (On-Bill Recovery Loan) and soft loan (Smart Energy Loan)
<b>Origination and underwriting</b>	<ul style="list-style-type: none"> <li>• Minimum credit score of 540 and DTI ratio of 40%</li> <li>• No bankruptcy, foreclosure, or repossession in past 24 months</li> <li>• Outstanding collections, judgments, liens and charge-offs may not exceed \$2,500</li> </ul>
<b>Application to rural and LMI groups</b>	No special criteria, but there is a requirement that 35% of funding from program goes to disadvantaged communities.
<b>Application of credit enhancements</b>	None
<b>Customer protection features</b>	Customers must work with participating contractor. All participating contractors are insured and subject to NYSERDA reviews.
<b>Cost-effectiveness requirements and assessments</b>	For On-Bill Recovery Loan only: Estimated monthly energy savings from installed measure must be greater than monthly loan payments.

### 2.3.2.2 Program: Hawaii Green Energy Money Saver (GEM\$)

Launched in 2019, the GEM\$ program provides financing of up to 20 years via tariff-on bill financing. It does not require any traditional underwriting criteria and has relaxed alternative underwriting criteria since its establishment in order to expand eligibility.

**Table 2-4: Hawaii GEM\$ Tariff On-Bill Details**

<b>Capital source</b>	Various sources including state green infrastructure bonds, state general funds, and federal funding
<b>Repayment mechanism</b>	Tariff On-Bill
<b>Origination and underwriting</b>	<ul style="list-style-type: none"> <li>• Must be current customer with min. 6 months of history with the utility</li> <li>• Households must be Low and Moderate-Income (LMI), defined as &lt;140% Area Median Income (AMI)</li> </ul>
<b>Application to rural and LMI groups</b>	Only LMI households are eligible to participate in the program

<sup>7</sup> Bridge loans are a short-term loan product that enables residential customers to finance federal and state tax credits and the NYC Real Property Tax Abatement for eligible renewable energy products. Loan amounts from \$1,500 to \$25,000 with a loan term of 2 years.



<b>Application of credit enhancements</b>	None
<b>Customer protection features</b>	Borrowers must use approved contractors who are verified for compliance. Contractors are capped in the rates they charge for installed measures and must conduct post-installation energy monitoring.
<b>Cost-effectiveness requirements and assessments</b>	Estimated bill savings must be between 5%-15% depending on number of disconnection notices borrower has received.

### 2.3.2.3 Program: PG&E Energy Efficiency Financing

This program in California is targeted to businesses and uses OBF and Pay-As-You-Save (PAYS) repayment mechanisms. The program leverages alternative underwriting criteria to offer loans via payment history screening (i.e. no past disconnection notices).

**Table 2-5: PG&E On-Bill Financing Program Details**

<b>Capital source</b>	Ratepayer funds
<b>Repayment mechanism</b>	On-bill financing and PAYS (Pay As You Save)
<b>Origination and underwriting</b>	<ul style="list-style-type: none"> <li>• Maintain active PG&amp;E business account for previous 24 months</li> <li>• Must have good credit standing, determined through payment history screening (no existence of disconnection notices in last 12 months)</li> </ul>
<b>Application to rural and LMI groups</b>	None
<b>Application of credit enhancements</b>	None
<b>Customer protection features</b>	<ul style="list-style-type: none"> <li>• Must use participating contractors</li> <li>• Prior to installation of equipment, contractor submits documents to Quality Assurance Reviewer</li> <li>• After installation, contractor required to conduct measurement and verification process annually</li> </ul>
<b>Cost-effectiveness requirements and assessments</b>	<ul style="list-style-type: none"> <li>• Project's estimated energy savings must be sufficient to repay the loan during maximum allowable term (120 months)</li> <li>• For larger projects (over \$250k), cost-effectiveness tests such as total resource cost and total system benefit are considered</li> </ul>

### 2.3.2.4 Program: Connecticut Green Bank Smart E-Loan

This soft loan program is administered by the Connecticut Green Bank, a quasi-public agency dedicated to accelerating the deployment of clean energy in the state. The program provides soft loans at low interest rates with flexible terms and is supported by credit enhancements, including both loan loss reserve and interest rate buy-down. Loans can be provided up to \$50,000 for residential buildings with one to four units.

**Table 2-6: Connecticut Green Bank Soft Loan Details**

<b>Capital source</b>	Private lenders and American Recovery and Reinvestment Act (ARRA) funds (for loan loss reserve and interest rate buy-down)
<b>Repayment mechanism</b>	Soft loan, repaid through private lenders
<b>Origination and underwriting</b>	Minimum credit score of 580 or above; all final underwriting decisions made by private lender

<b>Application to rural and LMI groups</b>	None
<b>Application of credit enhancements</b>	Loan loss reserve and interest rate buy-down
<b>Customer protection features</b>	Must use participating contractors
<b>Cost-effectiveness requirements and assessments</b>	No specific requirement but only qualifying measures are eligible for the program.

### 2.3.2.5 Program: Illinois Energy Efficiency Loan

This on-bill repayment (OBR) program uses a private lender, Slipstream, to originate loans. Slipstream partners with private capital providers to supply funding for loans through the program. This program excludes LMI groups and has had relatively low uptake.

**Table 2-7: Illinois On-Bill Repayment Loan Details**

<b>Capital source</b>	Private capital provider
<b>Repayment mechanism</b>	On-bill repayment
<b>Origination and underwriting</b>	<ul style="list-style-type: none"> <li>• Minimum credit score of 640 and DTI ratio of 50%</li> <li>• No bankruptcy within two years</li> </ul>
<b>Application to rural and LMI groups</b>	None - LMI groups are scoped out of program participation
<b>Application of credit enhancements</b>	None
<b>Customer protection features</b>	Must use participating contractors
<b>Cost-effectiveness requirements and assessments</b>	No specific requirement but only qualifying measures are eligible for the program.

## 2.4 Key Themes Identified

A number of themes emerged from the desktop research and administrator interviews conducted as part of the National Best Practices review, particularly related to **consumer eligibility, consumer protection, cost effectiveness**, and other areas of program design:

- **On-bill lending programs that allow for alternative underwriting criteria are able to expand eligibility:** Eligibility varied widely among the programs reviewed, including the sector and type of buildings included (residential, single-family homes vs. multi-unit residential buildings, and commercial), and individuals eligible to participate in programs. Generally, on-bill financing programs were more likely to offer alternative underwriting terms (such as considering payment and shut-off history instead of credit score and debt-to-income ratio), which allows for expanded eligibility, particularly for LMI groups. Some programs (like Hawaii’s GEM\$ program) specifically targeted LMI individuals, while others (like Illinois’ Energy Efficiency Loan) have excluded this group from their program.

- **Approved contractor networks are the gold standard for consumer protection measures:** There was some consistency in consumer protection measures, with almost all programs utilizing an approved contractor network, in which program participants are required to use a pre-approved contractor in order to access the program. As well, contractors were noted as a very positive force for marketing the program to eligible consumers.
- **Cost-effectiveness can also be an important consumer protection measure:** bill neutrality was also seen as a consumer protection feature, with many administrators voicing that consumers should consistently save more on their bill than they were paying in incremental loan payments. In some programs - like EcoSave - additional measures are taken to guarantee energy savings, and reduce or refund monthly payments if promised energy savings do not arise. However, not all programs required cost-effectiveness tests. Some administrators noted that strict adherence to cost-effectiveness can negatively impact the eligibility of some beneficial electrification measures.
- **Consequences for non-payment, including shut-off, differ between programs:** Unlike issuing traditional loans, lenders cannot simply recoup the asset as a result of loan default. Many programs use shut-off of electrical service as a consequence of non-payment, while experts advised that employing shut-offs does not meaningfully impact default rates and may be unpopular with utilities or lenders who wish to build trust and confidence with consumers.<sup>6</sup>

A blue-tinted photograph of a winding road in a rural landscape. In the background, a wind turbine is visible on a hill. The road curves through the landscape, and there are some road signs on the right side. The overall scene is serene and open.

# **CHAPTER THREE**

## **On-Bill Lending Assessment**

### 3. On-Bill Lending Assessment

On-bill programs allow utility customers to repay costs for beneficial electrification or energy efficiency improvements through their utility bill. There are three categories of on-bill programs: **on-bill financing (OBF)**, **on-bill repayment (OBR)**, and **tariff on-bill (TOB)** – each with distinct characteristics defined by their source of capital, ownership of improvements, transferability of the loan, and criteria for eligibility and underwriting.

**Table 3-1: Summary of on-bill program types**

	Source of capital	Owner of asset	Eligibility	Charge on monthly bill	Transferability
<b>OBF</b>	Utility funds	Building owner or homeowner	Building owners and homeowners	Debt payment	Loan typically must be paid off before selling home
<b>OBR</b>	Third-party (private or public)	Building owner or homeowner	Building owners and homeowners	Debt payment	Loan typically must be paid off before selling home
<b>TOB</b>	Public, utility, private	Utility (cost recovery charge tied to meter)	Building owners, homeowners, and renters	Cost recovery fee	Transferred to the next occupant

Importantly, TOB programs are not considered a loan, unlike OBR and OBF programs. Instead, they are structured as a cost recovery charge tied to the utility meter where upgrades are made. This significantly broadens eligibility, extending it to renters since the charge is associated with the meter rather than a specific homeowner.

In existing TOB programs, participation rates amongst renters vary; some programs see high uptake largely due to concerted efforts to engage with landlords and renters on the benefits of installing energy efficiency or electrification measures, while others see lower uptake. The success of TOB programs with renters largely depends on the design of the program and the effectiveness of its marketing strategies. The Environmental and Energy Study Institute (EESI) has helped launch many TOB programs and notes that, of these programs, 80% of participants are homeowners and 20% are renters.<sup>8</sup>

In contrast, OBF and OBR programs are considered loans and are linked to an individual utility account holder who is responsible for repayment. As such, they are typically not transferable when a home is sold and not applicable to renters.

<sup>8</sup>Most TOB programs the EESI has helped launch are administered by rural electric cooperatives. Proportionally, the number of renters in rural areas is typically lower than in urban areas.

## How do on-bill program lending rates and term lengths differ from consumer loans currently offered in Maine?

On-bill programs across the US generally offer more favorable terms than Maine’s existing consumer loans, with longer term lengths, higher maximum loan amounts, and lower rates. This advantage often stems from utilizing public or utility funds and/or credit enhancements backed by public capital, which helps reduce risks for lenders.

While there are several loans that specifically target energy products in Maine, they are generally more restrictive in terms of finance amounts and term lengths (except for Efficiency Maine’s 10-year option). However, they do offer better rates compared to personal and home equity loans. As well, the loans offered by credit unions focus on home heating products/heat pumps and do not include other beneficial electrification products.

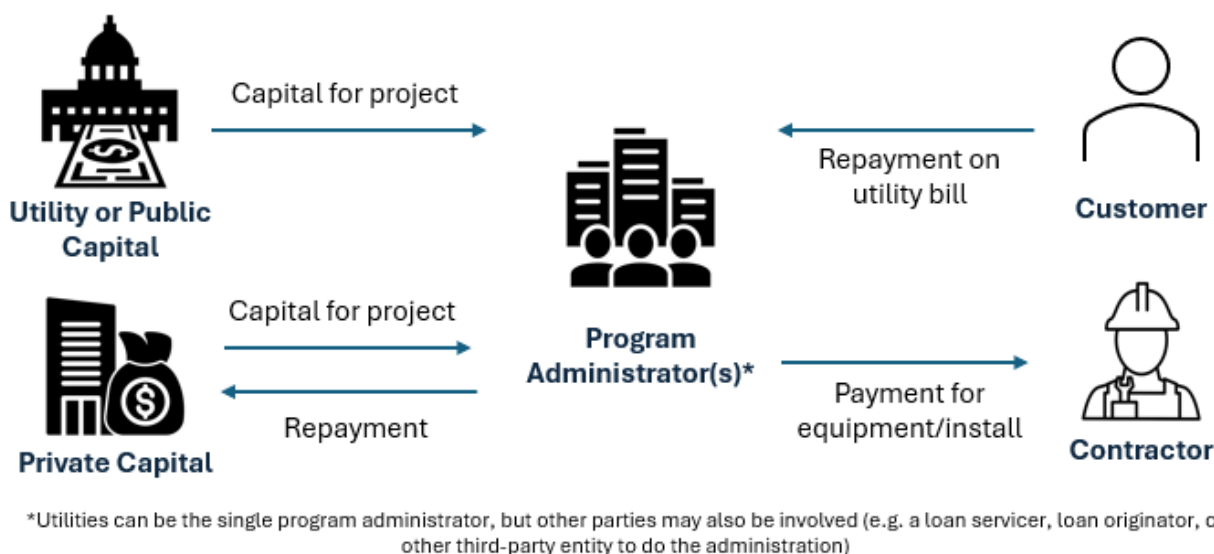
The rates and terms listed are reflective of the current lending environment, with a federal reserve rate of 5.33% at the time of analysis.

**Table 3-2: Existing consumer loans offered in Maine compared to reviewed on-bill programs**

Type of loan	Loan provider	Maximum term length	Maximum loan amount	Minimum interest rate
<b>Existing Loans in Maine</b>				
<b>Personal</b>	Maine Family Federal Credit Union	5 years	Varies	9.50%
	UCU Maine	5 years	\$25,000	9.99%
<b>Home Equity</b>	Maine State Credit Union	15 years	Varies	6.75%
	Maine Family Federal Credit Union	15 years	Varies	6.63%
<b>Energy Efficiency</b>	Maine Family Federal Credit Union	5 years	\$10,000	4.50%
	Maine State Credit Union Home	1 year	\$5,000	4.99%
	Efficiency Maine	10 years	\$7,500	5.99%
<b>On-Bill Programs</b>				
<b>OBF</b>	Various programs in California (for businesses only)	10 years	\$250,000 - \$1,000,000	0%
<b>OBR</b>	Various	10 years	\$10,000 - \$20,000	0.99% - 8.99%
<b>TOB</b>	Various	10 - 20 years	\$50,000 - \$100,000+ (some programs do not specify max)	0.50% - 5.50%

### 3.1 On-Bill Program Administration

While capital sources vary across on-bill program types, customer repayment for all programs is done through the utility bill. When private lenders are used, the utility collects funds from the customer and then passes the payment directly back to the lender. All programs typically have an approved contractor network, and contractors will work with the customer directly to install the equipment. Contractors are paid for the equipment and installation directly by the program administrator responsible (typically either the utility or loan originator). Figure 3-1 summarizes the flow of capital in on-bill programs.



**Figure 3-1: Capital flow within on-bill programs**

There is a wide spectrum of ways that utilities can be involved in an on-bill program. At one end, utilities can choose to only serve as the payment pass-through to a private lender and have them manage all other aspects of the program. On the other end, utilities can choose to be the sole administrator and manage everything from underwriting loans, to setting up new loans and their payments, to working with contractors, and billing customers. The administrative functions associated with an on-bill programs include:

- **Loan origination:** Initial stages of loan process, including receiving loan applications, underwriting, closing loans, and paying contractors
- **Loan servicing:** Ongoing management of the loan after origination, including payment processing, and maintaining records of payments and defaults.
- **Program administration:** General oversight of the program, including managing contractors, third-party entities responsible for loan origination and loan servicing, and marketing. Typically, the utility or a government funded body.

## 3.2 Underwriting Criteria

On-bill programs employ a variety of underwriting assessments before issuing loans, ranging from traditional methods that include credit checks, to expanded methods with less stringent credit score requirements, to alternative methods such as looking at utility bill repayment history. Utilities may also opt for a hybrid approach.

Table 3-3 summarizes an analysis from SEE Action comparing default rates and decline rates (percentage of applications that are rejected) across on-bill programs that use varying underwriting standards. As can be seen, the program that relies on traditional underwriting rejects participants approximately 5-8 times more than those that use alternative or hybrid underwriting standards. Using utility bill repayment history and/or shut-off history instead of traditional underwriting criteria can significantly increase access to the program and helps reach underserved customers that are not traditionally eligible for consumer loans. On-bill programs traditionally have very low default rates, and it has not been found that there is a strong association between default rates and the type of underwriting standard used. Similarly, it has not been found that programs that include the threat of utility service disconnection have significantly lower default rates than those that do not.<sup>6</sup>

Programs that use public, utility, or ratepayer (typically OBF and TOB programs) capital, are more amenable to using alternative underwriting than those that rely on private capital. Those that rely on private capital (typically OBR programs) that wish to use non-traditional underwriting standards need to consider the potential impact on their ability to attract private capital, as well as the willingness of utilities to share data on utility bill repayment history if they are not the ones underwriting loans. Providing credit enhancements can help shift the focus of private investors away from individual creditworthiness and more likely enable program administrators to tap into larger pools of low-cost capital.

**Table 3-3: Default rates and application decline rates based on underwriting criteria used<sup>5</sup>**

<b>Underwriting standard</b>	<b>Number of programs</b>	<b>Average decline rate</b>	<b>Average default rate</b>
<b>Traditional</b>	1	49%	0%
<b>Expanded</b>	3	25%	3%
<b>Alternative</b>	8	10%	<1%
<b>Hybrid</b>	9	6%	<1%



### 3.3 Consumer Protection Provisions

Various types of consumer protection provisions are included within on-bill programs designed to safeguard customers from unfair practices and sometimes also to ensure they have an ability to pay.

#### Eligible measures

All on-bill programs reviewed have a list of eligible measures that consumers can install as part of the program. The most common measures included are energy efficiency related, such as heat pumps, or high efficiency HVAC or water heaters. Some on-bill programs have consumer protection provisions that require savings to be at least as large as project costs, known as bill neutrality, as mentioned in the National Best Practices section. This requirement can constrain the list of eligible measures to energy efficiency measures that have shorter payback periods and leave out other beneficial electrification measures such as electric vehicle chargers or ground source heat pumps.

#### Approved contractor network

Most on-bill programs have a certified network of contractors that borrowers must use to ensure they are protected against pressured sales tactics and/or installations that are not done properly. Program administrators typically ensure they are certified with the appropriate credentials, conduct training to ensure they are knowledgeable on the list of eligible measures and how to talk about the program to customers, and in some programs choose to set caps on amounts contractors can charge customers. Contractors are often seen as the single greatest element in successful on-bill programs, as they often do most of the work in marketing on-bill programs and help assist homeowners in filling out paperwork, ensuring a faster turnaround of applications.<sup>9</sup>

#### Ability to pay criteria

Some programs reviewed require a specific maximum DTI ratio (monthly debt payments divided by gross monthly income). Although this is typically listed within the underwriting criteria, it can also be seen as a consumer protection as it ensures customers can manage their monthly payments and can repay their on-bill financing loan. The programs reviewed that included DTI had a maximum DTI requirement between 40% and 50% and had minimum credit score requirements.

Conversely, programs reviewed that use alternative underwriting (i.e. looking at bill repayment history) do not review DTI. Instead, they often incorporate bill neutrality or savings

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<sup>9</sup> Pacific Institute for Climate Solutions. (2015). [Cheaper Power Bills, More Jobs, Less CO<sub>2</sub>: How On-Bill Financing Done Right can be a Quick Win for British Columbia.](#)

requirements to ensure customers can afford payments and do not have an increase in their bills due to their participation in the program. However, because bill neutrality requirements are typically based on projected savings instead of actual, the variance in actual savings versus estimates have been found to be substantial. Therefore, using metrics such as DTI may be a more reliable consumer protection, particularly for LMI customers.

## Energy audits

Pre- and post-installation energy audits are a requirement in some on-bill programs; pre-installation audits provide customers with expert advice and a custom plan on possible measure(s) to install based on their home, while post-installation audits determine that the installation was done properly and assesses the actual impact of the installation. In practice, it has been found that mandating energy audits prior to installation may serve as an entrance barrier for consumers, as it is an additional step they are required to complete and typically at a cost.<sup>99</sup> Ensuring a seamless application process is a key aspect of successful on-bill programs, and pre-installation energy audits may dissuade consumers from participating in them.

## 3.4 On-Bill Lending in the Maine Context

Several of the Maine Public Utilities Commission's rules are relevant to the implementation of on-bill programs, including:

- **Payment waterfall:** Utilities in Maine are required by legislation to allocate payments in accordance with Rule Chapter 322: Metering, Billing, Collections, and Enrollment Interactions among Transmission and Distribution Utilities and Competitive Electricity Providers and Chapter 815: Consumer Protection Standards for Electric and Gas Transmission and Distribution Utilities. If an on-bill program were to be implemented, these chapters would need to be updated to indicate the placement of the loan repayment within the waterfall.
- **Service disconnection:** Utilities are permitted to disconnect customer's utility service in accordance with Rule Chapter 815 of the Public Utilities Commission. If an on-bill program were to be implemented in Maine, updates to this chapter could provide clarity on if service disconnection can be used as a consequence for non-repayment of the loan repayment.
- **Low-income assistance program (LIAP):** Low-income customers can receive electricity bill repayment assistance as set out in Rule Chapter 314: Statewide Low-Income Assistance Plan of the Public Utilities Commission.

Table 3-4 outlines the legislative or Commission rule changes necessary for the three types of on-bill programs. Specifying the payment waterfall and service disconnection procedures is required across all three types of on-bill lending programs. However, the creation of a tariff is

only relevant for a TOB program, and specifying the allowed rate of return is relevant for OBF/TOB programs when utility funds are used.

**Table 3-4: Legislative or Commission rule changes required for on-bill programs**

<b>Legislation</b>	<b>Description of change</b>	<b>OBF</b>	<b>OBR</b>	<b>TOB</b>
<b>Payment Waterfall</b>	Specifying where on-bill lending charges falls within the payment waterfall. Most commonly subordinate to other utility charges.	X	X	X
<b>Service disconnection</b>	Amendments to specify inclusion of service disconnection (if applicable and including as part of on-bill program).	X	X	X
<b>Creation of tariff</b>	TOB programs require the creation of a tariff that is approved by the MPUC.			X
<b>Rate of return allowed</b>	If utility funds are used for an on-bill program, an allowed rate of return may be considered.	X	*	X
<b>LIAP credits applicability</b>	Specify if LIAP credits can apply to financing repayments.	X	X	X
<b>Optional program design elements</b>	Certain jurisdictions have chosen to include specific design elements into legislation (requiring loss reserve, eligible measures, etc.). This is optional and not required.	X	X	X

\*Utilities may require capital expenditures to support OBR. If so, the Commission may consider an appropriate rate of return on these investments.

With respect to LIAP, the statutes and regulations do not clearly prohibit using these credits for financing repayment.<sup>10</sup> However, even if these credits may be used, due to the current waterfall repayment structure, it is unlikely that they are sufficient to cover more than outstanding transmission, distribution, and energy charges (assuming the on-bill charges are subordinate to other charges, as is commonly the case).

To note, LIAP credits are calculated based on income and electricity usage. While out of scope for this study, it is suggested that consideration be given to how electrification program(s) - which increase electricity usage - impact LMI customers' electricity consumption and overall energy bills. In particular, whether the LIAP benefits corresponds with the increase in usages and electricity bills relative to other forms of assistance customers would have received for heating oil and propane.

<sup>10</sup> See Rule Chapter 314 of the Public Utilities Commission.

Additionally, there exists legislation (within Title 35-A: Public Utilities) in the State of Maine that allows utilities to develop and approve a program to lease “effective electric heat pumps”<sup>11</sup>. While this legislation explicitly notes that it would not constitute financing (i.e. users would not own the heat pump and would instead be leasing it from the utility), any program design may consider if a complimentary heat pump leasing program could be developed, particularly to target LMI customers.

### 3.4.1 Program Administration

It is important that the program administrator of an on-bill program is a trusted entity, though there is flexibility in who fulfills this role. As seen in the list of programs reviewed in the National Best Practices, it is common for a separate entity to administer the program while the utility handles the payment processing. To this end, Efficiency Maine Trust could be well placed to administer an on-bill program, should the State move in this direction, given that they currently run various loan programs through their Green Bank. Note that program complexity – particularly creation of a new line item in the billing systems – was raised as a potential concern from distribution utilities in Maine, though this was not a concern raised from existing programs through the National Best Practices Review.

### 3.4.2 Opportunities for Rural and LMI Customers

A large proportion of Maine residents live in rural counties, are renters, or are considered LMI. The implementation of an on-bill program should be inclusive and ensure that these groups have access to it. Several program design elements mentioned in the above sections can be included to ensure an inclusive on-bill program, including, but not limited to:

- Using alternative underwriting such as utility bill repayment history and/or shut-off history instead of traditional credit checks;
- Allowing incentives to be coupled with financing;
- Including some ability to pay criteria (such as DTI) specifically for LMI customers to ensure they are protected from taking on additional debt that they cannot pay off;
- Ensuring renters are included in the program by implementing a TOB.

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<sup>11</sup> Title 35-A: Public Utilities; Part 3: Electric Power; Chapter 31: General Provisions; Subchapter 1: Electric Rates; [§3105. Heat pump program](#).

A blue-tinted photograph of a winding road in a rural landscape. In the background, a wind turbine is visible on a hill. The road curves through the scene, with white dashed lines marking the lanes. The overall atmosphere is serene and open.

# CHAPTER Four Comparative Analysis

## 4. Comparative Analysis

As part of the comparative analysis, each of the financing mechanisms were compared across various criteria to determine their fit with beneficial electrification priorities. A summary of the criteria analyzed is presented in Table 4-1 below, with the scoring for each detailed in Table 4-2 to 4-9. Each criterion was evaluated on a five-point scale, with a score of five being the most favorable and one being the least favorable.

**Table 4-1: Key criteria evaluated as part of comparative analysis**

Criteria	Description
<b>Ability to address barriers faced in key markets</b>	LMI households are less likely to access to capital at low rates and be able to absorb an increase in monthly bills; Rural households may face barriers such as a lack of contractors that service their areas; Renters have difficulty accessing loans due to transferability issues and split incentives between tenants and landlords.
<b>Ability to address barriers for key technology types</b>	Technologies that have longer payback periods may be more difficult to implement through financing programs (e.g. ground source heat pumps), as it may be difficult to meet a cost-effectiveness test.
<b>Potential sources of capital</b>	Private, public, and utility (ratepayer and shareholder funds) can be used for the financing mechanisms assessed. Scored based on the number of sources of capital options available.
<b>Administrative cost and complexity</b>	Scored based on the level of administration required for government entities and/or utilities. On-bill programs require strong coordination with utilities to be successful, while third-party mechanisms require less administration from government entities as they can be administered by the private sector.
<b>Consumer protection measures</b>	Typically depends on program design. The most common protection is having a certified contractor network.
<b>Underwriting criteria</b>	Range of approaches used that range from checking credit scores to looking at utility bill repayment history. Scored based on ability to increase access.
<b>Cost-effectiveness considerations</b>	Cost-effectiveness (as it relates to customer savings) is a requirement in many on-bill programs. Scored based on the ability to increase access to beneficial electrification measures.
<b>Fit with Maine’s existing system</b>	Considering legislative amendments that are required, existing entities that can administer programs, and ease of implementation.

## 4.1 Ability to address barriers faced in key markets

When it comes to addressing unique barriers that renters, LMI, and rural customers face, TOB programs are most favorable as they use alternative underwriting criteria which not only broadens access but can also streamline the application process. It is also the only program that is directly applicable to renters, as the payment obligation is tied to the meter instead of an individual homeowner.

**Table 4-2: Ability for programs to address barriers faced in key markets**

<b>Financing Mechanism</b>	<b>Description</b>	<b>Score</b>
<b>OBF</b>	Varies based on program design, but generally can be favorable to ensuring eligibility for LMI groups if the utility uses alternative underwriting criteria.	4
<b>OBR</b>	Varies based on program design, but generally can be seen as similar to traditional lending programs, unless public capital or credit enhancements are used to help create more favorable lending terms. There may be some benefits of increasing access if customers feel a strong sense of trust with their utility and therefore feel additional comfort paying back the loan via their utility bill.	3
<b>TOB</b>	Generally favorable to ensuring eligibility for LMI groups as utilities often use alternative underwriting criteria for TOB programs. TOB is also uniquely poised to provide financing options for renters, who are unlikely to be covered in other program models.	5
<b>Third-party mechanisms (ESAs, equipment leases, PPAs)</b>	Can work with customers in rural and LMI areas but varies depending on program design. ESA payments are based on actual savings, which helps protect customers, but they are limited to larger commercial, public, or multi-family buildings. PPA agreements are typically priced lower than a utilities per kWh cost, so customers are guaranteed savings. Leasing often ends up costing more than financing at a fixed interest rate as the cost of maintenance, repairs, and program administration is factored in.	2
<b>Soft loans</b>	Most soft loan programs use more lenient underwriting standards (e.g. minimum credit score requirement lower than traditional loans) and have lower interest rates, which can help expand eligibility to LMI customers, but are not typically as accessible as on-bill programs.	3

## 4.2 Ability to address barriers for key technology types

As discussed in the above sections, requiring specific cost-effectiveness tests (a common characteristic of on-bill programs) can decrease the technology types that are available to be financed. For this reason, some third-party mechanisms can help broaden barriers to key technology types more than on-bill programs.

**Table 4-3: Ability for programs to address barriers for key technology types**

<b>Financing Mechanism</b>	<b>Description</b>	<b>Score</b>
<b>OBF</b>	If there is a strong emphasis on cost-effectiveness - as there typically is for on-bill programs - this can be a hinderance for including costlier technology types, or those that are less focused on energy efficiency.	3
<b>OBR</b>	If there is a strong emphasis on cost-effectiveness - as there typically is for on-bill programs - this can be a hinderance for including costlier technology types, or those that are less focused on energy efficiency. Note that in order to allow for loan terms that are long enough to scope in a variety of technology types, public capital is likely required to enhance OBR's ability to provide significant access to beneficial electrification technology.	3
<b>TOB</b>	Stronger emphasis on cost-effectiveness than OBF/OBR programs as TOB programs are viewed as a utility expenditure. This can make it challenging to access beneficial electrification products not related to efficiency. However, security associated with TOB allows for longer terms and can scope in longer-term projects. Ultimately, the ability to address barriers in this area will depend on the program's adherence to bill neutrality and cost-effectiveness.	3
<b>Third-party mechanisms (ESAs, equipment leases, PPAs)</b>	PPAs reduce the upfront cost barrier of solar to customers and still allow them to benefit from reduce electricity costs, ESAs allow customers to bundle various measures together, and a range of equipment is typically available for leasing. For ESAs, given payments are based on savings, some technologies may not produce large enough savings to pay back the financing within a reasonable term length.	4
<b>Soft loans</b>	Typically, because of no strong emphasis on cost-effectiveness, a range of measures are allowed to be installed (heating and cooling, water heating, renewables, home efficiency, etc.). However, soft loans require significant support to allow for low interest rates, so it is difficult for programs to allow for the long loan terms required for significant access to a range of beneficial electrification technologies.	2



## 4.3 Potential sources of capital

A variety of capital sources are available for the financing mechanisms assessed, including private, public, and utility funds. OBR programs have the most flexibility in terms of where loan capital can come from.

**Table 4-4: Potential sources of capital**

<b>Financing Mechanism</b>	<b>Description</b>	<b>Score</b>
<b>OBF</b>	OBF programs specifically source capital from utility funds. This can be positive, as it allows the utility additional flexibility, but also carries dangers of increasing the weighted debt load of the utility and costs to ratepayers.	2
<b>OBR</b>	OBR programs source capital from private lenders, but can also source funds from public funds or utility/ratepayer capital. While private funds can be more restrictive to the utility than an OBF program in terms of the underwriting criteria, OBR has a significantly greater number of capital source options than OBF.	5
<b>TOB</b>	TOB programs can source capital from a variety of areas including public funds (most common), ratepayer funds, and private funds (less common). Using utility or public funds helps increase access but can potentially increase costs to ratepayers.	4
<b>Third-party mechanisms (ESAs, equipment leases, PPAs)</b>	Capital can come from the public or private sector. In cases where private capital is used, there may be a lower risk tolerance for projects that are taken on (e.g. ESAs backed by private equity may only take on very large projects of \$1M+).	4
<b>Soft loans</b>	Public capital is used for loan funding and preferential terms (buying down interest-rate or loan loss reserve). Can also choose to provide loan funding via private capital (or a mix of private and public), which reduces cost of capital requirement from public funds.	2

## 4.4 Administrative cost and complexity

All on-bill programs require utilities to create a mechanism to bill for loan repayment (i.e. create a new line item on utility bills), which itself creates administrative complexity.<sup>12</sup> OBF and TOB have higher administrative cost and complexity for the utilities compared to other program types as they may require the utility to build additional capacity to originate and service loans, as well as administer programs.

**Table 4-5: Administrative cost and complexity**

Financing Mechanism	Description	Score
<b>OBF</b>	As an on-bill program, OBF would require utilities to create a line item to bill for loan repayment, which adds some administrative complexity and could be a time-consuming process. Compared to other types of on-bill lending (OBR), there is a higher perceived administrative cost and complexity, as utilities may have to build capacity to become a lender and assess loan applications, market the program, and manage contractors. Flexibility does exist when third-party entities are responsible for program administration and/or loan servicing/origination instead of the utility, as seen in some of the programs reviewed.	2
<b>OBR</b>	Lower administration complexity compared to other types of on-bill programs, as utilities simply act as a medium between the consumer and private lender. The program administration requirements are still notable (e.g. managing contractors, marketing the program) and OBR requires upgrading the billing systems to include a line item for on-bill loan repayment. However, the OBR structure offers a greater deal of flexibility than OBF, as it allows an experienced partner, such as a green bank or local credit union, to take on loan origination, underwriting, and tracking loan repayment progress.	4
<b>TOB</b>	Compared to other types of on-bill lending (OBR/OBF), there is a higher administrative cost and complexity, as utilities would not only have to add a line item to bills but may have to build capacity to become a lender and assess loan applications (unless private capital is used). As well, there are added perceived administrative challenges and risk to associating the loan to the meter rather than the individual (such as managing the transferring of the	2

<sup>12</sup> Interviews with utilities in Maine revealed that implementing an on-bill program may require updating their billing systems, which may be costly. However, one investor-owned utility highlighted that OBR would not be difficult to implement as they already bill for similar 3<sup>rd</sup> party charges.

	charge), though these have been overcome in comparator jurisdictions. Flexibility does exist when third-party entities are contracted as program administrators and/or loan originators/servicers which can reduce administrative burden for utilities. There are also additional regulatory processes to follow when creating a TOB program, including filing with the PUC for approval, which can add rigidity to the program if it must go back to the PUC for every program change.	
<b>Third-party mechanisms (ESAs, equipment leases, PPAs)</b>	Varies depending on the program design; third-party mechanisms can be offered by both private and public entities. When offered by private companies, the administrative costs and requirements for government or a quasi-government institution are low.	4
<b>Soft loans</b>	There is flexibility in terms of administrative approaches. Governments can choose to provide funds and work with a third-party entity to provide administration, underwriting, and marketing.	3

## 4.5 Consumer protection measures

The types of consumer protection measures that are built into programs varies depending on the program. TOB programs typically include shut-off as a consequence for non-payment, as they are considered a utility expenditure. Many third-party mechanisms provide maintenance and repairs throughout the term length, helping to reduce the burden for customers to maintain equipment and ensuring that the equipment is performing as intended.

**Table 4-6: Consumer protection measures**

<b>Financing Mechanism</b>	<b>Description</b>	<b>Score</b>
<b>OBF</b>	This varies based on program design. Administrators can choose robust consumer protection measures (approved contractor networks, energy audits, etc.) in the program design phase.	3
<b>OBR</b>	This varies based on program design. Administrators can choose robust consumer protection measures (approved contractor networks, energy audits, etc.) in the program design phase.	3
<b>TOB</b>	This varies based on program design. Administrators can choose robust consumer protection measures (approved contractor networks, energy audits, etc.) in the program design phase. There may be higher standards of consumer protection associated with TOB programs compared to other on-bill programs as they are viewed as a utility expenditure. Most TOB programs in comparative jurisdictions include shut-off as a consequence for nonpayment.	4
<b>Third-party mechanisms (ESAs, equipment leases, PPAs)</b>	In many third-party mechanisms, the service provider owns the equipment and thus is responsible for installation, maintenance, and repairs throughout the term. For ESAs, monthly payments are based on actual savings; if savings fall short, customers are reimbursed for the difference.	4
<b>Soft loans</b>	Varies based on program design. Most typical for soft loans is requiring authorized contractors. Soft loans are likely to have limited avenues if recourse for non-payment.	3

## 4.6 Underwriting criteria

OBF and TOB provide the most flexibility in using alternative underwriting criteria such as utility bill repayment and shut-off history, helping to improve access.

**Table 4-7: Underwriting criteria**

Financing Mechanism	Description	Score
<b>OBF</b>	OBF provides the utility the flexibility to use alternative underwriting criteria, such as payment history with the utility or shut-offs within a particular timeframe. This can create perceived additional risk for the utility but improves access and widens eligibility for the program.	5
<b>OBR</b>	OBR typically uses traditional underwriting criteria such as checking credit scores, based on private lenders criteria. This limits risk to the lender but can limit access. Depending on the lender, there may be some opportunity to use alternative underwriting criteria, particularly if there is some kind of risk protection via a credit enhancement.	4
<b>TOB</b>	OBF provides the utility the flexibility to use alternative underwriting criteria, such as payment history with the utility or shut-offs within a particular timeframe. This can create perceived additional risk for the utility but improves access and widens eligibility for the program.	5
<b>Third-party mechanisms (ESAs, equipment leases, PPAs)</b>	Underwriting varies depending on the third-party mechanism used. For leases, credit checks are typically done, while for ESAs/PPAs, typically focused on projected performance of the project and ability to borrower to meet payment obligations <sup>13</sup> .	3
<b>Soft loans</b>	Typically looks at minimum credit score but criteria is more lenient than traditional loans. This expands consumer eligibility slightly, but not as much as alternative underwriting such as looking at utility bill payment history.	3

<sup>13</sup> Reinvestment Fund/National Energy Improvement Fund. [Underwriting Financing for Energy Projects](#).

## 4.7 Cost-effectiveness considerations

TOB programs typically include SIR requirements which can restrict access to beneficial electrification technology types that have longer payback periods. Conversely, soft loans and some OBF and OBR programs have less of a focus on cost-effectiveness which helps increase access to more technology types.

**Table 4-8: Cost-effectiveness considerations**

<b>Financing Mechanism</b>	<b>Description</b>	<b>Score</b>
<b>OBF</b>	Varies based on program design, but because consumers pay back the loan on their utility bill, there is an expectation of cost-effectiveness for consumers. Many programs employ an internal cost-effectiveness assessment to create a list of eligible measures.	4
<b>OBR</b>	Varies based on program design, but because consumers pay back the loan on their utility bill, there is an expectation of cost-effectiveness for consumers. Many programs employ an internal cost-effectiveness assessment to create a list of eligible measures.	4
<b>TOB</b>	Cost-effectiveness is a higher priority than in comparator programs such as OBF or OBR, as the cost of the measure is considered a utility expenditure and cost recovery is tied to the meter. Most TOB program examples require SIR > 1.	2
<b>Third-party mechanisms (ESAs, equipment leases, PPAs)</b>	Monthly payments for ESAs are equal to savings, thus savings realized must be large enough that financing can be paid back within the allowed term length (typically a maximum of 15 or 20 years). For leases and PPAs, there is typically not specific savings requirements, however for PPAs the price per kWh typically has to be competitive with standard electricity prices.	3
<b>Soft loans</b>	Typically, no specific requirements on cost-effectiveness, but most programs employ an internal cost-effectiveness assessment to create a list of eligible measures.	4

## 4.8 Fit with Maine’s existing system

OBF and TOB programs will require utilities to build additional capacity, while OBR, third-party mechanisms, and soft loans can more easily leverage existing programs and processes in Maine.

**Table 4-9: Fit with Maine’s existing system**

<b>Financing Mechanism</b>	<b>Description</b>	<b>Score</b>
<b>OBF</b>	OBF may be challenging to implement with Maine’s existing system, as it could create administrative challenges (building lending and administrative capacity) – particularly for the investor-owned utilities. There is however flexibility in who administers the program and performs the loan servicing and origination tasks.	2
<b>OBR</b>	OBR is likely easier than OBF to implement within Maine’s existing system, as it would create fewer administrative challenges since the lending portion is handled through third-party lenders. OBR would be most successful with a model that leverages existing strengths from Efficiency Maine Trust.	4
<b>TOB</b>	TOB may be challenging to implement with Maine’s existing system, as it could create administrative challenges (building lending and administrative capacity) – particularly for the investor-owned utilities. There is however flexibility in who administers the program and performs the loan servicing and origination tasks.	2
<b>Third-party mechanisms (ESAs, equipment leases, PPAs)</b>	Efficiency Maine currently offers a few lease products (more specific to manufactured homes and municipal buildings), and PPAs are already offered in Maine. These existing products could be modified to broaden reach to consumers and LMI customers. There are many ESCOs that exist today that operate nationwide in the US that Maine could work with. However, rural and LMI markets are not ultimately ideal for this type of program, which could impact the program’s reach in these areas of Maine.	3
<b>Soft loans</b>	Efficiency Maine’s Green Bank offers a home energy loan program specifically targeted at LMI customers, providing loans up to \$7,500 with a 5.99% interest rate and term limit of 10 years. To broaden the program’s reach and make terms more attractive, a soft loan approach could be beneficial. This could help enhance eligibility across other sectors (commercial, multi-family, non-LMI) and introduce favorable terms such as reduced interest rates and longer terms.	3

## 4.9 Comparative Analysis Results

Across all programs, there exists a variety of alignment with the key criteria analyzed. Table 4-10 summarizes the results across the financing mechanisms.

**Table 4-10: Summary of results**

Criteria	OBF	OBR	TOB	Third-party mechanisms	Soft loans
Address barriers in key markets	4	3	5	2	3
Address barriers for key technologies	3	3	3	4	2
Sources of capital	2	5	4	4	2
Administrative cost and complexity	2	4	2	4	3
Consumer protection measures	3	3	4	4	3
Underwriting criteria	5	4	5	3	3
Cost-effectiveness considerations	4	4	2	3	4
Fit with Maine's existing system	2	4	2	3	3
<b>Total</b>	<b>25</b>	<b>30</b>	<b>27</b>	<b>27</b>	<b>23</b>

The ranking of total scores from highest to lowest is as follows:

1. **OBR:** Achieved the highest score due to its flexible capital sourcing options (both private and public funds), its potential for lower administrative complexity, and fit with Maine's existing context. It is moderately effective at addressing barriers in key markets and technologies, though using public capital or credit enhancements could further alleviate these barriers.
2. **TOB and third-party mechanisms tied for second:**
  - a. **TOB:** Particularly strong in addressing barriers in key markets, as renters and LMI customers are eligible to participate in TOB programs. However, strict cost-effectiveness requirements are generally included, which may make beneficial electrification measures not focused on efficiency difficult to access. Additionally, their higher administrative costs and regulatory complexity could pose challenges in integrating with Maine's existing system.



- b. Third-party mechanisms (ESAs, equipment leases, PPAs):** These mechanisms can come from many potential capital sources, help increase access to key technologies, and have low administrative cost and complexity for utilities. However, their effectiveness in broadening access to a diverse set of consumers, especially in rural and LMI areas, may be limited.
- 3. OBF:** Helps address barriers for LMI customers as alternative underwriting criteria is typically used. However, using utility and ratepayer funds as the sole source of capital can introduce challenges and their effective delivery is dependent on the utilities' commitment to administer the programs.
- 4. Soft loans:** Moderately effective in enhancing access through lenient underwriting standards. These loans typically require substantial support from public funds, which can make them costly to sustain and difficult to tune to measures with long payback periods.

Note that this scoring summary assumes that all criteria are equally prioritized, while those considering program design may wish to weight some criteria more heavily than others (for example, in this case, fit with Maine's existing system may be weighted as particularly important).

A blue-tinted photograph of a winding road in a rural landscape. The road curves from the bottom left towards the center right. In the background, a wind turbine is visible on a hill. The sky is a uniform blue. The overall scene is serene and open.

# CHAPTER FIVE

## Recommendations

## 5. Recommendations

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Through the National Best Practices review, the On-Bill Lending assessment, and desktop research and interviews with both program administrators and Maine stakeholders associated with this study, recommendations have been developed to guide the State if further consumer financing programs for beneficial electrification are considered.

In developing these recommendations and considering the implementation of a successful consumer financing program in Maine, it is clear that leveraging existing successful initiatives operated by Efficiency Maine Trust is crucial, as is avoiding potential bottlenecks and implementation challenges that could exist at the utility level in Maine. As well, the balance between cost-effectiveness, consumer protection, and program eligibility are key considerations that may have a major impact on program uptake and ultimately, impact. A balanced approach that seeks to maximize eligibility – particularly amongst groups who would otherwise not be able to obtain traditional financing – is key. Inclusion of credit enhancements can make this balance easier to achieve by reducing associated risk to the lender.

**Recommendation 1:** If the State wishes to pursue an on-bill lending program, on-bill repayment is likely the best program design method.

In Maine, Efficiency Maine Trust operates a number of successful consumer financing offerings through its Green Bank, and has developed a positive reputation and trust with consumers in the State considering energy efficiency upgrades. Any potential on-bill program should leverage this existing success and knowledge. An on-bill repayment program – rather than an on-bill financing program or tariff-on bill program – that leverages Efficiency Maine Trust’s Green Bank would minimize administrative complexity and perceived challenges amongst the transmission and distribution utilities while building on Efficiency Maine Trust’s capacity. A potential model could see Efficiency Maine Trust as the program administrator, while the utilities act as the payment processor, in order to reduce additional administrative burden and need for expanded capacity for the utilities.

**Recommendation 2:** Prioritize work with utilities to develop a mechanism for billing for loan repayment.

Based on initial discussions with Maine’s transmission and distribution utilities, including Versant and Central Maine Power, there could be a number of technical challenges associated with creating the capacity to bill for loan repayment. If the State does wish to pursue any type of on-bill lending program, work with utilities to create this mechanism

should begin on a priority basis. Otherwise, administrative delays could ultimately become a significant barrier to a timely program launch.

**Recommendation 3:** In an on-bill lending program, design should consider cost-effectiveness, but should not adhere strictly to bill neutrality.

Strict adherence to bill neutrality is likely to reduce the list of eligible measures - depending on other key program design features, such as interest rate and loan length - which can limit the overall impact of the program. Particularly as the State is seeking to expand its consumer financing offerings beyond just energy efficiency, it is unlikely that strict adherence to bill neutrality will provide a meaningfully robust suite of beneficial electrification measures to consumers. As many Maine residents still rely on heating oil, they may experience an increase on their electricity bill if switching fuel sources, despite overall decreasing monthly energy costs are a result of switching to an electrified measure (i.e. a heat pump). Moreover, assessing cost-effectiveness should consider other benefits such as the value of home quality, thermal comfort and adding air-conditioning services. Therefore, program design should still consider cost-effectiveness, but also focus on the societal and environmental impacts rather than just the financial impact.

**Recommendation 4:** An on-bill lending program should seek to use alternative underwriting criteria to screen for eligibility.

To maximize program eligibility, program design of an on-bill program should consider using alternative underwriting criteria, such as bill payment or shut-off history, rather than traditional underwriting criteria such as credit score and debt-to-income ratio. While using some traditional underwriting criteria can be seen as a consumer protection measure (i.e. ensuring consumer ability to pay), it can also limit access and raise questions regarding additionality (i.e. ensuring that the program enables a greater number of projects financed, rather than financing projects that could have been financed through private loans offered by traditional financial institutions and would have occurred without the program). Program design should begin with alternative underwriting criteria, though there should also be close monitoring of loan defaults, with criteria to be adjusted and potentially blended with some traditional underwriting criteria if challenges arise with non-repayment throughout program availability.

**Recommendation 5:** Consider leniency when developing recourse for non-repayment of loans.

Utilities in Maine are prohibited from disconnecting residential electrical service during winter months (mid-November to mid-April) via the Winter Disconnect Protection Program. Additionally, the recent enactment of LD 1962 Resolves 2023, Chapter 145 further prohibits utilities from disconnecting service between mid-April to mid-November during extreme weather or temperature conditions. Outside of these conditions, utilities may disconnect

electric service for non-payment according to Rule Chapter 815 of the Public Utilities Commission.

Most on-bill programs reviewed within the National Best Practices included disconnection because of nonpayment. However, in practice, there is no evidence that the threat of disconnection has a meaningful impact on default rates. And disconnection requirements for non-payment can introduce additional risks to participants, particularly among low-income and rural customers. Several alternatives exist to reduce the cost of capital and protect against defaults (particularly when private lenders are used, they may require utility service disconnection as a consequence). These include encouraging competition among lenders to lower interest rates, requiring autopay, and providing credit enhancements such as interest rate buy-downs or loss reserves. An additional approach can include applying non-extractive financing principles, which would provide flexibility to the lender or program administrator to adjust the repayment schedule for small businesses and low to moderate and rural customers.

Further, the decision of where to place the on-bill charges within the regulations governing the payment waterfall would have an impact on the administrator's ability to use disconnection as recourse for non-payment. If on-bill charges are placed in priority to other charges, including supply and distribution charges, the utility likely could not consider separate recourse for utility bill repayment and loan repayment. However, if the on-bill chargers were subordinate to other utility charges (as is commonly the case), there is additional flexibility for the utility or program administrator to consider other avenues of recourse for non-payment.

**Recommendation 6:** Seek sources that may be able to provide credit enhancements, such as loan reserves or guarantees.

Credit enhancement such as loss reserves or guarantees can cover a portion of the lender's risk, which could provide additional comfort with moving forward with some of these recommendations (not requiring disconnection for non-repayment, using alternative underwriting criteria), which in turn can expand program eligibility and impact. They may bring further benefits, such as lower interest rates or longer loan term lengths, which can improve lists of eligible measures and make the potential program more attractive to would-be participants.

# APPENDIX



# Appendix A

## Programs Included in National Best Practices Review

### Programs included in Desktop Review:

Financing Programs	Credit Enhancement Programs
PG&E On-Bill Financing and PAYS program	Mass Saves HEAT Loan Program
GoGreen Financing (California Hub for Energy Efficiency Financing)	NH SAVES Res
Ouachita Electric Cooperative On-Bill Tariff Program	GoGreen Pilots
CleanBC Better Homes Low-Interest Financing Program	DOE Innovative Clean Energy Loan Guarantee Program
Connecticut Green Bank Smart-E Loan	
Canada Infrastructure Bank EV and Buildings Programs	
Efficiency Capital Energy Savings Performance Agreement	

### Interviews Conducted:

Government & Utility	Private Sector & Thought Leaders
Hawaii Green Energy Investment Authority (On-Bill Tariff program)	Tom Stanton (formerly of the National Regulatory Research Institute)
Vermont Housing Finance Agency (On-Bill Financing program)	Environmental and Energy Study Institute
NYSERDA (On-Bill Recovery Loan and Smart Energy Loan)	Ecosave
Orcas Power & Light Cooperative (On-Bill Tariff program)	Chris Kramer (Independent Consultant, formerly at Energy Futures Group)
Illinois Energy Efficiency Loan Program (via Slipstream - On-Bill Financing program)	



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