THE BUILDING ENERGY HUB

Start Here: A Building Retrofit Series
Episode 1

The Business Case for Decarbonization – Why It Matters Now

October 14, 2025

DOE-ELEVATE-0010930-36

The Building Energy Hub is a project of Illinois Green Alliance

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Start Here: A Building Retrofit Series for Owners and Operators

Register here

Episode 1

The Business Case for Decarbonization – Why It Matters Now

Learn why investing in building upgrades makes financial and strategic sense, with insights on savings, risk reduction, and long-term value.

TODAY!

Episode 2

Planning for Action – From Awareness to Strategy

Learn how to get started with assessments, benchmarking, and incentive programs to create a customized, actionable plan.

Nov 5, 2025 @ Noon

Episode 3

Making it Happen – Implementation Pathways

See why investing in building upgrades makes financial and strategic sense, with insights on savings, risk reduction, and long-term value

Dec 16, 2025 @ Noon

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Poll Questions:

1. What industry do you represent?
    - List of Illinois Green Alliance professional categories
2. What do you hope to learn today?
    - List of topics (in progress)

Speakers

Nancy
Kohout Smith
Group

Ryan Wilmington
Illinois Green Alliance

Emmy Riley
Cyclone Energy

Nancy Kohout, P.E., LEED AP

Senior Principal, MEP Engerineering Leader

SmithGroup

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Operational vs. Embodied Carbon

***Figure 1**. Embodied carbon (yellow) and operational carbon (blue) across the key life cycle stages of a building.*

Operational carbon currently accounts for 28% of global GHG. Though embodied carbon only accounts for 11% now, with the estimated increase in construction, by the year 2050 embodied and operational carbon emission levels will be the same.

What does decarbonization *really* mean?

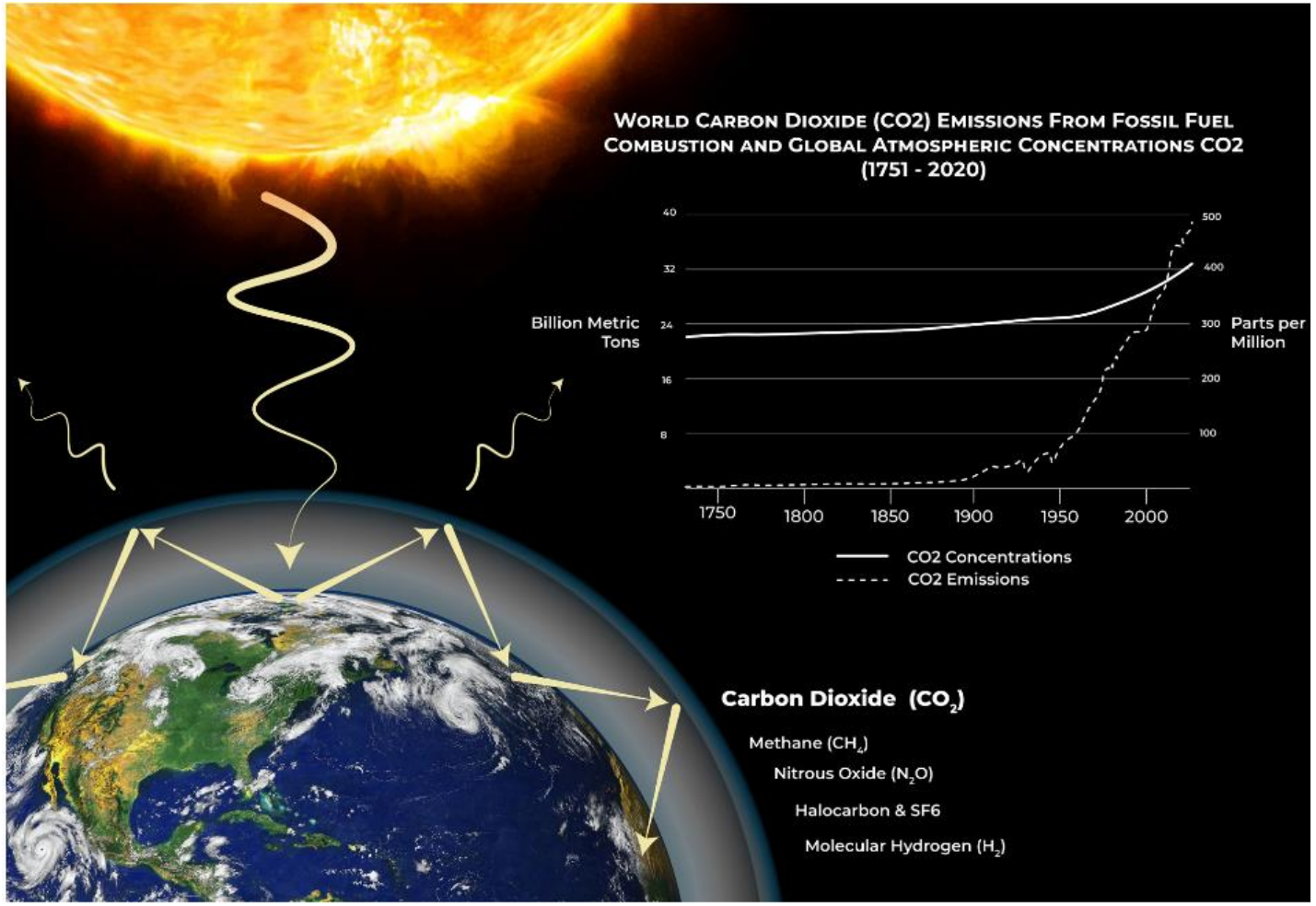

Figure 1 | The greenhouse effect of carbon dioxide

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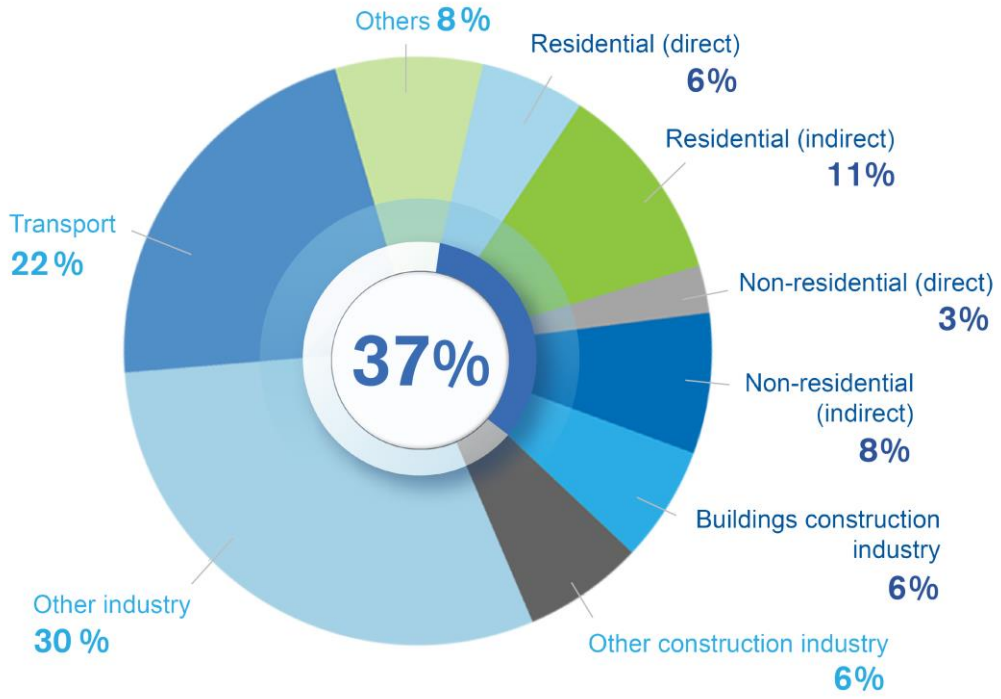
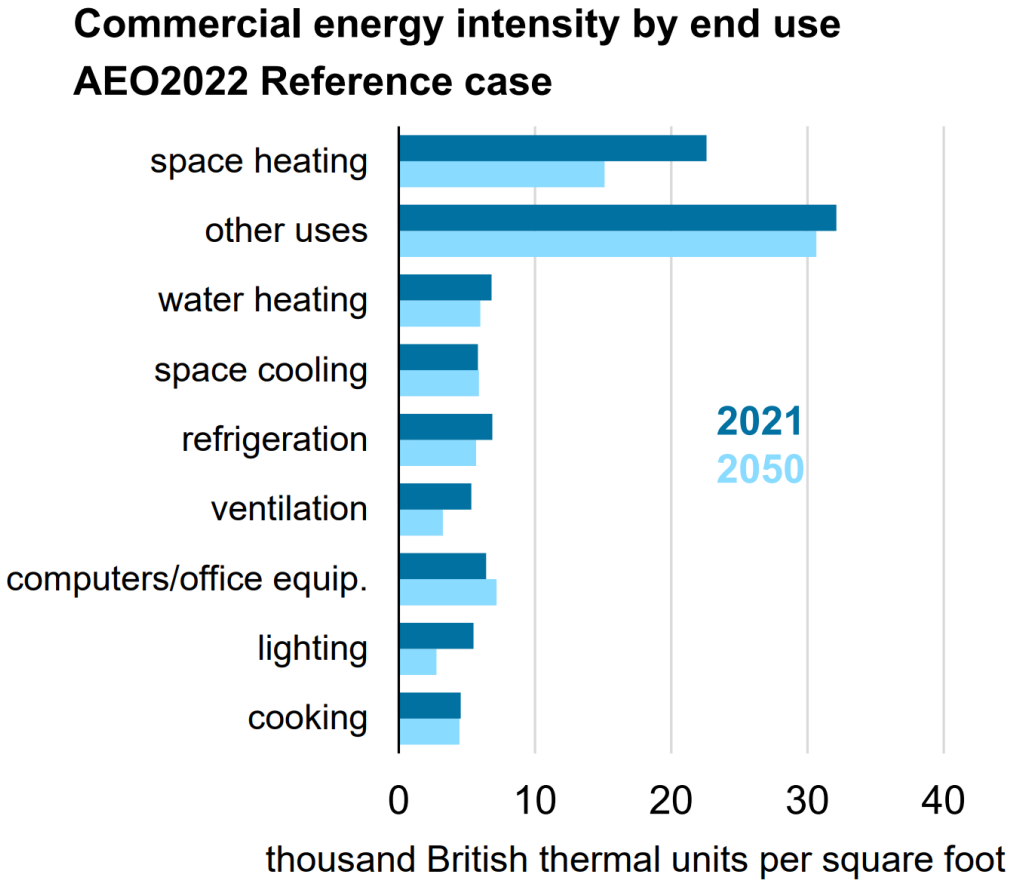
Buildings have a big impact!





https://www.ashrae.org/about/cebd-building-decarb-101

https://www.eia.gov/outlooks/archive/aeo22/pdf/AEO2022_ChartLibrary_Buildings.pdf

Ryan Wilmington

Policy & Communications Assoicate, LEED GA

Illinois Green Alliance

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Decarb Drivers: Resiliency

Decarb Drivers: Industry Commitments

Decarb Drivers: Policy

- ESG policies continue to gain
- National Building Performan
  Earth Day 2024.

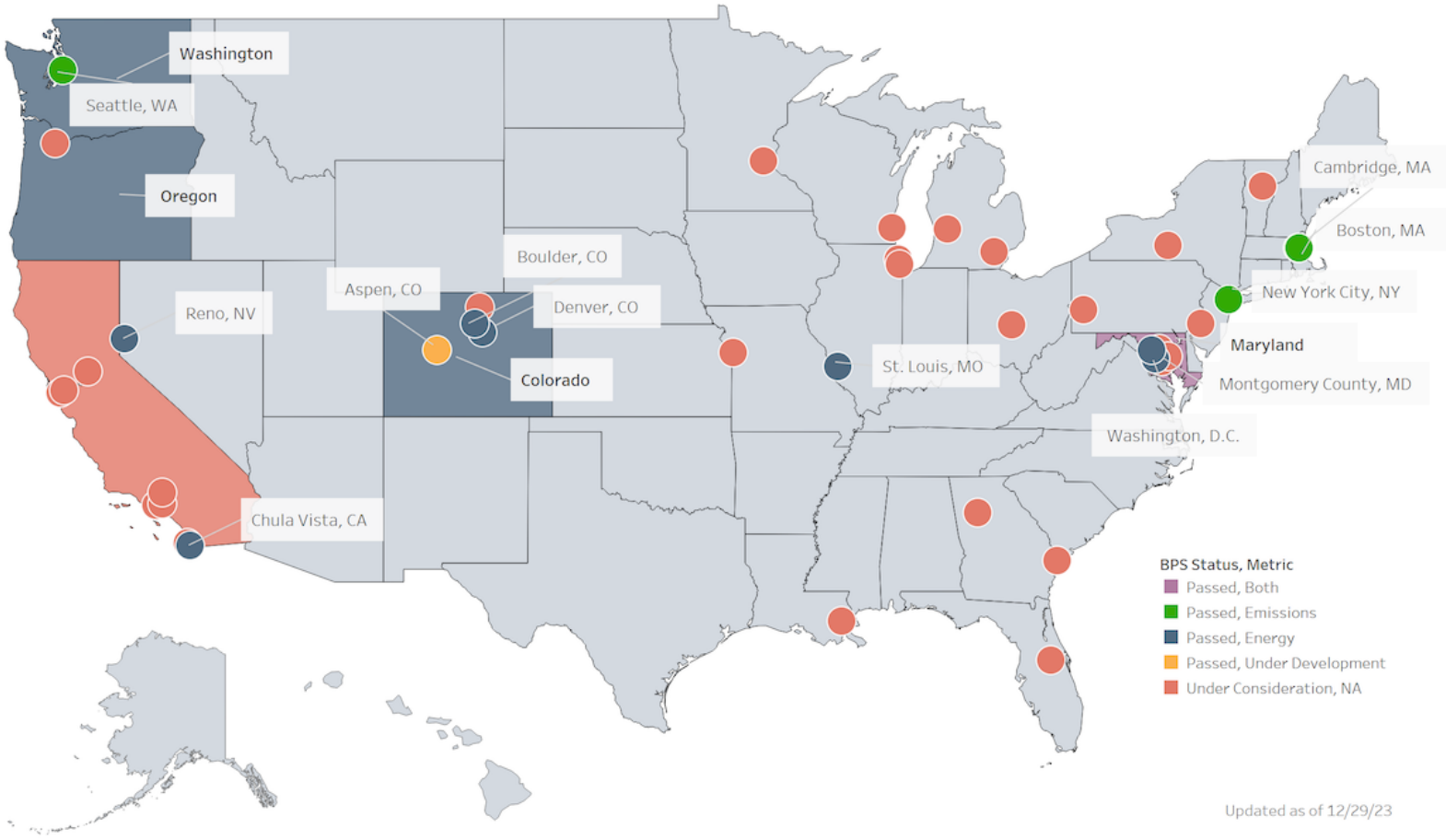
40%
OVERALL CONTRIBUTION OF BUILDINGS TO CARBON IN THE ATMOSPHERE

28%
CONTRIBUTION OF BUILDING OPERATIONS TO CARBON IN THE ATMOSPHERE

11%
CONTRIBUTION TO CARBON IN THE ATMOSPHERE FROM EMBODIED CARBON

22%
CONTRIBUTION OF CONCRETE AND STEEL TO EMBODIED CARBON OF BUILDINGS

State and Local Building Performance Standards



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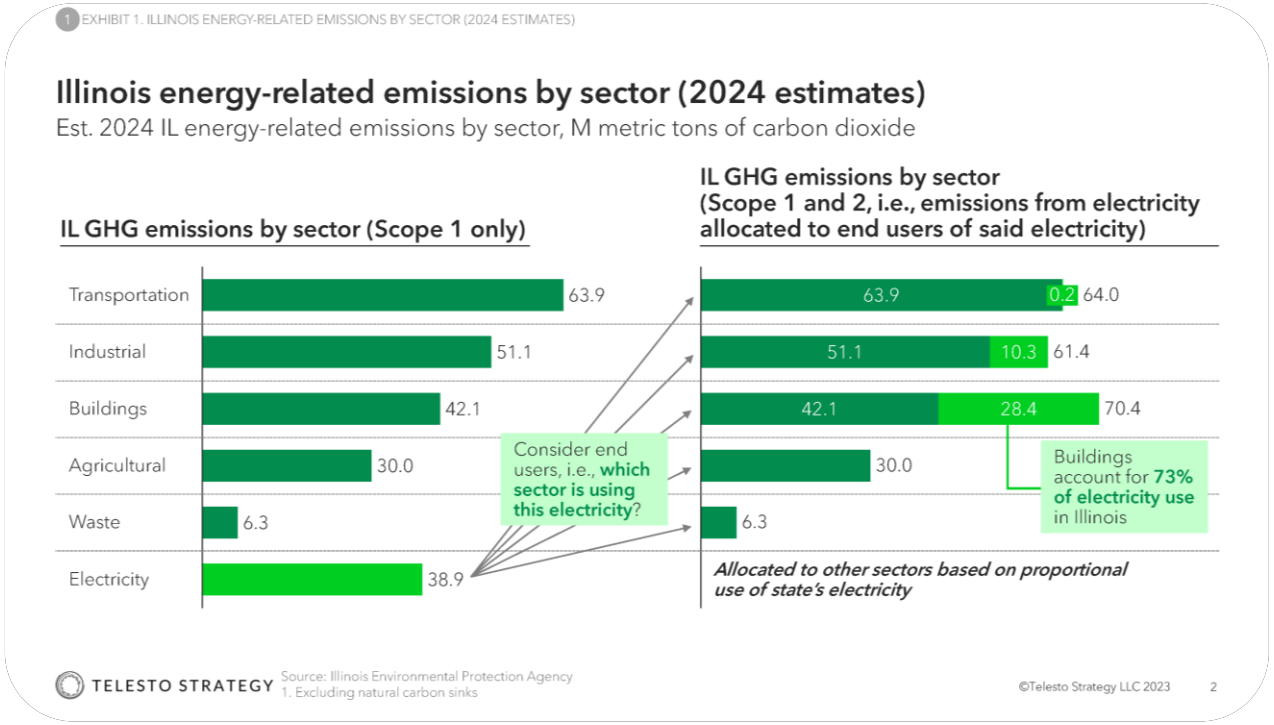
2024 Getting to Zero Illinois Report

Buildings create 30% of Illinois' GHG emissions and use 73% of our electricity.



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2002

The formation was catalyzed around the potential USGBD's Leadership in Energy and Environmental Design (LEED) could play in making an impact.

2003

The Center for Green Technology in Chicago, the first LEED Platinum municipal building in the world, became a signature project and living laboratory.

2004

Chicago introduced a Sustainable Development Policy to push buildings to adopt more environmentally-friendly practices.

2009

Illinois adopts the Energy Efficient Building Act which requires the state to adopt the minimum standards in the most recent IECC.

Green Building Policy Trends

To Date

Policymakers at the state and local level have continually advanced building standards and incentives.

2013

Chicago adopts the Energy Benchmarking Ordinance which requires buildings to track utility use and promotes efficiency.

2016

Illinois passes the landmark Future Energy Jobs Act which includes major green programs like Solar for All, efficiency incentives, job training, and more.

2021

Illinois passes nation-leading Climate and Equitable Jobs Act which includes funding for renewable energy, storage, job and contractor training, EVs and charging infrastructure, establishes the Illinois Climate Bank, and high-performance building codes.

2023

Oak Park adopts an Energy Benchmarking Ordinance and New-Construction Decarbonization Ordinance.

2024

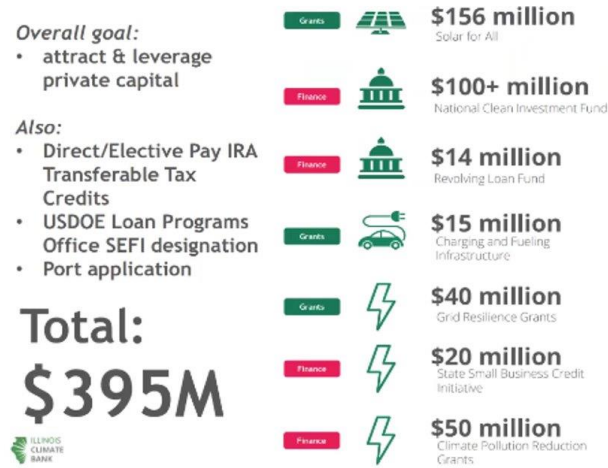
Chicago and Evanston launch programs for home electrification and energy efficiency.

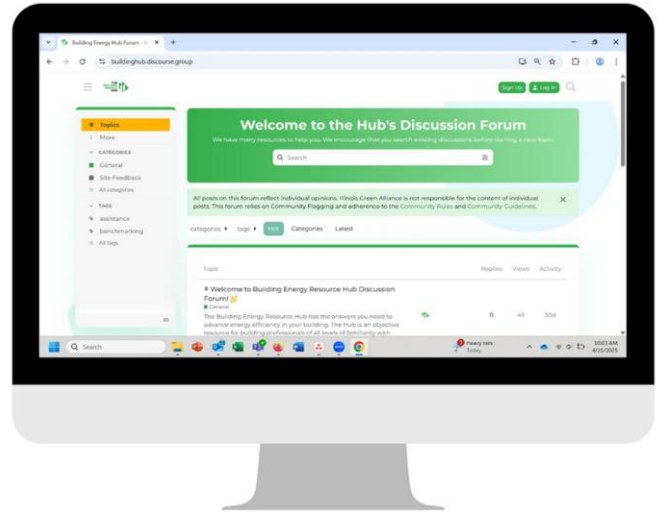
2024

Illinois finalizes stretch codes — high performance energy codes — for municipalities to adopt and launches energy efficiency workforce programs.

2025

Evanston becomes the first in the state to adopt stretch energy codes and building performance standards.





Emmy Riley, CEM, BEAP, WELL Performance Testing Agent

Energy Engineering Team Leader & Account Manager

Cyclone Energy Group

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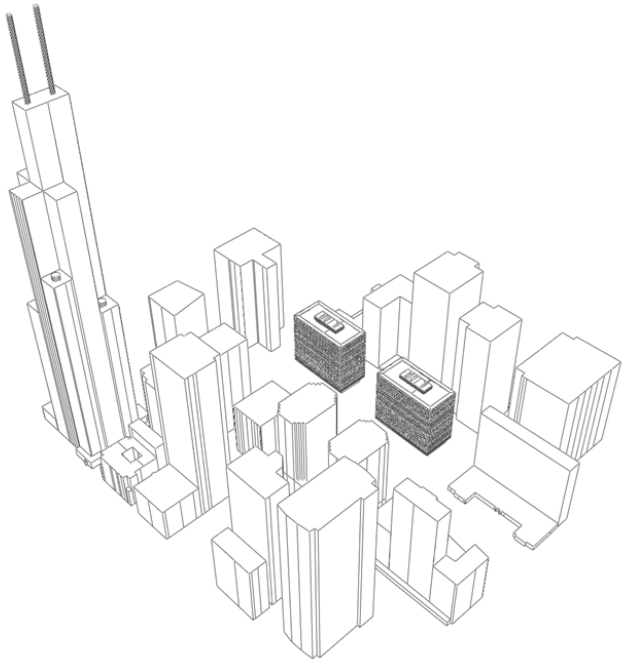
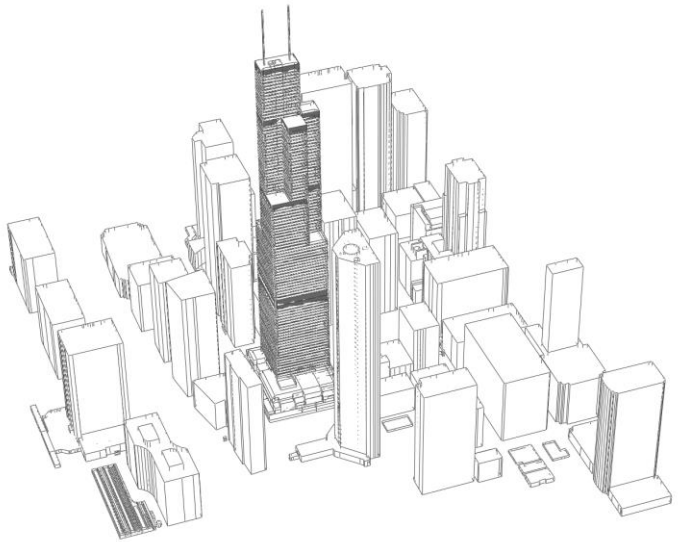
Case Study Comparison

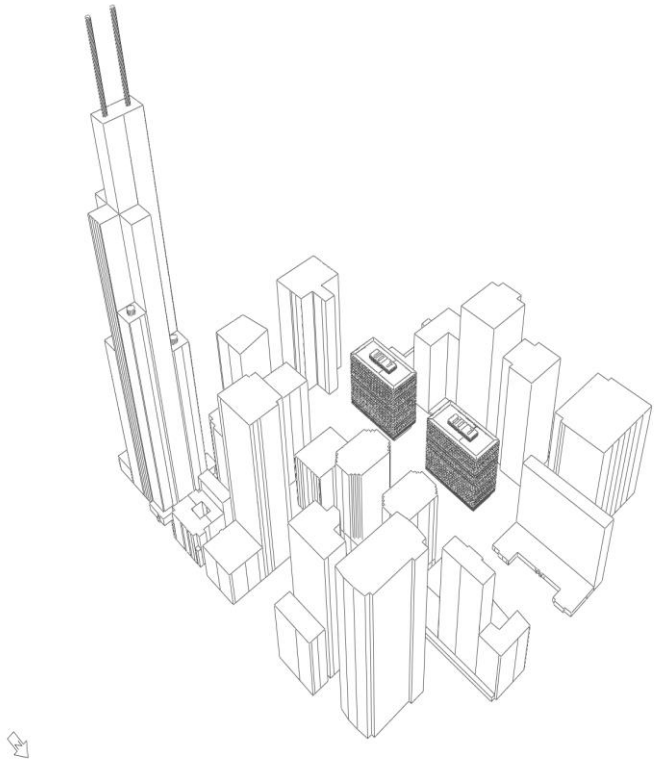
- Two Chicago buildings
- Similar age
- Similar starting EUI (~70 kBtu/sf)
- One had already done RCx, one hadn't
  - The one that had saved ~350,000 kWh
    - ~0.7 kWh/sf
  - The one that hadn't has saved ~3M kWh from 2023 to date through MBCx
    - ~0.5 kWh/sf
- One had already performed many capital equipment upgrades to HVAC & envelope
- The other still has much of its original equipment





Net Zero Roadmap Case Study (2023)

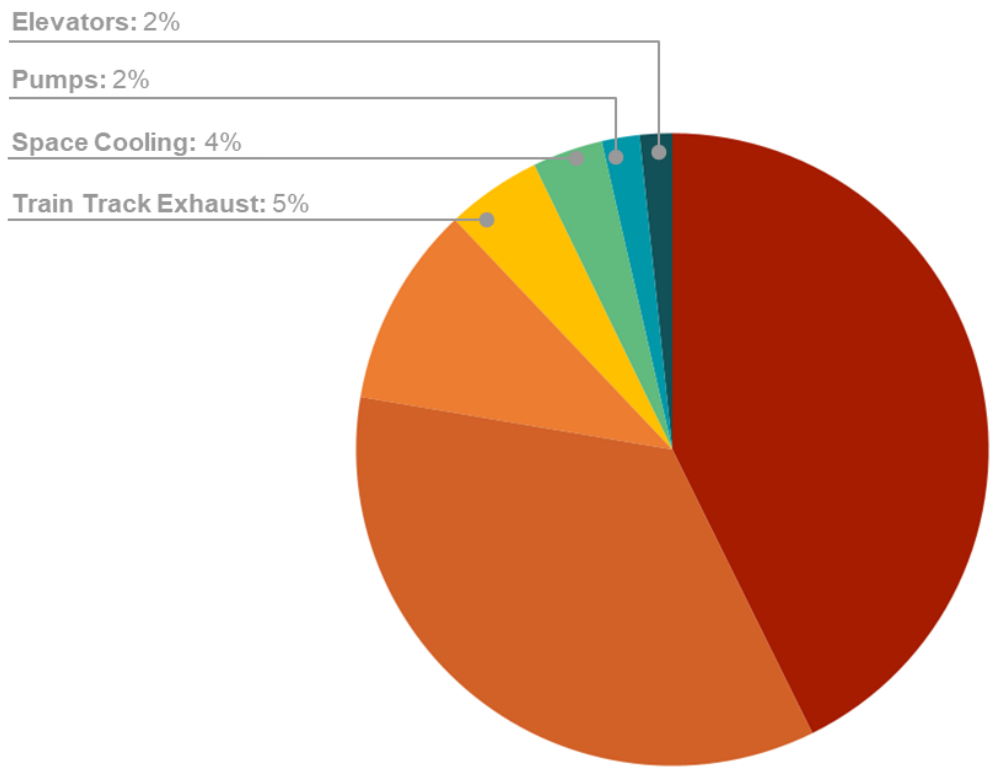
- **Major Findings**
- Measure-Related
  - Cyclone's recommended approach was to perform plant level HVAC upgrades, add heat pumps, install on-site solar, and reduce lighting power density
  - Significant (~30%) EUI reductions can be met without major tenant space disruptions
  - Under the existing EPA permit, the buildings could use the river as a heat source, which made the single most impactful measure viable to implement
- Economics-Related
  - Net zero goals can be realized with investment in the range of $15M
  - +/- NPV is sensitive to variables like potential increased tenant revenue, future building performance standards, and future grid cleanliness
  - Incentives ultimately play a small role (2-14% of project cost)



Calibrated Energy Model

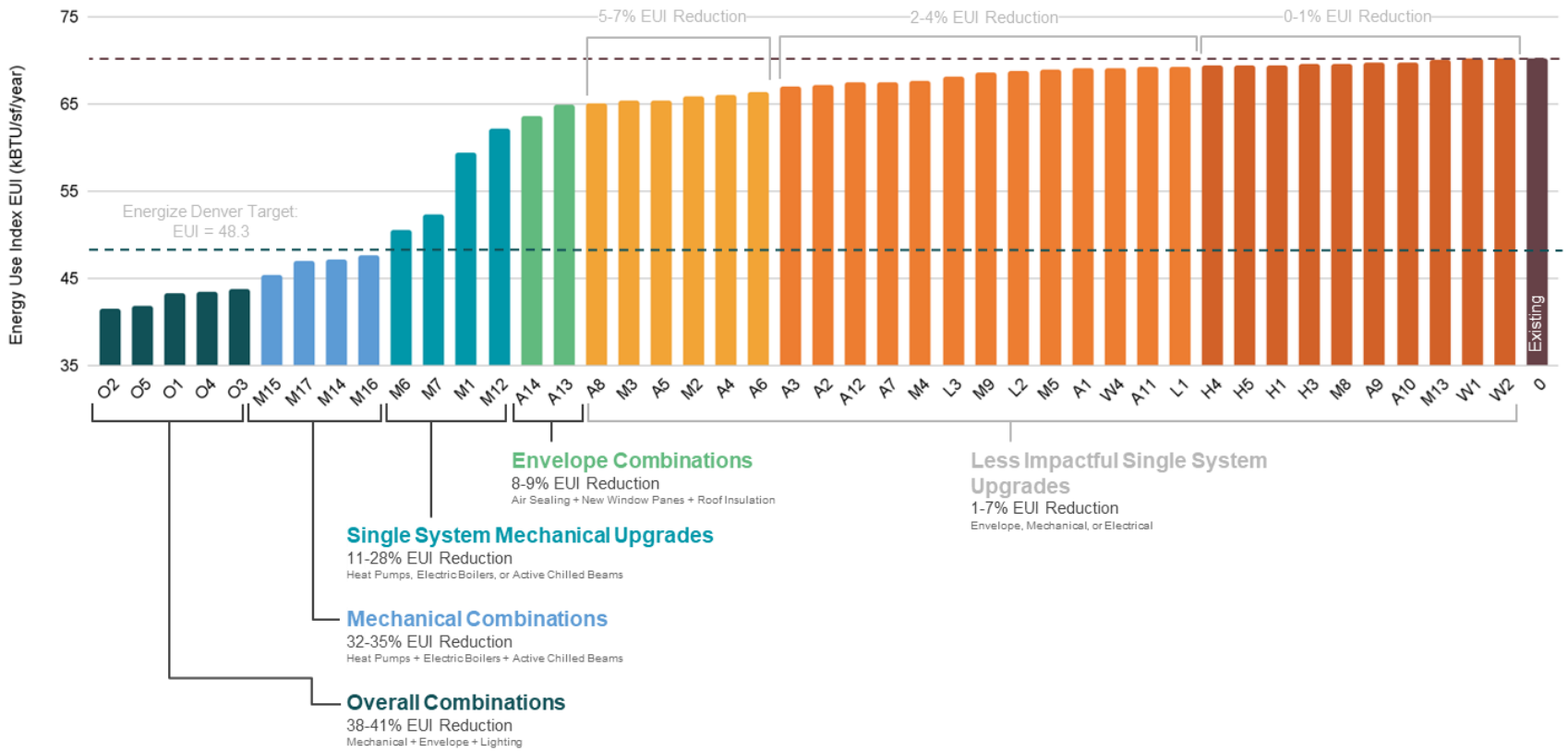
Data Collection . Preliminary Analysis . Detailed Analysis . Refine & Execute . Ongoing Monitoring

- End uses with the highest energy consumption present the greatest opportunities for improvements in energy efficiency.
- **Tenant energy usage** is significant and can be addressed through leasing agreements.
- Upgrades to **central heating plant systems and ventilation controls** represent the most impactful energy conservation measures.



Energy Conservation Measures

Data Collection . Preliminary Analysis . Detailed Analysis . Refine & Execute . Ongoing Monitoring



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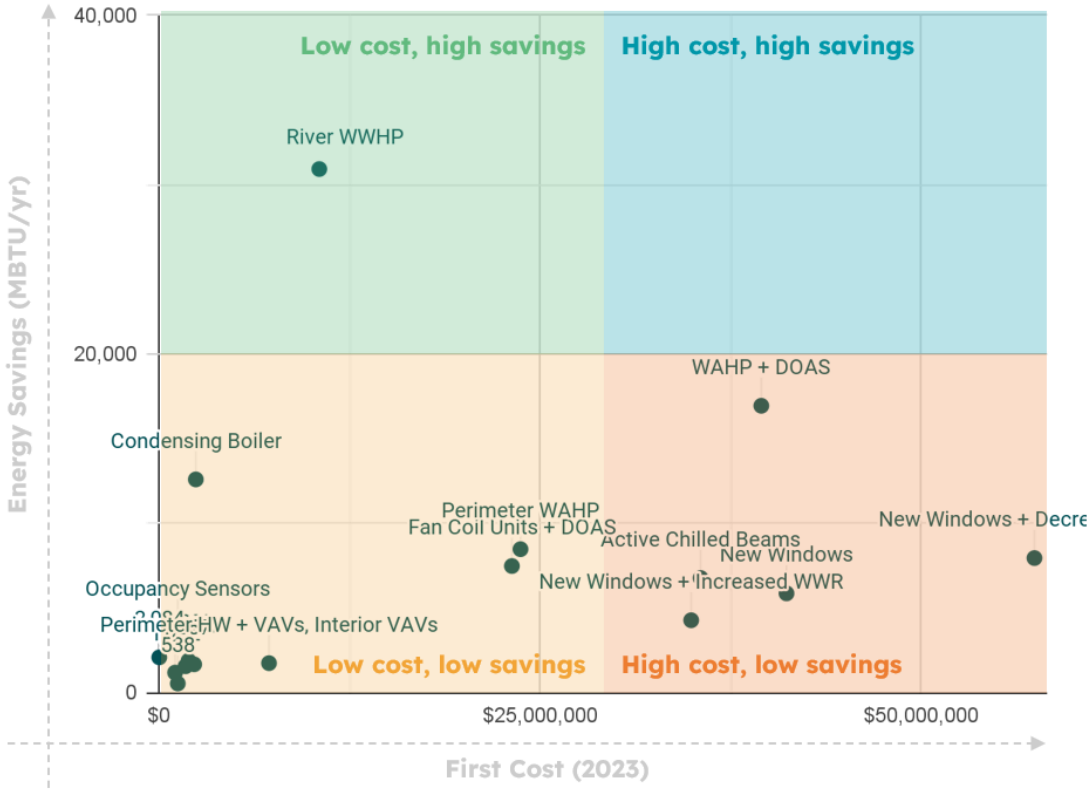
Decision Matrix

Data Collection . Preliminary Analysis . Detailed Analysis . Refine & Execute . Ongoing Monitoring

- There is not an economical case to be made for implementing envelope measures.
- The River WWHP is the clearest, easiest choice to make.
- There were a handful of options that can be bundled together to yield higher savings.



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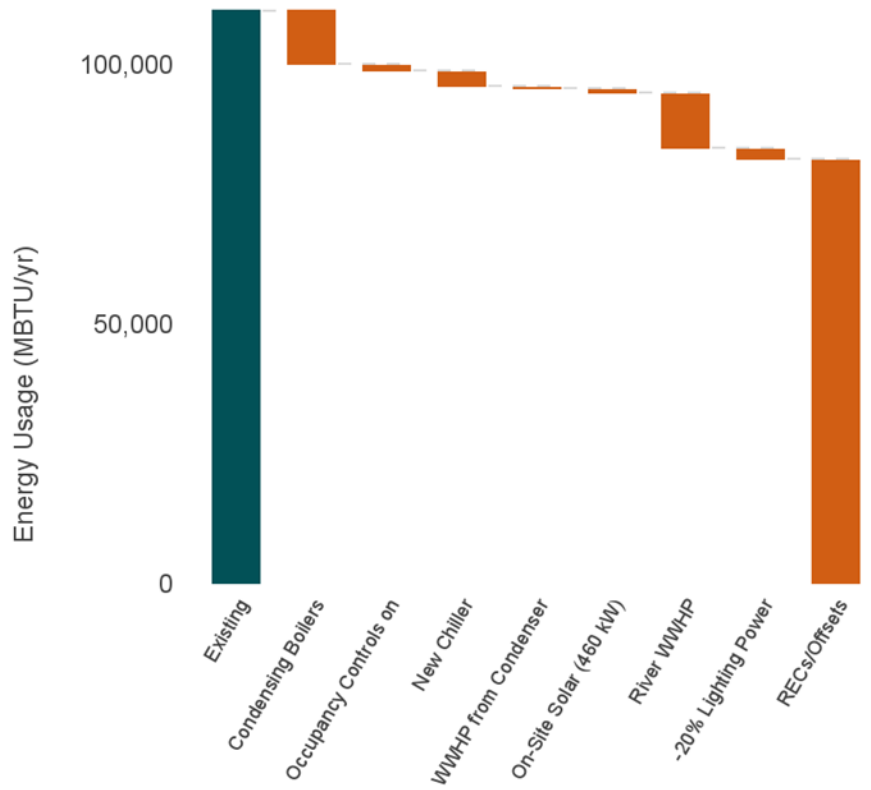
Recommended Measure Bundle

Data Collection . Preliminary Analysis . Detailed Analysis . Refine & Execute . Ongoing Monitoring

- Called this bundle the "Balanced Approach"
- Consisted of central mechanical plant upgrades only.
- No tenant level upgrades are made.

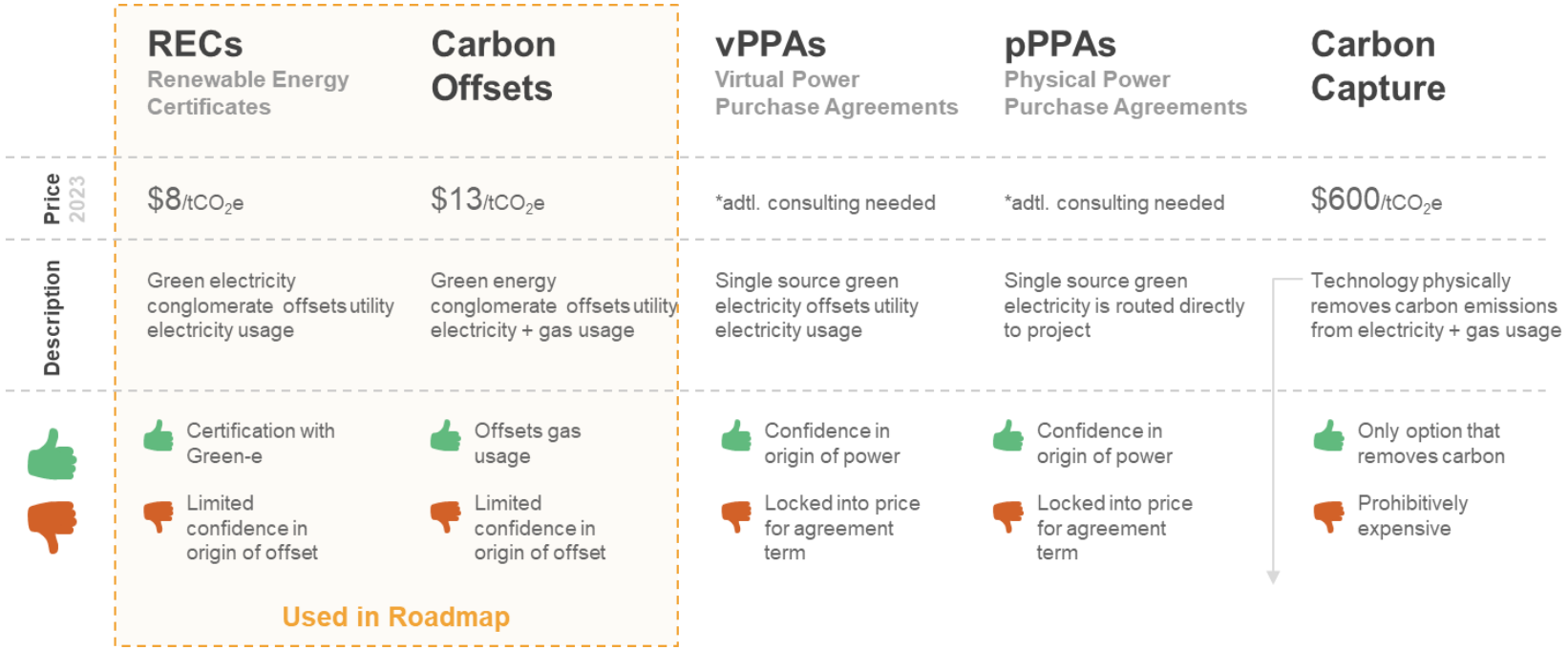
Today:	
Net Present Value	-$7,900,000
First Cost of Upgrades	$17,537,500
First Cost/SF	$11
In 2040:	
RECs/Offsets Purchased ($/yr)	$152,420
Operational Energy ($/yr)	$2,185,891
EUI (kBTU/sf/yr)	52
Operational Carbon (tCO2e)	7,590



Offsetting Remaining Operational Carbon

Data Collection . Preliminary Analysis . Detailed Analysis . Refine & Execute . Ongoing Monitoring

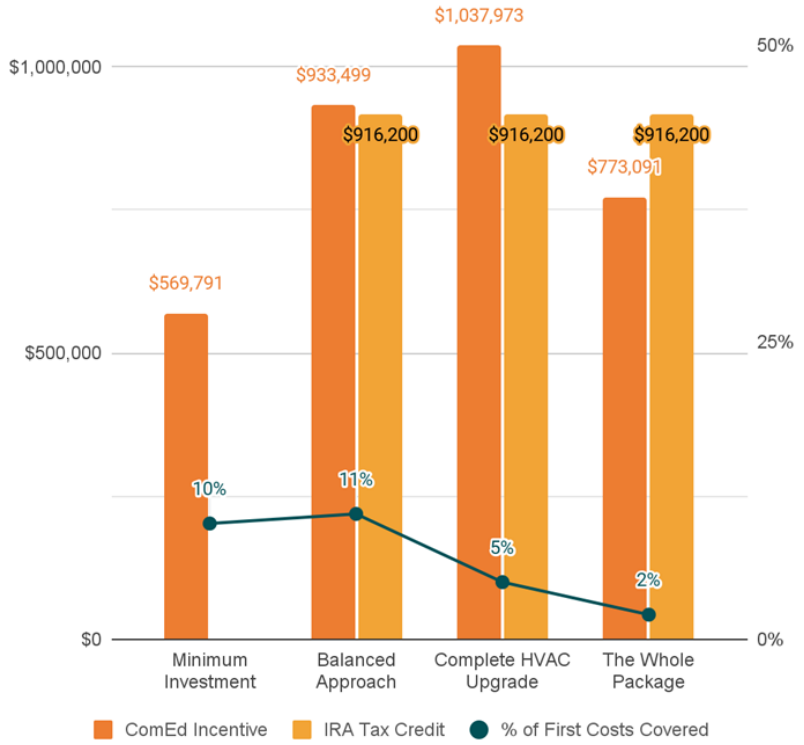
- Until the U.S. electric grid reaches zero emissions, offsets will be required to achieve net zero.



Incentives

Data Collection . Preliminary Analysis . Detailed Analysis . Refine & Execute . Ongoing Monitoring

- ComEd Incentives
  - Amount available is dependent on which program applies:
    - Existing Buildings ($0.18/kWh saved)
    - New Construction ($0.07/kWh & $0.35/therm).
    - There is more funding available with the Existing Buildings Program. New Construction is ~60% less lucrative.
- Inflation Reduction Act Tax Credits
  - 30% Tax Credit offered for the cost of solar installations +10% for local production, available through 2033
  - 179D - would need to achieve ≥25% energy and cost savings compared to ASHRAE 90.1-2007 by EOY 2026. This outcome is unlikely.
  - The baseline requirement may change to the existing building instead of the ASHRAE standard.



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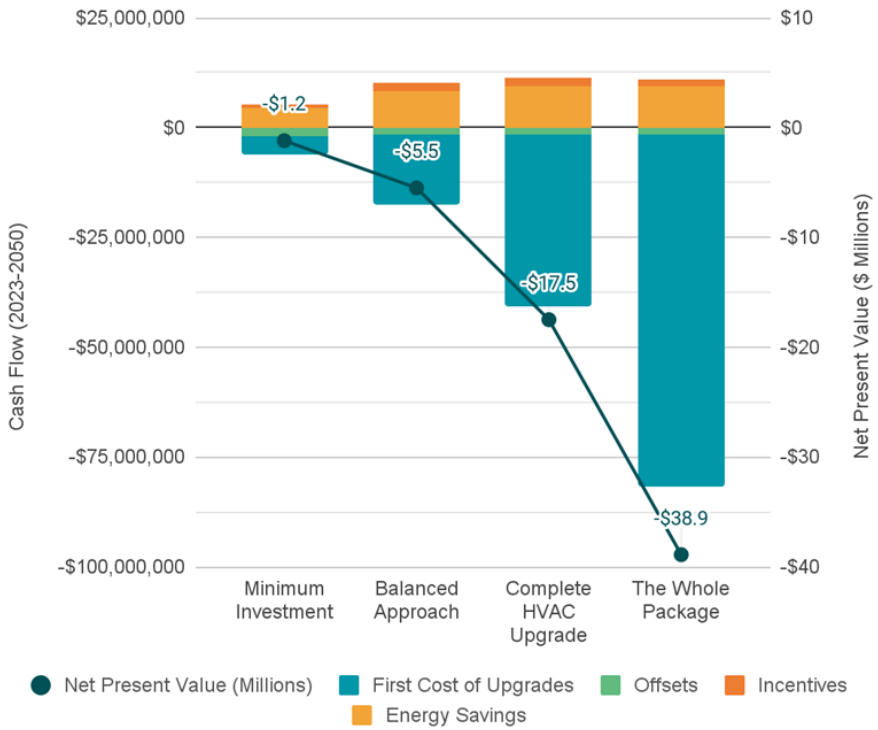
Roadmap Option Comparisons

Data Collection . Preliminary Analysis . Detailed Analysis . Refine & Execute . Ongoing Monitoring

- Given our assumptions, any decarbonization roadmap will be cash flow negative
- While significant on their own, incentives (dark orange) and offset purchases (light green) play a relatively small role in the larger financial picture
- The NPV (dark teal line) reflects the most conservative scenario; however, several factors could positively influence it:
  - **Rent Increase -** A rent increase of only **0.75%** ($0.26/SF) would make the NPV of the balanced approach neutral.
  - **Capitalization Rate -** Assuming a **5.5%** Cap Rate, the Balanced Approach adds $8.4M value to the properties ($6/SF).
  - **Carbon Penalty -** Adding only ~26% of Denver's carbon penalty ($0.30/kBTU/yr) in 2040 would make the NPV of the minimum investment equal the balanced approach.



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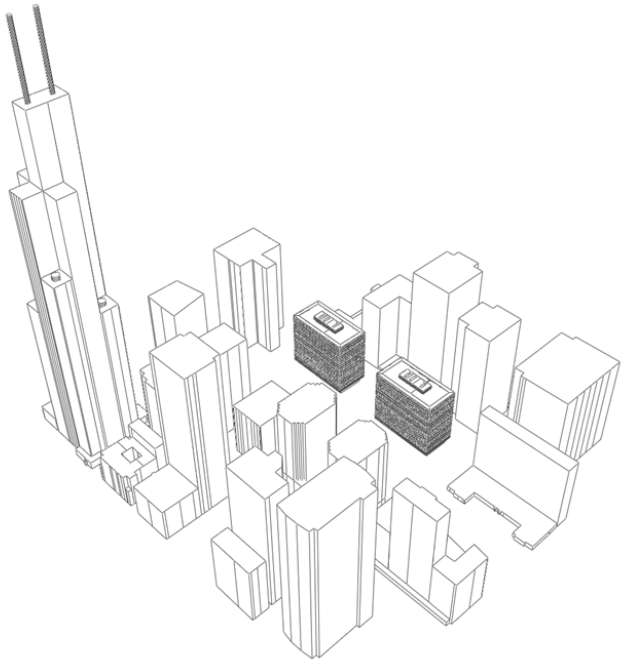
Major Takeaways

Data Collection . Preliminary Analysis . Detailed Analysis . Refine & Execute . Ongoing Monitoring

- Significant (~30%) EUI reductions can be met without major tenant space disruptions
- Net zero goals can be realized with investment in the range of $17M
- +/- NPV is sensitive to variables like potential increased tenant revenue, future building performance standards, and future grid cleanliness
- Incentives & RECs played a smaller role project economics than estimated
- **This was a great time to develop a Decarbonization Roadmap, given the age of their existing equipment & their net zero timeline**



Resources

ASHRAE

Center of Excellence for Building Decarbonization

- https://www.ashrae.org/technical-resources/cebd-center-of-excellence-for-building-decarbonization

Building sector breakdown source

- https://www.ashrae.org/about/cebd-building-decarb-101

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Leadership in energy innovation

- https://betterbuildingssolutioncenter.energy.gov/

EIA Commercial Energy Intensity

National sample survey of buildings

- https://www.eia.gov/outlooks/archive/aeo22/pdf/AEO2022_ChartLibrary_Buildings.pdf

Building Energy Hub

Greenhouse Gas Emissions 101

- https://www.buildinghub.energy/ghg-emissions

Funding and Financing Resources

- https://www.buildinghub.energy/funding-and-financing

The Goals of the Hub are to:

- Educate & train building professionals
- Support diverse contractors
- Connect contractors to a project pipeline
- Build capacity for advanced codes and policies
- Streamline access to financial resources

The Hub is growing capacity for commercial & multi-family building retrofits.

Engage with the Hub

- Check out our updated website
- Volunteer with us
- Share a featured building or project
- Sign up for our newsletter
- Follow us on LinkedIn