London Economics International LLC

New York City Energy Infrastructure Long Term Plan Review

Prepared for:

The New York Energy Consumers Council ("NYECC") webinar

Stella Mueller
Jingyun Huang
Julia Frayer

November 9, 2023

www.londoneconomics.com

LEI is a global economic, financial, and strategic advisory professional services firm specializing in energy and infrastructure

London Economics International LLC ("LEI") combines a detailed understanding of specific network and commodity industries with sophisticated analysis and a suite of proprietary quantitative models to produce reliable and comprehensible results.

LEI is actively involved in projects focusing on the New York electricity market, and its experience in the state dates back nearly 20 years, or essentially since the deregulation. LEI closely monitors policy, regulatory, and market developments in New York.

In addition, LEI has in-depth expertise in several areas, including:

GENERATION:

- Working with generators to forecast market conditions and evaluate future revenues
- Assessing the impact of new generation resources on capacity and energy prices

TRANSMISSION:

- Advising on tariff design and other issues for regulated and merchant transmission developers
- Conducting cost-benefit analysis for proposed transmission projects

RENEWABLES:

- Valuing potential revenue streams from Renewable Energy Credits ("RECs")
- Counseling governments and regulators on creating policies which efficiently incentivize investment in renewable energy

NATURAL GAS:

- Assessing the synergies between the natural gas and electric power industries
- Examining performance-based ratemaking and total factor productivity for natural gas distribution companies

ASSET VALUATION, PRICE FORECASTING & MARKET ANALYSIS

REGULATORY ECONOMICS & TARIFF DESIGN

TRANSMISSION AND DISTRIBUTION

RENEWABLE ENERGY AND PROCUREMENT

717 Atlantic Avenue, Suite 1A
Boston, Massachusetts 02111
Tel: (617) 933-7200
Fax: (617) 933-7201

390 Bay Street, Suite 1702
Toronto, Ontario M5H 2Y2
Tel: (416) 643-6610
Fax: (416) 643-6611

LEI was retained to review ConEd's long-term energy plans and assess their appropriateness for meeting the energy needs of NYC

- **LEI prepared two reports as part of this project – available on NYECC's Reports webpage**
  - The "NYC Energy Infrastructure Long Term Plan Review" Report (March 17, 2022)
  - The Update Memo (May 4, 2023), which explored developments since the March 2022 Report

Reports produced by LEI

March 2022 Report

- Assessed the extent to which ConEd's planning efforts align with the State's public policy objectives
- Concluded with findings and recommendations for ConEd going forward

May 2023 Update Memo

- Discussed developments since the March 2022 Report related to:
  - Policy and regulatory updates
  - Investment plans
  - Relevant analysis issued by state agencies
- Assessed the extent to which these updates impact LEI's conclusions

- **This webinar will focus on:**
  - Providing a high-level overview of the **key findings and conclusions** discussed in these reports
  - Summarizing the **developments in the electric and gas sectors** discussed in the May 2023 Update Memo

Major takeaways first discussed in LEI's March 2022 Report and later confirmed in the May 2023 Update Memo

Electric sector

Further influx of renewable generation

- Anticipated increase in renewable and storage capacity growth could place further strain on ConEd's system
- Needs to be accounted for in transmission and distribution planning activities

Shrinking reliability margins in NYC

- Narrowing reliability margins in NYC due to retiring thermal peaking power resources and dependence on a few transmission interconnections
- Requires holistic consideration of additional transmission solutions and potential non-wires alternatives

Gas sector

Transitioning the gas system

- Need for a sustained shift away from a focus on gas main replacement and towards decarbonizing ConEd's gas system

Regulatory activity to spur on this shift

- NYS PSC's order requiring utilities to prioritize "no infrastructure options" or non-pipeline alternatives as part of their long-term gas planning efforts

Agenda

1	**Introduction**
2	Key themes and challenges
	Electric sector
	Gas sector

New York has liberalized electricity and gas markets; multiple agencies participate in their governance, operation, and regulation

New York was one of the first states in the US to deregulate its electricity and gas markets in the late 1990s. Competitive power generation and gas supply are separate from transmission and distribution ("T&D") operations. Electric and gas T&D utilities continue to be regulated.

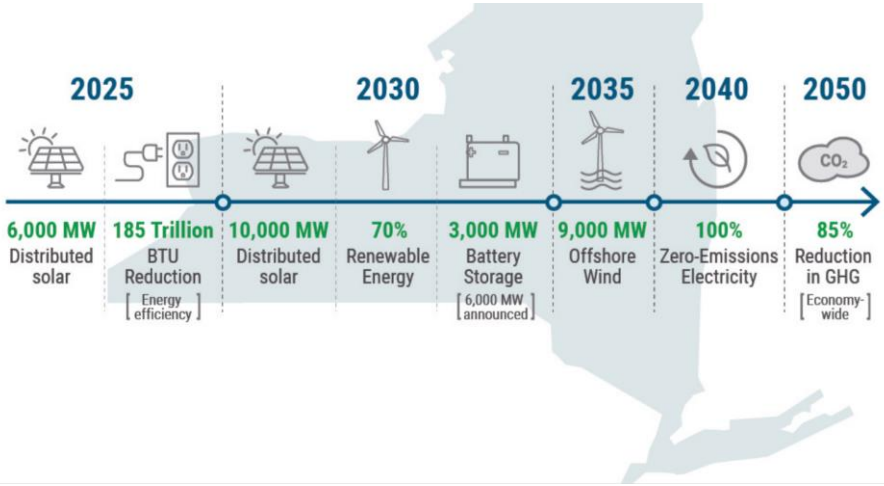
Federal Energy Regulatory Commission ("FERC")	New York State Public Service Commission ("NYS PSC")	New York State Department of Environmental Conservation ("NYSDEC")	New York Independent System Operator ("NYISO")	New York State Reliability Council ("NYSRC")	New York State Energy Research and Development Authority ("NYSERDA")
► Regulates NYISO & other ISOs/RTOs in the US ► Jurisdiction over transmission service & wholesale power sales	► Jurisdiction over generation, transmission siting, resource adequacy, compliance with NYSRC rules, and local electric distribution within the state	► New York State's environmental protection and regulatory agency	► Responsible for the operation of the bulk electricity grid and wholesale electricity markets of the entire state	► Responsible for reliability rules specific to the NY power system ► Monitors compliance with the reliability rules	► Administers funding and procurements for clean energy innovation projects and investments ► Provides information and analysis, innovative programs, technical expertise

Sources: NYISO. *New York Market Orientation Course (NYMOC).* Feb 6-9, 2023; agencies' websites.

New York State's clean energy mandates as well as gas ban will necessitate rapid change in the electric and gas systems

New York's Climate Act – CLCPA

- **New York State's Climate Leadership and Community Protection Act ("CLCPA") was passed in July 2019, which is among the most ambitious climate laws in the US**



Carbon pricing

- **New York is part of the RGGI**
  - New York is also planning an economy-wide cap-and-trade program which will require GHG emitters to buy allowances

New York's fossil fuel restrictions

- **The Department of Environmental Conservation's Peaker Rule**
  - Reduces ozone-contributing pollutants associated with peaking unit generation
  - Compliance obligations phased in between 2023 and 2025
- **New York State 2024 Fiscal Budget Bill**
  - Prohibits fossil-fuel equipment and building systems in new buildings beginning 2026
  - With this, New York became **the first state in the US to ban natural gas and other fossil fuels in most new buildings**
  - This is expected to significantly increase demand for electricity
- **New Efficiency: New York**
  - NYS PSC January 2020 Order (Case 18-M-0084)
  - Targets a 1.3% reduction in annual gas usage by 2025

Sources: NYISO. *Public Policies and the Transformation of NY's Electric Grid*; NY Gov. *2023 State of the State.*

NYC has also enacted local mandates to reduce greenhouse gas emissions and impact gas usage going forward within city limits

OneNYC 2050

- Achieve carbon neutrality by 2050
- Secure 100% renewable electricity

Climate Mobilization Act

- Local Law ("LL") 97 – carbon emission caps for energy use in the city's large buildings starting in 2024; electrification of heating and cooking in about 50,000 NYC building systems
- LL92, 94 – requires all new buildings (or following roof renovations) to be covered with solar panels, green roofs, or some combination of the two
- LL95 – building efficiency grade
- New York City Energy Conservation Code ("NYCECC")

NYC residual oil elimination mandate

- Prohibited the consumption of fuel oil no. 6 beginning in 2020 and prohibits no. 4 beginning in 2025; the mandate is expected to impact nearly 3,000 MW of generation in NYC

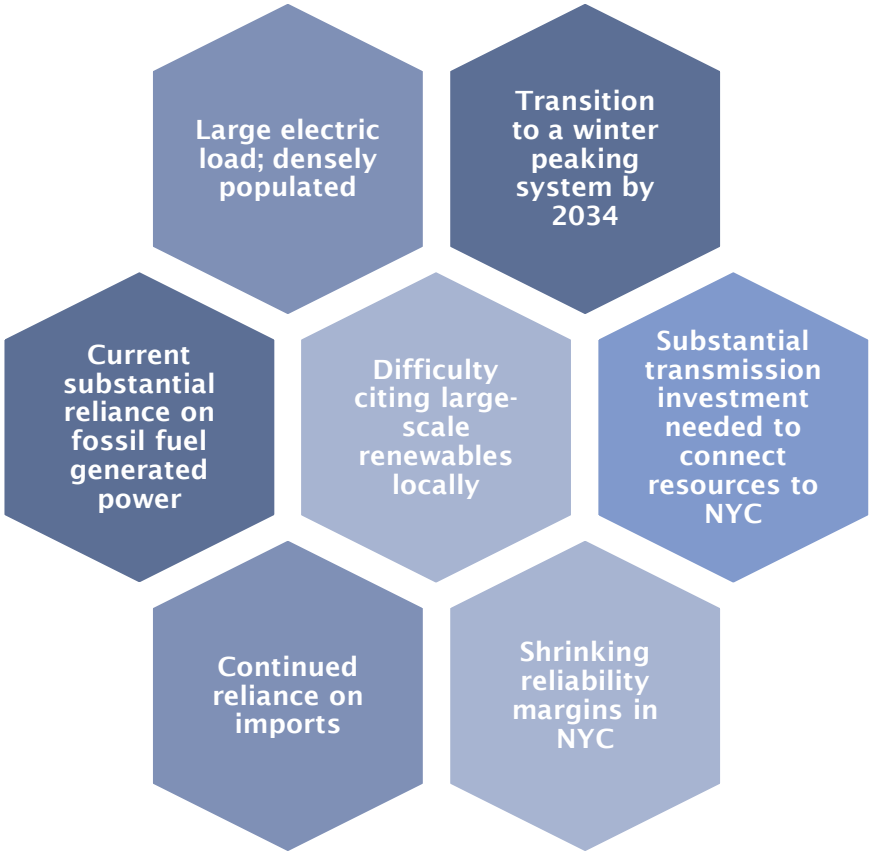
Executive Order 52

- Opposes infrastructure development (e.g., pipelines) that would expand fossil fuel supply in the city

NYC Council Int 2317-2021

- Passed in 2021
- Prohibits new and renovated buildings from combusting fossil fuels beginning 2024

New York City faces a unique interplay of challenges



- **In order to meet state climate objectives, ConEd, as the electric and gas utility serving NYC, will need to evolve its electric grid and gas infrastructure to allow new resources and technologies to come online in a timely manner**

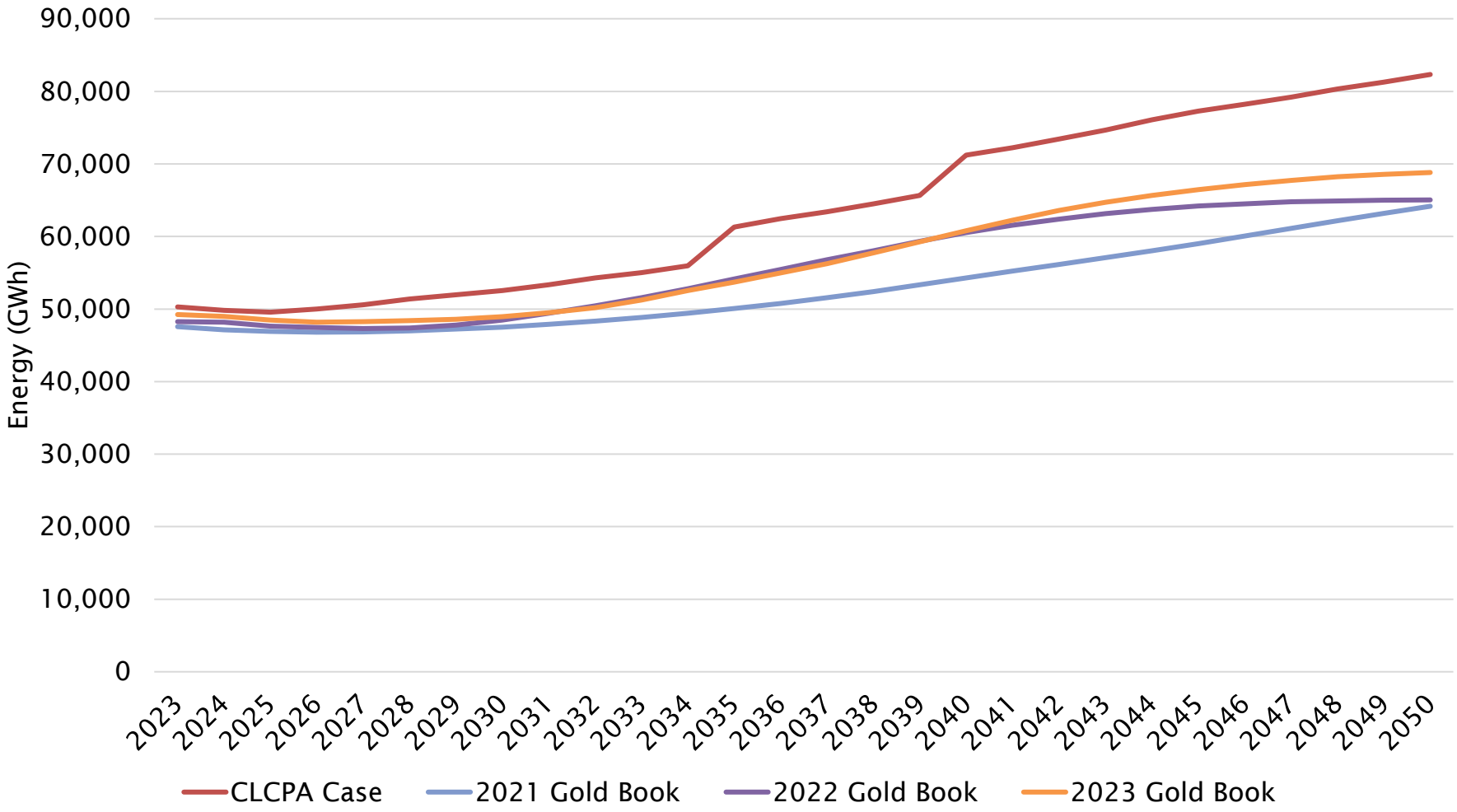
Source: NYISO. 2022 and 2023 Power Trends report

Agenda

1	Introduction
2	**Key themes and challenges**
	Electric sector
	Gas sector

Electrification load trajectory to meet CLCPA mandates not fully accounted for in NYISO's planning efforts

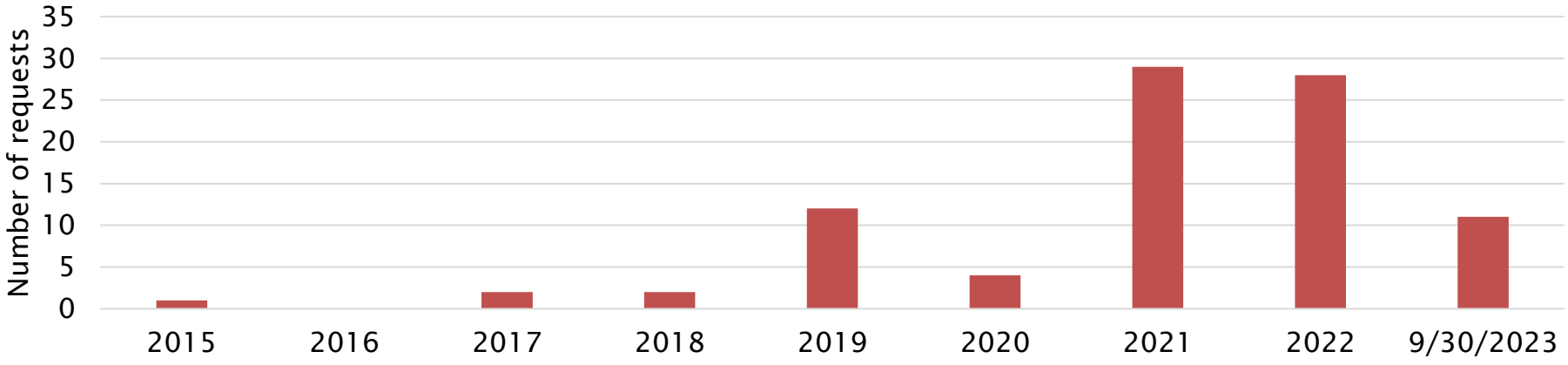
NYC (Zone J) load forecast



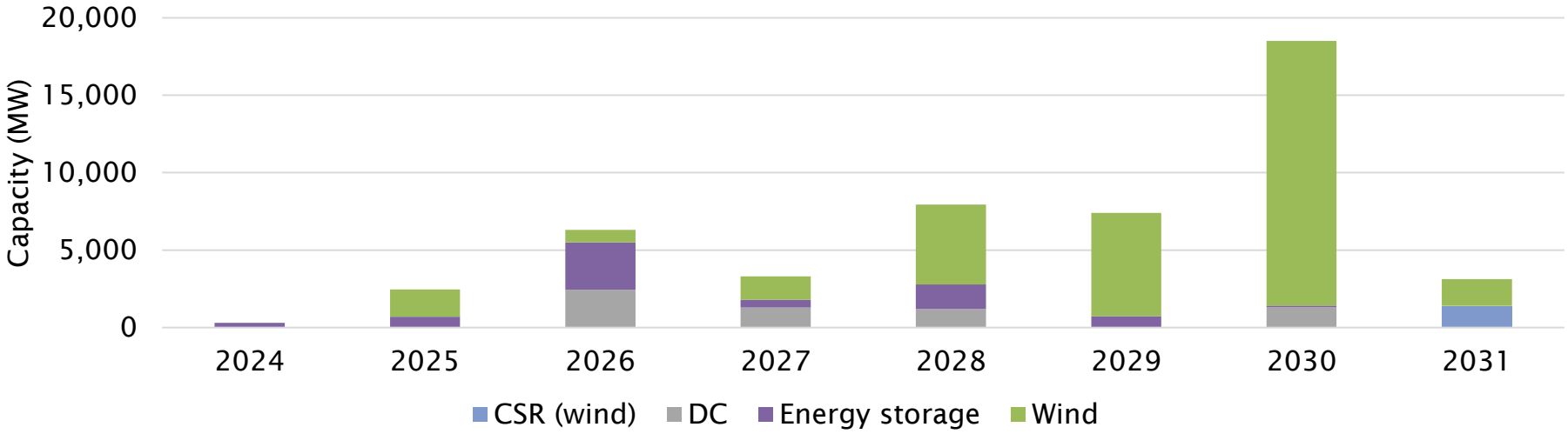
Source: NYISO. *Gold Book reports (2021, 2022, 2023)*

Significant renewable and storage investment spurred on by policy mandates requiring interconnection in NYC

Number of projects seeking interconnection in NYC (Zone J)



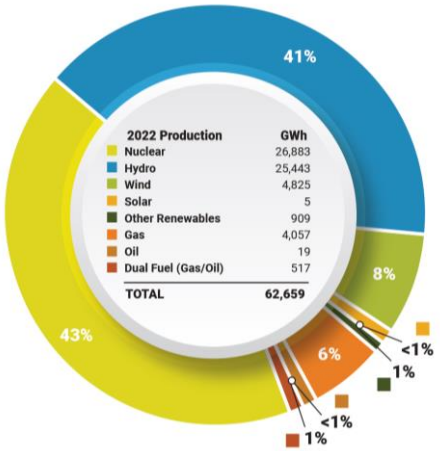
Capacity of projects seeking interconnection in NYC (Zone J)



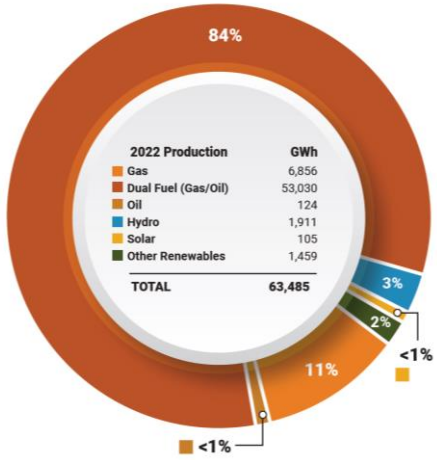
Source: NYISO Interconnection Queue as of 9/30/2023

Clean upstate generation cannot flow to NYC due to transmission constraints; difficulty siting renewables downstate means continued reliance on thermal generation in NYC

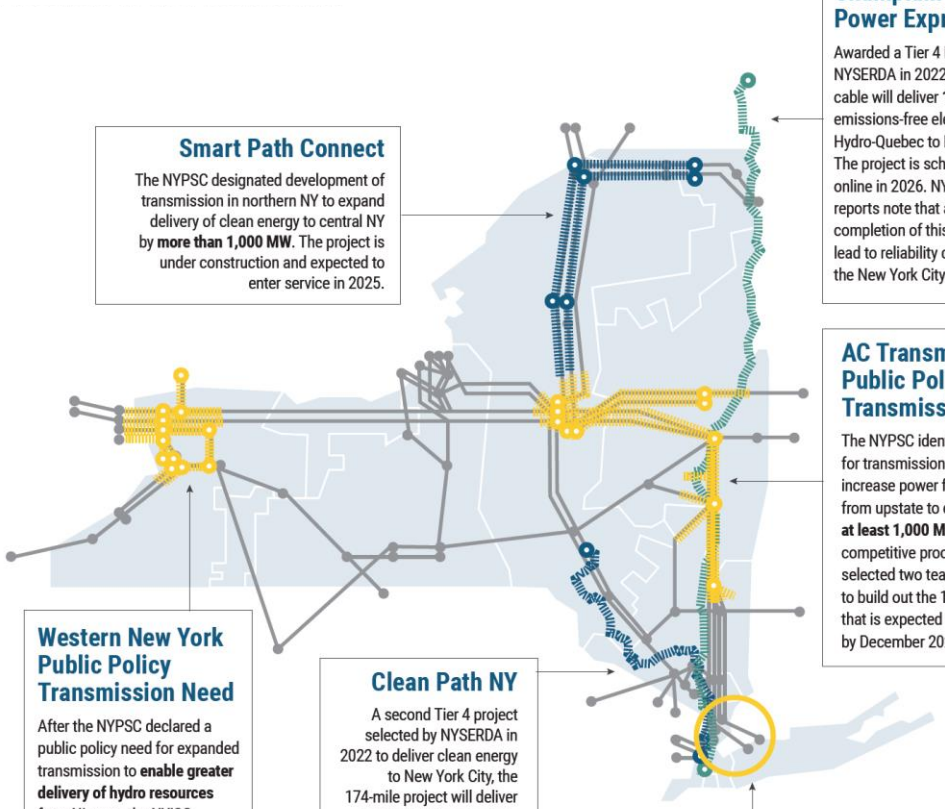
2022 upstate energy production



2022 downstate energy production



Transmission projects in NY



Champlain Hudson Power Express (CHPE)

Awarded a Tier 4 REC contract by NYSERDA in 2022, the 339-mile cable will deliver **1,250 MW** of emissions-free electricity from Hydro-Quebec to New York City. The project is scheduled to come online in 2026. NYISO reliability reports note that any delays in the completion of this project could lead to reliability challenges in the New York City area.

Smart Path Connect

The NYPSC designated development of transmission in northern NY to expand delivery of clean energy to central NY by **more than 1,000 MW**. The project is under construction and expected to enter service in 2025.

AC Transmission Public Policy Transmission Need

The NYPSC identified the need for transmission investment to increase power flow of energy from upstate to downstate by **at least 1,000 MW.** Through a competitive process, the NYISO selected two teams of developers to build out the 150-mile project that is expected to be in service by December 2023.

Western New York Public Policy Transmission Need

After the NYPSC declared a public policy need for expanded transmission to **enable greater delivery of hydro resources** from Niagara, the NYISO selected a 20-mile, $181 million project through an extensive, competitive process. The project entered operation in June 2022.

Clean Path NY

A second Tier 4 project selected by NYSERDA in 2022 to deliver clean energy to New York City, the 174-mile project will deliver **1,300 MW** from upstate. The project is currently undergoing permitting and interconnection analysis, with an expected in-service date of 2027.

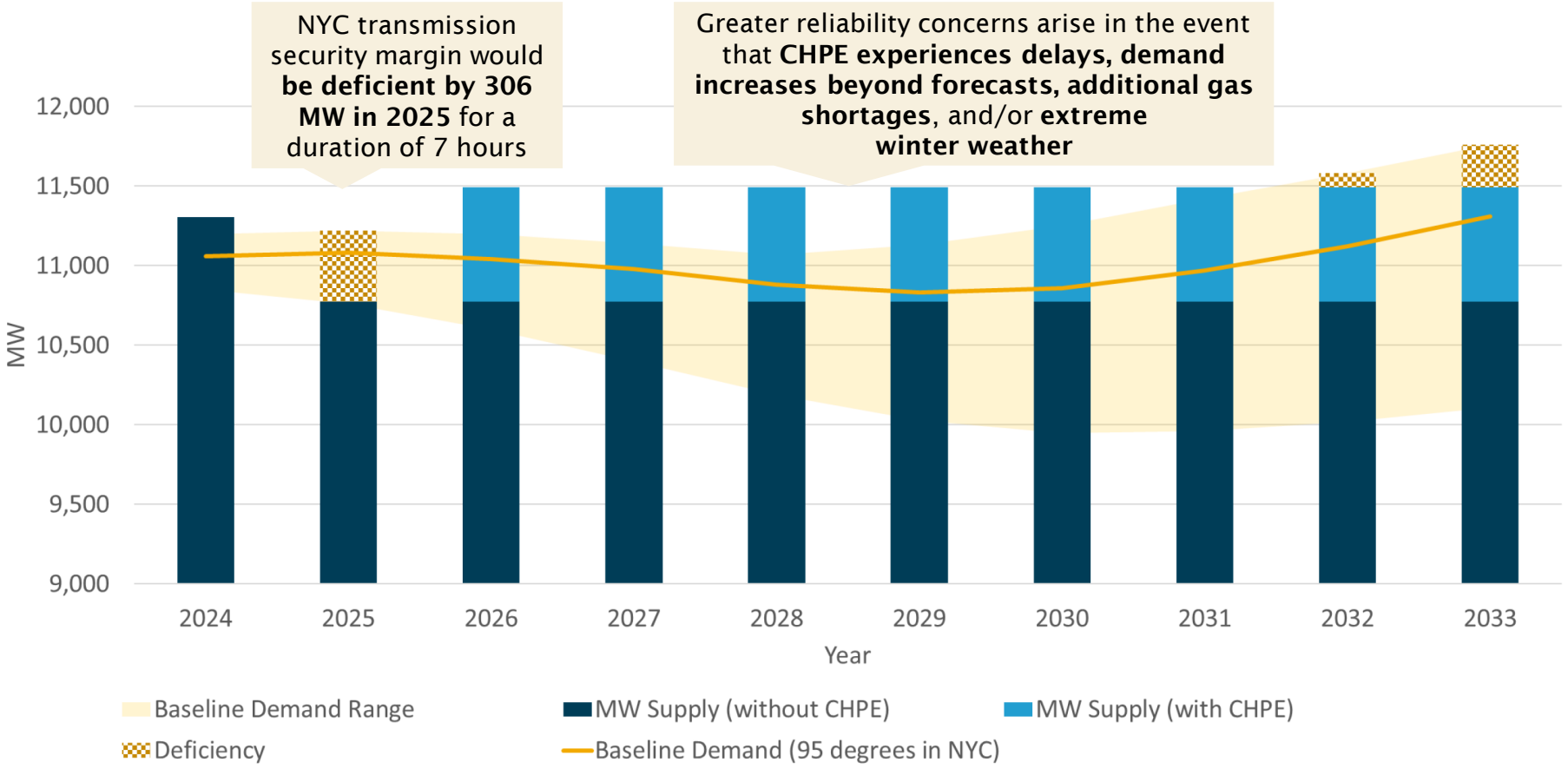
Long Island Public Policy Transmission Need

In 2021, the NYPSC identified a need to expand the transmission capability between Long Island, NYC, and the rest of the state by **at least 3,000 MW** to support the CLCPA's offshore wind requirements. Expanded transmission is needed to move offshore wind energy from Long Island to the rest of NY. The NYISO reviewed proposals and expects to make a final determination in 2023.

Source: NYISO. *2023 Power Trends.*

Shrinking reliability margins have been a major challenge in NYC due to fast pace of thermal retirements and electrification programs

NYC transmission security margin (expected summer weather)



- **Driven by the assumed unavailability of gas generation affected by the Peaker Rule, NYISO identified a reliability shortage in NYC as early as 2025; ConEd is responsible for developing a solution to the transmission need**

Source: NYISO. *Short-Term Assessment of Reliability*. Q2 2023.

Need for additional transmission solutions and potential non-wires alternatives to address NYC's reliability challenges

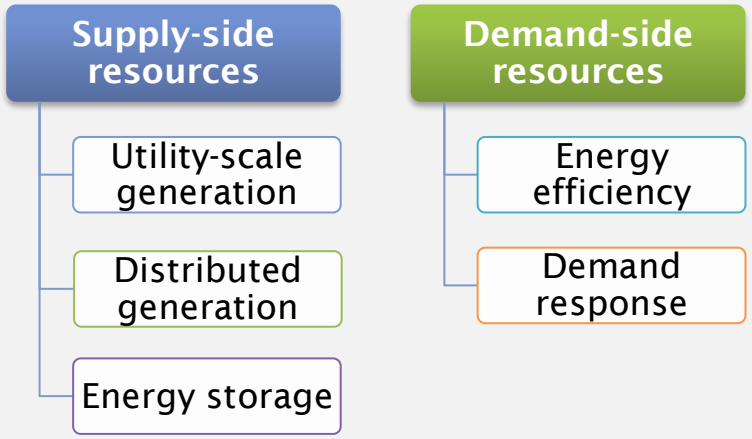
- Needed to ensure delivery of energy from generation resources located primarily upstate and offshore to load pockets downstate, in and around the NYC metropolitan area
- NYC needs to evaluate both traditional transmission solutions and non-wires alternatives holistically to address shrinking reliability margins

Traditional transmission solutions

- For example:
- Phase 1 Reliable Clean City Projects
  - Upgrade ConEd's electric substations and build new, local transmission lines; together, the projects in Queens, Staten Island, and Brooklyn will add 900 MW of transmission capacity across NYC
- Phase 2 Brooklyn Clean Energy Hub
  - Address longer-term reliability needs and serve as an interconnection point for offshore wind or other clean energy resources that can feed directly into NYC; planned to be in-service beginning in 2027

Non-wires alternatives

- A portfolio of solutions to an identified electric system need that does not involve the construction of traditional transmission infrastructure



Source: ConEd website

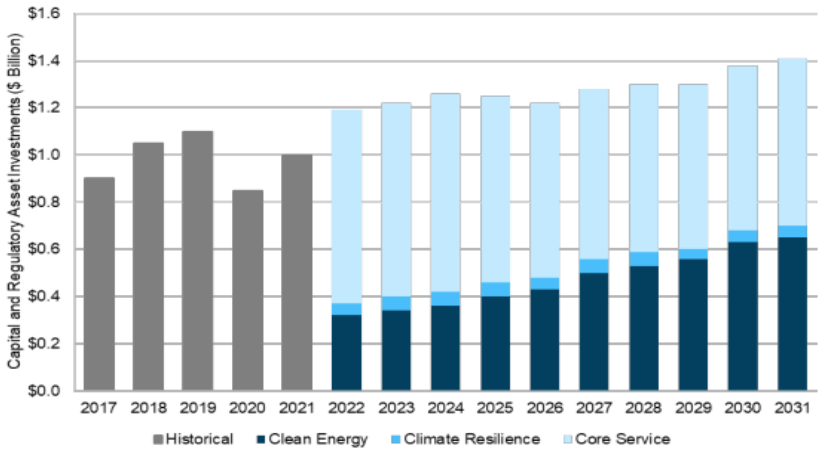
Agenda

1	Introduction
2	**Key themes and challenges**
	Electric sector
	Gas sector

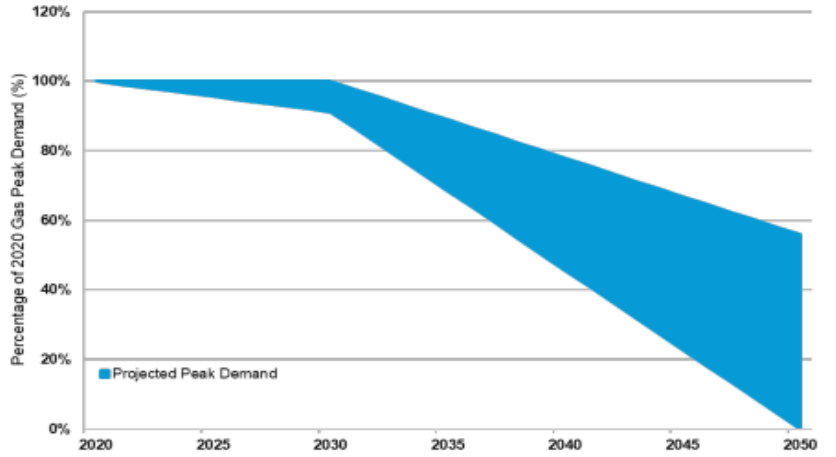
There has been a strong focus on gas main replacement to ensure reliability; public policy objectives focus on decarbonization

- **For example, the largest component of ConEd's 2022 Gas Long-Range Plan is its gas main replacement program…**
  - $4.6 billion for 2022-2031 period
  - Replaces ~85 miles of aging cast iron and unprotected steel distribution mains per year
- **…despite projecting declining gas usage going forward**
- **This poses a significant risk of stranded assets**
- **However, ConEd demonstrated a shift in tone towards decarbonizing its gas system in its recent rate case; Joint Proposal filed February 2023 and approved in July**
  - Pursuing energy efficiency initiatives and non-pipeline alternatives
  - Purchasing certified natural gas
  - Removing/electrifying portions of its system

ConEd's expected capex for gas



ConEd's gas peak demand projections



Source: ConEd. *Gas Long-Range Plan.* January 2022.

Regulatory activity will be key in spurring on the gas system transition

- To achieve CLCPA targets and economy-wide GHG emissions reductions, the gas distribution system will need to be reimagined
- May 2022 NYS PSC order regarding state-wide long-term gas planning efforts requires utilities to assess "no infrastructure options" or non-pipeline alternatives

NYS PSC's gas system planning process

Gas system planning process seeks to decarbonize the gas system in greater alignment with the CLCPA goals and avoid new investment in gas infrastructure

Key highlights:

- ✓ ***Utilities must file a long-term plan every 3 years***
- ✓ ***Utilities must assess several supply scenarios, including a no infrastructure option***
- ✓ ***No infrastructure option would require utilities to rely on demand response, energy efficiency, and electrification***
- ✓ ***Utilities must quantify greenhouse gas emissions impacts***

Source: NYS PSC. *Case Nos. 20-G-0131 and 12-G-0297.*