NEW YORK INDEPENDENT SYSTEM OPERATOR

Transition Cluster Study 2024
Preliminary Deliverability Study Report

A Report by the
New York Independent System Operator
Interconnection Projects

March 2026

Table of Contents

Executive Summary

The Transition Cluster 2024 Study[1] (C24 Study) is being performed in accordance with the applicable rules and requirements set forth under Attachment HH of the NYISO Open Access Transmission Tariff (OATT). One part of the C24 Study – the SUF Study – identifies the interconnection facilities (*i.e.*, the System Upgrade Facilities (SUFs), the Connecting Transmission Owner Attachment Facilities (CTOAFs), and some Interconnection Customer Attachment Facilities (ICAFs), that would be required under the Minimum Interconnection Standard (MIS) for the reliable interconnection of the group of projects referred to as Transition Cluster Study 2024 (C24)[2]. For the group of C24 projects requesting Capacity Resource Interconnection Service (CRIS), the Cluster Study includes a deliverability evaluation to determine the extent to which each project is deliverable at the requested CRIS MW level – the Cluster Study Deliverability Study.

As described in more detail in Section 1 of this Report, the purpose of the Cluster Study Deliverability Study is to identify, and cost allocate any System Deliverability Upgrades (SDUs) that may be required for the projects requesting CRIS in Transition Cluster Study 2024 (C24 CRIS projects) under the NYISO Deliverability Interconnection Standard (DIS). The DIS is applied only to those Cluster Study projects requesting CRIS. The NYISO DIS is designed to ensure that the proposed project (at the requested CRIS MW level) is deliverable throughout the New York Capacity Region where the project is interconnected or will interconnect, and also that the Interconnection Customer of the project restores the transfer capability of any Other Interfaces degraded by its interconnection, as required under the DIS.

This report summarizes the results of Preliminary C24 Deliverability Study to be presented to the Interconnection Projects Facilities Study Working Group (IPFS WG[3]), the Transmission Planning Advisory Subcommittee (TPAS) and the Operating Committee (OC).

Below in Table 1 and Table 2 is a summary of the projects that comprise C24 and their respective CRIS requests.

[1] Capitalized terms not otherwise defined in this report have the meaning set forth in Attachment HH of the OATT.

[2] Cluster Study Project is defined as "a project with a validated Interconnection Request or CRIS Only Request that thereby becomes one of the group of Projects included in the particular Cluster for that Cluster Study Process." *See* OATT Attachment HH, Section 40.1.

[3]To encourage the participation of Market Participants in the study process, at the beginning of each Cluster Study the NYISO assembles a working group of all interested parties, including Transmission Owners, project developers and their subject matter experts, NYISO staff, etc. The working group is called the Interconnection Projects Facilities Study Working Group.

Table 1: Projects Subject to C24 MIS Study and the C24 DIS Study

QUEUE POS.	PROJECT	ZONE	Point of Interconnection	Requested Summer ERIS MW	Requested Summer CRIS MW	UNIT TYPE	CTO
C24-003	Vineyard Mid-Atlantic West	K	East Garden City 345kV	1321	1321	Offshore Wind	NYPA
C24-004	Palladium Storage	J	Hell Gate Annex 138KV Substation	140	140	ES=Energy Storage	NYPA
C24-005	Blue Spruce Storage	J	Mott Haven 138KV Bus	300	300	ES=Energy Storage	ConEd
C24-008	KCE NY 30	K	West Babylon 69 kV	50	50	ES=Energy Storage	LIPA
C24-010	KCE NY 21	K	Pulaski 69kV Substation	60	60	ES=Energy Storage	LIPA
C24-013	Battery Park Storage	J	Greenwood 138KV	190	190	ES=Energy Storage	ConEd
C24-021	Bluepoint Wind 1	J	Brooklyn Clean Energy Hub 345kV Substation	1310	1310	Offshore Wind	ConEd
C24-032	Oakdale Battery Storage LLC	C	Oakdale 115 kV	150	150	ES=Energy Storage	NYSEG
C24-033	KCE NY 31	K	Shoreham 138kV	50	50	ES=Energy Storage	LIPA
C24-042	Hoffman Falls Wind 2	C	Fenner - Shippy Rd Line 3 115 kV	29.8	29.8	W=Wind	NGrid
C24-047	Lincoln Park DG, LLC	G	Lincoln Park - East Kingston 115 kV	150	150	ES=Energy Storage	CHGE
C24-048	BPP NY Lansing BESS I	C	Milliken 115kV (aka Cayuga 115kV)	200	200	ES=Energy Storage	NYSEG
C24-052-001	Hemlock Hollow Wind	A	Dugan - Homer Hill 115kV, Line #155	95	95	W=Wind	NGrid
C24-060	Gemma Energy Storage	C	Stony Ridge 230kV	200	200	ES=Energy Storage	NYSEG
C24-061	Daphne Energy Storage	K	Moriches 69kV	75	75	ES=Energy Storage	LIPA
C24-062	Highbush Energy Storage	G	Manchester 115 kV	200	200	ES=Energy Storage	CHGE
C24-064	Fraser Energy Storage	E	Fraser substation 115 kV	135	135	ES=Energy Storage	NYSEG
C24-066	Coral Energy Storage	C	Yawger 115kV Substation	100	100	ES=Energy Storage	NYSEG
C24-072	Eastwater Energy Storage	B	Station 82 - Station 121 Line 23 115kV	100	100	ES=Energy Storage	NGrid
C24-074	Lighthouse Energy Storage	A	Gardenville - Dunkirk Line 74 230 kV	250	250	ES=Energy Storage	NGrid
C24-079	Maple Harvest Wind	C	Tilden-Cortland Line 18.	162	162	W=Wind	NGrid
C24-081	Port Morris Energy Storage	J	Hell Gate Annex 138kV	130 (total) 38.8 (increase)	130 (total) 38.8 (increase)	ES=Energy Storage	NYPA
C24-085	Arch 4	G	Rock Tavern 345kV Substation	150	150	ES=Energy Storage	CHGE
C24-088	Arch 3	G	Rock Tavern 345kV Substation	100	100	ES=Energy Storage	CHGE
C24-093	Alcazar 1	G	Hurley 345kV Substation	100	100	ES=Energy Storage	CHGE
C24-094	Alcazar 2	G	Hurley 345kV Substation	150	150	ES=Energy Storage	CHGE
C24-097	Basecamp BESS	A	Laona Station 115kV	170	170	ES=Energy Storage	NGrid
C24-098	Farmhouse BESS	G	Roseton 345 kV Substation	150	150	ES=Energy Storage	CHGE
C24-104	Horseblock Energy Storage	K	West Yaphank 69kV Substation	100	100	ES=Energy Storage	LIPA
C24-108	NY125C - Little Salmon Solar	D	345kV Line HW1 Haverstock - Willis	200	200	S=Solar	NYPA
C24-111	Fort Edward Solar Farm (NY53)	F	Mohican to Battenkill 115 kV Line #15	100	100	S=Solar	NGrid

QUEUE POS.	PROJECT	ZONE	Point of Interconnection	Requested Summer ERIS MW	Requested Summer CRIS MW	UNIT TYPE	CTO
C24-125	Town Line Solar Phase II	E	Coopers Corner to Middletown Tap 345 kV Line	60	60	CR=CSR - ES + Solar	NYPA
C24-129	Buffalo Road Energy Storage	A	Dupont to Packard 115 kV Line #184	100	100	ES=Energy Storage	NGrid
C24-130	Elevate Bethlehem	F	Albany Steam 115 kV Substation	120	120	ES=Energy Storage	NGrid
C24-131	Elevate Arthur Kill II	J	Fresh Kills 345 kV substation	180	180	ES=Energy Storage	ConEd
C24-135	Cayuga Solar	C	Milliken 115 kV Substation	60	60	S=Solar	NYSEG
C24-138	Marathon BESS	K	Greenlawn 138kV	135	135	ES=Energy Storage	LIPA
C24-139	Valcour Storage	D	Patnode 230 kV substation	150	150	ES=Energy Storage	NYPA
C24-148	Willard Storage	F	Eastover 115kV	300	300	ES=Energy Storage	NGrid
C24-154	Sandlot IFB	K	Deposit - Indian Head 69 kV Line	50	50	ES=Energy Storage	LIPA
C24-162	Ramadi Utility Storage	K	William Floyd to West Yaphank 69kV	140	140	ES=Energy Storage	LIPA
C24-163	Porter Energy Storage	F	Hague Road to Ticonderoga 115 kV line 4	50	50	ES=Energy Storage	NGrid
C24-165	KCE NY 38	F	Churchtown 115 kV Substation	250	250	ES=Energy Storage	NY Transco
C24-167	KCE NY 37	K	Sills Rd - Brookhaven 138 kV line	150	150	ES=Energy Storage	LIPA
C24-173	KCE NY 34	G	Saugerties 69 kV	100	100	ES=Energy Storage	CHGE
C24-175	Stargazer I	A	Homer City to Pierce Brook 345 kV Line	325	325	CR=CSR - ES + Solar	NYSEG
C24-176	Stargazer II	A	Homer City to Pierce Brook 345 kV Line	325	325	CR=CSR - ES + Solar	NYSEG
C24-178	Gowanus Energy Storage	J	Gowanus 138kV Substation	150	150	ES=Energy Storage	ConEd
C24-182	Southern Tier Energy Center	C	Oakdale - Watercure 345 kV line	200	200	ES=Energy Storage	NYSEG
C24-183	East Setauket Storage II	K	Holbrook - North Shore Beach 138kV	248	248	ES=Energy Storage	LIPA
C24-189	North Country Wind	D	Willis 230kV substation	380	380	W=Wind	NYPA
C24-190	North Country Wind II	D	Willis-Haverstock 345kV HW1	380	380	W=Wind	NYPA
C24-202	Brusselville Solar Energy Center	B	Dysinger-New Rochester 345kV Line (DH2)	170	170	CR=CSR - ES + Solar	NYPA
C24-205	Wheelhouse Energy Storage	F	Edic - Princetown Line #352	200	200	ES=Energy Storage	NYPA
C24-207	Trelina Energy Storage	C	Border City to Station 168 115 kV	120	120	ES=Energy Storage	NYSEG
C24-217	Bay Breeze solar	E	North Watertown (Lyme Junction)-Lyme Line 13 115 kV	150	150	S=Solar	NGrid
C24-224	Cohocton	C	Bath - Spencer Hill (Howard) 115 kV	130	130	CR=CSR - ES + Solar	NYSEG
C24-225	Goldenrod Wind	A	Moon Road-Hartfield 115kV Line159	39	39	W=Wind	NGrid
C24-229	Buttercup Wind	A	Dunkirk-Falconer Line 160 115kV	49.9	49.9	W=Wind	NGrid
C24-230	Dewdrop Wind	A	South Ripley Substation -Dunkirk Substation 230kV	62	62	W=Wind	NGrid
C24-233	Shallow Seam BESS	C	Homer City - Mainesburg 345kV Line (L47)	400	400	ES=Energy Storage	NYSEG
C24-238	Zenobe Burns LLC	C	Moraine Rd 115kV Substation	100	100	ES=Energy Storage	NYSEG
C24-253	Troy Heights Energy Storage	C	Coddington Substation 34.5 kV	40	40	ES=Energy Storage	NYSEG

QUEUE POS.	PROJECT	ZONE	Point of Interconnection	Requested Summer ERIS MW	Requested Summer CRIS MW	UNIT TYPE	CTO
C24-270	Bassett Energy Storage	C	Spencer Hill 115 kV Substation	79.9	79.9	ES=Energy Storage	NYSEG
C24-281	Brentwood Energy Storage	K	Brentwood 69 kV Substation	49.1(total) 2 (increase)	49.1 (total) 2 (increase)	ES=Energy Storage	LIPA
C24-283	Resilient New York Energy Storage	J	Goethals 345 kV	349	349	ES=Energy Storage	ConEd
C24-284	South Bronx Energy Storage	J	Hell Gate 138 kV Substation	100	100	ES=Energy Storage	NYPA
C24-293	Oswego Clean Energy	C	Oswego 115 kV Substation	24.9	24.9	S=Solar	NGrid
C24-300	Kimberlite Solar	C	Homer City - Mainesburg 345kV Line (L47)	175	175	S=Solar	NYSEG
C24-301	Moonlight Flats Solar	C	Homer City 345 kV to Mainesburg 345 kV L47	250	250	S=Solar	NYSEG
C24-304-004	NY Chateaugay 0 Willis Rd Storage	D	Willis 230kV substation	150	150	ES=Energy Storage	NYPA
C24-317	Leo Energy Storage	D	Lyon Mountain 115 kV Substation	75	75	ES=Energy Storage	NYSEG
C24-318	Sherburne Storage	E	County Line 46 kV Substation	40	40	ES=Energy Storage	NYSEG
C24-321	Jericho Solar	D	NYPA's Willis Sub @115kV	100	100	S=Solar	NYPA
C24-324	Overlook Storage	G	Pleasant Valley - Todd Hill 115 kV	199	199	ES=Energy Storage	CHGE
C24-326	Lockport Storage	A	Robinson Road 230 kV	180	180	ES=Energy Storage	NYSEG
C24-331	Hell Gate Energy Storage	J	Hell Gate 138kV	90	90	ES=Energy Storage	NYPA
C24-333	Pouch Energy Storage System	J	Fox Hills 138kV Substation	47.1	47.1	ES=Energy Storage	ConEd
C24-336	Mill Point Solar II	E	Marcy - New Scotland 345kV, Line 18	100	100	CR=CSR - ES + Solar	NGrid
C24-337	Aria Storage 1	H	East Fishkill 345 kV substation	100	100	ES=Energy Storage	ConEd
C24-338	Aria Storage 2	H	East Fishkill 345 kV	150	150	ES=Energy Storage	ConEd
C24-341	Marlboro Storage	G	Marlboro 115kV Substation	100	100	ES=Energy Storage	CHGE
C24-352	Swiss Valley Energy Storage	C	Wethersfield 230 kV Substation	300	300	ES=Energy Storage	NYSEG
C24-358	Sugar Loaf Energy Storage I	G	Sugarloaf 138 kV Substation	300	300	ES=Energy Storage	O&R
C24-362	Amsterdam Solar	E	Edic - Gordon Road 345 kV, Line 14	150	150	S=Solar	NGrid
C24-363	Town Line Solar CSR Phase I	E	Coopers Corner to Middletown Tap 345 kV Line	240	240	CR=CSR - ES + Solar	NYPA
C24-364	Erie Canal BESS	A	Robinson Road 115 kV	230	230	ES=Energy Storage	NYSEG
C24-366	Azalea Wind 1	C	Montour Falls to Coddington Road 115kV	50	50	W=Wind	NYSEG
C24-370	Azalea Wind 2	C	Montour Falls to Coddington Road 115kV	50	50	W=Wind	NYSEG

Notes:

C24-125 Town Line Solar Phase II is an uprate of C24-363 Town Line Solar CSR Phase I project (a proposed Co-located Storage Resource (CSR)). C24-125 Town Line Solar Phase II is requesting 60 MW CRIS of solar, and 0 MW CRIS of BESS uprate (a total of 60 MW CRIS uprate request). In total, C24-125 Town Line Solar Phase II and C24-363 Town Line Solar CSR Phase I are requesting 300 MW CRIS and 300 MW ERIS.

C24-175 Stargazer I is a proposed CSR requesting 240 MW CRIS of solar and 85 MW CRIS of BESS (a total of 325 MW CRIS request).

C24-176 Stargazer II is a proposed CSR requesting 240 MW CRIS of solar and 85 MW CRIS of BESS (a total of 325 MW CRIS request).

C24-202 Brusselville Solar Energy Center is a proposed CSR requesting 150 MW CRIS of solar and 20 MW CRIS of BESS (a total of 170 MW CRIS request).

C24-224 Cohocton is a proposed CSR requesting 30 MW CRIS of solar and 100 MW CRIS of BESS (a total of 130 MW CRIS request).

C24-336 Mill Point Solar II is an uprate of Q1031 Mill Point Solar (a proposed CSR). C24-336 Mill Point Solar II is requesting 100 MW CRIS of solar uprate and 0 MW CRIS of BESS uprate (a total of 100 MW CRIS uprate request).

C24-363 Town Line Solar CSR Phase I is a proposed CSR requesting 140 MW CRIS of solar and 100 MW CRIS of BESS (a total of 240 MW CRIS request).

C24-081 Port Morris Energy Storage is a repowering project that proposes to retire Harlem River GT# 1, and 2 (PTIDs 24160 through 24161). The C24-081 Port Morris Energy Storage, as proposed, will have a total ERIS capability of 130 MW (Summer) and 130 MW (Winter) and CRIS (Summer) of 130 MW (38.8 MW Summer CRIS increase).

C24-281 Brentwood Energy Storage is a repowering project that proposes to retire Brentwood GT (PTID 24164). The C24-281 Brentwood Energy Storage, as proposed, will have a total ERIS capability of 49.1 MW (Summer) and 49.1 MW (Winter) and CRIS (Summer) of 49.1 MW (2 MW Summer CRIS increase).

C24-331 Hell Gate Energy Storage is a repowering project that proposes to retire Hellgate GT# 1, and 2 (PTIDs 24158 through 24159). The C24-331 Hell Gate Energy Storage, as proposed, will have a total ERIS capability of 90 MW (Summer) and 90 MW (Winter) and CRIS (Summer) of 90 MW (same location CRIS transfer).

C24-333 Pouch Energy Storage System is a repowering project that proposes to retire Pouch GT (PTID 24155). The C24-333 Pouch Energy Storage System, as proposed, will have a total ERIS capability of 47.1 MW (Summer) and 47.1 MW (Winter) and CRIS (Summer) of 47.1 MW (same location CRIS transfer).

Table 2: CRIS-Only Requests – Subject Only to C24 Deliverability Study

QUEUE POS.	PROJECT	ZONE	Point of Interconnection	Requested Summer ERIS MW	Requested Summer CRIS MW	UNIT TYPE	CTO
CR24-1002	West Babylon Internal Combustion (IC), Unit 4	K	West Babylon 13.8 kV	N/A	49	O=Oil	LIPA
CR24-1003	Bethlehem Energy Center Uprate	F	Albany Steam 115 kV	N/A	40	NG=Natural Gas	NGrid
CR24-1004	Arthur Kill Unit 2 Uprate	J	Freshkills 138 kV	N/A	12.2	NG=Natural Gas	ConEd

DIS Study Conclusions

Rest of State (ROS) and Lower Hudson Valley (LHV) Capacity Regions:

Forty-eight (48) C24 CRIS Projects in the ROS and LHV Capacity Region are not deliverable at their requested CRIS levels and require SDUs to be deliverable. The remaining C24 CRIS Projects in the ROS and LHV Capacity Regions are deliverable at their requested CRIS levels and thus eligible to receive full CRIS for the requested value without the need for any SDUs.

- The following C24 CRIS Projects did not pass the Highway "No Harm" or the Highway

Capacity Deliverability Assessments in the ROS Capacity Region. As a result, the following C24 CRIS Projects in the ROS Capacity Region require Highway Interface SDUs to be deliverable:

- C24-032 Oakdale Battery Storage LLC
- C24-048 BPP NY Lansing BESS I
- C24-052-001 Hemlock Hollow Wind
- C24-060 Gemma Energy Storage
- C24-064 Fraser Energy Storage
- C24-066 Coral Energy Storage
- C24-072 Eastwater Energy Storage
- C24-074 Lighthouse Energy Storage
- C24-079 Maple Harvest Wind
- C24-097 Basecamp BESS
- C24-108 NY125C - Little Salmon Solar
- C24-129 Buffalo Road Energy Storage
- C24-135 Cayuga Solar
- C24-139 Valcour Storage
- C24-175 Stargazer I
- C24-176 Stargazer II
- C24-182 Southern Tier Energy Center
- C24-189 North Country Wind
- C24-190 North Country Wind II
- C24-202 Brusselville Solar Energy Center
- C24-207 Trelina Energy Storage
- C24-217 Bay Breeze Solar
- C24-224 Cohocton
- C24-233 Shallow Seam BESS

- C24-238 Zenobe Burns LLC
- C24-253 Troy Heights Energy Storage
- C24-270 Bassett Energy Storage
- C24-300 Kimberlite Solar
- C24-301 Moonlight Flats Solar
- C24-304-004 NY Chateaugay 0 Willis Rd Storage
- C24-317 Leo Energy Storage
- C24-318 Sherburne Storage
- C24-321 Jericho Solar
- C24-326 Lockport Storage
- C24-352 Swiss Valley Energy Storage
- C24-364 Erie Canal BESS

- The preliminary Highway Interface SDUs identified for the above ROS projects consist of the SDUs listed below, which are "new" (i.e., not previously identified and cost allocated in a prior Class Year Study and not substantially similar to a System Deliverability Upgrade previously identified and cost allocated in a Class Year Study) and therefore require an Additional SDU Study per Section 40.14 of Attachment HH if any of the projects listed above elect to move forward with such Additional SDU Study:
  - Ames Rd - Princetown 345 kV ckt 1 Rebuild
  - Ames Rd - Q1089 POI 345 kV ckt 2 Rebuild
  - Edic - Ames Rd 345 kV ckt 2 Rebuild
  - Edic - Ames Rd 345 kV ckt 1 Rebuild
  - Fraser - Gilboa 345 kV ckt 1 Rebuild
  - Watercure - Oakdale 345 kV ckt 1 Terminal Upgrades
  - Oakdale - Fraser 345 kV ckt 1 Rebuild
- The high-level non-binding cost estimate for the above-listed ROS Highway Interface SDUs is **$1.107 Billion (±50%)**, broken down as follows:

- Ames Rd - Princetown 345 kV ckt 1 Rebuild: **$94,020,000 (±50%)**
- Ames Rd - Q1089 POI 345 kV ckt 2 Rebuild: **$35,000,000 (±50%)**
- Edic - Ames Rd 345 kV ckt 2 Rebuild: **$260,000,000 (±50%)**
- Edic - Ames Rd 345 kV ckt 1 Rebuild: **$340,000,000 (±50%)**
- Fraser - Gilboa 345 kV ckt 1 Rebuild: **$290,000,000 (±50%)**
- Watercure - Oakdale 345 kV ckt 1 terminal upgrades: **$1,200,000 (±50%)**
- Oakdale - Fraser 345 kV ckt 1 Rebuild: **$87,626,000 (±50%)**

- Physical feasibility of the applicable SDUs will be confirmed in the Additional SDU Study if any of the projects indicated above elect to move forward with such Additional SDU Study.
- The following C24 CRIS Projects in the ROS and LHV Capacity Region did not pass the Other Interfaces[4] total transfer limit evaluations and require Other Interface SDUs to be deliverable:
  - C24-032 Oakdale Battery Storage LLC
  - C24-047 Lincoln Park DG, LLC
  - C24-048 BPP NY Lansing BESS I
  - C24-060 Gemma Energy Storage
  - C24-064 Fraser Energy Storage
  - C24-066 Coral Energy Storage
  - C24-072 Eastwater Energy Storage
  - C24-074 Lighthouse Energy Storage
  - C24-093 Alcazar 1
  - C24-094 Alcazar 2
  - C24-097 Basecamp BESS
  - C24-125 Town Line Solar Phase II
  - C24-129 Buffalo Road Energy Storage
  - C24-139 Valcour Storage

[4] The Other Interfaces "No Harm" test also included the testing of the Norwalk-Northport Cable (NNC)

- C24-148 Willard Storage
- C24-173 KCE NY 34
- C24-175 Stargazer I
- C24-176 Stargazer II
- C24-182 Southern Tier Energy Center
- C24-207 Trelina Energy Storage
- C24-224 Cohocton
- C24-233 Shallow Seam BESS
- C24-238 Zenobe Burns LLC
- C24-270 Bassett Energy Storage
- C24-300 Kimberlite Solar
- C24-301 Moonlight Flats Solar
- C24-304-004 NY Chateaugay 0 Willis Rd Storage
- C24-326 Lockport Storage
- C24-352 Swiss Valley Energy Storage
- C24-363 Town Line Solar CSR Phase I
- C24-364 Erie Canal BESS

- The preliminary Other Interface SDUs for the above ROS and LHV projects consist of the SDUs listed below, which are "new" (i.e., not previously identified and cost allocated in a prior Class Year Study and not substantially similar to a System Deliverability Upgrade previously identified and cost allocated in a Class Year Study) and therefore require an Additional SDU Study per Section 40.14 of Attachment HH if any of the projects listed above elect to move forward with such Additional SDU Study:
    - Coopers Corners - Dolson Ave. 345 kV ckt 2 terminal upgrades
    - Add a 115 kV Series Reactor of 8% to Line 956 at North Waverly
    - Laurel Lake – Oakdale 115 kV line Rebuild
- The high-level non-binding cost estimate for the above-listed ROS and LHV Other Interface

SDUs is **$22M (±50%)**, broken down as follows:

- Coopers Corners - Dolson Ave. 345 kV ckt 2 Terminal Upgrades: **$350,000 (±50%)**
- Add a 115 kV Series Reactor of 8% to Line 956 at North Waverly: **$ 8,839,373 (±50%)**
- Laurel Lake – Oakdale 115 kV line Rebuild: **$12,969,000 (±50%)**

- Physical feasibility of the applicable SDUs will be confirmed in the Additional SDU Study if any of the projects indicated above elect to move forward with such Additional SDU Study.
- The ROS Byway tests indicated that the below projects located in the ROS Capacity Region are not deliverable and require Byway SDUs to be fully deliverable:
  - C24-052-001 Hemlock Hollow Wind
  - C24-060 Gemma Energy Storage
  - C24-066 Coral Energy Storage
  - C24-074 Lighthouse Energy Storage
  - C24-097 Basecamp BESS
  - C24-175 Stargazer I
  - C24-176 Stargazer II
  - C24-182 Southern Tier Energy Center
  - C24-207 Trelina Energy Storage
  - C24-224 Cohocton
  - C24-225 Goldenrod Wind
  - C24-229 Buttercup Wind
  - C24-230 Dewdrop Wind
  - C24-233 Shallow Seam BESS
  - C24-238 Zenobe Burns LLC
  - C24-253 Troy Heights Energy Storage
  - C24-270 Bassett Energy Storage
  - C24-300 Kimberlite Solar

- C24-301 Moonlight Flats Solar
- C24-326 Lockport Storage
- C24-352 Swiss Valley Energy Storage
- C24-364 Erie Canal BESS
- C24-366 Azalea Wind 1
- C24-370 Azalea Wind 2

- The Byway SDUs for ROS projects consist of the SDUs listed below, which are "new" (i.e., not previously identified and cost allocated in a prior Class Year Study and not substantially similar to a System Deliverability Upgrade previously identified and cost allocated in a Class Year Study) and therefore require an Additional SDU Study per Section 40.14 of Attachment HH if any of the projects listed above elect to move forward with such Additional SDU Study:
  - Stagecoach - S. Owego 115 kV ckt 1 Rebuild
  - Harrison Radiator - Hinman Rd 115 kV ckt 1 Rebuild
  - Sta. 162 - Sta. 158 115 kV ckt 1 Rebuild
  - Robinson Rd - Allegheny Ludlum Tap 115 kV ckt 1 Rebuild
  - Allegheny Ludlum Tap - Harrison Radiator 115 kV ckt 1 Rebuild
  - Hinman Rd - Lockport 115 kV ckt 1 Rebuild
  - Lounsberry - Stagecoach 115 kV ckt 1 Rebuild
  - Moraine Rd - Meyer 115 kV ckt 1 Rebuild
  - N. Waverly - Lounsberry 115 kV ckt 1 Rebuild
- The high-level non-binding cost estimate for the above-listed ROS Byway SDUs is **$45 M (±50%)**, broken down as follows:
  - Stagecoach - S. Owego 115 kV ckt 1 Rebuild: **$5,299,000 (±50%)**
  - Harrison Radiator - Hinman Rd 115 kV ckt 1 Rebuild: **$1,996,000 (±50%)**
  - Sta. 162 - Sta. 158 115 kV ckt 1 Rebuild: **$6,983,049 (±50%)**
  - Robinson Rd - Allegheny Ludlum Tap 115 kV ckt 1 Rebuild: **$2,369,000 (±50%)**
  - Allegheny Ludlum Tap - Harrison Radiator 115 kV ckt 1 Rebuild: **$1,781,000 (±50%)**

- Hinman Rd - Lockport 115 kV ckt 1 Rebuild: **$2,462,000 (±50%)**
- Lounsberry - Stagecoach 115 kV ckt 1 Rebuild: **$5,885,000 (±50%)**
- Moraine Rd - Meyer 115 kV ckt 1 Rebuild: **$8,839,373 (±50%)**
- N. Waverly - Lounsberry 115 kV ckt 1 Rebuild: **$9,766,000 (±50%)**

- Physical feasibility of the applicable SDUs will be confirmed in the Additional SDU Study if any of the projects indicated above elect to move forward with such Additional SDU Study.

New York City (NYC) Capacity Region

- The NYC Byway tests indicated that the following projects located in the NYC Capacity Region are not deliverable at their requested CRIS level and require a Byway SDU to be fully deliverable:
  - C24-004 Palladium Storage
  - C24-081 Port Morris Energy Storage
  - C24-131 Elevate Arthur Kill II
  - C24-283 Resilient New York Energy Storage
  - C24-284 South Bronx Energy Storage
  - CR24-1004 Arthur Kill Unit 2 Uprate
- The Byway SDU for the above NYC project consists of following, which are "new" (i.e., not previously identified and cost allocated in a prior Class Year Study and not substantially similar to a System Deliverability Upgrade previously identified and cost allocated in a Class Year Study) and therefore requires an Additional SDU Study per Section 40.14 of Attachment HH if any of the projects listed above elect to move forward with such Additional SDU Study:
  - Hell Gate 1 - Hell Gate 1 Tap 138 kV ckt 1 Rebuild
  - Installing a PAR (Phase Angle Regulator) controlled 345 kV line between the Fresh Kills 345 kV substation to BCEH 345 kV substation with two shunt reactors on the Fresh Kills 345 kV substation
- The high-level non-binding cost estimate for the above-listed NYC Byway SDUs is **$ 618 M (±50%)**, broken down as follows:
  - Hell Gate 1 - Hell Gate 1 Tap 138 kV ckt 1 Rebuild: **$ 1,200,000 (±50%)**

- Installing a PAR (Phase Angle Regulator) controlled 345 kV line between the Fresh Kills 345 kV substation to BCEH 345 kV substation with two shunt reactors on the Fresh Kills 345 kV substation: **$ 616,626,314 (±50%)**

- Physical feasibility of the applicable SDUs will be confirmed in the Additional SDU Study if any of the projects indicated above elect to move forward with such Additional SDU Study.
- The remaining C24 CRIS Projects in the NYC Capacity Region are deliverable at their requested CRIS levels and thus eligible to receive CRIS for the requested value without the need for any SDUs.

Long Island (LI) Capacity Region

- The LI Byway tests indicated that the following C24 CRIS projects in the LI Capacity Region are not deliverable at their requested CRIS levels and require Byway SDUs:
    - C24-033 KCE NY 31
    - C24-061 Daphne Energy Storage
    - C24-104 Horseblock Energy Storage
    - C24-162 Ramadi Utility Storage
    - C24-167 KCE NY 37
    - C24-183 East Setauket Storage II
- The Byway SDUs for the above LI projects consist of the following, which are "new" (i.e., not previously identified and cost allocated in a prior Class Year Study and not substantially similar to a System Deliverability Upgrade previously identified and cost allocated in a Class Year Study) and therefore requires an Additional SDU Study per Section 40.14 of Attachment HH if any of the projects listed above elect to move forward with such Additional SDU Study:
    - A PAR controlled 138 kV line between Pilgrim 138 kV station - West Bus 138 kV station with 138 kV underground cable (two cables per phase) together with Holbrook - Q971 POI 138 kV & Medford – Holbrook 69 kV Rebuild
    - Bayport to Great River 69kV Rebuild to underground cable
    - W. Yaphank to Holtsville 69 kV line Rebuild
- The high-level non-binding cost estimate, which includes some cost estimates derived from prior study findings and planning-level assumptions, for the above-listed SDUs is **$419 M**

(±50%), broken down as follows:

- A PAR controlled 138 kV line between Pilgrim 138 kV station - West Bus 138 kV station with 138 kV underground cable (two cables per phase), together with Holbrook - Q971 POI 138 kV & Medford – Holbrook 69 kV Rebuild: **$334,247,988 (±50%)**
- Bayport to Great River 69 kV Rebuild to underground cable: **$80,479,927 (±50%)**
- W. Yaphank to Holtsville 69 kV line Rebuild: **$5,023,619 (±50%)**

- Physical feasibility of the applicable SDUs will be confirmed in the Additional SDU Study if any of the projects indicated above elect to move forward with such Additional SDU Study.
- The remaining C24 CRIS Projects in the LI Capacity Region are deliverable at their requested CRIS levels and thus eligible to receive CRIS for the requested value without the need for any SDUs.

1. Cluster Study Deliverability Study Methodology

This section describes the methodology of the Cluster Study Deliverability Study and SDU identification used in the C24 Deliverability Study.

1.1 Overview of Deliverability Study

The Cluster Study Deliverability Study evaluates the deliverability of the proposed capacity associated with the C24 CRIS Projects. If the Cluster Study Deliverability Study determines that any of the proposed capacity is not fully deliverable, the study identifies the SDUs that would be required to make the proposed capacity fully deliverable, and the amount of the proposed capacity that would be deliverable without SDUs, if any.

Deliverability is broadly defined in the OATT as the ability to deliver the aggregate of NYCA capacity resources to the aggregate of the NYCA load under summer peak load conditions. This is implemented by evaluating the deliverability of proposed C24 CRIS Projects within each of the four Capacity Regions in New York State: Rest-of-State (ROS – Zones A through F), Lower Hudson Valley (LHV – Zones G, H, I), New York City (NYC – Zone J), and Long Island (LI – Zone K).

The C24 Deliverability Study uses the base case representation of 2029 summer peak system condition (CBA-D) and the CBA-D case with all C24 CRIS Projects modeled in-service (CPA-D). All C24 CRIS Projects will be evaluated on an aggregate Cluster Study basis; that is, all C24 CRIS Projects are evaluated as a group. Deliverability will be determined by simulating generation-to-generation shifts within that Capacity Region and between the adjacent Capacity Regions.

1.2 Tariff Sections Regarding the Deliverability Test Methodology

The deliverability test methodology used to determine the deliverability of resources is contained in the NYISO OATT. The specific sections of the OATT defining the modeling of the system and the test methodology applied to the C24 Deliverability Study include:

- NYISO OATT, Attachment HH, 40.13
- NYISO OATT, Attachment HH, 40.14
- NYISO OATT, Attachment HH, 40.15

1.3 Transfer Limits Assessments Required for Determination of Deliverability

The C24 CBA-Deliverability (CBA-D) base case is based on the CBA case for the MIS portion of the C24 Phase 2 Study and further conditioned for deliverability study purposes. The base case conditioning steps are described in **Section 2.2**.

The transfer limit calculations are performed on the CBA-D and CPA-D cases using the linear transfer simulation function of the software TARA. Generation-to-generation shifts are simulated from combinations of zones within the Capacity Region from "upstream" generation of an interface to "downstream" generation of that interface. Simulation of power transfer within each Capacity Region determines the ability of the network to deliver capacity from generation in one (or more) surplus zone(s) to another deficient zone(s) within that Capacity Region.

The facilities monitored in the deliverability analyses are consistent with those in the Installed Reserve Margin analyses and the Comprehensive System Planning Process, and the defined Highway and Byway facilities.

In the actual transfer limit assessment, all transmission facilities within the NYISO are monitored. Contingencies tested in the transfer limit assessment include all "emergency transfer criteria" contingencies defined by the applicable Northeast Power Coordinating Council (NPCC) Criteria and New York State Reliability Council (NYSRC) Reliability Rules.

The concept of First Contingency Incremental Transfer Capability (FCITC) is used in the determination of deliverable capacity across Highway interfaces within the ROS and LHV Capacity Regions. The FCITC measures the amount of generation in the exporting zone that can be increased to load the interface to its transmission limit. It is the additional generation capacity that could be exported from a given zone(s) above the base case dispatch level.

All generators in the exporting zone(s) are uniformly increased (scaled) in proportion to their maximum power limits (Pmax) while all generators in the importing zone(s) are decreased uniformly in proportion to the difference between their initial generation dispatch level (Pgen) and their minimum power limits (Pmin). The FCITC and Highway transmission constraint(s) for the exporting zone(s) are noted for each export/import combination.

The net generation available[5] is compared to the FCITC Highway transmission constraint(s) for the exporting zone(s) transfer. If the net generation available upstream is greater than the calculated FCITC, that amount of generation above the FCITC is considered to be constrained or "bottled" capacity and may not be fully deliverable under all conditions.

If the net generation available upstream is less than the FCITC (that is, the available generation upstream does not reach the transmission limit), the difference is an indication of the available "transfer

[5] The "net generation available" in any defined exporting zone is the difference between the sum of the zonal generators' Pmax and the sum of the zonal generators' actual MW output (Pgen).

capability" to accommodate additional generation resources in the upstream area.

2. Transition Cluster Study 2024 Deliverability Study Case Modeling and Assumptions

This section of the report describes the assumptions and base case conditioning steps of the base case for the C24 Deliverability Study.

2.1 Cluster Study Deliverability Study Assumption Matrix

The Cluster Study Deliverability Study baseline case setup utilizes results from extensive NYISO studies and reports. The sources for the parameters used to create C24 CBA-Deliverability (CBA-D) case are summarized in Table 3.

Table 3: Parameters Established in other NYISO Studies and Reports

#	Parameter	Description	Reference
1	Installed Capacity Requirement	NYCA Installed Capacity Requirement to achieve LOLE less than 0.1 days per year, which is based on the Installed Reserve Margin (IRM) identified by the New York State Reliability Council (NYSRC) and accepted by the Commission	2025 NYSRC IRM report (for the 2025-2026 Capability Year)
2	RNA Emergency Transfer Limits	Emergency transfer limits on ROS interfaces corresponding to RNA study	Transfer limit from the 2024 RNA report used for the Interface limit
3	Locational Capacity Requirements	The Locational Capacity Requirements (LCR) for the NYC (Zone J) and Long Island (Zone K) Capacity Regions and for the G-J Locality	2025 NYISO LCR report (for the 2025-2026 Capability Year; approved by Operating Committee on January 20, 2025)
		Load model	
4	Peak Load Forecast	Study Capability Period peak demand forecast contained in the latest ISO's Load and Capacity Data report (i.e., "Gold Book")	2029 Summer peak load conditions from 2025 Gold Book Table I-3a
5	Impact of Load Forecast Uncertainty	The impact of IRM due to uncertainty relative to forecasting NYCA loads	2025 NYSRC IRM report
		Generator model	
6	Existing CRIS generators, and all projects with Unforced Capacity Deliverability Rights	Existing Capacity Resource Interconnection Service ("CRIS") generators and transmission projects in-service on the date of the latest ISO's Load and Capacity Data report	2025 Gold Book Table III-2, IV-1, IV-2, IV-3, IV-4 and IV-5
7	Planned generation projects or Merchant Transmission Facilities	The project that has accepted either (a) Deliverable MW or (b) a System Deliverability Upgrade cost allocation and provided cash or posted required security pursuant to OATT Attachment S	
8	UCAP Derate Factor (UCDF)	Convert ICAP to Unforced Capacity (UCAP) based on derated generator capacity incorporating availability	2025 NYSRC IRM report and 2025 NYISO LCR report
9	Inactive CRIS	CRIS for units with inactive CRIS are modeled unless the CRIS rights will expire prior to the scheduled completion of the applicable Expedited Deliverability Study, or the CRIS is associated with a Retired facility that cannot transfer such rights prior to CRIS expiration.	CRIS-inactive facilities whose CRIS will expire prior to August 1,2023 are removed
		Transmission model	
10	Existing transmission facilities	Identified as existing in the ISO's Load and Capacity Data report	2025 Gold Book and updates consistent with C24 MIS cases
11	Firm plans for changes to transmission facilities by TOs	Planned changes of facilities in the latest ISO's Load and Capacity Data report	
12	System Upgrade Facilities and System Deliverability Upgrades	Facilities associated with planned projects identified in (7) above, except that System Deliverability Upgrades will only be modeled if the construction is triggered	
		Import/Export model	
13	External System Import/Export	NYCA scheduled imports from HQ/PJM/ISO-NE/IESO	NYISO Tariffs - OATT Section 40.13.8.2.1.9, Attachment HH

#	Parameter	Description	Reference
14	Base case direct transfer from ROS to other New York Capacity Regions	Actual flow scheduled from ROS to LHV, NYC, and LI consistent with the IRM and the LCRs	- ROS to NYC: Approximately 2906 MW
			- LHV to NYC: Approximately 300 MW
			- ROS to LIPA: Approximately 657 MW

2.2 Developing the C24 CBA-Deliverability Study Base Case

The C24 study cases are a five-year look-ahead of the New York Control Area (NYCA) system. The CBA-D is based on the CBA MIS case (which originated from the NYISO FERC Form No. 715 2029 Summer case (the FERC Case) and is then further customized as part of the DIS to meet specific Attachment HH requirements for modeling the baseline system.

The case conditioning incorporates the parameters listed in Section 2.1:

- Load modeling: load forecast uncertainty is applied to the MW forecasted load. Details are included in Section 2.2.
- Generator modeling: only generators with CRIS rights listed in Table III-2 of the 2025 GB and proposed generators with CRIS that accepted their cost allocation in the prior Class Year are modeled in-service. Details are included in Section 2.2.
- Import/Export models: pursuant to Attachment HH, Section 40.13.8.2.1.9, external imports and exports into NYCA are modeled in the cases. Details are included in Section 2.2.

The transmission system model in the CBA-D is the same as that in the CBA MIS study cases.

Load Modeling

The Load forecast used in the CBA-D is the coincident 2029 Summer firm peak load before reductions for emergency demand response programs in the RNA study. Load Forecast Uncertainty (LFU) is applied to each of the 4 (four) Capacity Regions:

ROS	6.93%
LHV	4.32%
NYC	3.60%
LI	4.70%

NYCA CRIS Modeling

The initial CRIS capability and available capacity resources are determined as follows:

- CRIS (MW) capability of existing generating units, as listed in the 2025 Gold Book and proposed generating units with CRIS that accepted their cost allocation in a prior Class Year

are modeled in the CBA-D.

- CRIS Expiration: Units that are CRIS-inactive for more than 3 years lose their CRIS rights pursuant to 40.18.2.2.2.2 of Attachment HH of the OATT. The CRIS for a facility is modeled in the CBA-D unless that CRIS will expire prior to the scheduled completion of the Transition Cluster Study or the CRIS is associated with a Retired facility that cannot transfer such rights prior to CRIS expiration. For C24, CRIS for CRIS-inactive units that have or are scheduled to lose CRIS during the Transition Cluster Study are thus not modeled in the Deliverability case.
- CRIS updates of existing generators include CRIS increases approved by the NYISO after the release of 2025 Gold Book.
- The Pmax data for each respective resource within the CBA-D base case and CPA-D power flow representation is the CRIS value derated by applicable equivalent forced outage rate below. This step incorporates the ICAP/ UCAP translation of different generators resources and Capacity Regions.
- Derates for intermittent resources are applied to the specific type of generation resource:
    - Small hydro 58.39%
    - Large hydro 1.86%
    - Land-based Wind 83.54%
    - Landfill Gas 36.27%
    - Solar 66.92%
    - Offshore Wind 61.76%
- Derates for non-intermittent resources are applied to the aggregate of all remaining generation ("Uniform Capacity"), including Energy Storage resources, within the Capacity Region. These are the ICAP/UCAP translation factors for each Capacity Region consistent with the applicable NYSRC Installed Reserve Margin study:
    - Rest of State (ROS) 5.54%
    - Lower Hudson Valley (LHV) 13.03%
    - New York City 5.99%
    - Long Island 10.31%
- The "derated capacity," or Pmax, is available to supply load and losses within each Capacity Region and adjacent Capacity Region(s). When power transfers are simulated, all generation in the exporting area is uniformly increased in proportion to its Pmax.
- Table 4 and Table 5 summarize the Resource Capacity and Capacity Derates for the C24 CBA-D

base case.

Table 4: C24 CBA-D – Summary of Capacity by Resource Type (MW)

Zone	DC	Landfill Gas	Large Hydro	Offshore Wind	Small Hydro	Solar	Uniform	Wind	CBA-D Grand Total CRIS
A	0.0	18.4	2700.0	0.0	3.1	585.0	747.9	781.0	4835.4
B	0.0	11.2	0.0	0.0	54.8	1685.0	718.5	200.1	2669.6
C	0.0	42.5	0.0	0.0	72.2	1475.2	5895.0	1553.2	9038.1
D	0.0	6.4	856.0	0.0	56.8	730.0	335.9	1133.4	3118.5
E	0.0	9.6	0.0	0.0	403.7	1094.0	216.6	852.2	2576.1
F	0.0	14.1	1165.1	0.0	313.4	910.5	3084.7	0.0	5487.8
ROS	0.0	102.2	4721.1	0.0	904.0	6479.7	10998.6	4519.9	27725.5
G	0.0	0.0	0.0	0.0	74.0	153.2	5362.4	0.0	5589.6
H	0.0	0.0	0.0	0.0	0.0	0.0	53.5	0.0	53.5
I	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	40.0
LHV	0.0	0.0	0.0	0.0	74.0	153.2	5455.9	0.0	5683.1
J	0.0	30.1	0.0	816.0	0.0	0.0	9812.7	0.0	10658.8
K	0.0	0.0	0.0	924.0	27.9	90.4	5687.6	136.0	6865.9
Grand Total	0.0	132.3	4721.1	1740.0	1005.9	6723.3	31954.8	4655.9	50933.3

Total CRIS Capacity represents the CRIS capacity basis for the CBA-D case.

Uniform Capacity is the CRIS capacity related with any generator that is not in a technology-specific group.

Table 5: C24 CBA-D – Summary of Capacity Derates by Resource Type (MW)

Zone	DC	Landfill Gas	Large Hydro	Offshore Wind	Small Hydro	Solar	Uniform	Wind	CBA-D Grand Total UCAP
A	0.0	11.7	2649.7	0.0	1.2	193.5	706.4	128.5	3691.3
B	0.0	7.1	0.0	0.0	22.8	557.4	678.7	32.9	1298.9
C	0.0	27.0	0.0	0.0	30.0	488.0	5568.4	255.6	6369.2
D	0.0	4.0	840.0	0.0	23.6	241.4	317.2	186.5	1613.1
E	0.0	6.1	0.0	0.0	167.9	361.8	204.6	140.2	880.8
F	0.0	8.9	1143.4	0.0	130.4	301.1	2913.8	0.0	4497.8
ROS	0.0	64.8	4633.1	0.0	375.9	2143.2	10389.1	743.7	18351.1
G	0.0	0.0	0.0	0.0	30.7	50.6	4663.6	0.0	4745.1
H	0.0	0.0	0.0	0.0	0.0	0.0	46.5	0.0	46.5
I	0.0	0.0	0.0	0.0	0.0	0.0	34.7	0.0	34.7
LHV	0.0	0.0	0.0	0.0	30.7	50.6	4744.8	0.0	4826.3
J	0.0	19.1	0.0	312.0	0.0	0.0	9224.9	0.0	9556.1
K	0.0	0.0	0.0	353.3	11.6	29.9	5101.2	22.3	5518.4

Zone	DC	Landfill Gas	Large Hydro	Offshore Wind	Small Hydro	Solar	Uniform	Wind	CBA-D Grand Total UCAP
Grand Total	0.0	83.9	4633.1	665.3	418.2	2223.7	29460	766	38251.9

Each Derate column is the amount of capacity reduction based on the application of the derate factor to the represented capacity.

Uniform Capacity Derate uses the specific ICAP/UCAP translation factor for the Capacity Region; hydro and wind use the technology-specific derate factors.

Total All Capacity Derates is the sum of category derates by Load Zone.

External System Imports Modeling

The initial generation and interchange schedules for the NYCA and the four New York Capacity Regions[6] are determined as follows:

External Generation Source

1. Inter-Area external interchange schedules include the following grandfathered long-term firm power transactions for the C24 case year (2029):
    a. External CRIS Right: Quebec (via Chateauguay) to NY: 1190 MW
    b. Existing Transmission Capacity for Native Load (ETCNL):
    PJM to NYSEG: 1080 MW
2. Generating capacity associated with firm export commitments are represented as follows:
    a. NYPA to AMP-Ohio, PA-RECs 183 MW
    b. NYPA to ISO-NE (Vermont) 84 MW
3. External firm capacity import rights:
    a. ISO-NE to NY 0 MW
    b. Ontario (IESO) schedule 0 MW
4. Generator reactive (MVAr) capabilities as determined by appropriate NYISO procedures, NPCC Criteria and NERC Standards requirements.
5. Wheeling contracts:
    a. ROS to NYC via ABC/JK through PJM 0 MW

[6] Schedules representing short-term external ICAP are not modeled in this assessment; deliverability of external ICAP is determined during the annual process of setting import rights.

b. ROS to NYC via Lake Success/Valley Stream through LIPA 300 MW

c. ROS to LIPA via Northport Norwalk Cable through ISO-NE 0 MW

The total external generation resources including items 1 to 5 are summarized in Table 6.

Table 6: Summary of External Generation Resources (MW)

Capacity Regions / External Regions	ROS Import (A-F)	LHV Import (G-I)	NYC Import (J)	LI Import (K)	NYCA
Ontario	0	0	0	0	0
HQ + EDR	1190	0	0	0	1190
PJM	496	338	63	0	897
ISO NE	-84	0	0	0	-84
Total External Generation Source	1602	338	63	0	2003

ROS and LHV Direct MW Transfer

Actual base case interchange schedules between New York Capacity Regions are consistent with the Installed Reserve Margin and the Locational Capacity Requirements:

- ROS (A-F) supply to New York City through LHV (G-I): 2906 MW
- ROS (A-F) supply to Long Island through LHV (G-I): 657 MW
  (combined with 300 MW wheeling contract)
- LHV (G-I) supply to New York City: 300 MW

Unforced Capacity Deliverability Rights (UDR) and External-to-ROS Deliverability Rights (EDR)

The following transmission projects are represented at their respective Unforced Capacity UDR and EDR capacity from the external area into the respective NYISO Zone.

- Linden VFT to New York City 315 MW
- Cross-Sound Cable to Long Island 330 MW
- Neptune HVDC to Long Island 660 MW
- Hudson Transmission Project to New York City 85 MW
- Cedar Rapids Transmission Project 80 MW
- Champlain Hudson Power Express (CHPE) 1250 MW

The total imports of each Capacity Region are summarized in Table 7. As derived from the external resources, Table 8 and Table 9 detail the NY-PJM scheduled flows.

Table 7: Summary of External Resources into Capacity Regions (MW)

From \ To	ROS Import (A-F)	LHV Import (G-I)	NYC Import (J)	LI Import (K)
Total External Source	1602	338	63	0
ROS direct MW transfer	0	1212	2906	657
LHV direct MW transfer	0	0	300	0
Total UDR	0	0	1650	990

Table 8: PJM – New York Scheduled Interchange and Wheels

PJM – New York Scheduled Interchange and Wheels	MW
ETCNL (PJM to ROS)	1080
NYPA Exports (from ROS)	-183
ConEd /PSE&G Wheel:	
ROS to PJM via LHV (ROS to LHV, LHV to PJM via the J&K tie-lines)	0
PJM to NYC (via the ABC tie-lines)	0
Wheel for RECO Load:	
PJM to ROS and LHV (20% PJM to ROS, ROS to LHV, 80% PJM to LHV)	416
LHV to PJM (RECO Load)	-416
PJM to NY Net Interchange Schedule via the AC Tie-lines (1080 – 183)	897
PJM to A-I Net Interchange Schedule (1080 - 183)	897

Table 9: PJM – New York Scheduled Flows

PJM – New York Scheduled Flows	MW
PJM to ROS (A – F):	
46% of PJM to NY Net Interchange (0.46 * 897)	412
20% of RECO Load (0.20 * 416)	83
Total Scheduled Flow to ROS via the Zones A and C tie-lines	495
PJM to LHV (to Zone G):	
32% of PJM to NY Net Interchange via 5018 tie (0.32 * 897)	287
80% of RECO Load via the 5018 tie (0.80 * 416)	333

PJM – New York Scheduled Flows	MW
Total scheduled flow on the 5018 ties	620
J&K ties (0 MW Wheel and 15% of PJM to NY Net Interchange) (0.15 * 897)	134
RECO Load delivered from LHV	-416
Total Scheduled Flow to LHV via the Zone G tie-lines	337
PJM to NYC (to Zone J)	
ABC ties (0 MW Wheel and 7% of PJM to NY Net Interchange, B&C out) (0.07 * 897)	63

2.3 Balancing Generation and Load

This step balances the supply of resources and demand of loads and losses. All CRIS generation within each Capacity Region is placed in-service and scaled proportional to the ratio of its Pmax to the sum of the Pmax in the respective exporting or importing zone(s) or Capacity Region. Actual generation is proportionally scaled (up or down) to match the demand.[7]

Phase Angle Regulators (PARs) controlling external tie lines are set consistent with NYISO Service Tariff, Attachment M-1, NYISO-PJM Joint Operating Agreement and applicable operating procedures and agreements.[8]

The UDRs are converted into proxy generators while the amount of external resources remains the same.

2.4 Creating the C24 CPA Deliverability Study Case

The above-described C24 CBA-D base case setup for the 2029 power flow representation of transmission system and resource capacity additions in the C24 CBA-D base case is also applicable to the C24 CPA-D base case for the Cluster Study Deliverability Study.[9]

The requested CRIS and corresponding UCAP of C24 CRIS Projects are included in Table 10 and Table 11.

[7] Demands include load (including load forecast uncertainty), transmission losses, and external schedule commitments

[8] The MW schedules of the PARs are included in Appendix A.

[9] For the purpose of this Study and Report, CBA-D base case refers to the CBA baseline power flow network representation without the Cluster Study CRIS Projects; the CPA-D base case is the CBA-D base case with the Cluster Study CRIS Projects added.

Table 10: C24 CRIS Projects Subject to Full C24 Evaluation (ERIS and CRIS)

QUEUE	PROJECT NAME	ZONE	Summer ERIS MW	Summer CRIS MW	EFORd (Derate)	UCAP MW
Full Cluster Study – ERIS and CRIS						
C24-003	Vineyard Mid-Atlantic West	K	1321	1321	61.76%	505.1
C24-004	Palladium Storage	J	140	140	5.99%	131.6
C24-005	Blue Spruce Storage	J	300	300	5.99%	282.0
C24-008	KCE NY 30	K	50	50	10.31%	44.8
C24-010	KCE NY 21	K	60	60	10.31%	53.8
C24-013	Battery Park Storage	J	190	190	5.99%	178.6
C24-021	Bluepoint Wind 1	J	1310	1310	61.76%	500.9
C24-032	Oakdale Battery Storage LLC	C	150	150	5.54%	141.6
C24-033	KCE NY 31	K	50	50	10.31%	44.8
C24-042	Hoffman Falls Wind 2	C	29.8	29.8	83.54%	4.9
C24-047	Lincoln Park DG, LLC	G	150	150	13.03%	130.4
C24-048	BPP NY Lansing BESS I	C	200	200	5.54%	188.9
C24-052-001	Hemlock Hollow Wind	A	95	95	83.54%	15.6
C24-060	Gemma Energy Storage	C	200	200	5.54%	188.9
C24-061	Daphne Energy Storage	K	75	75	10.31%	67.2
C24-062	Highbush Energy Storage	G	200	200	13.03%	173.9
C24-064	Fraser Energy Storage	E	135	135	5.54%	127.5
C24-066	Coral Energy Storage	C	100	100	5.54%	94.4
C24-072	Eastwater Energy Storage	B	100	100	5.54%	94.4
C24-074	Lighthouse Energy Storage	A	250	250	5.54%	236.1
C24-079	Maple Harvest Wind	C	162	162	83.54%	26.6
C24-081	Port Morris Energy Storage	J	130	130	5.99%	122.2
C24-085	Arch 4	G	150	150	13.03%	130.4
C24-088	Arch 3	G	100	100	13.03%	86.9
C24-093	Alcazar 1	G	100	100	13.03%	86.9
C24-094	Alcazar 2	G	150	150	13.03%	130.4
C24-097	Basecamp BESS	A	170	170	5.54%	160.5
C24-098	Farmhouse BESS	G	150	150	13.03%	130.4
C24-104	Horseblock Energy Storage	K	100	100	10.31%	89.6
C24-108	NY125C - Little Salmon Solar	D	200	200	66.92%	66.1
C24-111	Fort Edward Solar Farm (NY53)	F	100	100	66.92%	33.0
C24-125	Town Line Solar Phase II	E	60	60	66.92%	19.8
C24-129	Buffalo Road Energy Storage	A	100	100	5.54%	94.4
C24-130	Elevate Bethlehem	F	120	120	5.54%	113.3
C24-131	Elevate Arthur Kill II	J	180	180	5.99%	169.2
C24-135	Cayuga Solar	C	60	60	66.92%	19.8
C24-138	Marathon BESS	K	135	135	10.31%	121.0
C24-139	Valcour Storage	D	150	150	5.54%	141.6

QUEUE	PROJECT NAME	ZONE	Summer ERIS MW	Summer CRIS MW	EFORd (Derate)	UCAP MW
C24-148	Willard Storage	F	300	300	5.54%	283.3
C24-154	Sandlot IFB	K	50	50	10.31%	44.8
C24-162	Ramadi Utility Storage	K	140	140	10.31%	125.5
C24-163	Porter Energy Storage	F	50	50	5.54%	47.2
C24-165	KCE NY 38	F	250	250	5.54%	236.1
C24-167	KCE NY 37	K	150	150	10.31%	134.5
C24-173	KCE NY 34	G	100	100	13.03%	86.9
C24-175	Stargazer I	A	325	325	66.92%/5.54%*	159.6
C24-176	Stargazer II	A	325	325	66.92%/5.54%*	159.6
C24-178	Gowanus Energy Storage	J	150	150	5.99%	141.0
C24-182	Southern Tier Energy Center	C	200	200	5.54%	188.9
C24-183	East Setauket Storage II	K	248	248	10.31%	222.4
C24-189	North Country Wind	D	380	380	83.54%	62.5
C24-190	North Country Wind II	D	380	380	83.54%	62.5
C24-202	Brusselville Solar Energy Center	B	170	170	66.92%/5.54%*	68.5
C24-205	Wheelhouse Energy Storage	F	200	200	5.54%	188.9
C24-207	Trelina Energy Storage	C	120	120	5.54%	113.3
C24-217	Bay Breeze solar	E	150	150	66.92%	49.6
C24-224	Cohocton	C	130	130	66.92%/5.54%*	104.4
C24-225	Goldenrod Wind	A	39	39	83.54%	6.4
C24-229	Buttercup Wind	A	49.9	49.9	83.54%	8.2
C24-230	Dewdrop Wind	A	62	62	83.54%	10.2
C24-233	Shallow Seam BESS	C	400	400	5.54%	377.8
C24-238	Zenobe Burns LLC	C	100	100	5.54%	94.4
C24-253	Troy Heights Energy Storage	C	40	40	5.54%	37.7
C24-270	Bassett Energy Storage	C	79.9	79.9	5.54%	75.4
C24-281	Brentwood Energy Storage	K	49.1	49.1	10.31%	44.0
C24-283	Resilient New York Energy Storage	J	349	349	5.99%	328.0
C24-284	South Bronx Energy Storage	J	100	100	5.99%	94.0
C24-293	Oswego Clean Energy	C	24.9	24.9	66.92%	8.2
C24-300	Kimberlite Solar	C	175	175	66.92%	57.8
C24-301	Moonlight Flats Solar	C	250	250	66.92%	82.7
C24-304-004	NY Chateaugay 0 Willis Rd Storage	D	150	150	5.54%	141.6
C24-317	Leo Energy Storage	D	75	75	5.54%	70.8
C24-318	Sherburne Storage	E	40	40	5.54%	37.7
C24-321	Jericho Solar	D	100	100	66.92%	33.0
C24-324	Overlook Storage	G	199	199	13.03%	173.0
C24-326	Lockport Storage	A	180	180	5.54%	170.0
C24-331	Hell Gate Energy Storage	J	90	90	5.99%	84.6
C24-333	Pouch Energy Storage System	J	47.1	47.1	5.99%	44.3
C24-336	Mill Point Solar II	E	100	100	66.92%	33.0

QUEUE	PROJECT NAME	ZONE	Summer ERIS MW	Summer CRIS MW	EFORd (Derate)	UCAP MW
C24-337	Aria Storage 1	H	100	100	13.03%	86.9
C24-338	Aria Storage 2	H	150	150	13.03%	130.4
C24-341	Marlboro Storage	G	100	100	13.03%	86.9
C24-352	Swiss Valley Energy Storage	C	300	300	5.54%	283.3
C24-358	Sugar Loaf Energy Storage I	G	300	300	13.03%	260.9
C24-362	Amsterdam Solar	E	150	150	66.92%	49.6
C24-363	Town Line Solar CSR Phase I	E	240	240	66.92%/5.54%*	140.7
C24-364	Erie Canal BESS	A	230	230	5.54%	217.2
C24-366	Azalea Wind 1	C	50	50	83.54%	8.2
C24-370	Azalea Wind 2	C	50	50	83.54%	8.2

Notes:

C24-125 Town Line Solar Phase II is an uprate of C24-363 Town Line Solar CSR Phase I project (a proposed Co-located Storage Resource (CSR)). C24-125 Town Line Solar Phase II is requesting 60 MW CRIS of solar, and 0 MW CRIS of BESS uprate (a total of 60 MW CRIS uprate request). In total, C24-125 Town Line Solar Phase II and C24-363 Town Line Solar CSR Phase I are requesting 300 MW CRIS and 300 MW ERIS.

C24-175 Stargazer I is a proposed CSR requesting 240 MW CRIS of solar and 85 MW CRIS of BESS (a total of 325 MW CRIS request).

C24-176 Stargazer II is a proposed CSR requesting 240 MW CRIS of solar and 85 MW CRIS of BESS (a total of 325 MW CRIS request).

C24-202 Brusselville Solar Energy Center is a proposed CSR requesting 150 MW CRIS of solar and 20 MW CRIS of BESS (a total of 170 MW CRIS request).

C24-224 Cohocton is a proposed CSR requesting 30 MW CRIS of solar and 100 MW CRIS of BESS (a total of 130 MW CRIS request).

C24-336 Mill Point Solar II is an uprate of Q1031 Mill Point Solar (a proposed CSR). C24-336 Mill Point Solar II is requesting 100 MW CRIS of solar uprate and 0 MW CRIS of BESS uprate (a total of 100 MW CRIS uprate request).

C24-363 Town Line Solar CSR Phase I is a proposed CSR requesting 140 MW CRIS of solar and 100 MW CRIS of BESS (a total of 240 MW CRIS request).

C24-081 Port Morris Energy Storage is a repowering project that proposes to retire Harlem River GT# 1, and 2 (PTIDs 24160 through 24161). The C24-081 Port Morris Energy Storage, as proposed, will have a total ERIS capability of 130 MW (Summer) and 130 MW (Winter) and CRIS (Summer) of 130 MW (38.8 MW Summer CRIS increase).

C24-281 Brentwood Energy Storage is a repowering project that proposes to retire Brentwood GT (PTID 24164). The C24-281 Brentwood Energy Storage, as proposed, will have a total ERIS capability of 49.1 MW (Summer) and 49.1 MW (Winter) and CRIS (Summer) of 49.1 MW (2 MW Summer CRIS increase).

C24-331 Hell Gate Energy Storage is a repowering project that proposes to retire Hellgate GT# 1, and 2 (PTIDs 24158 through 24159). The C24-331 Hell Gate Energy Storage, as proposed, will have a total ERIS capability of 90 MW (Summer) and 90 MW (Winter) and CRIS (Summer) of 90 MW (same location CRIS transfer).

C24-333 Pouch Energy Storage System is a repowering project that proposes to retire Pouch GT (PTID 24155). The C24-333 Pouch Energy Storage System, as proposed, will have a total ERIS capability of 47.1 MW (Summer) and 47.1 MW (Winter) and CRIS (Summer) of 47.1 MW (same location CRIS transfer).

Table 11: C24 CRIS-Only Requests – Subject Only to C24 Deliverability Study

CRIS Only					
QUEUE	PROJECT	ZONE	Summer CRIS MW	EFORd (Derate)	UCAP MW
CR24-1002	West Babylon Internal Combustion (IC), Unit 4	K	49	10.31%	43.9
CR24-1003	Bethlehem Energy Center Uprate	F	40	5.54%	37.7
CR24-1004	Arthur Kill Unit 2 Uprate	J	12.2	5.99%	11.4

All C24 CRIS Projects are added to the CBA-D case and evaluated in each Capacity Region. The level of CRIS requested is derated to calculate the Pmax (UCAP) by applying ICAP to UCAP translation factors (derates). The levelized generation dispatch within each of the affected Capacity Regions is adjusted to reflect the additional capacity represented by the C24 CRIS Projects.

In the CPA-D case, the representational values for existing capacity resources (CRIS, ICAP, UCAP, and Pmax) are the same as for the CBA-D case with the C24 CRIS Projects added.

Table 12 and Table 13 summarize the Resource Capacity and Capacity Derates for the C24 CPA-D base case.

Table 12: C24 CPA-D – Summary of Capacity by Resource Type (MW)

Zone	DC	Landfill Gas	Large Hydro	Offshore Wind	Small Hydro	Solar	Uniform	Wind	CPA-D Grand Total CRIS
A	0.0	18.4	2700.0	0.0	3.10	1065.0	1847.9	1026.9	6661.3
B	0.0	11.2	0.0	0.0	54.8	1835.0	838.5	200.1	2939.6
C	0.0	42.5	0.0	0.0	72.2	2015.1	7884.9	1845.0	11859.7
D	0.0	6.4	856.0	0.0	56.8	1030.0	710.9	1893.4	4553.5
E	0.0	9.6	0.0	0.0	403.7	1694.0	491.6	852.2	3451.1
F	0.0	14.1	1165.1	0.0	313.4	1010.5	4044.7	0.0	6547.8
ROS	0.0	102.2	4721.1	0.0	904.0	8649.6	15818.5	5817.6	36013.0
G	0.0	0.0	0.0	0.0	74.0	153.2	7061.4	0.0	7288.6
H	0.0	0.0	0.0	0.0	0.0	0.0	303.5	0.0	303.5
I	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	40.0
LHV	0.0	0.0	0.0	0.0	74.0	153.2	7404.9	0.0	7632.1
J	0.0	30.1	0.0	2126.0	0.0	0.0	11272.7	0.0	13428.8
K	0.0	0.0	0.0	2245.0	27.9	90.4	6796.6	136.0	9295.9
Grand Total	0.0	132.3	4721.1	4371.0	1005.9	8893.2	41292.7	5953.6	66369.8

Table 13: C24 CPA-D – Summary of Capacity Derates by Resource Type (MW)

Zone	DC	Landfill Gas	Large Hydro	Offshore Wind	Small Hydro	Solar	Uniform	Wind	CPA-D Grand Total UCAP
A	0.0	11.7	2649.7	0.0	1.2	352.3	1745.5	169.0	4929.6
B	0.0	7.1	0.0	0.0	22.8	607.0	792.0	32.9	1460.6
C	0.0	27.0	0.0	0.0	30.0	666.6	7448.0	303.6	8475.4
D	0.0	4.0	840.0	0.0	23.6	340.7	671.5	311.6	2191.6
E	0.0	6.1	0.0	0.0	167.9	560.3	464.3	140.2	1339.1
F	0.0	8.9	1143.4	0.0	130.4	334.2	3820.6	0.0	5437.7
ROS	0.0	64.8	4633.1	0.0	375.9	2861.1	14939.9	957.3	23834
G	0.0	0.0	0.0	0.0	30.7	50.6	6141.3	0.0	6222.7
H	0.0	0.0	0.0	0.0	0.0	0.0	263.9	0.0	263.9
I	0.0	0.0	0.0	0.0	0.0	0.0	34.7	0.0	34.7
LHV	0.0	0.0	0.0	0.0	30.7	50.6	6439.9	0.0	6521.3
J	0.0	19.1	0.0	812.9	0.0	0.0	10597.4	0.0	11429.6
K	0.0	0.0	0.0	858.4	11.6	29.9	6095.8	22.3	7018.2
Grand Total	0.0	83.9	4633.1	1671.3	418.2	2941.6	38075.0	979.6	48803.1

3. Transition Cluster Study 2024 Deliverability Study Results

In the C24 Deliverability Study, the following deliverability tests were performed to evaluate the impact to the transmission system, from the C24 CRIS Projects:

1. Highway Deliverability Test for ROS and LHV:
    a. Highway Interface Transfer Capability "No Harm" assessment: results and findings are summarized in Section 3.1 and 3.3.
    b. Highway Interface Capacity Deliverability Assessment: results and findings are summarized in Section 3.2 through 3.3.
2. ROS and LHV Byway Capacity Deliverability Assessment: results are and findings summarized in Section 3.4 through 3.5.
3. Other Interface Transfer Capability "No Harm" assessment: results and findings are summarized in Section 3.6 through 3.8.
4. NYC Byway Capacity Deliverability Assessment: results and findings are summarized in Section 3.9 through 3.10.
5. LI Byway Capacity Deliverability Assessment: results are summarized in Section 3.11 through 3.12.

3.1 Highway Interface Transfer Capability "No Harm" Assessment

Transfer capability for the five ROS and one LHV Highway Interfaces were evaluated from west-to-east and north-to-south by exporting from one (or more) zones in upstate NY to the remaining zone(s) within the ROS and LHV Capacity Region. A summary of these interface transfer limits for the CBA-D and CPA-D cases are presented in Table 14. The Table also references the corresponding transfer limits included in the NYCA Transmission System Representation (topology) in the 2025 RNA Study.

Table 14: Highway Interface "No Harm" Study Results

C24 Highways Interfaces "No Harm" Test								
Interface	Source	Sink	Reference RNA Limit	CBA-D	Constraint	CPA-D	Constraint	(CPA-D) Minus (CBA-D)
West Central	AB	CDEF	1500	2922	(1)	2758	(2)	-164
Dysinger East	A	BCDEF	2000	2223	(3)	2059	(4)	-164
Moses South	D	ABCEF	3500	4524	(5)	4484	(5)	-40
Volney East	ABC	DEF	5650	6751	(6)	1750	(7)	-5001
Total East	ABCDE	F	5650	9809	(8)	9034	(9)	-775
UPNY-ConEd	G	HI	7050	9104	(10)	9053	(10)	-51

Notes:

(1)	149025 S122 115 115 136197 S168 115 1T 115 1	@ STE	280	MVA L/O	Q883-Clay	
(2)	148530 Q883_POI 345 136150 CLAY 345 2	@ STE	1673	MVA L/O	136150 CLAY 345 149001 S122 345 1	
(3)	147841 NIAGAR2E 230 147834 NIAG 345 345 2	@ STE	575	MVA L/O	TB:345-230:NI3	
(4)	147841 NIAGAR2E 230 147834 NIAG 345 345 2	@ Norm	575	MVA L/O	Base Case	
(5)	147741 NH3453-B 345 148608 Q1446_POI 345 1	@ STE	1685	MVA L/O	147835 ADRON B1 345 148975 Q800 POI 345 2	
(6)	147830 JA FITZP 345 137200 EDIC 345 1	@ STE	1661	MVA L/O	LN:345:VOL MCY 19	
(7)	818200 C24_182_POI 345 130755 OAKDL345 345 1	@ STE	717	MVA L/O	P1_C24_233_SE_345_1	
(8)	137200 EDIC 345 137405 AMES_351 345 1	@ STE	2038	MVA L/O	LN:345:EDC PTN B	
(9)	130753 FRASR345 345 147831 GILB 345 345 1	@ STE	1793	MVA L/O	FRASER - COOPERS 345 33	
(10)	146874 LOVETT345 ST 345 126263 BUCHANAN S 345 1	@ STE	2530	MVA L/O	BUCHANAN_NORTH:I1.A_FDR_Y94	

Discussion

De Minimus Transfer Limit Degradation for Highway Interface Facilities

Per Section 40.13.8.2.1.14 of Attachment HH, for Highway interfaces, the Cluster Study CRIS Projects, whether or not they are otherwise deliverable, will not be considered deliverable if their aggregate impact degrades the transfer capability of the interface more than the lesser of 25 MW or 2 percent of the transfer capability identified in the CBA and results in an increase to the NYCA LOLE determined for the CBA of .01 or more.

ROS Highway Interface Transfer Capability "No Harm" Results:

1. The West Central interface transfer limit decreased by more than 25 MW (i.e., by -164 MW) as constrained by Q883 POI – Clay 345 kV line 2 for the loss of Clay – S122 345 kV line 1. Though the degradation of the West Central transfer limit is above the *de minimus* 25 MW, that degradation occurs at transfer limits above the RNA reference limit of 1500 MW. As a result, C24 CRIS Projects pass the Highway Interfaces "No Harm" test for West Central Interface.

2. The Dysinger East interface transfer limit decreased by more than 25 MW (i.e., by -164 MW) as constrained by Niagara 230 kV – Niagara 345 kV ckt 2 pre-contingency. Though the degradation of the Dysinger East transfer limit is above the *de minimus* 25 MW, that degradation occurs at transfer limits above the RNA reference limit of 2000 MW. As a result, C24 CRIS Projects pass the Highway Interfaces "No Harm" test for the Dysinger East Interface.

3. The Moses South interface transfer limit decreased by more than 25 MW (i.e., by -40 MW) as constrained by Haverstock 345 kV – Q1446 POI 345 kV ckt 1 for the loss of Adirondack 345 kV – Q800 POI 345 kV ckt 2. Though the degradation of the Moses South transfer limit is above

the *de minimus* 25 MW, that degradation occurs at transfer limits above the RNA reference limit of 3500 MW. As a result, C24 CRIS Projects pass the Highway Interfaces "No Harm" test for Moses South Interface.

4. The Volney East interface transfer limit decreased by more than 25 MW (i.e., by -5001 MW) as constrained by Watercure – Oakdale 345 kV line 1 for the loss of C24-233 POI to Homer City 345kV line 1. As a result, C24 CRIS Projects did not pass the Highway Interfaces "No Harm" test for Volney East Interface.

5. The Total East interface transfer limit decreased by more than 25 MW (i.e., by -775 MW) as constrained by Fraser – Gilboa 345 kV line 1 for the loss of Fraser – Coopers 345 kV line 33. Though the degradation of the Total East transfer limit is above the *de minimus* 25 MW, that degradation occurs at transfer limits well above the RNA reference limit of 5650 MW. As a result, C24 CRIS Projects pass the Highway Interfaces "No Harm" test for Total East Interface.

LHV Highway Interface Transfer Capability "No Harm" Results:

6. The transfer limit on UPNY-ConEd decreased by more than 25 MW (*i.e.*, by -51 MW) as constrained by Lovett - Buchanan South 345 kV ckt 1 for the loss of Buchanan North – Ramapo 345 kV feeder Y94. Though the degradation of the UPNY-ConEd transfer limit is above the *de minimus* 25 MW, that degradation occurs at transfer limits well above the RNA reference limit of 7050 MW. As a result, C24 CRIS Projects pass the Highway Interfaces "No Harm" test for UPNY-ConEd Interface.

Conclusion - ROS and LHV Highway Interface "No Harm" Results

When comparing the CPA-D limits with the CBA-D limits, transfer limit violating criteria were observed on Volney East interface. As such, no C24 CRIS Projects in ROS passed the Highway "No Harm" Test for Volney East interface. C24 CRIS Projects in ROS and LHV passed the Highway "No Harm" Test for West Central, Dysinger East, Moses South, Total East and UPNY-ConEd interfaces.

3.2 Highway Interface Capacity Deliverability Assessment

The deliverability tests within the ROS and LHV Capacity Region were evaluated from west-to-east and north-to-south by exporting from one (or more) zones in upstate NY to the remaining zone(s) within the ROS and LHV Capacity Region.

Additional Transmission Capacity or Bottled Generation Capacity was calculated by FCITC less the amount of net available capacity. A summary of these interface transfers for the CBA-D and CPA-D cases is presented in Table 15.

Table 15: Highway Interface Capacity Deliverability Assessment Results (MW)

C24 Highways Capacity Deliverability Test							
Capacity Region	Interface	Source	Sink	Net Available Capacity (MW)	FCITC (MW)	Constraint	Deliverable (+) or Bottled (-) Generation Capacity
				A	B		C=B-A
CBA-D							
ROS	West Central	AB	CDEF	640	3963	(1)	3323
	Dysinger East	A	BCDEF	473	2092	(3)	1619
	Moses South	D	ABCEF	208	3059	(5)	2851
	Volney East	ABC	DEF	1459	4392	(6)	2933
	Total East	ABCDE	F	1779	5597	(8)	3818
LHV	UPNY-ConEd	G	HI	1870	3461	(10)	1591
CPA-D							
ROS	West Central	AB	CDEF	2088	3808	(2)	1720
	Dysinger East	A	BCDEF	1542	1662	(4)	120
	Moses South	D	ABCEF	678	2922	(5)	2244
	Volney East	ABC	DEF	4764	-701	(7)	-5465
	Total East	ABCDE	F	5812	4606	(9)	-1206
LHV	UPNY-ConEd	G	HI	3514	3586	(10)	72

Net Available Capacity is the remaining CRIS available after consideration of base generator dispatch, capacity derates, and net capacity exports.

FCITC is the incremental transfer limit corresponding to the most limiting FCTTC in the Highway interface analysis calculated by the software TARA.

Additional Transmission Capacity or Bottled Generation Capacity is the available unused transfer capability (+) or the amount of CRIS that is bottled (-) by the interface transfer limit constraint. It is calculated by FCITC (B) less Net Available Capacity (A).

Notes:

(1) 149025 S122 115 115 136197 S168 115 1T 115 1 @ STE 280 MVA L/O Q883-Clay

(2) 148530 Q883_POI 345 136150 CLAY 345 2 @ STE 1673 MVA L/O 136150 CLAY 345 149001 S122 345 1

(3) 147841 NIAGAR2E 230 147834 NIAG 345 345 2 @ STE 575 MVA L/O TB:345-230:NI3

(4) 147841 NIAGAR2E 230 147834 NIAG 345 345 2 @ Norm 575 MVA L/O Base Case

(5) 147741 NH3453-B 345 148608 Q1446_POI 345 1 @ STE 1685 MVA L/O 147835 ADRON B1 345 148975 Q800 POI 345 2

(6) 147830 JA FITZP 345 137200 EDIC 345 1 @ STE 1661 MVA L/O LN:345:VOL MCY 19

(7) 818200 C24_182_POI 345 130755 OAKDL345 345 1 @ STE 717 MVA L/O P1_C24_233_SE_345_1

(8) 137200 EDIC 345 137405 AMES_351 345 1 @ STE 2038 MVA L/O LN:345:EDC PTN B

(9) 130753 FRASR345 345 147831 GILB 345 345 1 @ STE 1793 MVA L/O FRASER - COOPERS 345 33

(10) 146874 LOVETT345 ST 345 126263 BUCHANAN S 345 1 @ STE 2530 MVA L/O BUCHANAN_NORTH:I1.A_FDR_Y94

ROS Highway Capacity Deliverability Assessment Results:

1. The Volney East interface is observed with 5465 MW bottled generation in CPA-D case as

constrained by Watercure – Oakdale 345 kV line 1 for the loss of C24-233 POI to Homer City 345kV line 1. As a result, C24 CRIS Projects did not pass the Highway Capacity Deliverability Assessment for Volney East Interface.

2. The Total East interface is observed with 1206 MW bottled generation in CPA-D case as constrained by Fraser – Gilboa 345 kV line 1 for the loss of Fraser – Coopers Corner 345 kV line 33. As a result, C24 CRIS Projects did not pass the Highway Capacity Deliverability Assessment for Total East Interface.

Conclusion – Highway Interface Capacity Deliverability Assessment

Bottled capacity was identified on Volney East, and Total East interfaces. As such, no C24 CRIS Projects in the ROS Capacity Regions passed the Highway Interface Capacity Deliverability test for Volney East, and Total East interfaces. C24 CRIS Projects in the ROS and LHV Capacity Regions did, however, pass the Highway Interface Capacity Deliverability test for West Central, Dysinger East, Moses South, and UPNY-ConEd interfaces.

Proposed Highway Interface SDU Solutions

Based on the results as seen from Table 14 and 15, Highway SDUs are required for C24 CRIS ROS projects to pass Volney East, and Total East interfaces.

Table 16 summarizes the proposed SDU solutions for Volney East, and Total East interfaces.

Table 16: Highway Interface SDU Solutions

C24 Highway SDUs for Deliverability Assessment	
1	Ames Rd - Princetown 345 kV ckt 1 Rebuild (Total East Interface)
2	Ames Rd - Q1089 POI 345 kV ckt 2 Rebuild (Total East Interface)
3	Edic - Ames Rd 345 kV ckt 2 Rebuild (Total East Interface)
4	Edic - Ames Rd 345 kV ckt 1 Rebuild (Total East Interface)
5	Fraser - Gilboa 345 kV ckt 1 Rebuild (Total East Interface)
6	Watercure - Oakdale 345 kV ckt 1 Terminal Upgrades (Volney East Interface)
7	Oakdale - Fraser 345 kV ckt 1 Rebuild (Volney East Interface)

Table 17 presents the Highway "No Harm" Test on Volney East interface for C24 CRIS Projects in the ROS Capacity Regions with proposed SDUs for full deliverability.

Table 17: Highway "No Harm" Test with SDU– Volney East

Interface	Source	Sink	Reference RNA Limit	CBA-D	Constraint	CPA-D	Constraint	(CPA-D) Minus (CBA-D)
Volney East	ABC	DEF	5650	6750.6	(6)	7624.3	(11)	874

Notes:

(6) 147830 JA FITZP 345 137200 EDIC 345 1 @ STE 1661 MVA L/O LN:345:VOL MCY 19

(11) 136150 CLAY 345 137200 EDIC 345 2 @ STE 1685 MVA L/O LN:345:CLA EDC 16

Table 18 presents the Highway Interface Capacity Deliverability test on Volney East, and Total East interfaces for C24 CRIS Projects in the ROS Capacity Regions with proposed SDUs for full deliverability.

Table 18: Highway Capacity Deliverability Assessment with SDU - Volney East, and Total East

Capacity Region	Interface	Source	Sink	Net Available Capacity (MW)	FCITC (MW)	Constraint	Deliverable (+) or Bottled (-) Generation Capacity
				A	B		C=B-A
ROS	Volney East	ABC	DEF	4764	5178	(11)	414
	Total East	ABCDE	F	5812	5914	(12)	102

Notes:

(11) 136150 CLAY 345 137200 EDIC 345 2 @ STE 1685 MVA L/O LN:345:CLA EDC 16

(12) 836200 C24_362_POI 345 148964 GORDON ROAD 345 1 @ Norm 1331 MVA L/O Base Case

3.3 Highway Interface SDU Cost Allocation

The preliminary cost allocation for C24 CRIS Projects whose impact on deliverability degradation is discussed in this section. In this report, the NYISO presents the planning level least-cost solution for full deliverability of C24 CRIS Projects in ROS Capacity Region.

Highway SDUs Cost Allocation% for Volney East, and Total East

Table 19 and table 20 provide each project's cost allocation for SDUs to fix issues identified in Highway "No Harm" test and Capacity Deliverability Assessment per each project's contribution. Individual project impact was calculated for cost allocation of C24 ROS CRIS Projects to each limiting element identified in Highway "No Harm" test and Capacity Deliverability Assessment.

Table 19: Highway SDUs for Total East Allocation Percentage

Project	CRIS MW	SDU 1		SDU 2		SDU 3		SDU 4		SDU 5	
		Impact	% Allocation	Impact	% Allocation	Impact	% Allocation	Impact	% Allocation	Impact	% Allocation
C24-032	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	26.8	**5.80%**

Project	CRIS MW	SDU 1		SDU 2		SDU 3		SDU 4		SDU 5	
		Impact	% Allocation	Impact	% Allocation	Impact	% Allocation	Impact	% Allocation	Impact	% Allocation
C24-048	200	5.3	**4.38%**	5.7	**4.37%**	5.0	**4.07%**	5.0	**4.07%**	22.0	**4.77%**
C24-052-001	95	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C24-060	200	3.2	**2.67%**	3.6	**2.77%**	3.0	**2.45%**	3.0	**2.45%**	27.5	**5.96%**
C24-064	135	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	37.5	**8.13%**
C24-066	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.9	**3.02%**
C24-072	100	4.2	**3.49%**	4.4	**3.41%**	4.3	**3.54%**	4.3	**3.54%**	6.7	**1.46%**
C24-074	250	8.0	**6.62%**	8.5	**6.54%**	8.1	**6.58%**	8.1	**6.58%**	23.7	**5.14%**
C24-079	162	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.1	**0.46%**
C24-097	170	5.3	**4.37%**	5.6	**4.32%**	5.3	**4.33%**	5.3	**4.33%**	16.6	**3.59%**
C24-108	200	4.3	**3.53%**	4.4	**3.40%**	4.5	**3.68%**	4.5	**3.68%**	N/A	N/A
C24-129	100	3.7	**3.08%**	3.9	**3.02%**	3.8	**3.10%**	3.8	**3.10%**	8.1	**1.75%**
C24-135	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.3	**0.50%**
C24-139	150	9.2	**7.56%**	9.4	**7.29%**	9.7	**7.88%**	9.7	**7.88%**	N/A	N/A
C24-175	325	3.9	**3.22%**	4.2	**3.24%**	3.8	**3.10%**	3.8	**3.10%**	20.1	**4.36%**
C24-176	325	3.9	**3.22%**	4.2	**3.24%**	3.8	**3.10%**	3.8	**3.10%**	20.1	**4.36%**
C24-182	200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	34.9	**7.56%**
C24-189	380	4.0	**3.34%**	4.2	**3.22%**	4.3	**3.48%**	4.3	**3.48%**	N/A	N/A
C24-190	380	4.0	**3.34%**	4.2	**3.22%**	4.3	**3.48%**	4.3	**3.48%**	N/A	N/A
C24-202	170	3.0	**2.47%**	3.1	**2.41%**	3.1	**2.50%**	3.1	**2.50%**	4.9	**1.05%**
C24-207	120	4.5	**3.74%**	4.8	**3.67%**	4.6	**3.75%**	4.6	**3.75%**	9.6	**2.07%**
C24-217	150	2.8	**2.35%**	2.9	**2.27%**	3.0	**2.41%**	3.0	**2.41%**	N/A	N/A
C24-224	130	2.5	2.08%	2.7	**2.09%**	2.4	1.98%	2.4	1.98%	13.2	**2.87%**
C24-233	400	6.8	**5.61%**	7.5	**5.79%**	6.4	**5.21%**	6.4	**5.21%**	54.1	**11.72%**
C24-238	100	2.5	**2.08%**	2.7	**2.08%**	2.5	**2.01%**	2.5	**2.01%**	11.3	**2.46%**
C24-253	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.9	**1.06%**
C24-270	79.9	N/A	N/A	2.0	1.57%	N/A	N/A	N/A	N/A	9.4	**2.03%**
C24-300	175	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.3	**1.80%**
C24-301	250	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12.3	**2.67%**
C24-304-004	150	9.2	**7.56%**	9.4	**7.29%**	9.7	**7.88%**	9.7	**7.88%**	N/A	N/A
C24-317	75	4.6	**3.78%**	4.7	**3.64%**	4.8	**3.94%**	4.8	**3.94%**	N/A	N/A
C24-318	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.8	**1.48%**
C24-321	100	2.1	**1.77%**	2.2	**1.70%**	2.3	**1.84%**	2.3	**1.84%**	N/A	N/A
C24-326	180	6.6	**5.43%**	6.9	**5.33%**	6.7	**5.45%**	6.7	**5.45%**	14.9	**3.23%**
C24-352	300	8.8	**7.24%**	9.3	**7.18%**	8.8	**7.14%**	8.8	**7.14%**	30.8	**6.66%**
C24-364	230	8.6	**7.07%**	9.0	**6.93%**	8.7	**7.11%**	8.7	**7.11%**	18.6	**4.04%**
			100.00%		100.00%		100.00%		100.00%		100.00%

(1) 137405 AMES_351 345 148965 PRNCTWN 345 1

(2) 137404 AMES_352 345 148593 Q1089_POI 345 2
(3) 137404 AMES_352 345 137200 EDIC 345 2
(4) 137200 EDIC 345 137405 AMES_351 345 1
(5) 130753 FRASR345 345 147831 GILB 345 345 1

Table 20: Highway SDUs for Volney East- Allocation Percentage

Project	CRIS MW	SDU (6)		SDU (7)	
		Impact	% Allocation	Impact	% Allocation
C24-032	150	N/A	N/A	43.3	**7.09%**
C24-048	200	N/A	N/A	29.4	**4.82%**
C24-052-001	95	2.9	**0.41%**	2.5	**0.41%**
C24-060	200	58.7	**8.41%**	43.5	**7.12%**
C24-066	100	25.8	**3.70%**	22.0	**3.60%**
C24-072	100	3.9	**0.55%**	6.6	**1.08%**
C24-074	250	33.8	**4.85%**	31.3	**5.13%**
C24-079	162	N/A	N/A	2.2	**0.35%**
C24-097	170	24.4	**3.50%**	22.2	**3.64%**
C24-129	100	8.7	**1.25%**	9.5	**1.55%**
C24-135	60	N/A	N/A	3.1	**0.51%**
C24-175	325	37.4	**5.36%**	30.0	**4.91%**
C24-176	325	37.4	**5.36%**	30.0	**4.91%**
C24-182	200	145.6	**20.86%**	62.0	**10.14%**
C24-202	170	3.2	**0.46%**	4.8	**0.79%**
C24-207	120	6.8	**0.98%**	11.0	**1.79%**
C24-224	130	21.2	**3.04%**	19.6	**3.21%**
C24-233	400	120.2	**17.22%**	85.5	**13.99%**
C24-238	100	18.6	**2.67%**	16.5	**2.69%**
C24-253	40	N/A	N/A	7.0	**1.14%**
C24-270	79.9	15.1	**2.17%**	13.8	**2.25%**
C24-300	175	18.4	**2.64%**	13.1	**2.14%**
C24-301	250	30.0	**4.30%**	19.9	**3.25%**
C24-326	180	17.0	**2.43%**	17.9	**2.93%**
C24-352	300	48.6	**6.96%**	42.5	**6.96%**
C24-364	230	20.2	**2.89%**	21.9	**3.59%**
			100.00%		100.00%

(6) 130755 OAKDL345 345 130757 WATRC345 345 1
(7) 130753 FRASR345 345 130755 OAKDL345 345 1

The high-level non-binding estimated cost for the following ROS Highway SDUs are:

1. Ames Rd - Princetown 345 kV ckt 1 Rebuild: **$94,020,000 (±50%)**

2. Ames Rd - Q1089 POI 345 kV ckt 2 Rebuild: **$35,000,000 (±50%)**
3. Edic - Ames Rd 345 kV ckt 2 Rebuild: **$260,000,000 (±50%)**
4. Edic - Ames Rd 345 kV ckt 1 Rebuild: **$340,000,000 (±50%)**
5. Fraser - Gilboa 345 kV ckt 1 Rebuild: **$290,000,000 (±50%)**
6. Watercure - Oakdale 345 kV ckt 1 Terminal Upgrades: **$1,200,000 (±50%)**
7. Oakdale - Fraser 345 kV ckt 1 Rebuild: **$ 87,626,000 (±50%)**

These SDUs are "new" (*i.e.*, not previously identified and cost allocated in a prior Class Year Study and not substantially similar to a System Deliverability Upgrade previously identified and cost allocated in a Class Year Study) and therefore requires an Additional SDU Study per Section 40.14 of Attachment HH if any of the projects listed above elect to move forward with such Additional SDU Study. Further physical feasibility of these SDUs will be confirmed in the Additional SDU studies if the projects indicated above decide to move forward with the Additional SDU studies.

3.4 ROS and LHV Byway Capacity Deliverability Assessment

Byway assessment was performed for C24 CRIS Projects in the ROS and LHV Capacity Regions. If the FCITC was greater than the net available capacity at the Point of Interconnection (POI) then the respective project passed the test. Each transfer was from all the generation at each POI into the Capacity Region where the project is located. Table 21 shows the FCITC resulting from the ROS and LHV Byway test.

Table 21: ROS and LHV Byway Capacity Deliverability Assessment Results

Queue	PROJECT	ZONE	Net Available at POI (MW)	CPA-D FCITC (MW)	Additional Transmission Capacity (+) or Bottled Generation (-)	Constraint
C24-032	Oakdale Battery Storage LLC	C	0	739.4	739.4	130836 N.WAV115 115 131162 CHEMU115 115 1 at STE 145 MVA L/O WTRCR - MAINSBRG 345 30
C24-042	Hoffman Falls Wind 2	C	0	107.1	107.1	146107 Q276POI 115 136184 CORTLAND 115 1 at STE 154 MVA L/O 136250 WHITMAN 115 136680 FEN-WIND 115 1
C24-047	Lincoln Park DG, LLC	G	0	107	107	125023 E.KINGST 115 125035 ER CBLTP 115 1 at STE 221 MVA L/O LN: Hurley1 - C24_047_POI
C24-048	BPP NY Lansing BESS I	C	0	281.1	281.1	134076 Q1009_POI 115 130800 ETNA 115 115 2 at STE 255 MVA L/O 130800 ETNA 115 115 130827 CAYUGA 115 1
C24-052-001	Hemlock Hollow Wind	A	0	-1357.4	-1357.4	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O P1_C24_182_SE_345_1
C24-060	Gemma Energy Storage	C	0	-1216.3	-1216.3	131611 HARIS115 115 130815 HINMN115 115 1 at STE 286 MVA L/O LN:230:64 NY
C24-062	Highbush Energy Storage	G	12.9	112.5	99.6	125036 MANCHEST 115 125043 PL.VAL 1 115 1 at STE 260 MVA L/O MC_Line_Out P1.2

Queue	PROJECT	ZONE	Net Available at POI (MW)	CPA-D FCITC (MW)	Additional Transmission Capacity (+) or Bottled Generation (-)	Constraint
C24-064	Fraser Energy Storage	E	0	1542.9	1542.9	130805 FRASR115 115 130851 SIDNT115 115 1 at STE 135 MVA L/O TF_FRASER_B3_ONE
C24-066	Coral Energy Storage	C	0	-834.8	-834.8	130853 A.LUD TP 115 131611 HARIS115 115 1 at STE 261 MVA L/O NIAGARA - ROBINSON 345 64
C24-072	Eastwater Energy Storage	B	0	91.3	91.3	807299 C24_72_POI 115 149715 S56 1T 115 23 at STE 185 MVA L/O P1_C24_072_SE_115_1
C24-074	Lighthouse Energy Storage	A	0	-1745.1	-1745.1	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O P1_C24_182_SE_345_1
C24-079	Maple Harvest Wind	C	0	206.1	206.1	146452 Q545POI 115 136246 TILDEN 115 1 at STE 236 MVA L/O 136248 TULLY CT 115 807970 C24_079_POI 115 1
C24-085	Arch 4	G	0	1397.4	1397.4	146773 SGRLF138 138 146873 STFORESTAP 138 1 at STE 317 MVA L/O Sugarloaf-Ramapo P1.2
C24-088	Arch 3	G	0	1397.4	1397.4	146773 SGRLF138 138 146873 STFORESTAP 138 1 at STE 317 MVA L/O Sugarloaf-Ramapo P1.2
C24-093	Alcazar 1	G	0	368.6	368.6	125030 HURLEY 1 115 125060 STURG115 115 1 at STE 191 MVA L/O 303:HurleyAvenue-Roseton P1.2
C24-094	Alcazar 2	G	0	368.6	368.6	125030 HURLEY 1 115 125060 STURG115 115 1 at STE 191 MVA L/O 303:HurleyAvenue-Roseton P1.2
C24-097	Basecamp BESS	A	0	-1642.4	-1642.4	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O 130755 OAKDL345 345 818200 C24_182_POI 345 1
C24-098	Farmhouse BESS	G	787.3	2168.8	1381.5	125002 ROSETON 345 125001 ROCK TAV 345 1 at STE 1870 MVA L/O TE38:L/O FISHKILL-ROSE 345 RFK305
C24-108	NY125C - Little Salmon Solar	D	0	1188.7	1188.7	148600 MNH1230 230 147840 MOSES W 230 1 at STE 562 MVA L/O 147835 ADRON B1 345 147836 ADRON B2 345 1
C24-111	Fort Edward Solar Farm (NY53)	F	0	243.8	243.8	145024 BRAN_POI 115 137895 SCHAGHTICOKW 115 1 at STE 237 MVA L/O P1_C24_111_SE_115_1
C24-125	Town Line Solar Phase II	E	0	2634.5	2634.5	146754 MDTN TAP 345 125001 ROCK TAV 345 1 at STE 2362 MVA L/O P1_C24_125_SE_345_1
C24-129	Buffalo Road Energy Storage	A	0	103.5	103.5	812900 C24_129_POI 115 148012 OLIN-184 115 1 at Norm 193 MVA L/O Base Case
C24-130	Elevate Bethlehem	F	0	179.4	179.4	137719 ALB4 115 148001 AIR INDE 115 1 at STE 368 MVA L/O 137718 ALB3 115 137719 ALB4 115 1
C24-135	Cayuga Solar	C	0	281.1	281.1	134076 Q1009_POI 115 130800 ETNA 115 115 2 at STE 255 MVA L/O 130800 ETNA 115 115 130827 CAYUGA 115 1
C24-139	Valcour Storage	D	0	777.7	777.7	148757 Q521_POI 230 147970 RYAN 230 1 at STE 318 MVA L/O P1_C24_139_SE_5
C24-148	Willard Storage	F	0	141.5	141.5	137563 EASTOVER RD 115 137517 N. TROY 115 1 at STE 237 MVA L/O EOVRNT307
C24-163	Porter Energy Storage	F	0	15.2	15.2	816305 C24-163_POI 115 137884 HAGUE4 115 1 at Norm 62 MVA L/O Base Case
C24-165	KCE NY 38	F	0	165.6	165.6	137489 BL STR E 115 137576 BL STR77G 115 1 at STE 185 MVA L/O 137554 CHURCHTOWN 115 125040 N.CAT. 1 115 1
C24-173	KCE NY 34	G	0	316.1	316.1	125038 MILAN 115 125043 PL.VAL 1 115 1 at Norm 221 MVA L/O Base Case
C24-175	Stargazer I	A	0	-1085.2	-1085.2	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O P1_C24_182_SE_345_1
C24-176	Stargazer II	A	0	-1085.2	-1085.2	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O P1_C24_182_SE_345_1
C24-182	Southern Tier Energy Center	C	0	-1057.5	-1057.5	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O 130755 OAKDL345 345 818200 C24_182_POI 345 1
C24-189	North Country Wind	D	0	1133.2	1133.2	148605 WILLWOLD230 230 147846 WILLIS W 230 1 at STE 637 MVA L/O 147845 WILLIS E 230 147846 WILLIS W 230 1
C24-190	North Country Wind II	D	0	1188.7	1188.7	148601 MNH2230 230 147840 MOSES W 230 1 at STE 562 MVA L/O 147835 ADRON B1 345 147836 ADRON B2 345 1
C24-202	Brusselville Solar Energy Center	B	0	3414.9	3414.9	135096 Q720-POI 115 130776 BORDR115 115 1 at STE 193 MVA L/O Q883-Clay
C24-205	Wheelhouse Energy Storage	F	0	5343.4	5343.4	148593 Q1089_POI 345 148965 PRNCTWN 345 2 at STE 2038 MVA L/O 137404 AMES_352 345 137405 AMES_351 345 1

Queue	PROJECT	ZONE	Net Available at POI (MW)	CPA-D FCITC (MW)	Additional Transmission Capacity (+) or Bottled Generation (-)	Constraint
C24-207	Trelina Energy Storage	C	0	-736.8	-736.8	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O HILLSIDE - WATERCURE 230 69
C24-217	Bay Breeze solar	E	0	58.6	58.6	145097 Q882_POI 115 136815 LYMETP 115 1 at Norm 119 MVA L/O Base Case
C24-224	Cohocton	C	0	-1060.4	-1060.4	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O 130755 OAKDL345 345 818200 C24_182_POI 345 1
C24-225	Goldenrod Wind	A	0	-1612.3	-1612.3	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O 130755 OAKDL345 345 818200 C24_182_POI 345 1
C24-229	Buttercup Wind	A	0	-1596.3	-1596.3	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O 130755 OAKDL345 345 818200 C24_182_POI 345 1
C24-230	Dewdrop Wind	A	0	-1520.1	-1520.1	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O 130755 OAKDL345 345 818200 C24_182_POI 345 1
C24-233	Shallow Seam BESS	C	55.8	-930.1	-985.9	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O 130755 OAKDL345 345 818200 C24_182_POI 345 1
C24-238	Zenobe Burns LLC	C	12.9	-1229.1	-1242	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O P1_C24_182_SE_345_1
C24-253	Troy Heights Energy Storage	C	0	-705.5	-705.5	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O HILLSIDE - WATERCURE 230 69
C24-270	Bassett Energy Storage	C	0	-1307	-1307	131611 HARIS115 115 130815 HINMN115 115 1 at STE 286 MVA L/O LN:230:64 NY
C24-293	Oswego Clean Energy	C	0	665.6	665.6	136172 ALTP 115 136223 NEW HAVN 115 1 at STE 145 MVA L/O 136228 PALOMATP 115 136235 S OSWEGO 115 1
C24-300	Kimberlite Solar	C	55.8	-930.1	-985.9	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O 130755 OAKDL345 345 818200 C24_182_POI 345 1
C24-301	Moonlight Flats Solar	C	0	-924.9	-924.9	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O P1_C24_182_SE_345_1
C24-304-004	NY Chateaugay 0 Willis Rd Storage	D	0	1133.2	1133.2	148605 WILLWOLD230 230 147846 WILLIS W 230 1 at STE 637 MVA L/O 147845 WILLIS E 230 147846 WILLIS W 230 1
C24-317	Leo Energy Storage	D	0	64	64	130825 LYONS115 115 147935 SARANAC 115 1 at STE 143 MVA L/O 130784 CHATP115 115 147856 WILL 115 115 1
C24-318	Sherburne Storage	E	0	232.1	232.1	130779 C.LIN115 115 130796 E.NOR115 115 1 at Norm 179 MVA L/O Base Case
C24-321	Jericho Solar	D	0	508.3	508.3	130825 LYONS115 115 147935 SARANAC 115 1 at STE 143 MVA L/O P1_C24_321_SE_4
C24-324	Overlook Storage	G	0	200.5	200.5	125054 TODD HIL 115 125026 FISHKILL 115 1 at STE 304 MVA L/O P1_C24_324_SE_3
C24-326	Lockport Storage	A	0	-2512.6	-2512.6	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O 130755 OAKDL345 345 818200 C24_182_POI 345 1
C24-336	Mill Point Solar II	E	0	2006.1	2006.1	145315 Q1031_POI 345 137453 N.SCOT99 345 1 at STE 2075 MVA L/O CE02:L/O MARCY-N.SCOT99 345 18_1
C24-337	Aria Storage 1	H	0	3097	3097	146766 LOVET138 138 146774 BOW138 138 1 at STE 317 MVA L/O 126261 BOWLINE2 345 126290 LADENTWN 345 1
C24-338	Aria Storage 2	H	0	3097	3097	146766 LOVET138 138 146774 BOW138 138 1 at STE 317 MVA L/O 126261 BOWLINE2 345 126290 LADENTWN 345 1
C24-341	Marlboro Storage	G	0	171.9	171.9	125037 MARLBORO 115 125081 DANSK-M 115 1 at STE 237 MVA L/O P1_C24_341_SE_4
C24-352	Swiss Valley Energy Storage	C	0	-1541.1	-1541.1	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O 130755 OAKDL345 345 818200 C24_182_POI 345 1
C24-358	Sugar Loaf Energy Storage I	G	0	156.9	156.9	146773 SGRLF138 138 146873 STFORESTAP 138 1 at STE 317 MVA L/O Sugarloaf-Ramapo P1.2
C24-362	Amsterdam Solar	E	0	2238	2238	137497 CURRY RD 115 137535 RUTHTP8 115 1 at STE 145 MVA L/O LN:345:ROT PTN
C24-363	Town Line Solar CSR Phase I	E	0	2122.1	2122.1	812500 C24-125_POI 345 130750 COOPC345 345 1 at STE 2258 MVA L/O P1_C24_363_SE_345_2
C24-364	Erie Canal BESS	A	0	-60.8	-60.8	131611 HARIS115 115 130815 HINMN115 115 1 at STE 286 MVA L/O LN:230:64 NY
C24-366	Azalea Wind 1	C	0	-1186.5	-1186.5	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O P1_C24_182_SE_345_1
C24-370	Azalea Wind 2	C	0	-1186.5	-1186.5	130836 N.WAV115 115 131018 LOUNS115 115 1 at STE 145 MVA L/O P1_C24_182_SE_345_1

Discussions

ROS and LHV Byway Capacity Deliverability Assessment Results:

1. The ROS and LHV Byway test results show that the following C24 CRIS Projects have bottled generation:

    - C24-052-001 Hemlock Hollow Wind
    - C24-060 Gemma Energy Storage
    - C24-066 Coral Energy Storage
    - C24-074 Lighthouse Energy Storage
    - C24-097 Basecamp BESS
    - C24-175 Stargazer I
    - C24-176 Stargazer II
    - C24-182 Southern Tier Energy Center
    - C24-207 Trelina Energy Storage
    - C24-224 Cohocton
    - C24-225 Goldenrod Wind
    - C24-229 Buttercup Wind
    - C24-230 Dewdrop Wind
    - C24-233 Shallow Seam BESS
    - C24-238 Zenobe Burns LLC
    - C24-253 Troy Heights Energy Storage
    - C24-270 Bassett Energy Storage
    - C24-300 Kimberlite Solar
    - C24-301 Moonlight Flats Solar
    - C24-326 Lockport Storage
    - C24-352 Swiss Valley Energy Storage
    - C24-364 Erie Canal BESS

- C24-366 Azalea Wind 1
- C24-370 Azalea Wind 2

2. NYSEG has firm local transmission plans to rebuild Meyer - S. Perry 115 kV, C24-224 POI - Bath 115 kV, Q777 POI - Sta. 82 115 kV, Q617 POI - Montour Falls 115 kV and N. Waverly - Chemung - Hillside 115 kV circuits. After applying NYSEG's firm local plans, the Byway results indicate above mentioned C24 ROS projects still did not pass the ROS byway tests.
3. The rest of the C24 CRIS Projects located in the ROS and LHV Capacity Regions passed the ROS and LHV Byway tests.

Conclusion – ROS and LHV Byway Capacity Deliverability Assessment

Bottled capacity was identified for 24 C24 CRIS Projects in the ROS capacity region in Byway Capacity Deliverability Assessment. The remaining C24 CRIS Projects in ROS and LHV Capacity Regions passed the Byway Capacity Deliverability Assessment.

Proposed ROS Byway SDU Solutions

Based on the results as seen from Table 21, ROS Byway SDUs are required for C24 ROS CRIS projects to pass ROS Byway Capacity Deliverability Assessments.

Table 22 summarizes the proposed SDU solutions for ROS Byway Assessments.

Table 22: ROS Byway SDU Solutions

	C24 ROS Byway SDUs for Deliverability Assessment
8	Stagecoach - S. Owego 115 kV ckt 1 Rebuild
9	Harrison Radiator - Hinman Rd 115 kV ckt 1 Rebuild
10	Sta. 162 - Sta. 158 115 kV ckt 1 Rebuild
11	Robinson Rd - Allegheny Ludlum Tap 115 kV ckt 1 Rebuild
12	Allegheny Ludlum Tap - Harrison Radiator 115 kV ckt 1 Rebuild
13	Hinman Rd - Lockport 115 kV ckt 1 Rebuild
14	Lounsberry - Stagecoach 115 kV ckt 1 Rebuild
15	Moraine Rd - Meyer 115 kV ckt 1 Rebuild
16	N. Waverly - Lounsberry 115 kV ckt 1 Rebuild

Table 23 shows the ROS Byway results after applying the above mentioned ROS Byway SDU solutions. The results now indicate that the following C24 CRIS Projects in the ROS Capacity Region pass the ROS Byway test:

- C24-052-001 Hemlock Hollow Wind
- C24-060 Gemma Energy Storage
- C24-066 Coral Energy Storage
- C24-074 Lighthouse Energy Storage
- C24-097 Basecamp BESS
- C24-175 Stargazer I
- C24-176 Stargazer II
- C24-182 Southern Tier Energy Center
- C24-207 Trelina Energy Storage
- C24-224 Cohocton
- C24-225 Goldenrod Wind
- C24-229 Buttercup Wind
- C24-230 Dewdrop Wind
- C24-233 Shallow Seam BESS
- C24-238 Zenobe Burns LLC
- C24-253 Troy Heights Energy Storage
- C24-270 Bassett Energy Storage
- C24-300 Kimberlite Solar
- C24-301 Moonlight Flats Solar
- C24-326 Lockport Storage
- C24-352 Swiss Valley Energy Storage
- C24-364 Erie Canal BESS
- C24-366 Azalea Wind 1
- C24-370 Azalea Wind 2

Table 23: ROS Byway Capacity Deliverability Assessment Results with ROS Byway SDUs

Queue	PROJECT	ZONE	Net Available at POI (MW)	CPA-D FCITC (MW)	Additional Transmission Capacity (+) or Bottled Generation (-)	Constraint
C24-052-001	Hemlock Hollow Wind	A	0	80.5	80.5	805201 C24_052_POI 115 135282 HOMERHIL 115 1 at STE 108 MVA L/O LN_966_MEYER_HOR
C24-060	Gemma Energy Storage	C	0	57.5	57.5	149010 STA 162 115 149045 STA 158S 115 1 at STE 175 MVA L/O LN:230:67 NY
C24-066	Coral Energy Storage	C	0	64.3	64.3	130860 YAWGER 115 130813 HICK 115 115 1 at STE 147 MVA L/O LN_963_Montr_ELM
C24-074	Lighthouse Energy Storage	A	0	265.1	265.1	130815 HINMN115 115 135452 LOCKPORT 115 1 at STE 309 MVA L/O LN:230:64 NY
C24-097	Basecamp BESS	A	0	43.2	43.2	146710 ARKWRIGHT 115 135274 EDNK-161 115 1 at STE 108 MVA L/O 135265 BNNT-162 115 135275 EDNK-162 115 1
C24-175	Stargazer I	A	0	101.7	101.7	130756 STOLE345 345 130857 STOLE115 115 0 at STE 350 MVA L/O TB:345-115:ST1
C24-176	Stargazer II	A	0	101.7	101.7	130756 STOLE345 345 130857 STOLE115 115 0 at STE 350 MVA L/O TB:345-115:ST1
C24-182	Southern Tier Energy Center	C	0	187.5	187.5	130768 WATRC230 230 130772 SHRED230 230 1 at STE 440 MVA L/O 130755 OAKDL 345 818200 C24_182_POI 345 1
C24-207	Trelina Energy Storage	C	0	67.9	67.9	135096 Q720-POI 115 130776 BORDR115 115 1 at STE 193 MVA L/O LN_TR08-1_S168_GEN
C24-224	Cohocton	C	0	45	45	149010 STA 162 115 149045 STA 158S 115 1 at STE 175 MVA L/O LN:230:67 NY
C24-225	Goldenrod Wind	A	0	51.9	51.9	146710 ARKWRIGHT 115 135274 EDNK-161 115 1 at STE 108 MVA L/O 135265 BNNT-162 115 135275 EDNK-162 115 1
C24-229	Buttercup Wind	A	0	189.6	189.6	146710 ARKWRIGHT 115 135274 EDNK-161 115 1 at STE 108 MVA L/O 135265 BNNT-162 115 135275 EDNK-162 115 1
C24-230	Dewdrop Wind	A	0	252.8	252.8	823099 C24_230_POI 230 135250 DUNKIRK 230 1 at STE 368 MVA L/O LN:345:37FM-PB
C24-233	Shallow Seam BESS	C	55.9	163.3	107.4	130756 STOLE345 345 130857 STOLE115 115 1 at STE 350 MVA L/O TB:345-115:ST2
C24-238	Zenobe Burns LLC	C	13	30.7	17.7	149010 STA 162 115 149045 STA 158S 115 1 at STE 175 MVA L/O LN:230:67 NY
C24-253	Troy Heights Energy Storage	C	0	35.4	35.4	131412 CODNGTN2 34.5 130787 CODNT115 115 1 at Norm 58 MVA L/O Base Case
C24-270	Bassett Energy Storage	C	0	43.8	43.8	149010 STA 162 115 149045 STA 158S 115 1 at STE 175 MVA L/O STOLLRD - SHLDON 230 67
C24-300	Kimberlite Solar	C	55.9	163.3	107.4	130756 STOLE345 345 130857 STOLE115 115 1 at STE 350 MVA L/O TB:345-115:ST2
C24-301	Moonlight Flats Solar	C	0	171.6	171.6	149010 STA 162 115 149045 STA 158S 115 1 at STE 175 MVA L/O LN:230:67 NY
C24-326	Lockport Storage	A	0	27.7	27.7	130815 HINMN115 115 135452 LOCKPORT 115 1 at Norm 227 MVA L/O Base Case
C24-352	Swiss Valley Energy Storage	C	0	35.2	35.2	149010 STA 162 115 149045 STA 158S 115 1 at STE 175 MVA L/O LN:230:67 NY

Queue	PROJECT	ZONE	Net Available at POI (MW)	CPA-D FCITC (MW)	Additional Transmission Capacity (+) or Bottled Generation (-)	Constraint
C24-364	Erie Canal BESS	A	0	8.8	8.8	130815 HINMN115 115 135452 LOCKPORT 115 1 at Norm 227 MVA L/O Base Case
C24-366	Azalea Wind 1	C	0	100.6	100.6	149010 STA 162 115 149045 STA 158S 115 1 at STE 175 MVA L/O LN:230:67 NY
C24-370	Azalea Wind 2	C	0	100.6	100.6	149010 STA 162 115 149045 STA 158S 115 1 at STE 175 MVA L/O LN:230:67 NY

3.5 ROS Byway SDU Cost Allocation

The preliminary cost allocation for C24 CRIS Projects whose impact on deliverability degradation is discussed in this section. In this report, the NYISO presents the planning level least-cost solution for full deliverability of C24 CRIS Projects in ROS Capacity Region.

ROS Byway SDUs Cost Allocation% for ROS Byway Capacity Deliverability Assessments

Table 24 and table 25 provide each project's cost allocation for SDUs to fix issues identified in ROS Byway Capacity Deliverability Assessment per each project's contribution. Individual project impact was calculated for cost allocation of C24 ROS CRIS Projects to each limiting element identified in ROS Byway Capacity Deliverability Assessment.

Table 24: ROS Byway SDUs (8)-(12) - Allocation Percentage

Project	CRIS MW	SDU (8)		SDU (9)		SDU (10)		SDU (11)		SDU (12)	
		Impact	% Allocation	Impact	% Allocation	Impact	% Allocation	Impact	% Allocation	Impact	% Allocation
C24-060	200	15.2	**9.05%**	6.3	**2.18%**	15.4	**13.66%**	8.6	**2.64%**	8.6	**2.64%**
C24-066	100	10.3	**6.12%**	N/A	N/A	5.2	**4.64%**	2.9	**0.90%**	2.9	**0.90%**
C24-074	250	10.3	**6.12%**	10.5	**3.61%**	N/A	N/A	13.3	**4.10%**	13.3	**4.10%**
C24-097	170	7.4	**4.42%**	6.0	**2.06%**	N/A	N/A	7.9	**2.43%**	7.9	**2.43%**
C24-175	325	11.2	**6.66%**	3.9	**1.34%**	2.1	**1.89%**	5.8	**1.79%**	5.8	**1.79%**
C24-176	325	11.2	**6.66%**	3.9	**1.34%**	2.1	**1.89%**	5.8	**1.79%**	5.8	**1.79%**
C24-182	200	13.5	**8.08%**	N/A	N/A	4.0	**3.58%**	3.3	**1.02%**	3.3	**1.02%**
C24-207	120	2.7	**1.60%**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C24-224	130	7.5	**4.46%**	2.9	**1.01%**	10.8	**9.54%**	4.2	**1.28%**	4.2	**1.28%**
C24-233	400	30.8	**18.38%**	7.7	**2.66%**	8.0	**7.06%**	12.3	**3.77%**	12.3	**3.77%**
C24-238	100	5.8	**3.48%**	3.6	**1.26%**	15.3	**13.50%**	4.8	**1.47%**	4.8	**1.47%**
C24-270	79.9	5.1	**3.05%**	2.3	**0.81%**	8.7	**7.73%**	3.3	**1.00%**	3.3	**1.00%**
C24-300	175	4.7	**2.82%**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C24-301	250	6.8	**4.05%**	N/A	N/A	2.0	**1.77%**	2.5	**0.78%**	2.5	**0.78%**
C24-326	180	5.1	**3.06%**	67.5	**23.34%**	N/A	N/A	69.6	**21.41%**	69.6	**21.41%**
C24-352	300	13.9	**8.32%**	29.7	**10.25%**	39.3	**34.74%**	33.1	**10.18%**	33.1	**10.18%**

Project	CRIS MW	SDU (8)		SDU (9)		SDU (10)		SDU (11)		SDU (12)	
		Impact	% Allocation	Impact	% Allocation	Impact	% Allocation	Impact	% Allocation	Impact	% Allocation
C24-364	230	6.1	**3.66%**	145.1	**50.15%**	N/A	N/A	147.7	**45.44%**	147.7	**45.44%**
			100%		100%		100%		100%		100%

(8) 130848 S.OWE115 115 131850 STAGECOA 115 1

(9) 130815 HINMN115 115 131611 HARIS115 115 1

(10) 149010 STA 162 115 149045 STA 158S 115 1

(11) 130846 ROBIN115 115 130853 A.LUD TP 115 1

(12) 130853 A.LUD TP 115 131611 HARIS115 115 1

Table 25: ROS Byway SDUs (13)-(16) - Allocation Percentage

Project	CRIS MW	SDU (13)		SDU (14)		SDU (15)		SDU (16)	
		Impact	% Allocation	Impact	% Allocation	Impact	% Allocation	Impact	% Allocation
C24-052-001	95	N/A	N/A	N/A	N/A	N/A	N/A	0.9*	N/A
C24-060	200	6.5	**2.19%**	15.2	**9.05%**	N/A	N/A	15.2	**9.05%**
C24-066	100	N/A	N/A	10.3	**6.12%**	N/A	N/A	10.3	**6.12%**
C24-074	250	10.8	**3.62%**	10.3	**6.12%**	4.5	**2.00%**	10.3	**6.12%**
C24-097	170	6.1	**2.06%**	7.4	**4.42%**	7.0	**3.12%**	7.4	**4.42%**
C24-175	325	4.0	**1.35%**	11.2	**6.66%**	5.6	**2.49%**	11.2	**6.66%**
C24-176	325	4.0	**1.35%**	11.2	**6.66%**	5.6	**2.49%**	11.2	**6.66%**
C24-182	200	N/A	N/A	13.5	**8.08%**	N/A	N/A	13.5	**8.08%**
C24-207	120	N/A	N/A	2.7	**1.60%**	N/A	N/A	2.7	**1.60%**
C24-224	130	3.0	**1.01%**	7.5	**4.46%**	70.0	**31.18%**	7.5	**4.46%**
C24-225	39	N/A	N/A	N/A	N/A	N/A	N/A	0.3*	N/A
C24-229	49.9	N/A	N/A	N/A	N/A	N/A	N/A	0.4*	N/A
C24-230	62	N/A	N/A	N/A	N/A	N/A	N/A	0.5*	N/A
C24-233	400	8.0	**2.68%**	30.8	**18.38%**	5.9	**2.61%**	30.8	**18.38%**
C24-238	100	3.7	**1.26%**	5.8	**3.48%**	75.3	**33.56%**	5.8	**3.48%**
C24-253	40	N/A	N/A	N/A	N/A	N/A	N/A	0.8*	N/A
C24-270	79.9	2.4	**0.81%**	5.1	**3.05%**	50.6	**22.55%**	5.1	**3.05%**
C24-300	175	N/A	N/A	4.7	**2.82%**	N/A	N/A	4.7	**2.82%**
C24-301	250	N/A	N/A	6.8	**4.05%**	N/A	N/A	6.8	**4.05%**
C24-326	180	69.2	**23.31%**	5.1	**3.06%**	N/A	N/A	5.1	**3.06%**
C24-352	300	30.4	**10.25%**	13.9	**8.32%**	N/A	N/A	13.9	**8.32%**
C24-364	230	148.8	**50.11%**	6.1	**3.66%**	N/A	N/A	6.1	**3.66%**
C24-366	50	N/A	N/A	N/A	N/A	N/A	N/A	0.5*	N/A
C24-370	50	N/A	N/A	N/A	N/A	N/A	N/A	0.5*	N/A
			100%		100%		100%		100%

Note: *These projects are bottled while having smaller impacts on the limiting element.

(13) 130815 HINMN115 115 135452 LOCKPORT 115 1

(14) 131018 LOUNS115 115 131850 STAGECOA 115 1

(15) 130826 MEYER115 115 130831 MORAI115 115 1

(16) 130836 N.WAV115 115 131018 LOUNS115 115 1

The high-level non-binding estimated cost for the following ROS Byway SDUs are**:**

8. Stagecoach - S. Owego 115 kV ckt 1 Rebuild: **$5,299,000 (±50%)**
9. Harrison Radiator - Hinman Rd 115 kV ckt 1 Rebuild: **$1,996,000 (±50%)**
10. Sta. 162 - Sta. 158 115 kV ckt 1 Rebuild: **$6,983,049 (±50%)**
11. Robinson Rd - Allegheny Ludlum Tap 115 kV ckt 1 Rebuild: **$2,369,000 (±50%)**
12. Allegheny Ludlum Tap - Harrison Radiator 115 kV ckt 1 Rebuild: **$1,781,000 (±50%)**
13. Hinman Rd - Lockport 115 kV ckt 1 Rebuild: **$2,462,000 (±50%)**
14. Lounsberry - Stagecoach 115 kV ckt 1 Rebuild: **$5,885,000 (±50%)**
15. Moraine Rd - Meyer 115 kV ckt 1 Rebuild: **$8,839,373 (±50%)**
16. N. Waverly - Lounsberry 115 kV ckt 1 Rebuild: **$9,766,000 (±50%)**

These ROS Byway SDUs are "new" (*i.e.*, not previously identified and cost allocated in a prior Class Year Study and not substantially similar to a System Deliverability Upgrade previously identified and cost allocated in a Class Year Study) and therefore require an Additional SDU Study per Section 40.14 of Attachment HH if any of the projects listed above elect to move forward with such Additional SDU Study. Further physical feasibility of these SDUs will be confirmed in the Additional SDU studies if the projects indicated above decide to move forward with the Additional SDU studies.

3.6 Other Interface Transfer Capability "No Harm" Assessment

The Other Interfaces "No Harm" test determines the impact of the C24 CRIS Projects on the transfer capability as follows:

- Among the Capacity Regions (by evaluating and comparing the following three interfaces):
  - ROS to LHV (UPNY-SENY);
  - LHV to J;
  - LHV to K; and
- From external areas into NYCA (by evaluating and comparing the following four interfaces):
  - PJM to NYCA;
  - NE to NYCA;

- HQ to NYCA; and
- the Norwalk Harbor to Northport Cable – NNC.

The transfer capabilities between external areas and NYCA were evaluated for import constraints into NYCA. These transfer simulations were evaluated individually and represent non-simultaneous transfer capabilities. All external area transfer simulations assumed the PARs between Ontario and Michigan are holding scheduled flow.

The interface transfer limit between a specific external area and applicable NYCA Capacity Region(s) is a measure of the ability of the transmission system to move capacity from that external area into the applicable NYCA Capacity Region; that is, how much power may be moved between the external area and a NYCA Capacity Region. The power transfer between the external area and NYCA could represent firm capacity and energy, non-firm energy, or emergency assistance in various combinations.

Each external interface was evaluated independently, and the calculated transfer limits were non-simultaneous. Therefore, the individual transfer limits should not be interpreted as an indication that sufficient capacity resources are available within that external area to support that level of power transfer at all times.

When simulating the import transfer into NYCA from an external area, all generation in the importing region was uniformly scaled down in proportion to the ratio of each generator's Pmax to the sum of the Pmax of all generators in the importing area.

The result of Other Interface "No Harm" test is summarized in Table 26.

Table 26: Other Interface Transfer Capability "No Harm" Results

Interface	Source	Sink	CBA-D Transfer Limit	Constraint	CPA-D Transfer Limit	Constraint	2% of CBA Transfer Limit	(CPA-D) Minus (CBA-D)
UPNY-SENY	ROS	LHV	8952	(1)	8275	(2)	179	-677
LHV to J	GHI	NYC	4140	(3)	4138*	(3)	83	-2
LHV to K	GHI	K	1101	(4)	1101*	(4)	22	0
PJM to NYISO	PJM-Classic	A – G 90% I – J 10%	1437	(5)	988	(5)	29	-449
ISO-NE to NYISO	NE_SOUTH 50% NE_NORTH 50%	Capital (F) 35% NYC (J) 65%	1807	(7)	1790	(7)	36	-17
HQ to NYISO (MSC-7040)	Hydro-Quebec	NYCA	1500	(8)	1500	(8)	30	0
NNC	New England	NYCA	459	(9)	459	(9)	9	0

*Applicable system adjustments were applied

Notes:

(1)	137451 LEEDS 3 345 128541 VAN_WAGNER 345 2	@ STE	1724	701801 KNICK_SCAP_1 345 701802 KNICK_SCAP_2 345 SC
(2)	130750 COOPC345 345 148995 DOLSON_AVE 345 2	@ STE	1793	P1_C24_363_SE_345_2
(3)	126600 REAC71 345 126641 MOTT HAVEN 345 3	@ Norm	785	Base Case
(4)	126266 DUNWOODIE 345 128835 SHORE RD 345 1	@ Norm	690	Base Case
(5)	200676 26E.SAYRE 115 130836 N.WAV115 115 1	@ Norm	227	Base Case
(7)	115005 NE_E205W_NY 230 137562 EASTOVER RD 230 1	@ STE	560	ALPSBERK393
(8)	INTERF:HQ-7040-NY	@ Norm	1500	Base Case
(9)	121408 NE_601_NY 138 129343 NRTHPT P 138 1	@ Norm	155	Base Case

Discussion

De Minimus Transfer Limit Degradation for Other Interface Facilities

Per Section 40.13.9.1 of Attachment HH, the C24 CRIS Projects whether or not they are otherwise deliverable across Highways and Byways, will not be considered deliverable if their aggregate impact degrades the transfer capability of any Other Interface more than the lesser of 25 MW or 2 percent of the transfer capability of the Other Interface identified in the CBA.

Internal:

1. UPNY-SENY transfer limit decreased by 677 MW as constrained by Leeds – Van Wagner 345 kV ckt 2 for loss of Knickerbocker - Pleasant Valley 345kV line Y57. As a result, C24 CRIS Projects did not pass the Other Interface "No Harm" test for UPNY SENY Interface.
2. LHV to J transfer limit decreased by 2 MW as constrained by pre-contingency loading Dunwoodie Series Reactor 71 – Mott Haven 345 kV ckt 3 with applicable system adjustments applied. The degradation of the LHV to J transfer limit is within the *de minimus* 25 MW. As a result, C24 CRIS Projects pass the Other Interface "No Harm" test for LHV to J Interface.
3. LHV to K transfer limit remained unchanged as constrained by pre-contingency loading on the Dunwoodie - Shore Road 345 kV line with applicable system adjustments applied. As a result, C24 CRIS Projects pass the Other Interface "No Harm" test for LHV to K Interface.

External:

4. The transfer limit from PJM into NYISO decreased by 449 MW. The binding constraint is the pre-contingency loading on East Sayre – North Waverly 115 kV line. As a result, C24 CRIS Projects did not pass the Other Interface "No Harm" test for PJM to NYISO Interface.
5. The transfer limit from ISO-NE into NYISO decreased by 17 MW. The binding constraint is the post-contingency loading on Bear Swamp (NE_E205W_NY) - Eastover Road 230 kV line for loss of Alps - Berkshire 345kV line 393. The degradation of the ISO-NE transfer limit is within the

de minimus 25 MW. As a result, C24 CRIS Projects pass the Other Interface "No Harm" test for ISO-NE to NYISO Interface.

6. The transfer limit for Hydro Quebec to NYCA remained unchanged. As a result, C24 CRIS Projects pass the Other Interface "No Harm" test for Hydro Quebec to NYCA Interface.

7. The transfer limit through NNC remained unchanged. The binding constraint is the pre-contingency loading on Northport – Norwalk Harbor 138 kV line 601. As a result, C24 CRIS Projects pass the Other Interface "No Harm" test for NNC Interface.

Conclusion – Other Interface Transfer Capability "No Harm" Results

No C24 CRIS Projects passed the Other Interface "No Harm" test for UPNY-SENY, and PJM to NY interfaces. C24 CRIS Projects did, however, pass the Other Interface "No Harm" test for LHV to J, LHV to K, ISO-NE to NY, Hydro Quebec to NY, and NNC interfaces.

Proposed Other Interface SDU Solutions

Based on the results as seen from Table 27, Other Interface SDUs are required for C24 CRIS projects to pass UPNY-SENY, and PJM to NY interfaces.

Table 27 summarizes the proposed SDU solutions for UPNY-SENY, and PJM to NY interfaces.

Table 27: Other Interface SDU Solutions

C24 Other Interface SDUs for Deliverability Assessment	
17	Coopers Corners - Dolson Ave. 345 kV ckt 2 Terminal Upgrades (UPNY-SENY Interface)
18	Add a 115 kV Series Reactor of 8% to Line 956 at North Waverly (PJM-NY Interface)
19	Laurel Lake – Oakdale 115 kV line Rebuild (PJM-NY Interface)

Table 28 presents the Other Interface "No Harm" Test on UPNY-SENY, and PJM to NY interface for C24 CRIS Projects with proposed SDUs for full deliverability.

Table 28: Other Interface "No Harm" Test with SDU Solutions – UPNY-SENY and PJM to NY

Interface	Source	Sink	CBA-D Transfer Limit	Constraint	CPA-D Transfer Limit	Constraint	2% of CBA Transfer Limit	(CPA-D) Minus (CBA-D)
UPNY-SENY	ROS	LHV	8951.8	(1)	8990.8	(1)	179	39
PJM to NYISO	PJM-Classic	A – G 90% I – J 10%	1437	(5)	1430	(10)	29	-7

(1)	137451 LEEDS 3 345 128541 VAN_WAGNER 345 2	@ STE	1724	701801 KNICK_SCAP_1 345 701802 KNICK_SCAP_2 345 SC
(5)	200676 26E.SAYRE 115 130836 N.WAV115 115 1	@ Norm	227	Base Case
(10)	200680 26LAUREL L 115 130838 OAKDL115 115 1	@ Norm	111	Base Case

3.7 Other Interface SDU Cost Allocation

The preliminary cost allocation for C24 CRIS Projects whose impact on deliverability degradation is discussed in this section. In this report, the NYISO presents the planning level least-cost solution for full deliverability of C24 CRIS Projects.

Other Interface SDUs Cost Allocation% for UPNY-SENY and PJM to NY

Table 29 provides each project's cost allocation for SDUs to fix issues identified in Other Interface "No Harm" test per each project's contribution. Individual project impact was calculated for cost allocation of C24 CRIS Projects to each limiting element identified in Other Interface "No Harm" test.

Table 29: Other Interface SDUs for UPNY-SENY and PJM to NY - Allocation Percentage

Project	CRIS MW	SDU (17)		SDU (18)		SDU (19)	
		Impact	% Allocation	Impact	% Allocation	Impact	% Allocation
C24-032	150	6.6	**2.91%**	N/A	N/A	N/A	N/A
C24-047	150	11.9	**5.23%**	N/A	N/A	N/A	N/A
C24-048	200	6.3	**2.78%**	N/A	N/A	N/A	N/A
C24-060	200	7.3	**3.23%**	N/A	N/A	N/A	N/A
C24-064	135	8.3	**3.63%**	N/A	N/A	N/A	N/A
C24-066	100	3.7	**1.63%**	N/A	N/A	N/A	N/A
C24-072	100	2.4	**1.05%**	N/A	N/A	N/A	N/A
C24-074	250	7.2	**3.18%**	11.6	**8.10%**	6.6	**9.52%**
C24-093	100	12.5	**5.50%**	N/A	N/A	N/A	N/A
C24-094	150	18.8	**8.27%**	N/A	N/A	N/A	N/A
C24-097	170	5.0	**2.20%**	8.4	**5.89%**	4.8	**6.85%**
C24-125	60	5.3	**2.34%**	N/A	N/A	N/A	N/A
C24-129	100	2.6	**1.16%**	2.3	**1.59%**	N/A	N/A
C24-139	150	2.1	**0.94%**	N/A	N/A	N/A	N/A
C24-148	300	4.1	**1.80%**	N/A	N/A	N/A	N/A
C24-173	100	10.5	**4.62%**	N/A	N/A	N/A	N/A
C24-175	325	5.6	**2.48%**	18.5	**12.96%**	8.9	**12.83%**
C24-176	325	5.6	**2.48%**	18.5	**12.96%**	8.9	**12.83%**
C24-182	200	8.7	**3.83%**	N/A	N/A	N/A	N/A
C24-207	120	3.1	**1.38%**	N/A	N/A	N/A	N/A
C24-224	130	3.7	**1.63%**	N/A	N/A	N/A	N/A
C24-233	400	14.5	**6.39%**	53.0	**37.04%**	22.4	**32.18%**
C24-238	100	3.2	**1.42%**	N/A	N/A	N/A	N/A
C24-270	79.9	2.6	**1.16%**	N/A	N/A	N/A	N/A
C24-300	175	2.2	**0.98%**	8.1	**5.67%**	3.4	**4.93%**
C24-301	250	3.3	**1.44%**	11.0	**7.67%**	4.0	**5.69%**
C24-304-004	150	2.1	**0.94%**	N/A	N/A	N/A	N/A

Project	CRIS MW	SDU (17)		SDU (18)		SDU (19)	
		Impact	% Allocation	Impact	% Allocation	Impact	% Allocation
C24-326	180	4.8	**2.12%**	3.9	**2.71%**	2.7	**3.81%**
C24-352	300	9.1	**4.00%**	2.9	**2.02%**	4.7	**6.70%**
C24-363	240	37.8	**16.62%**	N/A	N/A	N/A	N/A
C24-364	230	6.1	**2.67%**	4.9	**3.40%**	3.3	**4.67%**
			100.00%		100.00%		100.00%

(17) 130750 COOPC345 345 148995 DOLSON_AVE 345 2

(18) 130836 N.WAV115 115 200676 26E.SAYRE 115 1

(19) 130838 OAKDL115 115 200680 26LAUREL L 115 1

The high-level non-binding estimated cost for the following Other Interface SDUs are:

17. Coopers Corners - Dolson Ave. 345 kV ckt 2 Terminal Upgrades: **$350,000 (±50%)**
18. Add a 115 kV Series Reactor of 8% to Line 956 at North Waverly: **$8,839,373 (±50%)**
19. Laurel Lake – Oakdale 115 kV line Rebuild to 161 MVA Normal Rating: **$12,969,000 (±50%)**

These SDUs are "new" (*i.e.*, not previously identified and cost allocated in a prior Class Year Study and not substantially similar to a System Deliverability Upgrade previously identified and cost allocated in a Class Year Study) and therefore requires an Additional SDU Study per Section 40.14 of Attachment HH if any of the projects listed above elect to move forward with such Additional SDU Study. Further physical feasibility of these SDUs will be confirmed in the Additional SDU studies if the projects indicated above decide to move forward with the Additional SDU studies.

3.8 ROS and LHV Deliverable MW

During the Highway "No Harm", Highway Capacity Deliverability Assessment, Other Interface "No Harm", ROS and LHV Byway Assessment, available deliverable MWs were identified in C24 ROS and LHV CRIS Projects. Table 30 summarizes each C24 ROS and LHV CRIS Project's deliverable CRIS MW.

Table 30: C24 ROS and LHV CRIS Projects – Deliverable MW

Project	CRIS MW	Deliverable MW
C24-032	150	0
C24-042	29.8	29.8
C24-047	150	12.4
C24-048	200	0
C24-052-001	95	0
C24-060	200	0
C24-062	200	200
C24-064	135	0

Project	CRIS MW	Deliverable MW
C24-066	100	0
C24-072	100	0
C24-074	250	0
C24-079	162	51
C24-085	150	150
C24-088	100	100
C24-093	100	8.3
C24-094	150	12.4
C24-097	170	0
C24-098	150	150
C24-108	200	31.7
C24-111	100	100
C24-125	60	0
C24-129	100	0
C24-130	120	120
C24-135	60	18.9
C24-139	150	0
C24-148	300	24.9
C24-163	50	50
C24-165	250	250
C24-173	100	8.3
C24-175	325	0
C24-176	325	0
C24-182	200	0
C24-189	380	60.4
C24-190	380	60.4
C24-202	170	19.9
C24-205	200	200
C24-207	120	0
C24-217	150	23.8
C24-224	130	0
C24-225	39	0
C24-229	49.9	0
C24-230	62	0
C24-233	400	0
C24-238	100	0
C24-253	40	0
C24-270	79.9	0
C24-293	24.9	24.9
C24-300	175	0
C24-301	250	0
C24-304-004	150	0

Project	CRIS MW	Deliverable MW
C24-317	75	11.9
C24-318	40	12.6
C24-321	100	15.8
C24-324	199	199
C24-326	180	0
C24-336	100	100
C24-337	100	100
C24-338	150	150
C24-341	100	100
C24-352	300	0
C24-358	300	300
C24-362	150	150
C24-363	240	0
C24-364	230	0
C24-366	50	0
C24-370	50	0
CR24-1003	40	40

3.9 NYC Byway Capacity Deliverability Assessment

The purpose of the NYC Byway Capacity Deliverability Assessment was to identify whether the NYC C24 CRIS projects can deliver power throughout the NYC Capacity Region.

Table 31 shows the FCITC resulting from the NYC Byway Capacity Deliverability Assessment. The NYC Byway transfer limit was evaluated by shifting CRIS generation from the sub-zone where the C24 CRIS Project is interconnected or proposes to interconnect, to the rest of the CRIS generation in NYC Capacity Region.

Table 31: C24 NYC Byway Capacity Deliverability Assessment Results

C24 Project	Exporting zone	Importing zone	C24 CBA-D				C24 CPA-D				Impact *c1-c	Byway Test Conclusion
			C24 CBA-D Net Available Capacity (MW) a	FCITC (Export Limit) (MW) b	Constraint	Additional Transmission Capacity (+) or Bottled Generation Capacity (-) *c = b-a	C24 CPA-D Net Available Capacity (MW) a1	FCITC (Export Limit) (MW) b1	Constraint	Additional Transmission Capacity (+) or Bottled Generation Capacity (-) *c1 = b1-a1		
C24-131, 283, 333, 1004	Case 1: Gowanus, Goethals, Linden, Fresh Kills, Fox Hills	Rest of NYC	772.5	772.5	(1)	0	1059.9	765.9	(1)	-294	-294	Bottled *

C24 Project	Exporting zone	Importing zone	C24 CBA-D				C24 CPA-D				Impact *c1-c	Byway Test Conclusion
			C24 CBA-D Net Available Capacity (MW) a	FCITC (Export Limit) (MW) b	Constraint	Additional Transmission Capacity (+) or Bottled Generation Capacity (-) *c = b-a	C24 CPA-D Net Available Capacity (MW) a1	FCITC (Export Limit) (MW) b1	Constraint	Additional Transmission Capacity (+) or Bottled Generation Capacity (-) *c1 = b1-a1		
C24-021	Case 2: Farragut, BCEH	Rest of NYC	2.0	2.0	(2)	0	3.1	3.1	(3)	0	0	Passed
C24-013, 178, 333	Case 3: Greenwood, Fox Hills	Rest of NYC	188.0	188.0	(4)	0	289.8	289.8	(4)	0	0	Passed
C24-004, 081, 284, 331	Case 6: Astoria East, Corona	Rest of NYC	267.8	267.8	(4)	0	412.8	412.8	(4)	0	0	Passed **
C24-005	Case 11: Mott Haven	Rest of NYC	N/A	N/A	N/A	N/A	0	0	(5)	0	0	Passed
C24-004, 284, 331	Case 14: Astoria East, Corona, Jamaica, Eastern Queens	Rest of NYC	297.5	297.5	(4)	0	458.5	458.5	(4)	0	0	Passed **

Notes:

*C24-333 Pouch Energy Storage System is a same location CRIS transfer.

**The circuit HG 1 138 126448 HG1 TAP 138 1 was observed to have unfixable thermal violations under both base case and post contingency conditions. SDUs will be needed for the subzones to be fully deliverable.

```
(1)   126283 GOTHLS         345  126287 GOWANUS       345  1    at 518 MVA Norm L/O Base Case
(2)   126551 ASTOR T5 TAP   138  126317 38M72 TAP     138  1    at 175 MVA Norm L/O Base Case
(3)   126543 W49 ST 1       138  126551 ASTOR T5 TAP  138  1    at 165 MVA Norm L/O Base Case
(4)   126644 FARRAGUT WES   345  126436 FGT_X10       138  1    at 120 MVA Norm L/O Base Case
(5)   126442 HG  1          138  126448 HG1 TAP       138  1    at 209 MVA Norm L/O Base Case
```

Conclusion – NYC Byway Capacity Deliverability Assessment

Bottled capacity was identified for C24 CRIS Projects in Case 1 subzone in NYC Byway Capacity Deliverability Assessment, Byway SDUs are therefore required for the following C24 CRIS Projects in the NYC Capacity Region to be fully deliverable:

- C24-131 Elevate Arthur Kill II
- C24-283 Resilient New York Energy Storage

- CR24-1004 Arthur Kill Unit 2 Uprate

In addition, unfixable thermal violations were identified for Hellgate 1 to Hellgate 1 Tap 138 kV Circuit 1 under both base case and post contingency conditions, Byway SDUs are therefore required for the following C24 CRIS Projects in the NYC Capacity Region to be fully deliverable:

- C24-004 Palladium Storage
- C24-081 Port Morris Energy Storage
- C24-284 South Bronx Energy Storage

The remaining C24 NYC CRIS Projects in the NYC Capacity Region passed the Byway Capacity Deliverability Assessment.

Proposed NYC Byway SDU Solutions

Based on the results as seen from Table 32, NYC Byway SDUs are required for C24 NYC CRIS projects to pass NYC Byway Capacity Deliverability Assessments.

Table 32 summarizes the proposed SDU solutions for NYC Byway Assessments.

Table 32: NYC Byway SDU Solutions

C24 NYC Byway SDUs for Deliverability Assessment	
20	Hell Gate 1 - Hell Gate 1 Tap 138 kV ckt 1 Rebuild
21	A new PAR-controlled line from Fresh Kills 345 kV substation to BCEH 345 kV substation with two shunt reactors on the Fresh Kills 345 kV substation

Table 33 shows the NYC Byway results after applying the above mentioned NYC Byway SDU solutions.

Table 33: NYC Byway Results with SDUs

C24 Project	Exporting zone	Importing zone	C24 CBA-D				C24 CPA-D with SDUs				Impact *c1-c	Byway Test Conclusion
			C24 CBA-D Net Available Capacity (MW) a	FCITC (Export Limit) (MW) b	Constraint	Additional Transmission Capacity (+) or Bottled Generation Capacity (-) *c = b-a	C24 CPA-D Net Available Capacity (MW) a1	FCITC (Export Limit) (MW) b1	Constraint	Additional Transmission Capacity (+) or Bottled Generation Capacity (-) *c1 = b1-a1		
C24-131, 283, 333, 1004	Case 1: Gowanus, Goethals, Linden, Fresh Kills, Fox Hills	Rest of NYC	772.5	772.5	(1)	0	1059.9	1059.9	(2)	0	0	Passed

```
(1)   126283 GOTHLS        345  126287 GOWANUS       345  1   at 518 MVA Norm L/O Base Case
(2)   126454 KENTTAP       138  126507 VERNON-W      138  1   at 194 MVA Norm L/O Base Case
```

The results in Table 33 show that, for Case 1 sub-zone in NYC, the resulting FCITC is greater or equal to the net available capacity from the interconnecting sub-zones in the CPA-D case. In addition, the thermal violations on Hell Gate 1 - Hell Gate 1 Tap 138 kV ckt 1 will be mitigated with the line rebuild. This indicates that the following C24 CRIS Projects in the NYC Capacity Region pass the NYC Byway tests with the proposed SDU solutions:

- C24-004 Palladium Storage
- C24-081 Port Morris Energy Storage
- C24-131 Elevate Arthur Kill II
- C24-283 Resilient New York Energy Storage
- C24-284 South Bronx Energy Storage
- CR24-1004 Arthur Kill Unit 2 Uprate

3.10 NYC Byway SDU Cost Allocation

The preliminary cost allocation for C24 CRIS Projects whose impact on deliverability degradation is discussed in this section. In this report, the NYISO presents the planning level least-cost solution for full deliverability of C24 CRIS Projects.

NYC Byway SDU Cost Allocation% for Case 1 Subzone

Table 34 provides each project's cost allocation for SDUs to mitigate deliverability issues identified in NYC Byway test per each project's contribution. Individual project impact was calculated for cost allocation of C24 CRIS Projects to each limiting element identified in NYC Byway test.

Table 34: NYC Byway SDUs for Case 1 Subzone - Allocation Percentage

Project	CRIS MW	SDU (20)		SDU (21)	
		Impact	% Allocation	Impact	% Allocation
C24-004	140	128.1	50.2%	N/A	N/A
C24-081	130	35.4	13.9%	N/A	N/A
C24-284	100	91.5	35.9%	N/A	N/A
C24-131	180	N/A	N/A	71.2	33.8%
C24-283	349	N/A	N/A	139.2	66.2%
CR24-1004	12.2	N/A	N/A	1.9*	N/A
			100%		100%

Note:

*CR24-1004 project is bottled while having a much smaller impact on the limiting element.

(20) Hell Gate 1 - Hell Gate 1 Tap 138 kV ckt 1 Rebuild

(21) Installing a new PAR-controlled line from Fresh Kills 345 kV substation to BCEH 345 kV substation with two shunt reactors on the Fresh Kills 345 kV substation

During the NYC Byway Assessment, available deliverable MWs were identified in C24. Table 35 summarizes each C24 NYC CRIS Project's deliverable CRIS MW.

Table 35: NYC Byway Assessment – Deliverable MW

Project	CRIS MW	Deliverable MW
C24-004	140	121.3
C24-005	300	300
C24-013	190	190
C24-021	1310	1310
C24-081	130	124.7
C24-131	180	93.5
C24-178	150	150
C24-283	349	179.9
C24-284	100	86.6
C24-331	90	90
C24-333	47.1	47.1
CR24-1004	12.2	6.2

The high-level non-binding estimated cost for the following NYC Byway SDUs are**:**

(1) Hell Gate 1 - Hell Gate 1 Tap 138 kV ckt 1 Rebuild: **$1,200,000 (±50%)**

(2) Installing a new PAR-controlled 345 kV line between the Fresh Kills 345 kV substation to BCEH 345 kV substation with two shunt reactors on the Fresh Kills 345 kV substation: **$616,626,314 (±50%)**

These SDUs are "new" (*i.e.*, not previously identified and cost allocated in a prior Class Year Study and not substantially similar to a System Deliverability Upgrade previously identified and cost allocated in a Class Year Study) and therefore requires an Additional SDU Study per Section 40.14 of Attachment HH if any of the projects listed above elect to move forward with such Additional SDU Study. Further physical feasibility of these SDUs will be confirmed in the Additional SDU studies if the projects indicated above decide to move forward with the Additional SDU studies.

3.11 LI Byway Capacity Deliverability Assessment

The purpose of the LI Byway Deliverability assessment was to identify whether the LI C24 CRIS Projects can deliver power throughout the LI Capacity Region.

Table 36 shows the FCITC resulting from the LI Byway Capacity Deliverability Assessment. The LI Byway transfer limit was evaluated by shifting CRIS generation from the sub-zone where the C24 CRIS Project is interconnected or proposes to interconnect, to the rest of the CRIS generation in LI Capacity Region.

Table 36: LI Byway Capacity Deliverability Assessment Results

C24 Project	Exporting zone	Importing zone	C24 CBA-D			Constraint	C24 CPA-D			Constraint	Impact *c-c1	Byway Test Conclusion
			C24 CBA-D Net Available Capacity (MW) a1	FCITC (Export Limit) (MW) b1	Additional Transmission Capacity (+) or Bottled Generation Capacity (-) *c1 = b1-a1		C24 CPA-D Net Available Capacity (MW) a	FCITC (Export Limit) (MW) b	Additional Transmission Capacity (+) or Bottled Generation Capacity (-) *c = b-a			
C24-033, 061, 104, 162, 167, 183	Case 1: LI-East	Rest of LI	686.5	686.5	0	(1)	1322.7	884.0	-438.7	(2)	-438.7	Bottled *
C24-008, 010, 138, 154, 281, 1002	Case 2: LI-Central	Rest of LI	639.1	639.1	0	(3)	1231.4	1231.4	0	(4)	0	Passed
C24-003	Case 3: LI-West	Rest of LI	278.4	278.4	0	(5)	536.4	536.4	0	(6)	0	Passed

Note:

*Unfixable overloading issue identified on 129811 HOLTSVIL 69.0 129848 W.YAPANK 69.0 1 post contingency condition in LI-East
*Unfixable overloading issue identified on 129717 BAYPORT 69.0 129737 GRT RVER 69.0 1 post contingency condition in LI-East

```
(1)   129457 SHM DC        138  128880 SHMHVDCL      192  1   at    353    MVA    Norm       Base Case
(2)   129361 RULND RD      138  129421 HOLBROOK      138  1   at    493    MVA    STE        L/O 138-881
(3)   129344 NRTHPT1       138  129355 PILGRIM       138  3   at    192    MVA    Norm       Base Case
(4)   129680 INDIANHD     69.0  815406 C24-154_POI  69.0  1   at    106    MVA    Norm       Base Case
(5)   129920 MAPLEAV      34.5  129977 OCEAN4T2     34.5  1   at     20    MVA    Norm       Base Case
(6)   129793 SOUTH MANOR  69.0  129817 MORICHES     69.0  1   at     77    MVA    Norm       Base Case
```

The results as seen from Table 36, bottled generation in LI-East was observed. Byway SDUs are therefore required for the following C24 CRIS Projects in the LI Capacity Region to be fully deliverable:

- C24-033 KCE NY 31
- C24-061 Daphne Energy Storage

- C24-104 Horseblock Energy Storage
- C24-162 Ramadi Utility Storage
- C24-167 KCE NY 37
- C24-183 East Setauket Storage II

Table 37 summarizes the proposed SDU solutions.

Table 37: C24 LI Byway SDU Solutions for Deliverability Assessment

C24 LI Byway SDUs for Deliverability Assessment	
22	A PAR (392/520/600) MVA plus UG circuit 138 kV (2 cables per phase) between Pilgrim - West Bus 138 kV, with Holbrook - Q971 POI 138 kV & Medford – Holbrook 69 kV Rebuild
23	Bayport – Great River 69 kV Rebuild to Underground Cable
24	W. Yaphank - Holtsville 69 kV Rebuild

Table 38 presents the analysis for C24 LI CRIS Projects with proposed SDUs for full deliverability.

Table 38: LI Byway Capacity Deliverability Assessment Results plus all C24 LI Byway SDUs

C24 Project	Exporting zone	Importing zone	C24 CBA-D			Constraint	C24 CPA-D with Byway SDUs Deliverability Assessment			Constraint	Impact *c-c1	Byway Test Conclusion
			C24 CBA-D Net Available Capacity (MW) a1	FCITC (Export Limit) (MW) b1	Additional Transmission Capacity (+) or Bottled Generation Capacity (-) *c1 = b1-a1		C24 CPA-D Net Available Capacity (MW) a	FCITC (Export Limit) (MW) b	Additional Transmission Capacity (+) or Bottled Generation Capacity (-) *c = b-a			
C24-033, 061, 104, 162, 167, 183	Case 1: LI-East	Rest of LI	686.5	686.5	0	(1)	1322.7	1322.7	0	(2)	0	Passed

(1) 129457 SHM DC 138 128880 SHMHVDCL 192 1 at 353 MVA Norm Base Case

(2) 129720 BOHEMIA 69.0 129807 HOLBRK2 69.0 1 at 106 MVA Norm Base Case

The results in Table 38 show that, for LI-East sub-zone in LI, the resulting FCITC is greater or equal to the net available capacity from the interconnecting sub-zones in the CPA-D case. This indicates that the following C24 CRIS Projects in the LI Capacity Region pass the LI Byway tests with the proposed SDU solutions:

- C24-033 KCE NY 31
- C24-061 Daphne Energy Storage
- C24-104 Horseblock Energy Storage

- C24-162 Ramadi Utility Storage
- C24-167 KCE NY 37
- C24-183 East Setauket Storage II

3.12 LI Byway SDU Cost Allocation

The preliminary cost allocation for C24 LI CRIS Projects whose impact on deliverability degradation is discussed in this section. In this report, the NYISO presents the planning level least-cost solution for full deliverability of C24 CRIS Projects in LI Capacity Region.

LI Byway SDUs Cost Allocation% for LI East

Table 39 provides each project's cost allocation for SDUs to mitigate deliverability issues identified in capacity deliverability assessment per each project's contribution. Individual project impact was calculated for cost allocation of C24 LI CRIS Projects to each limiting element identified in LI Byway deliverability assessment.

Table 39: LI Byway SDU for Capacity Deliverability Assessment - Allocation Percentage

Project	CRIS MW	SDU (22)		SDU (23)		SDU (24)	
		Impact	% Allocation	Impact	% Allocation	Impact	% Allocation
C24-033	50	15.3	6.7%	2.7	5.6%	10.2	8.0%
C24-061	75	22.4	9.8%	4.7	9.8%	12.6	9.9%
C24-104	100	27.9	12.3%	8.2	17.1%	40.8	32.2%
C24-162	140	39.5	17.3%	11.1	23.2%	51.3	40.4%
C24-167	150	46	20.2%	8.2	17.1%	2.6	2.0%
C24-183	248	76.6	33.6%	13	27.1%	9.4	7.4%
			100.00%		100.00%		100.00%

(22) A PAR (392/520/600) MVA plus UG circuit 138 kV (2 cables per phase) between Pilgrim - West Bus 138 kV with Holbrook - Q971 POI 138 kV & Medford – Holbrook 69 kV Rebuild

(23) Bayport – Great River 69 kV Rebuild to underground cable

(24) W. Yaphank - Holtsville 69 kV Rebuild

During the LI Byway Assessment, available deliverable MWs were identified in C24. Table 40 summarizes each C24 LI CRIS Project's deliverable CRIS MW.

Table 40: LI Byway Assessment – Deliverable MW

Queue	CRIS Request MW	Deliverable MW
C24-003	1321	**1321**
C24-008	50	**50**
C24-010	60	**60**
C24-033	50	**8.7**

Queue	CRIS Request MW	Deliverable MW
C24-061	75	**12.6**
C24-104	100	**16.9**
C24-138	135	**135**
C24-154	50	**50**
C24-162	140	**22.6**
C24-167	150	**23.8**
C24-183	248	**40.1**
C24-281	49.1	**49.1**
CR24-1002	49	**49**

The high-level non-binding estimated cost for the following LI Byway SDUs are**:**

22. Installing a new PAR controlled 138 kV lines between Pilgrim and West Bus with two 138 kV underground cables per phase, together with Holbrook - Q971 POI 138 kV & Medford – Holbrook 69 kV Rebuild: **$334,247,988 (±50%)**
23. Bayport – Great River 69 kV Rebuild to Underground Cable: **$80,479,927 (±50%)**
24. W. Yaphank – Holtsville 69 kV Rebuild: **$5,023,619(±50%)**

These SDUs are "new" (*i.e.*, not previously identified and cost allocated in a prior Class Year Study and not substantially similar to a System Deliverability Upgrade previously identified and cost allocated in a Class Year Study) and therefore requires an Additional SDU Study per Section 40.14 of Attachment HH if any of the projects listed above elect to move forward with such Additional SDU Study. Further physical feasibility of these SDUs will be confirmed in the Additional SDU studies if the projects indicated above decide to move forward with the Additional SDU studies.

4. Conclusions

For the C24 CRIS Projects located in ROS and LHV Capacity Regions, the "No Harm" Highway, Highway Capacity Deliverability Assessment, and the Other Interfaces total transfer limit evaluations indicate that Highway and Other Interface SDUs are required for the projects to be deliverable.

For the C24 Projects located in the ROS and LHV Capacity Region, SDUs are required for these projects to be fully deliverable.

The proposed Highway Interface SDUs include:

- Ames Rd - Princetown 345 kV ckt 1 Rebuild
- Ames Rd - Q1089 POI 345 kV ckt 2 Rebuild
- Edic - Ames Rd 345 kV ckt 2 Rebuild
- Edic - Ames Rd 345 kV ckt 1 Rebuild
- Fraser - Gilboa 345 kV ckt 1 Rebuild
- Watercure - Oakdale 345 kV ckt 1 Terminal Upgrades
- Oakdale - Fraser 345 kV ckt 1 Rebuild

The proposed Other Interface SDUs include:

- Coopers Corners - Dolson Ave. 345 kV ckt 2 Terminal Upgrades
- Adding a 115 kV Series Reactor of 8% to Line 956 at North Waverly
- Laurel Lake – Oakdale 115 kV line Rebuild

The proposed Byway Interface SDUs include:

- Stagecoach - S. Owego 115 kV ckt 1 Rebuild
- Harrison Radiator - Hinman Rd 115 kV ckt 1 Rebuild
- Sta. 162 - Sta. 158 115 kV ckt 1 Rebuild
- Robinson Rd - Allegheny Ludlum Tap 115 kV ckt 1 Rebuild
- Allegheny Ludlum Tap - Harrison Radiator 115 kV ckt 1 Rebuild
- Hinman Rd - Lockport 115 kV ckt 1 Rebuild
- Lounsberry - Stagecoach 115 kV ckt 1 Rebuild

- Moraine Rd - Meyer 115 kV ckt 1 Rebuild
- N. Waverly - Lounsberry 115 kV ckt 1 Rebuild

Further physical feasibility of the identified new SDUs will be confirmed in the Additional SDU studies if the projects indicated above decide to move forward with the Additional SDU studies.

For the C24 CRIS Projects located in the NYC Capacity Region, NYC Byway SDUs are required for these projects to be fully deliverable. The proposed NYC Byway SDUs include:

- Hell Gate 1 - Hell Gate 1 Tap 138 kV ckt 1 Rebuild
- Adding a PAR-controlled line from Fresh Kills 345 kV substation to BCEH 345 kV substation with two shunt reactors on the Fresh Kills 345 kV substation

Further physical feasibility of the identified new SDUs will be confirmed in the Additional SDU studies if the projects indicated above decide to move forward with the Additional SDU studies.

For the C24 CRIS Projects located in the LI Capacity Region, LI Byway SDUs are required for these projects to be fully deliverable. The proposed LI Byway SDUs include:

- Adding a PAR controlled 138 kV line between Pilgrim 138 kV station - West Bus 138 kV station with 138 kV underground cable (2 cables per phase) together with Holbrook - Q971 POI 138 kV & Medford – Holbrook 69 kV Rebuild
- Bayport – Great River 69 kV Rebuild to underground cable
- W. Yaphank – Holtsville line Rebuild

Further physical feasibility of the identified new SDUs will be confirmed in the Additional SDU studies if the projects indicated above decide to move forward with the Additional SDU studies.

Appendix A Summary of Phase Angle Regulator Schedules in Deliverability Power Flow Cases

External Tie PAR schedules

Circuit #	Controlled Line	Schedule (MW)
ISO-NE to NYCA		
7/K37	Blissville – Whitehall	25
138-1385	Norwalk Harbor – Northport	0
PV-20	Sandbar – Plattsburgh	0
PJM to NYCA		
5018	Hopatcong – Ramapo	620
B-3402	Hudson – Farragut	0
C-3403	Hudson – Farragut	0
A-2253	Linden – Goethals	63
J3410/69	Waldwick – South Mahwah	-1
K3411/70	Waldwick – South Mahwah	-135
IESO to NYCA		
L33P	St. Lawrence – Moses	0
L34P	St. Lawrence – Moses	0

PAR schedules between Capacity Regions (Inter-Capacity)

Circuit #	Controlled Line	Schedule (MW)
LHV to NYC		
99031	Dunwoodie N – Sherman Creek	148
99032	Dunwoodie N – Sherman Creek	153
99153	Dunwoodie S – E. 179th St.	223
M29	Sprain Brook – Sherman Creek	59
X28	Sprain Brook – Tremont	380
LHV to LI		

Circuit #	Controlled Line	Schedule (MW)
Y49	Sprain Brook – E. Garden City	-636 (128822)
NYC to LI		
903	Jamaica – Lake Success	200
901	Jamaica – Valley Stream	100

PAR schedules inside Capacity Regions (Intra-Capacity)

Circuit #	Controlled Line	Schedule (MW)
ROS		
	Inghams	144
NYC		
18001	Corona – Jamaica	32
18002	Corona – Jamaica	27
21191	Fresh Kills (345/138)	27
21192	Fresh Kills (345/138)	22
42231	Gowanus (345/138)	220
42232	Gowanus (345/138)	222
LI		
	Barrett – Freeport	185
	Pilgrim – Hauppauge	241