

# Buildings of Excellence Competition

Demonstration and Early Design Support Projects

Zero Place



Credit: Chris Kendall Photography

Highbridge



Credit: Magnusson Architecture and Planning, PC; Nightnurse Images Inc.

St. Marks Passive House



Credit: Cycle Architecture LLC and BQE

THE RESIDENCES at Sterlington



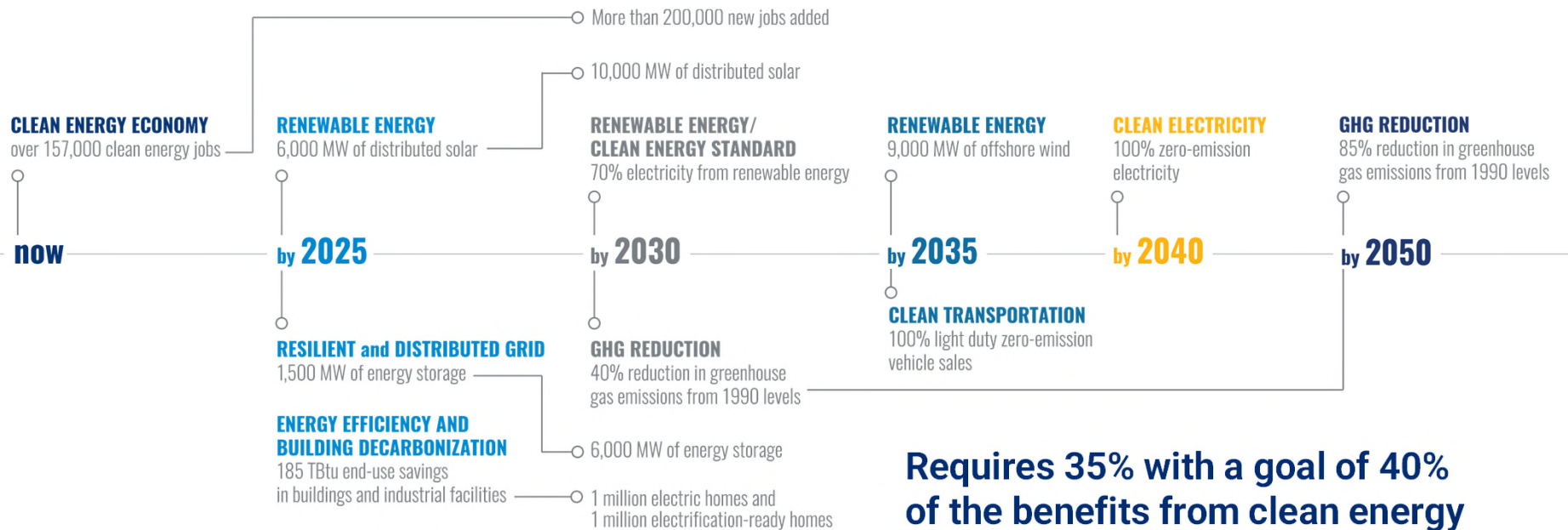
Credit: Watch Tower Bible and Tract Society of New York, Inc.



NYSERDA

# New York State Clean Energy Goals

## Climate Leadership and Community Protection Act (Climate Act)



**Requires 35% with a goal of 40% of the benefits from clean energy investment to flow to disadvantaged communities.**



Solara Apartments, Rotterdam, NY

## Achieving carbon neutral buildings by 2050

This leading-edge goal requires acceleration or improvement of:

- electrification of thermal loads
- thermal performance of building envelopes
- ability of buildings to store and/or shift energy use and interact with the electric grid
- supplying energy loads from zero emissions resources

# Buildings of Excellence Competition

- Demonstration Projects
- Early Design Support

---

Over \$48 Million  
Competition



# Demonstration Projects

**Livonia C3**



Credit: Magnusson Architecture and Planning, PC; Nighthurse Images Inc.

**The Rise**



Credit: Nighthurse Images courtesy of Magnusson Architecture and Planning

**Linden Boulevard Phase III**



Credit: Magnusson Architecture & Planning

# Early Design

**Shore Hill Development**



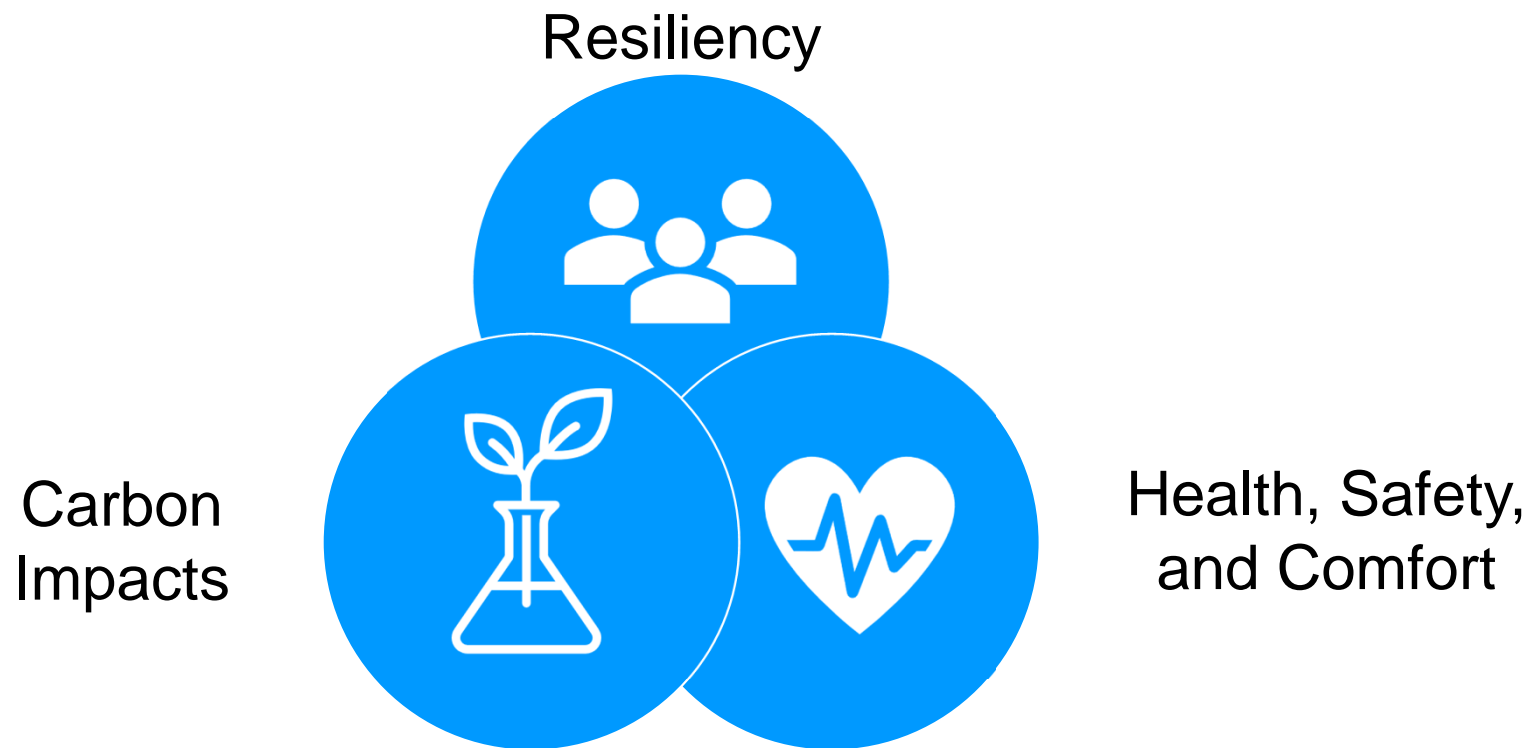
Credit: Curtis + Ginsberg Architects

**Cooper Park Commons**



Credit: Architecture Outfit and Magnusson Architecture and Planning

# Co-Benefits



# Resiliency

Renewable technologies



Green roofs



Renewable with battery storage



Design with materials to withstand storms



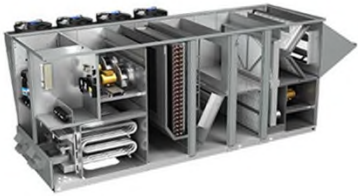
## Other Co-Benefits:

- Community shelter
- Stormwater management
- Locate outside floodplain
- No livable spaces below grade
- Future Meteorological Year data



# Health, Safety, and Comfort

Improved indoor air quality



Exterior shading devices



Natural lighting



Induction cooktops



## Other Co-Benefits:

- Natural ventilation

# Carbon Impacts

Low carbon materials

**LOW-CARBON  
CONCRETE**

Low GWP refrigerants



Other Co-Benefits:

- Adaptive reuse
- Carbon sequestration

Locally sourced materials



Heat pumps



# Awarded Projects Overview

	Buildings of Excellence Round 1 Projects	Buildings of Excellence Round 2 Projects	Buildings of Excellence Round 3 Projects
Number of Awarded Projects	28	14	14
Percentage of LMI Projects	71%	79%	57%
Number of Dwelling Units	2,851	1,566	2,337
Average Cost per Sq.Ft. (\$/sqft)	401	371	564
Number of All-Electric Projects	15	14	14

Note: Round 1 proposals were allowed to utilize fossil fuel systems. Round 2 and Round 3 proposals were required to be all-electric.

Last Updated: May 8, 2023

See [NYSERDA Buildings of Excellence Competition microsite](#) for additional analysis, presentations, and recordings

# Performance Validation

## **NYSERDA has committed to comprehensive cost and performance validation of projects awarded through the Buildings of Excellence Competition**

- All projects are required to provide 2 years of benchmarking data.
- Estimated operational utility costs are being requested for each Buildings of Excellence project prior to project completion.
- Actual operation cost analysis and performance validation is being completed for Buildings of Excellence projects as they reach project completion.
- Channel partners will work with NYSERDA to share cost and performance data widely and perform additional analysis of results.

# Buildings of Excellence Competition Overview

- Data Collection and Strategies
- Aggregated Cost Analysis
- Project Specific Analysis
- Observations
- Presentation of Appendices

# Cost Data Collection

## Cost data being collected goes beyond just project budgets



### Financials

- Overall building first cost
- Overall building incremental first cost
- Performance related tax credits
- NYSERDA incentives
- Project Soft costs vs. Hard Costs
- Performance related costs breakouts:
  - Space Conditioning
  - Lighting
  - Envelope
  - DHW
  - Appliances
  - Renewable Generation
  - Soft Costs



### Building Attributes

- System types and classifications
- Performance path
- Construction methods
- Critical component identification
- Building Height
- Renewables
- # Units (Dwelling, sleeping, congregate, other)
- Total Building Area
- All Electric
- Net Zero



### Market

- Energy Equity and Affordability
- Disadvantaged Communities
- Equity and Inclusivity
- Climate Justice
- Downtown Revitalization Initiative
- Environmental Justice Area
- LMI/Market Rate
- Regional Economic Development Council (REDC)
- Building use



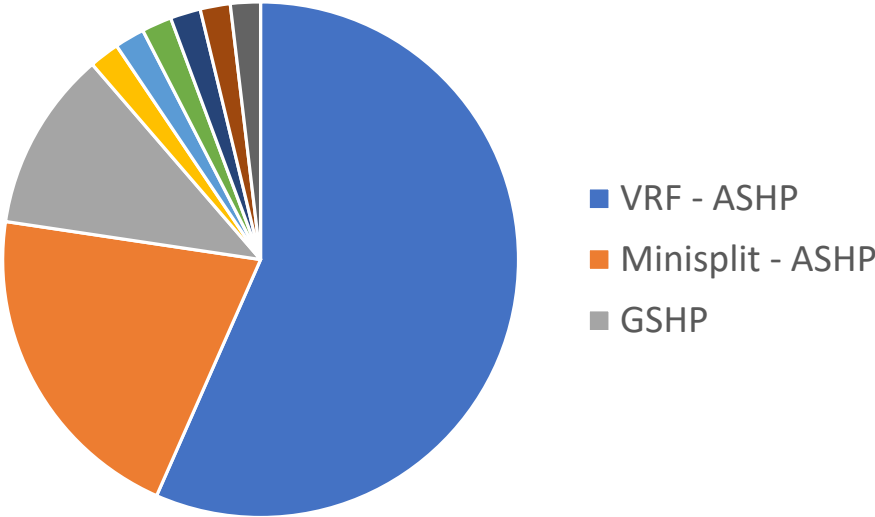
### Building Performance

- Site energy with renewables
- Site energy without renewables
- Annual predicted energy cost
- Annual predicted demand charges
- Annual predicted operational cost
- Annual actual utility and operational costs

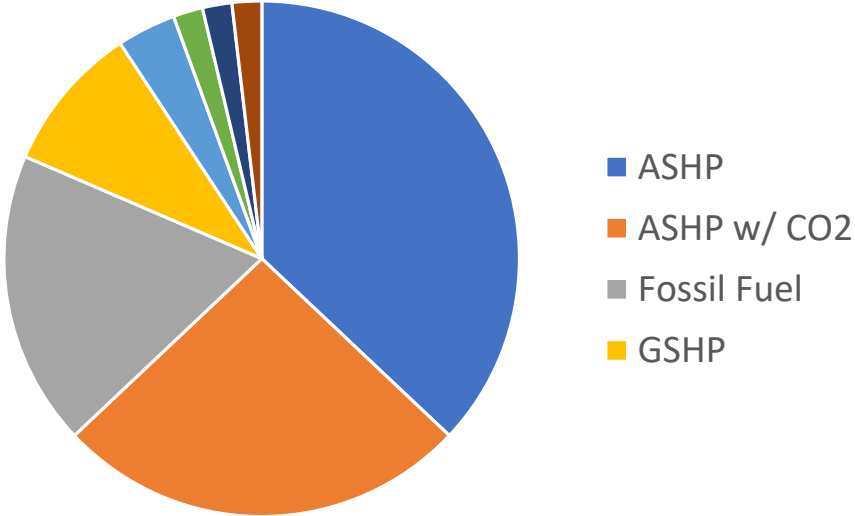
Cost data is updated monthly and published on the [Buildings of Excellence Resources page](#)

# Building Systems by Project Count

Buildings of Excellence Space Conditioning Distribution



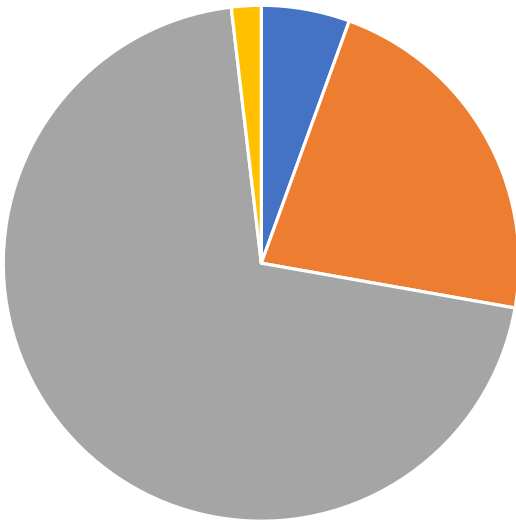
Buildings of Excellence DHW Distribution



Note: Charts show Round 1, Round 2, and Round 3 Projects

# Building Attributes by Project Count

### Buildings of Excellence Height Classification Distribution

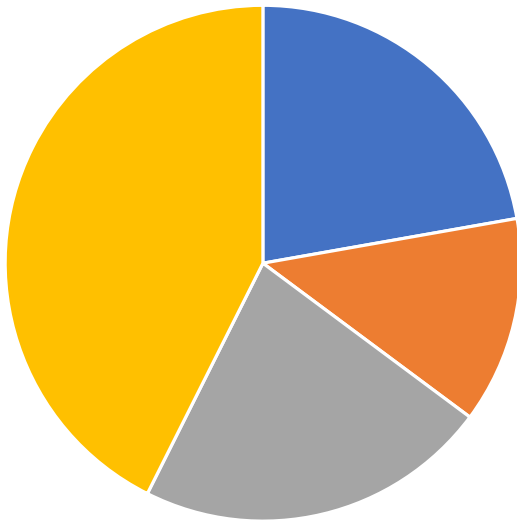


- High Rise
- Low Rise
- Mid Rise
- Super Tall

Building Height Categories:

- Low Rise = 1-3 stories
- Mid Rise = 4-25 stories
- High Rise = 26-39 stories
- Super Tall = 40+ stories

### Buildings of Excellence Performance Path Distribution



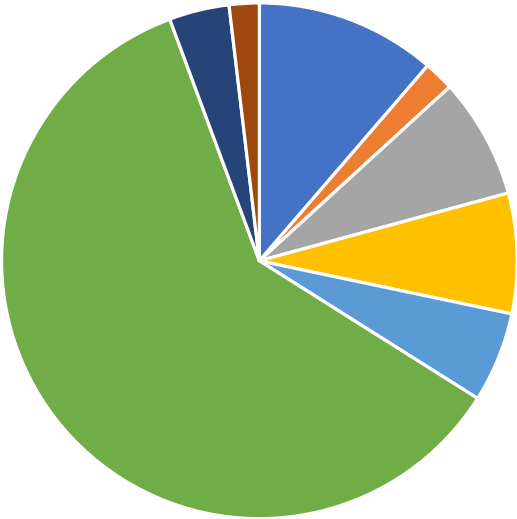
- ASHRAE
- ERI
- PHI
- Phius

Note: Charts show Round 1, Round 2, and Round 3 Projects



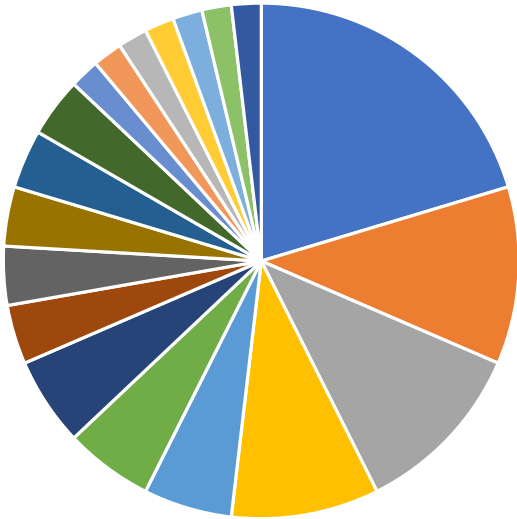
# Building Attributes by Project Count

Buildings of Excellence Regional Distribution



- Capital Region
- Central NY
- Finger Lakes
- Mid Hudson
- Mohawk Valley
- NYC
- Southern Tier
- Western NY

Buildings of Excellence Structural Envelope Distribution



- Block and Plank
- Wood Frame
- Panelized
- Cast in Place Concrete

Note: Chart shows Round 1, Round 2, and Round 3 Projects

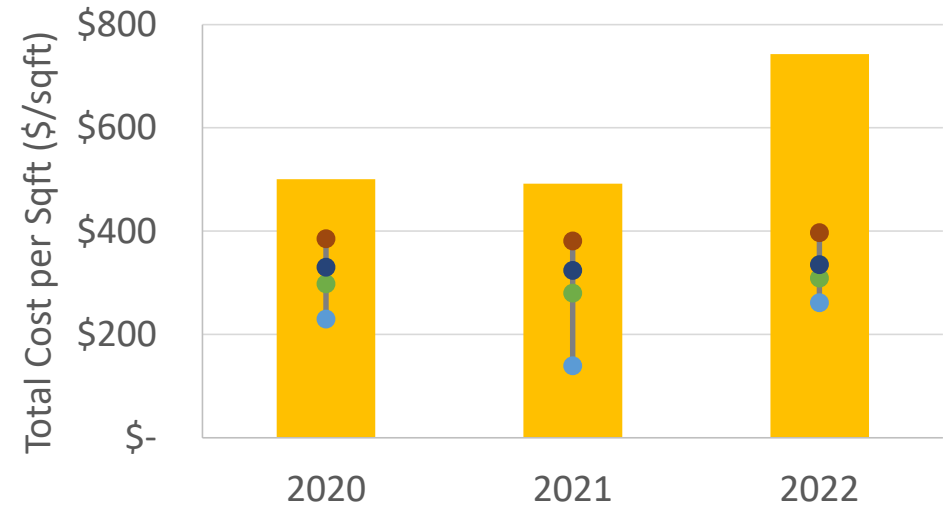
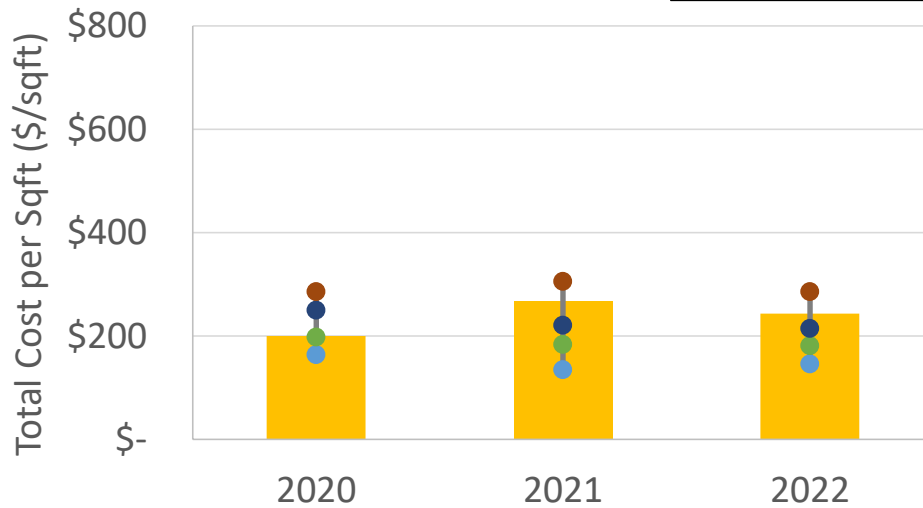
# Buildings of Excellence Project Costs vs. General Market Construction Costs

BOE Rd 1 awards ceremony was in 2019

Upstate

Note: General market construction costs provided by the Dodge Construction database

Downstate



■ BOE     
 ● 20% Quintile   
 ● 40% Quintile  
● 60% Quintile   
 ● 80% Quintile

■ BOE     
 ● 20% Quintile   
 ● 40% Quintile  
● 60% Quintile   
 ● 80% Quintile

Disclaimer: BOE Rounds 1, 2, and 3 cost data are included in 2020, 2021, and 2022, respectively. However, BOE project construction timelines may fall outside the "dedicated" year.

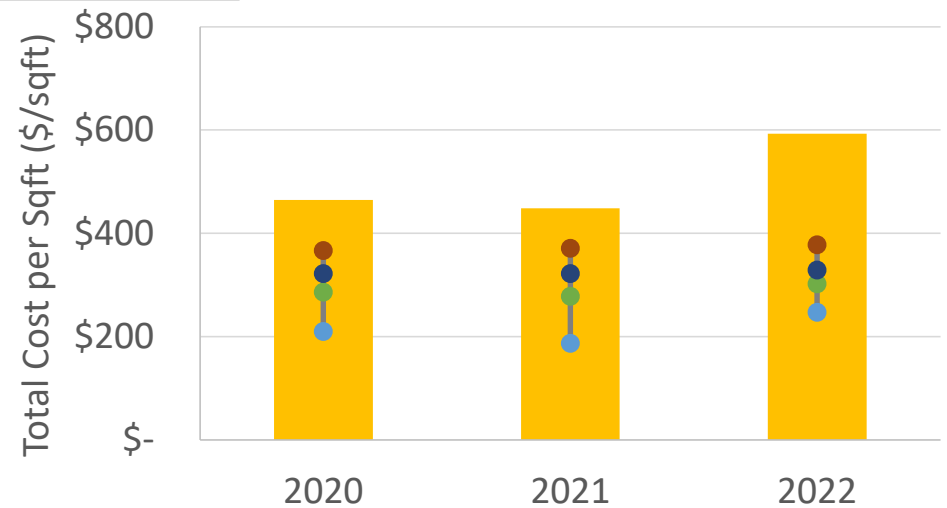
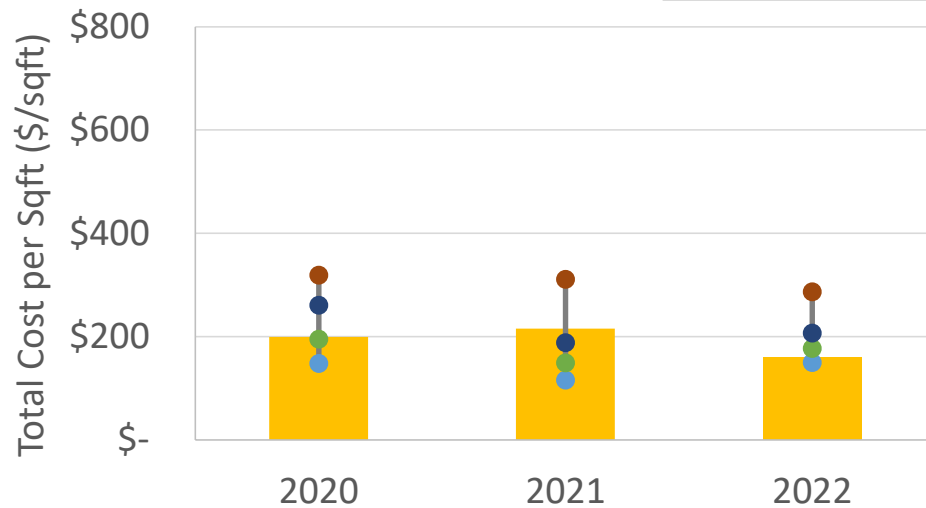
# Buildings of Excellence Project Costs vs. General Market Construction Costs

BOE Rd 1 awards ceremony was in 2019

Low Rise

Note: General market construction costs provided by the Dodge Construction database

Mid Rise

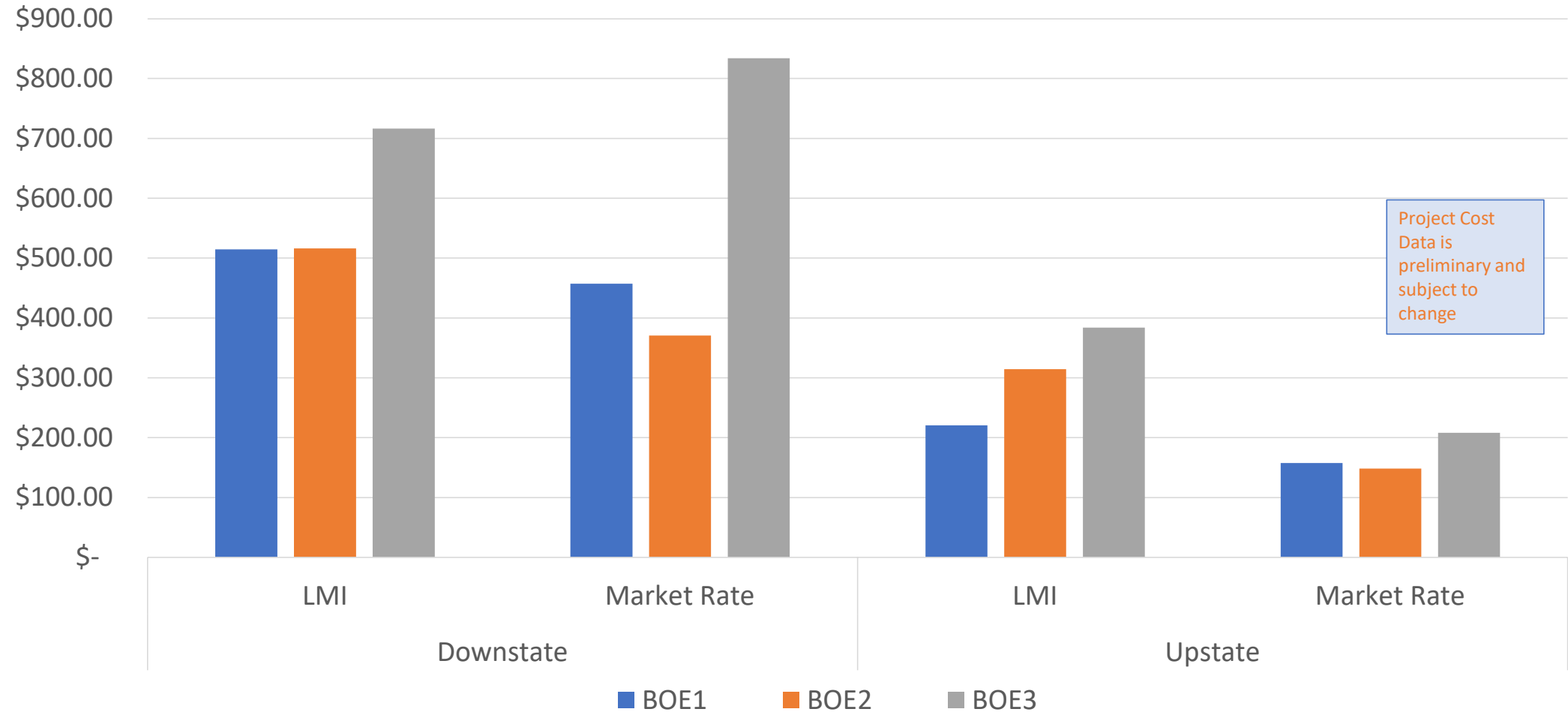


■ BOE     
 ● 20% Quintile   
 ● 40% Quintile  
● 60% Quintile   
 ● 80% Quintile

■ BOE     
 ● 20% Quintile   
 ● 40% Quintile  
● 60% Quintile   
 ● 80% Quintile

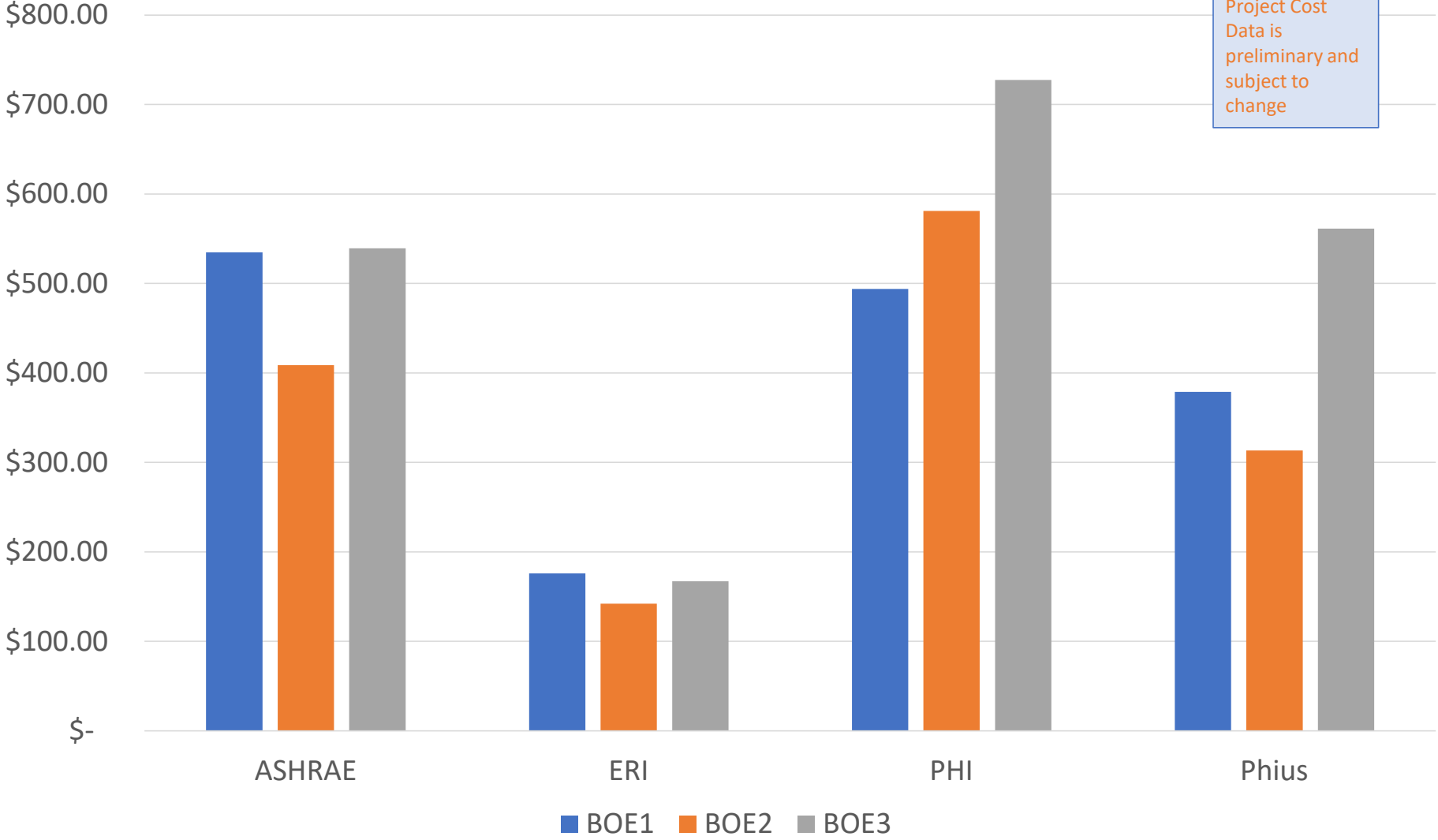
Disclaimer: BOE Rounds 1, 2, and 3 cost data are included in 2020, 2021, and 2022, respectively. However, BOE project construction timelines may fall outside the "dedicated" year.

### Average Project Cost Per Sq.Ft. by Market Sector

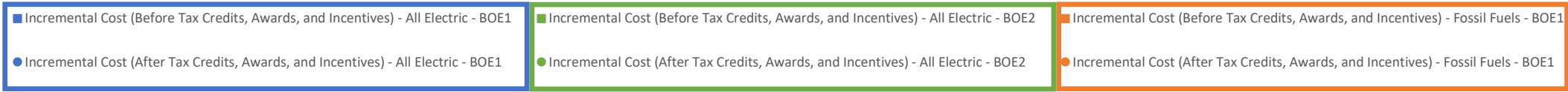
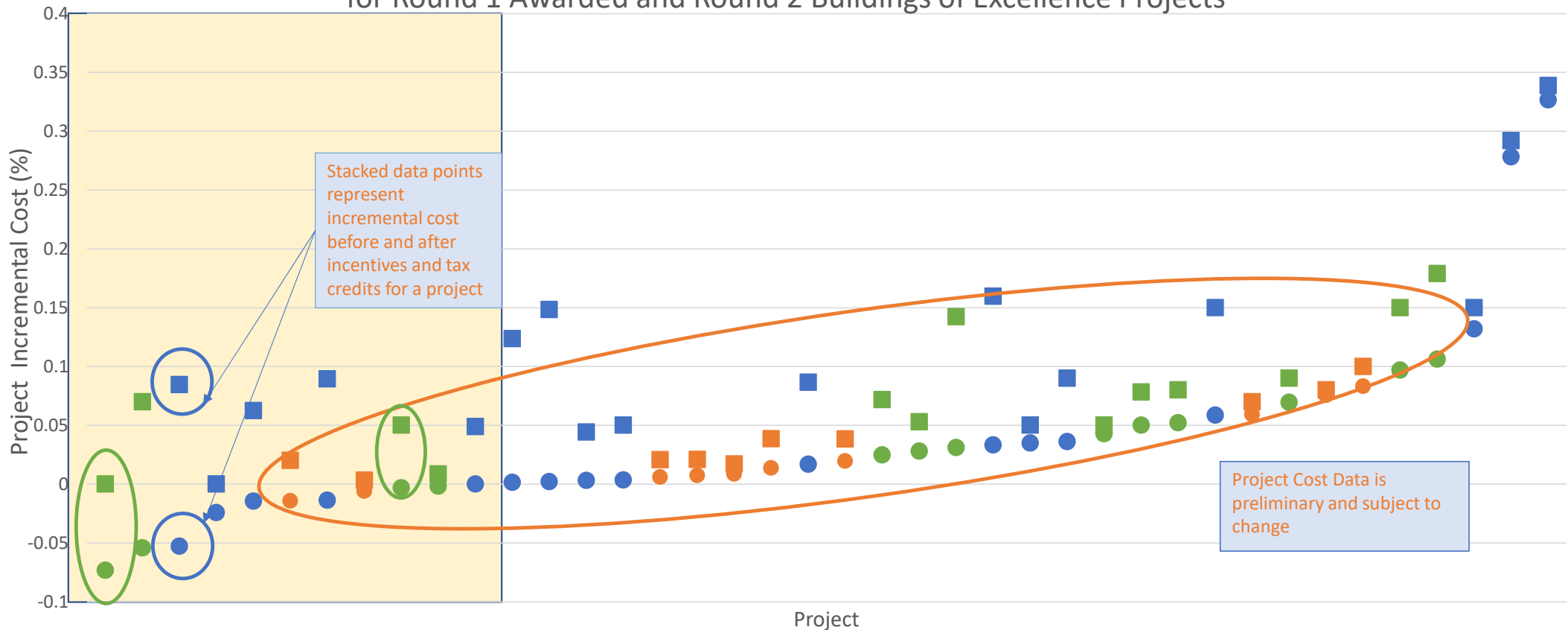


# Average Project Cost Per Sq.Ft. by Performance Path

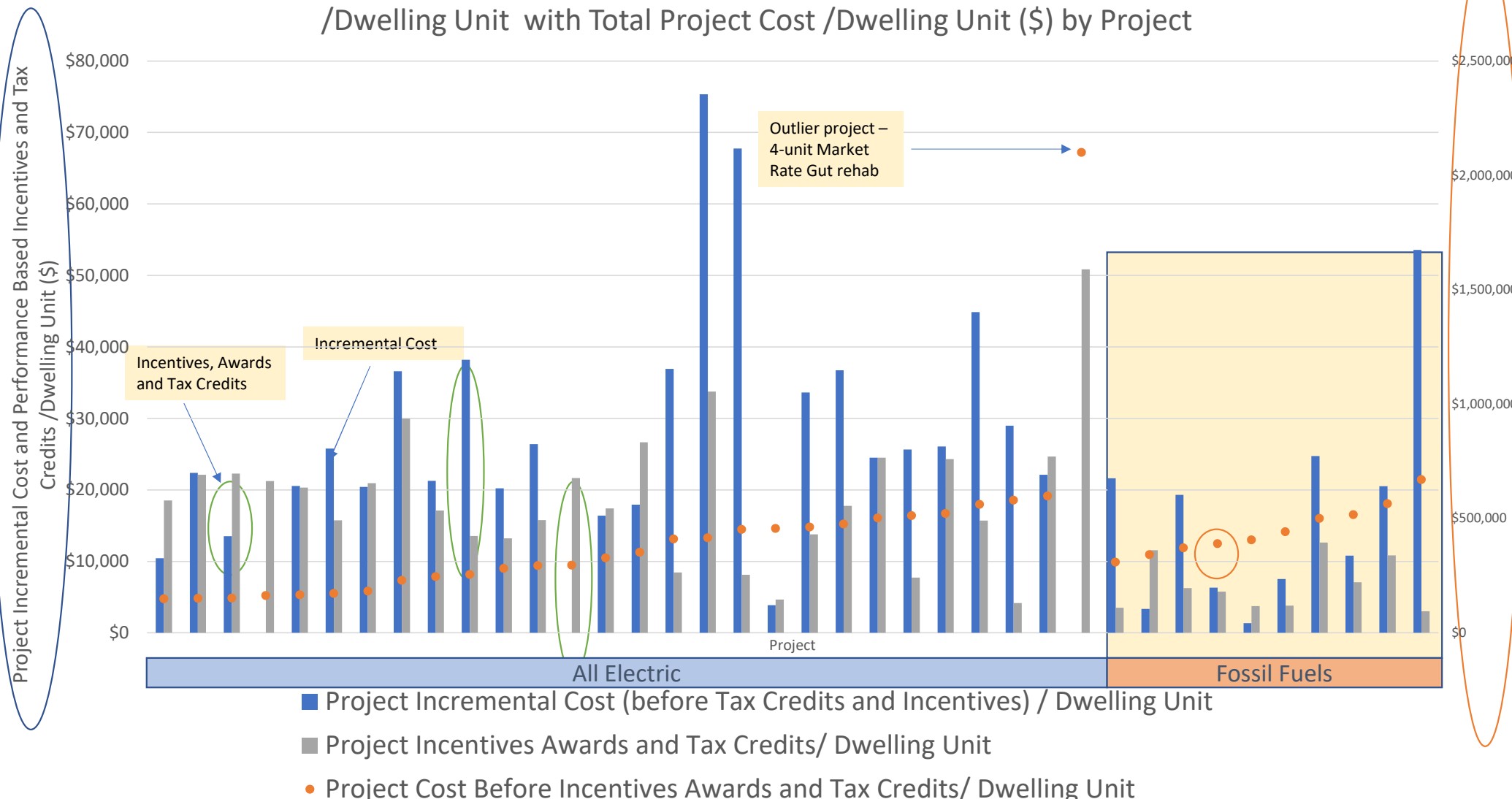
Project Cost Data is preliminary and subject to change



## Percent Incremental Cost Before and After Incentives and Tax Credits for Round 1 Awarded and Round 2 Buildings of Excellence Projects

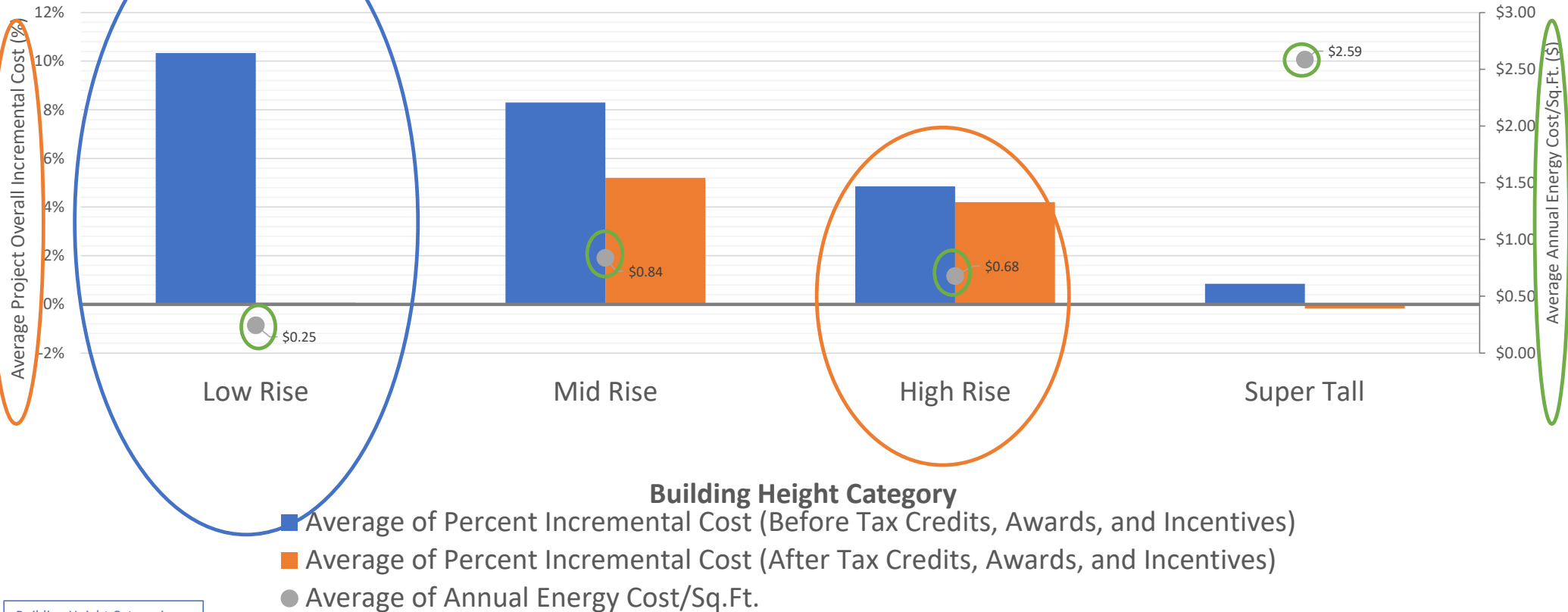


# Project Incremental Cost and Performance Based Incentives, Awards and Tax Credits / Dwelling Unit with Total Project Cost / Dwelling Unit (\$) by Project



# Percent Incremental Cost Before and After Incentives, Awards, and Tax Credits by Building Height

Project Cost Data is preliminary and subject to change

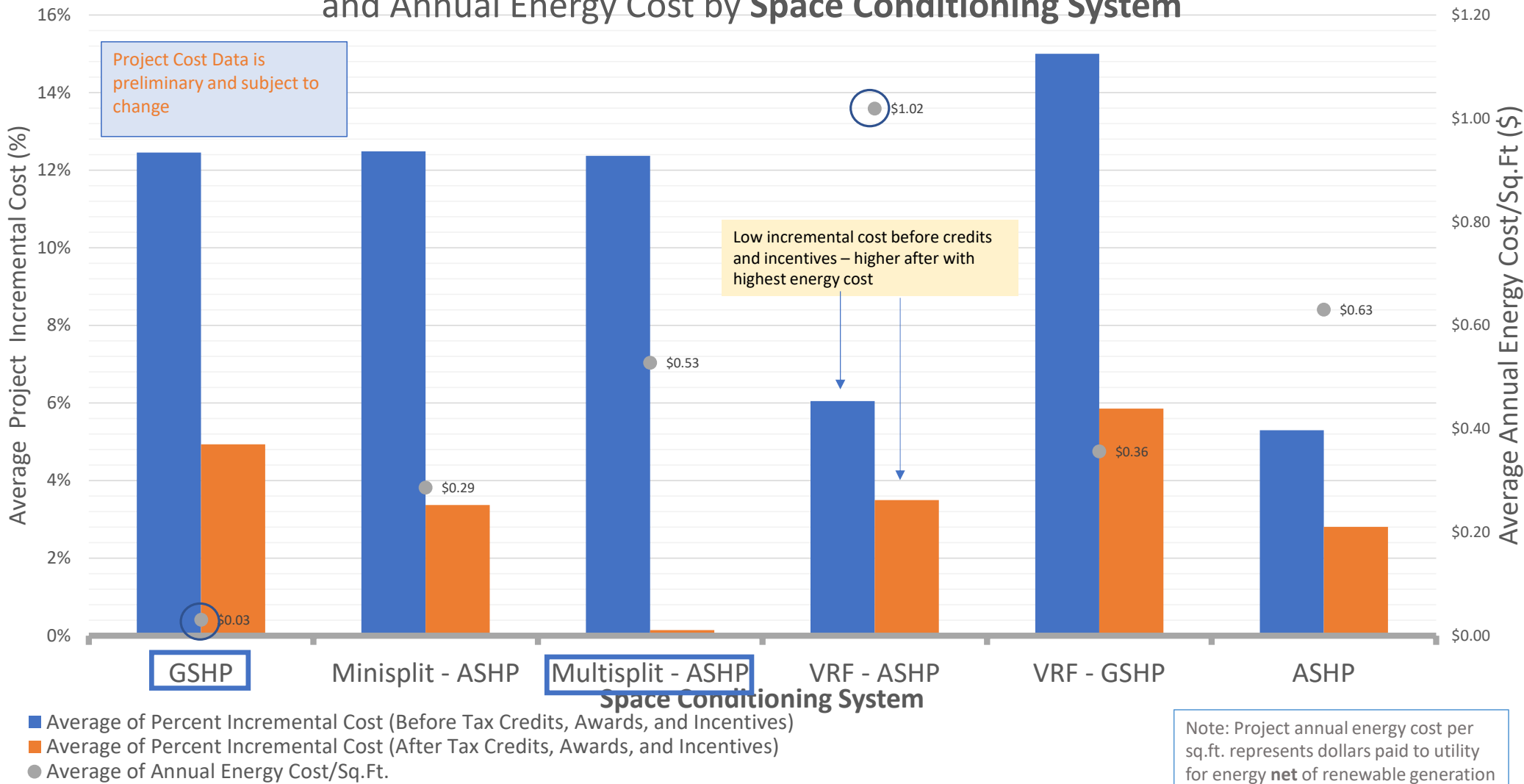


- Building Height Categories:
- Super Tall = 40+ stories
  - High Rise = 26-39 stories
  - Mid Rise = 4-25 stories
  - Low Rise = 1-3 stories

Note: Project annual energy cost per sq.ft. represents dollars paid to utility for energy net of renewable generation

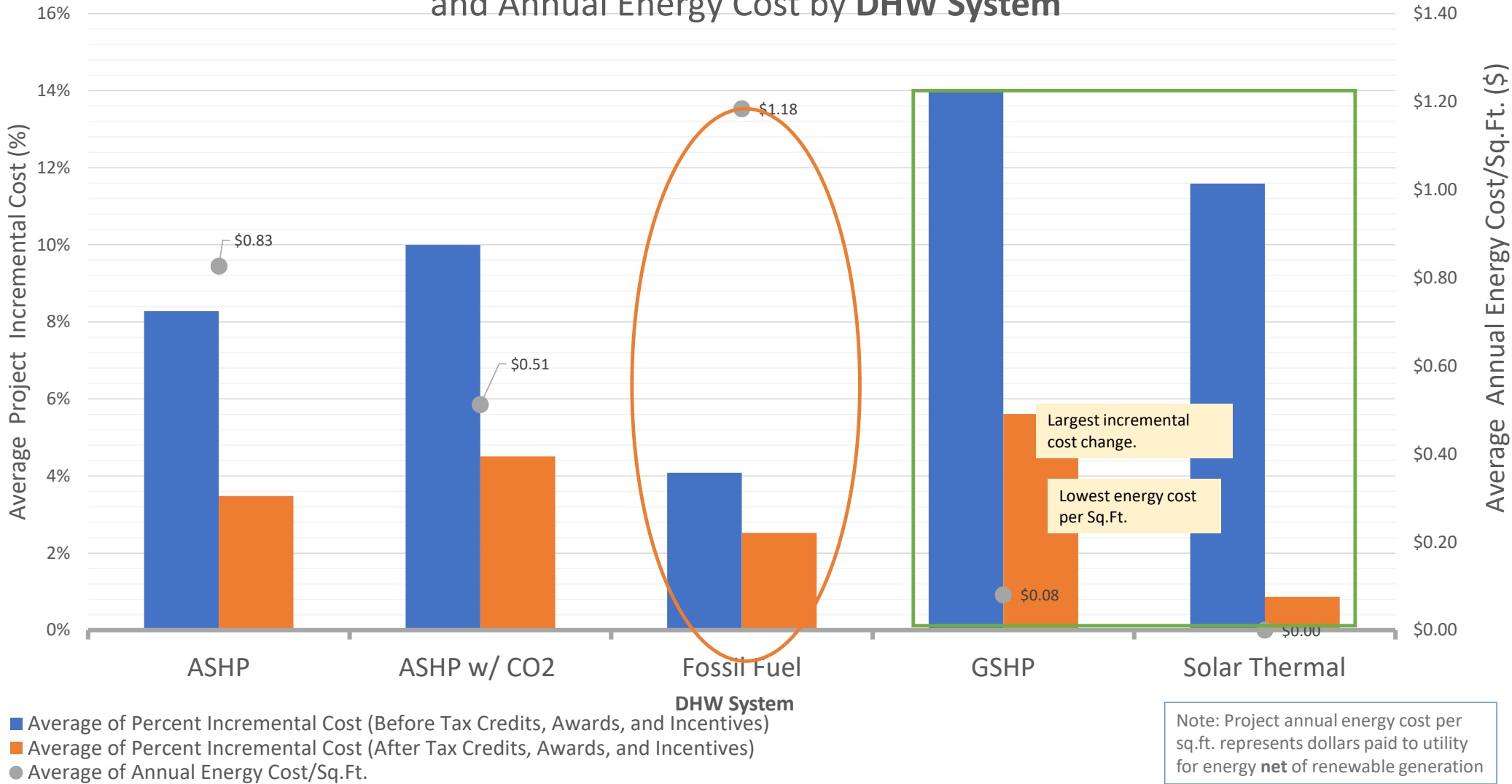


# Percent Incremental Cost Before and After Incentives and Tax Credits and Annual Energy Cost by Space Conditioning System



Project Cost Data is preliminary and subject to change

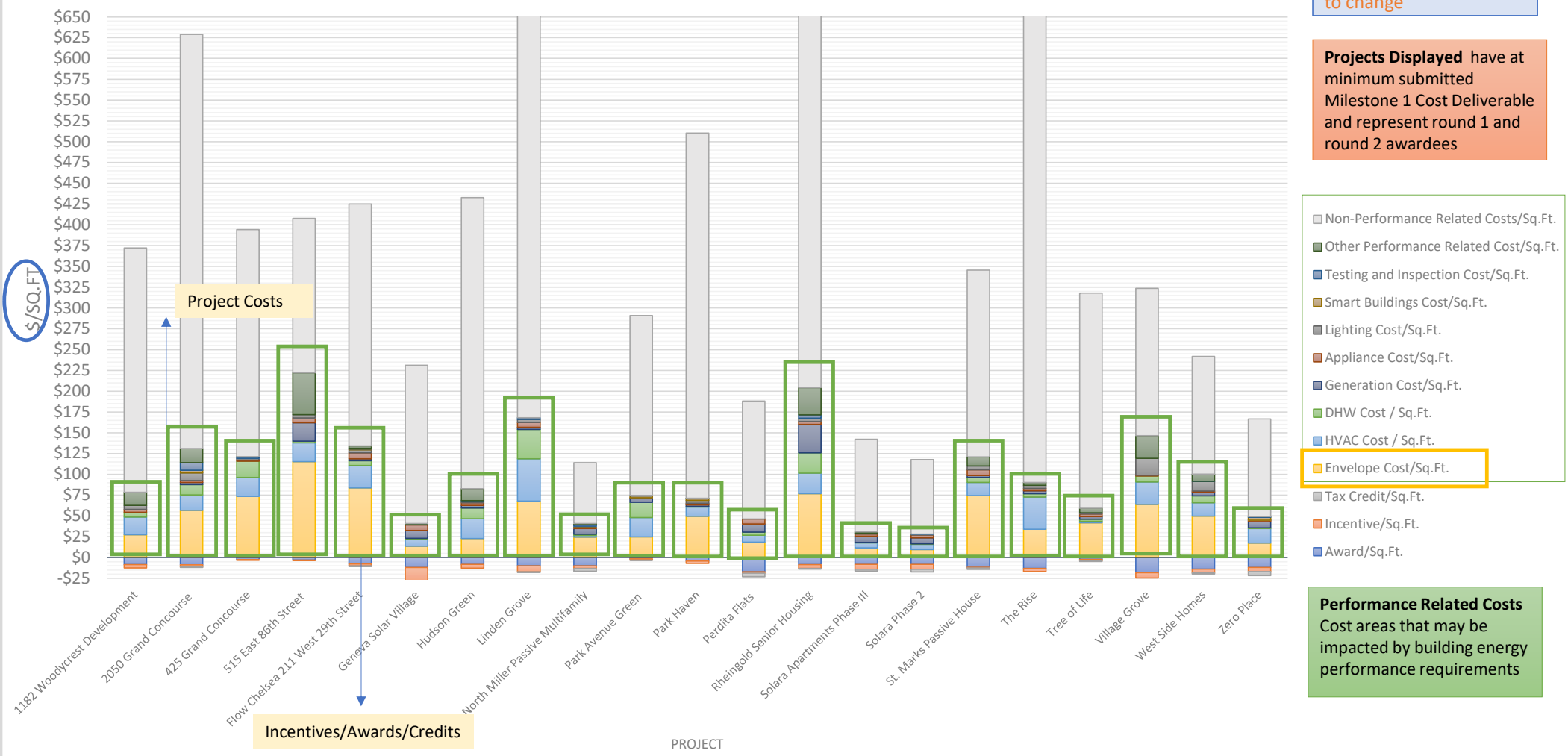
## Incremental Cost Before and After Incentives and Tax Credits and Annual Energy Cost by DHW System



# Total Project Performance Related Costs, Non-Performance Related Costs, Incentives, Awards, and Tax Credits Per Sq.Ft.

Project Cost Data is preliminary and subject to change

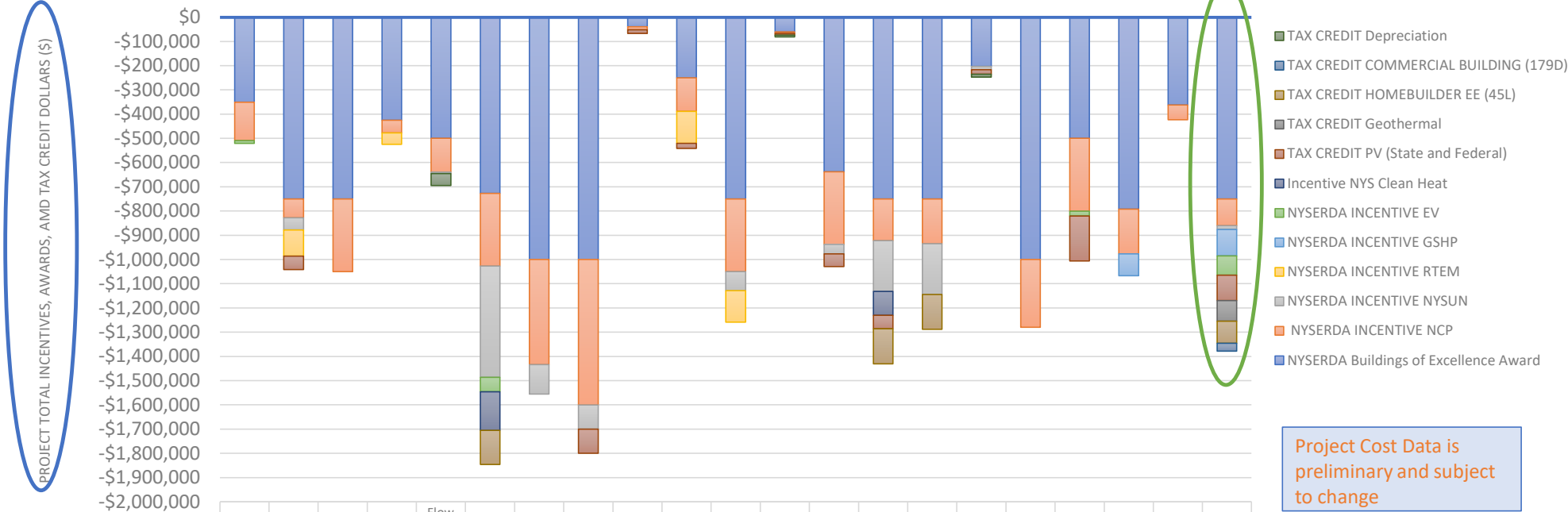
Projects Displayed have at minimum submitted Milestone 1 Cost Deliverable and represent round 1 and round 2 awardees



- Non-Performance Related Costs/Sq.Ft.
- Other Performance Related Cost/Sq.Ft.
- Testing and Inspection Cost/Sq.Ft.
- Smart Buildings Cost/Sq.Ft.
- Lighting Cost/Sq.Ft.
- Appliance Cost/Sq.Ft.
- Generation Cost/Sq.Ft.
- DHW Cost / Sq.Ft.
- HVAC Cost / Sq.Ft.
- Envelope Cost/Sq.Ft.
- Tax Credit/Sq.Ft.
- Incentive/Sq.Ft.
- Award/Sq.Ft.

**Performance Related Costs**  
Cost areas that may be impacted by building energy performance requirements

### Total Project Performance Related Incentives, Awards, and Tax Credits



Project Cost Data is preliminary and subject to change

TAX CREDIT Depreciation	\$0	\$0	\$0	\$0	-\$49,39	\$0	\$0	\$0	\$0	\$0	-\$7,500	\$0	\$0	\$0	-\$11,15	\$0	\$0	\$0	\$0	\$0	
TAX CREDIT COMMERCIAL BUILDING (179D)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-\$32,40
TAX CREDIT HOMEBUILDER EE (45L)	\$0	\$0	\$0	\$0	\$0	-\$140,8	\$0	\$0	\$0	\$0	\$0	\$0	-\$144,0	-\$144,0	\$0	\$0	\$0	\$0	\$0	\$0	-\$92,00
TAX CREDIT Geothermal	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-\$85,00
TAX CREDIT PV (State and Federal)	\$0	-\$55,59	\$0	\$0	\$0	\$0	\$0	-\$100,0	-\$14,25	-\$20,40	\$0	-\$7,433	-\$52,25	-\$55,80	\$139,03	-\$18,75	\$0	-\$185,5	\$0	\$27,878	-\$104,0
Incentive NYS Clean Heat	\$0	\$0	\$0	\$0	\$0	-\$159,0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-\$99,000	\$99,000	\$0	\$0	\$0	\$0	\$0	\$0
NYSERDA INCENTIVE EV	\$12,00	\$0	\$0	\$0	\$0	-\$60,00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-\$20,00	\$0	\$0	-\$80,00
NYSERDA INCENTIVE GSHP	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-\$90,00	\$0	-\$109,3
NYSERDA INCENTIVE RTEM	\$0	-\$108,0	\$0	-\$47,11	\$0	\$0	\$0	\$0	\$0	-\$132,0	-\$130,0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
NYSERDA INCENTIVE NYSUN	\$0	-\$50,02	\$0	\$0	-\$6,610	-\$459,0	-\$121,0	-\$100,0	\$0	\$0	-\$78,20	\$0	-\$39,24	-\$209,2	-\$209,2	-\$13,60	\$0	\$0	\$0	\$55,819	-\$15,000
NYSERDA INCENTIVE NCP	\$157,7	-\$77,60	-\$300,0	-\$52,50	-\$139,0	-\$300,0	-\$434,0	-\$600,0	-\$12,60	-\$138,6	-\$300,0	-\$6,400	-\$300,0	-\$172,0	-\$184,8	\$0	-\$279,6	-\$300,0	-\$184,0	-\$60,00	-\$110,7
NYSERDA Buildings of Excellence Award	\$350,9	-\$750,0	-\$750,0	-\$425,0	-\$500,0	-\$727,2	-\$1,000	-\$1,000	-\$39,46	-\$250,0	-\$750,0	-\$59,97	-\$637,5	-\$750,0	-\$750,0	-\$203,0	-\$1,000	-\$500,0	-\$792,4	-\$362,6	-\$750,0

LIHTC, historic tax credits, property tax abatements, and other non-performance based financial benefits are **EXCLUDED** from this presentation

# Envelope and HVAC System Cost Per Sq.Ft. Upstate and Downstate by Project Structural Envelope

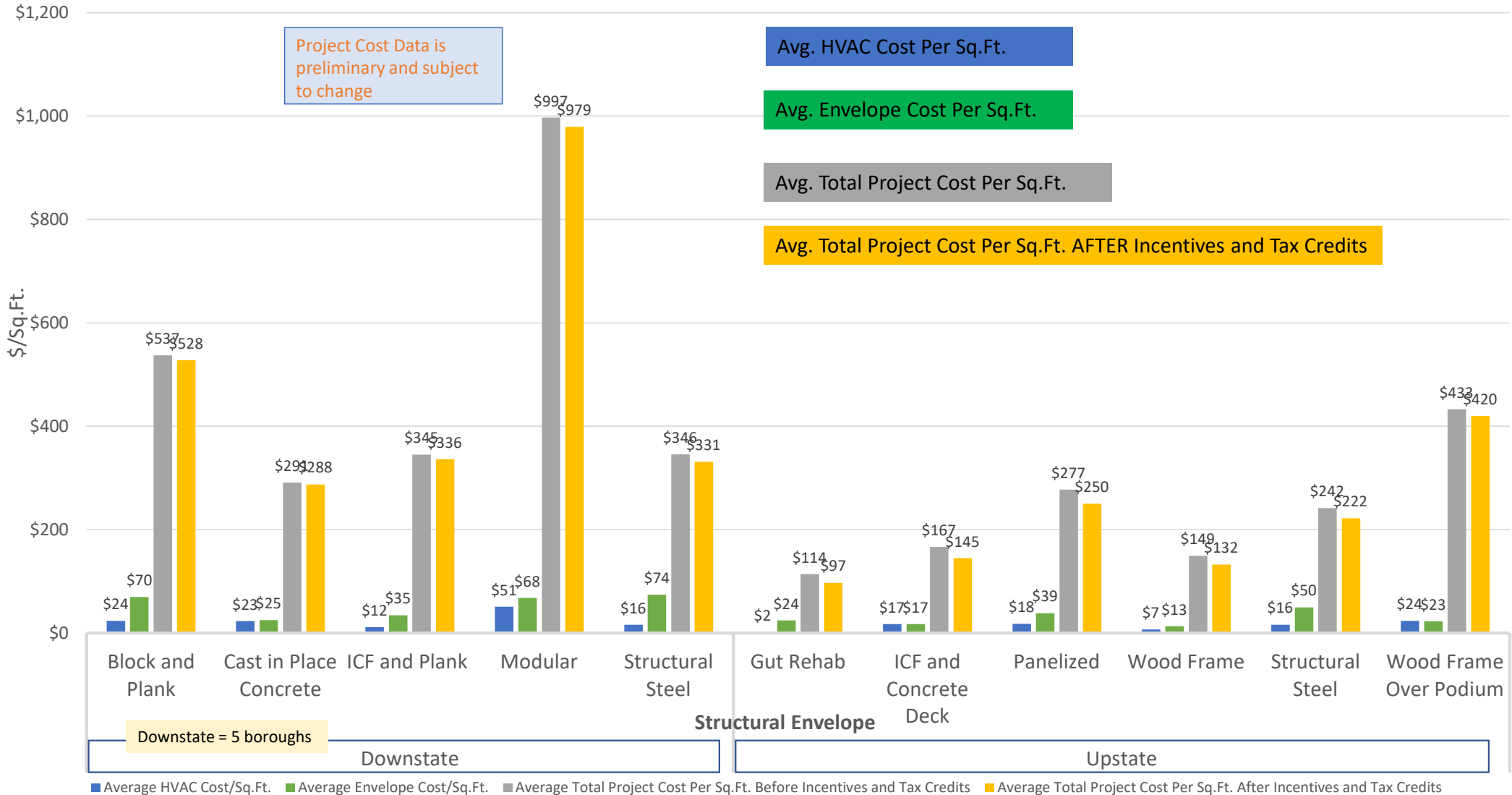
Project Cost Data is preliminary and subject to change

Avg. HVAC Cost Per Sq.Ft.

Avg. Envelope Cost Per Sq.Ft.

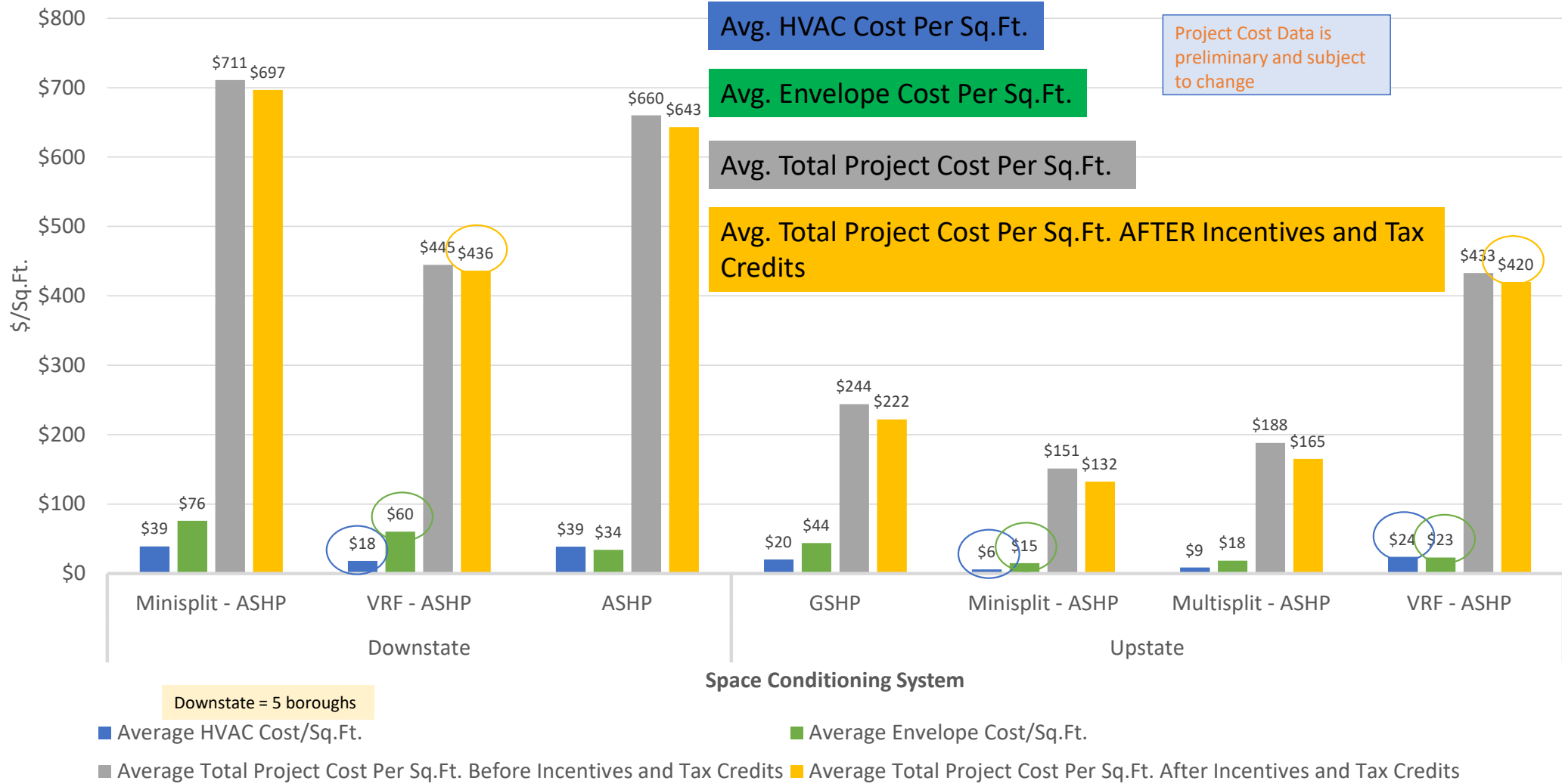
Avg. Total Project Cost Per Sq.Ft.

Avg. Total Project Cost Per Sq.Ft. AFTER Incentives and Tax Credits

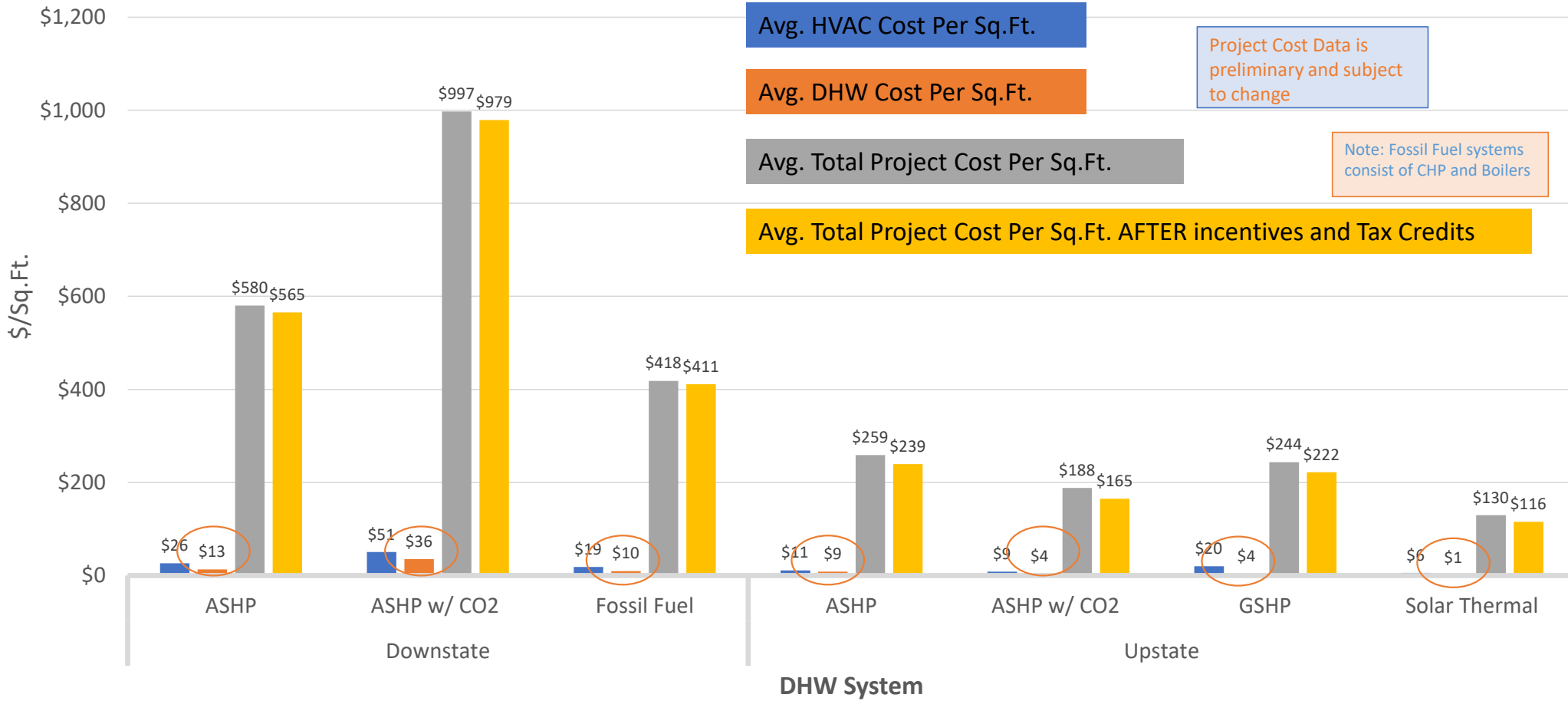


■ Average HVAC Cost/Sq.Ft. ■ Average Envelope Cost/Sq.Ft. ■ Average Total Project Cost Per Sq.Ft. Before Incentives and Tax Credits ■ Average Total Project Cost Per Sq.Ft. After Incentives and Tax Credits

## HVAC System and Envelope Cost Per Sq.Ft. Upstate and Downstate by Project Space Conditioning System



## DHW and HVAC System Cost Per Sq.Ft. Upstate and Downstate by Project DHW System



- Average HVAC System Cost/Sq.Ft.
- Average DHW System Cost/Sq.Ft.
- Average Total Project Cost Per Sq.Ft. Before Incentives and Tax Credits
- Average Total Project Cost Per Sq.Ft. After Incentives and Tax Credits

# Observations

- **Climate Zones and Regions**
  - Successful awarded projects across 8 NYS regions and in climate zones 4, 5, and 6
- **Incentives and tax credits are more impactful for projects with certain building attributes**
  - Low Rise
  - All Electric
  - Geothermal
- **Space Conditioning**
  - VRF - ASHP are overwhelmingly the most popular space conditioning solution
  - Projects using VRF-ASHP show:
    - Highest annual energy cost per sq.ft. of HVAC options
    - Lowest incremental construction cost **before** incentives and tax credits
    - Higher incremental construction cost **after** incentives and tax credits
  - GSHP
    - GSHP projects are more cost effective **after** incentives and tax credits
    - Projects average the lowest annual energy cost per sq.ft.
- **Observations on incremental construction costs after tax credits and incentives**
  - Approximately one-half of all BoE projects resulted in <1% incremental cost
- **Electrified DHW**
  - Contrary to frequent perception, fully electrified projects are still able to achieve a <1% incremental construction cost after tax credits and incentives
  - Electrified DHW projects see lower average cost of energy for building operation when renewables are factored into the cost
  - Solar Thermal, and GSHP systems have the lowest DHW system Cost per Sq.Ft across projects with detailed cost submittals



# Appendices

- > Appendix A – Awarded Project Cost Detail
- > Appendix B – Awarded Project Summaries
- > Appendix C – Building Systems Illustrations and Definitions
- > Appendix D – Understanding the Data
- > Appendix E – Acronyms

# Appendix A

## Awarded Project Cost Detail



# Solara Phase III

Rotterdam, NY

## Technical attribute summary:

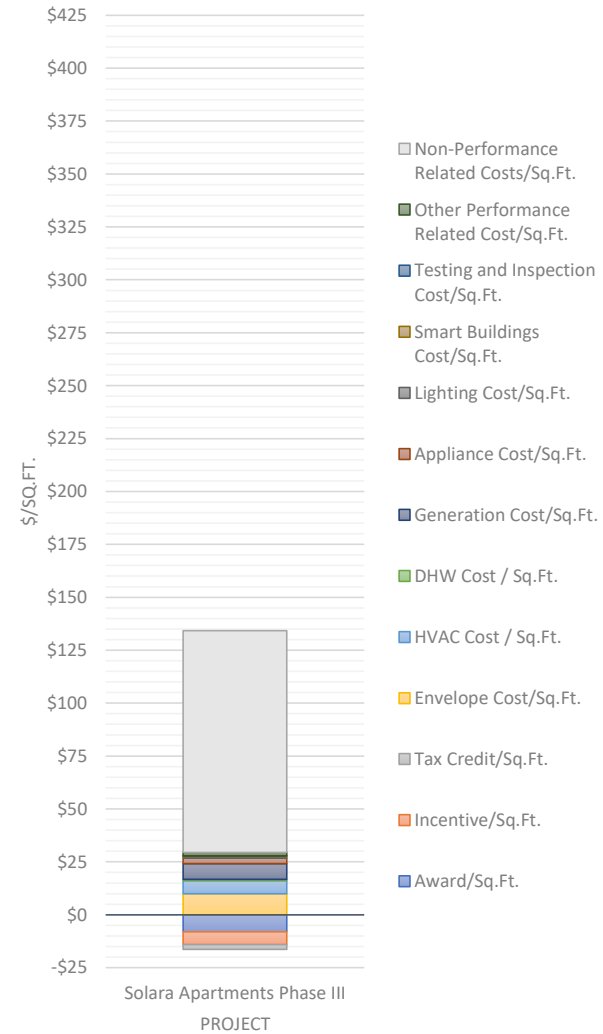
- 3 Stories, 72 Dwelling Units
- Market Rate
- Solar thermal DHW
- Minisplit ASHP Space Conditioning
- Wood Frame
- ERV
- HP clothes dryers
- EV Charging
- Advanced controls/monitoring
- 100% Renewable Energy
- All Electric



**\$750,000 Award**

Credit: 3DPlans.com

Total Project Performance Related Costs, Non-Performance Related Costs, Incentives, Awards, and Tax Credits Per Sq.Ft.



# Appendix B

## Awarded Project Summaries



# Great Oaks Mixed Use Eco-Park

Albany, NY

**Early Design**  
**\$1,000,000 Award**

Rosenblum Development Corporation  
Re:Vision Architecture

# of Dwellings	# of Buildings	# of stories	New or GutRehab	Total SF	Residential SF	Electric Utility	Gas Utility	REDC	DEC Env.Justice	Downtown Revitalization Initiative
96	1	5	New	158,271	97,271	Nat'l Grid	NA	Capitol Region	No	No
Space Conditioning	Ventilation	DHW	Building Envelope	All Electric	Urban or Suburban	Net Zero	Mixed Use	Performance Path	Other 3 <sup>rd</sup> party certs.	Occupancy
GSHP	ERV	CO2 GSHP	Wood fiber insulation under consideration by design team.	Yes	Suburban	Yes	Yes	Phius	Phius+ 2018, Phius+ Source Zero, Well Certification, EGC 2020 Plus	Market Rate

Proposer's summary: Building 150 will be constructed at RDC's Great Oaks Office Park, which is ideally situated in an urban-adjacent location on the border of the City of Albany and Town of Guilderland in New York's Capital Region. Great Oaks is currently comprised of three office buildings in a natural, park-like setting that are impeccably maintained to retain a first-class appeal inside and out. The proposed +/- 160,000 sqft., five-story mid-rise building will provide 96 residential units and robust amenity space including a café/market space, fitness center, indoor bicycle storage, and elevated courtyard. Tenants of Building 150 will also enjoy access to the park's groomed trail, picnic areas, immediate mass transit, and walkability to shopping, dining and other conveniences. By maximizing onsite solar PV and the prescribed benefits from planned Passive House (Phius+ 2018) and Phius+ Source Zero certifications, Building 150 will achieve lower embodied carbon, superior comfort, net-zero energy use, and resiliency for future climate hurdles. Particularly relevant post-COVID-19, the air-tight envelope coupled with continuous filtered ventilation makes Building 150 more resilient to airborne disease. Furthermore, the new residential development activates underutilized landscape and parking areas while maintaining the current level of green space, which comprises over 30% of the property.

Technical attribute summary: All Electric, Solar PV, Ground Source Heat Pump, Heat Pump-based Domestic Hot Water, Heat Pump Dryers, Induction Cooktops



Credit: Re:Vision Architecture

# Appendix C

## Building System Illustrations and Definitions



# ASHP Space Conditioning System Types

- Minisplit
  - One Condenser – One Line Out – One Head
  - <65 kbtu/hour
- Multisplit
  - One Condenser – Multiple Lines Out – Multiple Heads
  - <65 kbtu/hour
- VRF
  - Multiple Condensers – Multiple Lines Out – Multiple Heads
  - >65 kbtu/hour



# Appendix D – Understanding the Data

All project data included is preliminary and subject to change. As projects progress, data will be updated and shared on NYSERDA's Building of Excellence web page.

- Project information stage is a reference to completeness of project submittals.
- Where projects claimed incremental cost within a range, the high end of that range was selected for analysis.
- "Incremental Cost" is defined as the dollar amount differential to a project's budget related to carbon neutral and net zero construction practices when compared to that project's stated baseline construction code per the developer submitted data.
- Building of Excellence project baseline construction code is defined as the NYS Energy Conservation Construction Code (ECCC) for the year that the project was permitted.
- Incremental cost values have been provided by the project teams as estimates related to their understanding of the project baseline.
- Incremental cost % after incentives and tax credits is calculated:
  - $$=(\text{estimated incremental cost } \$ - \text{anticipated NYSERDA incentive } \$ - \text{anticipated project tax credits } \$) / \text{estimated building cost } \$$$
  - Where % incremental cost is negative, incentives and tax credits exceed the dollar amount of estimated incremental cost
- Cost and incremental cost data being collected for Buildings of Excellence projects is preliminary and based on project estimates.
- All Buildings of Excellence projects utilize Electrified Space Conditioning despite being identified as not all electric.
- Energy Costs identified are pulled from project model values – NOT building measurements.
- Where provided, Low to Moderate Income (LMI) Tax Abatements have been excluded from this analysis.
- If a field is blank the project has not yet provided that information to NYSERDA.



# Reminder!

Cost data is updated monthly on the [Buildings of Excellence Resources page](#)

# Thank You

