

nationalgrid



# The Future of Electric Networks in New York

Building a Smarter, Stronger, Cleaner and More Equitable Energy Future

# Executive summary

## National Grid is Committed to Delivering the Clean Energy Future and a Just Transition

The nation and our region are at inflection point on climate and energy. New York has established nation-leading climate change, clean energy, and equity goals — goals that we share at National Grid. To meet them, we must build for the future now. We have an opportunity to make real and lasting changes for all our customers across New York. It will take innovation, collaboration, and policy reform to achieve a clean energy future that is reliable, affordable and works for all.

National Grid's New York territory traverses the state from Buffalo to Montauk. Our three operating companies serve 1.7 million electric customers and 2.5 million gas customers. We're ready — and excited — to do our part. And our work is underway.

**Our Clean Energy Vision is our plan to achieve a clean, fair and affordable energy transition for all our customers and communities. It is rooted in actions that:**

- Reduce costs, maintain affordability and enable greater customer choice through energy efficiency and demand response programs.
- Advance electrification through the development of a smarter, stronger, cleaner electric network of the future; and
- Decarbonize the existing pipeline distribution network.

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At its core, the clean energy transition is about re-imagining the future of the energy network, its relationship to customers and communities, and our the ability to cost-effectively deliver on our settled climate goals. In order to facilitate the Empire State’s clean energy goals, the corresponding regulatory paradigms will also need to evolve.

## Policy Changes to Build the Future Electric Network and Deliver a Clean, Fair and Affordable Energy Transition

Policy Changes	Key Actions
<p><b>Accelerate investments to modernize and optimize the network to connect renewables, enable electrification, and build resilience to a changing climate, including through:</b></p>	<ul style="list-style-type: none"> <li>• Reforming the permitting and siting process to make it more transparent and predictable and provide agency to host communities,</li> <li>• Advancing anticipatory planning and investment,</li> <li>• Adequately staffing and resourcing oversight and regulatory agencies, and</li> <li>• Ensuring the timely review and approval of regulatory filings.</li> </ul>
<p><b>Enable customer deployment and adoption of clean, decarbonized technologies and facilitate the cost-effective connection of local, clean energy resources, including through:</b></p>	<ul style="list-style-type: none"> <li>• Advancing innovative and flexible rate designs to reduce peak demand, and</li> <li>• Enabling targeted electrification pilots through integrated energy planning.</li> </ul>
<p><b>Ensure families and businesses can afford their energy bills and easily access savings and assistance programs that place equity at the heart of the transition, including through:</b></p>	<ul style="list-style-type: none"> <li>• Expanding assistance program eligibility,</li> <li>• Transitioning to an energy burden-based approach for providing support, and</li> <li>• Providing financial support to upgrade customer premises to prepare for electrification.</li> </ul>
<p><b>Drive innovation, economic opportunity and growth, prioritizing communities that have historically been left behind and have borne the brunt of the fossil fuel-based economy.</b></p>	<ul style="list-style-type: none"> <li>• Invest in disadvantaged communities as contemplated in the CLCPA, and</li> <li>• Focus community investment on communities most impacted.</li> </ul>

New York is advancing an electrification-based pathway to achieve its climate and clean energy goals, which were established in the 2019 Climate Leadership and Community Protection Act (CLCPA). Signed into law in 2019, New York's nation-leading CLCPA serves as a roadmap to the state's climate change goals. It sets clean energy and greenhouse gas emission reduction targets - including a 40% reduction in emissions by 2030, and 85 percent by 2050. Delivering the emissions reductions mandated by law over the next two decades requires a shift from a multi-fuel energy system to one that increasingly relies more on clean electricity.

Today, customers meet their energy needs through a combination of electric, gas, heating oil and propane, as well as a vast network of fueling stations for their cars, buses, and trucks. In the future, customers will rely on the electric network to power many aspects of their lives and it will become the foundation for our future economic growth and prosperity.

The CLCPA calls for 70 percent renewable energy by 2030, and 100 percent zero-emission electricity by 2040, along with 9,000 MW of offshore wind by 2035; 3,000 MW of energy storage by 2030 and 6,000

MW of solar by 2025. Additionally, in 2022, the governor directed the state Department of Environmental Conservation to adopt regulations that will require all new passenger cars, pickup trucks, and SUVs sold in New York State be zero-emission by 2035.

By 2050, the future electric network in New York must meet customer demand that is forecasted to be more than three times higher than today, with a marked shift in customer usage. Today, New York's electric system experiences peak demand in the summer. As a result of increased power demand driven by the electrification of heating and transportation systems as part of the clean energy transition, the peak for energy demand is projected to shift to the winter.

In its most recent *Reliability Needs Assessment*, the New York Independent System Operator (NYISO) identified the potential for electricity supply shortfalls in New York City beginning in the summer of 2025. The NYISO also modeled the impact of increased electricity demand from anticipated economic development projects - primarily in western and central New York. In 2025, due to a combination of increasing demand and generator retirements, the statewide system margin (amount of reserve power for

days of high demand) is projected to be deficient by 145 MW. By 2033, additional large increases in electricity requirements will further strain system margins and challenge the state's ability to securely and reliably meet forecasted demand.

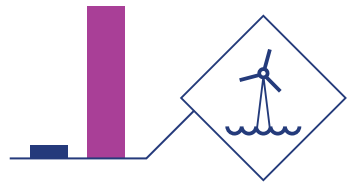
The development of renewables is occurring slower than the CLCPA anticipated. Financial concerns driven by inflationary and supply chain challenges have resulted in the cancellation of some previously announced projects while others remain at risk. To meet the CLCPA 2030's renewable electricity goals, the state will have to more than triple the installed 2022 renewable capacity of roughly 6.5 GW by adding an additional 20 GW over an eight-year period. Even if New York meets the goal of 70% renewable energy by 2030, the decarbonization of heat leading up to the 2040 goal will remain a challenge.

The State projects that between 1 million and 2 million homes will need to be electrified with heat pumps by 2030, joining roughly 3 million zero-emission vehicles that the State's transportation plan projects to be sold by the end of the decade.

**While enabling customers' ability to dynamically manage their power usage is key to addressing their cost and demands on the electric grid, load management will not be enough in most cases. This increase in demand and electrified end-use technologies necessitates a timely buildout of the electric grid and a transformation of how National Grid plans, constructs, and operates its networks.**

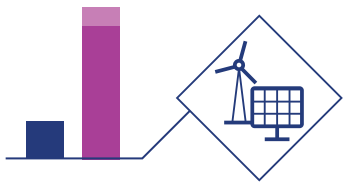
# Meeting our customers' needs requires a transformational scaleup of our electric networks not seen since they were first built

## The 2035 Electricity Network in New York



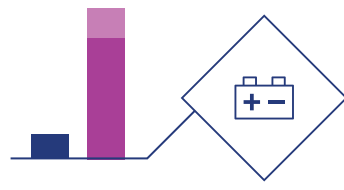
At least  
**9 GW**  
Installed Capacity

### Offshore wind



At least  
**16 GW**  
Installed capacity

### Onshore Solar and Wind



At least  
**6 GW**  
Installed capacity by 2030

### Storage

Delivery of this transition requires significant upgrades and extensions to our electricity networks. CLCPA Phases I and II have provided specific details about network buildout by 2030:



At least  
**600 miles**

**New and upgraded transmission line**  
in National Grid right-of-ways by 2030

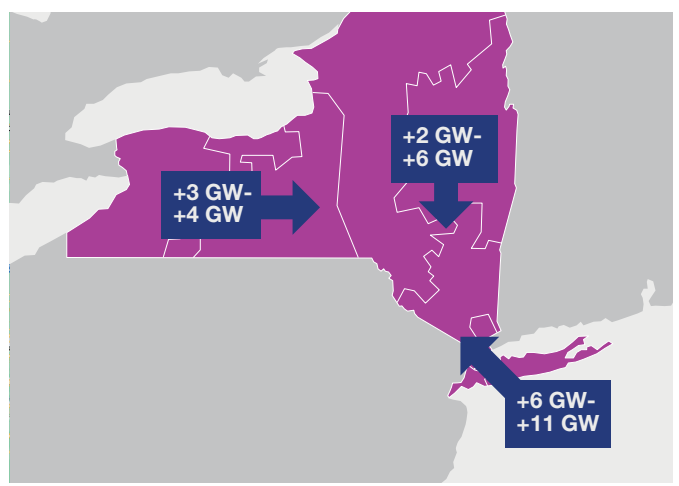


At least  
**45**

**New and upgraded substations**  
in National Grid's network by 2030

CLCPA Phases I and II will comprise at least 50 distinct projects across our New York territory, including multi-value investments and targeted upgrades to unbundle renewable energy in high priority areas, putting New York on track to reach 70% renewable energy by 2030.

## New Renewable Generation Capacity in 2035



Up to  
**1.5 million**

### Electric Vehicles

Will be garaged and installed at buildings in our New York Territory by 2035



Up to  
**250,000**

### Heat Pumps

↑ Increase in network capacity required at points on the network, and direction of electricity flow.

■ Network boundary

The source for the data included in this infographic can be found on page 14.

## Investments Are Needed in Three Key Areas to Enable the Future Electric Network

### Network Infrastructure



To make both transmission and distribution networks stronger and ready to accommodate increased power flows and connections.

### Technology and Platforms



To create more flexible, dynamic, and efficient networks and provide greater visibility and control into the transmission and distribution systems.

### Customer Programs



To deliver cleaner energy solutions and put customers in control of their energy choices and usage.

The grid must expand to meet the demands of an increasingly electrified future. In the near term, for rural networks and generator deliverability, another 600 miles of rebuilds and 500MWs of transmission-connected energy storage will be required by 2035.

**Ultimately, the pace and scale of decarbonization will be driven by three key factors: (i) the ability to deploy clean firm, dispatchable generation technology and sufficient renewable generation capacity to meet demand; (ii) the pace at which customers embrace and adopt clean, efficient, and electrified technologies and (iii) the individual choices customers make with regard to the efficiency of the equipment they choose.**

The future network must be capable of leveraging and optimizing the use of clean energy resources for the benefit of both customers and the grid. Customer involvement is key consideration in planning. The suite of electrification choices ranges from lower-cost electric resistance units with higher operating costs over time, to ground source heat pumps, which typically cost more up front, and are more efficient and more economical to operate in the long term.

The resulting investments will transform the electric grid of the past into a more resilient, sustainable, community-focused grid that provides all customers the opportunity to participate in and benefit from the clean energy transition.

### Smarter



A **smarter** system will enable a self-healing network and the seamless orchestration and optimization of the system, while providing customers with more control over their energy usage and choices.

### Stronger



A **stronger** system will ensure the grid is ready, more robust, and better able to withstand the impacts of climate change and is protected against evolving threats.

### Cleaner



A **cleaner** system can connect more renewable resources, energy storage, and electrified transportation and heating more quickly at all levels, and leverage these resources to create value for the grid and customers alike.

# Today's Electric Grid Needs to Be Ready to Meet Tomorrow's Needs

To serve the varied needs of our New York customer base, National Grid operates and maintains an electric system that consists of more than 6,000 miles of electric transmission lines. These transmission lines carry electricity long distances at high voltage levels to 192 transmission substations. From the substations, electricity can then be safely carried across 48,000 miles of smaller sub-transmission and distribution lines. These are supported by hundreds of thousands of poles and 515 strategically located distribution substations in 40 subregions. Power is then delivered to homes and businesses — delivering 6.8GW of peak electric energy in 2023 and 35.8 GWh.

Today, National Grid also operates natural gas distribution networks throughout New York that consist of 1,000 miles of transmission mains, and 22,000 miles of distribution mains. These networks deliver 362M Dth, or equivalent to 105,000 GWh. Due to customers converting from natural gas and other delivered fuels

to electric systems, our extensive electric network could need to nearly triple in size and capacity over the next 20 years — including adding a substantial number of new substations and expanding others — to meet our customers' future needs and achieve the CLCPA goals.

Absent substantial system investments, expected electric load growth will overload the existing infrastructure, impacting the safety and reliability of network operations for all National Grid's 1.7 million New York customers.

Similarly, National Grid's distribution operations systems must be modernized and readied for the future. Our vast interconnected network is kept in balance by our operations control centers, which monitor and manage the network 24/7/365. Today the control center is the “orchestrator” of the network with real-time visibility into network conditions and is responsible for dispatching assets and field operations crews as needed.

In the future the role of control centers will evolve with the accelerated adoption of Distributed Energy Resources (DER) and electrification across the network, and require new tools, processes, and resources to operate a more dynamic and reliable network. DERs can serve as an important tool to help manage load flexibility and under the right set of circumstances, can be leveraged as an alternative to additional traditional utility wires investments.

These investments will leverage DER as providers of grid services both at the distribution level and to the New York Independent System Operator (NYISO) wholesale markets, as Federal Energy Regulatory Commission (FERC) Order 2222 takes hold and creates additional value streams for local clean generation, energy storage, and demand response.

The pace and cost at which we can make this transition are dependent on a holistic and comprehensive plan, supported by a ready workforce, sustainable supply chain and the right underlying policies.



# National Grid's Roadmap to Accelerating Electrification to Achieve Net Zero Emissions is Consistent with the Climate Action Council Scoping Plan

National Grid is working to deliver a clean, fair and affordable energy future to 4.2 million customers in more than 840 towns, villages, and cities – including its 1.7 million electric customers. As part of a statewide effort, New York's utilities prepared plans to integrate large scale renewables and unbundle congestion on the existing electric networks —

known as CLCPA 1 and CLCPA 2 — that presented the investments needed in the local transmission system and supporting electric networks to help meet the state's greenhouse gas, electrification, and clean energy goals through 2030. National Grid and the other utilities submitted these plans to the state Department of Public Service in 2022. National Grid's proposed investments necessary to deliver an electric network that meets the goals of, and is consistent with, New York's decarbonization effort, was approved in 2023. National Grid's plan includes investments in network infrastructure and new grid-enhancing technology to deliver smart, electrified, and decarbonized buildings, electrified transportation, and clean power so all customers can participate in and benefit from the clean energy transition.

## Required Network Infrastructure Investments

Network infrastructure investments are needed to expand the capacity of the existing system — including in assets like substations, transmission lines, and distribution feeders. This is necessary to accommodate increased flows of electricity due to increased customer usage driven by the electrification of transportation, heating, and industrial processes, as well as rising air conditioning loads as summers get hotter.

Without the necessary investment, accelerated rates of electric end-use technology adoption will outpace the grid's ability to keep up with demand and threaten reliability.

As the economy grows increasingly reliant on electricity as its primary fuel source, the electric network must be stronger and even more reliable and resilient than it is today. This requires hardening of existing infrastructure and building new infrastructure to even higher security standards to withstand more frequent and severe weather events as well as evolving physical and cyber threats.





**Required Technology and Platform Investments**

Investments are needed in new planning tools, systems, and processes to drive smarter decision-making. This includes installing state-of-the-art data and monitoring systems to provide greater visibility into how the grid and interconnected devices are operating to ensure system safety and stability. It also requires evolving our distribution system control centers to function as a distribution system operator, to manage a smarter electric grid where there are bi-directional flows of clean energy.

Upgrading IT systems and communications networks will support two-way information flows and control, and provide greater system flexibility, security, and more timely information to customers. This will provide the ability to better utilize customer-owned technologies as grid solutions, creating an opportunity to use them to deliver

localized capacity and operational needs, such as using distributed solar and batteries to create “Virtual Power Plants.” In addition, these upgrades will accommodate newly deployed Automated Metering Infrastructure, which will be rolled out in New York beginning in 2024, to advance time varying rates and managed charging.

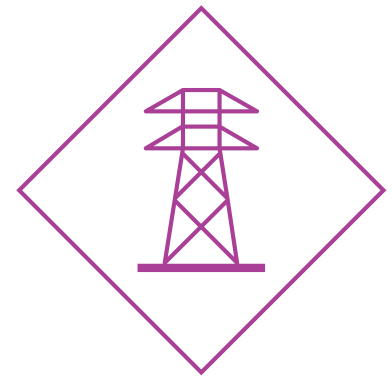
**Required Customer Program Investments**

Investments in customer programs and tools — including a more automated interconnection process for solar and storage — will deliver a more seamless experience and provide customers the ability to adopt new decarbonized end-use technologies more quickly.

In addition, providing new offerings and pilot programs will help residential and commercial power consumers reduce their carbon footprint, adopt cleaner energy solutions, and drive smart energy

use to help them to better manage costs and build community resilience and agency.

At the same time, there is a need to expand financial and technical support to customers to enable them to pursue clean energy and energy efficient solutions and to better tailor and target programs to meet the needs of individual customer segments and circumstances.



# Executing the Energy Transition Requires a Ready Workforce and Available Supply Chain

**The scale and pace of the transition and corresponding work to achieve it are significant and success of this effort relies on the alignment of many external factors, including the ability to procure equipment and the availability of a ready and well-trained workforce. New York is one of many states and regions across the country – and the world – making the energy transition. As such, there is competition for limited resources, workers, and equipment.**

## Significant Workforce Needs Offer Opportunities to Advance a Just Transition

The clean energy transition will result in significant employment opportunities and needs. The New York State Energy Research and Development Authority (NYSERDA) estimates the clean energy economy will generate 172,000 new jobs by 2030 – a 55 percent increase in that workforce since 2019, with over half of those jobs focused on building

decarbonization. The cumulative job growth, according to NYSERDA, will reach nearly 600,000 positions by 2050.

The need for an expanded workforce offers opportunities to create generational wealth and mobility in communities that were burdened by the fossil fuel-based economy. A 2021 survey by the National Association of State Energy Offices found that the U.S. energy sector has below-average representation of Black, Hispanic, Latino, and women workers, and high rates of union members with low diversity representation.

Addressing these disparities in New York will take intentional work across both public and private sectors. National Grid is working with a variety of partners – including NYSERDA, SUNY, Ascend Long Island, Bloc Power, and others – on job training initiatives, incubator and accelerator programs, training, and financial support for students, to help build the green workforce of tomorrow.

To appropriately scale these programs and hire the future workforce requires predictability in the timing and approval of necessary investments, as it will be nearly impossible to pursue a “just in time” hiring strategy, given the technical and skills-based nature of the work required.



The clean energy economy will generate **172,000** new jobs by **2030** – a **55% increase** in that workforce since 2019.



# A Clean, Fair and Affordable Energy Transition Requires Policy Changes

To successfully enable this Future Electric Network and deliver a clean, fair and affordable energy transition requires coordination and collaboration at all levels, as well as policy changes to accelerate the buildout of needed infrastructure and ensure a just transition.

These changes and regulatory action must occur at the state and federal levels to deliver the future electric network. Without them, achieving a just and equitable energy transition will not be possible.



## State Actions

Action is already being taken by various state entities in New York to improve planning, but state efforts must go further and occur at a faster pace.

### This includes the following:

**Accelerate deployment of grid (distribution and transmission) investments that optimize the network to connect renewables, enable electrification, and build resilience to a changing climate.**

- Reinforcing NYISO and Public Service Commission anticipatory planning and investment policies in support of the CLCPA that enable and encourage utilities to build out the network beyond CLCPA Phases 1 and 2, including interregional transmission lines.
- Reforming siting rules that would trigger the need for Article VII when rebuilding existing lines by leveraging existing regulations that govern major electric transmission facility maintenance. These improvements would accelerate and reduce lead times for utility infrastructure projects necessary to decarbonize the electric sector while protecting the environmental resources and ensuring opportunity for public engagement in the process including:
  - Transparency and accessibility, and
  - Establish a more predictable and timely application process.
- Adequately resourcing and staffing permitting and regulatory agencies to support the timely review and processing of applications for energy infrastructure.

**Enable customer deployment and adoption of clean, decarbonized technologies and facilitate the cost-effective connection of local, clean energy resources.**

- Funding neighborhood-level integrated energy planning pilot demonstrations to support state decarbonization goals through targeted electrification of certain communities.
- Securing utility ownership of storage as a bridge to transmission upgrades or, as an alternative, by defining storage as a transmission asset, provided the assets are not involved in providing wholesale market-based services, and support renewable energy integration and grid reliability.

**Ensure residential customers and businesses can afford their energy bills and easily access savings and assistance programs that place equity at the heart of the transition.**

- Expanding customer outreach to improve awareness of, and increase participation in, the Company's low- and moderate-income (LMI) programs.
- Engaging LMI customers and those in disadvantaged communities to access weatherization services more equitably.
- Exploring the "LIHEAP Direct" model, which provides for direct application of LIHEAP funds on utility bills to eligible customers, without customers having to apply.

## Federal Level



**Recent federal government actions to support clean energy — including the Bipartisan Infrastructure Law and the Inflation Reduction Act — have helped position the energy sector in New York for faster growth at a lower cost to customers.**

Additional policies and regulatory changes under consideration in Congress and at pertinent agencies — most notably the Department of Energy (DOE) and the Federal Energy Regulatory Commission (FERC) — have the potential to further bolster progress toward decarbonization and electrification, while improving outcomes for

Empire State communities and customers. These primarily include policies and regulatory actions that, among other things:

- Enable more streamlined development of utility infrastructure and clean energy through permitting and interconnection reforms, while ensuring protection of environmental resources and vulnerable communities.
- Allow for continued anticipatory transmission planning and investment.
- Encourage coordinated and interregional transmission planning to leverage offshore wind resources.

## Conclusion

We have an opportunity to make real and lasting change as we work collectively to deliver the clean energy future. While National Grid is building and preparing the future electric network for this transition, we continue to focus on our day-to-day foundational mission of providing the great service and safe, reliable, and affordable energy our customers expect and deserve.

National Grid will continue to be a trusted partner in supporting our customers' changing needs, while prioritizing reliability, affordability, and resilience, as we navigate this important transition together. We are committed to empowering New York by building a smarter, stronger, cleaner, and more equitable energy future, and look forward to continuing to be a partner for progress in all our communities across the state.



# About National Grid

**National Grid (NYSE: NGG) is an electricity, natural gas, and clean energy delivery company serving more than 20 million people through our networks in New York and Massachusetts.**

National Grid is focused on building a path to a clean, fair and affordable energy future. We are transforming our electricity and natural gas networks with smarter, cleaner, and more resilient energy solutions to meet the goal of reducing greenhouse gas emissions.

For more information, please visit our [website](#), follow us on [X \(formerly Twitter\)](#), watch us on [YouTube](#), like us on [Facebook](#) and find our photos on [Instagram](#)

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