

## CHAPTER 9



The Erie County Board of Elections had been relying on a large boiler system to heat the entirety of the 120,000-square-foot building on West Eagle Street in Buffalo. In March 2023, the County began retrofitting the 90-year-old structure with an electrical heat pump system, which is a cleaner and healthier alternative to traditional heating and cooling systems. New condensers located throughout the building will allow room temperatures to be controlled individually.

"We're doing what we can to shift away from fossil fuels," says Erie County Director of Energy Development and Management Reed Braman. "This is a demonstration of the technology that exists today and how multi-story buildings can be brought up to modern standards."



# Commercial Energy Conservation and Renewable Energy



## GOAL: Move toward net-zero-carbon-emissions commercial buildings and support the transition to a decarbonized electrical grid.

Commercial buildings provide the setting for much of the social, cultural, and economic activity in Erie County, but almost all of them were constructed at a time before the burning of fossil fuels for energy was a concern. During Erie County’s cold winters, buildings require significant amounts of energy for heating, while the changing climate is resulting in increased energy loads to cool buildings during hot summer months. Furthermore, many of the buildings in Erie County were constructed before proper insulation, high-performing windows, energy-smart, or fossil-free technologies became available. Consequently, commercial buildings contribute significantly to our carbon footprint, with office buildings alone accounting for 22% of statewide GHG emissions, mostly from natural gas use.<sup>99</sup>

Decarbonizing commercial energy in Erie County requires a deep understanding of the value of carbon reduction and energy efficiency within the commercial building sector while partnering with key stakeholder utilities and energy consumers. From there, Erie County can work toward improvements in three ways:

1) From the demand side by supporting improved energy code implementation in buildings and building electrification;

2) From the supply side by supporting ramped-up renewable electricity production; and

3) From the interface between both sides by encouraging the incorporation of energy storage and flexible, smart management of electrical demand on the grid. Because the electrical grid serving Erie County already has the lowest GHG emissions rate of any region in the country, with a GHG emission rate less than one third the national average, Erie County is already well on its way toward a decarbonized electric energy supply.<sup>100</sup>

In the future, new commercial buildings that are compliant with more efficient energy codes and deploy high performance technologies will interface with a decarbonized grid built from distributed renewables and storage. A smarter grid will manage its loads such that electricity will be sent from wherever it is produced to wherever it is needed and buildings will scale back electricity usage in times of high demand. However, Erie County’s transition to a decarbonized grid is not only a technological challenge, but will also require clear and reliable information for planning energy projects and consistent advocacy for the County government’s goal of net-zero-carbon-emission buildings and a decarbonized electrical grid.

### DEFINITIONS FOR ACTIONS SPECIFICATIONS

#### Short-term:

By or before 2030

#### Medium-term:

By 2040

#### Long-term:

By 2050

#### Direct:

County government can directly control the action - relating to County government operations and infrastructure

#### Indirect:

Regional agencies and municipalities have control and/or County government can support/influence



Green Energy Futures, Passive solar energy is key to building a net-zero home, 2012, photograph, <https://www.flickr.com/photos/greenenergyfutures/14520819865/in/photostream/>

## Passive Design Techniques for Buildings

Passive design works with the local climate to maintain a comfortable temperature in a building without an external heat source like a boiler or heat pump. The following are examples of passive design strategies:

- Keep spaces open to allow wind to passively ventilate the building.
- Provide shade with large overhangs and trellises.
- Efficient insulation.
- Use high-performance windows and doors.
- Create an airtight building.
- Build high-performing walls.
- For new builds, strategically place the building to maximize solar exposure, provide protection from prevailing winds, and take advantage of the site's natural features.<sup>1</sup>

Source:

<sup>1</sup> Laura Rote, "9 Passive Design Strategies to Inspire Your Next Project," gb&d, July 12, 2021, <https://gbdmagazine.com/passive-design-strategies/>.

## Electrification: An Opportunity for WNY

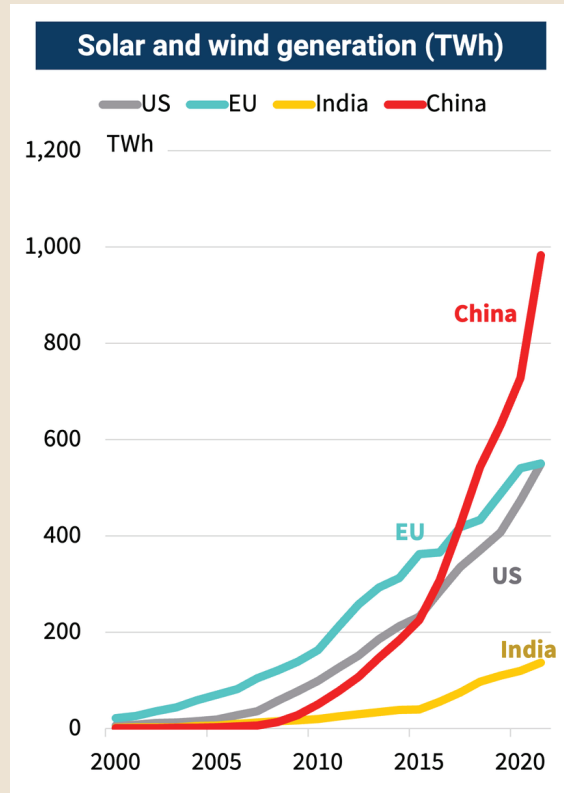
Electrification and transitioning to clean energy offers a host of opportunities to reduce air pollution, invest our energy dollars in local jobs, and move our community into the future while protecting the planet from climate pollution. Technology improvements are driving down renewable energy costs, resulting in exponential growth around the world (see Figure 27). We are well on our way to a truly clean electric grid since WNY has the greenest, least carbon intensive electricity of any region in the country.<sup>1</sup> Our large hydropower plant at Niagara Falls can supplement when solar and wind power outputs are low. Therefore, our community is especially well suited for building wind and solar power projects.

Many of the clean energy technologies also make our electric system more resilient to the intense storms that we are more frequently experiencing because of climate change. Strategies like rooftop solar, vehicle-to-grid and battery storage systems, smart load shifting technologies, load shedding technologies, and microgrids make the electric system less centralized and less vulnerable to disruption. As utilities upgrade the electric distribution system to increase its capacity, there is an important opportunity to make the system more resilient to storms to avoid power outages. For example, during the Buffalo 2022 blizzard, substations were not designed for heavy wind and snow and were shut down for days. A more resilient electrical grid will be less vulnerable to disruption.

Economic and health benefits offer additional benefits and opportunities. By investing in clean energy technology, such as local wind and solar farms, EVs, and efficient buildings, we create local investment, local jobs, and keep our energy dollars in our community. Furthermore, transitioning to clean energy greatly improves air quality, keeps workers on the job, and lifts up communities that have suffered the most from fossil fuel pollution.

Source:  
1 USEPA, "Power Profiler," Data and Tools, United States Environmental Protection Agency, June 5, 2023, <https://www.epa.gov/egrid/power-profiler>.

Figure 27 Solar and Wind Generation



Rocky Mountain Institute, Solar and wind generation, 2023, graph, <https://rmi.org/the-energy-transition-in-five-charts-and-not-too-many-numbers/>

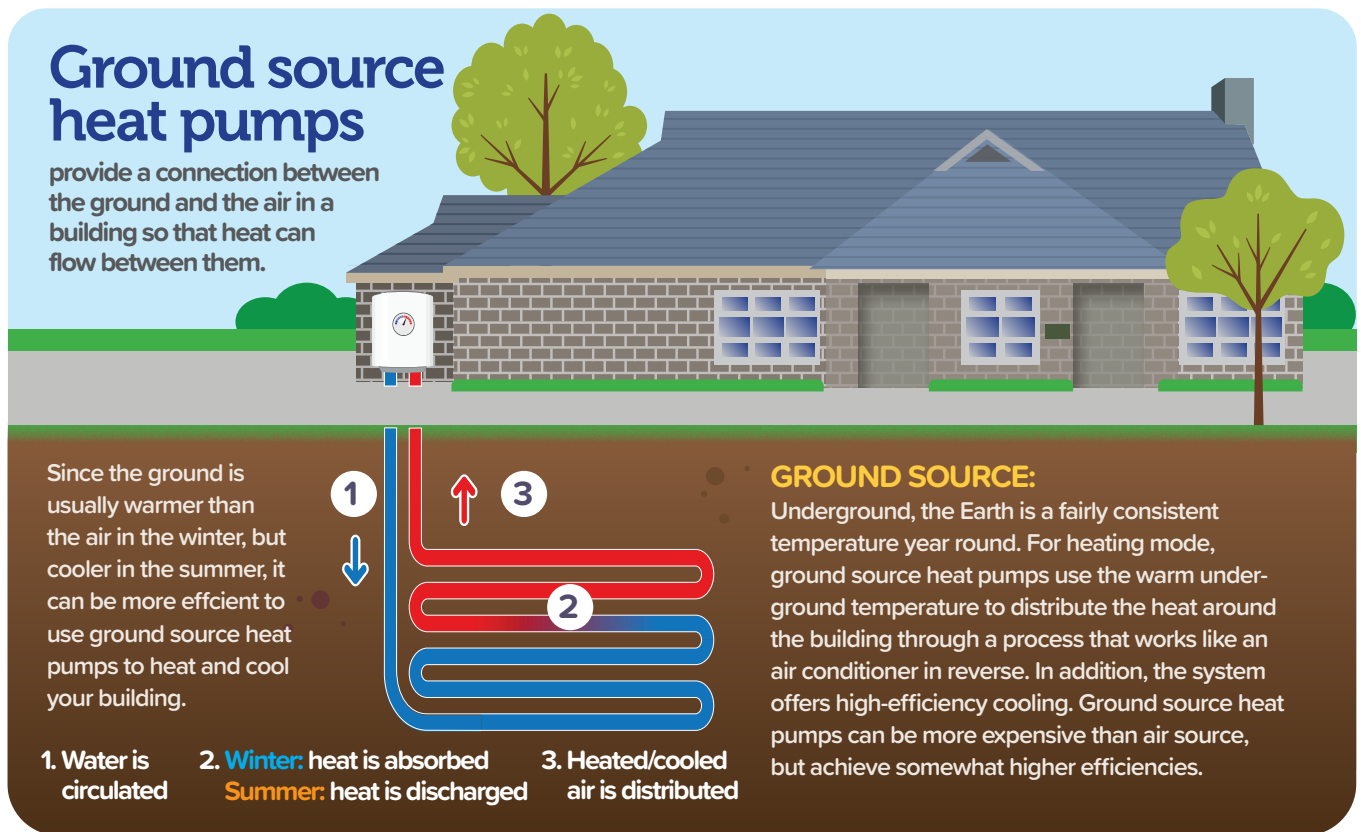
## STRATEGY 1: Building Performance & Efficiency Education

The commercial buildings in Erie County are major energy users, and until such time as the grid is carbon-free and buildings are electrified, they will remain significant contributors to GHG emissions. This is to be expected, given the advanced age of much of the commercial building

stock. As the climate shifts toward hotter summers in Erie County with more frequent extreme heat events, the energy demand for cooling technologies will rise, placing even more demand on the electrical grid. While the County sets its long-term sights on system-wide changes, it must not lose

perspective on the need to improve commercial building performance throughout Erie County to reduce the electricity loads put on the grid, which reduces the overall need for new renewable energy sources over time.

Figure 28 Ground Source Heat Pumps



A significant additional step toward reducing the GHG emissions associated with current commercial buildings is to develop a clear understanding about the drivers of energy use in commercial buildings and transparent communication to all stakeholders about building energy performance. The gaps in information include:

- Sound business cases for high-performance strategies in old buildings

in cold climates exist, but may not be readily known to building owners and managers.

- The energy performance of a building relative to its comparable peers is often unclear to both the current owners hoping to improve efficiency and to prospective buyers or renters looking to mitigate future energy cost risk.
- Information about funding and

financing for efficiency improvements may be hard to find or understand.

Erie County can play a significant role in closing the information gaps among commercial building stakeholders with clear market signals demanding high performance, energy efficiency, and the reduction of GHG emissions from its commercial building inventory.

**COMMERCIAL ENERGY CONSERVATION AND RENEWABLE ENERGY GOAL:** Move toward net-zero-carbon-emissions commercial buildings and support the transition to a decarbonized electrical grid.

<b>STRATEGY 1: Building Performance &amp; Efficiency Education</b>	<b>HORIZON</b>	<b>SPHERE OF INFLUENCE</b>	<b>LEAD COUNTY ENTITY</b>	<b>PARTNERS</b>
<b>ACTION ITEM 9.1.1:</b>	<b>Create and maintain a website to connect the community to key local and industry resources (including case studies) related to building energy performance.</b>			
	Short-Term	Direct	DEP, DPW	American Institute of Architects (AIA), United States Green Building Council (USGBC), WNY SBR, NYSERDA, Buffalo & Erie County Library
<b>ACTION ITEM 9.1.2:</b>	<b>Advocate for utility companies to include energy performance ratings on energy bills.</b>			
<b>ACTION ITEM 9.1.3:</b>	<b>Advocate for building performance information requirements and resources to address building efficiency be provided to homebuyers and renters at time of closing or leasing.</b>			
	Medium-Term/ Long-Term	Indirect	DEP, DPW	Utilities, New York State Association of Counties (NYSAC), Public Service Commission (PSC)
<b>ACTION ITEM 9.1.4:</b>	<b>Advocate for public benchmarking and disclosure of commercial building energy consumption for larger buildings.</b>			
<b>ACTION ITEM 9.1.5:</b>	<b>Educate developers on funding and financing opportunities, including Property Assessed Clean Energy (PACE) financing.<sup>101</sup></b>			
<b>ACTION ITEM 9.1.6:</b>	<b>Use high performing County-owned buildings and facilities to educate the community on building efficiency opportunities.</b>			
<b>ACTION ITEM 9.1.7:</b>	<b>Work with Industrial Development Agencies (IDAs) to incentivize high-performing buildings.</b>			
	Short-Term/ Medium-Term	Indirect	DEP; Office of Economic Development	ECIDA, regional IDAs, Chambers of Commerce

## Heat Pumps

Cold-climate heat pumps are a clean, comfortable, and efficient way to heat and cool homes and buildings — achieving two to four times the efficiency of electric resistance heating while emitting no climate pollution when paired with renewable energy.<sup>1</sup> In heating mode, they work like an air conditioner in reverse — moving energy from outside air, ground, or water to the interior of the building. Below are common types of heat pumps:

- **Air Source:** In heating mode, air from the outside acts as an energy source (cold air still has heat in it), with common models operating at full capacity below -15 °F. Air source heat pumps are often less expensive than ground source heat pumps. There are different types of air source heat pumps:
  - **Ducted Air Source Heat Pump** - Some versions replace a conventional furnace, using the building’s existing ductwork.
  - **Ductless Air Source Heat Pump** - Sometimes called a “mini-split” or “multi-split,” these systems often have wall-mounted interior units and do not use ductwork.
  - **Variable Refrigerant Flow (VRF) Systems** - Large scale systems that use sophisticated control systems to heat and cool commercial buildings.
- **Ground Source:** Underground, the Earth is a fairly consistent temperature year-round. For heating mode, ground source heat pumps use the warm underground temperature to distribute the heat around the building through a process that works like an air conditioner in reverse. In addition, the system offers high-efficiency cooling. Another variation uses a pond or other body of water as the energy source and sink for heating and cooling, respectively. Ground source heat pumps can be more expensive than air source, but achieve somewhat higher efficiencies.
- **Heat Pump Domestic Hot Water Heater:** Heat pump water heaters can be used in homes and larger buildings to heat hot water for sinks, showers, and other uses. Energy from the surrounding air is transferred to water in an enclosed tank.



VRF at the Erie County Board of Elections building.



Commercial air source mini-split heat pumps at the Police Apartments in Buffalo, NY.



Ductless air source heat pump indoor unit.

National Renewable Energy Laboratory, Ductless air source heat pump indoor unit, 2017, photograph, 61st and Pena Station, Denver, <https://www.flickr.com/photos/nrel/37751098576>

Source:

<sup>1</sup> Lacey Tan and Jack Teener, “Now Is the Time to Go All In on Heat Pumps,” RMI, July 6, 2023, <https://rmi.org/now-is-the-time-to-go-all-in-on-heat-pumps/>.

## STRATEGY 2: Decarbonized Power Sector

The largest reductions in Erie County’s carbon footprint will be seen by the electrification of buildings and transportation using renewable energy. To maximize the benefits of electrification, New York State has set a goal of 100% zero-emission electricity by 2040.<sup>103</sup> Fortunately, New York State already has one of the lowest carbon-based electric supplies in the United States, with about 74% of generation within upstate NY from zero-emissions sources, including solar, wind, nuclear, and hydropower.<sup>104</sup> Reaching this goal will require a much broader deployment of renewable energy sources. To be successful in our community, the County must continue leading this transition, while working to protect important resources including agricultural and Native lands, as well as ecologically sensitive areas.

The Erie County government currently

supports utility-scale renewable energy development in key ways. For most utility-scale projects, the County’s DEP reviews site plans and advises local governments on approval determinations. Typically, developers negotiate Payment in Lieu of Taxes (PILOT) agreements with towns, school districts, and the County, which reduces real estate taxes for developers. This system reflects that solar and wind projects create community benefits, do not create increased demands on municipal services, and gives the County some leverage on whether and how the projects move forward. In addition, the County hosts trainings for local government leaders and staff regarding renewable energy planning and permitting. Furthermore, the County provides planning grants through its Office of Agriculture to support updates to municipal comprehensive plans, zoning

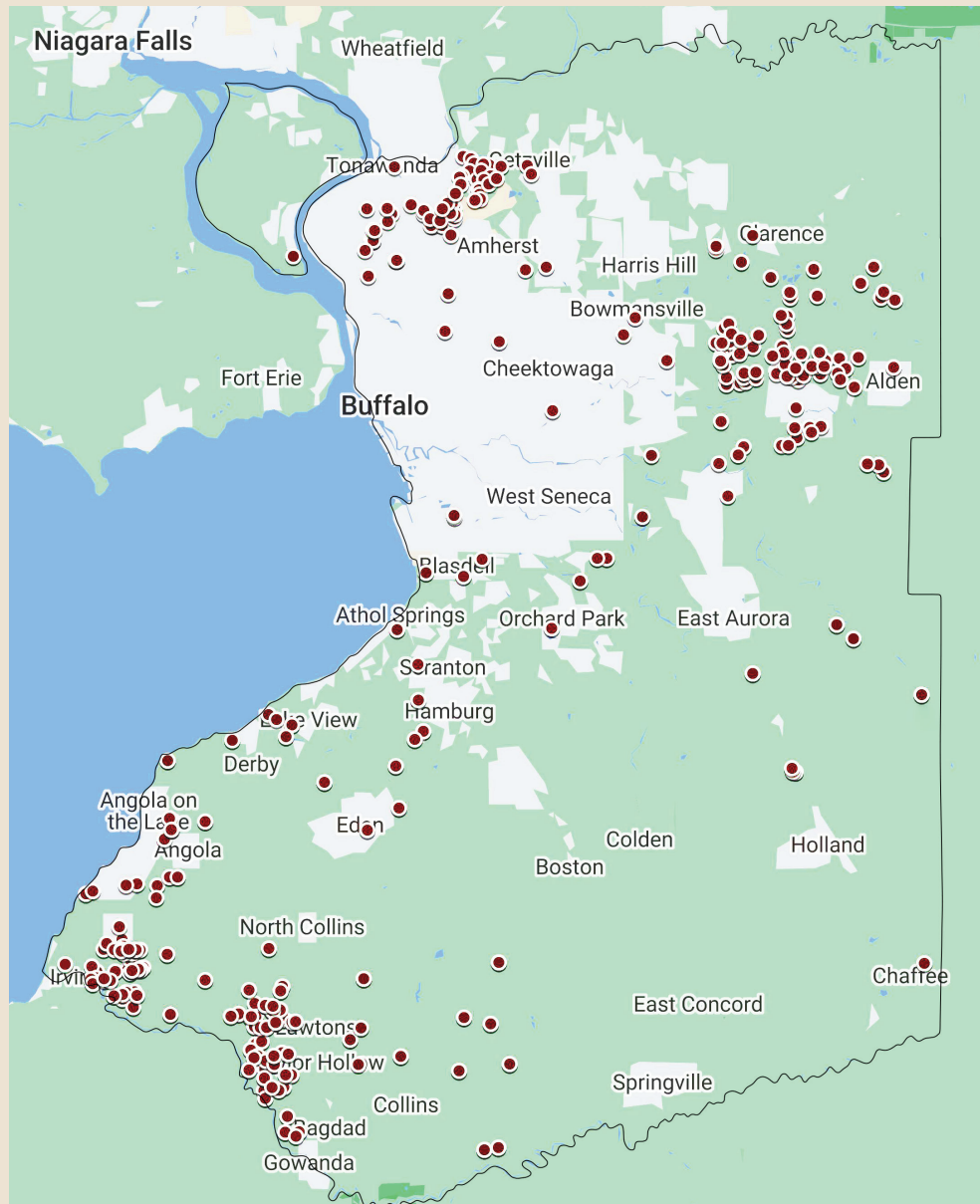
regulations, and ordinances.

Despite these positive actions, Erie County must do more to decarbonize the power sector. There is increasing confusion in the community regarding the benefits and impacts of renewable energy, and the County needs to proactively provide scientific information in plain, accessible language while advocating for appropriate clean energy projects. The County government must also support the development of a workforce with the skills to implement clean energy projects, including training workers from disadvantaged communities, which is discussed in the Economic and Workforce Development chapter. Finally, the County will lead our community with innovative solutions that support an affordable and equitable transition to clean energy, which is being planned through its ECLIPSE program.

<b>STRATEGY 2: Decarbonized Power Sector</b>	<b>HORIZON</b>	<b>SPHERE OF INFLUENCE</b>	<b>LEAD COUNTY ENTITY</b>	<b>PARTNERS</b>
<b>ACTION ITEM 9.2.1:</b>	<b>Work with renewable energy developers, land owners, local governments, residents, and other stakeholders to foster the broad deployment of renewable energy, including wind power, solar energy, and hydropower.</b>			
	Short-Term/ Long-Term	Indirect	DEP	Local municipalities, developers, NYSERDA, WNY SBR
<b>ACTION ITEM 9.2.2:</b>	<b>Educate and train municipal leaders on how to plan and permit renewable energy development.</b>			
	Short-Term/ Long-Term	Direct	DEP	UBRI, NYSERDA, NYSDOS, local municipalities
<b>ACTION ITEM 9.2.3:</b>	<b>Emphasize projects that conserve energy in the County’s CDBG program.</b>			
	Short-Term/ Long-Term	Indirect	DEP	HUD, local municipalities, WNY SBR
<b>ACTION ITEM 9.2.4:</b>	<b>Promote finance programs, such as PILOT and PACE for renewable energy projects.</b>			
	Short-Term/ Long-Term	Indirect	DEP	County IDAs, businesses, WNY SBR, developers, NYSERDA
<b>ACTION ITEM 9.2.5:</b>	<b>Support the alignment of economic development policy and incentives for renewable energy with climate goals.</b>			
	Short-Term/ Long-Term	Indirect	DEP; Office of Economic Development	County IDAs, local municipalities, developers, WNY SBR, NYSERDA
<b>ACTION ITEM 9.2.6:</b>	<b>Coordinate with the NYSDEC to raise awareness about the New York Works Well Plugging Initiative<sup>102</sup> as well as the importance of identifying and plugging wells.</b>			
	Short-Term/ Long-Term	Indirect	DEP	NYSDEC, Erie County Soil & Water Conservation District (SWCD), WNY Land Conservancy (WNYLC)



**Figure 29** Orphaned Wells in Erie County



## Abandoned Oil and Gas Wells

Abandoned, uncapped oil and gas wells often leak methane, a potent climate pollutant, and they also often contribute to groundwater contamination. NYSDEC has identified 334 potential abandoned wells in Erie County, almost all of which are natural gas wells, which are especially challenging to cap. Capping the wells is a challenging and expensive technical process that involves the placement of cement at specific depth intervals in a wellbore to seal hydrocarbon-bearing zones, therefore,

preventing pollution. Fortunately, NYSDEC has a voluntary program to identify wells and cap them at no expense to landowners. If you are aware of a well that might be uncapped, or if you are a landowner and would like to learn more about this program, please contact NYSDEC.<sup>1</sup>

Note:

<sup>1</sup> To learn more about orphaned and abandoned well plugging, go to the NYSDEC's website at <https://www.dec.ny.gov/energy/111211.html>

## STRATEGY 3: Energy Code

Constructing new commercial buildings efficiently and incorporating energy efficiency into rehabilitation projects is much more cost effective than later retrofitting existing buildings. Additionally, energy efficiency is linked with reduced energy burden and health benefits. New York State has issued an Energy Code for buildings that is enforced by local governments and is frequently updated to incorporate improved practices.<sup>105</sup> In addition to the required Energy Code, NYSERDA released the 2020 NYStretch Energy Code to support higher efficiency standards and serves as an option for municipalities to adopt as an alternative to the existing Energy Code.<sup>106</sup> Local governments are not always able to fully enforce the Energy Code, and there is an opportunity for the County to support its municipalities so they can better implement the Energy Code while supporting

implementation of the NYStretch Energy Code. Enforcement of the Energy Code for commercial buildings is especially important regarding multifamily residential buildings where LMI residents live because this will reduce their energy burden while improving health for a population that is often negatively impacted by substandard housing.

As we look for opportunities to revitalize our communities and update an aging building stock, the County will continue to advance energy efficiency measures by educating code officials on new smart technologies and their integration into building systems. By partnering with the NYDOS, NYSERDA, and other experts, Erie County will continue to provide training sessions on Energy Code and other specialized energy topics for municipalities and commercial building owners. Topics may include long-duration

battery storage, solar power generation, wind power generation, and potentially geothermal heating and cooling systems. These trainings can target not just municipalities, but also renters, landlords, homeowners, businesses, and building professionals, especially those from disadvantaged communities. Additionally, the County will develop educational materials, such as business case studies that will be shared with elected officials and planning board members to highlight clean energy advantages and encourage the adoption of the NYStretch Energy Code. Finally, Erie County will identify opportunities to directly support improvements in County-wide code compliance by providing technical support to local governments for Energy Code compliance implementation.

STRATEGY 3: Energy Code	HORIZON	SPHERE OF INFLUENCE	LEAD COUNTY ENTITY	PARTNERS
<b>ACTION ITEM 9.3.1:</b>	<b>Educate local governments on energy and building codes, including NYStretch Code and American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).</b>			
Short-Term/Ongoing	Direct	DEP	NYDOS, NYSERDA, utilities, UBRI, BOMA, Association of Local Governments	
<b>ACTION ITEM 9.3.2:</b>	<b>Provide direct technical support to local governments for Energy Code compliance and implementation.</b>			
Short-Term/Ongoing	Direct	DEP	Association of Local Governments, IDAs, Construction Exchange, AIA, New York Conference of Mayors (NYCOM), NYSAC	

### NYStretch Code

Every local government is required to regulate new building construction according to minimum energy conservation requirements described in the Energy Conservation Construction Code for New York State. NYStretch Energy Code 2020 (NYStretch) was developed by NYSERDA as a voluntary option for local governments that saves 10-12% more energy than the NYS's base energy code.<sup>1</sup> NYStretch can protect the environment while creating healthier, more comfortable buildings with lower operating costs.<sup>2</sup> Erie County can provide training and support to implement NYStretch.

Sources:

<sup>1</sup> NYSERDA, "NYStretch Energy Code: 2020 Outreach, Training and Resources," NYSERDA, July 17, 2023, <https://www.nyserdera.ny.gov/All-Programs/Clean-Resilient-Building-Codes/NYStretch-Energy-Code-2020>.

<sup>2</sup> NYSERDA.

<sup>3</sup> NYSERDA, "NYStretch Energy Code — 2020: Frequently Asked Questions," July 2019, <https://www.nyserdera.ny.gov/-/media/Project/Nyserda/Files/Programs/Energy-Code-Training/codes-faqs.pdf>.

The NYStretch Code benefits:

- Significant energy and utility cost savings for homeowners, tenants, renters, and building owners.
- Reduced building operational costs.
- Reduced climate and environmental impacts.
- Increased occupant comfort and health.
- Increased real estate value and community attractiveness.
- Research and development stimulation and commercialization of products that improve energy efficiency performance.
- Green job creation.<sup>3</sup>

## STRATEGY 4: Energy Storage & Demand Management

Western New York's electrical grid adjusts to large fluctuations in electric demand mostly by ramping up and down the electricity generated at natural gas and hydropower plants. However, the grid will become increasingly powered by renewable energy sources in the coming years, as new wind and solar projects are built. The productivity of renewable energy sources is driven by the availability of wind and sunlight, which does not always closely line up with the times of peak electricity demand on the grid. Furthermore, some additional capacity for the grid to respond to shifting demand will be needed to maintain a resilient supply of electricity to consumers throughout Erie County. In anticipation of increased quantities of renewable energy production sources, the grid should incorporate more energy storage capacity while enabling demand management strategies. Storage and demand management will allow a zero-GHG-emissions grid to deliver electricity even in high-demand situations, such as during extreme heat events with high air-conditioning use. Overall, a grid with storage capacity is more resilient to climate change impacts. In addition, a grid with significant energy storage and managed demands requires the utility to invest less in new power plants to meet times of high demand. This averted cost may translate into lower costs for ratepayers as well.

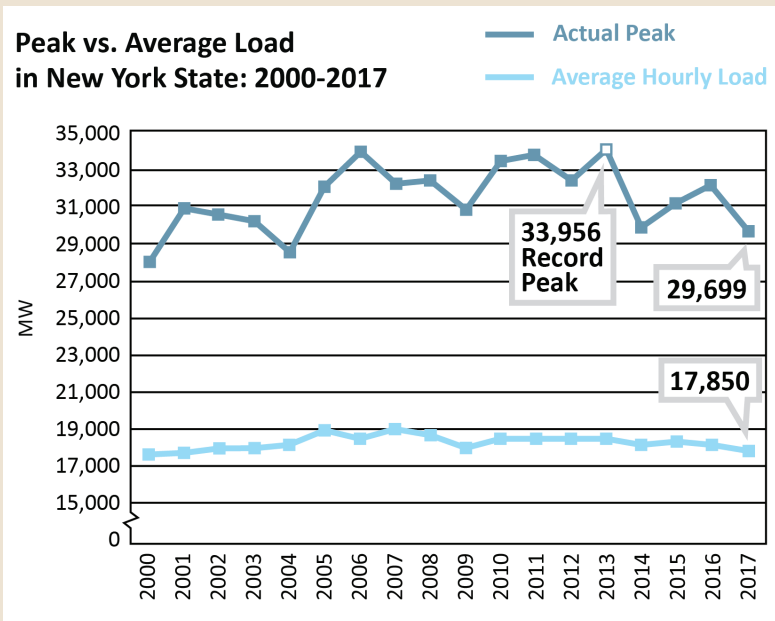
Energy storage today includes both utility-scale battery and non-battery facilities. Battery systems are installed within commercial and residential buildings. The world is experiencing a revolution in battery technology, with new, high-performance options becoming increasingly affordable.<sup>107</sup> Soon, advanced EVs will allow vehicle owners to make their car battery available for grid energy storage. This gives the owner the option to use the power for their home or provide power to the grid when electricity is in high demand and charge up their vehicle when there is less demand. While energy storage systems are considered safe,<sup>108</sup> battery systems will need to be carefully deployed and disposed. In the case of utility-scale systems, energy storage systems will require careful siting and sensitivity to climate justice, agricultural, and ecological concerns.

Demand management strategies are the mechanisms that allow the grid to take full advantage of energy storage and allow consumers to make energy-use choices, which can reduce the peak electricity demand on the grid. These strategies require a flow of information to consumers, indicating a need for a shift in how information is provided and received based on the forecasted demand. Today, alerts warning consumers of an upcoming high demand day may be sent to consumers via email or text. As newer "smart" meters are deployed through-

out the County, grid demand information can be sent in real time directly to consumers' equipment and appliances, allowing for an automated response in accordance with the owner's predetermined choices. For example, a building owner might set an air conditioning system to raise the building thermostat a few degrees when the utility signals electricity is in high demand. Often, smart metering is accompanied by demand pricing, which incentivizes the decision to shift loads by making electricity more expensive in times of peak usage. Thus, behaviors which make the grid resilient can also translate into lower costs for consumers.

Erie County has already begun promoting the use of battery storage technology by hosting training sessions to educate municipal staff on how to include battery storage in comprehensive plans and to inform local government code enforcement officers on how to permit battery storage projects. To help support New York State's goals of 1,500 megawatts (MW) of energy storage by 2025 and 3,000 MW by 2030, the County will promote battery storage and load shifting technologies, provide building owners with educational resources, work with municipalities to formulate ordinances and codes for when battery storage is employed, and ensure equitable distribution of the benefits of these technologies.

Figure 30 Peak vs. Average Load in New York State



New York Independent System Operator, Peak vs. Average Load in New York State: 2000 – 2017, 2018, graph, <https://www.nyiso.com/-/understanding-summer-energy-demand>

Revised by Shania Julia Anunciacion

## Load Shifting, Interconnectivity, Demand Response, and Load Leveling

Our entire electric system, including generating facilities, substations, transmission lines, and distribution lines, is designed to have the capacity to deliver electricity at times of peak electric use. These peak loads may only occur for brief times and are typically more than twice the average loads (see Figure 30 above). In our region, peak electric use normally happens during hot days in the summer, when air conditioning use is high. As we transition to clean energy, if we use electricity more flexibly to reduce peak loads and make electric demand more balanced (sometimes called **load leveling**), our community can greatly reduce the cost of investments in the electric system.

There are a wide variety of approaches to reduce peak loads that fall under the umbrella terms **demand management** and **demand response**. Many activities that require electricity can be coordinated so that they use the electricity when there isn't as much demand on the grid. Examples can include Time of Use meters that allow utilities to charge less for electricity when demand is low. For example, National Grid residential customers

can request a Time of Use meter that allows them to charge their EV at night, when there is excess electric capacity and rates are inexpensive.

More sophisticated approaches can involve smart meters and connected devices where, for example, an individual or business can sign up to allow the utility to make changes to a thermostat or delay the use of an appliance to reduce peak loads. This is often called **load shifting**. Some of these strategies are already in use with large commercial buildings and industrial energy consumers, but it is anticipated that new technologies will allow for much more equipment and appliances to be automatically controlled which will have a larger effect.

Energy storage systems like building batteries or “vehicle-to-grid” systems using electric vehicle batteries, sometimes called **distributed storage systems**, are also likely to be important tools for leveling electric loads, as individuals and businesses can save electric costs by charging batteries when electric rates are inexpensive, and selling or using the stored energy when rates are high.

<b>STRATEGY 4: Energy Storage &amp; Demand Management</b>	<b>HORIZON</b>	<b>SPHERE OF INFLUENCE</b>	<b>LEAD COUNTY ENTITY</b>	<b>PARTNERS</b>
<b>ACTION ITEM 9.4.1:</b>	<b>Educate commercial, industrial, residential, and school building owners about battery storage and load shifting options.</b>			
	Short-Term/ Medium-Term	Direct	DEP, DPW	BOMA, WNY SBR, NYSERDA, NYPA, NY State Assembly & Senate, NYSAC
<b>ACTION ITEM 9.4.2:</b>	<b>Educate municipal officials about battery storage for formulation of ordinances and codes protecting life and property, while valuing climate justice.</b>			
	Short-Term/ Medium-Term	Direct	DEP	NYDOS, NYSERDA, ECEMC
<b>ACTION ITEM 9.4.3:</b>	<b>Incorporate battery storage and load shifting into the County’s heat emergency plan and other resilience plans.</b>			
	Medium-Term	Direct	DEP, Emergency Services, ECDOH	Libraries

## Further Reading

### Building Performance & Efficiency Education Strategy

#### Air Source Heat Pumps –

Visual of how air source heat pumps work.

<https://goclean.masscec.com/article/how-air-source-heat-pumps-work/#tab-id-1>

#### Ducted and Ductless Air Source Heat Pumps –

Visual of how ducted and ductless air source heat pumps work.

<https://goclean.masscec.com/clean-energy-solutions/air-source-heat-pumps/#tab-id-1>

### Decarbonized Power Sector Strategy

**Top 5 Large-Scale Solar Myths** – Initial reactions to the prospect of large-scale photovoltaic facilities or solar farms tend to include a myriad of misperceptions.

<https://www.nrel.gov/state-local-tribal/blog/posts/top-five-large-scale-solar-myths.html>

#### Wind and Solar on the Power Grid:

**Myths and Misperceptions** – Common myths and misperceptions on wind and solar regarding their contribution to a low-cost and reliable power grid.

<https://www.nrel.gov/docs/fy15osti/63045.pdf>

**Wind Energy Myths** – 10 common myths and misconceptions with explanations on how energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America.

<https://www.nrel.gov/docs/fy05osti/37657.pdf>

### Energy Code Strategy

#### Microgrid and Smart Grid Technologies

– Learn more about the difference is between a smart grid and a microgrid.

<https://epeconsulting.com/microgrid-vs-smart-grid/>



Western New York's electrical grid will become increasingly powered by renewable energy sources in the coming years as more clean energy technology projects, such as solar farms, are built.

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**FOOTNOTES:** Commercial Energy Conservation and Renewable Energy

99 NYSDEC, "2022 Statewide GHG Emissions Report."

100 USEPA, "Power Profiler."

101 NYSERDA, "Commercial Property Assessed Clean Energy (PACE) Financing Resources," NYSERDA, accessed July 12, 2023, <https://www.nyserd.org/All-Programs/Commercial-Property-Assessed-Clean-Energy-PACE-Financing-Resources>.

102 New York Works Well Plugging Initiative plugs oil and gas wells on private property at no cost to land owners, and reduces an important source of methane emissions

103 NYS Climate Action Council, "New York State Climate Action Scoping Plan."

104 USEPA, "Power Profiler."

105 International Code Council, "Effective Use of the Energy Conservation Construction Code of New York State," ICC, November 2019, <https://codes.iccsafe.org/content/NYSECC2020P1/effective-use-of-the-energy-conservation-construction-code-of-new-york-state>.

106 NYSERDA, "NYStretch Energy Code — 2020," July 2019, <https://www.nyserd.org/-/media/Project/Nyserda/Files/Programs/Energy-Code-Training/NYStretch-Energy-Code-2020.pdf>.

107 To learn more about battery technology improving, go this report completed by the Rocky Mountain Institute, [https://rmi.org/wp-content/uploads/2019/10/rmi\\_breakthrough\\_batteries.pdf](https://rmi.org/wp-content/uploads/2019/10/rmi_breakthrough_batteries.pdf)

108 The federal and NYS government have worked to make sure that energy storage systems are safe in residential and commercial settings. To learn more, go to this frequently asked questions document from the National Renewable Energy Laboratory, <https://www.nrel.gov/docs/fy21osti/79393.pdf>