



2019 Interim Area Transmission Review of the New York State Bulk Power Transmission System

A **Draft** Report by the
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1. Introduction

The New York Independent System Operator (NYISO) conducts an annual Area Transmission Review (ATR) of the New York State Bulk Power System (BPS) as required by the Northeast Power Coordinating Council (NPCC) [1] and the New York State Reliability Council (NYSRC) [2]. The Bulk Power Transmission Facilities (BPTF), as defined in this review, include all of the facilities designated by the NYISO to be part of the BPS as defined by NPCC and the NYSRC; additional non-BPS facilities are also included in the BPTF. The purpose of this assessment is to demonstrate conformance with the applicable NPCC Transmission Design Criteria and NYSRC Reliability Rules.

The ATR is prepared in accordance with NPCC and NYSRC procedures that require the assessment to be performed annually, with a Comprehensive Area Transmission Review (CATR) performed at least every five years. Either an Interim or Intermediate Review can be conducted between CATRs, as appropriate. In an Interim Review, the planning coordinator summarizes the changes in planned facilities and forecasted system conditions since the last CATR and assesses the impact of those changes. No new analysis are required for an Interim Review. An Intermediate Review covers all the elements of a Comprehensive Review, but the analysis may be limited to addressing only significant issues, considering the extent of the system changes. The most recent NYISO CATR (2015) [3] was approved by the NPCC Reliability Coordinating Council (RCC) in June 2016.

This report comprises the second Interim ATR submitted by NYISO since the 2015 NYISO CATR [3]. Both the 2016 and 2018 ATRs were Intermediate Reviews, and the 2017 ATR was an Interim Review.

This assessment is conducted in accordance with the requirements for an Interim Review as described in the NPCC Directory #1 [1] - Appendix B “Guidelines and Procedures for NPCC Transmission Reviews” and the NYSRC “Procedure for New York Control Area Transmission Reviews” [2]. The 2019 Interim ATR assesses the reliability impacts of changes in forecasted system conditions and planned New York State BPTF since the 2015 NYISO CATR [3], and is conducted for the year 2024.

2. Forecasted System Conditions and Planned Facilities

The forecasted system conditions and planned generation and transmission facilities assessed in the NYISO 2015 CATR [3] were based on the 2015 NYISO Load and Capacity Data Report (“Gold Book”) for the year 2020. This Interim Review is based on the forecasted conditions and planned facilities from the 2019 Gold Book [5] for the year 2024. Tables 1-4 summarize the forecasted conditions and planned facilities

included in this Interim ATR and compares these assumptions with those used for the 2015 CATR [3]. Additional changes to transmission plans, generation additions/up-rates, or deactivations/re-ratings that occurred following the publication of the NYISO 2019 Gold Book [4] will be captured in future reviews.

2.1 Load & Capacity Forecast

Table 1 provides a comparison between the statewide load and capacity forecasts in the 2019 Interim ATR (study year 2024) and 2015 CATR [3] (study year 2020). The 2019 statewide coincident peak load forecast for summer 2024 for the New York Control Area (NYCA) is 31,522 MW, which is 2,787 MW less than the summer 2020 forecast of 34,309 MW used in the NYISO 2015 CATR [3]. The corresponding installed capacity for summer 2024 is 40,333 MW, which includes Special Case Resources (SCR, or demand response) of 1,309 MW. The installed capacity used in the NYISO 2015 CATR [3] was 43,779 MW. Comparing the 2019 Interim ATR installed capacity to that used in the 2015 CATR [3] there is a decrease of 3,446 MW. The summer 2024 reserve margin is 28%, which is well above the required Installed Reserve Margin (IRM) of 17% approved by the NYSRC for the 2019-2020 capability period.

2.2 Generation Facilities

Proposed future generation projects and up-rates to existing generating facilities since the NYISO 2015 CATR [3] are listed in Table 2. Generator deactivations in this assessment since the NYISO 2015 CATR [3] are noted in Table 3 along with other generator derates.

2.3 Transmission Facilities

The transmission plans shown in Table 4 reflect changes to the BPTF since the NYISO 2015 CATR [3]. Additional significant transmission plans in the near-term planning horizon, when compared to the transmission plans studied in the 2018 Intermediate ATR [4], include the selection of the AC Transmission Public Policy Transmission Projects, which are the North American Transmission (NAT)/New York Power Authority (NYPA) (NYISO Queue #556) Segment A Double Circuit project and the National Grid/Transco (NYISO Queue #543) New York Energy Solution Segment B project, and the outage of the Con Edison B3402 and C3403 cables. The 2018 Intermediate ATR reflected the addition of the Western New York Public Policy Transmission Project, which is the NextEra “Empire State Line” project, which has an in-service date in 2022.

3. Impact Assessments

The 2015 CATR [3] assessed and evaluated thermal, voltage, fault current, and stability performance of

the New York State BPTF for design and extreme contingencies as required by NPCC Directory #1 [1] and NYSRC Reliability Rules [2]. The 2015 CATR [3] results confirmed that the base case meets criteria, and by limiting power transfers consistent with the transfer limits reported in the 2015 CATR [3], the security of the New York State BPTF will be maintained and projected demand will be supplied. Additionally, no Corrective Action Plans were noted in the 2015 CATR [3] for overdutied breakers.

The NYISO studied the system changes noted in Tables 2, 3, and 4 either in the 2018 Intermediate ATR [4] or pursuant to the NYISO Generator Deactivation Process and Interconnection Processes and found no adverse impact on the reliability of the BPTF. As such, no Corrective Action Plans are required at this time.

3.1 Special Protection Systems

Since the 2015 CATR, New York has added a new Type III Special Protection System (SPS) (#222). System conditions have not changed sufficiently to impact the operation or classification of existing SPS. However, New York has retired several SPS since the 2015 CATR [3]. These retired SPS have gone through the NPCC SPS retirement evaluation process.

3.2 Dynamic Control Systems

System conditions have not changed sufficiently since the 2015 CATR to impact the operation or classification of previously reviewed Dynamic Control Systems (DCS) [3].

3.3 Review of Exclusions from NPCC Basic Criteria

The NPCC Directory #1 [1] contains a provision that allows a member to request an exclusion from criteria contingencies that are "simultaneous permanent phase to ground faults on different phases of each of two adjacent transmission circuits on a multiple circuit tower, with normal fault clearing." NYISO does not have any such exclusion at this time; therefore, no exclusions were reviewed. Furthermore, NYISO does not anticipate requesting any exclusions in the near future.

3.4 System Restoration Assessment

NYSRC Reliability Rules B.2 R1.3 [2] requires the NYISO to evaluate the impact of system expansion or facility reconfiguration plans on the NYCA System Restoration Plan. The list below outlines planned system expansion facilities and facility reconfigurations which will have an impact on the NYCA System Restoration Plan:

- The Empire State Line/Western New York Public Policy (WNYPP) Project includes a new Dysinger 345 kV substation planned to connect into the Niagara – Kintigh – Rochester 345 kV path, a new East Stolle 345 kV switchyard, and a new PAR.
- The Rochester Gas & Electric (RG&E) Rochester Transmission Reinforcement is a planned

345/115 kV substation (Station 255) located approximately two miles west of Station 80, connecting to the two Niagara-Rochester 345 kV lines. Additionally, there are Station 80 345 kV substation reconfiguration plans.

- The Con Edison Rainey 345/138 kV transformer/PAR is an addition to the existing Rainey facility. Additionally, there are Rainey 345 kV substation reconfiguration plans.
- The New York State Electric and Gas (NYSEG) Watercure 345/230 kV transformer is an addition to the existing Watercure facility. Additionally, there are Watercure 345 kV substation reconfiguration plans.
- The NYSEG Gardenville 230/115 kV transformer is an addition to the Gardenville facility.
- The NYSEG Oakdale 345/115/34.5 kV transformer is an addition to the existing Oakdale facility. Additionally, there are Oakdale 345 kV substation reconfiguration plans.
- The NYSEG Fraser 345/115 kV transformer is an addition to the existing Fraser facility. Additionally, there are Fraser 345 kV substation reconfiguration plans.
- The NYSEG Coopers Corners 345/115 kV transformer is an addition to the existing Coopers corners facility. Additionally, there are Coopers Corners 345 kV substation reconfiguration plans.
- The NYPA and NAT Segment A double circuit project T027 (Q#556) includes: retiring two Porter – Rotterdam 230 kV Lines #30 and #31; building two new 345 kV transmission lines from Edic 345 kV to New Scotland 345 kV; constructing a new Rotterdam 345 kV substation which loop in the existing Edic to New Scotland 345 kV transmission line; constructing a new Princetown 345 kV switchyard interconnecting the Rotterdam to New Scotland, and Edic to New Scotland 345 kV AC transmission lines.
- The National Grid Segment B Knickerbocker project T027 (Q#543) includes: new Knickerbocker 345 kV substation between New Scotland 345 kV and Alps 345 kV stations and a new 345 kV line between Knickerbocker and Pleasant Valley; new series compensation capacitor bank with bypass switching provision on the new Knickerbocker – Pleasant Valley 345 kV line at the proposed Knickerbocker 345 kV Switching Satiation.

The potential impacts of the system expansion plans listed above have been communicated to NYISO Operations Engineering for consideration in the annual review and update of the NYCA System Restoration Plan.

3.5 NYSRC Local Rules Assessment

The NYSRC has adopted Local Reliability Rules [2] that apply to New York City and Long Island zones to protect the reliable delivery of electricity for specific electric system characteristics and demographics relative to these zones. The NYISO requests information from the local Transmission Owners on changes in local system conditions that would impact the New York State BPTF at the beginning of every year. The base conditions are described in Section 2 of this report, and adherence to the following local rules to the system models used for this year’s assessments is shown below:

G.1 (R2) Operating Reserves/Unit Commitment, G.1 (R3) Locational Reserves (New York City)

Local Operating Reserve rules are considered in the development of the base case used for all reliability assessments.

G.2 Loss of Generator Gas Supply (New York City), G.3 Loss of Generator Gas Supply (Long Island)

Specific loss of generator gas supply studies are performed by Con Edison and Public Service Electric and Gas (PSE&G)-Long Island and are reviewed by the NYISO. The planned system is expected to be compatible with local rules regarding loss of generator gas supply.

G.1 (R4) Thunderstorm Watch (New York City)

Proposed facilities included in this assessment may impact the Thunderstorm Watch contingency list due to substation reconfiguration and facility additions. The contingencies impacted by system facility changes will be evaluated before the proposed facilities are in-service.

3.6 Extreme System Condition Assessment

NPCC Directory #1 [1] and the NYSRC Reliability Rules [2] require assessments of extreme system conditions, which have a low probability of occurrence, such as loss of major gas supply and extreme peak load level resulting from extreme weather conditions. The 2015 CATR [3] and 2018 Intermediate ATR [4] found no significant voltage violations, thermal overloads, or stability issues under evaluated loss of major gas supply and extreme weather conditions.

4. Summary

The annual reliability assessment performed in this Interim Area Transmission Review of the changes in forecasted NYCA system conditions and planned facilities indicate the New York State Bulk Power Transmission Facilities, as planned through the year 2024, conform to the reliability criteria described in the NYSRC Reliability Rules [2] and NPCC Directory #1 [1].

Tables and Graphs

Table 1: Load and Capacity Forecast

	Comprehensive Review: 2015 Forecast for Summer 2020	Intermediate Review: 2018 Forecast for Summer 2023	Interim Review: 2019 Forecast for Summer 2024	Change from 2015 CATR to 2019 Interim Review
Peak Load (MW)	34,309	32,284	31,522	-2,787
Total Capacity (MW)	43,779 (1)	40,198 (2)	40,333 (3)	-3,446
Reserve Margin	27%	24%	28%	+1%

Notes:

1. This amount is derived from the NYISO 2015 Gold Book and represents the 2020 Total Resource Capability from Table V-2a; net resource changes from Tables IV-1, IV-2a, IV-2b, and IV-3.
2. This amount is derived from the NYISO 2018 Gold Book and represents the 2023 Total Resource Capability from Table V-2a plus changes in generation facilities included in the 2018 Intermediate Review.
3. This amount is derived from the NYISO 2019 Gold Book and represents the 2024 Total Resource Capability from Table V-2a plus changes in generation facilities included in this 2019 Interim Review.

Table 1: Additions/Up-rates in Generation Facilities¹

Additions/Up-rates	Queue	Size (MW)	2015 Comprehensive ATR	2018 Intermediate ATR	2019 Interim ATR
			Included/IS Date	Included/IS Date	Included/IS Date
CPV Valley Energy Center	251	677.6	Y/2017-10	Y/In-Service	Y/In-Service
Rochester Gas & Electric Station 2	338	6.3	N/A	Y/2018-09	Y/2019-10
Taylor Biomass	349	19	N/A	Y/2021-04	Y/2021-04
Cassadaga Wind	387	126	N/A	Y/2019-12	Y/2020-12
Berrians East Replacement ²	393	508	N/A	N/A	Y/2023-02
Copenhagen Wind	395	79.9	N/A	Y/2018-11	Y/In-Service
Baron Wind	396	300	N/A	N/A	Y/2020-12
Bethlehem Energy Center Uprate	403	72	N/A	Y/2017-2018	Y/In-Service
Arkwright Summit	421	78.4	N/A	Y/2018-10	Y/In-Service
Eight Point Wind	422	101.2	N/A	N/A	Y/2020-12
Cricket Valley Energy Center II	444	1020	N/A	Y/2020-01	Y/2020-03
East River 1 Uprate	461	2	N/A	Y/In-Service	Y/In-Service
East River 2 Uprate	462	2	N/A	Y/In-Service	Y/In-Service
Shoreham Solar	467	25	N/A	Y/In-Service	Y/In-Service
Riverhead Solar	477	20	N/A	Y/2018-10	Y/2019-05
Ogdensburg	511	79	N/A	Y/2018-05	Y/2019-06
Lyons Falls Mill Hydro	512	2.5	N/A	Y/2018-03	Y/2021-11
Orangeville	513	20	N/A	N/A	Y/2020-12
Great Valley Solar	534	20	N/A	N/A	Y/2020-06
Sky High Solar	545	20	N/A	N/A	Y/2019-12
Albany County	570	20	N/A	N/A	Y/2019-06
Little Pond Solar	575	20	N/A	N/A	Y/2020-12
Dog Corner Solar	584	20	N/A	N/A	Y/2019-06
Scipio Solar	590	20	N/A	N/A	Y/2019-11
Niagara Solar	592	20	N/A	N/A	Y/2019-11
Albany County II	598	20	N/A	N/A	Y/2020-06
Saugerties Solar	621	20	N/A	N/A	Y/2019-12
Swinging Bridge Unit 3	696	9	N/A	N/A	Y/2019-03

Notes:

1. The MW values noted in this table are summer value noted in the 2018 and 2019 Gold Book Tables IV-1 and IV-2.
2. Q#393 Berrians East Replacement is a repowering project that would include retiring NRG GTs 2, 3, and 4 (PTIDs 24094-24105).

Table 2: Deactivations/De-ratings in Generation ¹

Deactivations/ De-ratings	Size (MW)	2015	2018	2019
		Comprehensive ATR Included/OS Date	Intermediate ATR Included/OS Date	Interim ATR Included/OS Date
Ravenswood 04	12.9	In-service	Out-of-Service	Out-of-Service
Ravenswood 05	15.5	In-Service	Out-of-Service	Out-of-Service
Ravenswood 06	12.6	In-Service	Out-of-Service	Out-of-Service
Niagara Bio-gen	39.7	In-Service	Out-of-Service	Out-of-Service
Dunkirk 2	75	In-Service	Out-of-Service	Out-of-Service
Dunkirk 3	185	In-Service	Out-of-Service	Out-of-Service
Dunkirk 4	185	In-Service	Out-of-Service	Out-of-Service
Huntley 67	187.9	In-Service	Out-of-Service	Out-of-Service
Huntley 68	189.5	In-Service	Out-of-Service	Out-of-Service
Astoria GT 05	12.3	In-Service	Out-of-Service	Out-of-Service
Astoria GT 07	11.5	In-Service	Out-of-Service	Out-of-Service
Astoria GT 08	11.4	In-Service	Out-of-Service	Out-of-Service
Astoria GT 10	18.4	In-Service	Out-of-Service	Out-of-Service
Astoria GT 11	16.5	In-Service	Out-of-Service	Out-of-Service
Astoria GT 12	17.7	In-Service	Out-of-Service	Out-of-Service
Astoria GT 13	16.9	In-Service	Out-of-Service	Out-of-Service
Binghamton	43.7	In-Service	Out-of-Service	Out-of-Service
Ravenswood 09	16.3	In-Service	Out-of-Service	Out-of-Service
Indian Point 2	1018.5	In-Service	2020-04	2020-04
Indian Point 3	1037.8	In-Service	2021-04	2021-04
Selkirk 1	78.1	In-Service	2018-05	In-Service
Selkirk 2	282.1	In-Service	2018-05	In-Service
Ravenswood GT 2-1, 2-2, 2-3, 2-4, 3-1, 3-2, and 3-4	214.4	In-Service	In-Service	Out-of-Service
Cayuga 2	139.6	In-Service	In-Service	Out-of-Service
Lyonsdale	19.3	In-Service	In-Service	Out-of-Service

Notes:

1. The values noted in this table are from 2018 and 2019 Gold Book Table IV-3, IV-4, and IV-5.

Table 4: Changes in the Bulk Power Transmission Facilities

Bulk Transmission	2015 Comprehensive ATR	2018 Intermediate ATR	2019 Interim ATR
	Included/IS Date	Included/IS Date	Included/IS Date
CPV Valley 345 kV Substation (Q#251) (Dolson Ave.)	Y/2016-05	Y/In-Service	Y/In-Service
Leeds-Hurley Series Compensation SDU	Y/2018S	Y/2020S	Y/2020S
Rochester Transmission Reinforcement 345 kV Substation (Q#339)	Y/2019W	Y/2020W	Y/2020W
Con Edison Rainey-Corona Transformer/Phase Shifter	Y/2019S	Y/2019S	Y/2019S
Con Edison Goethals-Linden 345 kV feeder separation	Y/2016S	Y/In-Service	Y/In-Service
NYPA Marcy-Coopers Corners 345 kV series compensation	Y/2016S	Y/In-Service	Y/In-Service
NYPA Edic-Fraser 345 kV series compensation	Y/2016S	Y/In-Service	Y/In-Service
NYPA Fraser-Coopers Corners 345 kV series compensation	Y/2016S	Y/In-Service	Y/In-Service
NYSEG Watercure 345/230 kV Transformer	Y/2018S	Y/2019W	Y/2020S
NYSEG Coopers Corners 345 kV Shunt Reactor	Y/2015S	Y/In-Service	Y/In-Service
NYSEG Gardenville 230/115 kV Transformer	Y/2017S	Y/2019W	Y/2022W
NYSEG/N. Grid Five Mile Rd 345 kV (New Substation)	Y/2015W	Y/In-Service	Y/In-Service
NYSEG Mainesburg (Q#394)	Y/2015S	Y/In-Service	Y/In-Service
RG&E Station 122 Station Upgrade (Transformers)	Y/2016W	Y/In-Service	Y/In-Service
O&R Sugarloaf 345/138 kV (New Substation)	Y/2016S	Y/In-Service	Y/In-Service
Feeder 76 Ramapo to Rock Tavern (Q#368)	Y/2016S	Y/In-Service	Y/In-Service
N. Grid Porter Reactors	Y/2017W	Y/In-Service	Y/In-Service
N. Grid Clay – Lockheed Martin 115 kV reconductoring	Y/2016W	Y/In-Service	Y/In-Service
N. Grid Clay – Dewitt 115 kV reconductoring	Y/2017W	Y/2019W	Y/2020W
N. Grid Clay – Teall 115 kV reconductoring	Y/2017W	Y/2019W	Y/2020W
N. Grid Clay-Woodard 115 kV (conductor clearance)	Y/2015W	Y/In-Service	Y/In-Service
N. Grid Packard – Huntley 77/78 Series Reactors	N/2016S	Y/In-Service	Y/In-Service
N. Grid Eastover Road 230/115 kV Transformer	N/2017S	Y/In-Service	Y/In-Service
O&R Lovett 345 kV Station (New Station)	N/2018S	Y/2021S	Y/2021S
NextEra Energy Transmission Empire State Line Project (Q#545A)	N/A	Y/2022S	Y/2022S
Con Edison E. 13th Street station reconfiguration (Transformers 12 & 13)	N/A	In-Service	In-Service
Con Edison E. 13th Street station reconfiguration (Transformers 14 & 15)	N/A	In-Service	In-Service
Con Edison E. 13th Street station reconfiguration (Transformers 10 & 11)	N/A	Y/2019S	Y/2019S
N. Grid Edic MV Edge (Transformers 5 & 6)	N/A	In-Service	In-Service
NYSEG South Perry 230 kV (New Substation)	N/A	In-Service	In-Service
NYSEG Oakdale 345/115/34.5 Transformer	N/A	In-Service	In-Service
NYSEG Fraser 345/115 Transformer	N/A	Y/2021W	Y/2022W

Bulk Transmission	2015 Comprehensive ATR	2018 Intermediate ATR	2019 Interim ATR
	Included/IS Date	Included/IS Date	Included/IS Date
NYSEG Coopers Corners 345/115 Transformer	N/A	Y/2021W	Y/2025W
NYSEG Wood St. 345/115 Transformer	N/A	Y/2022S	Y/2023S
Cricket Valley Energy Center 345 kV Substation (Q#444)	N/A	Y/2022S	Y/2020W
NAT/NYPA T027 (Q#556) Segment A Double Circuit	N/A	N/A	Y/2023W
National Grid/Transco T027 (Q#543) Segment B	N/A	N/A	Y/2023W
PSEG Long Island Kings Highway 138 kV (New Substation)	N/A	Y/2019S	Y/2019S
Con Edison B3402 and C3403 Cables	N/A	In-Service	Out-of-Service

References

1. Northeast Power Coordinating Council, "NPCC Regional Reliability Reference Directory #1, Design and Operation of the Bulk Power System", Version 2, dated September 30, 2015.
2. New York State Reliability Council, "Reliability Rules and Compliance Manual", Version 44, dated April 11, 2019.
3. New York Independent System Operator, "2015 Comprehensive Area Transmission Review of the New York State Bulk Power Transmission System", Final Report, dated June 1, 2016.
4. New York Independent System Operator, "2018 Intermediate Area Transmission Review of the New York State Bulk Power Transmission System", Final Report, dated May 29, 2019.
5. New York Independent System Operator, "2019 Load and Capacity Data", Revision Final, dated April 2019.