Decarbonization with Intention: Democratizing Data to Dismantle Barriers in Retrofits

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Decarbonization with Intention: Democratizing Data to Dismantle Barriers in Retrofits

To ensure equitable decarbonization, we must engage existing communities, accelerate pre-construction planning, and streamline financial pathways. By leveraging public data, we can democratize information and automate a scope relevant to the people who need it most to participate in a just clean energy transition. This session provides case studies on how diverse community partners are using Momentum software to inform decarbonization scopes, contractor proposals, and other relevant financial products, creating an accessible pathway for cost-effective decisions to be made quickly and confidently.
Existing multifamily is a must-solve climate problem
Multifamily uses the most on-site energy

2019 Total Site Energy Use by Sector
NYC Buildings > 50,000 sf

K-12 School 65.7
Office 74.3
Multifamily 82.4
College 105.5
Hotel 112.8

Buildings must stop emitting greenhouse gases
Sector emits up to 75% of urban GHG emissions

From Fossil fuel HVAC
To Clean electric HVAC

From Leaky enclosures
To Modernized enclosure & ventilation
Relevant upgrades known ahead of time
Less Time
Lower Cost
Preliminary scope of work in minutes, not months
## Advanced Search

### Search Parameters

#### Housing Classification
- Affordable
- Market Rate

#### Building Location
- Borough:
  - The Bronx
  - Brooklyn
  - Queens
- ZIP codes

#### Building Details
- Gross Floor Area
- Above Grade Floors
- Number of Dwelling Units
- Number of Stories
- Year Built
- Building Footprint Area

#### Space Heating System
- One-plate Steam
- Two-plate Steam
- Hot Water Heat
- Hydronic Fan Coil
- Electric Resistance

#### Primary Fuel Type
- Oil
- Kerosene
- Gas
- Natural Gas
- Electricity
- Electric Steam

#### Energy Star Grade
- A
- B
- C
- D
- E

#### Cooling Tower
- Yes
- No

#### Compliance
- HPD Violations
  - Domestic Hot Water
  - Roof
- DOB Violations
  - Boiler
  - Facade
  - Elevator

[Search] [Clear]
“Affordable housing is generally defined as housing on which the occupant is paying no more than 30 percent of gross income for housing costs, including utilities.”
-U.S. Department of Housing and Urban Development (HUD)

Jessica lives in a non-profit-run, project-based section 8 building and makes $24.66 per hour for an annual salary of $51,290.02. 30% ($14,835.00) of her salary before tax is required for rent. After taxes ($37,480.30), 40% of her take-home pay must be set aside for her not to miss payment on rent alone.
Affordable Housing Market Issues?

- Historical Divestment
  - Financing

- Pandemic Workforce Shortages
  - Contractor Engagement

- Ownership Structure
  - One Size Fits All Programming (Energy & Housing)

- Historical Negligence
  - Policy Awareness
  - Public Education & Trust
What does Data have to do with Housing and Decarbonization?

Implements access to information, allowing folks to be better informed

- **Historical Negligence**
  - Provide decision-makers insights to trusted community leaders (community-based organizations, non-profit owners, cooperative board members, etc.)

- **Disinvestment**
  - Demystifies program incentives and rebates
  - Convenient financing options, including incentives and loan products, if needed

- **Ownership Structure**
  - Using publicly accessible information, decision-makers can receive information that is relevant to them

- **Workforce Shortages**
  - Decision-makers obtain automatic contractor proposals that maximize contractor time and decision makers' time
What happened to Jessica?

- If....
  - Jessica’s non-profit-owned property interested in decarbonization the market offers...
    - ABC non-profit is required to pay $20,000 - $30,000 for an energy audit
    - After this, they must navigate which financing option would lend to them since they do not meet the debt-to-income ratio
    - Simultaneously, they would have to research contractors online to obtain a quote, not knowing which option is right for their property or if there’s funding to support this effort

- If data is accessible...
  - ABC non-profit receives information on property at no-cost
  - Lending options are streamlined to include incentives that minimize the overall financial burden
  - Contractor information is provided right away to determine best course of action
  - Can also assess tariff structure to lower overall tenant and owner operational costs
    - *This can be key in affordable housing properties, ensuring we improve building systems without passing on the burden to those who are already burdened.*
UHAB empowers low-to moderate-income residents to take control of their housing and enhance communities by creating strong tenant associations and lasting affordable co-ops.
UHAB's Climate and Resiliency team connects co-op residents with resources so they can lead the way to a carbon-free future.

We increase access to energy efficiency measures to fight climate change and keep housing safe, healthy, and affordable.
AMEEP and LL97 Pathways

Scope Name:
(Priority Measures)

New York, NY 10035
Year Built: 1994
Total Units: 135
Total SQFT: 168963
Above Grade Floors: 7
Heating: Hot Water Heat
Cooling Tower:
Affordable Housing: Yes

About this scope:
Projects that achieve 150 points in the NYS Affordable Multifamily Energy Efficiency Program (AMEEP) qualify for the Comprehensive Pathway Tier 2 and $2,000 per dwelling unit in incentives. The Clean Heat Program defrays the cost of Air Water Heat Pump, which dramatically improves the carbon performance of your hot water system.
Initial Scopes of Work

Summary of Selected Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Incentives</th>
<th>Construction Cost</th>
<th>GHG Reduction KgCO2e</th>
<th>Energy Savings MMBTU</th>
<th>OpEx Savings per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window replacement</td>
<td>$35,550 40 points</td>
<td>$809K $845K</td>
<td>12172.6</td>
<td>177.8</td>
<td>$6,257</td>
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<tr>
<td>EMS</td>
<td>$11,250 20 points</td>
<td>$6,188 $97,438</td>
<td>10445.3</td>
<td>196.7</td>
<td>$2,557</td>
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<tr>
<td>Heating pipe insulation</td>
<td>$730 20 points</td>
<td>$7,483 $8,213</td>
<td>6509.8</td>
<td>122.6</td>
<td>$1,593</td>
</tr>
<tr>
<td>Boiler replacement - condensing</td>
<td>$40,180 40 points</td>
<td>$1.1M $1.1M</td>
<td>5995.6</td>
<td>112.9</td>
<td>$1,468</td>
</tr>
<tr>
<td>Common area lighting</td>
<td>$6,030 5 points</td>
<td>$31,142 $37,172</td>
<td>29623.9</td>
<td>228.9</td>
<td>$28,207</td>
</tr>
<tr>
<td>Low-Flow Showerheads &amp; Aerators</td>
<td>$0 5 points</td>
<td>$0</td>
<td>13588.1</td>
<td>255.8</td>
<td>$3,326</td>
</tr>
<tr>
<td>DHW pipe insulation</td>
<td>$730 20 points</td>
<td>$7,483 $8,213</td>
<td>3055.7</td>
<td>57.5</td>
<td>$748</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$270K 150 points</strong></td>
<td><strong>$1.8M</strong></td>
<td><strong>81,391</strong></td>
<td><strong>1152</strong></td>
<td><strong>$44,155</strong></td>
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</tbody>
</table>
LL97 Prescriptive Pathway Measures

Summary of Selected Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Incentives</th>
<th>Construction Cost</th>
<th>GHG Reduction KgCO2e</th>
<th>Energy Savings MMBTU</th>
<th>Utility Cost Savings per year</th>
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</thead>
<tbody>
<tr>
<td>Air sealing package</td>
<td>$1,890</td>
<td>$57,240</td>
<td>25126.1</td>
<td>473.1</td>
<td>$6,150</td>
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<tr>
<td>EMS</td>
<td>$11,250</td>
<td>$6,190</td>
<td>10445.3</td>
<td>196.7</td>
<td>$2,560</td>
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<tr>
<td>Smart thermostats</td>
<td>$5,240</td>
<td>$62,260</td>
<td>27854.1</td>
<td>524.5</td>
<td>$6,820</td>
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<tr>
<td>Heating pipe insulation</td>
<td>$670</td>
<td>$6,880</td>
<td>5985.5</td>
<td>112.7</td>
<td>$1,470</td>
</tr>
<tr>
<td>Common area lighting</td>
<td>$6,030</td>
<td>$31,140</td>
<td>32200.3</td>
<td>259.3</td>
<td>$29,990</td>
</tr>
<tr>
<td>DHW pipe insulation</td>
<td>$670</td>
<td>$6,880</td>
<td>2809.6</td>
<td>52.9</td>
<td>$690</td>
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<tr>
<td>Total</td>
<td>$25,760</td>
<td>$196K</td>
<td>104,421</td>
<td>1619</td>
<td>$47,670</td>
</tr>
</tbody>
</table>

85 points
## Comparing Scopes

### Summary of Selected Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Incentives</th>
<th>Construction Cost</th>
<th>GHG Reduction KgCO₂e</th>
<th>Energy Savings MMBTU</th>
<th>OpEx Savings per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler clean and tune</td>
<td>$1,350</td>
<td>$11,400</td>
<td>2410.5</td>
<td>45.4</td>
<td>$590</td>
</tr>
<tr>
<td>Heating pipe insulation</td>
<td>$1,440</td>
<td>$1,175 $2,615</td>
<td>2946.7</td>
<td>55.5</td>
<td>$721</td>
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<tr>
<td>Common area lighting</td>
<td>$2,170</td>
<td>$35,002 $37,172</td>
<td>10664.6</td>
<td>82.4</td>
<td>$10,154</td>
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<tr>
<td>DHW pipe insulation</td>
<td>$490</td>
<td>$2,145 $2,635</td>
<td>2946.7</td>
<td>55.5</td>
<td>$721</td>
</tr>
<tr>
<td>Low-Flow Showerheads &amp; Aerators</td>
<td>$0</td>
<td>$0</td>
<td>13588.1</td>
<td>255.8</td>
<td>$3,326</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$5,450 55 points</strong></td>
<td><strong>$49,722</strong></td>
<td><strong>32,557</strong></td>
<td><strong>495</strong></td>
<td><strong>$15,513</strong></td>
</tr>
</tbody>
</table>
Scope Name: AMEEP Comprehensive Sample Scope

Year Built: 1921
Total Units: 40
Heating: Hot Water Heat
Affordable Housing: Yes
Total SQFT: 59269
Above Grade Floors: 7
Cooling Tower: 

About this scope:
Projects that achieve 150 points in the NYS Affordable Multifamily Energy Efficiency Program (AMEEP) qualify for the Comprehensive Pathway Tier 2 and $2,000 per dwelling unit in incentives. The Clean Heat Program defrays the cost of Air Water Heat Pump, which dramatically improves the carbon performance of your hot water system.
# Summary of Selected Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Incentives</th>
<th>Construction Cost</th>
<th>GHG Reduction KgCO2e</th>
<th>Energy Savings MMBTU</th>
<th>OpEx Savings per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation - roof</td>
<td>$38,540 40 points</td>
<td>$67,240 160k</td>
<td>10233.8</td>
<td>192.7</td>
<td>$2,505</td>
</tr>
<tr>
<td>Air sealing package</td>
<td>$0 10 points</td>
<td>$0</td>
<td>9128.6</td>
<td>171.9</td>
<td>$2,234</td>
</tr>
<tr>
<td>Boiler clean and tune</td>
<td>$1,350 5 points</td>
<td>$1,650 41k</td>
<td>2960.4</td>
<td>55.7</td>
<td>$725</td>
</tr>
<tr>
<td>Smart thermostats</td>
<td>$1,740 10 points</td>
<td>$18,260 460k</td>
<td>9236.9</td>
<td>173.9</td>
<td>$2,261</td>
</tr>
<tr>
<td>EC Motor HW circ pump</td>
<td>$4,030 10 points</td>
<td>$712 18k</td>
<td>5087.3</td>
<td>60.1</td>
<td>$3,521</td>
</tr>
<tr>
<td>EMS</td>
<td>$5,300 20 points</td>
<td>$900 22k</td>
<td>12828.6</td>
<td>241.5</td>
<td>$3,140</td>
</tr>
<tr>
<td>LED lamps - In Unit</td>
<td>$0 5 points</td>
<td>$0</td>
<td>442.1</td>
<td>5.2</td>
<td>$306</td>
</tr>
<tr>
<td>Low-Flow Showerheads &amp; Aerators</td>
<td>$0 5 points</td>
<td>$0</td>
<td>4026.1</td>
<td>75.8</td>
<td>$985</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$60,000 105 points</strong></td>
<td><strong>$79,521</strong></td>
<td><strong>53,944</strong></td>
<td><strong>977</strong></td>
<td><strong>$15,678</strong></td>
</tr>
</tbody>
</table>
## Executive Summary

<table>
<thead>
<tr>
<th>Building</th>
<th>Per Dwelling Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Incentives</strong></td>
<td><strong>Incentives Per Unit</strong></td>
</tr>
<tr>
<td>$60,000 105 points</td>
<td>$1,500 105 points</td>
</tr>
<tr>
<td><strong>Construction Cost</strong></td>
<td><strong>Construction Cost Per Unit</strong></td>
</tr>
<tr>
<td>$65,569 - $93,473 $126K - $153K</td>
<td>$1,639 - $2,337 $3,139 - $3,837</td>
</tr>
<tr>
<td><strong>OpEx Savings Per Year</strong></td>
<td><strong>OpEx Savings Per Year</strong></td>
</tr>
<tr>
<td>$15,678</td>
<td>$392</td>
</tr>
<tr>
<td><strong>GHG Reduction KgCO2e</strong></td>
<td><strong>GHG Reduction KgCO2e</strong></td>
</tr>
<tr>
<td>53,944</td>
<td>1,349</td>
</tr>
<tr>
<td><strong>Energy Savings MMBTU</strong></td>
<td><strong>Energy Savings MMBTU</strong></td>
</tr>
<tr>
<td>977</td>
<td>24</td>
</tr>
<tr>
<td>2024 LL97 Per Year/ $0/ $0</td>
<td>2024 LL97 Per Year/ $0/ $0</td>
</tr>
<tr>
<td>2030 LL97 Per Year/ $0/ $5,683</td>
<td>2030 LL97 Per Year/ $0/ $142</td>
</tr>
</tbody>
</table>
Exploring Electrification

Scope Name: DHW Electrification

New York, NY 10024

Year Built: 1890
Total Units: 20
Total SQFT: 10610
Above Grade Floors: 6
Heating: One-pipe Steam
Cooling Tower: no
Affordable Housing: Yes

About this scope:
Projects that achieve 150 points in the NYS Affordable Multifamily Energy Efficiency Program (AMEEP) qualify for the Comprehensive Pathway Tier 2 and $2,000 per dwelling unit in incentives. The Clean Heat Program defrays the cost of Air Water Heat Pump, which dramatically improves the carbon performance of your hot water system.
Domestic Hot Water Heat Pumps

### Building Total Estimates

- **Incentives**: $26,450 (0 points)
- **Construction Cost**: $63,550 - $83,550
- **OpEx Savings per year**: $-127
- **Energy Savings MMBTU**: 132

### Water & Hot Water

**Clean Heat - AWHP DHW**

The installation of an air source heat pump plant to provide all (100%) of the domestic hot water for the building, reducing energy usage and associated GHG emissions. This lower-cost (relative to space heating) electrification measure connects to the existing hot water distribution system, requiring little-to-no distribution work.

- **Points / Estimated Rebates**: $26,450
- **Estimated Total Cost**: $73,550
- **OpEx Savings**: $-127
- **Energy Savings MMBTU**: 132.2
- **GHG Savings kgCO2e**: 5745.8

**Rebate**: NYS Clean Heat (2023) program provides a rebate rate per MMBTU of net energy savings.

**Construction Cost**: Installation quotes from participating contractors fall within $16,000-$20,000 per heat pump. The cost varies with building size and installation complexity. Depending on hot water usage, one heat pump is estimated to serve four apartments.

**OpEx Savings**: Energy use for domestic water heating (DHW) is estimated as 0.08 MMBTU per square foot of gross floor area, the median multifamily usage intensity from the NYC Technical Working Group report. If we could estimate this specific building’s water heating use from monthly energy data, we did. This energy use is removed from the building’s DHW fuel use, and new electricity is used by the new heat pump at a ratio of 0.82/35 (old efficiency/new efficiency). Energy savings is the change considering all fuel types. We multiplied electricity at fuel use changes by the utility cost rates found in the building details.
○ A mission-driven 501(c)3 clean energy investment platform and program partner investing in underserved communities and markets.
○ Delivering capital and market-shaping programs.
○ Partner for financial institutions, government, developers, and nonprofits.
○ Spun out of Connecticut Green Bank.
**What does IPC do?**

### Our Strategies

- **Lending** flexible capital and de-risking complex capital stacks, with a focus on the under-served

- **De-risking Lenders** with direct lending or catalyzing innovations: PRI, credit guarantees, etc.

- **New Structure Lending & Asset Ownership** for solar and innovative technologies

- **Program Design** for governments, lenders, CDFIs, and others to scale solutions or “white label” our products

### Multifamily, Nonprofit & Municipal Products

- **Catalyst** construction + term loan for energy & related upgrades; mid-cycle, alternatively secured

- **Credit Facilities** for multi-family portfolios and contractors to improve energy efficiency

- **Navigator** pre-development loans to plan energy improvements; mid-cycle or new construction
TEAM UP makes energy retrofits faster, easier, and cheaper for multifamily housing

- Predictive analytics expedite planning by suggesting high-impact scopes of work
- Software-enable scope development brings transparency to contractors, thus enabling demand aggregation
- Trust partner to engage on the ground
- New funding unlocked with standardized risk management rooted in energy efficiency
Example: Segmenting building stock by heating type

<table>
<thead>
<tr>
<th>Heating Type</th>
<th>Buildings</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-Pipe Steam</td>
<td>600</td>
<td>240,000</td>
</tr>
<tr>
<td>One-Pipe Steam</td>
<td>1,950</td>
<td>117,000</td>
</tr>
<tr>
<td>Hydronic</td>
<td>1,700</td>
<td>102,000</td>
</tr>
<tr>
<td>Total &gt;25k sf</td>
<td>4,250</td>
<td>459,000</td>
</tr>
</tbody>
</table>

Source: Catalyst team analysis based on New York City Housing and Vacancy Survey (NYCHVS), 2021 and Cadence OneFive Momentum.
Predictive analytics reduce audit and planning costs

Programmatic technology to reduce engineering soft costs

- ASHRAE Level 2 audits typically cost ~$10k - $40k+, while more targeted Climate Mobilization Act assessments can cost ~$5k - $10k

- But there is severely limited market capacity, especially for serving smaller buildings under 50 units

- Light-touch verification of Cadence OneFive Momentum and KC3 staff eliminates nearly all of these soft costs

- Expanding the workforce through community-based activities can further reduce costs by leveraging hyperlocal technical assistance
Standard scopes simplify contractor bidding, even across portfolios and geographies

Aggregating demand for forecastable pipeline of biddable projects

- Aggregation of demand from repeatable upgrades allow smaller owners to procure like bigger owner
- By creating a forecastable pipeline, TEAMUP enables contractor growth across the industry, and even opportunities for new business creation - especially by accessing forthcoming IRA funds
- Negotiating equipment purchases at scale can reduce hard costs

<table>
<thead>
<tr>
<th>Measure</th>
<th>Data for Bidding</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS</td>
<td>Advanced boiler control system</td>
</tr>
<tr>
<td></td>
<td>Sensors in apartments and elsewhere</td>
</tr>
<tr>
<td></td>
<td>Turn boiler on/off based on actual temperature, not just seasonal variations</td>
</tr>
<tr>
<td></td>
<td>Service contract for remote contracting</td>
</tr>
<tr>
<td></td>
<td># units</td>
</tr>
<tr>
<td></td>
<td># boilers, boiler size, and photo of controls</td>
</tr>
<tr>
<td>TRV</td>
<td>Controls on radiators eliminate hot and cold spots</td>
</tr>
<tr>
<td></td>
<td>Occupants no longer open windows to let heat out or experience excessive cold</td>
</tr>
<tr>
<td></td>
<td>2.5 radiator / apt; price adjusted based on actual installations</td>
</tr>
<tr>
<td></td>
<td>Photo of one radiator</td>
</tr>
<tr>
<td>LED</td>
<td>High-efficiency lighting in common areas</td>
</tr>
<tr>
<td></td>
<td>Survey to upgrade to LED</td>
</tr>
<tr>
<td></td>
<td>Energy audit bulb count is an unnecessary step</td>
</tr>
</tbody>
</table>
TEAM UP can help address major cost drivers

Predictive analytics shrinks planning costs

Bid support for high-impact measures saves contractor marketing costs

Demand aggregation through standardized planning and bulk purchasing

Example predicted scope for two-pipe steam

<table>
<thead>
<tr>
<th>Measure</th>
<th>Cost</th>
<th>Net of Incentives</th>
<th>Annual Savings</th>
<th>Years to Payback</th>
</tr>
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<tbody>
<tr>
<td>High Impact</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>EMS Energy Management System</td>
<td>$22k</td>
<td>$11k</td>
<td>$8k</td>
<td>1.4</td>
</tr>
<tr>
<td>TRV Thermostatic Radiator Valve</td>
<td>$190k</td>
<td>$114k</td>
<td>$25k</td>
<td>4.6</td>
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<tr>
<td>LED lighting in common areas</td>
<td>$45k</td>
<td>$37k</td>
<td>$34k</td>
<td>1.1</td>
</tr>
<tr>
<td>Medium Impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master venting for steam distribution</td>
<td>$9k</td>
<td>$9k</td>
<td>$2k</td>
<td>4.5</td>
</tr>
<tr>
<td>Air sealing</td>
<td>$8k</td>
<td>$8k</td>
<td>$7k</td>
<td>1.1</td>
</tr>
<tr>
<td>Pipe insulation</td>
<td>$3k</td>
<td>$2k</td>
<td>$1k</td>
<td>2.0</td>
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<tr>
<td>Optiona l</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventilation overhaul</td>
<td>$241k</td>
<td>$182k</td>
<td>$19k</td>
<td>9.6</td>
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<tr>
<td>Hybrid Heat Pump for DHW</td>
<td>$414k</td>
<td>$207k</td>
<td>($1k)</td>
<td>NA</td>
</tr>
</tbody>
</table>

Source: Cadence OneFive Momentum. Costs, incentives, savings, and payback period are estimates; actual figures may be higher or lower.
## Improved retrofit process with TEAM UP

<table>
<thead>
<tr>
<th>Program Creation</th>
<th>Project Definition</th>
<th>Contracting</th>
<th>Underwriting</th>
<th>Construction</th>
<th>Monitoring &amp; Asset Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide standardized underwriting platform: borrower requirements, workflow, closing documents, enabling software</td>
<td>Connect with owner to gather information on their goals</td>
<td>Manage bid process, compare prices</td>
<td>Full-service energy underwriting, outsourced for those without internal capacity</td>
<td>Facilitate construction monitoring and commissioning</td>
<td>Generate performance data by project type</td>
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<tr>
<td>Expertise sizing risk capital, e.g., reserves and other resources made available for internal or third-party lending</td>
<td>Discuss software-generated scope</td>
<td>Compile bids from multiple vendors</td>
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<td>Facilitate energy monitoring service</td>
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<td></td>
<td>Facilitate self-survey with building supers to validate scope</td>
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<td>Determine loan servicing partnership</td>
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<td></td>
<td>Coordinate with engineering firm for physical needs assessment, when needed</td>
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<td></td>
<td>Generate multiple scopes of work, including costs, savings, and incentives</td>
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</tbody>
</table>

**Catalyst**

**Local Partner**

**Software**
TEAM-UP can help enable capital creation

Develop and promotes standards to meet energy goals

- Scopes for energy projects customized by hyper-local need
- Standards for community outreach to build pipeline of loans set local policy makers
- Build predictable pipeline of projects for efficient deployment and scaling of EE lending market

Support and enable capital creation

- Underwriting and credit box for lending created, subsidy need identified
- Bond program with pledged loans
- Use of public monies for reserves and credit enhancement,
- Bond capital available for loans to end users directly or through lending intermediary (CDFI or local lender)

Use TEAM-UP to originate loans

- Buildings benefit from operating and maintenance cost savings, and ongoing performance monitoring
- Underwriting in-house, delegate to lending institution or can be outsourced
- Servicing in-house at lender or originator, or outsourced, i.e. local CDFI, etc

Operating efficiencies help repay loans
Standardized underwriting key to unlocking capital

Look at the mortgage market: approved appraisals, standard underwriting, liquid mortgage products

- Standard underwriting is how risk is measured, control for variables, and access capital
- Highly active secondary market
- Standardization accesses the largest sources of capital the world

Underwriting energy efficiency can follow housing finance lead

- Amortize to EUL - light bulbs, solar, roofs
- Control risks - warranties on equipment, insurance savings, commissioning

Underwriting at scale through standardized products and tech-enabled processes

Energy lending is the next alternative fixed-income investment

- Through data driven underwriting, everyone should be able to access capital
- Why wouldn't pension funds invest in lowering energy bills through installing 100 million lightbulbs, they may even own the mortgage-backed security for the building?
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