NYC Energy Infrastructure Long Term Plan Review

prepared by London Economics International LLC for SourceOne Energy Solutions, The Durst Organization, and the New York Energy Consumers Council

March 17, 2022

LONDON ECONOMICS

London Economics International LLC ("LEI") was engaged by SourceOne Energy Solutions, The Durst Organization, and the New York Energy Consumers Council to review Consolidated Edison Company of New York, Inc. ("ConEd")'s long-term planning for electricity and gas infrastructure in New York City ("NYC"). The following report details LEI's analysis and findings regarding the appropriateness of ConEd's plans to meet the energy needs of NYC and public policy targets in a practical and cost-efficient manner.

LEI's review concludes that while ConEd, with guidance from the New York Public Service Commission, has undertaken efforts to prepare its transmission and distribution system, there are some areas where ConEd's planning and level of preparedness are not yet aligned with the State public policy objectives. LEI concludes that ConEd's planning and capital investment forecasts should account for the uncertainty surrounding future developments by considering a range of load scenarios, retirement of thermal generation, and interconnection of new wholesale supply resources, as these scenarios may reveal transmission and distribution needs earlier than currently planned. ConEd's planning scenarios must also properly account for potential solar and storage capacity growth within load pockets, and demand-side resource capabilities, as potential alternatives to traditional infrastructure buildout. Finally, ConEd's aggressive planned gas infrastructure investments should be re-examined given ConEd's own forecast of declining gas demand in response to the State and local public policy objectives.

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List of acronyms

AMI	Advanced Metering Infrastructure	**LMI**	Low to Moderate Income
AREGCB	Accelerated Renewable Energy Growth and Community Benefit Act	**LSE**	Load-Serving Entity
BCA	Benefit/Cost Analysis	**LTP**	Local Transmission Plan
BTS	Bulk Transmission System	**MDth**	Thousand Dekatherms
Btu	British Thermal Unit	**NWS**	Non-Wire Solution
CAGR	Compound Annual Growth Rate	**NYC**	New York City
CES	Clean Energy Standard	**NYCA**	New York Control Area
CHP	Combined Heat and Power	**NYCECC**	New York City Energy Conservation Code
CLCPA	Climate Leadership and Community Protection Act	**NYISO**	New York Independent System Operator
C&S	Codes & Standards	**NYSERDA**	New York Energy Research and Development Agency
ConEd	Consolidated Edison Company of New York, Inc.	**PSC**	Public Service Commission
CSPP	Comprehensive System Planning Process	**REC**	Renewable Energy Credit
DER	Distributed Energy Resource	**REV**	Reforming the Energy Vision
DERMS	DER Management System	**RNA**	Reliability Needs Assessment
DPS	Department of Public Service	**SCADA**	Supervisory Control and Data Acquisition
DSIP	Distributed System Implementation Plan	**SEEP**	System Energy Efficiency Plan
DSP	Distributed System Platform Provider	**T&D**	Transmission & Distribution
EIA	Energy Information Administration	**TBtu**	Trillion British Thermal Units
EPRI	Electric Power Research Institute	**TLA**	Transmission Load Area
EV	Electric Vehicle	**TO**	Transmission Owner
GHG	Greenhouse Gas	**TRACE**	Transmission Reliability and Clean Energy
GIS	Geographic Information System	**ZEC**	Zero-Emission Credit

1 Executive summary

Given the significant changes anticipated for the generation mix and load profile over the next decades, the New York Control Area ("NYCA") electric transmission grid will need to evolve to allow new resources and technologies to come online. This is especially true in New York City ("NYC"), which presents unique challenges given the city's large electric load, its current overwhelming reliance on fossil fuel generated power, and the difficulty siting large-scale renewable generation locally.

These factors present particular challenges for the Consolidated Edison Company of New York, Inc. ("ConEd") as it works to support the transition to renewable energy mandated by State and local public policy objectives. Doing so will require ConEd's system to accommodate the anticipated retirement of significant quantities of existing thermal resources, electrification-driven load growth, distributed energy resources ("DERs"), offshore wind resources, and power injection from high-voltage direct current ("HVDC") projects bringing renewable supply into NYC.

Similarly, while natural gas currently represents a significant source of energy for many buildings, natural gas demand in New York State is forecasted to decline over time as the State pursues decarbonization and electrification efforts consistent with the Climate Leadership and Community Protection Act ("CLCPA") mandates.

LEI's review of ConEd's plans to accommodate the changes in electric load volume and pattern as well as interconnection of new resources concludes that ConEd, with guidance from the New York Public Service Commission ("NY PSC" or the "Commission"), has begun to undertake efforts to prepare its transmission and distribution ("T&D") system. ConEd has, to some degree:

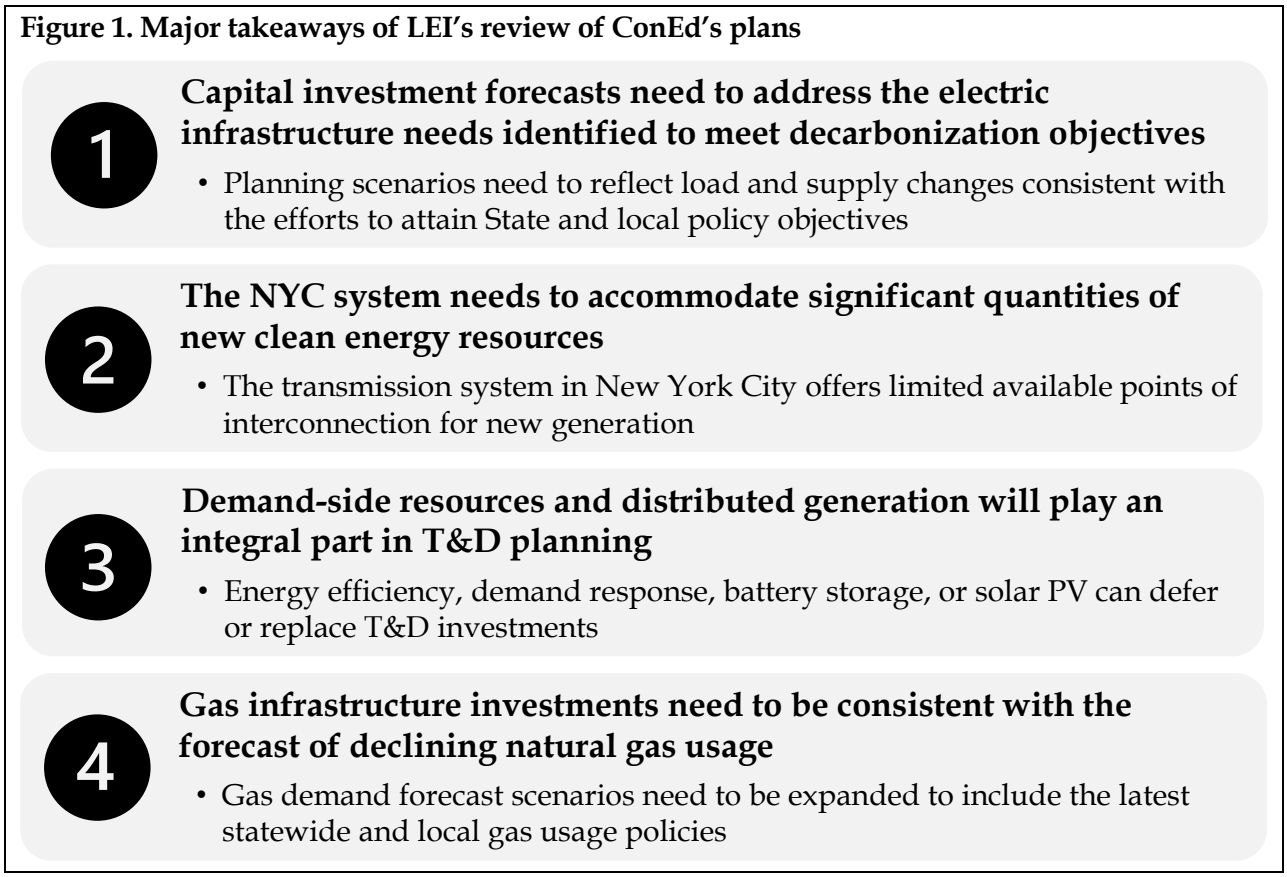
- planned for grid investments needed to support technologies like electric vehicles and building electrification;
- planned investments required for the distribution electric system to meet growing demand;
- planned investments in energy efficiency ("EE") programs to reach legislative energy reduction targets;
- invested in grid modernization initiatives in order to accommodate DERs on its system, with the goal of expanding ConEd's role into a distributed system platform provider ("DSP");
- evaluated risk reduction investments to increase system resilience; and
- investigated non-wires solutions as possible alternatives to traditional transmission and distribution infrastructure investments.

However, while these changes are imminent, LEI also found areas where ConEd's planning and level of preparedness are not yet aligned with the State public policy objectives (see Figure 1). On the electric side, current planning analyses do not appear to have contemplated a combination of factors such as additional programs to support or mandate electrification, additional incentives

for the purchase of electric vehicles, retirement of existing thermal generation resources, and need to interconnect large quantities of new clean energy resources. And, more importantly, ConEd must make sure that its capital plans include the necessary investments in order to maintain system reliability while ensuring the attainment of public policy objectives. On the gas side, ConEd is forecasting declining gas usage over time in response to State and local decarbonization objectives. However, ConEd continues to anticipate aggressive capital spending on its gas system over the next ten years.

These inconsistencies could ultimately impact electric reliability, add costs to ratepayers, and delay the attainment of the goals of the CLCPA.

Figure 1. Major takeaways of LEI's review of ConEd's plans



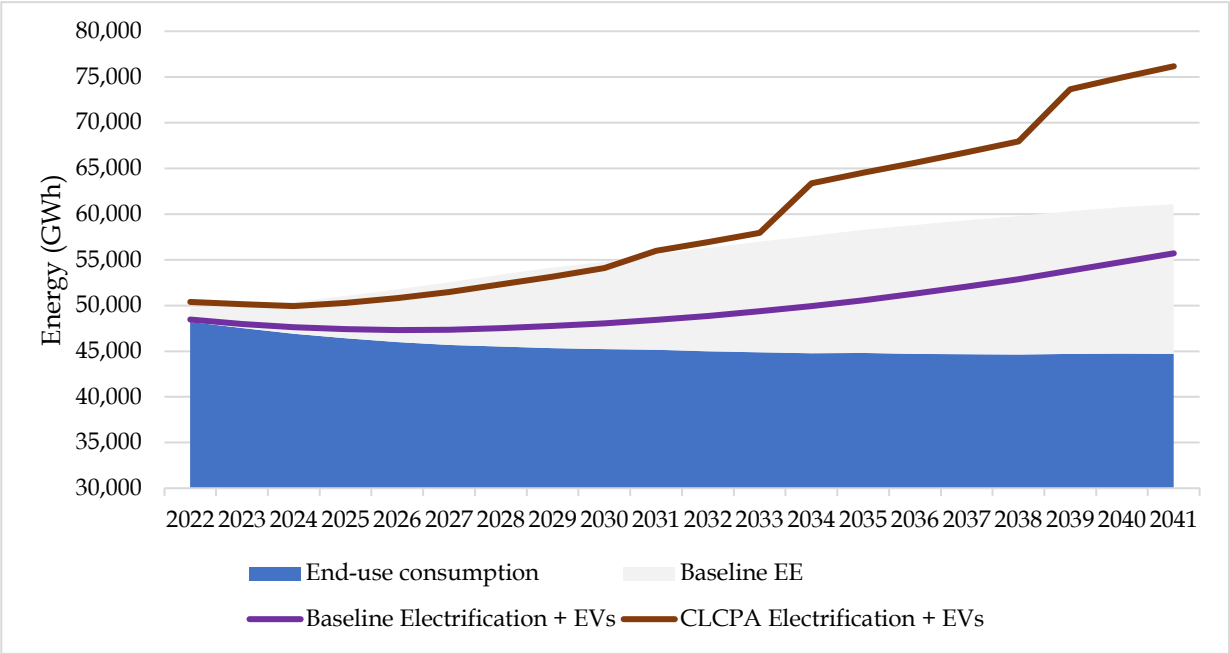
1.1 Load and supply scenarios

On the electricity demand side, load growth in NYC will be driven by electrification and electric vehicle load as the State, and the City of New York, pursue decarbonization efforts to achieve their public policy objectives. Partially offsetting this growth in electrification and EV load are energy efficiency gains, which may come following a ramp up in programs aimed at reducing both electricity and gas usage (see Figure 2).

The operator of New York's bulk electric system and competitive power markets, the New York Independent System Operator ("NYISO"), annually prepares a baseline forecast upon which most transmission planning analyses by the State's Transmission Owners ("TO"), including

ConEd, are based. However, the baseline forecast includes approximately a third of the electrification and EV load forecasted under an alternative scenario, the CLCPA scenario, where load has been forecasted so as to achieve the State's decarbonization targets.

Figure 2. NYISO NYC electrification scenarios – 2022-2041



Note: Shift changes in values for 2035 and 2040 in CLCPA scenario reflects significant assumed changes in end-use technologies necessary to work towards CLCPA policy targets.

Source: NYISO 2021 Load and Capacity Data Report

While the electrification of space heating equipment would mostly affect winter load and peak,[1] NYISO's CLCPA forecast demonstrates that the summer peak load would also be impacted, notably by EV load as well as electrification of other equipment. Furthermore, the seasonal flow patterns would change by putting much stress on the system than has been typical of past winter periods. System planning should therefore consider a range of load scenarios in order to account for electrification and EV load consistent with State's efforts to reach its decarbonization objectives, while also being aware of the challenges associated with achieving these objectives.

As discussed in the next section, planning scenarios must also anticipate the potential impacts of bulk power use changes from retiring generators, offshore wind, and new transmission line interconnections. Indeed, these revised planning assumptions may reveal further T&D needs, or for such investments to occur earlier than planned.

[1] The NYCA, and NYC, are currently summer-peaking systems. Electrification programs and mandates would spur a switch from fossil fuels to electricity for space and water heating needs, thereby increasing winter electricity demand.

1.2 Interconnection of new supply resources, and retirement of thermal resources, on ConEd's grid

In addition to changes in the demand pattern over the coming decades, the supply mix serving ConEd's customers is also poised to evolve over the next two decades, driven by policy mandates (see Figure 3).

Figure 3. Major upcoming supply changes in ConEd's service territory

New York DEC emissions regulation

- Approximately 1,800 MW of peaking generation will ultimately be unavailable during the summer ozone period to comply with the emissions requirements

Offshore wind

- NYISO's interconnection queue includes 13 projects totaling 8.8 GW of offshore wind seeking to interconnect in Zone J (NYC)
- In 2021 the Public Service Commission identified a public policy need to ensure the full output from at least 3,000 MW of offshore wind is deliverable from Long Island to the rest of the State including NYC

Renewable energy delivery in NYC

In September 2021, the State selected two transmission projects totaling 2,550 MW to deliver additional renewable energy into NYC as part of the Tier 4

- Champlain Hudson Power Express, a 1,250 HVDC transmission line that will carry hydropower from Québec
- Clean Path New York, a 1,300 MW transmission line that will deliver upstate wind and solar energy firmed by NYPA pumped storage

ConEd's long-range planning has demonstrated that the transmission system in NYC offers limited available points of interconnection for new resources, such as contracted Tier 4 HVDC projects or offshore wind resources, and many of the interconnection points that exist today will require substantial upgrades to make the interconnecting generation deliverable to load customers.

As such, ConEd has proposed the creation of "Clean Energy Hubs" starting in 2027 to facilitate interconnection of these new resources, along with projects to increase transfer capacity into transmission load areas ("TLAs") to enable delivery of renewable generation to customers. The planning process is part of a Commission proceeding to ensure that New York's transmission and distribution infrastructure will support the State's climate mandates.[2] However, ConEd has also since identified additional transmission and distribution needs in its latest long-range electric

[2] NY PSC Case 20-E-0197.

plan that will need to be addressed before 2030 in order to maintain system reliability and meet the State public policy objectives.[3]

At the same time, ConEd has identified reliability issues, and proposed transmission solutions, to account for the retirement of 1,800 MW of peaking generation following enactment of new emission regulations starting in 2023. However, there is currently over 10,000 MW of thermal generation installed capacity in NYC. Beyond the retirement of peaking units due to emission regulations, it is also very likely that other thermal resources will retire in NYC over the next twenty years. Most of the thermal generating capacity in the State is quite old and a large number of resources are approaching an age of retirement. Second, the CLCPA-driven influx of renewable generation resources in the energy and capacity markets, and requirement for carbon-free electricity generation by 2040, would lower the capacity factor of thermal resources and may render them uneconomic to operate.

In its latest long-range electric plan, ConEd discusses a range of load scenarios in order to incorporate load assumptions consistent with State policy, together with the impact of bulk power use changes from retiring generators, offshore wind interconnections, and new transmission line interconnections. However, it appears that its latest five-year capital plan falls short of the investment needs identified in its long-range plan (see discussion in Section 4.3.2).

In the current long-range plan, ConEd forecasts approximately $53 billion in capital expenditures through 2031, resulting in an average electric revenue requirement (which is a proxy for overall customer cost) increase of 9% per year over the same period. Significant additional investments could be required to meet the State and local mandates beyond 2030, given the load forecast changes and supply changes that will still be taking place through 2040 and beyond.

1.3 The role of distribution grid-connected and demand-side resources

In addition to accommodating large generation interconnections, ConEd is facing reliability transmission needs that can be defined as "off-ramp" constraints – i.e., constraints in getting power from the higher voltage bulk power system down to the lower voltage local system and into TLAs to meet load obligations. These types of constraints can be addressed either through traditional utility infrastructure investments, or when economically feasible through non-wire solutions ("NWS"), which usually involve a portfolio of demand-side or grid-connected resources such as DERs, energy storage, demand response, and EE projects.

ConEd has in the past been successful in deferring traditional infrastructure investments by using distributed resources and efficiencies, and other non-traditional portfolio measures. However, ConEd's evaluation of non-traditional solutions seems inconsistent. For instance, the City of New York questioned the cost-effectiveness of ConEd's proposed traditional transmission solutions in response to a near-term reliability need (see Section 5.2), given that the need in the affected areas lasts for hours or days a year. NYC also questioned ConEd's consideration of non-wire alternatives, noting that ConEd failed to consider whether a combination of possible solutions,

[3] ConEd Electric Long-Range Plan. January 2022.

such as energy efficiency, storage and distributed energy resources, would be a more cost-effective approach.

Furthermore, as part of its proceeding to ensure that New York's transmission and distribution infrastructure will support the State's climate mandates, the Commission found that ConEd's and other TOs' proposed framework for cost-benefit analysis of planned investments was unsatisfactory, in part because the framework could overlook alternatives such as energy storage, alternative siting of generation, competitive transmission investment (including merchant facilities or facilities funded by market participants), demand-side solutions, and that other NYISO transmission siting processes should also be evaluated.[4]

As such, it will be important for ConEd in the future to not only account for increasing penetration of distributed and demand-side resources, including energy storage resources, in its transmission and distribution planning, but also to appropriately consider cost-effective non-wire solutions that complement transmission infrastructure investments and avoid unnecessary spending which would result in even higher costs to ratepayers.

1.4 Long-term gas planning

In New York, several statewide and local targets aimed at achieving decarbonization objectives will impact gas usage going forward, primarily by driving increased energy efficiency and electrification as buildings switch away from fossil fuel-fired heating options. Notably, several proposed measures in the New York State legislature would require ConEd to plan for the elimination of gas service, and a recently enacted NYC law effectively implements a ban on natural gas combustion in certain new buildings in the coming years.

ConEd's updated Long-Range Gas Plan, released in January 2022, marks a notable shift in the utility's view on expected gas usage going forward. In this latest document, ConEd prepared three forecast scenarios where demand would decrease between 60% (in the hybrid consumption scenario) to 100% (in the full electrification scenario) from 2020 levels by 2050.[5]

However, ConEd's demand forecasting does not yet take into account the impacts of NYC Local Law 154, which phases in a gas-ban for certain new buildings in the City beginning in 2024. As such, it will be important for ConEd to expand its gas planning modeling scenarios to account for the impacts of this policy on future gas usage, ensuring that planned capital investments be evaluated in the appropriate context.

Furthermore, despite planning for decreasing natural gas usage going forward, ConEd still anticipates spending approximately $13 billion through 2031 on its gas system, which amounts

[4] NY PSC. Order on Local Transmission and Distribution Planning Process and Phase 2 Project Proposals. Case 20-E-0197. September 9, 2021.

[5] ConEd. 2022 Gas Long-Range Plan. Table 6, page 22. January 2022.

to around $1.3 billion in capital expenditures per year.[6] This annual value is higher than the planned annual capital expenditures presented in ConEd's 2019 Long-Range Gas Plan, which anticipated total spending of approximately $22 billion over 20 years (or $1.1 billion per year).[7] In addition, the $13 billion capital plan outlined in the 2022 Long-Range Gas Plan represents an estimated increase in ConEd's gas revenue requirement (equivalent to overall customer costs) of approximately 6% per year through 2031 – again despite a planned decrease in natural gas usage. Investments in gas infrastructure increase the risk of stranded assets if gas usage does decline, or alternative system needs (i.e. hydrogen) emerge.

ConEd must plan for a reliable gas network despite uncertainty surrounding future gas demand. However, in light of clear signals from policymakers, ConEd should re-examine these planned investments and include consideration of non-pipeline alternatives to help ensure a reliable gas network while meeting the State decarbonization targets and avoid investments which may result in stranded assets in the future.

[6] ConEd. 2022 Gas Long-Range Plan. Page 58. January 2022.

[7] ConEd. *Gas Long-Range Plan (2019-2038)*. January 2019.

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2 Introduction

Given the significant changes anticipated for the generation mix and load profile over the next decades, the NYCA electric transmission grid will need to evolve to allow new resources and technologies to come online. This is especially true in NYC, where the ConEd transmission system will need to accommodate distributed energy resources, load growth, offshore wind resources, and new power injection from high-voltage direct current resources.

Similarly, the natural gas demand in New York State is forecasted to decline over time as State and local governments pursue decarbonization and electrification efforts consistent with decarbonization targets and other legislative mandates.

In this context, The Durst Organization, as a developer, owner, and operator of commercial and residential real estate in NYC, together with the New York Energy Consumers Council and SourceOne Energy Solutions, have selected London Economics International LLC ("LEI") to review ConEd's long-term capital and operating plans to ensure that they capture, and address, these upcoming changes in NYC's power supply and demand outlook.

LEI's review focused on the expected electricity supply and demand trends given the State and local public policy goals, as published by government agencies, the NYISO, and other agencies or entities. LEI also reviewed interconnection plans for new resources, including offshore wind, storage resources, distributed energy resources, or new HVDC transmission lines, anticipated to come online in NYC. Separately, LEI reviewed ConEd's long-term transmission plans through corporate planning documents and other documents submitted to the State or Federal regulator in rate cases or other regulatory proceedings. In addition to electricity planning documents, LEI reviewed ConEd's long term gas system planning documents and processes, given that the decarbonization objectives are likely to change the pattern of natural gas consumption in NYC.

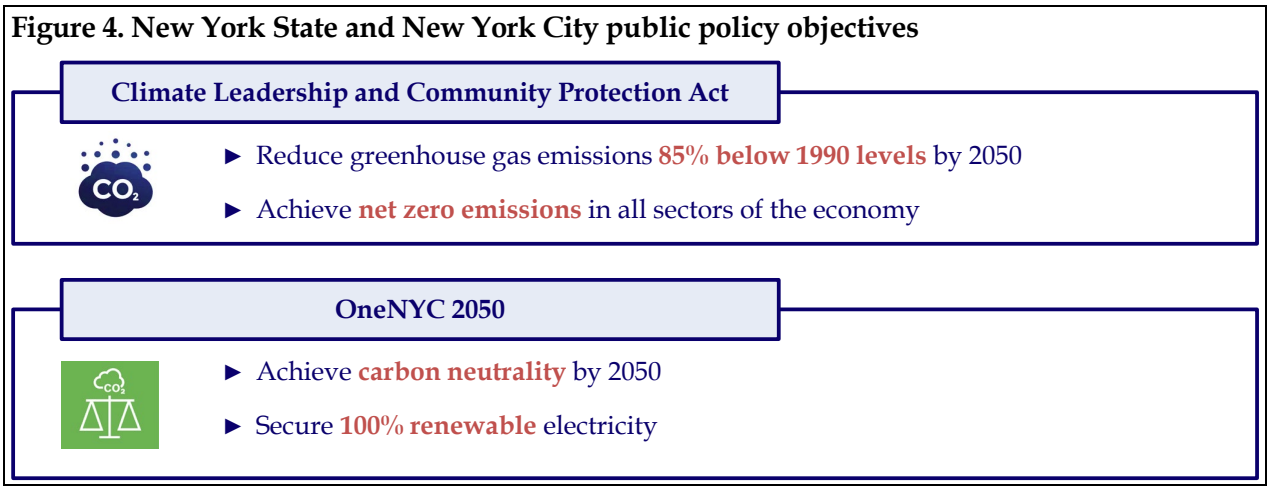
3 New York State and New York City energy public policy objectives

In recent years, the New York State legislature has enacted legislation to accelerate the push for decarbonization in the State, including setting ambitious objectives for the decarbonization of the electric and gas sectors through mandates for reduction of the sectors' greenhouse gas ("GHG") emissions, energy efficiency savings, and incentives for specific electricity generation technologies such as DERs, offshore wind resources, or battery storage resources.

In July 2019, the New York State legislature passed the Climate Leadership and Community Protection Act ("CLCPA"), which establishes a statewide goal of reducing GHG emissions 85% below 1990 levels by 2050, as well as achieving net zero emissions in all sectors of the economy.[8] The State legislature also enacted the Accelerated Renewable Energy Growth and Community Benefit Act ("AREGCB") in April 2020, aimed at assisting the siting and construction of clean energy projects and achieving the State's policy objectives identified in the CLCPA.[9]

The City of New York has similarly set a target to reduce emissions of greenhouse gases and achieve carbon neutrality by 2050 (see Figure 4).[10]

Figure 4. New York State and New York City public policy objectives



3.1 Electricity public policy mandates

With respect to the electric sector, the CLCPA increased the Clean Energy Standard ("CES") target so that 70% of the State's load be served by renewable sources by 2030, and with 100% carbon-

[8] NY State Senate. *Senate Bill S6599.* June 18, 2019.

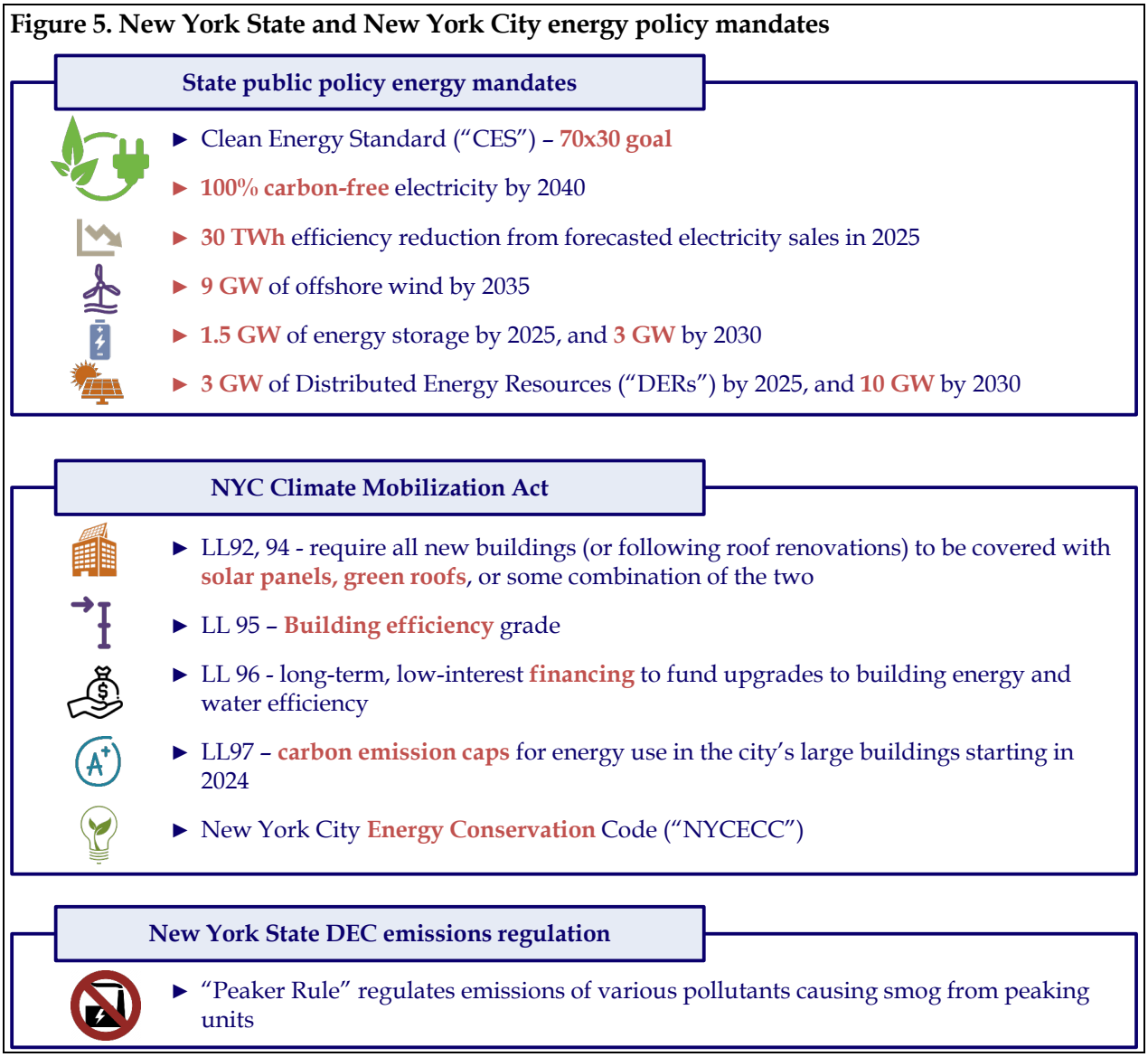
[9] NYSERDA. New York State Announces Passage of Accelerated Renewable Energy Growth and Community Benefit Act as Part of 2020-2021 Enacted State Budget. April 2, 2020. https://www.nyserda.ny.gov/About/Newsroom/2020-Announcements/2020-04-03-NEW-YORK-STATE-ANNOUNCES-PASSAGE-OF-ACCELERATED-RENEWABLE-ENERGY-GROWTH-AND-COMMUNITY-BENEFIT-ACT-AS-PART-OF-2020-2021-ENACTED-STATE-BUDGET

[10] New York City. OneNYC 2050. http://onenyc.cityofnewyork.us/#main-content

free electricity by 2040. The CLCPA additionally set mandates for EE, energy storage, distributed generation, and offshore wind procurement.

The City of New York has similarly enacted local legislation through the Climate Mobilization Act to achieve its decarbonization targets (see Figure 5).

Figure 5. New York State and New York City energy policy mandates



3.1.1 Clean Energy Standard

On October 15, 2020, the NY PSC adopted an order modifying the CES to integrate the policy objectives detailed in the CLCPA. Notably, the expanded CES now mandates that 70% of New York's load be served by energy from renewable sources by 2030.[11]

The CES features:

- obligations on load-serving entities ("LSEs") to financially support new renewable generation resources;
- a requirement for regular renewable energy credit ("REC") procurement solicitations;
- obligations on distribution utilities to financially support the maintenance of certain existing at-risk small hydro, wind, and biomass generation attributes;
- a program to maximize the value of potential new offshore wind resources; and
- obligations on LSEs to preserve existing nuclear zero-emissions attributes through the purchase of zero-emission credits ("ZECs").

The REC procurement as outlined in the CES is agnostic on the nature of new renewable supply (i.e., there is no carve-out for specific technologies), as long as they meet the requirements of Tier 1 resources.[12] The economics of new technologies, availability of resources, as well as possible preference by some LSEs for deliverability of some amounts of energy to their respective service territories, are going to drive development of new renewable resources.

To facilitate the transaction of Tier 1 RECs, the New York State Energy Research and Development Agency ("NYSERDA") acts as the central procurement administrator, issuing annual competitive solicitations to award long-term contracts to eligible renewable generators for the purchase of RECs, which NYSERDA then sells to LSEs looking to meet their Tier 1 obligations.[13] Entities such as the New York Power Authority and the Long Island Power Authority, which are not under NY PSC jurisdiction, have also committed to adopt the State's renewable energy targets.[14]

As part of an October 2020 Order, the NY PSC also adopted modifications to Tier 2 resources to provide support to certain existing baseline renewable resources. Finally, the NY PSC announced the creation of a Tier 4 program aimed at reducing the reliance on fossil fuel-fired generation in New York City. Tier 4 eligible resources generally include new renewable resources that would otherwise be eligible as Tier 1 resources, with the addition of large-scale hydro resources (with

[11] NY PSC. Order Adopting Modifications to the Clean Energy Standard. Case 15-E-0302. October 15, 2020.

[12] Generally speaking, eligible technologies include small hydro, biogas/biomass, solar, and wind. The full eligibility requirements can be found in Appendix A to the NY PSC Clean Energy Standard order.

[13] NY PSC. *Order Adopting a Clean Energy Standard*. Case 15-E-0302. August 1, 2016.

[14] NYSERDA. Clean Energy Standard Annual Progress Report: 2017 Compliance Year. February 2019.

restrictions), and that are either located in New York City (Zone J) or can deliver their energy into Zone J through incremental transmission capacity. Offshore wind resources are excluded, as they are the subject of their own separate procurement process. The NY PSC specified a limit of 3,000 MW on Tier 4 resources.

3.1.2 Offshore wind energy mandate

In the same October 2020 Order, the NY PSC adopted the CLCPA's statewide goal of installing 9 GW of offshore wind capacity by 2035. NYSERDA is tasked with conducting annual solicitations for offshore wind resources, with a procurement schedule target of approximately 750 MW to 1,000 MW of offshore wind capacity per year through 2027.[15]

3.1.3 Energy storage mandate

In December 2018, the NY PSC issued an Order Establishing Energy Storage Goal and Deployment Policy. This Order created the targets of 1,500 MW of energy storage by 2025, as well as 3,000 MW by 2030.[16] The CLCPA reaffirmed those targets.[17]

3.1.4 Distributed energy mandate

As part of the CLCPA, a mandate for distributed energy has also been established, aiming to install 6,000 MW of distributed solar energy capacity in the State by 2025.[18] This target was recently raised to at least 10,000 MW by 2030.[19]

3.1.5 Energy efficiency mandate

The CLCPA has set a statewide energy efficiency goal of 185 trillion British thermal units ("Btu") in energy reduction relative to forecasted energy consumption levels in 2025, inclusive of all fuel sources.[20] For the electricity sector specifically, there is a sub-target of a 30,000 GWh reduction from forecasted electricity sales in 2025, which amounts to annual savings in sales of approximately 3%.[21]

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[15] See the NYSERDA offshore wind solicitation website at https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/Focus-Areas/Offshore-Wind-Solicitations

[16] NY PSC. Case 18-E-0130: Order Establishing Energy Storage Goal and Deployment Policy. December 13, 2018.

[17] NY State Senate. *Senate Bill S6599*. June 18, 2019.

[18] Ibid.

[19] NYSERDA. *Governor Hochul Announces Expanded NY-Sun Program to Achieve at Least 10 Gigawatts of Solar Energy by 2030.* September 20, 2021.

[20] NY State Senate. *Senate Bill S6599*. June 18, 2019.

[21] Ibid.

3.1.6 New York City Climate Mobilization Act

NYC's Climate Mobilization Act of 2019 includes several laws that are designed to cut carbon emissions in the City, including:[22]

- Local Laws 92 and 94 – Green Roofs – require all new buildings and buildings undergoing major roof renovations to be covered with solar panels, green roofs, or some combination of the two. The laws also require all buildings to reduce urban heat hazards;
- Local Law 95 – Building Energy Efficiency Grade – amends Local Law 33 of 2018 for how energy efficiency grades are calculated for buildings required to annually benchmark their energy and water consumption;
- Local Law 96 – Property-Assessed Clean Energy – establishes long-term, low-interest financing to fund upgrades to building energy and water efficiency;
- Local Law 97 – Buildings Mandates – sets carbon emission caps for energy use in the city's large buildings starting in 2024. It is anticipated that the law will drive increased electrification, especially as buildings switch away from fossil fuel-fired heating options; and
- NYC's Energy Conservation Code ("NYCECC"), which was updated in 2020.[23]

3.1.7 New York State Department of Environmental Conservation emissions regulation

In December 2019, the New York State Department of Environmental Conservation ("NYS DEC") issued requirements to reduce emissions of various pollutants causing smog from peaking units (the "Peaker Rule").[24] The so-called Peaker Rule, which phases in compliance obligations between 2023 and 2025, will affect approximately 3,300 MW of simple-cycle turbines located mainly in the Lower Hudson Valley, New York City and Long Island. [25]

3.2 Natural gas-related public policy mandates

Several statewide and local targets will impact gas usage going forward, primarily by driving increased energy efficiency and electrification as buildings switch away from fossil fuel-fired heating options. These mandates are driven by the same State and NYC objectives discussed in the previous section on electric consumption mandates, such as the CLCPA and NYC's OneNYC 2050 carbon-neutrality objective (see Figure 6).

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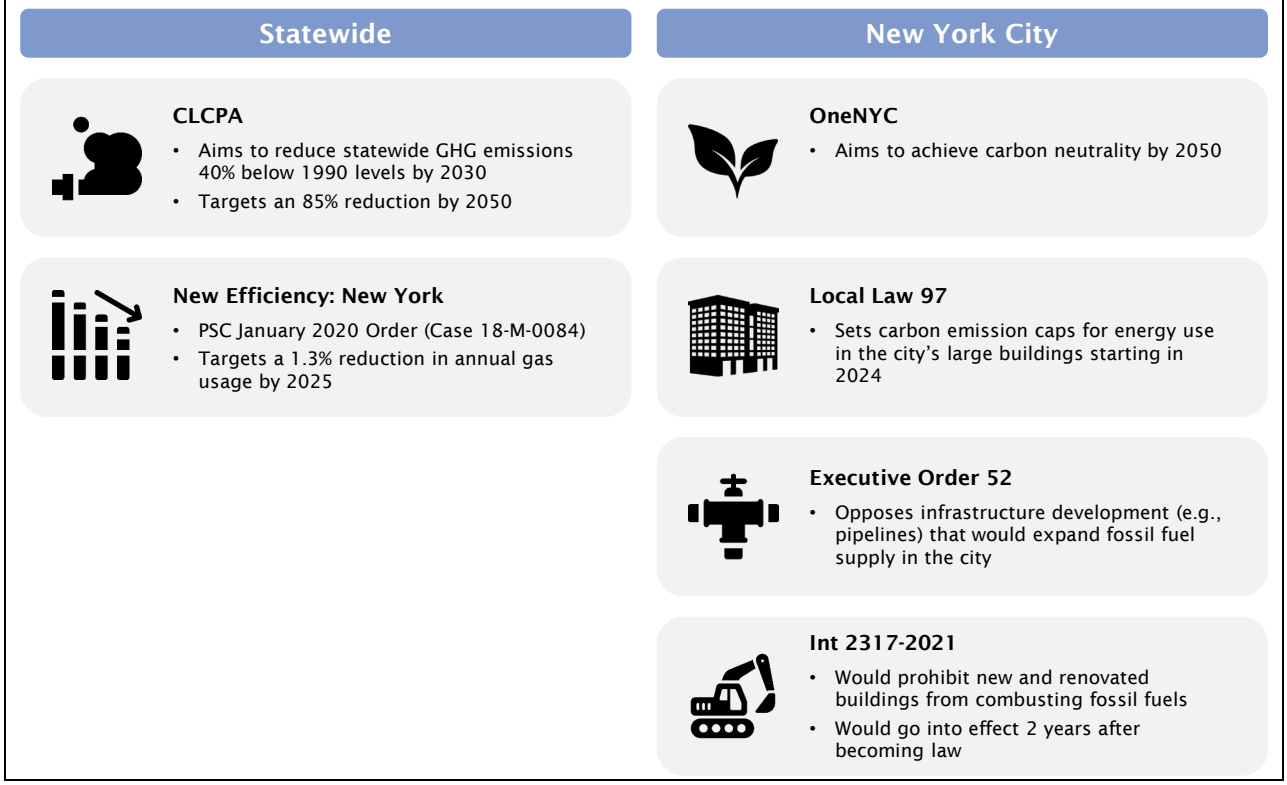
[22] NYC. The Climate Mobilization Act, 2019. https://www1.nyc.gov/site/sustainability/legislation/climate-mobilization-act-2019.page

[23] NYC. Energy Conservation Code. https://www1.nyc.gov/site/buildings/codes/energy-conservation-code.page

[24] https://www.dec.ny.gov/enb/20191231_not0.html

[25] NYISO. 2020 Reliability Needs Assessment. November 2020.

Figure 6. Statewide and local targets impacting gas usage



3.2.1 PSC-ordered energy efficiency targets

In Case 18-M-0084, the Commission in January 2020 approved targets to reduce annual gas usage 1.3% by 2025 through various gas energy efficiency and electrification programs.[26]

3.2.2 NYC Local Law 97

Enacted in May 2019, the local law sets carbon emissions caps beginning in 2024 for energy use in the City's large buildings. The law applies to most buildings over 25,000 square feet, which is estimated to impact approximately 50,000 buildings in NYC (59% residential and 41% commercial), or 60% of the City's building area.[27] Specifically, the law targets emissions reductions of 40% below 2005 levels by 2030, and 80% by 2050.[28]

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[26] NY PSC. *Press Release – Governor Cuomo Announces Additional $2 Billion in Utility Energy Efficiency and Building Electrification Initiatives to Combat Climate Change*. January 16, 2020.

[27] Urban Green Council. *NYC Building Emissions Law Summary: Local Law 97*. July 9, 2020.

[28] NYC. *Local Law 97.*

3.2.3 NYC Executive Order 52

Signed in February 2020, the Executive Order outlines the City's opposition to energy infrastructure development that would expand fossil fuel supply in the City (including pipelines, terminals, or new fossil fuel-fired electric generation capacity).[29]

3.2.4 NYC Bill Int 2317-2021

Voted in December 2021, the legislation prohibits combustion of any fuel that emits 25 kilograms or more of carbon dioxide per million Btu of energy used. This would notably bar the use of natural gas. The law's application would be phased in, starting in 2024 with developers of buildings with fewer than seven stories. Developers of larger buildings would have until July 1, 2027, before the restrictions phase in.

[29] NYC. *Executive Order No. 52*. February 6, 2020.

4 Electric load forecast and planned capital expenditures

4.1 Electric load forecast

Central to the transmission and distribution planning efforts are forecasts of electric load (peak load and annual energy consumption) across the State, which are used to evaluate future system needs.

The NYISO annually prepares a baseline load forecast, along with some alternative scenarios, over a 30-year period (2021-2050) in their Load and Capacity Data Report (also known as the "Goldbook"). The modeling scenarios include (see Figure 7):[30]

- Baseline scenario;
- Low load scenario;
- High load scenario; and
- CLCPA case.

The baseline scenario represents NYISO's view of the load trajectory under typical economic growth conditions, substantial attainment of current energy efficiency programs, and medium penetration of distributed solar resources, EVs, and electrification.

Conversely, the CLCPA case is based on NYISO's Climate Change Impact Study, and includes "*State electrification to meet targeted greenhouse gas emission targets.*"[31]

[30] NYISO. 2021 Load and capacity Data Report. April 2021.
https://www.nyiso.com/documents/20142/2226333/2021-Gold-Book-Final-Public.pdf

[31] Ltron, inc. New York ISO Climate Change Impact Study – Phase 1 : Long-Term Load Impact. December 2019.
https://www.nyiso.com/documents/20142/10773574/NYISO-Climate-Impact-Study-Phase1-Report.pdf

Figure 7. NYISO load forecast scenario summary

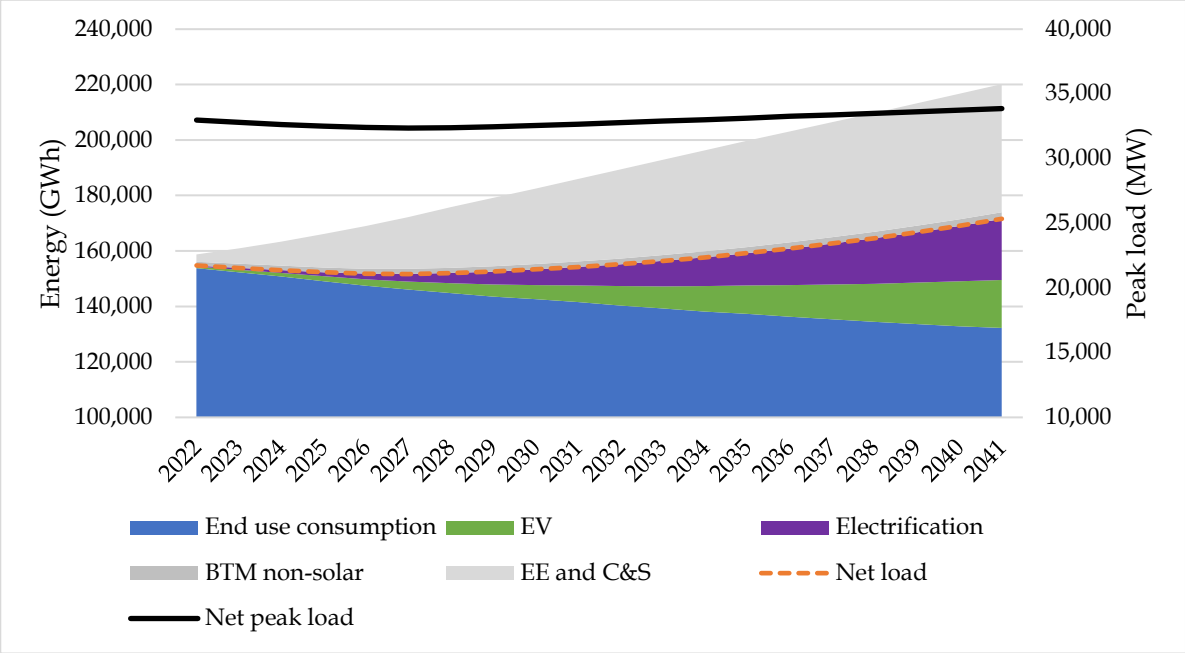
Forecast Component	Baseline Forecast	Low Load Scenario	High Load Scenario	CLCPA Case
Weather Trends	Trended Weather from NYISO Climate Change Impact Study - average NYCA temperature gain of approximately 0.7 degrees Fahrenheit per decade	Same as Baseline Forecast	Same as Baseline Forecast	Same as Baseline Forecast
Economic Assumptions	Expected baseline recovery from the COVID-19 recession, followed by typical economic growth in the long run	Weaker recovery from the COVID-19 recession, followed by below typical economic growth in the long run	Stronger recovery from the COVID-19 recession, followed by above typical economic growth in the long run	Baseline economic growth with no recession (forecast from 2019)
Energy Efficiency (Table I-8)	Large energy efficiency gains - substantial attainment of current policy measures, plus additional codes & standards impacts	Very large energy efficiency gains - full attainment of current policy measures, plus additional codes & standards impacts	Moderate energy efficiency gains - lower attainment of current policy measures, plus additional codes & standards impacts	Projected impacts from energy efficiency policy measures in effect as of early 2019
BTM Solar PV (Table I-9)	Medium BTM solar - 6,000 MW DC installed nameplate capacity by early 2026	High BTM solar - 6,000 MW DC installed nameplate capacity by 2025	Low BTM solar - 6,000 MW DC installed nameplate capacity by 2027	High BTM solar - 6,000 MW DC installed nameplate capacity by 2025
BTM Non-Solar DG (Table I-10)	Over 500 MW installed non-solar BTM DG nameplate capacity by 2035. No assumption of future entry of resources into the wholesale DER market	Same as Baseline Forecast	Same as Baseline Forecast	Existing BTM non-solar DG resources as of 2019 - no projection of future capacity increases
Electric Vehicles (Table I-11)	Approximately 4.3 million EVs (passenger vehicles, trucks and buses) in 2040. Unmanaged charging profile	Approximately 3.3 million EVs in 2040. Increasing probability of managed charging over time	Approximately 5.3 million EVs in 2040. Unmanaged charging profile	Over 4.5 million EVs in 2040. Unmanaged charging profile
Energy Storage (Table I-12)	Over 3,000 MW installed nameplate capacity by 2029, with over 10,000 MW installed in 2051 (total behind-the-meter plus wholesale)	3,000 MW installed nameplate capacity by 2026, and over 19,000 MW installed in 2051, with a larger proportion of storage behind-the-meter	3,000 MW installed nameplate capacity by 2032, and nearly 8,000 MW installed in 2051	Approximately 3,000 MW installed nameplate capacity by 2030, with approximately 5,000 MW installed in 2050
Non-EV Electrification (Table I-13)	Medium electrification - substantial electrification of space heating and other end uses	Low electrification - modest electrification of space heating and other end uses	High electrification - high saturation of electric space heating and other end uses	Very high electrification - very high saturation of electric heating and space conditioning, and significant electrification of other end uses

Source: NYISO 2021 Load and Capacity Data Report

4.1.1 Baseline load forecast scenario

Removing the impact of solar distributed generation, the NYISO's baseline forecast assumes that significant EE savings will offset modest increases in EV load and electrification statewide, resulting in no net growth over the next ten years, and a 1% average annual growth rate over the next decade (see Figure 8).

Figure 8. NYISO statewide baseline load forecast – 2022-2041



Source: NYISO 2021 Load and Capacity Data Report

Generally speaking, end-use "business-as-usual" consumption will decline approximately 1% per year on average, driven by EE initiatives, while EV and electrification load will increase to represent approximately 4% each (8% total) of the statewide load by 2031, and 10% (EV) and 12% (electrification) by 2041.

For NYC specifically, on the demand side, EE targets and electrification are the biggest drivers for load going forward (see Figure 9).

Figure 9. NYC load forecast drivers

NYC load modifiers

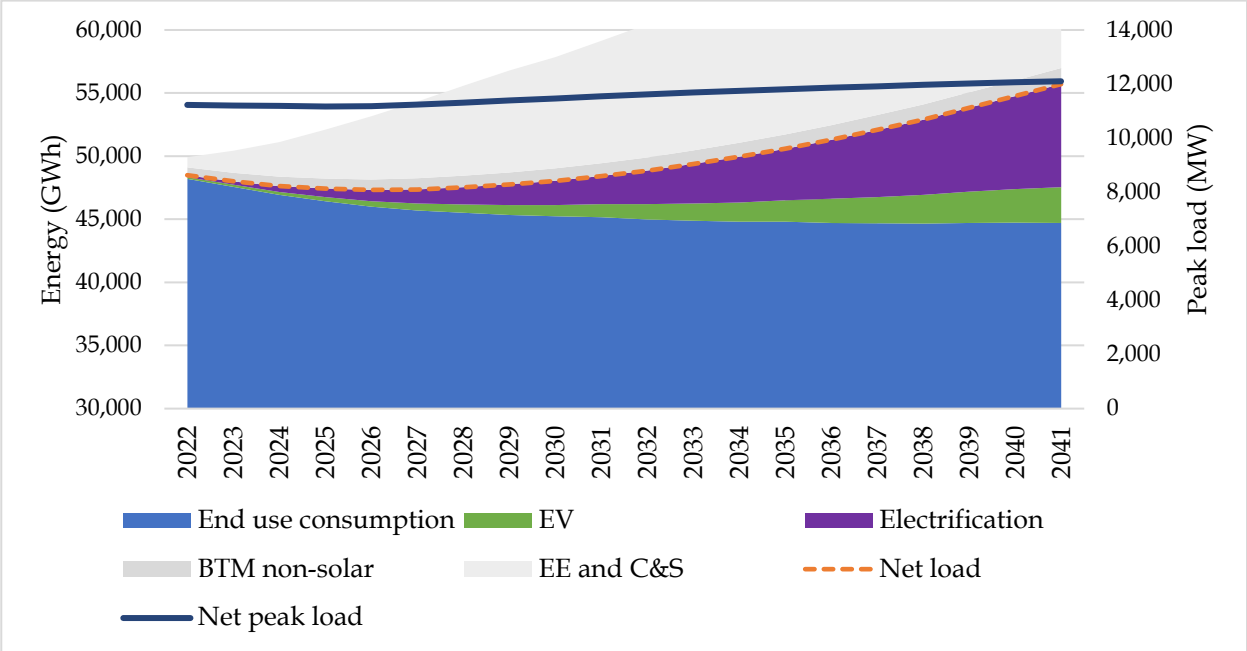
- **Energy efficiency** – 9.6 TWh, or about 25% of ConEd's econometric load forecast by 2030*
- **Electrification** – 1.8 TWh to 7.7 TWh additional energy in NYC by 2030
- **Solar PV DERs** – 627 MW by 2030 (vs 263 MW in 2020)
- **EVs** – 0.8 TWh to 1.1 TWh additional energy in NYC by 2030
- **Battery Storage** – 788 MW by 2030

* The econometric forecast is the business-as-usual load forecast without excluding impacts from EE, Codes & Standards, DERs, or EVs

Source: NYISO 2021 Load and Capacity Data Report

Current electrification incentives will result in a slightly larger relative increase in electrification load in the baseline scenario, where electrification load will represent 4.6% of net load by 2031, while EV load will represent only 2%. By 2041, EVs and electrification will represent 5% and 15% of total load, respectively (see Figure 10).

Figure 10. NYISO NYC baseline load forecast – 2022-2011



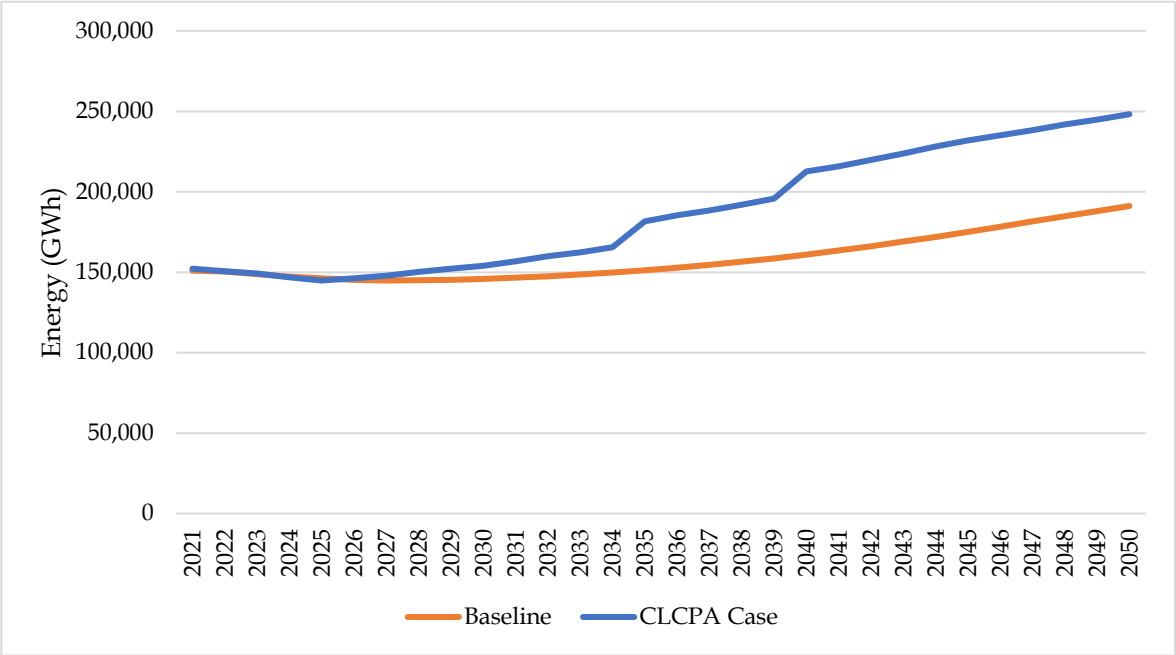
Source: NYISO 2021 Load and Capacity Data Report

4.1.2 Public policy impact on load forecast

The baseline assumptions do not necessarily represent a path to achieving public policy targets for decarbonization. Over a period of 30 years, there is a significant divergence between the statewide baseline load forecast (net of EE and DER, including EV and electrification load), and the forecast of load assuming achievement of the CLCPA targets (see Figure 11). This difference, with CLCPA load being 30% higher than the baseline forecast by 2050, is mostly the result of the massive shift to electrification and resulting load required to achieve the State's GHG emission reduction targets. This is especially important given that the seasonal profile of electrification load is very different from historical load patterns – indeed, the NYISO would become a winter peaking system in future decades due to electrification primarily via space heating and electric vehicles; this scenario would occur much faster under the larger electrification load forecast in the CLCPA case.[32]

[32] NYISO. 2021 Load and Capacity Data Report. April 2020.
https://www.nyiso.com/documents/20142/2226333/2021-Gold-Book-Final-Public.pdf

Figure 11. NYISO statewide baseline vs CLCPA load forecast



Note: Shift changes in values for 2035 and 2040 in CLCPA scenario reflects significant assumed changes in end-use technologies necessary to work towards CLCPA policy targets.

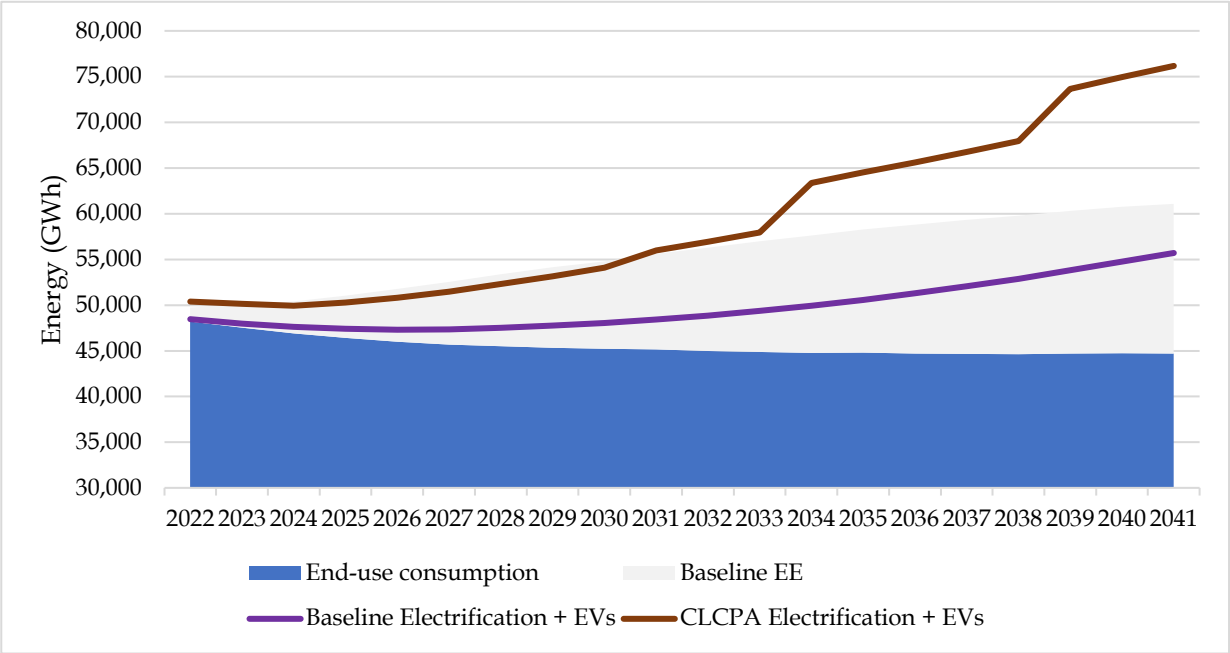
Source: NYISO 2021 Load and Capacity Data Report

This divergence between the Baseline and CLCPA forecasts does illustrate the extent of the challenges if the State is to meet its decarbonization objectives, including the need for new technologies.

Focusing on NYC, the CLCPA case forecast includes approximately three times as much electrification and EV load with respect to the baseline forecast (see Figure 12).[33] This would result in a total net load of approximately 56 TWh in NYC by 2031 (as opposed to 48 TWh in the baseline forecast); and 76 TWh by 2041 (as opposed to 55.7 TWh in the baseline scenario).

[33] In this figure, LEI relied on the latest econometric and EE forecasts from the baseline 2021 NYISO forecast for NYC, but compared the impact of baseline vs CLCPA-levels of EV and electrification load.

Figure 12. NYISO NYC energy load electrification scenarios – 2022-2041



Note 1: In this figure, LEI relied on the latest econometric and EE forecasts from the baseline 2021 NYISO forecast for NYC, but compared the impact of baseline vs CLCPA-levels of EV and electrification load.

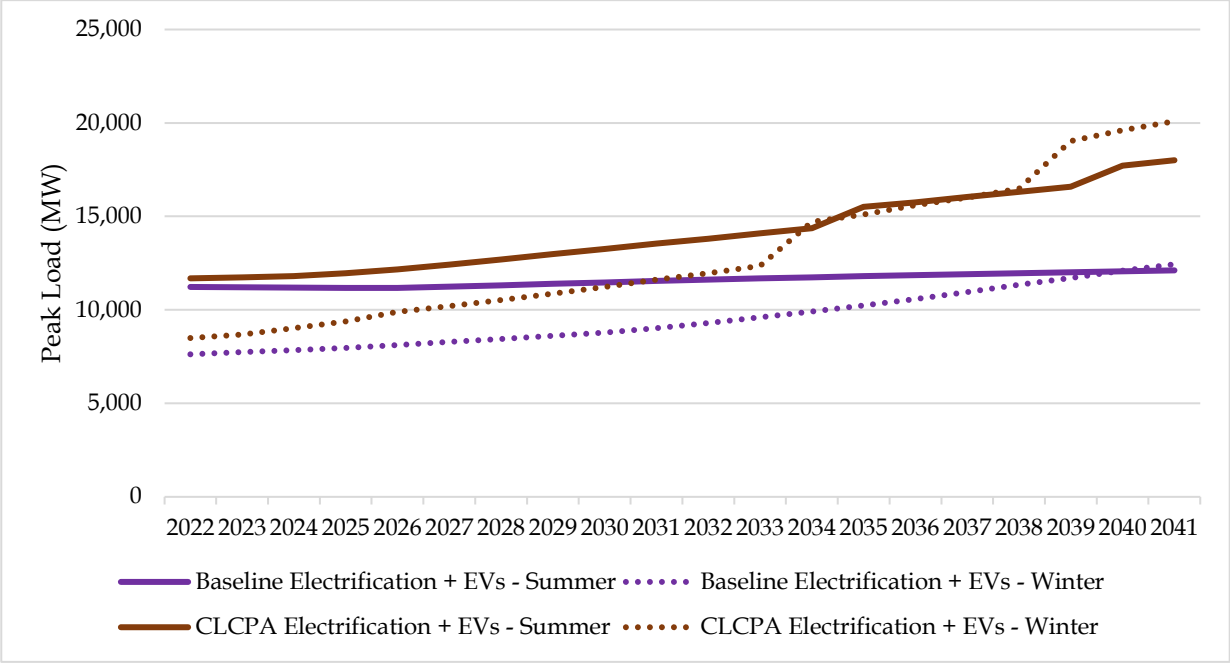
Note 2: Shift changes in values for 2035 and 2040 in CLCPA scenario reflects significant assumed changes in end-use technologies necessary to work towards CLCPA policy targets.

Source: NYISO 2021 Load and Capacity Data Report

With respect to peak load, NYC (like the State) would become a winter-peaking system under all scenarios; however, in the CLCPA scenario where the decarbonization targets are assumed to be met, the winter peak reached the summer peak earlier, around 2034, than in the baseline scenario, around 2040 (see Figure 13).

While the electrification of space heating equipment would mostly affect winter peak, Figure 13 demonstrates that the summer peak load would also be impacted by EV load as well as electrification of other equipment. Furthermore, the seasonal flow patterns would change by putting much higher stress on the system than has been typical of past winter periods.

Figure 13. NYISO NYC peak load electrification scenarios – 2022-2041



Note 1: In this figure, LEI relied on the latest econometric and EE forecasts from the baseline 2021 NYISO forecast for NYC, but compared the impact of baseline vs CLCPA-levels of EV and electrification load.

Note 2: Shift changes in values for 2035 and 2040 in CLCPA scenario reflects significant assumed changes in end-use technologies necessary to work towards CLCPA policy targets.

Source: NYISO 2021 Load and Capacity Data Report

As an alternative to the NYISO forecasts, the Electric Power Research Institute ("EPRI") has also created electrification forecast scenarios for the State of New York.[34] EPRI's analysis includes a "Mandates" scenario, which is consistent with the State policy targets and is described as such:

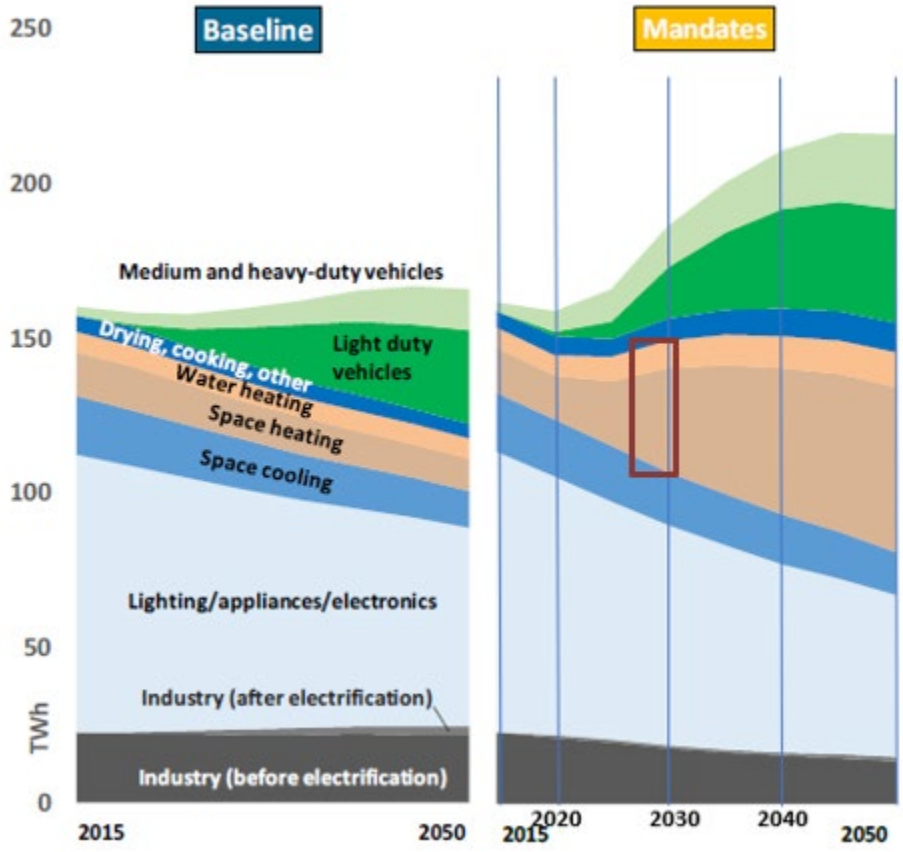
"The Mandates scenario explores the impact of possible regulatory interventions for electric end uses and energy efficiency. The policies this scenario examines would require building and vehicle owners to select electric technologies for new purchases, beginning in 2025. In this scenario, heating equipment performance improvements are accelerated by 15 years, but advanced technological breakthroughs are not assumed"

EPRI's "Mandates" scenario can be contrasted against its baseline forecast, which only assumes attainment of the State's pre-2019 clean energy targets (see Figure 14). The "Mandates" scenario results in approximately 22 TWh of additional water and space heating electrification statewide

[34] EPRI. Electrification Scenarios for New York's Energy Future. February 27, 2020. https://www.epri.com/research/products/3002017940

by 2030 with respect to their Baseline scenario; this value is consistent with NYISO's CLCPA case electrification scenario.

Figure 14. EPRI Statewide electrification scenarios



Source: EPRI. Electrification Scenarios for New York's Energy Future. February 27, 2020.

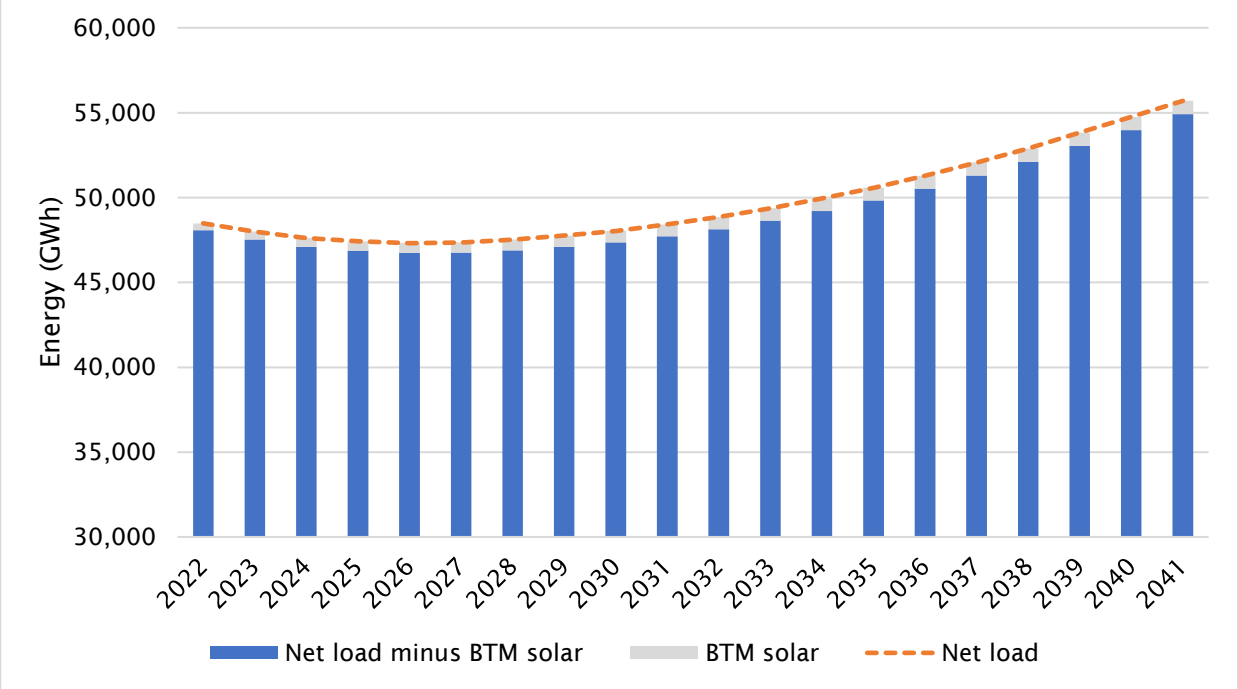
Generally, the NYISO and the State's TOs rely on the baseline forecasts for system planning purposes. However, the baseline load forecast is not consistent with attainment of the State's policy targets, as has been demonstrated by comparison to NYISO's "CLCPA case" and EPRI's "Mandates" load forecasts. Indeed, electrification load needs to be much higher than shown in the baseline forecast in order to achieve decarbonization of the energy sector consistent with legislative mandates. As such, were the State to achieve its policy targets, the electric load could end up being much higher than currently being forecasted for system planning purposes.

4.1.3 Solar DER impacts on NYC load

At the distribution level, DER penetration, driven by State objectives, would reduce the net load to be served by wholesale supply resources. However, in NYC, due to space constraints, distributed solar resources would have a relatively modest 1.4% reduction impact on baseline load by 2031 (see Figure 15). By comparison, distributed solar resources would reduce baseline load by approximately 6.0% for Long Island, 7.3% for upstate regions, and 5.5% on average

statewide. The impact in NYC would be even smaller using the CLCPA case forecast as a reference.

Figure 15. Impact of NYC solar DER on baseline load forecast



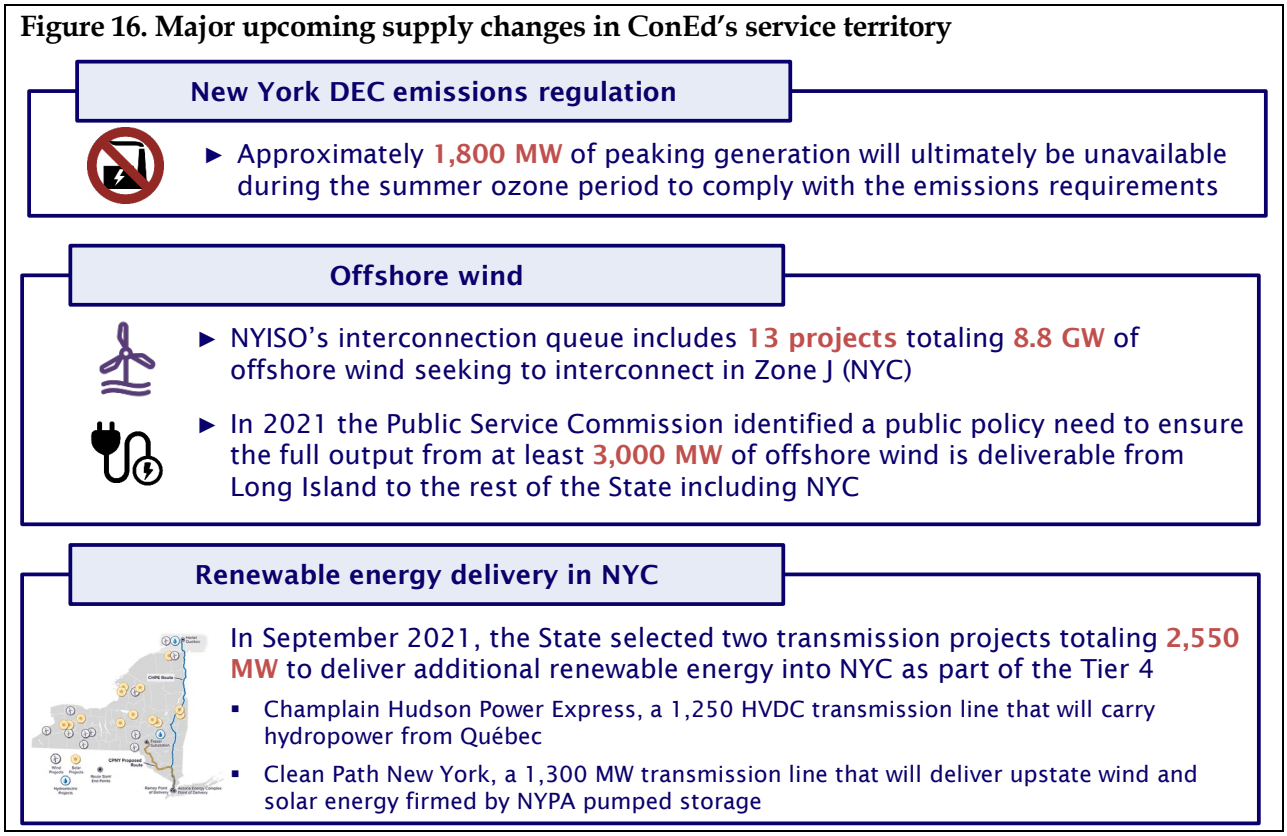
Source: NYISO 2021 Load and Capacity Data Report.

4.2 Major upcoming changes in supply for NYC

In addition to changes in the demand pattern over the coming decades, the supply mix serving ConEd's customers is also poised to evolve over the next two decades, driven by policy mandates (see Figure 16).

London Economics International LLC
717 Atlantic Avenue, Suite 1A
Boston, MA 02111
www.londoneconomics.com

Figure 16. Major upcoming supply changes in ConEd's service territory



4.2.1 Retirements of thermal generation

Following adoption of the Peaker Rule (described in Section 3.1.7), owners of thermal peaking generation resources in NYC filed compliance plans with the NY PSC identifying approximately 1,800 MW of nameplate capacity (approximately 1,500 MW of net operating capacity) in New York City that would ultimately be unavailable during the summer to comply with the emissions requirements. These resources would retire gradually as the emission limits become effective, between 2023 and 2025. The remaining units either currently comply with the emissions limits as operated, or will be upgraded to achieve compliance with the emissions limits.[35]

As further described in Section 5.2, ConEd has determined that the retirement of these generation resources will cause reliability issues that will be addressed through transmission upgrades.

Currently, there is over 10,000 MW of thermal generation installed capacity in NYC.[36] Beyond the retirement of peaking units due to emission regulations, it is also very likely that other thermal resources will retire in NYC over the next twenty years. On the one hand, most of the thermal generating capacity in the State is quite old and a large number of resources are approaching an

[35] NYISO. 2020 RNA Report. November 2020. https://www.nyiso.com/documents/20142/2248793/2020-RNAReport-Nov2020.pdf

[36] NYISO. 2021 Load and Capacity Data Report.

age of retirement. By 2029, more than 8,370 MW of gas turbine and steam-turbine generating capacity in the state (a lot of it in NYC) could reach an age at which nationally 95% of these types of generation capacity have deactivated.[37]

Second, the CLCPA target of carbon-free electricity by 2040, and associated mandates for wind, solar, and other clean energy resources, will make it very unlikely that all these thermal resources will remain, even if burning renewable natural gas. Indeed, the influx of zero-marginal cost generation would lower the capacity factor of thermal resources, and the resulting added installed capacity could price out older resources in the capacity market.[38]

4.2.2 Offshore wind

All of the offshore wind resources that would be coming online pursuant to the CLCPA's statewide goal of 9 GW of offshore wind capacity by 2035 would interconnect either in NYC or in Long Island ("LI"). Currently, there are 13 projects in NYISO's interconnection queue totaling 8.8 GW of offshore wind installed capacity that is seeking to interconnect in Zone J (NYC). While it is very unlikely that all these projects will end up being built, there is still a large quantity of offshore wind that is expected to interconnect with ConEd's system.

Furthermore, pursuant to its public policy planning process,[39] the NYISO in 2020 asked stakeholders to submit proposed transmission needs driven by Public Policy Requirements. NYISO subsequently filed these proposals with the NY PSC; the Long Island Power Authority similarly referred to the NY PSC a Public Policy Transmission Need for the delivery of offshore wind output on Long Island and from Long Island into New York City.[40]

In a March 2021 Order, the NY PSC identified a public policy need to ensure the full output from at least 3,000 MW of offshore wind is deliverable from Long Island to the rest of the State.[41] As a result, the NYISO issued a solicitation for projects to address this need in August 2021.[42]

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[37] NYISO. Power Trends 2019. https://www.nyiso.com/documents/20142/2223020/2019-Power-Trends-Report.pdf

[38] NYISO is proposing changes to the capacity market rules to better accommodate state objectives, while maintaining an effective capacity market. See: Modifications to the BSM Construct in the NYISO Capacity Market. December 2021. https://www.nyiso.com/documents/20142/25957407/AG%20BSM%20Report%20Draft%20and%20Appendix%20A%20-%20Repost.pdf

[39] NYISO's Public Policy Transmission Planning Process is detailed in Attachment Y of the OATT and the NYISO Public Policy Transmission Planning Process Manual.

[40] LIPA. Letter of Rick Shansky to Chair John Rhodes. Case No. 18-E-0623. July 30, 2020.

[41] NY PSC. Order Addressing Public Policy Requirements for Transmission Planning Purposes. Case No. 20-E-0497 and Case No. 18-E-0623. March 19, 2021.

[42] NYISO. Long Island offshore wind export public policy transmission need project solicitation. August 12, 2021.

4.2.3 Tier 4 transmission interconnections

In January 2021, NYSERDA issued a solicitation for the procurement of Tier 4 RECs from qualified suppliers located in New York City, or delivering their energy into New York City over a new transmission interface. NYSERDA was seeking up to 1,500 MW through this solicitation, but reserved the right to exceed that quantity if it received sufficiently compelling proposals.[43]

In September 2021, New York Governor Kathy Hochul announced that the State had selected two projects under the Tier 4 solicitation:

- Champlain Hudson Power Express, a 1,250 HVDC transmission line from Québec to New York City that will carry hydropower from Québec; and
- Clean Path New York, a 1,300 MW transmission line from Delaware County to New York City. This line will deliver upstate wind and solar energy, firmed by NYPA's Blenheim-Gilboa pumped storage facility.

Together, these two projects will deliver approximately 18 TWh to New York City.

4.3 ConEd planned capital expenditures

4.3.1 Five-year capital spending plan

Over the next five years, ConEd plans to invest approximately $16.0 billion, representing capital expenditures of between $2.3 billion and $3.6 billion annually (see Figure 17).[44]

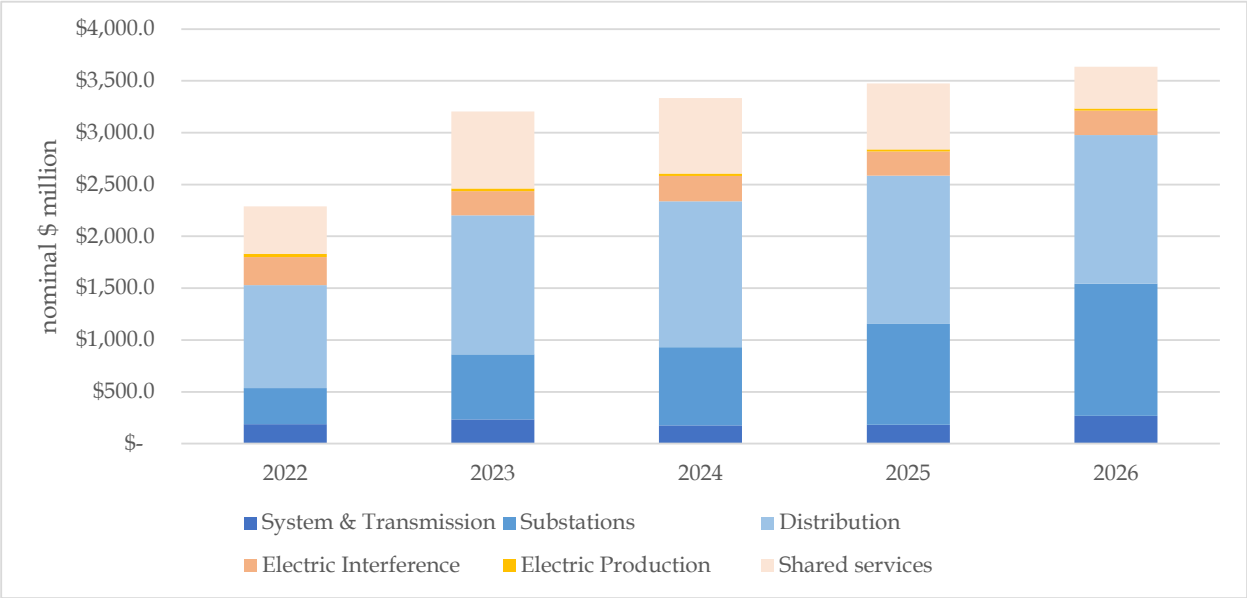
The System & Transmission investments will total $1.1 billion over five years, while distribution investments (including substations) will total $10.6 billion over the same period. Other investment categories include Electric Interference,[45] Electric Production, and Shared Services totaling $5.4 billion over five years.

[43] See NYSERDA's Tier 4 solicitation website at <https://www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Standard/Renewable-Generators-and-Developers/Tier-Four>

[44] ConEd. Report on 2021 Capital Expenditures and 2021-2026 Electric Capital Forecast. Case 19-E-0065. February 28, 2022.

[45] As explained in ConEd's Distributed System Implementation Plan, "*when New York City or another municipality performs work, such as installing or repairing a sewer or water main in the vicinity of the Company's facilities, the Company bears all the costs to locate, move, support, protect, and/or relocate the facilities affected by the municipality's construction activity.*" Source: https://www.ConEd.com/-/media/files/ConEd/documents/our-energy-future/our-energy-projects/2016-distributed-system-implementation-plan.pdf

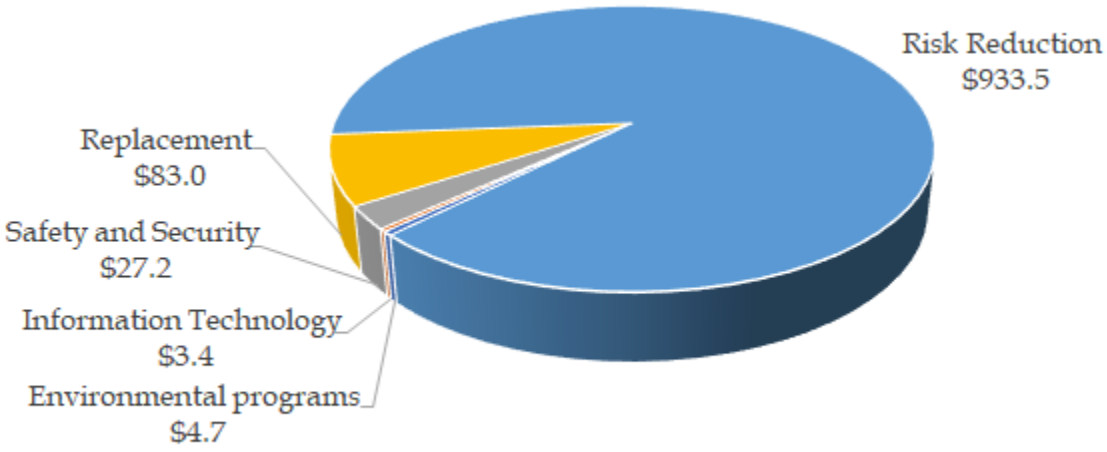
Figure 17. ConEd 2022-2026 capital expenditure plan



Source: Report on 2021 Capital Expenditures and 2022-2026 Electric Capital Forecast. Case 19-E-0065. February 28, 2022.

With respect to System & Transmission, ConEd's $1.1 billion investments on system and transmission infrastructure (excluding the TRACE projects) will consist mostly of "risk reduction" projects, designed to lower operational risks causing transmission outages (see Figure 18).

Figure 18. ConEd 2022-2026 system & transmission capex plan (million dollars)



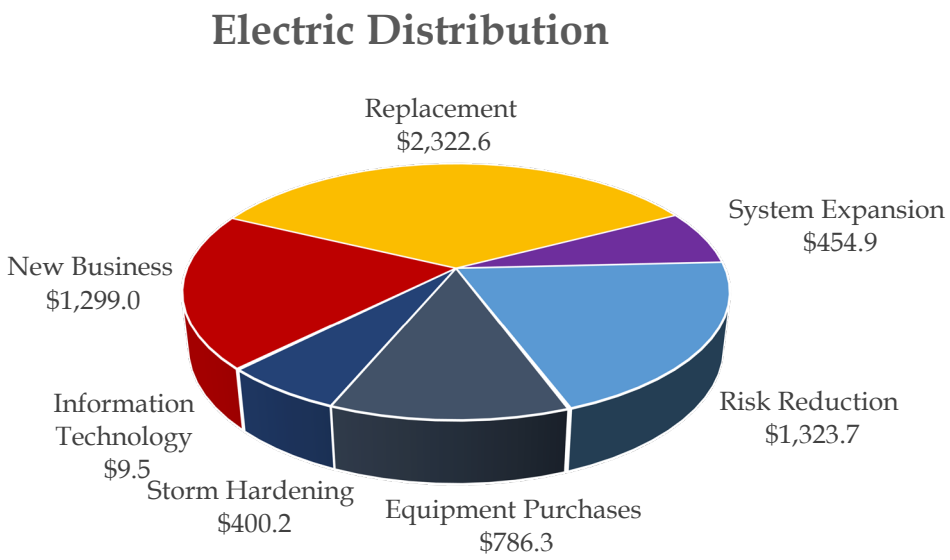
Source: Report on 2021 Capital Expenditures and 2022-2026 Electric Capital Forecast. Case 19-E-0065. February 28, 2022.

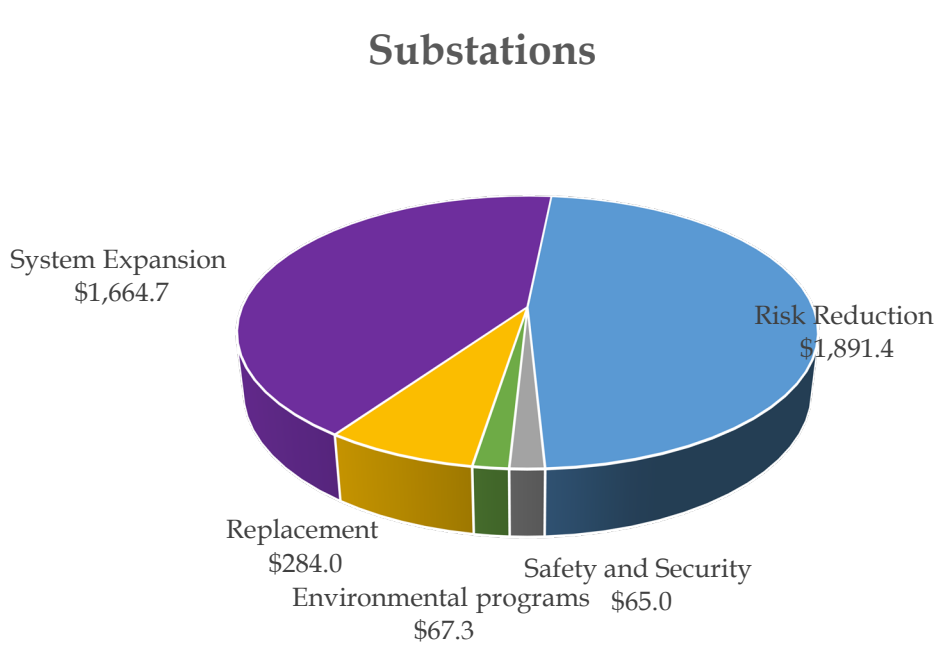
Most of the costs in the "risk reduction" category are tied to replacement of some feeders (transmission cables supplying load areas) that are not currently adequately protected; other

expenditures are related to ConEd's pipe and joint replacement programs, or structure modernization.

With respect to distribution and substation investments, ConEd plans expenditures of $6.6 billion and $4.0 billion, respectively (see Figure 19). For the distribution system, investments will notably include just over $2.3 billion for replacement of assets, $1.3 billion for new interconnections, and $1.3 billion for risk reduction (enhanced resilience) measures. For substations, most investments will focus on risk reduction measures ($1.9 billion) – which are spread over a large number of projects aimed at increasing system resilience – and system expansion ($1.6 billion).

Figure 19. ConEd 2022-2026 substation and distribution capex plan (million dollars)





Source: Report on 2021 Capital Expenditures and 2022-2026 Electric Capital Forecast. Case 19-E-0065. February 28, 2022.

These investment plans do not incorporate potential funding from the $1.2 trillion Infrastructure Investment and Jobs Act discussed in the textbox below. While the Act would indeed fund initiatives that are consistent with some of ConEd's planned investments (including grid resilience, transmission development, and smart grid investments), it is too early to determine the extent to which the Act will impact electric infrastructure in NYC.

The Infrastructure Investment and Jobs Act

Signed into law on November 15, 2021, the $1.2 trillion bipartisan Infrastructure Investment and Jobs Act allocates $65 billion specifically to power grid investments across the country. This funding will be available for various initiatives, including those focused on grid infrastructure, resiliency, and reliability (approximately $28.8 billion), supply chains for clean energy technologies (approximately $8.6 billion), and fuels and technology infrastructure investments (approximately $27.9 billion).

This funding will mostly be distributed to states either through formula grants (where the amounts allocated to states will be based on formulas established by Congress), or through competitive solicitations among state and local agencies.

Sources: *Bipartisan Infrastructure Investment and Jobs Act Summary*; Norton Rose Fullbright. *Infrastructure Investment and Jobs Act: A Historic Investment in U.S. Infrastructure.* November 18, 2021.

4.3.2 Long-term capital spending plan

Over the long term, ConEd's latest Electric Long-Range Plan forecasts approximately $53 billion of investments by 2031[46] – as compared to a total $50 billion of investments forecasted in ConEd's 2019 plan over a period twice as long (20 years).[47] In this latest plan, approximately $23.3 billion would go towards readying ConEd's transmission system for clean energy hubs and asset reinforcement and reliability, while $14.1 billion would be dedicated to energy efficiency and electrification initiatives, another $13.5 billion for core services, and $2.6 billion for climate resilience projects(see Figure 20).[48]

Figure 20. ConEd ten-year capex summary

Strategic Objective	Example Initiative(s)	Approximate Expenditure 2022-2031 ($ Millions)
Multi-value	Clean Energy Hubs Asset Reinforcement and Reliability + *Other initiatives*	$23,300
Clean Energy	Energy Efficiency Electrification of Building Heating Electrification of Transportation + *Other initiatives*	$14,100
Climate Resilience	Selective Undergrounding Transformer Climate Adaptation + *Other initiatives*	$2,600
Core Service	Customer Experience Grid Modernization Cybersecurity + *Other initiatives*	$13,500
Total		**$53,500**

Source: ConEd Electric Long-Range Plan. Page 78. January 2022.

ConEd's planned multi-value investments notably include a range of transmission infrastructure investments that would deliver renewable energy and supply increased demand to help meet the statewide clean energy goals. These investments would include initiatives to maintain system reliability while allowing for the retirement of fossil fuel-fired generation, investments in large generation, transmission, and storage interconnection hubs, and substation upgrades to accommodate load growth (see Figure 21).

[46] ConEd. Electric Long-Range Plan. January 2022.

[47] ConEd. Electric Long-Range Plan 2019 – 2038. January 2019.

[48] ConEd. Electric Long-Range Plan. January 2022.

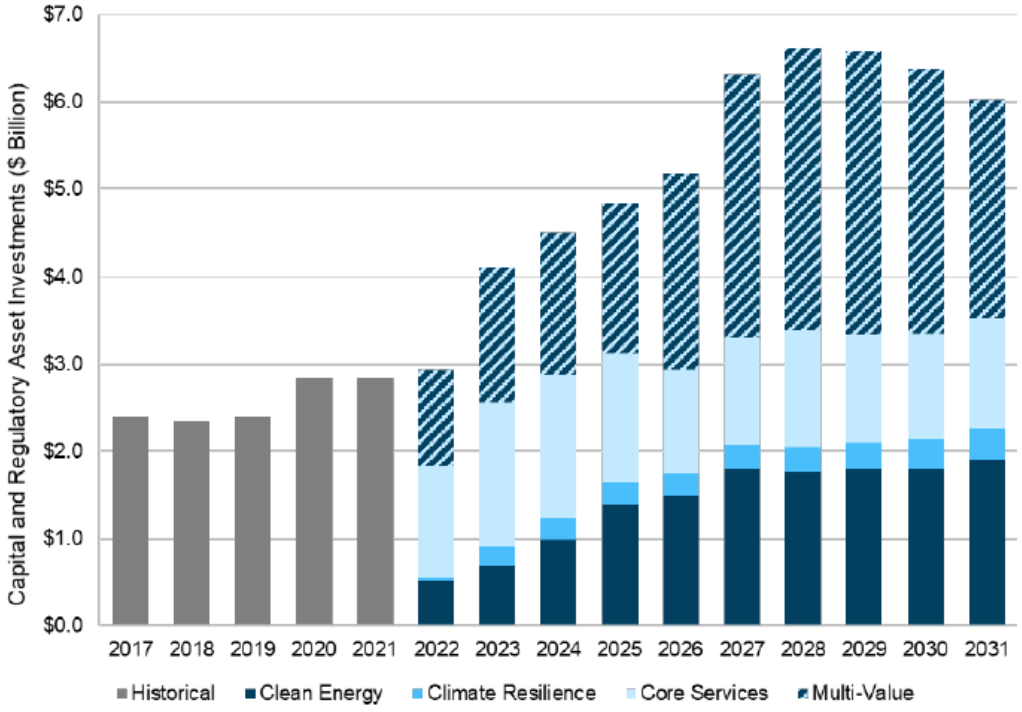
Figure 21. ConEd ten-year electric transmission initiatives

Transmission Focus Area	Example Initiative	Description and Value Delivered
Enabling Fossil Fuel Retirement *Relieve existing transmission bottlenecks and potential voltage constraints on local transmission networks*	**Reliable Clean Cities (RCC) Projects**	This initiative addresses future local transmission deficiencies caused by the planned retirement or unavailability of fossil fuel-fired generation while enabling the further retirement of fossil fuel generation and the delivery of renewable electricity to our customers. RCC projects will enable continued reliability of the electric system across our service territory.
	Voltage Support Solutions	This initiative supports grid management, specifically in maintaining the range of system voltage needed to sustain overall system integrity and health. This initiative prepares the electric system for increased variability from the retirement of fossil fuel generation and the injection of new renewable generation.
Expanding Renewable Generation Capacity *Create new points of interconnection*	**Brooklyn Clean Energy Hub**	These initiatives will provide cost-effective points of interconnection for offshore wind or other large-scale renewables to be directly connected to the 345 kV system in New York City while limiting the need for local upgrades. In addition, it supports continued safe and reliable electric service.
	Additional Clean Energy Hubs	
	Energy Storage Hubs	This initiative will identify optimal locations on the 138 kV system within our service territory to introduce energy storage and guide more efficient system interconnections. In addition, it will provide storage developers with clearer signals for interconnection location and lower interconnection costs; it will also increase customer use of clean energy.
	Additional Feeders in New York City	This initiative addresses expected transmission constraints that would curtail the delivery of land-based and offshore wind, as well as optimize the flow of renewable energy throughout our system.
Preparing for Future Demand Growth *Increase system capacity for expected future demand*	**Substation Replacement/ Upgrades**	This initiative replaces poorly performing assets with new upgrades that redirect system flows to alleviate expected constraints. Replacement/upgrades prepare the system for future demand growth in a timely manner by making upgrades before the electric system becomes over-constrained and improves resiliency and reliability.

Source: ConEd Electric Long-Range Plan. Page 34. January 2022.

ConEd's $53 billion total investments would require a ramp up in annual investments to between $4.0 billion and $6.5 billion annually starting in 2023, ultimately representing almost three times the average annual investment from the last five years (see Figure 22).

Figure 22. ConEd 2019-2038 annual capex plan by major functional group

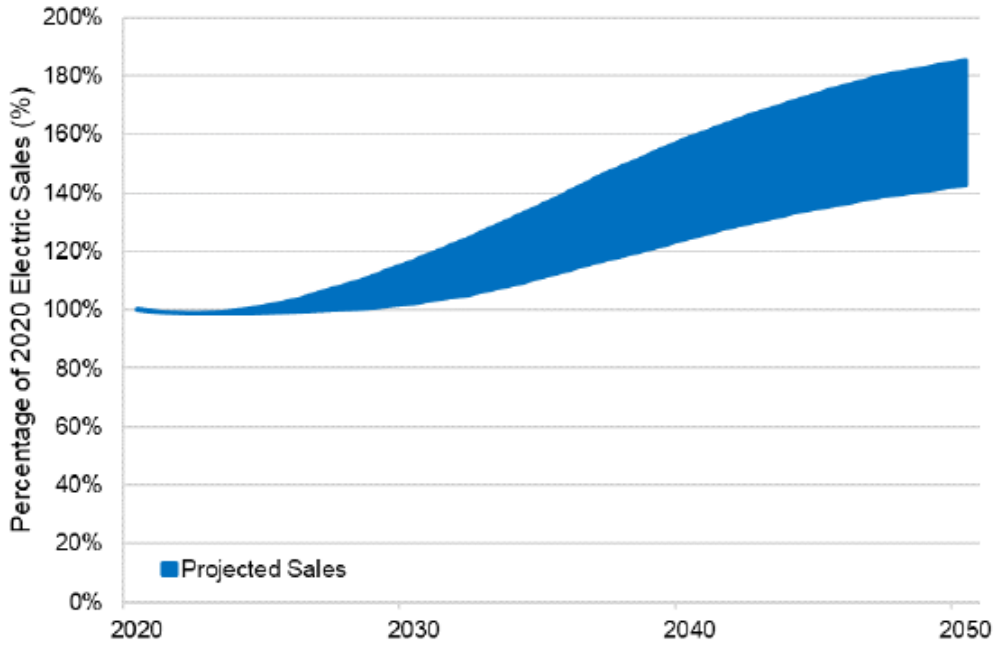


Source: ConEd Electric Long-Range Plan. January 2022.

However, as shown in Figure 17, ConEd's current five-year plan includes investments of approximately $2.3 billion in 2022, ramping up to $3.6 billion by 2026 – not quite reaching the levels forecast under the long-range plan.

ConEd's ten-year investment plan is premised on forecast assumptions of energy sales increasing by 25% to 60% by 2040 with respect to current levels, with most of the load increase in the 2030-2040 period (see Figure 23). For comparison purposes, the higher end of ConEd's forecast range is roughly consistent with the CLCPA forecast that would meet the State policy objectives (see Figure 12 page 25). However, it is unclear if ConEd's planned investments over the next ten years are designed to accommodate the higher end of the load forecast range – or a lower value.

Figure 23. ConEd projected energy sales through 2050

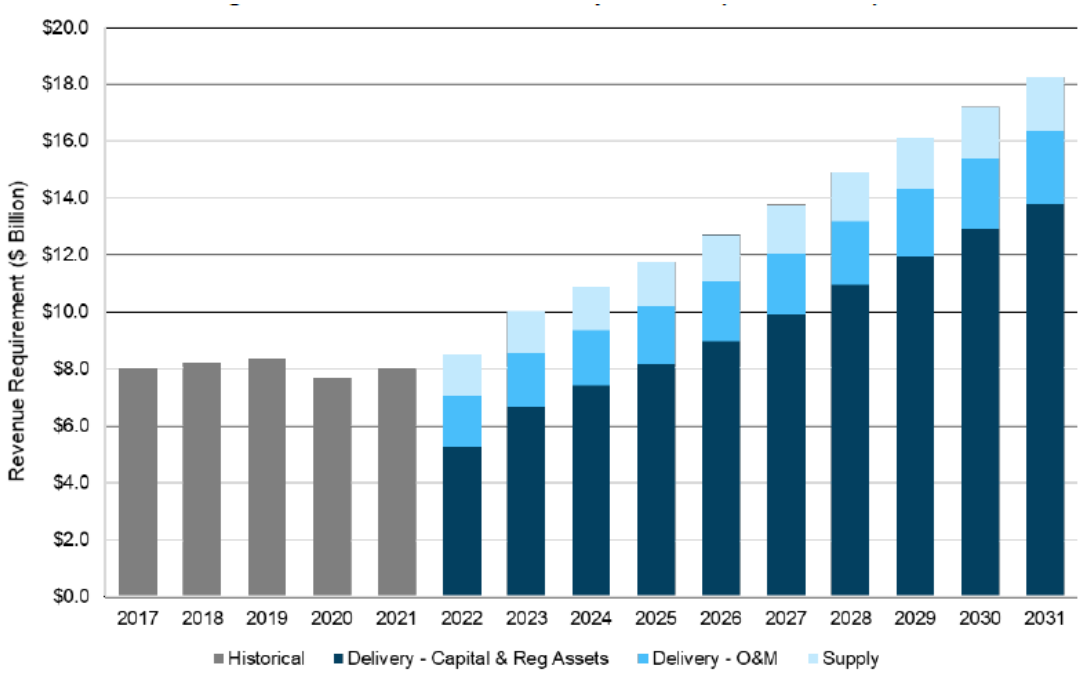


Source: ConEd Electric Long-Range Plan. Page 26. January 2022.

Given the anticipated costs associated with implementing the long-term investment plan, ConEd projects its electric revenue requirement (which ConEd considers a proxy for overall customer costs) to increase by approximately 9% per year through 2031 (see Figure 24).[49] However, LEI notes that some of those additional customer costs could be partly offset by lower costs associated with other energy purchases (such as reduced natural gas or gasoline costs).

[49] ConEd Electric Long-Range Plan. Page 79. January 2022.

Figure 24. ConEd electric revenue requirement forecast through 2031



Source: ConEd Electric Long-Range Plan. Page 79. January 2022.

4.4 Key takeaways

There may be a need for larger investments than currently planned

To reach the State's decarbonization mandates, major efforts will need to be expanded to reduce dependency on carbon-emitting fuels, notably driving the adoption of EVs and electrification of buildings. However, when comparing the baseline load forecast used for most planning studies by the NYISO, ConEd, and other TOs, against the load forecast in a scenario where the CLCPA targets are met (see Figure 11 and Figure 12), it appears that the baseline load forecast's electrification and EV load are lower than required to meet the State's decarbonization targets – although meeting those targets may prove challenging.

ConEd's long range electric planning process does take into account the latest public policy objectives – however it appears that its most recent five-year capital plan falls short of the investments laid out in the long range plan.

In the current plan, ConEd forecasted approximately $53 billion in capital expenditures through 2031, resulting in an average customer cost increase of 9% per year over the same period. Additional investments would additionally be required in the 2030-2040 period and beyond to meet the State mandates, given the significant load increase that is being forecast post-2030 to meet these objectives.

5 Transmission planning

In New York, electric system planning is mostly a joint exercise between the NYISO and the TOs. At a high level, the NYISO's tariff stipulates that NYISO will lead resource adequacy planning and planning of the bulk power system (backbone transmission system), while TOs will be responsible for planning of their local transmission system, which generally includes lower-level transmission lines. Distribution entities are also responsible for the planning of the distribution system. For NYC, ConEd is responsible for both local transmission planning and distribution planning.

5.1 Transmission planning process

Electric system transmission planning in the State is governed by the NYISO tariff, through the Comprehensive System Planning Process ("CSPP") (see Figure 25).[50] Transmission infrastructure is typically built for one of three reasons:

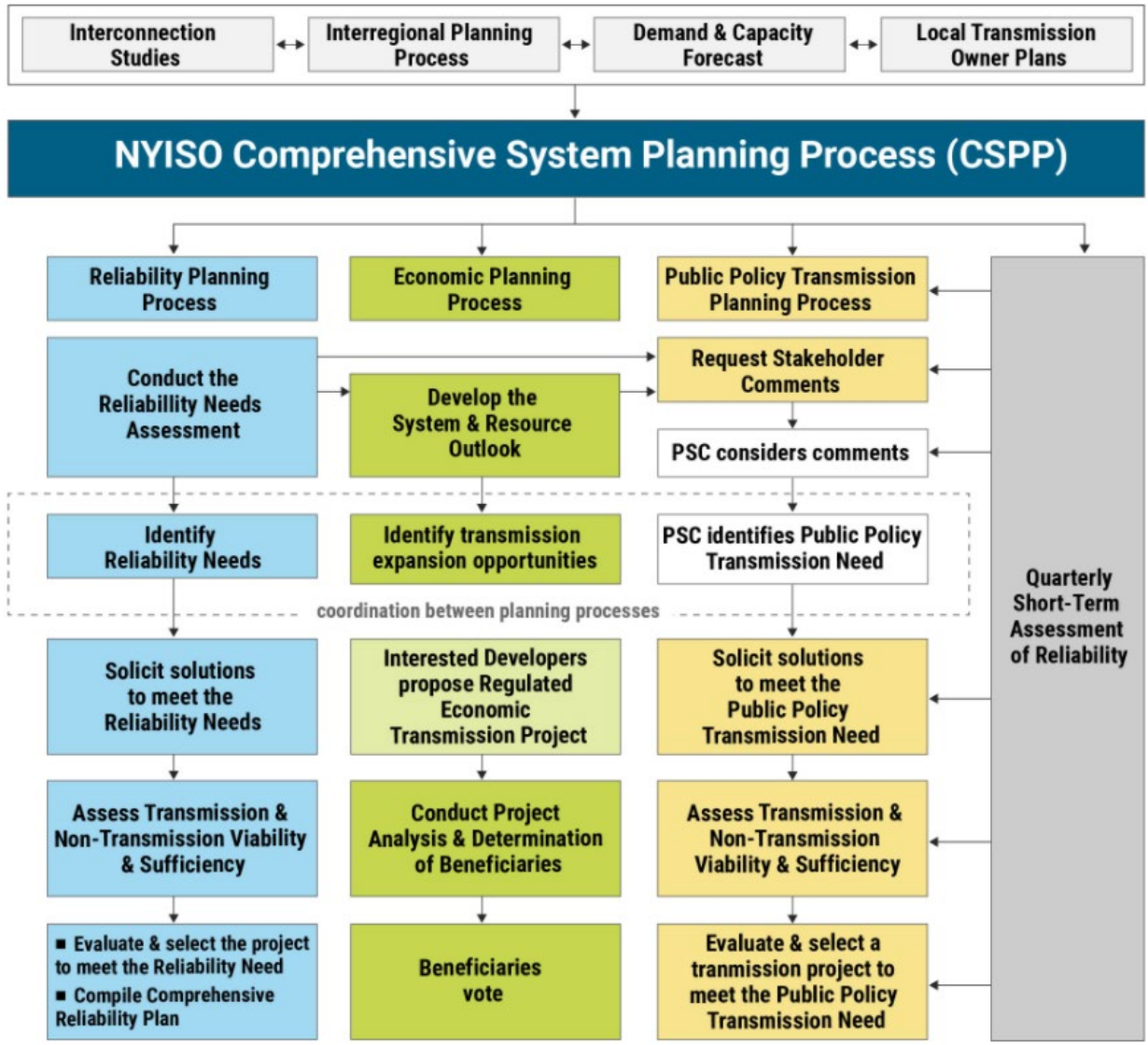
- Address a reliability need that has been identified in the Reliability Needs Assessment ("RNA");
- Provide congestion relief and positive economic benefits; or
- Advance public policy objectives, by addressing a Public Policy Transmission Need that has been identified by the Commission.

At a high level, the NYISO is responsible for planning of the Bulk Transmission System ("BTS", also referred to as the backbone transmission system) in cooperation with the affected TOs, while individual TOs (including ConEd) are responsible for Local Transmission Planning ("LTP") studies that typically focus on lower-voltage transmission infrastructure within their individual service areas. These studies typically rely on the NYISO's baseline Goldbook forecasts and databases.[51]

[50] https://www.nyiso.com/csppf

[51] ConEd. 2021 LTP Study Assumptions. https://www.ConEd.com/en/business-partners/transmission-planning

Figure 25. NYISO Comprehensive System Planning Process



Source: NYISO

However, transmission upgrades required for new generator and transmission interconnection requests go through a different process. New utility-scale generation resources, or proposed transmission interconnection, must go through NYISO's interconnection process. Resources that plan on providing capacity are the subject of deliverability studies, and are responsible for any system upgrades required to ensure deliverability of their power on the transmission grid. NYISO's Class Year Study performs a detailed study of the collective reliability impact of a group

of projects, as well as a deliverability evaluation, and identifies and provides binding cost estimates for required upgrades (see Figure 26).[52]

Figure 26. NYISO Class Year process

Source: NYISO

It is important to note that even though ConEd is not directly responsible for anticipating and preparing for new project interconnections, it still needs to make sure its own long-range transmission planning includes reasonable assumptions about future generation (such as offshore wind) and transmission interconnections.

5.2 Short-term reliability needs in ConEd's service area

In its latest RNA report, which looks over a period of ten years, the NYISO identified reliability transmission needs in ConEd's service area starting in 2023 due to the retirement of peaking generation resources in compliance with the NYS DEC Peaker Rule, as discussed in Section 4.2.[53] NYISO further identified additional reliability issues starting in 2025, consistent with the deadline for full implementation of the Peaker Rule.

Similarly, in its Local Transmission Planning report, ConEd identified needs on its local transmission system in 2023 and 2025 related to the planned peaking generation resource retirements.

ConEd's reliability transmission needs can be defined as "off-ramp" constraints – i.e., constraints in getting power from the higher voltage bulk power system down to the lower voltage local system and into Transmission Load Areas. Indeed, the retiring peakers interconnected at 138 kV would normally be available to turn on and provide power during higher load periods. However, absent these supply resources, more power needs to be drawn from the bulk power system (345

[52] NYISO. Transmission Expansion and Interconnection Guide. December 2020. https://www.nyiso.com/documents/20142/3625950/UG-21-TEI+Guide-v1.0-Final.pdf

[53] NYISO. 2020 RNA Report. November 2020. https://www.nyiso.com/documents/20142/2248793/2020-RNAReport-Nov2020.pdf

kV), leading to the observed transmission constraints as transfer capacity to the lower voltage system is not sufficient to meet load obligations.[54]

In response to these transmission needs, ConEd identified three transmission projects representing a $860 million investment that would be placed in service between 2023 and 2025, increasing the transfer capacity between the bulk power system and local transmission system in order to mitigate the reliability issues identified (see Figure 27). ConEd also stated that these projects would help reaching the CLCPA targets by allowing greater delivery of renewable energy from the BPS to the constrained TLAs.[55]

Figure 27. ConEd solutions to local identified needs

Project Name	Zone	Terminal A	Terminal B	Project Description	Estimated Project Benefit (MW)	Proposed In-Service Date	Order of Magnitude (OOM) Cost Estimate
2nd Rainey – Corona Feeder	J	Rainey	Corona	New 345 / 138 kV PAR Controlled Feeder (~6 Miles UG)	300	2023	-
3rd Gowanus – Greenwood Feeder	J	Gowanus	Green-wood	New 345 / 138 kV PAR Controlled Feeder (~1 Miles UG)	300	2025	-
Goethals – Fox Hills	J	Goethals	Fox Hills	New 345 / 138 kV PAR Controlled Feeder and Rebuild of Fox Hills 138 kV Substation (~8 Miles UG)	300	2025	-
						Total:	$860M

Source: Utility Transmission and Distribution Investment Working Group Report. Case 20-E-0197. November 2, 2020.

On December 30, 2020, ConEd filed a petition before the NY PSC for approval to recover the cost of the transmission projects, renamed the Transmission Reliability and Clean Energy ("TRACE") projects. ConEd stated that these projects would also "*potentially contribute to reducing the New York Bulk Power Transmission Facilities ("BPTF") needs also caused by the Peaker Rule identified by the NYISO in the RNA beginning in year 2025.*"[56]

ConEd stated that it "*performed a comprehensive evaluation to determine if the incremental load could be met through a Non-Wires Solutions ("NWS") instead of the TRACE Projects. […] Based on the*

[54] Note that ConEd's off-ramp constraints can be contrasted against the "on-ramp" constraints faced by upstate TOs given increasing renewable penetration – i.e. the issue of interconnecting all these generation resources on lower-voltage local transmission lines, with power then flowing to the bulk transmission system for delivery to downstate load centers.

[55] Utility Transmission and Distribution Investment Working Group Report. Case 20-E-0197. November 2, 2020.

[56] ConEd. Petition of Consolidated Edison Company of New York, inc. For Approval to Recover Costs of Certain Transmission Reliability and Clean Energy Projects. Case 19-E-0065. December 30, 2020.

magnitude of load relief identified in the assessment to successfully defer the traditional solutions, as well as the limited time to conduct, and uncertain outcome of, a market solicitation that would be necessary to implement an NWS, the Company concluded that pursuing a portfolio of Non-Wires would not timely resolve the reliability needs in a cost-effective manner in all three instances."[57]

However, in comments filed with the NY PSC, the City of New York questioned the cost-effectiveness of the proposed solutions, given that the need in the affected areas lasts for hours or days a year. NYC also questioned ConEd's consideration of non-wire alternatives, noting that ConEd failed to consider whether a combination of possible solutions, such as energy efficiency, storage and distributed energy resources, would be a more cost-effective approach.[58]

Ultimately, the Commission approved ConEd's petition to recover costs for the TRACE projects from its customers, based on the immediate need for additional transmission capacity in the affected TLAs and the necessity of continued provision of safe and adequate electric service to customers. The Commission also rejected ConEd's request for a "halting mechanism" that would allow it to recover all costs incurred for a TRACE project in the event that any of the projects are cancelled by the Commission. The Commission ruled that should it determine that any of the TRACE projects should be halted, cost recovery of such projects will be addressed at that time.[59]

5.3 Longer-term reliability needs in ConEd's service area

In parallel with NYISO's 10-year RNA analysis and ConEd's 10-year LTP process, the AREGCB Act of 2020 directed the NY PSC to take specific actions to ensure that New York's transmission and distribution infrastructure will support the State's climate mandates. As such, the NY PSC opened a proceeding focusing on Transmission Planning Pursuant to the Accelerated Renewable Energy Growth and Community Benefit Act.[60]

As part of this proceeding, the State's TOs prepared a comprehensive report proposing two categories of local T&D projects that would contribute to further public policy objectives:[61]

- Phase 1 projects are immediately actionable projects that satisfy reliability, safety, and compliance purposes but that can also address bottlenecks or constraints that limit renewable energy delivery within a utility's system; and

[57] Ibid.

[58] Comments of the City of New York. Case 19-E-0065. March 22, 2021.

[59] NY PSC. Order Regarding Transmission Investment Petition. Case 19-E-0065. April 15, 2021.

[60] NY PSC Case 20-E-0197.

[61] Utility Transmission and Distribution Investment Working Group Report. Case 20-E-0197. November 2, 2020.

- Phase 2 projects may increase capacity on the local transmission and distribution system to allow for interconnection and delivery of new renewable generation resources within the utility's system.

Focusing on ConEd's analysis as part of these proceedings, and given the timing of when the analysis was performed, ConEd relied on NYISO's 2020 Goldbook forecast. This forecast for NYC was approximately 2 TWh, or 4%, higher by 2030 than the 2021 baseline NYC forecast. However, as discussed in Section 4.1, the NYISO 2021 baseline forecast is premised on high attainment of EE targets, and electrification numbers that are not consistent with achieving the public policy targets. The supply resource database used in the analysis did include modifications to be consistent with the anticipated future resource mix (such as 9 GW of offshore wind interconnecting in NYC and LI, and a new transmission line interconnection from Quebec); however more recent developments, such as the NY PSC's identification of a PPTN for 3,000 MW of transfer capacity from LI for delivery of offshore wind, and NYSERDA's selection of a second Tier 4 transmission line, were not included.[62]

In a similar fashion, another report by an external entity found that ConEd's grid was equipped to handle building electrification.[63] However the study's conclusions were premised on a narrow look at ConEd's ability to handle a higher winter peak load following installation of building heat pumps. The study relied on NYISO's baseline forecast, which as discussed previously is not entirely consistent with the achievement of public policy objectives. Furthermore, as discussed in Section 4.1, building electrification will not only impact winter peak load, but also summer load (albeit to a lesser extent). Finally, the State public policy objectives will result in a host of changes to flow patterns on the electric grid through new supply resources and different load patterns driven by electrification and distributed energy and storage resources. As such, it is important to look at the combination of all these changes in order to assess the grid's readiness.

With respect to Phase 1 projects, ConEd identified the three TRACE projects as immediately actionable projects needed to address reliability issues, and for which it later filed a petition before the NY PSC as discussed in the previous section. ConEd did not identify any other immediately actionable project that would be needed to address issues related to achieving the CLCPA mandates.

Given the uncertainty about future developments in ConEd's service area, and highlighted by actual developments discussed in Section 4.2, a report filed by the NY Department of Public Service ("NY DPS") Staff and jointly authored with NYSERDA and other consultants recommended that ConEd expand the scope of their analysis through additional scenarios to account for:[64]

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[62] Ibid.

[63] Urban Green Council. Grid Ready – Powering NYC's All-Electric Buildings. December 2021.

[64] Initial Report of the New York Power Grid Study. Case 20-E-0197. January 19, 2021.

a) the impact of bulk power use changes from offshore wind and new and existing upstate transmission line interconnections;

b) further determination of potential solar and storage capacity growth within the affected load pockets; and

c) optimization of the off-ramp capacity (beyond the use of standard 300 MW off-ramp capability) and location to facilitate offshore wind integration and provide increased CLCPA benefits at a lower cost per MW.

With respect to Phase 2 projects, ConEd identified multiple Phase 2 projects to increase renewable delivery in the late 2020s, totaling approximately $4 billion (see Figure 28).

Figure 28. ConEd proposed phase 2 transmission projects

Project Name	Zone	Terminal A	Terminal B	Project Description	Estimated Project Benefit (MW)	Proposed In-Service Date	Order of Magnitude (OOM) Cost Estimate
NYC Clean Energy Hub #1	J	TBD	TBD	Clean Energy Hub to provide additional POIs into local system	3,000	2027	-
NYC Clean Energy Hub #2	J	TBD	TBD	Clean Energy Hub to provide additional POIs into local system and enable load transfer	2,180	2029	-
NYC Feeder 1	I, J	TBD	TBD	Each is a new local Feeder to unbottle renewable supplies	700	2027	-
NYC Feeder 2	J	TBD	TBD		700	2030	-
NYC Feeder 3	J	TBD	TBD		700	2030	-
Load Transfer	J	TBD	TBD	Rebuild 2 Area Stations; Load Transfer	406	2030	-
						Total:	$4.05B

Source: Utility Transmission and Distribution Investment Working Group Report. Case 20-E-0197. November 2, 2020.

Importantly, ConEd noted that the transmission system in NYC offers limited available points of interconnection for new, large generators, and many of the interconnection points that exist today would require substantial upgrades to make the interconnecting generation deliverable to load customers. As such, ConEd's proposal included the creation of "Clean Energy Hubs" to facilitate interconnection of offshore wind resources, energy storage systems, or other new, clean resources, as well as to unbottle TLAs by transferring load to the higher voltage system. ConEd has included a discussion of its plans for these hubs in its latest long-range electric plan, together with plans for "storage hubs" designed to allow for the interconnection of storage resources in its service territory.[65] In the long-range plan, ConEd identified other additional transmission needs

[65] ConEd Electric Long-Range Plan. Page 34. January 2022.

– for instance related to maintaining reliability of its system following the retirement of fossil-fueled plants beyond those directly impacted by the NYS DEC "Peaker Rule".[66]

As part of the report, ConEd and other TOs proposed a benefit/cost analysis ("BCA") framework that would be used to evaluate Phase 2 projects and achieve the most cost-effective set of Phase 2 T&D upgrades. However, the Commission, in a September 2021 Order, found that the proposed framework was unsatisfactory, and directed the utilities to propose a revised framework. As the Commission put it, "*the purpose of the BCA is to guide the Utilities toward the most cost-effective expenditure of ratepayer dollars to meet the CLCPA mandates. The Utilities' proposal is not properly tailored to satisfy this objective.*"[67] Indeed, several stakeholders took issue with the BCA's "*narrow "Comparison to Traditional Investments" approach*", noting that such an approach overlooks alternatives such as energy storage. The NYISO's independent market monitor, Potomac Economics, also stated that energy storage, alternative siting of generation, competitive transmission investment (including merchant facilities or facilities funded by market participants), demand-side solutions, and other NYISO transmission siting processes should also be evaluated.[68]

[66] *Ibid.*

[67] NY PSC. Order on Local Transmission and Distribution Planning Process and Phase 2 Project Proposals. Case 20-E-0197. September 9, 2021.

[68] Ibid.

5.4 Key takeaways

New large supply interconnections will require additional planning scenarios

In New York, electric system planning is mostly a joint exercise between the NYISO and the TOs. Over the next decade, NYISO and ConEd's planning has revealed future reliability issues that ConEd will address through the TRACE transmission upgrades, which have been approved by the NY PSC.

ConEd's planning has also identified that the transmission system in NYC offers limited available points of interconnection for new, large generators, and that many of the interconnection points that exist today would require substantial upgrades to make the interconnecting generation deliverable to load customers. As such, ConEd is proposing the creation of "Clean Energy Hubs" starting in 2027 to facilitate interconnection of these new resources, along with projects to increase transfer capacity into TLAs to enable delivery of renewable generation to customers.

ConEd's planning, however, does not appear to fully account for the uncertainty surrounding future developments, as highlighted by actual developments discussed in Section 4.2 that have not been modeled. ConEd's transmission planning should therefore consider a range of load scenarios and supply flow patterns, in order to account for:

- increased load and changes in seasonal load patterns driven by electrification and EV load consistent with the efforts to attain State policy objectives;
- potential solar and storage capacity growth within load pockets;
- the impact of bulk power use changes from offshore wind and new transmission line interconnections; and
- the potential retirement of significant quantity of existing thermal generation.

Indeed, these revised transmission planning assumptions may reveal further transmission needs, or an earlier need for interconnection points on ConEd's system. For instance, in its latest long-range plan, ConEd has identified additional needs related to interconnecting storage resources, or related to the expected retirement of additional fossil-fueled resources. It will be important to ensure that the solutions identified to meet those needs are included in capital expenditure plans, otherwise a delay in building up the required infrastructure could delay attainment of the State policy objectives, or even jeopardize reliability of the system.

Finally, ConEd's transmission planning must properly account for contribution of combinations of distributed or demand-side resources as a possible alternative to transmission expansion. Indeed, the City of New York questioned ConEd's consideration of non-wire alternatives in the TRACE proceedings, noting that ConEd failed to consider whether a combination of possible solutions, such as energy efficiency, storage and distributed energy resources, would be a more cost-effective approach. The Commission also noted that the proposed BCA framework for Phase 2 projects would tend to overlook non-traditional solutions.

6 Distribution planning

While transmission planning is generally a joint exercise with the NYISO, ConEd is responsible for the planning of its distribution system, including substations and the delivery system. Since the distribution planning process does not play out through stakeholder committees, as is the case for NYISO's process, there is less visibility into the distribution planning process.

6.1 Long-term distribution planning

The proceeding initiated by the NY PSC (discussed in Section 5.3) to ensure that New York's transmission and distribution infrastructure will support the State's climate mandates did offer some insight into ConEd's long-term distribution planning assumptions and results.

ConEd used the same long-term assumptions for its distribution planning as for its transmission planning. ConEd similarly identified both Phase 1 immediately actionable projects, as well as Phase 2 projects to increase capacity on the local transmission and distribution system to allow for interconnection and delivery of new renewable generation resources within the utility's system.[69]

ConEd's findings with regards to planning for the distribution grid, given its study assumptions, can be summarized with these four key findings:

1. Distribution system constraints due to significant increases in electrification are unlikely to transpire before 2030;
2. The most significant challenge to DER interconnection is reverse flows during low load conditions;
3. ConEd plans to continue investing in NWS, such as DERs, energy storage, and EE projects, to address capacity constraints as they arise on the system; and
4. Phase 2 projects (system expansion and storage resources) are proposed for post-2030, representing $1.3 billion.

Indeed, ConEd system planners, after accounting for the adoption of clean energy resources (DERs, demand response, and EE), concluded that "*in contrast to other New York distribution utilities that are more likely to face distribution system constraints due to significant solar, storage, and wind penetration, [ConEd's] future distribution system constraints are most likely to arise due to significant increases in electrification, which the Company forecasts is likely to transpire after 2030.*"[70]

As such, ConEd's proposed Phase 1 projects total approximately $1.1 billion over the 2020-2025 period and, importantly, are already funded or represented in ConEd's five-year capital plan (see Figure 29).

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[69] Utility Transmission and Distribution Investment Working Group Report. Case 20-E-0197. November 2, 2020.

[70] Ibid.

Figure 29. ConEd proposed Phase 1 distribution projects

Project Name	Project Description	MW Impact	Proposed In-Service Date	Order of Magnitude Cost Estimate ($000s)[116]
DSP Programs	Investments to improve distribution system safety, reliability, resiliency, efficiency, and automation	-	2020+	$107,000*
DSP Incremental Programs	Incremental investment in the DSP	-	2024	-
Communications Infrastructure	Systems to manage data exchange across systems, applications, and devices	-	2020+	$50,000*
Newtown Extension	Expansion of planned NWS to install new transformer and sub-transmission line	120	2025	-
Vinegar Hill Distribution Switching Station ("DSS")	Distribution switching station to add capacity and provide operational flexibility	240	2022	$215,000*
Energy Storage Program	Five projects to provide a range of operational and CLCPA-related benefits	50	2025	-
Fox Hills Energy Storage Project	Energy Storage at Area Substation to facilitate DER interconnection and provide system support	7.5	2022	22,000*
EV Make-Ready Investments	Investments as approved by the Commission	-	2025	$395,000*
		Phase 1 Total		$1,130,000

* Denotes projects already funded (totaling $789 million).

Source: Utility Transmission and Distribution Investment Working Group Report. Case 20-E-0197. November 2, 2020.

These Phase 1 projects include investments related to ConEd's DSP platform (see Section 6.4), other investments designed to increase system flexibility and DER interconnections, energy storage projects, as well as EV-related investments. ConEd also noted a challenge related to DER interconnections, requiring specific investments to modernize its equipment as further discussed in Section 6.4.

Over the course of the planning horizon, ConEd plans to continue investing in NWS, such as DERs, energy storage, and EE projects, to address capacity constraints as they arise on the system. ConEd has in the past been successful in deferring traditional infrastructure investments by using distributed resources and efficiencies, and other non-traditional portfolio measures.[71] For instance, in 2017, ConEd was successful in deferring a $1.2 billion substation upgrade by contracting for 52 MW of demand reductions and 17 MW of distributed resource investments. This use of distributed resources and efficiencies thereby deferred the need for traditional utility

[71] ConEd. Non-Wired Solutions Quarterly Expenditures & Program Report. Case 19-E-0065. Second Quarter 2021.

infrastructure.[72] However, ConEd's evaluation of NWS seems inconsistent. Indeed, as discussed in Section 5, ConEd has rather opted for traditional transmission upgrades (the TRACE projects) in order to meet a reliability need, and the Commission has found the proposed Phase 2 BCA framework to overlook non-traditional solutions.

Finally, ConEd identified Phase 2 projects that would be needed to increase capacity on the local distribution system and allow for interconnection and delivery of new renewable generation resources (see Figure 30).

Figure 30. ConEd proposed Phase 2 distribution projects

Project Name	Project Description	MW Impact	Proposed In-Service Date	Order of Magnitude Cost Estimate ($000s)
New Area Substation	New substation and sub-transmission feeders to pick up load from nearby network	235	2030+	-
Energy Storage Projects	Six individual projects to provide a range of benefits	125	2030	-
			Total	$1,300,000

Source: Utility Transmission and Distribution Investment Working Group Report. Case 20-E-0197. November 2, 2020.

ConEd mentioned that these Phase 2 projects would be necessary to meet CLCPA goals and prepare for a future characterized by significant DER and renewables penetration. However, in its latest long-range electric plan, ConEd now states that "electrification could push certain area substations past their capacities in the next 5-10 years."[73] As such, it appears that ConEd will need to undertake additional Phase II projects in order to meet its customer load beyond those identified in the Utility Transmission and Distribution Investment Working Group Report.

ConEd also noted that these projects are driven by currently forecasted future conditions assuming achievement of CLCPA objectives, but will "*monitor changing market conditions and distribution capacity to possibly revise the specific scope and funding levels for each project in response to changing market conditions and transmission capacity.*"[74]

[72] Utility Dive. Straight Outta BQDM: Consolidated Edison looks to expand its non-wires approach. July 19, 2017. https://www.utilitydive.com/news/straight-outta-bqdm-consolidated-edison-looks-to-expand-its-non-wires-appr/447433/

[73] ConEd Electric Long-Range Plan. Page 26. January 2022.

[74] Utility Transmission and Distribution Investment Working Group Report. Case 20-E-0197. November 2, 2020.

6.2 Energy efficiency investments

As shown in Section 4.1, ambitious EE savings are a cornerstone of the State's decarbonization efforts. The Commission initially established in 2018 a goal of reducing customer energy usage statewide by 185 trillion British thermal units ("TBtu") by 2025 (including both gas and electric).[75] However, following adoption of the CLCPA, the Commission directed an additional incremental 35.8 TBtu of utility-driven energy efficiency savings, with additional goals of achieving:[76]

- 3 percent annual reduction in electricity sales by 2025 and 1.3 percent of natural gas sales;
- An aggregate reduction of 3.6 TBtu through heat pump deployment; and
- the continued provision and enhancement of programs for low to moderate income ("LMI") customers.

According to its 2019-2025 System Energy Efficiency Plan ("SEEP"), ConEd forecasts a period of significant growth and development of its energy efficiency programs – which are projected to almost double, from approximately 2,445,000 MMBtu in 2019 to approximately 4,723,000 MMBtu in 2025 across both electricity and gas consumption. To help meet these goals, ConEd is planning to invest over $1.7 billion to increase its energy efficiency savings by 2025.[77]

ConEd's programs target four categories of savings:

1. Electric portfolio – conventional electricity EE measures such as high efficiency lighting and controls, rebates for energy-efficient appliances, HVAC measures, insulation, and other incentives for commercial and residential customers;
2. Gas portfolio – conventional natural gas EE measures, a lot of them similar to the electric incentives, but targeted towards gas usage;
3. Heat pump initiative – implemented as part of the State's NYS Clean Heat Statewide Heat Pump Program, which supports the installation of heat pump technologies that are best suited to heat efficiently in cold climates; and
4. LMI customer programs – implemented as part of the State's Statewide LMI initiative, which represents a holistic and coordinated approach to deliver energy efficiency to LMI customers and communities.

With respect to the cumulative electricity saving targets according to the plan, ConEd appears on-track to exceed the Commission's 2025 target of approximately 4.5 TWh; for fuel transition

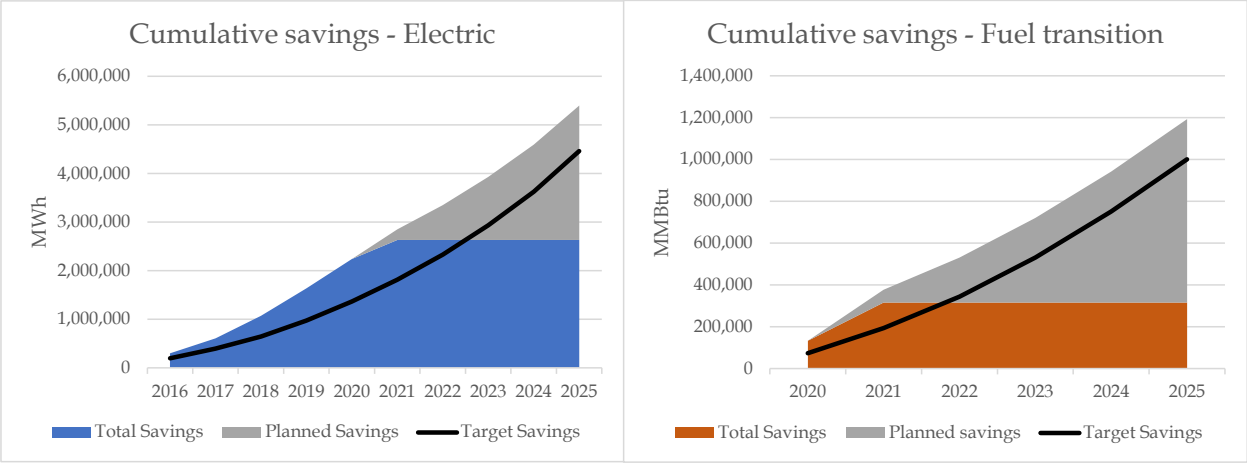
[75] NY PSC. Order Adopting Accelerated Energy Efficiency Targets. Case 18-M-0084. December 13, 2018.

[76] NY PSC. Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025. Case 18-M-0084. January 16, 2020.

[77] ConEd. System Energy Efficiency Plan (SEEP) 2019-2025. Refiled April 1, 2021. Case 18-M-0084.

savings, ConEd similarly appears on track to exceed the Commission's 1.0 MMBtu target (see Figure 31).[78]

Figure 31. ConEd cumulative and forecasted EE savings



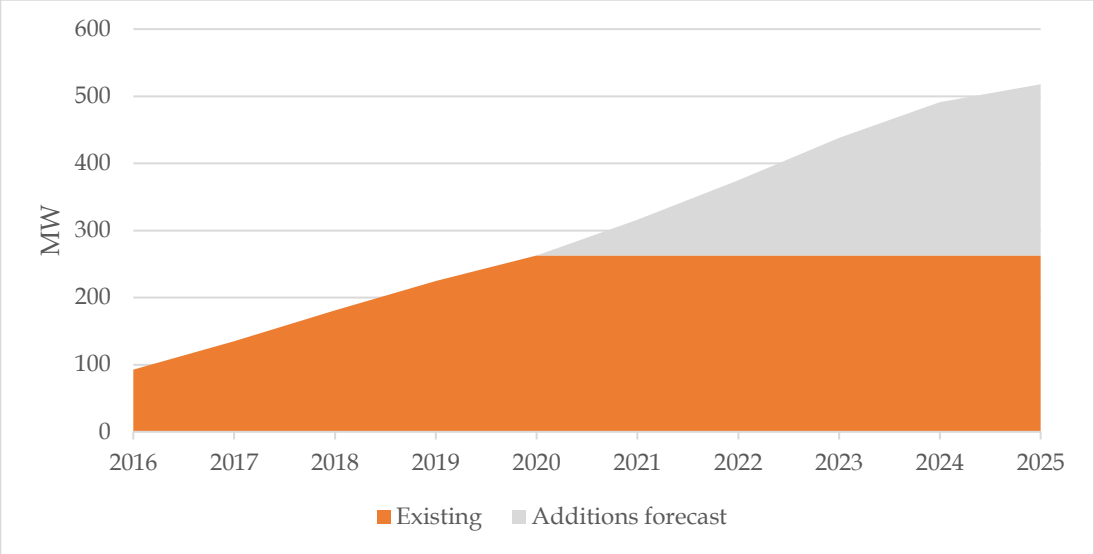
Source: NYSERDA Clean Energy Dashboard

6.3 DER interconnections

As of the end of 2020, the NYISO reports that there are 263 MW of installed solar PV DER capacity in NYC. Per their forecast, ConEd appears on track to integrate an additional 255 MW of installed capacity by 2025 – which is consistent with a statewide installed capacity of approximately 7,000 MW by 2030. However, as mentioned in Section 3.1.4, the target was recently raised to 10,000 MW by 2030. As such, ConEd could need to integrate more solar DER capacity by then.

[78] NYSERDA Clean Energy Dashboard. https://www.nyserda.ny.gov/Researchers-and-Policymakers/Clean-Energy-Dashboard/View-the-Dashboard

Figure 32. NYC cumulative installed capacity – solar PV DER



Source: NYISO 2021 Goldbook

ConEd has identified the most significant challenge to DER interconnection in its service area as being so-called "reverse flows" during minimum load conditions, when power flows from solar DERs onto the distribution grid. ConEd has therefore initiated a series of projects to modernize its equipment accordingly, projects which are already included in its five-year capital spending plan (see Section 4.3.1).

6.4 Distributed system platform provider

6.4.1 What is a distributed system platform provider?

> ***"The DSP will enable the transformation of the traditional one-directional energy delivery system into an advanced two-way platform for delivering energy both to and from customers."***
>
> - ConEd. *Electric Long-Range Plan (2019-2038)*. January 2019.

The distributed system platform provider concept was born out of the State's Reforming the Energy Vision ("REV") initiative, which was launched in 2014. Among other goals, REV seeks to promote wider deployment of DERs across the State,[79] which encompasses end-use energy efficiency, demand response, distributed storage, and distributed generation.[80] In order to integrate an increasing level of DERs, the DSP requires the expansion of the traditional distribution utility model. Under the DSP concept as envisioned by the Commission, the distribution utility would

[79] NY DPS. *Reforming the Energy Vision – About the Initiative.* Updated May 9, 2018.

[80] DER definition from ConEd. *Distributed System Implementation Plan.* June 30, 2020.

evolve beyond the role of simply delivering energy to customers, to take on three primary DSP functions:

1. **Integrated system planning:** utilities will incorporate DERs as alternatives to meeting system requirements in their distribution system planning processes and grid planning efforts;

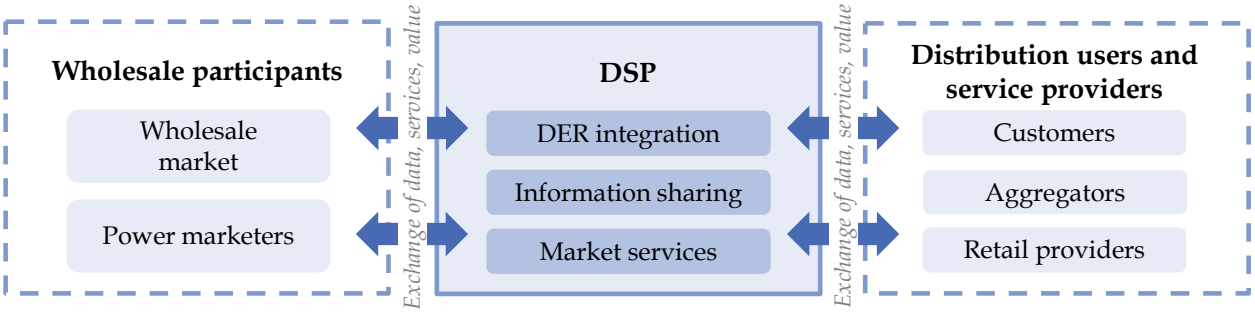
2. **Grid operations:** utilities will facilitate data exchanges between the NYISO wholesale markets, DSP market participants, and end users, in order to monitor and dispatch DERs and thus enable a flexible power system; and

3. **Market operations:** utilities will enable transactions between distributed energy suppliers and customers, and offer services and pricing to support greater DER adoption.[81]

Eventually, the DSP will serve as the interface between New York's bulk power system and end users, thus facilitating a distribution-level market and enabling DER management (see Figure 33). This role will become increasingly important as DER penetration rises in the State – this growth will be driven in part by public policy mandates, such as the 2019 CLCPA, which targets installing 6 GW of distributed solar statewide by 2025. As mentioned previously, this target was recently raised to at least 10 GW by 2030.[82]

For reference, by the end of March 2021, ConEd had interconnected 339 MW of solar onto its distribution network, along with 15 MW of distribution-connected energy storage.[83]

Figure 33. DSP model structure



Adapted from ConEd. *Distributed System Implementation Plan*. July 31, 2018.

To kick-start this evolution of the traditional distribution utility into a DSP, the NY PSC ordered each utility to file an initial Distributed System Implementation Plan ("DSIP") in 2016 to "*[address]*

[81] NY PSC. *Order Adopting Regulatory Policy Framework and Implementation Plan (Case 14-M-0101)*. February 26, 2015.

[82] NYSERDA. *Governor Hochul Announces Expanded NY-Sun Program to Achieve at Least 10 Gigawatts of Solar Energy by 2030.* September 20, 2021.

[83] ConEd. *CUNY 2021 Solar+Storage Installer Workshop*. April 28, 2021.

its own system and [identify] immediate changes that can be made to effectuate state energy goals and objectives."[84] The utilities were then required to file a subsequent joint Supplemental DSIP to "*[address] the tools, processes, and protocols that will be developed jointly or under shared standards to plan and operate a modern grid capable of dynamically managing distribution resources and supporting retail markets*."[85]

Each utility now files individual DSIPs on a two-year cycle, covering a five-year planning horizon. The following section provides an overview of ConEd's most recent 2020 DSIP, which reports on the utility's plans and progress in implementing the State's DSP vision.

6.4.2 ConEd's DSP plans and progress

The DSP model as envisioned by the NY PSC will require the development of new and enhanced capabilities in the realms of software, systems, tools, and processes. As such, ConEd's initial investments have been focused on building critical foundational technologies, with planned investments in later years designed to incorporate advanced applications and functionalities that will enable the integration of higher levels of DERs.

ConEd is currently in the early phase of its evolution, which can be broken down into three major stages occurring over approximately 20 years (see Figure 34):

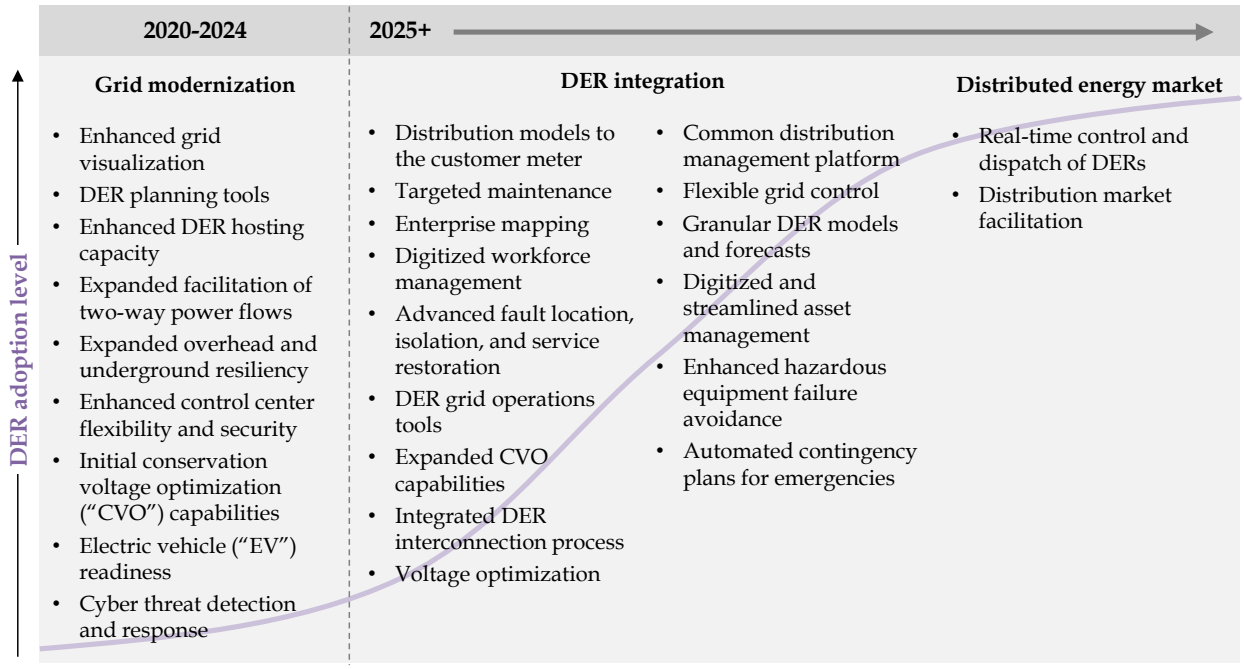
- **Stage 1: Grid modernization –** involves replacing aging infrastructure and enhancing the grid by incorporating advanced technologies to enable two-way power flow, improve system visibility and control, and facilitate the integration of DERs;
- **Stage 2: DER integration –** layers on more sophisticated functions and capabilities over time to eventually enable the formation of an operational marketplace, which will facilitate transactions and coordination between the utility, wholesale markets, and DER providers; and
- **Stage 3: Distributed energy market –** entails significantly higher DER adoption, where DERs can provide services through multi-party transactions and the platform is able to facilitate customer-to-customer exchanges.[86]

[84] NY PSC. *Order Adopting Distributed System Implementation Plan Guidance (Case 14-M-0101).* April 20, 2016. P. 144.

[85] Ibid.

[86] Joint Utilities. *Supplemental Distributed System Implementation Plan.* November 1, 2016.

Figure 34. Timeline of planned investments to enable DSP capabilities

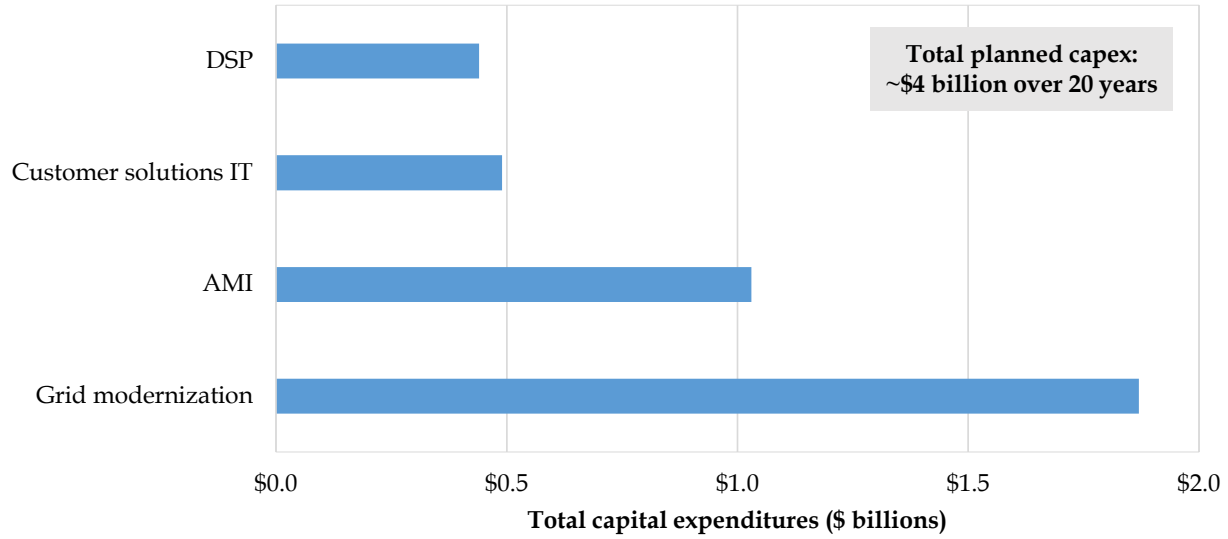


Adapted from ConEd. *Distributed System Implementation Plan.* June 30, 2020; Joint Utilities. *Supplemental Distributed System Implementation Plan.* November 1, 2016.

As outlined in its Electric Long-Range Plan (2019-2038), ConEd expects to spend approximately $4 billion over 20 years to enable the new capabilities that are needed to reach the State's DSP vision. This includes around $500 million budgeted for what ConEd categorizes as direct DSP investments. The remaining planned capital expenditures are related to a portfolio of other investments needed to enable DSP functionalities, such as communications infrastructure, DER management systems, advanced data analytics, and grid-edge sensors.[87]

[87] ConEd. *Electric Long-Range Plan (2019-2038).* January 2019.

Figure 35. Planned 20-year capex to develop new capabilities



Source: ConEd. *Electric Long-Range Plan (2019-2038)*. January 2019.

According to updates provided in ConEd's 2020 DSIP and 2022 Long-Range Electric Plan, the utility's grid modernization efforts are already underway, with progress made on several key investments – for example:

- **Advanced metering infrastructure ("AMI"):** AMI is a system comprised of smart meters, next generation communications, grid-edge computing, and information technology, which together provides data to customers regarding their energy usage and also enables the utility to monitor and control DERs.[88] As such, this communications network will form the backbone of the distribution-level marketplace envisioned by the NY PSC and will provide near real-time, granular DER performance data. As part of these efforts, ConEd plans to deploy over 4.7 million smart meters throughout its service territory by 2022 – by the end of September 2021, this initiative was over 90% complete, with more than 4.3 million smart meters installed;[89]

- **Geographic Information System:** a mapping and visualization tool that will incorporate information related to the location and operating characteristics of DERs on the grid, as well as the structure of the distribution system. ConEd is proceeding with implementation of the GIS;

- **DER Management System:** will act as a comprehensive DER data repository that will be fully integrated with operating and planning systems to facilitate greater monitoring and control. This system is still in the design phase – ConEd has developed a proof of concept

[88] Ibid.

[89] ConEd. *Revised AMI Metrics Report Q3 2021 (Case 19-E-0065 and Case 19-G-0066)*. November 12, 2021.

that demonstrates four key functionalities, namely weather and load forecasting, load flow planning, network modeling, and real-time load flow;

- **Substation metering and supervisory control and data acquisition upgrades:** these upgrades will enhance system visibility and enable system operators to leverage energy storage for grid support. ConEd has developed the necessary engineering and design plans, but upgrade work was delayed due to COVID-19;

- **Modernized network and protector relay upgrades:** these upgrades will enable bi-directional capabilities to monitor two-way power flow and host DERs. ConEd plans to deploy 600 microprocessor relay upgrades per year;[90] and

- **Volt/VAR optimization:** better power flow management is expected to facilitate energy conservation in the near term; in the longer term, this program will enhance DER management. Deployment projects were impacted by COVID-19 but are expected to continue through 2022.[91]

In addition to these investments, ConEd is also running several REV demonstration or pilot projects, which will further inform DSP development. For example, ConEd collaborated with NYISO on a DER aggregation pilot to examine the interoperability of jointly operated storage assets, among other efforts.[92]

[90] ConEd. *2022 Electric Long-Range Plan*. January 2022.

[91] ConEd. *Distributed System Implementation Plan*. June 30, 2020.

[92] Ibid.

6.5 Key takeaways

Distribution planning will require additional planning scenarios and consideration of distribution grid-connected and demand-side resources

With respect to distribution system planning, ConEd foresees additional substation upgrade needs related to load increases that will need to be met by 2030. While these needs are discussed in its latest long-range electric plan, they were not identified as possible Phase II projects in the Commission's transmission and distribution planning proceeding. It is also important to note that these conclusions are premised on significant EE savings and electrification estimates that would not necessarily meet the State's decarbonization targets.

While EE savings appear to exceed current targets set by the Commission, additional savings will be progressively harder to achieve, thereby needing continued and significant investments over the next decades. Similarly, DER interconnections are progressing; while the forecasted DER penetration in NYC is comparatively lower than in other regions, ConEd must continue progress on grid modernization to enable increased penetration of DERs.

Similar to the conclusions about transmission planning, ConEd's distribution planning should consider a range of load scenarios and supply flow patterns in order to ensure that the distribution system is adequately prepared to handle the changes in load (volume and seasonal pattern) and supply (retirements and new resources) required to meet the State's decarbonization objectives, as well as properly account for potential solar and storage capacity growth within load pockets.

DSP development is a long-term initiative, ConEd is in the early stages

The NY PSC's vision of a distribution-level market facilitated by DSPs requires the development of new utility capabilities. ConEd is currently implementing grid modernization projects to enable these capabilities – these near-term investments will serve as the foundation for more advanced and sophisticated functions that will be added in later years. According to ConEd's most recent 2020 DSIP, some of its grid modernization projects experienced delays due to COVID-19 – the status of these projects should be monitored in the next DSIP update to ensure that overall DSP progress is not substantially impacted.

7 Gas planning

ConEd serves over 1.1 million gas customers across its service territory in New York City and Westchester County.[93] The bulk of ConEd's residential and commercial customers use natural gas primarily for cooking and space and water heating. For reference, the US Energy Information Administration ("EIA") reports that approximately 60% of households in New York rely on natural gas for their home heating needs.[94] ConEd's interruptible customers include electric and steam generation plants.

The following section first reviews the State's climate policies as they relate to gas usage and then assesses whether and how ConEd incorporates these decarbonization objectives in its long-term gas planning efforts. Overall, ConEd's updated Long-Range Gas Plan, released in January 2022, demonstrates greater alignment with the State's targets than in previous planning documents, although there is still room for improvement, as discussed further below.

7.1 New York's gas-related public policy mandates

Several statewide and local targets will impact gas usage going forward, primarily by driving increased energy efficiency and electrification as buildings switch away from fossil fuel-fired heating options. These targets, discussed earlier in Section 3.2, include:

- **New York's CLCPA:** passed in July 2019, the CLCPA sets numerous targets, including reducing statewide greenhouse gas emissions 40% below 1990 levels by 2030 and 85% by 2050, as well as achieving net zero emissions in all sectors of the economy;[95]

- **PSC-ordered energy efficiency targets:** under Case 18-M-0084, the PSC in January 2020 approved targets to reduce annual gas usage 1.3% by 2025 through various energy efficiency and electrification programs;[96]

- **OneNYC 2050:** released in April 2019, the long-term strategy aims to achieve carbon neutrality in the City by 2050, in part by "*pursuing steep cuts in greenhouse gas emissions from buildings*";[97]

- **NYC Local Law 97:** enacted in May 2019, the local law sets carbon emissions caps beginning in 2024 for energy use in the City's large buildings. The law applies to most

[93] ConEd. *2022 Gas Long-Range Plan*. January 2022.

[94] EIA. *Profile Analysis: New York.* October 21, 2021.

[95] NYS DEC. *Reducing Greenhouse Gas Emissions.*

[96] NY PSC. *Press Release – Governor Cuomo Announces Additional $2 Billion in Utility Energy Efficiency and Building Electrification Initiatives to Combat Climate Change.* January 16, 2020.

[97] NYC. *OneNYC 2050: Building a Strong and Fair City.* April 2019.

buildings over 25,000 square feet, which is estimated to impact approximately 50,000 buildings in NYC (59% residential and 41% commercial), or 60% of the City's building area.[98] Specifically, the law targets emissions reductions of 40% below 2005 levels by 2030, and 80% by 2050;[99]

- **NYC Executive Order 52:** signed in February 2020, the Executive Order outlines the City's opposition to energy infrastructure development that would expand fossil fuel supply in the City (including pipelines, terminals, or new fossil fuel-fired electric generation capacity);[100] and

- **NYC Local Law 154):** voted in December 2021, the legislation prohibits new buildings and gut renovations in the City from combusting carbon-emitting fossil fuels (including natural gas), with phased-in implementation starting in 2024 for lower-rise buildings and mid-2027 for taller buildings.[101]

7.2 ConEd's current long-term gas plan

7.2.1 Demand forecast

ConEd's updated Long-Range Gas Plan, released in January 2022, marks a notable shift in the utility's view on expected gas usage going forward. Prior to the 2022 Long-Range Gas Plan, ConEd anticipated increasing gas demand despite the statewide and local policies discussed in Section 3.2. Most recently, with projections calculated as of January 2021 in ConEd's 2020 Annual Report, the utility estimated a 1.4% annual average growth rate in firm peak demand over a five-year period under design weather conditions.[102, 103]

However, through projections calculated using data as of April 2021 and released as part of the 2022 Long-Range Gas Plan, ConEd recognizes that gas demand is likely to decline "*as buildings get more efficient, adopt electrification, and new buildings connect to electric instead of gas service*."[104]

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[98] Urban Green Council. *NYC Building Emissions Law Summary: Local Law 97.* July 9, 2020.

[99] NYC. *Local Law 97.*

[100] NYC. *Executive Order No. 52*. February 6, 2020.

[101] Urban Green Council. *NYC All-Electric New Buildings Law: Local Law 154.* January 6, 2022.

[102] ConEd. *2020 Annual Report.* February 18, 2021.

[103] Firm peak demand captures the maximum amount of gas that firm gas customers demand at a single point in time, measured in thousands of dekatherms per day ("MDth/day"). Annual gas demand captures the annual gas deliveries to firm gas customers, measured in MDth.

[104] ConEd. *2022 Gas Long-Range Plan*. January 2022. P. 22.

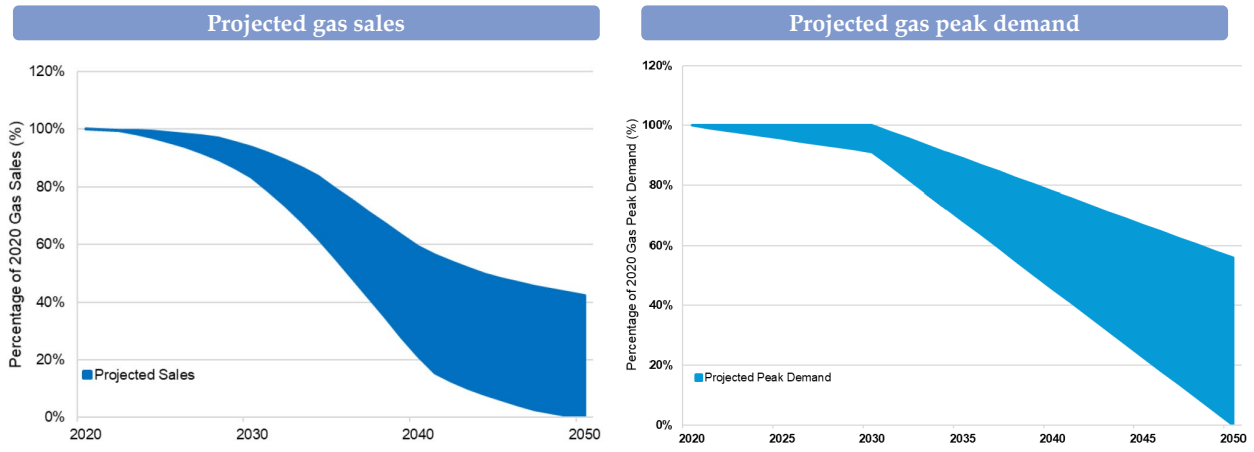
ConEd projects a downward trend in gas demand under all three scenarios or pathways studied as part of its long-term planning exercise (see Figure 36):

- Under the **hybrid consumption scenario**, over half of buildings in the City are assumed to convert to renewable electricity and decarbonized steam by 2050, with the remaining "difficult-to-electrify" buildings relying on the gas system to transport low-to-zero carbon gaseous fuels (e.g., renewable natural gas, hydrogen). Under this scenario, ConEd projects gas distribution volumes declining by over 60% from 2020 levels by 2050;

- Under the **targeted electrification scenario**, the vast majority of buildings in the City are assumed to convert to renewable electricity and decarbonized steam by 2050, such that gas distribution volumes are projected to decline over 85% from 2020 levels by 2050. Notably, this scenario anticipates phasing out the gas distribution system across most of ConEd's service territory, except for in dense urban centers; and

- Under the **full electrification scenario**, the entire building stock in ConEd's service territory is assumed to convert to renewable electricity and decarbonized steam. As such, this scenario anticipates a full decommissioning of the utility's gas distribution system, where gas distribution volumes are projected to decline 100% from 2020 levels by 2050.[105]

Figure 36. ConEd's gas demand forecast



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

It is important to note that ConEd's demand projections do not incorporate the impacts of the new-building gas ban passed in December 2021 (NYC Local Law 154).[106] This law takes effect as early as 2024, and is likely to lead to even greater reductions in gas demand than projected in the 2022 Long-Range Gas Plan. Given these projections inform capital investment planning

[105] Ibid. *See Table 6 (P. 22).*

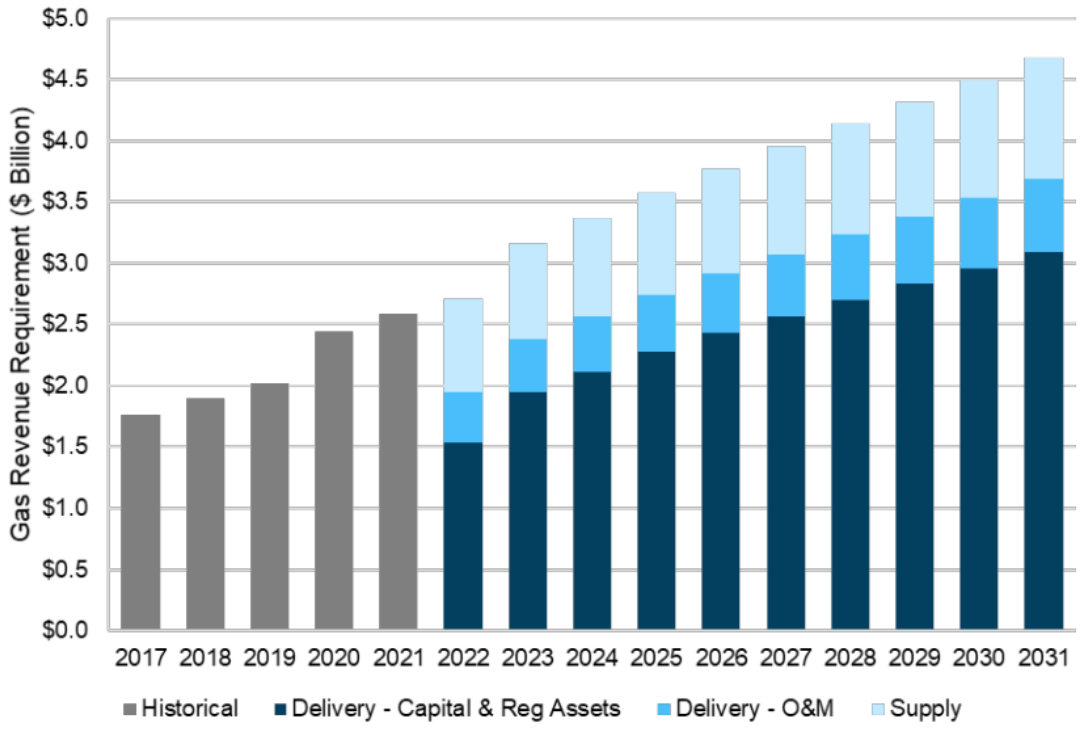
[106] Although ConEd acknowledges the legislation in various parts of its 2022 Long-Range Gas Plan, the analysis contained in the planning document is only based on information available as of April 2021.

(discussed further in Section 7.2.2 below), LEI believes an updated analysis incorporating the impacts of NYC Local Law 154 should be issued by ConEd as soon as is practical.

7.2.2 Planned investments

As discussed above, ConEd's peak demand forecasts form the basis for the utility's long-term investment plans. According to its 2022 Long-Range Gas Plan, ConEd anticipates spending approximately $13 billion through 2031 on its gas system, which amounts to around $1.3 billion in capital expenditures per year.[107] Notably, this is higher than the planned annual capital expenditures presented in ConEd's 2019 Long-Range Gas Plan, which anticipated total spending of approximately $22 billion over 20 years (or $1.1 billion per year).[108] In addition, the $13 billion capital plan outlined in the 2022 Long-Range Gas Plan represents an estimated increase in ConEd's gas revenue requirement of approximately 6% per year through 2031, ultimately more than doubling the average annual revenue requirement from that last five years (see Figure 37).

Figure 37. ConEd gas revenue requirement forecast through 2031



Source: ConEd. *Gas Long-Range Plan (2019-2038)*. January 2019.

[107] ConEd. *2022 Gas Long-Range Plan*. January 2022.

[108] ConEd. *Gas Long-Range Plan (2019-2038)*. January 2019.

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Boston, MA 02111
www.londoneconomics.com

The largest component of ConEd's 2022 spending plan is its Main Replacement Program, which seeks to replace aging cast iron and unprotected steel mains for a total cost of $4.6 billion (or approximately 35% of the 10-year capex plan).[109] The replacement of leak-prone pipes will minimize emissions from ConEd's gas system and is thus being positioned as one of the utility's tools for supporting State and local environmental goals.

Despite ConEd's recognition that usage of its gas system will need to be reimagined amidst the State's planned transition to a clean energy future, the utility still seems to be pursuing aggressive capital investments in gas infrastructure in the near-term, driving up customer costs. This increases the risk of stranded assets as gas usage declines. As such, LEI believes these planned capital expenditures should be carefully reexamined once ConEd issues updated projections considering the impacts of NYC Local Law 154.

7.2.3 ConEd's Smart Solutions program

It is important to note that ConEd has been exploring non-traditional options to meet firm gas demand through its Smart Solutions for Natural Gas Customers (or "Smart Solutions") program. Initiated in 2017, the program was developed in response to anticipated pipeline capacity constraints, uncertainty regarding the construction of new interstate pipelines, and an increased reliance by ConEd on volatile, short-term delivered gas services to provide peaking supply.[110]

The Smart Solutions initiative is comprised of four components:

1. **Competitive solicitations for non-pipeline alternatives:** seeks proposals from vendors, suppliers, and customers for supply-side and/or demand-side solutions. Supply-side solutions include options such as localized compressed natural gas or renewable natural gas; demand-side solutions include options such as energy efficiency, demand response, or electric heat pumps;

2. **Enhanced energy efficiency programs:** includes rebates, incentives, and educational efforts to achieve reductions in gas usage among residential, multifamily, and commercial customers;

3. **Gas demand response pilot:** a pilot program to reduce gas usage during the entirety of a peak demand day – for commercial and industrial customers, it is structured as a performance-based pilot; for residential customers with Wi-Fi-enabled thermostats, the pilot is operated on a direct load control basis; and

[109] ConEd. *2022 Gas Long-Range Plan*. January 2022.

[110] Ibid.

4. **Gas innovation project:** explores alternatives to natural gas heating, including the use of electric heat pumps (i.e., technologies such as geothermal heat pumps or air-source heat pumps).[111]

However, early results from the Smart Solutions program suggest that these initiatives may not yet be sufficient to delay or defer the need for investments in additional gas infrastructure. For example, ConEd has issued two competitive solicitations (one in December 2017 and another in January 2020) seeking proposals for "*innovative non-pipeline solutions that provide natural gas supply or demand relief during peak days and peak periods*."[112] As a result of the 2017 solicitation, the NY PSC approved a $222 million portfolio of demand-side projects, which are set to provide approximately 37.5 MDth/day of peak day relief.[113] The approved measures include:

- **Targeted gas energy efficiency programs** for low-income customers and government buildings that provide critical community services. ConEd expects these programs to reduce peak day usage by 25 MDth/day by November 2024; and

- **Renewable thermal electrification** programs to install residential geothermal heat pumps in 8,800 single-family residences in Westchester County and air source heat pumps in 1,000 multi-family buildings in the Bronx. ConEd expects these measures to reduce peak demand by 12.4 MDth/day over the same time period.[114]

Despite these measures, ConEd notes that "*the projects to date will not be able to fully meet its expected natural gas supply needs such that it can avoid the need for incremental pipeline capacity*"[115] and described the portfolio as "*not [providing] a realistic pathway for [ConEd] to fully address its need for additional pipeline capacity or reduced use of delivered services*."[116] With regards to the 2020 solicitation, it is unclear what proposals, if any, were implemented.

In July 2021, ConEd released another solicitation, this time to "*address projects that would be designed for strategic abandonment of leak prone pipe through electrification, where most effective, while maintaining system reliability*."[117] Specifically, the solicitation called for "*holistic solutions to target*

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[111] Ibid.

[112] ConEd. *Request for Information: Non-Pipeline Solutions to Provide Peak Period Natural Gas System Relief.* January 31, 2020. P. 3.

[113] NY PSC. *Order Approving with Modification the Non-Pipeline Solutions Portfolio (Case 17-G-0606).* February 7, 2019.

[114] Ibid.

[115] ConEd. *Request for Approval of Non-Pipeline Solutions Portfolio in the Smart Solutions for Natural Gas Customers Program (Case 17-G-0606).* September 28, 2018. P. 1.

[116] Ibid. P. 9.

[117] ConEd. *Request for Proposal: Non-Pipeline Alternatives to Provide Whole Building Electrification Services.* July 12, 2021. P. 4.

suitable leak-prone pipe for retirement, rather than replacement, via full building electrification, removing the need for customer connection to the distribution gas infrastructure system."[118]

Although proposals were due by the end of August 2021, and ConEd was expected to provide a status update to respondents by the end of October 2021, the results of this solicitation have yet to be announced. Other active solicitations under ConEd's non-pipeline alternatives program include those for targeted gas demand-side management load reduction in Port Chester and Soundview.[119] LEI believes these solicitations should be closely monitored, as they represent promising options for achieving State and local targets while simultaneously reducing the risk for stranded assets. If sufficient viable proposals are submitted in response to these solicitations, ConEd could eliminate or reduce a substantial component of its planned capital expenditures.

7.3 PSC's gas planning proceeding

The NY PSC recognized a misalignment between the State policies discussed in Section 3.2 and the traditional gas planning approach, which tends to favor investments in gas infrastructure despite the State's intentions to reduce gas usage going forward. As such, the PSC initiated Case 20-G-0131 in March 2020 to revamp the State's gas planning process.

> ***"The current approach to gas system planning poses risks of incomplete alignment with CLCPA, sub-optimal consideration of alternatives and timeframe, increased risk and cost to consumers, and unsatisfactory provision of service and solutions for those same consumers. To align with these policies and to recognize the emergence of potentially viable alternatives to gas infrastructure, gas planning must explicitly take account of the likely useful life of all alternatives, and of the resulting cost and risk implications."***
>
> - NY PSC. *Order Instituting Proceeding (Case 20-G-0131)*. March 19, 2020. P. 6-7.

In February 2021, NY DPS Staff filed a proposal in the proceeding, which outlined a modernized and improved gas planning process that is "*comprehensive, suited to forward-looking system and policy needs, designed to minimize total lifetime costs, and inclusive of stakeholders*."[120] Under the proposal, NY DPS Staff envision a process in which utilities would be required to submit long-term gas plans on a three-year cycle. These planning documents would need to incorporate stakeholder feedback and would have to evaluate a "no-infrastructure option", which would "*include a mix of utility-sponsored demand reduction measures that will close any gap between the projected load and available supply*."[121] Furthermore, utilities would be required to file annual reports, which would provide stakeholders with progress updates, as well as updated gas demand forecasts, among other requirements. Together, these proposed changes would "*help the*

[118] Ibid. P. 5.

[119] ConEd. *Non-Pipeline Alternatives for Natural Gas Customers – Current Opportunities.*

[120] NY DPS. *Staff Gas System Planning Process Proposal (Case 20-G-0131)*. February 12, 2021. P. 3.

[121] Ibid. P. 9.

utilities plan where, when, and how to deploy capital to ensure reliability in the future at reasonable cost and in line with State policies."[122]

Multiple Intervenors have filed comments in the proceeding in response to the NY DPS Staff proposal. Although the proposal represents an encouraging change to the conventional gas planning approach, the NY PSC has yet to issue an order in this proceeding.

7.4 Key takeaways

Certain forecast assumptions and planned investments should be reassessed

LEI's review of ConEd's 2022 Gas Long-Range Plan identified two key areas for improvement to bring the utility's long-term gas planning approach further in line with State and local environmental policies.

In terms of forecast assumptions, ConEd's demand forecasting should be expanded to incorporate the impacts of NYC Local Law 154, which phases in a gas-ban for certain new buildings in the City beginning in 2024. Ensuring demand forecasts incorporate the latest available information and policies would enable planned capital investments to be evaluated in the appropriate context.

As for planned investments, ConEd must plan for a reliable gas network despite uncertainty surrounding the rate of decline in future gas demand. However, any investments in gas infrastructure for system expansion increase the risk of stranded assets as gas usage declines, or alternative system needs (i.e., hydrogen) emerge. As such, emphasis should shift away from capital-intensive initiatives and should focus instead on non-pipeline alternatives, including expanding gas energy efficiency programs.

[122] Ibid. P. 6.

8 Works consulted

8.1 Electric

- EPRI
  - Electrification Scenarios for New York's Energy Future – February 2020
- NYC
  - OneNYC 2050
  - Climate Mobilization Act
- NYISO
  - October 2021 Generator Interconnection Queue
  - 2021 Power Trends Report
  - 2021 Load & Capacity Data Report (Goldbook)
  - 2020 Reliability Needs Assessment Report
  - 2020 Climate Change Impact Study
- ConEd documents
  - Electric Long-Range Plan (2019-2038) – January 2019
  - Electric Long-Range Plan – January 2022
  - Clean Energy Commitment Plan
  - Climate Change Resilience Plan
  - ConEd 2020 Annual Report – February 18, 2021
  - 2021 Local Transmission Plan (LTP) Study Assumptions and report
- NY PSC Case 16-E-0060 – 2016 Electric Rate Case
  - Report on 2018 Capital Expenditures and 2019-2023 Electric Capital Forecast – February 28, 2019
  - Report on 2019 Capital Expenditures and 2020-2024 Electric Capital Forecast – February 28, 2020
- NY PSC Case 18-E-0130 – Energy Storage Deployment Program
  - Order Establishing Energy Storage Goal and Deployment Policy – December 18, 2018
  - Annual energy storage deployment report – April 1, 2021
- NY PSC Case 19-E-0065 – 2020 Electric Rate Case
  - Prepared Direct Testimony of New York City Billing and Interconnection Panel – May 2019

    - Climate Change Implementation Plan – December 29, 2020
    - NWS Implementation, Community, and Outreach Plan – January 29, 2021
    - NWS Quarterly expenditures & program report – Q2 2021
    - Report on 2021 Capital Expenditures and 2022-2026 Electric Capital Forecast – February 28, 2021
    - 2020 Con Edison Earnings Adjustment Mechanism Achievement Report – March 31, 2021
- NY PSC Case 19-E-0065 – TRACE projects petition
    - Petition of ConEd for approval to recover costs of certain transmission reliability and clean energy projects – December 30, 2020
    - Comments of the City of New York – March 22, 2021
    - Order regarding transmission investment petition - April 15, 2021
- NY PSC Case 18-M-0084 – Comprehensive Energy Efficiency Initiative
    - Order authorizing utility energy efficiency and building electrification portfolios through 2025 – January 16, 2020
    - System Energy Efficiency Plan (SEEP) 2019-2025 – September 15, 2020; refiled April 1, 2021
    - Con Edison 2020 System Energy Efficiency Plan (SEEP) Annual Report – May 12, 2021
- NY PSC Case 18-E-0130 – Energy Storage Deployment Program
    - Revised Implementation Plan of Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc. for a Competitive Direct Procurement of Scheduling Rights from Qualified Energy Storage Systems – May 17, 2021
- NY PSC Case 20-E-0197 - Transmission Planning Pursuant to the Accelerated Renewable Energy Growth and Community Benefit Act
    - Utility Transmission and Distribution Investment Working Group Report – November 2, 2020
    - Initial Report on the New York Power Grid Study – January 19, 2021
    - Order on Local Transmission and Distribution Planning Process and Phase 2 Project Proposals – September 9, 2021
- NYSERDA. *Governor Hochul Announces Expanded NY-Sun Program to Achieve at Least 10 Gigawatts of Solar Energy by 2030.* September 20, 2021.
- Urban Green Council. *NYC Building Emissions Law Summary: Local Law 97.* July 9, 2020.

8.2 DSPP

- NY PSC Case 14-M-0101 – Reforming the Energy Vision proceeding:
  - Order Adopting Regulatory Policy Framework and Implementation Plan – February 26, 2015
  - Order Adopting Distributed System Implementation Plan Guidance – April 20, 2016
- NY PSC Case 16-M-0411 – DSIP proceeding:
  - ConEd 2016 Initial DSIP – June 30, 2016
  - Comments of the City of New York – September 12, 2016
  - Joint Utilities 2016 Supplemental DSIP – November 1, 2016
  - Order on Distributed System Implementation Plan Filings – March 9, 2017
  - ConEd 2018 DSIP – July 31, 2018
  - Comments of the City of New York – November 19, 2018
  - ConEd 2020 DSIP – June 30, 2020
- NY DPS. *Reforming the Energy Vision – About the Initiative.* Updated May 9, 2018.

8.3 Gas

- NY PSC Case 17-G-0606 – ConEd Smart Solutions proceeding:
  - ConEd Petition – September 29, 2017
- NY PSC Case 19-G-0066 – ConEd gas rate case:
  - Direct Testimony of the NYC Gas Infrastructure Panel – May 24, 2019
  - Direct Testimony of the NYC Policy Panel – May 24, 2019
  - ConEd 2020 Earnings Adjustment Mechanism Achievement Report – March 31, 2021
  - ConEd 2020 Gas Peak Reduction Earnings Adjustment Mechanism Achievement Report – June 30, 2021
- NY PSC Case 20-G-0131 – Gas planning procedures proceeding
  - Order Instituting Proceeding – March 19, 2020
  - Press release: "PSC Launches Proceeding to Improve Transparency of Natural Gas Planning and Investments in New York" – March 19, 2020
  - ConEd Supply and Demand Analysis for Regions Vulnerable to Supply Constraints – July 17, 2020
  - ConEd Report on Demand Reducing Measures – August 17, 2020
  - Staff Gas System Planning Process Proposal – February 12, 2021

    - Comments of the City of New York – May 3, 2021
- ConEd Gas Long-Range Plan (2022-2050) – January 2022
- ConEd Gas Long-Range Plan (2019-2038) – January 2019
- ConEd 2020 Annual Report – February 18, 2021
- S&P article: "NYC lawmakers aim to block natural gas use in new buildings, major renovations" – May 27, 2021
- New York City Council – Int 2317-2021
- NYC - Executive Order No. 52 - February 6, 2020.

8.4 Other

- EIA. *Profile Analysis: New York.* October 21, 2021.
- NYS DEC. *Reducing Greenhouse Gas Emissions.*