# Buildings of Excellence: Cost Trends in New York State Clean and Resilient Multifamily Construction

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Gwen McLaughlin
Project Manager
NYSERDA

Nate Heckman, AIA
Associate Technical Consultant
Resource Refocus

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NYS & NYSERDA

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# New York State & NYSERDA

## Goals and Initiatives

### The Climate Act:

- Zero-emission electricity sector by 2040
- 70 percent renewable energy generation by 2030
- Reducing greenhouse gas emissions by 85 percent from 1990 levels by 2050
- Reducing on-site energy consumption by 185 trillion BTUs of end-use energy savings by 2025
- At least 35 percent, with a goal of 40 percent, of the benefits of clean energy investments are directed to disadvantaged communities

### NYSERDA:

- Serves as state energy office
- Promotes energy efficiency, renewable energy, and emissions reduction across New York's economy and energy system
- New Construction Program: advancing high performance carbon neutral buildings across residential and commercial sectors

Dekalb Commons, Brooklyn, NY - Imagery Credit: Rendering by Nightnurse Images courtesy of Magnusson Architecture and Planning

# Buildings of Excellence Competition
## Overview

### Competition and Program:

- Launched in 2019
- First three rounds of Competition have awarded $48 million to 56 projects
- 70 percent of award winners provide affordable housing
- Collaboration between architects and developers
- Create clean, resilient, and carbon neutral multifamily buildings that are healthy and safe for occupants at predictable costs
- Innovation, replicability, and scalability
- Blue Ribbon for Design Excellence Award
    - Materiality, structural systems, construction technology selections, building design function, site context, and ways to make the spaces comfortable and pleasing for the occupants


Bethany Terraces Senior Housing, Brooklyn, NY - Imagery Credit: Paul A. Castrucci, Architects PLLC

# Buildings of Excellence Competition

## Current Activities

### **Overview:**

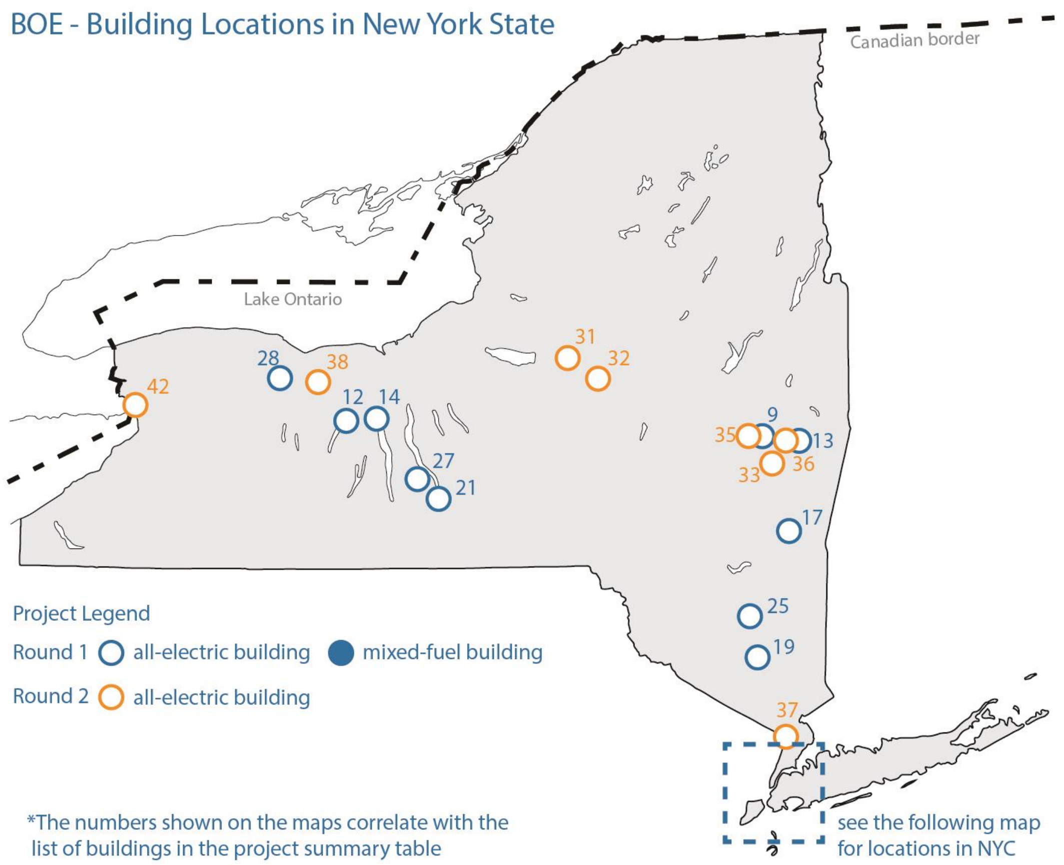
- BOE Round 4 closed in Sept 2023
- Anticipate announcing winners in Q1 2024
- Early Design Stage Funding RFP
  - Seeks to build the practice and proficiency of design firms in the carbon neutral space.
  - Reduces barriers and soft costs that design firms may face
  - Open Enrollment Program available through June 2024

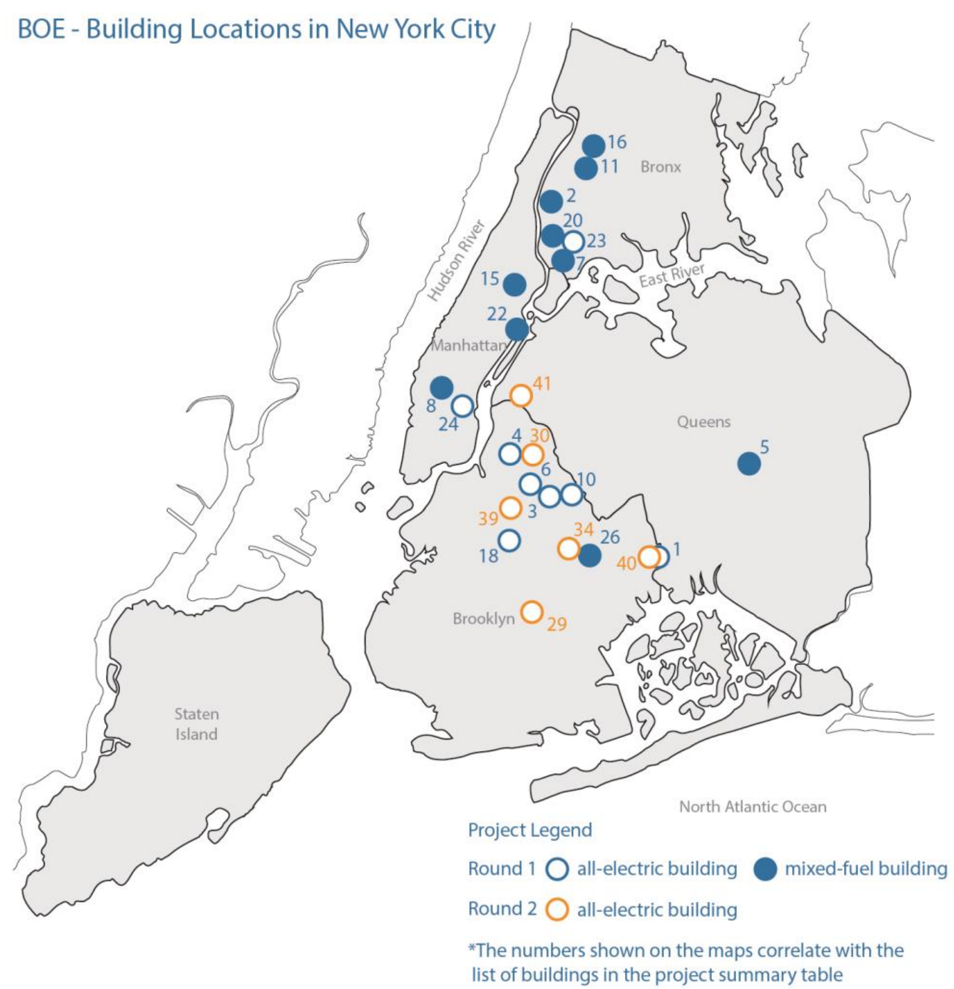
Solara Apartments, Rotterdam, NY – Imagery Credit: Photo Courtesy of Harris A. Sanders Architects, P.C., and Black Mountain Architecture

**The Buildings of Excellence (BOE) Competition was initiated by NYSERDA in 2019 to recognize and reward the design, construction, and operation of clean and resilient multifamily buildings that are healthier, more comfortable, and more resilient.**

*425 Grand Concourse, Bronx, NY*
*Rendering by Dattner Architects / Synoesis, LLC*

# BOE Project Overview



# NYC and Upstate BOE Projects

NYC

*Dekalb Commons, Brooklyn, NY*
*Rendering by Nightnurse Images courtesy of Magnusson Architecture and Planning*

*Bushwick Alliance, Brooklyn, NY*
*Rendering by STAT Architecture*

*425 Grand Concourse, Bronx, NY*
*Rendering by Dattner Architects / Synoesis, LLC*

*Park Avenue Green, Bronx, NY*
*Rendering courtesy of Curtis + Ginsberg Architects*

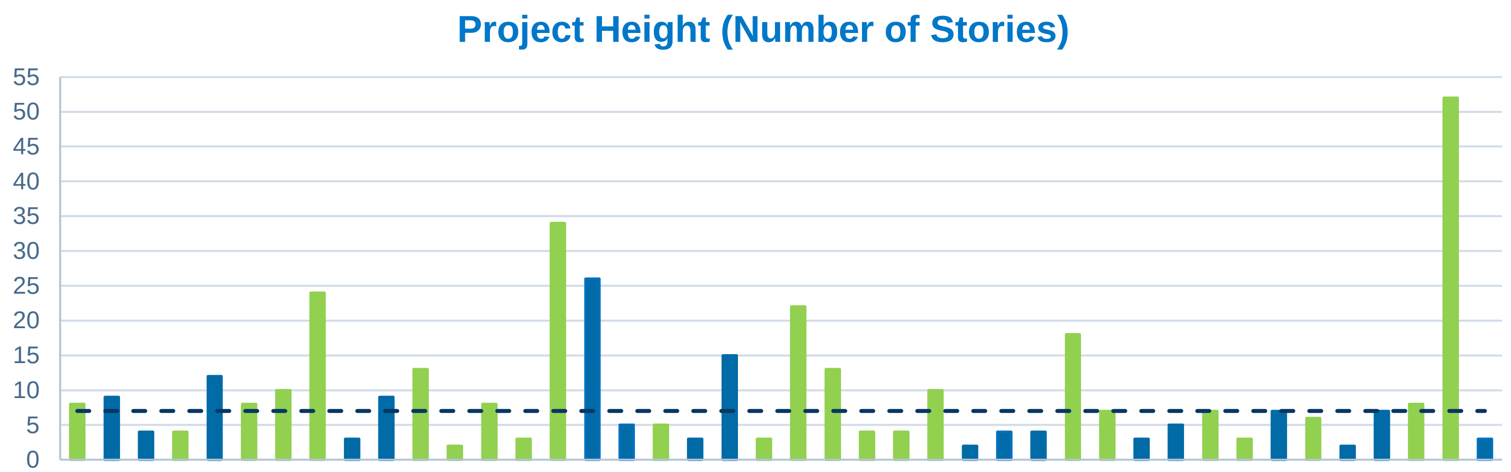
Upstate

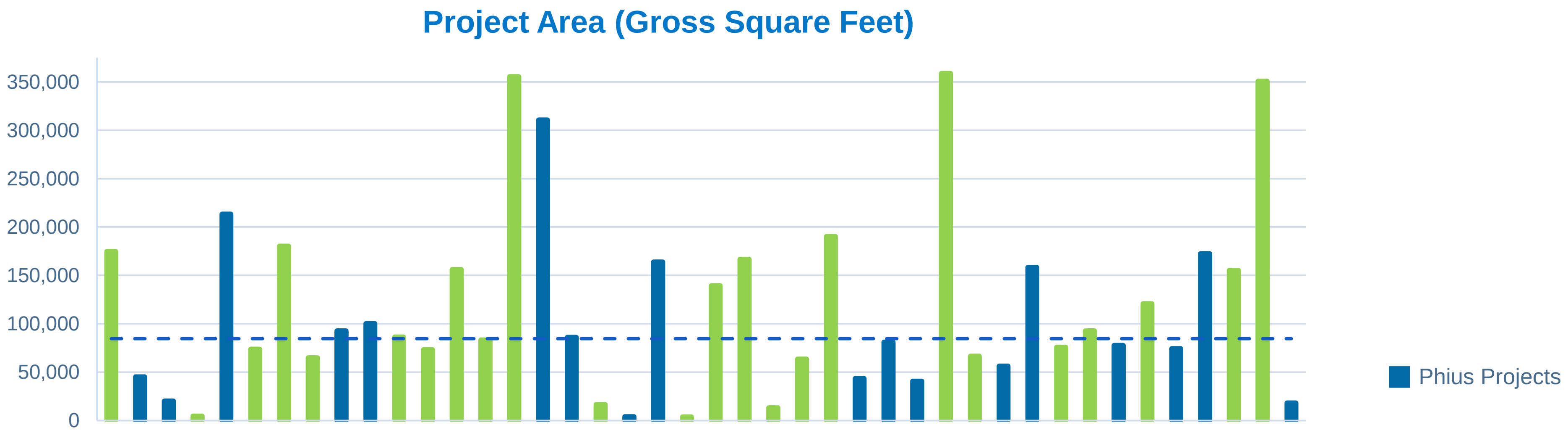
*Village Grove, Trumansburg, NY*
*Rendering by HOLT Architects PC and Ithaca Neighborhood Housing Services, Inc.*

*West Side Homes, Buffalo, NY*
*Rendering by Stieglitz Snyder Architecture – A LaBella Company*

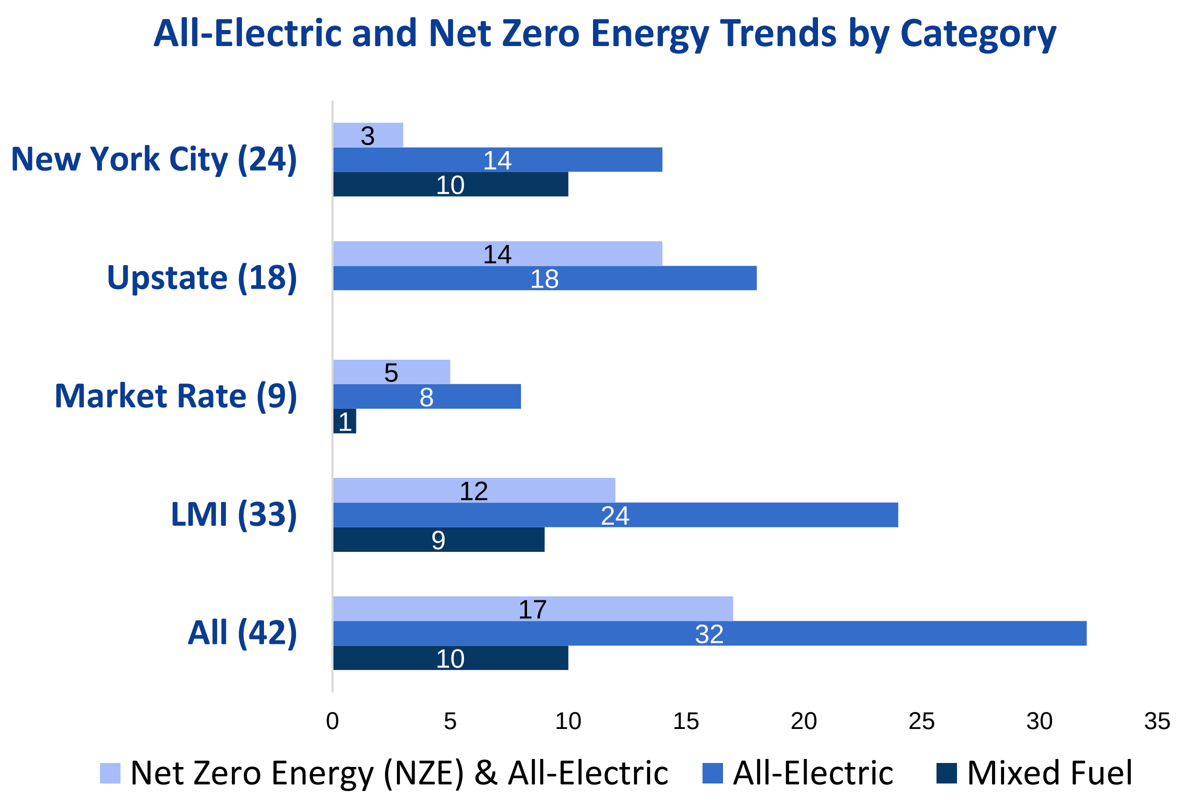
*Baird Road Apartments, Fairport, NY*
*Rendering by SWBR Architecture, Engineering & Landscape Architecture PC*

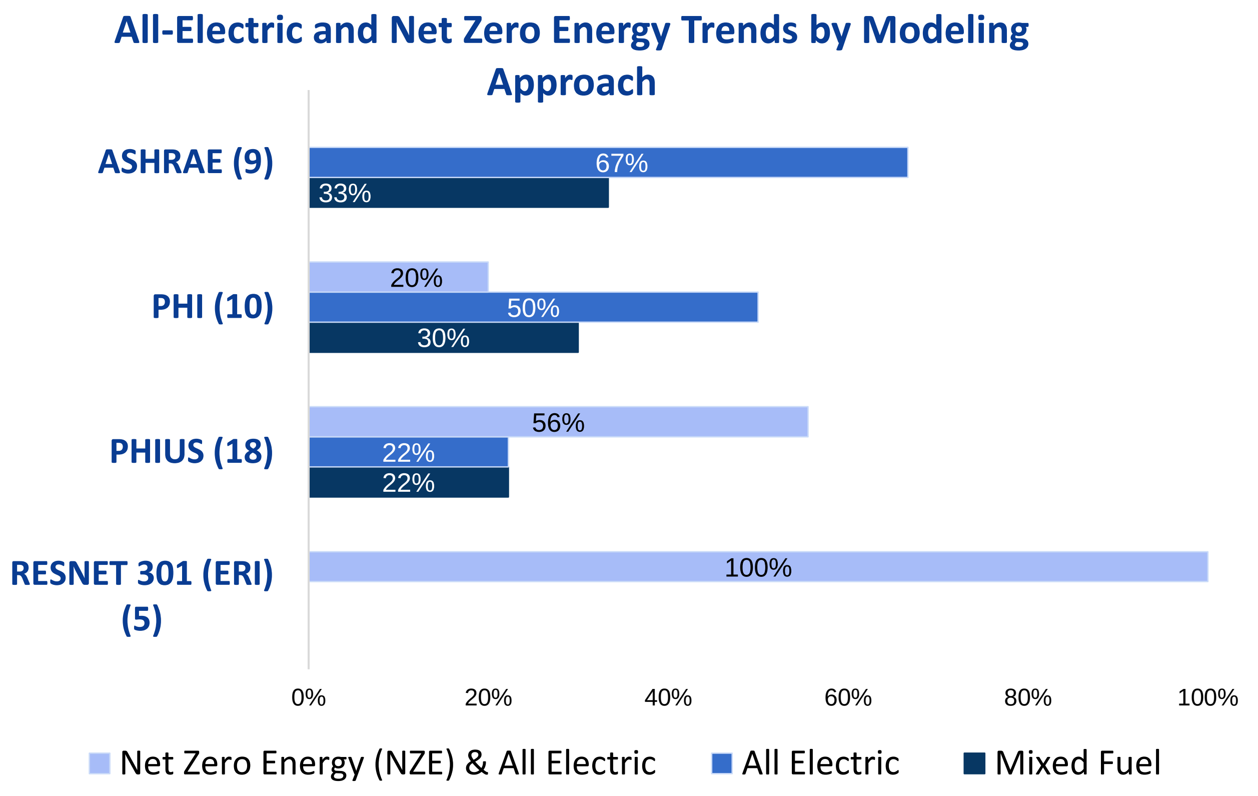
# BOE Project Size



# All-Electric and Net Zero Energy Trends



# Qualitative Analysis

- **Planning and Design Approach:** Goals and motivations, project team compositions, design considerations, and replicability.
- **Energy Efficient, Carbon-neutral Design**: All-electric systems, building envelope, lighting, and renewable energy and storage.
- **Building Operations:** Installation and commissioning, occupant engagement, and smart building technology and energy management.
- **Design Quality and Non-Energy Benefits:** Target occupants, adaptive reuse, **occupant health, comfort and productivity, and resiliency.**

*Johnson Park Green, Utica, NY*
*Rendering by SWBR Architecture, Engineering & Landscape Architecture PC*

# Planning & Design Approach Takeaways

## 1
### Goals and Motivations

The most frequently stated goals were to create a building that enhances the lives of residents and provide more affordable housing

## 2
### Integrated Teams

Integrated and experienced project teams are critical to the success of high-performance design and construction

## 3
### Design Feasibility

Passive House design is possible in urban areas and high-rise construction, and is a feasible practice for the LMI rental market

## 4
### Replicability

Project teams with a focus on replicability note the importance of creating models for future developments to create a pathway for others to follow

# Design Quality & Non-Energy Benefits Takeaways

## 1 Occupant Demographics

Many design teams aimed to support specific disadvantaged communities, such as formerly housing challenged, low-income seniors, and people with chronic illnesses.

## 2 Adaptive Reuse

Teams noted the importance of including a Passive House consultant and a properly trained general contractor in the early design phases.

## 3 Site Context

Most projects are located within walking distance of public transportation and/or provide access to community amenities and resources.

## 4 Occupant Health, Comfort, and Productivity

All projects were designed to deliver a higher indoor environmental quality of living.

## 5 Resiliency

Resiliency features include maintaining stable internal temperatures, planning for electrical power outages, providing continuous access to clean water, and more.

# Occupant Health, Comfort, and Productivity

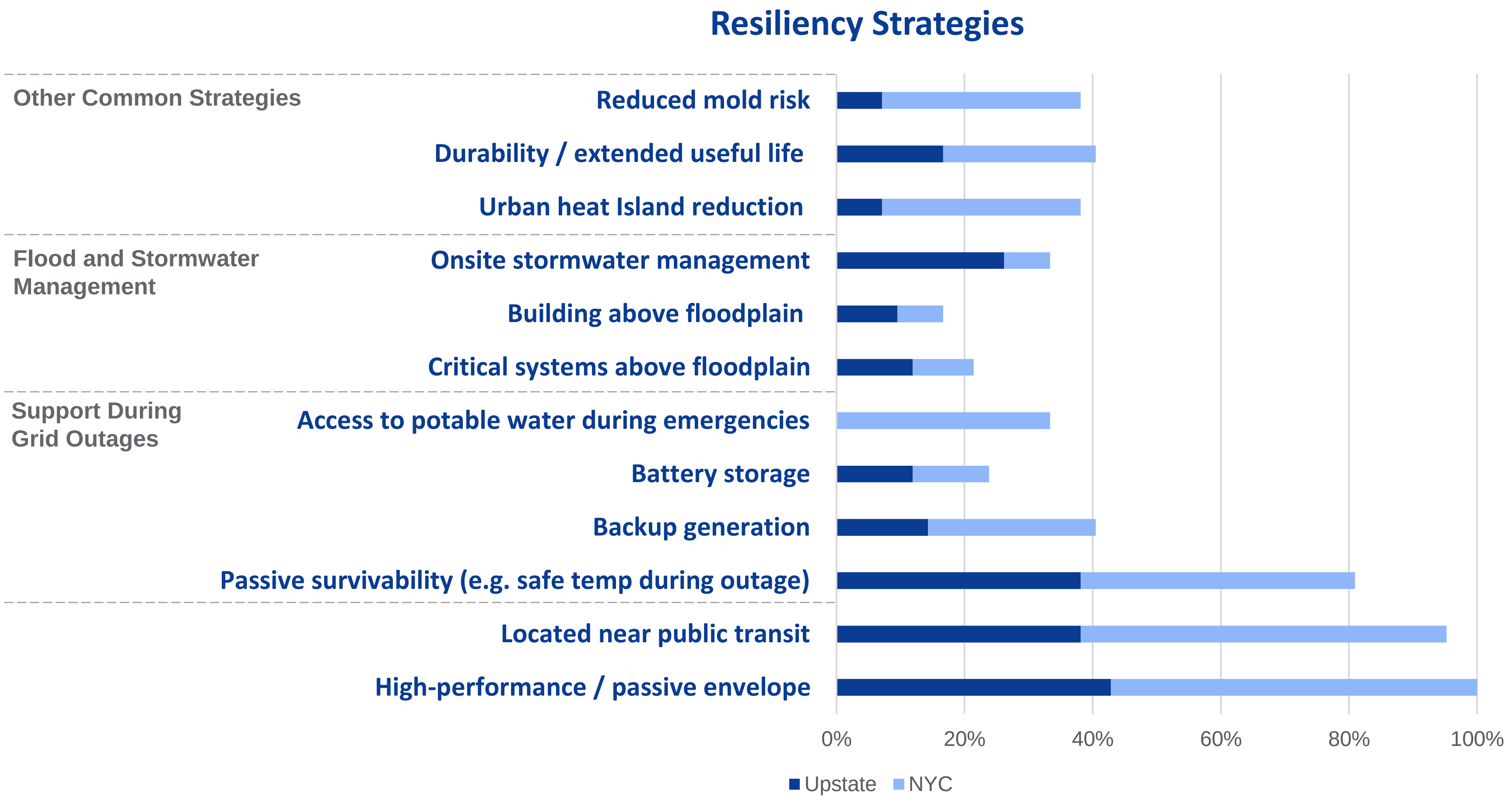
## Key Design Benefits:

- **Thermal Comfort:** Teams noted that superior envelope construction and HVAC systems work together to provide balanced temperatures within each unit.
- **Daylighting and Visual Comfort:** NYC mid- or high-rise buildings  stressed improved daylighting strategies in their designs
- **Indoor Air Quality/Health:** A key component to increasing indoor air quality is eliminating combustion equipment within the conditioned spaces
- **Active Lifestyles:** Projects include bike storage, and are near public transit and other services
- **Mental Health:** Green spaces especially in dense urban sites can have a positive impact on mental health

*Bethany Terraces, Brooklyn, NY*
*Sectional Perspective by Paul A. Castrucci, Architects PLLC*

# Resiliency

West Side Homes, Buffalo, NY
Rendering by Stieglitz Snyder Architecture – A LaBella Company

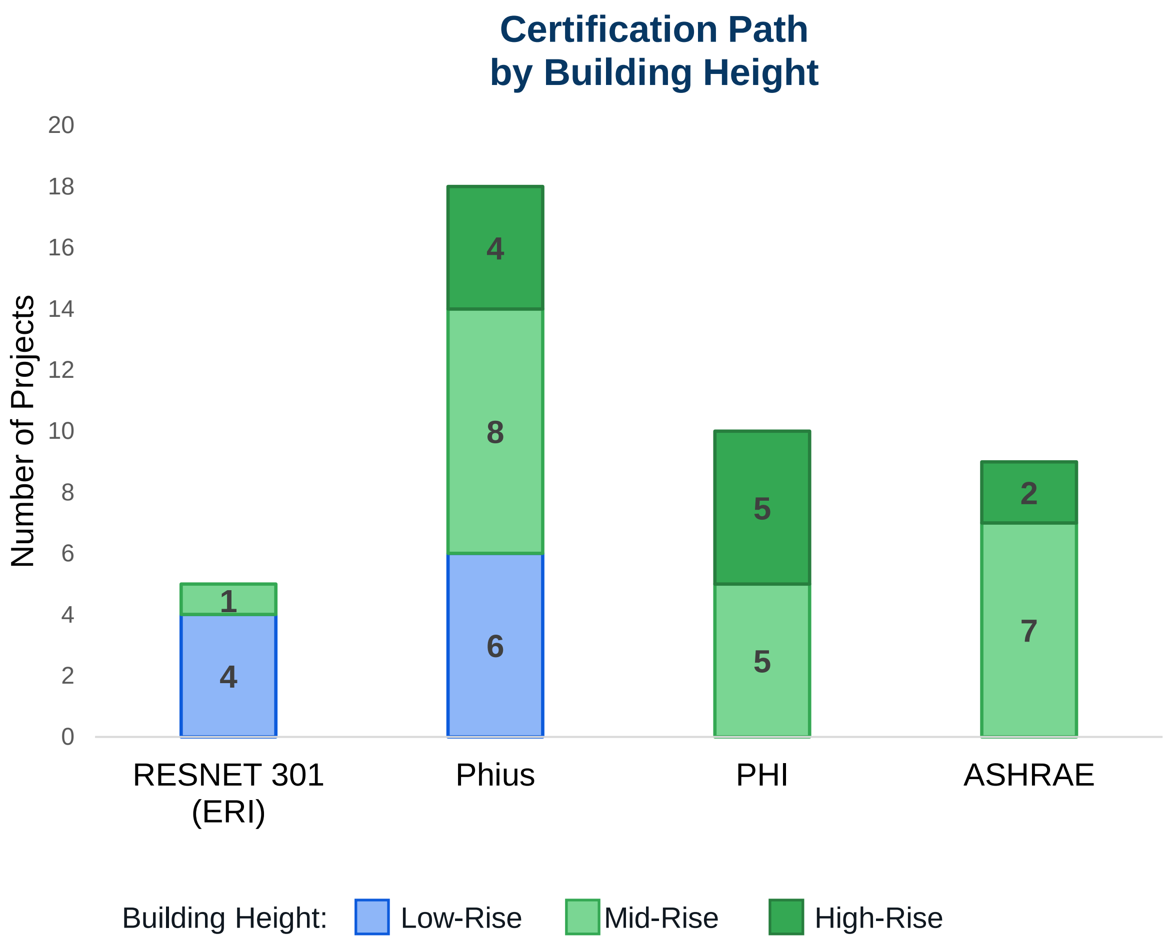


# Quantitative Analysis

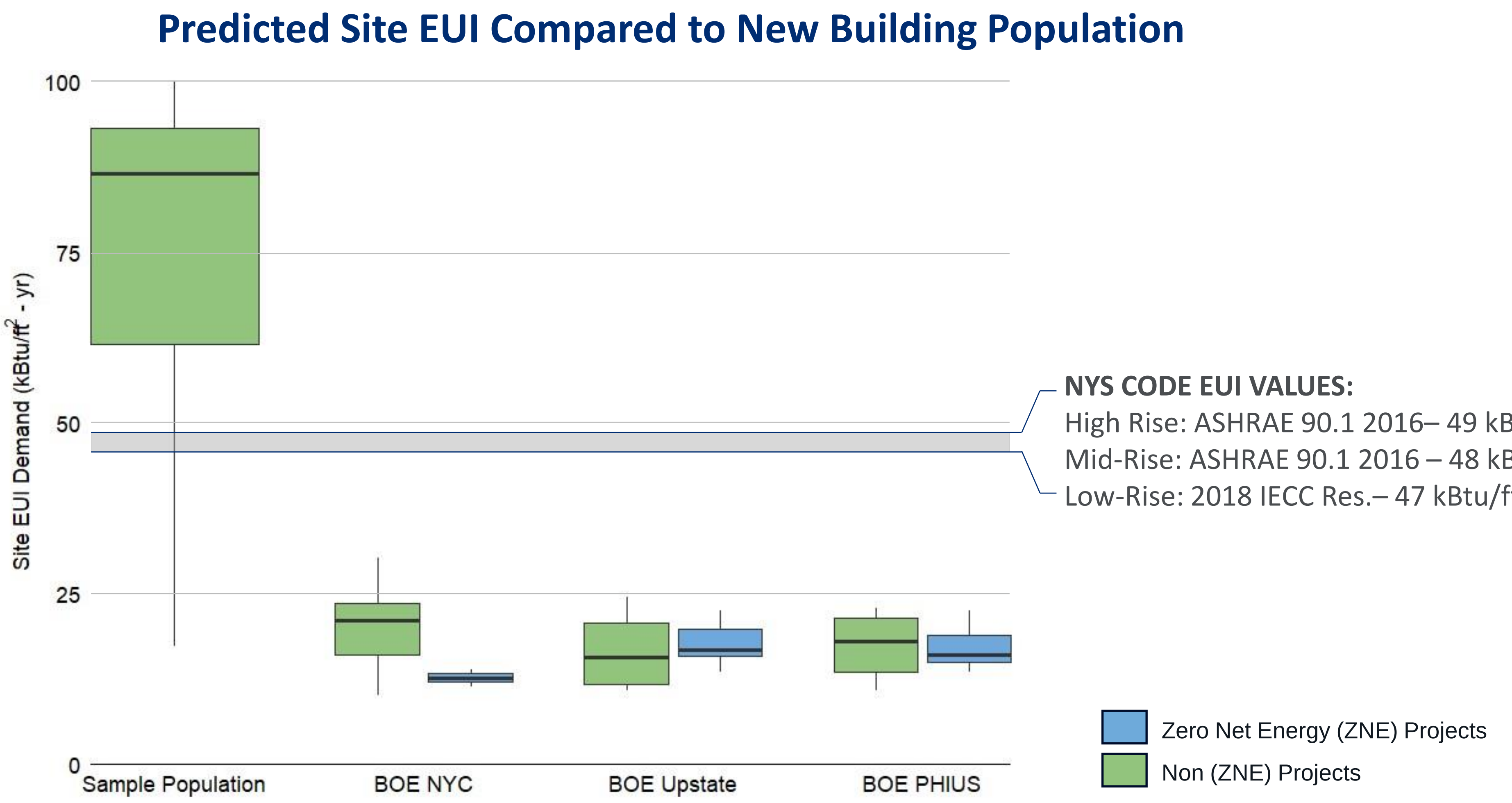
- **Design Energy and Carbon Emissions:** Analyze design performance from an energy and a carbon perspective.
- **Measured Energy and Carbon Emissions**: Analyze measured performance for completed and occupied buildings where available.
- **Economic Performance:** Examine projected or, if available, actual economic performance metrics such as project and measure costs, energy savings, full payback, and return on investments (ROIs).


*Dekalb Commons, Brooklyn, NY*
*Rendering by Nightnurse Images courtesy of Magnusson Architecture and Planning*

# Modeling Pathways



# Design Energy Use Intensity




**NYS CODE EUI VALUES:**

High Rise: ASHRAE 90.1 2016– 49 kBtu/ft$^2$-yr

Mid-Rise: ASHRAE 90.1 2016 – 48 kBtu/ft$^2$-yr

Low-Rise: 2018 IECC Res.– 47 kBtu/ft$^2$-yr

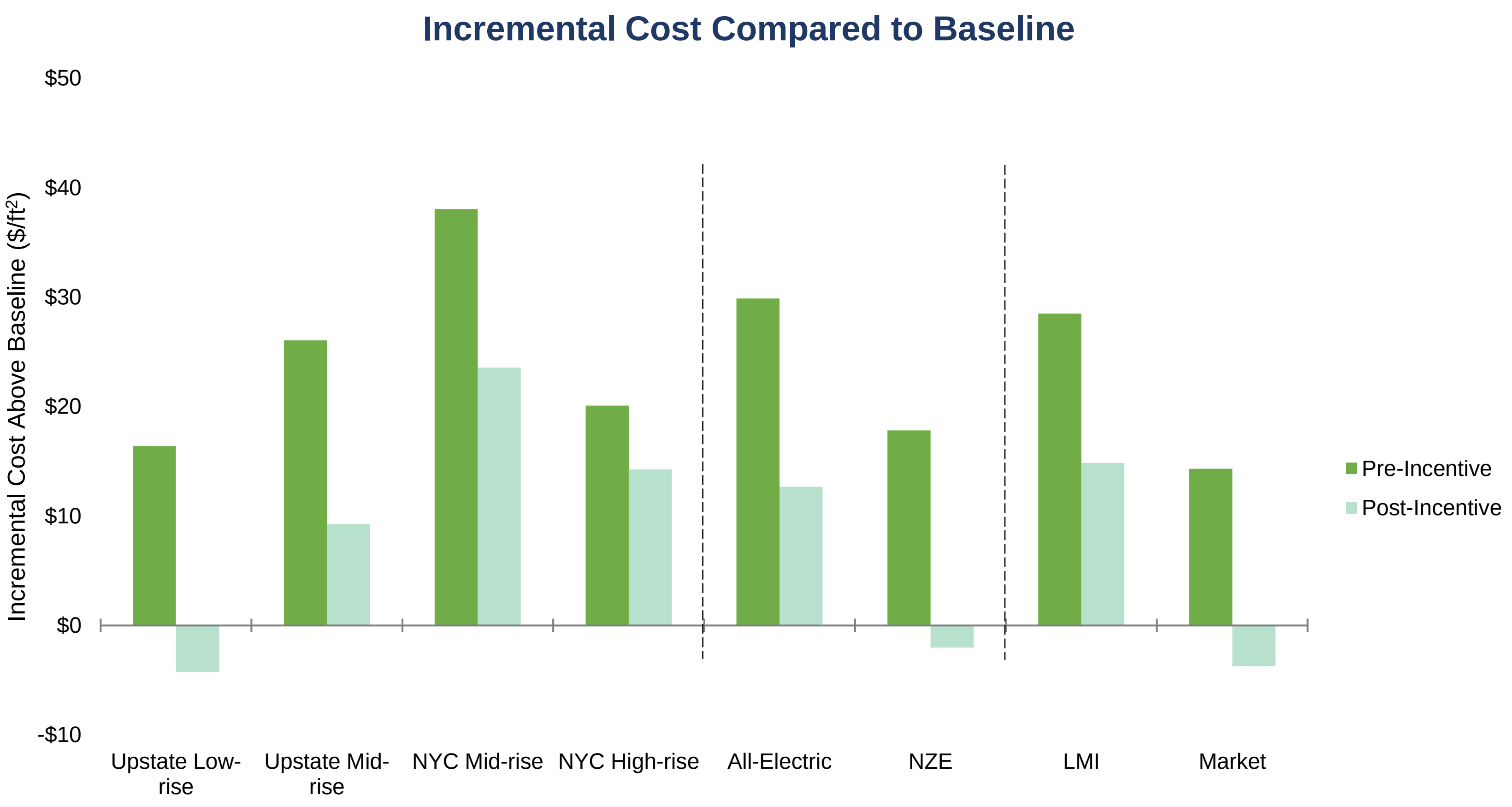
# Cost Implications

## Economic Analysis:

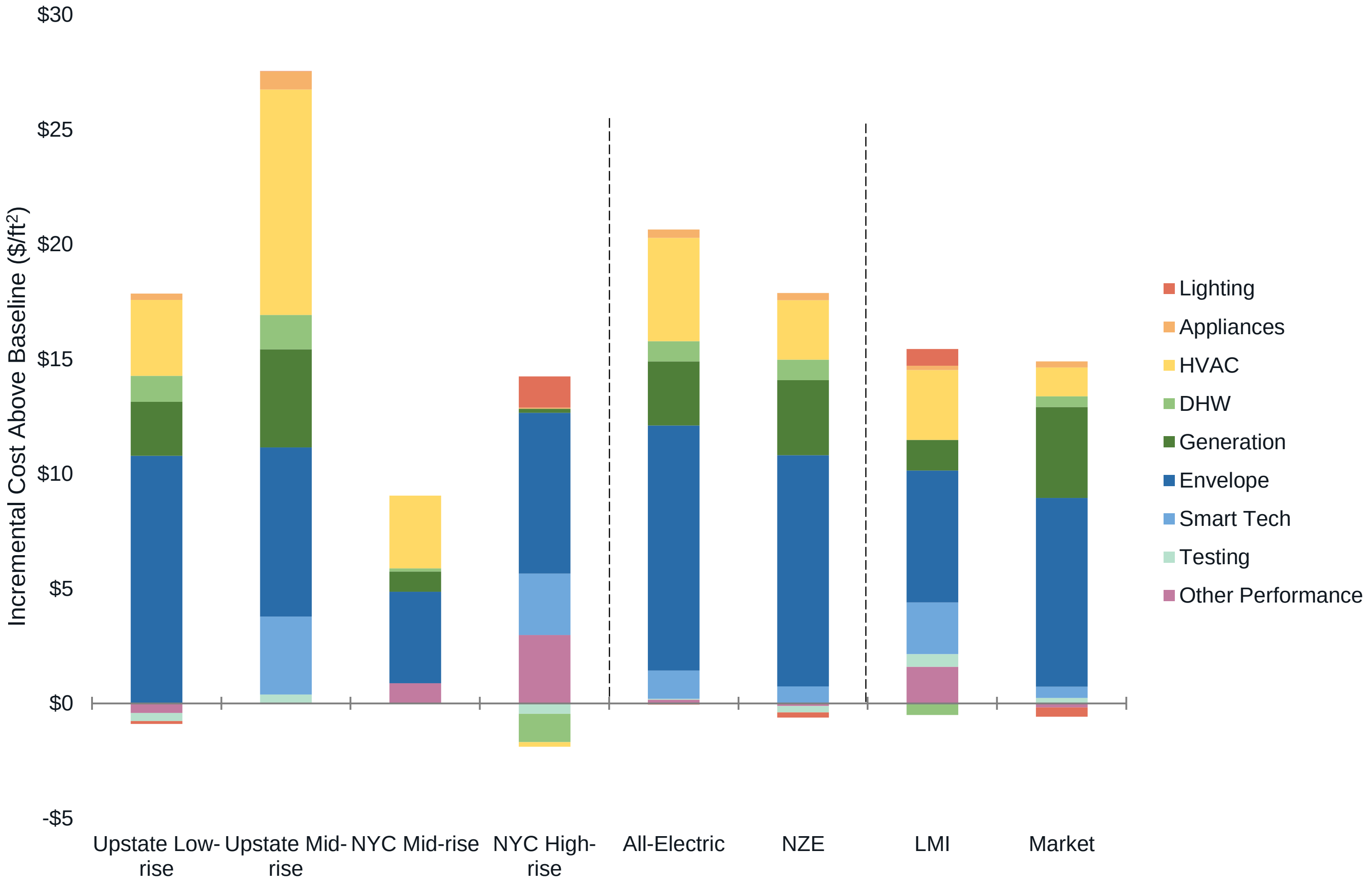
- Project teams self reported project costs and incremental costs.
- Cost baselines were determined by project teams based on their cost estimates.
- The report team attempted to align or qualify the way the design teams estimated total and incremental costs and compare them to other methods and standards to add context to the economic performance metrics.
- Energy cost can vary by time of use or demand charges. The report team qualified, where available, how projected energy costs were estimated by project.

*75 North Seventh Street, Hudson, NY*
*Rendering by Urban Architectural Initiative, RA, PC*

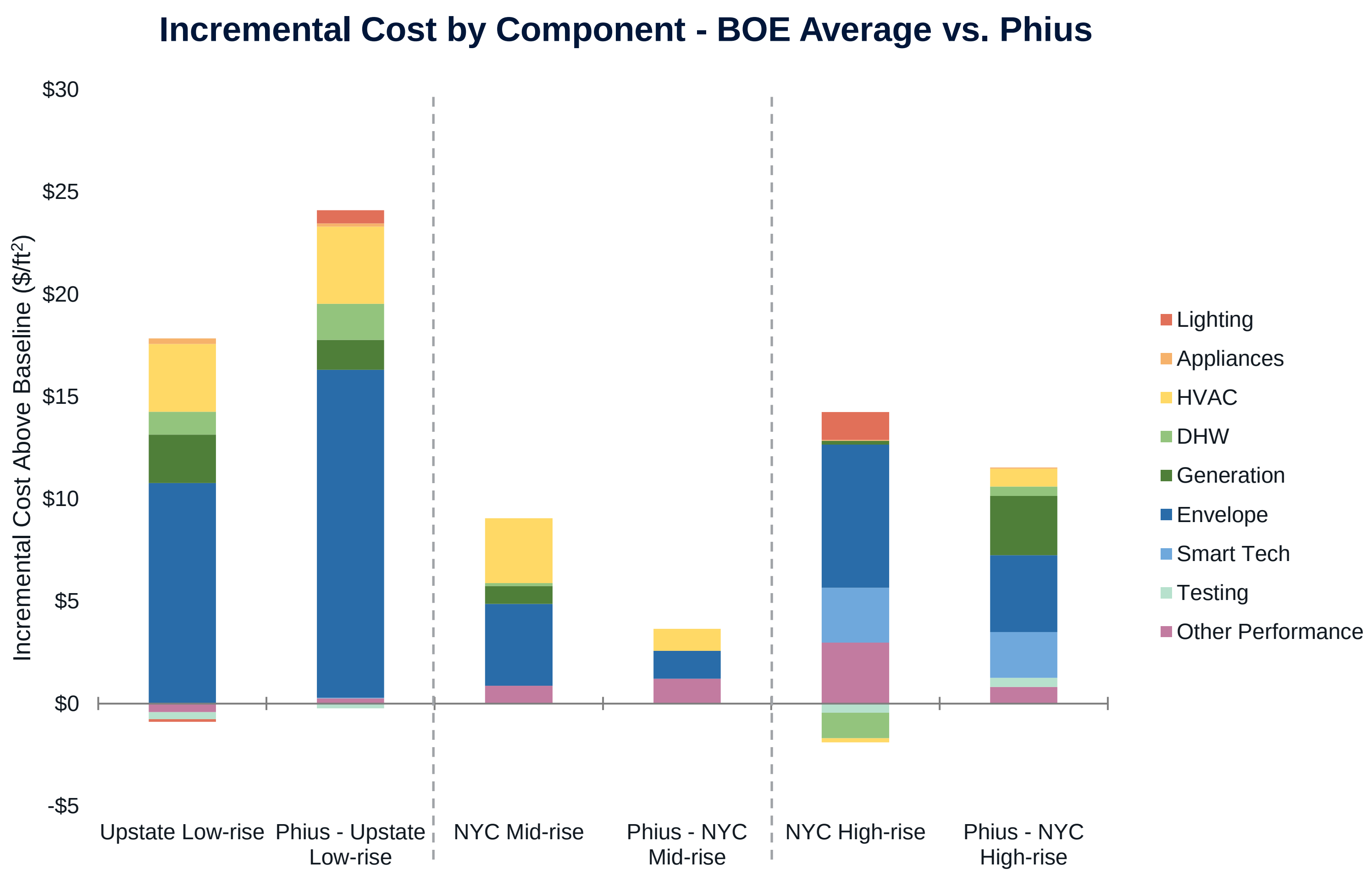
# Project Incremental Costs



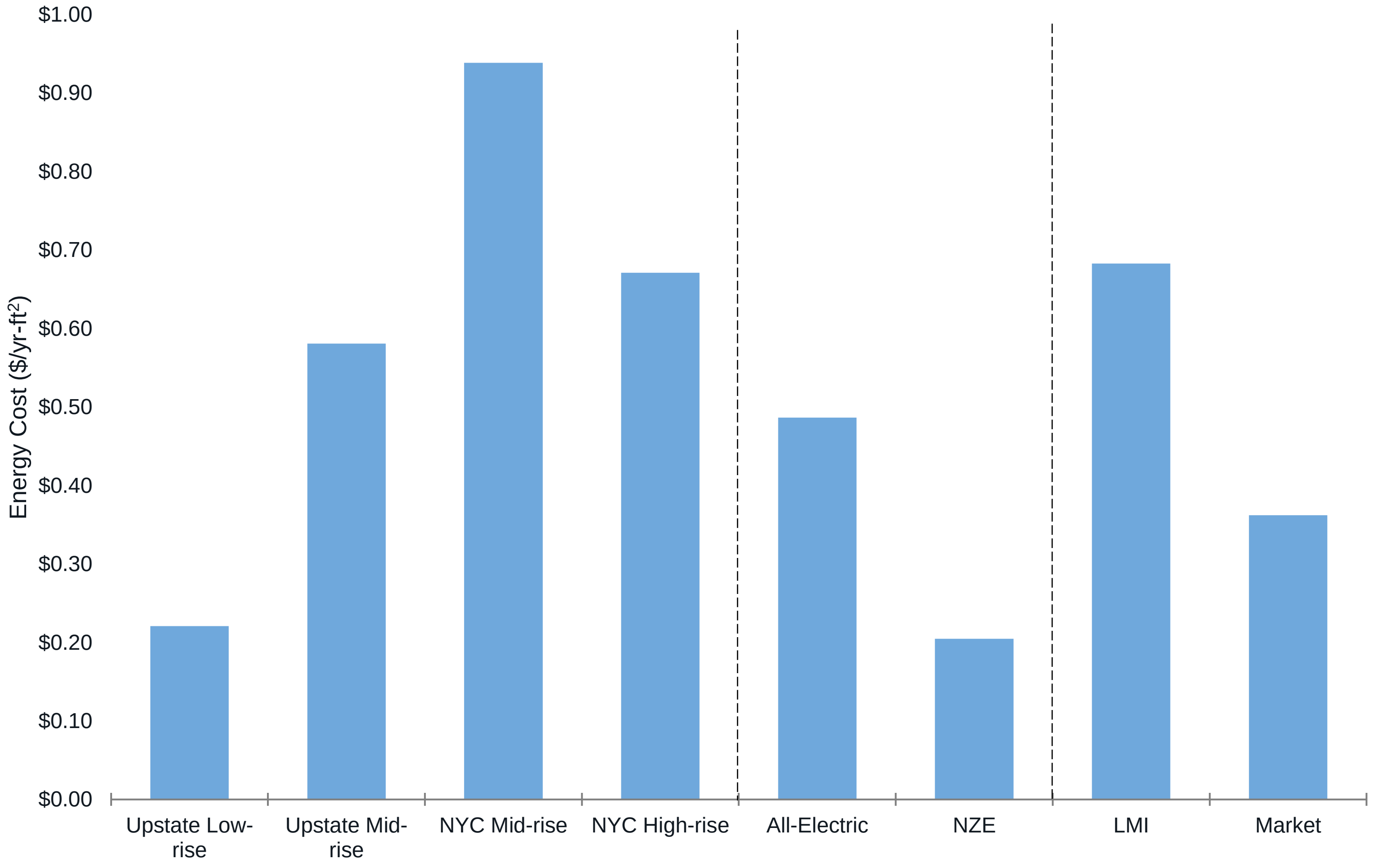
# Incremental Cost by Component



# Incremental Costs of Phius Projects



# Annual Energy Costs




# Cost Reduction Strategies

## Economic Performance and Understanding Tradeoffs:

- **Integrated teams** iteratively designed a package that prioritizes investments in energy and carbon reduction.
- Cost premiums were kept small, largely because of the **project teams' prior collective experience with high-performance design** and construction, allowing them to make intelligent, cost-effective package tradeoffs without sacrificing performance.
- Cost reduction strategies included **shortening learning curves**, **opting for simple, replicable designs**, and using **prefabricated materials**.
- **Solar PV systems, envelopes, and HVAC systems** drove incremental costs, while DHW was not a significant incremental cost in any project.

**Thank you!**

**Contact:**

Gwen McLaughlin

Project Manager

NYSERDA

gwen.mclaughlin@nyserda.ny.gov

Nate Heckman, AIA

Associate Technical Consultant

Resource Refocus

nate@resourcerefocus.com

Buildings of Excellence Case Studies:

https://www.nyserda.ny.gov/All-Programs/Multifamily-Buildings-of-Excellence/Winners/Resources

*Photo of Solara Apartments, Rotterdam, NY*
*Courtesy of Harris A Sanders Architects, P.C., and Black Mountain Architecture*