

Can The Power Grid Support Local Law 97?

If all, or even a simple majority, of New York City's buildings that are not exempt from Local Law 97 comply with the law and switch from fossil fuels to electricity, can the grid support it?

Attached are reports from ConEd, NYISO (New York Independent System Operator) and the Urban Green Report, in which all three raise concerns.

Highlights of the three documents:

ConEd Integrated Long Range Plan for NYC & Westchester County

Says ***full electrification of buildings is the most expensive option***, both for customers and utilities, and relies on significant breakthroughs in energy storage technology.

NY ISO 2021-204 System & Resource Outlook (Key Findings)

Says "state climate mandates" are driving unprecedented need for investment in the grid and the electrification of buildings will rapidly increase peak and annual energy demand. They also report that the "grid of the future," in order to be carbon-free, will rely on DEFRs (Dispatchable, Emission Free Resources), which ***"must be developed and added at scale"***

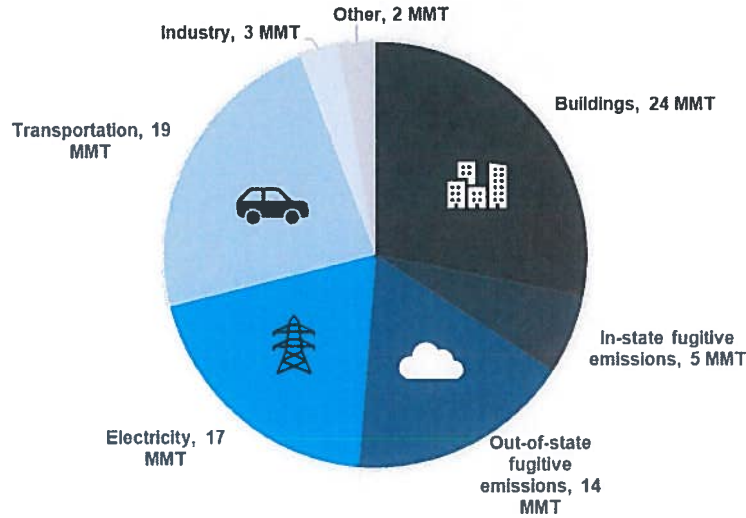
Urban Green report "Grid Ready: Powering NYC's All-Electric Buildings"

Emphasizes a need for "Smart electrification" or "flexible electrification" — neither of these options exist for buildings under LL97. Says ***"electrifying just 20 percent of the city's building area, or just over 1 billion SF, would mean about 40 zip codes would have winter peaks higher than or equal to their summer peaks."***

Contact Information:

Western Queens Coop Coalition
Jane Menton
janementon@outlook.com

Figure 6. GHG Emissions, New York City and Westchester County, 2019 (MMTCO₂e)¹³



No single set of clean energy solutions exists to address these GHG emissions. In fact, an infinite number of combinations of solutions could achieve 2050 goals. As a result, we will remain open to considering all clean energy solutions that may advance societal goals and increase value to our customers. Further, we will provide customers choice for their clean energy solutions and advocate for policies and solutions that are cost-effective and reflect the value of clean energy.

We expect technology to improve and costs to decline such that some clean energy solutions that are cost-prohibitive today will become cost-effective. These solutions are at different levels of maturity and the pace and cost of adoption is uncertain, as is the emergence of policy over the next 30 years. Therefore, we identified three representative pathways to capture a wide range of potential futures so that we remain flexible until a pathway emerges. The representative pathways are described in Table 5. Each pathway differs in the technology breakthroughs required and the expected relative cost to achieve the clean energy transition.

LL97

Table 5. Representative Pathways

		Full Electrification	Targeted Electrification	Hybrid Consumption
Description		Relies on existing technology solutions to eliminate GHG emissions in the buildings sector. Significant breakthrough in energy storage occurs, and policies mandate electrification of fossil energy use.	Balances use of existing technologies and innovation in low-to-zero carbon gaseous fuel technologies for flexibility and cost-effectiveness.	Significant breakthroughs in low-to-zero carbon gaseous fuels occur. Leverages existing electric, gas, and steam infrastructure to mitigate customer complexity and disruption.
Relative Cost Impact	Customer	→ \$\$\$\$\$	\$\$\$	\$\$
	Utility Infrastructure	\$\$\$\$\$	\$\$\$\$	\$\$\$
	Market Innovation	\$	\$	\$\$

¹³ Note that this figure and value includes National Grid's gas service territory.

20-Year Outlook Forecasts Transmission & Resources Needed to Meet Policy Objectives

The NYISO evolved its planning processes to produce the first-ever System & Resource Outlook. This new study includes a 20-year forecast that examines multiple cases and scenarios that identify transmission investment opportunities and project resource mixes for achieving 2030 and 2040 policy mandates while maintaining reliability. The Outlook will be updated every two years.

Key Findings



✓ **State climate mandates** are driving the need for unprecedented levels of investment in new generation to achieve decarbonization and maintain system reliability.



✓ **Electrification of buildings and transportation** required by state policies will rapidly increase peak and annual energy demand.



✓ **Extensive transmission investment** will be necessary to deliver renewable energy and address new constraints that appear across the electric system.



✓ **To achieve an emission-free grid,** Dispatchable Emission-Free Resources (DEFs) must be developed and deployed at scale well before 2040 to ensure reliability and meet climate mandates.



“ The Outlook shows that unprecedented levels of transmission and generation investment will be necessary to achieve clean energy goals while continuing to meet grid reliability needs. ”

– Zach G. Smith, VP System & Resource Planning, New York ISO

Generation Required to Meet CLCPA Mandates

**+20 Gigawatts
New by 2030**



Estimated 20 GW of New Renewable Generation Needed for 70% by 2030 Goal. Roughly seven years from now, an estimated 20 GW of additional renewable generation must be in-service to support the energy policy target of 70% renewable generation by 2030. For reference, 12.9 GW of new generation has been developed since wholesale electricity markets began more than 20-years ago in 1999.

**111-124 Gigawatts
Total by 2040**

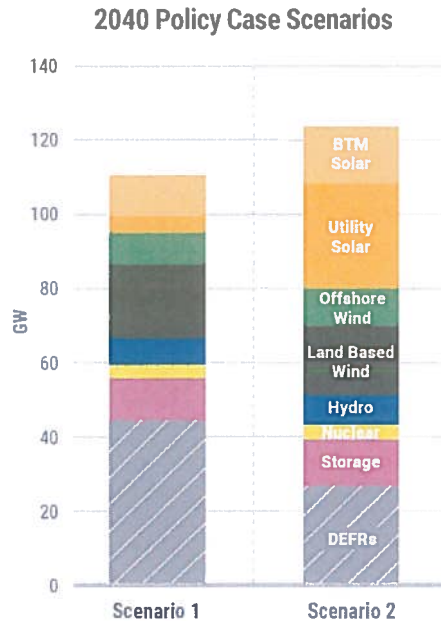


Total Installed Capacity Must Triple for 100% by 2040 Goal. At least 95 GW of new generation projects and/or modifications to existing plants will be needed. Over the past five years, 2.6 GW of renewable and fossil-fueled generators came on-line while 4.8 GW of generation deactivated. New York currently has approximately 37 GW of generating capacity.

2021-2040 System & Resource Outlook: Key Findings

DEFRs are Critical for a Reliable Future Grid

» As more wind, solar, and storage plants are added to the grid, Dispatchable Emission-Free Resources (DEFRs) must be developed and added to the system at scale to reliably serve demand when intermittent generation is unavailable. The lead time necessary for research, development, permitting, and construction of DEFrs will require action well in advance of 2040 if state policy mandates under the CLCPA are to be achieved. Fossil generation will likely need to be retained past the 2040 mandates to keep the system reliable if DEFr technology is not in operation.



Modeling Cases Used in The Outlook

The NYISO examined three reference cases for the report.

- 1 Baseline Case:** This is a “business-as-usual” type scenario looking at the electric system as it performs today, aligning with the NYISO’s Comprehensive Reliability Plan to define the demand, generation, and transmission assumptions.
- 2 Contract Case:** This case builds upon the Baseline Case by adding incremental renewable generation projects that have received project awards and financial contracts with the state.
- 3 Policy Case:** Assumptions in this case reflect the federal, state, and local policy mandates that impact the New York power system, such as the Climate Leadership and Community Protection Act and the Accelerated Renewable Energy Growth and Community Benefit Act. Scenarios 1 and 2 project different approaches to achieve these policies.

The NYISO Commits To

- ✓ **Identify Needs & Opportunities.** Continue to assess the evolving system and identify the challenges and opportunities associated with achieving state policies in an economic and reliable manner.
- ✓ **Review Its Wholesale and Reliability Rules** to facilitate the orderly transition of replacement resources.
- ✓ **Solicit Stakeholder Feedback** on public policy transmission needs.



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There will be a great need for dispatchable emission-free resources to meet the flexibility and energy supply needs of the future system. Until these technologies are commercially available at the necessary scale, existing emitting generation may need to be retained.



– Yachi Lin, Director
Transmission Planning,
New York ISO



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Full Report



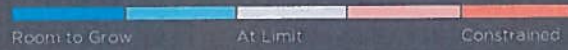
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MAP 5

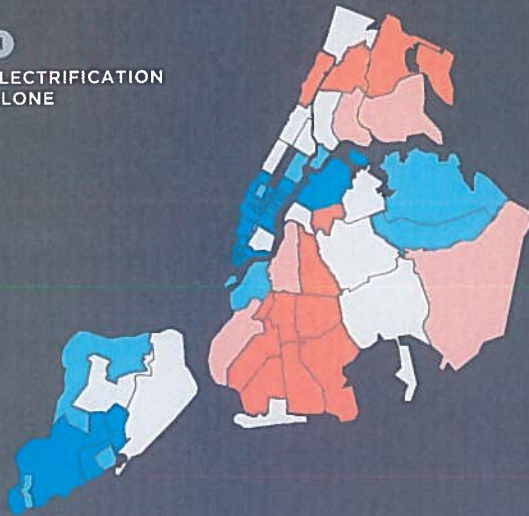
Comparing Scenarios at 40% Citywide Electrification: How We Electrify Matters

Data: EnergyPlus 8760 Models, NYISO Actual Load 2010-2019

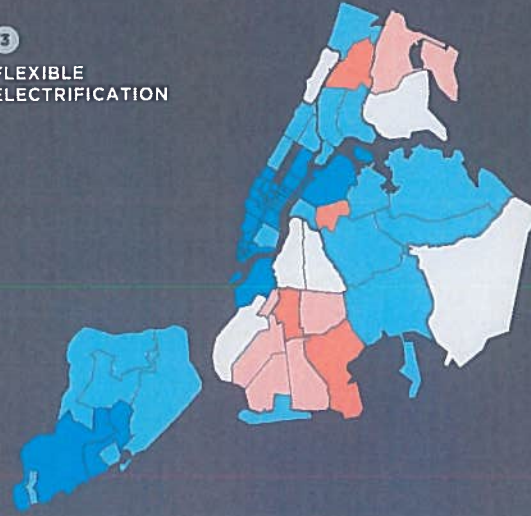
Capacity for Electrification



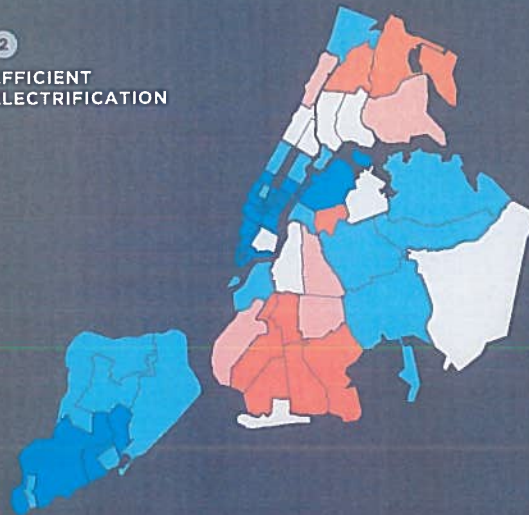
1
ELECTRIFICATION ALONE



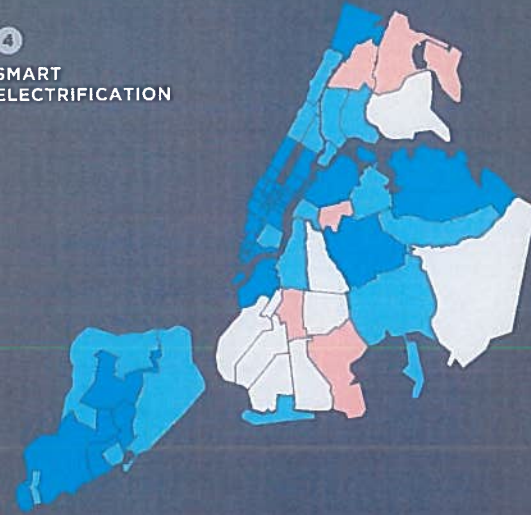
3
FLEXIBLE ELECTRIFICATION



2
EFFICIENT ELECTRIFICATION



4
SMART ELECTRIFICATION



- 1 **Electrification Alone:** Electrifying 40 percent of the city without any efficiency or flexibility upgrades leads to demand exceeding capacity throughout Brooklyn and the Bronx.
- 2 **Efficient Electrification:** Pairing affordable energy-efficiency upgrades with heat pumps reduces power demand in each network area. Capacity upgrades are probably still needed to meet peak demand in network areas of southern Brooklyn and the northern Bronx.

- 3 **Flexible Electrification:** Demand flexibility measures were more effective at reducing peak demand than energy efficiency measures. These measures could delay major capacity upgrades in the Central Bronx network area.
- 4 **Smart Electrification:** Smart Electrification that includes energy efficiency and demand flexibility measures allows for this level of electrification with potential upgrades needed in the Flatbush, Sunnyside, Fordham and Northeast Bronx networks.