
A BETTER CITY
BUILT TO LEAD:
LESSONS IN BUILDING DECARBONIZATION IN NEW CONSTRUCTION
LEARN MORE HERE

BUILT TO LEAD: LESSONS IN BUILDING DECARBONIZATION AND RESILIENCE

1. **September 24 Built to Lead:** Lessons in Building Decarbonization in Existing Buildings

2. **October 30 Built to Lead: Lessons in Building Decarbonization in New Construction**

3. **December 17 Built to Lead: Lessons in New Technologies and Opportunities, @ 10-11:30 AM at 290 Congress St, Fort Point Room, Boston, MA 02210**
   - John Fernandez, MIT (and Co-founder of Lamaar.AI)—*AI building envelope evaluation*
   - Zeyneb Magavi, HEET — *Thermal energy potential of water sources*
   - John Kastrinos, Haley & Aldrich and Ari Greenberg, BR+A—*Right sizing of geothermal energy*
   - Colin Schless, Turner Construction—*Hybrid electrification*

4. Built to Lead: Lesson in Deconstruction and Embodied Carbon, TBD

5. Built to Lead: Lessons in Resilience, TBD

A BETTER CITY

AGENDA

10:00 AM	**Kate Dineen, A Better City**—Welcome
10:02 AM	**Yve Torrie, A Better City**—Introduction
10:05 AM	**Rustom Cowasjee, Tishman Speyer**—*Enterprise Research Center (ERC), net zero residential building, hotel, and lab*
10:14 AM	**Heather Henriksen, Harvard University**—*Rubenstein Treehouse Conference Center using Mass Timber and lower embodied carbon concrete*
10:23 AM	**David Gillespie, AvalonBay**—*Salem, MA, passive house development*
10:32 AM	**Christoph Stump, Trinity Financial**—*Bronx, NY, passive house development*
10:41 AM	**Yanni Tsipis, WS Development**—*Seaport, net zero carbon office building using Sublime cement and all-electric systems*
10:50 AM	**Randy Boles, Vertex**—*Seaport, 95% electric lab development*
11:00 AM	**Q+A**, facilitated by Yve Torrie, A Better City
11:30 AM	**Event Concludes**

RUSTOM COWASJEE, TISHMAN SPEYER

October 2025

Enterprise Research Campus

A hub for creativity, research, & culture

Presented by Rustom Cowasjee
Managing Director, Design & Construction
Tishman Speyer

ERC Overview

Phase A
Delivering Q3 2025 – Q1 2026

- **One Milestone:** 500K SF of lab / office
- **Residences:** 343 units
- **Hotel:** 246 rooms
- **David Rubenstein Treehouse at Harvard University:** Conference Center
- **Greenway:** +2 acres of open space

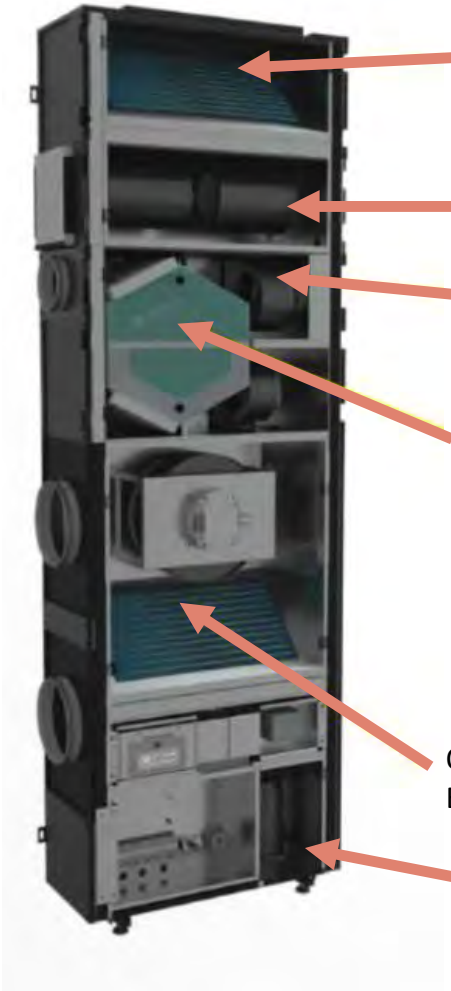
<u>Our Development Commitment</u>

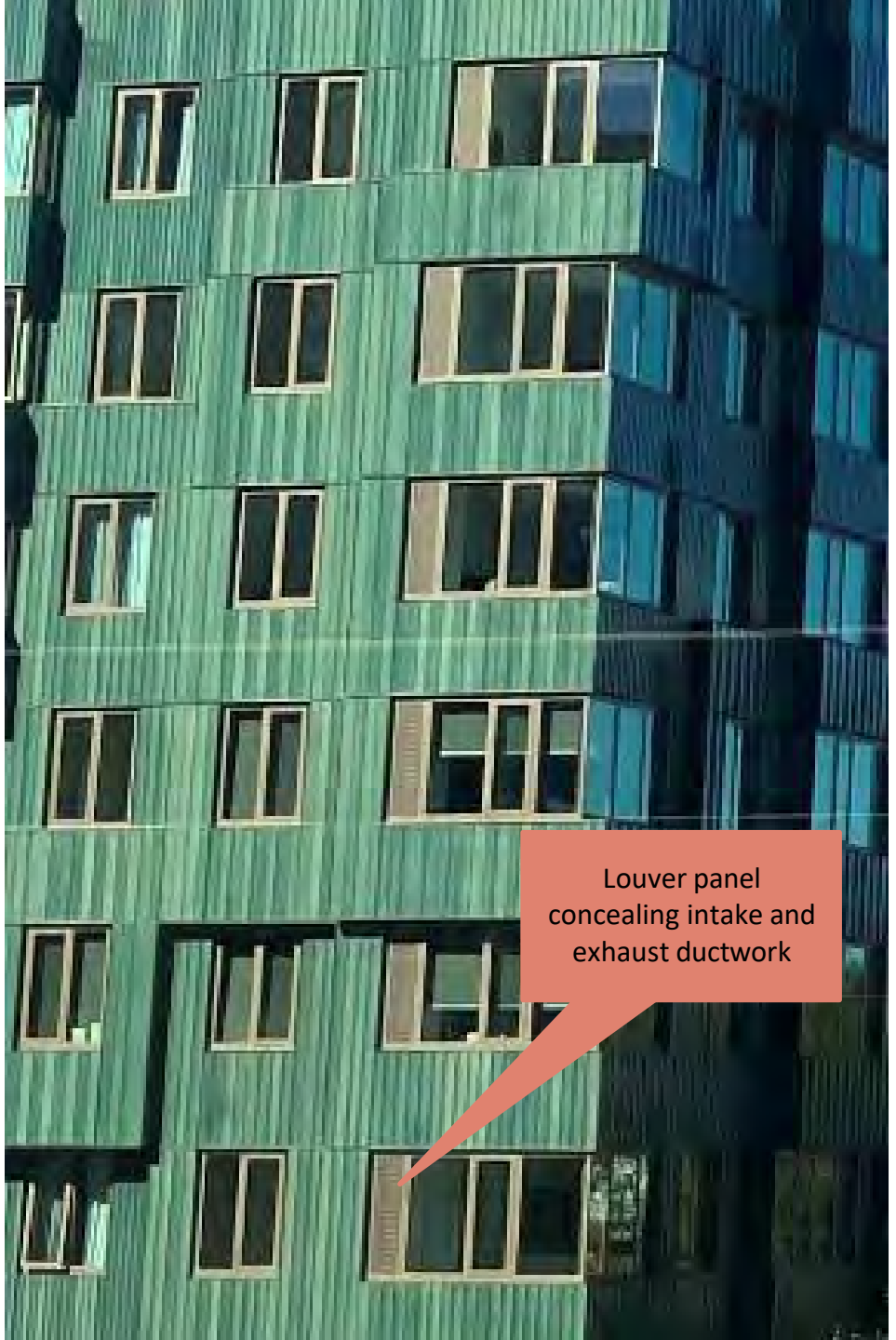
Develop, document, and implement building energy and emissions strategies and solutions for Developer's buildings to be fossil fuel-neutral by 2026 and **fossil fuel-free by 2050**


VERRA
Goals
• Energy Efficiency
• Indoor Air Quality
• Aesthetics with Envelope
Solutions
• Ephoca AIO
• Electric DHW

Ephoca AIO

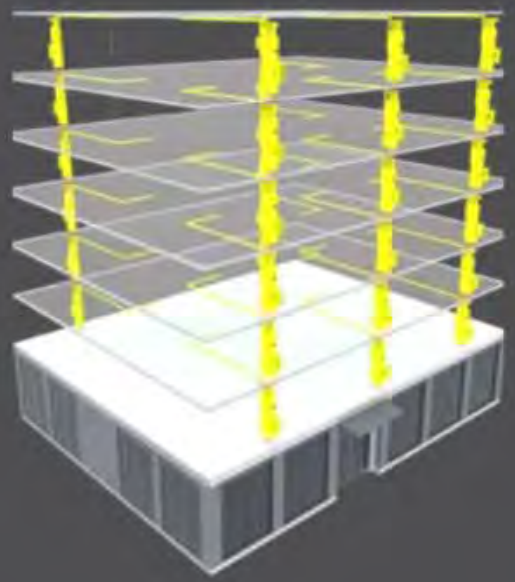
All-In-One Heat Pump and ERV

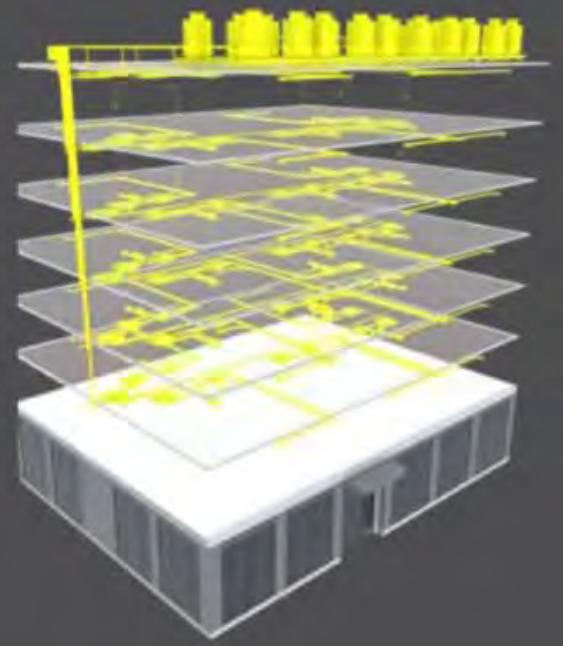




Ephoca AIO

AIO vs VRF





AIO

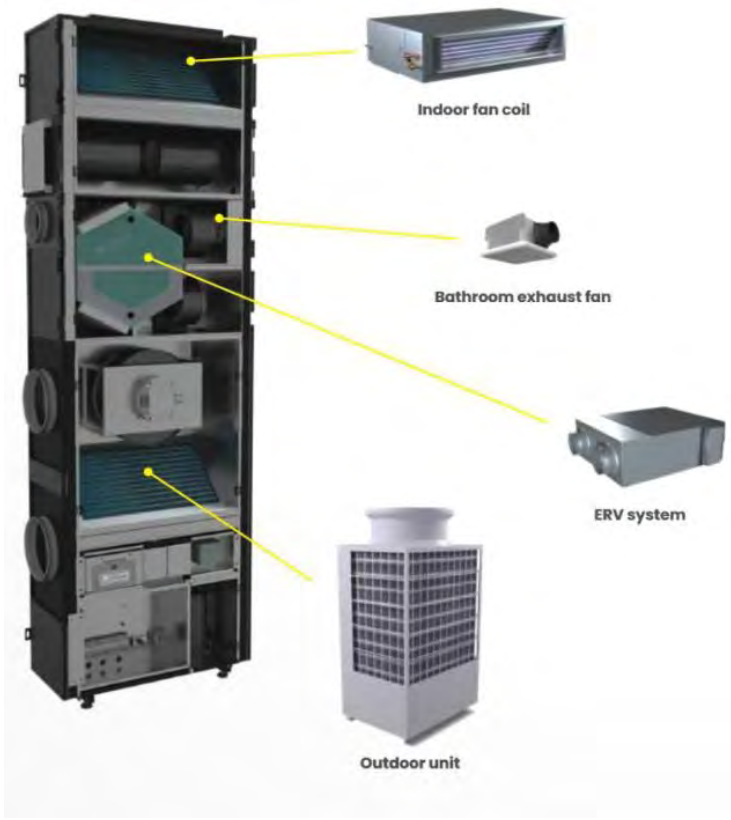
- One unit
- One bathroom duct run
- One power point
- Simple to engineer and install

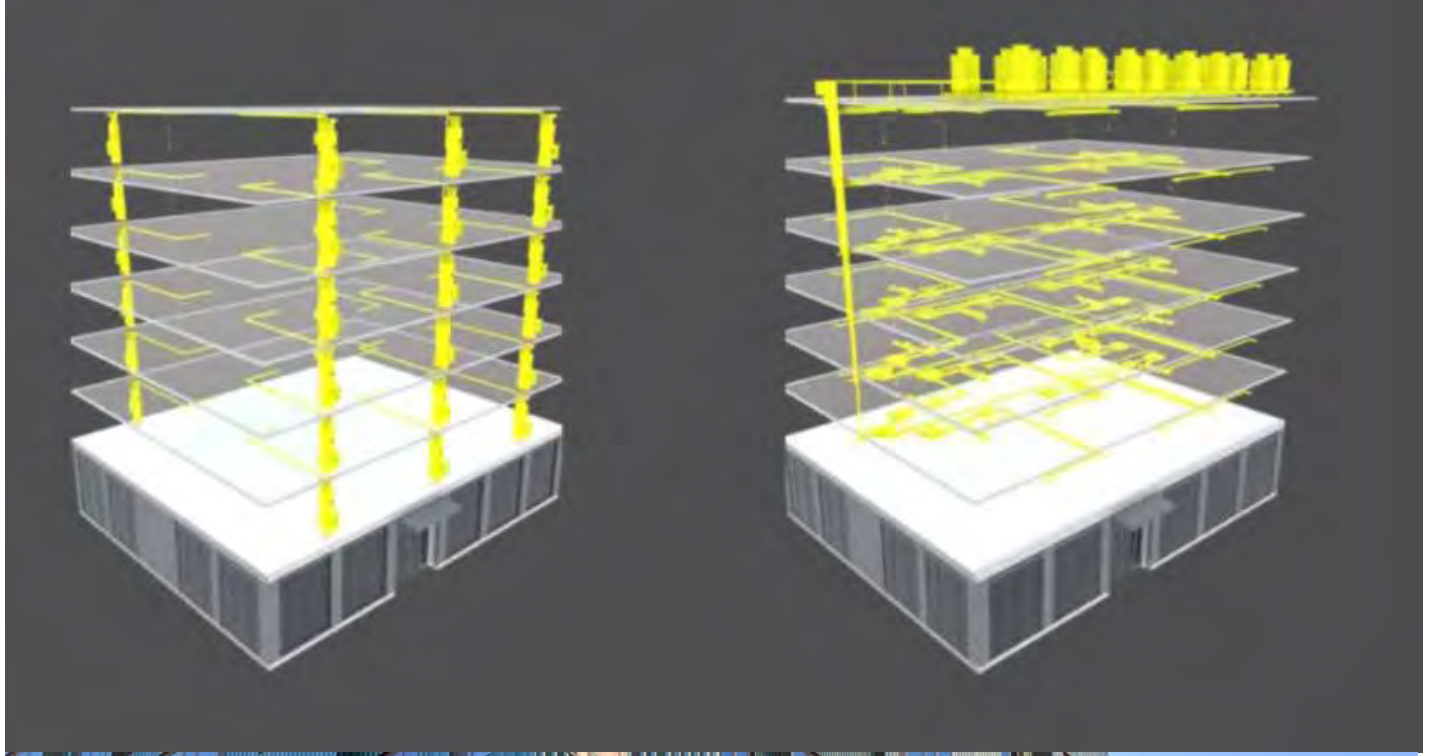
VRF

- Outdoor unit
- Indoor unit
- Thousand of feet of line sets
- MCU
- Billing software and staff
- Multiple power points
- ERV unit
- ERV ducting
- Bathroom exhaust
- Bathroom exhaust ducting
- Loads of drywall
- Complex to engineer and install

Ephoca AIO

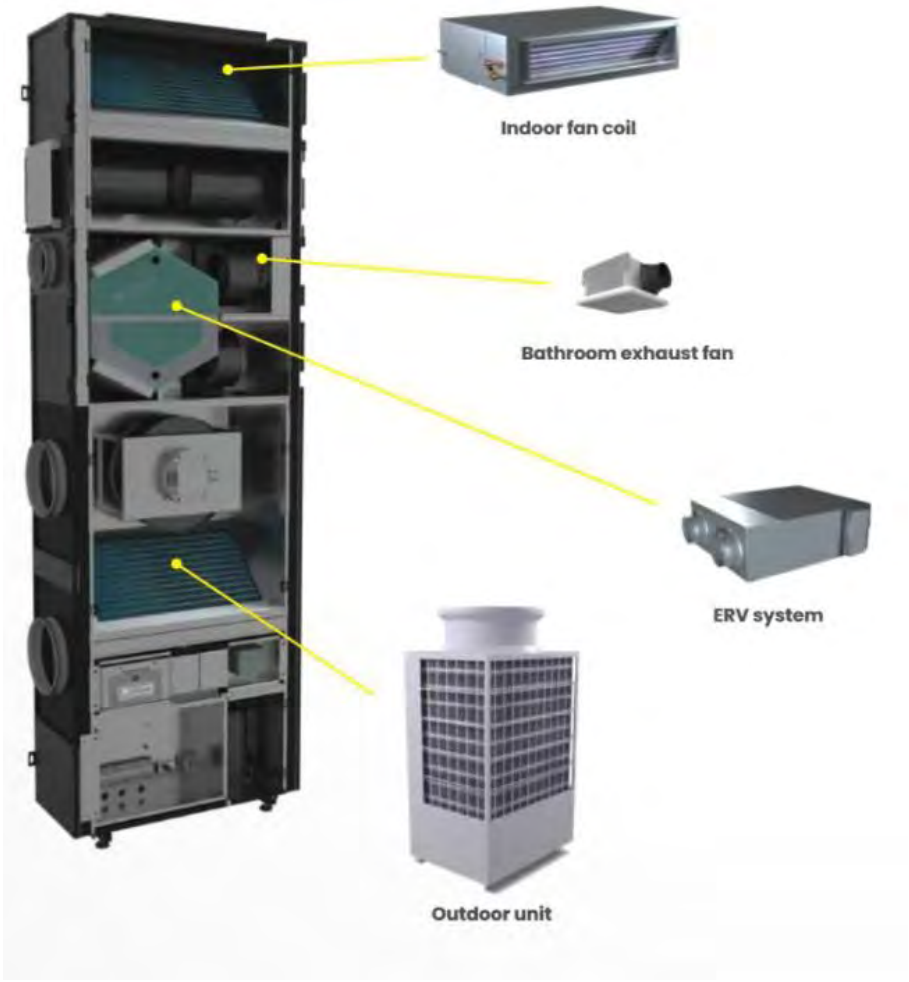
AIO vs VRF





Ephoca AIO

All-In-One Heat Pump
and ERV



THE ATLAS
HOTEL

Goals

- Energy Efficiency
- Quiet Comfort
- 100% Electric

Solutions

- Daikin VRV Heat Pumps
- Central ERV Heat Pump (for Ventilation)
- Electric DHW

Goals

- Energy Efficiency (reduce demand)
- Optimize Day 1 Electrification
- Plan for Future

Lab Challenges

- Ventilation Air constitutes 63% of Peak Electric Load (0 deg)
- Diminishing Performance of ASHPs during Colder Weather

Solutions

- Maximize Heat Recovery
  - HR Chiller
  - LabX HR Coils and Pumping
- 24 ASHPs as primary heat source
  - 16% of Peak Demand
  - 95.4% reduction in Gas Use
- Condensing Gas Boilers for coldest weather operations

HEATHER HENRIKSEN, HARVARD UNIVERSITY

Harvard's Vision for Holistically Sustainable Buildings

Heather Henriksen
Harvard Chief Sustainability Officer

HARVARD
Office for Sustainability

David Rubenstein Treehouse
at Harvard University

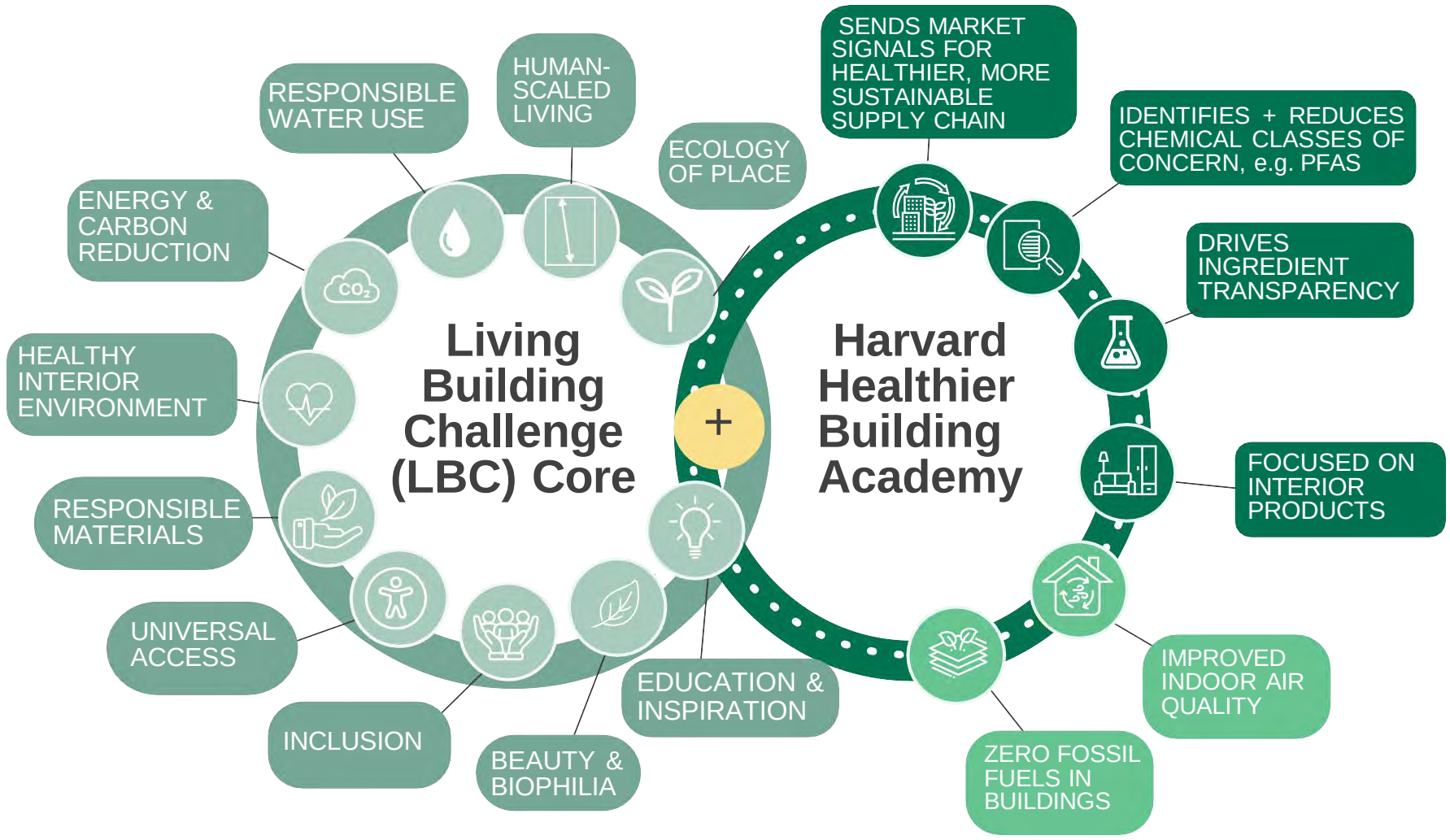
Targeting ambitious standards: LBC Core + Harvard Targets

Living Building Challenge + Harvard Healthier Building Academy

Holistic requirements

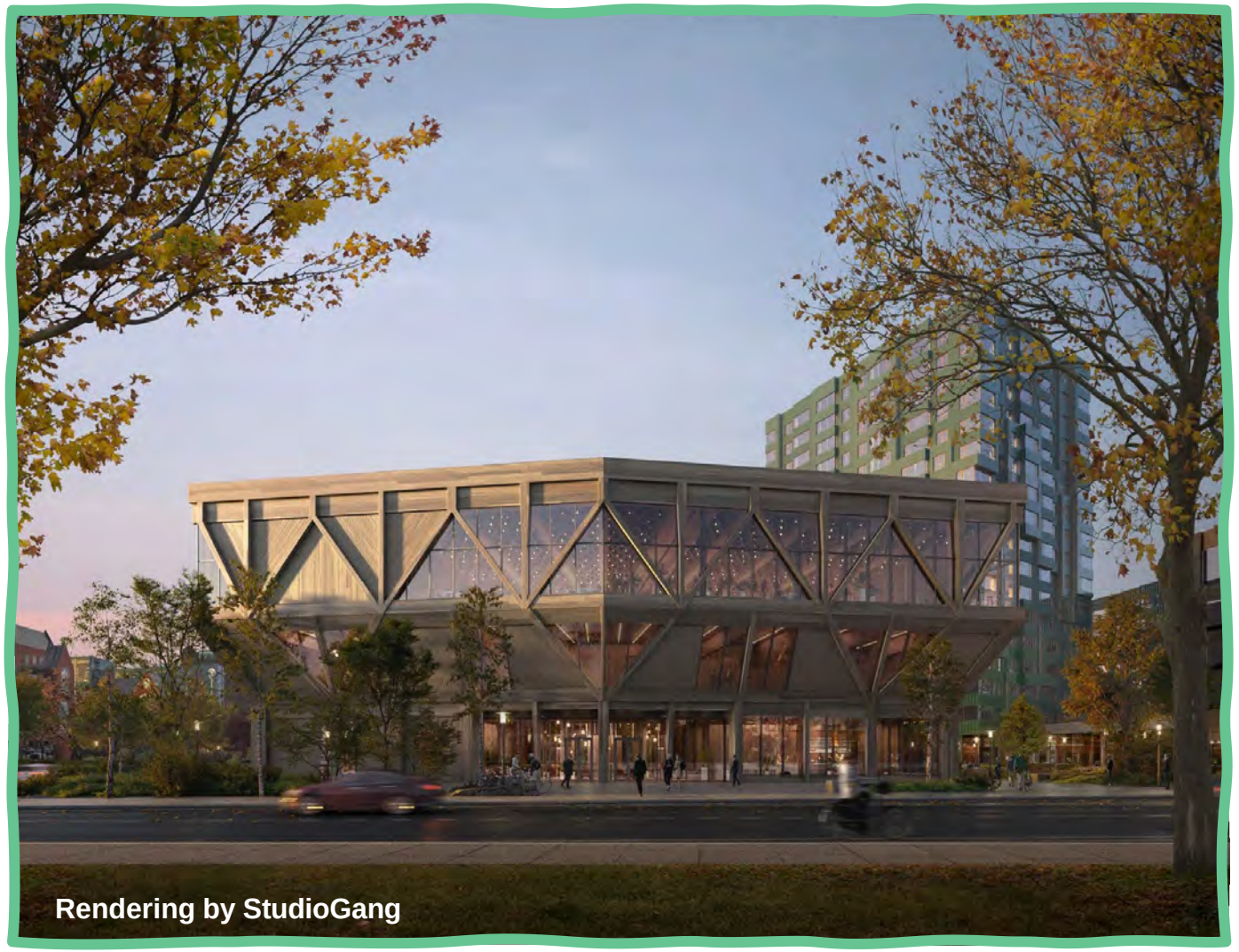
Performance-based

Net-positive goals



David Rubenstein Treehouse Conference Center (Fall 2025)

Piloting, proving, and scaling sustainable building solutions



- Pursuing **Living Building Challenge (LBC) Core** + **LBC Petal** certifications + **HHBA**
- **Zero fossil fuels** on site, all-electric commercial kitchen
- **~60% reduction in embodied carbon**:
  - **Mass timber** structure
  - Healthier, low-embodied carbon **concrete with ground glass pozzolan (GGP)**
- **Rooftop** PV system
- **Heat recovery** & **underfloor air** systems
- **Increased outside air ventilation** (+75%)
- **Water recycling** for irrigation + toilets

Rubenstein Treehouse: Reducing Embodied Carbon

Address Climate And Health

ARCHITECT
Studio Gang

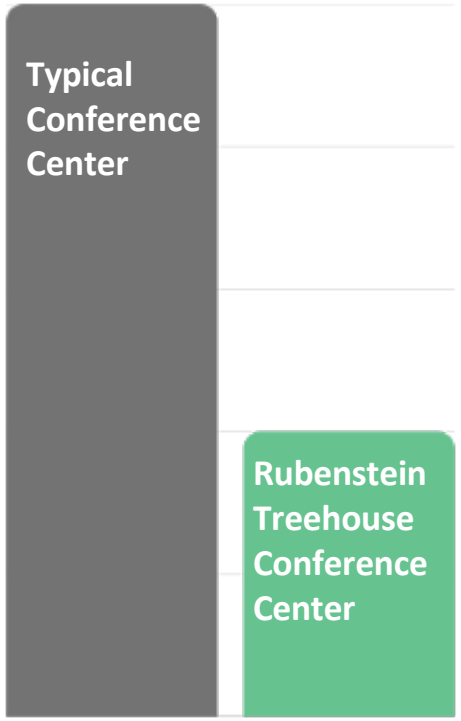
STRUCTURAL ENGINEER
Arup

CONTRACTOR
Consigli

SUPPLIER
Boston Sand & Gravel

CONSULTANT
Perkins & Will

Roadmap to Healthier, Low-Embodied, Structural Concrete + Mass Timber



60% less

EMBODIED CARBON

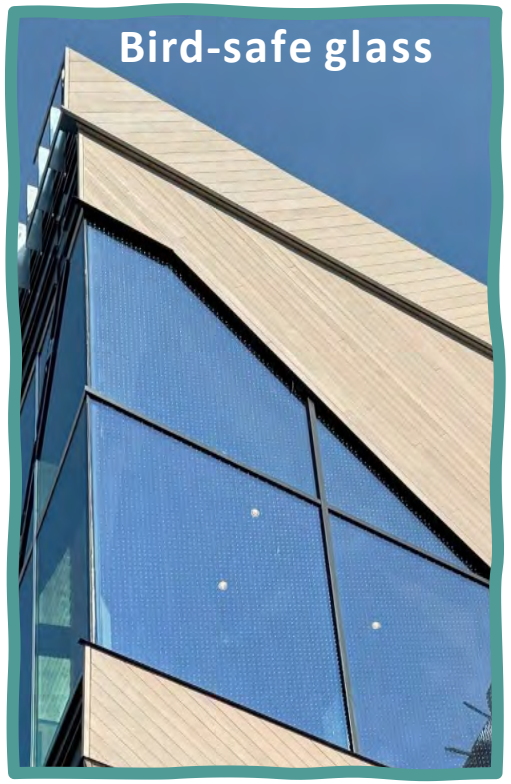
1st Mass Timber building at Harvard.

1st in MA use healthier, **low-embodied concrete** with **Ground Glass Pozzolan**

Low-embodied carbon Insulation and **Glazing**

Focus on Healthier, Sustainable Materials

Followed Harvard Healthier Building Academy's Playbook



The Rubenstein Treehouse Achieved Healthier Materials Selections:

100%

of products researched for health

100%

Interior and impactful product categories

72

HHBA-compliant product categories

PFAS/ forever chemicals

Chemical flame retardants

Anti-microbials

Rubenstein Treehouse: Resiliency + Stormwater Management

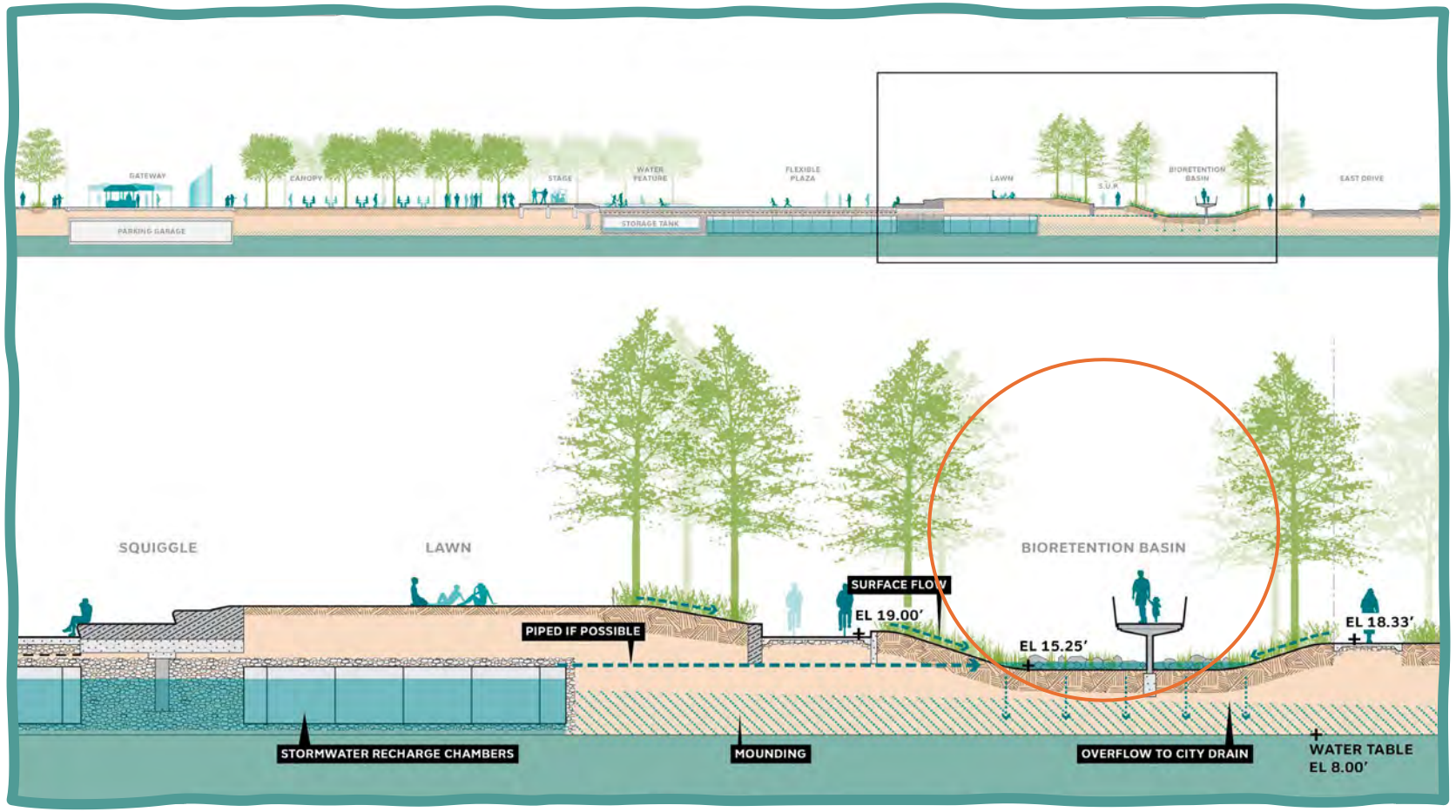
Sustainable Infrastructure Minimizes Impacts & Creates a Resilient Landscape

90%
of stormwater managed on-site

100%
reduction in potable water for irrigation

50%
reduction in indoor potable water use

20,000
-gallon rainwater harvesting system recycles rainwater.



Rubenstein Treehouse: Replicability & Scaling Solutions

Across Harvard and Beyond for Impact

Meeting Ambitious Certifications @ Scale

1 certified **LBC Core**

10+ targeting **LBC Core**

Applying Lessons Learned @ Harvard

Healthier AND **Lower-Embodied Carbon Concrete**

Ground Glass Pozzolan (**GGP**), NOT Fly Ash Cement Replacement

Scaling Beyond Harvard

Rendering by MDS Architects/Sasaki.

Healthier Materials in Public Schools

- Replicating HHBA's playbook
- Remove Toxic Classes, Not Lists, Chemicals
- Meeting public procurement laws

Stay Connected with Sustainable Harvard

HARVARD
Office for Sustainability

sustainable.harvard.edu

@GreenHarvard

@SustainableHarvard

@Harvard_Sustain

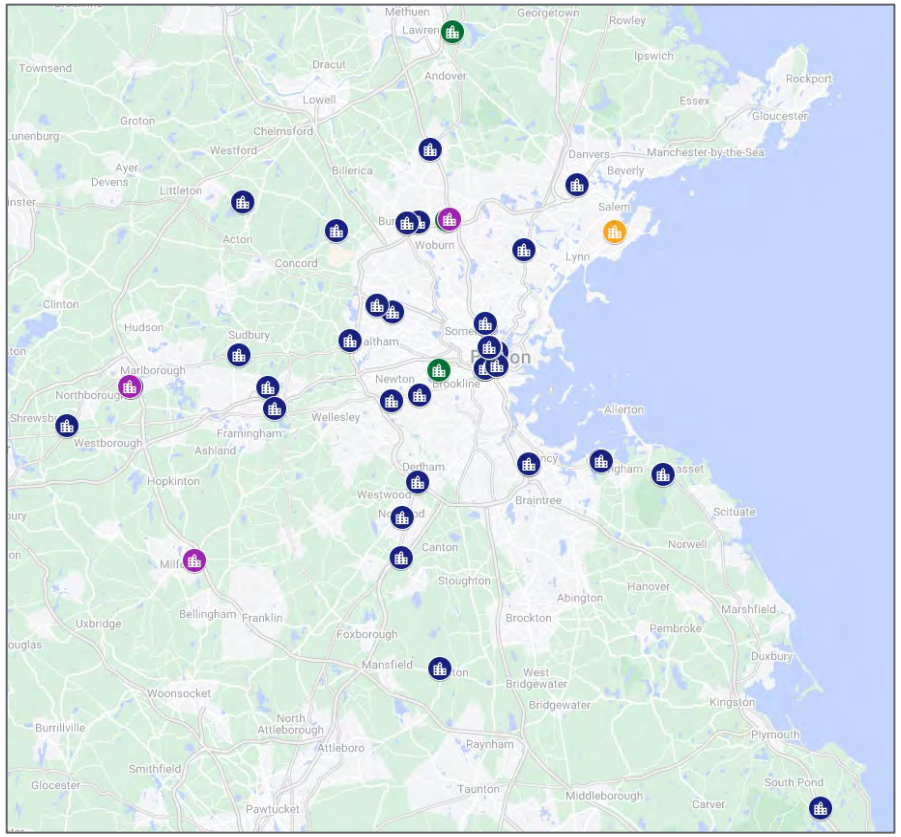
DAVID GILLESPIE, AVALON BAY

Avalon Salem - Passive House Planning

AvalonBay COMMUNITIES

AvalonBay – Strong, Local Presence

- National, publicly traded apartment owner/developer
- 90,000 apartment homes in 10 markets
- 30+ years experience in Greater Boston
- Successfully permitted and built 50 developments
- Act as our own contractor and property manager
- Strong track record of leading in sustainability



STABILIZED

45 communities
>10,000 apartments

CONSTRUCTION

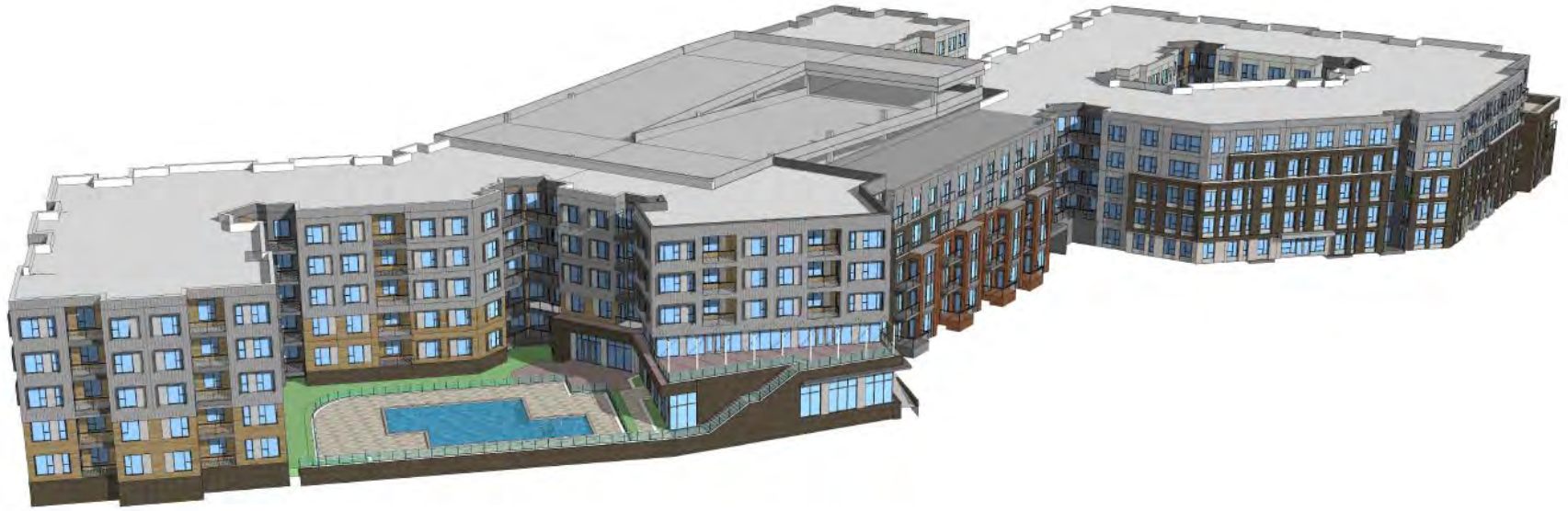
1 community
~300 apartments

PREDEVELOPMENT

4 communities
~1,050 apartments

AvalonBay COMMUNITIES

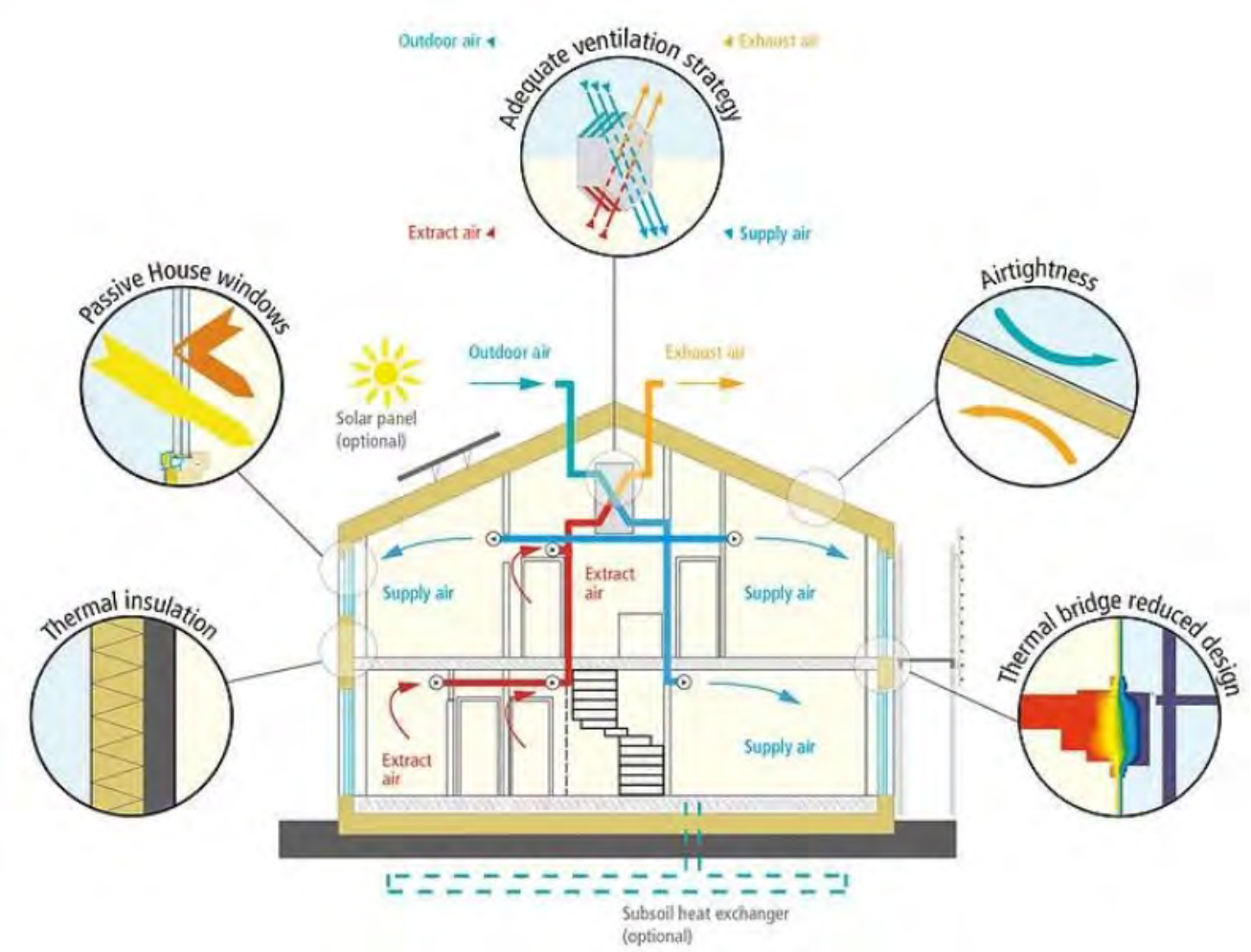
Avalon Salem - Design



- 340 Apartment Homes
- 80% market rate, 20% affordable
- 5-story wrap building with precast garage
- 1st AvalonBay Passive House project

AvalonBay COMMUNITIES

Passive House Principles



Process

- Design
- Energy Modeling
- Construction
- Testing and Inspections
- Final Certification
- Monitoring

AvalonBay COMMUNITIES

Why Passive House?

- High performance building
- Sustainability goals
- Innovation goals
- Specialized Energy Code
- Financial incentives

Passive House Pathways

- Settled pathways
  - Better, continuous insulation
  - Window sizing, specification and detailing
  - Small hole mitigation: Seal taping, Aeroseal
  - LED Lighting
  - Mechanical ventilation w/ energy recovery
  - Heat pumps

Passive House Pathways

- Impactful pathways
  - Domestic hot water production
  - Fossil fuel free?
  - Clothes dryers
  - Quality control process
  - Inspections, inspections, inspections

Passive House Financials

- Rebates
  - Feasibility Study - $5,000
  - Energy Modeling - $20,000
  - Pre-certification - $750/unit
  - Final certification - $3,000/unit
- Costs
  - 5% premium to stretch: ~$15,000/unit
  - Schedule impact
- Long term questions
  - Will residents pay more?
  - Is building worth more?

Avalon Salem

Project website:
www.forestriverresidences.com
Contact information:
david_gillespie@avalonbay.com

AvalonBay COMMUNITIES

CHRISTOPH STUMP, TRINITY FINANCIAL

A BETTER CITY

A Better City
Passive House Energy Costs

Trinity Financial

- Offices in New York City and Boston
- Over 38 years in operation
- Over $3.3 Billion in Development work in NY, MA, RI and CT
- More than 10,000 units and over 600,000 sf of retail/commercial
- Specializations:
  - Affordable Housing Development
  - Public Housing Redevelopment
  - Mixed Use & Mixed Income Housing
  - Market Rate Housing Development

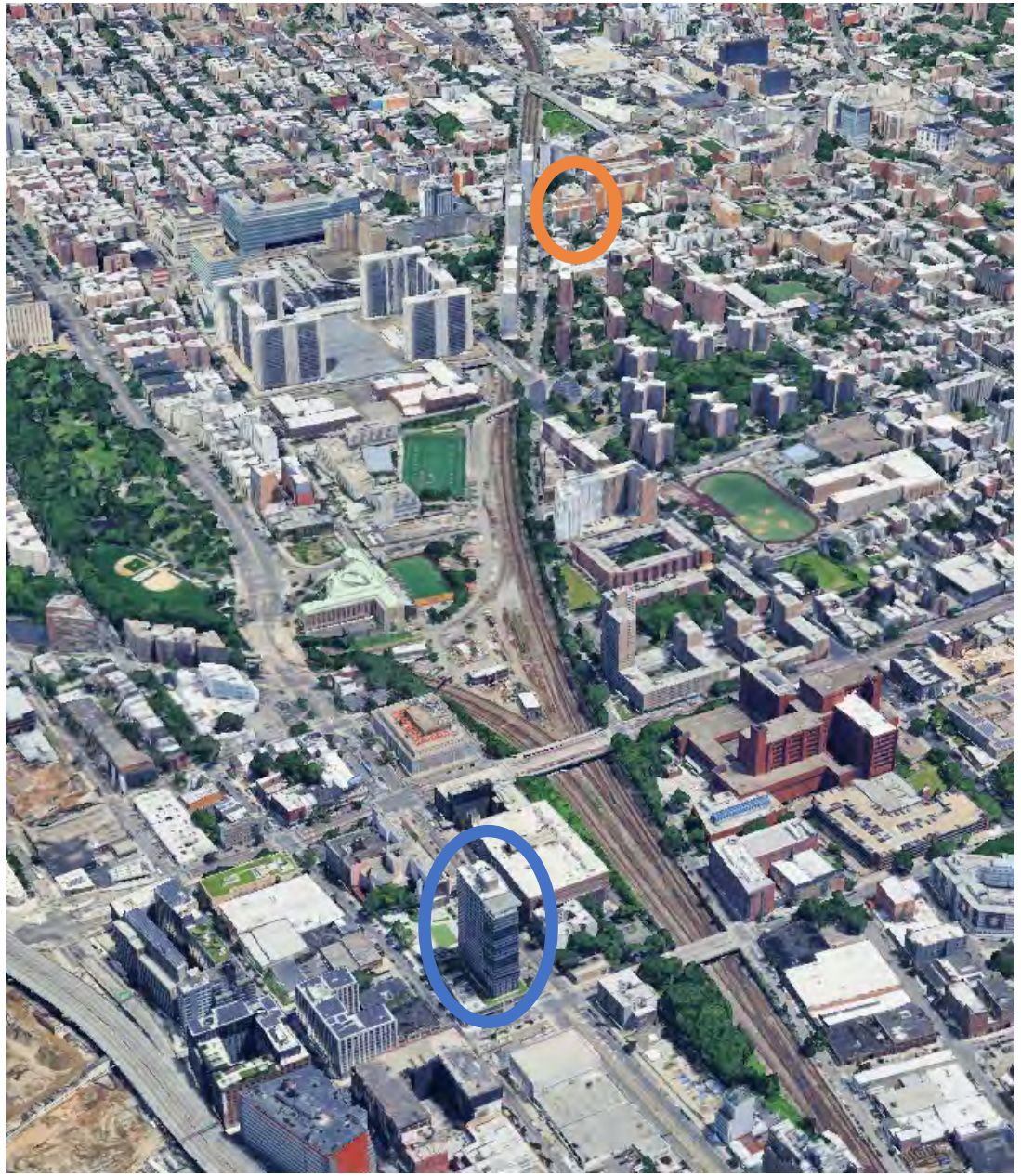
425 Grand Concourse

The Bronx

- Passive House (Phius)
- 277 Affordable Rental Apartments (30% - 130% AMI)
- 29,000 sf Community College
- 12,000 sf Supermarket
- 4,000 sf Urgent Care Facility
- 1,400 sf Cultural Space
- Public Bathrooms

Utility Model ≠ Prediction

	Modeled Design (2019)		
	Energy	Total Cost	Unit Cost
Electricity [kWh]	452,537	$ 79,194	$ 0.18
Gas [Therms]	13,010	$ 16,484	$ 1.27
Total		**$ 95,678**	

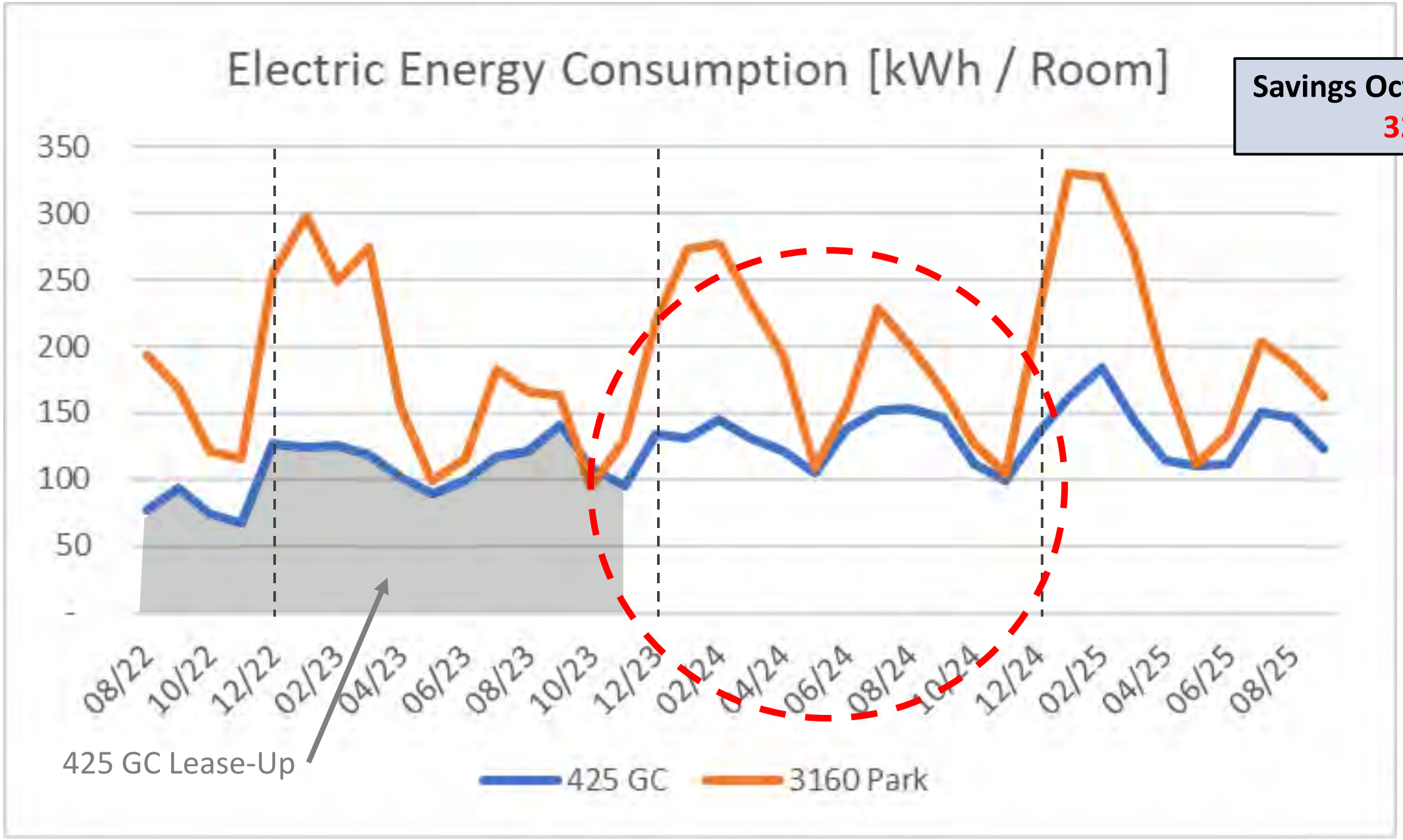


3160 Park Avenue, Bx (Non-PH)

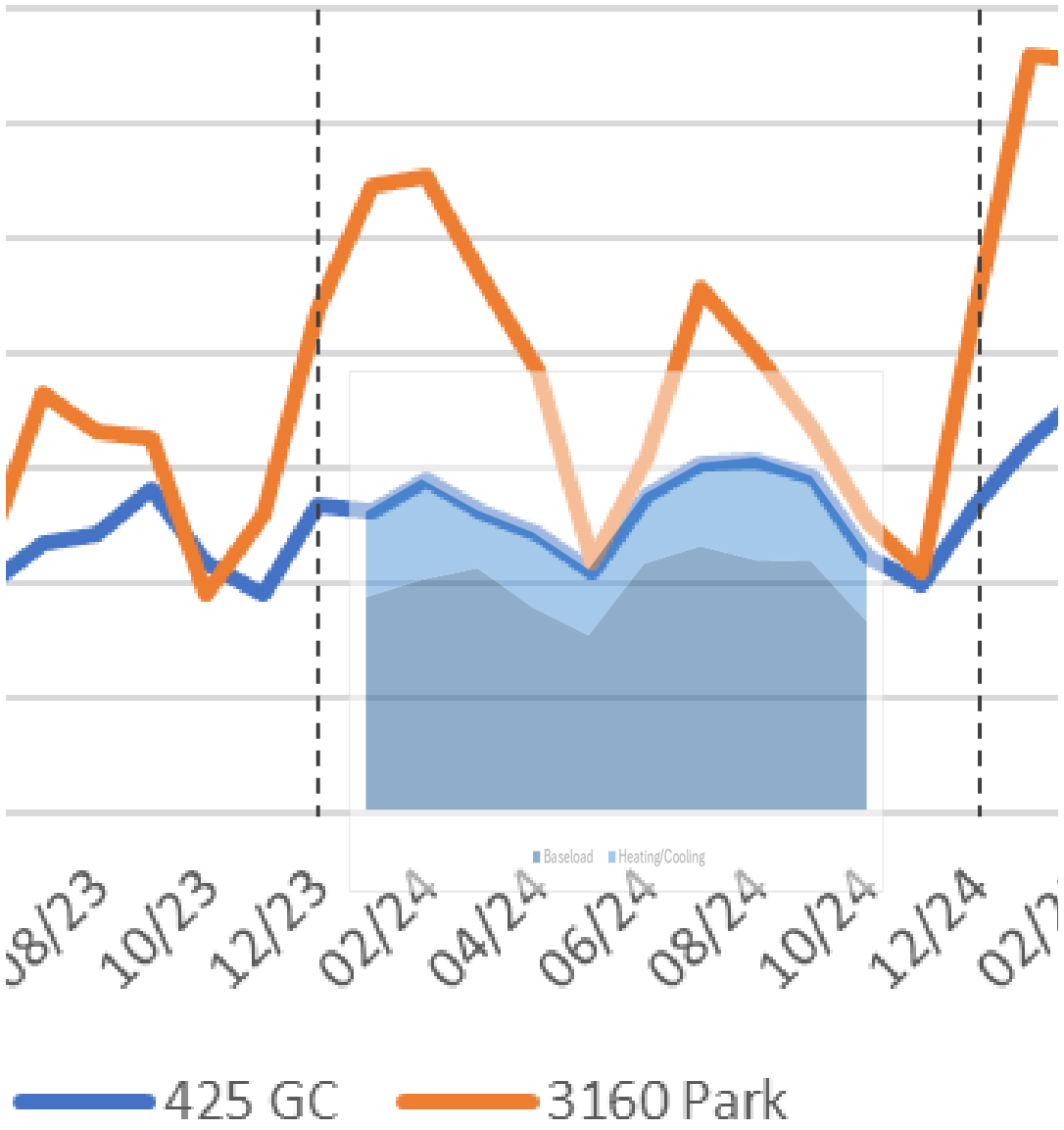
- Above-Code, Non-PH Envelope
- “Trickle Vent” Ventilation (Exhaust-Only)
- Central VRF
- High-Efficiency Gas DHW

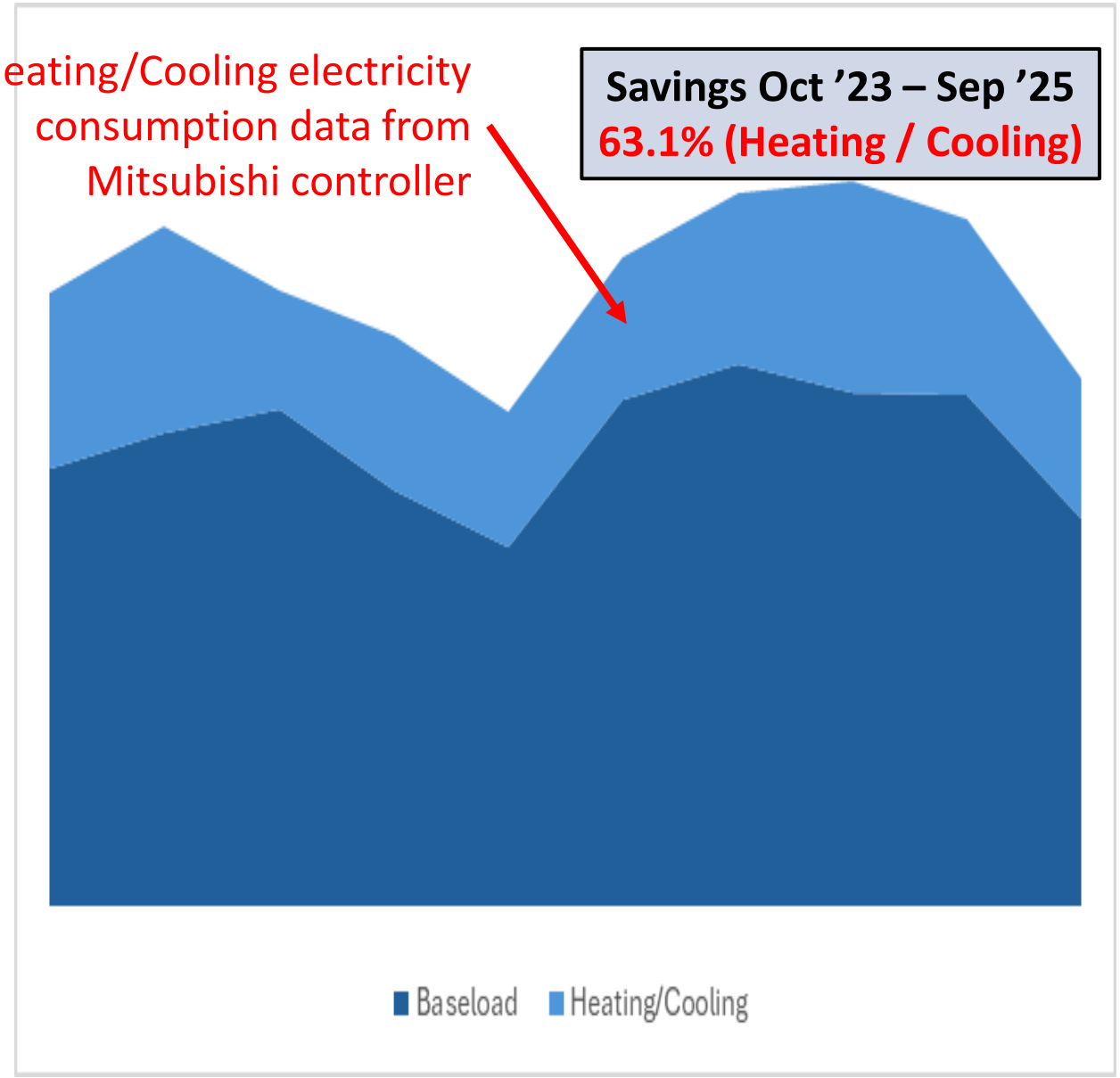
425 Grand Concourse, Bx (Passive House)

- PH Envelope
- Balanced Ventilation (ERV)
- Central Heat-Recovery VRF
- High-Efficiency Gas DHW

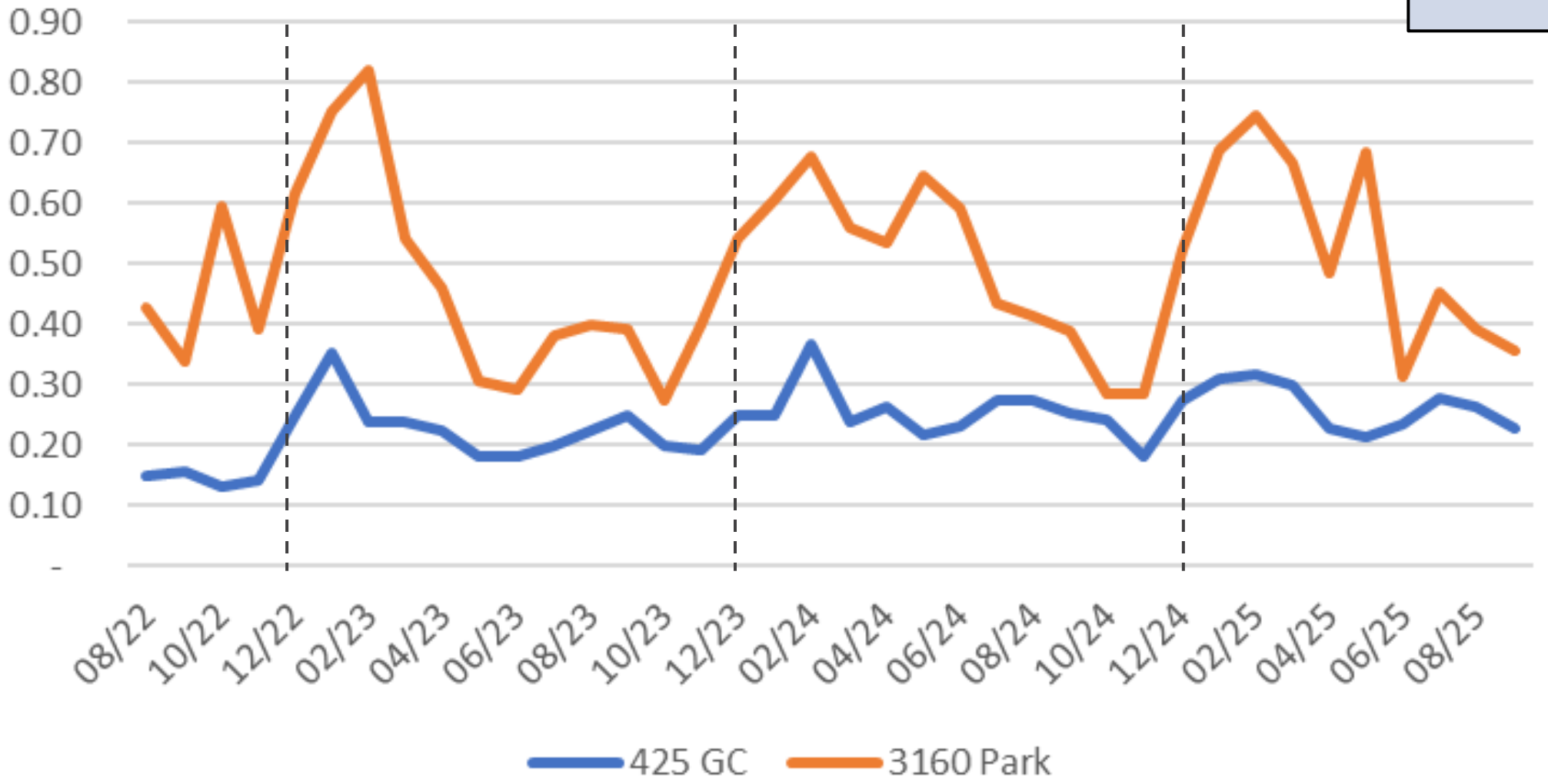


Savings Oct '23 – Sep '25
32.0%


Baseload
Heating/Cooling
08/23
10/23
12/23
02/24
04/24
06/24
08/24
10/24
12/24
425 GC
3160 Park


Heating/Cooling electricity consumption data from Mitsubishi controller
Savings Oct '23 – Sep '25
63.1% (Heating / Cooling)
Baseload
Heating/Cooling

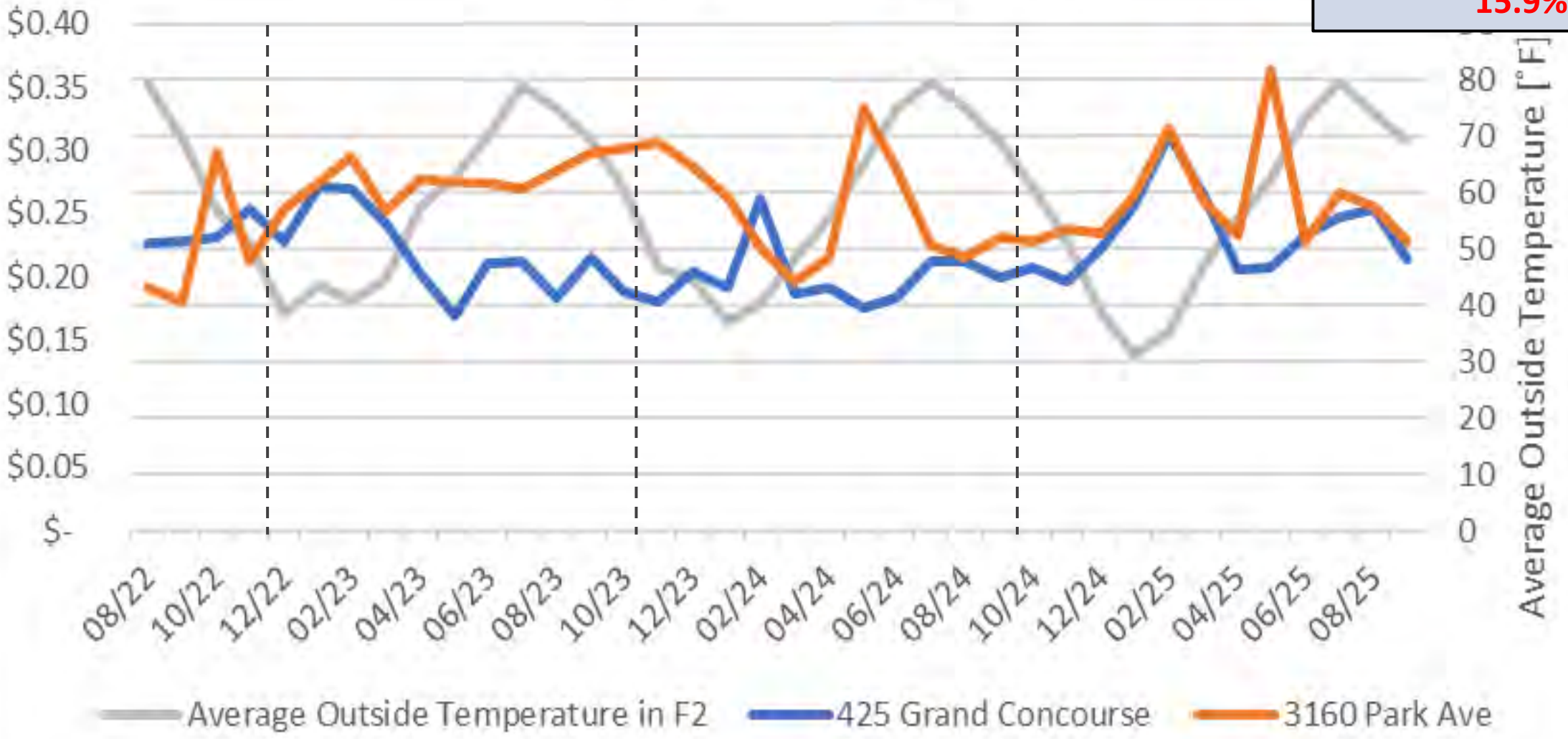
Electric Peak Consumption [kW / Room]

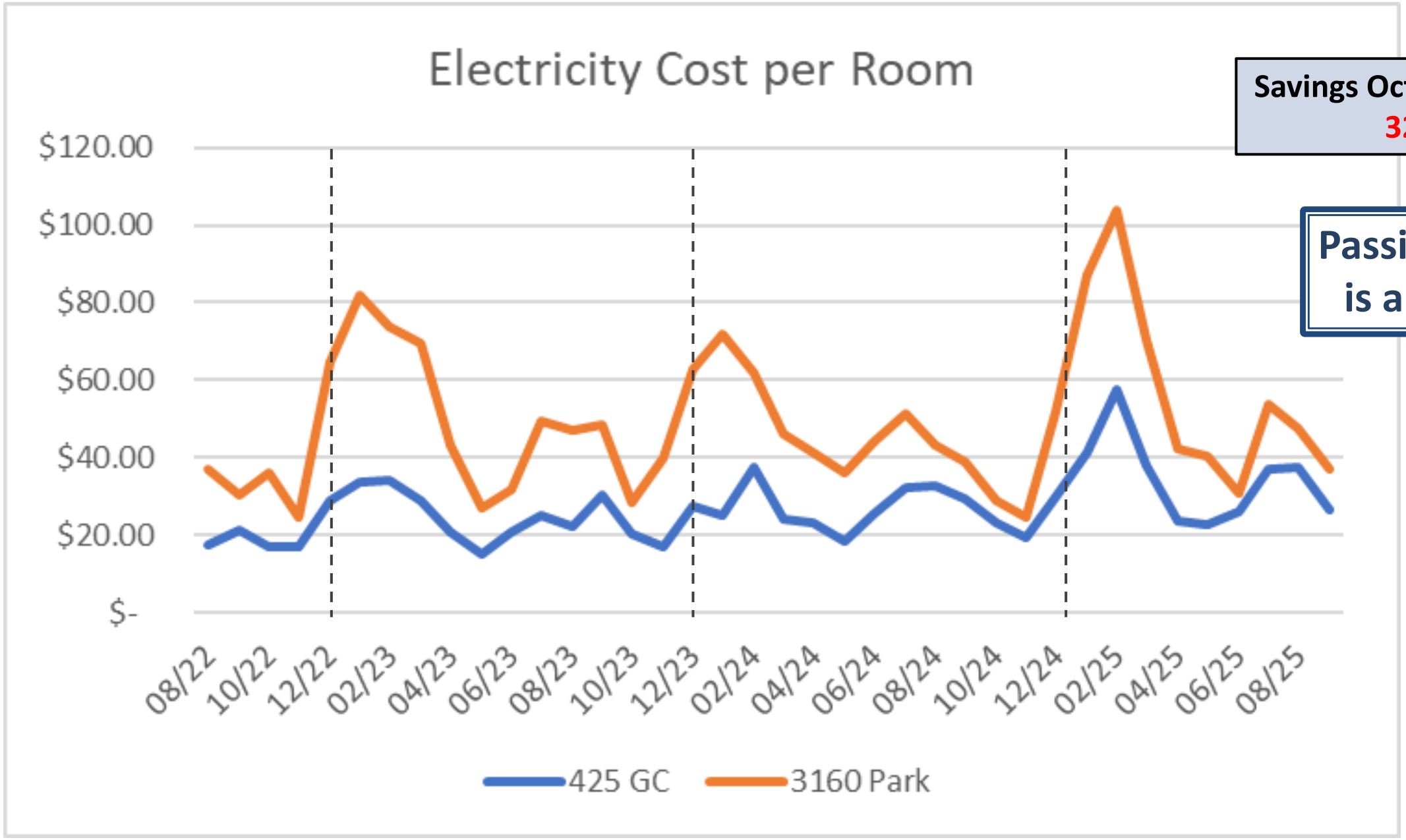


Savings Oct ’23 – Sep ’25
49.2%

Electricity Rates [$/kWh]

Savings Oct ’23 – Sep ’25
15.9%

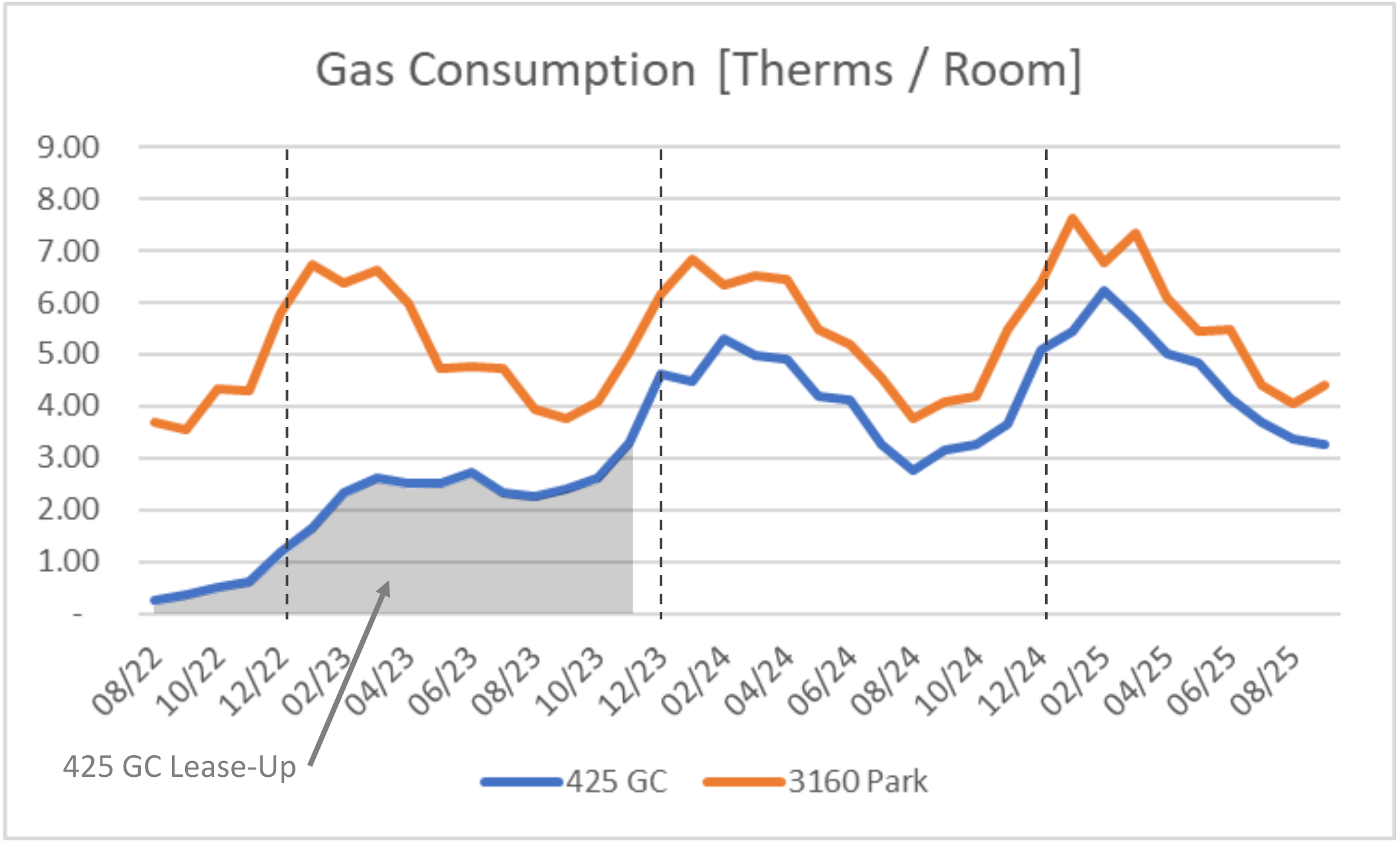




Savings Oct ’23 – Sep ’25
32.0%

Passive House is a Winner

…and what ever happened to Domestic Hot Water?


Gas Consumption [Therms / Room]
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
-
08/22
10/22
12/22
02/23
04/23
06/23
08/23
10/23
12/23
02/24
04/24
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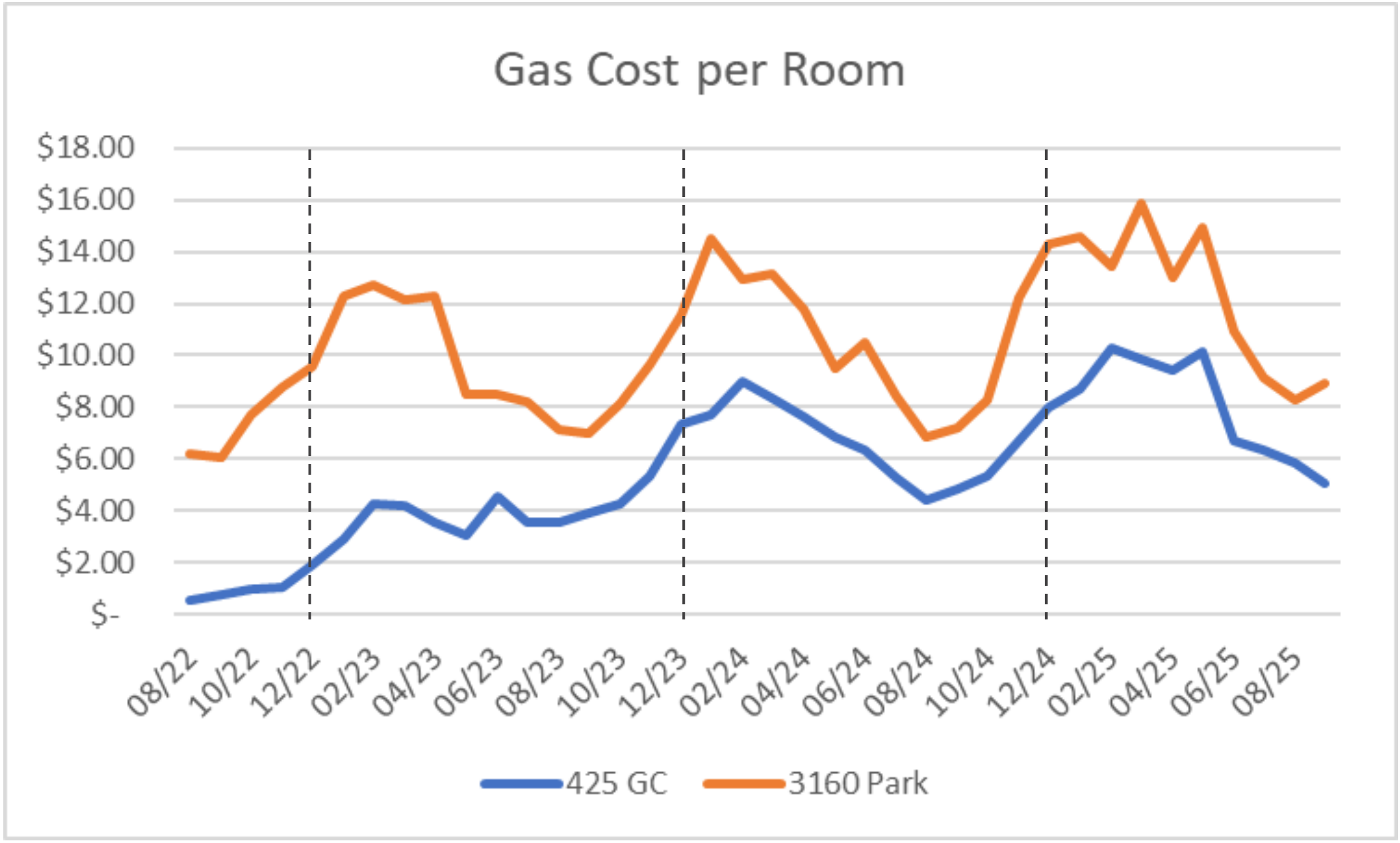
08/25
425 GC Lease-Up
425 GC
3160 Park


Gas Cost per Room
$18.00
$16.00
$14.00
$12.00
$10.00
$8.00
$6.00
$4.00
$2.00
$-
08/22
10/22
12/22
02/23
04/23
06/23
08/23
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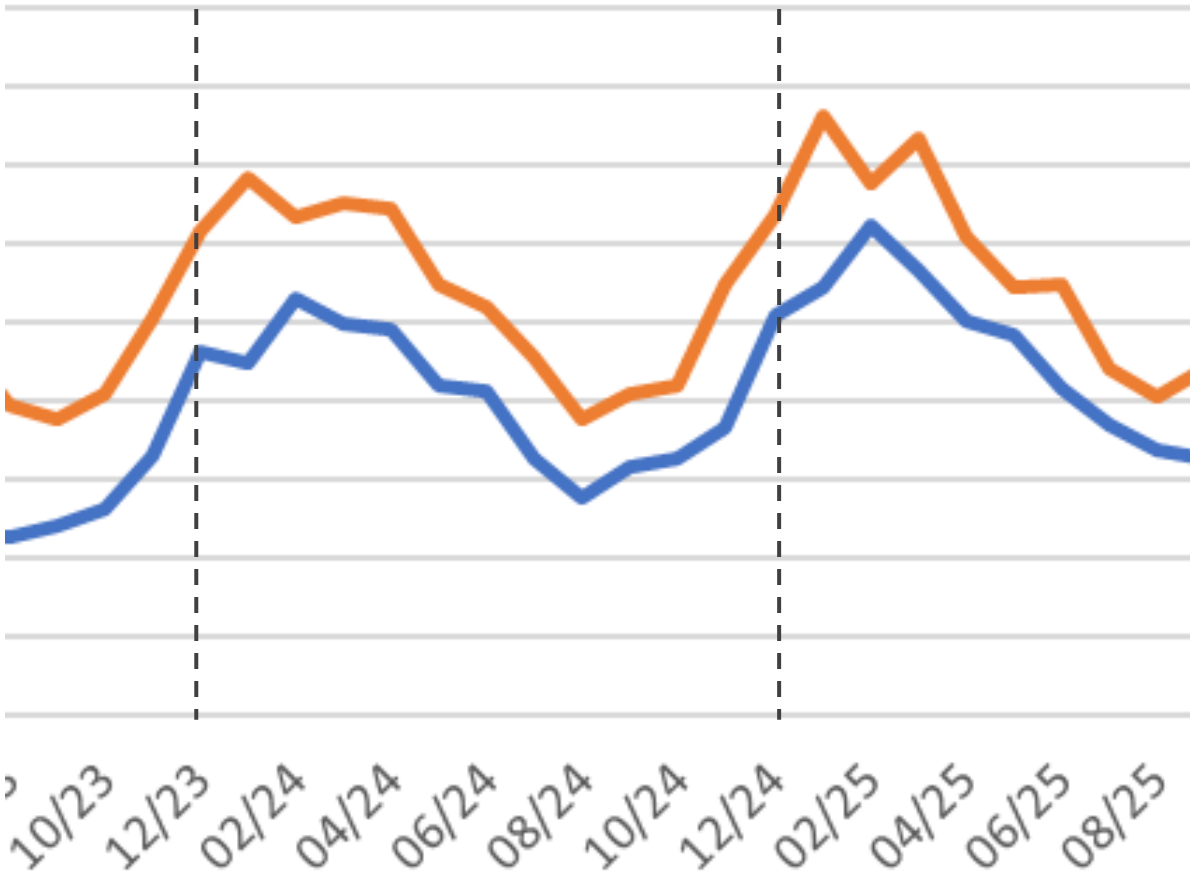
425 GC
3160 Park



“Electrify Me”: DHW

- Beware of pronounced Seasonality
- Beware of Internal Heat Losses
- Consider Ground Source Heat Pumps

A Better City
Thank You

More Information

- Christoph Sump – cstump@trinityfinancial.com
- Trinity – trinityfinancial.com/425-grand-concourse
- Tax Credit Advisor – The “Everything” Building, June 2022
- Massive Passive – youtube.com/watch?v=UJImxUFC9TE
- Dept. of Energy – Humidity and Variable Refrigerant Flow Operation in Multifamily Buildings, June 2025 - https://docs.nrel.gov/docs/fy25osti/89805.pdf
- NYSERDA – nyserda.ny.gov/About/Publications/Featured-Case-Studies/Buildings-of-Excellence-425-Grand-Concourse

YANNI TSIPIS, WS DEVELOPMENT

SEAPORT

BOSTON, MASSACHUSETTS

BOSTONSEAPORT.XYZ / @SEAPORTBOS

SEAPORT:
A 21ST CENTURY NEIGHBORHOOD

Seaport is built for the way people live and work today, and has become one of the most sought-after addresses for the modern workforce.

—

7.6 MILLION SQUARE FEET of development, creating a burgeoning destination for culture, food and retail

800,000+ SF OF RETAIL including several DTC first-to-Boston brands

DIRECT ACCESS to I-93 and I-90

5-MINUTE WALK from South Station regional hub, access to subway and Amtrak service

5-MINUTE DRIVE OR PUBLIC TRANSIT to Boston Logan International Airport

500+ FREE PUBLIC EVENTS annually across three neighborhood parks

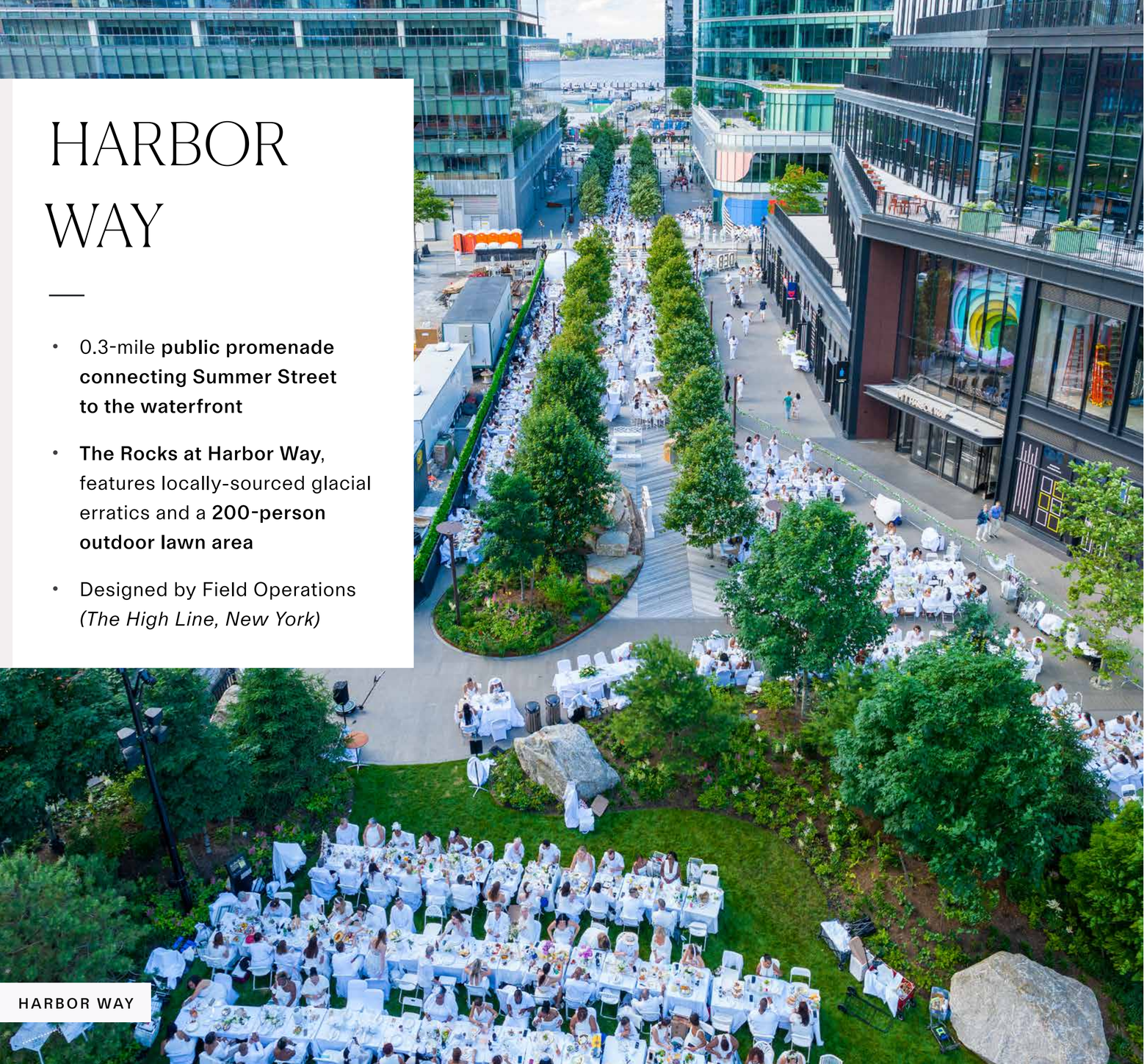
2.4 MSF RESIDENTIAL with 2,600+ units

100+ RESTAURANTS across the neighborhood

10 ACRES OF PUBLIC OPEN SPACE including 3 new parks and Harbor Way, a new 0.3-mile pedestrain promenade

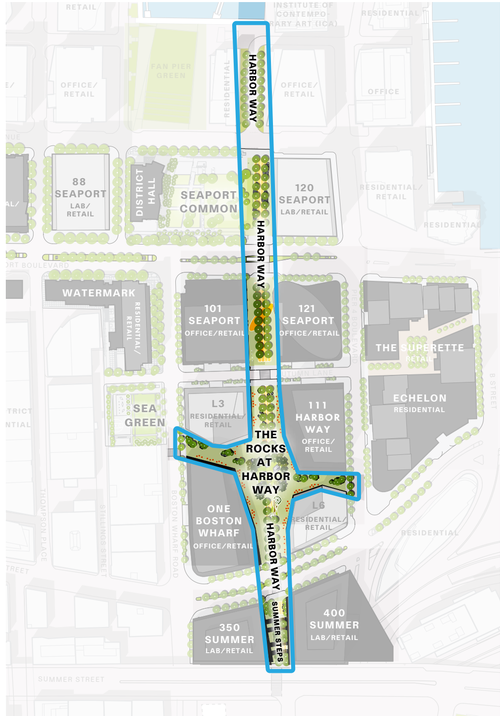
HARBOR WAY

- 0.3-mile **public promenade connecting Summer Street to the waterfront**
- **The Rocks at Harbor Way**, features locally-sourced glacial erratics and a **200-person outdoor lawn area**
- Designed by Field Operations *(The High Line, New York)*



HARBOR WAY

THE ROCKS AT HARBOR WAY



ONE BOSTON WHARF

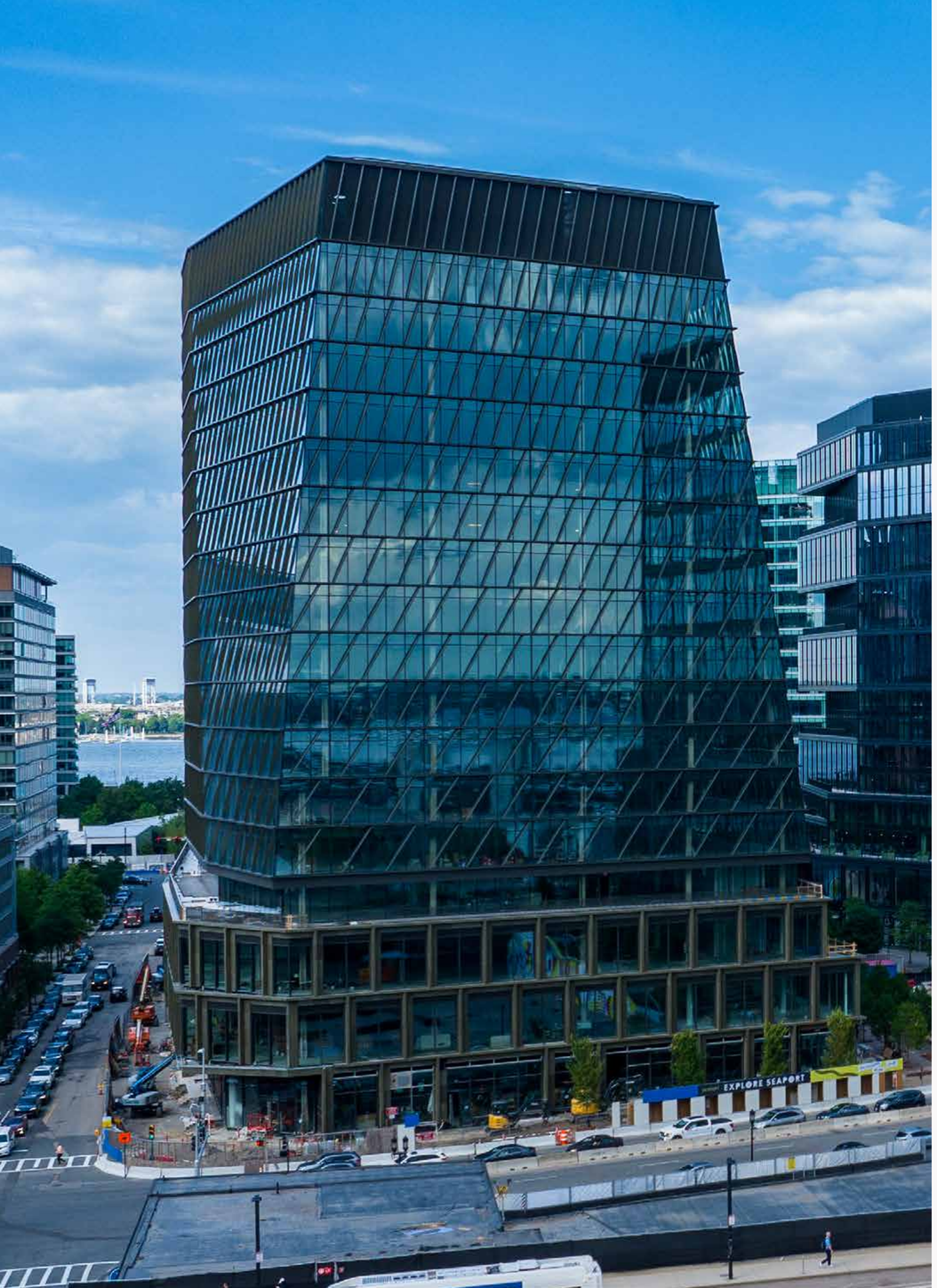
—

- COMPLETE/UNDER CONSTRUCTION
- FUTURE DEVELOPMENT
- ONE BOSTON WHARF

ONE BOSTON WHARF

—

- Office, Retail and 700-seat, 2-venue, Performing Arts Center: 694,000 SF
- **Largest net-zero carbon** office building in Boston
- Designed by Henning Larsen (Copenhagen, DN)


EXPLORE SEAPORT


ONE WAY


Airstack
Airstack


This Floor
Is the first commercial use of Sublime Cement,™ made with a fossil-fuel-free cement manufacturing process.
A step on this floor is a step closer to our post-carbon future.

SEAPORT

BOSTON, MASSACHUSETTS

BOSTONSEAPORT.XYZ / @SEAPORTBOS

YANNI TSIPIS
yanni.tsipis@wsdevelopment.com

RANDY BOLES, VERTEX

Sustainable New Construction

Randy Boles

October 30, 2025

Introduction

Randy Boles

Global Head of EHS and Sustainability

Randy_Boles@vrtx.com

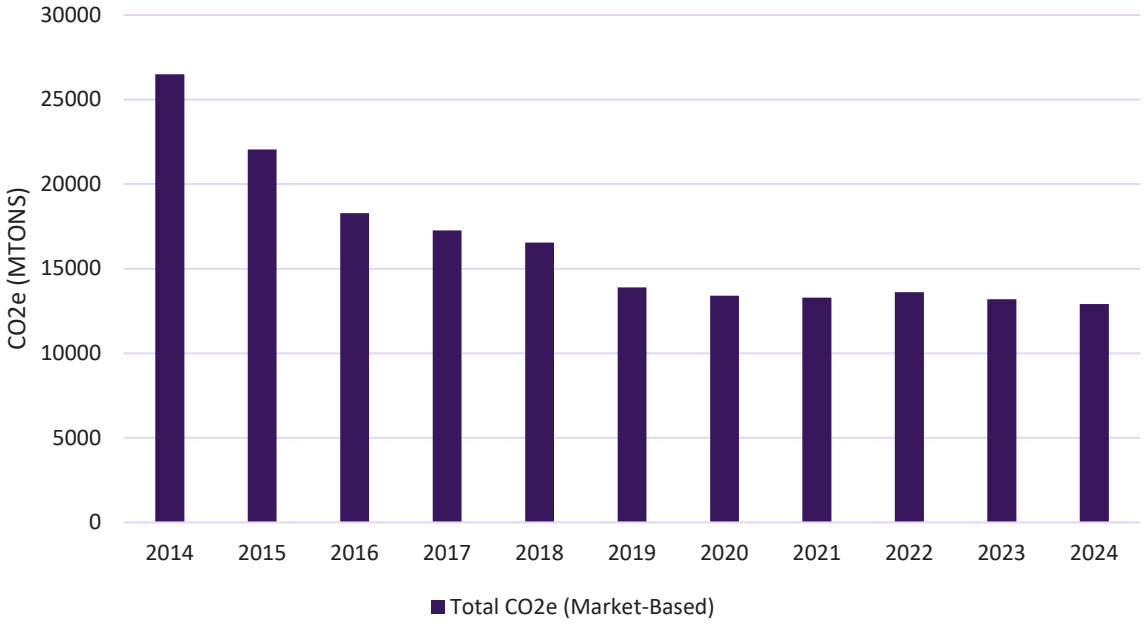
Vertex Pharmaceuticals

- Biotech Company
- Focus on rare diseases
- Approximately 6000 employees
- Headquarters in Boston

Targets and Performance

Our current goal is to reduce Scope 1 and Scope 2 CO2 emissions (market-based) by 42% by 2032 using 2022 as our baseline

In 2024: *51% reduction in absolute GHG emissions since 2014; 5% reduction since baseline year 2022.*



Green Building	Optimization	Decarbonization
• Minimizes growth in GHG emissions from expansion • Locking in long term energy efficiency	• Optimize performance of existing assets • Improve building reliability • Includes major upgrades	• Transition natural gas loads to electricity where practicable • Competitive procurement of green electricity

VERTEX Leiden Center II

A 345,000 SF expansion of the Vertex Leiden Campus in Boston's Raymond L. Flynn Marine Park.

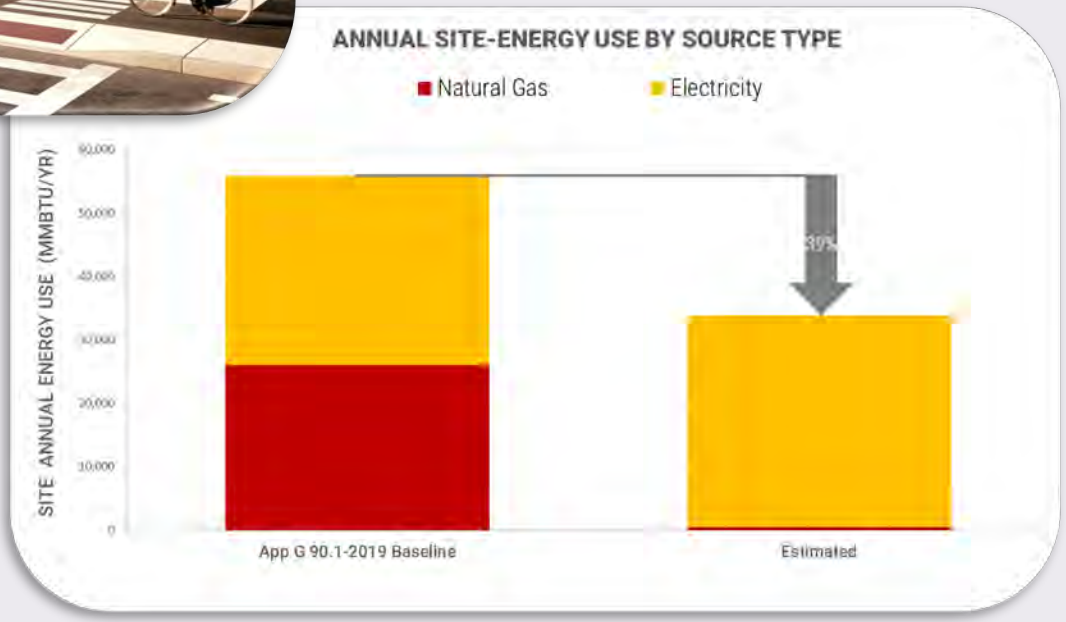
LC II will support the company's cell and genetic therapies research.

Sustainability & Climate Resiliency

Anticipated 39% site energy savings, 60% indoor water use reduction, and 96% Scope 1 reduction compared to code minimum.

Ground floor entrance and critical infrastructures, such as the electrical vault, are located above the flood plain.

Anticipating LEED Platinum



Decarbonization

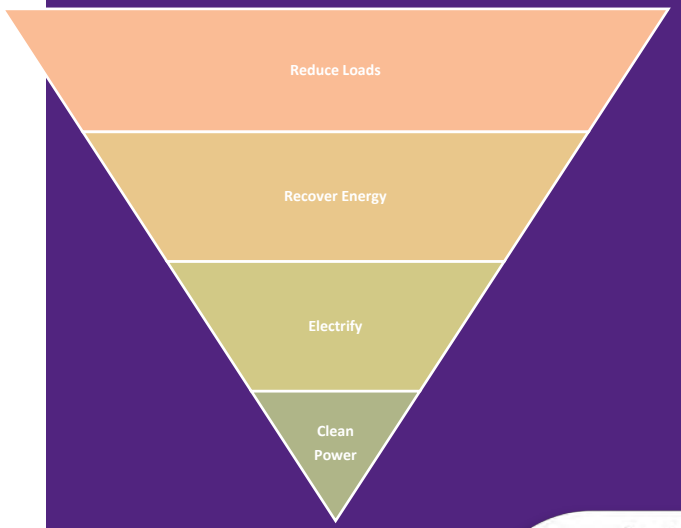
Reduce demand for energy with a high-performance envelope and high-efficiency equipment.

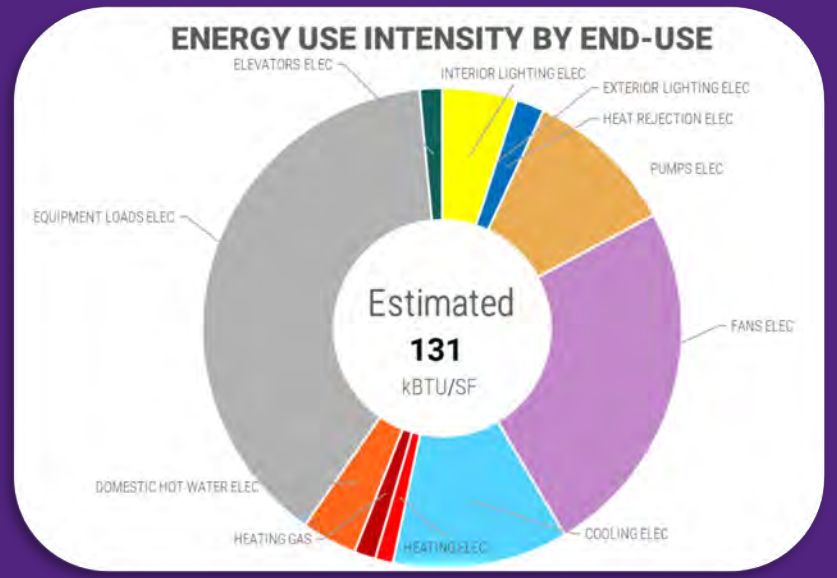
Shift heat with a heat recovery chiller and exhaust source heat pump.

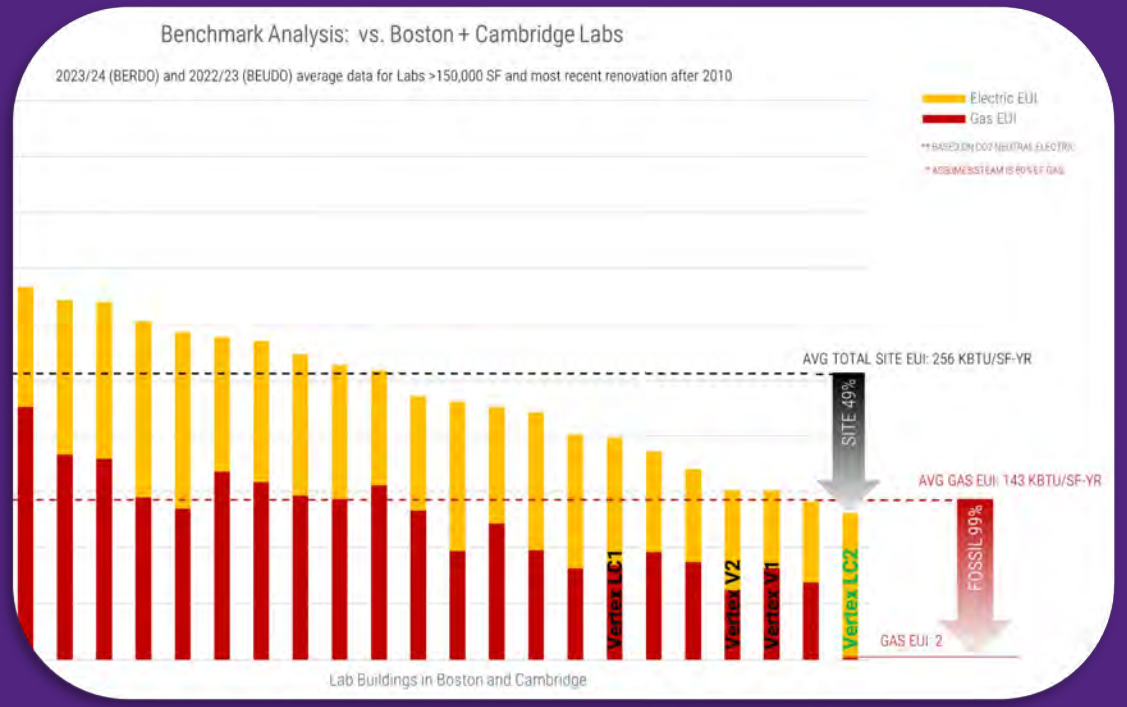
Electrify with an air-source heat pump, electric domestic water heaters, and an electric commercial kitchen.

Procure clean power via RECs and on-site PV

Estimated $170k (7%) annual utility cost savings compared to code minimum







Climate resiliency

- Electrical vault located above flood plain
- Ground floor level elevated above flood plain
- Flood barriers
- On-site stormwater management
- Low flow fixtures
- Clear water waste recovery for on-site use
- Under building parking, greenery, and reflective roof reduce heat island effects
- On-site EV charging
- Solar panels


Q&A


A BETTER CITY
BUILT TO LEAD:
LESSONS IN BUILDING DECARBONIZATION
NEW TECHNOLOGIES & OPPORTUNITIES
SAVE THE DATE
WEDNESDAY, DECEMBER 17, 2025
10-11:30 AM