October 25, 2023

By Electronic Filing

Hon. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: New York Independent System Operator, Inc. *et al.*, Docket Nos. RM22-16-000 and AD21-13-000; Order No. 897 One-Time Informational Report

Dear Secretary Bose:

The New York Independent System Operator, Inc., on behalf of itself, the New York Transmission Owners,[1] LS Power Grid New York Corporation I ("LS Power NY"), NextEra Energy Transmission New York, Inc. ("NEETNY"), and New York Transco, LLC ("NY Transco") (collectively, the "New York Joint Filers"), hereby submits a one-time informational report in compliance with the directives of the Federal Energy Regulatory Commission ("Commission") in Order No. 897.[2]

Order No. 897 requires transmission providers to submit one-time informational reports "describing their current or planned policies and processes for conducting extreme weather vulnerability assessments of their Commission-jurisdictional transmission assets and operations."[3] This reporting obligation extends to both public utility transmission owners that are members of ISOs/RTOs and to the ISOs/RTOs themselves, and the Commission has explicitly authorized the filing of joint reports by ISOs/RTOs and their public utility members.[4] Accordingly, the New York Joint Filers are submitting a joint report that includes the responses of each transmission provider to the questions set forth in Appendix A to Order No. 897. These responses are appended to this transmittal letter as Attachment A.

The answers in Attachment A describe each transmission provider's activities and processes that are responsive to the questions posed by the Commission. The responses from each transmission provider are provided separately but compiled for the Commission's review. Together, these materials constitute a collective response to Order No. 897's Appendix A

[1] The New York Transmission Owners ("NYTOs") are: Central Hudson Gas & Electric Corporation ("Central Hudson"), Consolidated Edison Company of New York, Inc. ("Consolidated Edison"), Long Island Power Authority ("LIPA"), Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid"), New York Power Authority ("NYPA"), New York State Electric & Gas Corporation ("NYSEG"), Orange and Rockland Utilities, Inc. ("O&R"), and Rochester Gas and Electric Corporation ("RG&E"). LIPA and NYPA are non-jurisdictional utilities that are voluntarily participating in this joint filing.

[2] *One-Time Informational Reps. on Extreme Weather Vulnerability Assessments Climate Change, Extreme Weather, & Elec. Sys. Reliability*, 183 FERC ¶ 61,192 (2023) ("Order No. 897").

[3] *Id*. at P 1.

[4] *Id*. at P 3 n.5 ("the reports we are proposing herein would be filed by either the public utility members of RTOs/ISOs, the RTOs/ISOs themselves, or both….").

questions. Each of the New York Joint Filers is solely responsible for its respective answers being provided in Attachment A to this filing, but they have coordinated in their preparation of their respective responses in an effort to identify areas of commonality and synergy. By presenting their responses together in this coordinated manner, the New York Joint Filers hope to provide a more comprehensive picture of existing efforts in New York related to extreme weather vulnerability assessments than if each had filed separately.

With regard to the Joint Filers and their respective responsibilities as pertinent to the questions raised in Appendix A to Order No. 897, each of the Joint Filers provide a brief overview of their respective company(ies) that own transmission in New York as an introduction at the beginning of their respective responses. For purposes of this transmittal letter, the NYISO is the independent system operator responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the State of New York. In terms of delineation of transmission planning compliance responsibilities, as explained in NYISO's enclosed response to Question No. 4 from Order No. 897's Appendix A, the NERC TPL-001 assessments are a joint effort among the NYISO and all transmission owners within the State of New York. While additional information is provided in NYISO's response to Question No. 4, NYISO's responsibilities for TPL-001 assessment purposes are the Northeast Power Coordinating Council ("NPCC") Bulk Power System elements within the State of New York, and the New York transmission owners evaluate the remaining portions of New York's NERC Bulk Electric System.

With regards to the NYTOs, they are the traditional owners of electric transmission facilities in the State of New York and, through each NYTO's separate ownership of its respective transmission facilities and system, collectively own the vast majority of the transmission facilities in the State. LIPA and NYPA are not public utilities for purposes of the Federal Power Act ("FPA"). As non-jurisdictional utilities normally exempt from the requirements of Part II of the FPA, LIPA and NYPA are not waiving their non-jurisdictional status but are voluntarily providing their respective responses to the questions contained in Appendix A to Order No. 897 to facilitate the Commission's efforts to promote system reliability and resiliency, and to allow for a more comprehensive joint report regarding the transmission system in the State of New York.

LS Power NY, NEETNY, and NY Transco have each won one or more competitive solicitations to construct, own, and operate a transmission project to address a transmission need(s) driven by a public policy requirement for purposes of Attachment Y to the NYISO Open Access Transmission Tariff.

In terms of each of the New York Joint Filers' enclosed responses, attached hereto are the following:

1) Attachment I: NYISO's Responses to Order No. 897's Appendix A Questions;

2) Attachment II: Central Hudson's Responses to Order No. 897's Appendix A Questions;

3) Attachment III: Consolidated Edison's and O&R's Responses to Order No. 897's Appendix A Questions;

4) Attachment IV: LIPA's Responses to Order No. 897's Appendix A Questions;

5) Attachment V: LS Power NY's Responses to Order No. 897's Appendix A Questions;

6) Attachment VI: National Grid's Responses to Order No. 897's Appendix A Questions;

7) Attachment VII: NEETNY's Responses to Order No. 897's Appendix A Questions;

8) Attachment VIII: NYPA's Responses to Order No. 897's Appendix A Questions;

9) Attachment IX: NYSEG and RG&E's Responses to Order No. 897's Appendix A Questions;

10) Attachment X: NY Transco's Responses to Order No. 897's Appendix A Questions.

The New York Joint Filers respectfully request that the Commission accept this informational report. If you have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,

/s/ James H. Sweeney
James H. Sweeney, Senior Attorney
New York Independent System Operator, Inc.
10 Krey Blvd.
Rensselaer, New York 12144
(518) 356-6000
JSweeney@nyiso.com

/s/ *Andrew W. Tunnell*
Andrew W. Tunnell
Lyle D. Larson
Abigail C. Fox
Balch & Bingham LLP
1710 Sixth Avenue North
Birmingham, Alabama 35203
llarson@balch.com
atunnell@balch.com
afox@balch.com
Attorneys for the New York Transmission Owners

/s/ John Borchert
John Borchert
Senior Director of Energy Policy and
Transmission Development
Central Hudson Gas & Electric Corporation
284 South Avenue
Poughkeepsie, NY 12601
jborchert@cenhud.com
Central Hudson Gas & Electric Corporation

/s/ Susan J. LoFrumento
Susan J. LoFrumento
Associate Counsel
Consolidated Edison Co. of New York, Inc.
Orange and Rockland Utilities, Inc.
4 Irving Place
New York, NY 10003
lofrumentos@coned.com
Consolidated Edison Co. of New York, Inc.
Orange and Rockland Utilities, Inc.

/s/ *Lisa Zafonte*
Lisa Zafonte
Assistant General Counsel
Long Island Power Authority
333 Earle Ovington Boulevard, Suite 403
Uniondale, NY 11553
lzafonte@lipower.org
Long Island Power Authority

/s/ Gary D. Levenson
Gary D. Levenson
Principal Attorney
Power, Transmission & Regulatory
New York Power Authority
123 Main Street
White Plains, NY 10601
gary.levenson@nypa.gov
New York Power Authority

/s/ Danielle K. Mechling
Danielle K. Mechling
FERC Legal Director
Avangrid Networks, Inc.
180 Marsh Hill Road
Orange, CT 06477
danielle.mechling@avangrid.com
New York State Electric & Gas Corporation and Rochester Gas and Electric Corporation

/s/ Carlos A. Gavilondo
Carlos A. Gavilondo
Assistant General Counsel
Niagara Mohawk Power Corporation
d/b/a/ National Grid
300 Erie Boulevard West
Syracuse, NY 13202
carlos.gavilondo@nationalgrid.com
Niagara Mohawk Power Corporation
d/b/a/ National Grid

/s/ Michael R. Engleman
Michael R. Engleman
Engleman Fallon, PLLC
1717 K Street NW, Suite 900
Washington, DC 20006
202-464-1332 (office)
mengleman@efenergylaw.com
Attorney for LS Power Grid New York Corporation I

/s/ Thomas C. Orvald
Thomas C. Orvald
Senior FERC Counsel
NextEra Energy, Inc.
801 Pennsylvania Ave., NW, #220
Washington, DC 20004
(202) 349-3497
Thomas.orvald@fpl.com
NextEra Energy Transmission New York, Inc.

/s/ Paul E. Haering
Paul E. Haering
VP Capital Investment
New York Transco, LLC
One Hudson City Center
Hudson, NY 12534
845-705-4322 (cell)
Paul.haering@nytransco.com
New York Transco, LLC

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with the requirements of Rule 2010 of the Rules of Practice and Procedure, 18 C.F.R. §385.2010.

Dated at Rensselaer, NY this 25th day of October 2023.

/s/ Stephanie Amann

Stephanie Amann
New York Independent System Operator, Inc.
10 Krey Blvd.
Rensselaer, NY 12144
(518) 356-8854

TABLE OF CONTENTS FOR ATTACHMENTS

Attachment I

NYISO's Responses to Order No. 897's Appendix A Questions

NYISO Responses to Report Questions

The NYISO is a not-for-profit corporation responsible for providing open-access transmission service, administering open and competitive wholesale markets, and bringing together buyers and sellers of electricity, capacity, and ancillary services, in New York State. The NYISO is also responsible for the reliable operation of the bulk electricity grid, and both short-term and long-term planning for the bulk power system in New York State. The NYISO manages the flow of power over nearly 11,000 circuit-miles of transmission lines and centrally dispatches over 300 generating units.

Q1) As a threshold matter, state whether the transmission provider conducts extreme weather vulnerability assessments, and if so, how frequently it conducts those assessments.

NYISO Response to Question 1

The NYISO affirms that it conducts extreme weather vulnerability assessments. On an annual basis, in compliance with Northeast Power Coordinating Council (NPCC)[1] and New York State Reliability Council (NYSRC)[2] reliability rules, the NYISO assesses the impact of peak load conditions resulting from extreme weather. These assessments are documented in the Area Transmission Reviews, which are posted on the NYISO website.[3] For both NPCC and NYSRC planning criteria, planning for peak load conditions resulting from extreme weather results in the evaluation of implementing a change to design or operating practices, but does not

[1] *See*, NPCC Regional Reliability Reference Directory #1, Design and Operation of the Bulk Power System (NPCC Directory #1).

[2] *See*, NYSRC Reliability Rules & Compliance Manual (NYSRC Manual).

[3] *See*, NYISO Planning – Reliability Compliance (NYISO Planning-Reliability Compliance).

result in a required development of a corrective action plan to address these deficiencies (*i.e.,* the existing reliability criteria at NPCC and NYSRC defines peak load conditions from extreme weather conditions as an informational scenario).

In addition to the studies that are required for compliance, the NYISO's biennial Reliability Planning Process (*i.e.,* the Reliability Needs Assessment (RNA) and the Comprehensive Reliability Plan (CRP)) as well as the quarterly Short-Term Reliability Process include assessments that highlight the reliability risks associated with extreme weather.[4] In the 2022 RNA, the NYISO highlights that, while the system maintains reliability, extreme weather events, such as heatwaves or storms, could result in deficiencies to serve demand statewide as well as in localities, such as in New York City. The quarterly short-term assessments of reliability also include, on a quarterly basis, assessments of the reliability impact of planned changes to the system and include updated information on the potential impact of heatwaves and cold snaps on reliability.[5]

The NYISO performed a standalone fuel and energy security study in 2019.[6] The fuel and energy security analysis identified severe winter conditions based on historical winter weather data. This data was then used to identify an appropriate extended "severe cold weather event" period in terms of length, number of heating degree days, and a short period of very severe weather within the extended event. At the end of 2019 NYISO committed to an ongoing effort to monitor the conclusions of this study and to provide updates to stakeholders every six months. Recognizing the ongoing pace of change and unique winter weather operational

[4] The 2022 Reliability Needs Assessment (RNA), A Report from the New York Independent System Operator (2022 RNA) includes several key takeaways for reliability risk factors (see page 91 for Reliability Risk Factors: Key Takeaways).

[5] *See*, Quarterly Short-Term Assessments of Reliability (STAR) (STAR Reports).

[6] *See*, NYISO 2019 Fuel and Energy Security Study (Fuel and Energy Security Study Report).

demands, the NYISO asked Analysis Group to update and expand its 2019 fuel and energy security study in 2023.[7] This 2023 analysis evaluates the NYISO's system projected supply/demand balance for three future winters—2023/2024, 2026/2027 and 2030/2031— under conditions that include a seventeen-day period of extended cold weather, including an extreme cold snap during three of those days similar to 2019. Several factors confirm the finding from the 2019 study that continued monitoring and analysis of the ongoing transition of the resource fleet and its potential impact on the reliable operation of the NYISO power grid remain important.

A. Scope

Q2) A description of the types of extreme weather events for which the transmission provider conducts, or plans to conduct, extreme weather vulnerability assessments, if any. For transmission providers that conduct, or plan to conduct, such assessments, a description of how the transmission provider determined which extreme weather hazards to include in the assessment (e.g., extreme storms such as hurricanes and the associated flooding and high winds, wildfires, extreme prolonged heat or cold, or drought conditions);

NYISO Response to Question 2

The NYISO considers extreme weather events across several different assessments such as reliability studies, compliance activities, and other evaluations. The impact of extreme weather can be considered in evaluations as either a system condition or an extreme contingency. A system condition is a state of the system for which the impact of design and extreme

[7] *See*, NYISO 2023 Draft Fuel and Energy Security Study (2023 Draft Fuel and Energy Security Study Report).

contingencies are evaluated. System conditions include the starting point of demand, generation, and transmission topology. Design and extreme contingencies evaluate the impact of the sudden loss of certain elements and combinations of elements on the system.

The most frequent assessment of extreme weather included in NYISO reliability studies, as well as in compliance studies, is increased peak load due to extreme weather conditions. These extreme weather conditions include both heatwaves and cold snaps. For instance, in the 2022 RNA, the NYISO evaluated the impact of extreme weather through transmission security margin calculations that assess both heatwaves and cold snaps.[8] Baseline peak forecasts and load shapes, for which the system is currently designed, assume expected peak day weather (*i.e.*, approximately average temperatures and weather conditions). The heatwave and cold-snap conditions are defined by the 90th percentile forecasts documented in the Load and Capacity Data Report (the "Gold Book").[9] Extreme heatwaves and extreme cold snaps correspond to the 99th percentile forecasts, which are also published in the Gold Book. Area Transmission Reviews performed for compliance with NPCC Directory #1 and the NYSRC Reliability Rules also include an assessment of the impact of peak load conditions resulting from extreme weather. Historically, the NYISO has assumed a heatwave demand condition to perform this evaluation.

The baseline and 90th/99th percentile summer peak forecasts utilize a cumulative temperature and humidity index, which reflects a weighted average weather condition on the peak day and the two proceeding days and is based on the historical distribution of peak-day weather. The peak load forecasts incorporate the projected impacts of increasing temperature trends throughout the forecast horizon. As documented in the 2022 RNA, a heatwave (1-in-10-

[8] *See*, 2022 RNA at Appendix F.

[9] *See*, NYISO Load and Capacity Data Report (the "Gold Book") (2023 Gold Book).

year or 90/10) has a statewide maximum temperature of 95 degrees Fahrenheit. An extreme heatwave (1-in-100-year or 99/1) has a statewide average maximum temperature of 98 degrees Fahrenheit. A cold-snap (1-in-10-year or 90/10) reflects a statewide daily average temperature of 6 degrees Fahrenheit with an extreme cold snap (1-in-100-year or 99/1) reflecting a statewide daily average temperature of 0 degrees Fahrenheit.[10]

Annual compliance studies (such as the NPCC/NYSRC Area Transmission Reviews and NERC TPL-001 assessments) include the assessment of the system following extreme contingencies. Extreme contingencies consider the impact of certain consequences of extreme weather hazards such as wildfires and extreme icing by removing components of the system in a common area based on the assumed weather condition. Extreme contingencies evaluate the impact of the sudden loss of electrical system components due to local area events (such as all generating units at an entire substation or loss of all transmission lines on a common right-of-way) as well wide area events such as the loss of a fuel delivery system impacting multiple generating plants (*e.g.,* gas pipeline contingencies). Extreme contingencies do not require the development of a corrective action plan to mitigate the consequences of the event. However, when the analysis concludes that cascading events result from the extreme contingency, an evaluation is performed to consider potential actions to reduce the likelihood of the events or to mitigate their consequences.

In addition, the NYISO participates in the NYSRC Extreme Weather Working Group (EWWG) that was established in 2022.[11] The Extreme Weather Working Group was established to inform the NYSRC's efforts to increase NYCA power system resilience to extreme weather

[10] The temperature values can have some variance from Gold Book to Gold Book. For instance, the 2023 Gold Book notes for winter the 90th percentile temperature for winter to be 5 degrees Fahrenheit and for 99th percentile to be minus 2 degrees Fahrenheit.

[11] Extreme Weather Working Group materials are available at NYSRC EWWG.

impacts. The efforts of this working group are expected to influence the types of extreme weather events evaluated and the types of assessments needed to evaluate the impact of extreme weather.

Q3) A description of how the transmission provider defines an extreme weather event for the purposes of its extreme weather vulnerability assessment, including what thresholds it uses relative to historical measurements or probabilities of occurrence, if applicable;

NYISO Response to Question 3

In NYISO's reliability planning processes, such as the transmission security margin assessments documented in the RNA, a heatwave (1-in-10-year or 90/10) has a statewide maximum temperature of 95 degrees Fahrenheit. An extreme heatwave (1-in-100-year or 99/1) has a statewide average maximum temperature of 98 degrees Fahrenheit. A cold-snap (1-in-10-year or 90/10) reflects a statewide daily average temperature of 6 degrees Fahrenheit with an extreme cold snap (1-in-100-year or 99/1) reflecting a statewide daily average temperature of 0 degrees Fahrenheit.[12] The NPCC and NYSRC compliance studies evaluating the peak load conditions resulting from extreme weather utilize the statewide coincident 90th percentile forecasts (1-in-10-year or 90/10). The NYISO has begun to include the historical NYCA peak day weather distributions in the 2023 Gold Book.[13]

For the 2023 fuel and energy security assessment, historical hourly weather data by zone was analyzed for the years 1993-2022. The period spanning December 25, 2017 through January

[12] The temperature values can have some variance from Gold Book to Gold Book. For instance, the 2023 Gold Book notes for winter the 90th percentile temperature for winter to be 5 degrees Fahrenheit and for 99th percentile to be -2 degrees Fahrenheit.

[13] *See*, Table I-20 in the 2023 Load and Capacity Data Report released April 2023 (2023 Gold Book).

8, 2018 was the coldest consecutive 14-day period in the historical data, with daily temperatures in the tenth percentile of wind-adjusted temperatures or lower, averaging 11.4 degrees F across the NYCA and minus 0.8 degrees F when wind-adjusted.

The fuel security risks caused by extended cold weather may be further exacerbated during short cold snap periods of a few days, when natural gas supply capacity reaches maximum utilization and when fuel oil transportation issues (such as frozen roads or waterways) may interfere with fuel replenishment. Using the NYISO's historical data, the period spanning January 18, 1994 through January 21, 1994 was identified as the coldest consecutive 3-day cold snap between 1993 and 2022, with an average temperature across the NYCA of 2.9 degrees F.

The temperature profile for the modeling period was constructed by combining the temperatures of the 3-day cold snap with the 14-day cold period, with the cold snap being inserted into the sixth through eighth days of the extended cold weather period. This 17-day modeling period thus represents an extreme cold weather event equivalent to a historically cold 17-day period from the last 25 years, including the worst-case three-day cold snap during that period. Since the purpose of the analysis is to examine fuel and energy security risks under severe winter conditions, this 17-day period is used in all cases as the model baseline for estimates of retail gas demand on local distribution companies, availability of natural gas for power generation, and hourly electrical demand.

Q4) A description of how the transmission provider selects, or plans to select, the set of assets and operations that will be examined;

NYISO Response to Question 4

The extreme weather condition assessments evaluated in the NYISO's biennial Reliability Planning Process (*i.e.,* Reliability Needs Assessment and Comprehensive Reliability

Plan) as well as the Short-Term Reliability Process (STRP) evaluate the reliability of the Bulk Power Transmission Facilities (BPTF).[14] The BPTF include (i) all NYCA transmission facilities 230 kV and above, (ii) all NYCA facilities identified by the NYISO to be part of the Bulk Power System, as defined by NPCC an the NYSRC, and (iii) select 115 kV and 138 kV facilities.[15]

The NERC TPL-001 assessments are a joint effort among the NYISO and all transmission owners within New York, with a specific division of responsibilities between the NYISO and the transmission owners. For the TPL-001 assessment, the NYISO's responsibilities are the NPCC Bulk Power System elements with the New York transmission owners evaluating the remaining portion of the NERC Bulk Electric System (BES). In the TPL-001 assessment, one of the sensitivity cases typically evaluates a year 5 peak case that uses the 90th percentile forecast, which is representative of the demand resulting from a heatwave.

In accordance with NPCC and NYSRC criteria, the NYISO reliability assessments evaluate various credible combinations of system conditions for compliance studies and other reliability studies.[16] The NYISO's compliance studies utilize the same assumptions for resources as those utilized in the reliability planning process.

In the 2019 and 2023 NYISO Fuel and Energy Security study models, system demand, supply resources, and transfer capabilities are based on previously-vetted NYISO study assumptions, including the 2019 Congestion Assessment and Resource Integration Study (CARIS) and the 2021-2040 System & Resource Outlook, respectively.[17] The extended period of

[14] *See*, NYISO Reliability Planning Process Manual (NYISO Reliability Planning Process Manual).

[15] *See*, NYISO Reliability Analysis Data Manual, Section 1.5 (NYISO Reliability Analysis Data Manual).

[16] *See*, NYSRC Reliability Rules & Compliance Manual, Rule B.1 R1.1 (NYSRC Manual)

[17] *See*, NYISO 2019 Fuel and Energy Security Study at p. 8 (Fuel and Energy Security Study Report) and NYISO 2023 Draft Fuel and Energy Security Study at pp. 8-9 (2023 Draft Fuel and Energy Security Study Report).

cold weather used in the assessments was based on the analysis of 25 years of historical weather data. The cold weather period used spans seventeen consecutive days of frigid winter conditions, including a historic three-day severe cold weather event.

Q5) A description of how the transmission provider determines, or plans to determine, the geographic or regional scope of the analysis;

NYISO Response to Question 5

The NYISO's extreme weather conditions assessments evaluated in the Reliability Planning Processes, the Short-Term Reliability Process, and the compliance studies analyze the New York Control Area ("NYCA"), which largely aligns with geography of New York State.

Q6) A description of whether and to what extent the transmission provider considers, or plans to consider, external interdependencies, such as interconnected utilities, other critical infrastructure sectors (e.g., water, telecommunications) and supply chain-related vulnerabilities, in the assessment;

NYISO Response to Question 6

For the extreme weather assessments included in the Reliability Planning Processes, the Short-Term Reliability Process, and compliance studies, external interdependencies are not specifically considered. In these studies, external area interchanges are modeled in accordance with the transactions coordinated through the Eastern Interconnection Reliability Assessment Group (ERAG) Multiregional Modeling Working Group (MMWG) process.[18] The extreme weather assessments impact load and thereby generation dispatch conditions in the assessments. After establishing the system conditions, contingency analysis is applied to evaluate the impact

[18] The ERAG MMWG includes the consideration of all "transactions that have confirmed annual firm transmission service (or one year or longer, including consideration of rollover rights) along the entire path from source to sink and have a firm energy contract for that resource." *See*, the Multiregional Modeling Working Group Procedural Manual, available at MMWG Procedural Manual.

the weather has on generation dispatch (depending on the assessment this could include both design and extreme contingencies). The contingencies evaluated include, as appropriate, contingencies in Areas[19] external to the NYCA.

The fuel and energy security model is a deterministic, scenario-based assessment of a future year's winter system operations subject to a variety of scenarios (different assumptions regarding future system topology) and physical disruptions (primarily episodic changes to the system affecting fuel and resource availability). An initial set of system conditions is identified that define weather, electric and gas demand, and gas and electricity transmission/transportation capacities. Scenarios and physical disruptions are then combined to define "cases," which are run through the fuel and energy security model to identify any risks associated with winter operations under these conditions.

Q7) A description of whether and to what extent the transmission provider coordinates, or plans to coordinate, with neighboring utilities and/or entities in other sectors that could potentially be relevant to the assessment;

NYISO Response to Question 7

For NPCC compliance studies, both the scope of the Area Transmission Reviews (ATRs) as well as the results of the annual ATRs are brought through the NPCC review process.[20] Within the Reliability Planning Processes, the NYISO reviews its plans to perform scenario analysis and reviews the study conclusions with stakeholders.[21]

---

[19] *See*, NPCC Glossary of Terms, An Area (when capitalized) refers to one of the following: New England, New York, Ontario, Quebec or the Maritimes (New Brunswick, Nova Scotia and Prince Edward Island). Within NPCC, Areas (capitalized) operate as control areas as defined by the North American Electric Reliability Council (NERC) (the definition of control area can be found in the NPCC Glossary of Terms Not Used by any Directories section of this NPCC Glossary of Terms.) (NPCC Glossary of Terms).

[20] *See*, NPCC Directory #1, Requirement 11.

[21] *See e.g.*, NYISO's discussion of RNA scenario analysis at the April 26, 2022 and August 1, 2022 Installed

In compliance with NERC and NPCC directives, the NPCC CO-12 and CP-08 working groups conduct a probabilistic and a deterministic seasonal assessment[22] twice a year, one for Summer and one for Winter. The working groups comprise representatives from NYISO, IESO, ISO-NE, HQ, NB, Maritimes, and some transmission owners within the NPCC region. The deterministic assessment examines the historical operating experiences and current operating procedures. The study looks at the resource adequacy concerns raised by the temperature variations, capacity factors of renewable resources, load forecast uncertainties, and fuel availability. The assessment reviews the capacity margins for Baseline, 90/10, and above 90/10 system load forecasts along with reviewing inter-area and intra-area transmission adequacy, including new transmission projects, upgrades, and potential transmission problems.

The probabilistic assessment estimates the use of the available NPCC Area Operating Procedures to mitigate resource shortages for the season in study. The assessment estimates the expected use of Operating procedures, such as External Assistance Calls, Activation of Demand Response/Security Constrained Resources, reduction in reserves, use of interruptible loads and voltage reductions, public appeals, and load shedding.

The final report of this assessment is coordinated with other parallel seasonal operational assessments, including the NERC Reliability Assessment Subcommittee's (RAS) Seasonal Reliability Assessment (NERC SRA).[23]

Q8) A description of whether and to what extent the transmission provider engages, or

Capacity Working Group meetings. During these meetings, the NYISO reviewed scenario results, including details of the statewide system margin and transmission security margins of the Lower Hudson Valley, New York City, and Long Island localities under 1-in-10-year heatwave and 1-in-100-year extreme heatwave conditions. Meeting materials are available at 2022 RNA Scenario Analysis Discussion on April 26, 2022 and 2022 RNA Scenario Analysis Discussion on August 1, 2022.

[22] *See*, NPCC Seasonal Assessments available at https://www.npcc.org/library/reports/seasonal-assessment.

[23] *See*, NERC Reliability Assessments available at https://www.nerc.com/pa/RAPA/ra/Pages/default.aspx.

plans to engage, with stakeholders in the scoping phase of the assessment, including the processes used to identify and engage relevant stakeholder groups and incorporate stakeholder feedback into the extreme weather vulnerability assessment, including all affected communities.

NYISO Response to Question 8

The NYISO's response to this question is covered in its response to question 7.

B. Inputs

Q9) A description of methods and processes the transmission provider uses, or plans to use, to determine the meteorological data needed for its assessment. In particular, how the transmission provider determines whether it can rely on existing extreme weather projections, and if so, whether such projections are adequately robust;

NYISO Response to Question 9

The NYISO currently develops 90/10 and 99/1 long-term forecasts which are published in its annual Load and Capacity Data Report (the "Gold Book").[24] These forecasts are driven by a historical analysis of peak-producing temperature and humidity indices over thirty years. The NYISO also incorporates in these extreme peak day-forecasts (as well as its baseline forecasts) temperature trends developed in its 2019 climate change study.[25] The detailed analysis found that the New York State average temperature is trending up by an average 0.71 degrees per decade with the peak-day cumulative temperature-humidity index (CTHI) increasing on average by 0.63 degrees per decade.

The NYISO is also contracting to secure 20 plus-year time-series generation profiles of

[24] *See*, NYISO Load and Capacity Data Report (the "Gold Book") (2023 Gold Book).

[25] *See*, New York ISO Climate Change Impact Study, Phase 1: Long-Term Load Impact (2019 Climate Change Study).

selected solar, terrestrial and off-shore wind resources to develop projections of the wind and solar impacts on NYCA net loads and the extent to which the patterns persist and are correlated. The results of this analysis are expected to be utilized in future transmission security assessments. Such analyses will augment the current approach to derating wind and solar generation by static percentages to capture the impact of wind lulls and extended cloudy periods.

The NYISO utilizes historical patterns of extreme winter weather in developing the assumptions for its winter energy security assessments. The 17-day modeling period utilized in both the 2019 and the 2023 studies represents an extreme cold weather event equivalent to a historically cold 17-day period from the last 25 years, including the worst-case three-day cold snap during that period.[26]

Q10) A description of how the transmission provider determines whether to use scenario analysis, and if so, whether to do so with multiple scenarios;

NYISO Response to Question 10

The preparation of long-term plan(s) for the future study period is based on forecasts of future economic, societal, technological and power market conditions. These forecasts involve a great deal of uncertainty. Thus, developing a "plan" based on only one set of forecasted future system conditions may not meet the future reliability requirements. Such an approach would also fail to provide the flexibility necessary to adapt to the changing conditions. This type of situation is best addressed by taking a scenario approach to planning. For informational purposes, the NYISO will use scenarios, such as possible changes in load and resources, to model the bulk power system to determine the impact of potential changes in future conditions.[27]

[26] *See*, Fuel and Energy Security Study Scope, Method, and Inputs Presentation, April 21, 2023 (April 2023 Presentation).

[27] *See*, NYISO Reliability Planning Process Manual, Section 3.4

In the NYISO's reliability planning process, scenarios are included to provide information on how the different conditions could impact reliability. In the recent 2022 RNA, the NYISO evaluated scenarios that included higher load through economic and policy driven changes to the forecast, extreme weather forecasts, as well as other changes.[28] The TPL-001 NERC compliance requirements include an assessment of sensitivity cases to "demonstrate the impact of changes to the basic assumptions used in the model."[29] Included in the sensitivity cases for TPL-001 analysis, the NYISO has at least one case which models peak load conditions from extreme weather (*e.g.*, a 90/10 load forecast). For the TPL-001 assessment, all sensitivity cases are evaluated against the planning design criteria events as well as the extreme contingency events.

Q11) The extent to which it reviews neighboring transmission providers' extreme weather vulnerability assessments, if available, to evaluate the consistency of extreme weather projections between transmission providers. Further, for RTOs/ISOs, a description of how it accounts for differences between transmission owner members' extreme weather vulnerability assessment assumptions and results;

NYISO Response to Question 11

For the extreme weather events captured in NPCC Directory #1 Area Transmission Reviews, these studies are reviewed through various NPCC working groups. The results of TPL-001 analysis are distributed to neighboring Planning Coordinators and Transmission Planners. Further, the input assumptions to the analysis included in the RNA and STRP studies are reviewed with stakeholders. The NYISO does not currently engage with the New York

[28] *See e.g.*, 2022 RNA at pp. 86-88 (2022 RNA).

[29] *See*, NERC Transmission System Planning Performance Requirements at 2.1.3 (NERC TPL-001).

transmission owners on the specific assumptions used in extreme weather assessments, other than to present its assumptions for discussion in open stakeholder forums. There has been general acceptance to date that the 90/10 and 99/1 extreme forecasts represent reasonable projections of load levels under extreme weather conditions for the purpose of NYISO reliability studies.

Q12) The timeframe(s) and discount rate(s) selected for the extreme weather vulnerability assessment;

NYISO Response to Question 12

The NYISO does not include a discount rate in its analyses.

Q13) A description of the methods and processes the transmission provider uses, or plans to use, to create an inventory of potentially vulnerable assets and operations.

NYISO Response to Question 13

Given the NYISO's role as the independent system operator, the NYISO does not create an inventory of potentially vulnerable assets.

C. <u>Vulnerabilities and Exposure to Extreme Weather Hazards</u>

Q14) A description of how the transmission provider identifies the transmission assets or operations vulnerable to the extreme weather events for which it conducts assessments;

NYISO Response to Question 14

Given the NYISO's role as the independent system operator, the NYISO does not identify specific assets for assessments.

Q15) A description of how the transmission provider uses, or plans to use, screening analyses to test for potential vulnerabilities, as well as how the transmission

provider examines, or plans to examine, the sensitivities of the transmission assets and operations being studied to types and magnitudes of extreme weather events.

NYISO Response to Question 15

The NYISO's use of analyses and sensitivities is discussed in prior responses.

NYISO Responses to Questions 16 to 21

The NYISO's complete responses to the one-time informational report questions are included above. Given the NYISO's role as the independent system operator, the NYISO does not have additional responsive material related to questions 16 through 21.

D. Costs of Impacts

Q16) A description of the methodology or process, if any, the transmission provider uses, or plans to use, to estimate the potential costs of extreme weather impacts on identified vulnerable assets and operations;

Q17) If the transmission provider estimates such potential costs, a description of the types of: (a) direct costs, such as replacements or repair costs, restoration costs, associated labor costs, or opportunity costs of lost sales, and (b) indirect costs, such as costs associated with loss of service to electric customers and other utilities that purchase power from the transmission provider, including equipment damage, spoilage, and health and safety effects, in calculating the costs of extreme weather impacts.

E. Risk Mitigation

Q18) A description of how the transmission provider uses, or plans to use, the results of its assessment to develop measures to mitigate extreme weather risks, including:

i. How the transmission provider determines which risks should be mitigated and

the appropriate time horizon for mitigation;

ii. How the transmission provider determines appropriate extreme weather risk mitigation measures, including any analyses used to determine the lowest-cost or most impactful portfolio of measures;

Q19) A description of how the transmission provider informs, or plans to inform, relevant stakeholders—such as neighboring transmission providers, RTOs/ISOs of which the transmission provider is a member, electric customers, all affected communities, emergency management agencies, local and state administrations, and state utility regulators—of identified extreme weather risks and selected mitigation measures;

Q20) A description of the extent to which the transmission provider incorporates, or plans to incorporate, identified extreme weather risks and mitigation measures into local and regional transmission planning processes;

Q21) A description of how the transmission provider measures, or plans to measure, the progress and success of extreme weather risk mitigation measures (e.g., through reduced outages) and how it incorporates these observations into ongoing and future extreme weather risk mitigation actions.

Attachment II

Central Hudson's Responses to Order No. 897's Appendix A Questions

Central Hudson Gas & Electric Answers for NETO/ISO-NE Joint Response to FERC Order 897 One-Time Report on Extreme Weather Events

Introduction

Central Hudson Gas and Electric Corporation (Central Hudson or Company) is a regulated gas and electric utility serving the Mid-Hudson Valley of New York State. The Company provides electric and gas transmission and distribution (T&D) services to approximately 309,000 electric customers and 84,000 natural gas customers. Central Hudson's service territory extends from the suburbs of metropolitan New York City north to the Capital District at Albany, covering approximately 2,600 square miles. The electric system is comprised of approximately 9,400 miles of transmission and distribution lines. Central Hudson is a wholly owned subsidiary of CH Energy Group. CH Energy Group's common stock is indirectly owned by Fortis Inc. ("Fortis"), which is a leader in the North American regulated electric and gas utility industry.

X. Appendix A: Report Questions

For the reasons discussed in this final rule we direct transmission providers to file a one-time informational report related to their extreme weather vulnerability assessment policies and processes, if any. The report must respond to the following questions.

(Q1) As a threshold matter, state whether the transmission provider conducts extreme weather vulnerability assessments, and if so, how frequently it conducts those assessments.

(A1) Central Hudson conducted an extreme weather vulnerability assessment as part of their study evaluating the effect of climate change on their systems. New York State legislation required Central Hudson to complete a Climate Change Vulnerability Study (CCVS) in NY (Public Service Law 66 subdivision 29) to be filed in September 2023. A Climate Change Resiliency Plan (CCRP) is planned to be completed by the end of November 2023 as a follow-up to the CCVS. There are no requirements to repeat the Climate Change Vulnerability Study, however, there is a requirement to that Central Hudson file an updated Plan with the Commission for approval at least every five years.

In addition to this Climate Change Vulnerability Study and Resiliency Plan effort, Central Hudson plans and conducts annual exercises that reflect the potential outcomes of extreme weather as part of its emergency preparedness efforts.

A. Scope

(Q2) A description of the types of extreme weather events for which the transmission provider conducts, or plans to conduct, extreme weather vulnerability assessments, if any. For transmission providers that conduct, or plan to conduct, such assessments, a description of how the transmission provider determined which extreme weather hazards to include in the assessment (*e.g.,* extreme storms such as hurricanes and the associated flooding and high winds, wildfires, extreme prolonged heat or cold, or drought conditions);

(A2) As part of the CCVS completed in September 2023, Central Hudson performed analysis to determine the effect of climate change on certain extreme weather events including but not limited to extreme heat, extreme wind, and extreme precipitation/flooding. An evaluation of the vulnerability of Central Hudson's assets to particular climate variables was used to determine which types of events to include in the assessments.

(Q3) A description of how the transmission provider defines an extreme weather event for the purposes of its extreme weather vulnerability assessment, including what thresholds it uses relative to historical measurements or probabilities of occurrence, if applicable;

(A3) Central Hudson has not developed a set method to define which weather events would be considered extreme in their CCVS. Rather, the CCVS qualitatively determined, with input from subject matter experts and

stakeholders, which extreme weather events to assess. Central Hudson did not define a threshold for extreme weather events, although it did consider number of days above and below various temperature thresholds and 100- and 500-year floodplain risk, among other weather risks.

(Q4) A description of how the transmission provider selects, or plans to select, the set of assets and operations that will be examined;

(A4) Central Hudson's CCVS evaluated assets and operational vulnerabilities to climate change and extreme weather. The list of assets and processes with vulnerabilities to climate change and extreme weather was developed using a risk-based approach, including subject matter expert feedback and experience.

(Q5) A description of how the transmission provider determines, or plans to determine, the geographic or regional scope of the analysis;

(A5) Central Hudson's CCVS was limited to the extent of the electric transmission and distribution system within its service territory.

(Q6) A description of whether and to what extent the transmission provider considers, or plans to consider, external interdependencies, such as interconnected utilities, other critical infrastructure sectors (*e.g.,* water, telecommunications) and supply chain related vulnerabilities, in the assessment;

(A6) External interdependencies were not considered as part of Central Hudson's CCVS. Transmission planning analysis under NERC TPL-001 also does not readily assess interdependencies.

(Q7) A description of whether and to what extent the transmission provider coordinates, or plans to coordinate, with neighboring utilities and/or entities in other sectors that could potentially be relevant to the assessment;

(A7) During development of the CCVS, there was strong coordination/collaboration with various other transmission providers throughout New York State who had similar obligations under the NYS legislation. Also as part of Central Hudson's CCVS, a Climate Resilience Working Group (CRWG) was formed of local and regional stakeholders that allowed for input on the CCVS from these external parties. Transmission planning analysis under NERC TPL-001 has a level of coordination with neighboring utilities and NYISO as related to the interregional and intertie import/export capabilities.

(Q8) A description of whether and to what extent the transmission provider engages, or plans to engage, with stakeholders in the scoping phase of the assessment, including the processes used to identify and engage relevant stakeholder groups and incorporate stakeholder feedback into the extreme weather vulnerability assessment, including all affected communities.

(A8) Through the CCVS and the CRWG, stakeholders were invited and were continually informed and consulted on the work being. Engagement with stakeholders occurred through CRWG meetings and the preview of study approach, results, and draft documents. Stakeholders were provided a draft copy of the CCVS to provide comments.

B. Inputs

(Q9) A description of methods and processes the transmission provider uses, or plans to use, to determine the meteorological data needed for its assessment. In particular, how the transmission provider determines

whether it can rely on existing extreme weather projections, and if so, whether such projections are adequately robust;

(A9) Quantitative projections for extreme weather events such as tropical cyclones and ice storms were not possible to generate for Central Hudson's CCVS. Instead, Central Hudson used literature review to determine qualitative projections for changes to extreme weather features like tropical storm intensity and frequency. Quantitative projections were performed for other events like flooding events (100-year and 500-year) and increases in temperature and precipitation.

(Q10) A description of how the transmission provider determines whether to use scenario analysis, and if so, whether to do so with multiple scenarios;

(A10) Central Hudson used scenario analysis in their CCVS. For quantitative analysis, a specified future socioeconomic scenario (i.e., Intergovernmental Panel on Climate Change (IPCC) SSP5-8.5) and the 50th percentile of results is being used to develop resilience measures. Another scenario (i.e., SS2-4.5) was evaluated in the vulnerability assessment, but focus is on one specified scenario (i.e., SSP5-8.5) for mitigation efforts. Determination of scenario(s) analysis is based on the available information and contribution to the quantitative analysis in the assessment.

(Q11) The extent to which it reviews neighboring transmission providers' extreme weather vulnerability assessments, if available, to evaluate the consistency of extreme weather projections between transmission providers. Further, for RTOs/ISOs, a description of how it accounts for differences between transmission owner members' extreme weather vulnerability assessment assumptions and results;

(A11) For the Central Hudson CCVS and CCRP, all participants in New York used largely the same dataset for quantitative results. For qualitative analyses, each participant could utilize information that they were able to locate, though there was strong collaboration between neighboring entities. Each New York participant shared a draft of their CCVS with each of the others.

(Q12) The timeframe(s) and discount rate(s) selected for the extreme weather vulnerability assessment;

(A12) The Climate Change Vulnerability Study and associated Resilience Plan for Central Hudson are focusing on the period from the present to 2050, though projections out to 2080 are being considered. No discount rate was prescribed.

(Q13) A description of the methods and processes the transmission provider uses, or plans to use, to create an inventory of potentially vulnerable assets and operations.

(A13) The most vulnerable asset-hazard combinations were identified in Central Hudson's CCVS using a multi-faceted approach that considered the asset's exposure to climate hazards, the asset's sensitivity to hazards, and the consequences of the asset's failure or degraded operation. Operational vulnerabilities were identified by conducting interviews with subject matter experts. For the most vulnerable asset-hazard combinations identified, Central Hudson conducted an asset screening to prioritize mitigation measures based on risk. Mitigation options will be included in Central Hudson's CCRP that is due in November 2023.

C. Vulnerabilities and Exposure to Extreme Weather Hazards

(Q14) A description of how the transmission provider identifies the transmission assets or operations vulnerable to the extreme weather events for which it conducts assessments;

(A14) The CCVS for Central Hudson assumes that all assets in the region of study could potentially be subjected to similar levels of atmospheric extreme weather, although different types of transmission assets and processes may have different vulnerabilities to certain types of extreme weather events.

(Q15) A description of how the transmission provider uses, or plans to use, screening analyses to test for potential vulnerabilities, as well as how the transmission provider examines, or plans to examine, the sensitivities of the transmission assets and operations being studied to types and magnitudes of extreme weather events.

(A15) Central Hudson subject matter experts determined which transmission assets could be vulnerable to extreme weather based on a combination of exposure, sensitivity, and potential consequence of failure. For example, a transmission structure can be exposed to extreme heat but is generally not sensitive to it, whereas extreme heat can lead to excessive sagging of transmission conductor, increasing the risk of vegetation contact. Both transmission structures and conductors are considered high-consequence assets.

D. Costs of Impacts

(Q16) A description of the methodology or process, if any, the transmission provider uses, or plans to use, to estimate the potential costs of extreme weather impacts on identified vulnerable assets and operations;

(A16) Central Hudson does not plan to directly estimate the potential costs of extreme weather impacts due to the high level of uncertainty surrounding frequency and duration of future events. However, as part of the CCRP, Central Hudson plans to prioritize mitigation measures by estimating the cost of implementing the mitigation measure and weighing that against a relative benefit score that incorporates a qualitative scoring by Central Hudson subject matter experts on the potential of the mitigation measure to reduce restoration costs associated with extreme weather events.

(Q17) If the transmission provider estimates such potential costs, a description of the types of: (a) direct costs, such as replacements or repair costs, restoration costs, associated labor costs, or opportunity costs of lost sales, and (b) indirect costs, such as costs associated with loss of service to electric customers and other utilities that purchase power from the transmission provider, including equipment damage, spoilage, and health and safety effects, in calculating the costs of extreme weather impacts.

(A17) As stated in (A16) above, Central Hudson does not plan to directly estimate such costs.

E. Risk Mitigation

(Q18) A description of how the transmission provider uses, or plans to use, the results of its assessment to develop measures to mitigate extreme weather risks, including:

i. How the transmission provider determines which risks should be mitigated and the appropriate time horizon for mitigation;

ii. How the transmission provider determines appropriate extreme weather risk mitigation measures, including any analyses used to determine the lowest cost or most impactful portfolio of measures;

(A18) Proposed projects included in the CCRP will address assets that are most vulnerable to climate hazards based on the exposure/sensitivity/consequence analysis included in the CCVS. The Plan will propose storm hardening and resiliency measures for the next ten years and twenty years with plans to be updated at least every five years. Mitigation measures to climate hazards have been proposed by Central Hudson subject matter experts and are also informed by input from a consultant with specific climate vulnerability/resilience

experience. The most impactful portfolio of measures was determined by comparing relative costs and benefits using a multi-criteria decision-making analysis that considered the potential for the measure to improve electrical service, improve system resilience, improve community resilience (including equity), and reduce economic impacts of outages. Most of these benefits were determined qualitatively utilizing subject matter input.

(Q19) A description of how the transmission provider informs, or plans to inform, relevant stakeholders—such as neighboring transmission providers, RTOs/ISOs of which the transmission provider is a member, electric customers, all affected communities, emergency management agencies, local and state administrations, and state utility regulators—of identified extreme weather risks and selected mitigation measures;

(A19) Central Hudson shared a draft of the CCVS to all CRWG participants and will do the same with the CCRP to address stakeholder concerns and incorporate relevant feedback. The final versions of both documents will be made publicly available upon filing. Per legislative requirements, a copy of the CCRP will be provided to the county executive or chief elected official for each county within Central Hudson's service territory as well as with both the mayor's office and emergency management office of the city of New York.

(Q20) A description of the extent to which the transmission provider incorporates, or plans to incorporate, identified extreme weather risks and mitigation measures into local and regional transmission planning processes;

(A20) It is expected that any site-specific results of the final CCRP for Central Hudson will be integrated into its typical project planning processes. Any results from the CCRP that pertain to specification updates and/or procedural changes will be integrated into business-as-usual activities.

(Q21) A description of how the transmission provider measures, or plans to measure, the progress and success of extreme weather risk mitigation measures (*e.g.,* through reduced outages) and how it incorporates these observations into ongoing and future extreme weather risk mitigation actions.

(A21) Central Hudson has not determined if and how they may measure the progress or success of resilience measures.

Attachment III

Consolidated Edison's and O&R's Responses to Order No. 897's Appendix A Questions

Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc.: *One-time informational report related to extreme weather vulnerability assessment policies and processes.*

Introduction

Consolidated Edison Company of New York, Inc. ("CECONY") is a regulated public utility that provides electric service in New York City (except a part of Queens) and most of Westchester County, gas service in Manhattan, the Bronx, parts of Queens and most of Westchester County, and steam service in parts of Manhattan. CECONY serves approximately 3.6 million electric customers, 1.1 million gas customers, and 1,555 steam customers. CECONY is a transmission owner in the New York Independent System Operator's ("NYISO") control area, a load serving entity, and a distribution provider in New York City and parts of Westchester County.

Orange and Rockland Utilities, Inc. and its utility subsidiary, Rockland Electric Company (together, "O&R") is a regulated public utility that provides electric service to more than 300,000 customers in southeastern New York and adjacent areas of northern New Jersey and gas service to 130,000 customers in southeastern New York. O&R is engaged in the transmission, distribution and wholesale and retail sale of electric power and gas and is a transmission owner in the NYISO's control area. O&R is an affiliate of CECONY.

Appendix A: Report Questions and Answers

Q1) As a threshold matter, state whether the transmission provider conducts extreme weather vulnerability assessments, and if so, how frequently it conducts those assessments.

Response: CECONY and O&R (collectively the "Companies") and the other utilities within New York State provide up to date weather response activities to the NYISO, and we are continually looking at extreme weather in our planning efforts.

Since Superstorm Sandy in 2012, CECONY has spent more than $1 billion on storm hardening infrastructure and other resilience efforts, preventing 1.2 million in weather related customer outages, as of August 2023. From 2017 to 2019, CECONY conducted a comprehensive review of climate change vulnerabilities and the impact from extreme weather events across our electric, gas, and steam systems, creating a first-of-its-kind study to establish the foundational understanding of the risks facing CECONY systems. In 2019, CECONY published its first Climate Change Vulnerability Study (CCVS). Similarly, since Superstorm Sandy in 2012, O&R has also invested a total of $83 million to improve resilience of the electric system in New York, as of October 2022. In September 2023, CECONY and O&R each released their own CCVS[1] based on updated climate science, addressing both CECONY and O&R assets and infrastructure. The Companies will continue to publish studies[2] assessing climate change vulnerabilities, resilience and adaptation measures, and the Companies will reassess climate risks every five years.

[1] Climate Change Vulnerability Study (2023), *See* Con Ed 2023 CCVS and O&R 2023 CCVS

[2] *See* Our Climate Change Resiliency Plan; Climate Change Resilience & Adaptation (2020 Summary); and Post Sandy Enhancement Plan.

A. Scope

Q2) A description of the types of extreme weather events for which the transmission provider conducts, or plans to conduct, extreme weather vulnerability assessments, if any. For transmission providers that conduct, or plan to conduct, such assessments, a description of how the transmission provider determined which extreme weather hazards to include in the assessment (e.g., extreme storms such as hurricanes and the associated flooding and high winds, wildfires, extreme prolonged heat or cold, or drought conditions);

Response: The Companies have a comprehensive plan for preparation and response to extreme weather events. In 2019, CECONY published the results of its first CCVS,[3] assessing the risks to its assets and facilities. In September 2023, CECONY and O&R each released an updated CCVS[4] that included new climate science. The types of extreme risks that the Companies prepare for include storms (extratropical cyclones, nor'easters, bomb cyclones, deluge rain events, etc.), heat (heat waves of 90 degrees Fahrenheit for 3 days or more), and coastal flooding (from increased storm surge and sea level rise). In addition, O&R prepares for heavy precipitation and inland riverine flooding, while CECONY prepares for coastal flooding and extreme winds that may arise due to extreme weather events such as hurricanes. These risks and operational vulnerabilities are assessed every five years by independent climate consultants in consultation with the Companies' subject

[3] Climate Change Vulnerability Study (2019) *See* Con Ed 2019 CCVS

[4] *See* Footnote 1.

matter experts, and the results are published for local and state agencies and other interested stakeholders to view. CECONY and O&R have also formed a wildfire review team, consisting of various operational, engineering, environmental and planning organizations. The team's objective is to review the historical and future impacts of drought and wildfire risk within the Companies' service territories.

Q3) A description of how the transmission provider defines an extreme weather event for the purposes of its extreme weather vulnerability assessment, including what thresholds it uses relative to historical measurements or probabilities of occurrence, if applicable;

Response: The definition of extreme weather is dependent on the type of event that is predicted to occur, e.g., high winds, large storms, deluge rain, or prolonged heat events. For planning purposes, the Companies maintain an internal climate change planning and design guideline that adopts climate change pathways using the latest climate data, and utilizes the projections for planning, coordination, and emergency response. The Companies' definition of extreme weather is derived from its plan for responding to local weather events. Extreme weather definitions include: Coastal storms with large wind waves and/or storm surge that strike the coastal zone such as Nor'easters and Tropical Cyclones; any two-day interval during which temperatures, at any hour within the period are likely to exceed an 86-degree Fahrenheit Temperature Variable (TV) for CECONY and 85-degree Fahrenheit TV for O&R; and concurrent or consecutive extreme weather events.

Q4) A description of how the transmission provider selects, or plans to select, the set of assets and operations that will be examined;

Response: The Companies review system vulnerabilities as they relate to electric assets and operations, and incorporate climate change data into its system planning and asset design guidelines. In consultation with the Companies' engineers and internal planning processes such as lessons learned from key storm events like Superstorm Sandy, the Companies' regularly work to review climate change vulnerabilities across the electric system. To that end, the Companies utilize the latest climate change pathways[5] as outlined in each utility's 2023 CCVS to predict the physical impacts of climate change. The Companies' subject matter experts incorporate the latest climate change data with respect to the selected pathway into comprehensive design guidelines for assets and operations, followed by making necessary investment upgrades to those assets based on system vulnerabilities. Considerations were given to both the exposure of certain weather events and their impacts. For example, an increase in sea level rise based on selected climate change pathway may increase flooding and can impact certain utility infrastructure and other facilities. Similarly, an increase in heat will impact power equipment and may require derating of equipment or additional cooling processes for transformers. The Companies also participate in the Electric Power Research Institute's (EPRI) Climate READi[6] program

[5] The Company's selected climate change pathways address the uncertainty in climate change projections by specifying a single set of projections for use in Company planning and practices. The climate change pathways characterize how much and when climate will change in the service territory.

[6] EPRI's Climate READi: Power Resilience and Adaptation Initiative.

which provides science-based insights to strengthen the power sector's collective approach to managing climate risk and addressing resilience efforts.

Q5) A description of how the transmission provider determines, or plans to determine, the geographic or regional scope of the analysis;

Response: The geographic scope of the analysis is determined based on the geographic boundaries of our service territory. The Companies serve various communities across New York City, Westchester County, and multiple counties in downstate New York and northern New Jersey and is responsible for providing reliable electric, gas, and steam service. The geographic boundaries of our service territory are well defined, and the Companies look at risks that are specific to our region.

Q6) A description of whether and to what extent the transmission provider considers, or plans to consider, external interdependencies, such as interconnected utilities, other critical infrastructure sectors (e.g., water, telecommunications) and supply chain-related vulnerabilities, in the assessment;

Response: The Companies engage with other utility operators (e.g., water, telecommunications) regularly and as part of the annual Emergency Response Plan review and filing process. The Companies also maintain current records of key infrastructure and contacts for prioritizing recovery from extreme weather impacts. Through our Utility Liaison Program, the Companies maintain direct lines of contact with each critical infrastructure operator in our service territory to ensure that recovery and response efforts

from extreme weather events are properly coordinated. As for supply chain vulnerabilities, the Companies' supply chain group continuously monitors and evaluates our various vendors to ensure that the Companies are prepared with proper and sufficient materials following any impactful event. As an additional resource, the Companies are part of the New York Materials Sharing Group, where neighboring utilities can assist by sharing materials should any supply chain issues lead to any shortages. Lastly, insights from climate studies are shared with supply chain and emergency preparedness teams to incorporate into their activities.

Q7) A description of whether and to what extent the transmission provider coordinates, or plans to coordinate, with neighboring utilities and/or entities in other sectors that could potentially be relevant to the assessment;

Response: The Companies collaborate with neighboring utilities on the operational risk and vulnerabilities of assets from the physical impacts of climate change. CECONY and O&R each plan for the physical impacts of climate change in its respective internal Planning and Design Guideline. As for local extreme weather events, the Companies may utilize and coordinate with contractors from neighboring utilities to assist with power restoration, and vice versa. In addition, utilities in New York have been collaborating on climate change risk assessments and vulnerability studies, as required by the Climate Resilience Law[7] signed by New York State Governor Kathy Hochul. Lastly, in November

[7] New York Public Service Law § 66(29).

2023, CECONY and O&R, as well as the other utilities in New York, will each be filing their own Climate Change Resilience Plan (CCRP) that outlines 5-, 10-, and 20-year investments to increase climate resilience in our electric systems in order to provide safe and reliable service.

Q8) A description of whether and to what extent the transmission provider engages, or plans to engage, with stakeholders in the scoping phase of the assessment, including the processes used to identify and engage relevant stakeholder groups and incorporate stakeholder feedback into the extreme weather vulnerability assessment, including all affected communities.

Response: As part of the Companies' 2023 climate change planning and resiliency efforts to develop or update the CCVSs and create a new CCRP for each utility, CECONY and O&R have each engaged Working Groups consisting of local stakeholders, municipalities, regulatory staff, environmental and customer advocacy groups, and other pertinent stakeholders to receive feedback such as questions and comments on the proposed plans. The Companies met with these Working Groups multiple times through virtual teleconferences/meetings, and incorporated feedback at each stage of our planning process. As a result, stakeholder groups (including environmental justice groups) had opportunity to give feedback on climate change and extreme weather resiliency efforts. The Working Groups will continue to meet at least twice a year at least until the next climate study and resilience plan is issued.

Additionally, the Companies share resources, such as climate science data and insights, with stakeholders like the New York State Department of Public Service Staff, the New York City Mayor's Office of Climate and Environmental Justice, other infrastructure owners, and other local representatives and advocacy groups. The Companies actively engaged with stakeholders through the creation of working groups to provide feedback on CCVS and Climate Change Resilience plans. Stakeholders in these groups include federal, state, and local government, universities, unions, and customer advocate groups. The Companies engage in regular meetings with the working groups and incorporate the feedback into the process.

B. Inputs

Q9) A description of methods and processes the transmission provider uses, or plans to use, to determine the meteorological data needed for its assessment. In particular, how the transmission provider determines whether it can rely on existing extreme weather projections, and if so, whether such projections are adequately robust;

Response: CECONY and O&R, as outlined in the CCVSs released in September 2023, used the Shared Socioeconomic Pathways (SSPs) as the basis for increased temperature and sea level rise projections. These projections assess the physical impacts from climate change and utilize the latest Global Climate Models (GCMs) to evaluate future emissions scenarios. The projections are the latest and best climate science and considered to be adequately robust because they are also used by the NYC Panel on Climate Change

(NYPCC) as well as the United Nation's Intergovernmental Panel on Climate Change (IPCC).

Q10) A description of how the transmission provider determines whether to use scenario analysis, and if so, whether to do so with multiple scenarios;

Response: The Companies currently utilize scenario analysis for their assessment of risk. The Companies are committed to using the best available science to understand future climate change in its service area. CECONY's 2023 CCVS updates the previous projections used in its 2019 CCVS with statistically downscaled climate change projections developed by Columbia University and NYSERDA in 2022. These projections are being used by the five New York State electric utilities to satisfy the legislation on climate resilience and draw on an ensemble of 16 Coupled Model Intercomparison Project Phase 6 (CMIP6) Global Climate Models (GCMs) and two future greenhouse gas emissions trajectories based on Shared Socioeconomic Pathways (SSPs), aligning with the latest climate science developed for the Intergovernmental Panel on Climate Change Sixth Assessment Report (IPCC AR6). The SSPs represent scenarios of projected socio-economic and technological changes and are used to develop emissions scenarios. Climate projections provide a range of plausible climate futures, reflecting uncertainty in future greenhouse gas concentrations, climate sensitivity to greenhouse gas increases, natural climate variability, and other factors. The range of projections can be evaluated using percentiles, comprising the low estimate (10th percentile of all model outcomes), the middle range (25th, 50th and 75th percentiles) and a high estimate (90th percentile), where

the 10th, 50th, and 90th percentiles represent the low-end, median, and high-end of the projection range, respectively.

The Companies' latest CCVS focuses on the 75th percentile of the SSP5-8.5 emissions scenario (i.e., a high emissions scenario) for temperature and precipitation, focusing a risk averse single scenario analysis. This is a risk averse scenario that aligns with the Companies' climate change planning and design scenario for sea level rise, local utility benchmarking, as well as New York governmental agencies planning processes. CECONY works to benchmark its scenario analysis with New York City at the 75th percentile and O&R also utilizes this risk-averse 75th percentile benchmark to align business enterprise.

Q11) The extent to which it reviews neighboring transmission providers' extreme weather vulnerability assessments, if available, to evaluate the consistency of extreme weather projections between transmission providers. Further, for RTOs/ISOs, a description of how it accounts for differences between transmission owner members' extreme weather vulnerability assessment assumptions and results;

Response: The utilities in New York have been collaborating on climate change risk assessments and vulnerability studies, as required by the Climate Resilience Law and developing their own CCRP that outlines a future investment plan to increase climate resiliency. Once filed, the New York State Public Service Commission (NYPSC) will review the utilities' submittals. Since New York State is large in geographic area and susceptible to multiple types of extreme weather events, the utilities will have different

vulnerability assessments due to the differing nature of climate impacts and types of extreme weather events. However, the goal of coordination and collaboration among the utilities and the Department of Public Service Staff allows for robust vulnerability studies and resilience plans for the State of New York. Despite the different geographies served, all New York utilities' Climate Change Vulnerability Studies use the latest climate projections and data provided by NYSERDA in partnership with Columbia University. NYSERDA, DPS Staff, and other external organizations participate in each utility's external working groups to provide consistency among the utilities.

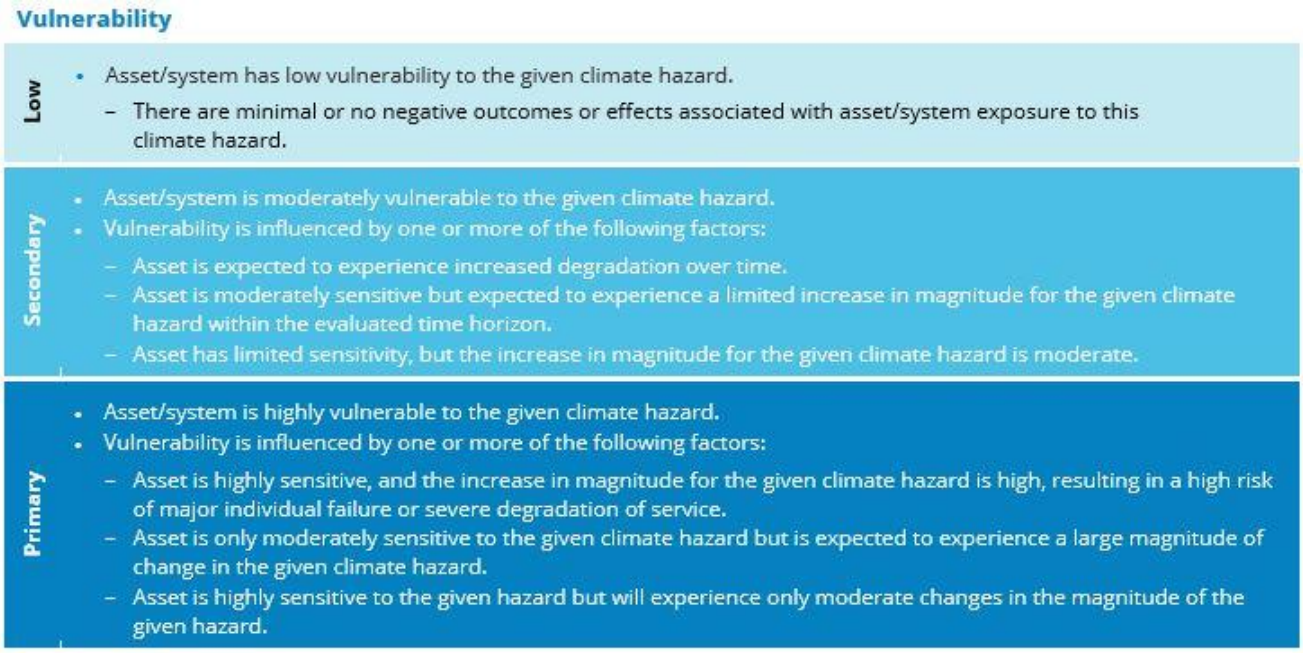
Q12) The timeframe(s) and discount rate(s) selected for the extreme weather vulnerability assessment;

Response: The Companies assess vulnerabilities from climate change annually, based on the latest climate data and the Companies reports on vulnerabilities every five years through the CCVS. The Companies do not utilize discount rates for their assessments. However, due to the need to update climate change projections continually, additional investments may be required to meet the standards set by the Companies once those future projections are taken into account (i.e., for load relief planning, reliability planning). High temperatures and extreme events remain the largest drivers of operational vulnerability. Adaptation measures will be continually developed for each of these vulnerabilities and are already identified on 5-, 10-, and 20-year timescales. Additionally, the timeframe to which these studies look forward to is 2080, which coincides with the lifetimes of assets in the study. Asset-hazard combinations considered to be secondary vulnerabilities may also

be selected to have adaptation options developed, if deemed prudent by system engineers and climate change experts. These measures will be described in the forthcoming CCRPs by the Companies, to be released in November 2023.

Q13) A description of the methods and processes the transmission provider uses, or plans to use, to create an inventory of potentially vulnerable assets and operations.

Response: In the latest CCVSs, CECONY and O&R assessed the nature, extent, and priority of the vulnerabilities of the Companies' infrastructure due to climate change. For each major asset group (e.g., overhead transmission, area substations, underground distribution) and climate hazard (i.e., extreme heat and humidity, flooding, wind, and ice) combination, the vulnerability rating is summarized as low, secondary, or primary. In addition to assessing the physical vulnerabilities of the Companies' infrastructure to climate hazards, the CCVSs provides an evaluation of potential climate risks to the Companies' operations and planning processes. The operations and planning functions reviewed include Load Forecasting, Load Relief Planning, Reliability Planning, Asset Management, Facility Energy System Planning, Emergency Response, and Worker Safety. A more in-depth analysis regarding the asset vulnerabilities and exposure are incorporated in CECONY's and O&R's CCVSs, but the classifications of low risk (light blue), secondary risk (medium blue), and primary risk (dark blue), or low, moderate and for O&R, are explained in the following table:



C. Vulnerabilities and Exposure to Extreme Weather Hazards

Q14) A description of how the transmission provider identifies the transmission assets or operations vulnerable to the extreme weather events for which it conducts assessments;

Response: The companies utilize internal subject matter experts, consultants, and the latest climate science to identify extreme-weather-vulnerable assets. The 2023 CCVS for each subsidiary provides an in-depth analysis of the vulnerabilities and exposure for transmission assets and operations to extreme weather events. This response provides a brief overview of the physical vulnerability assessment for each subsidiary as they slightly differ due to the different geographical areas for each's service territory:

CECONY Assessment

For CECONY, the following chart[8] identifies the low (light blue), secondary (medium blue), and primary (dark blue) risks of extreme weather events for utility assets, with high heat, flooding, wind and ice, and sea level rise being the main physical climate hazards.

	Temperature and Temperature Variable (TV)	Flooding	Wind and Ice
Transmission Substations	Primary	Primary	Low
Area and Unit Substations	Primary	Primary	Low
Overhead Transmission	Secondary	Low	Secondary
Overhead Distribution	Secondary	Low	Primary
Underground Transmission	Secondary	Secondary	Low
Underground Distribution	Primary	Secondary	Low
Key Company Facilities	Secondary	Secondary	Low

As explained in CECONY's CCVS, the overall vulnerability of electric assets to changes in *temperature and Temperature Variable (TV)* within the next 20 years is summarized below:

Area and transmission substations - primary vulnerabilities. The combination of high exposure to increasing temperatures, potential for accelerated aging, and the need to decrease capacity of critical components justifies the primary vulnerability rating. Higher average temperatures, as well as periods of extreme high heat, increase the aging rate of transformers' insulation. Accelerated aging of critical components results in decreased asset life and increases the risk of premature or unexpected failure, consequently leading to outages and repair costs. Within a substation, transformers are more likely to be affected by chronic heat because their design reference temperatures tend to be lower (i.e., 86°F)

[8] Note: This chart slightly differs from the published 2023 CECONY CCVS. After the issuance of the CCVS, the vulnerabilities for overhead transmission for temperature and TV were reviewed and revised to secondary.

than that of other assets. Circuit breakers, disconnect switches, GIS, and switchgear begin to experience degradation at temperatures above 104°F, which is projected to occur approximately 5 days per year in 2050, compared to a baseline of 0. Additionally, higher average temperatures have the potential to lower the effective capacity of substation transformers up to 0.7% per 1-degree Celsius increase in temperature above 40°C (104°F).[9] Decreased capacity combined with higher than usual demand (due to increased air conditioner usage) could require load shedding to prevent severe damage to substation equipment if not fully identified and accounted for in planning processes.

Overhead transmission systems - secondary vulnerabilities. Overhead transmission lines are sensitive to high temperatures and can experience line sag and loss of material strength, especially when high temperatures correspond with high demand. Line sagging can reduce the clearance between overhead assets and surrounding vegetation. This can increase the potential for vegetation to come in contact with lines, leading to asset failure and safety risks. Derating lines helps mitigate the risk of line sag but could necessitate load relief measures (demand reduction calls, voltage reduction, or at worst localized outages) if other system capacity is unavailable. Comprehensive LiDAR and digital mapping of the transmission line right of way could help to better predict line sag issues in the future.

As explained in CECONY's CCVS, the overall vulnerability of electric assets to changes in ***flooding*** within the next 20 years is summarized below:

[9] Sathaye, J. A., Dale, L. L., Larsen, P. H., Fitts, G. A., Koy, K., Lewis, S. M., de Lucena, A. F., Estimating Impacts of Warming Temperatures on California's Electricity System, Global Environmental Change, 23(2), 499–511 (2013).

Transmission, Area, and Unit Substations - primary vulnerabilities. The exposure assessment found that a 16-inch rise in sea level by 2050 (relative to 1995-2014 sea levels) would impact 23 substations in 2050 by a 1% annual chance flood. All these locations could experience equipment damage, corrosion, soil weakening, and accessibility issues. Seven of these locations do not currently have flood protection in place, while 16 of them have existing flood protection that would need to be modified or replaced to provide sufficient protection against future flood levels. Substations contain equipment that is highly sensitive to flooding. Specifically, the following components are unable to tolerate inundation without disruption or failure:

- Substation transformers,
- Protection and control devices,
- Circuit breakers, and
- Instrument transformers[10]

In addition, substations might experience an overflow of water from transformer spill moats in a severe enough rainstorm that coincides with another source of flooding. However, the risk of such a coincidence is very low. Transformer spill moats are built to contain several sources of flooding at the same time.

Underground transmission and distribution systems - secondary vulnerabilities. CECONY's underground electric systems are exposed to all surface level flood events (via infiltration into manholes) and could be exposed sooner than surface level assets if

[10] This category includes potential transformers, coupling capacitor voltage transformers ("CCVT") and current transformers.

water can back up through conduits. This exposure is partially mitigated because all underground cables and splices operate while submerged in water. Additionally, all underground distribution equipment installed in current flood zones (and all new installations) are submersible. However, there remains equipment in the expanded future floodplain that is not yet submersible, and deluge rain events that overwhelm the local stormwater systems can result in flooding outside of FEMA floodplains. The primary sensitivities for this asset-hazard combination include corrosion and limited access. In cases of incomplete sealing or existing damage, even submersible conductors could be subject to corrosion. Salt water, either from storm surge or sea level rise, can infiltrate the underground distribution system, causing arcing and failure of components. Chronic flooding events may also affect pad mount transformers and switchgear that are located on the surface and serving underground cables. Most pad mount transformers and switchgear are not designed to be submersible and cannot operate while flooded. Flooding also limits the ability of CECONY staff to access underground equipment for maintenance or repairs. This is especially relevant for underground assets that could be inundated by sea level rise, as associated tidal flooding could happen more frequently.

As explained in CECONY's CCVS, the overall vulnerability of electric assets to *wind and ice* within the next 20 years is summarized below:

Overhead distribution system – **primary vulnerability**. Overhead distribution assets, including conductors, attachments, and cross-arms, are built to withstand defined design tolerances for combined ice and wind loading. Wind and ice events that exceed those tolerances can cause asset failure. The overhead system is also sensitive to the indirect

impacts of nearby vegetation falling onto overhead components. Tree contact can cause lines to disconnect and fall and can even lead to pole collapse, especially older poles or those with existing damage.

Overhead transmission system - secondary vulnerability. Ice accumulation on transmission towers and lines can result in unbalanced structural loading and subsequent transmission line failure. This is especially a concern when ice accumulation is accompanied by heavy winds. However, as stated above, vegetation clearances for the overhead transmission system are greater than for the distribution system, which justifies the secondary rating.

O&R Assessment

For O&R, the following chart identifies the low (green), moderate (yellow), and high (red) risks of extreme weather events for utility assets groups and represents vulnerability on a midcentury (2050) timeframe. The highest rated vulnerabilities are substations & extreme flooding and overhead distribution & wind and ice.

	Temperature and Temperature Variable (TV)	Flooding	Wind & Ice
Substations	Moderate	High	Low
Overhead Transmission	Moderate	Moderate	Moderate
Overhead Distribution	Moderate	Low	High
Underground Transmission	Moderate	Moderate	Low
Underground Distribution	Moderate	Moderate	Low
Company Facilities	Moderate	Moderate	Low

Green: Asset/system has low vulnerability to the given climate hazard.

Yellow: Asset/system is moderately vulnerable to the given climate hazard. Vulnerability is typically driven by assets' propensity to experience degradation from exposure to hazard overtime.

Red: Asset/system is highly vulnerable to the given climate hazard. Vulnerability is typically driven by asset's high sensitivity or a significant expected increase in magnitude of given climate hazard, resulting in a high risk of major failure or severe degradation of service.

Certain substations are highly vulnerable to heavy precipitation and flooding. Substation equipment is typically not designed to come into contact with water and can experience sudden failure if exposed. Flooding impacts can be severe enough to disable equipment and lead to circuit failures, which can affect system reliability and life expectancy of the assets. In addition, the following assets are unable to tolerate inundation without significant disruption or failure: substation transformers and regulators, protection and control devices, circuit breakers, and instrument transformers.

O&R assessed flood vulnerability based on projected changes to precipitation, as well as geospatial overlays with inland and coastal floodplains. Climate projections show that the precipitation intensity for a 25-year, 24-hour rain event could increase to 7.2 inches in Mohonk, from 6.35 inches, and 7.7 inches in Dobbs Ferry, relative to a baseline of 6.7 inches, by 2050. This aligns with an overall trend in the service territory towards intensifying rain events. More intense precipitation can lead to stream and river overflows, as well as ponding and flash floods. Of O&R's 89 total substations, three (Hillburn, Summitville, and Lovett) are located within or adjacent to floodplains.

Overhead distribution systems are vulnerable to wind and ice. Current standards are designed for combined wind and ice events up to 100 mph,[11] as per the ASCE 7 and NESC Heavy 250B standards. Findings from the Extreme Weather Events Literature Review suggest that events with high wind speeds, such as tropical cyclones, could become more

[11] There are exceptions, such as a wind loading district close to the Hudson River, which is designed to greater than 100 mph.

intense in the O&R service territory in the future.[12] Furthermore, projections show that heavy wind events could become stronger within the 2050 timeframe.[13]

Overhead distribution assets are sensitive to both the direct impacts of wind and the indirect impacts of nearby vegetation coming in contact with the electric system. While O&R has a robust vegetation management program, tree contact with lines remains a large concern. Distribution lines tend to have relatively smaller clearance gaps, increasing the risk of tree contact with distribution conductors and poles. Ice accumulation on distribution poles and lines can also result in unbalanced structural loading and line failure, especially when accompanied by wind. Damage is more susceptible to occur if poles are older or have existing damage.

Q15) A description of how the transmission provider uses, or plans to use, screening analyses to test for potential vulnerabilities, as well as how the transmission provider examines, or plans to examine, the sensitivities of the transmission assets and operations being studied to types and magnitudes of extreme weather events.

Response: The Companies at this time do not use any specific extreme weather screening analysis to test for potential vulnerabilities on the Transmission system. For the

[12] Knutson, T., Camargo, S. J., Chan, J. C., Emanuel, K., Ho, C. H., Kossin, J., et al., Tropical Cyclones and Climate Change Assessment: Part II: Projected Response to Anthropogenic Warming, Bulletin of the American Meteorological Society, 101(3), E303-E322 (2020).

[13] Comarazamy, D., González-Cruz, J. E., and Andreopoulos, Y., Projections of Wind Gusts for New York City Under a Changing Climate, ASME. J. Eng. Sustain. Bldgs. Cities, 1(3): 031004 (2020).

Underground Distribution system, the Companies utilize a Network Resiliency Index (NRI), which is a tool to predict the risk of failure by any given network. It models the relative strength of each network by calculating the probability of failure of multiple associated feeders within a network over time, as caused by individual component failures. This index takes into account several climate variables as well as the predicted future electrification in our area due to recent emissions legislation.

D. Costs of Impacts

Q16) A description of the methodology or process, if any, the transmission provider uses, or plans to use, to estimate the potential costs of extreme weather impacts on identified vulnerable assets and operations;

Response: The Companies are not aware of any universally accepted or adopted methodology for estimating the potential cost of extreme weather impacts on transmission assets.

Q17) If the transmission provider estimates such potential costs, a description of the types of: (a) direct costs, such as replacements or repair costs, restoration costs, associated labor costs, or opportunity costs of lost sales, and (b) indirect costs, such as costs associated with loss of service to electric customers and other utilities that purchase power from the transmission provider, including equipment damage, spoilage, and health and safety effects, in calculating the costs of extreme weather impacts.

Response: The Companies do not employ and is not aware of any universally accepted or adopted forward looking cost estimation methodology. Currently, there is no reasonable methodology to estimate the cost of the damage an extreme weather event may cause to utility assets. Complete substations and transmission feeders can cost in the hundreds of millions to billions of dollars. The cost can be highly variable and depended on the extent of the damage and the cost to repair or replace the assets impacted. However, the Companies' underground transmission systems are mostly protected from extreme weather events which limits the exposure to extreme weather.

E. Risk Mitigation

Q18) A description of how the transmission provider uses, or plans to use, the results of its assessment to develop measures to mitigate extreme weather risks, including:

i. How the transmission provider determines which risks should be mitigated and the appropriate time horizon for mitigation;

ii. How the transmission provider determines appropriate extreme weather risk mitigation measures, including any analyses used to determine the lowest-cost or most impactful portfolio of measures;

Response: In the most recent CCVSs, CECONY and O&R provide an in-depth analysis of the vulnerabilities and adaptation measures to respond to extreme weather events, and any further investments for climate resilience will be identified in the November CCRP filing. The plan will include a suite of adaptation measures to reduce risk to the system. These

measures were selected using the Companies' resilience framework developed as part of CECONY's 2019 CCVS. One benefit of the framework is that it encourages holistic thinking about the types of measures that may help build a more resilient system. The framework encompasses investments to:

- **Prevent** climate change impacts by hardening infrastructure.
- **Mitigate** the impacts from outage-inducing events by minimizing disruptions.
- **Respond** rapidly to disruptions by reducing recovery times and costs.

The "prevent" component of this framework considers both gradual and extreme climate risks by proposing and evaluating resilience actions which consider the life cycle of assets. As such, many adaptation strategies fall under this category. Investments to increase the resilience of the system to withstand climate events also provide co-benefits such as enhanced blue-sky functionality and reliability of the Companies' systems.

In support of our resilience planning framework, a toolbox of potential adaptation measures has been identified that could help address the identified climate hazard vulnerabilities as shown in the following table:

Climate Hazard	Adaptation Measure
Temperature	Install equipment capable of collecting, tracking, and organizing temperature data at substations to allow for location-specific ratings and operations
Temperature	Increase capabilities to provide flexible, dynamic, and real-time line ratings for overhead transmission lines
Temperature	Make ground temperature data more accessible and track increases over time
Temperature	Routinely review asset ratings in light of observed temperatures
Temperature	Standardize ambient reference temperatures across all assets for developing ratings
Temperature	Continue to invest in grid modernization to increase resilience to climate change through new technology and increased data acquisition

Climate Hazard	Adaptation Measure
Heat Waves	Implement load relief strategies to keep NRI rating below 1. Options include - Split the network into two smaller networks, create primary feeder loops within and between networks, install a distribution substation, incorporate distributed energy resources and non-wires solutions, install interrupters, and/or reconfigure networks that consider combinations of these options.
Heat waves	Incorporate climate change projections in NRI modeling
Heat waves	Improve fault monitoring capabilities
Heat waves	Update utility specifications to include the creation of feeder loops as well as non-wire solutions (NWS) as accepted strategies
Heat waves	Maintain non-network reliability in higher temperatures by implementing: - Autoloop sectionalization - Increased feeder diversity
TV	Integrate climate projections into long-term load forecasts for temperature variable (i.e., 10 and 20-year)
TV	Consult utilities in cities with higher temperatures to refine the load forecast equation for high TV numbers
TV	Develop a load relief plan that integrates future changes in temperature and TV into asset capacity and load projections.
TV	Integrate considerations of climate change into the long-range transmission plan
TV	Continue tracking changes in the 1-in-3 peak producing TV event, and updating infrastructure design to match the observed changes
TV	Routinely update voltage reduction thresholds and hands-off thresholds in correlation to the changing TV ratings for electrical equipment due to the increasing temperature projections.
Precipitation	Update precipitation design standards to reference NOAA Atlas 14 for up-to-date precipitation data.
Precipitation	Update the design storm from the 25-year precipitation event to the 50-year event to account for future increases in heavy rain events.
Precipitation; extreme events	Harden electric substations from increased incidence of heavy rain events by raising the height of transformer moats, installing additional oil-water separator capacity, increasing “trash pumps” behind flood walls to pump water out of substations
Precipitation	Underground critical transmission and distribution lines
Precipitation	Retrofit ventilated equipment with submersible equipment to eliminate the risk of damage from water intrusion.
Precipitation	Reduce the incidence of manhole events due to increased precipitation and salting by: - Expanding the underground secondary reliability program - Accelerated deployment of vented manhole covers and latches to lessen the severity of manhole events - Replacement of underground cable with dual-layered and insulated cable which is more resistant to damage

Climate Hazard	Adaptation Measure
Precipitation	Expand monitoring and targeting of high-risk vegetation areas
Sea Level Rise	Revise design guidelines to consider sea level rise projections and facility useful life
Extreme events - heat waves	After the annual NRI reviews, proactively install high reliability components and remove/replace high-failure equipment as needed (e.g., removal before failure strategy)
Extreme events - heat waves	Continue to actively engage forward-looking technologies to further reduce the impact of extreme heat on distribution systems - automated splicing systems to reduce feeder processing times - demand response technologies that more efficiently regulate load
Temperature; Extreme events - heat waves	Replace limiting wire sections with higher rated wire to reduce overhead transmission line sag during extreme heat wave events. Alternatively, remove obstacles or raise towers to reduce line sag issues.
Extreme events - heat waves	Continue other measures to mitigate line sag risks, such as clearing out vegetation and contouring terrain
Extreme events - heat waves	Continue to track line sag and areas of vegetation change via LIDAR flyovers to identify new segments that may require adaptation
Extreme events - heat waves	Explore incorporating higher temperature rated conductors
Extreme events - heat waves	Undertake measures that contribute to load relief such as energy efficiency, demand response, adding capacitor banks or upgrading limiting components such as circuit breakers, disconnect switches and buses, which represent the lowest cost options
Extreme events - heat waves	Gradually install transformer cooling, or replace existing limiting transformers within substations
Extreme events - heat waves	Expand technologies to ensure the health of transformers in the face of extreme heat, including health monitoring and trend analyses
Extreme events - hurricanes	Continue to expand existing programs to reinforce transmission structures; address problems with known components
Extreme events - hurricanes	Invest in retrofits for open wire design with aerial cable and stronger poles
Extreme events - hurricanes	Underground critical sections of the overhead distribution system to ensure resilience against hurricane force winds and storm surge
Extreme events - hurricanes; precipitation	Continue to explore and expand operational measures to increase resiliency of the overhead distribution system - increasing tree trimming efforts to limit tree-on-line events - increasing spare pole inventories to replace critical lines that are compromised during extreme weather events
Extreme events - hurricanes	Complement existing meteorological model used to predict work crews required to service weather-driven outages with an updated model that better resolves, 1)

Climate Hazard	Adaptation Measure
	extreme weather events and, 2) extreme weather impacts to customers in the service territory
Extreme events - nor'easters	Continue to expand programs to reinforce transmission and distribution structures and expand the number of compression fittings used to address weak points in transmission lines
Extreme events	Stagger demand response consecutive event days across different customer groups
Extreme events	Ensure demand response program participants understand the purpose/cause of the event
Extreme events	During load relief planning, consider if extreme events could reduce the effectiveness of the demand response program effectiveness
Extreme events	Use AMI to rapidly shed load on a targeted network to help ensure demand does not exceed supply
Extreme events	Consider additional deployment of hybrid energy generation and storage systems at critical community locations and resilience hubs
Extreme events	Continue installation of energy storage strategies, including on-site generation at substations or mobile storage on demand/TESS units, and CNG tank stations
Extreme events	Consider increasing the percentage of solar/other distributed generation projects to allow for islanding
Extreme events	Encourage on-site generation for individual businesses and residential buildings
Extreme events	Increase use of LiDAR and drones to assess damage and reduce manual labor
Multiple	Remote sensing - near-real time monitoring (i.e., to aid storm recovery such as flood and system damage monitoring and assessment)
Multiple	Expand vegetation management practices to incorporate greater use of technology (i.e., GIS modeling, drones, and lidar) and improve ability to assess potential impacts (i.e., combat line sag and wind-blown debris impact)
Multiple	Micronet and in-situ observation - expand observations in Orange, Rockland, and Westchester Counties to understand the Urban Heat Island effect and other phenomena
Multiple	Micronet and in-situ observations - standardize observations across stations

Q19) A description of how the transmission provider informs, or plans to inform, relevant stakeholders—such as neighboring transmission providers, RTOs/ISOs of which the transmission provider is a member, electric customers, all affected communities, emergency management agencies, local and state administrations,

and state utility regulators—of identified extreme weather risks and selected mitigation measures;

Response: The Companies conduct regular (at least annual, if not more frequent) information sessions with elected officials and emergency management entities that represent the various communities within the Companies' service territories (e.g., New York City Emergency Management, Westchester County Department of Emergency Services, Westchester municipalities, etc.). During these sessions, the Companies cover a number of topics, including system improvements, weather impact mitigation measures, response and recovery processes, and other pertinent information to help support and educate the local and state administrations and customers. The Companies also hold regular meetings with our state regulators and with an external climate working group to provide updates on the various system improvement efforts to make our infrastructure more resilient.

In the event of forecasted extreme weather, NYISO reaches out to all New York State utilities to coordinate and discuss any potential impacts to the system. The Companies' system operators communicate with NYISO on every shift via a recorded line should there be any weather related risks.

In terms of communicating with customers and other stakeholders, the Companies engage in multiple outreach strategies. In the case of extreme weather such as extreme heat, the Companies will send emails to all customers alerting customers of the risk and calling for conservation when appropriate. The Companies also work to regularly share information via social media, e-mails, text messages, press releases, and television. When

appropriate, representatives from the company will also join elected officials and policymakers at public briefings to inform the public as well.

Q20) A description of the extent to which the transmission provider incorporates, or plans to incorporate, identified extreme weather risks and mitigation measures into local and regional transmission planning processes;

Response: The Companies' transmission planning processes consider extreme weather risks in its decision to determine the appropriate sensitivities to perform in its analysis. Due to the existing transmission topology of New York State coupled with limited generation, the Company analysis evaluates the impact of generation loss in its planning studies. Additionally, the Company will be reviewing and commenting on *NERC Project 2023-07: Modifications to TPL-001-5.1 Transmission System Planning Performance Requirements for Extreme Weather*. The Companies anticipate that when Project 2023-07 is approved by FERC, it will establish the requirements for extreme weather analysis in transmission planning. These requirements will be uniform and consistent across the NERC Regions.

Q21) A description of how the transmission provider measures, or plans to measure, the progress and success of extreme weather risk mitigation measures (e.g., through reduced outages) and how it incorporates these observations into ongoing and future extreme weather risk mitigation actions.

Response: The Companies are currently exploring ways to measure its success of extreme weather risk mitigation investment, including by reviewing and analyzing post storm data to determine avoided outages and reduced outage time, if applicable.

Attachment IV

LIPA's Responses to Order No. 897's Appendix A Questions

Introduction

The Long Island Power Authority ("LIPA"), a corporate municipal instrumentality and political subdivision of the State of New York created by the Long Island Power Authority Act[1], is responsible for providing reliable electric service to the 1.1 million customers in its service area on Long Island. While LIPA is outside of FERC's jurisdiction, LIPA is a transmission owner and a market participant in the NYISO-administered markets for energy, capacity, and ancillary services. Accordingly, LIPA joins the New York Transmission owners and NYISO in this response.

The Authority utilizes a public-private partnership business model and contracts with PSEG Long Island ("PSEGLI"), a subsidiary of Public Service Enterprise Group Incorporated, one of the nation's largest electric utilities, to operate LIPA's electric system. PSEGLI is fully dedicated to the Authority's operations and provides operations, maintenance and related services for the T&D system, including the extreme weather planning activities described herein. Each response below describes activities in several program areas that are responsive FERC inquiries.

Q&A

1) **As a threshold matter, state whether the transmission provider conducts extreme weather vulnerability assessments, and if so, how frequently it conducts those assessments.**

PSEGLI on behalf of LIPA considers extreme weather vulnerability to its transmission assets and operations through several processes, as described below:

[1] See Title 1-A of Article 5 (§1020 et seq.) of the Public Authorities Law of the State of New York.

Climate Change Vulnerability Study (CCVS)

PSEGLI on behalf of LIPA conducted an initial Change Vulnerability Study, which was completed in November 2022, and covered both transmission and distribution assets and operations. The study considered vulnerability to a wide range of extreme events, including hurricanes, nor'easters, extreme cold snaps, thunderstorms and heavy downpours, drought, and extreme wind. The study identified several areas of potential asset and operational vulnerabilities, identified adaption strategies, and recommended a more granular assessment of climate risk.

In 2022, New York State passed legislation that required investor-owned utilities to conduct Climate Change Vulnerability Studies and subsequently develop Climate Change Resiliency Plans (CCRP). Although not required by the law, PSEGLI on behalf of LIPA is conducting an assessment of vulnerability to climate change, with similar scope to the IOUs' studies. Based on the results of our Climate Change Vulnerability Study, in 2024, PSEGLI anticipates developing and/or modifying existing multi-year resilience plans. Among other requirements of the CCRP legislation, utilities' plans are required to consider reliability during extreme weather events. While there are currently no plans to repeat the vulnerability assessment, the legislation requires utilities to update their plans at least every five years after approval of a utility's five-year climate resilience plan, and LIPA expects to update their plan at a similar frequency.

Transmission Planning Studies

Our Transmission Planning organization conducts annual Summer Operating study prior to the summer operating season. As part of the study, voltage and thermal analysis is performed to determine the impact of an extreme weather electric demand forecast condition (90^{th} percentile high peak load scenario; 10% probability of occurrence) for current year on the LIPA bulk transmission/sub-transmission system. The extreme weather scenario reflects a high peak load electric demand forecast, considering a 10% probability of occurrence. As a comparison, a normal weather scenario reflects a 50% probability of

occurrence. The normal weather and extreme weather electric load forecasts utilized in transmission planning studies are specified in the PSEG Long Island Transmission Planning Criteria document.

For 2022-23 Winter Operating Study, Transmission Planning conducted an extreme cold weather event assessment (thermal and voltage reliability assessments). Study assumptions were reviewed and identified based on discussions with Transmission Operations. The extreme cold weather assessment considered a higher load forecast relating to an extreme cold weather event (9 degrees F). The outage of gas only generation units in addition to the planned generation and transmission outages for the winter operating period was a base assumption to account for potential gas constraints during an extreme cold weather event. In addition, imports from several LIPA interties were assumed to be 0 MW.

The T&D Planning Department also establishes an annual Ten Year T&D Development Plan. As part of the ten-year horizon transmission planning analysis, voltage and thermal analysis is performed to determine the impact of an extreme weather electric demand forecast condition (90^{th} percentile; 10% probability of occurrence) for future years on the LIPA bulk transmission/sub-transmission system.

In addition, both the LIPA and NYISO annual NERC Planning Assessments that are performed to meet compliance with NERC TPL-001-5.1 have traditionally considered a high summer peak load (90/10 load forecast) as a Year 5 sensitivity scenario to demonstrate the impact of a heatwave on the transmission system.

Equipment Weatherization

As per NERC guidelines, Asset Management organization performs annual equipment winterization analysis. This analysis is conducted consistent with guidance in NERC Alert R-2021-08-18-01 and NERC Alert R-2022-09-12-01.

Emergency Planning: Hurricane Drills

Hurricane drills are conducted annually. The purpose of the drill is to increase awareness to PSEG Long Island's restoration plans and activities while providing an opportunity to enhance coordination and collaboration among internal and external stakeholders.

A. Scope

2) **A description of the types of extreme weather events for which the transmission provider conducts, or plans to conduct, extreme weather vulnerability assessments, if any. For transmission providers that conduct, or plan to conduct, such assessments, a description of how the transmission provider determined which extreme weather hazards to include in the assessment (e.g., extreme storms such as hurricanes and the associated flooding and high winds, wildfires, extreme prolonged heat or cold, or drought conditions);**

Climate Change Vulnerability Study

For our ongoing Climate Change Vulnerability Study, we are considering the following extreme weather conditions: extreme heat; heat wave; extreme cold; heavy precipitation; hurricanes (including coastal flooding and extreme wind); thunderstorms, tornados, wind droughts, and ice storms. PSEGLI identified extreme events for consideration in two ways. First, we are making use of downscaled Global Climate Model data developed by NYSERDA and Columbia University. That dataset included future projections around extreme temperatures, heat waves and heavy precipitation. Second, we held meetings with SMEs across multiple departments within the organization to identify extreme weather conditions to be included in our Climate Change Vulnerability Study as part of our study via literature review and/or scenario development, based on potential impact to assets and operations in our service territory.

Transmission Planning Studies

For our Summer Operating Studies, extreme weather analysis utilized the current year extreme weather forecast (10% probability) for the LIPA system. The Ten Year and NERC TPL extreme weather analysis utilized the future year extreme weather forecast (10% probability) for the LIPA system.

The Winter 2022-23 Operating Study Extreme Cold Event analysis considered a higher load forecast relating to an extreme cold weather event (9 degrees F). The outage of gas only generation units in addition to the planned generation and transmission outages for the winter operating period was a base assumption to account for potential gas constraints during an extreme cold weather event. In addition, imports from several LIPA interties were assumed to be 0 MW. All analysis mentioned above evaluated voltage and thermal reliability performance on the LIPA bulk transmission/sub-transmission system with design contingencies.

Equipment Weatherization Analysis

For winterization studies, low temperature of -4 deg F over a prolonged event is assumed for most equipment.

NYSRC Extreme Weather Working Group

In addition, PSEGLI on behalf of LIPA participates in the NYSRC Extreme Weather Working Group (EWWG). The Extreme Weather Working Group was established to inform the NYSRC's efforts to increase NYCA power system resilience to extreme weather impacts. The EWWG is developing extreme weather operating plans and resource adequacy assessment requirements as well as extreme weather resource and transmission planning criteria. The efforts of this working group are expected to influence the types of extreme weather events evaluated and the types of assessments needed to evaluate the impact of extreme weather.

3) **A description of how the transmission provider defines an extreme weather event for the purposes of its extreme weather vulnerability assessment, including what thresholds it uses relative to historical measurements or probabilities of occurrence, if applicable;**

Climate Change Vulnerability Study

For purposes of our Climate Change Vulnerability Study, we do not have a formal definition of an extreme weather event. However, when assessing vulnerabilities, the thresholds of specific assets were considered based on applicable design standards. PSEGLI is also assessing the vulnerability of the T&D system to geographically anticipated climate conditions such as 100-year and 500-year flooding events, high wind events such as tropical storms, thunderstorms and tornadoes, and ice storms.

Transmission Planning Studies

PSEGLI Transmission Planning Criteria specifies the transmission system to consider 90/10 summer peak load forecast. To develop the 90/10 summer peak forecast, our Load Forecasting team analyzes the set of actual weather conditions that drove our experienced system peak loads, to develop a distribution of peak producing weather conditions. From this effort we can provide a system peak load forecast under various probabilities, with 50/50, 80/20, 90/10 and 1 in 30 being the most common.

For details regarding other Transmission Planning studies, such as the Winter Operating Study / cold weather event assessment, Ten Year T&D Plan and annual NERC TPL Planning Assessments, please see our response to Question #1 above.

4) A description of how the transmission provider selects, or plans to select, the set of assets and operations that will be examined;

Climate Change Vulnerability Study

For purposes of our Climate Change Vulnerability Study, the list of assets and processes with vulnerabilities to climate change and extreme weather was developed using a risk-based approach, including subject matter expert feedback and experience.

Transmission Planning Studies

All planning analysis evaluated voltage and thermal reliability performance for LIPA bulk transmission/sub-transmission system under both normal system conditions and contingency conditions (considering both planning events and extreme events) considering PSEGLI transmission planning

criteria.

Equipment Weatherization Analysis

All NERC/BES assets are reviewed for winter readiness (as per NERC requirements).

5) **A description of how the transmission provider determines, or plans to determine, the geographic or regional scope of the analysis;**

Climate Change Vulnerability Study

Our Climate Change Vulnerability Study is focused on conditions within LIPA's service territory, i.e., Nassau and Suffolk Counties on Long Island and the Rockaways area of New York City.

Transmission Planning Studies

All analyses mentioned above are mainly focused on the service territory within LIPA transmission system. However, Transmission Planning also coordinate the inter-regional inter-ties import/export capabilities with neighboring utilities, NYISO, and ISONE. In addition, Transmission Planning also performs local reliability rule on loss of gas contingency for the Summer Ops Study, loss of a single gas pipeline (Iroquois) based on the local reliability rule G-3 (formally known as GR-3 or I-R5) found in the NYSRC Reliability Rule document, stated as "The NYS Bulk Power System shall be operated so that the loss of a single gas facility does not result in the uncontrolled loss of electric load within the Long Island zone."

6) **A description of whether and to what extent the transmission provider considers, or plans to consider, external interdependencies, such as interconnected utilities, other critical infrastructure sectors (e.g., water, telecommunications) and supply chain-related vulnerabilities, in the assessment;**

Climate Change Vulnerability Study

External interdependencies are not being considered within our Climate Change Vulnerability Study.

Transmission Planning Studies

All analyses mentioned above are mainly focused on the service territory within LIPA transmission system. Additional assessment involved with external interdependencies is coordinated by NYISO. PSEGLI on behalf of LIPA meets with the neighboring transmission providers and ISOs prior to summer and winter seasons to coordinate the upcoming seasonal operational periods and relevant study assumptions. Extreme Cold weather analysis studies assume no gas only generation and zero New England import to Long Island based upon historic trends and possible extreme gas limitations.

Emergency Planning: Hurricane Drills

During the 2023 Hurricane Exercise, PSEGLI as part of exercise planning invited external stakeholders from neighboring utilities as well as the MTA/LIRR.

Procurement Strategy

Our existing procurement strategy incorporates a collaborative risk assessment processes including analyzing historical data and tracking vulnerability and recent supply chain trends. Based on that assessment, our inventory strategy is focused on maintaining 100% stock level of critical material in preparation for an extreme event, plus three or more months of operating stock.

7) **A description of whether and to what extent the transmission provider coordinates, or plans to coordinate, with neighboring utilities and/or entities in other sectors that could potentially be relevant to the assessment;**

Climate Change Vulnerability Study

PSEGLI on behalf of LIPA meets periodically with other New York State electrical utilities to align study approaches.

Transmission Planning Studies

All analysis mentioned above are mainly focused on the service territory within LIPA transmission

system. Additional assessment involved with external interdependencies is coordinated by NYISO. PSEGLI on behalf of LIPA meets with the neighboring transmission providers and ISOs prior to summer and winter seasons to coordinate the upcoming seasonal operational periods and relevant study assumptions.

Emergency Planning: Hurricane Drills

During the 2023 Hurricane Exercise, PSEGLI as part of exercise planning met and collaborated with Nassau and Suffolk County Offices of Emergency Management, the NYS Department of Public Service and the Long Island Power Authority. In addition, the following external stakeholders were invited to participate in the exercise:

3. INVITED STAKEHOLDERS

UTILITIES	
Altice	NYSEG
Avangrid	Orange & Rockland (OG&E)
Central Hudson Gas & Electric	PSEG Long Island
Con Edison	PSEG New Jersey
National Grid - Electric & Gas	Verizon
COUNTIES, TOWNS, & MUNICIPALITIES	
City of Long Beach	Town of Oyster Bay
Nassau County	Town of Riverhead
Suffolk County	Town of Smithtown
Town of Babylon	Town of Southampton
Town of Brookhaven	Town of Southold
Town of East Hampton	Village of Freeport*
Town of Hempstead	Village of Greenport*
Town of Huntington	Village of Rockville Centre*
Town of Islip	Village of Sands Point
Town of North Hempstead	*municipal / cooperative electric utilities
FEDERAL, STATE & LOCAL PARTNERS	
American Red Cross (ARC)	New York City Emergency Management (NYC EM)
Federal Emergency Management Agency (FEMA)	New York Power Authority (NYPA)
International Brotherhood of Electrical Workers (IBEW) Local 1049	New York State Department of Environmental Conversation (NYS DEC)
Long Island Power Authority (LIPA)	New York State Department of Public Service (NYS DPS)
Long Island Railroad / Metropolitan Transportation Authority (LIRR/MTA)	New York State Department of Transportation (NYS DOT)
Nassau County Department of Public Works (NC DPW)	New York State Division of Homeland Security & Emergency Services (DHSES)
Nassau County Fire Marshal's Office	National Oceanic and Atmospheric Administration / National Weather Service (NOAA/NWS)
Nassau County Office of Emergency Management (NC OEM)	Suffolk County Fire Rescue and Emergency Services (FRES)

8) A description of whether and to what extent the transmission provider engages, or plans to engage, with stakeholders in the scoping phase of the assessment, including the processes used to identify and engage relevant stakeholder groups and incorporate stakeholder

feedback into the extreme weather vulnerability assessment, including all affected communities.

Climate Change Vulnerability Study

For purposes of our Climate Change Vulnerability Study, we are holding periodic meetings with stakeholders representing environmental, consumer, health and welfare, and municipalities within our service territory as our study evolves. Prior to adopting the Climate Change Vulnerability and Resilience Plan, we anticipate that the LIPA Board of Trustees will present recommendations at a public meeting and will allow an opportunity for public comment prior to approving the plan.

Transmission Planning Studies

PSEGLI on behalf of LIPA meets with the neighboring transmission providers and ISOs prior to summer and winter seasons to coordinate the upcoming seasonal operational periods and relevant study assumptions. PSEGLI on behalf of LIPA also engages with generator operators around seasonal preparedness.

Emergency Planning: Hurricane Drills

During the 2023 Hurricane Exercise, PSEGLI as part of exercise planning met and collaborated with Nassau and Suffolk County Offices of Emergency Management, the NYS Department of Public Service and the Long Island Power Authority. In addition, the following external stakeholders were invited to participate in the exercise:

3. INVITED STAKEHOLDERS

UTILITIES	
Altice	NYSEG
Avangrid	Orange & Rockland (OG&E)
Central Hudson Gas & Electric	PSEG Long Island
Con Edison	PSEG New Jersey
National Grid - Electric & Gas	Verizon
COUNTIES, TOWNS, & MUNICIPALITIES	
City of Long Beach	Town of Oyster Bay
Nassau County	Town of Riverhead
Suffolk County	Town of Smithtown
Town of Babylon	Town of Southampton
Town of Brookhaven	Town of Southold
Town of East Hampton	Village of Freeport*
Town of Hempstead	Village of Greenport*
Town of Huntington	Village of Rockville Centre*
Town of Islip	Village of Sands Point
Town of North Hempstead	*municipal / cooperative electric utilities
FEDERAL, STATE & LOCAL PARTNERS	
American Red Cross (ARC)	New York City Emergency Management (NYC EM)
Federal Emergency Management Agency (FEMA)	New York Power Authority (NYPA)
International Brotherhood of Electrical Workers (IBEW) Local 1049	New York State Department of Environmental Conversation (NYS DEC)
Long Island Power Authority (LIPA)	New York State Department of Public Service (NYS DPS)
Long Island Railroad / Metropolitan Transportation Authority (LIRR/MTA)	New York State Department of Transportation (NYS DOT)
Nassau County Department of Public Works (NC DPW)	New York State Division of Homeland Security & Emergency Services (DHSES)
Nassau County Fire Marshal's Office	National Oceanic and Atmospheric Administration / National Weather Service (NOAA/NWS)
Nassau County Office of Emergency Management (NC OEM)	Suffolk County Fire Rescue and Emergency Services (FRES)

NYSRC Extreme Weather Working Group

PSEGLI on behalf of LIPA is participating and leading the New York State Reliability Council Extreme Weather Working Group of the New York State Reliability Council (EWWG). The Extreme Weather Working Group was established for the purpose of mitigating extreme weather reliability impacts to the

NYCA power system. The EWWG is developing extreme weather operating plans and resource adequacy assessment requirements as well as extreme weather resource and transmission planning criteria for improving NYCA resilience to extreme weather events. This includes recommended NYISO operating criteria requiring measures, e.g., operating reserve requirements, for improving extreme weather resiliency, if any, that would supplement operating measures as well as justification for the recommended resource planning and operating resiliency criteria, including the parameters and analyzes used as the basis for determining the recommended resource resiliency criteria, including the alternate metrics considered. As any NYCA-wide requirements are adopted that affect LIPA's planning and operating criteria LIPA will adjust its processes accordingly.

B. Inputs

9) A description of methods and processes the transmission provider uses, or plans to use, to determine the meteorological data needed for its assessment. In particular, how the transmission provider determines whether it can rely on existing extreme weather projections, and if so, whether such projections are adequately robust;

Emergency Planning

PSEG Long Island recently completed the implementation of a four-year project with DTN to deliver a weather-based damage prediction solution that forecasts the occurrence and extent of damage from storms impacting our electric transmission & distribution system. Titled "Storm Impact Analytics" (SIA), this damage and outage incident prediction module uses a sophisticated, machine learning-based approach to provide a set of quantitative predictions that support a more prepared response to service interruptions. Based on historical weather data and outages, along with PSEG Long Island asset data, including geographical location of the corresponding assets within PSEG Long Island's service territory, this tool serves as an additional means to forecast severity, level of damage, and expected geography to be impacted. This tool, which is periodically refined using a machine learning approach based on quarterly

updates of experienced outages, assists in improving PSEG Long Island's overall outage preparation and response strategy

Load Forecasting

PSEGLI on behalf of LIPA analyzed CMIP6 climate change data, downscaled for a local weather station, to determine the projected impacts of climate change on the actual weather conditions that drove our experienced system peak loads, to develop a distribution of peak producing weather conditions impacted by climate change. From this effort we can provide a system peak load forecast reflecting climate change under various probabilities, with 50/50, 80/20, 90/10 and 1 in 30 being the most common.

Climate Change Vulnerability Study

For purposes of our Climate Change Vulnerability Study, quantitative projections were developed for events such as flooding events (100 year and 500 year) and increases in temperature and future heat wave intensity/duration.

SME interviews identified potential risk from some extreme event scenarios for which quantitative projections were not available. For several types extreme events identified by our SMEs, literature reviews were conducted to develop qualitative projections for changes to extreme weather events, including thunderstorms, winter storms with icing or tropical storm-strength winds.

NYSRC Extreme Weather Working Group

The NYSRC Extreme Weather Working Group uses analysis of historical meteorological data to determine probabilistic exposure to extreme weather events. Sufficient historical data must be analyzed to ensure proper contextualization of extreme weather events. Ideally, meteorological experts on the EWWG have suggested a 70-year analysis should be performed to obtain a full understanding of range and return period of events however this is not always readily available. For the analysis of off shore wind lull extreme weather events the EWWG used 21 years of hourly wind data at seven wind development sites, extending from New Jersey to Rhode Island, prepared by the NYISO and its weather service provider DNV. DNV also performed extensive benchmarking and validation of its modeling against

other data profiles to verify the veracity of the data set. In total this data set represented over one million modeled wind power observations which was made available to the EWWG for additional probabilistic and correlative analyses. It is noted NYISO is also working with its weather service provider DNV on additional efforts to obtain similar data sets for terrestrial wind & solar data, etc. For this analysis 23 years of hourly data for each of 79 terrestrial wind sites and 77 solar locations will be utilized to ensure sufficient spatial resolution for robustness analysis. Based on this information EWWG will is developing extreme weather operating plans and resource adequacy assessment requirements as well as extreme weather resource and transmission planning criteria for improving NYCA resilience to extreme weather events. The current practice used by NYSRC and NYISO to determine NYCA Resource Adequacy requirements is to use the previous 5 years of hourly production data for wind and solar resources.

10) A description of how the transmission provider determines whether to use scenario analysis, and if so, whether to do so with multiple scenarios;

Emergency Planning

PSEG LI Emergency Restoration Plan (ERP) is presented as a top down, blueprint of operations that incorporates an all-hazard approach which details key strategies and guidelines that are used by PSEG Long Island during all phases of an emergency. It is structured to follow the chronological order of preparing for, and responding to, an emergency, focusing on the efforts performed by the primary functional areas, including Operations, Logistics, and Communications.

Climate Change Vulnerability Study

For the Climate Change Vulnerability Study, PSEGLI considered two emissions pathways CMIP 6 SSP 2- 4.5 and CMIP 6 SSP 5-8.5. The SSPs represent scenarios of projected socio-economic and technological changes that are used to develop potential future emissions scenarios. Within that, an ensemble of 16 downscaled GCMs provided a range of potential outcomes for potential climate hazards. PSEGLI is still evaluating which scenario(s) to adopt for planning purposes.

The Climate Change Vulnerability Study is also considering two extreme event scenarios. Scenario selection was based on conversations with SMEs about the likelihood of the event to occur within the service territory as well as potential impacts from such an event.

Transmission Planning Studies

For summer peak condition, the reactive power assumptions on inter-ties has a big impact on thermal and voltage constraints on extreme weather forecast scenario. As result, the Extreme Weather analysis for summer peak condition utilizes the extreme weather forecast (10% probability) for LIPA system, and examines system wide thermal and voltage constraints based on three scenarios of different reactive power contribution assumptions from the Neptune cable, an HVDC tie line between the Long Island Transmission District and PJM (Sayreville, NJ). The seasonal operating studies consider facility outages and associated sensitivities as applicable.

NYSRC Extreme Weather Working Group

A basic principle of NYCA power system design and prudent utility practice is that facilities are planned to meet performance requirements and supplemental performance requirements for specified contingency events. Credible combinations of system conditions which stress the system must be considered. Examples of credible scenarios include load forecast, internal NYCA and inter-Area and transfers, transmission configuration, active and reactive resources, generation availability, and other dispatch scenarios. The EWWG is working with NYISO and NY Stakeholders to expand the definition of credible scenarios to include extreme weather considerations including credible combinations of system conditions which stress the system for wind and/or solar generating resource lulls based upon analysis of historical and predicted hourly off-shore wind, terrestrial wind, solar and electric demand data in NYCA and contiguous control areas.

11) The extent to which it reviews neighboring transmission providers' extreme weather vulnerability assessments, if available, to evaluate the consistency of extreme weather

projections between transmission providers. Further, for RTOs/ISOs, a description of how it accounts for differences between transmission owner members' extreme weather vulnerability assessment assumptions and results;

Climate Change Vulnerability Study

For our Climate Change Vulnerability Study, we consulted with other utilities in the State about consideration of extreme events. However, as extreme event impacts can vary greatly from utility to utility within the State, selection of extreme events for consideration is ultimately a utility-by-utility consideration. For example, tropical storms are less impactful further inland. Downstate utilities have not historically experienced significant icing on T&D equipment, whereas winter storms pose a greater threat to upstate utilities.

Transmission Planning Studies

The NYISO and NY state TOs, including LIPA, perform annual NERC transmission planning assessment, which is a coordinated effort by all parties. NYISO and LIPA's annual NERC transmission planning assessment presently consider 90/10 summer peak extreme weather condition as a sensitivity scenario.

In addition, LIPA has the opportunity to review and participate in the NYISO Comprehensive System Planning Process (CSPP) related study efforts.

12) **The timeframe(s) and discount rate(s) selected for the extreme weather vulnerability assessment;**

Climate Change Vulnerability Study

For most climate variables, our Climate Change Vulnerability Study is relying on a NYSERDA/Columbia University dataset that extended through 2080. We have not considered a discount rate as of this time.

13) **A description of the methods and processes the transmission provider uses, or plans to use,**

to create an inventory of potentially vulnerable assets and operations.

Climate Change Vulnerability Study

For our Climate Change Vulnerability Study, PSEGLI developed an initial list of assets and operations potentially vulnerable to changing climate conditions, including some extreme weather events. An assessment of potential vulnerability was developed via an approach that considered the asset's exposure to climate hazards based on location and decadal projections of climate hazards, the asset's sensitivity to hazards, and the consequences of the asset's failure or degraded operation. We then reviewed that list with internal SMEs from several parts of the organization to refine the list, based on their industry experience.

Transmission Planning Studies

Seasonal operating studies and associated assumptions are coordinated with Transmission Operations. Our analysis evaluated voltage and thermal reliability performance for LIPA bulk transmission/sub-transmission system under both normal system conditions and contingency conditions (considering both planning events and extreme events) considering PSEGLI transmission planning criteria and NERC TPL-001 criteria. If planning criteria violation under extreme weather has been identified from the Extreme weather analysis, capital project solution to address the violation will be proposed under the local transmission planning process.

Extreme Cold Weatherization Analysis

As part of our extreme cold analysis, PSEGLI on behalf of LIPA reviews asset registries to determine the relevant standards the various equipment were designed to. These standards define the minimum operating temperatures by asset type.

C. Vulnerabilities and Exposure to Extreme Weather Hazards

14) A description of how the transmission provider identifies the transmission assets or operations vulnerable to the extreme weather events for which it conducts assessments;

Climate Change Vulnerability Study

PSEGLI SMEs determined which transmission assets could be vulnerable to extreme weather based on location and decadal projections of climate hazards and review of a combination of exposure, sensitivity, and potential consequence of failure. SMEs from multiple business areas were also interviewed to assess vulnerability of operations and processes to extreme weather events.

Transmission Planning Studies

The LIPA studies that consider extreme weather (see response to Question #1 above) may identify transmission assets that do not meet PSEGLI transmission planning criteria / NERC TPL-001 criteria. One example to consider would be the identification of a transmission asset that is overloaded (i.e., non-conformance to thermal performance criteria) and hence "vulnerable" to the extreme weather scenario. If planning criteria violation under extreme weather are identified from the extreme weather analysis, capital project solutions and/or operating procedures to address the violation will be proposed.

Extreme Cold Weatherization Analysis

As part of our extreme cold analysis, once all assets are reviewed to determine their minimum operating temperatures, any required operating reviews (i.e., testing of heating equipment) is performed by Operations.

15) A description of how the transmission provider uses, or plans to use, screening analyses to test for potential vulnerabilities, as well as how the transmission provider examines, or plans to examine, the sensitivities of the transmission assets and operations being studied to types and magnitudes of extreme weather events.

Climate Change Vulnerability Study

For our Climate Change Vulnerability Study, vulnerability was based on consideration of exposure and sensitivity, if exposed. Transmission assets were scored on a scale of low-medium-high for sensitivity to climactic conditions, if exposed. The sensitivity scales were developed based on SME input. We used our Geographic Information System to consider the location of transmission assets with respect to exposure to future climate hazards, including risks associated with extreme weather conditions.

D. Costs of Impacts

16) A description of the methodology or process, if any, the transmission provider uses, or plans to use, to estimate the potential costs of extreme weather impacts on identified vulnerable assets and operations;

Climate Change Vulnerability Study

For purposes of our Climate Change Vulnerability Study, we are still contemplating whether, and if so, how to estimate potential costs of extreme weather impacts on identified vulnerable assets and operations.

Transmission Planning

If planning criteria violation under extreme weather has been identified from the Extreme weather analysis, capital project solution to address the violation will be proposed under the local transmission planning process.

17) If the transmission provider estimates such potential costs, a description of the types of: (a) direct costs, such as replacements or repair costs, restoration costs, associated labor costs, or opportunity costs of lost sales, and (b) indirect costs, such as costs associated with loss of service to electric customers and other utilities that purchase power from the transmission provider, including equipment damage, spoilage, and health and safety effects, in calculating the costs of extreme weather impacts.

Climate Change Vulnerability Study

For purposes of our Climate Change Vulnerability Study, we are still contemplating whether, and if so,

how to estimate potential costs of extreme weather impacts on identified vulnerable assets and operations.

E. Risk Mitigation

18) A description of how the transmission provider uses, or plans to use, the results of its assessment to develop measures to mitigate extreme weather risks, including:

i. How the transmission provider determines which risks should be mitigated and the appropriate time horizon for mitigation;

Climate Change Vulnerability Study

For purposes of our Climate Vulnerability Study, we are still contemplating approaches to project prioritization.

Transmission Planning Studies

If planning criteria violation under extreme weather has been identified from the Extreme weather analysis, capital project solution to address the violation will be proposed under the local transmission planning process. Operating procedures may also be identified and implemented.

ii. How the transmission provider determines appropriate extreme weather risk mitigation measures, including any analyses used to determine the lowest-cost or most impactful portfolio of measures;

Climate Change Vulnerability Study

For purposes of our Climate Vulnerability Study, we are still contemplating approaches to project prioritization.

Transmission Planning Studies

Based on different thermal and voltage planning criteria violations, the recommended capital project solution will consider transmission solutions, distribution solutions, generation solutions, and non-wire alternatives. Typical information considered with respect to alternatives are costs, feasibility, impact on

rates (net present value of revenue requirements), as well as any specific advantages or disadvantages of the alternative. If desired in-service date that address the planning criteria violation will not be met, additional temporary mitigation measures (such as, distribution load transfers, emergency generation deployment, load relief programs, etc.) will be considered.

19) A description of how the transmission provider informs, or plans to inform, relevant stakeholders—such as neighboring transmission providers, RTOs/ISOs of which the transmission provider is a member, electric customers, all affected communities, emergency management agencies, local and state administrations, and state utility regulators—of identified extreme weather risks and selected mitigation measures;

Climate Change Vulnerability Study

For purposes of our Climate Change Vulnerability Study, we are holding periodic meetings with stakeholders representing environmental, consumer, health and welfare, and municipalities within our service territory as our study evolves. Prior approving a Climate Change Vulnerability and Resilience Plan, we anticipate presenting recommendations at a public meeting and providing an opportunity for public comment prior to approving the plan.

Transmission Planning Studies

LIPA meets with the neighboring transmission providers and ISOs prior to summer and winter seasons to coordinate the upcoming seasonal operational periods and relevant study assumptions. LIPA shares its seasonal operating studies with NYISO.

With respect to mitigation measures, under an extreme weather scenario, if a planning criteria violation is identified a capital project solution address the violation will be proposed under the local transmission planning process. Any update to local transmission plan will be communicated with NYISO and its stakeholders. Firm projects are included in the FERC-715 filing base cases.

Emergency Planning: Hurricane Drills

As discussed earlier, PSEGLI on behalf of LIPA conducts an annual hurricane drill. During the 2023 Hurricane Exercise, PSEG LI as part of exercise planning met and collaborated with Nassau and Suffolk County Offices of Emergency Management, the NYS Department of Public Service and the Long Island Power Authority. In addition, neighboring utilities; municipalities within our service territory; and multiple Federal, State and local partners are invited to participate.

20) A description of the extent to which the transmission provider incorporates, or plans to incorporate, identified extreme weather risks and mitigation measures into local and regional transmission planning processes;

NYSRC Extreme Weather Working Group

As noted above, the NYSRC EWWG is developing extreme weather operating plans and resource adequacy assessment requirements as well as extreme weather resource and transmission planning criteria for improving NYCA resilience to extreme weather events. EWWG has drafted new reliability rules aimed at consideration of credible combinations of system conditions which stress the system defined based upon analysis of historical and predicted extreme weather phenomena in NYCA and contiguous control areas. These rules are presently under review by NY Stakeholders including NYISO.

Furthermore, EWWG has recently completed a white paper analysis[2] of off shore wind lull extreme weather event using 21 years of hourly wind data at seven wind development sites, extending from New Jersey to Rhode Island.

Based on this information EWWG is developing extreme weather operating plans and resource adequacy assessment requirements as well as extreme weather resource and transmission planning criteria for improving NYCA resilience to extreme weather events.

[2] https://www.nysrc.org/wp-content/uploads/2023/07/NYSRC-Wind-Impacts-Final-07_18_23.pdf

Climate Change Vulnerability Study

In the event that we identify and prioritize for funding any transmission projects as a result of our Climate Vulnerability Study, capital project solutions to address the violation will be proposed under the local transmission planning process, and any update to local transmission plan will be communicated with NYISO and its stakeholders. Firm projects are included in the FERC-715 filing base cases.

Transmission-related recommendations proposed in the Climate Change Resilience Plan and subsequently adopted, such as changes to transmission design specifications or ratings, would be factored into future planning efforts.

Transmission Planning Studies

For risk assessment scenarios, NYISO and the NY State TOs coordinate the identification of the scenarios to be considered in the annual FERC-715 filing base cases.

With respect to mitigation measures, under an extreme weather scenario, if a planning criteria violation is identified a capital project solution address the violation will be proposed under the local transmission planning process. Any update to local transmission plan will be communicated with NYISO and its stakeholders. Firm projects are included in the FERC-715 filing base cases.

21) A description of how the transmission provider measures, or plans to measure, the progress and success of extreme weather risk mitigation measures (e.g., through reduced outages) and how it incorporates these observations into ongoing and future extreme weather risk mitigation actions.

Climate Change Vulnerability Study

PSEGLI and LIPA have not determined if and how they may measure the progress or success of resilience measures. We are participating in industry efforts such as EPRI's Climate READi initiative in considering best practices and approaches to measures of success.

Attachment V

LS Power NY's Responses to Order No. 897's Appendix A Questions

LS POWER GRID NEW YORK CORPORATION'S RESPONSE TO ONE-TIME INFORMATION REQUEST ON EXTREME WEATHER VULNERABILITY ASSESSMENTS

INTRODUCTION

LS Power Grid New York Corporation I ("LSPGNY") is a transmission-only company organized under the laws of the State of New York to own and operate transmission facilities. LSPGNY, jointly with the New York Power Authority, was selected to upgrade the transmission system through the Central East Energy Connect project. These upgrades will help relieve bottlenecks to the New York power grid, support renewable energy, replace aging infrastructure to improve reliability, and provide other benefits to businesses and residents across New York State. The project includes new/improved 345 kV transmission lines and new substations between the Towns of Marcy and new Scotland. The project has been energized in segments, with the initial segment energized on May 28, 2021 and final project completion expected in December 2023.

ORDER NO. 897 QUESTIONS

Q1) ***As a threshold matter, state whether the transmission provider conducts extreme weather vulnerability assessments, and if so, how frequently it conducts those assessments.***

Scope

A1) LSPGNY is a transmission owner in the New York Independent System Operator ("NYISO") administered region. LSPGNY does not currently perform individual extreme weather vulnerability assessments. LSPGNY's operating transmission facilities,

which are currently only a portion of public policy transmission facilities LSPGNY was assigned by NYISO,[1] have only been in operation since May 2021. The in-operation and under development transmission and related facilities were planned pursuant to NYISO planning criteria, including as appropriate NYISO standards for extreme weather and other vulnerabilities, as relevant at that time of development. In addition, as a public policy project directed by the New York Public service Commission the project design meets NY PSC requirements. LSPGNY will continue to participate in NYISO regional transmission planning efforts, including assessments of extreme weather and other vulnerabilities, as appropriate.

Q2) A description of the types of extreme weather events for which the transmission provider conducts, or plans to conduct, extreme weather vulnerability assessments, if any. For transmission providers that conduct, or plan to conduct, such assessments, a description of how the transmission provider determined which extreme weather hazards to include in the assessment (e.g., extreme storms such as hurricanes and the associated flooding and high winds, wildfires, extreme prolonged heat or cold, or drought conditions);

A2) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Q3) ***A description of how the transmission provider defines an extreme weather event for the purposes of its extreme weather vulnerability assessment, including what thresholds it uses relative to historical measurements or probabilities of occurrence, if applicable;***

A3) Because LSPGNY does not perform extreme weather vulnerability assessments,

[1] The complete Segment A transmission Project has an in-service date of December 31, 2023 per an executed Development Agreement with NYISO.

not applicable.

Q4) A description of how the transmission provider selects, or plans to select, the set of assets and operations that will be examined;

A4) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Q5) A description of how the transmission provider determines, or plans to determine, the geographic or regional scope of the analysis;

A5) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Q6) A description of whether and to what extent the transmission provider considers, or plans to consider, external interdependencies, such as interconnected utilities, other critical infrastructure sectors (e.g., water, telecommunications) and supply chain-related vulnerabilities, in the assessment;

A6) As noted above, LSPGNY will continue to participate in NYISO regional efforts to assess extreme weather vulnerability as appropriate to LSPGNY's facilities.

Q7) A description of whether and to what extent the transmission provider coordinates, or plans to coordinate, with neighboring utilities and/or entities in other sectors that could potentially be relevant to the assessment;

A7) Although LSPGNY does not conduct individual assessments, it participates in NYISO regional transmission planning, including extreme weather vulnerability assessments to the extent they occur.

Q8) A description of whether and to what extent the transmission provider engages, or plans to engage, with stakeholders in the scoping phase of the assessment, including the processes used to identify and engage relevant stakeholder groups and incorporate stakeholder feedback into the extreme weather vulnerability assessment, [especially with regard to disadvantaged or vulnerable] *including all affected* communities.

A8) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Inputs

Q9) A description of methods and processes the transmission provider uses, or plans to use, to determine the meteorological data needed for its assessment. In particular, how the transmission provider determines whether it can rely on existing extreme weather projections, and if so, whether such projections are adequately robust;

A9) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Q10) A description of how the transmission provider determines whether to use scenario analysis, and if so, whether to do so with multiple scenarios;

A10) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Q11) The extent to which it reviews neighboring transmission providers' extreme weather vulnerability assessments, if available, to evaluate the consistency of extreme weather projections between transmission providers. *Further, for RTOs/ISOs, a description of how it accounts for differences between transmission owner members' extreme weather vulnerability assessment assumptions and results;*

A11) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable to analysis of consistency with LSPGNY's assessments. LSPGNY does review for applicability to LSPGNY transmission all extreme weather vulnerability

assessments of NYISO and other NYISO transmission owners to which it is provided access.

Q12) The timeframe(s) and discount rate(s) selected for the extreme weather vulnerability assessment;

A12) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Q13) A description of the methods and processes the transmission provider uses, or plans to use, to create an inventory of potentially vulnerable assets and operations.

A13) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Vulnerabilities and Exposure to Extreme Weather Hazards

Q14) A description of how the transmission provider identifies the transmission assets or operations vulnerable to the extreme weather events for which it conducts assessments;

A14) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Q15) A description of how the transmission provider uses, or plans to use, screening analyses to test for potential vulnerabilities, as well as how the transmission provider examines, or plans to examine, the sensitivities of the transmission assets and operations being studied to types and magnitudes of extreme weather events.

A15) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Cost of Impacts

Q16) A description of the methodology or process, if any, the transmission provider uses, or plans to use, to estimate the potential costs of extreme weather impacts on identified vulnerable assets and operations;

A16) Because LSPGNY does not perform extreme weather vulnerability assessments,

not applicable.

Q17) If the transmission provider estimates such potential costs, a description of the types of: (a) direct costs, such as replacements or repair costs, restoration costs, associated labor costs, or opportunity costs of lost sales, and (b) indirect costs, such as costs associated with loss of service to electric customers and other utilities that purchase power from the transmission provider, including equipment damage, spoilage, and health and safety effects, in calculating the costs of extreme weather impacts.

A17) Because LSPGNY does not perform extreme weather vulnerability assessments,

not applicable.

Risk Mitigation

Q18) A description of how the transmission provider uses, or plans to use, the results of its assessment to develop measures to mitigate extreme weather risks, including:

i. **How the transmission provider determines which risks should be mitigated and the appropriate time horizon for mitigation;**

ii. **How the transmission provider determines appropriate extreme weather risk mitigation measures, including any analyses used to determine the lowest-cost or most impactful portfolio of measures;**

A18) Because LSPGNY does not perform extreme weather vulnerability assessments,

not applicable.

Q19) A description of how the transmission provider informs, or plans to inform, relevant stakeholders—such as neighboring transmission providers, RTOs/ISOs of which the transmission provider is a member, electric customers, *all* affected [and frontline] communities, [shareholders and investors,] emergency management agencies, local and state administrations, and state utility regulators—of identified extreme weather risks and selected mitigation measures;

A19) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Q20) A description of the extent to which the transmission provider incorporates, or plans to incorporate, identified extreme weather risks and mitigation measures into local and regional transmission planning processes;

A20) As noted, LSPGNY will continue to participate in NYISO regional efforts to assess extreme weather or other vulnerabilities as appropriate. If NYISO identifies extreme weather planning criteria relevant to LSPGNY's transmission facilities LSPGNY will evaluate the appropriate actions, if any, to incorporate such assessments.

Q21) A description of how the transmission provider measures, or plans to measure, the progress and success of extreme weather risk mitigation measures (e.g., through reduced outages) and how it incorporates these observations into ongoing and future extreme risk mitigation actions.

A21) Because LSPGNY does not perform extreme weather vulnerability assessments, not applicable.

Attachment VI

National Grid's Responses to Order No. 897's Appendix A Questions

APPENDIX A: Report Questions
Responses of Niagara Mohawk Power Corporation (National Grid)

Background

Niagara Mohawk Power Corporation (NMPC or National Grid) is a Commission-regulated public utility company organized and operated under the laws of the State of New York. It serves over 1.7 million electric customers and over 600,000 gas customers in upstate New York. NMPC owns and operates transmission facilities in New York, all of which are subject to the operational control of the NYISO. NMPC recovers its transmission revenue requirements pursuant to formula rates under the NYISO Open Access Transmission Tariff (OATT).

The outstanding common shares of NMPC are wholly owned by National Grid USA. National Grid USA is an indirect, wholly owned subsidiary of National Grid plc, a company incorporated in England and Wales. National Grid USA is a public utility holding company; it is not a public utility because it does not directly own or operate Federal Power Act-jurisdictional facilities (or any electric facilities), nor does it engage in the sale, transmission, or distribution of electric power. Direct and indirect subsidiaries of National Grid USA are engaged in: (i) electric transmission under Commission jurisdiction in New York, Massachusetts, Vermont, and New Hampshire; (ii) electric distribution to residential, commercial, and industrial customers in New York, and Massachusetts; and (iii) the distribution of natural gas to residential, commercial, and industrial customers in New York and Massachusetts. These various subsidiary companies operate and maintain power lines, substations, and/or natural gas distribution facilities; provide metering, billing, and

customer service; design and build electric and/or gas facilities; and provide related products and services, including energy efficiency programs for customers. National Grid USA is also affiliated with entities that own, operate, or control qualifying facilities, distributed generation, behind-the-meter solar, and other renewable generating capacity.

NMPC is the only National Grid USA subsidiary that owns or operates transmission facilities in New York. National Grid USA also indirectly owns four New York generation subsidiaries: (1) National Grid Generation LLC, (2) National Grid Glenwood Energy Center LLC, (3) National Grid Port Jefferson Energy Center LLC, and (4) National Grid Generation Ventures, LLC. The energy and capacity of these public utility subsidiaries on Long Island are wholly committed to the Long Island Power Authority under long-term contracts.

National Grid's Responses to Order No. 897 Appendix A: Report Questions

Q1) As a threshold matter, state whether the transmission provider conducts extreme weather vulnerability assessments, and if so, how frequently it conducts those assessments.

National Grid performed a Climate Change Vulnerability Study (CCVS) as required under New York Public Service Law § 66(29), which became effective in March 2022. National Grid filed the CCVS with the New York Public Service Commission on September 22, 2023. The CCVS evaluated the vulnerability to both the electric transmission and distribution system for a wide range of climate hazards including extreme temperatures, flooding, wind, and icing. The CCVS will be followed by a climate change

resilience plan (CCRP) which will be filed in November 2023, and which is to be updated at least every five years. The CCRP will "… propose storm hardening and resiliency measures for the next ten years and twenty years, and shall explain the systematic approach the corporation will follow to achieve the objectives of mitigating the impacts of climate change to utility infrastructure, reducing restoration costs and outage times associated with extreme weather events, and enhancing reliability…".[1]

Additionally, as part of regular studies to demonstrate compliance with NERC TPL-001, National Grid assesses the impact of peak load conditions resulting from extreme weather. Planning for peak load conditions resulting from extreme weather results in the evaluation of implementing a change to design or operating practices but does not result in a required development of a corrective action plan to address these deficiencies (i.e., extreme weather conditions are studied as informational scenarios).

A. <u>Scope</u>

Q2) A description of the types of extreme weather events for which the transmission provider conducts, or plans to conduct, extreme weather vulnerability assessments, if any. For transmission providers that conduct, or plan to conduct, such assessments, a description of how the transmission provider determined which extreme weather hazards to include in the assessment (e.g., extreme storms such as hurricanes and the associated flooding and high winds,

[1] N.Y. Public Service Law 66(29)(b)(i).

wildfires, extreme prolonged heat or cold, or drought conditions);

In its Climate Change Vulnerability Study (CCVS), National Grid identified extreme temperatures, flooding, wind, and icing as the most impactful climate hazards. This determination was made based on the evaluation of climate projections by groups of subject matter experts (SMEs) with support from climate scientists and experts as well as data scientists. The vulnerability assessment considered the exposure to a climate hazard, the sensitivity of our assets to that hazard, as well as potential consequences. Climate projections were based on three sources: (i) global climate models (GCMs) based on CMIP6 SSP 2-4.5 and 5-8.5 pathway projections[2] provided by New York State Energy Research and Development Authority (NYSERDA) in collaboration with Columbia University; (ii) the Climate Change Risk Tool (CCRT) developed by National Grid to evaluate climate risks based on GCMs based on CMIP5 RCP 4.5 and 8.5 pathway projections; and (iii) a study prepared by Massachusetts Institute of Technology (MIT) for National Grid, which provides wind and icing projections based on a global climate model using CMIP5 and the RCP 8.5 pathway. SME groups included experienced engineers and other utility professionals in teams including distribution and sub-transmission lines, transmission lines, substations, operations, emergency response, reliability, and forecasting.

[2] CMIP6 is the sixth and most recent phase of the Coupled Model Intercomparison Project organized by the World Climate Research Program which provides the latest methodologies for preparing climate models. SSPs or Shared Socio-Economic Pathways are future scenarios that reflect differing amounts of global carbon emissions. SSP 2-4.5 is considered an intermediate scenario that roughly aligns with 2° C rise in global temperature by 2100, vs. SSP 5-8.5 which is considered more of a worst-case scenario or 4° C rise. CMIP5 became available in 2008 and used representative concentration pathways (RCP) such as 4.5 and 8.5 that correlate to the newer SSP 2-4.5 and 5-8.5, respectively.

Although not specifically addressed in the CCVS, National Grid intends to consider wildfire risk in future assessments. Although the current wildfire risk is low in New York State, we recognize the significant consequence of this risk and therefore will continue to review how climate change could impact wildfire risk levels in the future and implement mitigations appropriate for the risk level.

Within reliability studies of National Grid's system, extreme weather is considered by examining increased peak load due to extreme weather conditions. These extreme weather conditions include both heatwaves and cold snaps. Baseline peak forecasts and load shapes, for which the system is currently designed, assume expected peak day weather (*i.e.*, approximately average temperatures and weather conditions). The heatwave and cold-snap conditions are defined by the 90th percentile forecasts (1-in-10 year). The baseline and 90th percentile summer peak forecasts utilize a cumulative temperature and humidity index, which reflects a weighted average weather condition on the peak day and the two proceeding days and is based on the historical distribution of peak-day weather. The peak load forecasts incorporate the projected impacts of increasing temperature trends throughout the forecast horizon.

Q3) A description of how the transmission provider defines an extreme weather event for the purposes of its extreme weather vulnerability assessment, including what thresholds it uses relative to historical measurements or probabilities of occurrence, if applicable;

For the purposes of the Climate Change Vulnerability Study, National Grid did not establish a formal definition of an extreme weather event. Rather, the Company assessed the vulnerability of its system to geographically anticipated climate conditions (*i.e.*, temperature, precipitation/flooding, winds, icing) based on the NYSERDA, Columbia University, and MIT climate projections. When assessing vulnerabilities, the thresholds of specific assets were considered such as wind gusts above 95 mph for transmission lines based on NESC standards, or average ambient temperatures above 32 degrees C for substation transformers based on substation transformer specifications.

National Grid also has an Electric Emergency Response Plan (ERP) it implements in emergencies (often consisting of extreme weather events) that affect the Company's electric system. The degree to which the ERP is implemented depends on the anticipated impacts of the emergency event, ranging from Class I to Class III.

Class I: Events in this classification typically possess any of the following characteristics: gusty winds, heat, rain, freezing rain, snow and/or lightning resulting in minor line problems, light system outages, and possible occasional damaged circuits that are relatively local in nature.

Class II: Events in this classification can possess any of the following characteristics: high winds over a prolonged period, heavy rain, freezing rain, sleet, wet snow, ice, and/or heavy lightning resulting in moderate system outages with damaged circuits.

Class III: Events in this classification include severe storms such as hurricanes, prolonged high wind events, heavy icing, accumulation of heavy or wet snow,

severe lightning, flooding, straight-line wind events, or other conditions which produce widespread prolonged outages, high customer call volume, extensive damage, and a large number of circuit lockouts.

Q4) A description of how the transmission provider selects, or plans to select, the set of assets and operations that will be examined;

In its Climate Change Vulnerability Study, National Grid considered assets grouped into individual substations, and lines. As indicated in response to Q.2, consideration was given to the exposure to a specific climate hazard, as well as the sensitivity to the hazard, and the potential consequences. Based on these considerations, the Company identified priority vulnerabilities, which National Grid plans to make the focus of its Climate Change Resilience Plan.

Q5) A description of how the transmission provider determines, or plans to determine, the geographic or regional scope of the analysis;

National Grid's Climate Change Vulnerability Study focused on conditions within the Niagara Mohawk Power Corporation electric service territory in New York State.

Q6) A description of whether and to what extent the transmission provider considers, or plans to consider, external interdependencies, such as interconnected utilities, other critical infrastructure sectors (e.g., water, telecommunications) and supply chain-related vulnerabilities, in the

assessment;

National Grid did not specifically consider external interdependencies as part of its Climate Change Vulnerability Study. The Company does anticipate evaluating potential supply chain considerations in developing its Climate Change Resilience Plan (*e.g.*, including spare materials for assets with greater projected vulnerabilities).

National Grid maintains close contact with interconnected electric utilities as part of its Electric Emergency Response Plan (ERP) and maintains a network of contacts in other utility sectors (*e.g.*, telecommunications) as well as with State and local emergency response officials in connection with ERP implementation.

Q7) A description of whether and to what extent the transmission provider coordinates, or plans to coordinate, with neighboring utilities and/or entities in other sectors that could potentially be relevant to the assessment;

National Grid has coordinated with the other investor-owned electric utilities in New York on the adoption of a consistent set of climate projections across the State that were developed by NYSERDA and Columbia University. Such coordination reduces the risk of neighboring utilities planning for future vulnerabilities based on inconsistent views of that future. National Grid also has engaged with a Climate Resilience Working Group (CRWG) to advise on climate study and resilience plan proposals and their implementation. The CRWG participants include stakeholders such as municipalities, customer advocacy groups, and energy and environmental advocacy organizations.

Q8) A description of whether and to what extent the transmission provider engages, or plans to engage, with stakeholders in the scoping phase of the assessment, including the processes used to identify and engage relevant stakeholder groups and incorporate stakeholder feedback into the extreme weather vulnerability assessment, including all affected communities.

Please see response to Q.7, above. The CRWG is required to meet at least two times annually. Working group members received a draft of National Grid's CCVS report and provided comments and input that was considered prior to finalizing the Climate Change Vulnerability Study. Stakeholders who participated or expressed interest in participating in the CRWG include individuals from the following organizations:

Organization	Organization	Organization
AARP	Genesee County NY	NY DPS Staff
Alliance for a Green Economy (AGREE)	Greenlots	Public Utility Law Project of New York, Inc.
Barclay Damon, LLP	HOCCPP	Rep. New York Geothermal Energy Org
Central NY Regional Planning & Development Board	Mission:data Coalition, Inc.	Rep: New York State Office of General Services
ChargePoint, Inc.	Natural Resources Defense Council	AARP New York
Citizen Action of New York, Inc.	New York Power Authority	Multiple Intervenors
City of Albany	New York State Department of Public Service	Walmart
City of Glens Falls	New York State Office of General Services	Marathon Power LLC
City of Niagara Falls	Niagara County	Schenectady County
City of Syracuse	NYGEO	Schenectady Fire Department
Columbia County Planning Department	NYSDOT	Sierra Club
Columbia Economic Development Corporation	NYSERDA	St Lawrence County Emergency Services

Direct Energy Services LLC	Office of Environment, Onondaga County	Stop NY Fracked Gas Pipeline
Division of Consumer Protection	Onondaga County DOT	Town of Amherst
Environmental Defense Fund	Onondaga County	Town of DeWitt
Erie County DHSES	Oswego County	Utility Intervention Unit, Division of Consumer Protection
Family Energy, Inc.	Pace Energy and Climate Center	Wyoming County Office of Emergency Services
Franklin County Government	People United for Sustainable Housing, Buffalo	Wyoming County Planning Department

Q9) A description of methods and processes the transmission provider uses, or plans to use, to determine the meteorological data needed for its assessment. In particular, how the transmission provider determines whether it can rely on existing extreme weather projections, and if so, whether such projections are adequately robust;

As indicated in response to Q.2, climate projections for temperature, precipitation, and humidity were provided by NYSERDA and Columbia University. Separate data sets were provided for 12 climate regions across New York State, so the granularity of the data is limited and may not fully represent smaller micro-climates across the state. National Grid also utilizes wind and icing projections developed by MIT, and climate risks from a Climate Change Risk Tool (CCRT) developed by National Grid. Although the CMIP6 models are the latest presently available, the underlying assumptions that feed into climate projections are updated as new information becomes available as with the update from CMIP5 to CMIP6.

As part of ongoing operations, National Grid closely monitors weather and other incidents and events both locally and around the country that might adversely impact the electric system. Weather forecasts are obtained three (3) times daily from the Company's third-party weather service provider, as well as from the National Weather Service and other media-based weather sources, and publicly available applications in an effort to anticipate potential weather effects.

Q10) A description of how the transmission provider determines whether to use scenario analysis, and if so, whether to do so with multiple scenarios;

As part of its Climate Change Vulnerability Study process, National Grid considered a range of climate scenarios, and eventually selected the 50th percentile of CMIP6 SSP5-8.5 pathway (a high emissions scenario) for the climate vulnerability analysis.

The TPL-001 NERC compliance requirements include an assessment of sensitivity cases to demonstrate the impact of changes to the basic assumptions used in the model. Included in the sensitivity cases for TPL-001 analysis, the NYISO has at least one case which models peak load conditions from extreme weather (*e.g.*, a 90/10 load forecast).

Q11) The extent to which it reviews neighboring transmission providers' extreme weather vulnerability assessments, if available, to evaluate the consistency of extreme weather projections between transmission providers. Further, for RTOs/ISOs, a description of how it accounts for differences between

transmission owner members' extreme weather vulnerability assessment assumptions and results;

As indicated in response to Q.7, above, National Grid coordinated with the other investor-owned electric utilities in New York in adopting a consistent set of climate projections across the State that were developed by NYSERDA and Columbia University. Such coordination reduces the risk of neighboring utilities planning for future vulnerabilities based on inconsistent views of that future. The State's electric utilities also developed a common report outline for both the Climate Change Vulnerability Study (CCVS) and Climate Change Resilience Plan (CCRP) reports. Content within that common report structure will vary based on the specific approach taken by each utility. The utilities met regularly to support the development of their individual studies, and the Upstate New York utilities aligned on the use of the 50th percentile of CMIP6 SSP5-8.5 pathway.

Q12) The timeframe(s) and discount rate(s) selected for the extreme weather vulnerability assessment;

The Climate Change Resilience Plan (CCRP) to be filed by National Grid in November 2023 will propose storm hardening and resiliency measures for the next 5, 10 and 20 years. Climate projections used for the study were provided out to the 2080s in the case of the NYSERDA/Columbia University data. No discount rate was prescribed or applied.

Q13) A description of the methods and processes the transmission provider uses, or plans to use, to create an inventory of potentially vulnerable assets and operations.

In its Climate Change Vulnerability Study, National Grid identified four key climate hazards for its electric service territory: 1) high temperature (extreme heat); 2) inland flooding; 3) high winds; and 4) icing. The Company identified priority vulnerabilities based on asset-hazard combinations with the highest potential for negative consequences for National Grid customers. That is, priority vulnerabilities reflect important assets located in areas of high exposure to a given climate hazard. Downscaled geographic climate projections from NYSERDA, Columbia University, and MIT were applied to electric asset locations (determined using GIS databases for line assets and substation maintenance software for substation assets) to determine the priority vulnerabilities.

B. Vulnerabilities and Exposure to Extreme Weather Hazards

Q14) A description of how the transmission provider identifies the transmission assets or operations vulnerable to the extreme weather events for which it conducts assessments;

National Grid identified climate change vulnerabilities of transmission assets and operations using the exposure-sensitivity-consequence approach described in responses to Q.2, Q.4 and Q.13.

Q15) A description of how the transmission provider uses, or plans to use, screening

analyses to test for potential vulnerabilities, as well as how the transmission provider examines, or plans to examine, the sensitivities of the transmission assets and operations being studied to types and magnitudes of extreme weather events.

For exposure analysis, National Grid compared climate projections to asset design thresholds based on their geographic location as part of the overall vulnerability analysis. For example, transmission structures in areas where wind gusts were projected to be greater than 95 MPH (present design standard based on latest NESC) were identified, and substation flood risk was screened using FEMA-defined flood risk scores corresponding to substation locations.

C. Costs of Impacts

Q16) A description of the methodology or process, if any, the transmission provider uses, or plans to use, to estimate the potential costs of extreme weather impacts on identified vulnerable assets and operations;

National Grid did not develop estimated costs of extreme weather impacts. The Company is in the process of developing a Climate Change Resilience Plan to be filed with the New York Public Service Commission in November 2023 that will identify 5-, 10-, and 20-year investment plans of incremental investment proposed to address the system vulnerabilities identified in National Grid's Climate Change Vulnerability Study.

Q17) If the transmission provider estimates such potential costs, a description of the types of: (a) direct costs, such as replacements or repair costs, restoration costs, associated labor costs, or opportunity costs of lost sales, and (b) indirect costs, such as costs associated with loss of service to electric customers and other utilities that purchase power from the transmission provider, including equipment damage, spoilage, and health and safety effects, in calculating the costs of extreme weather impacts.

As part of the Company's Climate Change Resilience Plan (CCRP), National Grid anticipates including costs for recommended resilience measures as well as benefits such as avoided costs and other benefits such as reliability, safety, and resilience which may not be quantified. Please also see the response to Q.16, above.

D. <u>Risk Mitigation</u>

Q18) A description of how the transmission provider uses, or plans to use, the results of its assessment to develop measures to mitigate extreme weather risks, including:

i. How the transmission provider determines which risks should be mitigated and the appropriate time horizon for mitigation;

Proposed projects included in National Grid's Climate Change Resilience Plan (CCRP) will address assets that are most vulnerable to climate hazards, based on the exposure-sensitivity-consequence analysis included in the Climate Change Vulnerability

Study (CCVS). The CCRP will propose storm hardening and resiliency measures for the next ten years and twenty years, and the CCRP is to be updated at least every five years.

ii. How the transmission provider determines appropriate extreme weather risk mitigation measures, including any analyses used to determine the lowest-cost or most impactful portfolio of measures;

National Grid developed proposed mitigation measures to climate hazards based on input from groups of subject matter experts (SMEs), and also informed by input from consultants with specific climate vulnerability/resilience experience, as well as considering measures taken by other utilities that have developed or are presently developing resilience plans. As part of its Climate Change Resilience Plan (CCRP) to be filed with the New York Public Service Commission in November 2023, National Grid anticipates including costs for recommended resilience measures as well as benefits associated with such measures. Under the relevant legislative framework (NY PSL § 66(29)(e)), the New York Commission has eleven months to approve or modify the Company's CCRP.

Q19) A description of how the transmission provider informs, or plans to inform, relevant stakeholders—such as neighboring transmission providers, RTOs/ISOs of which the transmission provider is a member, electric customers, all affected communities, emergency management agencies, local and state administrations, and state utility regulators—of identified extreme weather risks and selected mitigation measures;

National Grid has informed relevant stakeholders throughout the process of developing the CCVS and CCRP with the vehicle of the Climate Resilience Working Group (CRWG) described in responses to Q.7 and Q.8, above. The Company also has met regularly with representatives from other electric utilities in the State as well as State regulatory staff throughout the process and filed the results of its CCVS with the New York Commission in September 2023, and will file its CCRP in November 2023. The relevant New York legislation (NY PSL § 66(29)(h)) also requires at least two CRWG meetings each year.

Q20) A description of the extent to which the transmission provider incorporates, or plans to incorporate, identified extreme weather risks and mitigation measures into local and regional transmission planning processes;

As part of National Grid's response to the Climate Change Vulnerability Study, the Company may consider new measures such as extreme weather load forecasting, reduced equipment thermal capacity due to increasing ambient temperatures or regional vulnerability due to limited availability of weather dependent generation resources. The need to consider these extreme weather risks in transmission planning studies may also be formalized as part of regional transmission planning criteria such as the New York State Reliability Council Reliability Rules. If reliability rule changes are made in New York, the Company would comply with all local and regional transmission planning requirements.

Any recommendations, such as changes to transmission design specifications, proposed in the Climate Change Resilience Plan (CCRP) also would be factored into future planning recommendations. For example, any recommendations in the CCRP for adding or replacing transmission transformers would utilize any update to transformer design specifications to withstand higher future temperatures. Transmission planning will also take into account the anticipated need for reduced conductor ratings based on projected future temperatures as proposed in the CCRP.

Q21) A description of how the transmission provider measures, or plans to measure, the progress and success of extreme weather risk mitigation measures (e.g., through reduced outages) and how it incorporates these observations into ongoing and future extreme weather risk mitigation actions.

There are presently no industry recognized resilience metrics used to measure the success/performance of climate resilience projects. National Grid is collaborating with the New York State Energy Research and Development Authority (NYSERDA) to develop potential resilience measures, and also supports similar efforts conducted by industry organizations such as the Institute of Electrical and Electronics Engineers (IEEE) and the Electric Power Research Institute (EPRI).

Attachment VII

NEETNY's Responses to Order No. 897's Appendix A Questions

NextEra Energy Transmission New York, Inc.
Information Report Regarding Policies and Processes Related to
Extreme Weather Vulnerability Assessments

NextEra Energy Transmission New York, Inc. ("NEETNY"), a subsidiary of NextEra Energy, Inc. ("NextEra"), is a transmission owner and competitive developer active in the NYISO region. NEETNY is the owner of the 20-mile, 345 kV Empire State Line that travels through Erie and Niagara counties to enable greater utilization of renewable energy from the Robert Moses Niagara Hydroelectric Power Plant and electricity imports from Ontario, Canada. The line improves electric reliability across the New York state electric grid and supports New York's goal of maximizing the flow of energy from renewable resources in the region. As directed by the Commission in Order No. 897, NEETNY provides the following responses to the Commission's questions and requests related to extreme weather vulnerability assessments.

Appendix A: Report Questions

Q1) As a threshold matter, state whether the transmission provider conducts extreme weather vulnerability assessments, and if so, how frequently it conducts those assessments.

A1) NEETNY does not conduct extreme weather vulnerability assessments for the Empire State Line. The state legislation requiring climate change vulnerability studies by New York's electric and gas utilities does not apply to transmission-only companies like NEETNY. However, NEETNY performs some extreme events analysis such as loss of all circuits within the same Right of Way (ROW) as part its planning assessments under TPL-001-5.1 overseen by the NYISO. Additionally, on a broader level, all subsidiaries of NextEra that own and operate Bulk Electric System ("BES") transmission assets are part of the company's enterprise-wide emergency management and business continuity plans. These plans evaluate a myriad of potential threats, whether natural (such as extreme weather), technical, or human, which may adversely impact any of NextEra's BES operations, including NEETNY's ability to reliably operate the Empire State Line in the NYISO region. Risk assessments for NextEra's emergency management and business continuity plans are updated from time to time based on lessons learned from drills and real-world incidents.

A. Scope

Q2) A description of the types of extreme weather events for which the transmission provider conducts, or plans to conduct, extreme weather vulnerability assessments, if any. For transmission providers that conduct, or plan to conduct, such assessments, a description of how the transmission provider determined which extreme weather hazards to include in the assessment (e.g., extreme storms such as hurricanes and the associated flooding and high winds, wildfires, extreme prolonged heat or cold, or drought conditions)

A2) With respect to TPL-001, Section 3.a of Table 1 provides that steady state analysis should be conducted for wide-area events affecting the transmission system based on system configuration and how it can be affected by events such as wildfires and severe weather (e.g., hurricanes and tornadoes). Additionally, risk assessments for NextEra's emergency management and business continuity plans include severe weather events such as hurricanes, tornadoes,

extreme hot and cold temperatures and humidity, floods, wildfire, lightning, and windstorms. The inclusion of these natural hazards in NextEra's risk management plan is based on an assessment of the likelihood of occurrence and the magnitude of the impact caused by natural incidents.

Q3) A description of how the transmission provider defines an extreme weather event for the purposes of its extreme weather vulnerability assessment, including what thresholds it uses relative to historical measurements or probabilities of occurrence, if applicable

A3) NEETNY has not defined extreme weather for purposes of performing a vulnerability assessment of the Empire State Line. Under NextEra's emergency management and business continuity plans, the risk assessment considers severe weather events such as hurricanes, tornadoes, extreme hot and cold temperatures and humidity, floods, wildfire, lightning, and windstorms.

Q4) A description of how the transmission provider selects, or plans to select, the set of assets and operations that will be examined

A4) With respect to TPL-001, the annual planning assessment encompasses NEETNY's portion of the BES for the New York Control Area. Risk assessments for NextEra's emergency management and business continuity plans encompass all of NextEra's BES assets and operations throughout the United States and Canada.

Q5) A description of how the transmission provider determines, or plans to determine, the geographic or regional scope of the analysis;

A5) With respect to TPL-001, the annual planning assessment encompasses NEETNY's portion of the BES for the New York Control Area. Risk assessments for NextEra's emergency management and business continuity plans encompass all geographic locations of NextEra's assets and operations throughout the United States and Canada, including NEETNY's portion of the BES in the NYISO region.

Q6) A description of whether and to what extent the transmission provider considers, or plans to consider, external interdependencies, such as interconnected utilities, other critical infrastructure sectors (e.g., water, telecommunications) and supply chain-related vulnerabilities, in the assessment

A6) With respect to TPL-001, annual planning assessments do not assess interdependencies or supply chain vulnerabilities. The risk assessment underlying NextEra's emergency management and business continuity plans consider numerous interdependencies and identify critical suppliers for NextEra's assets and operations throughout the United States and Canada.

Q7) A description of whether and to what extent the transmission provider coordinates, or plans to coordinate, with neighboring utilities and/or entities in other sectors that could potentially be relevant to the assessment;

A7) With respect to TPL-001, annual planning assessments incorporate a level of coordination with neighboring utilities and the NYISO related to interregional and intertie import/export capabilities. Under NextEra's emergency management and business continuity plans, coordination with impacted third parties is a critical part of incident response but third

parties are not involved in determining the scope of risk assessments related to severe weather incidents incorporated into such plans.

Q8) A description of whether and to what extent the transmission provider engages, or plans to engage, with stakeholders in the scoping phase of the assessment, including the processes used to identify and engage relevant stakeholder groups and incorporate stakeholder feedback into the extreme weather vulnerability assessment, including all affected communities.

A8) With respect to TPL-001, stakeholders other than responsible transmission owners are not involved in the scoping phase of annual planning assessments. Under NextEra's emergency management and business continuity plans, coordination with impacted third parties is a critical part of incident response but third parties are not involved in determining the scope of risk assessments related to severe weather incidents incorporated into such plans.

B. Inputs

Q9) A description of methods and processes the transmission provider uses, or plans to use, to determine the meteorological data needed for its assessment. In particular, how the transmission provider determines whether it can rely on existing extreme weather projections, and if so, whether such projections are adequately robust;

A9) NEETNY does not have a process established for determining what meteorological data to use for extreme weather vulnerability assessments and whether such data is adequately robust.

Q10) A description of how the transmission provider determines whether to use scenario analysis, and if so, whether to do so with multiple scenarios;

A10) Aside from scenario analysis incorporated into TPL-001 planning assessments, NEETNY does not have a process in place for determining how and whether to use scenario analysis for extreme weather vulnerability assessments.

Q11) The extent to which it reviews neighboring transmission providers' extreme weather vulnerability assessments, if available, to evaluate the consistency of extreme weather projections between transmission providers. Further, for RTOs/ISOs, a description of how it accounts for differences between transmission owner members' extreme weather vulnerability assessment assumptions and results;

A11) NEETNY is aware of the climate change vulnerability studies completed by New York's gas and electric utilities but has not evaluated the consistency of extreme weather projections between transmission providers.

Q12) The timeframe(s) and discount rate(s) selected for the extreme weather vulnerability assessment;

A12) With respect to TPL-001, the timeframe for annual planning assessments is determined in accordance with the Coordinated Functional Responsibility agreement with the NYISO. NEETNY's last planning assessment evaluated the planned system for the years 2022, 2026, and

20231. NEETNY does not have a discount rate policy in place for extreme weather vulnerability assessments.

Q13) A description of the methods and processes the transmission provider uses, or plans to use, to create an inventory of potentially vulnerable assets and operations.

A13) The inventory of NEETNY's assets and operations is currently limited to the property, equipment, materials and supplies associated with the Empire State Line.

C. Vulnerabilities and Exposure to Extreme Weather Hazards

Q14) A description of how the transmission provider identifies the transmission assets or operations vulnerable to the extreme weather events for which it conducts assessments;

A14) NEETNY's assets and operations are currently limited to the Empire State Line.

Q15) A description of how the transmission provider uses, or plans to use, screening analyses to test for potential vulnerabilities, as well as how the transmission provider examines, or plans to examine, the sensitivities of the transmission assets and operations being studied to types and magnitudes of extreme weather events.

A15) NEETNY has not utilized screening analysis or examined sensitivities to study the impact that extreme weather events could have for the Empire State Line.

D. Costs of Impacts

Q16) A description of the methodology or process, if any, the transmission provider uses, or plans to use, to estimate the potential costs of extreme weather impacts on identified vulnerable assets and operations;

A16) NEETNY does not have a process to estimate the costs of extreme weather impacts on the Empire State Line.

Q17) If the transmission provider estimates such potential costs, a description of the types of: (a) direct costs, such as replacements or repair costs, restoration costs, associated labor costs, or opportunity costs of lost sales, and (b) indirect costs, such as costs associated with loss of service to electric customers and other utilities that purchase power from the transmission provider, including equipment damage, spoilage, and health and safety effects, in calculating the costs of extreme weather impacts.

A17) NEETNY does not currently estimate the costs of extreme weather impacts for the Empire State Line.

E. Risk Mitigation

Q18) A description of how the transmission provider uses, or plans to use, the results of its assessment to develop measures to mitigate extreme weather risks, including:

i. How the transmission provider determines which risks should be mitigated and the appropriate time horizon for mitigation;

ii. How the transmission provider determines appropriate extreme weather risk mitigation measures, including any analyses used to determine the lowest-cost or most impactful portfolio of measures;

A18) While NEETNY has not performed an extreme weather vulnerability assessment for the Empire State Line, NextEra generally supports storm hardening as the primary measure to mitigate extreme weather risks for BES transmission assets.

Q19) A description of how the transmission provider informs, or plans to inform, relevant stakeholders—such as neighboring transmission providers, RTOs/ISOs of which the transmission provider is a member, electric customers, all affected communities, emergency management agencies, local and state administrations, and state utility regulators—of identified extreme weather risks and selected mitigation measures;

A19) NEETNY has not conducted a vulnerability assessment with identified extreme weather risks and proposed mitigation measures for which stakeholders can or should be informed.

Q20) A description of the extent to which the transmission provider incorporates, or plans to incorporate, identified extreme weather risks and mitigation measures into local and regional transmission planning processes;

A20) NEETNY has not conducted a vulnerability assessment with identified extreme weather risks and proposed mitigation measures for incorporation into local and regional planning processes for the NYISO region.

Q21) A description of how the transmission provider measures, or plans to measure, the progress and success of extreme weather risk mitigation measures (e.g., through reduced outages) and how it incorporates these observations into ongoing and future extreme weather risk mitigation actions.

A21) NEETNY has not determined if and how to measures the progress or success of extreme weather mitigation measures and how these measurements should be incorporated into future mitigation actions.

Attachment VIII

NYPA's Responses to Order No. 897's Appendix A Questions

Introduction

Created in 1931, the New York Power Authority ("NYPA") is a public authority and political subdivision of New York State (State). NYPA generates, transmits, purchases and sells electric power and energy as authorized by law. NYPA owns and maintains 1,456 circuit miles of high voltage transmission lines, including major 765-kV and 345-kV transmission facilities, and principally recovers its transmission costs from all New York State electric consumers through the NYISO tariff. NYPA also owns and operates five major generating facilities, eleven small electric generating units located at seven facilities, and four small hydroelectric facilities, with a total installed capacity of approximately 6,051 MW. NYPA's electric power customers include municipal and rural electric cooperatives located throughout the State, investor-owned utilities, high load factor industries, commercial/industrial and not-for-profit businesses throughout the State, and various government agencies and public corporations located within the metropolitan area of The City of New York and Westchester County, New York. NYPA also sells output into the NYISO electric markets. As noted in the transmittal letter, NYPA, a state instrumentality within the definition of Federal Power Act ("FPA"), is non-jurisdictional with respect to Part II of the FPA. NYPA does not waive its non-jurisdictional status through its voluntary participation in this one-time informational report filed in compliance with Order No. 897.

Q&A

1) **As a threshold matter, state whether the transmission provider conducts extreme weather vulnerability assessments, and if so, how frequently it conducts those assessments.**

   NYPA considers extreme weather vulnerability to its transmission assets and operations through several processes, as described below:

   Emergency Planning:
   NYPA's Crisis Management team conducts "all-hazards" vulnerability assessments with the regional leadership every 3 years. The all-hazards approach looks at Natural, Man Made, Technological, and Hazardous Materials-based hazards at the local level (site footprint and surrounding area) and its potential impact on NYPA Operations. Extreme Heat and Extreme Cold are included within the Natural hazards category.

   Climate Change Vulnerability Study:
   In 2021, NYPA initiated a climate vulnerability assessment with the U.S. Department of Energy Argonne National Laboratory that was completed in late 2022 ("Argonne Study"). The Argonne Study was launched in order to help NYPA better understand how its ability to generate and transmit electricity may be affected by climate change. As part of the process, NYPA collaborated with the Electric Power Research Institute ("EPRI") and Columbia University's Center on Global Energy Policy for methodology and result validation, and with other utilities for benchmarking. Data from this study is currently being augmented by additional publicly available climate change projections and will be operationalized by internal SMEs, with consultants as needed for specific projects. A statewide and asset-wide vulnerability assessment may be repeated in a few years when changes to the statewide electricity grid coupled with newer climate projections warrant updated analyses.

Transmission Planning Studies:
The New York Transmission Owners (NYTOs) and New York Independent System Operator, Inc. (NYISO) perform the TPL-001-5 Annual Planning Assessment. NYISO's assessment covers all Bulk Power System and Bulk Power Transmission Facilities (BPS/BPTF) in the New York Control Area (NYCA) and NYPA's assessment covers NYPA owned non-BPS Bulk Electric System (BES) facilities. The 90th percentile high peak load scenario, which reflects heat wave conditions, was studied as one of the sensitivities. Other sensitivity analysis may be performed under NERC TPL, CIP014 or regional processes.

Equipment Weatherization:
NYPA sites implement cold weather plans including periodic verification of equipment prone to extreme weather (e.g., circuit breakers).

A. Scope

2) A description of the types of extreme weather events for which the transmission provider conducts, or plans to conduct, extreme weather vulnerability assessments, if any. For transmission providers that conduct, or plan to conduct, such assessments, a description of how the transmission provider determined which extreme weather hazards to include in the assessment (e.g., extreme storms such as hurricanes and the associated flooding and high winds, wildfires, extreme prolonged heat or cold, or drought conditions);

Climate Change Vulnerability Study:
NYPA's Climate Change Vulnerability Study looked at extreme temperatures, extreme precipitation, inland flooding, and coastal flooding. Hazards were identified through stakeholder engagement during the RFP process in selecting Argonne to complete the climate vulnerability assessment. Then, during the assessment, additional climate variables were identified by different business units within NYPA as being important factors in decision making.

The Argonne Study provides projections for 2045-2054. These midcentury projections provide datasets that project changes in: (1) the magnitude and frequency of temperature fluctuations; (2) the intensity, frequency and duration of extreme precipitation and winter storms; (3) the frequency and magnitude/depth of extreme inland flooding; and (4) coastal flooding caused by sea level rise and cool season storm surge. These projections were used to assess which climate impacts could impact NYPA assets and facilities.

Transmission Planning Studies:
Heatwaves are assessed in the 90^{th} percentile high peak load scenario conducted in the TPL-001-5 Annual Planning Assessment.

3) A description of how the transmission provider defines an extreme weather event for the purposes of its extreme weather vulnerability assessment, including what thresholds it uses relative to historical measurements or probabilities of occurrence, if applicable;

NYPA considers extreme weather events on a case-by-case basis and defines thresholds as necessary for each business unit and end goal. For example, NYPA's Operational Risk Library that is updated on an ongoing basis throughout the year defines "major environmental force" as

"acts of nature that result in disrupting reliability and availability of generation, transmission, other business operations, or the workforce."

Climate Change Vulnerability Study:
Extreme events were defined as: single-day events occurring on a regional basis, representing the extreme daily high temperatures associated separately with 10-, 25-, and 50-year events; flooding representing single-day flooding events with extreme flood depths represented on a regional basis for the 50-yer flooding event.

Transmission Planning Studies:
A heatwave condition was defined by the 90th percentile summer peak forecasts documented in the NYISO Gold Book. The baseline and percentile summer peak forecasts utilize a cumulative temperature and humidity index, which reflects a weighted average of weather conditions on the peak day and the two preceding days and is based on the historical distribution of peak-day weather. The peak demand forecasts incorporate the projected impacts of increasing temperature trends throughout the forecast horizon. In general, a heatwave (1-in-10-year or 90/10) has a statewide average maximum temperature of 95 degrees Fahrenheit.[1]

4) A description of how the transmission provider selects, or plans to select, the set of assets and operations that will be examined;

Climate Change Vulnerability Study:
The Argonne Study considered all NYPA transmission assets, with such physical infrastructure and the accompanying transmission load flow analysis overlaid on the midcentury climate projections. The assets will be prioritized with subject matter expert (SME) input and hazard/vulnerability analyses. Existing processes and policies, including those involving asset management and business risk are being leveraged.

Extreme Cold Weatherization Analysis:
NYPA examines critical transmission equipment prone to extreme weather at regular intervals, such as breakers and instrumentation, and also prepares for under frequency load shedding/manual load shedding, which may occur during extreme weather events.

5) A description of how the transmission provider determines, or plans to determine, the geographic or regional scope of the analysis;

Climate Change Vulnerability Study:
The geographic scope of NYPA's climate change assessment is the entirety of its transmission assets which are located throughout New York State. Hydrological modeling does cross the state lines where watersheds dictate such considerations. Future scenario planning will also include larger geographic areas as necessary due to grid interconnections and hydrogeneration facilities within the Great Lakes region.

6) A description of whether and to what extent the transmission provider considers, or plans to consider, external interdependencies, such as interconnected utilities, other critical

[1] NYISO RNA Report.

infrastructure sectors (e.g., water, telecommunications) and supply chain-related vulnerabilities, in the assessment;

Procurement Strategy:
NYPA utilizes spare equipment strategy to plan and procure major transmission equipment with long lead times moreover redundancy is an important consideration of system design and substation architectures. NYPA also maintains mutual aid agreements with other TOs to share resources and equipment during system emergencies. Confidentiality, Integrity and availability of communication between NYPA transmission infrastructure and control centers is another important aspect. Formal agreements are executed with telecommunications providers and neighboring TO/ISOs that own, support or maintain some of these circuits. NYPA also owns an internal communications backbone for data transfer/sharing purposes. NYPA maintains redundancy of protection systems for all NPCC Bulk Power System facilities and analyzes single point of failure in its planning analysis. NYPA has a formal supply chain cyber security risk management process where new procurements, products and vendors are formally assessed from a cyber risk perspective. NYPA also coordinates with NYISO and neighboring TOs to determine any critical load (such as natural gas pipeline) that is supported by NYPA transmission infrastructure and the overlap between manual and automatic underfrequency load shedding is adequately addressed.

Climate Change Vulnerability Study:
The entire NYS transmission and generation grid was modeled for the load flow portion of NYPA's climate vulnerability assessment since the vulnerability of NYPA's assets is not independent of the rest of the NYISO and vice versa.

7) **A description of whether and to what extent the transmission provider coordinates, or plans to coordinate, with neighboring utilities and/or entities in other sectors that could potentially be relevant to the assessment;**

Climate Change Vulnerability Study:
NYPA meets periodically with other NYS electric utilities to align on climate resilience approaches. NYPA also independently meets with out of state utility peers who are similarly operationalizing climate projection data, in addition to being heavily involved with EPRI's Climate READi program.

Transmission Planning Studies:
Per NYISO/NYTO Transmission Planners Coordinated Functional Registration Responsibility Matrix, NYPA provides the NYISO its Planning Assessment as part of a standardized addendum to the NYISO Planning Assessment. NYISO then distributes the Planning Assessment to neighboring utilities in the other regions.

8) **A description of whether and to what extent the transmission provider engages, or plans to engage, with stakeholders in the scoping phase of the assessment, including the processes used to identify and engage relevant stakeholder groups and incorporate stakeholder feedback into the extreme weather vulnerability assessment, including all affected communities.**

Emergency Planning: NYPA was a participant in the hurricane drills/exercise referenced in PSEGLI's answer to Question 8 and plans to participate in this activity annually.

Climate Change Vulnerability Study:
NYPA keeps customer and community stakeholders top of mind when making generation and transmission decisions. The current iteration of the Argonne Study is intended as an internal document, but phase 2 of the study will more directly address community climate vulnerabilities.

NYS Climate Assessment:
NYPA is a part of the NYS Climate Impacts Assessment - Energy Technical Working Group . The assessment is a comprehensive research effort to better understand and document how climate change is affecting NYS and what future impacts may be and how NYPA can prepare for them. The energy chapter covers many aspects of the power grid, analyzing climate impacts and providing adaptation strategies.[2] The group provides an opportunity for NYPA to engage with NYS SMEs and stakeholders and develop a statewide approach to extreme weather and adaptation.

B. Inputs

9) A description of methods and processes the transmission provider uses, or plans to use, to determine the meteorological data needed for its assessment. In particular, how the transmission provider determines whether it can rely on existing extreme weather projections, and if so, whether such projections are adequately robust;

Climate Change Vulnerability Study:
The end-use of the weather variables has a large impact on which data sets are used and the amount of uncertainty or ranges accepted in the data. NYPA is currently working on inputting three different data sets into a user-friendly Geographic Information System web services interface that can be used by various departments. These datasets include the Argonne National Laboratory climate projections developed in consultation with Columbia and EPRI under NYPA, the Columbia University data developed under the New York State Energy Research and Development Authority ("NYSERDA"), and Massachusetts Institute of Technology data developed under National Grid. These datasets offer some comparison, but also importantly round out the climate variables modeled that can be used for decision-making.

In cases where New York specific data is not available, a literature review or meta-analysis combined with scenario planning and stress testing are planned. This is the case for the Great Lakes watershed, where undertaking a NYS or NYPA-specific study would be time and cost prohibitive as well as replicate efforts already undertaken by other entities. Internal and external SMEs provide guidance on useable data and what data gaps are priorities to fill.

[2] Technical Workgroups – New York State Climate Impacts Assessment (nysclimateimpacts.org).

10) **A description of how the transmission provider determines whether to use scenario analysis, and if so, whether to do so with multiple scenarios;**

Climate Change Vulnerability Study:
Scenario analyses were used in the Argonne Study, for example, emissions scenarios were selected based on best practices and NYPA's role providing a critical infrastructure function to the state of New York. Argonne generated dynamically downscaled climate impact projections for three CMIP5-based general circulation models (GCM) simulations using two future emission scenarios for each, resulting in six datasets. The emission scenarios used were RCP4.5 and RCP8.5, as characterized in the Intergovernmental Panel on Climate Change's Fifth Assessment Report ("AR5").[3] This NYPA effort, however, focused only on RCP8.5-based projections for two reasons: first, the variations between RCP 4.5 and RCP 8.5 up until mid-century are marginal; second, the climate impact datasets will be used by NYPA in future planning and risk-based analysis, therefore a more aggressive approach is warranted given the high risk of future climate change.

Further scenario analysis involving the evolving energy landscape and other socioeconomic drivers is planned for stress testing some of NYPA's larger generating facilities for long term planning.

11) **The extent to which it reviews neighboring transmission providers' extreme weather vulnerability assessments, if available, to evaluate the consistency of extreme weather projections between transmission providers. Further, for RTOs/ISOs, a description of how it accounts for differences between transmission owner members' extreme weather vulnerability assessment assumptions and results;**

Climate Change Vulnerability Study:
NYPA reviews peer utility and NYS utility vulnerability assessments as available in addition to regular discussions. NYPA also participates in state and national groups addressing climate change mitigation and adaptation for the electric sector, such as EPRI, North American Transmission Forum, and the Interagency Climate Adaptation and Resilience Work Group.

Each of the other New York utilities has a unique service territory, set of assets, and customer base that guide individual decisions on the most appropriate climate change adaptation practices and which climate variables should be addressed. Where appropriate, NYPA strives to remain consistent with state partners and uses the same climate projection data. The processes underpinning the vulnerability assessments and ultimate adaptation prioritization remain consistent.

Transmission Planning Studies:
NYPA reviews annual planning assessments conducted by peer utilities, the NYISO and some neighboring utilities in the other regions.

12) **The timeframe(s) and discount rate(s) selected for the extreme weather vulnerability assessment;**

[3] AR5 Synthesis Report - Climate Change 2014 (ipcc.ch)

Climate Change Vulnerability Study:
NYPA is currently using different timeframes to evaluate climate risks and opportunities. NYPA's short-term time horizon is 0-2 years (2024) in alignment with the Authority's Risk and Asset Management policies. NYPA's medium-term time horizon is 2-9 years (2030) in alignment with the VISION2030 strategic plan and regulatory requirements. NYPA's long-term horizon is 9-31 years (2054) in alignment with the long-term time horizon established for the Authority's ongoing climate vulnerability study and pertinent for long-term planning.

In the context of the Argonne Study and other publicly available NYS data sets, a discount rate has not yet been directly considered. For other analyses, such as for BuildSmart projects and GHG accounting, NYPA considers the social costs of carbon in line with DEC recommendations and calculates the 1 percent (high), 2 percent (average), and 3 percent (low) discount rates.

13) A description of the methods and processes the transmission provider uses, or plans to use, to create an inventory of potentially vulnerable assets and operations.

Climate Change Vulnerability Study:
The second part of the climate vulnerability assessment conducted by Argonne National Laboratory included a transmission load flow analysis that resulted in site-specific asset and operational vulnerabilities. This comprises the base for the roadmap NYPA is using to create an inventory of potentially vulnerable assets and operations.

C. Vulnerabilities and Exposure to Extreme Weather Hazards

14) A description of how the transmission provider identifies the transmission assets or operations vulnerable to the extreme weather events for which it conducts assessments;

Climate Change Vulnerability Study:
NYPA will utilize the inventory of site-specific assets and operational vulnerabilities identified from the second part of the climate vulnerability assessment conducted by Argonne National Laboratory to prioritize asset classes and projects with internal SMEs.

15) A description of how the transmission provider uses, or plans to use, screening analyses to test for potential vulnerabilities, as well as how the transmission provider examines, or plans to examine, the sensitivities of the transmission assets and operations being studied to types and magnitudes of extreme weather events.

Climate Change Vulnerability Study:
After Argonne National Laboratory developed the climate projections, the climate impact estimates were used in Argonne's EPClimate electric-transmission grid load-flow model to identify and quantify local scale and system-level impacts to transmission infrastructure and NYPA generation facilities. Although the model considered all transmission infrastructure in New York State, the results focus on NYPA-owned assets. The next step was a sensitivity analysis to understand the extent and significance of the climate-change impact on NYPA's facilities, assets, and equipment. The Argonne Study combined the results of the model and the sensitivity analysis to produce a risk-based vulnerability analysis and system-wide risk assessment.

NYPA is also using its Geographic Information System in conjunction with other internal software platforms such as those employed by NYPA's Asset Management team to evaluate physical and operational exposure.

D. Costs of Impacts

16) A description of the methodology or process, if any, the transmission provider uses, or plans to use, to estimate the potential costs of extreme weather impacts on identified vulnerable assets and operations;

Climate Change Vulnerability Study:
NYPA is in the process of operationalizing the results of the Argonne Study, including development of asset-specific cost benefit analysis in order to evaluate the best approaches for prioritization of decisions. These cost-benefit analyses would consider environmental, social, and governance factors.

17) If the transmission provider estimates such potential costs, a description of the types of: (a) direct costs, such as replacements or repair costs, restoration costs, associated labor costs, or opportunity costs of lost sales, and (b) indirect costs, such as costs associated with loss of service to electric customers and other utilities that purchase power from the transmission provider, including equipment damage, spoilage, and health and safety effects, in calculating the costs of extreme weather impacts.

Climate Change Vulnerability Study:
As stated in the answer to Question #16, the potential costs, the types of costs, indirect and direct costs associated with the climate change vulnerability study is currently being considered/reviewed.

E. Risk Mitigation

18) A description of how the transmission provider uses, or plans to use, the results of its assessment to develop measures to mitigate extreme weather risks, including:

- **i. How the transmission provider determines which risks should be mitigated and the appropriate time horizon for mitigation;**
- **ii. How the transmission provider determines appropriate extreme weather risk mitigation measures, including any analyses used to determine the lowest-cost or most impactful portfolio of measures;**

Climate Change Vulnerability Study:
Based upon potential mitigation strategies set forth in the Argonne Study, NYPA is developing a formal project prioritization process. Best management practices from across the industry and in alignment with NYPA's risk appetite, ISO55001 certification, VISION2030, Sustainability Plan, the CLCPA, and other guiding policies and regulations are being incorporated.

19) A description of how the transmission provider informs, or plans to inform, relevant stakeholders—such as neighboring transmission providers, RTOs/ISOs of which the transmission provider is a member, electric customers, all affected communities, emergency

management agencies, local and state administrations, and state utility regulators—of identified extreme weather risks and selected mitigation measures;

Emergency Planning:
NYPA Crisis Management maintains relationships with stakeholders at all levels of government (Local, County, State and Federal). NYPA conducts/participates in various meetings and activities with our stakeholders that cover education, preparation and response activities.

Climate Change Vulnerability Study:
NYPA is part of multiple utility groups and undertakes regular meetings with peer utilities and state entities to discuss climate risks and adaptation strategies.

20) A description of the extent to which the transmission provider incorporates, or plans to incorporate, identified extreme weather risks and mitigation measures into local and regional transmission planning processes;

Though NYPA does not have a local transmission system to plan for, it participates with other New York transmission owners to address regional system concerns. Further details are noted below.

Emergency Planning:
NYPA Crisis Management's Hazard Vulnerability Assessment process includes representation from the Transmission group. Crisis Management is a member of the Transmission Maintenance Committee that meets at least twice a year and supports the Transmission group with their Transmission Emergency Restoration Plan.

NYS Reliability Council ("NYSRC") Extreme Weather Working Group ("EWWG"):
The NYSRC EWWG is developing extreme weather operating plans and resource adequacy assessment requirements as well as extreme weather resource and transmission planning criteria for improving NYCA resilience to extreme weather events. EWWG has drafted new reliability rules aimed at consideration of credible combinations of system conditions which stress the system defined based upon analysis of historical and predicted extreme weather phenomena in NYCA and contiguous control areas. These rules are presently under review by NY Stakeholders including NYISO. Furthermore, EWWG has recently completed a white paper analysis of offshore wind lull extreme weather event using 21 years of hourly wind data at seven wind development sites, extending from New Jersey to Rhode Island. Based on this information EWWG is developing extreme weather operating plans and resource adequacy assessment requirements as well as extreme weather resource and transmission planning criteria for improving NYCA resilience to extreme weather events.

Transmission Planning:
For risk assessment scenarios, NYISO and the NYTOs coordinate the identification of the scenarios to be considered in the annual FERC-715 filing base cases. With respect to mitigation measures, under an extreme weather scenario, if a planning criteria violation is identified a capital project solution to address the violation will be proposed. Firm projects are included in the FERC-715 filing base cases. NYTOs and NYISO also coordinate on the TPL-001-5 Annual

Planning Assessment and will work to determine the inclusion of extreme weather risks and mitigation as appropriate.

21) A description of how the transmission provider measures, or plans to measure, the progress and success of extreme weather risk mitigation measures (e.g., through reduced outages) and how it incorporates these observations into ongoing and future extreme weather risk mitigation actions.

Climate Change Vulnerability Study:
NYPA is currently developing a formal process for operationalization of the climate vulnerability assessment across all business units.

Attachment IX

NYSEG and RG&E's Responses to Order No. 897's Appendix A Questions

Avangrid (NYSEG and RG&E) Answers for NETO/ISO-NE Joint Response to FERC Order 897 One-Time Report on Extreme Weather Events

Introduction

New York State Electric & Gas Corporation (NYSEG) and Rochester Gas and Electric Corporation (RG&E) are subsidiaries of AVANGRID, Inc. Established in 1852, NYSEG operates approximately 35,000 miles of electric distribution lines and 4,500 miles of electric transmission lines across more than 40% of upstate New York. Established in 1848, RG&E serves approximately 386,000 electricity customers and 320,000 natural gas customers in a nine-county region centered on the City of Rochester, New York. AVANGRID, Inc. is a leading, sustainable energy company with $39 billion in assets and operations in 24 U.S. states. AVANGRID, Inc. is part of the Iberdrola Group and has two primary lines of business – Avangrid Networks, Inc. ("Avangrid" for purposes of this report), of which NYSEG and RG&E are a part, and Avangrid Renewables, LLC.

X. Appendix A: Report Questions

For the reasons discussed in this final rule we direct transmission providers to file a one-time informational report related to their extreme weather vulnerability assessment policies and processes, if any. The report must respond to the following questions.

(Q1) As a threshold matter, state whether the transmission provider conducts extreme weather vulnerability assessments, and if so, how frequently it conducts those assessments.

(A1) NYSEG and RG&E have each conducted extreme weather vulnerability assessments as part of their respective studies evaluating the effect of climate change on their systems. New York State legislation required NYSEG and RG&E to complete a Climate Change Vulnerability Study (CCVS) in NY (Public Service Law 66 subdivision 29) completed in September 2023. A Climate Change Resiliency Plan (CCRP) is planned to be completed by the end of 2023 as a compendium follow-up to the CCVS. There are no requirements to repeat the Climate Change Vulnerability Study.

A CCVS was last completed for NYSEG and RG&E in 2016 as part of the voluntary Department of Energy's (DOE) Partnership for Energy Sector Climate Resilience. Avangrid also performs NERC TPL-001 studies to assess the impact of extreme events (refer to NERC TPL-001-5 Table 1) on peak demand (90/10 weather) at least once every 5 years, or as required by system changes. Finally, Avangrid plans and conducts exercises that reflect the potential outcomes of extreme weather as part of its emergency preparedness efforts.

A. Scope

(Q2) A description of the types of extreme weather events for which the transmission provider conducts, or plans to conduct, extreme weather vulnerability assessments, if any. For transmission providers that conduct, or plan to conduct, such assessments, a description of how the transmission provider determined which extreme weather hazards to include in the assessment (e.g., extreme storms such as hurricanes and the associated flooding and high winds, wildfires, extreme prolonged heat or cold, or drought conditions);

(A2) As part of the CCVS completed in September 2023, NYSEG and RG&E performed analysis to determine the effect of climate change on some extreme weather events including but not limited to tropical cyclones, ice storms, and heat waves. An evaluation of the vulnerability of NYSEG and RG&E's assets to particular weather events is used to determine which types of events to include in the assessments. The 2016 CCVS for NYSEG and RG&E evaluated increasing temperatures and heatwaves, heavy snowfalls and icing events, increasing precipitation and heavy downpours, and increasing frequency of hurricane and wind events.

As part of the NERC TPL-001 studies in New York, the following two types of extreme weather events are assessed by Avangrid: 1) extreme events, including loss of all transmission lines on a common right-of-way; loss of a switching station or substation; loss of all generating units at a generating station as a result of severe weather event (e.g., hurricane, tornado, flood, etc.) and 2) extreme peak demand (99/1): 99th

percentile peak demand forecast is representative of an extremely hot and humid (well above expected weather) peak day. These assessments determine the transmission system's vulnerability to many extreme weather events.

(Q3) A description of how the transmission provider defines an extreme weather event for the purposes of its extreme weather vulnerability assessment, including what thresholds it uses relative to historical measurements or probabilities of occurrence, if applicable;

(A3) NYSEG and RG&E have not developed a set method to define which weather events would be considered extreme in their 2023 CCVS. Rather, the 2023 CCVS qualitatively determined, with input from stakeholders, which extreme weather events to assess. NERC TPL-001 does not establish a threshold and the 2016 CCVS for NYSEG and RG&E did not define a threshold for extreme weather events, although it did consider number of days above 90 degrees and 100- and 500-year floodplain risk, among other weather risks.

(Q4) A description of how the transmission provider selects, or plans to select, the set of assets and operations that will be examined;

(A4) The 2016 and 2023 CCVS studies evaluated assets and operations vulnerability to climate change and extreme weather. The list of assets and process with vulnerabilities to climate change and extreme weather was developed using a risk-based approach, including subject matter expert feedback and experience. Transmission planning analyses evaluate system performance of NYSEG and RG&E's bulk transmission systems under both normal system conditions and contingency conditions (considering both planning events and extreme events) in accordance with Avangrid transmission planning criteria.

(Q5) A description of how the transmission provider determines, or plans to determine, the geographic or regional scope of the analysis;

(A5) The 2016 and 2023 extreme weather vulnerability assessments related to climate change for NYSEG and RG&E have been and are expected to be constrained to the area in which the transmission system is located, with particular focus on the service territories of each company. Transmission planning analysis under NERC TPL-001 is also focused on NYSEG and RG&E service territories, although planning and analysis of interties and interregional import/export capabilities is coordinated with neighboring utilities and NYISO.

(Q6) A description of whether and to what extent the transmission provider considers, or plans to consider, external interdependencies, such as interconnected utilities, other critical infrastructure sectors (e.g., water, telecommunications) and supply chain related vulnerabilities, in the assessment;

(A6) The 2016 and 2023 CCVs have limited analysis on interdependencies as it relates to the effect of climate change on extreme weather. Transmission planning analysis under NERC TPL-001 does not readily assess interdependencies. Additional assessment involved with external interdependencies is coordinated by NYISO.

(Q7) A description of whether and to what extent the transmission provider coordinates, or plans to coordinate, with neighboring utilities and/or entities in other sectors that could potentially be relevant to the assessment;

(A7) NYSEG and RG&E's 2016 CCVS was conducted as part of the DOE Partnership for Energy Sector Climate Resilience, wherein DOE coordinated a level of information exchange. During development of the 2023 CCVS there was strong coordination/collaboration with various other transmission providers throughout New York state. In addition, a Climate Resilience Working Group (CRWG) was formed of NYSEG and RG&E stakeholders that allowed for input on the CCVS from external parties. As stated in answer to Q5,

transmission planning analysis under NERC TPL-001 has a level of coordination with neighboring utilities and NYISO as relates to the interregional and interties import/export capabilities.

Also note the potentially relevant ongoing work with the New York State Reliability Council (NYSRC) Extreme Weather Working Group (EWWG). NYSEG and RG&E have a seat on the NYSRC Executive Committee and so have had a role in authorizing the EWWG subcommittee work. The NYSRC EWWG is developing extreme weather operating plans and resource adequacy assessment requirements as well as extreme weather resource and transmission planning criteria for improving New York Control Area (NYCA) resilience to extreme weather events.

(Q8) A description of whether and to what extent the transmission provider engages, or plans to engage, with stakeholders in the scoping phase of the assessment, including the processes used to identify and engage relevant stakeholder groups and incorporate stakeholder feedback into the extreme weather vulnerability assessment, including all affected communities.

(A8) Stakeholders were invited and were continually informed and consulted on the work being done in NY for the 2023 CCVS. Engagement with stakeholders occurred mainly through CRWG meetings. Stakeholders were also provided a draft copy of the CCVS to provide comment. For transmission planning analysis under NERC TPL-001, NYSEG/RG&E coordinates with NYISO and neighboring transmission providers on relevant study assumptions.

B. Inputs

(Q9) A description of methods and processes the transmission provider uses, or plans to use, to determine the meteorological data needed for its assessment. In particular, how the transmission provider determines whether it can rely on existing extreme weather projections, and if so, whether such projections are adequately robust;

(A9) Quantitative projections for extreme weather events like tropical cyclones and ice storms were not possible to generate for NYSEG and RG&E's 2016 and 2023 CCVSs and associated climate change resilience plans (CCRPs). Instead, NYSEG and RG&E used literature review to determine qualitative projections for changes to extreme weather features like tropical storm intensity and frequency. Quantitative projections were performed for other events like flooding events (100 year and 500 year) and increases in temperature and future heat wave intensity/duration. Transmission planning analysis for NYSEG and RG&E under NERC TPL-001 utilizes the forecasts on extreme weather projections contained in NYISO's Gold Book.

(Q10) A description of how the transmission provider determines whether to use scenario analysis, and if so, whether to do so with multiple scenarios;

(A10) NYSEG and RG&E used scenario analysis in their 2016 and 2023 CCVSs. Regarding the 2023 CCVSs, for quantitative analysis a specified future socioeconomic scenario (i.e., Intergovernmental Panel on Climate Change (IPCC) SSP5-8.5) and the 50th percentile of results was used to assess risk and develop resilience measures. Another scenario (i.e., SS2-4.5) was evaluated in the vulnerability assessments, but focus was on one specified scenario (i.e., SSP5-8.5) for mitigation efforts. For future climate parameter values, Avangrid's 2016 CCVS for NYSEG and RG&E utilized the lower emissions scenario known as scenario B1 (from the U.S. Global Change Research Program's 2014 *Climate Change Impacts in the United States: The Third National Climate Assessment*). Ultimately, determination of scenario(s) analysis is based on the available information and contribution to the quantitative analysis in the assessment.

(Q11) The extent to which it reviews neighboring transmission providers' extreme weather vulnerability assessments, if available, to evaluate the consistency of extreme weather projections between transmission providers. Further, for RTOs/ISOs, a description of how it accounts for differences between transmission owner members' extreme weather vulnerability assessment assumptions and results;

(A11) For the NYSEG and RG&E 2023 CCVS and associated Resilience Plan all participants in New York used largely the same dataset for quantitative results. For qualitative analyses each participant could utilize information that they were able to locate, though there was strong collaboration between neighboring entities. NERC TPL-001 study reports are shared with NYISO and neighboring utilities as designated in the standard. NYSEG/RG&E's annual NERC transmission planning assessment presently consider 99/1 summer peak extreme weather condition as a sensitivity scenario.

(Q12) The timeframe(s) and discount rate(s) selected for the extreme weather vulnerability assessment;

(A12) The 2016 and 2023 Climate Change Vulnerability Studies and associated Resilience Plans for NYSEG and RG&E focused on the period from the present to 2050, though projections out to the end of the century were considered.

(Q13) A description of the methods and processes the transmission provider uses, or plans to use, to create an inventory of potentially vulnerable assets and operations.

(A13) The most vulnerable asset types or processes were identified in CCVSs for NYSEG and RG&E using a risked-based approach. Specific assets found to be the most vulnerable have associated recommended mitigation options to be identified. Mitigation options will be included in a Climate Change Resilience Plan (CCRP) for NYSEG and RG&E that is due in November 2023. This approach to creating an inventory of potential vulnerabilities was taken for the 2016 CCVS for NYSEG and RG&E. As provided in answer to Q4, transmission planning analyses under NERC TPL-001 evaluate system performance of the NYSEG and RG&E bulk transmission system under both normal system conditions and contingency conditions (considering both planning events and extreme events) in accordance with Avangrid transmission planning criteria.

C. Vulnerabilities and Exposure to Extreme Weather Hazards

(Q14) A description of how the transmission provider identifies the transmission assets or operations vulnerable to the extreme weather events for which it conducts assessments;

(A14) The 2016 and 2023 CCVSs for NYSEG and RG&E assume that all assets in the region of study could potentially be subjected to similar levels of atmospheric extreme weather, although different types of transmission assets and processes may have different vulnerabilities to certain types of extreme weather events. Vulnerability to extreme weather events such as icing and high winds was assessed. As previously stated, NERC TPL-001 focuses on the bulk transmission system.

(Q15) A description of how the transmission provider uses, or plans to use, screening analyses to test for potential vulnerabilities, as well as how the transmission provider examines, or plans to examine, the sensitivities of the transmission assets and operations being studied to types and magnitudes of extreme weather events.

(A15) A combination of exposure and sensitivity was used in the 2023 CCVS for NYSEG and RG&E to determine which transmission assets could be vulnerable to extreme weather. For example, a transmission structure can be exposed to extreme heat but is generally not sensitive to it; a transmission conductor would be exposed to this same type of weather and is sensitive to it. The goal of the 2016 CCVS for NYSEG and RG&E was to identify and quantify threats to physical assets and operations in terms of exposure, sensitivity, and adaptive capacity due to future climate-related changes.

D. Costs of Impacts

(Q16) A description of the methodology or process, if any, the transmission provider uses, or plans to use, to estimate the potential costs of extreme weather impacts on identified vulnerable assets and operations;

(A16) As part of the risk-based framework to identify the most at-risk facilities, high-level estimates of the direct costs to restore damaged equipment due to the evaluated extreme weather events will be included in the planned 2023 CCRP for NYSEG and RG&E. Avangrid's 2016 resiliency plan in follow-up to the CCVS for NYSEG and RG&E did not as much assess potential costs of extreme weather impacts on identified vulnerable assets and operations as it conducted a high-level cost-benefit analysis of prioritized resiliency strategies.

(Q17) If the transmission provider estimates such potential costs, a description of the types of: (a) direct costs, such as replacements or repair costs, restoration costs, associated labor costs, or opportunity costs of lost sales, and (b) indirect costs, such as costs associated with loss of service to electric customers and other utilities that purchase power from the transmission provider, including equipment damage, spoilage, and health and safety effects, in calculating the costs of extreme weather impacts.

(A17) High-level estimates of the direct costs to restore the system due to the evaluated extreme weather events will be included in NYSEG and RG&E's forthcoming 2023 resiliency plans. Opportunity costs or indirect costs will not be included. Avangrid's 2016 resiliency plan for NYSEG and RG&E considered in its cost-benefit analysis of prioritized resiliency strategies the ability of the strategy to affect the potential outage cost to customers.

E. Risk Mitigation

(Q18) A description of how the transmission provider uses, or plans to use, the results of its assessment to develop measures to mitigate extreme weather risks, including:

i. How the transmission provider determines which risks should be mitigated and the appropriate time horizon for mitigation;

ii. How the transmission provider determines appropriate extreme weather risk mitigation measures, including any analyses used to determine the lowest cost or most impactful portfolio of measures;

(A18) The 2016 and 2023 assessments for NYSEG and RG&E include general and specific mitigation measures to the impact of climate change on extreme weather as laid out in resiliency plans developed in follow-up to the vulnerability assessments. No specific mitigation measures have been developed for extreme events as part of NERC TPL-001 assessments.

The 2023 CCVS for NYSEG and RG&E utilize a risk-based approach to identify for each extreme weather event which specific assets or locations are expected to be most at-risk. This evaluation includes, but is not limited to, current customer count, critical customer count, current facility limitations, and expected future conditions. The selected time horizons for mitigation depend on when particular risks become realized due to climate change. Avangrid' 2016 CCVS and resiliency plan utilized the following evaluation criteria to determine timing and implementation feasibility of resiliency strategies: number of company and non-company groups involved, whether it is a process or an installation of a hard asset, the level of technology that is needed, and where the strategy fits within the planning horizon to the year 2050 based on the climate related threat addressed by the strategy.

It is anticipated that the forthcoming 2023 CCRP for NYSEG and RG&E will perform a multicriteria evaluation of potential resilience measures. This process is anticipated to score a resilience measure from 1-10 on some or all of the following categories: resilience, reliability increase, equity, safety increase, cost, asset condition, and capacity. In the 2016 Avangrid CCVS and CCRP, a resiliency strategy risk mitigation matrix assessment was developed to identify priority risk mitigation strategies for cost-benefit analysis and further consideration. Criteria to evaluate resilience strategies included number of key utility risks addressed, type

and number of internal business operations addressed, system impact prevention, system impact restoration, and likelihood that the resilience strategy will address the utility risks and the system impacts.

(Q19) A description of how the transmission provider informs, or plans to inform, relevant stakeholders—such as neighboring transmission providers, RTOs/ISOs of which the transmission provider is a member, electric customers, all affected communities, emergency management agencies, local and state administrations, and state utility regulators—of identified extreme weather risks and selected mitigation measures;

(A19) NYSEG and RG&E will be sending the 2023 CCVS and CCRP to all CRWG participants, and publishing the results on its website. Regarding NERC TPL-001 assessments, NYSEG and RG&E submit NERC TPL-001 assessment report to NYISO and NYISO shares the assessment report with other transmission owners within NY state and other jurisdictions.

(Q20) A description of the extent to which the transmission provider incorporates, or plans to incorporate, identified extreme weather risks and mitigation measures into local and regional transmission planning processes;

(A20) It is expected that any site-specific results of the final CCRP for NYSEG and RG&E will be integrated into typical Avangrid project planning processes. Any results from the CCRP that pertain to specification updates and/or procedural changes will be integrated into business-as-usual activities. As an example, an outgrowth of the Avangrid 2016 CCVS and CCRP work was a modification to substation siting criteria wherein all new substation sites are now designed to withstand a 500-year flood event. No specific mitigation measures have been incorporated for extreme events as part of NERC TPL-001 assessments.

(Q21) A description of how the transmission provider measures, or plans to measure, the progress and success of extreme weather risk mitigation measures (e.g., through reduced outages) and how it incorporates these observations into ongoing and future extreme weather risk mitigation actions.

(A21) NYSEG and RG&E have not determined if and how they may measure the progress or success of resilience measures.

Attachment X

NY Transco's Responses to Order No. 897's Appendix A Questions

NY Transco Response to Order No. 897

Introduction

New York Transco ("NY Transco") is a New York limited liability company that develops and operates high voltage bulk transmission facilities and maintains those projects under the functional and operational control of the NYISO. NY Transco is owned by the following affiliates of the New York Transmission Owners: Consolidated Edison Transmission, LLC; Grid NY, LLC; Iberdrola USA Networks New York Transco, LLC; and Central Hudson Electric Transmission, LLC. Transco's corporate objective is to plan, develop, and own new high-voltage electric transmission projects designed to reduce energy prices for consumers, facilitate the growth of renewable generation resources, and ensure long-term grid reliability. NY Transco is a transmission-owning member of NYISO and is a registered Transmission Owner and Transmission Planner with NPCC. Each response below describes activities in several areas that are responsive to FERC inquiries.

Q&A

1) **As a threshold matter, state whether the transmission provider conducts extreme weather vulnerability assessments, and if so, how frequently it conducts those assessments.**

Vulnerability of NY Transco's transmission assets to direct effects of extreme weather events (e.g., wind, ice loading) is factored into NY Transco's design standards. All NY Transco transmission assets have been constructed within the last 10 years and are designed to meet the latest requirements of the National Electric Safety Code (NESC) and in many cases NY Transco design standards exceed the NESC requirements.

NY Transco also considers the effects of extreme weather conditions and extreme weather events on our transmission assets in our annual transmission planning assessment. In addition to NY Transco's own assessments, NY Transco's Bulk Power System (BPS) assets (as defined by the Northeast Power Coordinating Council (NPCC)) and New York State Bulk Power Transmission Facility (BPTF) assets (as defined in the New York Independent System Operator, Inc. (NYISO) Open Access Transmission Tariff (OATT)) are also included, where applicable, in assessments

performed by NYISO as discussed in the NYISO response to Order No. 897.

2) **A description of the types of extreme weather events for which the transmission provider conducts, or plans to conduct, extreme weather vulnerability assessments, if any. For transmission providers that conduct, or plan to conduct, such assessments, a description of how the transmission provider determined which extreme weather hazards to include in the assessment (e.g., extreme storms such as hurricanes and the associated flooding and high winds, wildfires, extreme prolonged heat or cold, or drought conditions);**

NY Transco assesses the impact of extreme weather in our annual planning assessment in two ways: (1) as a system condition represented in the power flow model, and (2) through selection of contingencies. NY Transco assesses extreme weather conditions by including a sensitivity in our annual planning assessment to heat wave conditions associated with a summer 90/10 peak load forecast (weather conditions that have a 10 percent probability of being exceeded). NY Transco assesses the impact of contingencies that could occur during extreme weather events, such as hurricane and other high wind events, that could result in loss of multiple circuits on a right-of-way or loss of all functionality at a substation. These extreme weather events are included based on evaluating the extreme events expected to produce more severe system impacts.

3) **A description of how the transmission provider defines an extreme weather event for the purposes of its extreme weather vulnerability assessment, including what thresholds it uses relative to historical measurements or probabilities of occurrence, if applicable;**

NY Transco has not developed a formal definition of an extreme weather event.

4) **A description of how the transmission provider selects, or plans to select, the set of assets and operations that will be examined;**

NY Transco selects the set of assets for inclusion in our annual planning assessment in accordance with the division of responsibility established by NYISO and NY Transco in accordance with North American Electric Reliability Corporation (NERC) Reliability Standard TPL-001-5.1, Requirement R7. NYISO is responsible for thermal and voltage assessments of the Bulk Power System (BPS) (as defined by NPCC) and transient stability assessment of the Bulk Electric System (BES) (as defined by NERC). NY Transco is responsible for thermal and voltage assessment of NY Transco's non-BPS BES assets.

NY Transco evaluates thermal and voltage performance for all NY Transco assets. NY Transco also evaluates thermal and voltage performance on assets of neighboring transmission providers for contingencies associated with NY Transco assets.

5) **A description of how the transmission provider determines, or plans to determine, the geographic or regional scope of the analysis;**

NY Transco assesses the Capital, Hudson Valley, and Mohawk Valley regions of New York State, which are the geographic regions in which NY Transco assets are located. The majority of NY Transco assets are located in the Capital and Hudson Valley regions and NY Transco assesses all BES assets in these regions. NY Transco's assessment of the Mohawk Valley is limited to the two BPS assets owned by NY Transco in this region. .

6) **A description of whether and to what extent the transmission provider considers, or plans to consider, external interdependencies, such as interconnected utilities, other critical**

infrastructure sectors (e.g., water, telecommunications) and supply chain-related vulnerabilities, in the assessment;

NY Transco considers the assets of interconnected utilities within the Capital and Hudson Valley regions in our assessments. NY Transco's assessments have not considered external interdependencies with other critical infrastructure sectors or supply chain related vulnerabilities.

7) **A description of whether and to what extent the transmission provider coordinates, or plans to coordinate, with neighboring utilities and/or entities in other sectors that could potentially be relevant to the assessment;**

NY Transco coordinates with neighboring transmission providers and NYISO as part of our annual planning assessment and through participation in NYISO and NY Transmission Owner working groups. NY Transco's annual planning assessment is included as an addendum to NYISO's annual planning assessment and is distributed by NYISO to adjacent Planning Coordinators, Transmission Planners, and other functional entities in accordance with NERC Reliability Standard TPL-001-5.1, Requirement R8. NY Transco has not identified entities in other sectors that could potentially be relevant to our assessments.

8) **A description of whether and to what extent the transmission provider engages, or plans to engage, with stakeholders in the scoping phase of the assessment, including the processes used to identify and engage relevant stakeholder groups and incorporate stakeholder feedback into the extreme weather vulnerability assessment, including all affected communities.**

NY Transco does not directly engage stakeholders in the scoping phase of our transmission planning assessments or solicit stakeholder feedback, other than NYISO and other transmission providers. NY Transco assessments do not affect specific communities of stakeholders because NY Transco is a transmission-only provider that does not have a franchise customer-service territory.

NY Transco indirectly obtains stakeholder input through participation in NYISO stakeholder group activities and compliance with reliability rules and regulatory orders that incorporate stakeholder input. For example, the New York State Reliability Council (NYSRC) Extreme Weather Working Group (EWWG) was established for the purpose of mitigating extreme weather reliability impacts to the New York power system. The EWWG, which includes stakeholder representation, is developing extreme weather operating plans and resource adequacy assessment requirements as well as extreme weather resource and transmission planning criteria for improving resilience to extreme weather events. NY Transco will comply with any applicable requirements that result from the EWWG assessment.

A. Inputs

9) A description of methods and processes the transmission provider uses, or plans to use, to determine the meteorological data needed for its assessment. In particular, how the transmission provider determines whether it can rely on existing extreme weather projections, and if so, whether such projections are adequately robust;

NY Transco does not serve any load and is not involved in development of load forecasts or decisions regarding the meteorological data on which forecasts are based. NY Transco assessments are based on the load forecasts included in the FERC 715 case development coordinated by NYISO. NY Transco is engaged in an assessment with other New York

transmission providers to determine whether meteorological data presently used for determining facility ratings is adequate to address future effects of climate change.

10) **A description of how the transmission provider determines whether to use scenario analysis, and if so, whether to do so with multiple scenarios;**

The NYSRC EWWG is working with NYISO and stakeholders to expand the definition of credible scenarios to include extreme weather considerations. NY Transco has not included scenario analysis in our assessments, but will comply with any applicable NYSRC reliability rule requirements that result from the EWWG assessment, including consideration of EWWG-identified credible scenarios in future NY Transco assessments.

11) **The extent to which it reviews neighboring transmission providers' extreme weather vulnerability assessments, if available, to evaluate the consistency of extreme weather projections between transmission providers. Further, for RTOs/ISOs, a description of how it accounts for differences between transmission owner members' extreme weather vulnerability assessment assumptions and results;**

NY Transco has not reviewed extreme weather vulnerability assessments of neighboring transmission providers, except to the extent that extreme weather and related events are considered in their annual planning assessments.

12) **The timeframe(s) and discount rate(s) selected for the extreme weather vulnerability assessment;**

NY Transco conducts assessments for the ten-year planning horizon. NY Transco has not considered use of a discount rate.

13) A description of the methods and processes the transmission provider uses, or plans to use, to create an inventory of potentially vulnerable assets and operations.

NY Transco has not developed a method or process to create an inventory of potentially vulnerable assets and operations. Vulnerability of NY Transco's assets to extreme weather is mitigated by the age of assets and the standards to which they have been designed. All NY Transco transmission assets have been constructed within the last 10 years and are designed to meet the latest NESC requirements and in many cases NY Transco design standards exceed the NESC requirements.

B. <u>Vulnerabilities and Exposure to Extreme Weather Hazards</u>

14) A description of how the transmission provider identifies the transmission assets or operations vulnerable to the extreme weather events for which it conducts assessments;

NY Transco includes all of our transmission assets in our extreme weather vulnerability assessments. Transmission assets that are vulnerable are identified though simulation of extreme weather conditions and contingencies associated with extreme weather events.

15) A description of how the transmission provider uses, or plans to use, screening analyses to test for potential vulnerabilities, as well as how the transmission provider examines, or plans to examine, the sensitivities of the transmission assets and operations being studied to types and magnitudes of extreme weather events.

NY Transco has not determined plans to use screening analyses to test for potential vulnerabilities or to examine sensitivities of assets and operations to types and magnitudes on extreme weather events.

C. Costs of Impacts

16) A description of the methodology or process, if any, the transmission provider uses, or plans to use, to estimate the potential costs of extreme weather impacts on identified vulnerable assets and operations;

NY Transco does not estimate the cost of extreme weather impacts on identified vulnerable assets and operations, except to the extent a system upgrade is identified to mitigate the impact. In such cases, a cost estimate would be developed to implement the system upgrade.

17) If the transmission provider estimates such potential costs, a description of the types of: (a) direct costs, such as replacements or repair costs, restoration costs, associated labor costs, or opportunity costs of lost sales, and (b) indirect costs, such as costs associated with loss of service to electric customers and other utilities that purchase power from the transmission provider, including equipment damage, spoilage, and health and safety effects, in calculating the costs of extreme weather impacts.

NY Transco does not estimate the cost of extreme weather impacts on identified vulnerable assets and operations, except as identified in our response to Question 16.

D. Risk Mitigation

18) A description of how the transmission provider uses, or plans to use, the results of its assessment to develop measures to mitigate extreme weather risks, including:

i. How the transmission provider determines which risks should be mitigated and the appropriate time horizon for mitigation;

NY Transco considers mitigation of contingencies associated with extreme weather events in the same manner as other extreme contingencies studied under applicable reliability standards and criteria, including NERC Reliability Standard TPL-001-5 Requirement R3, Part 3.2, and NPCC Regional Reliability Reference Directory #1, Design and Operation of the Bulk Power System, Appendix C. If an assessment of extreme weather (e.g., 90/10 load forecast) identifies planning criteria violations under NERC Reliability Standard TPL-001-5, a corrective action plan would be considered in accordance with Requirement R2, Part 2.7.

ii. How the transmission provider determines appropriate extreme weather risk mitigation measures, including any analyses used to determine the lowest-cost or most impactful portfolio of measures;

NY Transco determines appropriate measures for mitigation of contingencies associated with extreme weather events in the same manner as other extreme contingencies studies under applicable reliability standards and criteria, including NERC Reliability Standard TPL-001-5 Requirement R3, Part 3.2, and NPCC Regional Reliability Reference Directory #1, Design and Operation of the Bulk Power System, Appendix C. If an assessment of extreme weather (e.g., 90/10 load forecast) identifies planning criteria violations under NERC Reliability Standard TPL-001-5, a corrective action plan would be considered in accordance with

Requirement R2, Part 2.7.

19) A description of how the transmission provider informs, or plans to inform, relevant stakeholders—such as neighboring transmission providers, RTOs/ISOs of which the transmission provider is a member, electric customers, all affected communities, emergency management agencies, local and state administrations, and state utility regulators—of identified extreme weather risks and selected mitigation measures;

NY Transco coordinates with neighboring transmission providers and NYISO as part of our annual planning assessment. NY Transco's annual planning assessment is included as an addendum to NYISO's annual planning assessment and is distributed by NYISO to adjacent Planning Coordinators, Transmission Planners, and other functional entities in accordance with NERC Reliability Standard TPL-001-5.1, Requirement R8. NY Transco assessments do not affect specific communities of stakeholders because NY Transco is a transmission-only provider that does not have a franchise customer-service territory.

20) A description of the extent to which the transmission provider incorporates, or plans to incorporate, identified extreme weather risks and mitigation measures into local and regional transmission planning processes;

NY Transco includes extreme weather risks through selection of appropriate system conditions and contingencies to model the effects of extreme weather. Approved mitigation measures are modeled in future assessments based on the expected in service date and NYISO rules for including firm projects in power flow base cases.

21) A description of how the transmission provider measures, or plans to measure, the progress and success of extreme weather risk mitigation measures (e.g., through reduced outages) and how it incorporates these observations into ongoing and future extreme weather risk mitigation actions.

NY Transco plans to measure progress by comparison of results in future extreme weather vulnerability assessments to results in past vulnerability assessments in which risks were identified.