high rise / low carbon series launch sponsored by NYSERDA

Moderator:

Janet Joseph, Senior Vice President for Strategy and Market Development, NYSERDA

Speakers:

Richard Yancey, Executive Director, Building Energy Exchange Michael Reed, Team Lead, Advanced Efficiency Solutions, NYSERDA Michael Izzo, Vice President of Carbon Strategy, Hines Will Sibia, Founder, urbs | Urban Systems Dana Schneider, Senior VP, Director of Energy and Sustainability, Empire State Realty Trust Joseph Weishaar, Vice President, L&M Workforce Housing Fund, L&M Fund Management Anna Weiss, Vice President, Omni New York

February 3, 2022 | 9 to 11 am | 1.5 AIA LUHSW Building Energy Exchange | be-exchange.org





High Rise / Low Carbon

Office Deep Retrofit Profiles

November 12, 2020







wide search



18 buildings selected

Variety of retrofit approaches

Multi-tenant and owner occupied

Between 10 and 102 stories

Retrofits completed between 2012 and present



retrofit performance site EUI

site EUI post-retrofit low to high





solu	itions matrix	1. HS	2. Rogers Building	ni Hastings Street	4. Kyoto Station Use	5. 560 Lexington	6. Five Manhat- tan West	7. NECHQ	Center	9. nium Building	10. State Building	1. 222 South Plaza	12. Battery Plaza	13. Maiden Lane	14. Pennsyl- vania	15. Sun Life ance	16. 67and	17. Palestra Building	18. 330West Street
ighting	Reduced lighting power density	•	٠	٠	٠	٠	•	•	٠	•	٠	٠	•	٠	٠	٠	•	•	•
	Daylight sensors and controls	٠	٠	٠	•	٠	•	•	٠	•	٠	•	•	•	•	•	•	٠	•
	Occupancy sensors	٠	٠	٠	•	•	•	•	•	•	•	•	•	•	٠	•	٠	•	٠
	Reduced lighting schedules	٠	٠	٠	•	•	٠	٠	•	•	•	•	•	•	٠	•	٠	•	•
* cooling	Cooling plant replacement or upgrade	٠	٠	٠	٠	٠	٠	•	•	•	٠	•	•	•	٠	•	•	٠	•
	VFDs on motors for pumps, fans, etc.	٠	٠	٠	٠	٠	٠	•	•	•	•	٠	٠	٠	٠	٠	٠	•	•
	Reduced schedules and setpoint temps	٠	٠	٠	•	•	٠	٠	•	٠	•	•	٠	•	•	•	٠	•	•
	Other innovative cooling ECMs	٠	٠	٠	٠	•	٠	٠	•	٠	•	٠	•	•	٠	٠	٠	٠	•
III heating	Boiler plant replacement or upgrade	•	٠	٠	٠	•	٠	•	•	•	•	•	•	•	•	٠	٠	٠	•
	Distribution system improvements	•	٠	٠	•	•	•	•	٠	٠	٠	٠	٠	•	•	٠	•	•	•
 SSS ventilation	AHU replacement or upgrade	٠	٠	•	•	•	٠	٠	٠	•	٠	٠	•	٠	٠	٠	٠	•	•
	Demand control ventilation	٠	٠	•	٠	•	•	•	•	٠	٠	•	•	•	٠	٠	٠	•	•
	Outside air economizer	•	٠	٠	•	•	•	•	٠	•	•	•	٠	٠	٠	•	٠	٠	•
envelope	Façade reclad or window replacement	•	•	•	•	0	•	•	•	•	•	•	•	•	•	•	•	•	•
	Air tightness improvements	•	•	٠	•	•	•	•	•	•	•	•	•	•	•	•	٠	•	•
	Additional insulation	•	٠	٠	•	•	•	•	٠	٠	٠	•	•	•	٠	٠	•	•	•
U plug loads	Energy Star appliances, new computers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Cloud-based computing (no servers)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Other plug load ECMs	٠	٠	٠	٠	•	٠	•	٠	٠	•	٠	٠	٠	٠	٠	•	٠	•
e hot water	Hot water heater replacement		•		•													•	
			-			-										•			
										•	•								
O other	Upgraded or new BMS and controls	٠	٠	٠	•	•	•	•	•	•	٠	٠	•	•	•	٠	٠	٠	•
	Regenerative drive elevators	٠	٠	٠	•	٠	•	•	•	•	•	٠	٠	•	٠	•	•	•	•
	On-site renewables	•	٠	٠	٠	•	•	•	•	٠	•	•	٠	•	•	•	٠	•	•
	Other ECMs	•	•	٠	٠	•	•	•	•	•	•	•	•	•	•	•	•	•	•



High Rise / Low Carbon Join New York's Retrofit Revolution

Empire Building Challenge High Rise / Low Carbon Series Launch February 3, 2022

be ex

building energy exchange

The Challenge

New York State has thousands of buildings that must decarbonize during this decade to achieve the State's ambitious goal of carbon neutrality by 2050



Join NY's Retrofit Revolution



New York's buildings will play a pivotal role in solving the climate crisis



of NYC's GHG emissions come from buildings



of the State's total emissions come from the building sector

Most buildings were constructed prior to current energy codes

New York has enacted ground-breaking climate policies and regulations



These policies have ignited a low-carbon retrofit revolution

- NYS will decarbonize buildings statewide by 2050
- NYS will transition to a clean energy grid by 2040
- NYC building emissions limits go into effect in 2024
- NYC's ban on fossil-fuel burning equipment ramps up over the next 5 years



The scale of action required is unprecedented – by 2030, NYC building owners must complete low-carbon retrofits in:



buildings, representing



square feet of residential real estate, and



square feet of commercial space



Over 90% of NYC's one million buildings will need to implement energy efficiency upgrades by 2050





The retrofit market is expected to reach



by 2030

New York's supply of low-carbon building retrofit solutions falls short of demand

The Opportunity

New York's low-carbon retrofit market is poised to explode and the State is seeking innovative solution providers to help lead the way



New York provides access to capital, world-class talent, innovative incubators, and cleantech hubs



New York offers the cleantech industry unparalleled financial support

- \$6B Clean Energy Fund to accelerate industry growth
- \$1.6B NY Green Bank for cleantech and green infrastructure investment
- Low-cost PACE financing for energy efficiency upgrades
- \$3.6B in utility incentives customer demand
- Tax credits and development incentives for companies to settle and scale



New York has one of the most skilled workforces in the world



in the nation for high-tech employment



for number of scientists and engineers



for STEM graduates in the Northeast

Supported by a \$27.5 million State investment in the cleantech workforce



- **Incubators** support early-stage growth
- Industrial parks and cleantech clusters help companies network and scale
- World-class universities and research centers foster public-private partnerships

The



Thriving industry networks offer boots-on-the-ground assistance

- Manufacturing, distribution, and vendor rep networks support commercialization and customer acquisition
- Trade associations connect vendors to local partners and opportunities
- Industry-savvy nonprofits provide market and regulatory insights



rapid cleantech market adoption

New York's solar industry has grown rapidly in just 10 years:

- 2,100% market growth
- 12,000+ new solar industry jobs

...accelerated by the State's supportive business environment:

- \$1B in State incentives
- clean energy incubators
- public-private partnerships

Demand for low-carbon building retrofits is taking off in New York



NYSERDA's Empire Building Challenge is demonstrating and scaling up low-carbon retrofits for tall buildings across NYS

10 portfolio owners

in the first cohort, representing



across New York

130M sq ft of real estate, and



combined public-private investment

\$20M awarded to four EBC partners to implement industry-leading retrofits



HUDSON SQUARE PROPERTIES





 Participating EBC buildings will achieve carbon neutrality within 10-15 years

 Partners will scale solutions across their portfolios, totalling 37M sq ft

The

Opportunity



"If you can make it here, you can make it anywhere"

- New York is set to become a global hub for low-carbon retrofits
- Other cities follow New York's lead on climate policies and regulations
- Success in New York provides a gateway to the North American market

New York needs your help – join New York's retrofit revolution and contribute your solutions to this rapidly expanding market

Join Up

Join local networks and attend knowledgesharing events to stay current

- Industry events like EBC's <u>"High Rise</u>
 <u>/ Low Carbon" series</u>
- Networks & newsletters from local organizations like <u>BE-Ex</u>
- Hack-a-thons & charrettes for cross-sector collaboration
- Matchmaking events for industry partnerships

Join

Connect with supportive partners and professional communities

- Business commercialization support from incubators, cleantech hubs, and trade associations
- Technical support from industry networks, research centers, and universities
- Financial support from agencies like NYSERDA, the NYC Economic Development Corporation, and NY Empire State Development

Join

Access opportunities in New York's low-carbon retrofit market

- Visit the NYSERDA <u>Empire Building</u> <u>Challenge website</u>
- Learn about NYSERDA's \$10M
 Empire Technology Prize
- Apply to <u>NYSERDA funding</u> opportunities
- Leverage <u>State, federal, and utility</u> incentives

Join

Join us and help build New York's low-carbon future!

Connect with the Empire Building Challenge online and by email: ebc@nyserda.ny.gov

Empire Building Challenge

Join NY's Retrofit Revolution

Join





Upcoming Events

These events offer businesses a great way to stay current on developments in New York's cleantech and low-carbon retrofit indutries, and to network with partners and like-minded entrepreneuers.

High Rise / Low Carbon Series

The Building Energy Exchange and the NYSERDA Empire Building Challenge are partnering to present the "High Rise / Low Carbon Series," highlighting the commitments of Challenge Partners. The series is designed to inspire action among New York's building industry stakeholders and invite the world's top solution providers to join New York on its journey toward a low-carbon future.

Visit the webpage to learn about upcoming events in this series and to stay up-todate on news from the Empire Building Challenge.

Hack-a-thons & Charettes -coming soon

Matchmaking Events- coming soon



New York State Incentives

New York State overs a variety of tax incentives, business incentives, and tax credits to benefit small or expanding business. This list is just a sampling of current incentives on offer. Learn more here and here.

Special Tax Credits for Manufacturers

Zero percent corporate income tax rate for qualified New York manufacturers. Real Property Tax Credit for Manufacturers equal to 20% of the real property tax paid during the taxable year for real property owned and principally used in manufacturing.

ESD Excelsior Jobs Tax Credits

Firms in the Excelsior Jobs Program may qualify for four, fully refundable tax credits. Businesses claim the credits over a 10-year period. To earn any of the following credits, firms must first meet and maintain the established job and investment thresholds outlined in Program Eligibility below:

Green Enhanced Excelsior

To be eligible for enhanced green project tax credits, a company must be eligible for the Excelsior Jobs Program operating in strategic industries inclusive of agriculture, manufacturing, software development, and scientific research and development and engage in a "green project". A "green project" means a project that makes products or develops technologies that are primarily aimed at reducing greenhouse gas emissions or supporting the use of clean energy.

• The Excelsior Jobs Tax Credit

A credit of up to 6.85% of wages per net new job. For a qualified green project, up to 7.5% of wages per net new job.

The Excelsior Investment Tax Credit

Valued at 2% of qualified investments. For a qualified green project, 5% of qualified investments.


New York Cleantech Incubators & Economic Development Agencies

New York has an array of cleantech incubators and economic development agencies dedicated to advancing the growth of early-stage and established companies. These organizations provide a range of services, including commercialization, financial, and networking support.

NYC Economic Development Corporation (NYCEDC)

NYCEDC promotes sustainable economic development in NYC. They advance the growth of startups and established companies, connecting them to everything they need to hit the ground running, from industry connections to competitive leases, finance solutions, and incentives.

NYS Empire State Development (ESD)

ESD facilitates business growth and job creation across New York. They connect businesses with tax-based incentives, operational support, growth support, and innovation development support. Their <u>Cleantech & Renewable Energy Division</u> supports the State's commitment to clean energy solutions and cleantech manufacturing growth.

ESD's Division of Science, Technology, and Innovation (NYSTAR) funds 70+ facilities and tools, including 10 Innovation Hotspots, 13 Centers of Excellence for university-private technology research and development, and 15 Centers for Advanced Technology.

NYSERDA-funded incubators

NYSERDA funds six clean energy incubators across New York State's regions, including NYC, Long Island, Central NY, Western NY, the Finger Lakes, and the Southern Tier:

- ACRE at Urban Future Lab
- CEBIP at Stony Brook University
- Clean Tech Center at the Tech Garden
- ECO & Launch NY
- SCI at Binghamton University
- Venture Creations at RIT



New York Cleantech Incubators & Economic Development Agencies, *Continued*

Urban Future Lab

Urban Future Lab is a center of cleantech innovation in New York, advancing market-ready solutions to address climate change. Their programs include <u>ACRE</u>, a business incubation program for pre-seeds to Series A startups. ACRE provides access to strategic advisement, introductions to industry stakeholders, marketing and branding support, investor networks, and access to a community of like-minded founders.

URBAN-X

Urban-X is a tech accelerator for startups reimaging city life. Every six months, they invest \$150,000 each in up to ten companies and provide development support and guidance. URBAN-X has a broad network of investors, industry mentors, and 100+ global city partners.



New York Research Centers & Cleantech Clusters

New York is home to world-leading research centers and universities dedicated to advancing innovative clean energy and energy efficiency technologies, and faciliating publicprivate partnerships.

Cleantech business clusters located across the state support re-location, growth, manufacturing, operations, and networking for diverse companies in the cleantech sector.

Brookhaven National Lab

Located on Long Island, Brookhaven National Lab is a federally-funded, multidisciplinary research center. The Lab's Clean Energy & Climate division aims to lead the nation towards a net-zero carbon economy.

Brooklyn Army Terminal

Brooklyn Army Terminal (BAT) is an affordable hub for modern industrial businesses and entrepreneurs. Located on 4.1M+ sqft of Brooklyn waterfront, BAT provides 100+ businesses with the tools and space they need to grow and succeed. BAT offers secure, longer-term leases and more attractive rents than private property owners because of their commitment to creating jobs and retaining businesses in NYC.

Brooklyn Navy Yard

The Brooklyn Navy Yard is a center of manufacturing and innovation located across 300-acres of Brooklyn waterfront. The Yard provides 500+ businesses with numerous benefits, including: competitive rents; no real estate taxes; access to a diverse and vibrant business community; an on-site property management team; a business support services team; and a team to assist businesses with employment needs.

Eastman Business Park

Eastman Business Park is a 1,200-acre R&D and manufacturing campus with over 16 million square feet of multi-scale manufacturing, distribution, lab and office space. The Park is also home to the NY-BEST Center – a hub for development and production of advanced battery and energy storage technologies.



New York Research Centers and Cleantech Clusters, *Continued* NY ESD Division of Science, Technology, and Innovation (NYSTAR)

NY Empire State Development funds 70+ facilities and tools, including 10 Innovation Hotspots, 13 Centers of Excellence for university-private sector technology research and development, and 15 Centers for Advanced Technology.

Saratoga Tech + Energy Park (STEP)

Located in the heart of New York's Tech Valley, the 280-acre STEP campus is a NYSERDA-funded property ideal for clean-energy and environmental technology companies. NYSERDA staff and the site develop work with businesses to customize a build-to-suit facility according to their needs or to identify existing space in STEP's current facility.

SELECTION OF LEADING CLEANTECH RESEARCH UNIVERSITIES

New York is home to world-class universities conducting innovative research and demonstration projects to advance cleantech solutions. Many of these universities seek offer competitive opportunities for private-sector technology providers to partner on R&D, demonstration projects, and more. Below is a sampling of some of the state's premier cleantech research institutions:

- <u>Cornell University CESI</u>
- Rochester Institute of Technology (RIT)
- <u>State University of NY Binghamton S3IP</u>
- <u>SUNY Buffalo UB RENEW</u>
- SUNY Stony Brook Advanced Energy Research and Technology Center



NYSERDA-funded programs & opportunities

The New York State Energy Research and Development Authority (NYSERDA) provides funding and incentives to support a broad range of activities aimed at acclerating growth of the low-carbon retrofit market in New York State. This list is just a sampling of programs on offer. <u>Visit their website to learn more</u>.

COMPETITIVE FUNDING OPPORTUNITIES

NYSERDA has various programs related to buildings (including residential, multifamily, and commercial buildings) that outline broad energy and environmental challenges. NYSERDA publicly request proposals, from any private or institutional entity, to submit project plans addressing those issues. To see individual opportunities, visit:

- <u>Current Funding Opportunities</u>
- <u>Closed Funding Opportunities</u>

NYSERDA-FUNDED PROGRAMS

NYSERDA has numerous programs that support clean energy and low-carbon retrofit businesses. Additionally, NYSERDA has programs to provide technical and financial support to homes and businesses to reduce their energy use and emissions, helping to stimulate market demand and lower barriers to project implementation. Below is a selection of NYSERDA programs; <u>learn about additional initiatives here.</u>

Advanced Buildings Program

Develops energy-efficient, building-related technology and business models for residential and commercial buildings.

Clean Energy Workforce Development

Supports renewable energy and energy efficiency training programs for new and existing staff.

Contractor Delivery Channel

Works with contractors to offer solutions that reduce energy usage and costs for NY residents, businesses, institutions, municipalities, and nonprofits.



NYSERDA-funded programs & opportunities, *Continued*

Empire Building Challenge

A public-private partnership with portfolio owners and developers that supports replicable and scalable low-carbon retrofits in existing tall buildings.

Entrepreneurs-in-Residence

Guides early-stage companies through issues like staffing, budgeting, resource planning, strategy, and partnerships.

Innovative Market Strategies

Provides funding for emerging clean energy solutions to bring clean energy adoption to scale in New York State.

M-Corps Hardware Scale-up

Helps startups overcome obstacles to manufacturing cleantech products in NYS.

RetrofitNY

Supports scalable solutions to renovate multifamily buildings while achieving or approaching net-zero energy use.



Industry Organizations & Networks

New York has a vibrant network of industysavvy organizations that provide useful resources and services for the real estate and low-carbon retrofit markets.

Additionally, many of the nation's leading professional associations have active membership networks and chapters in New York, which help businesses build partnerships and stay up-to-date on the latest industry developments.

This list is just a short selection of the many organizations that support the industry.

NEW YORK-BASED ORGANIZATIONS

Building Energy Exchange (BE-Ex)

BE-Ex, a nonprofit dedicated to improving the built environment and accelerating the transition to low-carbon and energy efficient buildings, serves as a resource and trusted expert to the building industry. Through <u>an active calendar of virtual</u> and in-person events at their NYC learning center, they provide education and trainings on best-in-class building projects and strategies, and convene diverse industry professionals for networking events and workshops. BE-Ex's resource library covers a wide variety of topics on high-performance building solutions, case studies, and New York City and State policies. Their newsletter and <u>membership</u> opportunities help industry stakeholders stay in the loop on new developments.

NYC Accelerator

NYC Accelerator, a program of the NYC Mayor's Office of Climate & Sustainability, works with thousands of buildings across the five boroughs to build a cleaner future by lowering pollution and carbon emissions. The Accelerator supports building owners in meeting NYC's mandated greenhouse gas emissions limits by providing technical and financial assistance. The program also partners with organizations like BE-Ex to offer trainings and resources that demystify NYC policies and regulations and showcase leading decarbonization solutions and building projects. The Accelerator is currently seeking applications from energy efficiency and building decarbonization service providers to work with the program.

Solar One

Solar One is a nonprofit organization that designs and delivers innovative education, training, and technical assistance to foster sustainability and resiliency in diverse urban environments. Solar One's Clean Energy Connections series— a partnership with Urban Future Labs— and weekly newsletter provide NYC's emerging cleantech sector with the resources it needs to grow and compete in the global economy.



Industry Organizations & Networks, *Continued*

Urban Green Council

Urban Green Council's mission is to transform buildings for a sustainable future in New York City and around the world. Urban Green organizes industry events, provides training on sustainable buildings, and publishes educational resources on building strategies and the latest New York green building policies.

PROFESSIONAL ASSOCIATIONS

AEE East Energy Conference & Expo

AEE East is annual event that brings together energy professionals from commercial, industrial, institutional, and governmental sectors to learn about the latest energy-saving strategies, products, services, and technologies.

American Council for an Energy-Efficient Economy (ACEEE)

ACEEE is a nonprofit research organization that develops transformative policies to reduce energy waste and combat climate change. ACEEE organizes multiple national conferences each year, and produces newsletters and a wide array of resources on technical topics, industry updates, and policy insights.

American Institute of Architects – NY Chapter (AIANY)

AIANY is the oldest and largest chapter of the AIA, with more than 5,000 practicing architects, allied professionals, students, and public members interested in architecture and design. AIANY is dedicated to three goals: design excellence, public outreach, and professional development. AIANY organizes an array of initiatives, programs and exhibitions that explore topics vital to the architecture profession. Their <u>Center for Architecture</u> is a gathering place and educational event space in NYC for all those interested in the built environment.



Industry Organizations & Networks, *Continued*

American Society of Heating, Refrigerating & Air-Conditioning Engineers (ASHRAE)

ASHRAE is a professional association seeking to advance heating, ventilation, air conditioning and refrigeration systems design and construction. ASHRAE has more than 57,000 members in more than 132 countries worldwide. ASHRAE organizes industry conferences, puts on professional development and networking events, and provides a variety of technical resources.

American Society of Mechanical Engineers (ASME)

ASME promotes the art, science, and practice of multidisciplinary engineering and allied sciences worldwide. ASME serves a wide-ranging community through learning, the development of codes and standards, certifications, research, conferences and publications, government relations, and other forms of outreach.

Building Owners and Managers Association (BOMA)

BOMA is the leading trade association for real estate professionals of all commercial building types, representing owners, managers, service providers, and more. BOMA's mission is to advance a vibrant commercial real estate industry through advocacy, influence and knowledge. <u>Their NY chapter</u> provides programs, services and resources for professionals across the Greater NY Area.

Building Trades Association (BTA)

BTA is made up of thousands of companies involved in all phases of the building and construction industries. BTA was formed to provide services for its members, saving them valuable time and money.

National Electrical Manufactures Association (NEMA)

NEMA is an ANSI-accredited Standards Developing Organization made up of business leaders, electrical experts, engineers, scientists, and technicians. NEMA convenes a neutral forum for members to discuss industry-wide concerns and objectives under a legal umbrella by trained NEMA Staff.



Industry Organizations, Networks, & Conferences, *Continued*

New Buildings Institute (NBI)

NBI works collaboratively with industry market players—governments, utilities, energy efficiency advocates and building professionals—to promote advanced design practices, innovative technologies, public policies and programs that improve energy efficiency and decarbonize the built environment. Their <u>Getting</u> to Zero Forum is a premier annual event dedicated to zero energy and zero carbon buildings, bringing together the world's leading experts.

Northeast Sustainable Energy Association (NESEA)

NESEA advances the adoption of sustainable energy practices in the built environment by cultivating a community where practitioners share, collaborate and learn. NESEA Membership has helped thousands of high-performance building and renewable energy professionals and businesses improve their practices by learning from and networking with each other. NESEA also organizes two industry-leading conferences and trade shows each year.

high rise / low carbon series launch sponsored by NYSERDA

Moderator:

Janet Joseph, Senior Vice President for Strategy and Market Development, NYSERDA

Speakers:

Richard Yancey, Executive Director, Building Energy Exchange Michael Reed, Team Lead, Advanced Efficiency Solutions, NYSERDA Michael Izzo, Vice President of Carbon Strategy, Hines Will Sibia, Founder, urbs | Urban Systems Dana Schneider, Senior VP, Director of Energy and Sustainability, Empire State Realty Trust Joseph Weishaar, Vice President, L&M Workforce Housing Fund, L&M Fund Management Anna Weiss, Vice President, Omni New York

February 3, 2022 | 9 to 11 am | 1.5 AIA LUHSW Building Energy Exchange | be-exchange.org





HUDSON SQUARE PROPERTIES

Sustainable Redevelopment – 345 Hudson BE-Ex – High Rise, Low Carbon Series Launch

February 3, 2022









The Problem Statement TRANSFORMING THE BUILT ENVIRONMENT, STARTING WITH 345 HUDSON





17 Floors

1930's Vintage



Natural Gas Boilers



Steam Heating



Floor Level Packaged Units 80 kbtu/SF

> 54% Energy Waste

 $\frac{5k}{\text{Tons CO}_{2e}}$

3.6 MW Electrical Peak

Decarbonizing Real Estate what if a simple solution can solve a complex problem



Network Effect end to end design process with best-in-class product manufacturers, financing and risk



System Boundaries DISSECTING THE ENERGY FLOWS WITHIN THE CURRENT INFRASTRUCTURE



Circular System Approach

ELECTRIFY HEATING, MOVE TO HYDRONIC BASED SYSTEMS AND REDUCE THE AMOUNT OF WASTE ENERGY



The Results

WE HAVE THE ENERGY THAT WE NEED, THE GREATEST EFFICIENCY GAIN IS BY RECYCLING AND UPCYCLING ENERGY



Scientific Based Outcome ELECTRIFIED SOLUTIONS ARE MORE RESILIENT AND ALIGN WITH CLIMATE SCIENCE – 1.5°C PATHWAY





High Rise, Low Carbon: Empire State Realty Trust

Dana Robbins Schneider

Senior Vice President, Director of Energy, Sustainability & ESG

Feb. 3, 2022

Who We Are

10.1 million rentable square feet across 14 office properties, including the Empire State Building.

Carbon Neutrality Targets:

- Empire State Building in 2030
- Full portfolio in 2035
- ✓ First commercial portfolio in the Americas to achieve WELL Health-Safety Rating
- ✓ Fitwel Champion
- ✓ Energy Star Partner of the Year
- ✓ 100% renewable wind power
- ✓ DOE Better Buildings Challenge Partner

















Approach/Focus



- How we define net-zero annual building operational carbon emissions
- By 2030, the Empire State Building will target carbon neutrality through an operational carbon reduction of 80 percent through a combination of:
 - Energy efficiency measures
 - More renewably sourced grid
 - Owner/tenant collaboration
 - Up to 20 percent offset with off-site clean energy generation and RECs





ENERGY USE INTENSITY

(kBtu/ft²)



GREENHOUSE GAS EMISSIONS INTENSITY

(kgCO2e/ft2)



Achieve net-zero greenhouse gas emissions for the entire portfolio

Approach/Focus



15-Year NPV of Package versus Cumulative Energy Savings



Cumulative Energy Saved Over 15 Years (Mbtu)



Base Building Measures Tenant Space Measures

ESB Current Status for LL97 and 80x30 Metrics





Key Takeaways:

- Building meets 2024 limit of 24,878 tCO2e/year
 - 17% reduction is required to meet LL97 2030 targets
 - 74.1% reduction is required to meet LL97 2035
 - Building + grid improvements

54.0% CO2e reduction from 2007 to 2019

- 8 61% building efficiency measures
 - ESB1.0 SOW
 - Broadcast reduction
- 39% 2007 to 2019 grid improvements

Critical Market Barriers

Workforce: Designers, Engineers, Contractors

Technology: Proven innovation, Market Forces, Scalability

Economics: Tools to make business case to CEO/CFO, Predictable Incentives, Predictable Risk

Transparency on LL97 GHG emissions factors and actual grid performance over time



2022 Projects (Selection)



Empire State Realty Trust has vetted and proven the business for numerous energy efficiency projects in 2022, which include:

- Controls Sequence Optimization
- Central Plant Sequence of Operations Updates
- Steam Improvements
- Perimeter Heating Control by BMS
- AHU Fan Alerton Control Conversion
- TX Optimization
- ERV pilots
- Plug load controls pilots

- Airside Sequence of Operations
- Airside Retro-commissioning
- Integration of Lighting with BMS
- Heating to AHUs
- Steam Phase-Out Tenant Perimeter Systems
- Kitchen Hood Exhaust Fan Control
- Lobby Air Distribution Optimization
- Heat pump pilots

The Heritage

NYSERDA | Empire Building Challenge

LªM The Heritage

Project History

- The Heritage (previously known as Schomburg Plaza) is 3-building, 600-unit multifamily complex located at the the northeast corner of Central Park consisting of two twin, 35-story octagonal towers, and one rectangular mid-rise slab on Madison Avenue.
- The project was sponsored by a coalition of neighborhood groups and the New York State Urban Development Corporation under the Mitchell-Lama affordable housing program.
- When the complex first opened in 1975, priority was given to people from the area, particularly those displaced from earlier slum clearance projects.
- The site also provided commercial space for a street-level grocery store, a bilingual Head Start program and the Northside Center for Child Development, a leading treatment program for children with mental and behavioral health issues.
- The property was taken out of the Mitchell-Lama program in 2005 and at the time none of the units were rent stabilized or under any regulatory agreement.
- In 2019, L+M Fund Management worked with the City of New York to put in place a 40-year regulatory agreement to preserve affordability for 402 units and provide protections for in-place tenants. Over 40% of households at Heritage rely on Section 8 rental subsidy.



Lª M The Heritage

Empire Building Challenge

Existing Conditions:

- Significantly deteriorated / nonexistent insulation
- Electric resistance baseboard heat
- Through-wall A/C sleeves
- Gas-fired domestic hot water plant
- No low-hanging fruit, following had all been completed:
- LED lighting
- Air-sealing
- Energy Star rated appliances
- Low-flow aerators and toilets

Initial Plan:

- Add Exterior Insulated Façade System (EIFS), which has three primary benefits
 - Reduce electric heating expenses
 - Reduce long-term façade maintenance costs (FISP)
 - Upgrade appearance of buildings resulting in higher rents on market-rate units
- Replace ribbon windows on 1660 Madison building with standard height windows to bring light and air to bedrooms and add sleeve for A/C





L≞M The Heritage

Empire Building Challenge

Empire Building Challenge Process

- Provided a framework to think creatively about how to reduce energy usage and achieve carbon neutrality
- Encouraged piloting new technologies to address decarbonization goals
- Allowed for collaboration with industry thought leaders and other leading real estate companies
- Shared technical resources and knowledge with our team
- Delivered funding to help overcome high upfront cost barriers

Project Scope

Façade Upgrades	 Towers will be insulated with Exterior Insulated Finishing System (EIFS) and mid-rise building will utilize combination of prefabricated wall panels and EIFS, significantly increasing R-value of façade
Window Upgrades	Midrise will receive new high-performance windows on both commercial and residential floors
Package Terminal Heat Pumps (PTHPs) and VRF	 PTHPs will provide cold-climate heating and cooling while significantly reducing electric consumption Increased insulation values will allow for PTHPs to operate without electric resistance heating element Energy-efficient VRF systems specified for lobbies and ground floor amenity spaces
Domestic Hot Water Electrification	 Compressor technology with CO₂ refrigerant will produce hot water 4x more efficiently than electric resistance heat while eliminating the building's largest green house gas use on mid-rise building
Ventilation Upgrades	• Will enhance indoor air quality to improve resident comfort and health while recovering waste heat
Grid-Responsive Centralized Controls	 Will allow for real-time monitoring and help to reduce risk of blackout or grid failure during peak demand Potential for residents to opt-in to demand response programs
Electrify Common Area Laundry	Will eliminate use of natural gas for common area laundry

Scope provides replicable framework for full building electrification while significantly reducing consumption.

Empire Building Challenge Case Study



Prope	rtv Ov	verview
TOPC		

Address	1295 & 1309 5th Ave. /
	1660 Madison Ave., New York, NY 10029
Neighborhood	East Harlem, Manhattan
Built	1975
Units	600 (402 affordable)
GSF / NSF	680,000 SF / 494,690 SF
Use	Multifamily and Mixed-Use

Value Creation		Project Costs		Environmental Impact	
Annual Energy Savings	\$225k Capped	Total Project Cost	\$18.7M	Annual Carbon Reduction	662 MT
	@5%	NYSERDA Grant	\$5.0M	811 acres of U.S. forests in one year)	
Capitalized Value	\$4.5M	Net Project Cost	73%	Heritage Baseline EUI (Energy Use Intensity; kBTU / SF)	77
NPV of CapEx Savings	\$3.5M			Heritage Target EUI	62
Value Creation	\$7.5M	Net Project Cost	\$13.7M	Energy Use Reduction	19%

Anticipate incremental revenue from commercial rents and market-rate units will bridge \$6.2 million gap.

L^{**•**}**M** The Heritage





Whitney Young Manor

- Yonkers, NY
- Two 12-story buildings
- 195 apartments
- 100% affordable
- Grocery store & daycare
- Built in 1974
- Rehabbed in 2007
- 2022 resyndication
- Carbon neutral by 2035





Existing conditions

- **1** | Electric resistance baseboard heat
- 2 | Window AC units & thru-wall AC sleeves
- **3** | Gas-fired domestic hot water system
- 4 | Brick façade with CMU behind, no insulation
- 5 | Balconies
- 6 | Aluminum double-hung windows
- 7 | Roof with assumed R-value of R-23
- 8 | Master metered utilities





Challenges to overcome



Install & maintain technology not fully proven out in NY market

BRIGHT P ER

> LORING CONSULTING ENGINEERS

> > Curtis + Ginsberg Architects


Our approach

1 | Upgrade Envelope

- EIFS with 4" of EPS
- Seal AC sleeves
- Double pane uPVC windows
- Replace doors
- New roof (R-value of 31.5)

2 | Centralized Modular ASHP H/C System

- Central thermal loop
- Fan coil units in apartments
- Backup gas boilers
- Water-to-water heat pumps for DHW

3 | Improve Ventilation Systems

- Overhaul exhaust ventilation systems
- Dedicated outdoor air system with ASHP & ERVs

4 | Energy Efficient Measures

- LEDs & common areas controls
- Low flow fixtures
- 87 kW PV system
- Variable frequency drives on CW booster pumps
- Building management system with RTEM





Solutions and opportunities

Prioritize load reduction: EIFS, heat recovery, efficient fixtures

- 2
- Use modular, more efficient ASHP & DHW equipment
- 3
- Cost-effective alternative materials: EIFS, uPVC windows, PEX piping
- 4
- Centralize heat pump system: avoid major electrical infrastructure upgrades
- 5
- Resiliency & redundancy: modular ASHPs & backup gas boiler plants



Rigorous oversight & maintenance of central system: BMS with RTEM

Achieve carbon neutrality by 2035

Save more than 20,000 tons of CO2eq over 20 years

Reduce site energy use index (EUI) from 96 kBTU/SF to 50

discuss. send questions via Zoom Q+A

Moderator

Janet Joseph, Senior VP for Strategy and Market Development, NYSERDA

Speakers Will Sibia, Founder, urbs / Urban Systems Dana Schneider, Senior VP, Director, Empire State Realty Trust Joseph Weishaar, VP, L&M Workforce Housing Fund, L&M Fund Management Anna Weiss, VP, Omni New York

additional resources

Empire Building Challenge - Technology Solution Provider Survey https://nyserda.az1.qualtrics.com/jfe/form/SV_4Pc0s/GfGeEy2OO

Building Decarbonization Insights, including the Empire Building Challenge Knowledge Base https://www.nyserda.ny.gov/All-Programs/Empire-Building-Challenge/Building-Decarbonization-Insights

Empire Building Challenge mailing list https://www.nyserda.ny.gov/All-Programs/Empire-Building-Challenge/Connect-with-Us

If you are doing exciting work within this field, we'd like to know about it! Reach out here: info@be-exchange.org



building energy exchange

thank you.

NEW YORK STATE OF OPPORTUNITY

building energy exchange