STATE OF NEW YORK

PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission to Implement Transmission Planning Pursuant to the Accelerated Renewable Energy Growth and Community Benefit Act	))))	Case 20-E-0197

Utilities' Revised Headroom Calculations

Introduction

In response to the New York Public Service Commission's (Commission) May 14, 2020 initiating order[1] in this proceeding each of New York's electric utilities (Utilities)[2] performed analyses of its local transmission and distribution (LT&D) systems in a November 2020 filing (the Utilities' Report)[3] and identified representative system upgrades for the Utilities that will support achievement of New York's climate policy goals through 2030.[4]

On September 9, 2021 the Commission issued its *Order on Local Transmission and Distribution Planning Process and Phase 2 Project Proposals*.[5] The Phase 2 Order addressed the Utilities' proposed investment criteria and required certain modifications. In addition, the Phase 2 Order adopted the Department of Public Service Staff's (Staff) recommended modifications to the calculation of headroom and directed the Utilities to provide updated headroom data to stakeholders.[6]

As required by the Phase 2 Order, on December 17, 2021 the Utilities filed a revised Benefit/Cost Analysis (BCA) approach, proposed a Coordinated Grid Planning Process, and recommended the creation of an advisory committee to enhance stakeholder input in the LT&D planning process.[7] As further required by the Phase 2 Order, this filing provides updated headroom estimates to help guide Staff, NYSERDA, and potential bidders as to existing system limitation identified under the methods proposed by Staff[8] and confirmed by the Commission in

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1 Case 20-E-0197, *Proceeding on Motion of the Commission to Implement Transmission Planning Pursuant to the Accelerated Renewable Energy Growth and Community Benefit Act* (Local T&D Planning Proceeding), Order on Transmission Planning Pursuant to the Accelerated Renewable Energy Growth and Community Benefit Act (issued May 14, 2020).

2 The Utilities include Central Hudson Gas & Electric Corp. (Central Hudson); Consolidated Edison Company of New York, Inc. (CECONY); Long Island Power Authority (LIPA); Niagara Mohawk Power Corporation d/b/a National Grid (National Grid); New York State Electric & Gas Corporation (NYSEG); Orange & Rockland Utilities, Inc. (O&R); and Rochester Gas and Electric Corporation (RG&E) (collectively, Utilities). Throughout this document, when referring to a single or generic company the term "utility" will not be capitalized.

3 Local T&D Planning Proceeding, Utility Transmission and Distribution Investment Working Group Report (Utilities' Report), November 2, 2020.

4 Most notably, the Climate Leadership and Community Protection Act (CLCPA). New York Public Service Law, § 66-p.

5 LT&D Planning Proceeding, Order on Local Transmission and Distribution Planning Process and Phase 2 Project Proposals (September 9, 2021) (Phase 2 Order).

6 LT&D Planning Proceeding, Phase 2 Order, pp. 3, 50.

7 LT&D Planning Proceeding, The Utilities' Coordinated Grid Planning Process and Revised Benefit Cost Analysis Proposals (December 17, 2021).

8 LT&D Planning Proceeding, Staff Straw Proposal for Conducting Headroom Assessments (March 16, 2021). Also, *see* LT&D Planning Proceeding, Addendum to Staff Straw Proposal for Conducting Energy Headroom Assessments (June 8, 2021).

the Phase 2 Order. The headroom approach contained in the sections that follow incorporates changes in the data sets, assumptions, and models the Utilities have used in performing headroom calculations. As directed in the Phase 2 Order, the Utilities have used a consistent approach for calculating capacity and energy headroom for local transmission projects.

The Utilities recognize the important work required to facilitate achievement of the State's CLCPA mandates and other environmental objectives and remain committed to meeting the purposes identified in the Phase 2 Order. As the Utilities have stated on many occasions, we are eager to serve as the State's partner in these vital endeavors.

National Grid

A. Local Transmission

One of the world's largest investor owned utilities, National Grid has more than 16,000 employees and delivers electricity and natural gas to more than 20 million people through transmission and distribution networks in New York, Massachusetts, and Rhode Island. In New York, National Grid owns and operates more than 6,500 miles of transmission lines, including approximately 500 miles of 230-kilovolt (kV) lines and 680 miles of 345-kV lines, as well as 712 substations, over a 25,000-square-mile area stretching from the eastern portion of the state to Lake Erie and including more than 450 cities and towns. The Company has continuously provided electric service to upstate New York since the 1890s; its electric and distribution businesses serve approximately 1.6 million customers in the region.

B. Headroom Study Assumptions

In order to identify high-priority and high-value locations for targeted transmission development within National Grid's local transmission system, and to improve the quality of the information available to policy makers, renewable generation developers, and other stakeholders, a headroom assessment was performed using the method(s) established in the Staff Straw Proposal for Conducting Headroom Assessments.[9] The Staff Straw Proposal for Conducting Headroom Assessments has been adjusted per the Phase 2 Order.[10] The Commission:

- accepted to use existing switching stations or other appropriate substations as potential interconnection locations for the headroom calculations;
- concurred that calculations should be made for model years 2030, 2035, and 2040;
- clarified that production cost modeling is not required as part of the energy headroom computation; and
- clarified that bulk system energy headroom studies by the Utilities would not be required.

The headroom calculation is based upon on the 2021 NYISO FERC Form 715 filing database and the information provided within the 2021 NYISO Load and Capacity Data ("Gold Book"). The database was modified to establish 2030, 2035, and 2040 Summer Peak base cases per Gold Book Coincident Summer Peak Demand by Zone – MW (Table I-3a) and 2030, 2035, and 2040 Winter Peak base cases per Gold Book Coincident Winter Peak Demand by Zone – MW (Table I-3b). Light Load base cases were also created for the study years, using the FERC 715 Light Load case as a starting point and maintaining the demand by zone as a percentage of the Summer Peak case for that same year. The Light Load case was modified to reflect seasonal rating assumptions. In

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[9] See *supra*, note 8.

[10] LT&D Planning Proceeding, Phase 2 Order, pp. 44-47.

addition, shoulder load cases were created by reducing the Summer Peak cases to 70% of the peak load.

The 2021 NYISO FERC Form 715 filing database and the modified 2030, 2035, and 2040 Summer Peak, Summer Shoulder, Winter Peak, and Light Load base case were not altered for any additional generation resource additions nor additional transmission expansion projects beyond the projected system topology that was established within the FERC Form 715 filing database, unless a transmission project has become firm since the creation of the base cases.

The headroom calculations, established for the selected existing switching stations or other appropriate substations assumed existing and firm local generation to be at 100% of its nameplate output, regardless of resource type; therefore, the established headroom is the remaining headroom at the point of injection. This assumption can result in a negative existing headroom at a location (especially at off-peak conditions). In some areas, non-firm generation, which may already be in the NYISO interconnection queue or have awards from NYSERDA, could be expected to use some portion of the reported available headroom. The assumed generation MW are listed following the headroom calculations. Firm storage projects included in the cases were set at maximum withdraw to simulate a period of time where peak generation output would need to either be curtailed or used to charge storage.

The headroom calculation established by this assessment is an electrical headroom estimate for the assumed study years and projected system topology. Physical feasibility and external (Bulk Power System) constraints to the local system may preclude achieving the identified headroom. For example, the headroom calculation can establish a MW/MWh headroom at a substation, however, there may not be physical space for an additional interconnection at that substation. Connecting generation at a location with available headroom does not allow a project to bypass any portion of the NYISO administered interconnection process or guarantee any outcome of that process.

C. Existing Capacity "Headroom" within National Grid's System

The headroom capacity calculations were done in accordance with the methodology discussed in the Appendix of the straw proposal for assessing local transmission capability headroom for on-ramp needs. To provide headroom data that is considerate of the interconnected local system topology, National Grid defined seven local transmission areas where the headroom was established, rather than on a broader regional basis.

Table 1: Capacity Headroom in the Southwest Region (MW)

Location	2030				2035				2040			
	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load
Dunkirk	200	160	170	250	200	160	170	260	200	170	180	250
Laona	-20	-30	-30	0	-20	-30	-30	0	-20	-30	-30	0
Moon	0	0	0	0	0	0	0	0	0	0	0	0
Falconer	0	0	0	0	0	0	0	0	0	0	0	0
Homer Hill	0	0	0	0	0	0	0	0	0	0	0	0
Five Mile	230	210	210	280	230	210	210	350	230	210	210	450
Arcade	0	20	20	60	0	20	20	50	0	20	20	20
Total	**410**	**360**	**370**	**590**	**410**	**360**	**370**	**660**	**410**	**370**	**380**	**720**

Table 2: Capacity Headroom in the Genesee Region (MW)

Location	2030				2035				2040			
	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load
Lockport	420	270	330	430	420	270	330	460	430	270	330	510
Batavia	220	130	180	230	220	130	180	240	220	130	180	250
Golah	50	0	20	50	50	0	20	60	50	0	20	70
Total	**690**	**400**	**530**	**710**	**690**	**400**	**530**	**760**	**700**	**400**	**530**	**830**

Table 3: Capacity Headroom in the East of Syracuse Region (MW)

Location	2030				2035				2040			
	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load
Cortland	140	110	140	170	140	110	140	170	140	110	140	180
Fenner	70	50	60	90	70	50	60	90	70	50	60	100
Oneida	210	160	250	290	220	160	250	280	220	160	250	270
Yahnundasis	200	130	170	240	200	130	170	250	200	130	170	250
Total	**620**	**450**	**620**	**790**	**630**	**450**	**620**	**790**	**630**	**450**	**620**	**800**

Table 4: Capacity Headroom in the Watertown/Oswego/Porter Region (MW)

Location	2030				2035				2040			
	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load
Malone	0	0	0	0	0	0	0	0	0	0	0	0
Colton	0	0	0	0	0	0	0	0	0	0	0	0
Dennison	30	10	20	230	30	0	10	230	30	0	20	230
McIntyre	0	0	0	30	0	0	0	40	0	0	0	50
Brown Falls	0	0	0	0	0	0	0	0	0	0	0	0
Taylorville	-80	-120	-100	0	-80	-120	-100	20	-80	-120	-100	30
Boonville	0	0	50	0	0	0	50	0	0	0	50	0
Rome	160	10	40	230	160	10	40	230	160	10	40	250
Black River	0	0	0	0	0	0	0	0	0	0	0	0
Coffeen	0	0	0	0	0	0	0	0	0	0	0	0
Lighthouse Hill	0	0	0	0	0	0	0	0	0	0	0	0
South Oswego	0	0	0	90	0	0	0	90	0	0	0	90
Total	**110**	**-100**	**10**	**580**	**110**	**-110**	**0**	**610**	**110**	**-110**	**10**	**650**

Table 5: Capacity Headroom in the Porter – Rotterdam Region (MW)

Location	2030				2035				2040			
	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load
Watkins	0	0	0	0	0	0	0	0	0	0	0	0
Valley	0	0	0	0	0	0	0	30	10	0	0	40
Inghams Central	0	0	0	0	0	0	0	0	0	0	0	0
Inghams East	0	0	0	0	0	0	0	0	0	0	0	0
St Johnsville	-20	-40	-20	0	-20	-30	-20	0	-10	-30	-20	0
Marshville	0	-70	0	0	0	-70	0	0	0	-70	0	0
Meco	0	-140	-90	60	0	-140	-90	70	0	-140	-90	120
Stoner	0	-10	0	0	0	-10	0	0	0	-10	0	0
Total	**-20**	**-260**	**-110**	**60**	**-20**	**-250**	**-110**	**100**	**0**	**-250**	**-110**	**160**

Table 6: Capacity Headroom in the Capital/Northeast Region (MW)

Location	2030				2035				2040			
	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load
Whitehall	0	0	0	0	0	0	0	0	0	0	0	0
Mohican	0	0	0	0	0	0	0	0	0	0	0	0
Battenkill	0	0	0	0	0	0	0	0	0	0	0	0
Luther Forest	0	110	0	170	0	110	0	170	0	110	0	190
Spier	0	0	0	0	0	0	0	0	0	0	0	0
Queensbury	0	0	0	0	0	0	0	0	0	0	0	0
Schaghticoke	0	0	0	0	0	0	0	0	0	0	0	0

Location	2030				2035				2040			
	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load
Lasher	310	380	200	570	300	380	170	590	300	380	170	620
Total	**310**	**490**	**200**	**740**	**300**	**490**	**170**	**760**	**300**	**490**	**170**	**810**

Table 7: Capacity Headroom in the Albany South Region (MW)

Location	2030				2035				2040			
	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load	Summer Peak Load	Light Load	Shoulder Load	Winter Peak Load
Churchtown	0	20	0	0	0	20	0	100	0	20	0	140
Hudson	40	0	10	60	40	0	10	100	50	0	10	90
Schodack	140	30	150	110	140	30	150	90	130	40	140	100
North Catskill	200	0	70	180	200	0	70	60	200	0	80	0
Long Lane	70	-50	-20	70	70	-50	-20	70	70	-50	-20	70
Feura Bush	120	80	130	140	120	90	130	140	120	90	130	140
Total	**570**	**80**	**340**	**560**	**570**	**90**	**340**	**560**	**570**	**100**	**340**	**540**

D. Existing Energy "Headroom" within National Grid's System

The headroom energy calculations were done in accordance with the methodology discussed in the Addendum to the Staff Straw Proposal for Conducting Energy Headroom. The analysis is presented for seven local transmission areas of the National Grid system.

Table 8: Energy Headroom in the Southwest Region (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	410	900	369
Winter Peak 2030	590	900	531
Shoulder 2030	370	4460	1650
LL 2030	360	2500	900
Total:			**3450**
Summer Peak 2035	410	900	369
Winter Peak 2035	660	900	594
Shoulder 2035	370	4460	1650
LL 2035	360	2500	900
Total:			**3513**
Summer Peak 2040	410	900	369
Winter Peak 2040	720	900	648
Shoulder 2040	380	4460	1695
LL 2040	370	2500	925
Total:			**3637**

Table 9: Energy Headroom in the Genesee Region (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	690	900	621
Winter Peak 2030	710	900	639
Shoulder 2030	530	4460	2364
LL 2030	400	2500	1000
Total:			**4624**
Summer Peak 2035	690	900	621
Winter Peak 2035	760	900	684
Shoulder 2035	530	4460	2364
LL 2035	400	2500	1000
Total:			**4669**
Summer Peak 2040	700	900	630
Winter Peak 2040	830	900	747
Shoulder 2040	530	4460	2364
LL 2040	400	2500	1000
Total:			**4741**

Table 10: Energy Headroom in the East of Syracuse Region (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	620	900	558
Winter Peak 2030	790	900	711
Shoulder 2030	620	4460	2765
LL 2030	450	2500	1125
Total:			**5159**
Summer Peak 2035	630	900	567
Winter Peak 2035	790	900	711
Shoulder 2035	620	4460	2765
LL 2035	450	2500	1125
Total:			**5168**
Summer Peak 2040	630	900	567
Winter Peak 2040	800	900	720
Shoulder 2040	620	4460	2765
LL 2040	450	2500	1125
Total:			**5177**

Table 11: Energy Headroom in the Watertown/Oswego/Porter Region (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	110	900	99
Winter Peak 2030	580	900	522
Shoulder 2030	10	4460	45
LL 2030	-100	2500	-250
Total:			**416**
Summer Peak 2035	110	900	99
Winter Peak 2035	610	900	549
Shoulder 2035	0	4460	0
LL 2035	-110	2500	-275
Total:			**373**
Summer Peak 2040	110	900	99
Winter Peak 2040	650	900	585
Shoulder 2040	10	4460	45
LL 2040	-110	2500	-275
Total:			**454**

Table 12: Energy Headroom in the Porter – Rotterdam Region (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	-20	900	-18
Winter Peak 2030	60	900	54
Shoulder 2030	-110	4460	-491
LL 2030	-260	2500	-650
Total:			**-1105**
Summer Peak 2035	-20	900	-18
Winter Peak 2035	100	900	90
Shoulder 2035	-110	4460	-491
LL 2035	-250	2500	-625
Total:			**-1044**
Summer Peak 2040	0	900	0
Winter Peak 2040	160	900	144
Shoulder 2040	-110	4460	-491
LL 2040	-250	2500	-625
Total:			**-972**

Table 13: Energy Headroom in the Capital/Northeast Region (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	310	900	279
Winter Peak 2030	740	900	666
Shoulder 2030	200	4460	892
LL 2030	490	2500	1225
Total:			**3062**
Summer Peak 2035	300	900	270
Winter Peak 2035	760	900	684
Shoulder 2035	170	4460	758
LL 2035	490	2500	1225
Total:			**2937**
Summer Peak 2040	300	900	270
Winter Peak 2040	810	900	729
Shoulder 2040	170	4460	758
LL 2040	490	2500	1225
Total:			**2982**

Table 14: Energy Headroom in the Albany South Region (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	570	900	513
Winter Peak 2030	560	900	504
Shoulder 2030	340	4460	1516
LL 2030	80	2500	200
Total:			**2733**
Summer Peak 2035	570	900	513
Winter Peak 2035	560	900	504
Shoulder 2035	340	4460	1516
LL 2035	90	2500	225
Total:			**2758**
Summer Peak 2040	570	900	513
Winter Peak 2040	540	900	486
Shoulder 2040	340	4460	1516
LL 2040	100	2500	250
Total:			**2765**

E. Base Case Solar and Wind Generation

The following solar and wind generators were included in study base cases.

Table 15: Base Case Solar and Wind Generation

Queue Pos.	Region	MW
0173	Southwest	72
0212	Southwest	29
0387	Southwest	127
0421	Southwest	78
0505	Southwest	100
0666	Southwest	20
0667	Southwest	20
0704	Genesee	100
0055	East of Syracuse	30
0276	East of Syracuse	90
0545	East of Syracuse	20
0395	Watertown/Oswego/Porter	80
0531	Watertown/Oswego/Porter	104
0589	Watertown/Oswego/Porter	15
0848	Watertown/Oswego/Porter	20
0156	Porter-Rotterdam	74
0495	Porter-Rotterdam	91

Queue Pos.	Region	MW
0564	Porter-Rotterdam	20
0565	Porter-Rotterdam	20
0581	Porter-Rotterdam	20
0586	Porter-Rotterdam	20
0618	Porter-Rotterdam	90
0619	Porter-Rotterdam	50
0638	Porter-Rotterdam	20
0670	Porter-Rotterdam	20
0682	Porter-Rotterdam	20
0748	Porter-Rotterdam	20
0730	Capital/Northeast	20
0731	Capital/Northeast	20
0734	Capital/Northeast	20
0735	Capital/Northeast	20
0807	Capital/Northeast	20
0833	Capital/Northeast	20
0855	Capital/Northeast	20
0570	Albany South	20
0572	Albany South	20
0573	Albany South	10
0598	Albany South	20
0637	Albany South	100
0644	Albany South	60

Central Hudson Gas & Electric

A. Local Transmission

Central Hudson Gas & Electric is a regulated transmission and distribution utility serving approximately 300,000 electric and about 79,000 natural gas customers in eight counties of New York State's Mid-Hudson Valley in a 2,600 square-mile service territory extending north from the suburbs of New York City to the capital district of Albany.

Central Hudson owns approximately 300 circuit miles of 345 kV and 115 kV transmission lines, three BES 345 kV substations and thirty-seven BES 115 kV substations. The majority of Central Hudson's load is in the NYCA Zone G (approximately half of Zone G) with one small distribution substation in Zone E. Central Hudson interconnects with the transmission systems of Consolidated Edison, Orange & Rockland Utilities, New York State Electric & Gas, National Grid, New York Power Authority, Eversource, NY Transco and First Energy.

B. Headroom Study Assumptions

In order to identify high-priority and high-value locations for targeted transmission development within Central Hudson Gas & Electric's local transmission system, and to improve the quality of the information available to policy makers, renewable generation developers, and other stakeholders, the headroom assessment was performed per the method(s) established in the Staff Straw Proposal for Conducting Headroom Assessments.[11] The Staff Straw Proposal for Conducting Headroom Assessments has been adjusted per September 9, 2021 Order.[12] The Commission:

- accepted to use existing switching stations or other appropriate substations as potential interconnection locations for the headroom calculations,
- concurred that calculations should be made for model years 2030, 2035, and 2040,
- clarified that production cost modeling is not required as part of the energy headroom computation, and that
- clarified that bulk system energy headroom studies by the Utilities would not be required.

The headroom calculation is based upon on the 2021 NYISO FERC Form 715 filing database and the information provided within the 2021 NYISO Load and Capacity Data ("Gold Book"). The database was modified to establish 2030, 2035, and 2040 Summer Peak per Gold Book Coincident Summer Peak Demand by Zone – MW (Table I-3a) and 2030, 2035, and 2040 Winter Peak per Gold Book Coincident Winter Peak Demand by Zone – MW (Table I-3b). Light Load cases were created

[11] See *supra*, note 8.

[12] See *supra*, note 10.

for the study years, using the FERC 715 Light Load case as a starting point and maintaining the demand by zone as a percentage of the Summer Peak case for that same year. The Light Load case used summer ratings. Shoulder load cases were also created for the study years, using the average of the summer peak and light loads as a starting point and maintaining the demand by zone as a percentage of the Summer Peak case for that same year. The Shoulder load cases also used summer ratings.

Central Hudson's summer peak, winter peak, shoulder load, and light load is shown below.

Table 16: Central Hudson's summer peak, winter peak, shoulder load, and light load (MW)

	CH Summer Bus Load	CH Winter Bus Load	CH Shoulder Bus Load	CH Light Bus Load
2030	946	781	684	422
2035	955	874	691	427
2040	979	1010	708	437

The load levels for the summer peak, shoulder load, and light load are very similar. Therefore, only the 2040 cases were developed for the summer peak load, shoulder load, and light load conditions. The 2030, 2035 and 2040 cases were developed for the winter load. The 2021 NYISO FERC Form 715 filing database and the modified 2030, 2035, and 2040 Summer Peak and Winter Peak base cases were not altered for any additional generation resource additions nor additional transmission expansion projects beyond the projected system topology that was established within the FERC Form 715 filing database, unless a project has become firm since the creation of the base cases.

The headroom calculations, established for the selected substations assumed existing and firm local generation to be at 100% of its nameplate output, regardless of resource type; therefore, the established headroom is the remaining headroom at the point of injection. This assumption can result in a negative headroom at a location (especially at off-peak conditions). In some areas non-firm generation, which may already be in the NYISO interconnection queue or have awards from NYSERDA, could be expected to use some portion of the reported available headroom. The assumed generation MW are listed with the headroom results. Firm storage projects included in the cases were set at maximum withdraw to simulate a period of time where peak generation output would need to be either curtailed or used to charge storage.

The headroom calculation established by this assessment is an electrical headroom estimate for the assumed study years and projected system topology. Physical feasibility and external (Bulk Power System) constraints to the local location may preclude achieving the identified headroom. For example, the headroom calculation can establish a MW/MWh headroom at a substation, however, there may be no physical room for additional interconnection at that substation. Connecting generation at a location with available headroom does not allow a project

to bypass any portion of the NYISO- or TO-administered interconnection process or guarantee any outcome of that process.

C. Existing Capacity "Headroom" within Central Hudson's System

The headroom capacity calculations were done in accordance with the methodology discussed in the Appendix of the straw proposal for assessing local transmission capability headroom for on-ramp needs.

Table 17: Central Hudson Capacity Headroom (MW)

Location	Summer[13] 2030, 2035, 2040	Winter 2030	Winter 2035	Winter 2040	Shoulder[14] 2030, 2035, 2040	Light Load[15] 2030, 2035, 2040
East Fishkill	0	0	0	0	5.3	2.3
Fishkill Plains	27.7	0	2.2	5.3	83	103.8
Southern Dutchess Area (Merritt Park, Forgebrook, Shenandoah, Wiccopee and Tioranda)	27.5	5.3	5.3	5.3	88.4	88.2
Mid Dutchess Area (Knapps Corners, Spackenkill, Barnegat, Sand Dock, North Chelsea and Manchester)	55.3	22.5	30.7	33.9	57.2	33.5
Myers Corners	19.2	0	1.5	1.7	11.7	7.2
P&MK (Modena 115 kV, Sturgeon Pool 115 kV, Kerhonkson, High Falls and Galeville)	0	0	0	0	5.4	0
Ellenville Area (Honk Falls, Greenfield Rd, Grimley Rd, Neversink)	0	0	0	0	0	0
Northwest Area (Saugerties, Woodstock, North Catskill, Coxsakie, New Baltimore, Westerlo, Freehold, South Cairo, Lawrenceville, Vinegar Hill)	56.3	86.7	96	115.3	55.2	23.6
WM Area (Maybrook, Montgomery, East Walden, Rock Tavern 69 kV, NYSEG Walden)	5.3	6.2	6.2	23.1	7.4	9.7

[13] Only ran the Summer 2040 case. The difference in load between the 2030, 2035 and 2040 cases was only a 32.7 MW (3.3%) difference.

[14] Only ran the Shoulder 2040 case. The difference in load between the 2030, 2035 and 2040 case was only a 23.7 MW (3.3%) difference.

[15] Only ran the Light Load 2040 case. The difference in load between the 2030, 2035 and 2040 cases was only a 14.6 MW (3.3%) difference.

Location	Summer[13] 2030, 2035, 2040	Winter 2030	Winter 2035	Winter 2040	Shoulder[14] 2030, 2035, 2040	Light Load[15] 2030, 2035, 2040
E Line (Hibernia, Stanfordville, Smithfield, Millerton, Pulvers Corners)	41.9	17.1	18.8	21.7	0	0
G Line (Tinkertown)	18.1	17.1	16.7	18.6	5.3	5
A&C Lines (Todd Hill)	5.3	2	1.7	0	5.3	0
J, RD and RJ Lines (Coldenham, Bethlehem Road, Union Ave, Rock Tavern 115 kV)	97	71	80.6	118.6	78.6	48.7
HG Line (West Delaware, Neversink and East Delaware)	0	0	0	0	0	0
HP, MR and Q Line (Hurley, Lincoln Park, East Kingston, Rhinebeck, Milan, Staatsburg, East Park)	41	48.8	51.2	48.9	15.4	9.5
IR-OR Lines (Highland, Reynolds, Ohioville, Highland)	0	0	0	5.4	20.8	1.7
MW Line (Marlboro, West Balmville)	0	0	0	5.4	25.9	18.6
Pleasant Valley Area	0	0	1.5	1.4	0	0
I Line and O Line (Hurley 69 kV, Sturgeon 69 kV, Boulevard, Dashville)	2.1	5.4	5.3	11.8	5.4	0
Total	**396.7**	**282.1**	**317.7**	**416.4**	**470.3**	**351.8**

D. Existing Energy "Headroom" within Central Hudson's System

The headroom energy calculations were done in accordance with the methodology discussed in the Addendum to the Staff Straw Proposal for Conducting Energy Headroom.

Table 18: Central Hudson Energy Headroom

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	397	900	357
Winter Peak 2030	282	900	254
Shoulder 2030	470	4460	2098
LL 2030	352	2500	880
Total:			**3588**
Summer Peak 2035	397	900	357
Winter Peak 2035	318	900	286
Shoulder 2035	470	4460	2098
LL 2035	352	2500	880
Total:			**3620**
Summer Peak 2040	397	900	357
Winter Peak 2040	416	900	375
Shoulder 2040	470	4460	2098
LL 2040	352	2500	880
Total:			**3709**

E. Base Case Generation

The amount of local generation for each area in the base cases are summarized below. No solar nor wind generators were included in the study base cases. Generation that are not local to a specific area remained as found in the base case. Generation from the NYS SIR process was assumed to be accounted for in the load.

Table 19: Central Hudson Local Generation (MW)

Location	Summer 2030, 2035, 2040	Winter 2030	Winter 2035	Winter 2040	Shoulder 2030, 2035, 2040	Light Load 2030, 2035, 2040
Southern Dutchess Area	0.8	0.8	0.8	0.8	0.8	0.8
Mid Dutchess Area	8.4	11.4	11.4	11.4	11.4	11.4
P&MK	2.8	2.8	2.8	2.8	0	0
Ellenville Area	50.5	50.5	50.5	50.5	50.5	50.5
Northwest Area	0.9	0.9	0.9	0.9	0.9	0.9
WM Area	19.7	15.0	15.0	15	17.9	17.9
J, RD and RJ Lines	0.5	0.5	0.5	0.5	0.5	0.5
I Line and O Line	5.5	5.5	5.5	5.5	5.5	5.5
Other local generation	530.5	585.5	585.5	585.5	10.5	10.5
Total	**619.6**	**672.9**	**672.9**	**672.9**	**98.0**	**98.0**

Con Edison Company of New York, Inc.

A. Local Transmission

Consolidated Edison Company of New York's (CECONY) principal business operations are its regulated electric, gas and steam delivery businesses. CECONY provides electric service to approximately 3.5 million customers in all of New York City (except a part of Queens) and most of Westchester County, an approximately 660 square mile service area ("Service Area") with a population of more than nine million. In addition, CECONY delivers gas to approximately 1.1 million customers in Manhattan, the Bronx, parts of Queens and most of Westchester County. In addition, CECONY operates the largest steam distribution system in the United States, producing and delivering approximately 19,796 MMlb of steam annually to 1,589 customers in parts of Manhattan.

B. Headroom Study Assumptions

In order to identify high-priority and high-value locations for targeted transmission development within CECONY local transmission system, and to improve the quality of the information available to policy makers, renewable generation developers, and other stakeholders, the headroom assessment was performed per the method(s) established in the Staff Straw Proposal for Conducting Headroom Assessments.[16] The Staff Straw Proposal for Conducting Headroom Assessments has been adjusted per September 9, 2021 Order[17]. The Commission:

- accepted to use existing switching stations or other appropriate substations as potential interconnection locations for the headroom calculations,
- concurred that calculations should be made for model years 2030, 2035, and 2040,
- clarified that production cost modeling is not required as part of the energy headroom computation, and that
- clarified that bulk system energy headroom studies by the Utilities would not be required.

The headroom calculation is based upon on the 2021 NYISO FERC Form 715 filing database and the information provided within the 2021 NYISO Load and Capacity Data ("Gold Book"). The database was modified to establish 2030, 2035, and 2040 Summer Peak base cases per Gold Book Coincident Summer Peak Demand by Zone – MW (Table I-3a) and 2030, 2035, and 2040 Winter Peak base cases per Gold Book Coincident Winter Peak Demand by Zone – MW (Table I-3b). Light Load base cases were also created for the study years, using the FERC 715 Light Load case as a starting point and maintaining the demand by zone as a percentage of the Summer Peak case for

[16] See *supra*, note 8.

[17] See *supra*, note 10.

that same year. The Light Load case may be modified to reflect seasonal rating assumptions. In addition, shoulder load cases were created by reducing the Summer Peak cases to 70% of the peak load.

The 2021 NYISO FERC Form 715 filing database and the modified 2030, 2035, and 2040 Summer Peak and Winter Peak base case were not altered for any additional generation resource additions nor additional transmission expansion projects beyond the projected system topology that was established within the FERC Form 715 filing database, unless a project has become firm since the creation of the base cases.

The headroom calculations, established for the selected existing switching stations or other appropriate substations assumed existing and firm local generation to be at 100% of its nameplate output, regardless of resource type; therefore, the established headroom is the remaining headroom at the point of injection. This assumption can result in a negative headroom at a location (especially at off-peak conditions). In some areas non-firm generation, which may already be in the NYISO interconnection queue or have awards from NYSERDA, could be expected to use some portion of the reported available headroom. The assumed generation MW are listed with the headroom calculations. Firm storage projects included in the cases were set at maximum withdraw to simulate a period of time where peak generation output would need to either be curtailed or used to charge storage.

The headroom calculation established by this assessment is an electrical headroom estimate for the assumed study years and projected system topology. Physical feasibility and external (Bulk Power System) constraints to the local location may preclude achieving the identified headroom. For example, the headroom calculation can establish a MW/MWh headroom at a substation, however, there is no physical room for additional interconnection at that substations. Connecting generation at a location with available headroom does not allow a project to bypass any portion of the NYISO administered interconnection process or guarantee any outcome of that process.

C. Existing Capacity "Headroom" within CECONY's System

The existing headroom capacity calculations is based in accordance with the methodology discussed in the Appendix of the Straw Proposal for conducting headroom assessment. The analysis is presented for 13 Transmission Load Areas within CECONY's service area.

Certain CECONY Transmission Load Areas or substations within Transmission Load Areas were not evaluated due to overlap and/or existing physical feasibility constraints. Moreover, Transmission Load Areas that encompass major parts of the Bulk Power System were not evaluated. All figures in the following tables in this Section C were round down to the nearest 10MW.

Table 20: Millwood / Buchanan 138 kV Transmission Load Area (MW)

Station	Assumed Local Generation	Millwood	Buchanan	Millwood + Buchanan
Summer Peak 2030	51.6	390	310	700
Winter Peak 2030/31	52.6	390	330	720
Shoulder 2030	52.6	370	320	690
LL 2030	52.6	330	280	610
Summer Peak 2035	51.6	380	310	690
Winter Peak 2035/36	52.6	410	330	740
Shoulder 2035	52.6	380	330	710
LL 2035	52.6	340	280	620
Summer Peak 2040	51.6	390	310	700
Winter Peak 2040/41	52.6	440	330	770
Shoulder 2040	52.6	380	330	710
LL 2040	52.6	340	290	630

Table 21: Eastview 138 kV TLA (MW)

Station	Assumed Local Generation	Eastview
Summer Peak 2030	0	1730
Winter Peak 2030	0	1730
Shoulder 2030	0	1740
LL 2030	0	1580
Summer Peak 2035	0	1760
Winter Peak 2035	0	1810
Shoulder 2035	0	1750
LL 2035	0	1590
Summer Peak 2040	0	1780
Winter Peak 2040	0	1910
Shoulder 2040	0	1760
LL 2040	0	1590

Table 22: Dunwoodie North / Sherman Creek 138 kV Transmission Load Area (MW)*

Station	Assumed Local Generation	Dunwoodie North
Summer Peak 2030	0	1400
Winter Peak 2030	0	1290
Shoulder 2030	0	1290
LL 2030	0	1320**
Summer Peak 2035	0	1430
Winter Peak 2035	0	1270
Shoulder 2035	0	1280
LL 2035	0	1330**
Summer Peak 2040	0	1440
Winter Peak 2040	0	1310
Shoulder 2040	0	1280
LL 2040	0	1330**

* Injection at Dunwoodie South may lower NYC Import Capability

** LL shows an uptick in outlet capability due to lower Zone K (Long Island) assumed imports

Table 23: Dunwoodie South 138 kV Transmission Load Area (MW)

Station	Assumed Local Generation	Dunwoodie South
Summer Peak 2030	0	1300
Winter Peak 2030	0	1160
Shoulder 2030	0	1150
LL 2030	0	1240**
Summer Peak 2035	0	1310
Winter Peak 2035	0	1100
Shoulder 2035	0	1130
LL 2035	0	1240**
Summer Peak 2040	0	1300
Winter Peak 2040	0	1150
Shoulder 2040	0	1120
LL 2040	0	1250**

* Injection at Dunwoodie South may lower NYC Import Capability

** LL shows an uptick in outlet capability due to lower Zone K (Long Island) assumed imports

Table 24: The Bronx 138 kV Transmission Load Area (MW)*

Station	Assumed Local Generation	Sherman Creek	East 179th Street	Sherman Creek East + 179th Street
Summer Peak 2030	0	300	790	1090
Winter Peak 2030/31	0	340	820	1160
Shoulder 2030	0	330	810	1140
LL 2030	0	390	780	1170
Summer Peak 2035	0	340	780	1120
Winter Peak 2035/36	0	360	830	1190
Shoulder 2035	0	330	810	1140
LL 2035	0	390	780	1170
Summer Peak 2040	0	330	790	1120
Winter Peak 2040/41	0	360	840	1200
Shoulder 2040	0	340	820	1160
LL 2040	0	390	780	1170

* Injection at East 179th Street and/or Sherman Creek may lower NYC Import Capability

Table 25: Astoria West / Queensbridge 138 kV Transmission Load Area (MW)

Station	Assumed Local Generation	Astoria West	Queensbridge	Astoria West + Queensbridge
Summer Peak 2030	1227.99	170	0	170
Winter Peak 2030/31	1285.7	90	0	90
Shoulder 2030	1285.7*	0	0	0
LL 2030	1285.7*	0	0	0
Summer Peak 2035	1227.99	200	0	200
Winter Peak 2035/36	1285.7	210	0	210
Shoulder 2035	1285.7*	0	0	0
LL 2035	1285.7*	0	0	0
Summer Peak 2040	1227.99	250	0	250
Winter Peak 2040/41	1285.7	330	110	440
Shoulder 2040	1285.7*	0	0	0
LL 2040	1285.7*	0	0	0

* Not all Assumed Local Generation can be committed w/o overloading outlet feeders

Table 26: Astoria East / Corona 138 kV Transmission Load Area (MW)

Station	Assumed Local Generation	Astoria East	Corona	Astoria East + Corona
Summer Peak 2030	754.41	0	1330	1330
Winter Peak 2030/31	836.5	570	450	1020
Shoulder 2030	836.5	560	350	910
LL 2030	836.5	0	790	790
Summer Peak 2035	754.41	0	1350	1350
Winter Peak 2035/36	836.5	580	630	1210
Shoulder 2035	836.5	570	380	950
LL 2035	836.5	0	800	800
Summer Peak 2040	754.41	10	1340	1350
Winter Peak 2040/41	836.5	0	1400	1400
Shoulder 2040	836.5	570	390	960
LL 2040	836.5	0	810	810

Table 27: Vernon / Queensbridge 138 kV Transmission Load Area (MW)

Station	Assumed Local Generation	Vernon
Summer Peak 2030	1062.21	280
Winter Peak 2030	1113.1	100
Shoulder 2030	1113.1*	0
LL 2030	1113.1*	0
Summer Peak 2035	1062.21	320
Winter Peak 2035	1113.1	260
Shoulder 2035	1113.1*	0
LL 2035	1113.1*	0
Summer Peak 2040	1062.21	370
Winter Peak 2040	1113.1	520
Shoulder 2040	1113.1*	0
LL 2040	1113.1*	0

* Not all Assumed Local Generation can be committed w/o overloading outlet feeders.

Table 28: Jamaica 138 kV Transmission Load Area (MW)

Station	Assumed Local Generation	Jamaica
Summer Peak 2030	103.71	280
Winter Peak 2030	116.8	280
Shoulder 2030	116.8	270
LL 2030	116.8	210
Summer Peak 2035	103.71	290
Winter Peak 2035	116.8	310
Shoulder 2035	116.8	270
LL 2035	116.8	210
Summer Peak 2040	103.71	290
Winter Peak 2040	116.8	340
Shoulder 2040	116.8	270
LL 2040	116.8	210

Table 29: East 13th Street 138 kV Transmission Load Area (MW)

Station	Assumed Local Generation	East 13th Street
Summer Peak 2030	639.6	1930
Winter Peak 2030	732.7	1540
Shoulder 2030	732.7	1450
LL 2030	732.7	1040
Summer Peak 2035	639.6	2000
Winter Peak 2035	732.7	1770
Shoulder 2035	732.7	1460
LL 2035	732.7	1060
Summer Peak 2040	639.6	2040
Winter Peak 2040	732.7	2060
Shoulder 2040	732.7	1490
LL 2040	732.7	1070

Table 30: Greenwood / Fox Hills 138 kV Transmission Load Area (MW)

Station	Assumed Local Generation	Greenwood
Summer Peak 2030	79.9	0
Winter Peak 2030	1170.4*	0
Shoulder 2030	1170.4*	0
LL 2030	1170.4*	0
Summer Peak 2035	79.9	60
Winter Peak 2035	1170.4*	0
Shoulder 2035	1170.4*	0
LL 2035	1170.4*	0
Summer Peak 2040	79.9	110
Winter Peak 2040	1170.4*	0
Shoulder 2040	1170.4*	0
LL 2040	1170.4*	0

* Not all Assumed Local Generation can be committed w/o overloading outlet feeders.

Table 31: Staten Island 138 kV Transmission Load Area (MW)

Station	Assumed Local Generation	Fresh Kills
Summer Peak 2030	384.7	0
Winter Peak 2030	390.2	0
Shoulder 2030	390.2	0
LL 2030	390.2	0
Summer Peak 2035	384.7	0
Winter Peak 2035	390.2	0
Shoulder 2035	390.2	0
LL 2035	390.2	0
Summer Peak 2040	384.7	0
Winter Peak 2040	390.2	0
Shoulder 2040	390.2	0
LL 2040	390.2	0

D. Existing Energy "Headroom" within CECONY's System

The existing headroom capacity calculations is based in accordance with the methodology discussed in the Addendum to the Straw Proposal for conducting headroom assessment. The analysis is presented for 13 Transmission Load Areas within CECONY's service area.

Certain CECONY Transmission Load Areas or substations within Transmission Load Areas were not evaluated due to overlap, and/or existing physical feasibility constraints. Moreover, Transmission Load Areas that encompass major parts of the Bulk Power System were not evaluated. All figures in the following tables in this Section C were round down to the nearest 10MW.

Table 32: Millwood / Buchanan 138 kV Transmission Load Area (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	700	900	630
Winter Peak 2030	720	900	640
Shoulder 2030	690	4460	3070
LL 2030	610	2500	1520
Total:			**5860**
Summer Peak 2035	690	900	620
Winter Peak 2035	740	900	660
Shoulder 2035	710	4460	3160
LL 2035	620	2500	1550
Total:			**5990**
Summer Peak 2040	700	900	630
Winter Peak 2040	770	900	690
Shoulder 2040	710	4460	3160
LL 2040	630	2500	1570
Total:			**6050**

Table 33: Eastview 138 kV TLA (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	1730	900	1550
Winter Peak 2030	1730	900	1550
Shoulder 2030	1740	4460	7760
LL 2030	1580	2500	3950
Total:			**14810**
Summer Peak 2035	1760	900	1580
Winter Peak 2035	1810	900	1620
Shoulder 2035	1750	4460	7800
LL 2035	1590	2500	3970
Total:			**14970**
Summer Peak 2040	1780	900	1600
Winter Peak 2040	1910	900	1710
Shoulder 2040	1760	4460	7840
LL 2040	1590	2500	3970
Total:			**15120**

Table 34: Dunwoodie North / Sherman Creek 138 kV Transmission Load Area (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	1400	900	1260
Winter Peak 2030	1290	900	1160
Shoulder 2030	1290	4460	5750
LL 2030	1320	2500	3300
Total:			**11470**
Summer Peak 2035	1310	900	1280
Winter Peak 2035	1100	900	1140
Shoulder 2035	1130	4460	5700
LL 2035	1240	2500	3320
Total:			**11440**
Summer Peak 2040	1300	900	1290
Winter Peak 2040	1150	900	1170
Shoulder 2040	1120	4460	5700
LL 2040	1250	2500	3320
Total:			**11480**

Table 35: Dunwoodie South 138 kV Transmission Load Area (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	1300	900	1170
Winter Peak 2030	1160	900	1040
Shoulder 2030	1150	4460	5120
LL 2030	1240	2500	3100
Total:			**10430**
Summer Peak 2035	1310	900	1170
Winter Peak 2035	1100	900	990
Shoulder 2035	1130	4460	5030
LL 2035	1240	2500	3100
Total:			**10290**
Summer Peak 2040	1300	900	1170
Winter Peak 2040	1150	900	1030
Shoulder 2040	1120	4460	4990
LL 2040	1250	2500	3120
Total:			**10310**

Table 36: The Bronx 138 kV Transmission Load Area (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	1090	900	980
Winter Peak 2030	1160	900	1040
Shoulder 2030	1140	4460	5080
LL 2030	1170	2500	2920
Total:			**10020**
Summer Peak 2035	1120	900	1000
Winter Peak 2035	1190	900	1070
Shoulder 2035	1140	4460	5080
LL 2035	1170	2500	2920
Total:			**10070**
Summer Peak 2040	1120	900	1000
Winter Peak 2040	1200	900	1080
Shoulder 2040	1160	4460	5170
LL 2040	1170	2500	2920
Total:			**10170**

Table 37: Astoria West / Queensbridge 138 kV Transmission Load Area (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	170	900	150
Winter Peak 2030	90	900	80
Shoulder 2030	0	4460	0
LL 2030	0	2500	0
Total:			**230**
Summer Peak 2035	200	900	180
Winter Peak 2035	210	900	180
Shoulder 2035	0	4460	0
LL 2035	0	2500	0
Total:			**360**
Summer Peak 2040	250	900	220
Winter Peak 2040	440	900	390
Shoulder 2040	0	4460	0
LL 2040	0	2500	0
Total:			**610**

Table 38: Astoria East / Corona 138 kV Transmission Load Area (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	1330	900	1190
Winter Peak 2030	1020	900	910
Shoulder 2030	910	4460	4050
LL 2030	790	2500	1970
Total:			**8120**
Summer Peak 2035	1350	900	1210
Winter Peak 2035	1210	900	1080
Shoulder 2035	950	4460	4230
LL 2035	800	2500	2000
Total:			**8520**
Summer Peak 2040	1350	900	1210
Winter Peak 2040	1400	900	1260
Shoulder 2040	960	4460	4280
LL 2040	810	2500	2020
Total:			**8770**

Table 39: Vernon / Queensbridge 138 kV Transmission Load Area (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	280	900	250
Winter Peak 2030	100	900	90
Shoulder 2030	0	4460	0
LL 2030	0	2500	0
Total:			**340**
Summer Peak 2035	320	900	280
Winter Peak 2035	260	900	230
Shoulder 2035	0	4460	0
LL 2035	0	2500	0
Total:			**510**
Summer Peak 2040	370	900	330
Winter Peak 2040	520	900	460
Shoulder 2040	0	4460	0
LL 2040	0	2500	0
Total:			**790**

Table 40: Jamaica 138 kV Transmission Load Area (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	280	900	250
Winter Peak 2030	280	900	250
Shoulder 2030	270	4460	1200
LL 2030	210	2500	520
Total:			**2220**
Summer Peak 2035	290	900	260
Winter Peak 2035	310	900	270
Shoulder 2035	270	4460	1200
LL 2035	210	2500	520
Total:			**2250**
Summer Peak 2040	290	900	260
Winter Peak 2040	340	900	300
Shoulder 2040	270	4460	1200
LL 2040	210	2500	520
Total:			**2280**

Table 41: East 13th Street 138 kV Transmission Load Area (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	1930	900	1730
Winter Peak 2030	1540	900	1380
Shoulder 2030	1450	4460	6460
LL 2030	1040	2500	2600
Total:			**12170**
Summer Peak 2035	2000	900	1800
Winter Peak 2035	1770	900	1590
Shoulder 2035	1460	4460	6510
LL 2035	1060	2500	2650
Total:			**12550**
Summer Peak 2040	2040	900	1830
Winter Peak 2040	2060	900	1850
Shoulder 2040	1490	4460	6640
LL 2040	1070	2500	2670
Total:			**12990**

Table 42: Greenwood / Fox Hills 138 kV Transmission Load Area (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	0	900	0
Winter Peak 2030	0	900	0
Shoulder 2030	0	4460	0
LL 2030	0	2500	0
Total:			**0**
Summer Peak 2035	60	900	50
Winter Peak 2035	0	900	0
Shoulder 2035	0	4460	0
LL 2035	0	2500	0
Total:			**50**
Summer Peak 2040	110	900	90
Winter Peak 2040	0	900	0
Shoulder 2040	0	4460	0
LL 2040	0	2500	0
Total:			**90**

Table 43: Staten Island 138 kV Transmission Load Area (GWh)

Station	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	0	900	0
Winter Peak 2030	0	900	0
Shoulder 2030	0	4460	0
LL 2030	0	2500	0
Total:			**0**
Summer Peak 2035	0	900	0
Winter Peak 2035	0	900	0
Shoulder 2035	0	4460	0
LL 2035	0	2500	0
Total:			**0**
Summer Peak 2040	0	900	0
Winter Peak 2040	0	900	0
Shoulder 2040	0	4460	0
LL 2040	0	2500	0
Total:			**0**

Orange and Rockland Utilities, Inc.

A. Local Transmission

Orange and Rockland Utilities, Inc. ("O&R"), a subsidiary of Consolidated Edison, Inc., serves three (3) counties in New York (*i.e.*, Rockland County, portions of Orange County, and portions of Sullivan County) located in Zone G (Lower Hudson Valley). O&R's 554-mile transmission network includes all facilities operated at voltage between 34.5 kV and 345 kV with about 310,000 electric customers and 140,000 natural gas customers in approximately 1,340 square miles of service territory. O&R has transmission interconnections with Central Hudson Electric and Gas Corporation and Consolidated Edison of New York.

B. Headroom Study Assumptions

In order to identify high-priority and high-value locations for targeted transmission development within O&R local transmission system, and to improve the quality of the information available to policy makers, renewable generation developers, and other stakeholders, the headroom assessment was performed per the method(s) established in the Staff Straw Proposal for Conducting Headroom Assessments.[18] The Staff Straw Proposal for Conducting Headroom Assessments has been adjusted per September 9, 2021 Order.[19] The Commission:

- accepted to use existing switching stations or other appropriate substations as potential interconnection locations for the headroom calculations,
- concurred that calculations should be made for model years 2030, 2035, and 2040,
- clarified that production cost modeling is not required as part of the energy headroom computation, and that
- clarified that bulk system energy headroom studies by the Utilities would not be required.

The headroom calculation is based upon on the 2021 NYISO FERC Form 715 filing database and the information provided within the 2021 NYISO Load and Capacity Data ("Gold Book"). The database was modified to establish 2030, 2035, and 2040 Summer Peak base cases per Gold Book Coincident Summer Peak Demand by Zone – MW (Table I-3a) and 2030, 2035, and 2040 Winter Peak base cases per Gold Book Coincident Winter Peak Demand by Zone – MW (Table I-3b). Light Load base cases were also created for the study years, using the FERC 715 Light Load case as a starting point and maintaining the demand by zone as a percentage of the Summer Peak case for that same year. The 2021 FERC 715 Cases modified to adjust to year 2030, 2035 & 2040 Light Load, Winter and Summer Peak cases.

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[18] See *supra*, note 8.

[19] See *supra*, note 10.

Instead of Gold Book MW data, O&R used the O&R summer peak load forecasts. The reason behind is that the ratio of the O&R New York Summer Peak load forecast over the NYCA Summer peak load is only 1.02. Based on this, it is assumed that the O&R New York forecast is basically the same as the NYCA. The same ratio is assumed for Winter and Light Load conditions. The resulting O&R net system load for the PSSE cases are summarized in Table 1 below:

Table 44: O&R Net System Load (MW)

Study Year	SUMMER (Net MW)	WINTER (Net MW)	LIGHT LOAD (Net MW)
2030	1560	1446	838
2035	1610	1505	872
2040	1810	1698	984

The term "Net MW" implies that there are load modifiers in each load bus in the O&R system. These load modifiers are modeled in the PSSE cases and the basis of the DER buses when determining the headroom capacity. In addition, O&R's Distribution Engineering has a list of hosting capacity limits per station. These limits become the maximum generation available in the DER buses modeled in the PSSE cases.

The 2021 NYISO FERC Form 715 filing database and the modified 2030, 2035, and 2040 Summer Peak and Winter Peak base case were not altered for any additional generation resource additions nor additional transmission expansion projects beyond the projected system topology that was established within the FERC Form 715 filing database, unless a project has become firm since the creation of the base cases. The cases, however, were modified with minor corrections and to model the load modifiers at the stations or load buses.

The headroom calculations, established for the selected existing switching stations or other appropriate substations assumed existing and firm local generation to be at 100% of its nameplate output, regardless of resource type; therefore, the established headroom is the remaining headroom at the point of injection. This assumption can result in a negative headroom at a location (especially at off-peak conditions). In some areas non-firm generation, which may already be in the NYISO interconnection queue or have awards from NYSERDA, could be expected to use some portion of the reported available headroom. The assumed generation MW are listed with the headroom calculations. Firm storage projects included in the cases were set at maximum withdraw to simulate a period of time where peak generation output would need to either be curtailed or used to charge storage.

The headroom calculation established by this assessment is an electrical headroom estimate for the assumed study years and projected system topology. Physical feasibility and external (Bulk Power System) constraints to the local location may preclude achieving the identified headroom. For example, the headroom calculation can establish a MW/MWh headroom

at a substation, however, there is no physical room for additional interconnection at that substations. Connecting generation at a location with available headroom does not allow a project to bypass any portion of the NYISO administered interconnection process or guarantee any outcome of that process.

C. Existing Capacity "Headroom" within O&R's System

For the existing headroom capacity calculations, O&R used the methodology discussed in the Appendix of the straw proposal for assessing local transmission capability headroom. O&R's existing capacity headroom are summarized in Table 45 below:

Table 45: O&R Capacity Headroom – 2030, 2035, and 2040 (MW)

Station	Light Load 2030	Winter Peak 2030	Summer Peak 2030	DER MW 2030	Light Load 2035	Winter Peak 2035	Summer Peak 2035	DER MW 2035	Light Load 2040	Winter Peak 2040	Summer Peak 2040	DER MW 2040
Blooming Grove	6.86	6.86	6.86	1.24	6.86	6.86	6.86	1.24	6.86	6.86	6.86	1.24
Bloomingburg	0.88	0.88	0.88	0.22	0.88	0.88	0.88	0.22	0.88	0.88	0.88	0.22
Blue Lake	11.50	11.50	11.50	0.60	11.30	11.30	11.30	0.80	11.20	11.20	11.20	0.9
Bulville	(2.98)	(2.98)	(2.98)	2.98	(2.98)	(2.98)	(2.98)	2.98	(2.98)	(2.98)	(2.98)	2.98
Burns	26.50	26.50	26.50	10.80	24.70	24.70	24.70	12.60	22.50	22.50	22.50	14.8
Chester	14.80	14.80	14.80	23.90	12.90	12.90	12.90	25.80	10.80	10.80	10.80	27.9
Congers	16.50	16.50	16.50	16.70	14.00	14.00	14.00	19.20	11.30	11.30	11.30	21.9
Corporate Dr.	13.40	13.40	13.40	2.20	13.00	13.00	13.00	2.60	12.50	12.50	12.50	3.1
Cuddebackville	(0.11)	(0.11)	(0.11)	0.11	(0.11)	(0.11)	(0.11)	0.11	(0.11)	(0.11)	(0.11)	0.11
Dean	9.10	9.10	9.10	1.00	9.00	9.00	9.00	1.10	8.80	8.80	8.80	1.3
Deerpark	8.14	8.14	8.14	3.16	7.94	7.94	7.94	3.36	7.54	7.54	7.54	3.76
East Walkill	6.70	6.70	6.70	10.60	6.10	6.10	6.10	11.20	5.20	5.20	5.20	12.1
Harriman	22.40	22.40	22.40	11.50	21.00	21.00	21.00	12.90	19.20	19.20	19.20	14.7
Hartley	12.40	12.40	12.40	15.30	12.40	12.40	12.40	15.30	12.30	12.30	12.30	15.4
Highland Falls	5.00	5.00	5.00	1.00	4.90	4.90	4.90	1.10	4.70	4.70	4.70	1.3
Hilburn	7.20	7.20	7.20	1.00	7.00	7.00	7.00	1.20	6.70	6.70	6.70	1.5
Hunt	7.40	7.40	7.40	6.80	6.50	6.50	6.50	7.70	5.40	5.40	5.40	8.8
Little Tor	1.80	1.80	1.80	2.10	1.50	1.50	1.50	2.40	1.10	1.10	1.10	2.8
Matamoras	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Mongaup	(0.05)	(0.05)	(0.05)	0.05	(0.05)	(0.05)	(0.05)	0.05	(0.05)	(0.05)	(0.05)	0.05
Monroe	30.30	30.30	30.30	13.60	28.20	28.20	28.20	15.70	25.70	25.70	25.70	18.2
Monsey	13.90	13.90	13.90	14.80	14.40	14.40	14.40	14.30	14.80	14.80	14.80	13.9
Nanuet	14.10	14.10	14.10	7.30	13.30	13.30	13.30	8.10	12.40	12.40	12.40	9
New Hempstead	18.10	18.10	18.10	22.80	15.50	15.50	15.50	25.40	12.40	12.40	12.40	28.5
Orangeburg	17.90	17.90	17.90	17.00	16.80	16.80	16.80	18.10	15.30	15.30	15.30	19.6
Otisville	(1.04)	(1.04)	(1.04)	6.34	(1.04)	(1.04)	(1.04)	6.34	(1.04)	(1.04)	(1.04)	6.34
Port Jervis	0.80	0.80	0.80	4.70	0.70	0.70	0.70	4.80	0.60	0.60	0.60	4.9
Q575_G1	0.00	0.00	7.00	3.00	10.00	10.00	7.00	3.00	10.00	10.00	7.00	3
Q575_G2	0.00	0.00	8.70	3.80	12.50	12.50	8.70	3.80	12.50	12.50	8.70	3.8
Ringwood	13.60	13.60	13.60	1.30	13.40	13.40	13.40	1.50	13.00	13.00	13.00	1.9

Station	Light Load 2030	Winter Peak 2030	Summer Peak 2030	DER MW 2030	Light Load 2035	Winter Peak 2035	Summer Peak 2035	DER MW 2035	Light Load 2040	Winter Peak 2040	Summer Peak 2040	DER MW 2040
Rio	0.01	0.01	0.01	0.09	0.01	0.01	0.01	0.09	0.01	0.01	0.01	0.09
Shoemaker	2.70	2.70	2.70	19.70	1.70	1.70	1.70	20.70	0.40	0.40	0.40	22
Silverlake	37.70	37.70	37.70	6.70	36.60	36.60	36.60	7.80	35.30	35.30	35.30	9.1
Sloatsburg	13.10	13.10	13.10	2.00	12.80	12.80	12.80	2.30	12.50	12.50	12.50	2.6
Snake Hill	21.90	21.90	21.90	7.70	20.70	20.70	20.70	8.90	19.60	19.60	19.60	10
South Goshen	4.77	4.77	4.77	0.93	4.77	4.77	4.77	0.93	4.77	4.77	4.77	0.93
Sparkill	17.90	17.90	17.90	2.20	17.60	17.60	17.60	2.50	17.30	17.30	17.30	2.8
Sterling Forest	5.80	5.80	5.80	0.50	5.70	5.70	5.70	0.60	5.60	5.60	5.60	0.7
Stonypoint	16.40	16.40	16.40	10.80	14.80	14.80	14.80	12.40	13.00	13.00	13.00	14.2
Summitville	(0.03)	(0.03)	(0.03)	0.03	(0.03)	(0.03)	(0.03)	0.03	(0.03)	(0.03)	(0.03)	0.03
Tallman	31.80	31.80	31.80	7.50	30.80	30.80	30.80	8.50	29.40	29.40	29.40	9.9
Washington Heights	11.55	11.55	11.55	0.35	11.55	11.55	11.55	0.35	11.55	11.55	11.55	0.35
West Haverstraw	24.90	24.90	24.90	14.50	22.70	22.70	22.70	16.70	20.10	20.10	20.10	19.3
West Milford	15.60	15.60	15.60	10.20	14.00	14.00	14.00	11.80	12.30	12.30	12.30	13.5
West Nyack	29.10	29.10	29.10	7.10	28.30	28.30	28.30	7.90	27.20	27.20	27.20	9
Westtown	(7.04)	(7.04)	(7.04)	7.04	(7.04)	(7.04)	(7.04)	7.04	(7.04)	(7.04)	(7.04)	7.04
Wisner	1.50	1.50	1.50	15.50	15.66	15.66	15.66	1.34	15.66	15.66	15.66	1.34
Wurtsboro	0.46	0.46	0.46	0.04	0.46	0.46	0.46	0.04	0.46	0.46	0.46	0.04
Grand Total	**503.22**	**503.22**	**518.92**	**318.78**	**511.68**	**511.68**	**504.88**	**332.82**	**477.58**	**477.58**	**470.78**	**366.92**

D. Existing Energy "Headroom" within O&R's System

For the existing headroom energy calculations, O&R used the methodology discussed in the Addendum to the Staff Straw Proposal for Conducting Energy Headroom. O&R's existing energy headroom are summarized in Table 46 below:

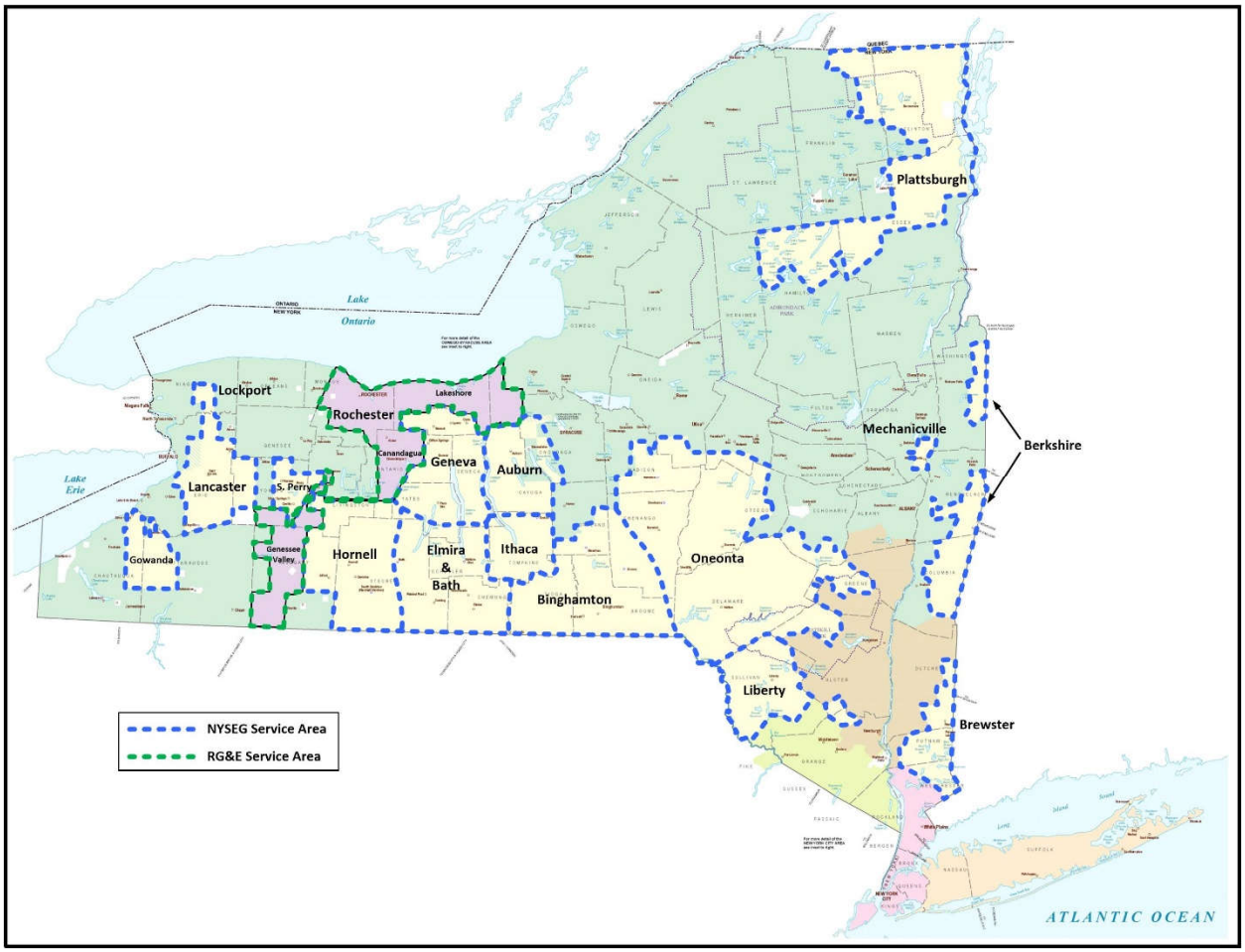
Table 46: O&R's Existing Energy Headroom

Station	Optimal Transfer	Applicable Hours	GWh
Summer Peak 2030	519	900	467
Winter Peak 2030	503	900	453
Shoulder 2030	NOT DETERMINED		
LL 2030	503	2500	1258
Total:			**2178**
Summer Peak 2035	505	900	454
Winter Peak 2035	512	900	461
Shoulder 2035	NOT DETERMINED		
LL 2035	512	2500	1279
Total:			**2194**
Summer Peak 2040	471	900	424
Winter Peak 2040	478	900	430
Shoulder 2040	NOT DETERMINED		
LL 2040	478	2500	1194
Total:			**2047**

AVANGRID NY (NYSEG & RG&E)

A. Local Transmission

NYSEG serves approximately 900,000 electricity customers, while RG&E serves approximately 380,000 customers. The NYSEG and RG&E transmission systems are predominantly networked and operate at a range of voltage levels from 345, 230, 115, 46, 34.5, and 11.5 kV. The scope of this study, as outlined in the Commission Order, will focus predominantly on the "Local" system, which includes transmission facilities with the operating voltage less than 200 kV. AVANGRID's transmission facilities operating above 200kV are considered to be part of NY's "Bulk" transmission system and will be captured in future studies. For the purpose this study, the NYSEG and RG&E analyses were performed under the "AVANGRID" umbrella and are discussed collectively in the proceeding sections.



B. Headroom Study Assumptions

In order to identify high-priority and high-value locations for targeted transmission development within AVANGRID's local transmission system and to improve the quality of the information available to policy makers, renewable generation developers, and other stakeholders, a headroom assessment was performed according to the methods established in the Staff Straw Proposal for Conducting Headroom Assessments.[20] The Staff Straw Proposal for Conducting Headroom Assessments was adjusted per the Phase 2 Order.[21] In the September 9 Order, the Commission:

- accepted to use existing switching stations or other appropriate substations as potential interconnection locations for the headroom calculations;
- concurred that calculations should be made for model years 2030, 2035, and 2040;
- clarified that production cost modeling is not required as part of the energy headroom computation; and
- clarified that bulk system energy headroom studies by the Utilities would not be required.

The headroom calculation is based on the 2021 NYISO FERC Form 715 filing database and the information provided in the 2021 NYISO Load and Capacity Data ("Gold Book"). The database was modified to establish 2030, 2035, and 2040 Summer Peak base cases per Gold Book Coincident Summer Peak Demand by Zone – MW (Table I-3a) and 2030, 2035, and 2040 Winter Peak base cases per Gold Book Coincident Winter Peak Demand by Zone – MW (Table I-3b). Light Load base cases were also created for the study years, using the FERC 715 Light Load case as a starting point and maintaining the demand by zone as a percentage of the Summer Peak case for that same year. In addition, shoulder load cases were created by scaling the Summer Peak cases to 70% of peak loading.

The 2021 NYISO FERC Form 715 filing database and the modified 2030, 2035, and 2040 Summer Peak and Winter Peak base cases were not altered for any additional generation resource additions nor additional transmission expansion projects beyond the projected system topology that was established within the FERC Form 715 filing database, unless a project has become Firm since the creation of the base cases.

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[20] See *supra*, note 9.

[21] See *supra*, note 10.

Table 47: Assumed NY Load Profile

Season	Year of Study 2030	2035	2040
Summer	31,453 MW	32,117 MW	32,812 MW
Winter*	25,252 MW	28,347 MW	32,668 MW
Shoulder	22,017 MW	22,482 MW	22,968 MW
Light	12,581 MW	12,847 MW	13,125 MW

* Winter loading for years 2030-31; 2035-36; 2040-41

The headroom calculations, established for the selected existing switching stations or substations assumed existing and firm local renewable generation to be dispatched at 100% of its nameplate output, regardless of resource type; therefore, the established headroom is the remaining headroom at the point of injection. This assumption can result in a negative existing headroom at a location, especially at off-peak conditions. In some areas, non-Firm generation, which may be in the NYISO interconnection queue or have awards from NYSERDA, could be expected to use some portion of the reported available headroom. The assumed existing generation dispatches are listed with the headroom calculations. Firm energy storage projects included in the cases were set at maximum withdraw to simulate a period of time where peak generation output would need to either be curtailed or used to charge storage.

The headroom calculation established by this assessment is an electrical headroom estimate for the assumed study years and projected system topology. Physical feasibility or Bulk system constraints may preclude achieving the identified headroom. For example, the headroom calculation may establish a positive capacity headroom at a substation, however, there may not be physical space for an additional interconnection at that substation. Connecting generation at a location with available headroom does not allow a project to bypass any portion of the NYISO-administered interconnection process or guarantee any outcome of that process.

C. Existing Capacity "Headroom" within AVANGRID's System

To provide headroom data that is considerate of the interconnected Local system topology, AVANGRID defined subsystems called "Renewable Energy Pockets" where the headroom was established for a given local area, rather than on a broader regional basis. When evaluating each Renewable Energy Pocket, the net headroom for that subsystem was determined. The Renewable Energy Pockets were largely based on the NYSEG and RG&E divisions presented in Section A:

AVANGRID NY Districts

- Auburn
- Berkshire
- Binghamton
- Brewster
- Elmira
- Geneva
- Gowanda
- Hornell
- Ithaca
- Lancaster
- Liberty
- Lockport
- Oneonta
- Plattsburgh
- Rochester

Each of these divisions were examined and a number of injection points (*i.e.* assumed interconnection stations) in each region were generally selected based on land availability, transmission system topology, and historic renewable interest. Additionally, only Local substations with voltages above 100 kV were selected. Generators were added to these buses and scaled up within each Renewable Energy Pocket until a binding constraint (*i.e.*, transmission facility overload) was identified. The following tables highlight which combination of locations will maximize headroom within the regions.

Table 48: Auburn (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load
State St	246	383	292	275	247	385	234	270	249	387	235	276
Wright Ave	296	83	220	309	298	81	282	316	300	80	283	318
Clinton Corn	0	0	0	0	0	0	0	0	0	0	0	0
Capacity Headroom	**466 MW**				**466 MW**				**467 MW**			

Table 49: Berkshire (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load*	Light Load	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load
Craryville	69	4	6	18	71	4	7	22	72	3	8	84
Klinekill	0	0	0	0	0	0	0	0	0	0	0	0
Stephentown	0	0	0	0	0	0	0	0	0	0	0	0
Mulberry St	129	103	106	108	129	103	106	111	130	103	107	130
New Salem	46	44	44	49	45	44	44	49	46	44	44	51
Wynantskill	301	285	291	352	170	285	291	356	255	285	291	347
Fallspark	67	116	136	133	65	113	136	126	63	110	136	61
Capacity Headroom	**550 MW**				**480 MW**				**544 MW**			

Table 50: Binghamton (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load
Kattelville	69	0	138	165	24	0	0	176	59	0	151	94
Clarks Corners	486	500	340	424	482	500	366	384	479	500	332	500
Oakdale	500	0	500	500	500	0	500	500	500	0	500	500
South Owego	86	0	98	99	101	0	97	74	94	0	70	138
Willet	155	0	128	191	127	0	79	195	125	0	165	117
Afton	3	0	0	26	2	0	0	20	11	0	19	0
Langdon	240	124	234	244	235	98	236	253	228	71	237	231
Lounsberry	14	136	5	16	14	130	5	16	14	118	5	14
Line 915	70	21	67	69	71	23	68	70	71	24	68	71
Capacity Headroom	**781 MW**				**751 MW**				**712 MW**			

Table 51: Brewster (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load
Carmel	179	171	177	238	180	172	177	240	180	172	177	196
Katonah	326	288	305	355	328	289	307	362	329	289	307	371
Pawling	196	38	168	144	206	42	174	155	201	45	177	204
Wood St	500	500	500	500	500	500	500	500	500	500	500	500
Goldens Bridge	25	9	22	25	25	10	22	28	26	10	23	26
Tilly Foster	83	156	80	83	76	153	77	90	81	152	77	62
Union Valley	40	8	14	16	42	8	14	18	45	8	14	22
Capacity Headroom	**1170 MW**				**1173 MW**				**1176 MW**			

Table 52: Elmira (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load
Bath	167	167	100	182	171	169	113	187	171	169	158	184
Hickling Station	0	0	0	0	0	0	0	0	0	0	0	0
Ridge Rd	0	0	82	112	0	0	2	97	0	0	98	0
Stony Ridge	297	105	375	443	145	60	237	458	188	26	380	370
Sullivan Park	0	0	0	0	0	0	0	0	0	0	0	0
Erwin	0	0	0	0	0	0	0	0	0	0	0	0
Chemung	0	0	46	110	0	0	0	122	0	0	62	0
Montour Falls	117	55	0	30	100	49	129	41	112	44	0	147
West Erie	0	0	0	0	0	0	124	0	0	0	0	0
Capacity Headroom	**327 MW**				**278 MW**				**240 MW**			

Table 53: Geneva (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load
Border City	236	199	205	176	237	200	196	231	238	200	191	238
Flat St	101	115	134	166	98	110	135	159	108	104	134	106
Guardian	37	96	183	113	30	104	183	43	14	110	183	17
Hyatt	90	29	30	167	102	25	39	170	115	22	46	112
Macedon	79	61	82	94	80	62	83	98	80	62	84	80
Sleight Ave	155	123	142	147	157	123	144	156	159	123	145	158
Capacity Headroom	**624 MW**				**624 MW**				**622 MW**			

Table 54: Gowanda (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load
Cold Spring Rd	51	42	46	47	51	42	46	49	52	42	46	51
Silver Creek	110	104	104	120	110	105	104	121	111	105	104	127
Capacity Headroom	**146 MW**				**147 MW**				**147 MW**			

Table 55: Hornell* (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load	Shoulder Load*	Winter Load	Heavy Load	Light Load	Shoulder Load*	Winter Load	Heavy Load	Light Load	Shoulder Load*	Winter Load
Eel Pot	7	19	66	28	8	10	59	14	8	10	36	131
Meyer	179	156	165	212	177	141	177	137	174	143	223	107
Bennett	130	79	207	204	130	0	208	214	129	51	209	212
South Perry	168	157	108	208	166	177	105	214	164	180	85	184
Indeck	75	13	41	13	75	13	41	13	75	13	41	41
Spencer Hill	0	0	4	0	0	86	4	0	0	146	4	0
Moraine Rd	0	0	0	0	0	0	0	0	0	0	0	0
Palimeter	0	0	0	0	0	0	0	0	0	0	0	0
Capacity Headroom	**423 MW**				**426 MW**				**542 MW**			

** Note: All proposed Queue generation in Hornell was set to 0 output.*

Table 56: Ithaca (MW)

Location	2030				2035				2040			
	Heavy Load*	Light Load	Shoulder Load	Winter Load	Heavy Load*	Light Load	Shoulder Load	Winter Load	Heavy Load*	Light Load	Shoulder Load	Winter Load
Coddington Rd	16	2	37	31	8	3	39	13	10	4	37	21
Etna	189	264	292	285	172	269	277	237	166	272	253	306
Cayuga	243	232	237	279	244	232	237	282	244	232	238	283
East Ithaca	0	0	39	16	0	0	15	0	0	0	40	0
Capacity Headroom	**448 MW**				**424 MW**				**420 MW**			

Table 57: Lancaster (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load	Shoulder Load*	Winter Load	Heavy Load*	Light Load	Shoulder Load	Winter Load	Heavy Load	Light Load	Shoulder Load*	Winter Load
Cobble Hill	185.2	172	172.1	199.5	186.4	172	171.2	199.2	186.9	172.3	172.6	210.1
Stolle Rd	179.3	284.8	194	154	155.8	283.1	226.7	176	146.9	282.9	182	234.3
Davis St	90.2	56.6	66.6	118.5	90.5	56.7	68.8	124.7	92.1	56.6	67.6	143
Capacity Headroom	**433 MW**				**433 MW**				**422 MW**			

Table 58: Liberty (MW)

Location	2030				2035				2040			
	Heavy Load*	Light Load	Shoulder Load	Winter Load	Heavy Load*	Light Load	Shoulder Load	Winter Load	Heavy Load*	Light Load	Shoulder Load	Winter Load
Coopers Corners	297	349	500	500	248	357	500	500	236	347	500	412
Shorcut Rd	136	126	133	135	136	126	133	137	137	126	133	137
Rock Hill	11	0	14	91	11	0	19	43	12	0	28	34
West Woodbourne	0	0	0	0	0	0	0	0	0	0	0	0
Ferndale	0	0	0	0	0	0	0	0	0	0	0	0
Mountaindale	0	0	0	0	0	0	0	0	0	0	0	0
Hazel	0	0	0	0	0	0	0	0	0	0	0	0
Capacity Headroom	**444 MW**				**395 MW**				**384 MW**			

Table 59: Lockport (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load*	Light Load	Shoulder Load	Winter Load	Heavy Load	Light Load	Shoulder Load	Winter Load*
Robinson Rd	93	26	46	33	102	27	57	61	113	27	61	26
Hinman Rd	56	103	281	334	48	100	272	314	39	97	269	144
Capacity Headroom	**129 MW**				**127 MW**				**124 MW**			

Table 60: Oneonta* (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load*
County Line	119	99	91	112	119	99	97	118	119	98	106	119
East Norwich	89	32	86	86	93	33	13	87	95	34	85	93
East Springfield	109	106	108	135	109	106	108	128	109	106	102	135
Colliers	75	10	41	71	71	10	51	87	74	10	0	80
Fraser	124	90	224	191	108	88	273	188	117	85	293	72
Sydney (Railroad St)	141	11	139	156	144	10	12	160	144	11	127	152
Grand Gorge	100	87	95	97	100	88	95	99	101	88	95	101
Hancock	16	71	0	13	20	70	0	24	19	68	0	13
Windham	132	126	139	165	132	126	139	167	132	126	140	158
Capacity Headroom	**632 MW**				**629 MW**				**626 MW**			

** Note: All proposed Queue generation in Hornell was set to 0 output.*

Table 61: Plattsburgh* (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load
Barton Brook	50	44	51	52	50	44	51	54	50	45	51	50
Chateaugay	120	0	58	74	121	0	61	85	122	0	65	158
Lyon Mountain	44	138	111	129	42	138	108	120	42	138	104	30
Northend	0	40	80	112	0	40	83	128	0	41	85	128
Masons Corners	68	185	197	228	70	185	197	231	73	185	198	135
Capacity Headroom	**281 MW**				**284 MW**				**286 MW**			

** Note: There are existing fossil fuel generators around Plattsburgh that adversely affect these headroom results during peak load*

Table 62: Rochester (MW)

Location	2030				2035				2040			
	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load	Heavy Load	Light Load*	Shoulder Load	Winter Load
Sta 168 (Farmington) Bus1	219	32	218	224	220	192	218	137	221	192	219	217
Sta 168 (Farmington) Bus2	109	109	58	148	109	0	86	148	109	0	109	148
Sta 127 (Hook Rd)	129	104	155	74	131	147	129	138	133	147	107	94
Sta 113	87	40	61	63	88	41	62	69	90	41	63	85
Sta 71	37	12	18	24	38	12	18	26	40	13	18	43
Sta 13A	0	0	66	0	0	91	60	0	0	82	25	0
Sta 122	385	348	20	500	372	239	55	500	378	225	0	500
Sta 121	151	322	340	331	152	263	353	364	157	263	369	187
Sta 7	378	278	328	413	385	280	332	446	390	283	338	439
Capacity Headroom	**1245 MW**				**1265 MW**				**1247 MW**			

D. Existing Energy "Headroom" within AVANGRID's System

The objective of this analysis is to determine the existing energy headroom (measured in GWh) for each Renewable Energy Pocket of NYSEG and RG&E's systems as described in Section C, Capacity headroom. The energy headroom differs as it looks at power over the entire year, rather than instantaneously. Table 63, below, shows a breakdown of applicable hours AVANGRID assumed for each load level analyzed.[22]

Table 63: Hours per Year in Each Load Level

Load Level	Description	Applicable Yearly Hours
Summer Peak	An average of summer peak hours	900
Winter Peak	An average of winter peak hours	900
Shoulder Load	Shoulder month load hours	4460
Light Load	Low load hours	2500
Total		**8760**

Table 64: Auburn Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	542	900	488
2030 Light Load	466	2500	1164
2030 Shoulder Load	512	4460	2283
2030 Winter Load	583	900	525
2030 Total			**4460**
2035 Summer Load	545	900	491
2035 Light Load	466	2500	1166
2035 Shoulder Load	515	4460	2297
2035 Winter Load	586	900	528
2035 Total			**4482**
2035 Summer Load	549	900	494
2035 Light Load	467	2500	1168
2035 Shoulder Load	518	4460	2309
2035 Winter Load	594	900	535
2040 Total			**4506**

[22] This table is adapted from the Energy Headroom Straw Proposal. *See* LT&D Planning Proceeding, Staff Straw Proposal for Conducting Headroom Assessments (March 16, 2021).

Table 65: Berkshire Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	612	900	550
2030 Light Load	550	2500	1375
2030 Shoulder Load	582	4460	2597
2030 Winter Load	660	900	594
2030 Total			**5116**
2035 Summer Load	480	900	432
2035 Light Load	548	2500	1371
2035 Shoulder Load	584	4460	2602
2035 Winter Load	663	900	597
2035 Total			**5002**
2035 Summer Load	565	900	509
2035 Light Load	544	2500	1361
2035 Shoulder Load	586	4460	2611
2035 Winter Load	673	900	605
2040 Total			**5086**

Table 66: Binghamton Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	1622	900	1459
2030 Light Load	781	2500	1952
2030 Shoulder Load	1510	4460	6735
2030 Winter Load	1733	900	1560
2030 Total			**11706**
2035 Summer Load	1556	900	1401
2035 Light Load	751	2500	1879
2035 Shoulder Load	1351	4460	6023
2035 Winter Load	1687	900	1519
2035 Total			**10822**
2035 Summer Load	1581	900	1423
2035 Light Load	712	2500	1781
2035 Shoulder Load	1547	4460	6900
2035 Winter Load	1665	900	1499
2040 Total			**11603**

Table 67: Brewster Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	1349	900	1214

2030 Light Load	1170	2500	2926
2030 Shoulder Load	1265	4460	5644
2030 Winter Load	1362	900	1226
2030 Total			**11010**
2035 Summer Load	1356	900	1220
2035 Light Load	1173	2500	2932
2035 Shoulder Load	1270	4460	5665
2035 Winter Load	1393	900	1254
2035 Total			**11071**
2035 Summer Load	1362	900	1226
2035 Light Load	1176	2500	2939
2035 Shoulder Load	1275	4460	5688
2035 Winter Load	1381	900	1243
2040 Total			**11096**

Table 68: Elmira Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	581	900	523
2030 Light Load	327	2500	818
2030 Shoulder Load	602	4460	2685
2030 Winter Load	877	900	789
2030 Total			**4815**
2035 Summer Load	416	900	374
2035 Light Load	278	2500	695
2035 Shoulder Load	604	4460	2692
2035 Winter Load	905	900	814
2035 Total			**4575**
2035 Summer Load	471	900	424
2035 Light Load	240	2500	599
2035 Shoulder Load	697	4460	3110
2035 Winter Load	701	900	631
2040 Total			**4764**

Table 69: Geneva Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	699	900	629
2030 Light Load	624	2500	1561

2030 Shoulder Load	776	4460	3462
2030 Winter Load	862	900	776
2030 Total			**6428**
2035 Summer Load	704	900	634
2035 Light Load	624	2500	1559
2035 Shoulder Load	780	4460	3479
2035 Winter Load	858	900	772
2035 Total			**6444**
2035 Summer Load	713	900	642
2035 Light Load	622	2500	1555
2035 Shoulder Load	784	4460	3494
2035 Winter Load	711	900	640
2040 Total			**6331**

Table 70: Gowanda Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	161	900	145
2030 Light Load	146	2500	366
2030 Shoulder Load	150	4460	667
2030 Winter Load	168	900	151
2030 Total			**1329**
2035 Summer Load	162	900	145
2035 Light Load	147	2500	367
2035 Shoulder Load	150	4460	668
2035 Winter Load	169	900	152
2035 Total			**1332**
2035 Summer Load	162	900	146
2035 Light Load	147	2500	367
2035 Shoulder Load	150	4460	669
2035 Winter Load	178	900	160
2040 Total			**1342**

Table 71: Hornell Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	560	900	504
2030 Light Load	423	2500	1058
2030 Shoulder Load	590	4460	2632

2030 Winter Load	665	900	599
2030 Total			**4793**
2035 Summer Load	555	900	500
2035 Light Load	426	2500	1064
2035 Shoulder Load	593	4460	2644
2035 Winter Load	592	900	533
2035 Total			**4741**
2035 Summer Load	550	900	495
2035 Light Load	542	2500	1356
2035 Shoulder Load	598	4460	2665
2035 Winter Load	674	900	607
2040 Total			**5123**

Table 72: Ithaca Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	448	900	403
2030 Light Load	497	2500	1244
2030 Shoulder Load	605	4460	2699
2030 Winter Load	611	900	550
2030 Total			**4896**
2035 Summer Load	424	900	381
2035 Light Load	504	2500	1259
2035 Shoulder Load	568	4460	2534
2035 Winter Load	532	900	479
2035 Total			**4653**
2035 Summer Load	420	900	378
2035 Light Load	508	2500	1269
2035 Shoulder Load	567	4460	2531
2035 Winter Load	610	900	549
2040 Total			**4727**

Table 73: Lancaster Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	455	900	409
2030 Light Load	513	2500	1284
2030 Shoulder Load	433	4460	1930
2030 Winter Load	472	900	425

2030 Total			**4048**
2035 Summer Load	433	900	389
2035 Light Load	512	2500	1280
2035 Shoulder Load	467	4460	2081
2035 Winter Load	500	900	450
2035 Total			**4200**
2035 Summer Load	426	900	383
2035 Light Load	512	2500	1280
2035 Shoulder Load	422	4460	1883
2035 Winter Load	587	900	529
2040 Total			**4075**

Table 74: Liberty Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	444	900	400
2030 Light Load	475	2500	1188
2030 Shoulder Load	647	4460	2885
2030 Winter Load	726	900	653
2030 Total			**5126**
2035 Summer Load	395	900	356
2035 Light Load	483	2500	1207
2035 Shoulder Load	651	4460	2905
2035 Winter Load	679	900	611
2035 Total			**5079**
2035 Summer Load	384	900	346
2035 Light Load	473	2500	1183
2035 Shoulder Load	661	4460	2946
2035 Winter Load	583	900	524
2040 Total			**4999**

Table 75: Lockport Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	149	900	134
2030 Light Load	129	2500	322
2030 Shoulder Load	327	4460	1459
2030 Winter Load	367	900	330
2030 Total			**2245**

2035 Summer Load	150	900	135
2035 Light Load	127	2500	317
2035 Shoulder Load	329	4460	1466
2035 Winter Load	375	900	337
2035 Total			**2255**
2035 Summer Load	152	900	136
2035 Light Load	124	2500	311
2035 Shoulder Load	331	4460	1474
2035 Winter Load	170	900	153
2040 Total			**2074**

Table 76: Oneonta Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	905	900	815
2030 Light Load	632	2500	1580
2030 Shoulder Load	922	4460	4114
2030 Winter Load	1025	900	922
2030 Total			**7431**
2035 Summer Load	895	900	805
2035 Light Load	629	2500	1573
2035 Shoulder Load	788	4460	3514
2035 Winter Load	1058	900	952
2035 Total			**6844**
2035 Summer Load	910	900	819
2035 Light Load	626	2500	1565
2035 Shoulder Load	947	4460	4224
2035 Winter Load	924	900	831
2040 Total			**7439**

Table 77: Plattsburgh Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	281	900	253
2030 Light Load	408	2500	1020
2030 Shoulder Load	497	4460	2216
2030 Winter Load	595	900	536
2030 Total			**4025**
2035 Summer Load	284	900	255

2035 Light Load	408	2500	1021
2035 Shoulder Load	500	4460	2230
2035 Winter Load	617	900	555
2035 Total			**4061**
2035 Summer Load	286	900	258
2035 Light Load	409	2500	1022
2035 Shoulder Load	504	4460	2246
2035 Winter Load	501	900	451
2040 Total			**3977**

Table 78: Rochester Energy Headroom (GWh)

Load Level	Optimal Transfer (MW)	Applicable Hours	Energy Headroom (GWh)
2030 Summer Load	1495	900	1346
2030 Light Load	1245	2500	3113
2030 Shoulder Load	1262	4460	5629
2030 Winter Load	1777	900	1600
2030 Total			**11688**
2035 Summer Load	1495	900	1346
2035 Light Load	1265	2500	3164
2035 Shoulder Load	1311	4460	5846
2035 Winter Load	1827	900	1644
2035 Total			**12000**
2035 Summer Load	1518	900	1366
2035 Light Load	1247	2500	3117
2035 Shoulder Load	1247	4460	5563
2035 Winter Load	1715	900	1543
2040 Total			**11589**

E. Base Case Solar and Wind Generation

The following solar and wind generators were included in study base cases.

Queue Position	Region	MW
0590	Binghamton	20
0768	Binghamton	20
0775	Binghamton	20
0828	Binghamton	20
	Total	**80**

Queue Position	Region	MW
0715	Geneva	20
0720	Geneva	80
	Total	**100**
0396	Hornell	234.675
0422	Hornell	101.81
0513	Hornell	20
0519	Hornell	290.7
0591	Hornell	20
	Total	**721.185***
0584	Ithaca	20
	Total	**20**
0592	Lancaster	20
0596	Lancaster	339.15
	Total	**359.15**
0704	Lockport	103.02
	Total	**103.02**
0579	Oneonta	124.2
0706	Oneonta	100.8
0784	Oneonta	5
	Total	**230**
0721	Rochester	280.28
	Total	**280.28**

* Note: In Hornell, the total proposed Queue generation is higher than the existing Capacity Headroom Available.

Long Island Power Authority (LIPA)

A. Local Transmission

LIPA serves approximately 1.1 million electric customers. The LIPA service territory consists of most of Nassau and Suffolk counties and the Rockaway Peninsula in Queens. LIPA's service territory covers about 1,230 square miles, encompassing nearly 90 percent of Long Island's total land area. Three small independent municipal electric systems - Freeport, Rockville Centre, and Greenport - are located within the LIPA service territory. The LIPA owned transmission and sub-transmission system includes approximately 1,366 miles of overhead and underground lines with voltage levels ranging from 23 kV to 345 kV.

The LIPA transmission system consists of 138 kV and 345 kV voltage levels and the LIPA sub-transmission system consists of 23, 34.5 kV and 69 kV voltage levels. The LIPA transmission system is electrically interconnected to the rest of New York State, New England, and New Jersey.

The LIPA 138kV transmission backbone primarily runs from west to east (from the Nassau/Queens border to Riverhead). Transfer of power from the western part of the system to the eastern part of the system, and vice versa is primarily supported by the LIPA 138kV transmission backbone in addition to underlying 69 kV sub-transmission circuits.

B. Headroom Study Assumptions

In order to identify high-priority and high-value locations for targeted transmission development within LIPA local transmission system, and to improve the quality of the information available to policy makers, renewable generation developers, and other stakeholders, the headroom assessment was performed per the method(s) established in the Staff Straw Proposal for Conducting Headroom Assessments.[23] The Staff Straw Proposal for Conducting Headroom Assessments has been adjusted per the September 9, 2021 Order.[24] The Commission:

- accepted to use existing switching stations or other appropriate substations as potential interconnection locations for the headroom calculations,
- concurred that calculations should be made for model years 2030, 2035, and 2040,
- clarified that production cost modeling is not required as part of the energy headroom computation, and
- clarified that bulk system energy headroom studies by the Utilities would not be required.

The headroom calculation is based upon on the 2021 NYISO FERC Form 715 filing database and the information provided within the 2021 NYISO Load and Capacity Data ("Gold Book"). As an

[23] See *supra*, note 9.

[24] See *supra*, note 10.

internal practice, the database was modified to establish 2030, 2035, and 2040 Summer Peak base cases per Gold Book Non-Coincident Summer Peak Demand by Zone – MW (Table I-4a) and 2030, 2035, and 2040 Winter Peak base cases per Gold Book Non-Coincident Winter Peak Demand by Zone – MW (Table I-4b). In addition, the LIPA system load for each case was modified to match the Long Island Zone K non-coincident LIPA internal system load forecast using the forecast from the 2021 Gold Book Table I-4a and I-4b as a starting point. Light Load base cases were also created for the study years, using the FERC 715 Light Load case as a starting point and the load level was set to 1600 MW based on a future yearly load forecast for the LIPA system. The future forecast data shows about 10% exposure to load levels less than 1600 MW. The Light Load case may be modified to reflect seasonal rating assumptions. In addition, shoulder load cases were created by reducing the Summer Peak cases to 80% of the peak load. In addition, Summary of the LIPA system load for each case can be found in Table 79, below.

Table 79: LIPA load for each case (MW)

Study Year	Summer Peak LIPA Load Flow Model (MW)	Summer Shoulder LIPA Load Flow Model (MW)	Winter Peak LIPA Load Flow Model (MW)	Light Load LIPA Load Flow Model (MW)
2030	4895	3196	3475	1600
2035	5198	4159	4021	1600
2040	5469	4376	4725	1600

The 2021 NYISO FERC Form 715 filing database and the modified 2030, 2035, and 2040 Summer Peak and Winter Peak base case were not altered for any additional generation resource additions nor additional transmission expansion projects beyond the projected system topology that was established within the FERC Form 715 filing database, unless a project has become firm since the creation of the base cases. Several LIPA Local non-BES projects have been added to the base cases. These Projects and descriptions are indicated below in Table 80.

Table 80: Summary of LIPA local, non-BES projects included for this assessment

Local Area	Project Name	Project Description	Proposed I/S Date
Far Rockaway	Rockaway Beach 34.5 kV new circuits	Install a new 34.5 kV circuit from the Far Rockaway substation to the Arverne substation.	12/31/2022
		Install a new 34.5 kV circuit from the Rockaway Beach substation to the Arverne substation.	6/1/2023
Central	New 69 kV Ruland to Round Swamp to Plainview Circuits	Install a new 69 kV circuit from the Ruland Rd. substation to the Round Swamp Substation to the Plainview substation.	6/1/2022
	New 69 kV Round Swamp Substation	Construct a new 69 kV substation. 69 kV supply will come from tapping the new Ruland Rd. to Plainview circuit (previous item)	6/1/2022
	69 kV Pilgrim Bus Reconfiguration	Reconfigure connections to 69kV Buses at Pilgrim substation.	12/1/2023
East of Holbrook	East of Buell 23 kV to 33 kV Conversion	Convert the Hero, East Hampton, Buell, Amagansett, Hither Hills, Navy Road, and Culloden Point substation from 23 kV to 33 kV	6/1/2024

The headroom calculations, established for the selected existing switching stations or other appropriate substations assumed existing and firm local generation to be at 100% of its nameplate output, regardless of resource type; therefore, the established headroom is the remaining headroom at the point of injection. This assumption can result in a negative headroom at a location (especially at off-peak conditions). In some areas non-firm generation, which may already be in the NYISO interconnection queue or have awards from NYSERDA, could be expected to use some portion of the reported available headroom. Within Zone K, NYSERDA awarded Offshore Wind projects have not been included in the base case. For LIPA's analysis, Firm storage projects included in the cases were set at maximum withdraw under light load condition, maximum injection under summer peak condition, and no output under both summer shoulder and winter peak conditions to be consistent with LIPA's internal practice. In addition, NYISO is currently coordinating the Long Island Offshore Wind Export Public Policy Transmission Need (PPTN) effort that will result in a significant change in system topology of the LIPA Bulk Electric System and underlying transmission. As result, the Headroom value documented in this assessment are expected to be significantly affected by the future PPTN process selected projects.

The headroom calculation established by this assessment is an electrical headroom estimate for the assumed study years and projected system topology. Physical feasibility and external (Bulk Power System) constraints to the local location may preclude achieving the identified headroom. For example, the headroom calculation can establish a MW/MWh headroom at a substation, however, there may not be physical room for additional interconnection at that

substations. Connecting generation at a location with available headroom does not allow a project to bypass any portion of the NYISO administered interconnection process or guarantee any outcome of that process. For LIPA's West of Newbridge Area, Inter-area transmission tie lines between LIPA system and rest of New York State (ConEd - LIPA Interface) are one of the variables that will change the headroom calculation results. For the base case scenario, a maximum normal import schedule through ConEd - LIPA Interface has been considered for the headroom calculation. In addition, an import schedule with only observing LIPA firm energy contract (*e.g.*, Fitzpatrick, Nine Mile Point, and NYPA customers) transfer through the interface has been established as a sensitivity assessment that demonstrate a lower import value will result in a higher headroom value in LIPA's West of Newbridge Area.

C. Existing Capacity "Headroom" within LIPA's System

The headroom energy calculations were done in accordance with the methodology discussed in the Addendum to the Staff Straw Proposal for Conducting Energy Headroom. The analysis is presented for four local transmission areas of the LIPA system and illustrated below in Table 81, Table 82, Table 83, Table 84, and Table 85.

Table 81: Capacity Headroom in the Far Rockaway Area (MW)

Substation	2030				2035				2040			
	Summer Peak	Winter Peak	Shoulder	Light Load	Summer Peak	Winter Peak	Shoulder	Light Load	Summer Peak	Winter Peak	Shoulder	Light Load
Far Rockaway 69kV	100	155	130	110	40	160	135	110	0	165	135	110

Table 82: Capacity Headroom in the West of Newbridge Area (MW)

Substation	2030				2035				2040			
	Summer Peak	Winter Peak	Shoulder	Light Load	Summer Peak	Winter Peak	Shoulder	Light Load	Summer Peak	Winter Peak	Shoulder	Light Load
Glenwood 69kV	40	0	0	0	170	0	0	0	25	0	65	0
Whiteside 69kV	70	0	70	0	30	0	130	0	0	80	135	0
Bellmore 69kV	100	0	0	0	130	0	20	0	160	0	45	0
East Garden City 138kV	0	0	0	0	5	0	0	0	195	0	0	0
Total	**210**	**0**	**70**	**0**	**335**	**0**	**150**	**0**	**380**	**80**	**245**	**0**

Table 83: Capacity Headroom in the West of Newbridge Area from the sensitivity analysis (MW)

Substation	2030				2035				2040			
	Summer Peak	Winter Peak	Shoulder	Light Load	Summer Peak	Winter Peak	Shoulder	Light Load	Summer Peak	Winter Peak	Shoulder	Light Load
Glenwood 69kV	230	0	240	0	225	0	235	0	220	80	210	0
Whiteside 69kV	140	0	130	0	100	0	130	0	0	150	135	0
Bellmore 69kV	115	0	0	0	140	0	50	0	155	0	105	0
East Garden City 138kV	475	530	495	0	580	665	510	0	755	640	535	0
Total	**960**	**530**	**865**	**0**	**1045**	**665**	**925**	**0**	**1130**	**870**	**985**	**0**

Table 84: Capacity Headroom in the Central Area (MW)

Substation	2030				2035				2040			
	Summer Peak	Winter Peak	Shoulder	Light Load	Summer Peak	Winter Peak	Shoulder	Light Load	Summer Peak	Winter Peak	Shoulder	Light Load
West Babylon 69kV	120	0	0	0	0	40	0	0	0	225	140	0
Pulaski 69kV	10	0	0	0	10	0	5	0	15	10	5	0
Deer Park 69kV	40	0	0	0	0	0	0	0	0	145	0	0
Ruland Road 138kV	380	150	250	0	580	305	315	0	660	220	250	0
Total	**550**	**150**	**250**	**0**	**590**	**345**	**320**	**0**	**675**	**600**	**395**	**0**

Table 85: Capacity Headroom in the East of Holbrook Area (MW)

Substation	2030				2035				2040			
	Summer Peak	Winter Peak	Shoulder	Light Load	Summer Peak	Winter Peak	Shoulder	Light Load	Summer Peak	Winter Peak	Shoulder	Light Load
Port Jeff 138kV	0	0	0	0	0	0	0	0	0	0	0	0
Shoreham 138kV	105	0	0	0	170	0	0	0	180	0	0	0
Holtsville GT 69kV	0	0	0	0	0	0	0	0	0	0	0	0
West Bus 138kV	0	0	0	0	0	0	0	0	0	0	0	0
Canal 138kV	0	0	0	0	0	0	0	0	0	0	0	0
Eastport 69kV	0	0	0	0	0	0	0	0	0	0	0	0
Wildwood 69kV	0	0	0	0	0	0	0	0	0	0	0	0
Navy Road 33kV	5	0	0	0	10	0	0	0	10	0	0	0
Total	**110**	**0**	**0**	**0**	**180**	**0**	**0**	**0**	**190**	**0**	**0**	**0**

D. Existing Energy "Headroom" within LIPA's System

The headroom energy calculations were done in accordance with the methodology discussed in the Addendum to the Staff Straw Proposal for Conducting Energy Headroom. The analysis is presented for four local transmission areas of the LIPA system.

Table 86: Energy Headroom in the Far Rockaway Area (GWh)

	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	100	900	90
Winter Peak 2030	155	900	140
Shoulder 2030	130	4460	580
Light Load 2030	110	2500	275
Total:			**1085**
Summer Peak 2035	40	900	36
Winter Peak 2035	160	900	144
Shoulder 2035	135	4460	602
Light Load 2035	110	2500	275
Total:			**1057**
Summer Peak 2040	0	900	0
Winter Peak 2040	165	900	149
Shoulder 2040	135	4460	602
Light Load 2040	110	2500	275
Total:			**1026**

Table 87: Energy Headroom in the West of Newbridge Area (GWh)

	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	210	900	189
Winter Peak 2030	0	900	0
Shoulder 2030	70	4460	312
Light Load 2030	0	2500	0
Total:			**501**
Summer Peak 2035	335	900	302
Winter Peak 2035	0	900	0
Shoulder 2035	150	4460	669
Light Load 2035	0	2500	0
Total:			**1057**
Summer Peak 2040	380	900	342
Winter Peak 2040	80	900	72
Shoulder 2040	245	4460	1093
Light Load 2040	0	2500	0
Total:			**1507**

Table 88: Energy Headroom in the West of Newbridge Area from the sensitivity analysis (GWh)

	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2040	960	900	864
Winter Peak 2040	530	900	477
Shoulder 2040	865	4460	3858
Light Load 2040	0	2500	0
Total:			**5199**
Summer Peak 2040	1045	900	941
Winter Peak 2040	665	900	599
Shoulder 2040	925	4460	4126
Light Load 2040	0	2500	0
Total:			**5666**
Summer Peak 2040	1130	900	1017
Winter Peak 2040	870	900	783
Shoulder 2040	985	4460	4393
Light Load 2040	0	2500	0
Total:			**6193**

Table 89: Energy Headroom in the Central Area (GWh)

	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	550	900	495
Winter Peak 2030	150	900	135
Shoulder 2030	250	4460	1115
Light Load 2030	0	2500	0
Total:			**1745**
Summer Peak 2035	590	900	531
Winter Peak 2035	345	900	311
Shoulder 2035	320	4460	1427
Light Load 2035	0	2500	0
Total:			**2269**
Summer Peak 2040	675	900	608
Winter Peak 2040	600	900	540
Shoulder 2040	395	4460	1762
Light Load 2040	0	2500	0
Total:			**2910**

Table 90: Energy Headroom in the East of Holbrook Area (GWh)

	Optimal Transfer (MW)	Applicable Hours	GWh
Summer Peak 2030	110	900	99
Winter Peak 2030	0	900	0
Shoulder 2030	0	4460	0
Light Load 2030	0	2500	0
Total:			**99**
Summer Peak 2035	180	900	162
Winter Peak 2035	0	900	0
Shoulder 2035	0	4460	0
Light Load 2035	0	2500	0
Total:			**162**
Summer Peak 2040	190	900	171
Winter Peak 2040	0	900	0
Shoulder 2040	0	4460	0
Light Load 2040	0	2500	0
Total:			**171**