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**California Housing Partnership Corporation comments on the Implementation of Senate Bill 350 (SB 350) Low Income Barriers Study Recommendations**

*Additional submitted attachment is included below.*



May 30, 2017

California Energy Commission  
1516 Ninth Street  
Sacramento, CA 95814-5512

**Subject:** Docket Number: 17-IEPR-08

**California Housing Partnership Corporation comments on the Implementation of Senate Bill 350 (SB 350) Low Income Barriers Study Recommendations**

The California Housing Partnership Corporation (CHPC) respectfully these comments regarding the California Energy Commission (CEC) recommendations for the implementation of Senate Bill (SB 350) “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 Housing Partnership Corporation looks forward to working with the CEC to ensure that the recommendations of the study are successfully implemented for low-income Californians living in deed-restricted multifamily affordable housing.

**California Housing Partnership’s comments cover two key recommendations related to the implementation of the Low Income Barriers study:**

- Creation of “one stop shop” services to enable owners and tenants of low-income housing to participate in energy efficiency, clean energy, and water-efficient upgrades in their buildings.<sup>1</sup>
- Developing a series of energy upgrade financing pilots programs to evaluate a variety of models to improve access and participation of low-income customers, including those in disadvantaged communities.<sup>2</sup>

**1. The creation of “one stop shop” services to enable owners and tenants of low income housing to participate in energy efficiency, clean energy, and water-efficient upgrades in their buildings.**

To address the issue of poor energy efficiency program integration and coordination, the Low Income Barriers study recommends that “ The State, in consultation with the Energy Commission, CPUC, ARB, CSD, and other related state and local agencies, should establish a pilot program for multiple regional one-stop shops to provide technical assistance, targeted outreach, and funding services to enable owners and tenants of low-income housing across California to implement energy efficiency, clean energy, zero-emission and near-zero emission transportation infrastructure, and water-efficient upgrades in their buildings” (page 63). California Housing Partnership Corporation supports this recommendation, as

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<sup>1</sup> California Energy Commission, “SB 350 Low-Income Barriers Study, Part A - Commission Final Report,” page 63, December 16, 2016. The Low Income Barriers Study recommends the development of multiple regional “one stop shops” to provide technical assistance to owner and tenant of low-income housing.

<sup>2</sup> Ibid, page 41. The Low Income Barriers Study recommends the establishment of a series of energy upgrade financing pilots.

further explained in joint written comments submitted on August 25, 2016.<sup>3</sup> While state agencies and program implementers frequently use the term “One Stop Shop” to define their energy efficiency program delivery models, there is significant variation in its interpretation. Prior to implementing this recommendation, CHPC suggests that the CEC work with stakeholders and state agencies to develop a standard definition and scope for One Stop Services.

**Specifically, a true One Stop Services model should consist of the following four components:**

- a. Single Point of Contact:** A key figure in a One Stop Services model is the Single-Point-of-Contact (“SPOC”) assigned to every owner. The single point of contact serves to streamline access to multiple efficiency, clean energy and water programs, reviews the owner’s portfolio to match property needs with corresponding programs and coordinates a team of experts to spearhead the major building upgrades to guide busy property managers through the entire retrofit process. These individuals become trusted advisors to local building owners. The people in this function should be specialists and empowered to build relationships with local partners, such as lenders, contractors, and utility staff.
- b. A single intake application:** As part of offering comprehensive One Stop services, regional one-stop programs should offer a single, standardized customer intake application across all territories that screens applicants for eligibility for all applicable multifamily programs, including programs offered by the CEC, CPUC, DWR, ARB, CSD, and other state agencies. A single application process will significantly lower the transaction costs, especially for low-income multifamily program participants, who often struggle to find the time to understand and adhere to the various applications processes for multiple energy efficiency programs.
- c. Streamlined access to all program funding:** Another key component of offering One Stop Services is providing multifamily program participants with streamlined access to program funding. Under this scenario, instead of simply referring participants to the various programs, the SPOC takes an active role in the “behind the scenes” reviewing of owner portfolios to identify candidate properties, layering of relevant funding sources and then provides the participants with an incentive projection, based on this combination of funding sources. Ideally, layering or coordinating multiple incentive programs will not require any additional customer involvement to prepare applications because enrollment is streamlined.
- d. Comprehensive technical assistance:** The last component of offering integrated One Stop services for the multifamily sector is providing comprehensive start-to-finish technical assistance for customers. Technical assistance includes the following: conducting initial project and portfolio-level assessments, performing onsite audits, performing comprehensive technical analysis including energy modeling, customized energy savings evaluations, and feasibility assessments, developing property level scopes of work, assessing financing and incentive leveraging opportunities, evaluating contractor bids, performing post installation verification, and generally reducing the overall project management time burden for owners by providing start-to-finish project support.

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<sup>3</sup> GREEN-EEFA Coalition, written comments, August 25, 2016: [http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN212956\\_20160825T164946\\_Caroline\\_McCormack\\_Comments\\_COMMENTS\\_OF\\_THE\\_GREENENERGY\\_EFFICIE.pdf](http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN212956_20160825T164946_Caroline_McCormack_Comments_COMMENTS_OF_THE_GREENENERGY_EFFICIE.pdf)

The CEC should look to the Department of Community Services and Development’s Low Income Weatherization Program for examples of offering comprehensive One-Stop-Shop services to for the low-income sector. **See Appendix A** for case studies highlighting the success of LIWP in reaching the deed restricted low-income housing properties in the San Joaquin Valley, San Diego, and San Francisco.

**2. Developing a series of energy upgrade financing pilots programs to evaluate a variety of models to improve access and participation of low-income customers, including those in disadvantaged communities.**

The Low Income Barriers study recommends that “ The State should continue developing a series of energy upgrade financing pilot programs to evaluate a variety of models to improve access and participation of low-income customers, including those living in disadvantaged communities” (page 41). As reflected in previously submitted comments, CHPC supports this recommendation and offers the following immediate suggestion for how the CEC can move forward with implementation:

**a. Review the lessons and recommendations from the CHPC’s On-Bill Repayment financing pilot and support combined clean energy, efficiency, and water solutions that are flexible enough to fill the gaps between incentive programs**

In March 2017, The California Housing Partnership released a case study examining our recent test of On-Bill Repayment financing at five affordable housing rental properties in the City of Santa Monica. **See CHPC’s full case study, attached in Appendix B.** The Santa Monica test illuminated several key lessons and recommendations for the use of performance-based energy efficiency financing mechanisms for the multifamily low-income housing sector. One of the key recommendations from the case study was that OBR should be expanded to include a more comprehensive set of eligible savings opportunities, such as solar PV, solar thermal, other energy management solutions, and water efficiency—financing programs such as OBR and OBF will likely see increased demand if the eligibility extends beyond energy efficiency. We recommend that the CEC play a role in ensuring that state and utility financing programs are integrated and inclusive of broader savings opportunities.

The California Housing Partnership appreciates the opportunity to provide comments on the implementation of the Low Income Barriers Report Study recommendations and looks forward to participating in future implementation workshops.

Respectfully submitted,



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**Appendix A:**

**Low Income Weatherization Program Case Studies**



# LOW-INCOME WEATHERIZATION PROGRAM FOR MULTIFAMILY PROPERTIES ENERGY RETROFIT PROFILE

## SELF-HELP ENTERPRISES

### PORTFOLIO PROFILE

- 5 properties
- Built in 1970 - 2006
- 304 units in 2-, 3-, and 4-bedroom units
- Homes for rural families, many of whom are farmworkers
- Located in Wasco, Madera, Goshen, Oildale and McFarland
- Serves renters at or below 60% and 80% Area Median Income

### ENERGY WORK COMPLETED

- Whole building energy efficiency retrofits with solar photovoltaics (PV) for renters and common areas
- LED lighting and dual-pane windows
- Low-flow fixtures (aerators, showerheads)
- High-efficiency refrigerators and washing machines
- Attic insulation and duct sealing
- Pipe insulation, water heaters, heat pump and distribution upgrades
- Timers for laundry room swamp cooler
- High-efficiency heat pump replacement for furnace/AC

## The Low-Income Weatherization Program for Multifamily Brings Energy Efficiency and Solar to Rural Communities

Self-Help Enterprises invests in the well-being of rural communities and farmworker families throughout the San Joaquin Valley. Based in Visalia, CA, Self-Help Enterprises used the Low-Income Weatherization Program for Multifamily Properties (LIWP-Multifamily) to improve 5 of its 28 multifamily affordable rental properties. Betsy McGovern-Garcia, Self-Help's Real Estate Development Director, says, **"LIWP-Multifamily's extensive technical assistance, incentive structure, and solar PV helped us increase energy savings, improve property cash flows, and create renter financial and health benefits above and beyond what we planned to do before leveraging this versatile program."** Three properties will be close to Zero Net Energy. All five properties have energy efficiency and solar PV improvements for resident units and common areas like hallways and community rooms.

This "portfolio approach" reached 304 low-income households. Compared to traditional energy programs, LIWP-Multifamily was more accessible to rural communities because of the extensive technical assistance and thorough site visits. Duplex and fourplex buildings are common in rural communities. These types of buildings tend to have more roof space per unit, which creates an opportunity to install larger solar systems that can lower both owner and renter energy use. LIWP-Multifamily's incentive structure is helping to improve the financial feasibility of such systems through economies of scale. More than 60 percent of total PV installed costs are covered by LIWP-Multifamily. One hundred percent of tenant solar system installed costs are covered.

### NUMBERS AT A GLANCE

**304**

low-income households benefited through in-unit upgrades

**3**

properties with 95+% reduction in energy cost

**\$2.3M**

savings for EE

**11.2K**

MTCO<sub>2</sub>e reduced

**62**

buildings improved

**18.3M**

kWh reduced through PV

*\*metrics are projected over 15 years*



Comparison of old windows vs. new dual-pane windows at North Park Apartments in Oildale, CA.

For more information about LIWP-Multifamily, contact [liwpinfo@aea.us](mailto:liwpinfo@aea.us)



# LOW-INCOME WEATHERIZATION PROGRAM FOR MULTIFAMILY PROPERTIES ENERGY RETROFIT PROFILE

## ISLAND VILLAGE APARTMENTS



### PROPERTY PROFILE

- Owned by East Village West LP and Housing Development Partners (HDP)
- Built in 2003
- 280 single-room occupancy studios
- Fully master-metered
- Property primarily serves at-risk homeless individuals and veterans
- Located in San Diego, CA
- Serves renters at or below 60% Area Median Income

### ENERGY WORK COMPLETED

- Whole building energy efficiency retrofit and solar photovoltaics (PV)
- Comprehensive LED lighting upgrade
- Low-flow fixtures (aerators, showerheads)
- High-efficiency boiler
- Temperature-controlled recirculation pumps
- Pipe insulation
- Energy Star rated refrigerators (261 units)
- Solar PV (3.9M kWh over 15 years)

## The Low-Income Weatherization Program for Multifamily Helps Preserve and Create Jobs

The energy efficiency and solar PV retrofits at Island Village Apartments will help cut annual utility costs by \$26,136. The addition of LED lighting in hallways and exteriors creates a pleasant, comfortable, and safe environment for its 280 low-income renters. Residents also benefit from new refrigerators, LED lighting, and low-flow faucet aerators and showerheads in their homes.

Investment by the Low-Income Weatherization Program for Multifamily Properties (LIWP-Multifamily) benefit regional economies like San Diego's by preserving and creating new job opportunities. Island Village Apartments is one of two large multifamily properties participating in LIWP-Multifamily that are jointly owned by HDP, a subsidiary of the San Diego Housing Commission.

These properties are also the first cap-and-trade funded retrofits by contractor Bottom Line Utility Solutions. To keep up with demand for LIWP-Multifamily, Bottom Line Utility Solutions hired two new workers. In April 2017, a diverse crew of six men, including the two new hires, worked quickly and systematically to upgrade all the studio apartments with limited disruption to Island Village Apartments residents. Their hard work reflects the pride and dignity shared by many more construction workers and solar installers that use their hands and tools to convert cap-and-trade dollars into tangible environmental benefits enjoyed by all Californians.

### NUMBERS AT A GLANCE

# 280

low-income households benefited through in-unit upgrades

# 15.3%

reduction in energy use

# \$392K

savings for EE

# 2.3K

MTCO<sub>2</sub>e reduced

*\*metrics are projected over 15 years.*



Crew members installing energy retrofit measures at Island Village Apartments.



For more information about LIWP-Multifamily, contact [liwpinfo@aea.us](mailto:liwpinfo@aea.us)

# LOW-INCOME WEATHERIZATION PROGRAM FOR MULTIFAMILY PROPERTIES

## ENERGY RETROFIT PROFILE

### ALEXANDER RESIDENCE

#### PROPERTY PROFILE

- Owned by Tenderloin Neighborhood Development Corporation (TNDC)
- Built in 1928
- 179 Units in a 12-story building
- Fully Master-metered
- Property primarily serves seniors
- Located in San Francisco
- Serves renters at or below 50% Area Median Income

#### ENERGY WORK COMPLETED

- Whole-building energy efficiency retrofit, with solar thermal installation
- Comprehensive LED lighting upgrade
- Low-flow fixtures (aerators, showerheads)
- Domestic hot water pipe insulation
- Refrigerator replacements
- Solar thermal hot water system
- New steam boiler

#### NUMBERS AT A GLANCE

**179**

low-income households benefited through in-unit upgrades

**26.3%**

reduction in energy use

**1.4K**

MTCO<sub>2</sub>e reduced

**\$415K**

savings

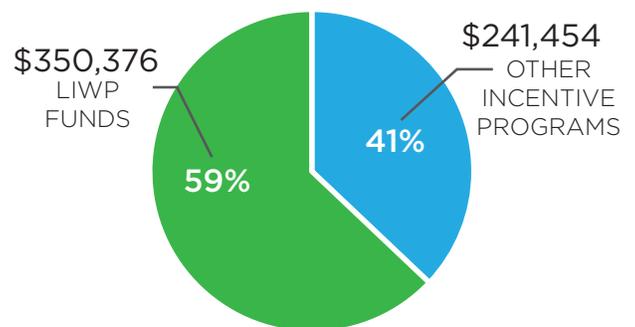
*\*metrics are projected over 15 years.*

#### Leveraging the Low-Income Weatherization Program for Multifamily Helps Achieve Deeper Energy Savings and Maintain Long-Term Affordability

In 2016, TNDC Alexander Residence—a 179 unit senior affordable housing development in the Tenderloin—was one of TNDC's most expensive properties in terms of energy usage. In an effort to reduce their operating expenses and ensure long-term affordability and availability of services for residents, TNDC staff sought energy efficiency programs that support deep energy savings, while also minimizing interferences to residents. One of these programs is the Low-Income Weatherization Program for Multifamily Properties (LIWP-Multifamily).

**“One of the most compelling aspects of LIWP is that the program focuses on providing whole-building savings rather than just solar or just energy efficiency—this supports an integrated approach,”** said Tabitha Harrison, Sustainability Program Manager at TNDC. Harrison also noted that the hands-on technical assistance

from program implementers was crucial to the success of the retrofit. TNDC worked with LIWP-Multifamily program implementers to leverage LIWP dollars in combination with incentives offered through the Bay Area Regional Energy Network Multifamily Building Enhancements rebate program and the California Solar Initiative's solar thermal rebate program. As a result, 98 percent of TNDC's retrofit costs were covered through a combination of LIWP-Multifamily and other resources.



According to Harrison, programs like LIWP-Multifamily are crucial to supporting her organization's goals. **“Energy efficiency and solar retrofits help manage our operating costs, which in turn supports our core mission: providing housing and supportive services for San Francisco's most vulnerable populations.”**

## **Appendix B:**

### **On-Bill Repayment Case Study**

# FINANCING ENERGY SAVINGS THROUGH ON-BILL REPAYMENT

Testing a new financing strategy  
for affordable rental homes in  
Santa Monica

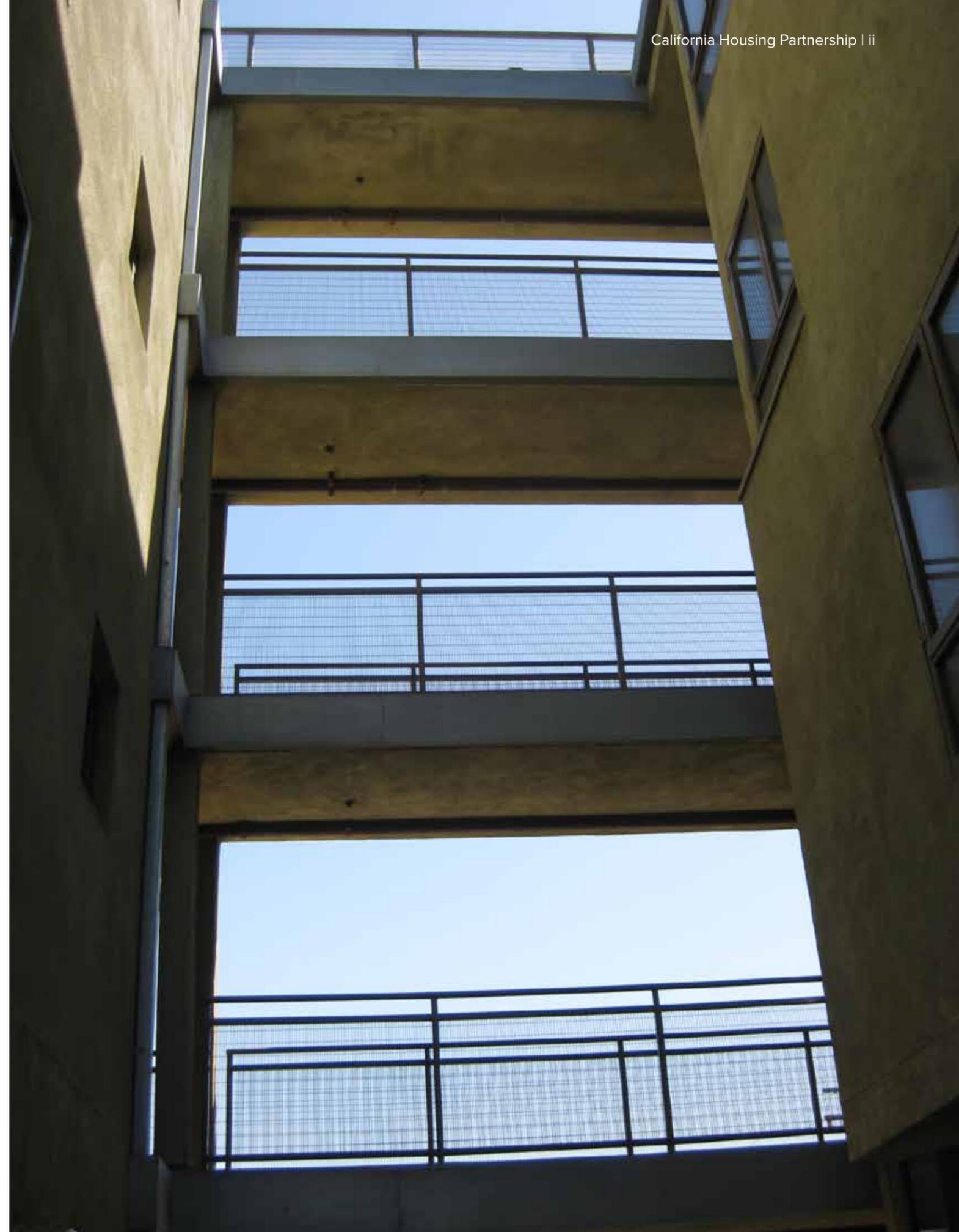


March 2017

# CONTENTS

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	PAGE
Executive Summary	1
Introduction	2
The Financing Challenge for Energy Retrofits for Low-Income Rental Housing	3
The Promise of On-Bill Repayment Financing for Low-Income Housing Retrofits	7
Developing On-Bill Repayment in California	9
The Santa Monica Test: Property Selection, Predevelopment, and Implementation	17
Key Lessons from the Santa Monica Test and Recommendations for full OBR Pilot	35
Conclusion	44



## About the California Housing Partnership

The State Legislature created the California Housing Partnership Corporation (CHPC) in 1988 to help preserve California's existing supply of affordable homes and to provide leadership on affordable housing policy and resource issues. The California Housing Partnership is unique in combining on-the-ground technical assistance with advocacy leadership at the state and national level to increase the supply of affordable homes. Since 1988, the California Housing Partnership has partnered with hundreds of nonprofit and government housing agencies statewide to leverage more than \$12 billion in public and private financing that resulted in the creation or preservation of more than 60,000 homes affordable to low-income Californians.

Our sustainable housing policy experts convene the [Green Rental home Energy Efficiency Network](#) (GREEN), a network of more than 80 mission-driven affordable rental housing, environmental and sustainable energy organizations working to increase access to energy efficiency,

clean energy and water conservation resources for affordable rental properties in California. We also co-lead California's chapter of [Energy Efficiency for All](#) (EEFA), a national partnership dedicated to linking the energy and housing sectors together to tap the benefits of the clean energy economy for millions of low-income families. In California, GREEN and EEFA work together with affordable rental housing property owners and partners to ensure that low-income households benefit from cleaner, healthier and more affordable housing.

California Housing Partnership staff contributing to this report included:

**Matt Schwartz**, President & CEO

**Blanca de la Cruz**, Sustainable Housing Program Director

**Caroline McCormack**, Sustainable Housing Policy Manager

**Stephanie Wang**, Policy Director



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### **Association for Energy Affordability**

John Neal, Senior Project Manager

### **Mercy Loan Fund**

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Julie Gould, Former President

### **Southern California Gas Company**

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Jack Stoddard, former Associate

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Fran Hereth, Principal

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# EXECUTIVE SUMMARY

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More than 400,000 California households live in publicly regulated, rent-restricted, affordable rental properties. The California Energy Commission recently studied barriers for low-income Californians to contribute to meeting the State's climate and energy goals and recognized that affordable rental housing faces unique barriers, including financial arrangements and limited budgets with restricted opportunities to take on additional debt. The Energy Commission recommended that the State continue to develop low-income energy upgrade financing and credit enhancement programs.

On-Bill Repayment (OBR) has the potential to unlock opportunities for affordable rental property owners to finance energy efficiency retrofits as a stand-alone project rather than waiting to finance the retrofits as part of a substantial rehabilitation, which typically occur only every 15 to 30 years. OBR also has the potential to enable affordable rental property owners to finance solar energy, energy storage and other systems to reduce energy bills.

## Key features of OBR include:

- OBR is secured by a customer's promise to pay its utility bill, not by other traditional debt collateral such as a lien on the property.
- Since OBR does not create a new lien on the property and can be sized based on projected utility bill savings, OBR has the potential to avoid triggering requirements to re-underwrite the property or obtain permission from each of the many existing lien holders with interests in these heavily regulated properties.
- OBR typically relies on private capital from participating financial institutions.

## This report examines a recent test of OBR at five affordable rental home properties in the City of Santa Monica, California. The Santa Monica Test illuminated six key lessons and recommendations for a full OBR pilot:

1. Participants need deep technical assistance to ensure accuracy of projected utility bill savings. A full OBR Pilot should include technical assistance beyond what is provided by typical whole-building retrofit incentive programs.
2. Affordable rental housing owners and their investors and lenders will not accept the risk of utility bill savings not materializing. Credit enhancement must be available to protect affordable housing owners from these risks.
3. Owner-metered savings alone will not cover the entire cost of a comprehensive retrofit. A full OBR Pilot should provide

access to energy incentives, include additional energy bill savings solutions like solar and energy storage, and consider making tenant savings eligible with strong consumer protections.

4. The Energy Services Agreement structure used in the Santa Monica test avoided the time-consuming lienholder consent process and should be adopted in the full OBR Pilot.

5. Owners need extensive information to get comfortable with unsecured financing that relies on utility savings to make payments. Program Administrators must educate owners about the costs, benefits and risks of OBR financing using the ESA structure.

6. Access to third-party benchmarking services designed to support OBR financing needs is critical to success. The OBR Pilot should provide a clear protocol around monitoring and verification of estimated

savings. OBR Pilot administrators should consider partnering with benchmarking service providers to reach out to owners of properties with the greatest savings potential.

## Conclusion

Owners of rent-restricted affordable rental housing must generally operate their properties close to the margin to maintain long-term affordability. Evidence from this case study suggests that owners need a performance guarantee to protect the financial health of their properties and the interests of the senior lien holders against the very real possibility that some portion of the anticipated energy savings do not materialize. Without credit enhancement to protect these owners in the event of short-falls in predicted savings, demand for OBR will be extremely limited.

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This report is divided into five parts:

- **Part 1** provides an overview of the challenges to financing energy efficiency improvements in multifamily affordable rental housing properties in California.
- **Part 2** covers the basics of OBR and describes the conditions that must be met for owners to use the financing tool successfully in this sector in California.
- **Part 3** describes the development of the OBR financing tool in California.
- **Part 4** examines the results of the OBR-financed energy efficiency retrofits at five properties in Santa Monica, California and provides initial data on the actual energy savings.
- **Part 5** presents a set of key lessons learned from the Santa Monica test, and provides recommendations for the future development of OBR financing in California.

# 1. The Financing Challenge for Energy Retrofits for Low-Income Rental Housing

Affordable rental properties with rent restrictions imposed by federal, state and local governments generally operate close to the margin. This means they rarely have the cash flow necessary to cover the gap between

utility incentives and recommended energy conservation measures (ECMs). California is home to more than 5,000 properties containing more than 400,000 units of these heavily regulated, affordable rental homes.

Table 1. Inventory of Subsidized Affordable Housing in California

Primary Funding Source	Properties	Total Units
Low Income Housing Tax Credit (LIHTC)	3,288	272,981*
U.S Department of Housing and Urban Development (HUD) Multifamily	1,271	79,149
Public Housing	219	37,193
U.S. Department of Agriculture Sec. 515 (USDA)	306	15,229
<b>TOTAL</b>	<b>5,084</b>	<b>404,552</b>

Source: CHPC Preservation Clearinghouse (2016) incorporating data from the California Tax Credit Allocation Committee, U.S. Department of Housing and Urban Development, and U.S. Department of Agriculture. This table does not include units created by Housing Choice Vouchers or other state and local sources such as HOME, CDBG, RDA, FHLB Affordable Housing Program, inclusionary housing policies, linkage programs, density bonuses, 501(c)(3) bonds, etc.

\*The total number of LIHTC-financed affordable rental homes operating in CA is 331,228. However, in order to give an accurate picture of the overall subsidized rental stock, we have subtracted the number of LIHTC homes that also have HUD and USDA subsidies.

A substantial portion of these properties are significantly less energy efficient than typical residential buildings and therefore represent an important opportunity for meeting the [State's aggressive Green Housing Gas \(GHG\) reduction goals](#). The cost of a whole-building multifamily retrofit in California is difficult to determine due to multiple factors such as building size, and energy savings potential. In addition, the depth of energy retrofits varies. For example, an energy audit may identify a comprehensive scope for 30% or higher energy savings, but when available capital is limited, an owner may decide to pursue a scope that meets a utility's minimum multifamily program energy savings requirements, i.e. 10% savings, 15% savings, etc. In the Santa Monica test, the per-unit cost range is \$3,000 to \$8,500 for comprehensive scopes.<sup>1</sup> However, the combined utility incentives currently available typically cover less than a quarter of the cost of a retrofit. As a result, owners of rent-restricted affordable properties often wait years to undergo retrofit, until there is an opportunity to finance them as part of a substantial rehabilitation, which typically occurs once every 15 to 30 years.

*Historically, federal and state energy retrofit programs in California have ignored the unique retrofit needs of multifamily affordable rental properties.*

## Energy Efficiency Program Treatment of Affordable Rental Housing in California

Historically, federal and state energy retrofit programs in California have ignored the unique retrofit needs of multifamily affordable rental properties with their varied HVAC and hot water delivery systems and instead focused on single-family homes, the industrial sector, and commercial users.<sup>2</sup> Programs available to multifamily buildings have most often taken a prescriptive, unit-by-unit approach to retrofitting complex multifamily systems. However in recent years, due in part to the advocacy of nonprofit housing, energy and environmental justice stakeholders, the landscape has changed to include [regional, utility, and state multifamily whole-building energy efficiency programs](#). Examples of these programs include Energy Upgrade California Multifamily Program (EUC MF), the [Bay Area Regional Energy Network \(BAYREN\)](#), and the new Cap-and-Trade-funded [Low-Income Weatherization Program \(LIWP\)](#) for large multifamily.

In total, the four major California Investor Owned Utilities (IOUs) budget more than \$325 million per year to retrofit housing occupied by low-income households through the [Energy Savings Assistance Program \(ESAP\)](#). While ESAP has a large program budget, it was historically designed to address the needs of individual tenants with relatively superficial direct-install measures such as lighting and weather-stripping.<sup>3</sup>

### Utility Incentive Programs are Necessary, but Not Sufficient

Although utility incentive programs are vital to undertaking energy efficiency retrofits in affordable rental housing, utility programs in California are generally piecemeal and administered independently of each other by different personnel, which complicates the opportunity to combine their funding streams and benefits for deep savings. For example, in the City of Los Angeles alone, Elevate Energy recently found that there are 28 different utility and state programs that multifamily owners must investigate individually.<sup>4</sup> Even if owners are willing to commit the staff time required, experience has shown that utility rebates and incentives are generally only sufficient to pay for less than 25% of the cost of the improvements recommended by energy audits in California, leaving owners of these rent-restricted multifamily properties without the means to pay for comprehensive energy efficiency retrofits outside of waiting 15 to 30 years for the next refinancing to pay for major renovations.<sup>5</sup>

### More Debt is Not the Answer

There have been several previous attempts to fill the gaps left by the hodgepodge of IOU programs by providing owners with tools to finance energy efficiency retrofits using traditional property-secured loans. The most recent and comprehensive was the [Bay Area Multifamily \(BAM\) Fund](#) undertaken in 2010-2012. Initially, there was strong interest in the program, with 54 properties proceeding with free energy audits. In the end, however, only four owners agreed to participate with six properties total.

This experience revealed that owners of these rent-restricted low-income properties are extremely reluctant to finance relatively small stand-alone energy efficiency improvements by taking on additional debt secured by the property for four primary reasons:

1. The financing of these properties is multilayered and complex, typically involving six to twelve public and private entities, each of whom has the right to approve changes to the property or its financing.
2. These properties were originally underwritten with maximum debt, meaning that any additional debt usually triggers the right of existing lien holders to re-underwrite the entire project.
3. Obtaining the permission of each lienholder to add debt typically takes dozens or even hundreds of hours of staff time.
4. Owners and their financing partners are generally not willing to take on the risk of energy savings not materializing because they do not want to assume responsibility for payments that would further strain their limited financial resources.

As a result, funding energy efficiency retrofits for affordable rental housing via traditional loans has proven to be problematic except as part of a substantial rehabilitation and recapitalization of the property, which typically occurs every 15 to 30 years.

*Funding energy efficiency retrofits for affordable rental housing via traditional loans has proven to be problematic except as part of a substantial rehabilitation and recapitalization of the property, which typically occurs every 15 to 30 years.*



## 2. The Promise of On-Bill Repayment Financing for Low-Income Housing Retrofits

On-Bill Repayment (OBR) theoretically offers a means of overcoming the constraints of traditional debt by financing the portion of the retrofit costs not paid for by IOU subsidies from the energy cost savings. OBR refers to the ability of the IOUs to add a line item to a utility bill to repay financing for energy efficiency work done at the property.

OBR is not a traditional real estate loan because the repayment obligation is not secured by the property, meaning no deed of trust or promissory note is provided to the capital provider, who is instead relying on the utility customer's dedication to always paying their utility bill. OBR thus has the potential to avoid triggering re-underwriting of the property, or triggering the extensive

amounts of time it can take to obtain formal permissions from existing lien holders for adding debt.

The primary advantage of OBR is that repayment of retrofit costs are secured by the normal promise to repay the utility bill, which is generally the first bill paid by owners and renters alike. Further, since payments on the utility bill can be limited to the estimated savings, properties can use the energy savings to finance retrofit work without increasing monthly utility payments, thus leaving intact covenants and other promises made by the owner to lenders and investors regarding cash flow.<sup>6</sup>

Below is a picture of the bill for the first OBR charge on a multifamily rental property in California.

		ACCOUNT NUMBER XXXXX AMOUNT DUE \$982.55
		
<b>Third Party Charges</b>		Amount(\$)
On-Bill Repayment		610.01
For Info Call Mercy Loan Fund (866)-338-0557		
<b>Total Third Party Charges</b>		<b>\$610.01</b>

### Key Features of OBR Financing for Affordable Rental Housing

- Provide non-debt gap financing for stand-alone energy retrofits that does not trigger investor and lender requirements to obtain permissions or to re-underwrite the property.
- Unlike On-Bill Financing (OBF), which uses IOU capital to fund the work, OBR relies on private capital from participating financial institutions.
- Retrofit costs are repaid through a charge placed on the utility bill without a lien on the property.
- OBR payments are sized based on an agreed upon percentage of the projected annual utility savings for a 10-year term. This percentage can range from a low of 70% to a high of 100%.

### 3. Developing On-Bill Repayment in California

In September 2013, the CPUC issued Decision A.12-07-001, directing the Southern California Gas Company (SoCalGas) to work with CHPC on a pre-pilot test of OBR financing for up to five affordable multifamily properties in SoCalGas and Southern California Edison (SCE) territory. This pre-pilot would then inform the design of the planned 5,000-unit statewide Master Metered MultiFamily (MMMMF) OBR Pilot (“Pilot”) now scheduled to launch in 2017. The main goal of the pre-pilot was to test OBR financing in combination with incentives tailored to the specific needs of low-income multifamily affordable rental properties, specifically the EUC MF program pilot.<sup>7</sup> Beyond testing OBR financing, a related goal of the pre-pilot was to build on CHPC’s work pushing utilities to adopt single points of contact (SPOCs) to minimize the number of utility representatives with whom property owners must interface to access multiple rebate and incentive programs.

In response to the Decision, CHPC officially launched the development of a financing pilot program for low-income multifamily

rental property owners later in 2013. CHPC initially partnered with [Stewards of Affordable Housing for the Future](#) (SAHF) to design and test an OBR finance product that could assist SAHF member properties in California.

CHPC and its partners invested in the development of OBR financing because it theoretically offers a way to overcome energy efficiency retrofit financing constraints without triggering the same levels of review and concern by owners or their financing partners, **but only if the following three conditions are met:**

1. It is paired with a source of financing that is able to rely solely on the promise of repayment through energy savings recaptured through the utility bill rather than on a deed of trust or promissory note. This means that the financing provider cannot require a deed of trust or promissory note.
2. One or more IOUs is authorized and agrees to enter into an agreement to put the repayment of the third party advance on the bill as a tariff.
3. A third party provides a guarantee of performance that protects the owners and tenants against the potential failure of savings to materialize.

At the time CHPC and SAHF began searching for pre-test properties, CHPC became aware that the [Community Corporation of Santa Monica](#) (Community Corp) had five properties in SoCalGas and SCE territory

coincidentally in the initial planning stages for energy retrofits and was eager to help test this new financing product. Since time was of the essence given the need to complete the retrofit and allow for enough time to study actual savings compared to projected savings, CHPC and SAHF asked Community Corp to participate in the OBR financing pre-pilot.

Founded in 1982, Community Corp owns and manages 1,700 units of affordable housing serving more than 4,000 people in the City of Santa Monica. In addition to having an organizational commitment to sustainability and being located in the right IOU territory, Community Corp was motivated to take part in the OBR financing pre-pilot because they had a rare and necessary ingredient—a project manager able and willing to spend roughly half his time managing the five-property project, referred to moving forward as the “Santa Monica Test.”

#### Identifying the OBR Capital Provider and Servicer

Once Community Corp was on board, the next step in the Santa Monica test was to identify a capital provider and servicer. While the original plan for the pre-pilot was to use a Community Development Financial Institution (CDFI) for capital funding, two previously interested CDFIs concluded that any financing, even subordinate unsecured financing using MacArthur Foundation

#### Additional Potential Features of OBR Financing Not Authorized Through the OBR Pilot

The following are features that a fully developed OBR financing program for affordable housing should have to have maximum benefits:

- The repayment obligation is tied to the meter and allows for transferability with sale of property (unlike Line-Item Billing, which is a nontransferable obligation).
- Potential to tap into savings from both tenant and owner meters thus solving the split incentive barrier.<sup>8</sup>
- Capturing savings from solar PV installed as part of an overall energy retrofit.

funding, would legally be considered debt and require obtaining consents of all senior lienholders. When it became clear a financial institution was unlikely to provide capital for this small pilot, Community Corp offered to use its own working capital for the OBR financing. Community Corp made this decision in part because doing so provided a way to capture a portion of cash flow at the property level that it would otherwise not have had access to since each property is owned by a separate legal entity.

The last missing piece was finding a servicing entity to manage the flow of the OBR payments from the properties through the SoCalGas bill and then back to Community Corp as the capital provider. Thankfully, [Mercy Loan Fund](#) stepped up to play this important role. With Community Corp as the capital provider and Mercy Loan Fund lined up as the servicer, CHPC and SAHF were able to turn their attention to developing a legal instrument that would document the exchange of goods and services involved in the retrofit and the financing.

### Using an Energy Services Agreement as a Model

The next challenge was to find a financing agreement that would be acceptable to the CPUC and familiar to capital providers. An Energy Services Agreement (ESA) is typically a contract between an Energy Services Company (ESCO) and the property owner for energy services in exchange for a periodic payment based on the value of the energy saved. The property owner receiving the services typically does not acquire an ownership interest in the equipment or improvements during the

term of the ESA. The ESCO is compensated based on estimated costs of the project and the energy savings.<sup>9</sup>

ESAs are most common in the commercial sector but have been used in the multifamily sector particularly for financing energy efficiency improvements in public housing portfolios. However, Public Housing Authorities and property owners often must pay ESCOs large amounts of profit and overhead, often in excess of 30% of the project value. Furthermore, ESCOs require either initial ownership of the fixtures and appliances or a UCC-1 filing giving them a lien on them as collateral. This structure is a non-starter for most low-income affordable rental housing developments with stacks of existing debt and equity lien holders who have the right to approve any such pledging of collateral that is otherwise pledged to them based on their underwriting.

To solve these challenges, CHPC and SAHF worked closely with pro bono attorneys at [Manatt Phelps & Phillips](#) to develop a new form of ESA in which the parent corporate owner sets up its own ESCO to enter into the ESAs, manage the construction, and verify the long-term performance of the properties post-construction. In the Santa Monica test, the ESCO holds each individual property ownership entity responsible for making payments through the ESA.

The OBR ESA addresses the particular challenges facing nonprofit owners seeking to retrofit their portfolios of heavily leveraged properties with multiple existing lenders and investors. This tool is tailored for stand-alone retrofits to cover a portion of the retrofit costs.

### Key Features of the Santa Monica Test Energy Services Agreement:

Protects owner and property's financial interests in the event that the projected savings fail to materialize due to no fault of owner/manager by:

1. Limiting payments to no more than actual savings on an annual basis.
2. Reviewing energy efficiency measure performance after the first 12 months. If payments exceed 100% of actual savings by more than 5% and all known material changes have been accounted for, the owner may initiate the protocol to correct the baseline energy usage and forecast energy savings resulting in a monthly payment adjustment that would apply for the remainder of the ESA term.
3. Requiring a payment "true-up" every 12 months. If payments exceed 100% of actual savings by more than 5%, the owner has the right to request the servicer to refund overpayments.
4. Giving the financing provider the discretion to extend the ESA term for 5-years to ensure it is made whole if payments are refunded/reduced due to under-performing buildings.

Needs only routine approvals for making capital improvements and avoids need for special approvals needed for adding debt and the need for re-underwriting entire project.

To set up the technical infrastructure for OBR in the Santa Monica Test, Mercy Loan Fund and SoCalGas executed a billing services agreement in late 2014. Community Corp was able to test the ESA language with its own attorney and the asset manager and attorney at its investor, [Enterprise Community Partners](#), as well as its lender, the [California Community Reinvestment Corporation](#), a consortium of permanent lenders representing the largest banks in California, the City of Santa Monica, and the State of California. After review and discussion, all parties agreed that the ESA did not constitute new debt or require special approvals.

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*The Santa Monica Test OBR ESA addresses the particular challenges facing nonprofit owners seeking to retrofit their portfolios of heavily leveraged properties with multiple existing lenders and investors.*

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## OBR PRE-PILOT DESIGN: OWNER/ESCO & ESA MODEL

**Step 1:** Program Administrator pays for audits and technical assistance to develop scope of work

1

2

**Step 2:** Owner decides on scope of work, obtains bids

3

**Step 3:** Capital Provider provides capital via subscription agreement through Servicer



4

**Step 4:** Servicer Advances Financing to Energy Services Company (ESCO)

5

**Step 5:** ESCO enters into OBR Energy Services Agreement

6

**Step 6:** ESCO Hires and manages Contractor(s) via construction contract(s)



7

**Step 7:** Utilities and property owners enter into OBR billing authorization at completion of upgrades

8

**Step 8:** Utilities collect fixed monthly payments from properties, send to Servicer

9

**Step 9:** Servicer transmits payments to Capital Provider quarterly or annually

10

**Step 10:** Utility Data Manager provides Monitoring and Verification services

11

**Step 11:** Annual "true-up" of actual cost savings vs. OBR Payment.

**Definitions for OBR partners:****Program Administrator:**

- Funds and arranges for comprehensive technical assistance for the owner including the initial ASHRAE Level II audit, determining the retrofit scope of work, identifying an OBR capital provider and servicer, layering in utility incentives, managing contractors and retrofit work, and overseeing monitoring and verification protocols. The Program Administrator also acts as the intermediary between the owner and the various partners.
  - *In the Santa Monica Test, this role was filled by CHPC, with support from the [Association for Energy Affordability \(AEA\)](#).*

**Property Owner(s):**

- Each property is owned by a separate legal entity to provide liability protection but controlled by a single corporation.
  - *In the Santa Monica Test, this role was represented by Community Corp.*

**Energy Services Company (ESCO):**

- Enters into Energy Services agreement with owner for energy services in exchange for a periodic payment based on the value of the energy saved or a fee based on the value of the work. The ESCO can be set up and controlled by the parent corporation, which can also function as the Capital Provider in whole or part. Also manages the contractor Responsible for performing

the retrofit work and coordinating with any sub- contractors.

- *In the Santa Monica Test, this role was represented by Community Corp.*

**Capital Provider:**

- Provides the upfront capital funding to perform the retrofit work, and receives a portion of the monthly OBR payments
  - *In the Santa Monica Test, this role was filled by Community Corp.*

**Servicer:**

- Manages the flow of OBR payments from the utility back to the capital provider for a fee.
  - *In the Santa Monica Test, this role was filled by Mercy Loan Fund.*

**Utility:**

- Provides On-Bill Repayment billing services and energy efficiency incentives.
  - *In the Santa Monica Test, this role was represented by SoCalGas.*

**Utility Data Manager:**

- Monitors long-term retrofit performance and provides monitoring and verification reporting.
  - *In the Santa Monica Test, this role was represented by WegoWise.*



*If payments exceed 100% of actual savings by more than 5%, the owner may initiate a protocol to adjust the energy savings forecast, resulting in an adjustment to their monthly OBR payment for the remainder of their ESA term.*

## 4. The Santa Monica Test: Property Selection, Predevelopment, and Implementation

Once the various legal and financial documents (including the ESA and the capital subscription agreement) had been negotiated, the pre-pilot team began the implementation phase. To assist CHPC confirm the eligibility of Community Corp’s properties, AEA conducted initial assessments (in the industry, called a “desktop analysis”) to roughly estimate the energy savings opportunities. The initial assessments were based on historical utility consumption and cost, information provided by the owner, including its facilities staff and any existing reports such as a Physical Needs Assessments.

Community Corp identified the properties shown in Table 2 as its worst energy performers. The Broadway Apartments property is the newest but nevertheless was included due to its high potential for gas savings because the boiler system was performing poorly. Two of the five properties are fully master-metered for water, gas and electricity. In total, the Santa Monica Test consisted of 170 units with rent restrictions.

### Properties Undergo ASHRAE Level II Energy Audits

In developing the OBR pre-pilot program design in consultation with SAHF and AEA, CHPC concluded that having an [ASHRAE Level II](#) energy performance audit was essential given the complexity and unique nature of the multifamily rental properties and the huge stakes for accuracy. By early 2014, CHPC and AEA had determined Community Corp’s candidate properties had sufficient savings opportunity to warrant spending additional funds on the audit, and moved forward with energy audits to obtain a detailed building survey and energy analysis.

The ASHRAE Level II energy performance audits compiled information on each property’s overall energy performance through fuel and utility rate analysis, 2013 energy usage benchmarking using Community Corp’s existing WegoWise account, and by performing various diagnostics tests of each building’s systems. This analysis became the basis for developing a detailed scope of work for each retrofit. A major benefit to Community Corp was the free energy audits and technical assistance provided by CHPC/AEA and paid for in part by the John D. and Catherine T. MacArthur Foundation and SoCalGas’ Energy Upgrade California Multifamily pilot program. AEA’s technical assistance was crucial to the success of the Santa Monica Test.

### Retrofit Tradeoffs of the Santa Monica Test: Energy Audit Recommendations vs. Final Scope-of-Work

Developing the final scope of work required thorough vetting of all the energy conservation measures (ECMs) recommended by the energy audits. This included extensive technical discussions, interviews with Community Corp’s facilities staff for on-the-ground knowledge about the building systems and tenant behavior. This process lasted about three months and was critical to Community Corp’s confidence in the analysis of the pros and cons of including

each measure. These discussions were also necessary for AEA to calibrate its energy model assumptions to closely reflect the existing building conditions. Not all recommended ECMs were included in Community Corp’s final selection.

Table 2 below describes the typical scope-of-work for the pilot properties.

Table 2. Description of Santa Monica Test Properties

Properties	Year Built	Unit Mix	Master Meter Level
Glenwood Apartments	1920s	11 studios and 4 one-bedroom	Fully Master-Metered
Bahamas Apartments	1957	26 studios	Except for unit electricy
Second Street Center	1994	43 studios & 11 one-bedroom	Except for unit electricy
Colorado Court	2001	44 studios	Fully Master-Metered
Broadway Apartments	2006	41 two- and three-bedroom	Except for unit electricy

Table 3. Final Scope of Work

#	Measures	Savings Potential by Utility		
		Electricity	Gas	Water
1	Replace existing toilets with 0.8 GPF toilets			●
2	Replace bathroom & kitchen aerators (0.5& 1.5 GPM)		●	●
3	Replace showerheads with 1.25 GPM		●	●
4	Install High Efficiency CEE Tier 3 Washing Machines	●	●	●
5	Retrofit lights to LED	●		
6	Replace HHW & DHW circulation pumps with EE model	●	●	
7	Replace domestic boiler with high efficiency condensing		●	
8	Insulate hot water pipes		●	
9	Drill and fill wall insulation (two properties only)		●	
10	Install ENERGY STAR® certified foam roof & windows (one property)		●	

Properties Included in the ASHRAE Level II Energy Audits:



Second Street Apartments



Colorado Courts Apartments



Glenwood Apartments



Broadway Apartments



Bahamas Apartments

The major measures deferred due to budget constraints included replacement of unit lighting fixtures at three properties and replacement of wall furnaces with direct vent at two properties. Both measures would have provided high savings, but Community Corp would not have been able to recover its investment because these buildings are individually metered for gas and electricity. This example illustrates the split incentive challenge that would have been solved if the CPUC had authorized the use of OBR based on savings from tenant meters as well as owner common areas. Because of the CPUC’s decision to not allow OBR financing of tenant-metered improvements, Community Corp prioritized only those measures with owner savings.

The audits recommended landscape and irrigation upgrades for two of the five properties. However, Community Corp chose to perform this work outside of OBR because the landscape areas were relatively small and refining the water savings calculations would have required additional soft costs that were not justified by the scale of the potential savings.

The energy audits also looked at opportunities for solar PV and solar thermal hot water. Overall, Community Corp embraced the majority of the recommended ECMs and optimized its savings. However, two properties, Broadway Apartments and Colorado Court, had potential for solar thermal and solar PV but since the owner’s cost benefit analysis did not pencil out, the Community Corp board was not receptive to the idea of proceeding with these ECMs.

**Critical Emphasis on Getting Projected Energy Savings Right**

In order to maximize OBR financing, the OBR payment was sized based on 100% of the cost savings. This meant that ensuring the accuracy of the projected savings was absolutely critical. To accomplish this, the team vetted the estimated energy savings calculations for each property at three different points during the Santa Monica Test. Table 4 shows: (1) the estimated energy savings from the energy audit based on the proposed scope of work, (2) energy savings estimates at pre-construction based on the final scope of work, (3) and post-construction savings based on verified installation of ECMs.

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*The fluctuation in savings at each milestone reflects the process of refining the scope of work and determining equipment selection, as well as making updates to the energy model assumptions about existing conditions when additional information was discovered.*

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Table 4. Energy Usage Savings Estimates By Milestone

Properties	Energy Audit Estimate Based on Proposed SOW	Pre-Construction Estimate Based on Final SOW	Post-Construction Estimate Based On Verified Installation
Glenwood Apartments	46%	24%	22%
Bahamas Apartments	46%	45%	35%
Second Street Center	19%	15%	13%
Colorado Court	12%	12%	10%
Broadway Apartments	12%	12%	11%

The fluctuation in estimated usage savings at each milestone reflects the process of refining the scope of work and determining equipment selection, as well as making updates to the energy model assumptions about existing conditions when additional information was discovered. The major difference between the energy audit and pre-construction estimates is due to some ECMs being deferred from the chosen scope. Estimated savings fluctuate a bit again from pre- to post-construction because the energy model was updated to reflect the verification of installed ECMs. Some of these adjustments are the result of the partial install of ECMs, or a decision to omit an ECM from the final scope of work or using more conservative modeling assumptions for some ECMs.<sup>10</sup>

The consequence of this level of scrutiny on energy savings estimates at every stage is that OBR financing relies heavily on the energy consultant’s technical assistance. AEA conducted quality assurance and verification on behalf of the Santa Monica Test and the pilot EUC MF program. If the cost of this level of technical assistance is not heavily subsidized by an OBR program, as it was in the Santa Monica Test, this soft cost would be passed on to the property owner.

**Project Financing and Construction Phase**

Table 5 shows the OBR financing amounts for each property, totalling \$190,000. The OBR amounts are based on 100% of the estimated energy and water savings as determined at post-construction (see Table 4). The total monthly OBR payment is just over \$2,000.

Table 6 shows how utility incentives and property reserves were combined with OBR to finance the total cost of the retrofits.

The combined SCG/SCE EUC MF incentive of \$170,000 represents roughly 23% share of the overall total energy retrofit costs of over \$700,000. OBR financing represents 26% of total costs. The remaining gap of 50% was paid with property reserves and some of its own funds. The Community Corp properties were selected for the test in part because they had available reserves to contribute to the improvements. These properties were unusual because rent-restricted properties that are in most need of

**Table 5. OBR Financing Amounts and Utility Savings**

Properties	OBR Advance	OBR Annual Payment Using 100% of Dollar Savings	OBR Monthly Payment
Glenwood Apartments	\$25,563	\$3,254	\$271
Bahamas Apartments	\$37,304	\$4,748	\$396
Second Street Center	\$57,513	\$7,320	\$610
Colorado Court	\$28,978	\$3,688	\$307
Broadway Apartments	\$40,707	\$5,181	\$432
<b>Total</b>	<b>\$190,065</b>	<b>\$24,191</b>	<b>\$2,016</b>

**Table 6. Post-Construction Financing Sources**

Properties	Total Energy Retrofit Costs	Utility Incentives	Property Reserves	Financing Based on Savings (OBR Amount)
Glenwood Apartments	\$127,940	\$24,000	\$78,377	\$25,563
Bahamas Apartments	\$128,623	\$41,600	\$49,719	\$37,304
Second Street Center	\$173,375	\$44,000	\$71,862	\$57,513
Colorado Court	\$166,794	\$30,800	\$107,016	\$28,978
Broadway Apartments	\$126,802	\$28,700	\$57,395	\$40,707
<b>Total</b>	<b>\$723,533</b>	<b>\$169,100</b>	<b>\$364,368</b>	<b>\$190,065</b>
		<b>23%</b>	<b>50%</b>	<b>26%</b>

energy improvements generally have very limited reserves. Community Corp decided to make funds available in large part to be able to leverage \$170,000 in utility incentives as shown in Table 6. By combining both EUC MF and OBR financing, the owner was able to successfully transform its worst performing properties into high performers.

In addition to the EUC MF program, the pre-pilot team considered the following three incentive programs that ultimately Community Corp choose not to use:

1. **Energy Savings Assistance Program (ESAP):** After much consideration, the owner cited concerns about construction scheduling, quality, oversight and coordination as well as the unit-by-unit income qualification process, and the lack of clarity upfront about the cost/benefit to participating as reasons to forego the free ESAP measures. Ironically, once the scope of work was finalized the properties were no longer eligible because they did not meet the minimum number of measures required

to participate.

**2. California Solar Incentive (CSI)-Thermal Program:**

the state provides incentives of up to 30% for solar hot water systems through the California Solar Initiative Program (CSI) program. However, Community Corp chose not to install solar thermal improvements at both Broadway Apartments and Colorado Court because of its determination that financial feasibility would be marginal at best.

**3. Toilet Rebate:**

the City of Santa Monica offers rebates to incentive the installation of low-flow toilets. Unfortunately, Community Corp was not able to pursue these due to application timing issues.

Table 7 is a breakdown of retrofit costs by property. These represent installation costs for measures with associated energy and water savings, including change orders. The per unit costs are the highest at the smaller properties, Bahamas Apartments and Glenwood Apartments, because there are fewer units and the retrofits included deep (less cost effective) energy saving measures.

Across all properties, low-flow aerators were installed in-house and were part of regular maintenance and operations. For this reason, these costs are not included in the OBR project cost. However, the associated savings from this ECM contributed to the savings calculation to size the OBR charges.

At Bahamas Apartments, the wall insulation, new windows and new roof with insulation were planned capital improvements so the costs were not included in the energy efficiency retrofit project costs since they were paid for by the property’s replacement reserves. However, \$4,461 from annual energy savings associated with the capital improvements was included in the sizing of the OBR financing amount.

Total hard costs represents 83% of retrofit costs. Soft costs included construction management, engineering, local permits, legal fees, servicing fees, administration and organizational expenses, and insurance. Some soft costs for relocation, environmental consultant, and environmental abatement were covered as part of the owner’s capital improvements.

Table 7. Construction Uses –Verified

Properties	Upgrades (ECMs)	Soft Costs	Total Energy Retrofit Costs	Cost Per Unit
Glenwood Apartments	\$101,584	\$26,355	\$127,940	\$8,529
Bahamas Apartments	\$105,070	\$23,553	\$128,623	\$4,947
Second Street Center	\$153,720	\$19,654	\$173,375	\$3,940
Colorado Court	\$128,971	\$37,823	\$166,794	\$3,791
Broadway Apartments	\$108,384	\$18,419	\$126,802	\$3,093
<b>Total</b>	<b>\$597,729</b>	<b>\$125,804</b>	<b>\$723,533</b>	--

**Post-Construction Savings and Monitoring & Verification**

The figures in Table 8 below represent the dollar savings predicted by the OBR energy models developed by AEA. Community Corp’s expected savings across all five properties is over \$24,000 annually. Forty percent of the total dollar savings are from lower water bills, followed by 32% savings from gas bills and 28% from electricity bills.

Despite the scope of work being fairly typical as shown in Table 2, Table 8 shows that annual cost savings to the property by utility varies widely. Similar measures do not result in similar savings across properties. All the central hot water boilers were upgraded, but gas savings are the highest at Broadway Apartments and Bahamas Apartments. The bulk of dollar savings at these two properties is from gas-saving measures.

**Table 8. Breakdown of Annual Projected Cost Savings by Property**

Properties	Water	Gas	Electricity	Total
Glenwood Apartments	\$1,712	\$1,243	\$299	\$3,254
Bahamas Apartments	\$1,290	\$2,472	\$986	\$4,748
Second Street Center	\$2,743	\$1,064	\$3,514	\$7,320
Colorado Court	\$1,965	\$876	\$847	\$3,688
Broadway Apartments	\$1,931	\$2,082	\$1,169	\$5,181
<b>Total Savings</b>	\$9,640	\$7,737	\$6,814	\$24,191
	40%	32%	28%	

**Table 9. Property Annual Cost Savings by Utility Bill**

Properties	Owner Savings/Year	Savings per Unit/Year	Gas	Electricity	Water (in building)	Total
Glenwood Apartments	\$3,254	\$217	38%	9%	53%	100%
Bahamas Apartments	\$4,748	\$183	54%	19%	27%	100%
Second Street Center	\$7,320	\$166	15%	48%	37%	100%
Colorado Court	\$3,688	\$84	24%	23%	53%	100%
Broadway Apartments	\$5,181	\$126	40%	23%	37%	100%

As shown in table 9 above, 53 percent of the cost savings at Colorado Court and Glenwood Apartments is due to reductions in water usage. The City of Santa Monica increased water rates on January 1, 2017 by five percent. So, water saving measures are anticipated to generate greater savings over time.<sup>11</sup> The retrofits are helping Community Corp hedge against future increased utility costs.

At Second Street Center electricity usage represents more than 45 percent of the savings as a result of including LED lighting retrofits for the Community Corp’s office space. The variables that influence the discrepancies in savings include property differences in utility rates, existing conditions, common areas, tenants behavior, number of units, unit sizes and occupancy, level of master meter and any previous efficiency upgrades.

**Estimated Savings at Construction Completion**

Table 10 below summarizes the estimated savings at post-construction, representing the difference from the 2013 benchmark data and the verified measure savings used to set up the OBR charges after all construction was completed and

operational in January 2016. Post-retrofit savings improvements over baseline conditions range from 10% to 35%.

The final savings estimates at post-construction were 892,000 gallons of water, 7,548 therms of gas, and 36,742 kWh of electricity.

**Table 10. Estimated Annual Energy Savings and Percent Improvement**

Properties	Percent Energy Improvement (therms+kWh)	Water Savings (1000 gallons)	Gas Savings (therms)	Electricity Savings (kWh)
Glenwood Apartments	22%	152	1,234	1,811
Bahamas Apartments	35%	113	2,567	5,301
Second Street Center	12%	271	1,135	17,712
Colorado Court	10%	192	914	4,818
Broadway Apartments	11%	165	1,698	7,099
		892	7,548	36,742

The annual percentage usage improvement varies widely by property and utility. Across all properties, water savings were more than 20%, except for Broadway Apartments where toilets were not replaced. However, the toilets were recently upgraded at that property so higher savings are reflected in Table 11. The two largest improvements are at Bahamas Apartments with 41% savings in gas and 38% in electricity. This property was built in the 1950s and is master-metered for water, space heating, and domestic hot water, which made it a particularly good candidate for OBR financing. The six major ECMs were drill-and-fill insulation, and the replacement of windows, toilets, light fixtures, and domestic hot water boilers.

**Actual Savings Results at Nine Months Post-Construction**

Table 11 summarizes the monitoring and verification data for the first nine months of 2016. First, the table compares cumulative dollar savings percentages and post-construction dollar saving targets for the period of January through September for 2013 and 2016. Second, the table compares actual savings with the total OBR payments for the same period.

Overall, actual cost savings at the five properties exceed total OBR payments by almost \$1,000. However, when we look at individual properties, only one property has savings that are higher than the OBR payments. A closer look at the cumulative savings percentage and savings target by utility shows that the major problem areas are isolated to electricity and gas savings at Glenwood Apartments and Bahamas Apartments.

The biggest shortfall is at Bahamas Apartments for electricity and gas savings. It appears that the negative electricity savings are the result of a combination of factors. First, the energy audit may have missed a number of lights in the common areas that were burned out (and not drawing energy) during 2013, which means the electricity baseline may have been underestimated. The audit tracks the number of light fixtures, identifies wattage, and makes assumptions about the number of hour the lights are used, when in fact there may have been a lot of lights running for zero hours making savings appear lower. Second, Community Corp added additional flood lights that may not have been there previously, which would result in higher post-construction use, thus lower savings. Third, one of the measures Community Corp used to control lighting, an astronomical time clock, did not function as expected. As a result, they switched back to an analog time clock, which reduced potential energy savings. Fourth, the variable speed pool pump was improperly selected by the contractor and not commissioned properly, and is currently using more energy than the previously installed pump. Lastly, Community Corp did not install the variable speed hot water pump, and the sensor-based approach they are currently using has not been as effective. The result is that the energy modeling may have overestimated baseline use, and underestimated post-construction use, and because of operation issues, Community Corp has not been able to keep all the equipment they hoped to have there.

In terms of gas savings at Bahamas Apartments, approximately half the projected savings were expected to come from hot water heater replacement,

Table 11. Summary of Verified Construction Savings vs. Actual Retrofit Savings

A. ELECTRICITY (comparing Q1-Q3 2013 to Q1-Q3 2016)				
	Savings (kWh)	Dollar Savings (\$)	Cumulative Dollar Savings (%)	Post-Construction Dollar Saving Target (%)
Glenwood Apartments	(5,348)	(\$810)	-22%	6%
Bahamas Apartments	(286)	(\$51)	-3%	37%
Second Street Center	13,336	\$2,168	30%	15%
Colorado Court	5,983	\$1,068	9%	5%
Broadway Apartments	24,138	\$3,137	35%	8%
<b>Total</b>	<b>37,823</b>	<b>\$5,512</b>	--	--

Actual savings for electricity show mixed results. Three properties exceeded the target savings, while savings were negative at Bahamas and Glenwood Apartments.

with the other half coming from reduced heating demand through higher insulation. As noted in Table 11B above, actual gas savings at Bahamas Apartments fell short of their savings target. One possible explanation is that fluctuations in weather from 2013 to 2016 meant that people used their heaters differently during those times. All the savings appear to be from the more efficient heaters and low to no savings from increased insulation.

The lower electricity savings at Glenwood Apartments may be largely due to higher

plug loads now that the building is up to code. At least one tenant reported few outlets working previously in his unit, but now all are working and new ones were added. In addition, one tenant installed a window air conditioner. Since this property is now individually metered for electricity but Community Corp still pays for all the utilities, they are now able to see that some tenants use more electricity than others.

Table 11B

B. GAS (comparing Q1-Q3 2013 to Q1-Q3 2016)				
	Savings (Therms)	Dollar Savings (\$)	Cumulative Dollar Savings (%)	Post-Construction Dollar Saving Target (%)
Glenwood Apartments	1,059	\$1,140	33%	26%
Bahamas Apartments	1,213	\$1,297	27%	40%
Second Street Center	994	\$1,058	18%	15%
Colorado Court	558	\$594	11%	12%
Broadway Apartments	1,523	\$2,011	21%	17%
<b>Total</b>	<b>\$5,347</b>	<b>\$6,100</b>	--	--

Gas savings targets are met or exceeded at most properties, except at Bahamas Apartments where gas savings of 27% fall short of meeting the 40% target.

**Monitoring Long-Term Project Performance**

The OBR ESA requires Community Corp to partner with a utility data management service provider to validate savings resulting from the retrofits annually, a process referred to as the 12-month “true-up.” Community Corp’s portfolio was already benchmarked using WegoWise, which made it relatively simple to expand this service to include annual reports specifically designed to meet the needs of the OBR pilot projects.<sup>12</sup> This premium service

includes quarterly property performance summaries comparing actual savings to the baseline. WegoWise also provides quarterly measurement and verification (M&V) reports, which look at the performance of ECMs by utility. This level of detail allows Community Corp to easily identify and address issues with any underperforming ECMs. The measurement and verification reports provide the basis for the true-up process outlined in the ESA.

Despite starting construction at the same time all properties have different completion

Table 11C

C. WATER (comparing Q1-Q3 2013 to Q1-Q3 2016)				
	Savings (Gallons)	Dollar Savings (\$)	Cumulative Dollar Savings (%)	Post-Construction Dollar Saving Target (%)
Glenwood Apartments	111,385	\$1,227	22%	23%
Bahamas Apartments	83,103	\$921	21%	20%
Second Street Center	204,922	\$1,837	27%	27%
Colorado Court	189,914	\$704	11%	21%
Broadway Apartments	233,316	\$2,820	15%	8%
<b>Total</b>	<b>822,640</b>	<b>\$7,509</b>	--	--

All properties are meeting or exceeding the water savings target, except for Colorado Court. The higher cost savings at Broadway Apartments include higher water savings due to recent toilet upgrades.

Table 12: Actual Savings vs. OBR Payments for Q1-Q3 2016

	Dollar Savings (\$)	OBR Payments	Difference
Glenwood Apartments	\$1,557	\$2,440	\$(883)
Bahamas Apartments	\$2,167	\$3,561	\$(1,394)
Second Street Center	\$5,063	\$5,490	\$(427)
Colorado Court	\$2,366	\$2,766	\$(400)
Broadway Apartments	\$7,968	\$3,886	\$4,082
<b>Total</b>	<b>\$19,121</b>	<b>\$18,143</b>	<b>\$978</b>

dates due to construction delays. However, for purposes of simplifying the ESA's required 12-month true-up, Community Corp and servicer Mercy Loan Fund agreed to set January 2016 as the start of OBR charges across all properties, creating a logical time for Community Corp and Mercy Loan Fund to true-up actual cost savings and OBR payments. The performance review process for the first 12-month true-up will begin in late-March 2017 when measurement and verification data is available for all of 2016.

#### Next Steps for the Santa Monica Test

Community Corp is committed to investigating the possible reasons for the shortfalls discussed above and finding solutions to get on track to meet their energy savings targets. This includes evaluating and following up on the maintenance conducted on the newly installed equipment, as well as tracking of issues and resolutions. Because the properties have ownership of the ECMs per the ESA, Community Corp is responsible for the long-term building performance. In addition to looking into maintenance and tracking practices, Community Corp is also using the quarterly M&V reports to understand its residents' usage patterns and is looking to develop programs and explore opportunities to engage residents to help meet the property's energy savings target.

## 5. Key Lessons from the Santa Monica Test and Recommendations for full OBR Pilot

### Lesson 1: Owner capacity and support for third-party technical assistance is critical to the success of On-Bill Repayment in this sector.

Since OBR financing terms are by necessity negotiated prior to a retrofit proceeding, OBR charges must be calculated initially on projected savings. Given that affordable housing providers such as Community Corp typically operate their properties under the pressure of restricted rents and limited cash flow by design, accuracy and consistency in the energy savings calculations must be a critical component of any OBR financing program. Community Corp's prior experience with retrofits underscored the risk of over-estimating post construction savings. The good news from the Santa Monica Test is that overall, the five OBR-financed retrofits are outperforming other retrofits in Community Corp's

portfolio. Community Corp believes this is due in large part to extensive upfront technical assistance provided by the Santa Monica Test. The technical assistance in the development of the detailed performance specifications and helping contractors accurately interpret the specifications and estimate project costs was particularly important. Even with technical assistance, however, an owner will still need a dedicated project manager with strong attention to detail to oversee the project from start to completion.<sup>13</sup>

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*Given that affordable housing providers such as Community Corp typically operate their properties under the pressure of restricted rents and limited cash flow by design, accuracy and consistency in the energy savings calculations must be a critical component of any OBR financing program.*

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### Recommendation #1 for statewide Master Metered Multifamily (MMMMF) Pilot:

Unless the statewide OBR Pilot subsidizes deep energy technical assistance, few owners will be willing to participate and even fewer will be successful in completing cost-effective projects. Due to the technical complexity of OBR financing, owners are in need of dedicated technical assistance to assist with reviewing the recommended scope of work, estimating projected savings, developing detailed performance specifications, leveraging utility incentives, and coordinating retrofits from start to finish. A key component of owner technical assistance should be providing help with budgeting for related unanticipated costs or repairs that emerge during the retrofit process, including for improvements to tenant controlled components of key utility systems.

While Energy Upgrade California Multifamily offers a model for providing comprehensive technical assistance, adding an OBR financing to a retrofit requires deeper, more tailored assistance even beyond

what is provided by the state's flagship multifamily retrofit program, the Low Income Weatherization Program. Deep technical assistance is necessary for the following reasons:

1. Owners and capital providers must have confidence in the program's audit standards, projected savings methodology, and measures and verification process to mitigate the risks associated with savings-based financing. Energy audits must more closely reflect actual contractor costs.
2. Technical assistance must ensure that the new systems are compatible with existing systems to overcome the incompatibility risk that could decrease projected savings.
3. Contractors are not accustomed to having their work tied to the performance of the systems they install; this is a market issue that the program needs to compensate for with extensive technical assistance.

## Lesson 2: When incurring financing risks, affordable rental housing owners and their investors and lenders will not accept the risk of savings not materializing.

Owners of affordable rental housing are generally unwilling to finance retrofits without third party guarantees regarding how the risk of projected savings not materializing will be mitigated. Investors and lenders are even more sensitive to this type of risk and generally have provisions in their legal documents that require their permission for adding financing that has any risk of affecting cash flow or asset condition

or control negatively. While the strong audit requirements and comprehensive technical assistance provided to Community Corp and discussed above are essential, they are not sufficient to induce most owners to proceed with financing a retrofit. The Santa Monica Test reinforced why it is not reasonable for the MMMF program to ask an owner like Community Corp to take on energy retrofit performance risk and why it is critical for the MMMF program to provide a guarantee of savings equaling the payment amount. The experience also showed that it is not reasonable to ask a potential capitol source such as Mercy Loan Fund to take on this risk without adequate credit enhancement.

### Recommendation #2 for MMMF OBR Pilot: Capital must be completely non-recourse and offer a performance guarantee when owner and ESCO can demonstrate use of strong maintenance and tracking protocols.

This scenario likely means ratepayer or other public or private grant funds must be made available for a credit enhancement to protect owners. Only with this type of financing will affordable rental property owners be willing to undertake retrofits.

Whether using public or private capital, the OBR program should outline the roles and responsibilities of each party involved in the transaction to provide transparency about risks. Furthermore, the program model should include

built-in incentives to ensure that each party upholds their responsibilities for achieving the projected energy savings for the full term. This is especially critical when it comes to resolving issues related to shortfalls in actual savings. If the property owner is to hold equipment ownership, as in the test, the screening process should include assessing the owner's capacity to maintain and track ECMs as needed to sustain savings for the financing term.



### Lesson 3: OBR financing through owner-metered energy savings opportunities alone will not cover the entire cost of a comprehensive retrofit.

The Santa Monica Test team struggled to find sufficient owner savings potential because three of five properties are individually metered. Even though the test properties selected were among Community Corp's worst performers relative to its overall portfolio, they were only able to tap into savings potential in common areas. In order to maximize owner-meter savings Community Corp pursued comprehensive scopes, which are inherently more risky than targeted scopes of measures with higher savings reliability such as lighting. Had Community Corp been able to include tenant-meter saving, the OBR amount could have been greater. Across the five Santa Monica retrofits, OBR financing paid for only 26% of total retrofit costs, utility incentives covered 23% of costs, and owner and property reserves covered the remaining 51%. The vast majority of affordable rental properties will not be able to contribute anywhere near this level of reserves.

The circumstances of the Santa Monica Test provide evidence that savings and related OBR financing could be increased to a higher percentage at older and larger properties especially when wrapping in more energy savings opportunities, such as solar pv, solar thermal systems, or other energy management systems. Such opportunities could also help improve overall savings reliability. To succeed, OBR must be paired with more robust utility incentives, but utility incentives alone may not be enough unless owners come to the table with more savings opportunities, significant property reserves, or other grant funds.

### Recommendation #3 for MMMF Pilot:

**a) Allow a portion of tenant meter savings to be financed to address the split incentive problem but only if tenants are involved in the decision-making:**

The Santa Monica test has shown that while OBR can work, it is unlikely to work at scale in California's relatively temperate climate zones unless some portion of retrofit savings from tenant meters can be added on to savings from owner-meter improvements for financing purposes.

The CPUC omitted the ability to finance tenant-metered improvements from the OBR pilot out of a desire to test the reliability of OBR as a financing mechanism first. CHPC and other proponents of testing OBR financing agreed with the understanding that if OBR proved to be a workable mechanism, the CPUC would consider making a portion of tenant savings eligible at a later date with appropriate consumer protections.

**b) Expand OBR financing to include a more comprehensive set of eligible energy savings opportunities, such as solar PV, solar thermal or other energy management solutions:**

The MMMF pilot program will likely

see increased demand for OBR financing if the set of eligible savings opportunities is broadened to include options such as solar PV, solar thermal or other energy management solutions.

**c) The MMMF program needs to ensure access to adequate utility incentives:**

The MMMF Program must ensure that OBR financing can be successfully leveraged and combined with other funding sources for energy efficiency or solar. Program administrators must play an active role in assisting owners to identify and secure additional sources, or by creating another funding stream that can be layered with the OBR financing. For instance, OBR financing should include wherever possible leveraging of Cap-and-Trade funded programs such as LIWP or the proposed Multifamily Affordable Housing Solar Roofs program in addition to utility incentives to reduce the affordable rental housing owner's contribution to a realistic level. Combined with other resources, OBR financing can help owners achieve expanded scopes for higher energy savings, which in turn helps to increase the OBR financing amount.

### Lesson 4: Energy Services Agreement structure avoids time-consuming lienholder consent process for owner.

The tailored ESA structure developed with extensive pro bono legal help in the Santa Monica Test was successful in not only eliminating the need for Community Corp to seek investor and lender approval of additional debt and time-consuming re-underwriting but also in creating a mechanism

that provided sufficient reassurance to existing lienholder such that they were willing to waive re-underwriting the properties.<sup>14</sup> An OBR ESA structure is far superior to conventional debt in eliminating approvals and should be an eligible if not preferred structure under the MMMF Pilot.

**Recommendation #4 for MMMF OBR Pilot: Offer an ESA structure that includes a 12-month adjustment provision to reassure lienholders that payments cannot exceed actual savings and therefore cannot damage lienholders' interests in the property.**

Adopting an ESA structure similar to the one used in the Santa Monica test will ensure that owners will not need to spend a significant amount of time obtaining formal permission and re-underwriting from existing equity, debt and regulatory lien holders to obtain the benefits of an MMMF OBR financing.

In addition, the ESA structure should include a Year-1 Performance Review provision. This provision gives

the owner and ESCO team the opportunity to adjust discrepancies identified with monitoring actual savings against saving projections during the first twelve months. This safety measure allows both owner and capital provider the opportunity to adjust measures and verification if needed to ensure savings projections are fair and as accurate as possible.

### Lesson 5: Owners need extensive information to get comfortable with unsecured financing that relies on utility savings to make payments.

The experience working with Community Corp in Santa Monica showed that it is critical that the affordable rental property owner receive substantial information in order to get comfortable with the following key aspects of OBR financing: (1) overall costs and benefits, (2) safeguards in the event that the projected utility savings are not

achieved, and (3) the allocation of costs and risks between the owner and the ESCO. In the case of Community Corp, the properties retained ownership of the new equipment and are responsible for ongoing maintenance and long-term savings performance. Because ESCOs typically have technical staff specialized in maintaining complex systems, it is possible that some owners may prefer an ESA model that provides for third-party ownership of the equipment, as is typical in commercial ESAs, as long as it can be done without threatening the interests of the existing lienholders.

### Recommendation #5 for MMMF OBR Pilot:

**Program Administrators must clearly educate owners about the costs, benefits and risks of OBR financing using the ESA structure. The Pilot should include a fact sheet about the allocation of risks associated with the ESA structure used in the Santa Monica test.**

The fact sheet should include clear guidelines on how responsibilities and costs are allocated between owner and ESCO and cover at least the following five areas:

**Utility Rate Changes:** which party assumes risk and benefits/costs if rates decrease or increase.

**Design and Engineering:** how responsibility for professional liability of engineering technical assistance and contractor is allocated.

**Commercial Liability Insurance:** any additional requirements and costs to the owner.

**Operations and Usage:** which party holds ownership of equipment and is responsible for operations and maintenance.

**Building Performance:** should specify the protocol for Measures and Verification Performance Monitoring, who pays for it, as well as any shared savings structure or savings guarantees.

## Lesson 6: Access to third-party benchmarking services designed to support OBR financing needs is critical to success.

Given the thin margins of OBR savings to payments witnessed in Santa Monica, it was absolutely essential that Community Corp feel comfortable with the Measures and Verification provider that is required under OBR financing. Since Community Corp had already benchmarked its portfolio with WegoWise, Community Corp used WegoWise's premium monitoring and verification service, which WegoWise

tailored further for the Santa Monica Test. WegoWise was an important partner in helping Community Corp identify the worst performing buildings in its portfolio, and in modifying its tracking and reporting systems to provide the necessary data to meet the requirements of the 12-month performance review. Other providers exist with the capability of providing similar services.

While some owners will have existing utility data management providers, not all will. Even those that do will likely need to modify the services to fit the needs of the OBR financing.

### Recommendation #6 for MMMF OBR Pilot:

#### a) OBR Pilot should provide a clear protocol around monitoring and verification of estimated savings.

In addition to requiring all participants to benchmark, the MMMF OBR program should adopt a measures and verification protocol and require that participants and capital providers adopt it. This standard should be accessible to energy benchmarking software firms already providing these services so that they can develop and offer OBR monitoring as part of a premium package.

#### b) MMMF Pilot program administrators should consider partnering with benchmarking service providers to identify and target properties with the greatest savings potential.

Relying on owners to come forward with OBR candidate properties is not an ideal approach for building demand for the pilot. Pilot program administrator should consider partnering benchmarking software service providers who will have the necessary data to make informed decisions about potential OBR candidate properties.

## CONCLUSION

While OBR Financing is still a promising means of paying for standalone retrofits, the Santa Monica Case Study has underscored the difficulty of accurately estimating energy savings and the critical need for performance guarantees.

Until OBR financing is refined to provide a simple process and attractive financing terms, owners will continue to advocate for higher utility incentive amounts and seek other opportunities to improve the energy efficiency of their portfolios.

1. Per-unit retrofit cost range aligns with testimony given by Association of Energy Affordability (AEA) in California Public Utilities Commission rulemaking A-11-007 et al., Testimony of David Hepinstall on behalf of the Natural Resources Defense Council, the National Consumer Law Center, and the California Housing Partnership, April 27, 2015. For 123 retrofits completed in 2014 under the BayREN Bay Area Multifamily Building Enhancement Program, AEA determined a cost range of \$750 to \$17,340 per unit. This analysis did not exclude any non-energy related work that may have been completed in tandem with the energy work.

2. Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee, (2015, 2011). Improving California's Multifamily Buildings: Opportunities and Recommendations for Green Retrofit and Rehab Programs.

3. In November 2016, The California Public Utilities Commission issued Decision 16-11-022, which authorized the use of unspent ESA funds for multifamily common area measures. The investor owned utilities are currently developing a new program design.

4. Initial findings from the forthcoming study, Los Angeles: Saving Energy in Affordable Housing, sponsored by the Natural Resources Defense Council through the Energy Efficiency for All initiative.

5. One exception is the Cap-and-Trade-funded Low Income Weatherization Program (LIWP), which provides deeper, performance-based incentives. However, only properties located Disadvantaged Communities (DACs), defined by [CalEnviroScreen](#), and are eligible for LIWP incentives.

6. An issue with OBR authorization in California is that this promise to pay through the utility bill is not currently enforceable through a shut off of utility service for non-payment.

7. The [Energy Upgrade California](#) program is an incentive program run through the IOUs. Incentive values range from \$500-\$2,500 per unit, based on percentage savings. In addition to providing an incentive, the program offers free technical assistance and energy assessments.

8. Legislation is needed to authorize the use of OBR on tenant meters, along with strong consumer protections to avoid tariffs

exceeding annual savings. Without the insurance of bill neutrality, OBR raises concerns that owners could potentially claim savings from tenant-paid utilities.

9. EcoMotion. Energy Services Agreements: A White Paper by Ted Flanigan. April 20, 2015.

10. For example, Bahamas Apartments achieved higher savings from more lighting upgrades, but the overall savings decreased because two ECMs were not installed as recommended; insulation in roof cavity and the pool pump required further commissioning so savings were not counted. Deferring upgrades to the community room lighting and the heat exchange pump at Colorado Court resulted in lower savings. Glenwood Apartments achieved higher savings from additional pipe insulation and a more efficient boiler, but reduced savings since there were less un-insulated walls than originally projected. At Second Street Center, six toilets were not replaced due to resident concerns with the toilets, and domestic hot water distribution system issues were not resolved. At Broadway Apartments, fewer lighting fixtures were replaced than initially planned.

11. Santa Monica Public Works, Water Resources: <https://www.smgov.net/Departments/PublicWorks/ContentWater.aspx?id=7742>

12. WegoWise annual reports comply with the methodology outlined in American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) 14-2002 (Whole Building Performance Approach) and Option C of the International Performance Measures & Verification Protocol (IPMVP).

13. Comprehensive scopes to achieve deep savings are inherently more risky when it comes to long-term performance, since savings may rely on nuanced repairs to central mechanical systems, or assumes some change in tenant behavior.

14. Routine approvals were still needed for capital improvements greater than \$10,000 as well as for using any reserves. An unintended consequence of communicating with the investor to obtain approval for OBR-related capital improvements resulted in investor questions about the property unrelated to the OBR retrofit project, which slowed down approvals.



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