Benchmarking Multifamily Building Energy Use

EEBA Excellence in Building Conference, Sept. 25, 2014
Presentation Topics

- A little about Elevate Energy
- Benchmarking in our multifamily program
- Benchmarking by partners in MI and PA
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

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Finding Our Wheelhouse

Our goal: Preserving affordable housing and improving the environment via reducing energy use

- Focused on low/moderate income areas
- Older courtyard 30-unit buildings were common in our target areas and generally inefficient
Energy Efficient Buildings

Multifamily buildings:

- More than 19,000 units retrofitted
- More than 4.5 million therms and 12 million kWh saved
- Typical savings of 30%

Expanding to serve additional building types:

- Small multifamily
- Nonprofit organizations
Elevate Energy’s one-stop-shop is a proven, streamlined process that addresses the challenges of building owner engagement.

- **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**
Elevate Energy’s one-stop-shop is a proven, streamlined process that addresses the challenges of building owner engagement.

**Benchmarking & Building Assessment:**
- Energy Analyst analyzes utility bills and schedules energy assessment.
- Energy Analyst conducts on-site energy assessment and discusses financing needs with customer.
- Energy Analyst develops report of recommended measures with cost, savings, payback and available incentives.
Consistent, reliable data is a strategy to engage building owners in energy use of their buildings.

Using Benchmarking to Identifying Outliers and Targets

wegowise

We help you lower your utility bills.
Elevate Energy’s one-stop-shop is a proven, streamlined process that addresses the challenges of building owner engagement.

**Benchmarking & Building Assessment:**

1. **Energy Analyst** analyzes utility bills and schedules energy assessment.
2. **Energy Analyst** conducts on-site energy assessment and discusses financing needs with customer.
3. **Energy Analyst** develops report of recommended measures with cost, savings, payback and available incentives.
Why is the Assessment Important?

• It creates the foundation of the relationship with the decision maker

• Provides an opportunity to:
  • Get rare face time and their complete attention
  • Show your technical competence
  • Educate the decision-maker on EE
  • Understand and address their problems and needs
  • Tell them how great your program is

• A good assessment, with a solid business case for retrofit, will almost always result in success
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>8,750</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Total**

<table>
<thead>
<tr>
<th><strong>Cost ($)</strong></th>
<th><strong>Savings (therms/year)</strong></th>
<th><strong>Savings (kWh/year)</strong></th>
<th><strong>Savings ($/year)</strong></th>
<th><strong>Simple payback (years)</strong></th>
<th><strong>Retrofit lifetime (year)</strong></th>
<th><strong>SIR</strong></th>
</tr>
</thead>
<tbody>
<tr>
<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>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* Assumes $1.00 per therm of natural gas or $0.10 per kWh of electricity. 1 therm = 29 kWh.

Estimated current yearly natural gas use: **40,170 therms**

Estimated post-retrofit yearly natural gas use: **35,920 therms**

Estimated yearly natural gas cost savings: **$13,510**
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</td>
<td>Free Direct Install</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nicor Multi-Family Home Energy Savings Program</td>
<td>Direct installed at no cost to owner</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>$5,000 per boiler, AFUE must be 90%+</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>
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<tr>
<td>Requires pre-inspection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DHW replacement</td>
<td>300</td>
<td>44,700</td>
<td>1%</td>
<td>15.4</td>
<td>1.3</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>

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


**Custom Rebates:** [http://nicorgasrebates.com/index.php/bus-custom/custom-welcome](http://nicorgasrebates.com/index.php/bus-custom/custom-welcome)

**Direct Install:** [http://www.nicorgasrebates.com/programs/mfhes](http://www.nicorgasrebates.com/programs/mfhes)
Elevate Energy one-stop-shop is a proven, streamlined process that addresses the challenges of building owner engagement.

Customer Intake → Benchmarking → Building Assessment → Closing the Deal → Construction → QA/QC Inspection & Project Wrap-up → On-going Monitoring

Customer

Admin → Energy Analyst → Construction Manager → Contractors

On-going Monitoring:
- Energy Analyst conducts on-going monitoring of utility bills
- Energy Analyst revisits any buildings not performing as expected
- Energy Analyst provides Customer with report of annual energy use for two years post-retrofit
Monitor energy use to ensure savings and optimize performance

- Energy Analyst monitors energy use to ensure savings by reviewing energy bills
- Energy Savers provides annual progress report on savings for two years following the upgrade
- If savings are not being met, Energy Savers will revisit the building to perform a tune-up or additional maintenance training/education
Monitor energy use to ensure savings and optimize performance

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Full-Year Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct 09 - Sep 10</td>
<td>9.0</td>
</tr>
<tr>
<td>Oct 10 - Sep 11</td>
<td>428</td>
</tr>
</tbody>
</table>

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

**Annual Savings**
- **Expected:** 20%
- **Actual:** 52% (Btu per square foot (conditioned))
Elevate is currently developing programs in 8 states.

Connecticut
Elevate is partnering with New Ecology, Inc. (NEI) to provide technical support to affordable multifamily buildings applying for CEFIA and PACE energy efficiency financing products.

Michigan
Michigan Energy Options with support from Elevate is developing and implementing a Consumers Energy pilot to provide affordable multifamily building owners with a full-suite of energy efficiency services starting from the assessment through post-retrofit monitoring.

Pennsylvania
Elevate is supporting the expansion of ACTION-Housing’s The One-Stop multifamily energy efficiency program by growing its pipeline of interested building owners.

Illinois and Wisconsin
Chicago-based Elevate Energy operates a multifamily energy efficiency program in Illinois and is partnering with Wisconsin Focus on Energy to enhance their program offering.

Massachusetts and Rhode Island
Elevate’s Boston-based partner NEI provides energy efficiency and green services to multifamily buildings in Massachusetts and is expanding to Rhode Island.

Louisiana
Elevate and NEI are partnering with Green Coast Enterprises in New Orleans, LA to establish retro-commissioning and energy management services.

We believe that to fully address this untapped and underserved market, new ways of thinking and working together are necessary.
Benchmarking in Michigan

- MSHDA
  - Customer Outreach

- Wegowise
  - Benchmarking

- MEO
  - EE Upgrades
Benchmarking in Pennsylvania

Multifamily buildings in Pennsylvania
(Photo Courtesy ACTION Housing)
Benchmarks in Missouri

We’re starting now! Interested?

Owners curious about having their multifamily affordable buildings benchmarked for free should contact:

Louise Sharrow - Louise.Sharrow@elevateenergy.org or 773-278-0862
Questions? -- Stay in Touch

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