Building Bridges to Net Zero

Multifamily Whole Building Program Progress in California

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Michael Maroney, TRC
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Moderated by: Nick Dirr, AEA
• California Programs
• Multifamily Home Energy Retrofit Coordinating Committee
• BayRENE: Bay Area Multifamily Building Enhancements & Capital Advance Financing

• Lessons Learned
• Case Studies
• Program Next Steps
Multifamily HERCC

• EPA Region IX convened:
  – Home Energy Retrofit Coordinating Committee (CA HERCC)
• StopWaste chairs:
  – MF Sub-Committee (MF HERCC)
• Consensus recommendations for multifamily energy upgrade programs & resources
  – Government, Utilities & Industry Professionals
  – Initiated during 2009-2013 stimulus funding
  – Produced original report Apr 2011
  – Update to report Jan 2015
MF HERCC Recommendation Areas

• Original Report:
  – Program Delivery
  – Professional Qualification & Training
  – Whole-Building Performance Approach
  – Energy Analysis Software
  – Performance Measurement, Tracking & Benchmarking
  – Low-Income and Energy Efficiency Program Access & Coordination
MF HERCC = Program Consistency

• MF HERCC Recommendations & Audit Protocol are referenced by the following California programs
  – ARRA Funded Local Government & CSD Weatherization (WAP)
  – CA State Treasurer Office Tax Credit Allocation Committee’s (TCAC) Low-Income Housing Tax Credit (LIHTC) Program
    • Sustainable Building Methods for Rehabs
  – IOU & RENs EUC Multifamily Whole-Building Programs
  – GreenPoint Rated Existing Home Multifamily
    • 3rd party-verified green & energy certification
2015 Update

• Update Based on 2013-2014 Lessons Learned
  – Streamline Program Participation Process
  – Refine Incentive Structures
  – Increase Marketing Effectiveness
  – Increase Operational Energy Savings
  – Increase Accessibility of Whole-Building Energy Use Data
  – Improve Electric Vehicle Charging Infrastructure
  – Promote Water Efficiency Upgrades
Regional Multifamily Housing Stock

- Bay Area spans 5 CEC Climate Zones (Zones 1, 2, 3, 4 & 12)
- According to Census:
  - ~ 2.8 Million Residential Housing Units (SF + MF) in 9 Counties
  - ~ 25% of total are MF 5 or more dwelling units
  - ~ 700,000 multifamily units in the Bay Area
  - ~ 1.7% market penetration of installed BAMBE units to date
Bay Area Multifamily Building Enhancements (BAMBE)

Regional Bay REN Multifamily Sub-Program
Lead by StopWaste: Energy Council

Cash Rebates
• $750 per dwelling unit
• 10% min whole building performance
• In-unit, central systems, common area
• Choose your own contractors

Free Energy Consulting
• Free energy usage analysis and site visit
• Utilizes simplified code-compliance modeling software
• One-stop-shop to connect with incentives & programs
Installed Impacts as of December 2014

- Total Rebates received by property owners = $6.2 million
- 8,340 Units in 124 projects completed
- 16% Average Estimated Savings per project
- Average Estimated Savings Per Unit: 406 kWh & 31 Therms
- 3,400,000 kWh (3.4 GWh) & 260,000 Therms saved per year
- 3,670 metric tons of CO2e reductions over 10 years
  (equivalent to GHG emissions from 773 passenger cars or 3.9 million pounds of coal burned)
Case Study – 1333 Jefferson

PROPERTY PROFILE

<table>
<thead>
<tr>
<th>Property</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>1333 Jefferson St., Napa, CA</td>
</tr>
<tr>
<td>Owner</td>
<td>Larry Dondero</td>
</tr>
<tr>
<td># of Units</td>
<td>6</td>
</tr>
<tr>
<td># of buildings</td>
<td>1</td>
</tr>
<tr>
<td>Sq ft</td>
<td>2,350</td>
</tr>
<tr>
<td>Year built</td>
<td>1930's</td>
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</table>

UPGRADE AT A GLANCE

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Savings</td>
<td>13.2% overall energy savings</td>
</tr>
<tr>
<td></td>
<td>210 Therms saved</td>
</tr>
<tr>
<td></td>
<td>2,203 kWh saved</td>
</tr>
<tr>
<td></td>
<td>2.7 metric tons CO₂ emissions reduced</td>
</tr>
<tr>
<td>Rebate Amount</td>
<td>$3,750</td>
</tr>
<tr>
<td>Measures Included</td>
<td>High Efficiency Condensing Tankless Water Heater</td>
</tr>
<tr>
<td></td>
<td>Domestic Hot Water Pipe Insulation</td>
</tr>
<tr>
<td></td>
<td>CEE Tier 3 Laundry Washing Machine</td>
</tr>
<tr>
<td></td>
<td>Interior &amp; Exterior LED Lighting</td>
</tr>
<tr>
<td></td>
<td>Low Flow Faucet Aerators &amp; Showerheads</td>
</tr>
<tr>
<td>Other Benefits</td>
<td>Water savings</td>
</tr>
<tr>
<td></td>
<td>Increased safety from improved lighting</td>
</tr>
</tbody>
</table>
Case Study – Cinnabar Commons

PROPERTY PROFILE

Location: 875 Cinnabar St., San Jose, CA
Owner: Seven Hills Properties
# of Units: 245
# of buildings: 5
Sq ft: 166,334
Year built: 2006

UPGRADE AT A GLANCE

- Energy Savings:
  - 10.7% overall energy savings
  - 4,386 Therms saved
  - 107,295 kWh saved
  - 97.3 metric tons CO₂ emissions reduced

- Rebate Amount: $183,750

- Measures Included:
  - Two High Efficiency Condensing Central Water Heaters/Boilers
  - Upgrade of in-unit, hallway, and garage lighting to LED fixtures

- Other Benefits:
  - Increased safety from improved lighting
BAMCAP Financing Overview

- $1.5 Million loan pool (pilot program) to finance energy efficiency
- 0.0% Interest Rate
- Loan proceeds for up to 50% of the cost of energy efficiency project, $5,000 per unit or $500,000, whichever is less
- Open lender model
  - Allow borrowers to bring their lender to the program
  - Opportunity to engage multiple lenders (and products) in program
- Pipeline
  - 2 completed loans for $1.5 million, 7 additional projects in the pipeline
  - Both non-profit housing owners and condo owners interested
Lesson Learned: Start with Quality Leads and Move Fast

DAYS FROM PROJECT START TO REBATE RESERVATION

109 DAY AVERAGE

54 DAY AVERAGE
Lesson Learned: Start with Quality Leads and Move Fast

- Prequalify project leads
- Early energy models mean better participants
- Simplify energy modeling and reports
- Simplify paper work
Lesson Learned: Leverage Other Programs for Deeper Savings

- Water
- BAMBE
- Renewables
- Financing

Single Point of Contact

To owner

MULTIFAMILY BUILDINGS 2015: BUILDING BRIDGES TO NET ZERO
Case Study – Leverage Other Programs for Deeper Savings

<table>
<thead>
<tr>
<th>Measure</th>
<th>Funding Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini Split Heat Pumps</td>
<td>BAMBE Rebate</td>
</tr>
<tr>
<td>In-Unit Lighting Upgrade</td>
<td>BAMBE Rebate</td>
</tr>
<tr>
<td>Replace Single Pane Windows with Dual Pane</td>
<td>BAMBE Rebate</td>
</tr>
<tr>
<td>Replace Toilets with Ultra High Efficiency</td>
<td>Water Utility Rebate</td>
</tr>
<tr>
<td>Exterior Lighting</td>
<td>Utility Rebate</td>
</tr>
<tr>
<td>In-Unit Refrigerators</td>
<td>Utility Rebate</td>
</tr>
</tbody>
</table>
Lesson Learned: Customized Owner Support Leads to Project Success
2016 and Beyond: Water, Water, Water
2016 and Beyond: HOA Specific Pathway
2016 and Beyond: Net Zero Planning

Project Phasing

Phase 1: Water Heater, Low Flows, & Common Area LEDs
Phase 2: Windows & Unit LEDs
Phase 3: Wall Insulation, Roof Insulation, & Heat Recovery Vent.
Phase 4: Ductless Mini Split Heat Pumps & Solar PV

Current EUI

EUI

Target EUI

Time

Energy Use
Renewables
ZNE
Karen Contreras & Mike Maroney

- PG&E Multifamily Upgrade Program
- Overview, Trends and Lessons Learned
Agenda

- Program overview
- Program 2015 trends
- Participant case studies
- 2016 program considerations

- CA Multifamily Utility Programs
- Customer Needs
- Pilot program lessons learned
### Multifamily overview of Statewide Utility offerings

<table>
<thead>
<tr>
<th>Program</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multifamily Whole Building Program</strong></td>
<td>• Comprehensive whole building approach with tiered incentives</td>
</tr>
</tbody>
</table>
| **Multifamily Energy Efficiency Rebate (MFEER) Program** | • Prescriptive cash back solutions  
                      • Energy efficiency measures available at little or no cost         |
| **3rd Party Programs**                            | • Direct install offerings such as: Re-circulation pumps, heat pumps, central A/C diagnostic and maintenance |
| **Energy Savings Assistance (ESA) Program**       | • Energy efficiency measures direct install at no cost to owners or income qualified tenants |
| **Middle Income Direct Install (MIDI) Program**   | • Energy efficiency measures direct install at no cost to tenants that are not able to provide income qualifications under ESA (some common area measures available and restrictions apply) |
| **On Bill Financing**                             | • Common area locations with commercial accounts may qualify  
                      • Zero interest loans between $5-100K per service address           |
Meet customers where the needs are

Customer Interest and needs assessment

Direct Install Programs (ESA/MIDI)

Whole Building (MUP)

Prescriptive Rebates (MFEER)

Large retrofits in phases

Bundled Measures
Mitigating key findings from the Multifamily Pilot

Lessons Learned

- Incentives were issued upfront vs. upon completion of project
- Reduced Marked Rate Assessment Incentive to encourage more Affordable Housing participation
- Properties need more time (from 12-18 months or longer) to complete large retrofits.
- Whole Building vs. Whole Property. Dual fuel vs. single fuel projects.

Modified Improvements

- Issue incentives only during the time of completion to ensure only fully committed projects apply
- Equal opportunity and incentive levels for both Market Rate and Affordable Housing
- Incremental phases are needed to help projects move forward
- Treat large properties with variances of building types as a single project. Split single fuels as needed
Program Overview

- Serving existing multifamily projects in PG&E territory
  - Design assistance, training, and incentives
  - In-unit, common, and exterior space upgrades
- Robust trade ally network: Partner Raters and Contractors conduct assessments, upgrades, and verification
- Combustion safety is required
Program Eligibility

Eligibility Requirements

The program is available to both affordable and market-rate housing properties. Buildings that meet the following eligibility requirements may qualify for energy efficiency incentives.

- Have 5 or more attached dwelling units
- Receive gas or electric service from PG&E
- Achieve a minimum of 10% energy savings
Program Process

**Prequalification:** Participant submits an interest form and TRC sets up a pre-enrollment meeting

**Enrollment:** Participant hires a Partner Rater and Contractor and submits Application

**Assessment:** Partner Rater conducts assessment and submits test-in docs

**Reservation:** TRC reviews test-in package and issues a letter of reservation

**Improvements:** Participant installs approved upgrade measures

**Verification:** Partner Rater verifies installation measures and submits test-out package

**Payment:** TRC reviews test-out package and issues a completion letter PG&E
## 2015 Program Trends

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects with funding reserved</td>
<td>27</td>
</tr>
<tr>
<td>Projects that have expressed interest in program</td>
<td>201</td>
</tr>
<tr>
<td>Average % improvement</td>
<td>19%</td>
</tr>
<tr>
<td>Average incentive per unit</td>
<td>$860</td>
</tr>
<tr>
<td>Average upgrade cost per unit</td>
<td>$7,800*</td>
</tr>
<tr>
<td>Average % of upgrade cost covered by incentive</td>
<td>24%</td>
</tr>
<tr>
<td>Average property vintage</td>
<td>1972</td>
</tr>
<tr>
<td>Most common upgrade measures</td>
<td>Windows, lighting, appliances</td>
</tr>
<tr>
<td>Number of Partners</td>
<td>21 Raters, 22 Contractors</td>
</tr>
</tbody>
</table>

* Upgrade costs includes all construction costs (not just energy efficiency)
2015 Program Trends

Project Referral Source

- Contractor
- Rater
- Email Blast
- Conference
- PG&E
- Direct Outreach

Planned Work

<table>
<thead>
<tr>
<th>Type</th>
<th>Projects</th>
</tr>
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<tbody>
<tr>
<td>Walls</td>
<td>11</td>
</tr>
<tr>
<td>Roof</td>
<td>31</td>
</tr>
<tr>
<td>Windows</td>
<td>61</td>
</tr>
<tr>
<td>Plumber</td>
<td>17</td>
</tr>
<tr>
<td>Lights</td>
<td>62</td>
</tr>
<tr>
<td>Appliances</td>
<td>31</td>
</tr>
<tr>
<td>CHW</td>
<td>43</td>
</tr>
<tr>
<td>HVAC</td>
<td>37</td>
</tr>
<tr>
<td>Star</td>
<td>9</td>
</tr>
</tbody>
</table>
2015 Training Series Outcomes

- 47.5 hours of training
- 153.5 CEU’s
- 297 attendees
- 4.2/5 Instructor rating
- 4.0/5 Course rating
## Participant Case Studies

<table>
<thead>
<tr>
<th></th>
<th>Sacramento Area</th>
<th>Sierra Nevada Foothills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of units</td>
<td>24</td>
<td>67</td>
</tr>
<tr>
<td>Year built</td>
<td>1925</td>
<td>1978</td>
</tr>
<tr>
<td>Percent improvement</td>
<td>37%</td>
<td>25%</td>
</tr>
<tr>
<td>Total incentive</td>
<td>$46,200 (gas only)</td>
<td>$76,125</td>
</tr>
<tr>
<td>Upgrade cost</td>
<td>$1,064,993</td>
<td>$191,905</td>
</tr>
<tr>
<td>Upgrade measures</td>
<td>Appliances, lighting, HVAC, insulation, windows, DHW</td>
<td>Appliances, lighting, HVAC, windows, roof</td>
</tr>
</tbody>
</table>
Program Portals

- Online application
- Easier data exchange
- Partner Raters upload documents
- Program tracks progress through Dashboard
2015 Lessons Learned

• Windows a big driver for participation
• A lot of interest in property level (exterior) improvements
• Strong partner network leads to a large pipeline
• Live Assessment reviews with partners improves review
• Upgrades in units usually done at tenant turnover = longer construction timelines than 1 year
• Incremental path attractive for owners and Raters
Incremental Approach (pilot)

Whole property assessment
- Total MUP SOW submitted with construction schedule

Reservation w/ schedule of upgrades and incentive payments
- Example 33% reduction
- 100 units x $1,400 = $140,000 total incentive

Phase I: Common area and envelope (attic insulation, lighting, windows)
- 52% of overall project savings
- $140,000 x 0.52 x 0.90 = $65,520 upon completion and verification of phase I

Phases II to IV: Unit upgrades at tenant turnover (HVAC, DHW, and refrigerators)
- Each phase of 33 units 16% of overall project savings
- $140,000 x 0.16 x 0.90 = $20,160 per 33 units
- X 3 phases = $60,480

10% retainer paid at project completion
- Test-out submission and program QA on all phases
- $140,000 x 0.10 = $14,000 added to final phase incentive
2016 Program Considerations

• Post-retrofit support
  – Resident engagement
  – Operations and maintenance training
  – Benchmarking

• Alternate participation pathways
  – Bundled measures
Thank you

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