


San Francisco Community Facilities Energy Retrofit Demand & Sensitivity Analysis

Low Income Investment fund

Prepared by Lori Bamberger Consulting
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LIIF's Vision and Mission: The Low Income Investment Fund (LIIF) is dedicated to creating pathways of opportunity for low income people and communities. Serving the poorest of the poor, LIIF is a steward for capital invested in housing, child care, education and other community-building initiatives. In so doing, LIIF provides a bridge between private capital markets and low income neighborhoods.

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I. Executive Summary

Recently, the Low Income Investment Fund (LIIF), a community development financial institution based in San Francisco, was asked to help develop a proof-of-concept around the application of two different energy retrofit financing innovations to nonprofit-owned community facilities in San Francisco. These facilities include affordable multifamily housing and other facilities that serve low-income families and neighborhoods. To do so required a detailed analysis of the utility costs and financing needs of existing community facilities, and an assessment of their sensitivity to different financial products, interest rates, loan terms, and retrofit investment levels. This report details LIIF's efforts to size San Francisco's community facility demand and test viability of the following two different innovative financing mechanisms applied to this community-based portfolio: the Property Assessed Clean Energy (PACE) model, and a targeted Energy Efficiency Revolving Loan Fund (EERLF) model.

We examined a data portfolio including approximately 132 multifamily housing developments, with approximately 7,250 individual housing units, and 20 other non-multifamily[1] community facilities representing a range of uses.[2] Our sample includes approximately 26% of the City's 27,233 affordable (and subsidized) nonprofit-owned multifamily housing units, and only a small subset of these other nonprofit owned community facilities.[3] We used this data to infer the functionality (loan repayment via energy savings accumulated during the loan term) of the PACE and EERLF models. Our analysis leads us to conclude the following:

- **Financing functionality in both models is directly correlated to high utility cost per unit of measurement, and not to high total utility costs per building.** For housing, that's annual cost per unit, for NonMF community facilities, that's cost per square foot.

- **Both models show sensitivity to both interest rate and loan term variation, yet both models function for community facilities with above-average utility costs.** At the same rate of interest, the PACE model will always appear less attractive than the EERLF model due to its upfront costs. However, at scale PACE investors should require a materially lower return vs. the unsecured EERLF model.

- **No single model today will fully serve a jurisdiction. Instead the data suggest that we test a variety of different financing mechanisms to scale and transform the financial marketplace, especially within a single jurisdiction**.

- **Nonprofit owners of community facilities have expressed significant skepticism that sufficient savings would materialize to fully repay debt.** Any scaled effort to reach this portfolio, and promote uptake of new financial products, therefore, will need to help (e.g. technical assistance) in translating costs, savings, loan mechanism functionality, and liabilities associated with these models.

- **Both the PACE and the EERLF models can function to retrofit a portion of the City's community facilities enabling accumulated savings to repay 10- or 12-year loans. Appropriately targeted, nearly 40% of all community facilities whose utility costs are above**

[1] Throughout this analysis, we refer to the non-multifamily facilities as "NonMF Community Facilities."

[2] We could not have accomplished this analysis without the generous help from the City of San Francisco, including especially three people: Mike McLoone (Mayor's Office of Housing); Dan Adams (Mayor's Office of Housing); Brian Cheu (Mayor's Office of Housing Community Development Division). Also, Tenderloin Neighborhood Development Corporation generously shared actual utility and building sizing information with us, and Bridge Housing Corporation gave us anecdotal retrofit proxies. In addition, we obtained the non Multifamily Community Facility information directly from 21 facility operators generously willing to share their information.

[3] We have not at all looked at the City's many unsubsidized and unassisted multifamily developments. Also we have not looked at public housing which is fully owned and subsidized by the federal government. Based on MOH's analysis, we have 41% of the 324 affordable, nonpublic, non-homeownership multifamily developments, and only 26% of the 27,233 units in the city. And, we can guess that we have only 5-10% of the non-MF portfolio of nonprofit owned community buildings. For this reason, when sizing demand, we multiply the housing portion by a 4x multiplier, and the NonMF portion by a 15x multiplier.

average can be reached. The data and anecdotal results also indicate that this initiative should, ideally, be implemented in partnership with a trusted community financial partner with proven capital structuring experience to overcome borrower concerns and structural financing barriers endemic to this asset class.

- **These facilities with high utility costs include:**
  - 37% of the sample multifamily housing portfolio (46 developments), including:
    - Nearly three-quarters of these with *ultra-high* and *high-cost* utility costs (exceeding 25 percent above average); and[4]
    - Nearly half of these owned by just 4 nonprofit owners.
  - 40% of the sample non-multifamily community facility portfolio (8 buildings), including:
    - Slightly more than half of these with *ultra high* or *high cost* utility costs
- **Our data indicate that a focus on the properties with above-average utility costs could result in an upfront retrofit investment ranging from $14.7 million to $18.5 million, depending on interest rate, financing model, and loan size.**
  - This initiative could retrofit approximately 8,648 affordable rental housing units and 105 non-multifamily community facilities.

II. Brief Background of Project

Why Green and Why Community Facilities?

In the world of climate change, it is generally recognized that energy efficiency is one of the least costly, most effective tools to reduce carbon emissions and stem global warming. Since buildings are thought to contribute nearly 50% of US generated carbon emissions into the environment, and since residences contribute nearly half of those building-generated emissions, much public policy today is oriented to developing strategies to reduce building-generated carbon. Large commercial buildings and government buildings enjoy greater access to capital, enabling building-wide energy efficiency retrofits that also offer building owners the benefit of reduced annual operating costs.

Yet, while fully engaged in developing novel approaches to this fascinating cross-section of financial engineering, community development, and climate change, policymakers are still figuring out exactly how to transform capital marketplaces to achieve the scaled retrofit of community facilities. These are the buildings, generally owned by nonprofit organizations, that serve as multifamily housing, community centers, health clinics, schools, homeless shelters, child care facilities, senior and youth service centers, social service providers, and nonprofit office spaces.

Green buildings offer low-income communities a unique chance to regain vibrancy. Green community facilities are healthy and less expensive to operate than typical buildings in communities of poverty. Green community facilities emit fewer pollutants into the environment, saving the planet while saving impoverished facility budgets. These buildings, the physical pillars helping to strengthen communities, survive with limited and ever-reduced budgets. We know first-hand that increased operating efficiencies and savings could help stabilize the very communities and organizations challenged today by reduced budgets and a downturned economy.

Barriers

Unfortunately, the upfront costs of a green or energy-efficient building retrofit and the nascency of this market has stymied the development of a robust green capital market willing to underwrite future savings. For new

[4] Facilities with high utility costs were grouped into the following categories: “ultra-high” (utility costs > 50% above average), “high cost” (utility costs > 25% above average) and “above average.”

construction, the costs of green are descending sufficiently such that the premium to build green is barely noticeable. But, in the retrofit arena, the upfront costs of energy-efficiency retrofitting may overwhelm the long-term savings possibilities, at least among community facilities maneuvering in tight budgetary environments. And, the cost of traditional debt financing and securitization has not generally been tailored to the needs or abilities of nonprofit organizations implementing energy efficiency or green retrofits.[5]

Innovative Financing Mechanisms

Given these barriers, a number of new financing mechanisms have been launched to attempt to redress the market failures in energy financing and to transform and scale the marketplace.

The PACE Model

The Property Assessment Clean Energy (PACE) model, authorized for California's cities via AB 811 [6] represents an innovative, transformative model, by eliminating the "first cost" issue facing home- and building-owners and offering relatively long term, low-cost financing capable of meeting the energy savings payback potential over time. The model allows cities to provide owners with upfront capital by issuing taxable, low-interest, fixed-rate 20-year municipal bonds ("micro bonds"). These bonds are repaid by proceeds from a new line-item on participating property owners' tax bills over the useful life of the asset. For solar, that amortization period is therefore 20 years; for energy efficiency, the useful life is shorter. Because these bonds will be purchased by the capital markets, costs and rates are ultimately reduced for the borrower. Once scaled, this model can provide an enormous ongoing infusion of low-cost upfront capital for retrofits through securitization and the capital markets.

This model is new (for energy financing), pioneered in California by the company, Renewable Funding, and implemented in California to date in Berkeley and Palm Desert (for solar only) and Sonoma County.

An Energy Efficiency Revolving Loan Model

Revolving loan funds are not new, and both LIIF and the City of San Francisco have long administered such funds for the development and renovation of housing and community developments. State energy departments have also long administered loan programs for the retrofit of buildings, and especially government and private commercial buildings. Yet, an energy efficiency loan fund targeted to community facilities owned by nonprofit owners is relatively novel.[7]

Application to Community Facilities

The City of San Francisco is interested in tailoring an innovative PACE or EERLF financing model to community facilities owned by nonprofit organizations, and not typically the focus of most national or regional retrofit initiatives.[8] In determining the viability of a PACE approach to community facilities, it has become clear that an informal demand analysis is needed – one that can examine attributes of community facilities (including existing costs, square footage, vintage) and that can size the demand for different models of retrofit financing. The following narrative describes the findings from our model.

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[5] While not directly relevant, since focused on single family 1-4 family housing units, Fannie Mae nonetheless exemplifies existing retrofit securitization as it manages a profitable, unsecured retrofit debt program with a high 12-14% interest rate, a rate likely to be too high to warrant participation by our nonprofit-owned community facilities.

[6] AB 811 is the California State legislation that permits cities and counties to set up this method of energy financing via property assessments. It also establishes a statewide pool for those jurisdictions that want to participate but don't want to create their own mechanism.

[7] Note that LIIF administers an energy financing revolving (grant) fund targeted to preschools and childcare centers and funded by the State PUC. LIIF"s CPEEP Program has helped over 700 childcare and preschool sites throughout the state of California become energy efficient, primarily via lighting upgrades.

[8] Note that nonprofit organizations in San Francisco are generally exempt from paying property taxes. The AB811 model could still work, however, via another municipal service charge added on to an existing, or via a new property tax assessment levied exclusively for participation in an AB811 financing program. Clearly, however, the lien priority, an essential feature of the 811 model, would need to be explored if the charge were not a tax assessment.

III. Demand Analysis Findings

This analysis is intended to present a building-specific understanding of the utility costs and savings potential of 152 buildings in San Francisco, including 132 affordable multifamily housing developments, and 20 other NonMF Community Facilities. The housing developments serve approximately 7,250 families in San Francisco (26 percent of the City's total portfolio of affordable, assisted, nonpublic rental units) and have some level of federal, state, or local subsidy. The non-multifamily community facilities serve approximately 92,000[9] individuals by offering homeless shelter, senior and youth community centers, child care services, disability services, and nonprofit office spaces.

A. Summary of Prospect Identification Methods

There are a variety of ways to think about identifying good prospects for a retrofit. Some of these can be evaluated using existing data, and others will need access to more data. Examples include:

1. **Ultra High Per Unit/Square Foot Costs**: Those buildings whose comparative utility costs by unit of measurement (in housing, per unit costs; in NonMF Community Facilities, per square footage costs) are ultra-high (>50% above average), high cost (>25% above average) or merely above average.
    - **Housing:** 20 (ultra high); 11 (high cost), 15 (above average). As portfolio percentages, these are: 16%, 9%, and 12%.
    - **NonMF Community Facilities:** 4 (ultra high), 1 (high-cost) and 2(above average). As portfolio percentages, these are 20%, 5%, and 10%.

2. **Functional Financing and Payback Scenario**: Those where the financing "model" works: where a deep or shallow upfront retrofit investment, assuming a 15-25% annual savings, financing charges, a 15-20% rebate, and an interest rate of 0% to 9% could be paid back within the useful life of the asset (which we modeled at approximately 8-12 years). Interestingly, we have found that functionality is directly correlated to high cost per unit of measurement, described above.

3. **Owner Aggregation:** Among San Francisco multifamily housing developments, as an example, a few owners own a large percentage of all buildings. Indeed, approximately 4 owners own 52% of the 7250 units in this database. Given enormous economies of scale that can arise from working with just a few owners, and the minimization of transaction costs, we might focus on those developments whose nonprofit owners own a significant percentage of buildings or units in the city.

In addition, while we don't have good data on the following parameters, there are at least three other worthwhile ways to think about identifying good prospects for a retrofit initiative.

- **Year 15 Refinancing (Housing Only):** Those (low-income housing) tax credit developments that are approaching year 15 refinancing, enabling a retrofit to be incorporated into a refinancing that will occur regardless.
- **Light Touch/Big Impact:** Those developments where extremely low-cost but cost effective improvements could generate savings. This might well coincide with our definition of a shallow retrofit.
- **In Need of Rehab**: Those with last rehab at least 10 years ago. This might correlate directly with high cost per unit of measurement properties.

[9] This figure is not un-duplicated, and sums each facility's own totals. It is likely that there is some duplication.

B. Summary of Building Size, Building Vintage and Annual Per Unit and Per Square Foot Existing Utility Costs

To compare utility costs, it's best to eliminate the size differentiation, and look at a cost per unit of measurement. For housing, the typical perspective is an annual cost per housing unit (or PUPY – Per Unit Per Year). For all other buildings, the typical measure is cost per square foot (C/SF). It would be ideal to use a C/SF across all the buildings in our analysis, so we developed a proxy for square footage of housing units. In this model, we use 580 square feet per unit.[10]

Building Size

	Average Units Per Development	Assumed Square Foot / Unit Proxy	Square Foot Average	Square Foot Median
Multifamily Housing	55[11]	580	31,769 (proxy)	23,780 (proxy)
NonMF Community Facilities	N/A	N/A	21,432	12,400

Based on our 580sf/unit proxy, we find the multifamily housing developments to be 33% larger, on average, than non-multifamily community facilities.

Building Vintage

	Year Constructed (Average / Median)	Last Rehab Year (Average / Median)
Multifamily Housing	1933, 1966	1951, NA
NonMF Community Facilities	1933, 1923	1998, 2005

Building Utility Costs

In General

MULTIFAMILY HOUSING

	Electricity	Water	Gas	Total
Avg. total (building) annual utility cost	$18,632	$10,913	$14,646	$44,192
Median total annual utility costs	$12,343	$6,067	$10,062	$33,614
Average PUPY cost/unit	$383	$233	$289	$905
Median PUPY cost/unit	$253	$161	$239	$717
Highest PUPY cost/unit	$3070	$1133	$1021	$3070
Proxy: Average Cost per square foot	$0.61	$0.47	$0.37	$1.41

[10] MOH suggested we use 450 for 1BR, 600 sf for 2BR, 800sf for 3BR. But, the database does not reveal bedroom size, only target population as families, seniors or homeless. Our analysis allows flexibility to input any figure for families and any figure for singles, although we decided to use 580 for both -- in part because we cross-referenced with actual square footage of a single owner (TNDC) whose actual square footage data across 25 developments averaged at 580 sf/unit.

[11] Note that our sample's average is lower than the 84 units per development (total portfolio average)

NONMF COMMUNITY FACILITIES

	Electricity	Water	Gas	Total
Average building total utility cost	$21,182	$7,287	$3,113	$32,192
Median building total utility cost	$12,000	$5,415	$2,500	$19,793
Avg building utility cost/SF	$1.03	$0.63	$0.34	$2.47
Median building cost/SF	$0.90	$0.39	$0.16	$1.52
Highest cost/sf	$2.88	$2.23	$1.96	$9.41

Since we've added a proxy for unit size, we've adjusted for the size differential between housing and other NonMF Community Facilities. Therefore, our finding that the cost per square foot for existing utility expenses is 37% higher in NonMF Community Facilities than in housing implies that these nonMF facilities are extremely inefficient, compared with housing.[12]

Analysis: Ultra-High and Significantly Above Average Utility Costs

The data show that approximately 16% of all multifamily buildings, and 20% of all other NonMF Community Facilities suffer from ultra-high utility charges that are 50% greater than the average. It also shows that fully 25% of all community facilities (both housing and nonMF others) have high-cost utility costs that are at least 25% above average. Also, that approximately 35% of all facilities have above average costs. Note that these totals are cumulative, individual totals are in the parentheticals.[13]

MULTIFAMILY HOUSING (PUPY UTILITY COSTS)

	Electricity	Water	Gas	Total Cumulative	Total Not Cumulative
# Buildings with PUPY Utility Costs > 50% Above Avg.	16	17	28	20	20
% of Portfolio with PUPY Utility Costs > 50% Above Avg.	13%	14%	26%	16%	16%
# Buildings with PUPY Utility Costs > 25% Above Avg.	31	27	36	31	11
% of Portfolio with PUPY Utility Costs > 25% Above Avg.	25%	22%	33%	25%	9%
# Buildings PUPY Costs Above Avg.	42	41	53	46	15
% Portfolio with PUPY Costs Above Avg.	34%	34%	48%	37%	12%

[12] Alternatively, our square foot proxy could be wrong. Remember, here we're comparing actual square footage of NonMF community facilities with a hypothetical proxy (580sf/unit) for multifamily housing. If the sf/unit proxy were reduced to something more closely correlated to studios, 400 sf/unit, we get to an avg housing cost per square foot of $2.05. At that level, by the way, an average retrofit investment of $4000/unit comes out to $10 per square foot (close to what we've estimated for the CF retrofit cost, later in this paper), compared with $6.90 per square foot that we generated from our housing proxy (580sf/unit) based on the deep retrofit investment. On the other hand, actual median cost/sf for NonMF ($1.52/sf) is pretty close to the proxy average for housing generated by our proxy ($1.41).

[13] Note also that these characterization of utility costs as "ultra high" and "high cost" are based on our own averages and not on what the utilities might articulate.

NONMF COMMUNITY FACILITIES (UTILITY COSTS/SF)

	Electricity	Water	Gas	Total Cumulative	Total Not Cumulative
# Buildings with Cost/SF > 50% Above Avg.	2	3	2	4	4
% of Portfolio with Cost/SF > 50% Above Avg.	15%	17%	15%	20%	20%
# Buildings with Cost/SF > 25% Above Avg.	2	4	2	5	1
% of Portfolio with Cost/SF > 25% Above Avg.	15%	22%	15%	25%	5%
# Buildings with Cost/SF Above Avg.	4	5	3	7	2
% of Portfolio with Cost/SF Above Avg.	31%	28%	23%	35%	10%

Within these totals, it is interesting to note that, in housing, more properties have ultra high gas costs than any other single utility charge (26-33% of the portfolio). And, in other NonMF Community Facilities, more properties have ultra high water costs than any other single utility charge (17-22% of portfolio). This means it may make sense to focus our retrofit activity on improvements capable of reducing gas or water consumption.

Owner Aggregation Among Multifamily Housing Developments with Above Average Costs

We find that within the 46 housing developments with above average costs, four owners (Asian Inc, BHNC, Mercy, and TNDC) possess 52% of the developments (24 developments). This bodes well for the city in reducing transaction costs among multifamily developments.

Multifamily Housing "Master Meters"

One idiosyncrasy in the multifamily arena arises from the issue of "master meters". Some multifamily developments are master-metered, meaning that owners pay for all utilities, even utilities associated with individual tenant units. From a retrofit perspective, this allows owners to accumulate all energy savings associated with an upfront retrofit initiative, and theoretically makes a financing template less complicated. In non-master metered developments, residents pay for their own utilities, meaning that owners generally pay lower total utility bills, and complicating owners' abilities to accumulate savings over time from investments. In these latter developments, residents may only pay a portion of actual utility costs, and the federal or state government subsidizes the remainder (called a "utility allowance"). Among the MOH database, we find 52 master-meters (39%) and 81 utility-allowance developments (61%).[14]

[14] Note that our assumptions used all those developments for whom a utility allowance was "0" to indicate master meters. It could be, however, that residents paid their share of utilities but did not have an allowance, so the master meters may be overstated here.

We expected that those developments with master meters would generally have higher total utility costs or higher PUPY costs than those developments without, and made some changes to our spread sheet to see how these factors played out. Interestingly, we found that those developments with master meters represent approximately the same share of ultra high, high cost and above average (35, 39 and 37%) developments as their total share of all developments. Here's the comparison:

MASTER METER DEVELOPMENTS AND COMPARISON WITHIN MASTER METER PORTFOLIO

Master Meter Developments	Electricity	Water	Gas	Total
# Buildings with Costs > 50% Above Avg.	9	5	9	7
% of Portfolio with Costs > 50% Above Avg.	20%	12%	24%	15%
# Buildings with Costs > 25% Above Avg.	14	8	12	12
% of Portfolio with Costs > 25% Above Avg.	12%	7%	11%	26%
# Buildings with Costs Above Avg.	17	11	16	17
% of Portfolio with Costs Above Avg.	14%	10	15%	37%

MASTER METER DEVELOPMENTS COMPARED TO ALL ULTRA HIGH, HIGH COST AND ABOVE AVERAGE

Master Meters as Percent of All Buildings	Electricity	Water	Gas	Total
% of Portfolio with Costs > 50% Above Avg.	56%	29%	32%	35%
% of Portfolio with Costs > 25% Above Avg.	45%	30%	33%	39%
% of Portfolio with Costs Above Avg.	40%	27%	30%	37%

What this shows is that 15%, 26%, and 37% of the master metered portfolio are either ultra high, high-cost, or above average cost. That's closely related to the whole portfolio whose rates are 15, 25, and37%.

And, of the total that are above average, master meters generally represent their share (39%) of all buildings in each category. The notable exception is electricity, where master meters comprise 40-56% of all the high cost and ultra-high developments – well above their share. With all this in mind, we therefore did not separate analysis by meter type given similar results.

C. Retrofit Models: Simple, PACE and Revolving Loan Fund

Background

We have modeled two different financing scenarios—a PACE and an EERLF model. We also compare these models to a simple model (no upfront costs, no interest). Our goal in this modeling: to guide the development of these two lending models by testing their viability and sensitivity to different retrofit investment levels, loan terms, and interest rates among a reasonable sample size of real community facilities in a single jurisdiction. We've defined viability as those properties that could repay upfront investment and financing costs out of annual energy savings during the term of the financing. We call this "financing functionality" meaning that these properties are capable of paying back loans out of savings during the term, even if lenders do not underwrite the savings.

Assumptions

Financing Costs/Terms
Our models include the following:

- **Simple Model**: No financing charges, no interest rate.
- **PACE Model:** Upfront financing charge of 15% of retrofit project cost, all-in, effective interest rates at 3, 5, 7 and 9 percent, loan terms of 8, 10 and 12 years.
- **Revolving Loan Model:** No upfront financing charge[15], all-in, effective interest rates at 3,5, 7, and 9 percent; loan terms of 8, 10, and 12 years.

Retrofit Levels Assumptions
Three levels modeled:

- **Deep retrofit**: $4,000 per unit (housing); $9 per square foot (NonMF Community Facilities); Annual energy savings: 25%.
- **Deep retrofit but with a rebate of 15-20%[16]:** $3,200 per unit (housing); $7.20 per square foot (CF); Annual energy savings: 25%.
- **Shallow retrofit**: $1,000 per unit (housing); $1.72 per square foot (CF); Annual energy savings: 15%.

Background on Cost Assumptions
Since the model entirely depends on the costs and savings assumptions, it's worth describing a little about our choice of costs. The bottom line, however, is that our modeling effort depends almost entirely on our retrofit cost and post-retrofit savings assumptions. To the extent that these facts vary significantly from our assumptions, the model will show much different results. However, our model can alter these assumptions relatively easily at will.

- **$4000 (deep) and $1000 (shallow)/unit**: Industry standards today are less than precise. In general, among those who work with HUD and federally assisted housing, the prevailing wisdom is that a deep energy retrofit might cost approximately $10,000 per unit, and a moderate energy retrofit might cost $3,000 to $5,000 per unit. We chose the $4000 figure as the midpoint in the moderate housing retrofit, even though we refer to this as deep. Yet, even these terms are misleading, since many energy retrofits are undertaken at a time of renovation or structure replacement, when costs are bundled, and the true energy retrofit cost is the delta between what would have been undertaken, and the increased costs attributable to energy-specific improvements.[17] Another way to approximate the cost of a deep retrofit would be to think about energy systems costs, which we understand might cost, as an example, $300,000, or approximately $5,500 per unit, or $14/square foot based on our average size community facility.[18] We used $1,000 as the shallow level since we know that can frequently accomplish lighting retrofits.
- **$9 (deep) and $1.72 (shallow)/square foot**: Our goal in NonMF Community Facilities was to come up with a cost-per square foot that resembled our $4000 per unit housing retrofit cost. So, using the square foot housing proxy we arrive at a deep C/SF of $6.90 and a shallow level of $1.72. After consultation with LIIF's own architect (who found a variety of systems costs at around $10/sf), and because the lower figure resulted in unlikely scenario of a majority of facilities with functional financing at extremely high interest rates, we increased the C/SF to $9/sf

[15] While our model has no upfront charge with the EERLF model, we do recognize that most of revolving funds will use some minimal administrative or servicing charge.
[16] We understand that most rebates are set at around 20%, though they often are targeted to specific measures or appliances. We incorporate a 15% rebate for the PACE model only (and 20% for others) because that turns out to be nearly identical to the EERLF no-rebate model (so simpler for depiction).
[17] So, for example, a community development lender in New York is financing renovations of up to $100,000 per unit (deep) and $3,000 to $5,000 (moderate) but both of those examples include much more than energy retrofitting.
[18] In addition, we have real examples of two different retrofits: 1) solar + HVAC + roof ($10,000/unit and $1,000,000 total); 2) roofing and hot water heater retrofit, $272,000 ($5,660/unit.).

for deep. We did keep the housing proxy for shallow retrofit ($1.72/sf), again correlated to what in our experience correlates to lighting retrofits.

Note on Limitations of Modeling PACE:
Note that the PACE analysis is inherently two dimensional. By this, we mean that it cannot really portray multiple marketplace effects –such as rate reductions – that occur when the model is scaled. Because this method of financing is secured by real property, the PACE model is a vehicle that has the potential to raise significant amounts of long-term private capital that is not dependent upon subsidy. Further, the potential of PACE investments to gain an investment grade rating materially lowers the cost of capital versus a traditional unrated loan fund model. This means that borrower costs (and, for example, interest rates) can be significantly reduced merely by the scaled entry of the capital markets. Absent the scaling effect, the EERLF appears cheaper and more accessible (in our model) at each interest rate. We think, however, that over time this delta may disappear and, indeed, even be reversed, given the potential of the PACE model to attract large-scale capital. Until that time, however, the addition of subsidy, at least initially, before the capital markets fully enter, may enhance the PACE model appeal to and functionality for nonprofit community facility owners with less financial flexibility.

Findings

Details on all findings described in this section are included in Appendices A and B at the end of this report.

Portfolio-wide, Untargeted Trends
The following tables illustrate how these assumptions play out on the full 132 housing developments and 20 NonMF Community Facilities at these various levels, with savings.

MULTIFAMILY HOUSING

	Deep	Shallow	20% Rebate
PUPY Retrofit Costs	$4,000	$1,000	$3,200
Total Building Retrofit Costs (Avg.)	$219,098	$54,774	$175,278
Annual Savings (Avg.)	$11,048 (25%)	$6,629 (15%)	$11,048
Payback Years for Whole Portfolio (Simple and Untargeted)	29 years	12 years	16 years

NONMF COMMUNITY FACILITIES

	Deep	Shallow	20%Rebate
Retrofit Costs per SF	$9.00	$1.72	$7.20
Total Building Retrofit Costs (Avg.)	$192,885	$36,863	$154,308
Annual Savings (Avg.)	$8,048	$4,829	$8048
Payback Years for Whole Portfolio (Simple and Untargeted)	27 years	9 years	20 years

Financing Functionality Demands a Focus on Least Efficient (Ultra High and High Cost Utility Costs) Buildings

Across the entire 152 building portfolio, even in the simple model, the payback period for a deep retrofit (27 or 29 years) exceeds typical useful life of assets (20 years). Yet, among all models, payback years are inversely correlated with utility costs per unit of measurement. This means that the higher utility cost per unit (for housing) and per square foot (for NonMF Community Facilities) the lower the payback years needed and the greater the financing functionality. Clearly, this demands a retrofit initiative targeted on those properties whose costs are highest above average, per unit of measurement. Therefore, while we modeled the entire portfolio in each scenario, we focus our results only among those ultra high, high cost, and above average properties most suited to a "financing functionality". By narrowing the properties targeted, we're able to reduce the payback horizon from an untenable 29 or 27 years, to a much more reasonable payback period of under 12 years.

We modeled each mechanism, at deep retrofit levels, with terms of 8, 10, and 12 years. At shallow levels, we modeled 8 and 10 years. Clearly, we are able to capture the most properties at 12 years (deep) or 10 years (shallow), and with rebates, than at shorter terms and without rebates. When describing the reach of each model below, we describe them in terms of functionality: at 12 years (deep) and 10 years (shallow), with and without rebates, at all interest rates, and in terms of the percent of reach into the ultra-high, high-cost, and above average portions of the portfolio.

Simple Model Conclusions

Deep Simple Model < 12	% Ultra High Cost	% High Cost	% Above Avg. Cost	% All Portfolio	Avg. Loan Size (w/ 20% Rebate)
Housing	100%	9-100%	0-27%	16-27%	$142,354
NonMF CF	100%	100%	50-100%	30-40%	$91,076

The ranges in the simple model summary chart reflect merely the presence or absence of a 20% rebate.

In a simple model, with no upfront charge and no interest charge over time, and a 20% rebate, we see the following results:

- **Housing:** The model functions at 12 year terms for deep retrofit levels on all the (20) ultra-high developments, and a shallow retrofit on all the (26) high cost and above average developments.
- **NonMF Community Facilities**: The model functions at deep retrofit levels for all (20) ultra high, high cost, and above average (and even average) cost facilities.
- **Payback Correlation with Utility Costs**:
  - **Housing**: In the deep retrofit model, payback scenario under 12 years is directly correlated to ultra high properties; and, in the shallow scenario, payback under 6 years is correlated to high cost properties.
  - **NonMF Community Facilities**: Payback under 8 years correlates to ultra-high properties; payback under 12-years correlates to high cost properties.

PACE Model Conclusions

Deep PACE Model <12	% Ultra High Cost	% High Cost	% Above Avg. Cost	% All Portfolio	Avg. Loan Size[19] at 3% w/ Rebate
Housing	15-60%	0	0	2-9%	$143,000
NonMF CF	25-100%	0-100%	0	5-25%	$45,004

The ranges in this summary chart reflect interest rate variation from 3 to 9%, and the presence or absence of a 15% rebate.

- **Deep PACE:**
  - **Housing:** The PACE deep retrofit can accomplish between 15% and 60% of the ultra high cost properties, depending on interest rate and rebate availability. It cannot reach any of the high-cost or above average cost properties given our assumptions.
  - **NonMF Community Facilities** The PACE model functions for 25 to 100% of the ultra high properties, depending on interest rate, with a 12 year term, and, at a 3% interest rate, can even reach all the high-cost properties.

- **Shallow PACE:**
  - **Housing**: The shallow pace model functions at *all interest rates for the ultra high and high cost properties,* assuming a 10-year term. Shallow PACE at 3 and 5% can also capture all the remaining above average properties. This model also functions at an 8-year term for all ultra high and nearly all high cost properties.
  - **NonMF Community Facilities:** PACE functions for *all above average properties* (all ultra high, all high cost, and all above average) at *all interest levels* and all loan terms. Using a 10-year term, it even reaches well into the below-average part of the portfolio.

EERLF Model Conclusions

Deep EERLF Model < 12	% Ultra High Cost	% High Cost	% Above Avg. Cost	% All Portfolio	Avg. Loan Size 3% w/ Rebate
Housing	20-100%	0-73%	0	3-22%	$115,200
NonMF CF	75-100	0-100%	0-50%	15-30%	$36,235

The ranges in this summary chart reflect interest rate variation from 3 to 9%, and the presence or absence of a 20% rebate.

- **Deep EERLF**
  - **Housing**: The deep RLF model functions for 20% to 100% percent of the ultra high properties, depending on interest rate and rebate availability and loan term. At 3%, the vast majority of high cost properties can function too.

[19] Avg loan size in our model varies depending upon which properties function in the model. This varies based on the idiosyncrasies of the developments with the highest costs per unit or square foot. For example, if the buildings are smaller, the average loan size will be smaller (since our model ties retrofit investment to a dollar amount per unit or square foot). . For purposes of the tables in this document, we show the loan size at a single interest rate that captures the most properties. On the accompanying excel spread sheets, loan sizes vary directly with the interest rate and model type.

- **NonMF Community Facilities**: The RLF model with an interest rate of 7 percent or lower functions for all ultra high and all the high-cost facilities. At 3% this model can capture 50% of the remaining above average properties as well.

- **Shallow EELRF:**
  - **Housing**: The shallow RLF model functions at all interest rates and all payback terms for all the ultra high and high cost properties. At rates of 5% or below, it reaches into the average and below average cost portion of the portfolio.
  - **NonMF Community Facilities**: Shallow RLF functions at all interest rates and all payback terms of the ultra high, high cost, and above average properties. Using a 10-year term, it even reaches, well into the below-average portion of the portfolio.

Model Breakeven Point

We find that the PACE model at 3 and 5% correlates closely to the EERLF model at approximately 7 and 9%. This has two implications: 1) given the upfront costs of the PACE model, a rate buy down would allow PACE to gain the greater reach of the EERLF model; and 2) a subsidy to cover the 15% up front costs associated with PACE would allow it the greater reach of the EERLF model at each interest rate.

IV. Audit and Anecdotal Findings

LIIF used an energy audit of a single housing development and also conducted detailed interviews with a few nonprofit community facility owners to compare against our findings and ascertain more qualitative issues and concerns.

A. Summary of the San Cristina Retrofit: Actual Project and Post-Project Audit and Findings

We were able to compare our model findings to those of an actual energy audit of a 58-unit multifamily development, the San Christina. This audit estimated a total Project Cost of approximately $54,760, for improvements that included lighting, hot water system upgrades, ceiling insulation, and an appliance (laundry) upgrade. Based on these figures, total retrofit costs amounted to $944/unit, with estimated 21% savings, and a rebate of 22% (allowing total retrofit cost to amount to $734/unit). With this in mind, this project (akin to a shallow retrofit) functions well in both the PACE model (with a payback of 11 years), and in the revolving loan fund model in approximately 4 years. Note that at the same interest rate the Revolving Fund model adds approximately 26% to project costs for financing, and the PACE model adds approximately 50% to project costs for financing. In both cases, however, annual savings each year meet financing needs.

B. Anecdotal Concerns Summary

The following are summaries of interview comments from several large owners of affordable multifamily housing and from survey respondents among the 20 nonprofit owners of community facilities.

<u>Structural</u>

- **General**
  - **Relatively modest utility costs in Bay Area:** Utility costs in San Francisco are considered generally low to moderate compared with other parts of the country. The low savings potential may make the model impossible.
- **Housing**
  - **Complex capital structure**: Owners emphasized the complex and layered capital structure used to finance affordable multifamily housing. They expressed concern that this complexity could prove extremely challenging in the PACE model unless the City or some vested capital marketplace lender first worked with a finite set of developers to overcome these structural issues.

- **Industry-wide Owner Skepticism**: In the nonprofit-owned affordable multifamily housing arena, there is interest in energy efficiency, but skepticism around the functionality of a financing mechanism that can be repaid out of savings. Some are interested for reasons of portfolio-wide risk mitigation (hedging against long-term energy costs) even if the economic benefits are not immediately realizable.

- **NonMF Community Facilities**
  - **High interest level**: Most survey respondents indicated an extremely high level of interest in energy efficiency financing. Many have already taken advantage of small rebate programs (including LIIF's CPEEP childcare lighting retrofit grant program) and may be ready for deeper retrofits.
  - **Need for TA**: Many respondents indicated a need for technical assistance to help understand the model, their needs, how to integrate a variety of public subsidies, rebates, and tax incentives, and the implication on debt and organizational liability.
  - **50% with no (or easily adaptable) mortgage debt**: Of 20 respondents, 8 have no mortgage, and 2 have a mortgage held by a community development financial institution (LIIF). These would be extremely suitable for a PACE model.
  - **Small Commercial model already exists**: Since the California PACE model (AB811) is already being tailored to small commercial properties, it would be easy to adapt to similar type NonMF Community Facilities.
  - **National Precedent**: Owners emphasized that these nonMF community facilities predominantly serve low-income populations and neighborhoods, making a citywide initiative targeted to their buildings unique (from an energy and municipal perspective), and a national precedent.

Legal

- **Lien Priority Issues**: Obtaining permission of first debt holder might be required and ultimately prove impenetrable.
- **Ownership of savings and carbon credits**: If the carbon trading markets move forward, the issue of who owns the carbon credits, and who can monetize them, will become critical.

Sectoral

- **Credit Enhancement Challenges**: Affordable housing stakeholders remarked that the housing finance (lender) community has generally imposed extremely high credit enhancement requirements to compensate for its distrust in energy savings, making models unnecessarily expensive.
- **Administrative Delays**: Multifamily owners expressed concern that administrative delays that occur in typical refinancing of city-subsidized properties might thwart success in an energy retrofit initiative.
- **HUD Barriers:** Owners expressed some concern that the existence of utility allowances and other barriers to recapture of savings for repayment of infrastructure investments might complicate or thwart a retrofit initiative. Virtual or net-metering might help.

V. Conclusion

This Demand and Sensitivity analysis illustrates the viability and potential size of two different energy efficiency retrofit financing mechanisms as applied to community facilities in San Francisco. The data show that both models can work if applied and tailored appropriately. Clearly, these models will depend on the actual, and not hypothetical, energy efficiency needs of these and other community facilities in San Francisco.

Based on the data and our analysis, **both of the financing models under consideration by the City of San Francisco can, indeed, function for nonprofit owned community facilities** by allowing savings that materialize over time to fully repay the upfront retrofit investment. Both models must be targeted appropriately -- to those community facilities with the highest costs per unit of measurement. At the same assumed interest rate, the EERLF will always be more economic, however the PACE model should over time be able to attract investors at a lower cost of capital. Furthermore access to capital for the unsecured EERLF model will always present more of a challenge as compared to the secured PACE model. Finally, the data suggests that to introduce the PACE model at scale at this nascent stage in the marketplace, an interest rate buydown and/or subsidy to offset the upfront costs could allow financing access to even more properties, helping test and scale the model at a considerably lower costs than a straight retrofit subsidy.

The capital required for an initial retrofit investment, based exclusively on those functioning properties in the PACE model at 3% or 5% interest, all in, or the EERLF model at 5% or 7%, all in, ranges from $14.7 million to $18.5 million given our cost and energy savings assumptions. These investments, based on this data, could accomplish the retrofit of approximately 8,648 housing units and 105 NonMF community facilities all plagued with above-average utility costs.

Appendices

- **Appendix A:** MOH Multifamily Database Plus Calculations and Analysis
- **Appendix B:** Results of LIIF Survey of 20 NonMF Community Facilities Plus Analysis
- **Appendix C:** Multifamily Housing and Community Facility Utility Cost Graphs

Appendix A:
MOH Multifamily Database Plus Calculations and Analysis

Summary of PACE and EERLF Models: HOUSING

PROGRAM CAPITAL REQUIREMENTS - HOUSING

PACE Model (all housing developments with above average utility costs)

	3% Intrest Rate			5% Intrest Rate		
	No. Buildings	Avg. Loan Size	Total Investment	No. Buildings	Avg. Loan Size	Total Investment
PACE Deep (15% rebate)	12	$ 143,000	$ 1,716,000	9	$ 103,556	$ 932,000
PACE Shallow	34	$ 55,752	$ 1,895,568	35	$ 54,834	$ 1,919,193
Portfolio Total	46	-	$ 3,611,568	44	-	$ 2,851,193
Approx. Units	2,162			2,098		
TOTAL PROGRAM (4x)	**8,648**		**$ 14,446,272**	**8,392**		**$ 11,404,773**

EERLF Model (all housing developments with above average utility costs)

	5% Interest Rate			7% Interest Rate		
	No. Buildings	Avg. Loan Size	Total Investment	No. Buildings	Avg. Loan Size	Total Investment
RLF Deep (20% rebate)	18	$ 118,933	$ 2,140,800	12	$ 114,400	$ 1,372,800
RLF Shallow	28	$ 47,377	$ 1,326,566	34	$ 48,408	$ 1,645,878
Portfolio Total	46	-	$ 3,467,366	46	-	$ 3,018,678
Approx Units	2,162			2,162		
TOTAL PROGRAM (4x)	**8,648**		**$ 13,869,464**	**8,648**		**$ 12,074,710**

PORTFOLIO SUMMARY - HOUSING

Per Unit Per Year Utility Costs

	Electric	Water	Gas	Total (E, W, G)
Avg.	$383	$233	$289	**$905**
> 25% Above Avg.	$478	$292	$361	**$1,131**
> 50% Above Avg.	$574	$350	$433	**$1,357**

Buildings in Cost Range

		Electric	Water	Gas	Total (E, W, G)
> Avg. (Above Avg.)	#	42	41	53	**46**
	%	34%	34%	48%	**37%**
> 25% (High Cost)	#	31	27	36	**31**
	%	25%	22%	33%	**25%**
> 50% (Ultra High Cost)	#	16	17	28	**20**
	%	13%	14%	25%	**16%**

Control Sample

Portfolio-Wide Costs Based on Simple Model (no financing costs)

Avg. Deep Retrofit Loan Amount	$	219,098
Number of Buildings		132
Program Cost	$	28,920,902
Total Portfolio Cost (4x Multiplier)	**$**	**115,683,609**
Avg. Deep Retrofit Payback Years		**29**

Portfolio Description and Assumptions

Portfolio

132 Multi-Family Housing Developments in San Francisco

Retrofit Costs

Deep: $4000/unit

Shallow: $1000/unit

Summary of PACE and EERLF Models: HOUSING

PACE MODEL SCENARIOS - HOUSING

PACE Model - Deep

	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	6	3	1	1	1
% Portfolio	5%	2%	1%	1%	1%
% Ultra High	30%	15%	5%	5%	5%
% High Cost	0%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 130,000	$ 205,467	$ 202,400	$ 202,400	$ 202,400
< 10 Years					
# of Buildings	12	6	4	3	1
% Portfolio	9%	5%	3%	2%	1%
% Ultra High	60%	30%	20%	15%	5%
% High Cost	0%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 143,000	$ 149,500	$ 181,700	$ 205,467	$ 202,400
< 12 Years					
# of Buildings	21	8	6	4	3
% Portfolio	16%	6%	5%	3%	2%
% Ultra High	100%	40%	30%	20%	15%
% High Cost	9%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 140,000	$ 125,925	$ 149,500	$ 181,700	$ 205,467

PACE Model - Shallow

	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	55	35	30	29	22
% Portfolio	43%	27%	23%	22%	17%
% Ultra High	100%	100%	100%	100%	100%
% High Cost	100%	100%	91%	82%	18%
% > Avg.	100%	27%	0%	0%	0%
Avg. Loan Size	$ 52,764	$ 51,159	$ 44,237	$ 43,938	$ 39,257
< 10 Years					
# of Buildings	84	50	44	35	30
% Portfolio	65%	39%	34%	27%	23%
% Ultra High	100%	100%	100%	100%	100%
% High Cost	100%	100%	100%	100%	91%
% > Avg.	100%	100%	87%	27%	0%
Avg. Loan Size	$ 60,595	$ 55,752	$ 54,834	$ 51,159	$ 52,354

PACE with 15% Rebate Model (or EERLF Model - Deep)

	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	6	4	4	3	1
% Portfolio	5%	3%	3%	2%	1%
% Ultra High	30%	20%	20%	15%	5%
% High Cost	0%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 130,000	$ 158,000	$ 158,000	$ 178,667	$ 176,000
< 10 Years					
# of Buildings	12	8	6	4	3
% Portfolio	9%	6%	5%	3%	2%
% Ultra High	60%	40%	30%	20%	15%
% High Cost	0%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 143,000	$ 109,500	$ 130,000	$ 158,000	$ 178,667
< 12 Years					
# of Buildings	21	12	9	6	4
% Portfolio	16%	9%	7%	5%	3%
% Ultra High	100%	60%	45%	30%	20%
% High Cost	9%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 140,000	$ 143,000	$ 103,556	$ 130,000	$ 158,000

Note

- indicates the model captures a percentage of the ultra high portfolio
- indicates the model captures a percentage of the high cost portfolio
- indicates the model captures a percentage of the above average portfolio

Summary of PACE and EERLF Models: HOUSING

EERLF MODEL SCENARIOS - HOUSING

EERLF Model - Deep (or PACE with 15% Rebate Model)

	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	6	4	4	3	1
% Portfolio	5%	3%	3%	2%	1%
% Ultra High	30%	20%	20%	15%	5%
% High Cost	0%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 130,000	$ 158,000	$ 158,000	$ 178,667	$ 176,000
< 10 Years					
# of Buildings	12	8	6	4	3
% Portfolio	9%	6%	5%	3%	2%
% Ultra High	60%	40%	30%	20%	15%
% High Cost	0%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 143,000	$ 109,500	$ 130,000	$ 158,000	$ 178,667
< 12 Years					
# of Buildings	21	12	9	6	4
% Portfolio	16%	9%	7%	5%	3%
% Ultra High	100%	60%	45%	30%	20%
% High Cost	9%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 140,000	$ 143,000	$ 103,556	$ 130,000	$ 158,000

EERLF Model - Deep Plus Rebate

	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	12	9	8	6	4
% Portfolio	9%	7%	6%	5%	3%
% Ultra High	60%	45%	40%	30%	20%
% High Cost	0%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 114,400	$ 82,844	$ 87,600	$ 104,000	$ 126,400
< 10 Years					
# of Buildings	28	16	11	9	6
% Portfolio	22%	12%	9%	7%	5%
% Ultra High	100%	80%	55%	45%	30%
% High Cost	73%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 115,200	$ 123,600	$ 105,309	$ 82,844	$ 104,000
< 12 Years					
# of Buildings	35	28	18	12	9
% Portfolio	27%	22%	14%	9%	7%
% Ultra High	100%	100%	90%	60%	45%
% High Cost	100%	73%	0%	0%	0%
% > Avg.	27%	0%	0%	0%	0%
Avg. Loan Size	$ 142,354	$ 115,200	$ 118,933	$ 114,400	$ 82,844

EERLF Model - Shallow

	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	55	49	40	35	30
% Portfolio	43%	38%	31%	27%	23%
% Ultra High	100%	100%	100%	100%	100%
% High Cost	100%	100%	100%	100%	91%
% > Avg.	100%	100%	60%	27%	0%
Avg. Loan Size	$ 47,426	$ 48,408	$ 45,525	$ 44,486	$ 38,467
< 10 Years					
# of Buildings	84	64	53	49	39
% Portfolio	65%	50%	41%	38%	30%
% Ultra High	100%	100%	100%	100%	100%
% High Cost	100%	100%	100%	100%	100%
% > Avg.	100%	100%	100%	100%	53%
Avg. Loan Size	$ 60,595	$ 56,922	$ 47,377	$ 48,408	$ 44,436

Note

indicates the model captures a percentage of the ultra high portfolio

indicates the model captures a percentage of the high cost portfolio

indicates the model captures a percentage of the above average portfolio

Appendix B:
Results of LIIF Survey of 20 NonMF Community Facilities Plus Analysis

Summary of PACE and EERLF Models: COMMUNITY FACILITIES

PROGRAM CAPITAL REQUIREMENTS - COMMUNITY FACILITIES

PACE Model (all housing developments with above average utility costs)

	3% Intrest Rate			5% Intrest Rate		
	No. Buildings	Avg. Loan Size	Total Investment	No. Buildings	Avg. Loan Size	Total Investment
PACE Deep (15% rebate)	5	$ 45,004	$ 225,018	4	$ 33,755	$ 168,773
PACE Shallow	2	$ 23,973	$ 47,945	3	$ 25,021	$ 50,041
Portfolio Total	7	-	$ 272,963	7	-	$ 218,814
TOTAL PROGRAM (15x)	**105**		**$ 4,094,447**	**105**		**$ 3,282,209**

EERLF Model (all housing developments with above average utility costs)

	5% Interest Rate			7% Interest Rate		
	No. Buildings	Avg. Loan Size	Total Investment	No. Buildings	Avg. Loan Size	Total Investment
RLF Deep (20% rebate)	5	$ 36,003	$ 180,014	5	$ 36,003	$ 180,014
RLF Shallow	2	$ 19,826	$ 39,653	2	$ 21,757	$ 43,514
Portfolio Total	7	-	$ 219,667	7	-	$ 223,529
TOTAL PROGRAM (4x)	**105**		**$ 3,295,005**	**105**		**$ 3,352,930**

PORTFOLIO SUMMARY - COMMUNITY FACILITIES

	Per Square Foot			
	Electric	Water	Gas	Total (E, W, G)
Avg.	$1.03	$0.63	$0.34	**$2.47**
> 25% Above Avg.	$1.28	$0.78	$0.43	**$3.08**
> 50% Above Avg.	$1.54	$0.94	$0.51	**$3.70**

		Buildings in Cost Range			
		Electric	Water	Gas	Total (E, W, G)
> Avg. (Above Avg.)	#	4	5	3	**7**
	%	31%	28%	23%	**35%**
> 25% (High Cost)	#	2	4	2	**5**
	%	15%	22%	15%	**25%**
> 50% (Ultra High Cost)	#	2	3	2	**4**
	%	15%	17%	15%	**20%**

Control Sample

Portfolio-Wide Costs Based on Simple Model (no financing costs)

Avg. Deep Retrofit Loan Amount	$	192,885
Number of Buildings		20
Program Cost	$	3,857,706
Total Portfolio Cost (15x Multiplier)	**$**	**57,865,590**
Avg. Deep Retrofit Payback Years		**27**

Portfolio Description and Assumptions

Portfolio

20 Community Facilities in San Francisco

Retrofit Costs

Deep: $9.00/square foot

Shallow: $1.72/sqare foot

Summary of PACE and EERLF Models - COMMUNITY FACILITIES

PACE MODEL SCENARIOS - COMMUNITY FACILITIES

PACE Model - Deep

	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	4	1	1	1	1
% Portfolio	20%	5%	5%	5%	5%
% Ultra High	100%	25%	25%	25%	25%
% High Cost	0%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 33,755	$ 36,225	$ 36,225	$ 36,225	$ 36,225
< 10 Years					
# of Buildings	5	3	2	1	1
% Portfolio	25%	15%	10%	5%	5%
% Ultra High	100%	75%	50%	25%	25%
% High Cost	100%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 45,004	$ 43,298	$ 36,225	$ 36,225	$ 36,225
< 12 Years					
# of Buildings	6	4	3	2	1
% Portfolio	30%	20%	15%	10%	5%
% Ultra High	100%	100%	75%	50%	25%
% High Cost	100%	0%	0%	0%	0%
% > Avg.	50%	0%	0%	0%	0%
Avg. Loan Size	$ 45,294	$ 38,818	$ 43,298	$ 36,225	$ 36,225

PACE with 15% Rebate Model (or EERLF Model - Deep)

	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	6	4	4	3	1
% Portfolio	5%	3%	3%	2%	1%
% Ultra High	30%	20%	20%	15%	5%
% High Cost	0%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 130,000	$ 158,000	$ 158,000	$ 178,667	$ 176,000
< 10 Years					
# of Buildings	12	8	6	4	3
% Portfolio	9%	6%	5%	3%	2%
% Ultra High	60%	40%	30%	20%	15%
% High Cost	0%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 143,000	$ 109,500	$ 130,000	$ 158,000	$ 178,667
< 12 Years					
# of Buildings	21	12	9	6	4
% Portfolio	16%	9%	7%	5%	3%
% Ultra High	100%	60%	45%	30%	20%
% High Cost	9%	0%	0%	0%	0%
% > Avg.	50%	0%	0%	0%	0%
Avg. Loan Size	$ 140,000	$ 143,000	$ 103,556	$ 130,000	$ 158,000

PACE Model - Shallow

	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	12	8	8	8	8
% Portfolio	60%	40%	40%	40%	40%
% Ultra High	100%	100%	100%	100%	100%
% High Cost	100%	100%	100%	100%	100%
% > Avg.	100%	100%	100%	100%	100%
Avg. Loan Size	$ 20,324	$ 25,021	$ 25,021	$ 25,021	$ 25,021
< 10 Years					
# of Buildings	18	12	8	8	8
% Portfolio	90%	60%	40%	40%	40%
% Ultra High	100%	100%	100%	100%	100%
% High Cost	100%	100%	100%	100%	100%
% > Avg.	100%	100%	100%	100%	100%
Avg. Loan Size	$ 22,059	$ 23,973	$ 25,021	$ 25,021	$ 25,021

Note

indicates the model captures a percentage of the ultra high portfolio

indicates the model captures a percentage of the high cost portfolio

indicates the model captures a percentage of the above average portfolio

Summary of PACE and EERLF Models - COMMUNITY FACILITIES

EERLF MODEL SCENARIOS - COMMUNITY FACILITIES

EERLF Model - Deep (or PACE with 15% Rebate Model)

	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	4	3	1	1	1
% Portfolio	20%	15%	5%	5%	5%
% Ultra High	100%	75%	25%	25%	25%
% High Cost	0%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 33,755	$ 37,650	$ 31,500	$ 31,500	$ 31,500
< 10 Years					
# of Buildings	5	4	4	3	1
% Portfolio	25%	20%	20%	15%	5%
% Ultra High	100%	100%	100%	75%	25%
% High Cost	100%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 45,004	$ 33,755	$ 33,755	$ 37,650	$ 31,500
< 12 Years					
# of Buildings	6	5	4	4	3
% Portfolio	30%	25%	20%	20%	15%
% Ultra High	100%	100%	100%	100%	75%
% High Cost	100%	100%	0%	0%	0%
% > Avg.	50%	0%	0%	0%	0%
Avg. Loan Size	$ 45,294	$ 45,004	$ 33,755	$ 33,755	$ 37,650

EERLF Model - Deep Plus Rebate

	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	5	4	4	3	3
% Portfolio	25%	20%	20%	15%	15%
% Ultra High	100%	100%	100%	75%	75%
% High Cost	100%	0%	0%	0%	0%
% > Avg.	0%	0%	0%	0%	0%
Avg. Loan Size	$ 36,003	$ 27,004	$ 27,004	$ 30,120	$ 30,120
< 10 Years					
# of Buildings	6	5	5	4	4
% Portfolio	30%	25%	25%	20%	20%
% Ultra High	100%	100%	100%	100%	100%
% High Cost	100%	100%	100%	0%	0%
% > Avg.	50%	0%	0%	0%	0%
Avg. Loan Size	$ 36,235	$ 36,003	$ 36,003	$ 27,004	$ 27,004
< 12 Years					
# of Buildings	8	6	5	5	4
% Portfolio	40%	30%	25%	25%	20%
% Ultra High	100%	100%	100%	100%	100%
% High Cost	100%	100%	100%	100%	0%
% > Avg.	100%	50%	0%	0%	0%
Avg. Loan Size	$ 91,076	$ 36,235	$ 36,003	$ 36,003	$ 27,004

EERLF Model - Shallow

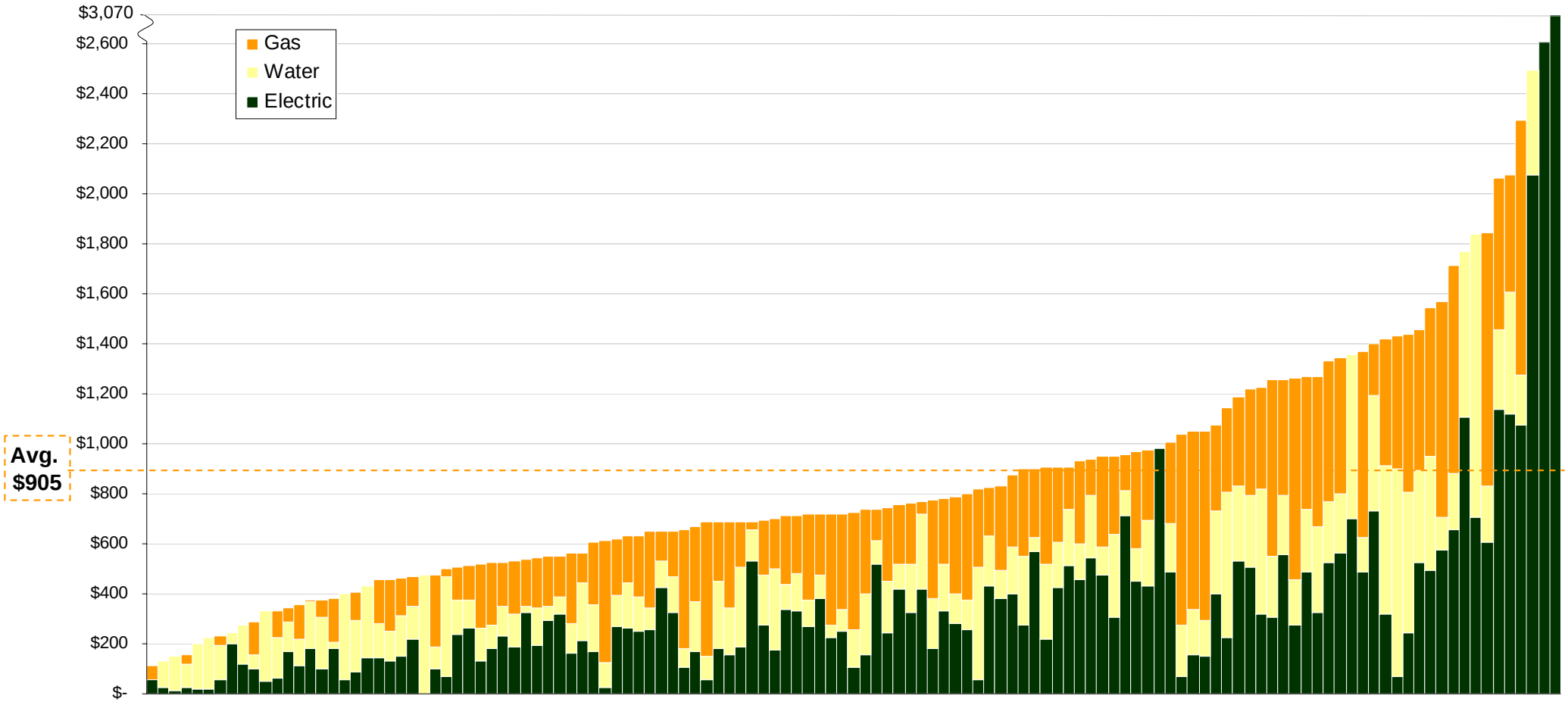
	Simple	Interest Rate 3%	5%	7%	9%
< 8 Years					
# of Buildings	12	10	8	8	8
% Portfolio	60%	50%	40%	40%	40%
% Ultra High	100%	100%	100%	100%	100%
% High Cost	100%	100%	100%	100%	100%
% > Avg.	100%	100%	100%	100%	100%
Avg. Loan Size	$ 20,324	$ 21,757	$ 21,757	$ 21,757	$ 21,757
< 10 Years					
# of Buildings	18	13	12	10	8
% Portfolio	90%	65%	60%	50%	40%
% Ultra High	100%	100%	100%	100%	100%
% High Cost	100%	100%	100%	100%	100%
% > Avg.	100%	100%	100%	100%	100%
Avg. Loan Size	$ 22,059	$ 20,324	$ 19,826	$ 21,757	$ 21,757

Note

- indicates the model captures a percentage of the ultra high portfolio
- indicates the model captures a percentage of the high cost portfolio
- indicates the model captures a percentage of the above average portfolio

Appendix C:
Multifamily Housing and Community Facility Utility Cost Graphs

Multi-Family Housing Projects
Annual Utility Cost Per Unit Per Year (Dollars)



Community Facilities Projects
Utility Cost Per Square Foot (Dollars)