BUILDINGENERGY NYC

Decarbonization with Intention: Democratizing Data to Dismantle Barriers in Retrofits

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Cadence OneFive°

KINETIC COMMUNITIES CONSULTING

uhab

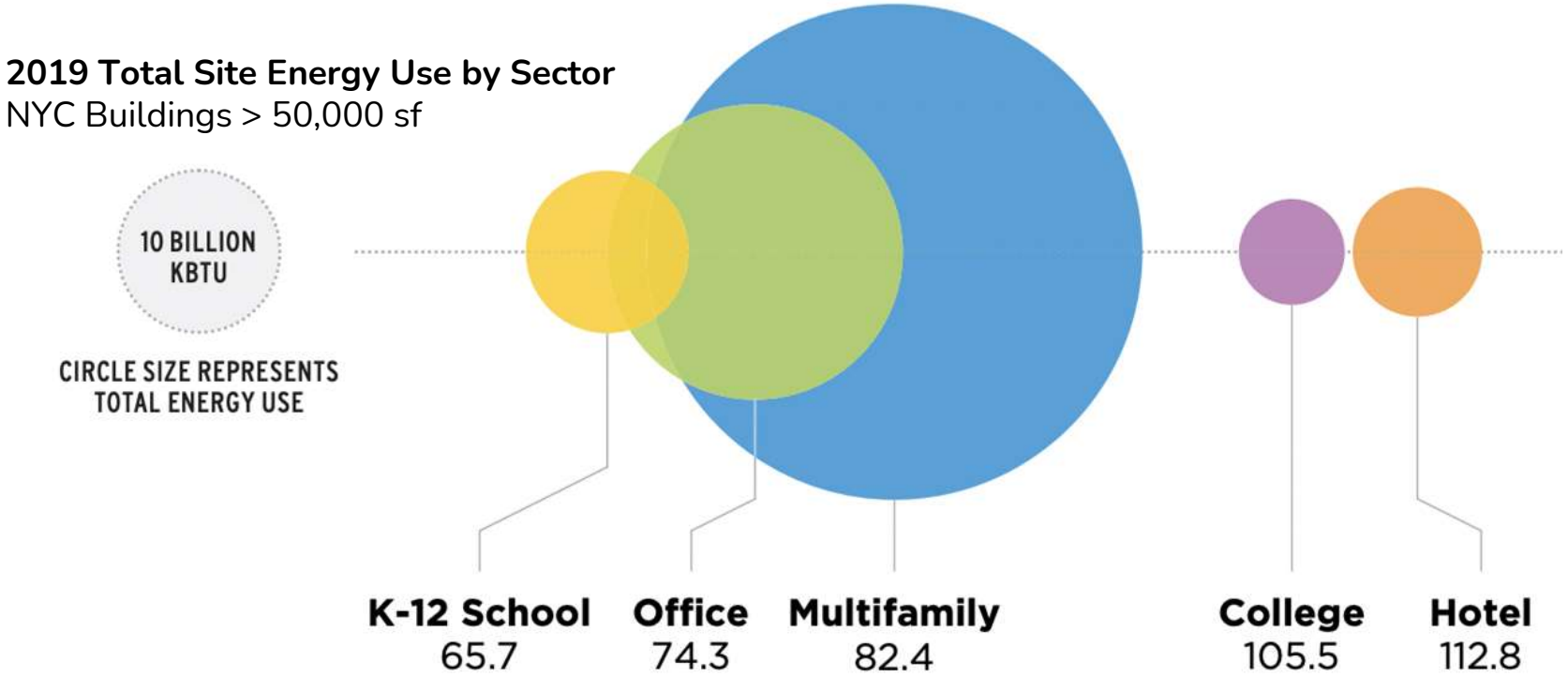
INCLUSIVE PROSPERITY CAPITAL

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



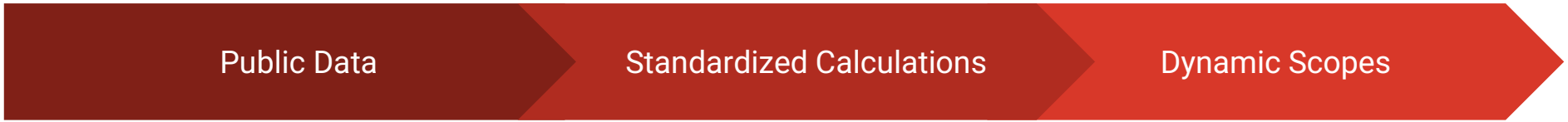
Urban Green Council “New York City’s Energy and Water Use 2020 Report”

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

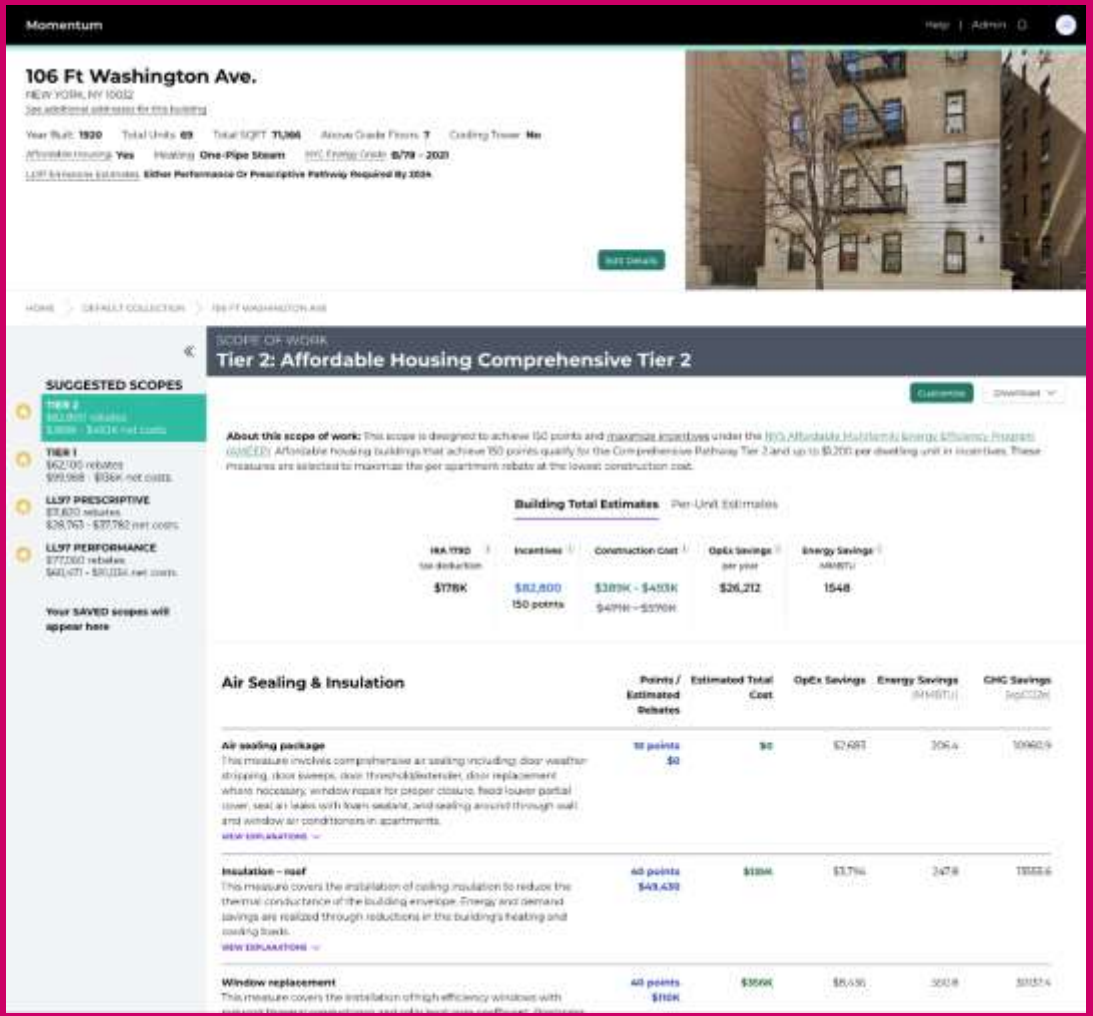
Relevant upgrades known ahead of time

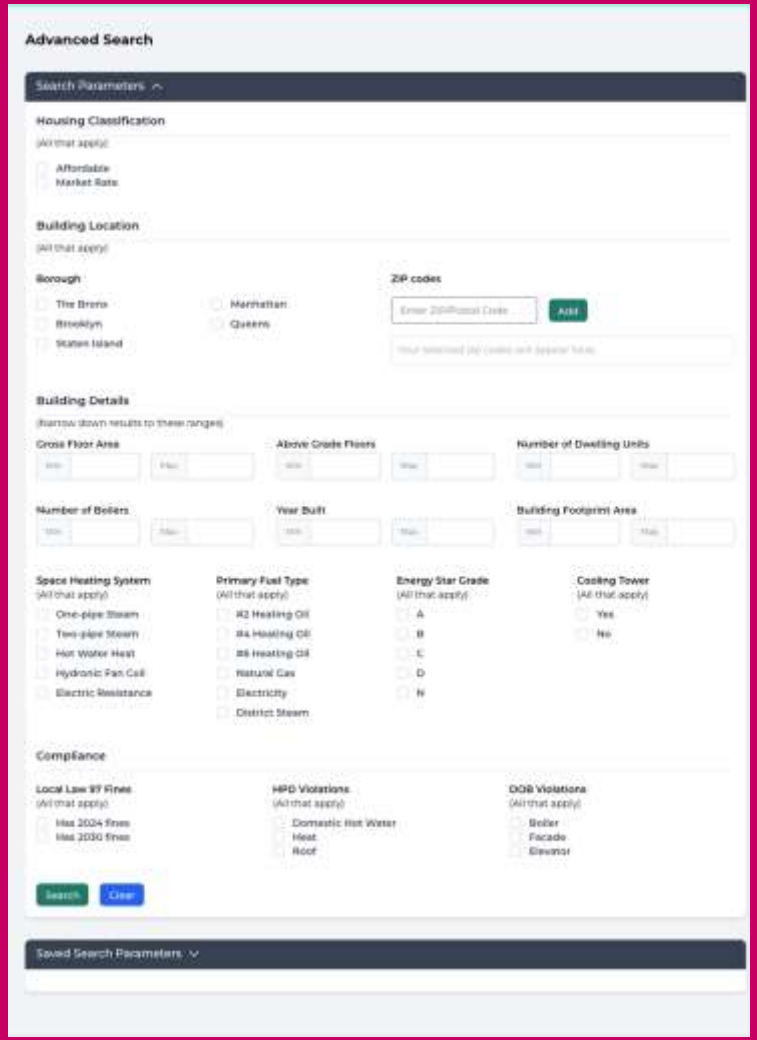


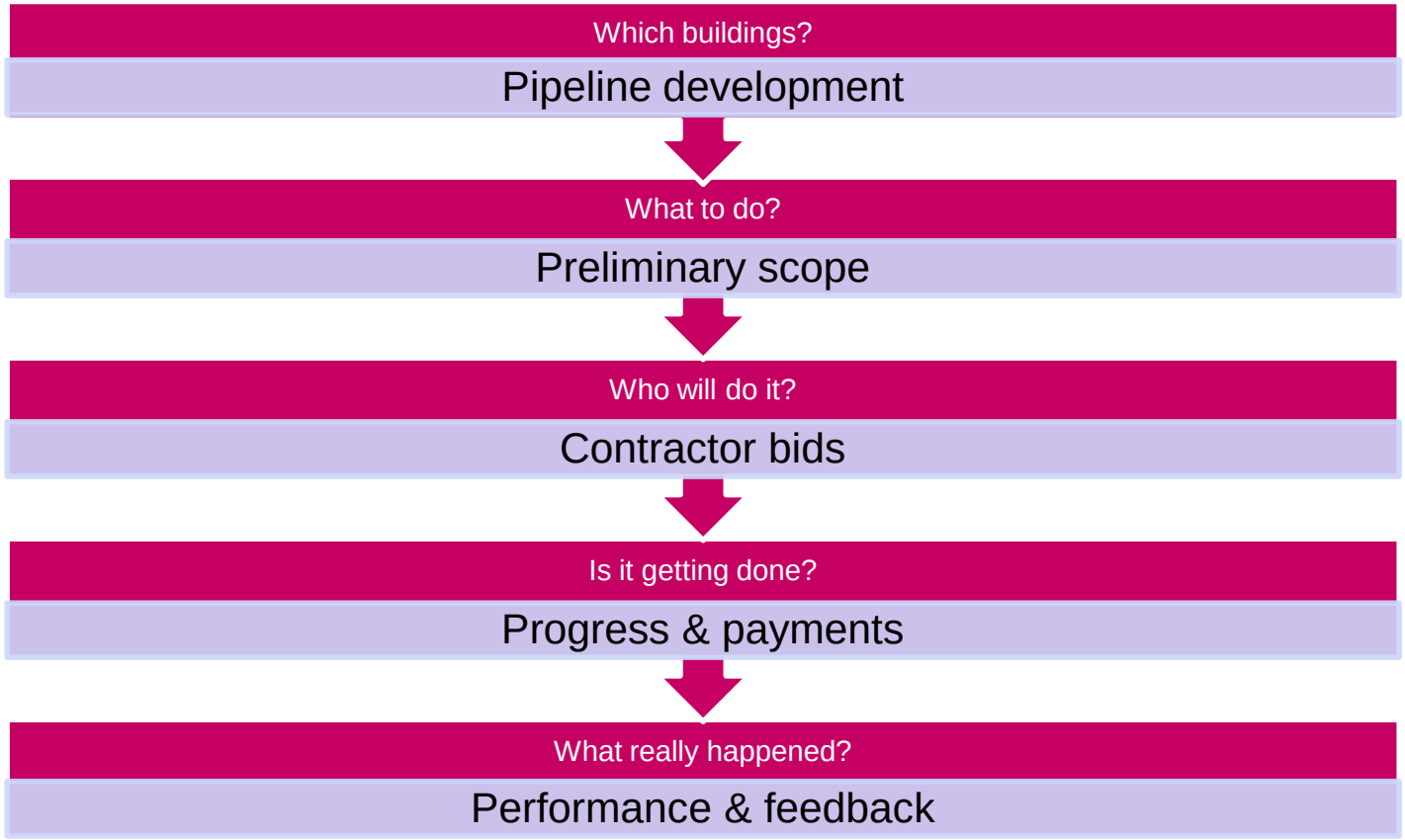
Less Time

Lower Cost

Preliminary scope of work in minutes, not months




Advanced Search
Search Parameters
Housing Classification
(All that apply)
Affordable
Market Rate
Building Location
(All that apply)
Borough
The Bronx
Brooklyn
Staten Island
Manhattan
Queens
ZIP codes
Add
Building Details
(Narrow down results to these ranges)
Gross Floor Area
Above Grade Floors
Number of Dwelling Units
Number of Boilers
Year Built
Building Footprint Area
Space Heating System
(All that apply)
One-pipe Steam
Two-pipe Steam
Hot Water Heat
Hydronic Fan Coil
Electric Resistance
Primary Fuel Type
(All that apply)
#2 Heating Oil
#4 Heating Oil
#6 Heating Oil
Natural Gas
Electricity
District Steam
Energy Star Grade
(All that apply)
A
B
C
D
N
Cooling Tower
(All that apply)
Yes
No
Compliance
Local Law 97 Fines
(All that apply)
Has 2024 fines
Has 2030 fines
HPD Violations
(All that apply)
Domestic Hot Water
Heat
Roof
DOB Violations
(All that apply)
Boiler
Facade
Elevator
Search
Clear
Saved Search Parameters

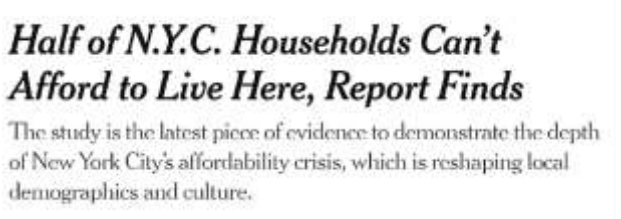

Which buildings?
Pipeline development
What to do?
Preliminary scope
Who will do it?
Contractor bids
Is it getting done?
Progress & payments
What really happened?
Performance & feedback

Affordable Housing & Decarbonization

“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)income-restricted

New York Is Rebounding for the Rich. Nearly Everyone Else Is Struggling.

The huge income gap between rich and poor in Manhattan is the latest sign that the economic recovery from the pandemic has been lopsided in New York City.

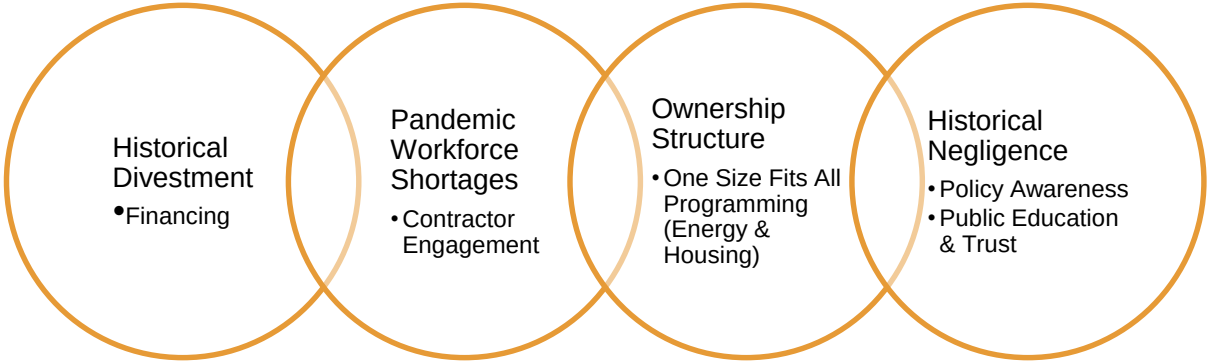


Half of N.Y.C. Households Can't Afford to Live Here, Report Finds

The study is the latest piece of evidence to demonstrate the depth of New York City's affordability crisis, which is reshaping local demographics and culture.

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?



What does Data have to do with Housing and Decarbonization?

Improves access to information, allowing folks to be better informed

- Historical Negligence
  - Provide decision-makers insights to trusted community leaders (community-based 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.**

Climate and Resiliency Programs

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 SQFT: 168963

Total Units: 135

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

Measure	Incentives	Construction Cost	GHG Reduction KgCO2e	Energy Savings MMBTU	OpEx Savings per year
Window replacement	$35,550 40 points	$809K ~~$845K~~	12172.6	177.8	$6,257
EMS	$11,250 20 points	$6,188 ~~$17,438~~	10445.3	196.7	$2,557
Heating pipe insulation	$730 20 points	$7,483 ~~$8,213~~	6509.8	122.6	$1,593
Boiler replacement - condensing	$40,180 40 points	$1.1M ~~$1.1M~~	5995.6	112.9	$1,468
Common area lighting	$6,030 5 points	$31,142 ~~$37,172~~	29623.9	228.9	$28,207
Low-Flow Showerheads & Aerators	$0 5 points	$0	13588.1	255.8	$3,326
DHW pipe insulation	$730 20 points	$7,483 ~~$8,213~~	3055.7	57.5	$748
Total	**$270K 150 points**	**$1.8M**	**81,391**	**1152**	**$44,155**

LL97 Prescriptive Pathway Measures

Summary of Selected Measures

Measure	Incentives	Construction Cost	GHG Reduction KgCO2e	Energy Savings MMBTU	Utility Cost Savings per year
Air sealing package	$1,890	$57,240 ~~$59,140~~	25126.1	473.1	$6,150
EMS	$11,250	$6,190 ~~$17,440~~	10445.3	196.7	$2,560
Smart thermostats	$5,240	$62,260 ~~$67,500~~	27854.1	524.5	$6,820
Heating pipe insulation	$670	$6,880 ~~$7,550~~	5985.5	112.7	$1,470
Common area lighting	$6,030	$31,140 ~~$37,170~~	32200.3	259.3	$29,990
DHW pipe insulation	$670	$6,880 ~~$7,550~~	2809.6	52.9	$690
Total	**$25,760 85 points**	**$196K**	**104,421**	**1619**	**$47,670**

Comparing Scopes

Summary of Selected Measures

Measure	Incentives	Construction Cost	GHG Reduction KgCO2e	Energy Savings MMBTU	OpEx Savings per year
Boiler clean and tune	$1,350	$11,400 ~~$12,750~~	2410.5	45.4	$590
Heating pipe insulation	$1,440	$1,175 ~~$2,615~~	2946.7	55.5	$721
Common area lighting	$2,170	$35,002 ~~$37,172~~	10664.6	82.4	$10,154
DHW pipe insulation	$490	$2,145 ~~$2,635~~	2946.7	55.5	$721
Low-Flow Showerheads & Aerators	$0	$0	13588.1	255.8	$3,326
Total	**$5,450 55 points**	**$49,722**	**32,557**	**495**	**$15,513**

AMEEP Comprehensive Pathway

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

Measure	Incentives	Construction Cost	GHG Reduction KgCO2e	Energy Savings MMBTU	OpEx Savings per year
Insulation – roof	$38,540 40 points	$67,240 ~~$106K~~	10233.8	192.7	$2,505
Air sealing package	$0 10 points	$0	9128.6	171.9	$2,234
Boiler clean and tune	$1,350 5 points	$1,650 ~~$3,000~~	2960.4	55.7	$725
Smart thermostats	$1,740 10 points	$18,260 ~~$20,000~~	9236.9	173.9	$2,261
EC Motor HW circ pump	$4,030 10 points	$712 ~~$4,742~~	5087.3	60.1	$3,521
EMS	$5,100 20 points	$900 ~~$6,000~~	12828.6	241.5	$3,140
LED lamps - In Unit	$0 5 points	$0	442.1	5.2	$306
Low-Flow Showerheads & Aerators	$0 5 points	$0	4026.1	75.8	$985
Total	**$60,000 105 points**	**$79,521**	**53,944**	**977**	**$15,678**

Executive Summary

Building

Incentives	$60,000 105 points
Construction Cost	$65,569 - $93,473 ~~$126K - $153K~~
OpEx Savings Per Year	$15,678
GHG Reduction KgCO2e	53,944
Energy Savings MMBTU	977
2024 LL97 Per Year	$0 ~~$0~~
2030 LL97 Per Year	$0 ~~$5,683~~

Per Dwelling Unit

Incentives Per Unit	$1,500 105 points
Construction Cost Per Unit	$1,639 - $2,337 ~~$3,139 - $3,837~~
OpEx Savings Per Year	$392
GHG Reduction KgCO2e	1,349
Energy Savings MMBTU	24
2024 LL97 Per Year	$0 ~~$0~~
2030 LL97 Per Year	$0 ~~$142~~

Exploring Electrification

Scope Name: DHW Electrification

New York, NY 10024

Year Built: 1890

Total SQFT: 10610

Total Units: 20

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 | Per-Unit Estimates

Incentives	Construction Cost	OpEx Savings per year	Energy Savings MMBTU
$26,450 0 points	$63,550 - $83,550 ~~$90,000 - $110K~~	$-127	132

Water & Hot Water	Points / Estimated Rebates	Estimated Total Cost	OpEx Savings	Energy Savings (MMBTU)	GHG Savings (kgCO2e)
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. VIEW EXPLANATIONS	$26,450	$73,550 ~~$100,000~~	$-127	132.2	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 0.018 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 usage at a ratio of 0.82 / 3.5 (old efficiency / new efficiency). Energy savings is the n change considering all fuel types. We multiplied electricity ar fuel use changes by the utility cost rates found in the building details.

TOP

INCLUSIVE
PROSPERITY CAPITAL™

TEAM UP
Technology Enabled Adaptation & Mitigation Underwriting Platform

NESEA - October 2023

INCLUSIVE PROSPERITY CAPITAL™

- 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.

OUR PARTNERS

NYC ACCELERATOR

NEW YORK STATE OF OPPORTUNITY | NYSERDA

amalgamated bank

NRDC NATURAL RESOURCES DEFENSE COUNCIL

NY GREEN BANK

NYSAFAH NEW YORK STATE ASSOCIATION FOR AFFORDABLE HOUSING

S1 SOLARone

WELLS FARGO

THE KRESGE FOUNDATION

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

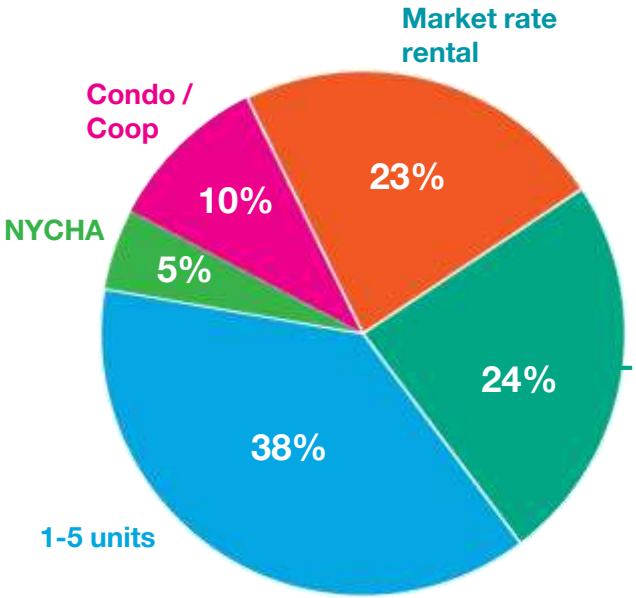
TEAM UP

Technology Enabled Adaptation & Mitigation Underwriting Platform

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



Multifamily affordable housing

Heating Type	Buildings	Units
Two-Pipe Steam	600	240,000
One-Pipe Steam	1,950	117,000
Hydronic	1,700	102,000
Total >25k sf	**4,250**	**459,000**

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

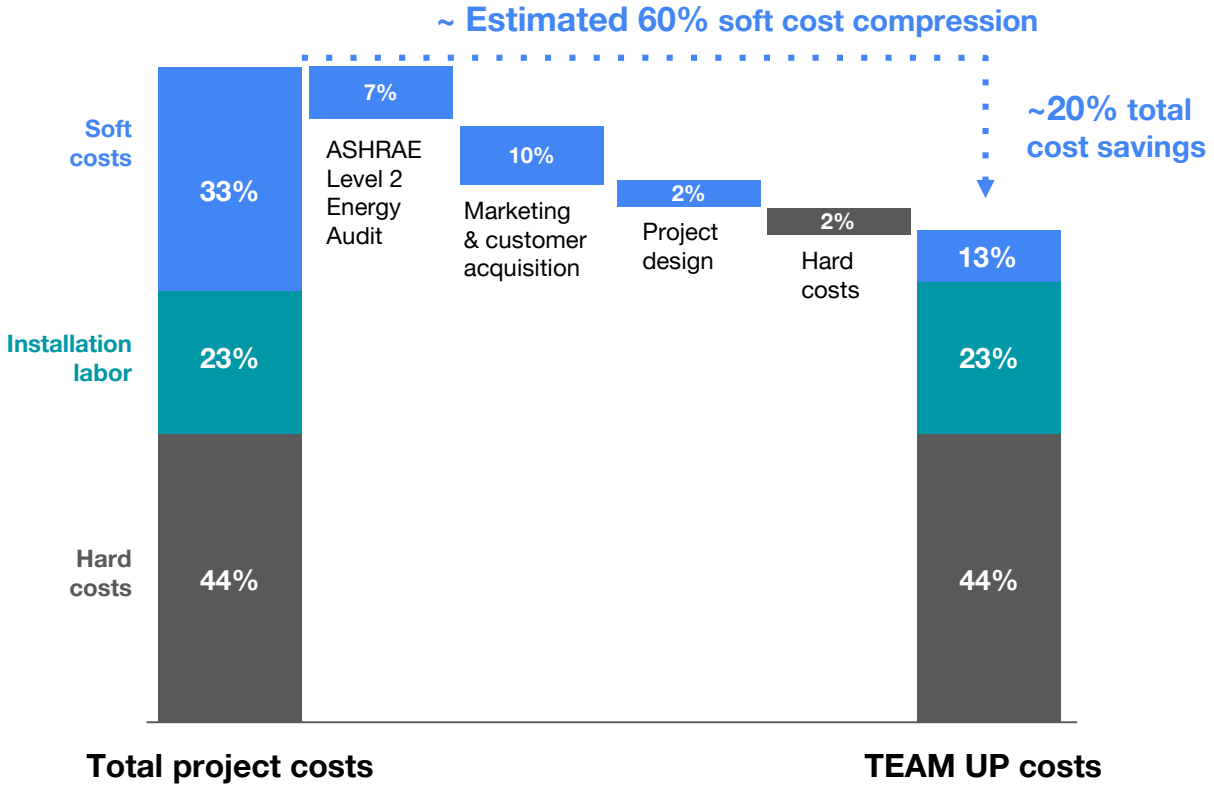
	Measure	Data for Bidding
EMS	Advanced boiler control system Sensors in apartments and elsewhere Turn boiler on/off based on actual temperature, not just seasonal variations Service contract for remote contracting	# units # boilers, boiler size, and photo of controls
TRV	Controls on radiators eliminate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

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



Sources: NYSERDA (2022), Energy Efficiency & Electrification Soft Costs in New York; *Technical Assistance Needed to Support a Green Multifamily Decarbonization Fund: Preliminary Market Insights (June 2023)*, Janet Joseph, JLJ Sustainability Solutions. Analysis by IPC and Digital Equity Partners.

Example predicted scope for two-pipe steam

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

1230 Webster Avenue, The Bronx

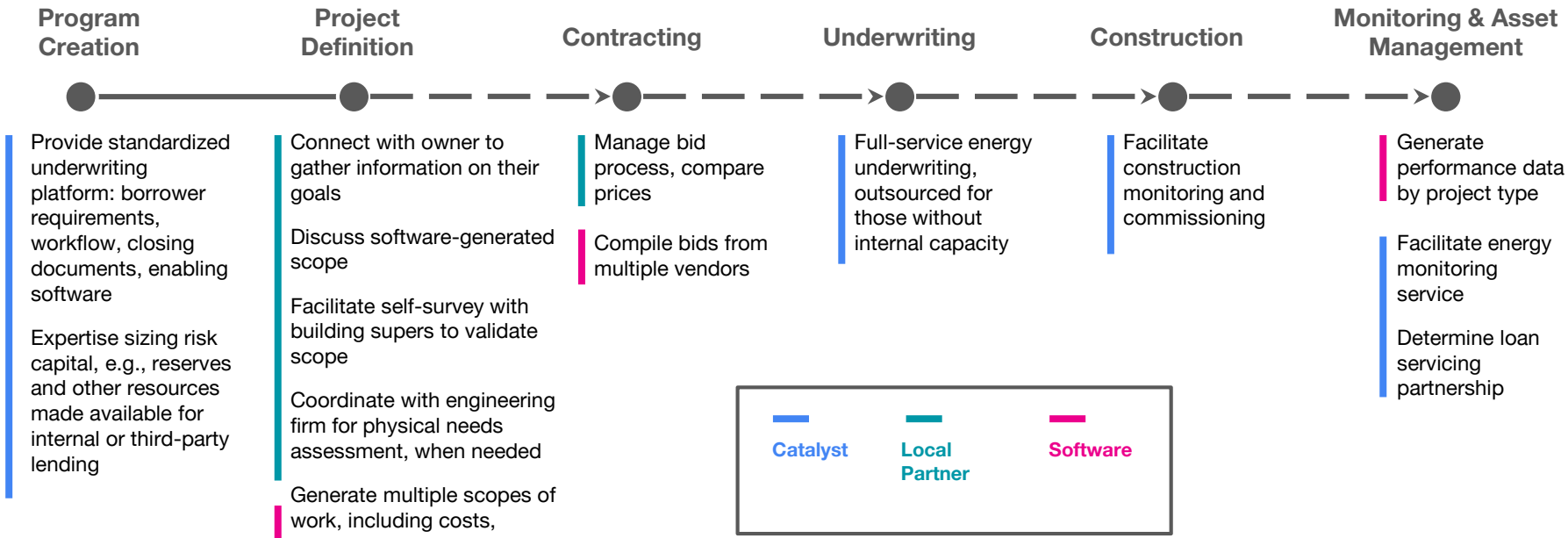
1964 construction

207 units | 21 stories | 203,259 sq ft

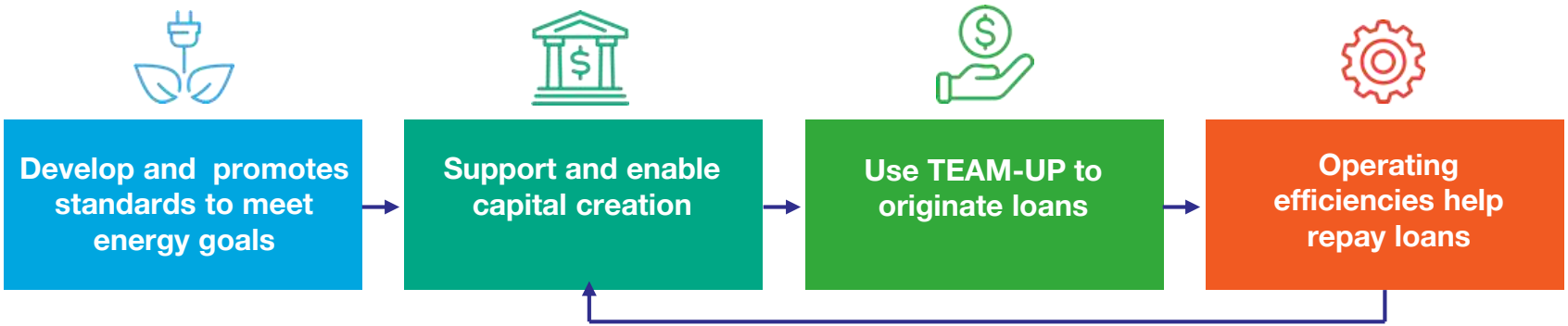
$267k high-impact measures >> $67k energy savings

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



TEAM-UP can help enable capital creation



- 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

- 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)

- 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

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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