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January 4, 2013

To: Service List (see Attached)

Re: Docket 2011-0186, in re Public Util. Commission, On-Bill Financing Investigation, Consultant's on-bill financing report.

On November 23, 2012, the Commission issued Order No. 30841 Amending the Schedule of Proceedings for Docket No. 2011-0186. In accordance with this amended procedural schedule, the Commission's consultant, Harcourt, Brown & Carey, submitted their report: *On-Bill Financing in Hawaii.*

Sincerely,

James Griffin
Chief of Policy and Research

JG:do

Enclosures: 1. Docket No. 2011-0186 Service List

2. Harcourt Brown & Carey Report: *On-Bill Financing in Hawaii*

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On-Bill Financing in Hawaii

Prepared for the Hawaii Public Utilities Commission

January 4, 2013

Harcourt Brown & Carey: Energy and Finance

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ENERGY & FINANCE

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On-Bill Financing Program for Hawaii

1. Executive Summary

HB&C has been tasked by the Hawaii Public Utilities Commission to specify elements of a successful on-bill financing program for the residential market for Hawaii. Because there are both investor owned utilities (IOUs) and electric cooperatives in Hawaii, this report recommends general program elements, some of which can be applied to all utilities and some of which are IOU-specific. After completing its analysis, HB&C concludes that there are several reasons that an on-bill finance program will be effective for Hawaii, including high energy costs, the ability of on-bill programs to serve renters and the opportunity to promote capital intensive solar technologies. HB&C's conclusion is further supported by Hawaii's direct experience with on-bill financing in addition to evaluations of Hawaii's market potential and a review of on-bill program activity from around the U.S.

HB&C recommends an on-bill program with the following elements and structure:

- All residential households (owners and tenants) will be eligible to participate.
- The financing program could support solar PV, solar thermal water heating and all permanently installed energy improvements offered by Hawaii Energy programs and referenced in the 2011 Technical Reference Manual.
- Eligible projects must achieve "bill neutrality" defined as the energy savings exceeding the project costs when financed over 12 years.
- The program should be contractor-centric and participating contractors will be certified and managed to maintain high installation quality.
- The program should be a service offered to customers as a tariff.
- The installation benefits and payments should be transferable to the successor owners/tenants.
- The procedures for non-payment should follow the Commission-approved procedures for utility tariff non-payment, including shut-off.
- Hawaii Energy should be integral to program marketing and operations
- An appropriate capital source and service provider selected through an RFP process should support the program.
- The basis for funding the on-bill program should be the public benefit fund (PBF) or a ratepayer/member fee, leveraged with third party capital.

The report provides details on all aspects of the proposed program.

2. Description of On-Bill Financing

On-Bill Financing Description

On-bill financing is a mechanism whereby a utility company includes the repayment for an energy efficiency or renewable energy project on the customer's monthly bill. Utility shareholders, ratepayers or third parties provide the project funds. The utility commission may allow ratepayer or member funds to cover losses incurred by the third party capital provider. Most on-bill programs require the project to be at least "bill neutral" to the consumer, meaning that the consumer's net utility bill (after accounting for both financing charges and for reduced energy costs) is lower than it had been in the past.

The key element of on-bill programs involves a decision as to whether the payment obligation is based on a loan or a service agreement. Loan-based programs typically require more comprehensive underwriting, compliance with consumer lender regulations, may or may not allow shut off for non-payment and are typically due and payable at a property's sale or vacancy. Service agreement based programs, however, generally present the offer as a tariff and rely on utility bill payment history for underwriting, incorporate all the utility collection practices for failure to pay the utility bill including shut off, do not require consumer lending regulation compliance and allow for transfer of payment obligation to the successor owner or tenant.

Impacts of On-Bill Programs

On-bill financing structures can have the following impacts:

- **Build volume through customer convenience:** On-bill structures insert a financing payment on a utility bill, making it easier for customers to pay for energy efficiency retrofits.
- **Attractive to renters and owners alike:** If structured to include a combination of bill neutrality and transferability of the financial obligation from one occupant to another, an on-bill program can be structured to be attractive to renters as well as owners.
- **Build volume through contractor convenience:** On-bill structures have the potential for strong contractor buy-in if designed to be "contractor friendly" with a simple process and fast payments to the contractor.
- **Ease of integration with rebate programs:** An on-bill program can be easily integrated with rebate programs such as those run by Hawaii Energy, allowing customers to take out financing net of any applicable rebates.
- **Security and credit enhancement:** If on-bill programs can include the utility's standard procedures (including disconnection) for failure to pay the financing charges, on-bill program portfolios may demonstrate better financial performance than a typical loan or lease. This improved security benefit to investors is as yet unproven, from the point of view of investors, and will require a time to "season" financing portfolios. Therefore on-bill programs may still require some level of credit enhancement.

3. On-Bill Financing Experience throughout the U.S

HB&C defines a successful program as one that ramps up quickly to levels of material volume and provides high quality installations with reliable savings to its participants. This section describes a small number of the nation's most successful on bill programs.

A. Successful On-Bill Programs

1. Residential Programs

Midwest Energy's How$mart Program

Midwest Energy, a cooperative utility, provides electricity to 49,000 customers and natural gas to 42,000 customers within 41 counties. Midwest began a pilot, tariff-based on-bill energy efficiency program in 2007 that became permanent in 2008. Midwest Energy based this program on the Pay As You Save financing model developed by the Energy Efficiency Institute. Since 2007, 725 projects have been completed, saving over 1,500,000 kWh and 180,000 terms of gas/propane. A key success for this program is penetration into the rental market. Eighteen percent of Midwest customers are renters, and approximately 13% of the completed projects are rental properties. This is one of the only financing programs anywhere in the country with any record of success in the rental markets.

Clean Energy Works Oregon (CEWO)

Clean Energy Works Oregon Inc., a non-profit organization, partnered with the Energy Trust of Oregon (utility public purchase fund administrator) for program implementation and has relationships with the utilities, local governments and financial institutions across the state such as Craft3 (CDFI), Umpqua Bank (community bank), SOFCU and Pacific Crest (credit unions). This loan (not tariff) program began as a pilot program in Portland in 2009 and became statewide in 2011. To date, the program has completed over 1100 projects worth over $13.3 million. The program has saved over 1.77 million kWh. According to program administration, one key success is that the program is one of the only programs in the country to develop a robust IT system that provides real-time reporting of the program's triple-bottom-line benefits.

2. Commercial Programs

Although we are suggesting that the Hawaii energy efficiency financing program start in the residential, addressing barriers and implementation issues in just that sector prior to entering the commercial sector, we feel it is important to reference two of the more successful on bill financing programs that have operated in the commercial sectors.

United Illuminating (UI) - Small Business Energy Advantage Program

The Small Business Energy Advantage Program began in 2000 and targets commercial and industrial customers with an average 12-month peak demand, up to 200 kW (including leased spaces, UI estimates 60% of the customers in this class operate from leased spaces). To date, the loan program completed 4,250 projects worth $34,000,000 (26% of the customer base). The program has saved 991 million kWh. UI attributes part of its success to 1) extending payback period, noting that doubled participation rates, and 2) a small business specific Energy Audit Certification course with a community college to ensure that the entire sales/audit/installer infrastructure has an in-depth "hands on" comprehensive training approach.

Sempra Utilities On-Bill Program (SDG&E and SoCalGas)

Sempra Utilities has been operating an on-bill program since 2007. This program targets small and large commercial, industrial, government and non-owner occupied multifamily buildings. For the 2010-2012 program cycle, the program has completed 856 projects worth $20,800,000. Key success features of this program are 1) the structure allows customers to easily recognize energy cost savings, and 2) the program has focused on developing networks of educated contractors.

B. Key Program Characteristics for Success

After reviewing our survey that profiled 18 on-bill programs across the country and interviewing many on-bill program managers, we identified several program characteristics that drive strong uptake. Absent these critical components, we have observed that many programs tend to falter. If a program is designed with these three major characteristics in mind, the program will have a better chance at achieving success. The following list describes these characteristics:

1. The Process

From start to finish, the process for energy efficiency projects contains many steps. These steps include communication among building owners, contractors, utilities and lenders if finance is used. Program managers have stressed that making this process as streamlined as possible is crucial for program success. One way to streamline this process is to move to a web-based approach through which contractors can walk into a home with a tablet computer, review an audit, make recommendations, process financing if necessary and close the deal. The fewer steps a homeowner has to endure, the better. The more contractor-centric a program is, the more successful it will be. Additionally, if contractors have received training in marketing, finance and sales, the overall process will be more efficient and successful.

2. The Benefit to the Customer

Positive cash flow is a critical component for program success. Variables for positive cash flow include energy savings numbers, interest rates, loan terms and incentives. The combination of reliable energy savings calculations, low interest rates, flexible loan terms and some amount of incentive lead to positive cash flow.

3. Risk Management

Program Controls

Well-designed quality assurance programs ensure high quality work and customer satisfaction, two very important aspects of a successful program. The programs need to include measurements installed to gauge the quality of the work performed by a contractor (Pre and Post audits and contractor reviews). Contractors should also be certified and quality controls should be in place. A clear set of rules and expectations need to be designed for all parties in the process.

Compliance with any Applicable Lending Law or Other Regulations

It is critical to be aware of relevant regulations and laws tied to consumer or business lending. Most utilities are not aware of these regulations because they are not lenders. Several program staff note that it has been important that they not create a program that made the utility a "bank," as lending is not a core function of a utility, nor are utilities able to comply easily with consumer lending regulations.

C. Scalability

Previously, we defined increased volume as a metric for success. Increased volume also has a direct relationship to scalability. Again, we highlight the Midwest Energy How$mart Program and the Clean Energy Works Oregon Program. Below are descriptions describing their experience with scalability.

1. Midwest Energy – How$mart Program

The How$mart program started as a pilot program in 2007 targeting homeowners and renters in four counties. The success of the pilot led to an expansion in 2008 to forty-one counties with inclusion of commercial and industrial financing. During the pilot phase, funds and the number of participants were limited, but the program has expanded since that first year. Program participation began to ramp up when Midwest Energy made it a policy to do post-retrofit audits. According to Michael Volker, program manager for the How$mart program, "it only takes about 200 projects per year to reach cost-effective scale regarding the non-audit overhead". He noted that it depends on the service area involved. Most Midwest customers live in rural areas; increasing administration costs associated with drive time for audits, which represent 40 percent of those costs. This program has the highest participation rate for all possible residential customers in the country at 1.3 percent.

2. **Clean Energy Works Oregon (CEWO)**

In 2009, Oregon started an on-bill pilot program called Clean Energy Works Portland. This program targeted 500 homeowners in the Portland area. In July 2010, the City of Portland authorized the establishment of a separate non-profit organization called Clean Energy Works Oregon to take the pilot to full-scale operations and fulfill the objectives of a U.S. DOE award of $20 million under the U.S. Departent of Energy BetterBuildings program. The greatest factor that affected the size of this program was market awareness and education of consumers – marketing makes a big difference. CEWO has noted that its on-bill program has involved a significant amount of administrative cost and is now beginning to focus more heavily towards off-bill solutions to help with this and make the program more scalable. The program participation rate for all possible customers is <1%, a number consistent with most other programs. The program has completed over 1100 projects.

4. Hawaii Market Size and Potential Uptake

This section focuses on the opportunity for residential on-bill financing in Hawaii's investor owned utility service territories.

A. Target Market Sector

HB&C suggests that initial focus should be on the residential market. While the commercial market presents a good technical opportunity for clean energy, it is hampered by a number of economic restrictions and is in fact a very different market. Specifically, HB&C's experience with commercial markets has been that:

- Many commercial property owners cannot or are highly reluctant to take on debt for non-core business activities.
- When they are willing to take on new debt, commercial property owners typically have very short time horizons because they may not have confidence that their business will be functioning in the same form, or functioning at all, beyond a 1-2 year time horizon.
- Credit underwriting is more complex for commercial markets, and typically relies on a detailed assessment of not only the business itself, but (in the case of smaller businesses) the principals of the business.
- Credit underwriting for small commercial properties may result in requirements that principals provide a personal guarantee of repayment.

As a result of the above factors, the capital providers for commercial clean energy programs are often different from those who engage in financing for residential sectors. These factors do not make it impossible to launch a financing program that focuses on the commercial sector; it is in fact quite beneficial to do so. However, given the complexity of launching any kind of financing program, HB&C recommends that Hawaii would benefit from an approach

that tackles each market separately and one at a time, addressing the issues the residential market and subsequently taking on the commercial market.

B. Residential Clean Energy Market Profile

HECO, HELCO and MECO serve approximately 390,000 residential customers with total residential sales of 27,697,000 kWh.[1] Renters represent approximately 40% of the residential sector.[2] The median household income is approximately $66,000[3] and, the average credit score is 704.[4]

Hawaii Energy offers 11 programs to the residential sector: Residential Energy Efficiency Measures (REEM), including water heating, lighting, appliances, air conditioning, measurement/control and awareness, Custom Energy Solutions for the Home (CESH), including a target cost request for proposals, Residential Energy Services and Maintenance (RESM), including direct installation, design and audits and system tune-up, and finally Residential Hard-to-Reach (RHTR), including energy efficiency equipment grants and landlord/tenant/apartment owner measures. Additional residential program initiatives include financing, recycling and disposal and point of purchase rebates.

We believe households will consider and adopt various eligible improvements, but that one technology in particular, solar thermal hot water, will drive uptake for the on-bill program. With a saturation rate for solar water heating of 28%, this technology can grow substantially. HB&C expects that the program will generate adoption rates of approximately .5% to 1% of the households in the program's first year, which may represent approximately 2,400 installations for this technology. This expectation is consistent with the HECO assumptions in its Simply Solar proposal. At a net cost of $3,000 per system (net of the federal tax credit and the state tax credit), the program would expend approximately $7 million in the first year. Based on our experience in other cases, we estimate that the following three to four years should see growth of approximately 50% until growth begins to tail off.

In addition to the opportunity to deploy solar thermal technology, a substantial opportunity exists to install solar PV technology. As the following table indicates, Hawaii electric utility customers have a 2% adoption rate for solar PV. This metric is a fairly accurate measure of the saturation rate of solar PV throughout Hawaii.

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[1] http://hei.com/hei2011annualreport.pdf
[2] Ibid.
[3] http://quickfacts.census.gov/qfd/states/15000.html
[4] http://www.nationalscoreindex.com/usscore.aspx

Hawaii Utility Companies Rank Among the Top in Cumulative Solar Systems

Utility	Number of Systems Installed per 1,000 Customers
1. Maui Electric Co. (HI)	**29.3**
2. Hawaiian Electric Co., Inc. (HI)	**23.0**
3. Roseville Electric (CA)	21.8
4. Hawaii Electric Light Co. (HI)	**20.6**
5. Kauai Island Utility Co-op (HI)	**19.9**
6. Verendrye Electric Co-op (ND)	19.0
7. City of Palo Alto Utilities (CA)	16.1
8. Healdsburg Electric Department (CA)	13.6
9. Sulphur Springs Valley Electric Co-op (AZ)	13.5
10. Pacific Gas & Electric (CA)	11.6

Source: *2011 SEPA Utility Solar Rankings,* May 2012 (SEPA)

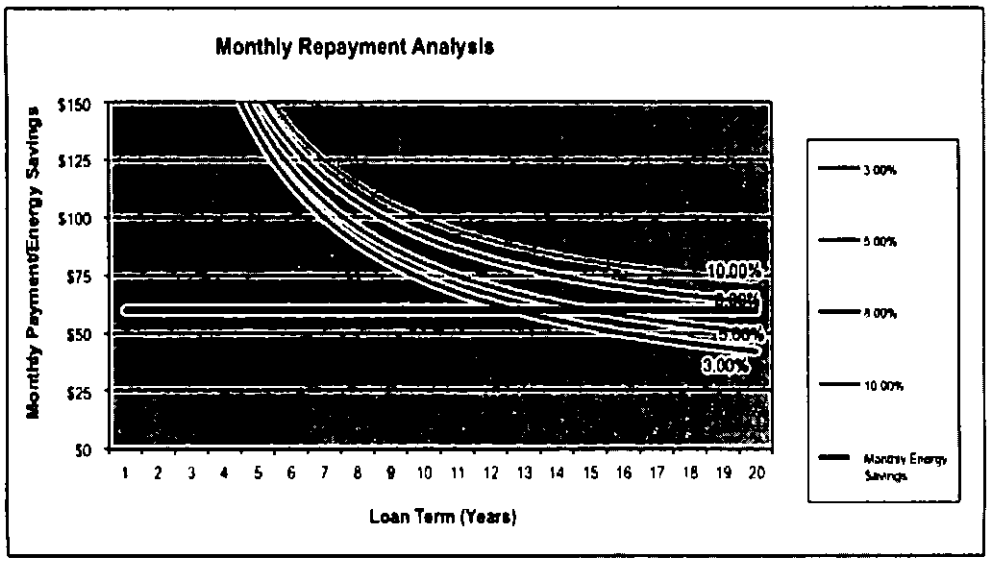
Assuming a $5,500 per kW installed cost for a 3 kW system, and federal and state tax credits of approximately 50%, the net installed cost would be around $8,250. Assuming an 8% rate, a twelve year term and $.34/kWh cost avoidance, the solar PV system would generate approximately $160/month, have a payment of around $100 per month and achieve bill neutrality for the homeowner.

5. Bill Neutrality and Customer Cost Impacts

HB&C believes that bill neutrality is an important feature in an on bill program; bill neutrality becomes especially important when an on bill program includes the ability to transfer payment obligations from one home occupant to another, and when the penalty for failure to pay the finance charge is service disconnection. Further, HB&C believes that a bill neutral program requirement should produce high-performing financial assets because it actually reduces household operating costs, unlike, for instance, financing to purchase a television or a vacation. A financing charge that places an additional cash flow burden on household could actually increase the likelihood of a default. To demonstrate the impact of cost and savings, we have modeled three scenarios: a) solar thermal without incentives, b) solar thermal with incentives and c) a package including solar thermal, air conditioning and appliances. These three scenarios show that it is possible to achieve bill neutrality in Hawaii for a solar thermal installation if terms are long enough, if with reasonable interest rates and by incorporating tax incentives into the project financing. In the appendix, we have included additional scenarios illustrating the impact of a requirement that the improvements produce positive cash flow for the customer, if actual savings are only 80% of the predicted savings.

Scenario a) Solar Thermal Water Heating without incentives

This scenario assumes a solar thermal water heater installation at a cost of $7,600 with savings of $60 per month. As the analysis indicates (black horizontal line), this scenario does not produce positive cash flow unless financing terms extend to 12 years or beyond.

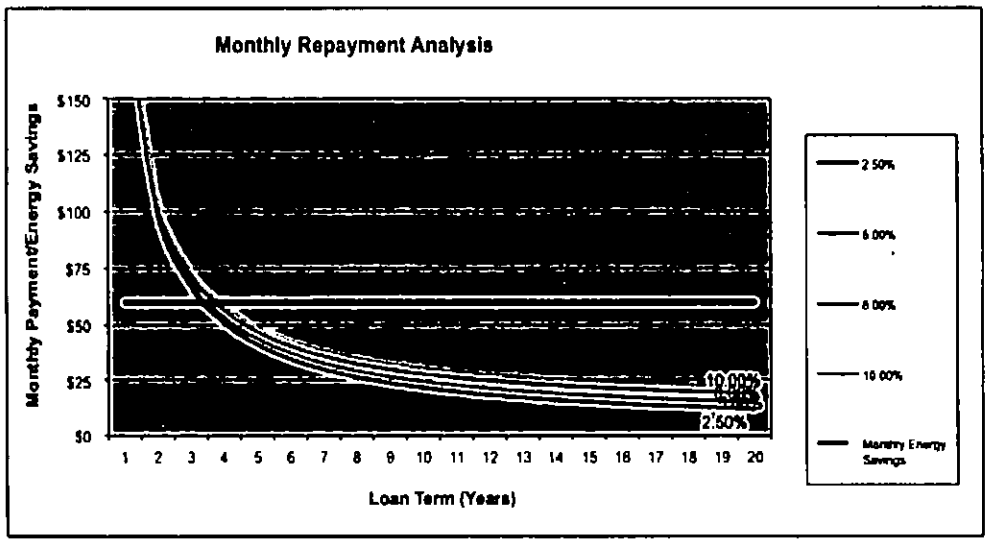


Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	60	60	60	60
Monthly loan payment	$136	$142	$153	$160

Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	120	120	120	120
Monthly loan payment	$62	$70	$81	$90

Scenario b) Solar Thermal Water Heating with Incentives

This scenario assumes a solar thermal water heater installation at a cost of $2,320 (net of federal, state and utility incentives equal to $4,800) with savings of $60 per month. As the analysis indicates (black horizontal line), this scenario achieves positive cash when financed with terms of 3 to 4 years (depending on rate).

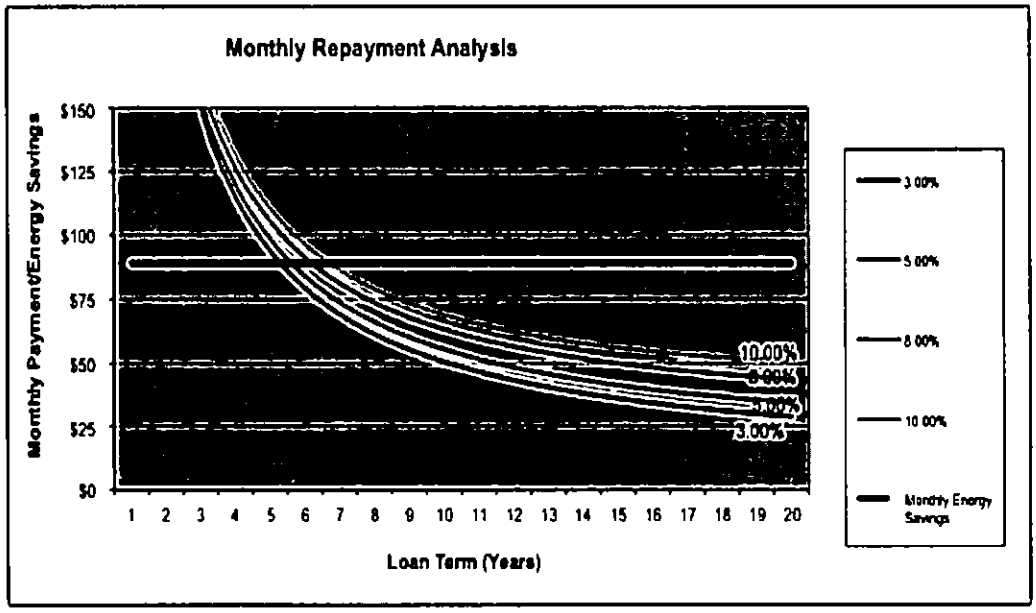


Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	60	60	60	60
Monthly loan payment	$42	$44	$47	$49

Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	120	120	120	120
Monthly loan payment	$19	$21	$25	$27

Scenario c) Solar Thermal Water Heating plus Energy Efficiency Package

This scenario assumes a solar thermal water heater installation plus a combination of air conditioning replacement, a refrigerator and a clothes washer. The cost of the package, net of incentives, is $5,246 with 3,132 kWh savings and annual saving of $1,065. As the analysis indicates, the project is bill-neutral when financed at six to nine years at the depicted rates.

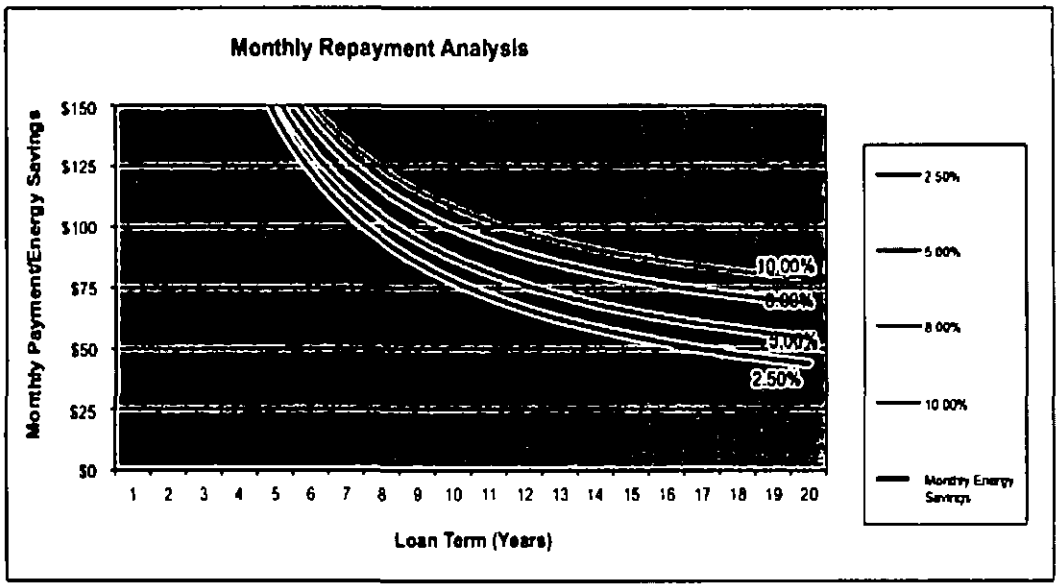


Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	60	60	60	60
Monthly loan payment	$94	$97	$106	$111

Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	120	120	120	120
Monthly loan payment	$43	$49	$56	$62

Scenario d) Solar Photovoltaic System

This scenario assumes the installation of a solar PV system at $5,500 per kW installed cost and federal and state tax credits of approximately 50%, the net installed cost is $8.250. Assuming an 8% rate, a twelve year term and $.39/kWh cost avoidance, solar PV technology would result in generation of $190/month of electricity and a payment of around $100 per month and achieve positive cash flow for the homeowner.

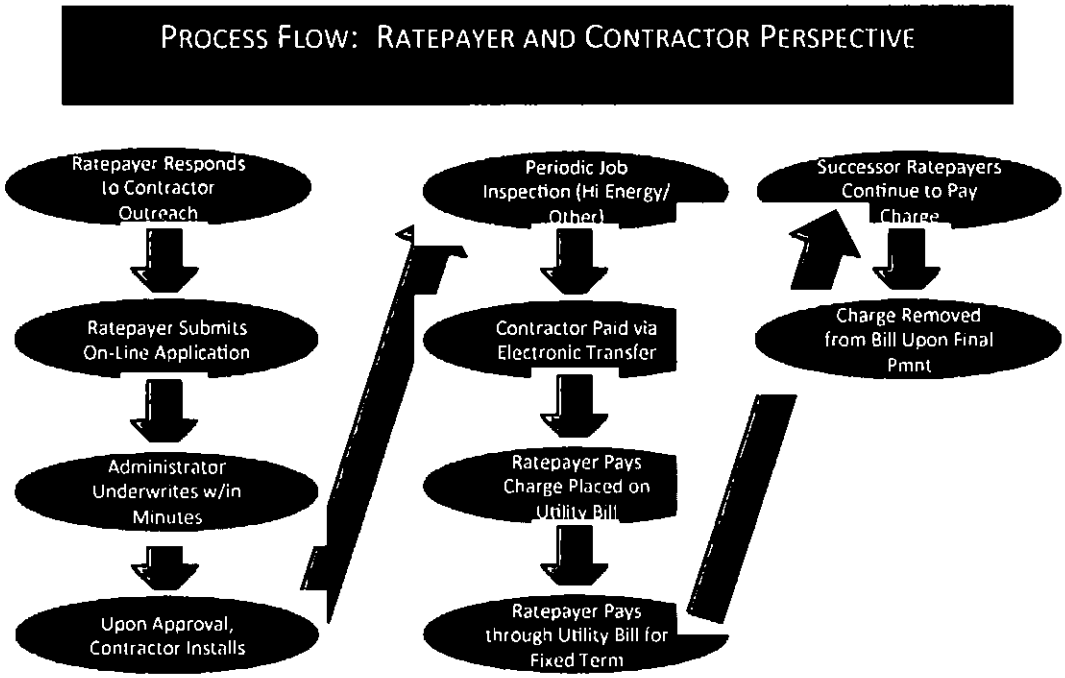


Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	60	60	60	60
Monthly loan payment	$148	$155	$166	$173

Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	120	120	120	120
Monthly loan payment	$68	$76	$89	$98

6. How Would an On-Bill Program Function?

The previous discussion indicates that an on-bill program has potential to drive uptake of efficient technologies in Hawaii, and could do so by providing positive cash flow to consumers in the state. Assuming, then, that an on-bill program structure makes sense in Hawaii, the following diagram describes the process that a customer and a contractor would go through for an individual transaction. Note that this diagram defines tasks that will be performed by different parties, some of which are not yet defined. For instance, the contractor management and job inspection functions may be performed by Hawaii Energy or by another party.



7. Proposed On-Bill Design Criteria for Hawaii

This section describes the elements of a proposed on-bill financing program. Some of these elements apply only to Hawaii's investor-owned utilities while others can be applicable to all of Hawaii's electric utilities

a. Eligible Participants

All residential households (owners and tenants, single family and multifamily properties) will be eligible to participate in the program. Tenants will be required to obtain written

approval from the property owner. Note that, based on the discussion in Section 4 above, we recommend an initial focus on the residential market.

We recommend a program that allows for renters to participate. We note, however, that rental markets have been challenging, and financing programs have as yet not made major inroads in the rental market.

The following table describes how the program could address the barriers to adoption of clean energy in residential rental properties.

Barrier	Solution
Tenants do not have easy access to capital	On-bill programs eliminates up front cost
Tenants will not "invest" in improvements to a space they do not own	A tariff is a "pay as you go" service, not an investment
Tenants move frequently	The service is transferable to the new tenant
The landlord will not invest because the tenant pays the energy bill	The landlord is not required to invest and the tenant pays for the installation while occupying the premises. A subordinated debt structure assumes the occupancy risk (the time period when a property is unoccupied).

b. Eligible Improvements

The proposed program should include all permanently installed energy improvements described in the Hawaii Energy TRM manual (2011). Solar PV can be offered as an eligible technology for an on-bill collection mechanism—benefiting in the same way as solar thermal or other technologies from the on-bill collections process that includes the typical utility process for disconnection for failure to pay finance charges. This benefit should provide a pathway to stronger lease or loan portfolio performance and to either reduce rates or create more expansive access to credit.

Many clean energy advocates recommend that this program require all cost effective energy efficiency measures be installed before installing renewable energy measures. We are concerned about the added program complexity that such a requirement would impose. Instead we suggest that the State, through Hawaii Energy, encourage consumers to invest in energy efficiency prior to investing in renewable energy. We take this position because we believe that a requirement could be counterproductive to the State's overall goals of reducing dependence on imported fuels and encouraging renewable energy.

We have had specific experience with a financing program in Colorado that used U.S. Department of Energy funds to establish a clean energy financing program. This program required a 15% reduction in energy use prior to installation of renewable energy measures, such as solar PV. The Colorado program's managers have expended considerable effort to attempt to identify new and more flexible sources of capital that would not impose this 15%

efficiency requirement because the requirement has reduced their project volume. This reduced volume results from:

- The 15% energy efficiency requirement adds complexity for many potential program applicants – both in terms of additional time required, that reduces willingness to engage in clean energy projects, and in terms of complexity of measurement.
- In many cases, particularly with newer homes that are already quite efficient, or with homes that have previously received a substantial retrofit, meeting an efficiency goal is complex and expensive. In some cases, it has resulted in contractor confusion about what types of customers can qualify for a financing program.

We recommend instead that Hawaii offer an integrated program that makes it easy for consumers to invest in both efficiency and solar PV measures—but avoid imposing a requirement for efficiency measures.

c. Eligible Contractors and Contractor Management

The program should include a system to qualify, monitor and measure performance of and allow for suspending and terminating contractors. This contractor management structure may be developed on the basis of existing Hawaii Energy contractor program or on the basis of another program, as defined by the Commission.

d. Bill Neutrality

Eligible projects must achieve "bill neutrality" defined as the energy savings matching or exceeding the project payments when financed over 12 years and at the program interest rate. The program administrator will provide each program applicant with an estimate of the annual energy savings and the annual payment. Households can choose to buy-down the project's cost with an up-front payment, to achieve bill neutrality.

We note that some parties suggested that a simple bill neutrality requirement is insufficient to attract participation in the program. In fact, several of the on-bill financing programs that now exist require that the consumer bill be no great than 80%-90% of the previous bill. This requirement provides (a) an additional enticement for consumers to participate in the program and (b) a buffer to allow for deviations between actual and achieved savings.

We do note, however, that a larger energy savings requirement will:

- Reduce the number of eligible program participants, since fewer customers will be able to achieve the 80% of prior bills than would be able to achieve a simple bill-neutral requirement <u>OR</u>
- Drive an increase in the terms of available financing in order to reduce monthly payments and achieve bill neutrality. The need for a longer term will reduce the amount of private capital available to the program, because few capital

providers are willing to offer money for greater than a 10-12 year duration, and longer terms equate to greater finance charges for the customer.

We suggest that the Commission consider this balance between program uptake and a positive cash flow or bill neutrality requirement. We have included calculations demonstrating the impact of an 80% efficiency requirement on loan durations in the appendix of this report.

HB&C recommends that that the estimated electricity bill savings calculation methodology be consistent with HECO's Simply Solar filing. Therefore, for solar water heating systems and other energy efficiency measures, the projected energy savings will be based on the most recent impact evaluation results for these systems times the average price of electricity at the time of enrollment. We recommend that the fixed monthly payment be 1/12 of the estimated annual savings, to allow for monthly variance in actual savings and to insure positive cash flow. For solar PV, as the generation is metered and not in question and the savings are established by the per kWh discount, we recommend the same bill neutrality requirement as for any projects supported by this program.

e. Financing Product: Loan versus Service

HB&C proposes that the program be offered as a service and offered to the utility customers as a tariff. Doing so utilizes the successful utility business model, which consumers trust and find convenient: simply sign-up, receive the service and pay over time on a single bill. By allowing shut-off for non-payment and utilizing PBF funds as a partial source of capital, the program can rely on less restrictive underwriting than would be imposed by a financial institution offering loans and this in turn will increase participation. In addition, the obligation will not become due and payable on sale or vacancy but rather be transferred to the new owner or tenant. The following table illustrates the contrast between a loan and a service agreement structure.

Program Step	Loan-Based Program	Service Agreement-Based Program
Marketing	Contractor presents program to prospect	Contractor presents program to prospect
Application	Applicant completes document with name, address, (for borrower and co-borrower) SS#, employment history and, in some cases, income data	In early (1st 2 years) of program, application matches that for Loan-Based program. With market maturity, applicant submits name, address and utility account data
Underwriting	Typical unsecured loan underwriting relies on credit scoring models such as the FICo score and frequently requires verification of income and employment for lower scoring individuals (referred to as stipulations)	In early (1st 2 years) of program, underwriting matches that of Loan-Based program, but incorporates utility bill payment history. As the market matures and investors become more comfortable with such structures, underwriting can rely more heavily on bill payment history
Origination	Review and sign loan note and	Program administrator describes

	completion certificate	tariff and voice records applicants acceptance
Payment	Monthly payment (generally based on daily simple interest) and includes principal and interest	Fixed payment amount each month
Partial Payment and Delinquency	Unpaid interest added to principal and payments recalculated, penalties may be due, utility delinquency procedures initiated	Utility delinquency procedures initiated
Default	Lender reports to credit bureaus. Service disconnect only applies where previously stipulated in program rules and where on bill collection is used	Service disconnect
Sell/Vacate Property	Outstanding loan amount "due and payable"	No additional payments due; payment obligation passes to successor occupant.

f. Transferability

The benefits and obligations of the service will be transferable to the successor owner/tenant who will be notified of the tariff and the transfer.

The proposed Simply Solar program requires the existing property owner to agree to inform a new owner about the tariff, the related equipment and the obligation to pay the surcharge. Renters are not mentioned, but it would be prudent to have the property owner also commit to inform any new tenant of obligations related to the tariff. Other notifications, consistent with Hawaii regulations or law, such as filing of a mechanics or other non-real estate secured lien may be appropriate to assure proper notification of successor occupants.

Midwest Energy files a Uniform Commercial Code (UCC) form with the county's Register of Deeds for all How$mart projects. The UCC provides information to potential buyers, brokers, or real estate agents that How$mart loans are attached to the property. And, a written disclosure ensures that payment obligation transfers to the new owner. If the disclosure is not given, the former owner must pay the loan within 30 days of sale of the property.

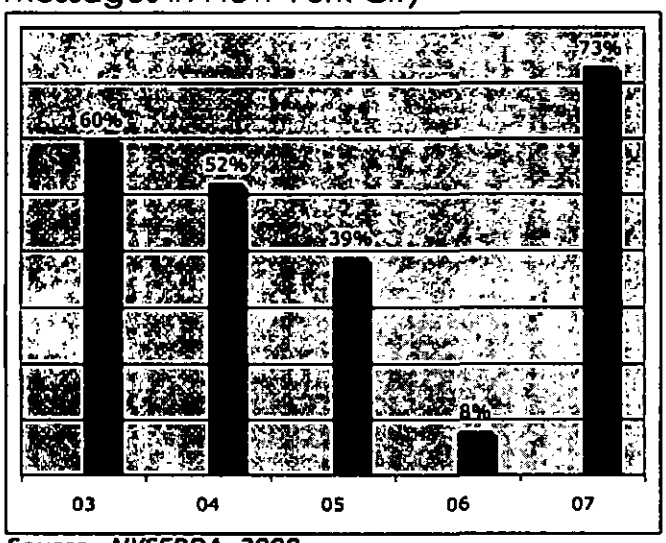
g. Collections Procedures and Shut-Off

The procedures for non-payment should follow the Commission-approved procedures for utility tariff non-payment, including shut-off. As described above, HB&C recommends that projects achieve at least bill neutrality for the client to eliminate the concern that in the event costs were greater than savings, the participant's credit risk would increase as would the likelihood of default.

h. Marketing

HB&C recommends that a robust budget be allocated for marketing the finance program. Although the size of that marketing budget needs to be carefully correlated to available funds, marketing spending does have a measurable impact on awareness and uptake of energy efficiency programs. For instance, HB&C was actively engaged in establishing an energy efficiency financing program for Boulder County, Colorado and has observed certain anecdotal evidence of the impact of marketing. For example, when marketing budgets were dramatically reduced during the final months of 2012 for the program, the number of web site "click throughs" (indicating customers visiting the energy efficiency financing program's web site) fell by one-half. New York State had a similar experience with its efficiency finance program, finding that customer awareness of efficiency financing fell dramatically when advertising budgets were cut. The following table illustrates this trend, showing program awareness falling dramatically in 2006, when budgets were cut, and increasing again in 2007 when advertising budgets increased.

Aided Advertising Awareness of BE COOL Messages in New York City



Source: NYSERDA, 2008

HB&C does not offer a specific recommendation for an advertising budget, but notes that:

- The Boulder County budget was close to $1,000,000.
- The New York budget was in excess of $7,000,000.
- The HECO proposed Simply Solar budget was $5,700,000.
- Our experience with the clean energy and household equipment finance industry is that the solar PV customer acquisition cost is typically around $3,000 per account and the residential HVAC industry experiences a typical customer acquisition of approximately $500 to $1,000 per account.

Consequently HB&C recommends a budget in the range of $3,000,000-$5,000,000, somewhat greater than a cost of $1,000 per participant in the initial years. This amount can decline as the program gains acceptance.

i. Underwriting, Origination and Servicer

The agreement will be underwritten, serviced and originated by an appropriate service provider, selected through the RFP process. In underwriting the account, the service provider should confirm that the applicant is a HECO, HELCO or MECO customer and deemed "credit worthy" under the utilities bill payment history credit evaluation methodology.

j. Finance Program Structure

HB&C believes that the basis for establishing an on-bill program should be using the public benefit fund (PBF) to serve as the core capital for a clean energy fund, credit enhance an existing market-based clean energy finance program or provide capital to support a hybrid capital approach that invests PBF funds alongside private capital.

We believe that leveraging of the PBF with private funds will be necessary because the current funding and allocation within the PBF will be inadequate to fund a major program. Specifically, a program that funds only 1% of the investor-owned utilities residential customers annually with average project size of $12,000 would require approximately $50 milion per year. And allowing additional uses of these funds adds to this capital need, and begins to reduce funds otherwise available from the PBF, forcing difficult decisions between starting a new financing program and terminating existing programs. Current Hawaii Energy budgets allocate slightly in excess of $3,000,000 to solar hot water programs and no funds for solar PV.

We evaluated three options to meet the gap between likely demand and current funding:

1. Increase the amount or allocation of PBF money.

This option will require either an increase in the PBF charge or a reallocation of PBF program funds from existing rebate and other programs to the new finance program.

2. Use PBF funds to fund projects and to build a portfolio of efficiency/solar financing assets.

This option would rely on a strategy that builds this portfolio until the relevant PBF funds are exhausted and would sell those financing assets to an investor. It would use the proceeds of that sale to recapitalize the PBF funds available for future efficiency/solar financing.

If the financing assets sold to an investor are classified as a service, they will have the following characteristics:

- Underwriting based on the bill payment history of the home occupant who assumed the payment obligation;
- Payment obligation (and therefore flow of repayments) transferrable from one home occupant to a successor occupant;

- An installation in a home that provides positive cash flow to all homeowners/tenants during the life of the financing;
- Security based on the potential for disconnection for failure to pay the finance charge.

HB&C believes that it may be challenging to find an investor willing to purchase a portfolio consisting of these rather atypical financial assets, especially without a large amount of time to season the assets prior to a possible sale. Note that HB&C estimates that demand for funds could easily outstrip supply of funds in the first year, thus requiring a sale of the financial assets to recapitalize the fund, with only minimal seasoning having occurred. HB&C further believes that, at least in early years of this structure, such as sale is likely to occur at a discount—effectively reducing total funds available with each cycle of sales to an investor.

3. Credit Enhance a Market-Based Finance Program

This structure would raise private capital by using a Request for Proposal (RFP) process to select and attract private capital providers and finance product originators/servicers. Under this arrangement HB&C recommends seeking proposals from either Hawaii-based or non-Hawaii-based financial institutions interested in developing a program that meets the program design criteria described in this paper.

This structure could be developed in many forms and we do not believe that the Commission needs to pre-determine all of the characteristics for the funding structure. Instead, we suggest that the Commission, or an entity such as Hawaii Energy, delegated by the Commission, issue an RFP to request proposals from private capital providers. This RFP would select a single financial institution to provide capital, perform finance product intake, underwriting, customer payment calculations, and notification of such customer payment calculations to the utility. The successful respondent would work in parallel with Hawaii Energy to integrate the finance product with the Hawaii Energy marketing, contractor networks, rebate and related programs.

The RFP would describe the following benefits made available to responders:

- On-bill repayment structure: The RFP would provide guidance to any applicant that repayments made by customers for clean energy financing would occur through the utility bill collection process.
- Disconnection for failure to pay: The finance charge would be deemed a tariff, with all recourse as currently structured for failure to pay the energy/finance charges. Failure to pay the finance charges would trigger initiation of disconnection procedure.
- Subordinated capital: The RFP would offer subordinated capital that takes a portion of losses incurred. Losses could result from (1) credit risk/non-payment of the finance charge (2) occupancy risk resulting from unoccupied rental properties (3)

partial payments (4) other risks resulting from non-payment of the energy/finance bill.

- Pari Passu Payment Distribution: Specifically and by way of example, if 80% of the customer's bill is for the energy charge (owed to the utility) and 20% of the bill is for the energy project (owed to the provider of funds for the energy project), the total payment, regardless of the amount, will be distributed to those two accounts in those percentages. This payment methodology may be structured such that any other required charges (taxes or other required fees) are paid prior to this payment allocation.

The RFP would request that applicants provide a proposal describing:

1. The origination process including:
   - The application process
   - Demonstrated ability to underwrite large numbers of small financing agreements quickly.
   - Ability to comply with all relevant regulations for privacy of information and other regulatory requirements that may apply.
   - Demonstrated ability to manage financing documents accurately and securely.
   - Ability to produce regular and accurate reports to the PUC or others.
   - Ability to manage contractor networks, if applicable, of to coordinate closely with Hawaii Energy on contractor network management.
   - Demonstrated net worth appropriate for fund volume
   - Pricing, expected to be based on a spread (expressed in basis points) over the cost of capital.
2. The preferred process for calculating and submitting to the utility customer payment calculations (amount, duration of finance agreements). This process removes the requirement that the utility calculate any financing charges; the originator/servicer provides notification to the utility of the amount to be placed on the utility bill. That originator/servicer will also provide notification to the utility of the timing for placing the obligation on the bill, as well as the timing for removing the obligation from the utility bill—based on either early pay-off of the obligation or upon final payment.
3. The preferred process and timing for transmitting customer remittances from the utility collections facility to the financial institution.
4. The preferred form of a credit enhancement (e.g., loan loss reserve, credit enhancement, etc.) and claim process.
5. The amount of capital available for this program, given a certain credit enhancement.
6. Ability to allow the participant payment obligation to be transferred to a subsequent owner or tenant (the obligation would be "tied to the meter").
7. The source of funds for their proposed program, either fund based or non-fund based.

Potential Respondents and RFP Outcome

Based on discussions with a number of potential investors, we expect that several types of entities and structures would submit a response to an RFP. These include:

Hawaii Financial Institution Funds

Traditional Hawaii-based financial institutions such as banks or credit unions may not have the capacity to submit an RFP response on their own; it has been our experience that typical banks or credit unions may find the origination, credit underwriting and other structures to be beyond their typical lines of business. A fund is a structure that can attract local capital from Hawaii banks, credit unions or other investors, and deploy it through a tailored origination structure. Likely participants would be:

- ***Hawaii-based banks.*** We believe that Hawaii based banks will see value in this product as a local, Hawaii investment (1) an adequate risk-return balance (2) low transaction cost and operational risk, since origination is conducted through a third party (3) potential Community Reinvestment Act credit.
- ***Hawaii charitable foundations.*** Foundations (mission investors) may see this structure as a way to deploy funds in to a structure consistent with their community-based mission of strengthening households by reducing household operating costs and of improving the Hawaii built environment. Mission investors may further see this as a structure that allows them to make a contribution to the community without having to do origination and servicing, while further taking advantage of the credit enhancement available from the PBF-provided subordinated debt. HB&C has experience in establishing similar structures in Michigan.

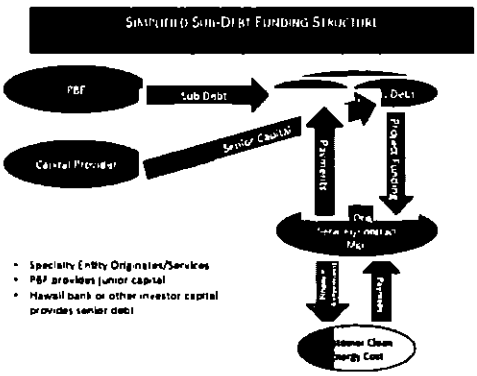
We have had discussions with the Hawaii Community Reinvestment Corporation (HCRC), a Hawaii CDFI that has been operating energy loan programs, that has strong relationships with banks and credit unions, and that has experience with similar structures. HCRC staff express that their initial impressions of this fund structure are positive, and that their organization may have the capacity to operate such a structure.

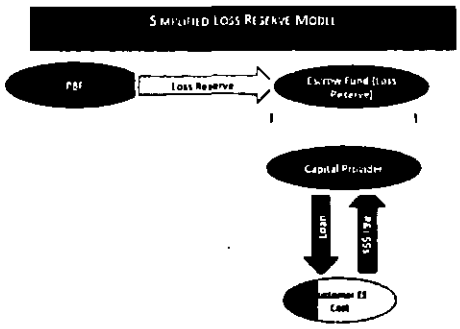
The first step in establishing a fund is to create an LLC registered in Hawaii. This fund would likely be established as a single member LLC with the fund administrator as that member. Bank or other debt providers provide capital to the fund, secured by the PBF capital provided to the fund.

Specialized Finance Companies and Investors

A number of financial institutions specialize in financing clean energy technologies many of which emphasize solar PV but also have an interest in funding solar hot water or energy efficiency. These funds have the ability to conduct project intake and underwriting, and also bring their own sources of capital – both tax equity and other debt and equity capital. HB&C has had discussions with several of these capital sources as part of our background research for this effort. We feel confident that there will be significant interest from these capital sources in supporting the program, with the elements described in this report.

The following two diagrams describe, in highly simplified form, two structures for provision of capital and engagement of the PBF. The first of the diagrams shows how the PBF, alongside private capital, could co-fund a funding structure for clean energy. The second illustrates how such a structure could be supported by a loss reserve that covers some level of losses. Each credit enhancement structure will serve to attract private capital, although the Sub-Debt structure will earn a return for the PBF capital invested.





Other Requirements of the RFP

Most market entities that finance clean energy, fund either renewable energy or energy efficiency but the Hawaii program would finance both. Therefore, responders must have the capability to finance both technologies. As the table below indicates, renewable energy projects, particularly solar PV, are attractive assets to finance and the industry is well developed.

Attribute	Energy Efficiency Project	Renewable Energy Project
Typical Dollar value	Less than $10k	Greater than $10k
Impact on bill	Calculated	Metered
Recoverable Collateral Value	No	Yes
Typical financing product	Unsecured Loan	Lease or Service Agreement secured with system
Performance history	No	Yes
Existing asset class	No	Yes

In addition to being required to fund both technologies, responders will be asked to provide the financing features identified below, to allow collections to be performed by the utility, to allow the obligation to be transferable to new owners/tenants and to accept the limits of the credit enhancement as described below:

Element	"Non-PV Measure Financing"	"PV Financing"
Contract type	Tariff – Service Agreement	Tariff – Service Agreement
Basis for payment	Fixed monthly service fee	Variable monthly service fee (based on production)
Limit risk to participant	Monthly payment is not greater than 1/12 of the annual savings estimate	Cost per kWh less than current utility cost
Transferability	Yes	Yes
Shut off for non-payment	Yes	Yes
Asset transfers to property owner with no cost at contract termination	Yes	Yes
Available subordinate capital or Loan Loss Reserve	30%	10%

k. Equipment Ownership and Tax Equity

Federal and state tax codes provide tax treatment benefits to entities that acquire certain clean energy technologies. By definition, these benefits are not available to non-profit, non-taxpaying entities. Therefore, to optimize the economics of the on-bill program, HB&C recommends that the equipment be owned by a taxable entity that can use these benefits. The structure of this ownership should be proposed by the applicant, based on the applicant's available capital sources. The ownership of equipment at the end of the financial product life is assumed to transfer to the homeowner, although precise terms for that transfer will depend on state and federal rules governing leases and tax equity.

l. Equipment Maintenance and Repair

HB&C proposes that the on-bill program acquire maintenance and repair insurance (similar to the proposed Simply Solar program) for the solar equipment to address system performance issues.

m. Measurement and Verification

The on-bill program will use existing M&V procedures to evaluate the effectiveness of the program.

o. Proposed Budget

To be determined when key program elements are established.

p. Utility Role and Incentive

The role of the investor-owned utilities should be limited to adding a line item to the residential utility bill, including the monthly payment amount in the bill, collecting and forwarding the payment to the provider of funds. The program will be designed to limit the utilities involvement to non-banking regulated functions. HB&C suggests that the utilities be compensated for this program support with cost recovery for each function performed.

8. Conclusion

HB&C was tasked by the Hawaii Public Utilities Commission to specify elements of a successful on-bill financing program for the investor-owned utility residential market for Hawaii . As part of this analysis, HB&C conducted a review of the HECO Simply Solar proposal and of the multiple on-bill financing programs in operation around the country. These reviews were provided to the Commission under separate cover.

After completing its analysis, HB&C concludes that there are several reasons that an on-bill finance program will be effective for Hawaii, including high energy costs, the ability of on-bill programs to serve renters and the opportunity to promote capital intensive solar technologies. HB&C's conclusion is further supported by Hawaii's direct experience with on-bill financing in addition to evaluations of the Hawaii's market potential and a review of on-bill program activity from around the U.S.

HB&C recommends an on-bill program with the following structure and elements:

- All residential households (owners and tenants) will be eligible to participate.
- The financing program could support solar PV and thermal and all permanently installed energy improvements offered by Hawaii Energy programs and referenced in the 2011 Technical Reference Manual.
- Eligible projects must achieve "bill neutrality" defined as the energy savings exceeding the project costs when financed over 12 years.
- The program will be contractor-centric and participating contractors will be certified and managed to maintain high installation quality.
- The program will be a service offered to customers as a tariff.
- The installation benefits and payments will be transferable to the successor owners/tenants.
- The procedures for non-payment will follow the Commission-approved procedures for utility tariff non-payment, including shut-off.
- Hawaii Energy should be integral to program marketing and operations
- An appropriate capital source and service provider selected through an RFP process should support the program.
- The basis for funding the on-bill program should be the public benefit fund (PBF), leveraged with third party capital.

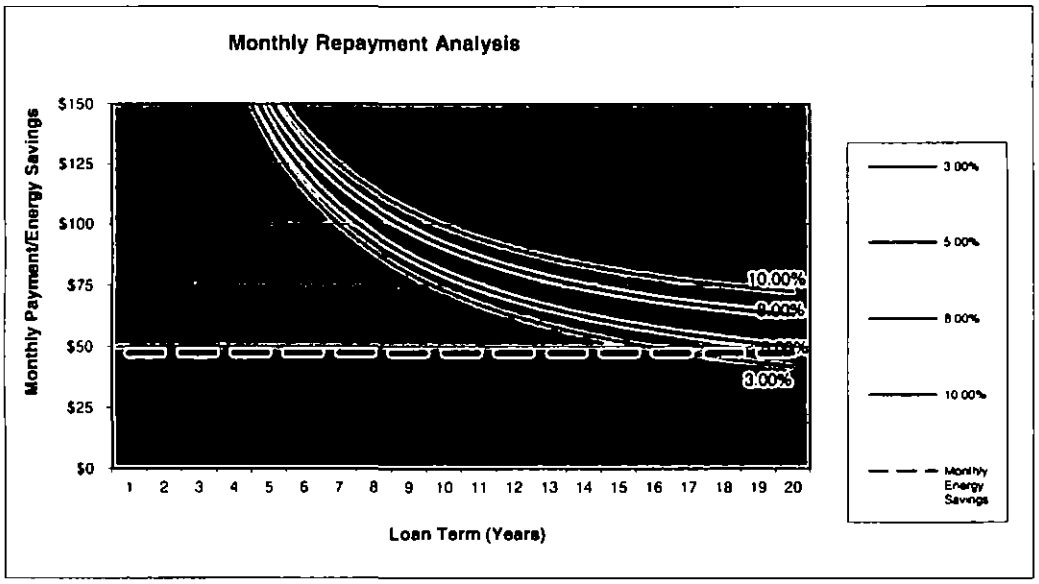
Appendix

Bill Neutrality and Customer Cost Impacts

The following scenarios illustrate a requirement that individual measures produce positive cash flow, when actual savings are 80% of predicted savings.

Scenario a) Solar Thermal Water Heating without incentives

This scenario assumes a solar thermal water heater installation at a cost of $7,600 with savings of $50 per month. As the analysis indicates (black horizontal line), this scenario does not produce positive cash flow unless financing terms extend to 18 years or beyond.

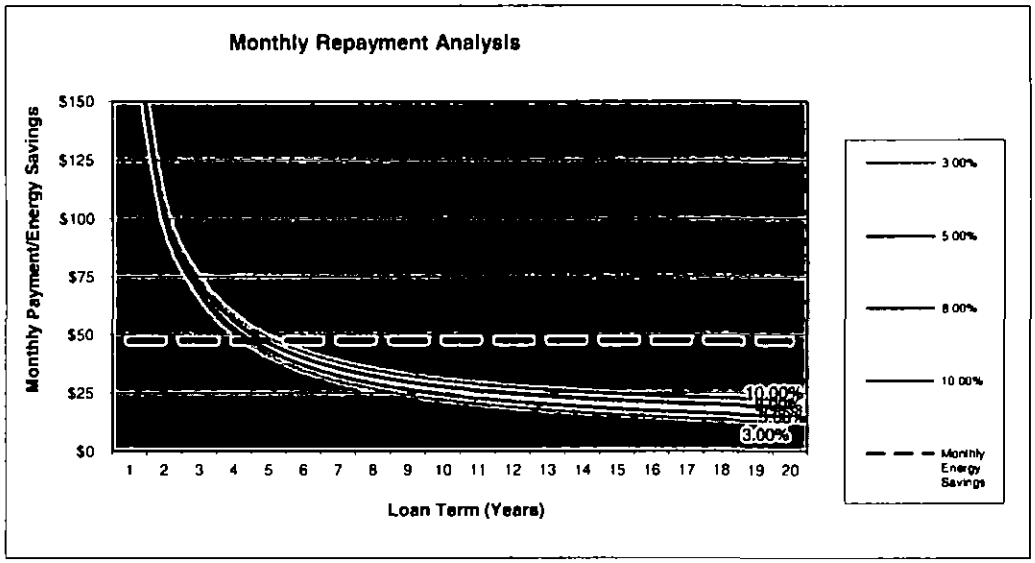


Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	60	60	60	60
Monthly loan payment	$136	$142	$153	$160

Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	120	120	120	120
Monthly loan payment	$62	$70	$81	$90

Scenario b) Solar Thermal Water Heating with Incentives

This scenario assumes a solar thermal water heater installation at a cost of $2,320 (net of federal, state and utility incentives equal to $4,800) with savings of $50 per month. As the analysis indicates (black horizontal line), this scenario achieves positive cash when financed with terms of 4 to 5 years (depending on rate).

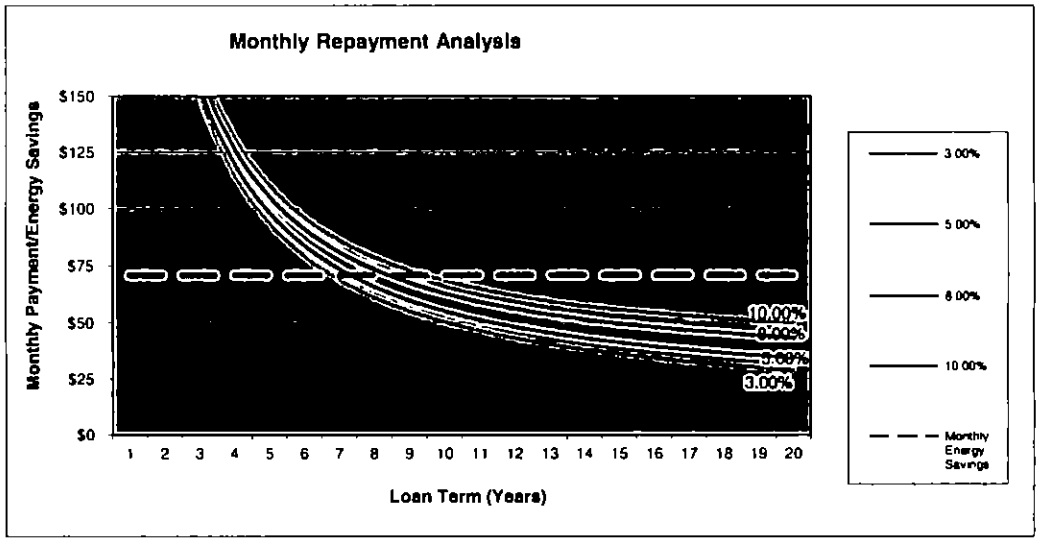


Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	60	60	60	60
Monthly loan payment	$42	$44	$47	$49

Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	120	120	120	120
Monthly loan payment	$19	$21	$25	$27

Scenario c) Solar Thermal Water Heating plus Energy Efficiency Package

This scenario assumes a solar thermal water heater installation plus a combination of air conditioning replacement, a refrigerator and a clothes washer. The cost of the package, net of incentives, is $5,246 with 2,500 kWh savings and annual saving of $850. As the analysis indicates, the project is bill-neutral when financed at seven to nine years at the depicted rates.

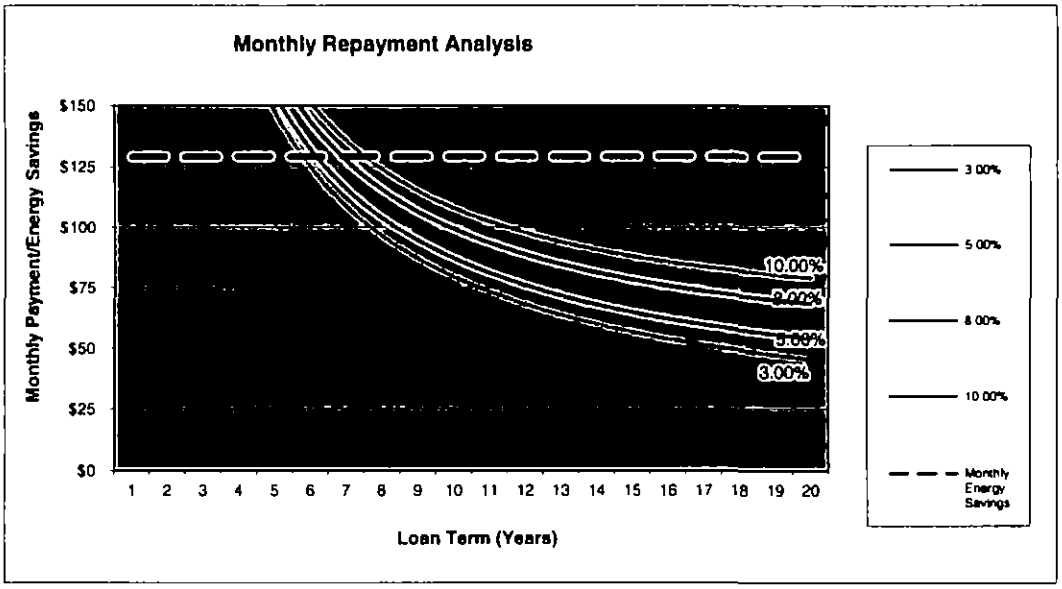


Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	60	60	60	60
Monthly loan payment	$94	$97	$106	$111

Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	120	120	120	120
Monthly loan payment	$43	$49	$56	$62

Scenario d) Solar Photovoltaic System

This scenario assumes the installation of a solar PV system at $5,500 per kW installed cost and federal and state tax credits of approximately 50%, the net installed cost is $8,250. Assuming an 8% rate, a twelve year term and $.34/kWh cost avoidance, solar PV technology would result in generation of $150/month of electricity and produces positive cash flow at around year six.



Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	60	60	60	60
Monthly loan payment	$148	$155	$166	$173

Sample Loan Payments				
Interest Rate	3%	5%	8%	10%
Loan term (months)	120	120	120	120
Monthly loan payment	$68	$76	$89	$98