Workshop on Multifamily Efficiency Programs

May 29, 2014
Using Data to Engage Owners To Implement Energy Efficiency in Multifamily Housing

Toby Ast-Preservation of Affordable Housing
Ed Connelly-New Ecology Inc.
Part 1:

What do building owners (aka customers) want?
Part 2:

How does data help make satisfied customers?
1A. Benchmarking and Portfolio Analysis- Tying into the Ownership Cycle

- Construction/Purchase
- Early Ops
- Later Ops
- Refinance/Rehab
1A. Benchmarking and Portfolio Analysis- Tying into the Ownership Cycle
1B. Using Benchmarking To Maximize Program Savings

Typical Approach to Retrofits

A Better Approach
<table>
<thead>
<tr>
<th>Name</th>
<th>Full-Year Sum</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>25 Central St</strong></td>
<td>13.6</td>
<td></td>
</tr>
<tr>
<td><strong>78 Jaskolski Traf...</strong></td>
<td>11.3</td>
<td></td>
</tr>
<tr>
<td><strong>43 Pfannerstill Glen</strong></td>
<td>11.3</td>
<td></td>
</tr>
<tr>
<td><strong>22 Rohan Lights</strong></td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td><strong>21 Lurline Burgs</strong></td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td><strong>85 Harry Pike</strong></td>
<td>10.9</td>
<td></td>
</tr>
<tr>
<td><strong>48 Joanne Forest</strong></td>
<td>10.9</td>
<td></td>
</tr>
<tr>
<td><strong>49 Daniel Pass</strong></td>
<td>9.97</td>
<td></td>
</tr>
<tr>
<td><strong>26 Hyatt Ports</strong></td>
<td>9.97</td>
<td></td>
</tr>
<tr>
<td><strong>27 Block Rest</strong></td>
<td>9.91</td>
<td></td>
</tr>
<tr>
<td><strong>10 Patricia Parkways</strong></td>
<td>9.68</td>
<td></td>
</tr>
</tbody>
</table>
2A. Using Building Level Data To Figure Out What To Do
2B. Using Data To Verify Results and Measure Savings
2B. Using Data To Verify Results and Measure Savings

### Effect of Boiler Upgrade (October 1, 2010)

<table>
<thead>
<tr>
<th>Name</th>
<th>Full-Year Sum</th>
<th>Detailed Data per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct 09 - Sep 10</td>
<td>9.0</td>
<td>Click for detailed data</td>
</tr>
<tr>
<td>Oct 10 - Sep 11</td>
<td>428</td>
<td></td>
</tr>
</tbody>
</table>

#### Description of Upgrade

- **Before:** (2) 180,000 BTU Burnham gas boilers
- **After:** (2) 660 Lochinvar knights gas boiler; 120 gallon storage tank for DHW
- **Cost:** $64,000.00

#### Annual Savings

- **Expected:** 20%
- **Actual:** 52% (5 Btu per square foot (conditioned))
2B. Using Data To Verify Results and Measure Savings

### Description of Upgrade

**Before:** Air leaks around doors and in attic. Deficient insulation in small area of attic and in walls.

**After:** Replace existing boilers with one MGB 175 CID and one MGB 125 CID gas boilers with outdoor resets. Add weather stripping to 4 doors, air seal attic, insulate 144 sf to R-38, dens-pac 6236 sf of walls.

**Cost:** $28,031.00

### Annual Savings

**Expected:** unknown

**Actual:** -5% (-1 Btu per square foot (conditioned))
4A. Using Performance Data To Figure Out How Much To Finance

- Savings: $39,855
- 5 Year: $167,884
- 10 Year: $293,336
- 30 Year: $548,597
4A. Using Performance Data To Figure Out How Much To Finance

- Groton Commons (pre-retrofit gas costs): $0.36/sf
- Savings (37% reduction of gas costs): $0.23/sf
- Savings over 26,586 SF/yr: $6,008
- Simple payback on cost of $35,397: 5.89 yrs
- Gas savings over 15 years: $90,124
- NPV 15 years: $73,878
- Annual P&I Payment of loan for 100% of the job ($35,397) at 5% for 15 years: $3,359
- Cumulative Cash Flow (No inc. in gas costs: $90,124 - $50,385): $39,739

Could have borrowed ~$70,000 and cash flowed
4B. Using Performance Data To Figure Out How To Build Better

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Heating Energy (kBtu/sqft/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive House</td>
<td>4.75</td>
</tr>
<tr>
<td>LEED Gold Townhouse 3</td>
<td>32.93</td>
</tr>
<tr>
<td>LEED Gold Townhouse 2</td>
<td>43.54</td>
</tr>
<tr>
<td>LEED Gold Townhouse 1</td>
<td>51.97</td>
</tr>
<tr>
<td>Lennox A</td>
<td>13.51</td>
</tr>
<tr>
<td>Bldg O</td>
<td>8.83</td>
</tr>
<tr>
<td>Bldg P</td>
<td>12.69</td>
</tr>
<tr>
<td>Bldg M</td>
<td>8.66</td>
</tr>
</tbody>
</table>
### 5A. Solving Data Access Issues - Owner Accounts

#### Water & Sewer FY 2015

<table>
<thead>
<tr>
<th>Account #</th>
<th>Bill #</th>
<th>Parcel ID</th>
<th>Bill Date</th>
<th>Due Date</th>
<th>Past Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>M89991</td>
<td>916351</td>
<td>150308</td>
<td>04/02/2015</td>
<td>04/23/2015</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

**Service Location**

12 POPE STREET

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Previous Read Date</th>
<th>Current Read Date</th>
<th>Read Code</th>
<th>Previous Reading</th>
<th>Current Reading</th>
<th>Usage (c.f.)</th>
<th>Charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>MO W 4.0 RS</td>
<td>02/25/2015</td>
<td>03/24/2015</td>
<td>A</td>
<td>2788748</td>
<td>2871479</td>
<td>82731</td>
<td>$4,122.15</td>
</tr>
<tr>
<td>MO W 4.0 RS</td>
<td>02/25/2015</td>
<td>03/24/2015</td>
<td>A</td>
<td>698190</td>
<td>758094</td>
<td>59904</td>
<td></td>
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<tr>
<td>MO S 4.0 RS</td>
<td>02/25/2015</td>
<td>03/24/2015</td>
<td>A</td>
<td>142635</td>
<td></td>
<td></td>
<td>$8,415.47</td>
</tr>
</tbody>
</table>

**REPLACED METER USAGE**

<table>
<thead>
<tr>
<th>READING / USAGE CODE</th>
<th>CTS’ ISSUE DATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - ACTUAL</td>
<td>OCTOBER, JANUARY, APRIL, JULY</td>
</tr>
<tr>
<td>O - ACTUAL READ, M</td>
<td>DISTRICT B: BILLS ISSUED AUGUST, NOVEMBER, FEBRUARY, MAY</td>
</tr>
<tr>
<td>E - SYSTEM ESTIMATE</td>
<td>DISTRICT C: BILLS ISSUED SEPTEMBER, DECEMBER, MARCH, JUNE</td>
</tr>
<tr>
<td>T - TROUBLESHOOT</td>
<td></td>
</tr>
<tr>
<td>P - IN-HOUSE ESTIMATE</td>
<td></td>
</tr>
<tr>
<td>H - NON-RESPONSIVE - METER REPLACEMENT</td>
<td></td>
</tr>
</tbody>
</table>
5A. Solving Data Access Issues-Tenant Accounts

GREEN BUTTON

Green Button Download My Data®

GREEN BUTTON APPS
- Apps for Energy Winners
- OpenEI Green Button Apps

RELATED ARTICLES
- VEHICLES
  - Open Data Winners from the BASW Eco Hackathon

Landlord Utility Services

Getting Started
Welcome to Consumers Energy's Landlord Utility Services, where you can manage utility services at multiple rental properties in one place! A Landlord Utility Services account allows you to view your properties, transfer service, and download energy use data.

To enroll, please email us or call our Landlord and Small Business Support Team at 1-855-477-9027 (available 7:00 am to 6:00 pm Monday through Friday, and 8:00 am to 5:00 pm on Saturday). Please reserve this number for your use only. Your tenants may call 1-800-477-2050.

Energy Efficiency Programs for Property Managers
If 60% or more of your tenants are at or below 200% of the federal poverty guidelines, call (877) 448-9433 to learn about energy efficiency measures available under Consumers Energy's Low-Income program. If your tenant base does not qualify as low-income, you can call (877) 813-9615, or visit www.consumersenergybusiness.com to learn about our Multifamily Direct Install program, and the cash incentives available under our Prescriptive and Custom energy measures.

Third Party Notification – One Less Thing to Worry About
Our free Third Party Notification service provides you with an extra measure of protection before an account's energy service is shut off. Using this service, you will receive a copy of shut-off notices issued to an account/tenant. Send us this form to receive these notifications.
5A. Solving Data Access Issues-Tenant Accounts

<table>
<thead>
<tr>
<th>Name</th>
<th>Full-Year Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apt. 324 Gas #481907...</td>
<td>69.2K</td>
</tr>
<tr>
<td>Apt. 222 Gas #605607...</td>
<td>59K</td>
</tr>
<tr>
<td>Apt. 313 Gas #693017...</td>
<td>58.4K</td>
</tr>
<tr>
<td>Apt. 219 Gas #223607...</td>
<td>57.6K</td>
</tr>
<tr>
<td>Apt. 218 Gas #091407...</td>
<td>53.8K</td>
</tr>
<tr>
<td>Apt. 311 Gas #620807...</td>
<td>51.7K</td>
</tr>
<tr>
<td>Apt. 111 Gas #654207...</td>
<td>45.9K</td>
</tr>
<tr>
<td>Apt. 302 Gas #894307...</td>
<td>44.8K</td>
</tr>
<tr>
<td>Apt. 109 Gas #428507...</td>
<td>44.3K</td>
</tr>
<tr>
<td>Apt. 201 Gas #405307...</td>
<td>39.9K</td>
</tr>
<tr>
<td>Apt. 313 Gas #467307...</td>
<td>39K</td>
</tr>
<tr>
<td>Apt. 104 Gas #625207...</td>
<td>38.9K</td>
</tr>
<tr>
<td>Apt. 212 Gas #846907...</td>
<td>37.7K</td>
</tr>
<tr>
<td>Apt. 213 Gas #615107...</td>
<td>36K</td>
</tr>
<tr>
<td>Apt. 319 Gas #873807...</td>
<td>35.4K</td>
</tr>
</tbody>
</table>
Automatic Data Retrieval

Utility Accounts in This Building

<table>
<thead>
<tr>
<th>Type</th>
<th>Account Number</th>
<th>Coverage</th>
<th>Utility Company</th>
<th>Data Import</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric</td>
<td>10052</td>
<td>Apartment #3c</td>
<td>Entergy</td>
<td>Up-to-date as of 2 days ago</td>
<td></td>
</tr>
<tr>
<td>Electric</td>
<td>11341</td>
<td>Apartment #3e</td>
<td>Entergy</td>
<td>Up-to-date as of 2 days ago</td>
<td></td>
</tr>
</tbody>
</table>
5A. Solving Data Access Issues-Tenant Accounts

SAMPLE RELEASE OF TENANT UTILITY INFORMATION

DATE:

TO: (Name of Utility Provider Address) FROM: (Name Owner/Agent Address)

SUBJECT: Request for Utility Information

Dear Sir/Madam:

The person named below receives housing assistance under a program of the U.S. Department of Housing and Urban Development (HUD). The Department provides utility allowances to properties receiving subsidy assistance where all or some utilities are paid directly by the tenants. These utility allowances are adjusted each year and supported by an owner’s analysis of the property’s utility costs and consumption data.

In order to perform this utility analysis and better estimate the allowance provided to our tenants, your cooperation is requested in providing cost and/or consumption data for the below individual for the previous 12 months. Please return this information to the person listed at the top of the page. Below you will find the tenant’s consent to release this information.

Thank you for your help with HUD’s mission to create strong, sustainable, inclusive communities and quality affordable homes for all.

Request for Utility Information for: NAME: _____________________________

ADDRESS: ________________________________________________________

__________________________________________________________________

PLEASE RETURN THIS UTILITY INFORMATION TO THE PERSON LISTED ABOVE
5A. Solving Data Access Issues-Tenant Accounts

Utility Allowance Calculations/Reports

Tenant Education
THANK YOU!

Edward Connelly
President - New Ecology Inc.
www.newecology.org
Connelly@newecology.org

Toby Ast
Director of Energy Management
Preservation of Affordable Housing Inc.
www.poah.org
tast@poah.org
Our Mission

We promote smarter energy use for all.

We give people the resources they need to make informed energy choices.

We design and implement efficiency programs that lower costs, and protect the environment.

We ensure the benefits of energy efficiency reach those who need them most.
Areas of Focus

• Smart grid benefits and dynamic electricity pricing in homes

• Energy efficient buildings

• Community-level programs

• Research, policy and innovation
New Markets and Partners

- Elevate/NEI Original Program
- New/Supported Market
Market Need

10.5 million units of affordable multifamily housing in the US

$3,400,000,000

$3.4B could be saved through multifamily energy efficiency improvements

Affordable Multifamily Savings Opportunity

Data shows that affordable multifamily buildings utilize more energy than market rate buildings.
Efficiency Benefits for Building Owners

Lower energy costs help building owners:

- Tenant Retention
- Positive Cash Flow
- Improved O&M
Efficiency Benefits for Residents

Lower energy costs help low-income families avoid:

- **Unstable Housing**
- **Food Insecurity**
- **Health Problems**

For a very low-income family, the average savings due to energy upgrades is 3% of their income – helping to reduce housing costs and the impact of rising energy costs.¹

When families spend less of their income on housing and utility costs, they can spend more on food, healthcare, child enrichment,² and other household needs.

When the burden of utility bills is reduced, infants and toddlers are 23% less likely to be at nutritional risk for growth problems³ and adults experience an 18% decrease in hypertension rates.⁴

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A flexible, *one-stop shop* process addresses the barriers that multifamily owners face.

**Barriers to Energy Efficiency Investments**

- Limited awareness of applicable programs
- Lack of energy use data and comparison benchmarks
- Lack of knowledge of cost-effective efficiency upgrades
- Lack of access to low-cost capital
- Lack of time and knowledge to oversee construction and ensure high quality work
- Lack of mechanisms to track post-retrofit savings

**Key Program Design Elements**

- Single point of contact to support owners throughout the energy upgrade process
- Portfolio Benchmarking (through Wegowise)
- Energy analysis, onsite building assessment, and cost-effective energy savings recommendations
- Access to low-cost energy efficiency financing products and any available state, local, or utility incentives or grants
- Contractor bid solicitation, construction oversight, and QA/QC provided
- Post-retrofit energy use monitoring and reports
One-Stop Shop Program Key To Success: Streamlined process to help owners access all services

- High quality customer service through a single point of contact
- Strong construction management with 100% QA of jobs
- Robust data to support energy savings and monitor post-retrofit results
CIC’s loan product is secured often as a second mortgage on the property

Energy Savers Loan Terms:
• Second mortgage loan often behind CIC first mortgage
• Personal recourse
• 3% (money obtained at 1%)
• 1.15 DSCR (debt service coverage ratio- *after retrofit*)
• 90% LTV (loan to value- recent appraisal)
• 7 year term
• 7-10 year amortization
# Elevate Energy – Chicago Multifamily Program

## Program Statistics - 2008 through March 18, 2015

<table>
<thead>
<tr>
<th>Category</th>
<th>Buildings</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
<td>1,441</td>
<td>54,871</td>
</tr>
<tr>
<td>Assessments</td>
<td>1,176</td>
<td>47,020</td>
</tr>
<tr>
<td>Upgrades</td>
<td>502</td>
<td>20,642</td>
</tr>
<tr>
<td>Jobs created</td>
<td></td>
<td>519</td>
</tr>
<tr>
<td>CIC Loans</td>
<td></td>
<td>$13,935,726</td>
</tr>
</tbody>
</table>
Elevate Energy – Chicago Multifamily Program

<table>
<thead>
<tr>
<th>Program</th>
<th>Annual Budget</th>
<th>Annual Participation</th>
<th>Annual Savings per unit</th>
<th>Levelized cost of saved energy ($/kWh and therm)</th>
<th>Benefit-cost ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevate Energy Multifamily Program*</td>
<td>$2,505,952</td>
<td>Units: 4,126</td>
<td>650 kWh</td>
<td>Electric: $0.10 Gas: $1.00</td>
<td>TRC: 2.10 gas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Projects: 110</td>
<td>240 therms</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*DC SEU had not completed a full program year at time of report publication in 2013.

**Elevate Energy was formerly known as CNT Energy in January 2014.

Impacts on Properties

Jeffery Parkway, retrofitted by Elevate Energy, is one of the first 17 existing multifamily properties nationwide to become Energy Star certified

“We were facing, just on the gas bill, a $60,000 bill a year. As of last year, our bill was $18,000. It was unbelievable savings...By putting more upfront funds [in our building], our tenant retention is much better... It's something to tell tenants, that we care about the building.”

Quote from Sandeep Sood, owner of Jeffery Parkway, in the November 24, 2014 Chicago Tribune article “South Side apartment building among 3 Chicago energy efficiency stars.”
High-Quality Program Characteristics

- Encourage and incentivize deep whole-building retrofits (vs. direct-install programs that focus on one measure).
- Improve efficiency of all energy end uses, regardless of energy source, with behind-the-scenes incentive and savings attribution.
- Provide incentives to motivate action by both owners and residents.
- Deliver high levels of customer service to building owners and managers.
- Ensure rigorous quality control and a strong focus on measurement and verification.
Thank You

Abigail Corso, P.E. LEED AP O+M
Elevate Energy
Abigail.Corso@elevateenergy.org
773.321.2663
Elevate provides building owners with a summary of the energy savings opportunities

**Table 1: Recommended retrofits**

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Cost ($)</th>
<th>Savings (therms/year)</th>
<th>Savings$ (kWh/year)</th>
<th>Savings$ ($/year)</th>
<th>Simple payback (years)</th>
<th>Retrofit lifetime (year)</th>
<th>SIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Insulate all accessible heating hot water pipe with all sleeve jacket fiberglass (R-6)</td>
<td>3,200</td>
<td>700</td>
<td>-</td>
<td>700</td>
<td>4.6</td>
<td>25</td>
<td>5.5</td>
</tr>
<tr>
<td>2. Roof cavity: Air seal roof cavity perimeter and all penetrations, gaps and bypasses with foam, and insulate with blown-in cellulose (R-49)</td>
<td>64,000</td>
<td>12,600</td>
<td>-</td>
<td>12,600</td>
<td>5.1</td>
<td>25</td>
<td>4.9</td>
</tr>
<tr>
<td>3. Insulate all accessible domestic hot water pipe with all sleeve jacket fiberglass (R-4.5)</td>
<td>800</td>
<td>150</td>
<td>-</td>
<td>150</td>
<td>5.3</td>
<td>25</td>
<td>4.7</td>
</tr>
<tr>
<td>4. Install low-flow shower heads (1.5 GPM) and faucet aerators (1.5 GPM kitchen, 1.0 GPM bathroom)</td>
<td>12,800</td>
<td>5,300</td>
<td>-</td>
<td>5,300</td>
<td>2.4</td>
<td>10</td>
<td>4.1</td>
</tr>
<tr>
<td>5. Install new high-efficiency (90%+ AFUE) heating hot water boiler with indoor averaging temperature sensors and outdoor cutoff</td>
<td>105,000</td>
<td>12,600</td>
<td>-</td>
<td>12,600</td>
<td>8.3</td>
<td>20</td>
<td>2.5</td>
</tr>
<tr>
<td>6. Convert incandescent exit sign bulbs to LEDs</td>
<td>4,900</td>
<td>-</td>
<td>8,750</td>
<td>875</td>
<td>5.6</td>
<td>10</td>
<td>1.8</td>
</tr>
<tr>
<td>7. Install new high efficiency (90%+ AFUE) domestic hot water heater</td>
<td>45,000</td>
<td>2,900</td>
<td>-</td>
<td>2,900</td>
<td>15.5</td>
<td>20</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$235,700</strong></td>
<td><strong>34,250</strong></td>
<td><strong>8,750</strong></td>
<td><strong>$35,125</strong></td>
<td><strong>6.7</strong></td>
<td><strong>-</strong></td>
<td><strong>-</strong></td>
</tr>
</tbody>
</table>

*Assumes $1.00 per therm of natural gas or $0.10 per kWh of electricity. 1 therm = 29 kWh*
We summarize the incentives to provide a complete picture of the opportunity.

Table 2: Rebates for select measures

<table>
<thead>
<tr>
<th>Rebate</th>
<th>Estimated rebate ($)</th>
<th>Cost after rebate ($)</th>
<th>Cost reduction (%)</th>
<th>Simple payback after rebate (years)</th>
<th>SIR after rebate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating hot water pipe insulation</td>
<td>320</td>
<td>2,880</td>
<td>10%</td>
<td>4.1</td>
<td>6.1</td>
</tr>
<tr>
<td>Nicor Gas Energy Efficiency Rebates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum of 1-inch thick insulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roof cavity insulation</td>
<td>12,600</td>
<td>51,400</td>
<td>20%</td>
<td>4.1</td>
<td>6.1</td>
</tr>
<tr>
<td>Nicor Gas Business Custom Incentive Program $1.00/thermsaved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DHW pipe insulation</td>
<td>320</td>
<td>480</td>
<td>40%</td>
<td>3.2</td>
<td>7.8</td>
</tr>
<tr>
<td>Nicor Gas Energy Efficiency Rebates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum of 1-inch thick insulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Showerheads and faucets</td>
<td>12,800 Value</td>
<td></td>
<td>Free Direct Install</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nicor Multi-Family Home Energy Savings Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct installed at no cost to owner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating Hot Water Boiler Replacement</td>
<td>20,000</td>
<td>85,000</td>
<td>19%</td>
<td>6.7</td>
<td>3.0</td>
</tr>
<tr>
<td>Nicor Gas Energy Efficiency Rebates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$5,000 per boiler, AFUE must be 90%+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LED exit signs</td>
<td>2,450</td>
<td>2,450</td>
<td>50%</td>
<td>2.8</td>
<td>3.6</td>
</tr>
<tr>
<td>ComEd Small Business Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requires pre-inspection</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>DHW replacement</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Nicor Gas Energy Efficiency Rebates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DHW must be 90%+ AFUE; ≥ 75 MBH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Rebate amounts are estimated. Actual rebate amount may vary.

ONE STOP SHOP MODEL
ENERGY OUTREACH COLORADO
MAY 29, 2015
CAITLIN ROOD
MERCY HOUSING
SUSTAINABILITY MANAGER
Mercy Housing Overview

- Affordable Housing Nonprofit
- ~280 owned properties
- ~18,000 units
- ~16.5M sf (owned)
- 18 States
- Mostly LIHTC, Section 202, Section 8, USDA RD
- BBC
- Enterprise Call to Action
What Stops Us

- Non Fungible Savings
- Properties that Don’t Cash Flow
- Split Incentives
  - Owner v HUD
  - Owner v Tenant
  - Developer v Manager
- Payback Periods
- LOC Adversity or Inability
Who is Energy Outreach Colorado?

- **Mission**
  - Ensure all Colorado households have access to affordable home energy

- **Have distributed more than $220 Million**

- **Programs**
  - Bill payment assistance
  - Energy efficiency
  - Resident engagement
  - Advocacy

- **Strong utility partnerships across the state**

- **Staff serve on Governor appointed energy committees**

- **Actively intervene at the Colorado Public Utilities Commission**
The EOC Model

Why It Works

- Turnkey
  - Energy Audit
  - Deep knowledge of efficiency programs/relationships in CO
    - Access to addition program funding
  - Utility/local program applications, agreements, other paperwork
  - Contractor selection, relationships, oversight, & commissioning
  - Resident Engagement
    - It’s what they do—mission driven

What It’s Missing

- Financing limited by incentives
- Replication in other states
Barriers to Utility-Driven Financing

- Low energy cost environment means less cost effective for customer and utility
- Utility programs must be leveraged
- Custom evaluation of low income programs; patience pays off!
- “Word of Mouth” marketing and quick fix installs
- Average rebate: $0.40/KWH & $45/Dth
Grace Apartments

- 53 Unit family apartments built in 1960
- Replace 2 Boilers and DHW Heaters (>$140K)
- Lighting and light fixtures, common and in unit
- Low flow faucets aerators and showerheads
- $120K from DOSP and Xcel, $65K from Mercy
Grace Apartments Proposal from EOC
Holly Park East and West

- 168 Unit, 15 building family apartments built in 1973
- Federal WAP
- Replace 5 Boilers and DHW Heaters and 9 additional DHW, water treatment
- Lighting and light fixtures, common and in unit
- Low flow faucets aerators and showerheads
- Exhaust fans
- $540K from DOE and EOC, $80K from Mercy
Questions?

Caitlin Rood
Sustainability Manager
Mercy Housing
crood@mercyhousing.org
303-830-6213
<table>
<thead>
<tr>
<th>PROGRAMMATIC OFFERING</th>
<th>Elevate Energy</th>
<th>EOC</th>
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</thead>
<tbody>
<tr>
<td>Benchmarking</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>No cost audit/opportunity identification</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Access to rebates NOT available to public</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Central location/deep knowledge of rebates throughout service territory</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Manage rebate application and reporting and other paperwork</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Contractor selection, relationships, and oversight</td>
<td></td>
<td>x</td>
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<tr>
<td>Energy education and behavior change program for residents</td>
<td></td>
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<tr>
<td>Advocacy in state, local, and national government</td>
<td></td>
<td>local/state</td>
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<tr>
<td>Administer LEAP</td>
<td></td>
<td>x</td>
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<tr>
<td>Administer NEEP</td>
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<td>x</td>
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<tr>
<td>Energy Bill Assistance Program</td>
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<td>x</td>
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<tr>
<td>Home Furnace Repair Program</td>
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<td>x</td>
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<tr>
<td>Exclusive low income focus</td>
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<td>x</td>
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<tr>
<td>Single family and multifamily</td>
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<td>x</td>
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<td>Non-profit</td>
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<td>x</td>
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<tr>
<td>Administer Federal WAP</td>
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<td>x</td>
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<tr>
<td>Low interest energy efficiency financing partnerships</td>
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<td>x</td>
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<td>QA/QC</td>
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<td>x</td>
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<tr>
<td>Post retrofit monitoring</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
Washington State Sustainable Energy Program:

Timeline and Opportunities

Ainsley Close
Senior Sustainable Energy Lead
Multifamily Housing and Community Facilities Division
Washington State Housing Finance Commission
Multifamily Affordable Tax Credit Lifecycle

New Construction

- 100% New Construction
- Significant Rehabilitation

Mid-Compliance

- 10-Year Tax Credit Allocation
- 15-Year Regulatory Agreement

Post-Year 15

- Disposition
- Rehabilitation
New Construction/ Significant Rehab

4% Tax Credit
- Non-competitive so long as there is sufficient tax-exempt bond cap authority
- Must meet state standards
- May require local and/or state green-building standards

9% Tax Credits
- Competitive for credit allocation
- States follow a Qualified Allocation Plan which varies widely; some encourage Energy Efficiency
- May follow green-building standards
Partnership Opportunities

Beyond Code Improvements
Built Smart Program

Lifecycle Cost Assessment
Can yield significant operational savings for building owners

Information Sharing
Formal and informal training and information-sharing networks are critical
Mid-Compliance

Challenges

- Tax Credit compliance restrictions with investors and other lenders
- Money available in reserves for emergency replacement
- Lack of capacity
- Often need to include energy and water improvements

Opportunities

- Low-interest, nonrecourse loans
- On-bill repayment
- Increasing analysis on loan bundling
- WSHFC partnering with SCL to pilot loan with on-bill for tax credit properties and nonprofits
- Utility Allowance adjustment
Washington State Utility Allowance Adjustments (from PHA) 2009-2014

- Actual Usage (#6)
- HUD Model (#7)
- Energy Consumption Model (#8)

-5%  -10%  -15%  -20%  -25%  -30%  -35%  -40%  -45%

N=1
N=19
N=5
Year 15 and Beyond

• Goals:
  – Preservation of affordable housing
  – Opportunity for significant rehabilitation

• Data and information at HFA on timing of projects being placed in service

• Focus on upgrades that help reduce long-term operations and maintenance costs
Challenges by the Numbers

- $0.08/kWh
- 59 electric power providers
- 28 public utility districts in Washington State
- 5 investor-owned utilities
- 1 housing finance agency per state
Contact us!

www.wshfc.org

Ainsley Close
Senior Sustainable Energy Lead

Ainsley.Close@wshfc.org
(206) 254-5359
PSE&G Multifamily Housing Program

Rachael P Fredericks
PSE&G Program Manager
Energy Services
Newark NJ

Rachael.fredericks@pseg.com
• Formed in 1903 as a combination of 400 utilities and transportation companies. Became PSE&G (largest subsidiary of PSEG) in 1948
• \( \frac{3}{4} \) of the total state population
• 2,600 square miles- 6 largest cities
• 1.8 million gas customers
• 2.2 million electric
Program Funding and History

- Three rounds of approved program funding
  - 2009= 19 million - partnership with NJHMFA
    - Important component - very viable pipeline
  - 2012= 20 million – open to market
    - Wide variety of opportunity
  - Third Program filed August 2014 approved in 2015= 35 million - address large waiting list – mix of properties
- A comparable program is not currently available for multi family in New Jersey
- PSE&G Investment. Rate Recovery Process every July to recover investment ---- PSE&G takes “risk” in investment into market sector
Results of our Multi Family Program to Date…

- 39 million total to invest: Almost all is committed (36 million +) Admin spend is about 4 million
- 45-50 project to be completed - Average size project is $800,000 +
- Well over 10K units and 280 buildings (many senior low income)
- On Bill Program Repayment is working- customers are repaying
- Energy savings will be well over 700Kw, over 8 million kWh and 2 million Therms.
- Cost per saved energy currently is .04 cents with $/kWh = 0.58
- Most savings are around 30-40 % DEEP APPROACH= DEEP SAVINGS
PSE&G’s Service Territory Ideal Target Market
But Multi Family Market Faces Steep Market Barriers

• Thin operating margins
• Deferred maintenance with poor building conditions, ongoing deterioration
• Market sector consistently overlooked and underserved by existing energy efficiency programs
• Relatively high energy usage
• Lack of available capital for improvements
• Aging mechanical equipment
• Need to preserve affordability
• Lack of knowledge about energy efficiency
Essential Program Elements

Turn Key approach –
Soup to nuts- audit to closeout

Utility acts like the bank

✓ PSE&G provides funds for approved construction scope **UPFRONT** and buy down incentive on whole project.
✓ Free audit
✓ Master metered and NON master metered buildings accepted
✓ Resident **and** common areas **all considered offered as a package**
✓ Diversity of building types
✓ Agreements and negotiations with building **owner only** - Removes split incentive issue

✓ Incentive is offered to buy down the project with customer paying an average of 30 % of the total project including the soft costs ie: design etc..

✓ On bill 0 % interest pay back on owner portion
Multifamily Program Incentive Structure

- 15 year simple payback on each measures but offered as package
- Total project incentive (not on a per measure basis) will **buy down** project cost by 6 yrs., but not to less than 3 years.. PSE&G applies cost effective test to whole project
- Typical project the customer is responsible for 30%- 40 % of total project cost

**Most attractive element:**

Program funds **entire project upfront** and customer finances their portion of project costs i.e.: Customer repays share of costs at 0% interest on customers’ utility bill over a period of **5 years** (10 years if HFMA mortgaged properties).
Common Measures

- Boiler optimization / replacement
- DHW improvements / replacement
- Ventilation improvements
- HVAC
- Insulation & air sealing
- Common area lighting and lighting controls
- Refrigerators
- Water saving devices
  - low flow aerators and shower heads
- Lighting in units

The more the better....
<table>
<thead>
<tr>
<th>Item</th>
<th>Measure Description</th>
<th>Measure Cost</th>
<th>Measure Savings ($)</th>
<th>Project Payback (yrs)</th>
<th>PSE&amp;G Buydown ($)</th>
<th>Customer Total Share</th>
<th>Customer Monthly Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Thermostatic Controls in apartments</td>
<td>$240,791</td>
<td>$24,371</td>
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<tr>
<td>2</td>
<td>Insulation of steam DHW- pipes and tanks</td>
<td>$81,990</td>
<td>$56,592</td>
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<tr>
<td>4</td>
<td>DHW heater Improvements</td>
<td>$83,299</td>
<td>$11,667</td>
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<td></td>
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<td>5</td>
<td>Basement steam trap repair</td>
<td>$38,685</td>
<td>$1,490</td>
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<td>6</td>
<td>Optimize boiler efficiency</td>
<td>$99,442</td>
<td>$9,678</td>
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<tr>
<td>7</td>
<td>CFLs in apartments</td>
<td>$1,828</td>
<td>$1,186</td>
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<tr>
<td>8</td>
<td>1.5 gpm showerhead, aerators</td>
<td>$3,360</td>
<td>$2,422</td>
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<td></td>
<td></td>
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<tr>
<td>9</td>
<td>Energy Star Fridges</td>
<td>$44,729</td>
<td>$4,043</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>10</td>
<td>Common area &amp; kitchen T8 fixture, lamp and ballast upgrade. CFL replacement in stairwells. LED EXIT signs.</td>
<td>$183,870</td>
<td>$18,818</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>11</td>
<td>LED &amp; T8 fixture, lamp and ballast upgrade for exterior lighting.</td>
<td>$29,347</td>
<td>$3,603</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>12</td>
<td>LED parking fixtures with integral photocells. Induction spotlights.</td>
<td>$15,250</td>
<td>$1,468</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>14</td>
<td>EC motors for rooftop fan assemblies</td>
<td>$40,125</td>
<td>$13,683</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Project Total</td>
<td>$862,716</td>
<td>$149,020</td>
<td>5.79</td>
<td>$564,676</td>
<td>$298,040</td>
<td>$4,967</td>
</tr>
</tbody>
</table>

**CUSTOMER SUMMARY TABLE**

- Customer Payback from Savings: 2.0
- Measure Savings: $149,020
- Annual Loan Repayment: $59,608
- Annual Net Cash Flow: $89,412
- MONTHLY CASH FLOW: $7,451
Lessons Learned

- Audit approach flexibility depth needed to realize savings
- Measure life is critical to cost effectiveness - bundle where we can
- Customer education and owner involvement important
- Dialogue with management firms & owners
- Accurate site energy analysis (baseline energy data) Overcoming site / access issues to move project to completion during and after audit and into construction

- Close out Process is Critical
- Accurate documentation
- Commitment to Cx
- Continued M & V
- Benchmarking before and after
PSE&G Multifamily Housing Program

Rachael P Fredericks
PSE&G Program Manager
Energy Services
Newark NJ
Rachael.fredericks@pseg.com
Incorporating Energy Efficiency into Multifamily Retrofits, Renovations & New Construction

Jogchum Poodt
jpoodt@dcseu.com
May 29, 2015
Talking Points

- Overcoming split incentive barriers
- Case study: one project’s incorporation of ECMs and how the deal worked out
- The DCSEU’s methodology and goals in forming partnerships with government agencies, affordable housing developers, and market place
Overcoming Split Incentive Barriers

- Building owner or manager reluctant to invest in energy efficiency because the renter is the beneficiary of lower utility bills.
- Developer with no long-term ownership interest less likely to invest in efficient technologies.
- Split incentives combine to discourage efficiency investments because investor reaps no direct reward.
Case Study at Channel Square

$500k Buyers Credit

Energy Efficiency Upgrades

Value Add:
Lower Utility Costs
- Increase NOI
- Increase Value
- Increase Supportable Debt

Owners/Developers
Property Management
Architect
General Contractor/Subs
MEP Engineers
Energy Consultant
DCSEU
- Low-flow shower heads and faucet aerators
- Efficient hot water boilers with new VFD pumps
- High-efficiency interior/exterior lighting upgrades
- Washington Gas Energy Services to supply 100% wind renewable power

**Green Upgrades Coming to Channel Square**

Channel Square is going green! Here’s a preview of the upgrades coming to the property starting in December.

**WATER**

- Installation of water-efficient low-flow shower heads, and faucet aerators in every unit.
  - Conserving 2.7 million gallons of water per year.
  - 16% savings expected in water expenses annually.

**HOT WATER**

- Replacement of the existing hot water boilers with new 95% efficient boilers.
  - Faster delivery of hot water.
  - 41% savings expected in expenses annually.

**LIGHTING**

- High-efficiency lighting upgrades in common areas, hallways, and garages. Replacement of existing exterior lighting with high efficiency fixtures. Exterior light levels will improve visibility at night, increasing levels of safety and security at Channel Square.
  - New light bulbs will last up to 10x longer.
  - Exterior lighting reduces maintenance costs by lasting 5x longer.
  - Free LED light bulb exchange for personal fixtures in units.
  - 29% combined savings expected in electricity expenses annually.

**RENEWABLE ENERGY**

- Channel Square has a new contract with Washington Gas Energy Services to supply 100% wind renewable power to the property.
- Natural gas equivalent to taking 54 cars off the road for the year, diverting 95 tons of waste from landfills and saving 594 barrels of oil annually.
- Electricity equivalent to taking 83 cars off the road for the year, diverting 149 tons of waste from landfills and saving 927 barrels of oil annually.

**SCHEDULE**

The improvement process will begin in early December. A schedule of the work and the specific dates when your apartment will be upgraded will be provided to you. Hamel Builders, Inc. will be overseeing the upgrades under the direction of Eagle Point Management and Channel Square Housing, LLC. We appreciate your cooperation and look forward to a greener and more sustainable Channel Square!

*CHANNEL SQUARE HOUSING, LLC*
Goals

- 20% reduction in utility costs
- Complete work in short timeframe
- Perform work with quickest paybacks
- Minimal inconvenience to residents
Approach

Project Scoping Process

- Identify potential energy and water savings activities
- Determine potential energy and water savings
- Decide preliminary scope
- Submit to contractor for actual pricing
- Engage DCSEU and others for gap funding
- Adjust scope based on actual cost and incentive
- Update final paybacks
Potential Energy & Water Measures

- Window and Sliding Door Replace
- Water Efficiency (Showerheads, aerators, toilets)
- Solar Hot Water and Photovoltaic Systems
- Convектор Unit Replacement
- Boiler Upgrade
- Variable Frequency Drives (VFD's) and controls
- Add economizer to Rooftop Air Handler
- Replace dampers
- Insulate Exterior walls and ceilings
- Air Sealing Measures
- Lighting Upgrades
- Heat Recovery on waste lines
### By the Numbers

<table>
<thead>
<tr>
<th>Measure</th>
<th>Total Cost</th>
<th>Utility Rate Savings</th>
<th>% Utility Savings</th>
<th>Simple Pay Back (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Plant Upgrades</td>
<td>$512,000</td>
<td>$32,500</td>
<td>6.0%</td>
<td>15.8</td>
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<tr>
<td>VFD Pumps</td>
<td>$69,000</td>
<td>$8,000</td>
<td>1.5%</td>
<td>8.6</td>
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<tr>
<td>Common Area Lighting</td>
<td>$160,000</td>
<td>$19,500</td>
<td>3.6%</td>
<td>8.2</td>
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<tr>
<td>Water Fixtures</td>
<td>$3,000</td>
<td>$19,900</td>
<td>3.7%</td>
<td>0.2</td>
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<tr>
<td>In-Unit Screw-In Light Bulbs</td>
<td>$0</td>
<td>$4,000</td>
<td>0.7%</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>$744,000</strong></td>
<td><strong>$83,900</strong></td>
<td><strong>15%</strong></td>
<td></td>
</tr>
</tbody>
</table>
Physical Analysis

Value Proposition

Balance Points

- % Confidence
- % Action
- $ Analysis
- $ Time
- Type of Measure
- Shifting the Curve
Energy Analysis Responsibility

Your responsibility as a consumer of Energy Analysis

- Establish clear expectations early on
- Be engaged (parties involved)
- Rough Order Magnitude (relative impact seem reasonable)
- Benchmarking & utilities (understand where the $ is going)
- Look at the package of measures (diversity)
DCSEU Mission

- Reduce energy use throughout the District
- Create green jobs for District residents
- Stimulate the local economy
- Improve the efficiency of housing for low-income residents
- Reduce the growth rate of peak electricity demand
- Increase renewable energy generating capacity
DCSEU Model

Centralized Coordination

Comprehensive Programs

Focus on Delivering Energy Services vs. Commodity Energy

Flexible Incentives
What sets DCSEU apart

- Account Management
- Not-for-profit
- Accessibility
- Sense of community
- Local focus
The DC Sustainable Energy Utility is a project of the Sustainable Energy Partnership under contract to the District Department of the Environment (DDOE).
Energy Capital Improvement Program
Better Buildings Summit
Workshop on Multifamily Efficiency Programs
Adrianne Todman, Executive Director, DCHA
Merrick Malone, Director OCP, DCHA
May 29, 2015
Discussion Points

- Program Background
- Program Analysis
- Economic Analysis
- Moving Forward
Energy Capital Improvement Program (ECIP)

- ECIP is a capital improvement program designed to financially leverage the energy and water savings associated with the replacement of aging equipment and infrastructure.

- Using established HUD subsidy incentives, DCHA funded the program from energy and water savings.
Program Goals

- Provide safe, comfortable, and affordable housing that improves the quality of life for the Residents;
- Reduce DCHA energy consumption;
- Reduce DCHA operations, emergency repair and maintenance costs; and to
- Increase DCHA staff capabilities, system-wide.
DCHA ECIP Profile

- 31 Properties
- 5,444 Units
- \( \approx 28,000 \) Residents affected
- Average $16 million annual utility budget
- Achieve $3.9 million in annual savings (24% reduction)
- Complete $21.1 million in critical infrastructure & equipment replacements
### ECIP Scope of Work

<table>
<thead>
<tr>
<th>Energy Conservation Measures (ECM)</th>
<th>Central Energy Management System</th>
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</thead>
<tbody>
<tr>
<td>Boilers</td>
<td>Automation/New Technologies</td>
</tr>
<tr>
<td>Chillers</td>
<td>Metering &amp; Communication</td>
</tr>
<tr>
<td>Hot Water Systems</td>
<td>Preventive Maintenance</td>
</tr>
<tr>
<td>Fan Coils</td>
<td>Commissioning</td>
</tr>
<tr>
<td>Water Saving Devices</td>
<td></td>
</tr>
<tr>
<td>Lighting/Appliances</td>
<td></td>
</tr>
</tbody>
</table>
## Comparing ECIP Financing Options

<table>
<thead>
<tr>
<th></th>
<th>Rate</th>
<th>Fees</th>
<th>Flexibility</th>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>Commercial Bank Loan</td>
<td>Mid-level</td>
<td>High</td>
<td>Full</td>
<td>Short</td>
</tr>
<tr>
<td>Bonds (via DCHFA)</td>
<td>Lowest</td>
<td>High</td>
<td>Limited</td>
<td>Long</td>
</tr>
<tr>
<td>Taxable Master</td>
<td>High</td>
<td>Low</td>
<td>Full</td>
<td>Long</td>
</tr>
<tr>
<td>Equipment Lease</td>
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<td></td>
</tr>
<tr>
<td>Tax-Exempt Master</td>
<td>Low</td>
<td>Low</td>
<td>Limited</td>
<td>Long</td>
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<tr>
<td>Equipment Lease</td>
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<tr>
<td>Energy Savings</td>
<td>Highest</td>
<td>Highest</td>
<td>None</td>
<td>Mid-level</td>
</tr>
<tr>
<td>Performance Contract</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Tax-Exempt Master Equipment Lease

- Acceptable form of Competitively procured Non-HUD financing
- DCHA acquires all equipment with the funds raised to complete the program
- DCHA makes “Rental Payments” pursuant to the terms of the Master Lease Agreement
- Interest rates are slightly higher than Bonds; issuance costs are much lower.
- Assets owned by Financier and sold to DCHA for $1.00 at end of Term
- Use of Proceeds can include reimbursing DCHA for self-funded construction work
Self Performance Economic Analysis

• ECIP Capital Cost - $21.1 million

• Industry/ HUD Program Soft Costs - 76%
  • $21.1 \times 76\% = $16.0 \text{ M} + $21.1 \text{ M} = $37.1 \text{ M} \text{ (Total Cost)}

• CSA/OCP Program Costs - 22%
  • $21.1 \times 22\% = $4.6 \text{ M} + $21.1 \text{ M} = $25.7 \text{ M} \text{ (Total Cost)}

• DCHA Project Savings - $11.4 million

• O&M avoided costs - $2.4 million
ECIP IN ACTION
Energy Efficiency Upgrades

New Energy Efficient Heating and Cooling Pumps
Demonstrated Savings
Greenleaf Gardens – Natural Gas

- Completed boiler retrofit
- 14% Reduction

<table>
<thead>
<tr>
<th>Year</th>
<th>Therms</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY08</td>
<td>242,360</td>
</tr>
<tr>
<td>FY09</td>
<td>217,584</td>
</tr>
<tr>
<td>FY10</td>
<td>193,331</td>
</tr>
</tbody>
</table>

Natural Gas Savings
Demonstrated Savings
Kenilworth Courts - Water

- Completed replacement of water fixtures
- Current reduction of 51%+ in rolling base water consumption data
Demonstrated Savings
Kentucky Courts - Electric

- Completed chiller retrofit
- 27% reduction

![Electricity Savings Chart]

<table>
<thead>
<tr>
<th>Year</th>
<th>kWh</th>
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</thead>
<tbody>
<tr>
<td>FY08</td>
<td>865,920</td>
</tr>
<tr>
<td>FY09</td>
<td>838,120</td>
</tr>
<tr>
<td>FY10</td>
<td>846,180</td>
</tr>
</tbody>
</table>

Source: [Kentucky Courts - Energy Savings](#)
Summary

- Modernized Infrastructure
- New Technologies
- $4 million/year in cost efficiencies
- Completed in 36 Months
- Established DCHA’s Energy & Environmental Leadership
## Program Results / Milestones

<table>
<thead>
<tr>
<th>Type</th>
<th>Savings</th>
<th>Equivalent in Metric Tons, Carbon Dioxide Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity Savings</td>
<td>1,047,093 Average Annual Kilowatt Hours Saved</td>
<td>722</td>
</tr>
<tr>
<td>Natural Gas Savings</td>
<td>635,346 Therms Saved</td>
<td>3,369</td>
</tr>
<tr>
<td>Total Combined Savings</td>
<td></td>
<td>4,091</td>
</tr>
</tbody>
</table>

**Equal To:**

The reduction of 9,740,476 Passenger Miles Driven Annually
Moving Forward

Innovative Technologies to Improve Energy Efficiency
Moving Forward

Micro Turbines and Fuel Cells for Electricity Production
Moving Forward

High Efficiency Heating and Hot Water Boiler Installations
Thank You!

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