



NYSERDA

2019 New York Getting to Zero Status Report

Status Report on Net Zero Energy
and High Performance Buildings

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Welcome



Welcome to the first-ever *New York Getting to Zero Status Report*. New York State is implementing nation-leading energy and climate policies that advance innovative solutions and reduce greenhouse gas (GHG) emissions, mitigate the impacts of climate change, and grow the State’s economy. Under Governor Andrew M. Cuomo’s leadership, New York continues to address climate change head on through his proposed Green New Deal. The Green New Deal puts New York on a clear path to carbon neutrality across all sectors.

A cornerstone of Governor Cuomo’s Green New Deal is an increase in the State’s Clean Energy Standard mandate from 50% to 70% renewable electricity by 2030 in addition to calling for 100% clean power by 2040. Additionally, the State’s ambitious clean energy agenda includes a 40% reduction of GHG emissions by 2030 (40 by 30) and 80% GHG reduction by 2050 (80 by 50) from 1990 levels.

To accomplish these significant goals and drive deeper energy efficiency savings throughout New York, we must address the State’s building stock. **In New York, the energy use of buildings is responsible for 56% of Statewide GHG emissions from fuel combustion.**¹ Dramatically reducing energy use in new and existing buildings while still providing comfortable, healthy, and safe indoor environments is essential for New York to meet its ambitious climate goals and combat climate change. In recognition of these facts, Governor Cuomo directed NYSERDA to prepare a roadmap to achieve a Statewide carbon neutral building stock.

In 2018, New York substantially increased its commitment to energy efficiency, setting a new target to achieve a cumulative 185 trillion BTUs (tBTU) of site energy savings by 2025 (from the 2015 Business As Usual forecast)—enough energy to power 1.8 million New York homes. To achieve that efficiency target, NYSERDA is undertaking a number of strategies, initiatives, and actions as outlined in the [New Efficiency: New York](#) report released in April 2018. NYSERDA recognizes net zero carbon buildings are a critical component in the State’s efforts to achieve its greenhouse reduction goals; however, this change requires significant buy-in from stakeholders and the industry.

Against the backdrop of its energy efficiency commitment and recognizing the prominence of Net Zero Energy (NZE) and Net Zero Carbon (NZC) buildings to New York’s climate goals, NYSERDA commissioned this summary of net zero buildings in New York. NZE buildings are highly efficient buildings in which energy use is equal to or less than the energy supplied to the building by renewable sources on an annual basis. While this report focuses on commercial and multifamily projects, similar movement in the single-family residential sector to get to net zero energy is underway. As this report indicates, New York leads the Northeast region in number of documented NZE projects by state. With this first Statewide study, NYSERDA takes an important and necessary step to establishing a baseline and highlighting progress towards scaling NZE buildings to become an integral solution to New York’s clean energy and climate action goals.

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

1 New York Governor’s Office, April 20, 2018. <https://www.governor.ny.gov/news/governor-cuomo-announces-new-energy-efficiency-target-cut-greenhouse-gas-emissions-and-combat>

Acknowledgements

This report was funded by the [New York State Energy Research and Development Authority](#) (NYSERDA). NYSERDA promotes energy efficiency and the use of renewable energy sources as key methods to developing more reliable and affordable clean energy system for all New Yorkers. Collectively, NYSERDA's efforts aim to reduce GHG emissions, accelerate economic growth, and reduce customer energy bills. The report was prepared by [New Buildings Institute](#) (NBI). NBI is a national nonprofit driving better energy performance in commercial buildings through the strategic areas of codes and policies, building innovation, and zero energy and carbon leadership.

NBI would like to acknowledge Greg Hale, Patrick O'Shei, Matt Brown, Priscilla Richards, Zach Zill, and Kaitlin Moody of NYSERDA for their support and contributions during the development of this report. The NBI report authors and contributors include Alexi Miller, Jim Edelson, Cathy Higgins, Kevin Carbonnier, Reilly Loveland, and Mark Lyles.

Tracking and representing the policies, practices, and projects that are moving the built environment to zero energy and zero carbon is highly dynamic and evolving. Best efforts have been made in this report to capture the current status of these topics in New York. NYSERDA and NBI welcome readers to identify omissions and recommend corrections. Please submit requests for consideration to newconstructionprogram@nyserda.ny.gov.

The *Getting to Zero Status Report* builds from work by New Buildings Institute on a series of published *Getting to Zero Status Updates* and *Regional Watchlists* on the progress of net zero energy building activity in the United States and Canada since 2012 and net zero building watch lists for the Northwest and California.

2. Omega Center for Sustainable Living, Rhinebeck, NY. Credit: Assassi.



Introduction

This *Getting to Zero Status Report* (the *Status Report*) offers building owners, tenants, design teams, contractors, and policymakers a summary of NZE commercial and multifamily buildings data in New York and how trends across the State compare with the national landscape. This *Status Report* provides an overview of the policies and programs in New York that are driving and supporting the progress of net zero buildings. New York's leadership in the design, construction, operation, and real estate sectors are highlighted through documentation of actual net zero energy, high performance, and Passive House² building projects. Similar to NZE buildings, high performance and Passive House buildings are designed for very low-energy use, but they do not require on-site renewables.

In New York, there are currently 132 best-in-class commercial and multifamily buildings, 27 of which are NZE. This *Status Report* will provide data on the type, size, location, and ownership of these buildings and explore the successful reduction of GHG emissions. A complete and detailed list of these buildings (the List) is included at the end of this report. These Projects demonstrate economic, environmental, and emerging technology trends that are steering the future for commercial real estate in New York. Net zero energy and very high performance building activity is accelerating across the nation and around the world. This rapid pace of market adoption is increasing the need for a large, highly trained workforce skilled in high performance design, construction, renovation, and facility management.

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3. Bloomberg Center South Facade.
Credit: Matthew Carbone for Morphosis.



² The [Passive House Institute](#) and the [Passive House Institute US](#) provide a stringent building design and construction standard that requires very tight and well-insulated building envelopes and carefully sized and balanced HVAC systems. [New York Passive House](#) works to promote the Passive House standard in New York State buildings.

Policy Context

New York’s overall GHG emission reduction and Clean Energy Standard (CES) goals are deeply linked to solutions in the buildings sector. In April 2018, NYSERDA and the New York State Department of Public Service (DPS) published the [New Efficiency: New York](#) report, answering Governor Cuomo’s call to set the State on a path to accelerate energy efficiency and reduce GHG emissions, decrease consumer energy costs, and create job opportunities to achieve these goals. The report cites net zero energy performance in new and existing buildings as a key strategy.

Realizing on Governor Cuomo’s vision demands meaningful improvement of the energy efficiency programs delivered by utilities and NYSERDA, leading by example in State buildings and investments, and advancing building energy codes and efficiency standards for products and appliances.

If New York is to achieve the 40 by 30 and 80 by 50 climate goals, it will be essential to retrofit the State’s existing building stock to dramatically reduce energy consumption, so that most buildings are able to reach Passive House or net zero energy performance levels. This presents an imperative to develop deep (i.e., 30-50% energy savings) and replicable retrofit strategies in the near term that can be applied to various common building types. This will only reach true scale when market players view deep energy efficiency projects as sound financial investments.

4. [New Efficiency: New York](#). Credit: NYSERDA, 2018.



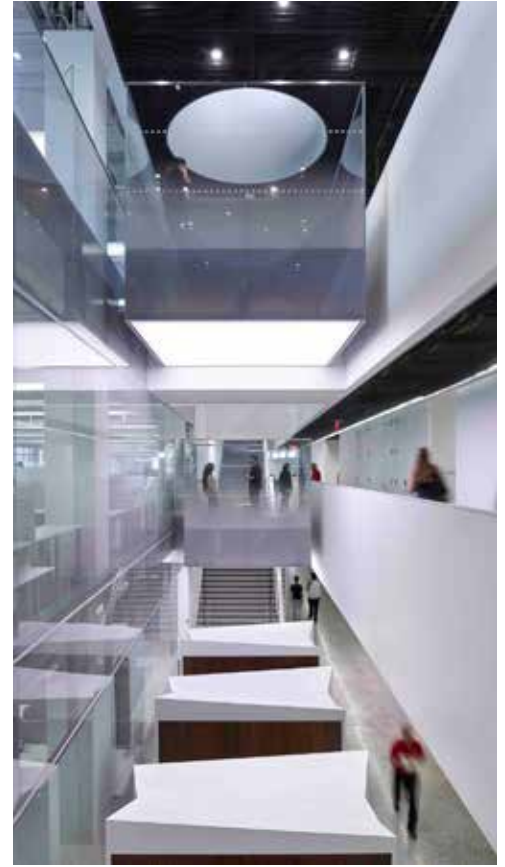
It is important to highlight that New York is already leading by example and launching even more ambitious planning efforts with a portfolio of programs to increase the numbers of NZE buildings throughout the State. These programs, further described on page 34, are catalyzing deep retrofits to transform the existing buildings sector, providing incentives and technical assistance in new construction, offering support to bring portfolios and districts to net zero, and accelerating the adoption of key technologies.

Moving to a Carbon Metric

Measuring building system performance in terms of carbon emissions, not just energy use, will be critical to meeting New York’s goals. The metric behind New York’s 40 by 30 and 80 by 50 goals is measured by GHG emissions not kilowatt hours. Over time, as New York’s Clean Energy Standard steadily drives increased in-State renewable generation, the correlation between electricity use and GHG emissions will decrease. The growing discrepancy between how energy efficient a building is and how much carbon it emits through operations requires new metrics.

This *Status Report* will focus on energy as the primary metric to measure progress in buildings toward net zero, thereby documenting building performance in the language and metrics most widely used in today’s market. But as energy policies increasingly emphasize the role of the built environment in reducing GHG emissions, and as the building sector concentrates on driving new and existing buildings toward net zero carbon, NYSERDA will incorporate carbon metrics into future versions of lists and reports as well as other net zero efforts.

5. Bloomberg Center Interior. Credit: Matthew Carbone for Morphosis.



6. Bloomberg Center Lobby. Credit: Matthew Carbone for Morphosis.



A BIG Market Opportunity

Making NZE Real in New York Real Estate

Several of New York’s existing clean energy policies are driving the building stock in New York on to the path to NZE. But this work is only recently underway, reaching a very small fraction of all commercial buildings in the State, so there is still a vast market opportunity for net zero buildings in New York. Advancing energy codes will move new construction closer to NZE, but reaching the existing commercial building stock already operating in New York is critical to meeting the State’s GHG goals. These buildings typically use far more energy than newer buildings and have a wide variation of potential upgrade and renovation opportunities. Existing buildings can get to, or near, NZE during major renovations or over time.

In fact, approximately 25% of national and New York NZE projects are existing building renovations.

RetrofitNY, a NYSERDA program described below and on page 34, is putting existing buildings in the NZE spotlight by driving dramatic improvements in energy performance. RetrofitNY is modeling how public/private partnerships can merge energy, occupant, and market benefits starting with a set of private developers of multifamily affordable housing projects—a dominant market type in New York. RetrofitNY will build from this model and expand across sectors to demonstrate how major renovations can include deep energy reduction in existing buildings Statewide.

RetrofitNY Projects

It will take a revolutionary approach to bring the existing building stock in New York to the high levels of performance needed to reach the State’s bold GHG emissions goals.

NYSERDA’s RetrofitNY program will accelerate the process, pace, and scale of deep energy renovations across residential and commercial sectors. Beginning with the affordable multifamily sector, RetrofitNY will drive the costs of deep retrofits down while catalyzing the private sector’s involvement, buy-in, and capacity to deliver NZE and near-zero buildings. Conceptual designs have recently been completed for the first-round pilot projects, at right.

This is only the beginning. NYSERDA will intensely focus on the manufacturing supply chain for NZE retrofit components to achieve cost compression and enhance the scalability and achievability of these transformational retrofits. Valuable lessons have already been learned that can be applied across the country. A critical aspect of RetrofitNY and the Statewide GHG emissions goals relies on getting building owners, investors, managers, and operators across New York to think bigger.

- **The International Center for Appropriate and Sustainable Technology (ICAST)** working with Beacon Communities on a two-story, six-unit building (part of a six-building campus) in Troy (Capital Region).
- **The Levy Partnership** working with Joint Ownership Entity (JOE) NYC on a six-story, 21-unit building in Harlem.
- **Bright Power** working with Volmar on a five-story, 42-unit building in the Bronx.
- **SWBR Architects** working with Conifer Real Estate on a two-story, 24-unit building in Portville (Western New York).
- **King + King Architects** working with Rock PMC on a two-story, eight-unit building (part of a five-building campus) in Phoenix, outside Syracuse.
- **Chris Benedict, RA** working with RiseBoro Community Partnership on a four-story, 46-unit building in Brooklyn.

Figure 1. Urban Green's Blueprint for Efficiency, which outlines the impacts and defines a path forward for existing buildings in NYC to achieve 80 by 50. Credit: Urban Green, 2018.

New York City stakeholders formed the *80x50 Buildings Partnership* to take carbon emissions head-on through their “Blueprint for Efficiency”

Major Impacts

20%
BUILDING ENERGY REDUCTION BY 2030

Reducing current costs with future uncertainties, these proposals will set large buildings on a realistic path to 80 by 50.

36%
PROGRESS TO 80x50

NYC buildings will be a third of the way to their 2050 CO₂ goal.

50K
BUILDINGS AFFECTED

All buildings over 25,000 square feet will be included.

The [80x50 Buildings Partnership](#) is a collaboration between leading New York City stakeholders to develop smart climate change policies. The result of eight months of discussion and 85 meetings, the “Blueprint for Efficiency” provides a practical policy framework to reduce emissions in large buildings by 2030, as well as the infrastructure to deliver improvements at scale through 2050.

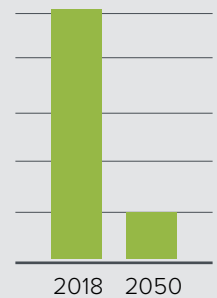
Twenty-one detailed proposals shape this world-leading energy performance policy, including:

- Require each building sector to save 20% in source energy use from 2020 to 2030
- Create a metric based on Energy Star calibrated to NYC-specific building data
- Regulate all energy sources together, with smaller reductions required of more efficient buildings
- Include flexible compliance pathways, such as green power purchase and efficiency credit trading
- Dramatically expand support and financing to help owners comply with particular focus on sectors that need more help
- Encourage electrification
- Focus first on less efficient buildings
- Require less of rent-stabilized housing to limit owner pass-through of costs in rent hikes

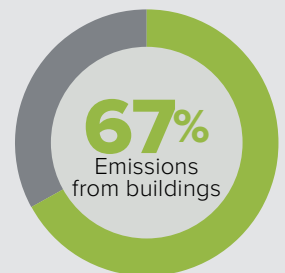
What does 80x50 mean for NYC?

Together with other leading world cities, NYC has pledged to cut its greenhouse gas emissions

80%
by 2050



Two-thirds of citywide carbon emissions come from buildings, so they are central to achieving this goal.



42
42 organizations joined together to form the *80x50 Buildings Partnership*.

70
70 experts from real estate, labor, energy efficiency, government, and nonprofit contributed time and ideas to the recommendations.

In July 2018, some of the largest commercial real estate companies in New York signed an ‘acceptance of the core ideas’ to a 20% energy reduction in their existing portfolios by 2030, delivering an important fundamental advancement that was facilitated by the Urban Green Council in New York City. Big things happen when building owners go further and show real performance outcomes, such as those on the Buildings List, and when business leaders say, “I will” rather than “I might.” Shifting New York’s built environment to NZE to meet the 80 by 50 goals will take practitioners, owners, and real estate developers with big vision and commitment to work with the State and New York City to make that target real.

There has been wide skepticism regarding the value and risk of investing in the design and technology features that result in NZE buildings. Fortunately, the trends and data driving the early leaders on the list to achieve NZE—and profit at the same time—are compelling. Real estate investors should consider these business factors.

The Occupant Currency

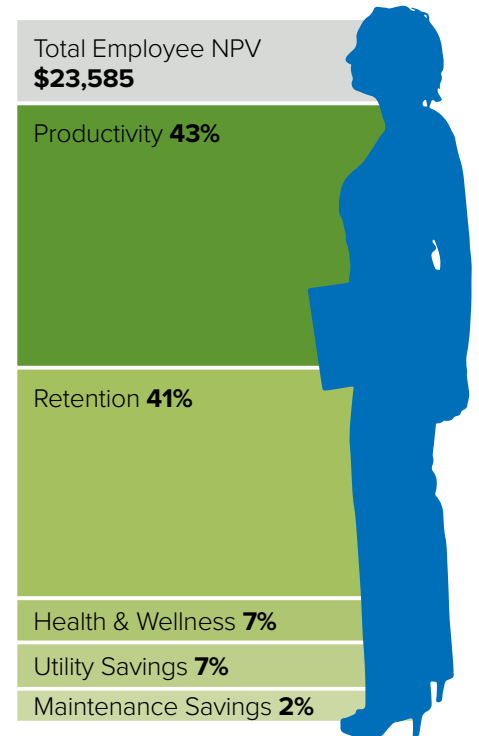
The return on investment for employment in NZE and green buildings can be astounding as shown in Figure 2. Talent acquisition and human resource departments are paying attention, as are millennials. By 2025, millennials will represent 75% of the workforce.³ They are more likely to research the issues a company supports and want healthy indoor workspaces that reflect their expectations for corporate sustainability.⁴ More than 400 reviewed studies in the last 33 years strongly connect our physical work environment to our health, productivity, absenteeism, retention, and job satisfaction.⁵ NZE buildings deliver the factors that benefit the employee-side of the business bottom line—greater access to daylight, good ventilation, control of glare, personal environmental controls, and good thermal comfort—along with the aesthetics and incorporation of natural materials common in well-designed NZE and green buildings.

Profit and Risk

Climate change is “the biggest capitalist opportunity we’ve ever seen,” said John Marshall, Chief Strategy Officer at New York’s Lippincott Creative Consultancy. Buildings are at the center of climate change solutions. There’s potential for real profitmaking in being a leader in how buildings can serve as climate change solutions—and real losses from being left behind.

Developers and owners who take a leadership role creating the future of NZE buildings may have a decided market advantage. As New York energy policies and codes are advancing critical climate and energy goals, some developers are actively trying to get ahead of the trend. NZE buildings are unique, currently giving them market distinction and recognition as well as a position well ahead of pending mandates and legislation. In addition, many of the passive building techniques and net zero design criteria could ensure

Figure 2. Net present value of employees over 10 years due to factors in NZE buildings. Based on an employee with an average fully-burdened salary of \$100,000 working 265 days per year in a company with a 10% profit margin. Credit: stok, 2018.



Developers and owners who take a leadership role creating the future of NZE buildings may have a decided market advantage.

3 Huffington Post, February 2018, [Rising Trend: Social Responsibility is High on Millennials List](#)

4 Forbes, September 2017, [Want to Engage Millennials? Try Social Responsibility](#)

5 Stok, October 2018, [The Financial Case for High Performance Buildings](#)

buildings meet occupant needs for hours, or even days, during a power outage. Buildings built to NZE can often sustain short daytime operations during power outages due to access to daylight, strong thermal envelope design, and solar energy or energy storage for key internal loads.

Publicity of net zero buildings and carbon-free economies is growing. In July 2018, 17 of New York's top marketing, advertising, and communications agencies partnered in anticipation of the impending market changes to form *Potential Energy*, a campaign to harness consumer insights and creativity that would motivate urgent and collective action to address climate change.⁶

Corporate and Community Positioning

U.S. executives know corporate citizenship can help increase company profits. The use of Corporate Sustainability Reports (CSRs) and sustainability strategies are “taking the business world by storm” and the number of companies directing their corporate sustainability from the C-Suite increased by nearly 75% in the last five years.⁷ Business studies and organizations suggest that business planning should include areas where sustainability issues have converged with business issues.⁸ Putting buildings on the path to NZE and reducing carbon are cover stories for CSR, and investors are watching.

At the community scale, entire districts are reducing carbon impacts through integrated planning of buildings, land use, and transportation. Large corporate building owners can play key roles through low-energy and low-carbon buildings that lead by example and gain positive business branding and improved financial return on their building asset.

6 GreenBiz August 2018, [Madison Avenue Takes on Climate Change](#)

7 Forbes, January 2018, [Eight Corporate Trends to Look for in 2018](#)

8 BSR, August 2018, [The Future of Sustainable Business](#)

Leading with Districts

The Western New York Manufacturing Zero Energy District is one of six national partners supported by the U.S. Department of Energy Better Buildings Zero Energy Districts Accelerator and the National League of Cities.

The goal is to optimize energy efficiency, district thermal energy, and renewable energy generation among multiple buildings so on-site renewable energy can offset the energy use at a district scale. NYSERDA is working with districts, communities, and large-scale redevelopments, including the Western New York Manufacturing Zero Energy District, through its Net Zero Energy for Economic Development program. This large-scale NZE district development is the first of 10 projects in the program and was funded in December 2018.

The Erie County Industrial Development Agency intends to work with 148 acres of the 994-acre Bethlehem Steel Redevelopment Area, the largest brownfield in Buffalo, New York. The first planned building in the NZE district is designed to be a large, NZE, light industrial building to serve as a “lighthouse project” to attract more NZE development. The project, funded by NYSERDA with \$1.75 million, will advance sustainable building design and construction and will ultimately tell the story of resiliency, urban and industrial regeneration, and innovation. The building will feature more than 80,000 square feet of mixed-use manufacturing and commercial office space and will be powered by solar, geothermal, and wind energy to produce as much energy as it consumes on an annual basis. As the first certified NZE manufacturing facility of its size in New York, the project will result in a state-of-the-art, dynamic facility to showcase new advances in renewable energy construction. The facility will also serve as a valuable hub for construction education and performance testing, energy management, and workforce training for the remaining district build-out and the greater region.⁹

9 Erie County Press Release, July 2017

Figure 3. Comparison of Total \$/Sf of Standard, Green, LEED Platinum, and NZE Buildings. Integral Group’s analysis showed that deep efficiency doesn’t have to come at a cost premium. Green, LEED Platinum, and NZE projects were delivered at costs comparable to the control group. Credit: Integral Group, 2018.



Not Breaking the Bank

When it comes to added cost, getting to zero in new construction projects dropped from roughly 20% of the project budget in 2009 to reportedly 0% to 4% of the budget on recent projects.¹⁰ Every building is distinct. The cost per square foot of green buildings is comparable to buildings of similar type as seen in Figure 3.

There are dozens of very detailed case studies of buildings across the U.S. that have been built to NZE, including many that delivered NZE at no additional cost beyond the client’s standard budget.¹¹ Common threads that run through these and other NZE cost success stories include:

- Working with a design firm experienced with NZE best practices
- Setting clear and measurable energy targets at the bid and contract stage
- Using life-cycle cost analysis and/or total cost-of-ownership to assess financial value
- Utilizing an integrated design process
- Soliciting early feedback from building occupants and team members to inform design
- Use of all available rebates, incentives, tax credits, and green financing options
- Conducting iterative energy models to guide design decisions
- Involving maintenance staff, commissioning agents, and controls integrators throughout the design and construction process and during the first year of occupancy
- Minimizing value-engineering decisions late in the game that may disrupt energy performance

7. 425 Grand Concourse Passive House Development (Rendering) Credit: Dattner Architects.



¹⁰ Stok, October 2018, [The Financial Case for High Performance Buildings](#)

¹¹ Pacific Gas & Electric (PG&E) [ZNE Case Studies Volumes 1-3](#)

Design firms competing for public-client projects should add NZE into their offerings—many firms offer this as a value-add in their bids within the program budget and to help the public client meet climate action plan goals. Likewise, private developers are seeing that there is money to be made from going NZE.

Net Positive Income

Net positive income was the NZE outcome for David Bruns, the developer of 156 residential apartment units that make up the netZero Village in Schenectady, NY. Mr. Bruns compared his costs (in today’s dollars) to his previous standard development of a 54-unit apartment complex in 2012. Although first costs for the NZE units were an additional \$20 per square foot—which would make most developers discard the option—Mr. Bruns used the building’s NZE attributes to attract tenants and ensure a higher income stream. He included a fixed monthly adder to the rent that covered all utilities as well as free electric vehicle charging. After procuring the solar PVs through a power purchase agreement, and accounting for additional construction and solar hot water costs (financed at 4.5% over 30 years), this project is bringing in about \$10,000 per year more as a result of making the decision to develop an NZE building. Mr. Bruns’ next project, Solara, is scheduled to be completed in spring of 2019, and will also perform at net zero levels.

New Models

Both new construction and major renovation projects have found their financial development criteria exceeded when they went NZE by gaining above-market rates for space, full pre-construction leasing, and establishing new models for energy use in their leases that recover investments.¹² In one case, the developer created a new model for profiting from solar in the lease while still guaranteeing the tenant that the utility energy price per square foot would be at or below the local average.¹³ Power purchase agreements, green financing funds, and other financial tools are being leveraged by developers that are stepping early into this emergent market of buildings that both use and produce energy.

¹² IBID - PG&E case studies

¹³ [Boulder Commons](#), 2017

8. Beach Green Dunes Landscaped Roof
Credit: The Bluestone Organization.



9. netZero Village. Credit: EMA for NYSERDA.

“It’s less about cost and more about cash flow. My netZero Village cost more at construction but is delivering net positive income.”

– David Bruns, Developer



The Numbers

Buildings on the Path to Zero

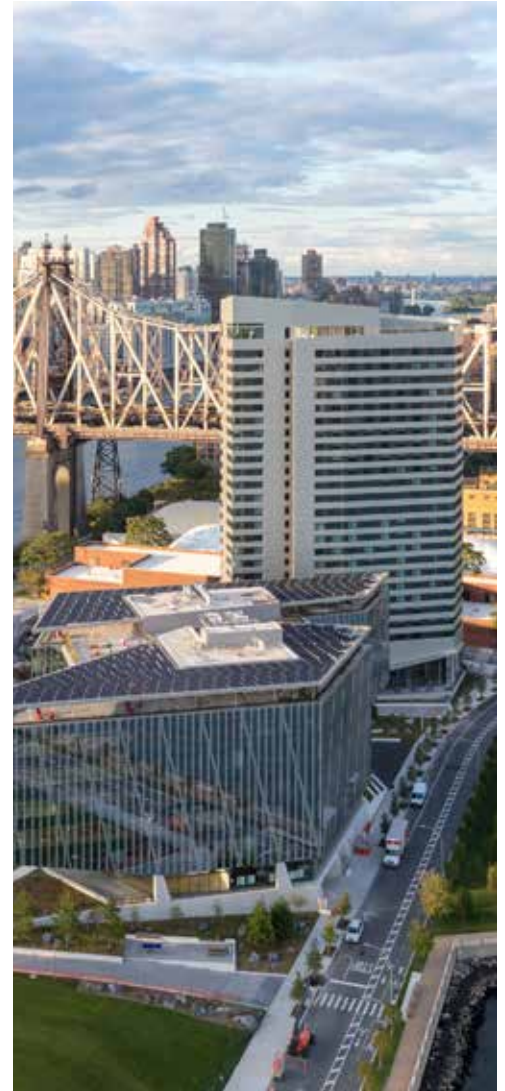
New York is the Northeast regional leader in NZE buildings, with 27 documented NZE projects. This leading cohort of NZE buildings in New York is indicative of a larger trend toward low-energy and low-carbon buildings. Just 10 years ago, NZE buildings were rare to find, but significant decreases in the cost of solar photovoltaics (PVs) and expansion of energy and climate policies are making NZE buildings more commonplace. NZE stands on the shoulders of early and strong leadership by those interested in exceptional energy-efficient structures through NYSERDA energy efficiency programs and Passive House presence in New York. These trailblazing projects are charting the course to a lower-carbon, higher-performance future.

Of the 27 NZE buildings and campuses presented in this report, four have been confirmed by NBI as having achieved NZE performance over the course of 12 months and are listed as **NZE Verified** projects. The remaining 23 projects have publicized their NZE goal and are on the path to zero; these are referred to as **NZE Emerging** projects.

The remaining 84 projects on the list participated in NYSERDA programs with predicted energy consumption at least 30% below the energy code,¹⁴ as well as 21 certified Passive House multifamily and commercial buildings across the State. The Passive House Standard¹⁵ includes a total energy use limit in addition to annual heating energy budgets. The performance of these buildings makes them ideal candidates for NZE as their energy-use levels are similar to the outcomes in NZE buildings—and New York has one of the largest populations of certified Passive House professionals in the country.¹⁶

Figure 8 (page 17) shows the energy performance of NZE buildings compared to New York code and existing buildings. The total number of commercial and multifamily projects identified in the list at the end of this report are shown in Figure 4.

10. Cornell Tech Tower 2, New York, NY. Credit: Handel Architects LLP.



14 Based on the energy code in effect when the building permit was issued
15 This list includes buildings certified by both the [Passive House Institute US](#) (PHIUS) and the [Passive House Institute](#) (PHI). Both standards are used in New York State.
16 Yancey, R. et. al. August 2018, [Jump Starting Passive House in New York City and Beyond](#)

Figure 4. Count of New York buildings by type in the New York Getting to Zero *Status Report* List.

Net Zero Energy		Passive House		High Performance		Total Buildings on the List
27	+	21	+	84	=	132

New York’s NZE, high performance, and Passive House projects stretch from Western New York throughout Central New York, the Southern Tier, Hudson Valley, New York City, and Long Island, as shown in Figure 5.

Figure 5. NZE, high performance, and Passive House projects across the State of New York.

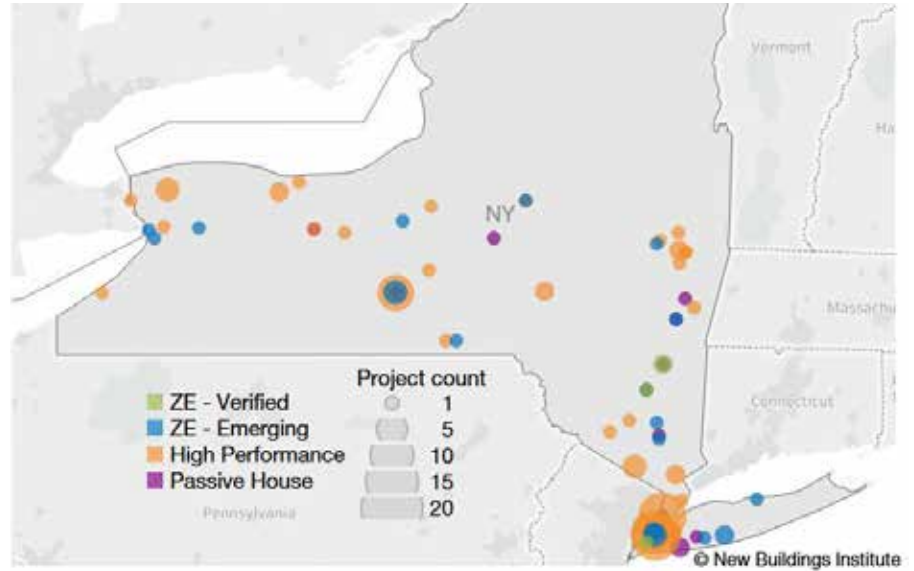
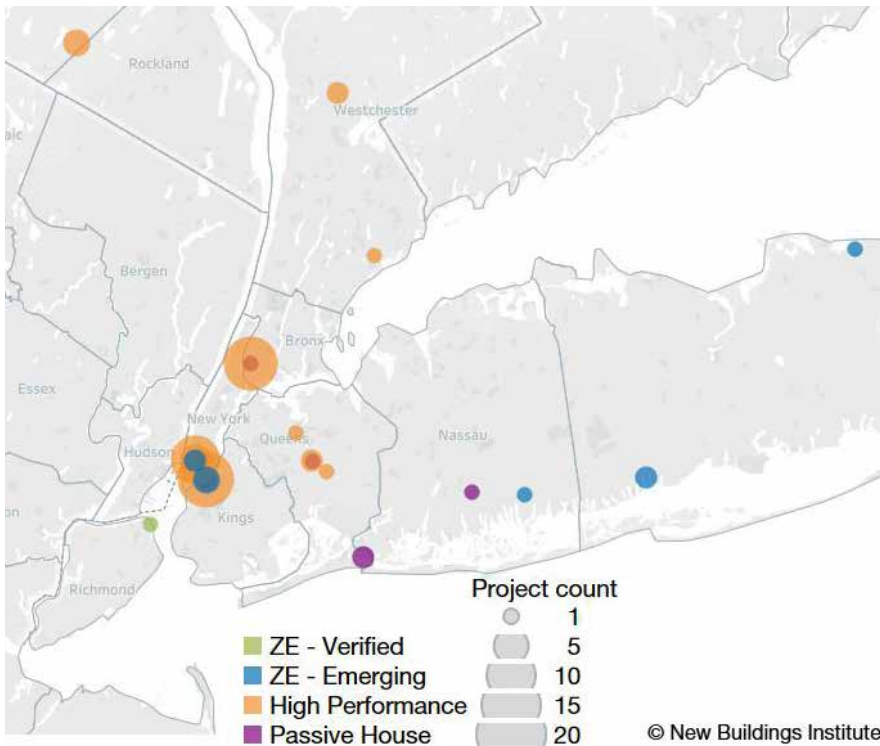


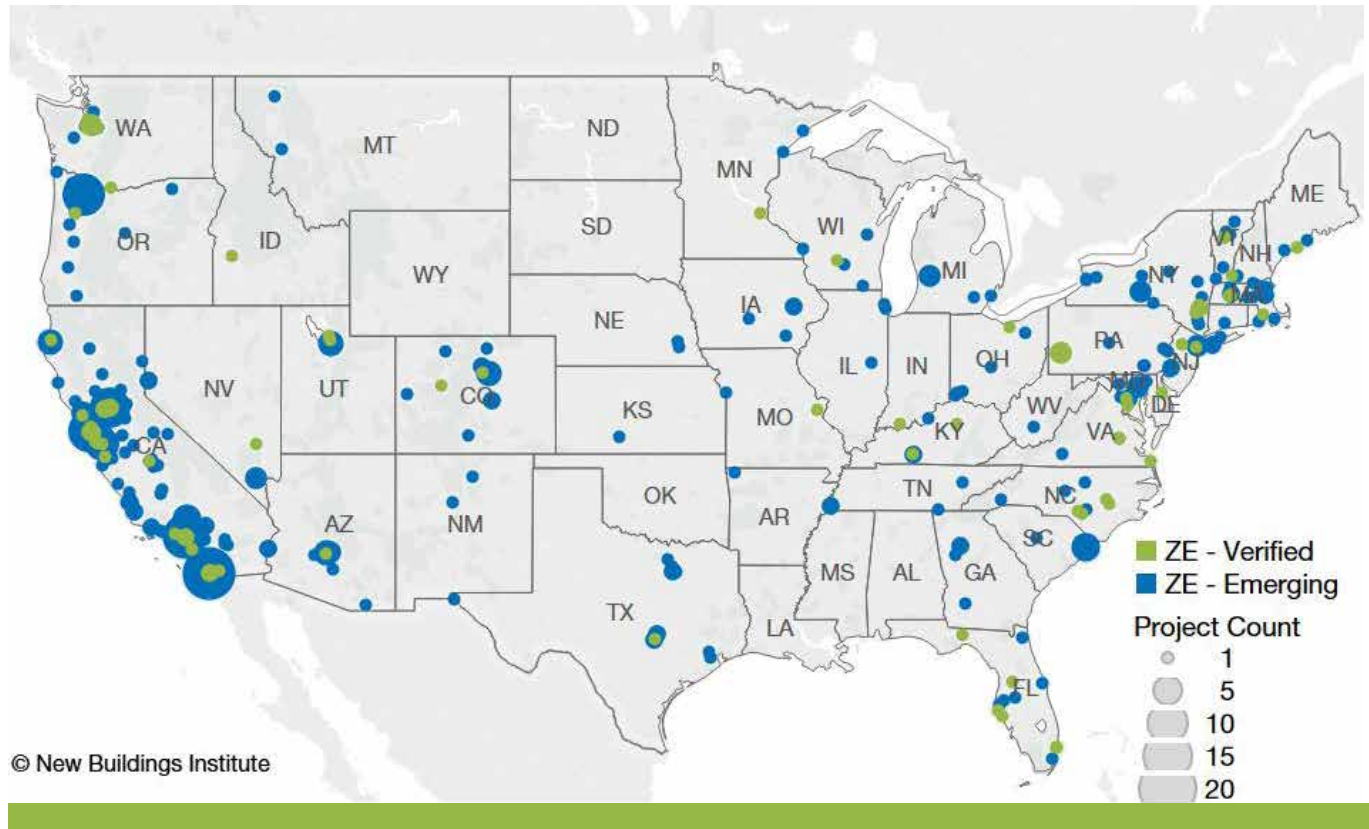
Figure 6. NZE, high performance, and Passive House projects in the New York City area.



New York City is a leader in energy efficient buildings, with six net zero, 41 high performance, and six Passive House projects across the five boroughs, as shown in Figure 6.

Nationally there are 552 NZE emerging and verified buildings. The Northeast and the West Coast are the leading regions.

Figure 7. NZE verified and emerging projects in the US and Canada (total: 552 projects).



Energy Performance

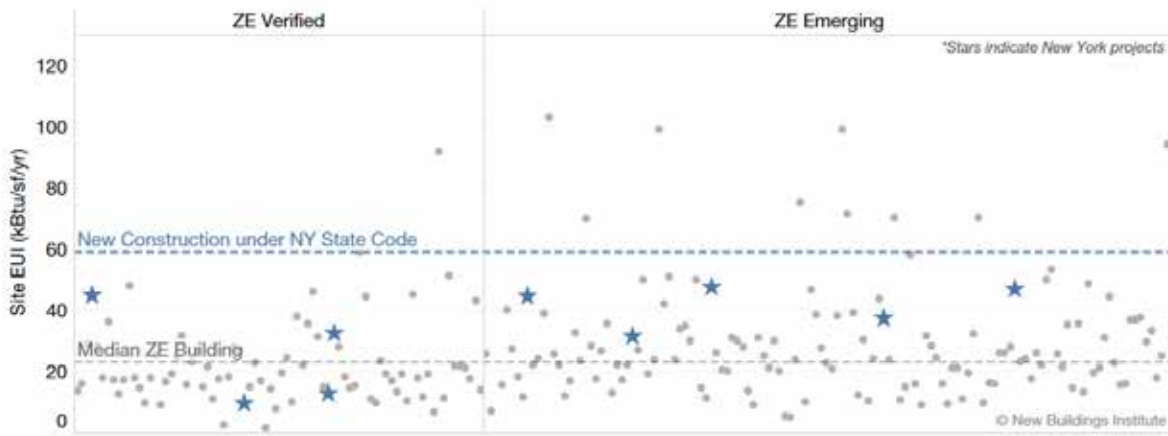
Nearly all net zero energy project teams take an **efficiency-first** approach and deliver high performance, super-efficient buildings. In New York, and across the United States, NZE buildings typically consume less than half the energy of their peers.¹⁷ In New York, the typical site Energy Use Intensity (EUI)¹⁸ of a new building constructed under the State energy code is about 59 kBtu per square foot per year (kBtu/sf/yr).¹⁹ The nationwide median site EUI of NZE projects tracked by NBI is just 22 kBtu/sf/yr (before renewables)—63% less than New York’s most current commercial energy code mandates. These extremely low-energy outcomes are the result of aggressive energy targets, careful design, and considered building operation that typically includes occupant education and engagement.

¹⁷ U.S. Department of Energy Commercial Buildings Energy Consumptions Survey (CBECS) 2012 median U.S. office building site EUI is 53 kBtu/sf/yr.

¹⁸ See Definitions on page 39.

¹⁹ Estimated based on a weighted mix of building types and locations across New York State.

Figure 8. Energy usage, before renewable generation, for NZE projects across North America. Stars indicate verified or predicted energy use for emerging projects for nine New York NZE buildings that have shared energy data. Note the range of savings beyond New York energy code.



Building Size

Most NZE projects are relatively small, though this is beginning to change. Across the United States, the great majority (about 80%) of verified NZE buildings are under 25,000 square feet, reflecting the early trend of small demonstration projects getting to zero. However, this dynamic is shifting. NBI’s research shows emerging NZE projects in the U.S. are more evenly distributed across size ranges with 40% of buildings tracked—both verified and emerging—now greater than 50,000 square feet. This suggests that not only are more diverse-sized projects pursuing NZE, but also that larger NZE and NZE-comparable buildings are entering the market.

Among New York’s high performance projects listed in this report, about two-thirds (60 of 85 projects) are more than 50,000 square feet. The largest of these projects, those more than 100,000 square feet, account for nearly 75% of all New York high performance projects by square footage. Figure 9 shows the size distribution for these low-energy projects.

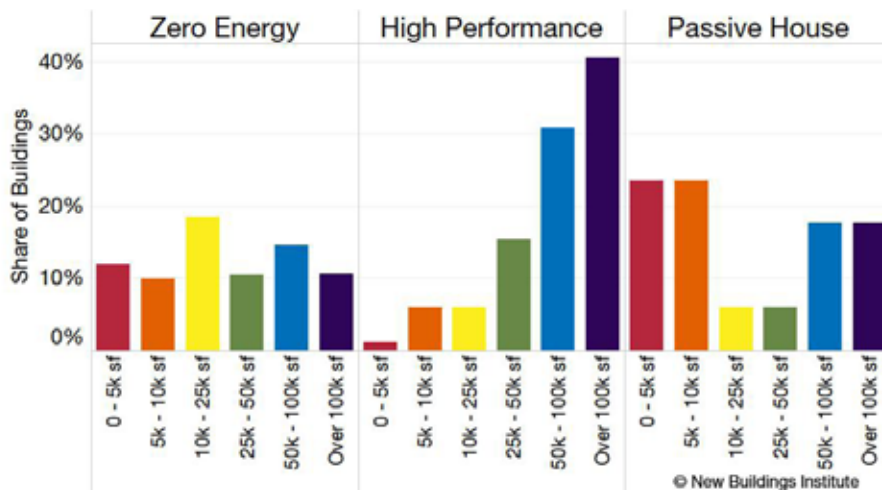


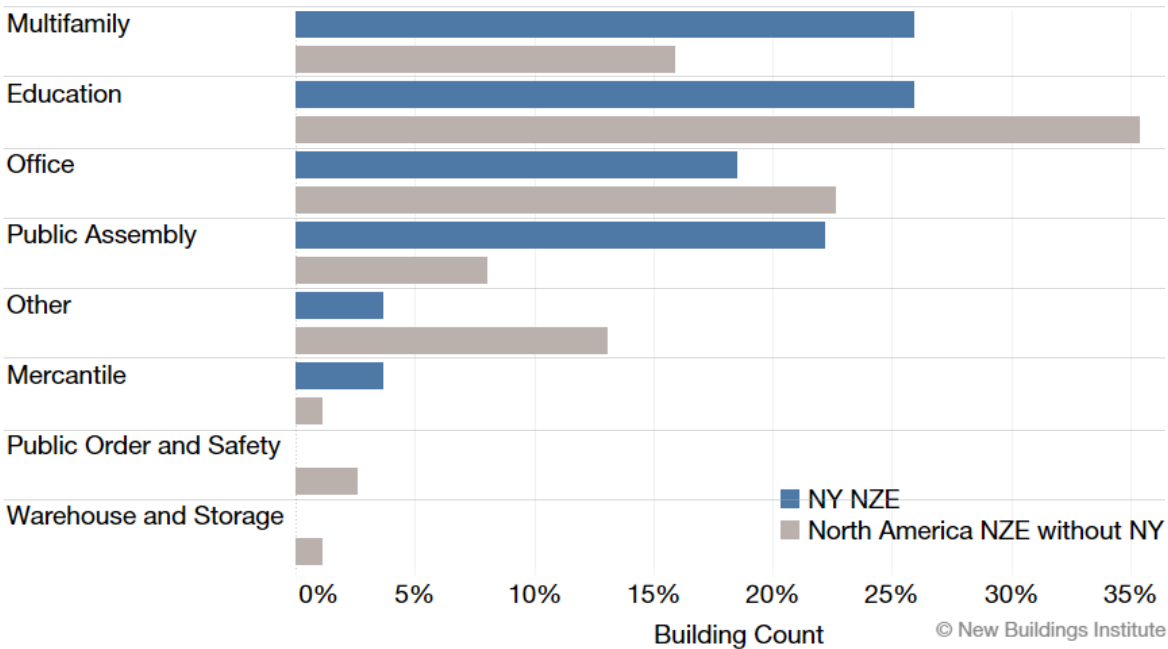
Figure 9. Small and mid-sized projects account for a majority of NZE and Passive House projects, but larger buildings constitute more of New York’s high performance projects.

Building Types

Net zero energy buildings can be found across a growing number of building types. In the early days of the NZE movement, most projects were small education and office buildings. Today, even highly energy-intensive building types, such as manufacturing, hospitals, grocery stores, and restaurants, are finding innovative ways to get to zero. In NBI’s larger buildings, education represents the largest sector achieving or striving for NZE performance, while in New York State, the multifamily sector accounts for one in three NZE projects. New York’s multifamily NZE market share is twice the national share of 16%. New York City’s high-density, extensive volume of multifamily buildings and absence of new school construction all play a part in this outcome as shown in Figure 10.

In New York, one in three NZE projects are multifamily—twice the national share of 16%.

Figure 10. Distribution of New York’s NZE buildings by sector compared to that of the NBI’s Getting to Zero List excluding New York projects.



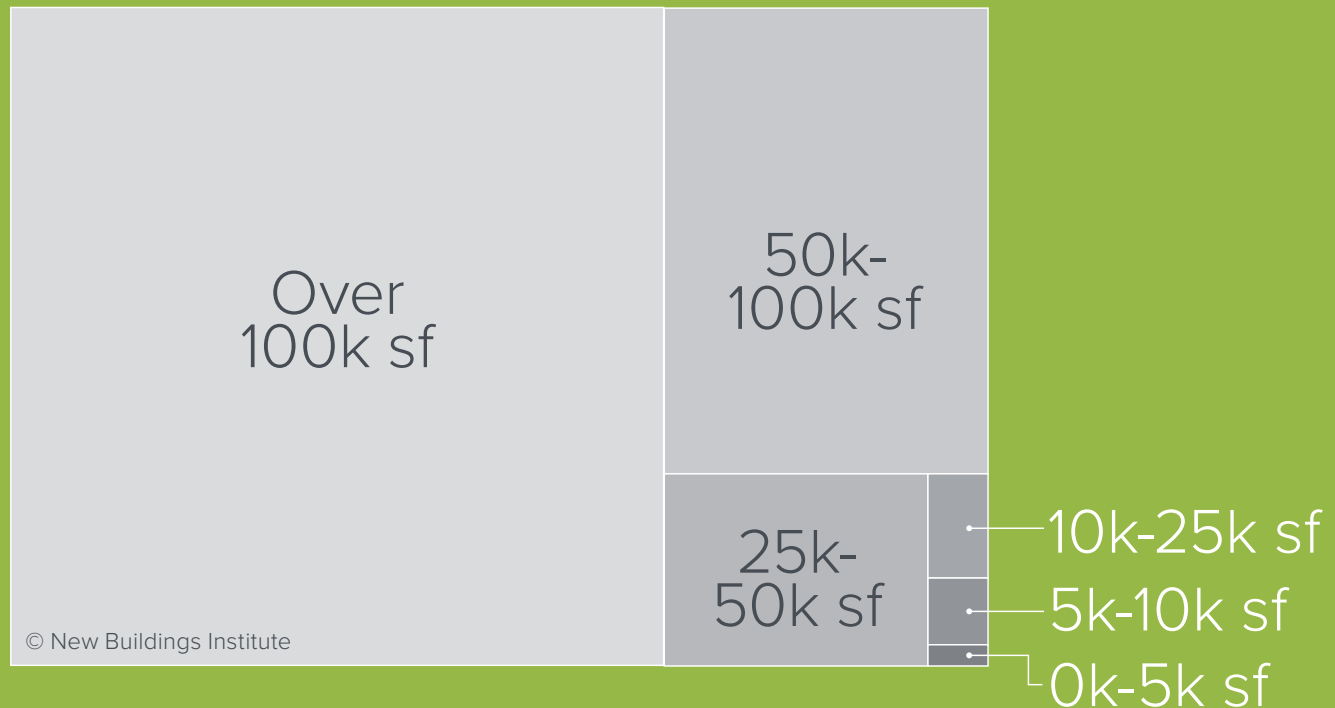
Affordable Multifamily Net Zero Energy

When it comes to multifamily buildings, New York stands out. Per capita, more people live in multifamily buildings in New York City than in any other major U.S. city. High-rise multifamily buildings are especially common in New York City.

For low-income families, paying energy bills can be a challenge. In New York City, the energy burden for low-income families is almost twice as high as the city's median.²⁰ For these families, living in a low-energy building can make a significant difference in extra income each month that can be used for rent, food, or other necessities. NYSERDA's RetrofitNY program will change the way buildings in the multifamily sector are renovated. RetrofitNY will bring a large number of affordable multifamily housing units to or near net zero energy use by 2025. For more about this program see page 34.

²⁰ Energy burden refers to the percent of income spent on energy bills. In 2013, the median low-income household energy burden in NYC was 6.7%, whereas the median city-wide household energy burden was 3.7%. Source: *Lifting the High-Energy Burden in America's Largest Cities*, ACEEE 2016

Figure 11. Size range of low-energy multifamily buildings in NY. Although 40% of all NZE, high performance, and Passive House multifamily buildings are under 50,000 sf, these smaller buildings only account for 10% of the total floor area.



Community, Districts, Portfolios, and Campuses

Districts, campuses, neighborhood developments, private portfolio holders, and institutional property owners such as the military are all beginning to pursue NZE projects beyond one building at a time. Taking a multi-building approach to NZE, either due to proximity or based on common ownership, is a growing and encouraging trend. These are counted at the portfolio level as a single **project** rather than being counted at the building level. While this is not always representative of the total number of **buildings**, it shows each project as a single decision to get to zero as a portfolio.

11. West Point Cadet Barracks. Credit: Ty Cole for Clark Nexsen.



“We have quickly moved into project execution and are well on our way. Net zero really helped focus us across the academy with this common goal.”

– Matt Talaber, Director of Public Works, West Point Military Academy

West Point Military Academy, located in New York’s Hudson Valley, is a U.S. Army Net Zero Pilot Site and has set a campus-wide goal of NZE performance by 2020.

West Point’s existing buildings are being retrofitted and upgraded, new construction must meet stringent energy targets, and renewable energy systems are coming online across the campus.

The Public Sector

The public sector laid the groundwork for NZE as an early leader investing in new projects—a decade ago, the majority of NZE buildings across North America were by far publicly owned. Today that number is almost evenly split with the private sector as the benefits of NZE buildings are beginning to get the attention of business leaders. The role of public buildings is critical as they lead by example and often have high visibility in the community. Education, for example, accounts for the majority of high performance public buildings, representing approximately 60% of publicly owned NZE buildings nationwide.

As previously stated, the education sector is leading the way in New York. The State University of New York (SUNY) has committed to construct all new facilities to achieve **net zero carbon** emissions, invest in deep energy retrofits in existing buildings, and source all electricity from NZC sources. SUNY owns and operates 2,346 buildings, which accounts for 40% of State-owned building infrastructure. NYSERDA is helping to develop facility plans and co-funding an on-site energy manager at each eligible SUNY campus or region to identify areas for improvement, engage in feasibility studies, and implement changes. SUNY and NYSERDA are also collaborating with the Dormitory Authority of the State of New York to retrofit an existing dormitory at SUNY Oneonta to NZE (or NZE-ready) performance, a project that is intended to serve as a prototype for replication across SUNY's entire 500 dormitory portfolio.

In May 2018, the New York Office of Parks, Recreation, and Historic Preservation announced that five different State Parks across New York will reach NZE performance by 2019. The largest solar array mounted on State-owned property is located at Robert Moses State Park and powers both Robert Moses and Captree State Parks. LED lighting upgrades and solar panels are already saving the State Parks Department about \$1 million per year in energy costs.

“All new SUNY buildings will be designed to achieve net zero carbon emissions... We will work to educate and expand the clean energy workforce of New York State.”

– Kristina M. Johnson, SUNY Chancellor

“Powering State Parks entirely with clean solar energy is a strong statement of our commitment to make our State Parks sustainable and efficient.”

– Rose Harvey, former New York State Parks Commissioner

12. Emerging Technology and Entrepreneurship Complex (ETEC) at SUNY Albany.
Credit: State University of New York SUNY Albany.



13. Rendering of NZE retrofit of Bronx multifamily building.
Credit: Magnusson Architecture and Planning.



A 42-unit building in the Bronx is one of six properties taking part in RetrofitNY, a pilot program administered by the New York State Energy Research and Development Authority. Volmar, Bright Power, Magnusson Architecture and Planning, and other partners will work to bring the development to or near net-zero energy standards.

Getting to Zero in Existing Buildings

While new buildings are often the focus, existing buildings are where the biggest opportunities for energy savings and emissions reductions can be found. Assuming 2% of buildings each year are new or deeply renovated (a conservative estimate based on permits), about three-quarters of the 2030 building stock already exists. In order to reach New York’s 40 by 30 and 80 by 50 goals, it is critical to enhance the energy performance of existing buildings. RetrofitNY is already working toward that in the multifamily building sector. By aggregating demand among building owners and engaging builders, manufacturers, and financial organizations, NYSERDA is working to dramatically expand the building renovation industry to deliver deep energy upgrades housing units across the State.

Designing the Future

Shepherding a project from concept through design, construction, and first occupancy to achieving NZE results, is a multi-year effort involving many dedicated participants. An increasing diversity of design firms are gaining expertise in designing and delivering successful NZE buildings. Although it is not always possible to capture the full list of team members involved in these projects, the State recognizes the important role firms and individuals play in advocating for advanced design and low-energy outcomes. Design firms are at the interface between clients and project teams, and the growth of their skills, knowledge, and confidence in practices to successfully get to zero expands the opportunity to mainstream NZE buildings.

“RetrofitNY can lead to innovations that can be adopted widely and will be essential in meeting Governor Cuomo’s ambitious clean energy goals. Net zero energy buildings for affordable housing are a win-win, not only for our most vulnerable population but also for the environment.”

— Alicia Barton, NYSERDA
President and CEO

CASE STUDY

Kathleen Grimm School



NYSERDA

14. Kathleen Grimm School Façade, Staten Island, NY
Credit: NYC School Construction Authority



New York Public School District 62 (P.S. 62)

Home to more than 400 elementary school students, Staten Island's Kathleen Grimm School, P.S. 62, is New York City's first NZE public school. The school's commitment to the next generation goes beyond the classroom. A range of energy efficiency measures developed for P.S. 62 are now being considered as standards for all new NYC public school construction going forward. The design, guided by Skidmore, Owings, and Merrill LLP, offers an energy-use reduction of 50% over a standard new public school.

The NYC School Construction Authority project team embarked on an integrated design process where at every step of the way they considered: *will this help us achieve net zero energy?* An important part of the integrated design process is soliciting feedback from school occupants, team members, and the community. The team conducted workshops with students, school staff, and other offices in the Department of Education. This led to design decisions that made everyday activities such as adjusting lighting, controlling temperatures, or even regular maintenance in the school more efficient.

Details

Year Completed	2015
City, State	Staten Island, NY
Construction Type	New Construction
Building Type	K-12 Education
Project Size (sf)	68,000 SF
Project Cost	\$58,000,000
Spaces Include	26 classrooms, Gymnasium, Cafeteria, Kitchen, Library, Offices, Custodial spaces
ASHRAE Climate Zone	A4
Client	New York City School Construction Authority on behalf of New York City Department of Education
Architect	Skidmore, Owings & Merrill
Design Partner	Roger Duffy, FAIA

The project team asked this key question at every step of the way: Will this help us achieve net zero energy?

The design team left no corner untouched and implemented strategies including:

- LED classroom lighting
- Ample daylighting through classrooms and hallways
- High performance building envelope
- Permeable paving systems for walkways and driveways
- Low-energy kitchen equipment
- Geo-exchange system
- Solar thermal for hot water
- Energy recovery and demand-control ventilation
- Advanced building controls

Energy dashboards will help students and staff work within the energy budget by encouraging competition, offering energy saving tips, and helping to isolate issues early which all lead to the success of reaching net zero energy. The building’s energy consumption is balanced out by a 650-kW PV system made up of more than 2,000 solar panels on the roof and south facade.

The building’s measured results show it is consuming less and generating more energy than predicted, achieving positive net zero energy in July 2018.

15. Kathleen Grimm School, Solar Panels, Interior, and Gym. Credit: NYC School Construction Authority.



Gross Site EUI
(kBtu/sf/yr)

31.8

On-site Renewable
Generation (kBtu/sf/yr)

34.7

Net Site EUI
(kBtu/sf/yr)

-2.9



New York as a Climate Policy Leader

Accelerating High Performance and Net Zero Carbon Buildings Statewide

New York is committed to combatting climate change and a consistent leader in the American Council for an Energy-Efficient Economy (ACEEE) national rankings of State energy efficiency performance.²¹ When the federal government stepped away from the Paris Climate Agreement, New York stepped up and co-founded the U.S. Climate Alliance, a bipartisan coalition of 22 states and Puerto Rico committed to achieving the goals of the Paris Agreement. With set goals to meet a 40% reduction in GHG emissions from 1990 levels by 2030 on the way to an 80% reduction by 2050, New York must have drastic cuts in new and existing building GHG emissions resulting from building energy use.

Along with significant investment plans to get Code to Zero²² for new construction, New York is providing leadership in developing deep retrofit programs, such as RetrofitNY, and implementing groundbreaking policy mechanisms, including current mandatory lighting upgrades and pending energy performance targets for existing buildings in New York City.

New York is among the leaders in its pursuit of NZE building through energy code policies. After over a decade of policy and market strategies around NZE, most recently California's Title 24-2019 residential energy code set the standard for requiring net zero or nearly net zero homes in all new construction starting in 2020. This includes requirements for on-site solar installations along with very high performance systems and envelopes. Washington State also passed a law in 2009 that essentially requires net zero energy codes for all buildings by 2031, and its energy code is on a path to meet that statutory mandate. New York is accelerating savings through energy codes with the development of a stretch energy code (intended to be implemented Statewide by 2023) and with the transition to a carbon-based code metric. Together, New York policies will help drive maximum carbon savings available through the State's energy code.

Providing Foundations for Growth in Zero Energy Buildings

In addition to broader State policies, NZE buildings are a growing focus in NYSERDA programs and in market mechanisms that will accelerate both efficiency and clean generation at the building and community scale.

16. Building 275, the Navy Yard, 4th St, Brooklyn, NY. Credit: Medium, Retrofitting NY.



17. Cornell Tech tower. Credit: Handel Architects LLP.



21 ACEEE 2018, [State Energy Efficiency Scorecard](#)

22 See the [Clean Energy Fund Investment Plan](#), Codes Chapter

The number of NZE buildings in New York represents a growing industry experience that will enable a transition to meet the State’s GHG emission goals in the building sector. This first *Status Report* highlights the new policy emphasis on NZE buildings in, the [New Efficiency: New York](#) report, and other planning efforts to achieve carbon neutrality that will become standard practice.

The New York State Energy Plan and the Path to Zero

The 2015 New York State Energy Plan (SEP) recognized the importance of both aggressive energy efficiency efforts and distributed generation. It is this combination of low-energy consumption and renewable energy generation, either on the building or in “shared systems,” that is the cornerstone of moving to net zero energy building stock in New York. The plan²³ explains:

When buildings use less energy, customers save money and the entire system benefits from reduced strain on our energy infrastructure. These circumstances make energy efficiency (both electric and thermal) the most powerful tool at New York’s disposal to achieve the State’s aggressive GHG reduction goals.

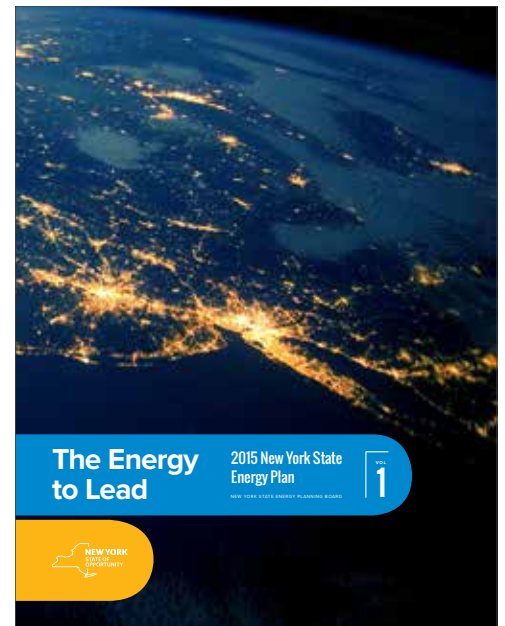
Conversations about the energy system of tomorrow often start with renewable energy production, and renewable resources will indeed play a critical role in shaping New York’s energy future, providing resilient power, reducing fuel cost volatility, and lowering GHG emissions.

Shared Renewables, or community net metering, opens a pathway for customers and entire communities to take advantage of solar and other renewable energy sources for the first time. Interested New Yorkers will be able to participate in local renewable energy projects and receive credit on their utility bills for their portion of the carbon-free power produced.

New policy efforts are increasingly focused on NZE buildings. The next SEP will be guided by the development of a comprehensive carbon neutrality roadmap. The roadmap will provide policy directions for achieving carbon neutrality on an economy-wide basis as soon as practicable. The built environment, as a large component of the State’s economy as well as its greenhouse gas footprint, will be a central consideration in both processes. Further analysis of net zero technical and market barriers in New York is planned in order to help target investments where they are most likely to spur wide-scale net zero solutions. Implementation of these policies and efforts will include an early emphasis on existing buildings as well as energy codes to capture new construction projects and rapidly expanding market sectors, such as multifamily construction. Plans for transitioning from a stretch energy code adopted by communities to a Statewide advanced energy code by 2022 will ensure that new construction in the next decade in New York will be on the path to NZE-level performance.

23 See Pages 63, 73, and 77 of the New York State Energy Efficiency Plan Volume 1, available at: <https://energyplan.ny.gov/Plans/2015.aspx>

18. The New York State Energy Plan. Credit: New York State Energy Planning Board, 2015.



19. Omega Center for Sustainable Living. Credit: Courtesy of Omega Institute.



Benchmarking and Disclosure

Benchmarking is the process of accounting for and comparing a metered building's current energy performance with its energy baseline.

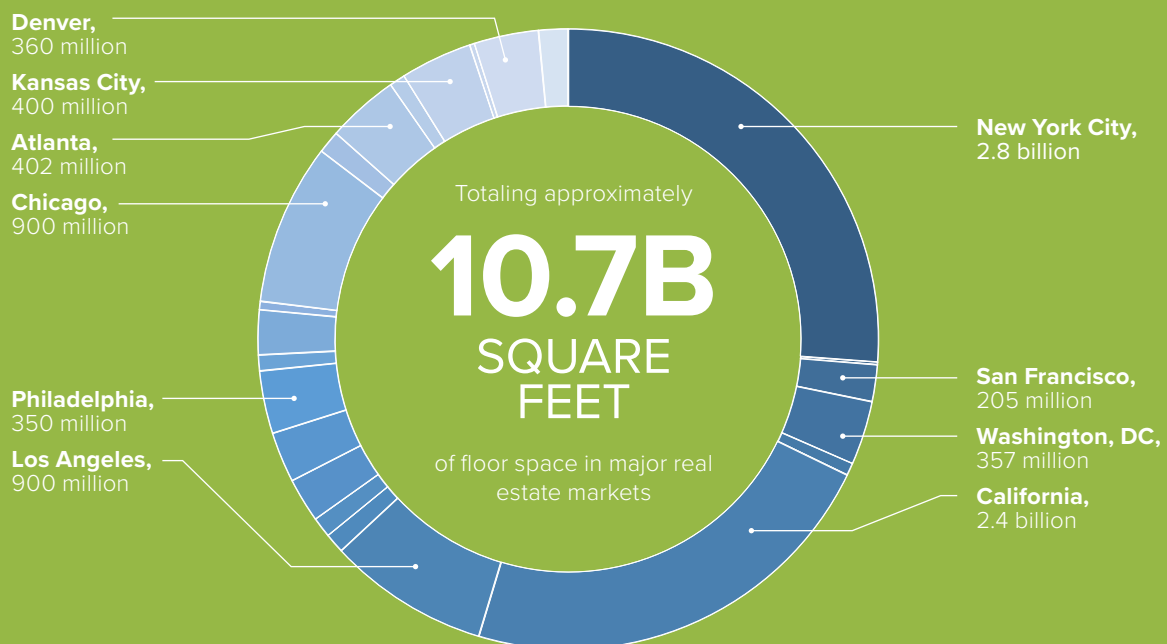
Fundamentally, benchmarking involves tracking a building's energy performance over time, including grid-purchased electricity, on-site renewable generation, natural gas, district energy, and delivered fuels at the individual building or portfolio level. Tracking building energy in this way can help identify the impacts of operational changes such as set points or lighting controls, maintenance work, or capital improvements. The practice informs decision-making for building owners and operators, portfolio holders, occupants, and policymakers that can lead to energy and cost savings. Buildings benchmarked over a three-year period showed an average of 2.4% annual savings in energy.²⁴

The practice of benchmarking has been growing at a rapid pace across the market largely due to the increasing prevalence of energy disclosure ordinances. As of 2018, more than 25 cities, three states, and one county adopted mandatory benchmarking ordinances for commercial and/or multifamily buildings as shown in Figure 12. In these jurisdictions, building owners must track and report the energy use of their buildings. New York City is the only jurisdiction currently with a mandatory benchmarking law in New York State, which covers 2.8 billion square feet of building stock. Several other municipalities and the State of New York are leading by example by voluntarily benchmarking their public buildings. NYSERDA offers step-by-step guidance and template policy language to be adopted for use in other New York communities.²⁵

24 Source: US EPA ENERGY STAR® Portfolio Manager™ program

25 NYSERDA information on [Benchmarking ordinances for local governments](#)

Figure 12. Affected building area in square feet covered by U.S. Disclosure Ordinances. Credit: IMT, 2018.



Transition to a New York-Based Carbon Metric

Analysis for this *Status Report* leverages data traditionally used to track the energy use intensity in buildings, however the need to correlate the performance of buildings to the 80 by 50 GHG emissions goal is becoming more pressing.

Transitioning to a New York-based carbon metric presents some technical challenges and there are policy implications for the various options of approach. It should be the objective of the metric to influence choices for both energy efficiency and electrification that align with New York’s plans, targets, and policies. The most consequential decision in transitioning to a carbon metric is devising a standardized and consistent protocol for converting a building’s measured energy imports from and exports to the electric grid to a carbon dioxide energy equivalency (CO₂e) impact. CO₂e is a standard unit used to measure the global warming potential of all GHGs compared with the equivalent amount of carbon dioxide. In addition, calculating CO₂e for the use of natural gas in power plants and in direct on-site consumption must include many assumptions of transport, processing leakage, and the efficiency of combustion. This work is underway. Energy and carbon will both be industry metrics in future assessments and reporting.

Getting these new and accurate metrics on a building’s CO₂e impacts will be critical to guiding the various professional segments involved with building design, construction and operation to achieve actual NZC building performance. Making informed fuel choices, especially as the electric grid becomes cleaner, will accelerate the path to net zero. Policies that focus on reducing energy use alone, especially if the remaining fuel use has high carbon content, may not lead to the lowest carbon output for New York at any given time. As noted by Adam Hinge, Managing Director at Sustainable Energy Partnerships in New York, “Having zero carbon as the metric will likely cause different design and construction choices than might be the case for net or nearly zero energy.”

A carbon-based strategy in New York will allow the selection of energy-using component installation or replacement to be an integral aspect of building programs and regulation. This important evolution in building sector policy is consistent in large part with existing New York and New York City building-level electrification objectives and aligned with efforts to support electrification of the transportation sector.

20. MacArthur Elementary School, Binghamton, NY. Credit: Binghamton City School District.



21. The fossil-fuel burning Ravenswood Generating Station, Long Island City, Queens, NY. Credit: Rhododendrites.



New York should work collaboratively with other states (through the U.S. Climate Alliance or other appropriate venues) to develop carbon-focused metrics to support deeper carbon savings.

– [New Efficiency: New York](#), page 62

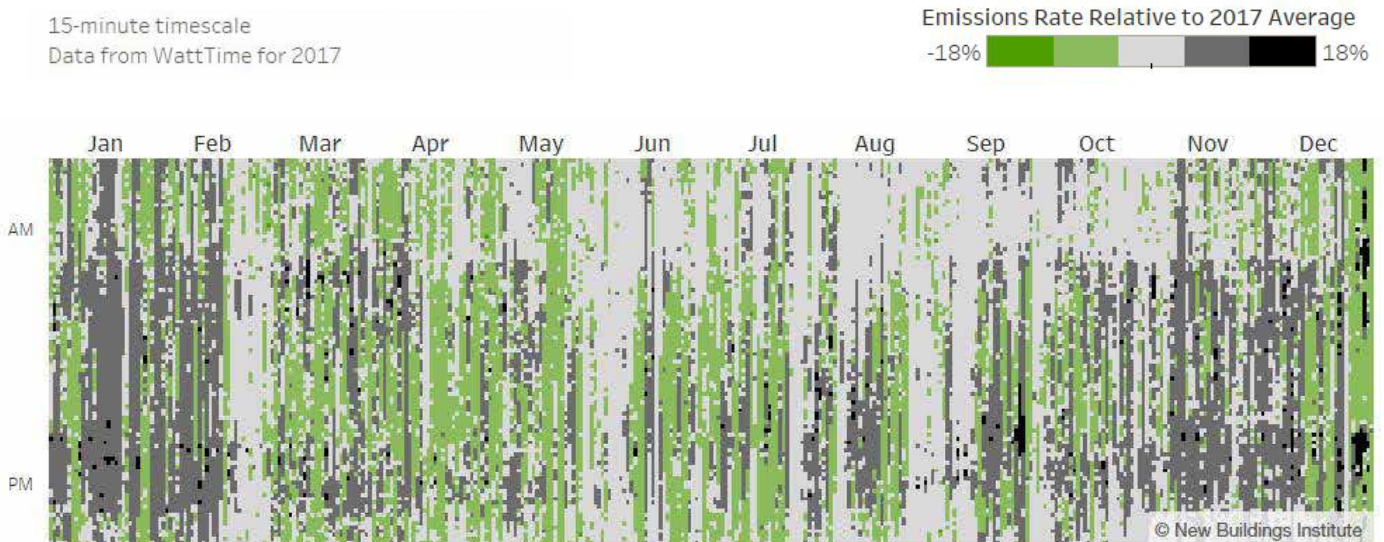
Time-Dependent Greenhouse Gas Emissions

New York’s power generation mix will continue to change in the coming years. The proposed increase in the State’s Clean Energy Standard would mandate that 70% of electricity come from renewable sources by 2030.

Wind, solar, and some hydropower are intermittent energy sources, meaning they are not always available. The time of day and season when electricity is being used are becoming more important to the operation of the grid and achieving GHG reduction goals.

For example, New York City’s electricity emissions profile varies both seasonally and by hour of the day. This variability is driven both by demand and the generation mix in operation: fossil-fuel thermal plants versus hydro and nuclear plants. However, other regions that already have high renewable penetration are beginning to see much greater variability. In California, marginal carbon emissions ranged from nearly zero up to levels similar to New York, and they occasionally had to curtail (turn off) renewable generation due to oversupply. California’s highly dynamic emissions profile may offer a window that allows us to see the future of New York’s electricity grid. As renewable penetration grows, particular times of the day and the year will likely offer electricity at substantially lower emissions rates. The buildings sector can either add to the problem or be part of the solution, creating an urgent need to take grid interaction and impacts into consideration during both the design and operation phase of buildings.

Figure 13. 2017 Marginal carbon emissions in New York City’s grid-supplied electricity. Note the higher emissions rates, indicated by darker shades of grey and black, during many autumn and winter days and evenings. Spring and early to mid-summer are relatively clean due to better alignment between renewable energy generation and demand on the grid.



22. netZero Village, Rotterdam, NY. Credit: EMA for NYSERDA.



The NY Stretch Code: Setting a Vision for Energy Code Advancement

NYStretch Energy Code-2019 (NYStretch) is NYSERDA's latest voluntary, locally adoptable stretch energy code, drafted with guidance from a 25-member advisory group composed of public and private stakeholders. A stretch code is a code adopted by a jurisdiction that “stretches” beyond the State energy code as an alternative local option for new construction. NYStretch Energy Code-2019 is roughly 10% to 15% more efficient than the residential provisions of the 2015 International Energy Conservation Code (IECC) and the commercial provision of ASHRAE 90.1-2013. NYSERDA's goals for this effort are to produce a stretch code that lowers energy use and GHG emissions associated with new and existing buildings and provide a set of building regulations that are:

- Readily adoptable with minimal changes by local governments and written in enforceable language
- Coordinated with the New York State Uniform and Energy Codes
- Approximately a cycle ahead of the current New York State Energy Code in its requirements
- Cost-effective and regionally appropriate
- Mandatory Statewide beginning with the 2022 code cycle

In anticipating the first cycle of NYStretch, the [New Efficiency: New York](#) report describes the role of NYStretch in this way:

Until deeper, carbon-focused metrics can be integrated into future New York State energy code, the use of “stretch” codes can help position the State to achieve the level of energy and GHG emissions reductions that are necessary to meet the State’s climate goals. Stretch codes provide readily-adoptable code language that local jurisdictions can voluntarily adopt to overlay the base energy codes to deliver increased energy savings, typically of 10 to 20%.

23. Sendero Verde.
Credit: Handel Architects LLP.



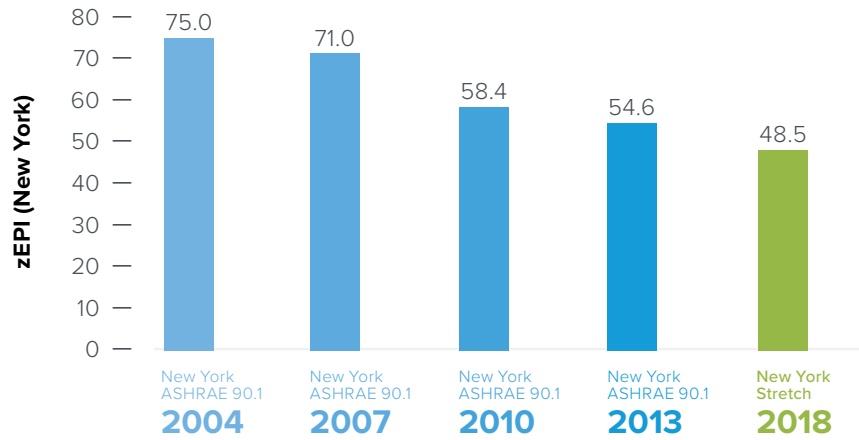
New Efficiency: New York

also recognizes that evolving NYStretch into a Statewide standard is a key component necessary to accelerate lower carbon and NZE building construction throughout New York. Municipalities across the State are also seeing the importance of energy codes. New York City already has their own version of a more advanced energy code within its city boundaries. It is anticipated that in 2019, the City will begin enforcing a version of the Statewide NYStretch Energy Code-2019.

Figure 14. Stretch codes advance energy efficiency.

Want Greener Buildings? Stretch Codes Get You There Faster.

Adopting stretch codes can drastically improve building energy efficiency beyond existing codes and put buildings on the path to zero.



* Adjusted to reflect the energy savings compared to 90.1-2013 as determined by PNNL (2018).

© New Buildings Institute

24. Skaneateles Village Hall. Credit: BD+C.



Ithaca Stretch Energy Code

In 2016, the City of Ithaca was awarded a \$100,000 grant to study green building policies in collaboration with the Town of Ithaca and they began working on a new Green Building Policy (GBP) project in 2017.

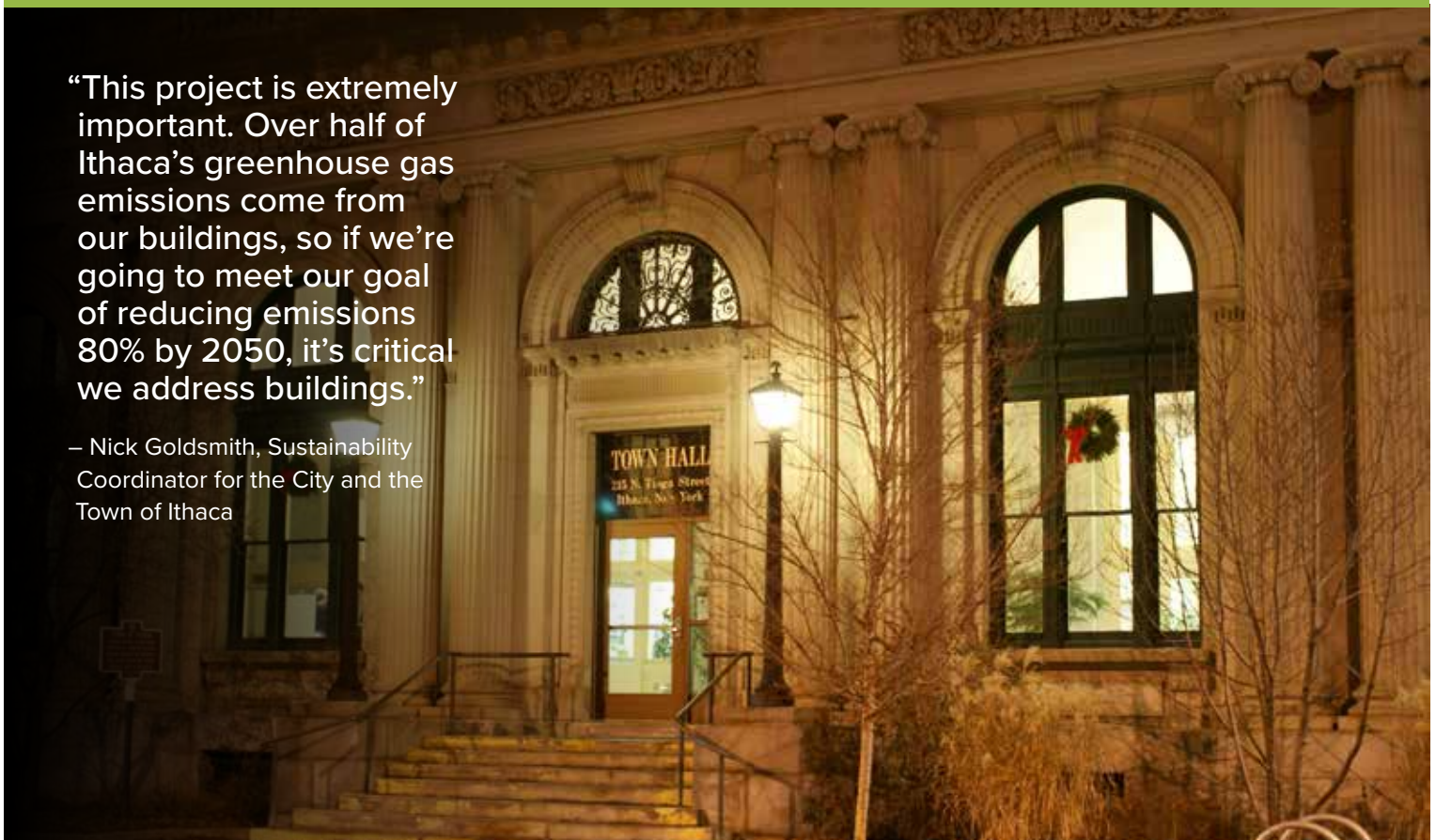
The project included a comprehensive study of Ithaca's existing and predicted building stock, green building standards, and the potential economic, social, and environmental impacts of policies that incentivize or mandate those standards. Extensive outreach was done to solicit feedback from the general public, municipal boards, and other interested parties. The resulting GBP Report included a policy recommendation for the adoption of a stretch energy code that includes energy efficiency requirements and incentives to substantially reduce carbon emissions across new buildings while emphasizing affordability.

In May 2018, the City of Ithaca Common Council and the Ithaca Town Board approved the recommended policy that requires all new buildings and major renovations to be designed and constructed with an estimated 40% to 50% reduction in GHG emissions compared to the New York State energy code. By 2030, the policy requires all new buildings to be NZE and minimize fossil fuel consumption by electrifying buildings and transportation. Both municipalities moved to codify the policy and currently have draft legislation under review for adoption and implementation in 2019.

25. Ithaca Town Hall, Ithaca, NY. Credit: Town of Ithaca.

“This project is extremely important. Over half of Ithaca’s greenhouse gas emissions come from our buildings, so if we’re going to meet our goal of reducing emissions 80% by 2050, it’s critical we address buildings.”

– Nick Goldsmith, Sustainability Coordinator for the City and the Town of Ithaca



Beyond the Meter: Building-Grid Interactions and Carbon Impacts

For a century, electricity flowed only one way: from the power plant to the building. This long-established paradigm is changing fast as distributed renewables and NZE buildings come online globally. New York set a target to reach 70% renewable energy on the grid by 2030. But transforming yesterday's power grid to accommodate tomorrow's energy resources is a new and untested challenge. Already, some grid operators are struggling to integrate renewable energy onto the grid and are even curtailing renewables at specific times and locations.

New York's Reforming the Energy Vision (REV)²⁶ strategy recognizes these issues and is advancing regulatory, policy, and business model innovations that more fully value distributed energy and energy flexibility at the customer level. These new business models and structures are designed to enable cleaner, more resilient, more affordable, and more flexible grid operations, all the while spurring economic development Statewide.

At the building level, there has been a lack of knowledge and incentives to encourage building design and operations that minimize grid costs and carbon impacts, or enhance grid operation. The status quo for designers and owners is to think of the power grid as an infinite battery of power supply that can be drawn on. Current thinking on the topic is fragmented with various players using different language to discuss and coming from a variety of perspectives.

The collaborative GridOptimal Buildings Initiative, led by NBI and the U.S. Green Building Council, seeks to provide standards, tools, and guidance to improve building-grid interactions by empowering owners, architects, and engineers with dedicated, standardized grid citizenship metrics. The [GridOptimal Buildings Initiative](#) will play a major role in bridging the gap in knowledge, understanding, and priorities across the meter, including both grid operators and electricity consumers.

²⁶ Learn more about REV at: rev.ny.gov/

26. Building-grid harmonization is quickly becoming more important as New York moves to a low-carbon future.

Transforming yesterday's power grid to accommodate tomorrow's clean energy resources is a new and untested challenge. Building-grid interactions are a critical piece of the puzzle.



NYSERDA Programs

New York's Clean Energy Fund (CEF) is designed as a market transformation mechanism that will deliver on the State's commitment to reduce ratepayer energy spending, drive economic development, and accelerate the use of clean energy and energy innovation. NYSERDA runs a comprehensive portfolio of programs under the CEF that are working to meet the State's ambitious climate goals. Visit nyserdera.ny.gov/Funding-Opportunities for more information on NYSERDA's programs.

Retrofit New York

RetrofitNY is revolutionizing the way buildings are renovated in New York. Beginning with the affordable multifamily sector, RetrofitNY is catalyzing the creation of low-cost, standardized, scalable solutions, and processes to bring existing buildings to NZE or near-zero performance levels, saving money for owners and tenants while improving the quality of life for residents. Through multiple rounds of competitive awards, RetrofitNY is working to bring a large number of affordable housing units to or near-net zero energy use by 2025 and provide new business opportunities in New York. RetrofitNY collaborates with a variety of industry stakeholders, including property owners and developers, solution providers, lending organizations, and regulators to develop innovative solutions for multifamily housing renovations that will also serve as a template for other building sectors.

RetrofitNY is transforming the building renovation industry through these key actions:

1. Aggregate demand among building owners, harnessing their collective market power
2. Mobilize the building industry to develop innovative technical solutions to substantially improve affordable housing buildings while residents continue to live in their apartments
3. Engage with manufacturers to help drive innovation, availability, and cost compression of relevant technologies
4. Work with financial organizations to fund projects by capturing energy savings
5. Engage regulatory agencies to help facilitate widespread adoption

Through multiple rounds of competitive awards, RetrofitNY is working to bring a large number of affordable housing units to or near net-zero energy use by 2025 and provide new business opportunities in New York.

27. RetrofitNY Portville Square Rendering. Credit: NYSERDA.



New Construction Incentive Programs: Multifamily, Low-Rise Residential, and Commercial

NYSERDA's New Construction Program (NCP) offers technical support and incentives to owners and developers of ground-up new construction or substantial renovations across all sectors.²⁷ NYSERDA project managers and expert consultants work with building owners and their design teams to analyze efficiency opportunities during the design phase as well as guide installation, commissioning, and verification during and after construction. Additional support is available for projects that are designed for deep energy savings, net zero energy, and projects incorporating smart building technologies.

Net Zero Energy for Economic Development

The Net Zero Energy for Economic Development Program is a multi-round competition that provides eligible New York State commercial, industrial, and institutional applicants with incentives for the construction of, or renovation to, existing buildings designed to achieve NZE performance. All projects must demonstrate that they will help achieve the goals of their Regional Economic Development Council's Strategic Plans or State Priority Areas. Incentives are available for the incremental cost of design, construction, and installation of all technologies (as compared to the cost to build/renovate to a code compliant standard) utilized to achieve NZE performance. Funding to support the planning and design for community and campus scale net zero development and redevelopment will be added to the program in 2019.

Buildings of Excellence

The Buildings of Excellence program will promote multifamily projects that have very low energy consumption and carbon emissions, as compared to a code compliant building, and exhibit architectural and urban design quality and innovation through multiple rounds of competitive awards. Projects must demonstrate design and construction methods are replicable and can achieve broad-based adoption by both developers and consumers. Projects must also demonstrate how they provide superior financial benefits for owners and provide healthy, safe, and otherwise outstanding living environments for occupants. Selected projects will be eligible to receive up to \$1 million in direct funding as well as support for initiatives focused on broad marketing and public awareness.

28. Cornell Tech Tower River Room. Credit: Cornell Tech.



29. Beach Green Dunes. Credit: The Bluestone Organization.



27 For more information on NYSERDA's low-rise residential NZE programs, see nysesda.ny.gov/All-Programs/Programs/Low-Rise-Residential/Low-Rise-Net-Zero-Energy-Housing/Resources.

Net Zero Portfolio Support

The Net Zero Portfolio Support program assists large real estate portfolio owners, across all sectors, in developing performance standards and institutional mechanisms to enable the design, construction, and operation of net zero energy buildings. NYSERDA will provide up to \$250,000 for the development of protocols, guidance documents, employee and contractor training procedures, peer design review, prototype designs, details, and specifications, or other similar activities that apply to all future new construction or gut renovation projects.

NY-Sun

New York State is making solar energy more accessible to homes, businesses, and communities through NY-Sun, which provides multiple resources:

- Incentives and financing for [home](#) and [business](#) to make going solar more affordable
- [Education](#) for homeowners and renters to make informed decisions about solar
- [Local Government Resources](#) including training, tools, and assistance to help local identify opportunities, mitigate barriers, and create solar programs
- Community Solar programs to expand access to solar projects for all New Yorkers

Ground Source Heat Pump Rebate

Through the Ground Source Heat Pump Rebate initiative, NYSERDA is making funding available for the installation of this cutting-edge, renewable energy technology. This initiative will provide funding to eligible Ground Source Heat Pump (GSHP) designers and installers approved by NYSERDA, who provide customers with multiple benefits at lower costs and reach communities where this clean technology could otherwise be unaffordable. The rebate is available on a first-come, first-served basis, and separated into two tiers based on system size. Designers and installers will receive the rebate upon completion of installation of the project.

30. netZero Village. Credit: Bruns Realty Group LLC.



The Zero Energy Performance Index (zEPI)

A Simple, Versatile Scale for Measuring Commercial Building Energy Performance

The Zero Energy Performance Index (zEPI) scale represents a fundamental shift in measurement of building efficiency. zEPI sets energy targets for actual energy consumption rather than using a predictive energy model of building energy performance comparing the building to code. zEPI is calculated using a building's EUI and is adjusted based on building type and climate. zEPI is also the measure by which a building's energy efficiency can be calculated once operational and occupied based on measured energy use data.

zEPI was created to address confusion caused by representing the energy efficiency of buildings as their "percent savings beyond code." Given that there have been at least six major commercial energy codes active at any given time in the United States since 2000, identifying the correct baseline can take some time.

zEPI sets a constant goal of net zero energy and shifts the conversation from better than code to an index leading to zero, which is the kind of market shift required for buildings to achieve wide-scale zero energy and exemplary energy performance. One noteworthy function of the zEPI scale is that it allows key energy milestones, including individual project consumption and energy policies to all be represented on one scale. When the target is zero, progress and outcomes are easier to visualize and understand.

Since 2016, NBI has included building zEPI scores in its analysis. The zEPI score is a simple metric measuring a building's progress toward net zero energy.

31. Omega Center for Sustainable Living, Rhinebeck, NY Omega Institute.



Figure 15. The Zero Energy Performance Index (zEPI). The NZE Certified Omega Center for Sustainable Living in Rhinebeck, NY has a zEPI score of -8.



Conclusion

This first-ever *New York Getting to Zero Status Report* shows how innovation and ingenuity have launched New York State on the road to zero. NYSERDA and NBI's large set of data uploaded into NBI's Getting to Zero Database creates a portrait of where we are and where we are going. Over the past 10 years, the market has seen tremendous growth and its trajectory will continue upward.

As the 132 leading NZE, high performance, and Passive House buildings included in this list clearly demonstrate, New York is a leader in net zero energy buildings that reduce the carbon footprint of the built environment. More importantly, this report addresses misconceptions that NZE development is not profitable, and showcases concrete real-world projects. New York is proof that steady cost compression can bring NZE construction to "business as usual" and drive economic development opportunities by transforming the conventional construction market.

In tandem, this report concludes that New York is on the right path, under Governor Cuomo's leadership and vision, with a broad range of programs and services now being offered to radically improve energy efficiency and decarbonize New York's building stock. These will help us achieve the State's goal to make New York's electricity 100% carbon-free by 2040 and ultimately to eliminate the State's entire carbon footprint. Governor Cuomo has directed agencies to lead by example with State-owned buildings. State agencies and authorities will be built to NZE standards approximately five years before NZE construction requirements are adopted under code for similar building types.

New York's leadership on this issue is demonstrated and driven by its policies and executive orders as well as legislative action. This leadership can and does drive market change, but this report also highlights that most importantly, progress is being catalyzed by people in the form of fast-growing demand for highly efficient, resilient, comfortable and affordable low-carbon living and working spaces.

Sustained growth in the NZE buildings market is cementing New York's leadership in the buildings industry and will provide a wealth of opportunities in high performance building design and construction, real estate, renovation, and management. Market actors and NYSERDA together can draw upon robust science, economic analysis, and technical analysis to create a comprehensive portfolio of technologically feasible and cost-effective approaches that make net zero energy buildings a reality in New York communities to benefit the State's number one asset: New Yorkers, themselves.

32. Cornell Tech Tower. Credit: Cornell Tech.



List Definitions

NET ZERO ENERGY

projects are buildings with significantly reduced energy loads, such that 100% or more of the energy use can be met with on-site renewable energy generation annually. In this list, projects are categorized as NZE Certified, NZE Verified, or NZE Emerging. For simplicity, projects that have set a net zero carbon goal are listed as net zero energy.

NET ZERO ENERGY CERTIFIED

projects have been awarded Net Zero Energy (or equivalent) certification by a trusted third party such as the International Living Future Institute (ILFI). The certifier has thoroughly reviewed at least one continuous year of energy consumption and generation data to certify zero energy performance.

NET ZERO ENERGY VERIFIED

projects have achieved NZE for at least one full year and NBI has verified the performance data.

NET ZERO ENERGY EMERGING

buildings have publicly stated goals of reaching NZE. These buildings may be in the planning or design phase, under construction, or have been in operation for fewer than 12 months. Others may have been operating for at least a year, but their measured energy use data either has yet to achieve NZE, or the data to document NZE performance was not available.

HIGH PERFORMANCE

projects received an incentive from NYSERDA because their predicted (modeled) energy consumption was at least 30% below the energy code in effect when the project began. These projects offer additional examples of buildings with low energy targets and outcomes.

PASSIVE HOUSE

projects have achieved certification from either the Passive House Institute (PHI) marked as **(A)** after the building name, or the Passive House Institute US (PHIUS) marked as **(B)** after the building name.

(L) after the project name indicates a project has achieved USGBC LEED certification (at any level).

(M) after the project name indicates a project that has provided measured energy use data.

SITE EUI

stands for the total gross site-level Energy Use Intensity (EUI), the industry common metric used to measure annual energy use per square foot (sf) of building floor area. Energy use includes consumption from all fuels (grid-delivered and on-site-generated electricity, natural gas, district energy, and delivered fuels) in thousands of British thermal Units (kBtu) per year (yr). That sum is divided by the building's gross size, thus the units are kBtu/sf/yr.

SOURCE EUI

accounts for upstream generation, transmission, and distribution losses associated with delivering usable energy to the site. Site to Source EUI conversions in this list follow the 2018 U.S. Energy Star® Portfolio Manager guidelines.²⁸

NET EUI

is annual energy use minus annual on-site renewable generation, divided by the building's floor area in sf. A building with a measured net EUI (site or source) less than zero has achieved ZE. Some buildings in the ZE Emerging category show a negative net EUI based on modeled or estimated data.

ZEPI

is a metric on a 0-100 scale that sets a constant goal of ZE and is normalized by climate and building type. See page 37.

28 See the 2018 US Energy Star Portfolio Manager Source Energy Technical Reference Document: <https://www.energystar.gov/buildings/tools-and-resources/portfolio-manager-technical-reference-source-energy>

2019 Net Zero Energy Buildings List

New York Net Zero Energy, High Performance, and Passive House Projects

The New York projects listed here demonstrate the leadership role of New York in the NZE movement.

In the seven years since NBI produced the first Getting to Zero List in 2012, the number of NZE projects across North America has increased more than 700%. More and more designers, owners, and occupants are gaining valuable NZE experience and expertise, and new projects are appearing regularly. Across New York, this trend is set to accelerate as owners, designers, occupants, and others recognize the value and benefits of getting to zero.

This list includes non-residential projects and multifamily projects with at least four units. Single-family homes and multifamily projects with three units or less are not included. Multi-building projects such as campuses are counted at the portfolio level as one project rather than by each building.

In the seven years since NBI produced the first Getting to Zero List in 2012, the number of NZE projects across North America has increased more than 700%.

Net Zero Energy Certified

Year Completed	Project Name	City	State	Building Type	Size (sf)	Total EUI	Source EUI	Site RPI	Source RPI	Net EUI	Net Source EUI	zEPI Score
2009	Omega Center for Sustainable Living (L) (M)	Rhinebeck	NY	Education	6,200	13.2	37.0	21.5	60.1	-8.3	-23.1	-7.7

Net Zero Energy Verified

Year Completed	Project Name	City	State	Building Type	Size (sf)	Total EUI	Source EUI	Site RPI	Source RPI	Net EUI	Net Source EUI	zEPI Score
2008	Hudson Valley Clean Energy HQ (M)	Rhinebeck	NY	Office	5,470	9.8	27.3	10.4	29.0	-0.6	-1.7	-0.7
2014	231 Main Street (Alfandre Architecture, EcoBuilders, and Others) (L) (M)	New Paltz	NY	Office	5,400	45.2	126.4	52.6	147.4	-7.5	-21.0	-8.9
2015	P.S. 62 (Kathleen Grimm School of Leadership and Sustainability) (M)	Staten Island	NY	Education	68,680	32.7	88.2	33.7	94.3	-1.0	-6.1	-1.0

Net Zero Energy Emerging

Year Completed	Project Name	City	State	Building Type	Size (sf)	Total EUI	Source EUI	Site RPI	Source RPI	Net EUI	Net Source EUI	zEPI Score
2012	Skaneateles Village Hall (L)	Skaneateles	NY	Office	3,723	47.0	131.6	0.0	0.0	47.0	131.6	56.9
2012	Valatie Free Library	Hudson River Valley	NY	Public Assembly	750							
2013	Bright 'n Green 'Sandy Resistant' Mixed Use Project (L) (B)	Brooklyn	NY	Multifamily	15,000							
2013	Delta Building - NYC	Brooklyn	NY	Multifamily	2,700							
2013	Park Slope Brooklyn ZNE Brownstone	Brooklyn	NY	Multifamily	7,000							
2015	Binghamton CSD MacArthur School	Binghamton	NY	Education	128,231	44.7	125.2			44.7		40.8
2015	Brinkmann True Value	Miller Place	NY	Mercantile (Retail Other than Mall)								
2015	NetZero Village	Rotterdam	NY	Multifamily	140,400							
2015	Zero Energy Nanotechnology Building at SUNY Poly	Utica	NY	Education	356,000							

Net Zero Energy Emerging

Year Completed	Project Name	City	State	Building Type	Size (sf)	Total EUI	Source EUI	Site RPI	Source RPI	Net EUI	Net Source EUI	zEPI Score
2016	HOLT Architects	Ithaca	NY	Office	7,640	47.8	133.8			47.8		57.3
2017	Cornell Tech NYC Academic Building - Roosevelt Island	New York City	NY	Education	158,000	31.9	89.3	0.0	0.0	31.9	89.3	31.1
2018	Casa Serena (Allentown Square Apartments)	Buffalo	NY	Multifamily	26,672							
2019	Erie County Z7+ Bethlehem Steel Site Manufacturing Facility	Lackawanna	NY	Other	76,280							
2019	Perdita Flats	Ithaca	NY	Multifamily	4,500							
2020	Energy and Nature Education Center	Wantagh	NY	Education								
2020	West Point USMA	West Point	NY	Education								
	Allen Treman State Park	Ithaca	NY	Public Assembly								
	Captree State Park	Babylon	NY	Public Assembly								
	Darien Lakes State Park	Darien Center	NY	Public Assembly								
	Dennings Point	Beacon	NY	Public Assembly								
	Natural Resources Defense Council HQ (M)	New York City	NY	Office	55,777	37.6	105.4	0.4	1.0	37.3	104.4	47.7
	Robert Moses State Park	Babylon	NY	Public Assembly								
	Zer0 Place	New Paltz	NY	Multifamily	62,680							

High Performance

Year Completed	Project Name	City	State	Building Type	Size (sf)	Total EUI	Source EUI	Site RPI	Source RPI	Net EUI	Net Source EUI	zEPI Score
2010	The Andrew	Queens	NY	Multifamily	51,173							
2012	JPA V	Utica	NY	Multifamily	4,528	31.3	87.6			31.3		36.3
2013	Brighton 1st Lane Condos	Brooklyn	NY	Multifamily	5,770							
2013	Knickerbocker Commons (B)	Brooklyn	NY	Multifamily	34,199							
2013	Monument Square Apartments	Troy	NY	Multifamily	80,481							
2013	Walmart #2107 Lockport	Lockport	NY	Mercantile (Retail Other than Mall)	208,890	151.2	423.4			151.2		128.6

High Performance

Year Completed	Project Name	City	State	Building Type	Size (sf)	Total EUI	Source EUI	Site RPI	Source RPI	Net EUI	Net Source EUI	zEPI Score
2014	161st Street Mixed Use Development (B)	Jamaica	NY	Multifamily	117,141							
2014	4001 Packard Road	Niagara Falls	NY	Service	463,091	44.5	124.6			44.5		38.4
2014	Breckenridge Place	Ithaca	NY	Multifamily	55,162							
2014	Carriage Factory Special Needs Apartments	Rochester	NY	Multifamily	71,467							
2014	Costco Wholesale Syracuse	Syracuse	NY	Mercantile (Retail Other than Mall)	157,000	132.3	370.4			132.3		112.5
2014	Gateway ShopRite	Brooklyn	NY	Mercantile (Retail Other than Mall)	89,102	58.6	164.1			58.6		54.9
2014	Price Chopper #138 - Store of the Decade	Latham	NY	Mercantile (Retail Other than Mall)	90,000	55.0	154.0			55.0		46.8
2014	Price Chopper Chatham	Ghent	NY	Mercantile (Retail Other than Mall)	45,000	21.7	60.8			21.7		18.5
2014	Price Chopper Watervliet	Watervliet	NY	Mercantile (Retail Other than Mall)	39,000	84.1	235.5			84.1		71.5
2014	SUNY Center for Science & Engineering OCCC	Middletown	NY	Education	93,308							
2014	SUNY Cortland, Student Life Center	Cortland	NY	Education	149,272							
2014	UNFI New York	Montgomery	NY	Service	518,156	146.7	410.9			146.7		126.6
2014	Warren Hall	Ithaca	NY	Education	112,055	73.1	204.7			73.1		66.7
2015	548 4th Avenue	Brooklyn	NY	Multifamily	25,808							
2015	Cornell University, Stocking Hall	Ithaca	NY	Education	144,000	81.8	229.0			81.8		74.6
2015	Costco Rochester	Rochester	NY	Mercantile (Retail Other than Mall)	157,000	114.9	321.7			114.9		97.7
2015	Green Manuf. Ctr (Brooklyn Navy Yard Dev. Corp)	Brooklyn	NY	Service	215,000	32.7	91.6			32.7		31.6
2015	Walmart Colonie #1997	Latham	NY	Mercantile (Retail Other than Mall)	182,873	19.2	53.8			19.2		16.3
2016	416 Waverly Avenue	Mamaroneck	NY	Mercantile (Retail Other than Mall)	40,340	35.0	98.0			35.0		32.8

High Performance

Year Completed	Project Name	City	State	Building Type	Size (sf)	Total EUI	Source EUI	Site RPI	Source RPI	Net EUI	Net Source EUI	zEPI Score
2016	EcoVillage TREE Neighborhood Common House - Sustainable Living Center (SLC)	Ithaca	NY	Multifamily	14,805	15.5	43.4			15.5		18.0
2016	Field House	Pleasantville	NY	Education	14,921	85.2	238.6			85.2		83.1
2016	HANAC Corona Senior Residence	Corona	NY	Multifamily	58,164							
2016	Homewood Suites Clifton Park	Clifton Park	NY	Lodging	83,124	63.2	177.0			63.2		44.6
2016	HWS Performing Arts Center	Geneva	NY	Education	59,978							
2016	Klarman Hall	Ithaca	NY	Education	75,378	45.2	126.7			45.2		41.3
2016	Lecture Hall Student Wing Renovation	Vestal	NY	Education	130,000	164.3	460.0			164.3		149.9
2016	Lockport Ice Arena	Lockport	NY	Mercantile (Retail Other than Mall)	88,312	79.0	221.2			79.0		67.2
2016	Maintenance and Fitness Center (Watchtower Bible a	Tuxedo	NY	Mercantile (Retail Other than Mall)	165,250							
2016	Office & Public Space (Watchtower Bible and Tract)	Tuxedo	NY	Mercantile (Retail Other than Mall)	281,992							
2016	Powerhouse and Rest Parking Garage (Watchtower Bib	Tuxedo	NY	Public Order and Safety	322,224							
2016	Riverdale Country School	Bronx	NY	Education	21,500	45.0	126.0			45.0		43.9
2016	SUNY New Paltz, Wooster Building	New Paltz	NY	Education	65,757							
2016	SUNY Oneonta, Physical Science Bldg	Oneonta	NY	Education	76,724	56.8	159.0			56.8		51.8
2016	Walmart 1744 Webster	Webster	NY	Mercantile (Retail Other than Mall)	186,000	145.5	407.4			145.5		123.7
2016	Walmart Cheektowaga #2586	Cheektowaga	NY	Mercantile (Retail Other than Mall)	179,570	51.4	143.9			51.4		43.7
2017	Albany Damien Center	Albany	NY	Multifamily	9,800	39.0	109.2			39.0		46.5
2017	Canandaigua Veterans Housing	Canandaigua	NY	Multifamily	36,689	38.0	106.4			38.0		45.3
2017	Cornell Tech Residential	New York City	NY	Multifamily	250,644							
2017	Edgemere West/Beach Green North	New York City	NY	Multifamily	119,859							

High Performance

Year Completed	Project Name	City	State	Building Type	Size (sf)	Total EUI	Source EUI	Site RPI	Source RPI	Net EUI	Net Source EUI	zEPI Score
2017	Fine Arts Storage	New York City	NY	Warehouse and Storage	112,510	76.6	214.5			76.6		209.4
2017	Joseph Allen (DePaul) Apartments	Schenectady	NY	Multifamily	52,500							
2017	Oneonta Auxiliary Services	Oneonta	NY	Education	20,450	99.8	279.4			99.8		91.0
2017	Our Lady of Lourdes Apts A	Brooklyn	NY	Multifamily	38,607							
2017	Pace Residence Hall A and B	Pleasantville	NY	Education	222,000	118.7	332.4			118.7		115.7
2017	Passiv Haus Greenpoint	Brooklyn	NY	Multifamily	6,834							
2017	SUNY Fredonia, Rockefeller Arts Center	Fredonia	NY	Education	91,022	61.8	173.0			61.8		57.3
2017	Visual Arts Research and Resource Center	New York City	NY	Education	9,325	28.6	80.1			28.6		27.9
2018	3365 Third Ave	Bronx	NY	Multifamily	37,386	33.0	92.4			33.0		45.4
2018	577 W 161st	New York	NY	Multifamily	16,755							
2018	Our Lady of Lourdes Apts C	Brooklyn	NY	Multifamily	45,585							
2018	Packet Boat Landing	Lockport	NY	Multifamily	60,000							
2019	156 Perry Street	New York	NY	Multifamily	32,600							
2019	1860 Eastern Parkway	Brooklyn	NY	Multifamily	61,300							
2019	211 Passive House	New York	NY	Multifamily	51,376							
2019	3500 Park Avenue	Bronx	NY	Multifamily	79,181							
2019	425 Grand Concourse	Bronx	NY	Multifamily	246,973							
2019	Beverly's Place	Brooklyn	NY	Multifamily	64,265	90.0	252.0			90.0		123.8
2019	City Centre	Ithaca	NY	Multifamily	167,100							
2019	Harold's Square	Ithaca	NY	Multifamily	105,669	29.0	81.2			29.0		33.6
2019	Tree of Life (B)	Queens	NY	Multifamily	213,490							
2020	1182 Woodycrest	Bronx	NY	Multifamily	41,198							
2020	1579 St. John's Place	Brooklyn	NY	Multifamily	185,000	33.0	92.4			33.0		45.4
2020	1675 Westchester Avenue	Bronx	NY	Multifamily	187,016							
2020	505 East 86th Street	New York	NY	Multifamily	108,362							
2020	Breaking Ground II - 453 East 142nd Street	Bronx	NY	Multifamily	125,000	33.0	92.4			33.0		45.4
2020	Chestnut Commons	Brooklyn	NY	Multifamily	263,917							
2021	2126 Mapes Avenue	Bronx	NY	Multifamily	33,052							
2021	302-314 West 127th Street	New York	NY	Multifamily	99,619	43.0	120.4			43.0		59.2
2021	37 Hillside Avenue	New York	NY	Multifamily	119,428							

High Performance

Year Completed	Project Name	City	State	Building Type	Size (sf)	Total EUI	Source EUI	Site RPI	Source RPI	Net EUI	Net Source EUI	zEPI Score
2021	4697 Third Avenue	Bronx	NY	Multifamily	63,125							
2021	65-89 East 233rd Street	Bronx	NY	Multifamily	52,435							
2021	925 Courtlandt Avenue	Bronx	NY	Multifamily	133,215							
2021	Balton Commons	New York	NY	Multifamily	29,216							
2021	Sendero Verde Building A	New York	NY	Multifamily	385,000	33.0	92.4			33.0		45.4
2021	St Nicks Alliance I & II	Brooklyn	NY	Multifamily	82,404							
2022	Sendero Verde Building B	New York	NY	Multifamily	330,000	33.0	92.4			33.0		45.4
2022	Sendero Verde Building C	New York	NY	Multifamily	92,000	33.0	92.4			33.0		45.4
	Bronx River Alliance	Bronx	NY	Public Assembly	7,000							

Passive House

Year Completed	Project Name	City	State	Building Type	Size (sf)	Total EUI	Source EUI	Site RPI	Source RPI	Net EUI	Net Source EUI	zEPI Score
2014	Rachel Carson Way (7 homes) (B)	Ithaca	NY	Multifamily	8,000							
2016	Columbia County Habitat Passive Townhouses (B)	Hudson	NY	Multifamily	2,680							
2017	44-19 Rockaway Beach Blvd. "Beach Green Dunes" (B)	Far Rockaway	NY	Multifamily	111,000	9.8	27.3	10.4	29.0	-0.6	-1.7	-0.7
2017	Seventh Day Adventist Church (B)	Kinderhook	NY	Public Assembly	6,538							
2018	178 Main Street (B)	Cold Spring	NY	Office	1,097							
2018	Beach Green North (B)	Far Rockaway	NY	Multifamily	93,894							
	11 W. 126th St. (B)	Manhattan	NY	Multifamily	9,655	45.2	126.4	52.6	147.4	-7.5	-21.0	-8.9
	156 Rivington St. "ABC No Rio" (A)	Manhattan	NY	Public Assembly		32.7	88.2	33.7	94.3	-1.0	-6.1	-1.0
	2 W. Loop Rd. "Cornell Tech" (A)	Roosevelt Island	NY	Multifamily	181,350							
	542 W 153rd St "Perch Harlem" (B)	Hamilton Heights	NY	Multifamily	28,573							
	951 Pacific St. "R-951 Residence" (A)	Brooklyn	NY	Multifamily	3,735							
	Bronx Tech Incubator (A)	Bronx	NY	Office	23,000							

Passive House

Year Completed	Project Name	City	State	Building Type	Size (sf)	Total EUI	Source EUI	Site RPI	Source RPI	Net EUI	Net Source EUI	zEPI Score
	Chevra Hatzalah Ambulance Station (A)	Brooklyn	NY	Health Care (Outpatient)	7,222							
	CreekView Apartments at Woodland Park Phase 1 (B)	Canandaigua	NY	Multifamily	89,758							
	Hanac Senior Housing (A)	Queens	NY	Multifamily	59,675							
	Morris II Apartments (B)	New York City	NY	Multifamily	152,126							
	Omega Institute for Holistic Studies - Women's Leadership Center (B)	Rhinebeck	NY	Education	1,422							

33. The net zero energy certified Omega Center for Sustainable Living, Rhinebeck, NY Credit: Omega Institute.



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New Buildings Institute (NBI) is a nonprofit organization driving better energy performance in buildings. We work 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. We also develop and offer guidance and tools to support the design and construction of energy efficient buildings.

Throughout its 20-year history, NBI has become a trusted and independent resource helping to drive buildings that are better for people and the environment.

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