Understanding Tariffed On-Bill Investment Programs

## A Model Program Plan in Alignment with California Public Utilities Commission Guidance



April 15, 2022

[Program Sponsor name and logo go here]

Table of Contents

[Executive Summary 5](#_Toc98921597)

[PART I: Overall Goals and Principles 6](#_Toc98921598)

[Program Goals, Objectives, and Market Barriers Addressed 6](#_Toc98921599)

[Financial Pro Forma, and Expected Benefits and Costs 11](#_Toc98921600)

[Alignment with ESJ Action Plan Goals 15](#_Toc98921601)

[PART II: Financing Program Requirements 21](#_Toc98921602)

[Financial Product Description and Program Development 21](#_Toc98921603)

[Customer Protections 40](#_Toc98921604)

[PART III: Program Design and Delivery Details 51](#_Toc98921605)

[Targeted Customer Sectors 51](#_Toc98921606)

[Customer Eligibility 51](#_Toc98921607)

[Eligible Technologies 53](#_Toc98921608)

[Combining Financing and Incentives 55](#_Toc98921609)

[Part IV: Costs and Benefits 58](#_Toc98921610)

[Program Budget 58](#_Toc98921611)

[Forecasted Benefits 59](#_Toc98921612)

[Projected Participation 60](#_Toc98921613)

[Program Time Frame 60](#_Toc98921614)

[PART V: Reporting and Metrics 63](#_Toc98921615)

[Metrics and Key Performance Indicators 63](#_Toc98921616)

[Schedule and Process for Tracking and Evaluating KPIs 66](#_Toc98921617)

[Part VI. Proposal Response to ACR Issues and Topics 67](#_Toc98921618)

List of Abbreviations

|  |  |
| --- | --- |
| TERM | DEFINITION |
| AC | Air conditioning |
| ACR | Assigned Commissioner’s Ruling (CPUC) |
| AFUE | Annual fuel utilization efficiency |
| AMI | Advanced metering infrastructure |
| BDC | Building Decarbonization Coalition |
| CARE | California Alternative Rates for Energy |
| CBO | Community-based organization |
| CCA | Community Choice Aggregator |
| CEC | California Energy Commission |
| CEMs | Clean energy measures |
| COP | Coefficient of performance |
| CPUC | California Public Utilities Commission |
| DAC | Disadvantaged community |
| EBCE | East Bay Community Energy |
| EF | Energy factor |
| ESA | Energy Savings Assistance (a utility program) |
| ESJ | Environmental and social justice |
| FERA | Family Energy Rate Assistance (a utility program) |
| GGRF | Greenhouse Gas Reduction Fund (a California program) |
| GHG | Greenhouse gas(s) |
| HP HVAC | Heat pump space heater |
| HPWH | Heat pump water heater |
| HSPF | Heating seasonal performance factor |
| HTR | Hard-to-reach |
| IOU | Investor-owned utility |
| KPI | Key performance indicator |
| LMI | Low- to moderate-income |
| LSE | Load-serving entity |
| MF | Multifamily |
| M&V | Measurement and verification (of installed measures) |
| ME&O | Marketing, education, and outreach |
| MOU | Memorandum of understanding |
| NEM | Net energy metering |
| NMEC | Normalized metered energy consumption |
| PG&E | Pacific Gas & Electric |
| PV | Photovoltaic (solar) |
| SCE | Southern California Edison |
| SEER | Seasonal energy efficiency ratio |
| SF | Single-family |
| SGIF | Self-Generation Incentive Program |
| TOB | Tariffed on-bill |
| TOU | Time of use (utility billing rate) |

# Regarding This Guide: Proposal Instructions and a Model Plan

The TECH Clean California’s Tariffed On-Bill Program team is providing this guide and model plan as a public service.

It offers instructions for prospective Program Sponsors wishing to submit a Tariffed On-Bill Investment proposal to the California Public Utilities Commission (CPUC) in response to the Commission’s call for proposals for clean-energy financing programs under proceeding R.20-08-022.[[1]](#footnote-2)

As a model plan, it offers topical information on tariffed on-bill financing that a Program Sponsor can consider when framing a proposal. In this respect, the TECH Clean California[[2]](#footnote-3) model plan closely follows the guidance and the proposal outline specified in the Assigned Commissioner’s Amended Scoping Memo and Ruling, dated November 19, 2021.[[3]](#footnote-4)

Throughout, the model contains opportunities for filling in blanks (shown in square brackets [ ]}, should a Program Sponsor be interested in adapting that section’s information in a proposal. It also contains comments, with attribution, from either the CPUC or the TECH Clean California team. Such comments and instructions for proposal preparation are signaled in *italics,* and appear at the beginning of the relevant sections.

# Executive Summary

*Guidance from TECH Clean California:*

*This section should contain the proposed program’s essential information, such as:*

* *A short description of the program approach*
* *What the program’s overall goals are (how it will overcome an identified market barrier)*
* *A description of the entity that will carry out the program*
* *Who is eligible to participate*
* *The general timeline*

# PART I: Overall Goals and Principles

## Program Goals, Objectives, and Market Barriers Addressed

*Guidance from The CPUC’s Assigned Commissioner’s Ruling (ACR), dated Nov. 19, 2021[[4]](#footnote-5)*

*Describe what this program is seeking to achieve, including which market barrier(s) is being addressed through the program.*

### Program Goal

The primary goal of the Tariffed On-Bill (TOB) Investment Program is to expand customer access to clean energy investments by offering an investment solution that does not necessitate financial means testing for participation. This innovation simplifies the customer enrollment process and expands eligibility to include customers who are typically disqualified from conventional loan and incentive programs. Disqualification might relate to customers’ high debt-to-income ratios, poor credit, low-income status, low home equity, or renter status. Full participation from these customer segments in residential decarbonization improvements will be necessary to meet state greenhouse gas (GHG) goals in an equitable fashion. In particular, the State’s TOB Program will establish the scalability of a tariffed on-bill investment solution by demonstrating:

* An expanded addressable market relative to market-rate incentive and loan programs via inclusion of renters and low- to moderate-income households[[5]](#footnote-6)
* High customer acceptance rates, relative to market-rate incentive and loan programs
* Expanded flexibility to support comprehensive project work scopes that maximize customer bill savings and GHG reductions
* Low financial risks to both customers and the utility, translating to low cost of capital
* Expanded private capital investment to complement public funding and accelerate overall adoption

In support of this goal, the Program Plan adopts as its design criteria the priorities and guidance provided in the Commissioner’s Amended Scoping Memo and Ruling (ACR):

* **Comprehensive decarbonization.** The Program will expand the current investor-owned-utilities’ (IOU) ratepayer-funded programs’ scope beyond energy efficiency and use other commercially viable technologies to broadly address California’s economy-wide decarbonization and greenhouse gas reduction goals, and resiliency, while offering different program options that meet the needs of various customer types.
* **Leverage.** The TOB Program will attract third-party investment to expand and accelerate ratepayer-funded, clean-energy investments.
* **Scalability.** The Program will demonstrate a scalability pathway to serve millions of California households.
* **Customer protection.** The Program will protect customers from many of the risks they might face from consumer loans, particularly default penalties, predatory lending practices, and poor equipment performance.
* **Affordability.** The Program will result in lower utility bills for participants and minimize cost shifts between participants and nonparticipant ratepayers.
* **Support of California’s clean-energy goals.** The Program will contribute to the State’s clean energy goals by lowering emissions, increasing the adoption of clean-energy technologies, and reducing the use of fossil-fueled energy.
* **Transparency.** The Program will ensure that customers are informed enough to determine which clean-energy technologies are most beneficial to them, while tracking the cumulative effects of these benefits toward broader State clean-energy policy and other ratepayer goals. The offer to the customer will be transparent and easy to understand.
* **Accountability**. The Program will incorporate metrics and evaluation strategies to ensure the investment solutions are meeting their established goals and targets.
* **Equity.** The Program will track and report its success in increasing access to low- to moderate-income customers, and customers with limited access to conventional financing options.

The Tariffed On-Bill Investment approach offers benefits that align directly with these design criteria:

* TOB is a technology-neutral, inclusive investment solution for customer-facing decarbonization upgrades, particularly energy efficiency building electrification, rooftop solar, and energy storage. Any improvement that contributes to lowering the customer’s combined gas and electric bills and GHG emissions can be capitalized via TOB investments. (This benefit relates to the comprehensive decarbonization criterion.)
* The TOB investment approach can incorporate capital from third-party sources. This capital can be in the form of private equity and debt, or be sourced via state and federal grants, government-issued climate bonds, foundation grants, credit unions, and Community Development Financial Institution loans. (This benefit relates to the leverage criterion.)
* The TOB approach incorporates a requirement that the TOB cost recovery charge assigned to the customer must be less than the customer’s expected savings. Participants are not asked to take on any financial obligation that they have not already signed up for, simply by subscribing to utility services. This program requirement avoids the need for financial means testing (for example, consumer credit checks) that would otherwise disqualify onsumers because of their income levels, credit scores, or renter status.[[6]](#footnote-7) (This benefit relates to the criteria for scalability, affordability, and equity.)
* By applying the cost recovery charge to the location rather than to the customer, the TOB approach enables cost recovery to be spread over the life of the upgrade, rather than be constrained to the tenure of the current occupant. (This benefit relates to the scalability, affordability, and equity criteria.)
* An operations efficiency for the utility provides a customer benefit if the utility can use existing mechanisms for making utility capital investments with cost recovery through monthly bills. Thus, a single utility bill can reflect combined service charges for decarbonizing improvements, with the lower utility bills resulting from the improvements made. (This benefit relates to the criteria for scalability and transparency.)
* In addition to the requirement for cash-positive outcomes for participants, the TOB approach incorporates protections to minimize customers’ financial risks and to reduce their exposure to the threat of disconnection for nonpayment. The customer’s history of satisfactory utility bill payments is the utility’s security, so this model imposes zero risk that the customer’s home might be foreclosed on, or the improvements repossessed. (This benefit relates to the customer protection criterion.)

### Market Barriers Addressed

Decarbonization of an existing home requires a substantial capital investment. Although a utility’s financial incentives are helpful in lowering upfront investment costs, customers still need access to capital to fund the remaining balance. A small number of customers have the financial means to pay cash or to finance decarbonization costs through conventional market-rate loan products. However, an accessible and affordable solution can accelerate investment. Even where capital is available in principle, if the payback on investments extends beyond the expected occupancy of the home, customers might be reluctant to make substantial investments for fear they will not recoup sufficient value.

The Greenlining Institute, Building Decarbonization Coalition (BDC), and other advocates have pointed out the particular capital access challenges facing low-to moderate-income (LMI) households and renters. BDC’s *Towards an Accessible Financing Solution* points out that “California is home to more than 4 million low-income households and more than 5.8 million households in rental housing, including 2 million moderate- and above moderate-income renter households.” The impact of poverty on household energy use manifests itself in at least two tangible ways:

1. **Energy burden.** In the *Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs* report commissioned by the CPUC in 2016, one-third of low-income households in California reached in the survey indicated that they struggle with energy bills either “often” or “constantly.” According to those survey data, households below 100 percent of the Federal Poverty Level (FPL) experienced energy burdens averaging 8.2 percent, whereas households with incomes exceeding 300 percent of FPL averaged less than 1.4 percent.[[7]](#footnote-8)
2. **Utility disconnections.** Low-income customers face a disproportionate risk of utility disconnections. Shutoff rates increased by more than 50 percent between 2010 and 2017, culminating in 886,000 household shut offs in 2017. In 2017, the disconnection rate rose to 9.3 percent for customers in Southern California Edison territory alone.[[8]](#footnote-9) The threat of actual utility disconnection can lead to other issues. Researchers Robert Levy and Joshua Sledge found that paying utility bills was the most common reason for high-cost payday loans, which can worsen the cycle of poverty.[[9]](#footnote-10) Other studies have found that shutting off utilities can contribute to homelessness.[[10]](#footnote-11) Constraints on utility disconnections applied by regulators during the COVID-19 pandemic might not offer long-term relief nor address the underlying economic causes and harms.

Low-income households contending with the effects of poverty—and even moderate-income households, some households just above moderate-income, and renters at every income level— together face barriers to making investments in clean energy upgrades, including building decarbonization:

* **Tenant / landlord split incentives deterring investment.** A landlord might decline to participate in an energy program if the landlord must make the capital outlay, but the benefits largely flow to the tenant paying the utility bills. Likewise, tenants might decline to participate if they must pay the upfront improvement costs but are unable to reap the full financial benefits. One-quarter of Californians are renters who are living on low or extremely low incomes, and the California Energy Commission’s (CEC’s) Barriers Study found this issue affects that rental segment most acutely.[[11]](#footnote-12)
* **Lack of access to capital and cash flow constraints.** Currently, one-third of Californians lack sufficient income to meet their basic needs. LMI households face many competing demands, such as childcare and medical expenses; these demands pose barriers to economic opportunities that are not immediately cash positive.
* **Credit score qualification criteria that limit access to consumer credit.** People who can demonstrate a credit history score above a minimum threshold typically have access to financing, whereas others do not. The Federal Reserve Board suggests that household income is only moderately correlated with consumers' credit scores. Thus, these challenges are not confined to low-income households. Jurisdictions can expect increases in the size of population that needs access to capital, and therefore assume a correlating need for an option that overcomes the upfront investment costs, without depending on only the consumer credit option.

Taken together, the BDC found that approximately 6 million households, or more than 40 percent of all California households, lack ready access to private capital for upgrading their homes.

Given these financial barriers, California has historically preferred 100 percent grant programs to bring energy efficiency and renewable energy services to a small number of lower-income households each year. For households with at least moderate incomes, California has sought to overcome the upfront cost barrier by offering rebates to reimburse customers who must first pay the full upfront cost for eligible upgrades.

Signatories to the Equitable Building Electrification Framework[[12]](#footnote-13) have raised concerns about the equity implications of such strategies, citing studies that have found the majority of benefits flowed to higher-income households.11 They set forth a vision for an equitable approach to building electrification that prioritizes attention to constituents described by the CPUC as *environmental and social justice* (ESJ) c*ommunities*:

Clean energy movements of the past, including rooftop solar and energy efficiency, have benefited those on the higher end of the income scale far more than those on the lower end, and have been slow to gain traction in ESJ communities. This pattern of relying on a market-driven, trickle-down approach that largely fails to deliver has led to significant distrust among the communities that are still waiting for their share of benefits. Through building electrification, California can break out of this pattern and create a plan that actively centers environmental justice and equity from the start. This must begin by targeting what the California Public Utilities Commission has termed environmental and social justice communities, the communities that have been long left behind by the state’s thriving green economy.[[13]](#footnote-14)

Relying on the same historical strategies would also appear insufficient to capitalize building decarbonization upgrades, given the number of households affected by the barriers above. Assuming financial assistance for 6 million LMI and renter decarbonization upgrades will be needed by 2045, a grant-only solution for electrification of space conditioning and water heating in the range of $12,000 to $25,000 per household would require a cumulative public and ratepayer spending on the order of $72 to $150 billion. This level of spending on building decarbonization would dwarf any public expenditure the state of California has made for energy efficiency or renewable energy programs.

## Financial Pro Forma, and Expected Benefits and Costs

*Guidance from CPUC ACR:*

*This section provides a sample financial pro forma with supporting analysis, based on analysis of East Bay Community Energy (EBCE) customer data. Program Sponsors should customize this section to align with their own financial targets and customer analysis.*

The Program seeks to mobilize at least [$XX million] in direct investments over [number] years in behind-the-meter clean-energy technologies that can abate GHG emissions in existing [type of building: single-family, multifamily homes]. Of that total, the Program will contribute at least [$XX million, or X percent] in capital. The balance will come from previously budgeted incentive pools from TECH and other programs, plus customer co-payments, if necessary. The TOB investment is a shared savings model in which no more than [X percent] of the customer’s expected lifecycle bill savings will be allocated to investment cost recovery. This shared savings model assumes the customer retains the remaining [X percent]. The above financial goals thus translate into aggregate lifecycle bill savings, net of program service charges, of at least [$XX million].[[14]](#footnote-15)

The following method and analysis are based on a hypothetical scenario of 1,000 retrofits involving replacement of furnaces, air conditioners, and water heaters with heat pumps and heat pump water heaters, plus energy efficiency improvements to reduce HVAC loads by 30 percent. In practice, the Program expects to undertake projects with varying scopes of work, investment requirements, and project benefits. **Table 1** provides the capital stack for deriving the total project investment.

Table 1. Program capital stack

|  |  |
| --- | --- |
| **Capital source** | **Amount** |
| Utility incentives |  |
| TOB contribution |  |
| Other capital |  |
| **Total investment** |  |

*From TECH Clean California:*

*Tailor list to utility bill impacts specific to measures that are included within the program’s scope*

The expected lifecycle benefits associated with the programmatic investments are shown in **Table 2.** Customer bill savings would derive from (a) reductions in gas consumption; (b) shifting cooling loads from peak periods to shoulder and off-peak hours; (c) applying cost-effective energy efficiency measures; (d) installing rooftop solar and battery storage systems (if applicable); and (e) transitioning customers to electrification rates with lower off-peak charges. The increase in electricity consumption due to new winter heating loads would be partially offset by summer cooling savings from improved equipment efficiency. Avoided costs for equipment replacement derive from the expectation that most upgrades would replace existing equipment that is approaching the end of its useful life.

**Table 2. Expected lifecycle program benefits**

|  |  |
| --- | --- |
| Benefit | Total |
| GHG reductions (MTeCO2) |  |
| Electricity savings (MWh) |  |
| Gas savings (MTherms) |  |
| Customer bill savings |  |
| Bill savings net of cost recovery charges |  |
| Avoided equipment replacement costs |  |

*From TECH Clean California:*

*Analysis inputs to derive the results follow this sample, which uses values [in brackets] from the ECBE data. A Program Sponsor’s customer data will be different.*

* Target the top 20 percent of customers, based on expected utility bill savings, as inferred from observed metered gas and electricity consumption
* Average baseline annual consumption
  + Space heating: [469] Therms per year
  + Space cooling: [751] kWh per year
  + Water heating: [74.5] gallons used per day, [128] Therms per year
* Replace 80 percent annual fuel utilization efficiency (AFUE) existing furnace and 10 seasonal energy efficiency ratio (SEER) existing central air conditioning (AC) with 10 heating seasonal performance factor (HSPF) (2.9 coefficient of performance {COP}) / 18 SEER heat pump
* Replace 58 percent energy factor (EF) existing gas water heater with 3.1 COP heat pump water heater
* Energy efficiency improvements to reduce heating and cooling loads by 30 percent
* Baseline gas price from [PG&E G-1 at $1.8814]
* Baseline summer cooling electricity price from [PG&E time of use (TOU)-C summer off-peak rate, $0.3563]
* Post-retrofit summer cooling electricity price from [PG&E EV2 summer weighted average of partial peak and off-peak rate, $0.2278]
* Post-retrofit winter space heating and water heating electricity price from [SCE TOU-D prime winter off-peak / super-off-peak rate, $0.1935]

**Table 3** shows the associated measure installation cost assumptions for the modeled upgrades. **Table 4** shows the modeled project-level factors to be considered. **Table 5** offers a model for determining the funding request, derived from the data in **Table 3** and **Table 4.**

**Table 3. Installed costs of relevant measures**

| Technology | Specification | Measure cost |
| --- | --- | --- |
| Heat pump | [Package, split, mini / multi-split, 18 SEER, 10 HSPF] | [$ 17,047] |
| Heat pump water heater | [COP 3.1 or better, > 55 gallons] | [$ 4,239] |
| Energy efficiency upgrades | [30%] reduction in space heating and cooling loads | [$ 2,157] |
| Internet-enabled smart thermostat | [ecobee3 lite or equivalent] | [$ 205] |
| Pre-wiring for electric appliances and car charging |  | [$ 750] |
| **Total** |  | **[$24,398]** |
| **Costs excluded from analysis** |  |  |
| Home Wi-Fi network |  | - |
| Service panel upgrade, as needed | Smart panel, to be covered by combination of TECH incentives and ratepayer funds | [$4,275] |
| Optional photovoltaic (PV) system | [3 kW] | $9,300 |
| Optional battery storage system | [Lithium-ion battery, 13.5 kWh, 10 kW peak power, no sun] | $10,500 |

**Table 4. Project financial pro forma factors and values**

|  |  |
| --- | --- |
| Factors | Amount |
| Total investment per project |  |
| Project useful life |  |
| Annual bill savings |  |
| TOB contribution per project |  |
| TOB monthly service charge |  |
| **Customer's net annual savings** |  |
| Utility incentive per project |  |
| Avoided like-for-like replacement cost |  |

**Table 5. Program Sponsor’s funding request for capital and program operations**

|  |  |
| --- | --- |
| **Budget line item** | **Amount** |
| Cost of capital @ 3% |  |
| Start-up costs |  |
| Risk mitigation costs *[provide brief explanation below]* |  |
| Program operations (2 years) |  |
| **Total** |  |
| **Funding request** |  |

## Alignment with ESJ Action Plan Goals

*From the CPUC:*

*Describe with specificity how this proposal meets each of the nine goals of the CPUC’s Environmental and Social Justice Action (ESJ) Plan. If it is unable to meet any of the nine goals, the proposal must explain why.*

*From TECH Clean California:*

*The description below each goal offers placeholder language that Program Sponsors can consider in linking Program-specific plans to ESJ goals. Program Sponsors should adapt this language to align with their own objectives.*

### Goal 1: Consistently integrate equity and access considerations throughout CPUC proceedings and other efforts

This proposal offers the CPUC the opportunity to advance social and environmental justice objectives by approving a Program with the capacity to expand access to both publicly funded and privately funded clean-energy investments. The proposal also incorporates strong customer protections, without imposing financial means testing requirements. The planning process associated with this proposal offers opportunities to engage with ESJ communities, as described under **Goal 5.**

### Goal 2: Increase investment in clean energy resources to benefit ESJ communities, especially to improve local air quality and public health

This Tariffed On-Bill Investment Program prioritizes investment in the replacement of in-home fossil-fueled appliances with high-performance alternatives powered by clean electricity combined with supporting upgrades for appropriate, cost-effective energy efficiency and renewable generation. These upgrades will remove a major in-home source of carbon monoxide, nitrous oxides, and sulfur dioxide, with associated improvements in both indoor and ambient air quality. By eliminating financial means testing, the TOB investment model expands the likely number of clean-energy projects in ESJ communities, in a way that incorporates valid and reliable customer protections.

### Goal 3: Strive to improve access to high-quality water, communications, and transportation services for ESJ communities

The Tariffed On-Bill investment model for water districts is already codified in state law through the Water Bill Savings Act (Senate Bill 564, McGuire, 2017). The mechanism has an established track record with California water utilities, shown in the experiences in the cities of Windsor and Hayward and other Bay Area municipal utilities with the Association of Bay Area Governments[[15]](#footnote-16). As part of the implementation planning process, [Program Sponsor] will explore opportunities to collaborate with local water districts in the joint delivery of both energy and water measures.

### Goal 4: Increase climate resiliency in ESJ communities

Rooftop solar and battery storage are eligible program measures. These measures, when combined, can mitigate the risks associated with Public Safety Power Shutoff events, while also minimizing grid electricity purchases during peak pricing periods.

One of the electrification measures prioritized in the Tariffed On-Bill Investment Program is heat pump space conditioning, coupled with Internet-enabled thermostat controls. This measure might offer the following climate resiliency benefits:

1. Adds mechanical air-conditioning services for households that currently lack air conditioning. Although adding new cooling load by itself would erode bill savings and thus conflict with the benefits from the TOB financial model, it might be possible to add air conditioning in combination with rooftop solar and battery storage. This addition would shield occupants from the effects of extreme heat events and reduce dependency on centralized cooling centers. Mechanical air conditioning would also reduce vulnerability to extremely poor outside air quality, such as that caused by nearby wildfires or forest fires. The ability to add air conditioning is contingent on the ability to deliver meaningful utility bill savings to the customer.
2. Internet-enabled controls, combined with basic weatherization measures, empower occupants to concentrate energy use during more affordable off-peak hours without sacrificing comfort.

### Goal 5: Enhance outreach and public participation opportunities for ESJ communities to meaningfully participate in the CPUC’s decision-making process and benefit from CPUC programs

This proposed Program offers opportunities to engage ESJ communities on issues of direct relevance to them. As described in **Goal 1,** the planning process associated with this proposal offers at least three distinct opportunities to engage ESJ communities:

1. [Program Sponsor] has already engaged with ESJ community representatives in the course of developing this current proposal. [Brief description of that engagement]
2. [Program Sponsor] commits to further ESJ community engagement for creating the implementation plan. [Reference marketing and outreach plan, role of community-based organizations (CBOs), customer protections, and workforce development, as appropriate]

### Goal 6: Enhance enforcement to ensure safety and customer protection for ESJ communities

The Tariffed On-Bill Investment Program incorporates customer protection mechanisms that shield participants from the threat of home foreclosure or equipment repossession. By reducing customer energy burdens, the Program reduces customer exposure to the risk of disconnections for nonpayment. The Program is able to achieve these outcomes while expanding access to clean-energy investments, and without imposing means testing.

It is impossible to eliminate all risks. However, it is appropriate to clearly identify them, describe mitigation strategies, and assign them to the party most able to handle them. The Program approaches customer protection with the philosophy that it is the Program’s responsibility to assure that TOB investments are scoped to be cash-positive for the occupant, and that building energy improvements perform as designed. The Program Sponsor, property owner, and occupant each share interests in the proper operation and maintenance of improvements, in keeping with equipment manufacturers’ recommendations. Finally, the occupant is solely responsible for any unrelated energy use changes. Specific customer protections:

* Assigning responsibility for participant recruitment and project scope development to an independent Program operator that is not financially motivated to maximize sales
* Requiring installers to be fully licensed and bonded and all project installations to be fully permitted
* Adopting Program procedures for post-installation project quality control inspections and acceptance testing
* Establishing warranty requirements for equipment, parts, and labor
* Constraining the decarbonization service charge to be [20 percent] less than the expected bill savings
* Incorporating a bill savings prediction guarantee to ensure that actual metered energy savings align with predictions
* Requiring annual equipment service agreements to optimize equipment performance and avoid premature failures, combined with a small surcharge for equipment repair insurance; this will eliminate the customer’s risk of equipment under-performance or failure during the expected life of the improvements

Taken together, these protections effectively minimize opportunities for fraud and unfair business practices that have been observed in other clean-energy financing strategies. They make clean-energy investments accessible to customer populations that are least equipped to take on any additional financial risks.

### Goal 7: Promote high road career paths and economic opportunity for residents of ESJ communities

The Tariffed On-Bill Investment Program will expand and accelerate clean-energy investments, thereby creating new economic opportunities. As a starting point, the Program will require installations to be performed by licensed professionals and require permit closeouts. This essential requirement will help promote best practices and prioritize contractors who consistently apply high quality to installations. [Program Sponsor] commits to working with the California Workforce Development Board’s High Road Training Partnership[[16]](#footnote-17) and other relevant workforce development programs to expand opportunities for High Road employers and their employees in ESJ communities. Any incremental project costs associated with High Road workforce requirements will be covered by public funding and will not be assigned to the occupant.

### Goal 8: Improve training and staff development related to environmental and social justice issues within the CPUC’s jurisdiction

[Program Sponsor] commits to monitoring and reporting on Program performance relative to key equity metrics in a way that can inform and advance CPUC staff’s understanding of ESJ issues. Proposed metrics are listed under **Goal 9**.

### Goal 9: Monitor the CPUC’s environmental and social justice efforts to evaluate how they are achieving their objectives

The Tariffed On-Bill Investment Program will contribute directly to the following CPUC Work Plan 2.0 actions:

* + 1. **Alignment & Coordination Across Marketing, Education & Outreach (ME&O) Plans.** The Program will compare ME&O plans of utilities and adopt best practices when appropriate.
    2. **Improve Feedback Loop from Customers to Foster Iterative Process in Program Design.** The Program will conduct workshops with program, community, and customer stakeholders to help Program design. It will also track Program performance relative to equity metrics.

2.3.2. **Consider Streamlined Application Processes and Enhance Coordination for Low Income and Clean Energy Programs.** [The Program will use the TECH Iris platform for integrating multiple incentives.]

2.3.3 **Leverage Scale of California Alternative Rates for Energy (CARE) and Energy Savings Assistance (ESA) Programs to Cross-Refer to Other CPUC Initiatives.** When possible, the Program will pursue opportunities to use CARE and ESA services and combine them with TOB investments.

2.5.2 **Continue Prioritization of ESJ Communities in Building Decarbonization Programs.** The TOB Program offers an opportunity to prioritize equity-targeted investments.

2.5.3 **Expand Investment in Electrification in San Joaquin Valley Proceeding.** The Program will continue to monitor developments in the proceeding and incorporate lessons learned.

5.2.1 **Statewide Mapping of Engagement with CBOs.** The Program will confer with the CPUC’s News and Outreach Office to identify opportunities to partner with CBOs.

7.1.1 **Implementation of an MOU with** **the California Workforce Development Board.** The Program will work with California Workforce Development Board’s High Road Training Partnership and other workforce development programs on opportunities to expand the number of High Road employers and their employees in ESJ communities

9.1.2 **Data Collection: Standardizing Data Requests & Key ESJ Indicators.** The Program will track and report on key equity metrics, as adapted from the California Energy Efficiency Coordinating Committee’s Equity Metrics Working Group[[17]](#footnote-18) recommendations. The Program will monitor and report on the following energy equity indicators:

* Total number of residential equity-targeted households served
* Expected first-year energy, GHG, and utility bill savings for equity-targeted participants
* Number of residential equity-targeted households receiving upgrades that are expected to improve home comfort, safety, and health outcomes
* Types of health and safety issues abated for equity-targeted households
* Number of residential equity-targeted households that could not be served because of a need for essential home repairs

For tracking and reporting, the Program will rely on indicators to identify ESJ households and communities:

* Disadvantage communities[[18]](#footnote-19) located in the top 25 percent of census tracts identified by Cal EPA’s CalEnviroScreen 4.0
* Households located in tribal lands
* Census tracts with median household income less than 80 percent of the area or state median income
* Low-income households, as indicated by their enrollment in the CARE or Family Electric Rate Assistance (FERA) programs
* 9.2.1 **Metrics to Measure Satisfaction, Comprehension, and Experience.** The Program will conduct periodic assessments of occupant comprehension of the Program and measures, satisfaction, and effectiveness of Program marketing, education, and outreach. Results will inform enhancements to program delivery.

# PART II: Financing Program Requirements

## Financial Product Description and Program Development

### Investment Mechanism Description

*From the CPUC:*

*Describe the financing mechanism and / or proposed financial product offered through the program.*

The intent of the Program is to expand customer access to capital to include customers who are typically disqualified because they have high debt-to-income ratios, poor credit, low amounts of home equity, or are renters. Taken together, Program results will provide empirical proof of concept to inform the planning and launch of a statewide Tariffed On-Bill investment mechanism(s).

The proposed investment mechanism is a special-purpose tariff with terms of service that allow the utility to invest in upgrades at a *specific site* in its service area, and to recover its cost for that investment from that site through a charge *on the customer bill.* The charge must be less than the estimated savings. The name *tariffed on-bill* is a literal description of the mechanism that allows a utility to deploy capital to cost-effective upgrades at the grid edge (that is, on the customer’s side of the meter). The mechanism also contains an assurance that the utility will be able to recover its cost on terms that meet basic tenets of economic regulation in the utility sector: non-discriminatory, cost-based, just, reasonable, and fair.

This plan proposes a tariff obligation for a site-specific decarbonization investment with a monthly Program Service Charge assigned to the meter location, and thus also to successor occupants / end users. The exact amount of the obligation will be based on the scale of the investment made at the site and the expected bill savings, after accounting for any incentives and co-payments made by others.

The Program adopts the following design parameters:[[19]](#footnote-20)

* A tariffed Program Service Charge shall be assigned to the location receiving the upgrades, not to an individual customer.
* The offer to the customer shall effectively shield the customer for installation and operating cost risks and equipment performance risks, including but not limited to the following provisions:
  + Program Service Charges shall be constrained to be less than [80 percent][[20]](#footnote-21) of the customer’s predicted annual savings deriving from the investment.
  + Duration of payments shall not be more than [80 percent][[21]](#footnote-22) of the project’s estimated useful life, calculated as the average of measure use lives, weighted by their respective contributions to expected energy savings.
  + Mid-payment-term increases are not permitted.
  + The Program Service Charge shall be a fixed amount.
  + The Program Service Charge might be subject to a post-installation true-up process to support a savings prediction guarantee.
  + Payments shall stop if installed upgrades stop working—until those measures are repaired or replaced, and the measures are working again as designed.
  + Charges shall also be suspended for building vacancy if a meter is shut off, and the cost recovery period commensurately extended.
  + Repairs or vacancy can extend the duration of charges but may not increase the monthly payment.
  + Upgrades belong to the building owner, unless a third-party ownership mechanism is necessary to maximize available tax credits.
  + Upgrades cannot have an end-of-lease charge or transfer of ownership financial obligation.
  + Customers who opt in to tariffed on-bill investments remain eligible for all other financial incentives.
  + TOB upgrades shall be commercially proven technologies that meet program standards for energy efficiency, performance, and reliability.
  + The Program Sponsor or its agent shall verify that products are appropriate, and savings estimates exceed payments in both the near and long terms.
* Billing and payment on the utility bill shall be subject to the same terms for disconnection for non-payment as are all other bill charges.
* Each month, [the utility doing billing and collection of tariffed on-bill charges] shall pay the capital provider(s) the monthly amount billed to TOB customers, regardless of the utility’s collections, and to treat any bad debt for TOB measures in the same way that it treats all other bad debt.

### Regulatory and Program Precedents

*From the CPUC:*

*Is there any precedent for a program of this type, and if so, what are the lessons learned from previous and similar programs? Please include any applicable program results from those other programs, such as forecast and actual participation by targeted customer group and describe, to the extent possible.*

The proposed Program incorporates both regulatory and program precedent into its design.

#### Regulatory and Program Precedents Nationwide

Tariffed on-bill programs based on the PAYS® (Pay As You Save®)[[22]](#footnote-23) system have been successful for the past 20 years in eight states. Their scope ranges across 18 utilities, from Hawaii to New Hampshire, and involve investor-owned, cooperative, and municipal utilities. **Figure 1** shows the scope and status of PAYS programs nationwide.

Diagram

Description automatically generated with low confidence

*Source:* LibertyHomes, 2021. <https://www.libertyhomes.org/>

**Figure 1. Map of existing PAYS® programs, showing current locations where they are in place, and prospective locations for adoption.**

Utilities have invested approximately $44 million in energy efficiency and renewable upgrades at more than 5,800 locations[[23]](#footnote-24)￼ According to the nonprofit organization￼LibertyHomes￼ energy upgrade programs using PAYS have reported customer acceptance of program offers at rates of 50 to 90 percent, with higher average capital investment per site compared to on-bill loans. The PAYS mechanism has also kept utility uncollectibles below 0.1 percent. These results hold true even in areas characterized by conditions of persistent poverty.

A recent paper on PAYS[[24]](#footnote-25) has documented relevant developments to this evolving system:[[25]](#footnote-26)

* In December 2019, the Missouri Public Service Commission approved Evergy’s energy efficiency plan, contingent on using the PAYS system…
* [In] July [of 2020], Ameren Missouri and staff of the Public Service Commission and other stakeholders announced a unanimous agreement to use the PAYS system for a two-year program with the intention to scale in subsequent years …
* Also, in July 2020, the City of Minneapolis filed a tariff for inclusive financing using the PAYS system … Additionally, in 2020, the Virginia Legislature unanimously passed SB 754 granting rural electric cooperatives State Corporation Commission conditional preapproval for on-bill tariff energy efficiency programs such as PAYS...
* In July 2020, Duke Energy reached a partial settlement with intervenors in its grid modernization rate case, agreeing to craft a tariffed on-bill program that could use the PAYS system, and that settlement has been submitted to the North Carolina Utilities Commission for consideration...

The Southeast Energy Efficiency Alliance (SEEA)[[26]](#footnote-27) has compiled the following case studies:[[27]](#footnote-28)

* **Ouachita Electric Cooperative – HELP PAYS®.** Ouachita Electric Cooperative started its HELP PAYS**®** program in 2016 after recognizing its previous on-bill loan program, called HELP, posed higher financial risks, limited eligibility, and limited project size. Ouachita Electric worked with its Program Operator, EEtility, to make the transition from making consumer loans to making TOB investments. The tariff was approved by the state’s utility commission in approximately four months, accounting for half of the time in the transition from due diligence to field implementation, which was eight months. Ouachita EMC upgraded 198 homes during eight months of 2016, reaching 2% of the market in the utility’s service area. The utility prioritized attention to renters in multifamily homes, making an offer to capitalize upgrades in every rental unit assessed. Of eligible units, 100% opted to proceed with the upgrades. In addition, more than 80% of the residents in single-family homes who received an offer through the HELP PAYS® program accepted it. Comparing the best four months of the previous on-bill loan program to the first four months of the HELP PAYS® program, the project size and number of participants doubled. The average cost of an upgrade project was $5,634, and the average estimated energy savings was 22%.
* **MACED – How$mart®KY.** The Mountain Association for Community Economic Development (MACED) has administered the How$mart®KY TOB program since 2011. At the time of publication, it is offered by six electric co-ops, all of which partner with MACED as the Program Operator. MACED worked with the co-ops to adapt its program design from intellectual property licensed from the Energy Efficiency Institute, as well as on precedents developed by Midwest Energy’s How$mart® program in Kansas. Residential and small commercial customer classes are eligible, and most of the projects are residential. As of June 2019, the program had assessed 607 buildings, offered upgrades to 405 member-owners, and facilitated 320 energy efficiency retrofits. The average job cost is $7,743, and the cost recovery rate is over 99.6%, with zero disconnections for non-payment. The average monthly projected savings is $51.98, or 5492 kWh, while the average monthly charge is $39.98.
* **Roanoke Electric Cooperative – Upgrade to $ave.** Roanoke Electric Cooperative began Upgrade to $ave in July 2015 after finding the vast majority of customers with the highest bills in its service area would not qualify for or be willing to apply for a loan through its debt-based program. As of September 2017, the average Upgrade to $ave job cost was $7,200, and the average monthly tariffed charge for cost recovery was about $60, with cost recovery ranging from 4-12 years, while the estimated monthly savings averaged over $80 per month. Participants are estimated to keep an average of 25% of savings during the cost recovery period. As of June 30, 2019, the co-op has invested approximately $3.4 million into energy efficient upgrades for member-owners through Upgrade to $ave and still has nearly $3.1 million left in federal financing to invest in the program with a capital cost less than 3%. 638 member-owners have already benefited from this high-impact program.
* **Appalachian Electric Cooperative – U-$ave Advantage.** Appalachian Electric Cooperative was the third cooperative in the Southeast to implement a PAYS program and the first Tennessee Valley Authority local power company to do so. As of September 2019, the average job cost was $6,414, while the estimated monthly savings averaged more than $68 and 640 kWh per month. 37 member-owners have already benefited from this high-impact program, the result of an 82% conversion rate of eligible homeowners.

#### California Policy and Program Precedents

In California, Senate Bill 350 (De León, Chapter 547, Statutes of 2015) directed the CEC to study barriers to low-income customers participating in the clean-energy economy. After months of extensive stakeholder consultation and several rounds of public comments and draft review, the CEC concluded, as expected, that access to financing is a barrier to low-income customers. In its report, [[28]](#footnote-29) the CEC advanced recommendations for addressing barriers to financing, including the following:

The CPUC should consider developing a tariffed on-bill Program for investments in energy efficiency that targets low-income customers regardless of credit score or renter status, and that do not pass on a debt obligation to the customer. Utilities could use the program to make energy upgrade investments and recover the cost through the bill, so long as the recovery charge is less than the [total] estimated savings. The Energy Commission should encourage and provide technical assistance to publicly owned utilities (POUs) and other load-serving entities seeking to implement a tariffed on-bill Program.

Following the CEC’s Barriers Study, the University of California Center for Law, Energy & Environment convened multifamily housing experts to give closer attention to barriers uniquely affecting renters. The results of their deliberations were published in a report[[29]](#footnote-30) that identified recommendations to address key challenges, including lack of reliable, long-term funding that inhibits market transformation:

The California Public Utilities Commission and utilities could propose, and institute utility tariffed on-bill programs that capitalize energy efficiency retrofits without making [consumer] loans. … This model is similar to on-bill financing in that the utility bears the upfront cost of efficiency measures and [the utility] recoups that cost via a Program Service Charge (known as the “tariffed charge”) on the customer’s monthly bill that is “tied to the meter” (i.e., is passed on to subsequent occupants). The significant difference is that the utility makes an investment rather than a loan. As a result, there are no limitations to eligibility related to income or credit history.

In a separate and subsequent process devoted specifically to building electrification, the Greenlining Institute and Energy Efficiency For All convened stakeholders to design a framework, released in September 2019, for equitable building electrification. The framework underscores the importance of ensuring funding for energy efficiency and clean-energy programs. Its recommendations included “[finding] ways to support Environmental and Social Justice (ESJ) households through alternative financing such as tariffed on-bill financing.”[[30]](#footnote-31)

The CEC issues an Energy Efficiency Action Plan for the state every two years. The Plan, finalized in December 2019, contains a similar recommendation: “Implement tariffed on-bill repayment programs statewide to open new financing mechanisms for low-to-middle-income households and multifamily units, with eligibility not based on credit score or income.”[[31]](#footnote-32)

Building on this body of policy recommendations, the Building Decarbonization Coalition launched the Accessible Financing Project in 2019 to map policy pathways for implementing both recommendations. The project produced *Towards an Accessible Financing Solution: A Policy Roadmap with Program Implementation Considerations for Tariffed On-Bill Programs,* in June 2020.[[32]](#footnote-33) Consistent with the policy recommendations cited above, the BDC Accessible Financing Project research team prioritized attention to the potential for addressing the key design requirements with site-specific investment and cost recovery through utility tariffed on-bill programs. The roadmap has sparked renewed interest in tariffed on-bill solutions in California—leading to, among other things, the inclusion of a TOB pilot within the TECH Clean California scope of work.

At the program level, Sonoma County Regional Climate Protection Authority and the BayREN have collaborated to design, launch, and improve upon the program model at the Windsor and Hayward municipal water utilities. The collaboration is rolling out a region-wide, on-bill initiative for other Bay Area municipal water utilities. This innovative and inclusive investment model facilitates utility customers’ installation of efficiency improvements with no upfront cost. It provides customers in several markets a simple and attractive path to install energy- and water-saving technologies with little to no risk to the customers and includes affordable and market rate residential rentals and small commercial buildings.

During the 9-month PAYS® Pilot in the Town of Windsor, occupants of 200 single-family residences and 225 multifamily units signed up for the program. More people participated in this program than in any of Windsor’s other water conservation programs. It was the first time that multifamily properties could participate in water conservation measures. Multifamily participants achieved average annual savings of 10 percent in energy costs, 30 percent in indoor water costs, and $170 in net bill utility costs.

This work involved strategies to evaluate the local built environment; engage with and research challenges and opportunities presented by potential sources for program capital; quantify energy, water, embedded energy (in water), and overall GHG savings; geographic analysis of project potential based on building stock, utility rates, and project costs; analysis consistent with critical policies and regulations, drought regulations and restrictions, utility rate and tariff requirements associated with Proposition 218 (the “Right to Vote on Taxes Act”), and real estate transactions and customer disclosure requirements and procedures.

### Draft Electric TOB Rate Schedule for Eligible Participants (“Schedule E-TOB”)

*From the CPUC:*

*For tariffed on-bill programs, please include draft tariff language. Also, provide a discussion of:*

* *The expected payment prioritization of the on-bill charge that discusses any potential legal, regulatory, and customer protection mechanisms included.*
* *Whether the program will be implemented through modifications to an existing or a new tariff offering, and the anticipated costs associated with implementing the updated or new tariff.*

#### If Program Sponsor is not an IOU

[Program Sponsor] has met and conferred with [named IOU] on the appropriate tariff terms to support a Tariffed On-Bill Investment Program. The following proposed terms are informed by those discussions.

#### If Program Sponsor is an IOU

[IOU] hereby respectfully requests the CPUC approve the following new E-TOB tariff.

#### APPLICABILITY

1. The proposed rate schedule applies to electric service to residential meters that meet the eligibility criteria specified in the Participant Eligibility section (below), and receives service under [IOU’s] Electric Rate Schedule or a Community Choice Aggregation Rate Schedule.

2. Schedule E-TOB is a utility investment strategy to deliver TOB Program services for the purchase, installation, maintenance—and, as necessary, repair—of eligible clean energy measures or equipment (CEMs) at the premises of qualified customers. Qualified customers are those customers who meet specified eligibility criteria and comply with TOB requirements in accordance with this Schedule.

3. Electric vehicle load that is separately metered under Schedule [TOU-EV-1] is ineligible for service under this Schedule.

#### TERRITORY

The entire [IOU] electric service territory.

#### DEFINITIONS

The definitions of capitalized terms used in this Rate Schedule are either defined in this Rate Schedule or in Electric Rule 1 Definitions, or in E-TOB Regulations, as defined below. Unless otherwise stated, all references to “Customer” in this Rate Schedule will refer to [IOU] Customers who have elected to participate in E-TOB.

1. **Clean Energy Measures (CEMs):** Improvements allowable under the TOB Program, as approved by the CPUC. CEMs are specified in the TOB Program Regulations available on the Program website, [URL], are subject to CPUC approval, and might change from time to time.
2. **Owner Agreement:** A written agreement between the Customer and [IOU] authorizing the utility or its designated agent to install mutually agreed-upon CEMs on the Owner’s premises, in addition to other terms as they might be specified in the TOB Program Regulations.
3. **Participation Agreement:** A written agreement between the Customer and [IOU] to capitalize and install CEMs at a Customer Premise. The named person(s) on the Participation Agreement must also be the named person(s) on the [IOU] bill on which the Program Service Charge will be repaid.
4. **Program Service Charge:** Amounts due during a billing period from a Customer on this E-TOB Schedule.
5. **Program Sponsor:** The Utility may delegate some or all responsibilities for delivering customer services to third party, subject to the terms of this tariff and any supplementary terms the Utility might require, as specified in an Advice Letter to the Commission.
6. **Tariffed On-Bill (TOB):** A process whereby the utility, or Program Sponsor if different, with the Customer’s permission and the permission of the property owner, if different from the Customer, may make a site-specific investment in qualifying Clean Energy Measures at the Customer Premise and recover the investment via Program Service Charges included in a Customer’s Bill, to be paid to [IOU] with the [IOU] Charges.
7. **TOB Regulations:** Requirements for participation in TOB will be established in the TOB Program Implementation Plan approved by the CPUC.

#### RATES

All charges and provisions of the Customer’s otherwise applicable tariffs shall pertain. In addition, a fixed monthly Program Service Charge amount due will appear as a line item on the Customer’s bill to facilitate the recovery of the Utility investment in the installed CEMs.

Customers receiving service under this Schedule will be charged the applicable rates under the E-ELEC tariff (PG&E) or TOU-D Option PRIME or TOU-D Option PRIME-CPP Option A (SCE) unless a financial analysis determines that an alternate tariff would be more financially beneficial to the Customer.

#### SPECIAL CONDITIONS

Investments by the Utility, or Program Sponsor if different, under this TOB Schedule will be accessible only if funds are available for investment as authorized by the California Public Utilities Commission, as appropriate for the regulated utilities or appropriate boards or councils for Community Choice Aggregators.

1. **Participant Eligibility.** Eligibility is subject to the following conditions:
   1. Eligible customers are single-family and multifamily residential customers receiving electric service at a Premise with a meter served by the participating partner utility.
   2. Customers in rented or leased single housing units may participate with the written consent of the property owner.
   3. Customer must be in good payment standing from when the Customer’s program application is approved through the funding of the investment. A Customer’s payment standing will be determined via a Payment History Screening, which may be based on the existence of any 24-hour disconnection notices in the last 12 months. If the Customer does not pass the payment screening, an appeal may be submitted to the program through a Utility account representative.

Customers must voluntarily opt to receive program services. Customers must receive a Clean Energy Site Plan (as defined below), demonstrating that program participation is likely to provide bill savings to the Customer at the Customer’s Premise, based on documented site conditions and utility bill analysis.

Program services and CEM installations may be completed once

* 1. the Customer at the site has signed a TOB Participant Agreement and agrees to program terms; and
  2. the Utility or Program Sponsor, or its designated agent operating the program, has verified that Customer-requested program CEMs can be safely installed at the site and perform sufficiently to deliver bill savings consistent with program requirements and Customer-reported and -observed site conditions.

##### For SCE Customers Only

Customer must attest to having one or more of the following technologies to be eligible for service on Option PRIME or Option PRIME-CPP:

* 1. Electric vehicle;
  2. On-site behind-the-meter (BTM) energy storage system; and / or
  3. Electric heat pump system for water and / or space heating

1. **Ownership:** If the Customer is not the building owner, the building owner must sign an Owner Agreement, agreeing (1) to contribute any applicable co-payment for replacement of space heating and domestic hot water systems; (2) not to remove or damage the measures; (3) to maintain them; and (4) to provide notice of the benefits and obligations associated with the measures at the location to the next owner or Customer before the sale or rental of the property.
2. **Clean Energy Site Plan:** The Utility or Program Sponsor, or its designated agent operating the program, shall perform an assessment of eligibility and identify recommended eligible CEMs to install at the site.
   1. Maximum value of investment: The sum of the value of invested funds for installed measures for each Customer premises shall not exceed $50,000 (fifty thousand dollars) except in the Utility or Program Sponsor’s sole opinion, unique opportunities to serve the Customer exist.
   2. Net savings: Recommended measures will be limited to those where the annual Program Service Charge (Service Charges), as described in Section 6, are no greater than 80 percent of the estimated combined annual benefit from changes to Customers’ energy charges, based on current retail rates for electricity and natural gas, after accounting for any applicable incentives, tax credits, or Customer co-payments.
   3. Co-pay option: To qualify a Program project that is not sufficiently cost effective, Customer may agree to pay the portion of a project’s cost that prevents it from qualifying for the Program—as an upfront payment to the Program Operator.
   4. Existing buildings: Projects that address measures to existing buildings deemed unlikely to be habitable or to serve their intended purpose for the duration of Service Charges will not be approved unless other funding can be used to make necessary repairs.
3. **Approved Program Contractors**: All CEMs must be installed by Contractors that have been approved by the Utility or Program Sponsor, subject to criteria specified in the TOB Program Regulations.
4. **Quality assurance:** When the measures are completed, the installer(s) will be paid by the Utility or Program Sponsor, if different, following verification and approval of the installation by the Utility or Program Sponsor, if different.
5. **Program Service Charge:** The Utility will recover the costs for the CEM investments made under this E-TOB Schedule, including any fees as allowed in this tariff, through monthly Service Charges assigned to the meter at the location where measures are installed and paid by Customers at that property, until all costs of the Utility or Program Sponsor, if different, have been recovered. The annualized Service Charges will not exceed 80 percent of total estimated annual savings. The Service Charge term will not exceed the weighted estimated life of the installed CEMs.

For tenant-occupied Premises, the landlord will be required to contribute a co-payment subject to calculation methods specified in the TOB Program Regulations.

Adjustments to the Program Service Charge to incorporate available incentives: The Utility or Program Sponsor, if different, may reduce the measure cost with an incentive payment for eligible measures; the incentive must be less than or equal to the value of the measures to the Utility.

* 1. For owner-occupied homes, any available incentives will be applied first to reduce or eliminate the project installation costs and a Customer’s co-pay requirement. Any additional available incentives will then be applied to reduce the TOB investment requirement.
  2. For tenant-occupied homes, any available financial incentives shall be applied first to zero out any tenant co-payment requirement. The remaining balance of incentive funds shall then be applied to reduce both the tenant’s contribution (via the Program Service Charge) and the landlord’s contribution (via a co-payment) in equal proportion.
  3. In either scenario, a Tariffed On-Bill charge will be applied only to the balance, and only if it meets the Program’s cash positive requirements.

The Service Charges and duration of payments will be included in the TOB Participant Agreement.

* 1. Cost recovery: The Service Charge will be applied to the Customer’s electric bill, following a minimum of 45 calendar days after installation of measures, and the Utility or the Program Sponsor have approved the completed work. The Customer will be billed the monthly Service Charge as determined by the Utility or Program Sponsor. The Utility will bill and collect Service Charges until the Utility has recovered all approved costs for installed CEMs (including any applicable annual maintenance fees), except in cases discussed in Repairs (Item *i* in this section).
  2. Maintenance of measures: Participating Customers and building owners (if the Customer is not the building owner) must agree, when signing the TOB Participant Agreement or the Owner Agreement, to (1) keep the measures in place for the duration of Service Charges, (2) maintain the measures per manufacturers' instructions, (3) participate in any Program-required annual maintenance, and (4) report the failure of any measures to the Program Operator, Utility, or Program Sponsor, if different, as soon as possible. If a measure fails, the Utility or Program Sponsor, if different, is responsible for determining its cause and for repairing the equipment in a timely manner, as long as the Owner, Customer, or occupants did not damage the measures, in which case they will reimburse the Utility or Program Sponsor, if different, as described in Repairs (item *i* in this section).
  3. Annual maintenance plan: The Utility or Program Sponsor, if different, may offer to participating Customers an annual maintenance plan for qualifying equipment, under terms and rules to be specified in the TOB Regulations. Billing for the annual maintenance plan may be included on the Customer bill as a supplement to the Program Service Charge. The maintenance plan is not an essential utility service. Customers may opt out of the plan; calculation of the maintenance fee is independent of the net savings provision specified in Special Conditions (3 b)*,* above. Nonpayment of the maintenance plan line item simply results in the Customer being unenrolled in the plan. Under no circumstances will nonpayment of the maintenance plan line item trigger any disconnection or arrears management actions.
  4. Termination of service charge: Once the Utility’s or Program Sponsor’s, if different, costs for measures at a location have been recovered, the monthly Service Charge will no longer be billed, except as described below in Repairs (Item *i* in this section).
  5. Vacancy: If a location at which measures have been installed becomes vacant for any reason and electric service is disconnected, Service Charges will be suspended until a successor Customer takes occupancy. If a building Owner maintains electric service at the location, the building Owner will be billed Service Charges as part of any charges it incurs while electric service is turned on.
  6. Repairs: If the Utility or Program Sponsor, if different, determines, during the billing of Service Charges, that the installed measure(s) are no longer functioning as intended and that the Customer, or building Owner, if different, did not damage or fail to maintain the measures in place, the Utility will reduce or suspend the Service Charges until the Utility can repair the measure(s). If the measure(s) cannot be repaired or replaced cost effectively, the Utility will waive remaining Service Charges. If the Utility or Program Sponsor, if different, determines the Customer or building Owner, if different, did damage or fail to maintain the measure(s), it will seek to recover all costs associated with the installation, including the balance of all unpaid and unbilled Service Charges and legal fees, which shall be due and payable immediately.
  7. Extension of Service Charge: If the monthly Service Charge is reduced or suspended for Vacancy or Repairs, once repairs have been successfully made or service reconnected, the number of total monthly payments will be extended by the number of Service Charge payments that were skipped during Vacancy or Repairs.
  8. Tied to the Premise: Until cost recovery for measures at the Premise is complete or the measures fail and cannot be cost-effectively repaired as described in Repairs (Item *i* in this section), the terms of this tariff will be automatically binding on the Premise and any future Customer who will receive service at that Premise.
  9. Disconnection for non-payment: Without regard to any other approved Utility rules or policies, the Service Charges will be considered an essential part of the Customer’s bill for electric service, and the Utility may disconnect the property for non-payment of Service Charges under the same provisions as for any other electric service. If service is disconnected for Customers on pre-paid payment plans, Service Charges will be pro-rated by the day.
  10. Paid to date and remaining pay-off. The Utility or Program Sponsor shall provide, upon Customer request and / or the request of the Owner, the value of Service Charges paid to date, the number of remaining Service Charges to achieve full cost recovery, and the remaining pay-off for full cost recovery.
  11. Prepayment of the Utility’s cost recovery interest in the CEMs: The Customer may, without prepayment penalty, pay the entire outstanding balance of Program Service Charges in one lump sum, provided the Customer first notifies [IOU] and obtains [IOU’s] approval before making the lump sum payment. Accelerated payments received from the Customer without prior [IOU] approval may, at [IOU’s] sole discretion, be applied proportionally to subsequent energy charges and Program Service Charges; [IOU] shall have no obligation to credit accelerated payments exclusively to subsequent Program Service Charges.

1. **Noticing:** The Owner must agree, as part of the TOB Participant Agreement (if the Owner is the Customer) or Owners Agreement, to have a Notice attached to their property records.[[33]](#footnote-34) Failure to obtain the signature on the Notice Form of a successor Customer who is renting the premises or a purchaser, in jurisdictions in which the Utility or Program Sponsor, if different, cannot attach the Notice to the property records, indicating that the successor Customer received notice, will constitute the Owner’s acceptance of consequential damages and permission for a tenant or purchaser to break their lease or sales agreement without penalty.
2. **Monitoring and evaluation:** The Utility or Program Sponsor, if different, will compare each participant’s post-installation actual annual savings to estimated annual savings at least once for each location. If any instances are identified in which actual CEM savings are below 80 percent of the CEM’s estimated savings, the Utility or Program Sponsor, if different, will investigate to identify the cause and take appropriate action including those described in the TOB Program Regulations and this E-TOB Schedule.
3. **Applicable rate and rate time periods** are defined as follows:
   1. PG&E E-Elec or EV-2 [cite source / reference]
   2. SCE TOU-D Prime: [cite source / reference]
   3. SCE TOU-D Prime-CPP: [cite source / reference]
4. **Other applicable terms.** Nothing in this Rate Schedule limits a Customer’s ability to participate in California Alternate Rates for Energy (CARE), Family Electric Rate Assistance, Arrearage Management Plan, or other Utility-sponsored program for which the Customer would otherwise be eligible.

### Discussion of E-TOB Terms

The Commission has posed two topics for discussion:

1. The expected payment prioritization of the on-bill charge that discusses any stated potential legal, regulatory, and customer protection mechanisms.
2. Whether the Program will be implemented through modifications to an existing or a new tariff offering, and the anticipated costs associated with implementing the updated or new tariff.

As noted above in Tariff paragraph 6.l, the Service Charges will be considered an essential part of the Customer’s bill for electricity service, and the Utility may disconnect the property for non-payment of Service Charges under the same provisions as for any other electric service. The Commission has taken important steps in recent years to minimize Customer exposure to disconnection risks, including the institution of arrears management plans and suspension of disconnections during the COVID-19 pandemic. Because TOB works via a shared savings with no new financial obligations to the Customer, [Program Sponsor] sees no need to propose further modifications to the disconnection rules.

E-TOB is proposed as a new tariffed offering that would function as a rider to the Customer’s otherwise applicable tariff. All charges and provisions of the Customer’s otherwise applicable tariffs would continue to apply.

### Request for New Building Electrification Tariff

[Program Sponsor] hereby requests the Commission to direct the IOUs to develop a new TOU tariff for Customers who adopt building electrification measures. The tariff should incorporate a two-tiered pricing structure, with the lowest tier price set to the Utility’s marginal cost of providing electricity service, and baseline quantities set to the expected incremental load to be added via building electrification. This innovation in rate design is needed to remedy a cost shift that would otherwise occur from participating ratepayers to nonparticipating ratepayers. The two-tiered structure should apply only to off-peak and partial-peak periods as a way of incentivizing building electrification adopters to prioritize new loads for off-peak periods, thereby minimizing negative grid impacts.

In D.21-11-016, the Commission approved PG&E’s proposal to add a new E-ELEC rate, which is scheduled to become active in December 2022. The E-ELEC rate was part of a joint settlement among PG&E, TURN, Cal Advocates, CforAT, WMA, Joint CCAs, NRDC, Sierra Club, SEIA, and CALSSA. PG&E also proposed to modify Schedule EV2’s applicability language to permit customers with heat pumps for water or space heating to qualify for that rate as well. The proposed and approved changes would thus give building electrification customers two options for managing their electricity costs.

Although these changes are welcome, they do not go far enough to send a clear price signal in favor of building electrification, and they do not fully mitigate the cost shift that will otherwise occur between participants and nonparticipants. Since these changes were negotiated via a settlement process, this current proposal leaves the D.21-11-016 decision intact and, instead, proposes that customers be offered a third-rate option for building electrification. It would be reasonable to restrict this option to customers who adopt new building electrification measures, in conjunction with opting into the new E-TOB rate. In addition to addressing the cost-shift issue, this new rate would dramatically expand the number of customers that Tariffed On-Bill investments could cost-effectively serve; it would also expand the portion of project funding that could be sourced from third-party capital, thereby reducing pressures to fund the balance from ratepayer dollars.

To illustrate the price structure for this new option using PG&E service territory as an example, this proposal adopts the new E-ELEC rate, as a suitable point of departure. As summarized in D.21-11-016 and shown in **Table 6**, E-ELEC price structure would be as follows.

**Table 6. E-ELEC rates from D.21-11-016**

| E-ELEC rate component | Price |
| --- | --- |
| Monthly fixed charge | $15 |
| Summer peak (4 pm – 9 pm) | $0.43340 / kWh |
| Summer part-peak (3 – 4pm, 9 pm – 12 am) | $0.27152 / kWh |
| Summer off-peak (12 am – 3 pm) | $0.21484 / kWh |
| Winter peak (4 pm – 9 pm) | $0.24032 / kWh |
| Winter part-peak (3 – 4pm, 9 pm – 12 am) | $0.21823 / kWh |
| Winter off-peak (12 am – 3 pm) | $0.20437 / kWh |

The off-peak and part-peak rates still remain substantially above the utility’s marginal cost of service, as evidenced by the following results in **Table 7** from the 2021 Avoided Cost Calculator for Climate Zone 12.

**Table 7. Average TOU levelized value of electricity ($ / MWh), Climate Zone 12**

|  |  |  |  |
| --- | --- | --- | --- |
| TOU | Description | Total levelized value | Load building marginal cost ($ / kWh) |
| 1 | Summer peak | $75.72 | $0.076 |
| 2 | Summer shoulder | $178.28 | $0.178 |
| 3 | Summer off-peak | $46.48 | $0.046 |
| 4 | Winter peak | $0.00 | $0.000 |
| 5 | Winter shoulder | $57.14 | $0.057 |
| 6 | Winter off-peak | $40.10 | $0.040 |

A new TOB-specific electrification rate would thus incorporate a pricing structure substantially similar to that presented in **Table 8**.

**Table 8. Proposed electrification rate in conjunction with E-TOB**

| E-ELEC rate component | Tier 1 price ($ / kWh) | Tier 2 price ($ / kWh) |
| --- | --- | --- |
| Summer peak (4 pm – 9 pm) | $0.433 | |
| Summer part-peak (3 – 4pm, 9 pm – 12 am) | $0.178 | $0.272 |
| Summer off-peak (12 am – 3 pm) | $0.046 | $0.215 |
| Winter peak (4 pm – 9 pm) | $0.240 | |
| Winter part-peak (3 – 4pm, 9 pm – 12 am) | $0.057 | $0.218 |
| Winter off-peak (12 am – 3 pm) | $0.040 | $0.204 |

A comparable approach could be applied to develop a new electrification tariff for other electric IOUs and other climate zones.

### Leveraging Private Capital

*From the CPUC:*

*Describe if and how this program will attract private capital in entirety or in addition to using public funds.*

*If so, what portion of the program would be covered by private capital when the program launches?*

The ability to make use of third-party capital (including private debt and equity investments, plus state- and federal-backed loans) hinges critically on the electricity price, and thus on the savings that customers can expect to realize via decarbonization investments. Under PG&E’s proposed EV-2 rate, the program forecasts the opportunity to deploy up to [$XX million] in private capital over a two-year implementation time frame, of which at least [$XX million] would derive from the Program’s Tariffed On-Bill investments. The balance would come from grants, incentives, and Customer co-payments. In this scenario, third-party capital could cover approximately [X percent] of the principal investment, with public funds and Customer contributions making up the balance.

If, on the other hand, Participating Customers could opt into the proposed new electrification tariff, the amount of third-party capital that could be deployed for the same scope of investments would increase to [$XX million], representing [X percent] of the principal investment; the demand for public funds and customer contributions would thus shrink to [$XX million].

In addition, the program estimates an operating revenue requirement of [$XX] over [XX years].

*From TECH Clean California:*

*The following sections describe some known funding options. Program Sponsors should rewrite to reflect their choices.*

**Option: Ratepayer funds.** As an initial start-up source of capital, [Program Sponsor] requests CPUC authorization to allocate ratepayer funds. The cost of capital assigned to ratepayer funds shall be zero. [Program Sponsor] will submit an Advice Letter in Year 2 of Program implementation, describing options for securing private capital sources to extend the Program sustainably and at scale.

**Option: Utility capital.** [Program Sponsor] seeks CPUC approval to fund TOB investments via debt. The cost of capital is proposed to be consistent with the Utility’s long-term cost of debt, as shown in **Table 9**.[[34]](#footnote-35) [Program Sponsor] attests that the amount of debt contemplated does not compromise the utility’s ability to secure debt-funding for other mission-critical purposes.

**Table 9. Utility long-term cost of debt**

|  |  |
| --- | --- |
| Utility | **Interest rate** |
| PG&E | 5.16% |
| SCE | 4.74% |
| SDG&E | 4.59% |
| SoCalGas | 4.23% |

**Option: USDA’s Energy Efficiency and Conservation Loan Program (EECLP).** [Program Sponsor] intends to undergo the loan application process to participate in USDA’s Energy Efficiency and Conservation Loan Program. Consistent with USDA loan program guidelines, [Program Sponsor] will target rural communities (roughly defined as *communities with populations less than 20,000*). If successful, the cost of capital through this mechanism is fixed at Treasury rates of interest. The maximum term for loans under the EECLP is 15 years. Consistent with program requirements, funding will be used to:

1. Improve energy efficiency and / or reduce peak demand on the customer side of the meter
2. Modify the electric load such that there is a reduction in overall system demand
3. Stimulate a more efficient use of existing electric facilities
4. Attract new business and create jobs in rural communities by investing in energy efficiency, and / or
5. Encourage the use of renewable energy fuels for demand-side management or to reduce the use of fossil fuel use within a service territory.

Program regulations accommodate tariffed investments behind the customer meter.[[35]](#footnote-36)

**Option: U.S. Department of Energy (DOE), Loan Programs Office (LPO).** [Program Sponsor] will apply for capital funds and / or loan guarantees through the DOE Loan Programs Office. LPO has up to $4.5 billion in loan guarantee authority for renewable energy and efficient energy projects under the Title 17 Innovative Energy Loan Guarantee Program, authorized by the Energy Policy Act of 2005. Title 17 helps eliminate gaps in commercial financing for energy projects in the United States that use innovative technology to reduce, avoid, or sequester greenhouse gas emissions.[[36]](#footnote-37)

**Option: Climate Catalyst Fund (I-Bank).** [Program Sponsor] will seek access to capital via the State of California’s Climate Catalyst Fund. This fund is a multi-purpose investment vehicle for climate and sustainability projects, offering low-interest loans, credit support, conduit bond financing, and special-purpose vehicles for critical infrastructure initiatives. The Climate Catalyst Fund can support projects sponsored by public, private, and not-for-profit entities, depending on the nature of the technology and its application.[[37]](#footnote-38)

*From TECH Clean California*

*Conduct a program-specific analysis of expected customer participation, bill savings, and capital stack, as shown in* ***Table 10****.*

**Table 10. Funding contributions to capital stack and program operations**

|  |  |  |
| --- | --- | --- |
| Source | Notes | Amount |
| Private capital | Utility / third party debt or equity or government-backed loans to program |  |
| Incentives | TECH + previously committed ratepayer funding |  |
| Funding gap | To be filled via Participant co-pay or additional public funds |  |
| Sponsor contribution | Cost of capital + start up + program operating |  |
| Total |  |  |

*From the CPUC:*

*Does the program intend to ultimately transition to 100% private capital at a specific milestone? Why or why not?*

The program does not intend to transition to 100 percent private capital for three reasons:

1. This TOB Program emphasizes decarbonization upgrades of existing homes, particularly replacement of fossil-fueled equipment with high-performing electric equipment. For many, if not most, California customers, savings from electrification upgrades are expected to be insufficient to cover the full investment cost; thus, additional incentives will remain necessary to avoid insurmountable customer co-pay requirements.
2. There are substantial public benefits associated with building decarbonization, particularly those associated with the environment, public health, the regional grid, and economics. It is consistent with State policy to allocate public co-funding for these investments, rather than assign the full investment responsibility to the customer.
3. The primary objective of the TOB Program is to expand customer access to clean energy investments to include customers who are typically disqualified due to high debt-to-income ratios, poor credit, low home equity, or renter status—and whose participation is necessary to meet state GHG goals in an equitable fashion. The same barriers that have prevented customers from accessing conventional financing have also impeded their ability to benefit from utility incentive programs. The policy priority should thus redress this historical inequity rather than reduce ratepayer funding for clean-energy investments. Incentive levels should be maintained or increased, at least for the foreseeable future.

## Customer Protections

*From the CPUC:*

*What are the potential financial, economic or other risks to the participating customer in this program and what customer protections does this proposal provide to mitigate customer/participant risk?*

Customer protection protocols should avoid or mitigate the following customer-facing risk factors:

* Installation cost risks
* Savings prediction risks—that is, the risk that cost recovery charges based on estimated savings will exceed the metered bill savings attributable to the upgrades
* Equipment operating and maintenance risks
* Cost shifts from landlords to tenants
* Notifications to successor customers

TOB participants are never at risk of losing their homes or having installed upgrades repossessed because the Program does not rely on either the home or the installed upgrades as collateral. The Program attaches no liens and there is no threat of foreclosure or equipment repossession.

### **Installation** Cost Risks

Unlike debt-based forms of capital finance, tariffed on-bill investments incorporate an inherent throttle on capital costs because the available TOB capital is limited to less than the Customer’s expected savings throughout the life of the installed measures. In addition, the Program adopts a contracting and service delivery model that removes opportunities for abuse that could occur if the sales agent’s compensation were linked to the scope and profitability of the project.

Consider the following scenarios:

1. In cases where the combination of publicly funded incentives, plus available TOB capital, is more than sufficient to cover the full project installation cost with no customer co-pay, the sales agent might be inclined to mark up the installation bid price or propose unnecessary scope elements to capture the surplus available funds, rather than return those funds to the customer in the form of lower TOB Service Charges.
2. In cases where a customer co-pay is required to cover the full installation costs, the sales agent might nevertheless be inclined to persuade the customer to accept a higher-than-necessary co-payment to cover premium pricing and / or unnecessary scope.

These risks are inherent in the standard bilateral Contractor-Customer business relationship, and they are the bases for admonitions to Customers to seek multiple bids. The Program avoids these risks by designating a Program Operator as the Program Sponsor’s agent and assigning the Program Operator full responsibility for Customer acquisition and project scope development. Installation costs are determined from a negotiated fee schedule, rather than project-by-project. The Program’s sales agent compensation is decoupled from project work scopes.

The Program’s contract structure is illustrated in **Figure 2.** A key aspect is that the installing contractor’s business relationship is with the Program Operator, not the Customer.

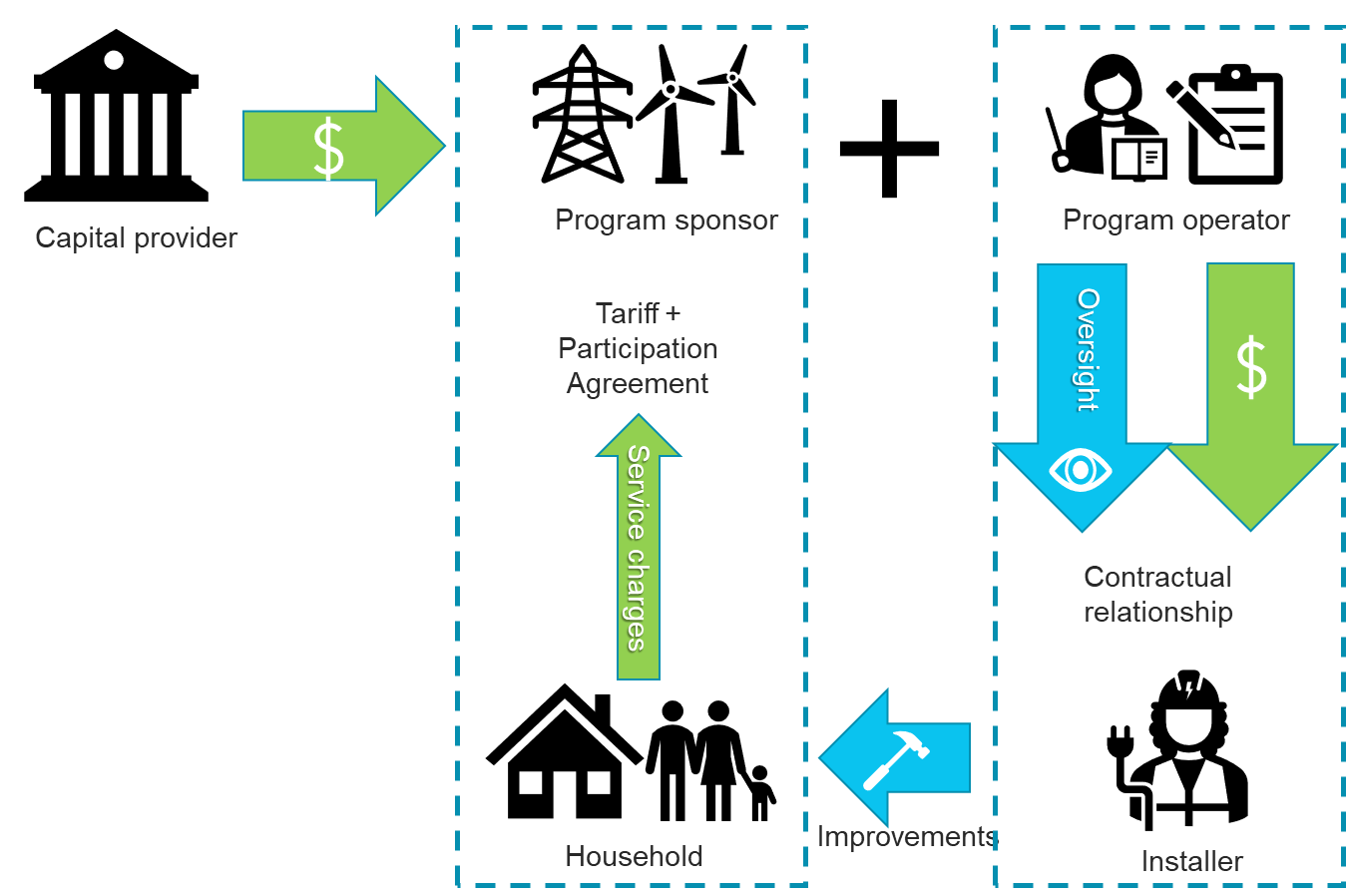


Figure 2. Program contract structure and capital flow.

In this model, the Program Operator handles Customer acquisition and project planning, including site assessment, project scope and specifications development, site data collection, energy modeling, financial feasibility analysis, and determination of TOB capital contribution. The sales agent works for the Program Operator and the agent’s compensation and performance metrics reward Customer protection, instead of maximizing sales volume or dollar value. The installation contractor's role is limited to installation services, based on the Program Operator’s pre-determined project scope and specifications. Financial compensation to the installer will be determined by a negotiated fee schedule.

This delivery model also has implications for installation contractor participation. In this model, participating Customers are not at liberty to select their own contractors, and participation is not open to any and all contractors who meet minimum eligibility requirements. Instead, the Program Operator will seek out the best-qualified and most price-competitive contractors via a competitive Request for Qualifications process. Selected contractors, in turn, can expect to be assigned a substantial volume of work that rewards them for prioritizing the Program as a key client. This model also relieves contractors from soft costs, including customer acquisition costs, that otherwise drive up the retail prices Customers face for measure installation.

### Savings Prediction Risks

A tariffed on-bill investment is not a loan, but rather a Utility investment for which cost recovery is tied to the location served by the Utility, according to terms set forth in a Utility tariff. The Program incorporates a cash-positive requirement as a central feature because it assures that the cost recovery charge functions as a shared savings mechanism rather than an additional financial obligation.

*From TECH Clean California:*

The wording below is the default Pay As You Save formula. The TECH team recommends that the Service Charge remain capped at no more than 80 of annual savings, but the term could extend to the full expected life of the installed measures, if the Program incorporates operations and maintenance protections, as described here.

[Specifically, the Program adopts an 80 / 80 rule, in which the annualized Program Service Charge is limited to less than 80 percent of the expected annual utility bill savings and the total available TOB capital is limited to less than 64 percent of the expected lifecycle savings (that is, 80 percent of annual savings multiplied by 80 percent of the expected useful life).][[38]](#footnote-39)

In practice, the cash-positive requirement offers multiple benefits to Program sponsors and participants.

* **Customer protection.** The cash-positive requirement is an important Customer protection because it ensures that households do not incur higher energy burdens as a consequence of their energy service improvements. Customers are not asked to take on any new financial obligation beyond the commitments they accepted as part of their subscription to Utility services.
* **Shared benefits.** Participants should share in the benefits of decarbonization, including joining in co-benefits that improve health, comfort, and safety. Low-income and disadvantaged communities should not be precluded from participating in solutions, just because they face barriers to using traditional forms of consumer finance or home ownership.
* **Higher Customer acceptance rates.** Based on prior program experience, assurance of positive cash flows is expected to support higher rates of customer acceptance of Program offers, compared to conventional loan programs and market rate incentives.
* **Risk management.** Estimates of future energy savings are subject to uncertainty. Instituting a cash-positive requirement thus provides a safety margin to households for performance risks.

TOB necessarily involves estimation of future energy savings to inform a project investment plan and shared savings proposal to the Customer. There is an inherent degree of uncertainty in this exercise. At the same time, it is critical that TOB investments reduce, rather than increase, customer energy burdens; so these risks must be borne by the Program Sponsor, rather than the Customer.

Published evaluation reports indicate that project and Program realization rates (that is, metered energy savings, divided by ex-ante predictions) can be highly variable. Some published studies report realization rates below 50 percent. Thus, the 20 percent buffer described above, although necessary, might not be sufficient to provide the necessary degree of assurance. The Program will field-test the risk mitigation strategies shown in **Table** **11,** to determine the optimum mix of protection measures that balances Customer protections and ratepayer financial burdens.

**Table 11. Savings prediction risk factors and possible mitigation strategies**

| Risk factor | Mitigation |
| --- | --- |
| Erratic baseline consumption might complicate efforts to calibrate engineering models and thus introduce unacceptable levels of uncertainty into savings predictions. | Apply standard CalTRACK protocols to screen candidates for baseline model stability (CVRMSE < 1.0). |
| Site data collection errors could lead to engineering model mis-specification. | Assign data collection responsibility to the Program Operator and adopt site data collection protocols that incorporate industry best practices  Establish minimum training and experience requirements for field technicians responsible for data collection |
| Model mis-specification, including over-reliance on model default values, could lead to biased savings estimates. | Assign data collection responsibility to the Program Operator and adopt physics-based modeling and simulation software tools that incorporate NREL’s EnergyPlus™ whole-building energy simulation engine  Require models to be calibrated to baseline metered gas and electricity consumption, including calibration to disaggregated weather-sensitive loads  Establish minimum training and experience requirements for personnel responsible for developing energy modeling |
| Savings mispredictions or installation quality issues could result in a fraction of Customers with realization rates below 0.8, which means their Program Service Charges would exceed their metered savings.  At the whole-building level, low realization rates could also be attributable to exogenous changes in the customer’s energy usage patterns, which is outside of program control and responsibility. | Test methods for isolating end use consumption via disaggregation and weather normalization of whole building energy consumption via CalTrack methods.  Supplement whole-building analysis with end use submetering as needed to isolate program-impacted end uses from unaffected end uses. Combine submetering with Smart Thermostat data and HPWH controls data for remote monitoring of equipment performance.  In cases where the first year of post-installation monitoring shows probable cause to believe that energy savings from Program-installed improvements falls short of predictions, investigate root causes via phone interviews and site visits as needed.  If under-performance or over-prediction is verified, the Program may repair or replace equipment and/or adjust customer’s Program Service Charge for all future payments to reflect the meter-based savings result for the improvements. Customer shall receive a bill credit for over-charges in prior months. |
| Some Customers might experience take-back effects, particularly lower-income Customers who practice “voluntary curtailment” (that is, they under-use their heating equipment to save money); plus, all customers who currently lack air conditioning. | To the extent that low-income Customers practicing “voluntary curtailment” can be identified during the planning phase, they should be steered towards direct install programs, in lieu of TOB investments.  Alternatively, a rooftop solar and battery storage system could be added offset new loads, especially new cooling loads. |

As part of the Program’s field research into scalable delivery models, [Program Sponsor] will also test the viability of less expensive guarantee strategies for a production-scale program. In particular, [Program Sponsor] will investigate alternatives that do not require phone interviews and site inspections, which would be challenging to perform at scale. For different guarantee strategies, [Program Sponsor] will back-cast what the results would have been, had [Program Sponsor] applied them to the Program participants. This back-casting might explore what fraction of guaranteed outcomes would have resulted in either false-positives (that is, Customers would have received unmerited Service Charge discounts) or false negatives (Customers would have merited Service Charge discounts or other mitigations, but failed to receive them). What would have been the cost to the program to provide the guarantee?

1. **Option 1.** Site-specific guarantee of weather-normalized end use consumption based on end use submetered results
2. **Option 2.** Site-specific guarantee of weather-normalized end use consumption based on end use disaggregation of whole-building consumption, combined with performance data from smart thermostats and other Internet-enabled sensors
3. **Option 3.** Site-specific guarantee of whole-house energy consumption
4. **Option 4.** Population-level guarantee. If population realization rate after one year of performance is less than 1, then apply discounts to Service Charges for the subset of participants with low project-level realization rates.
5. **Option 5.** No guarantee.

### Equipment Operating and Maintenance Risks

The Customer protections required to mitigate equipment operating and maintenance risks mirror the protections that Program Sponsors and their Program Operators should take to mitigate their own business risks relating to recovery of Program Service Charges. The guiding principles adopted here are that the Program must be responsible for ensuring that improvements perform as designed, whereas the property owner and occupant must take responsibility for proper operations and maintenance in keeping with manufacturer’s recommendations.

Customer protection protocols for operationalizing these principles are:

* Terms enumerated in the TOB tariff
  + Charges stop if upgrades stop working until they are repaired and working again. Charges are also suspended for vacancy, if the meter is shut off.
  + Repairs or vacancy may extend the duration of charges, but not increase the monthly payment amount.
* Program-sponsored quality-control inspections and acceptance testing of equipment installations on at least a sampled basis
* Requirements for minimum 10-year manufacturer warranties on installed equipment
* Requirement for the installing contractor to provide a one-year warranty on labor
* “Big data” analytics of metered energy consumption data, smart thermostat data (HVAC), and hot water controls to detect possible instances of equipment performing outside design parameters
* Customer enrollment in Program-sponsored annual maintenance plans spanning the full cost recovery period
* Program surcharge for repair insurance

To assist the property Owner and occupant with proper operations and maintenance, the Program will offer annual maintenance services for installed mechanical equipment. A service technician will make annual site visits to perform routine maintenance and equipment tune-ups per manufacturers’ recommendations for appliances installed as part of the Program. The service technician will also investigate any comfort or energy service complaints, check for equipment operating schedules to ensure they remain optimized for both energy services and cost, and confirm that all remote monitoring capabilities remain functional. Service visits will be available for the full cost recovery period. The plan will also incorporate a no-fault repair guarantee to cover all repair costs that are not otherwise covered by warranty, and which do not originate from the customer’s removal of equipment, intentional damage, or gross negligence.

The Program will negotiate annual maintenance plan fees, in bulk, with participating installers. It is anticipated that the Program will be able to secure more favorable pricing than Customers would be able to find on the open market.

### **Tenant Protections**

Landlords have a fiduciary duty to provide space heating and hot water services to their tenants. Providing program funds with tariffed cost recovery for the full replacement cost of old mechanical systems would unfairly shift that financial burden from landlords to tenants. For this reason, the Program will incorporate landlord co-payment provisions for water heating and space conditioning upgrades.

In cases where the available TOB capital, as determined by the expected lifecycle savings from installed measures, exceeds the tenant share of the investment (that is, the difference between the total project installed cost and the landlord’s co-payment), then the TOB contribution will be capped at the tenant’s share.

Any available financial incentives shall first be applied to zero out any tenant co-payment requirement. The remaining balance of incentive funds shall then be applied to reduce both the tenant’s contribution (via the Program Service Charge) and the landlord’s contribution (via a co-payment) in equal proportion.

Following the example of SCE’s BE Ready Home application,[[39]](#footnote-40) the Program will incorporate a Split Incentives Agreement similar to what is currently being used in the SJV-DAC. The TOB Program Split Incentive Agreement will require property Owners to agree to limit evictions to “At Fault Just Cause” as defined by California Tenant Protection Act of 2019 (AB 1482) and avoid Ellis Act evictions for five years. The Agreement will also limit annual rent increases to 3.6 percent over five years, to protect participating renters from significant rent increases or displacement, post-treatment. Failure to adhere to agreement terms will subject the landlord to financial liability for the full TOB investment amount. The agreement must be signed by the property owner, tenant, and the Program Operator. The Program Operator will be tasked with conducting an annual survey of participating renter-occupied housing to confirm compliance. Survey responsibility may be delegated to a community-based nonprofit with a track record of delivering services to lower income households and / or tenants.

### Notifications to Successor Customers

*From the CPUC:*

*How will the repayment obligation transfer if the participating customer vacates a property they lease or own? How will repayment obligations be communicated to any new tenants or owners?*

#### Customer Notifications

Because utility tariffs involve no assignment of a debt obligation, they do not impose a legal obligation on one person that then must be transferred to another person. As a result, the tariffed charge applies automatically to successor Customers, survives foreclosure proceedings, and can be floated through periods of vacancy. This feature plays a critical role in the economic opportunity of TOB because it enables investments with cost recovery over a term comparable to the full useful life of the improvements. If successor Customers are not automatically assigned the Service Charge, it raises a question about whether the Customer is obligated to pay the Service Charge at all, which would create new financial risks for capital providers or general ratepayers.

However, it is essential to notify successor Customers of their benefits and obligations at an upgraded location to ensure that customers know about the improvements made to the home and to avoid potential misunderstandings.

Prospective building purchasers need to know that the building has been upgraded through a utility program for which cost recovery is still under way. When a successor Customer applies for new service, the Utility shall send the new Customer a letter explaining that the property has been improved for resource efficiency, outlining the benefits and obligations of the tariff that applies to the location until the utility’s costs are recovered. The disclosed information shall address:

* Types of upgrades made
* Upgrade in-service date
* Cost of the monthly charge or directions for obtaining cost information from the program sponsor
* Expected date of completion for cost recovery or directions for obtaining cost information from the program sponsor

[Pending confirmation that the Customer billing system will support it, the Utility will consider communicating expected utility bill savings on the bill in conjunction with the cost recovery charge.]

For upgrades to rental properties, landlords shall be required to notify prospective tenants that the rental units under consideration have been upgraded for resource efficiency and lower operating costs. This requirement will be established as part of the Owner Agreement that the property Owner signs.

If and when future changes in state law permit, the implementing utility will record a Notice of Decarbonization Charge on the property records maintained by the county recorder.[[40]](#footnote-41) When attached to the property record, the notice would be communicated to a prospective home buyer in the course of a title search.

#### Early Repayment

The Program will offer an easy pathway for either the current or the successor Customer to make early payment of Program Services Charges as a mechanism for buying out the Utility’s remaining interest in the investment asset. There will be no penalties or fees associated with early repayment.

### Penalties for Nonpayment

*From the CPUC:*

*Describe any penalties that may be imposed if the Customer does not repay the loan (such as credit reporting, asset forfeiture, utility disconnection).*

Foreclosure on a Customer’s home and repossession of the investment asset are both prohibited within the TOB Program. The threat of disconnection of an essential service, albeit in accordance with a CPUC and State policy, is the only protection against non-payment and it is the same security used to assure cost recovery for regular utility services. The TOB Program Service Charge is a Utility service charge for essential services, and thus, existing Customer protections relating to disconnections for nonpayment apply equally to the TOB tariff as to the rest of the Customer’s regular Utility bill. To the extent that CPUC policies limit or prohibit disconnections for nonpayment as a collections method, such protections would apply equally to the TOB tariff. Because the TOB investment is structured to reduce Customer energy burdens, it therefore reduces the Customer’s risk of Utility disconnection.

### Customer Compliance Obligations

*From the CPUC:*

*Describe any non-financial terms and conditions customers must satisfy to stay in compliance with the program.*

Customers are responsible for the proper operations and maintenance of installed equipment. Their participation in the annual maintenance program, combined with the no-fault repair guarantee, assists them in fulfilling this compliance obligation. The following terms are contained in the Customer participation agreement for regular maintenance and care:

* Assignment to Customer of financial liability for damaging or removing installed improvements
* Requirements to notify the TOB Program Sponsor of non-functioning products

### Customer Screening and Informed Customer Consent

*From the CPUC:*

*What processes will be included to ensure that customers understand and can shoulder the full financial burden of participating in this proposed financing program?*

The Tariffed On-Bill Program model is a shared-savings approach that reduces Customers’ future energy burdens, rather than increase them. For this reason, means testing to screen Customers for eligibility is unnecessary.

Although personal credit history is not a factor in Program eligibility, the Program will use bill payment history as an indicator that an account is in good standing, before capitalizing upgrades at that site. In short, a Customer’s track record of paying past utility bills will be taken as sufficient evidence that the Customer can afford lower bills in the future.

Although the TOB investment model does not require financial means testing, it does necessitate careful Customer screening to identify those with the greatest prospects for meaningful bill savings attributable to Program investments. This screening process necessitates advance access to Customer-specific energy consumption data from both gas and electric meters.

### Customer Outreach

*From the CPUC:*

Describe the customer outreach component of the program. Will community-based organizations or groups support and facilitate customer outreach to ensure all participating customers are appropriately made aware of their obligations, and if so, how?

*From TECH Clean California:*

*Program Sponsor to lead development of Customer outreach plan*

Although financial means testing is unnecessary for determining Customer eligibility, the Program will nevertheless adopt proxies for financial means in determining whom to target for marketing and outreach.

*From TECH Clean California:*

*Describe target Customer segments to include and exclude*

*Describe communication channels, role of trusted community-based organizations*

# PART III: Program Design and Delivery Details

## Targeted Customer Sectors

*From the CPUC:*

*What sector(s) will this program target (i.e., residential (Single Family/Multifamily), commercial, industrial, agricultural, public, disadvantaged, and hard-to-reach)?*

Single-family and multifamily Customers, both Owner-occupied and tenant-occupied, will include disadvantaged communities. For purposes of this plan, *disadvantaged communities* are defined as (a) U.S. Census tracts that score in the top 25 percent of CalEnviroScreen 4.0; or (b) Census tracts in which aggregated household incomes are less than 80 percent of Area or State Median Income.

The Program will initially avoid proactively marketing its services to Customers who are enrolled in CARE, until Program systems have been field-tested and the Program can be confident in making offers that are truly at no risk to the customer. Nevertheless, the Program does not include a financial means test for Customer eligibility and CARE customers might ask to participate. In those instances, the Program will first seek to assist the Customer in addressing home upgrade needs via direct installation and related grant-only programs and consider a TOB investment only if and when other resources have been exhausted.

## Customer Eligibility

*From the CPUC:*  
*1.* *How does the program propose to determine customer eligibility?*

*a.* *What are the credit score ranges used to determine customer eligibility?*

*b.* *What criteria in addition to or in lieu of credit scores will be used to determine eligibility (such as bill payment history)?*

*c.* *How will the program measure ability to repay loans?*

*i.* *What are the debt-to-income ratios used to determine customer eligibility?*

*ii.* *What are the estimated customer energy savings (IOU and Non-IOU) used to determine customer eligibility?*

*iii.* *How will energy savings be calculated and tracked? (IOU and non-IOU fuels).*

*2.* *How are the criteria described in Question 1 of this section prioritized to determine customer eligibility?*

The TOB Program is open to all Customers, regardless of debt, income, credit score, or renter status. As enumerated in the proposed tariff, eligibility requirements for program participation involve:

1. Single-family and multifamily residential Customers receiving electric service at a premise, with a meter served by the participating partner Utility
2. Customers in rented or leased single-housing units, participating with the written consent of the property Owner
3. Customers in good payment standing from when the Customer’s Program application is approved through the funding of the investment. A Customer’s payment standing will be determined according to a Payment History Screening, which may be based upon the existence of any 24-hour disconnection notices in the last 12 months. If the Customer does not pass the payment screening, the Customer may submit an appeal to the Program through a Utility Account Representative.

Outbound outreach efforts will seek to identify Customers who (a) experience high energy bills; and (b) have equipment nearing the end of its useful life.Customers with higher energy use will be targeted for participation in the Program, assuming the likelihood of better economic return for that Customer’s project. The Program will target [the top 20 percent] of eligible high energy users. High energy loads for water heating, space heating, and space cooling are likely to deliver the best potential economics for a TOB project. Equipment that is nearing the end of its useful life offers attractive planned replacement opportunities.

The Program will calculate and track energy savings via CalTRACK hourly methods with a control group, in keeping with CPUC-approved normalized metered energy consumption (NMEC) protocols.

[Additional eligibility requirements / criteria to consider:]

1. **Multifamily Customers:** Multifamily eligibility in properties with master-metered electric service could be considered with a building agreement signed by the building Owner and Customer at the master meter. Multifamily eligibility in properties with individually metered units could be considered with unit agreement signed by Customer / tenant and building Owner.
2. **On-site PV:** Solar PV may be recommended or required at some sites, to ensure alignment with final Program requirements for project cost effectiveness and bill neutrality.
3. **Geographic targeting for system benefits:** [Depending on the partner Utility], additional system benefits could be delivered by exceeding certain thresholds of Customer participation in certain geographies. For example, if high participation in a specific neighborhood could delay or eliminate the need for gas distribution system upgrades or allow for a specific gas line to be de-commissioned, those cost savings could be used to incentivize or otherwise benefit TOB Program participants.

[Note that if the partner Utility seeks to decommission a gas line entirely, then it needs to offer comprehensive measures, target early replacement, and serve all Customers on that gas line, regardless of demographics and building type.] The economics for such an investment strategy will be very different from the use cases analyzed for this plan.

*From TECH Clean California:*

*Customize this section as needed to describe Customer eligibility criteria, involving:*

* *Intended audience*
* *Eligibility requirements for appliance recipients, for example:*
* *Geographic area / Utility service territory*
* *Types of buildings or energy systems*
* *Market trigger events (for example, equipment replacement on burnout, home renovation, early replacement, time of home resale)*
* *Customer demographics and / or income*
* *Energy use patterns or amounts*

## Eligible Technologies

*From the CPUC:*

*Which clean energy technologies or distributed energy resources will be supported by the program? If the program focuses on a limited or specific type of technology or technologies, explain why that specific type of technology or technologies should be prioritized for a new clean energy financing program*

At a minimum, eligible technologies will include conversion of gas space heating and water heating end uses to high-performance electric alternatives. Other technologies may be included at the partner Utility’s discretion. A key criterion will be that eligible technologies need to show a quantifiable impact on Customer utility bills that can support tariff-based measure cost recovery and reduce Customer-level GHG emissions.

A secondary criterion is that technologies should be controllable to minimize loads during peak periods. As shown above, the inclusion of energy efficiency and PV could be necessary to produce a financially viable project scope. **Table 12** offers details about the possible technologies.

**Table 12. Technology components of proposed Program measure package**

| Technology | Rationale | Funding source |
| --- | --- | --- |
| Heat pump, minimum 10 HSPF (2.9 COP), 18 SEER | Significant source of residential GHG emissions; specify the most cost-effective efficiency level commercially available. | TOB investment + incentives |
| Internet-enabled smart thermostat, Ecobee or equivalent | Improves energy efficiency; facilitates demand response and load shifting; facilitates remote monitoring and detection of performance issues; may contribute to “virtual submetering” | TOB investment + incentives |
| Heat pump water heater, 50 or 80 gallons, minimum 3.1 COP, with Internet-enabled controls | Significant source of residential GHG emissions; specify the most cost-effective efficiency level commercially available. | TOB investment + incentives |
| Optional PV system sized to cover at least 100% of expected cooling load; Internet-enabled inverter for remote data collection | Offsets any load increases from new cooling loads or take-back effects; improves overall project financial performance | TOB investment + incentives and tax credits |
| Optional battery storage system capable of meeting 4 hours of peak demand | Facilitates demand response and load shifting; ensures value of PV system against future changes to net energy metering (NEM) tariffs; provides resiliency for Customers who face public safety power shutoff events; may improve overall project financial performance | TOB investment + incentives and tax credits |
| Optional: Energy-efficient upgrades to building shell, ducts, and hot water distribution systems | Include if cost-effective, or if Customer wishes to co-pay for non-energy benefits | TOB investment + incentives or Customer co-pay |
| Pre-wiring for electric cooking, clothes drying (if gas clothes drying is present), and car charging | Precondition for whole-house electrification | TOB investment or ratepayer funding |
| Service panel upgrade, as needed | Precondition for whole-house electrification in some cases | TECH incentives and / or ratepayer funding |

## Combining Financing and Incentives

*From CPUC:*

How will IOU or non-IOU program incentives be delivered to customers? How will program incentives be coordinated with existing incentives offered through other clean energy financing programs?

[Program Sponsor] believes that costs for achieving societal benefits should be allocated broadly across Customers. This general principle is already enshrined in CPUC policy—for example, in the methods the Commission has adopted for linking ratepayer funding for energy efficiency investments to Total Systems Benefits, including grid benefits, GHG reductions, and related environmental benefits.

In pursuit of this principle, the Program will seek to maximize incentive contributions from TECH, energy efficiency programs, the Self-Generation Incentive Program (SGIP), and other programs where applicable. The Program will also investigate opportunities to monetize load shifting and demand response opportunities. Because the Program Operator pays the Contractor for installing the improvements, these incentives will need to be assignable to the Program Operator.

Building electrification offers the opportunity to produce societal benefits: GHG reductions, improved indoor and ambient air quality, and methane leakage reductions, that are not already accounted for in the Avoided Cost Calculator. The importance of these societal benefits is illustrated in **Figure 3,** from the *Societal Cost Test Impact Evaluation* (2022), which shows that the net present value of the societal benefits from electrifying a single-family home greatly outweigh the benefits that are accounted for in the Total Resource Cost Test.

Timeline

Description automatically generated

*Source:* CPUC.[[41]](#footnote-42)

Figure 3. Cost effectiveness of a sample building electrification measure under a Total Resource Cost scenario, versus the “Core” and “High SCC” Societal Cost Test scenarios.

[Program Sponsor] advocates that State policy makers continue to apply this principle to address remaining gaps, such as:

* Either ratepayer funding, taxpayer funding, or both should be allocated to address the societal benefits not accounted for in the Avoided Cost Calculator.
* Supplemental public funds are needed to address maintenance issues in low-income Customer homes; these issues (for example, mold and mildew, asbestos, substandard electrical wiring, or water leaks) could preclude clean-energy investments. Remedying these issues not only puts the Customer on a path to lower utility bills and reduced environmental impacts, but also improves public health and safety outcomes and helps retain vital affordable housing units.
* Health care revenues should be earmarked to support home upgrades that improve indoor environmental quality and occupant health outcomes. Additional public funds should be allocated to capture benefits from ambient air quality improvements that are not fully reflected in the Avoided Cost Calculator.
* High-road workforce requirements are an important tactic for expanding high-quality employment opportunities and economic development in disadvantaged communities. Any incremental project costs associated with these requirements should thus be publicly funded, rather than passed through to participants.

The Program will adhere to the Commission’s four guiding principles for incentive layering, as articulated in D.21-11-002, issued on November 9, 2021:

1. Ease of participation
   * + Eligibility for single-family residential customers will be nearly universal, subject only to financial feasibility constraints. Program equity goals will be addressed through affirmative outreach and recruitment, rather than eligibility means testing. Eligibility will not be conditional upon participation (or non-participation) in another program. Project financial feasibility analysis will consider all incentive programs for which the customer is eligible.
     + Whenever possible, supporting financial incentives will be assigned to the Program Operator to enable a turn-key installation with no out-of-pocket costs to the participating customer.
2. Complementary incentives
   * + For owner-occupied homes, all available incentives will first be applied to reduce or eliminate the customer’s copay requirement. Any additional available incentives will then be applied to reduce the TOB investment requirement. A Tariffed On-Bill charge will only be applied to the balance and only if it meets the program’s cash positive requirements.
     + For tenant-occupied homes, incentives will be applied to offset project installation costs in a manner that adheres to the principle that the landlord has fiduciary responsibility to cover the like-for-like replacement costs for space conditioning and domestic hot water, while the tenant’s financial responsibility is limited to the incremental costs for the clean energy upgrade.
3. Non-duplicative attribution of program benefits
   * + Total Systems Benefits will be attributed preferentially to any energy efficiency program that provides incentives
     + GHG benefits will be attributed to the Program
4. Ongoing coordination between program administrators and implementers

# Part IV: Costs and Benefits

## Program Budget

*From the CPUC:*

*What is the estimated budget for this program, broken down by estimated percentage and amount of rate-payer funds (including funding category, such as public purpose charge, distribution rates, generation rates), private capital, state, federal funds (e.g., DOE), IOU shareholder, public or private bonds, or other sources?*

An itemized Program budget, including capital requirements, start-up, risk mitigation, and operating requirements, is shown in **Table 13.**

**Table 13. Program budget**

|  |  |  |
| --- | --- | --- |
| Line item | Explanatory notes | Budget amount |
| Total investment principal |  |  |
| TOB capital contribution |  |  |
| Utility incentives |  |  |
| Customer co-pay |  |  |
| Cost of TOB capital |  |  |
| Total capital requirement |  |  |
|  |  |  |
| Start-up costs | Billing system and program IT setup, legal and other costs |  |
|  |  |  |
| Utility charge off risk mitigation | Reserve contribution @ 3% of TOB capital |  |
| Customer performance reserves | 5% of TOB capital |  |
| Total risk mitigation costs |  |  |
|  |  |  |
| Program operating costs |  |  |
| Administration | 10% of program costs |  |
| Marketing and outreach | 6% of program costs |  |
| Implementation |  |  |
| Measurement & verification |  |  |
| Total operating costs |  |  |
| Total Program budget | **Capital + start-up + risk management + operating costs** |  |

Funding sources for the budgeted line items are proposed as shown in **Table 14**.

**Table 14. Proposed funding sources**

|  |  |  |
| --- | --- | --- |
| Line item | Budget amount | Explanatory notes |
| TOB capital contribution |  | Public or private bonds or other debt financing, secured by ratepayer revenues and possibly DOE guarantees |
| Utility incentives |  | Previously budgeted public-purpose charge funds; possible State & federal funds, including tax credits |
| Customer co-pay |  | Participating customers |
| Cost of TOB capital |  | Ratepayers: public-purpose charge funds |
| Start-up costs |  |  |
| Risk mitigation |  |  |
| Program operating costs (partial) |  |  |
| Program operating costs (balance) |  | Ratepayers: public purpose charge funds |

## Forecasted Benefits

*From the CPUC:*

*What are the forecasted benefits, energy and/or GHG savings, if any, from this program at the sector, customer type (SF, MF, DAC, HTR, etc.), and measure/technology/project levels?*

[Revise as appropriate:]

The benefit analysis derives from a hypothetical scenario of 1,000 retrofits of single-family homes involving replacement of furnaces, air conditioners, and water heaters—with heat pumps and heat pump water heaters, plus energy efficiency improvements to reduce HVAC loads by 30 percent. In practice, the program expects to service a range of projects with varying scopes of work, investment requirements, and project benefits, as shown in **Table 15**.

**Table 15. Expected lifecycle Program benefits**

| Benefit | Heat pump | Heat pump water heater | Energy efficiency | Total |
| --- | --- | --- | --- | --- |
| GHG reductions (MT eCO2) |  |  |  |  |
| Electricity savings (MWh) |  |  |  |  |
| Gas savings (MTherms) |  |  |  |  |
| Customer bill savings |  |  |  |  |
| Bill savings net of cost recovery charges |  |  |  |  |
| Avoided equipment replacement costs |  |  |  |  |

## Projected Participation

*From the CPUC:*

*What number of loans is this program expected to support?*

The Program intends to sponsor upgrade investments for somewhere between [710 and 6,750 single-family homes] between January 1, 2023, and December 31, 2024. The lower number reflects a scenario in which $5 million in TOB capital is deployed to co-fund projects that all involve comprehensive work scopes, including heat pump and heat pump water heater installations plus energy efficiency improvements. The upper bound reflects the opposite extreme, in which the same $5 million is deployed exclusively for heat pump water heater installations.

*From TECH Clean California:*

*[Discuss any specific goals related to income category, DAC status, geographic subdivisions, etc.]*

## Program Time Frame

*From the CPUC:*

*How many years will the program run?*

Planning for the Program will occur in 2022, concurrently with Commission review and approval. The Program will launch its marketing and outreach campaign by December 7, 2022. Project enrollment will extend two years—2023 and 2024—and measurement and verification (M&V) will continue for an additional year in 2025. The work plan and timeline are shown in **Table 16.**

**Table 16. Program work plan and timeline**

| Task Name | Duration (in days) | Start | Finish | Comments |
| --- | --- | --- | --- | --- |
| Program Planning Phase | 413 | 04/01/21 | 10/31/22 |  |
| *Program Implementation Plan, Policies & Procedures, M&V Plan* | 45 | 04/15/22 | 06/16/22 |  |
| Community workshops to present implementation plan | 20 | 06/17/22 | 07/14/22 | Emphasize CBOs and related organizations that could contribute to marketing and outreach |
| Secure Program Operator services | 403 | 04/15/21 | 10/31/22 | Get agreement on terms by 9/15, but don't execute until the governing body signs off on the final plan |
| Secure sources of capital | 120 | 04/15/22 | 09/29/22 |  |
| Revise plan as needed in response to proceeding comments and community feedback | 20 | 07/11/22 | 08/05/22 |  |
| Submit draft plan to LSE executive leadership for review and approval | 45 | 08/08/22 | 10/07/22 |  |
| Recruit installer contractors | 332 | 09/16/21 | 12/23/22 | Release installer Request for Qualifications as soon as governing body approves final plan |
| Proposed Decision from CPUC |  | **09/30/22** | |  |
| Finalize plan | 15 | 10/10/22 | 10/28/22 |  |
| Commission Decision |  | **10/31/22** | |  |
|  |  |  |  |  |
| Program Implementation Phase | 1120 | 09/16/21 | 12/31/25 | Specific scope and timeline subject to joint planning outcomes |
| Perform meter-based customer targeting analysis | 20 | 10/31/22 | 11/25/22 |  |
| Utility establishes cost recovery mechanisms on billing system | 90 | 10/31/22 | 03/03/23 |  |
| TOB Program Launch |  | **1/02/23** | | **Launch marketing and outreach campaign** |
| Conduct installer onboarding | 20 | 01/02/23 | 01/27/23 |  |
| Conduct first site assessments | 10 | 01/30/23 | 02/10/23 |  |
| Execute first customer participation agreements | 5 | 02/13/23 | 02/17/23 |  |
| Conduct first project installations | 5 | 02/20/23 | 02/24/23 |  |
| Initiate quality assurance / quality control | 5 | 02/27/23 | 03/03/23 |  |
| Collect first month's cost recovery charge | 20 | 04/03/23 | 04/28/23 |  |
| Ongoing project assessments, installation, quality assurance / quality control | 482 | 02/27/23 | 12/31/24 |  |
| Program measurement and verification | 698 | 05/01/23 | 12/31/25 |  |

# PART V: Reporting and Metrics

## Metrics and Key Performance Indicators

*From the CPUC:*

*Describe the key performance indicators (KPIs) that will be developed for the program in order to determine:*

* *Whether the program is successful in delivering benefits and addressing specific market barriers.*
* *Whether the program aligns with local and regional clean energy goals.*
* *Whether / when the program needs to be reconfigured or closed.*

Any other KPI.

Development of Program metrics is informed by the statutory metrics the Commission has endorsed in its adopted Decision for the TECH program in proceeding R.19-01-011:[[42]](#footnote-43)

* Cost per metric ton of avoided GHG emissions (using meter-based data whenever appropriate and feasible)
* Projected annual and lifetime utility bill savings (using meter-based data whenever appropriate and feasible)
* Market share for eligible technologies

Further, the Commission Decision directs evaluation of savings and cost-effectiveness “to ensure that customer utility bills do not increase, and that a full range of costs and benefits to the customer (e.g., non-energy impacts and improvements in energy services) is evaluated.”

Additionally, the Commission Decision directs staff and the program evaluator to consider possible additional metrics such as:

1. Market share data (i.e., demographic factors) for technology adoption
2. Customer outreach and Customer satisfaction, benchmarked relative to customer awareness and satisfaction of Customer incentive and direct install programs
3. Contractor performance**,** as measured by Program quality control outcomes

The Program will incorporate this guidance into its routine tracking and reporting, process evaluation, and M&V plans. In addition, these plans will incorporate procedures for tracking the equity indicators identified in Goal 9 of the Environmental and Social Justice Action Plan; specifically:

* Total number of residential equity-targeted households served
* Expected first-year energy, GHG, and utility bill savings for equity-targeted participants
* Number of residential equity-targeted households receiving upgrades that are expected to improve home comfort, safety, and health outcomes
* Health and safety issues abated for equity-targeted households
* Number of residential equity-targeted households that could not be served due to the need for additional home repairs
* Customer comprehension of Program offers and satisfaction with Program outcomes
* Effectiveness of marketing and outreach campaigns

In addition to the metrics described above, the Program adopts KPIs to determine:

* Whether the Program is successful in delivering benefits and addressing specific market barriers
* Whether the Program aligns with local and regional clean energy goals, or
* Whether / when the program needs to be reconfigured or closed

In developing these KPIs, the Program first articulated theory-of-change hypotheses for each Program design criterion. For each hypothesis, the Program then described outcomes that would provide empirical evidence supporting the hypothesis. These outcomes will be the Program KPIs and are described in **Table 17**.

**Table 17. Theory-of-change hypotheses and associated KPIs, grouped by design criteria**

| **Theory-of-change hypothesis** | **KPI** |
| --- | --- |
| **Affordability** | |
| A TOB investment model can deploy shared-savings methods that attract capital investments while reducing Customer energy burdens. | Occupant retains least 20% of the expected annual energy savings and 10% of the actual metered energy savings |
| By incorporating risk mitigation strategies that protect Customers, the utility, and the capital providers, a TOB program can acquire capital below the market rate for unsecured consumer loans and below the IOUs’ weighted average cost of capital. | Program cost of capital is less than the lowest GoGreen Financing interest rate for unsecured consumer debt and less than IOU weighted average cost of capital (7-8%) |
| **Maximum impact and uptake** | |
| By adopting a shared-savings mechanism with the participating Customer, a TOB investment model can offer Customers clean-energy upgrades with little or no Customer co-payments. | Average TOB private capital investment plus available incentives sufficient to cover installation costs |
| Within four years of launch, a TOB program, combined with aggressive and complementary incentives and market transformation investments, can achieve a participation rate equivalent to 50 percent of the annual replacement rate for furnaces and water heaters in the target market. | Within two years, demonstrate pathway for production-scale program to serve 50 percent of annual equipment replacements among population of customers that meet filter criteria based on annual bill savings opportunities. |
| **Reduced complexity** | |
| TOB investments can be structured as a simple, transparent, and low-risk offer that facilitates high customer acceptance | 50% of TOB customer offers are accepted |
| **Minimizing risk** | |
| A TOB investment model can incorporate customer protections that offer participants a 99% probability of cash-positive outcomes as shown by meter-based M&V of program-sponsored improvements, excluding Utility bill impacts from participants’ exogenous lifestyle choices. | Metered savings exceed 80% of predicted savings (kWh and Therms) for at least 99% of participants. Performance guarantees assure that all participants realize at least 90% of predicted savings. |
| A TOB program can incorporate safeguards that maintain or strengthen utility procedures for deferring or forgiving cost recovery obligations for customers experiencing job loss, high medical bills, etc., without thereby creating a moral hazard. | Program participants experience reduced arrears, compared to the sponsoring Utility’s rates for the source population |
| **Equity and inclusion** | |
| By adopting a shared-savings mechanism with the participating Customer, minimizing program complexity, and incorporating strong customer protections, TOB can facilitate investments benefiting low- and moderate-income households | Compared to the source population of Customers that meet filter criteria, Program achieves participation rates among LMI households that exceed observed rates for comparable market-rate incentive and loan programs |
| By linking the investment to the site rather than the customer and enabling the Program Service Charge to transfer to successor Customers, TOB can facilitate investments benefiting renters | Program upgrades housing units occupied by renters at a rate that meets or exceeds the observed rate comparable market-rate incentive and loan programs |

## Schedule and Process for Tracking and Evaluating KPIs

*From the CPUC:*

*Describe the proposed schedule and process for tracking and evaluating these KPIs.*

Data collection protocols for tracking and reporting KPIs will be integrated into Program operating procedures. The status of Program performance relative to KPIs will thus be reportable, ongoing. Evaluation of KPI outcomes relative to pre-established benchmarks will occur at the two-year anniversary of program launch.

# Part VI. Proposal Response to ACR Issues and Topics

*From TECH Clean California:*

For proposal responses, add section references and page numbers to the relevant proposal passages

Table 18. ACR topics to be addressed, and proposal responses

| ACR topics and issues | Proposal response |
| --- | --- |
| Topic 1: Programmatic Goals and Coordination | |
| 1. What are the benefits and costs of financing strategies that could apply to a suite of behind-the-meter clean energy resources including, but not limited to, energy efficiency, solar and storage, electric vehicle infrastructure, single customer microgrids, and other distributed energy resources? |  |
| 1. What baseline or benchmarks should be adopted to measure success of new programs in meeting their established goals and targets? |  |
| 1. Should separate financing programs be developed for different Customer segments, including renters, lessees, and property owners? |  |
| 1. What should happen if Customers enrolled in a financing program moves out of the property they rent or own before fully repaying the financer? What protections need to be put in place to disclose loan payments to subsequent Utility account holders? |  |
| 1. What parameters, metrics, and requirements should be adopted to allow stacking of different financing tools to support a single customer’s energy investment(s) while still ensuring a simple repayment structure? |  |
| Topic 2: Marketing, Education, Outreach, and Evaluation | |
| 1. Who should be responsible for developing and implementing marketing, education, and outreach (ME&O) and evaluation associated with any new clean-energy financing programs? Which ME&O and evaluation costs should be recoverable from IOU ratepayers, and which should be recovered from program partners, such as lenders and implementers? |  |
| 1. What Program design and evaluation strategies should be adopted, with special consideration given to ensuring new financing options are reaching specific hard-to-reach and low- and moderate-income communities, technology adoption goals, and financing repayment targets? |  |
| 1. What metrics, KPIs, and / or evaluation strategies best ensure any approved financing offerings align with the nine goals of the Commission’s Environmental and Social Justice (ESJ) Action Plan? |  |
| Topic 3: Designing Scalable Financing Options | |
| 1. Which specific types of Customer-side clean-energy financing programs or lending mechanisms are most likely to attract third-party vendors and program administrators, and what advantages and disadvantages would these financing programs provide in comparison to programs or lending mechanisms administered by existing administrators, the IOUs, or other implementers? |  |
| 1. How can on-bill repayment mechanisms be used to repay multiple lenders, without putting a Customer at risk of Utility disconnection if they are unable to make loan payments? |  |
| 1. How can [Program Sponsor] deploy outreach to ensure consumers considering clean-energy financing are aware of their rights and the pros and cons of the various available financing options? |  |
| 1. Which financing and consumer protection mechanisms best protect Customers from potential disconnection, interruption of service, loss of lease or mortgage, or liens, in instances of non-payment of utility bills? |  |
| 1. Should any existing cost-effectiveness thresholds apply to new energy financing programs, or should energy financing programs be treated differently from energy efficiency financing programs, in terms of their cost effectiveness? |  |
| Topic 4: Alignment with Other Programs Already Offered by the IOUs, The California Treasurer’s Office, The State’s Infrastructure and Economic Development Bank, and Other Local and Regional Clean Energy Financing Options | |
| 1. How can new IOU financing programs be designed to address technology gaps for comprehensive customer financing packages and to better leverage existing State, regional, and local clean-energy investment programs with both ratepayer and non-ratepayer funds? |  |
| 1. What metrics or parameters should be included to ensure new financing options directly align with local and regional clean-energy targets, including those set by tribal governments? |  |
| 1. How can [Program Sponsor] use the expertise of sister agencies such as the Department of Financial Protection and Innovation (DFPI) to both develop and scale new financing options and protect consumers' rights? |  |
| Topic 5: Rate Impacts of New Financing Programs | |
| 1. What are the comparative potential customer rate impacts of TOB finance, on-bill finance and on-bill repayment, and other possible financing programs, for both participating and non-participating Customers, based on currently authorized Utility rate recovery designs? |  |
| 1. What metrics should be tracked to quantify the potential cost shift between participating and non-participating customers? |  |
| 1. Should the IOUs be authorized to hire additional full-time staff to better target and engage underserved Customers to participate in new financing programs? |  |

1. For detailed information on Proceeding R20-08-022, see <https://apps.cpuc.ca.gov/apex/f?p=401:56:0::NO:RP,57,RIR:P5_PROCEEDING_SELECT:R2008022>. [↑](#footnote-ref-2)
2. TECH Clean California is a statewide initiative to accelerate achievement of the State’s goal of achieving carbon neutrality by 2045. Specifically, it promotes the adoption of clean space and water heating technology across California’s single-family and multifamily homes. Approximately 40 percent of program benefits are targeted for low-income and disadvantaged communities. It provides market incentives and workforce education and training to make it easier for distributors and contractors to stock, sell, and install low-emissions heat pump technology. TECH Clean California supports existing initiatives through matched incentive funding, and extends incentives statewide. It was authorized under California Senate Bill 1477, and is funded by California natural gas ratepayers under the auspices of the California Public Utilities Commission. [↑](#footnote-ref-3)
3. Documents relating to the Scoping Ruling can be found at <https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=424114102>. [↑](#footnote-ref-4)
4. See <https://docs.cpuc.ca.gov/SearchRes.aspx?DocFormat=ALL&DocID=424114102> [↑](#footnote-ref-5)
5. As a matter of program practice, low-income customers should first be encouraged or required to maximize the benefits they can receive from grant-only direct install programs before making TOB investments. [↑](#footnote-ref-6)
6. See BDC White Paper [↑](#footnote-ref-7)
7. Evergreen Economics, 2016. *Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs*, Vol. 1 of 2. Southern California Edison Co., CALMAC ID: SCE0396.01. [www.calmac.org](http://www.calmac.org) [↑](#footnote-ref-8)
8. Sandoval, Gabriela, MRP, Ph.D., and Mark Toney, Ph.D., 2018. “Living Without Power: Health Impacts of Utility Shutoffs in California.” The Utility Reform Network. <http://www.turn.org/wp-content/uploads/2018/05/2018_TURN_Shut-Off-Report_FINAL.pdf>*,* p. 18. [↑](#footnote-ref-9)
9. Levy, Robert, and Joshua Sledge, 2012. *A Complex Portrait: An Examination of Small-Dollar Credit Consumers*. Center for Financial Services Innovation. <http://policylinkcontent.s3.amazonaws.com/ComplexPortraitExaminationOfSmallDollarCreditConsumers_CFSI_0.pdf>*,* p. 4. [↑](#footnote-ref-10)
10. Vick, John, and Carol Norton, 2008. *State of Metropolitan Housing Report 2008*. Center for Environmental Policy and Management (CEPM) at the University of Louisville, on behalf of Metropolitan Housing Coalition. [www.metropolitanhousing.org/wp-content/uploads/member\_docs/2008\_State\_of\_Metropolitan\_Housing\_Report.pdf](http://www.metropolitanhousing.org/wp-content/uploads/member_docs/2008_State_of_Metropolitan_Housing_Report.pdf)*,* p. 13. [↑](#footnote-ref-11)
11. Scavo, Jordan, Suzanne Korosec, Esteban Guerrero, Bill Pennington, and Pamela Doughman, 2016. *Low-Income Barriers Study, Part A: Overcoming Barriers to Energy Efficiency and Renewables for Low-income Customers and Small Business Contracting Opportunities in Disadvantaged Communities*. California Energy Commission, Pub. no. CEC-300-2016-009-CMF. <https://efiling.energy.ca.gov/getdocument.aspx?tn=214830>. [↑](#footnote-ref-12)
12. This framework offers steps California (and by extension, any other state considering building electrification or decarbonization policy) “must take to ensure that electrification helps close the clean energy gap... and provides relief to millions of residents facing energy insecurity in the current system.” Miller, Carmelita, Stephanie Chen, Lisa Hu, and Isaac Sevier, 2019. *Equitable Building Electrification: A Framework for Powering Resilient Communities.* Oakland, CA: Greenlining Institute, and Energy Efficiency For All. <https://assets.ctfassets.net/ntcn17ss1ow9/4bcrgrRiiymPoVKoMDCqPz/8568c1dd9eec6545c901c3b035a77832/Greenlining_EquitableElectrification_Report_2019_WEB.pdf>. [↑](#footnote-ref-13)
13. Miller et al., *Equitable Building Electrification,* p. 13. [↑](#footnote-ref-14)
14. If X is the fraction of total lifecycle savings allocated to cost recovery, the customer savings can be calculated as Total TOB investment x (1-X / X). [↑](#footnote-ref-15)
15. The Bay Area Regional Energy Network’s Water Upgrades $ave program is a jointly implemented tariffed on-bill initiative between the Association of Bay Area Governments and partner Bay Area municipal water utilities. [↑](#footnote-ref-16)
16. The High Road Training Partnership, an initiative of the California Workforce Development Board, offers a model for creating economically resilient communities that place an emphasis on equity and job quality. See <https://cwdb.ca.gov/wp-content/uploads/sites/43/2020/08/OneSheet_HRTP_ACCESSIBLE.pdf>. [↑](#footnote-ref-17)
17. The California Energy Efficiency Coordinating Committee sponsors working groups across several topics. For more information about the Equity Metrics Working Group, see <https://www.caeecc.org/equity-metrics-working-group-meeting>. [↑](#footnote-ref-18)
18. As designated by SB 535 Disadvantaged Communities (updated June 2017), and described by the California Office of Environmental Health Hazard Assessment. See <https://oehha.ca.gov/calenviroscreen/sb535>. [↑](#footnote-ref-19)
19. Adapted from Cillo, Paul, 2021. “Updated PAYS® [Pay As You Save] Essential Elements and Minimum Program Requirements Effective December 31, 2020.” Energy Efficiency Institute, Inc.. <https://www.eeivt.com/updated-pays-essential-elements-and-minimum-program-requirements-effective-december-31-2020/>. [↑](#footnote-ref-20)
20. TECH Clean California recommends that the rate be no more than 80 percent. [↑](#footnote-ref-21)
21. TECH Clean California recommends that the length of the term not exceed the project’s useful life. [↑](#footnote-ref-22)
22. The U.S. Patent and Trademark Office has designated Pay As You Save® and its acronym, PAYS®, as registered trademarks for a system with specific essential elements and minimum program requirements. The Energy Efficiency Institute, Inc., which holds the registered trademarks, has never charged any entity for using its marks. The trademarks ensure that *Pay* *As You Save* and *PAYS* may be used only to refer to programs that have PAYS’ essential elements and minimum program requirements. [↑](#footnote-ref-23)
23. Energy Efficiency Institute, 2021. “2021 PAYS® Status Update. <http://www.eeivt.com/wp-content/uploads/2021/12/2021-PAYS-Status-Update_12.30.21rev.pdf> [↑](#footnote-ref-24)
24. Bickel, Stephen, Jill Ferguson, and Daniel Kauffman, 2020. “Utility Value of a Pay As You Save® Energy Efficiency Program.” Panel 2: Residential Buildings: Program Design, Implementation, & Evaluation. *Proceedings of the* *ACEEE 2020 Summer Study on Energy Efficiency in Buildings.* Washington, DC: American Council for an Energy-Efficient Economy: 2-15 to 2-29. <https://www.aceee.org/files/proceedings/2020/event-data/pdf/catalyst_activity_10638/catalyst_activity_paper_20200812131023120_f3ae9c74_21aa_4f2d_ab9b_e70982627d24>. [↑](#footnote-ref-25)
25. LibertyHomes summarizes the enabling regulatory authority for these programs: <https://www.libertyhomes.org/post/6-25-21-policy-precedents-for-pay-as-you-save-and-inclusive-utility-investment>. [↑](#footnote-ref-26)
26. SEEA is a 501(c)(3) nonprofit and Regional Energy Efficiency Organization (REEO) established in 2007 in Atlanta, Georgia. [↑](#footnote-ref-27)
27. Holmes, Wesley, Cyrus Bhedwar, Kate Lee, and Emme Luck, 2020. “Utility Guide to Tariffed On-Bill Programs.” Atlanta, GA: Southeast Energy Efficiency Alliance. <https://www.seealliance.org/wp-content/uploads/SEEA_TOBGuide_FINAL_UPDATED_2020_04_13.pdf> [↑](#footnote-ref-28)
28. Scavo et al., *Low-Income Barriers Study*, p. 7 [↑](#footnote-ref-29)
29. Elkind, Ethan, and Ted Lamm, 2019. *Low-Income, High Efficiency: Policies to Expand Low-Income Multifamily Energy Savings Retrofits.”* Berkeley, CA: Center for Law, Energy & the Environment (University of California at Berkeley), and Emmett Institute on Climate Change and the Environment (University of California at Los Angeles): 33. <https://www.law.berkeley.edu/wp-content/uploads/2019/06/Low-Income-High-Efficiency-June-2019.pdf>. [↑](#footnote-ref-30)
30. Miller et al., *Equitable Building Electrification*, p. 43 [↑](#footnote-ref-31)
31. Kenney, Michael, Heather Bird, and Heriberto Rosales, 2019. *2019 California Energy Efficiency Action Plan.* California Energy Commission. Publication Number: CEC-400-2019-010-SF: <https://www.energy.ca.gov/filebrowser/download/1900>. [↑](#footnote-ref-32)
32. Mast, Bruce, Holmes Hummel, and Jeanne Clinton, 2020. *Towards an Accessible Financing Solution.* Building Decarbonization Coalition. <https://www.buildingdecarb.org/uploads/3/0/7/3/30734489/bdc_whitepaper_final_small.pdf>. [↑](#footnote-ref-33)
33. Note: this is not strictly authorized today but would be authorized under SB 1112 (Becker, 2022) [↑](#footnote-ref-34)
34. California Public Utilities Commission, May 2021. *Utility Costs and Affordability of the Grid of the Future: An Evaluation of Electric Costs, Rates, and Equity Issues Pursuant to P.U. Code Section 913.1.* <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/office-of-governmental-affairs-division/reports/2021/senate-bill-695-report-2021-and-en-banc-whitepaper_final_04302021.pdf>. [↑](#footnote-ref-35)
35. For more information, see Rural Utilities Service, Electric Program, n.d. *An Outline of the Regulation for the Energy Efficiency and Conservation Loan Program.* Washington, DC: U.S. Department of Agriculture. <https://www.rd.usda.gov/programs-services/electric-programs/energy-efficiency-and-conservation-loan-program>. [↑](#footnote-ref-36)
36. For more information, see <https://www.energy.gov/lpo/renewable-energy-efficient-energy-projects-loan-guarantees> [↑](#footnote-ref-37)
37. For more information, see <https://ibank.ca.gov/climate-financing/climate-catalyst-program/> [↑](#footnote-ref-38)
38. This is the default Pay As You Save formula. The TECH team recommends that the Service Charge remain capped at no more than 80 of annual savings but the term may extend to the full expected life of the upgrade if the program incorporates operations and maintenance protections, as described below. [↑](#footnote-ref-39)
39. SCE Application A.21-12-009 [↑](#footnote-ref-40)
40. California requires that the only notices attached to property record be authorized by statute. The state legislature authorized such a notice in the Water Bill Savings Act of 2017 (Senate Bill 564), and it would presumably need to repeat this authorization for building energy upgrades. [↑](#footnote-ref-41)
41. CPUC, 2022. *Societal Cost Test Impact Evaluation: CPUC Staff Report on the Impact of a Societal Cost Test on Resource Procurement.* <https://www.ethree.com/wp-content/uploads/2022/01/CPUC-SCT-Report-FINAL.pdf>. [↑](#footnote-ref-42)
42. CPUC, 2020. Proceeding R.19-01-011, Decision D.20-03-027, adopted March 26, 2020. <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M330/K031/330031291.PDF> [↑](#footnote-ref-43)