Building Electrification Retrofits for Cold Climate Affordable Housing

Jackie Montesdeoca, Elevate
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About Elevate

- Elevate seeks to create a world in which everyone has clean and affordable heat, power, and water in their homes and communities — no matter who they are or where they live
Background on Elevate

Elevate has retrofitted over 100,000 units of affordable housing over the past 20 years

- Our programs span energy and health retrofits, solar, demand response and dynamic pricing, and contractor and workforce development
- We are developing an implementation model to electrify and decarbonize the affordable housing market as quickly and as equitably as possible
Building Electrification

- We need to eliminate fossil fuel use in buildings to combat the climate crisis.
- Residents with lower wealth, renters, seniors, and other vulnerable groups are more likely to:
  - Live in older buildings,
  - Lack cooling,
  - Disproportionally experience the effects of climate change, and
  - Be left behind in climate mitigation efforts.
- Building electrification retrofits may shift energy costs to tenants, this can be done without increasing energy burden.

*We believe affordable housing should be high quality and low-carbon, and we need to move as quickly as possible to combat the climate crisis.*
Project Case Study – La Paz Place, Chicago IL.

- 3-building property totaling 44 units.
- Masonry courtyard-style building, which is typical of the pre-War vintage.
- Of the 44 units, 31 are affordable to families at 50% Area Median Income (AMI) or $44,550, and 13 are affordable at 30% AMI ($26,730).
- Owner provides housing development and preservation, economic empowerment, leadership development, and tenant organizing.
- Pre-retrofit- individual gas furnaces and gas stoves, and common area gas hot water heaters and gas dryers
Project Team & Partners

Bickerdike

BICKERDIKE REDEVELOPMENT CORPORATION

ELEVATE

slipstream

comed

db | HMS

AN EXELON COMPANY
Air Source Heat Pumps with back-up electric resistance heat were installed in 10 of three- and four-bedroom units and tied into the solar PV array.

<table>
<thead>
<tr>
<th>End Use</th>
<th>Pre-Retrofit</th>
<th>Post-Retrofit</th>
<th>Resident or Owner Paid</th>
<th>Resident Experience Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space Heating &amp; Cooling</td>
<td>Individual gas furnaces &amp; window AC units</td>
<td>Ducted cold-climate ASHPs</td>
<td>Resident</td>
<td>Added central cooling &amp; reduced costs</td>
</tr>
<tr>
<td>Domestic Hot Water</td>
<td>Central gas boiler</td>
<td>Heat pump water heaters (in parallel)</td>
<td>Owner</td>
<td>None</td>
</tr>
<tr>
<td>Cooking</td>
<td>Natural gas stoves</td>
<td>Non-induction electric stove</td>
<td>Resident</td>
<td>Shifted from gas to electric &amp; improved indoor air quality</td>
</tr>
<tr>
<td>Clothes Dryers</td>
<td>Natural gas dryers in common area</td>
<td>Electric resistance dryers</td>
<td>Owner</td>
<td>None</td>
</tr>
<tr>
<td>Renewable Energy</td>
<td>None</td>
<td>70 kW solar PV array</td>
<td>Owner &amp; Residents in 10 units</td>
<td>Adding solar for 10 units</td>
</tr>
</tbody>
</table>
# Utility Bill and Carbon Analysis Results

## Utility Bill Annual Impacts (Modeled)

<table>
<thead>
<tr>
<th>Utility Payer</th>
<th>Pre-Retrofit Annual Energy Cost</th>
<th>Post-Retrofit Annual Energy Cost (no solar)</th>
<th>Post-Retrofit Annual Energy Cost (with solar)</th>
<th>Percent Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident</td>
<td>$61,452</td>
<td>$49,362</td>
<td>$48,811</td>
<td>21%</td>
</tr>
<tr>
<td>Common Areas</td>
<td>$14,253</td>
<td>$21,034</td>
<td>$13,692</td>
<td>4%</td>
</tr>
<tr>
<td>Total</td>
<td>$75,705</td>
<td>$70,396</td>
<td>$62,504</td>
<td>17%</td>
</tr>
</tbody>
</table>

## Carbon Annual Impacts (Modeled)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Pre-Retrofit Annual Carbon</th>
<th>Post-Retrofit Annual Carbon (no solar)</th>
<th>Post-Retrofit Annual Carbon (with solar)</th>
<th>Percent Carbon Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>635,661 lbs CO₂</td>
<td>400,977 lbs CO₂</td>
<td>356,021 lbs CO₂</td>
<td>44%</td>
</tr>
</tbody>
</table>
Utility Costs of Electrification + Solar

- Current (Gas Baseline)
- Future (Electrification)
- Electrification + Solar

$\text{Common} \quad \text{Tenant}$
Resident Engagement

- Bilingual resident engagement
  - Property-wide community meeting
  - Flyers
  - Door-knocking
  - Cash incentives
  - Post-retrofit interviews planned

- Support with bridging changing LIHEAP benefits due to shift from gas to electric heat
Learnings – This is complex, but it can be done!

- Building owners need support to figure it out the best solutions for their tenants and buildings.
- Affordable housing owners are focused on their tenants and operating costs.
- Adding cooling, resiliency, and health are of interest for owners and residents.
- Regional differences are very real in terms of economics, technology solutions, and contractor knowledge and availability.
- Electrification must be integrated with the other pillars of building decarb, especially energy efficiency, but requires braiding of funds.
- Policy is needed to fill gaps and address first costs, especially for electrical service upgrades and address LIHEAP benefits.
- Utility rate structures particularly for electric heat in certain regions need to be re-examined.
- Investments in diverse workforce and contractors are needed help to pivot electrification.

*If done right, we can save tenants money and reduce carbon emissions.*
Thank you!

Please reach out if you have follow-up questions:

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