



2016 CARIS 2 Preliminary Base Case Results

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KCC*

Update and Extension of CARIS Phase 1 Database for CARIS Phase 2

- ◆ **NYISO must update and extend the CARIS 1 database for Phase 2 studies**
 - *Economic Planning Process Manual, Section 3.1*
 - *CARIS 1 Base Case (2015-2024) updated and extended until 2034 for a total of 20-year study period*
- ◆ **CARIS 2 Base Case to be utilized in evaluation of specific Regulated Economic Transmission projects**
 - *Also available for use in optional Additional CARIS Studies*

NYCA Generation Updates Removals

- ◆ **Hogansburg, 0.7MW (03/17/2015)**
- ◆ **Niagara Bio-Gen, 39.7MW (01/01/2016)**
- ◆ **Dunkirk 2, 75MW (01/01/2016)**
- ◆ **Dunkirk 2, 3 and 4 refueling 435MW (01/01/2016)**
- ◆ **Huntley 67&68, 377.4MW (03/01/2016)**
- ◆ **Astoria GT 5,7,8,10,11,12&13, 104.7MW (01/01/2016)**
- ◆ **Ravenswood GT 4, 5 & 6, 41MW (04/30/2016)**
- ◆ **Fitzpatrick , 852.9MW (01/01/2017)**
- ◆ **Ginna, 581.4MW (04/01/2017)**

*Summer DMNC from 2016 Gold Book

NYCA Generation Updates

◆ Additions

- *Black Oak Wind, 12.6MW(9/1/2016)*
- *Copenhagen Wind, 79.9MW(10/1/2016)*
- *CPV Valley, 677.6MW (10/01/2017)*

◆ Updates

- *Sithe Independence, 43MW(5/1/2016)*

NYCA Transmission Updates

- ◆ **Staten Island Un-bottling Project Phase 2 Removed**
- ◆ **Central East Voltage Collapse Transfer Limit* Updated**
 - *235 MW derate for Marcy South Series Capacitors in service*
 - *Updated derate for Independence unit outages*
- ◆ **Packard-Sawyer 77&78 1.5% Series Reactor Added**
- ◆ **Rochester-Area Upgrades (GRTA) Added**
 - *Station 122 and Station 80 upgrade*
- ◆ **Leeds-Hurley 21% Series Compensation Added**
 - *2018 Summer*

* http://www.nyiso.com/public/webdocs/markets_operations/market_data/reports_info/operating_studies/CE-14/CE_VoltageandStability_Limit_ReportFinalOCAproved3-17-2016.pdf

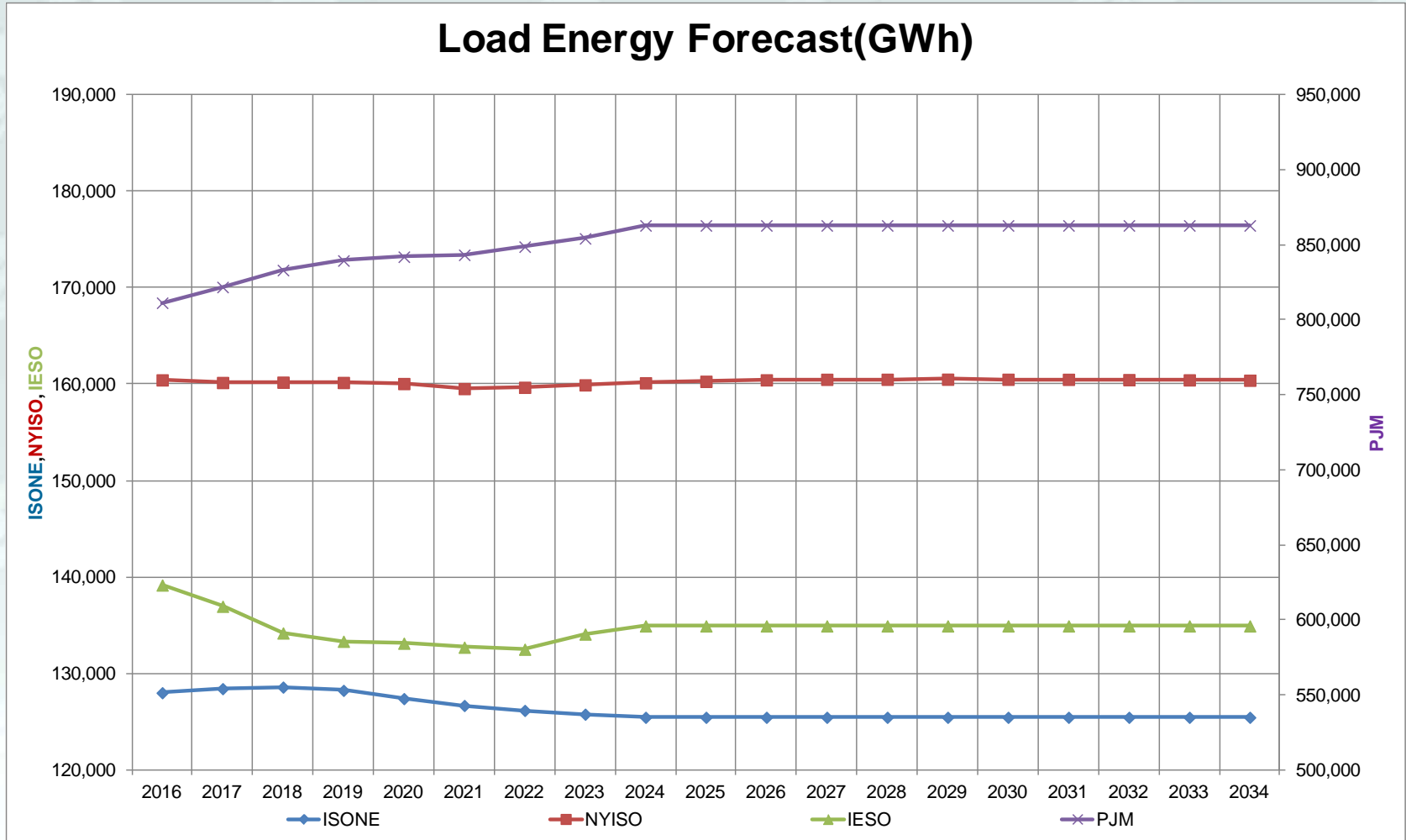
Con Ed/PSEG Wheel Agreement Cancellation

- ◆ **PJM/NYISO Interchange being modeled consistent with 2016 RNA topology**
- ◆ **PAR ABC**
 - *Hard limit is from 0MW to 200MW into NY*
- ◆ **PAR JK**
 - *Hard limit is from 0MW to 200MW into NY*
- ◆ **Ramapo schedule**
 - *Hard limit is 1000MW into PJM*
 - *Hard limit for PAR JK grouped with 5018 is 480MW into NY*
 - *80% of RECO load served through 5018 line*

20-Year Representative System

- ◆ **No need to add generic capacity to maintain Target Reserve Proxy**
 - *Model assumptions consistent with 2016 RNA, with load forecasts extended out to 2034*
- ◆ **NYISO will track resolution of transmission security violations identified in 2016 RNA**
 - *Solutions may need to be captured in update to CARIS 2 Base Case*
 - *Any updates will be reviewed with ESPWG and BIC prior to any evaluation of projects proposed for cost recovery in CARIS 2*

Baseline Load Forecast Updates

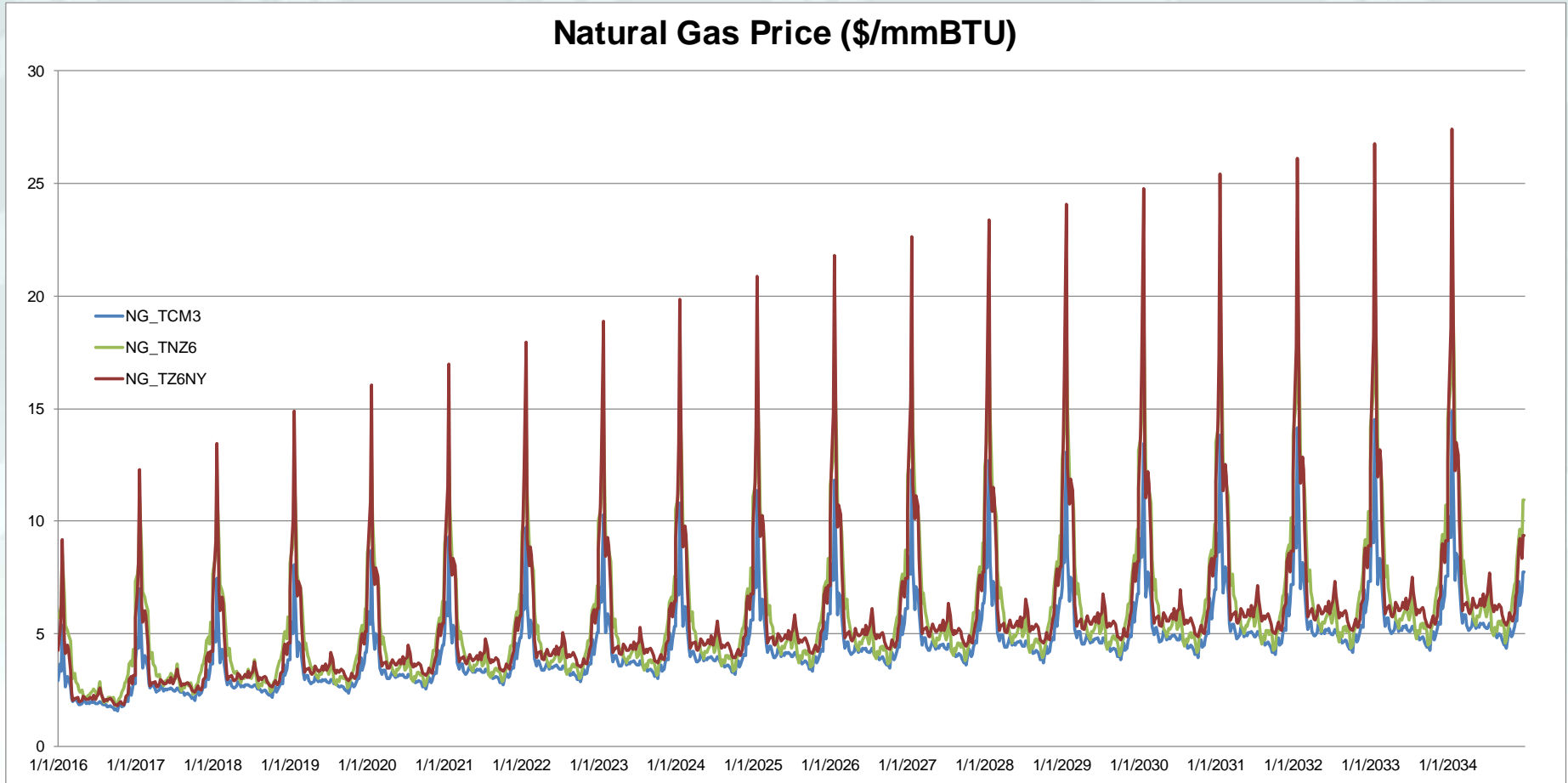


Note: External loads are frozen starting 2024.

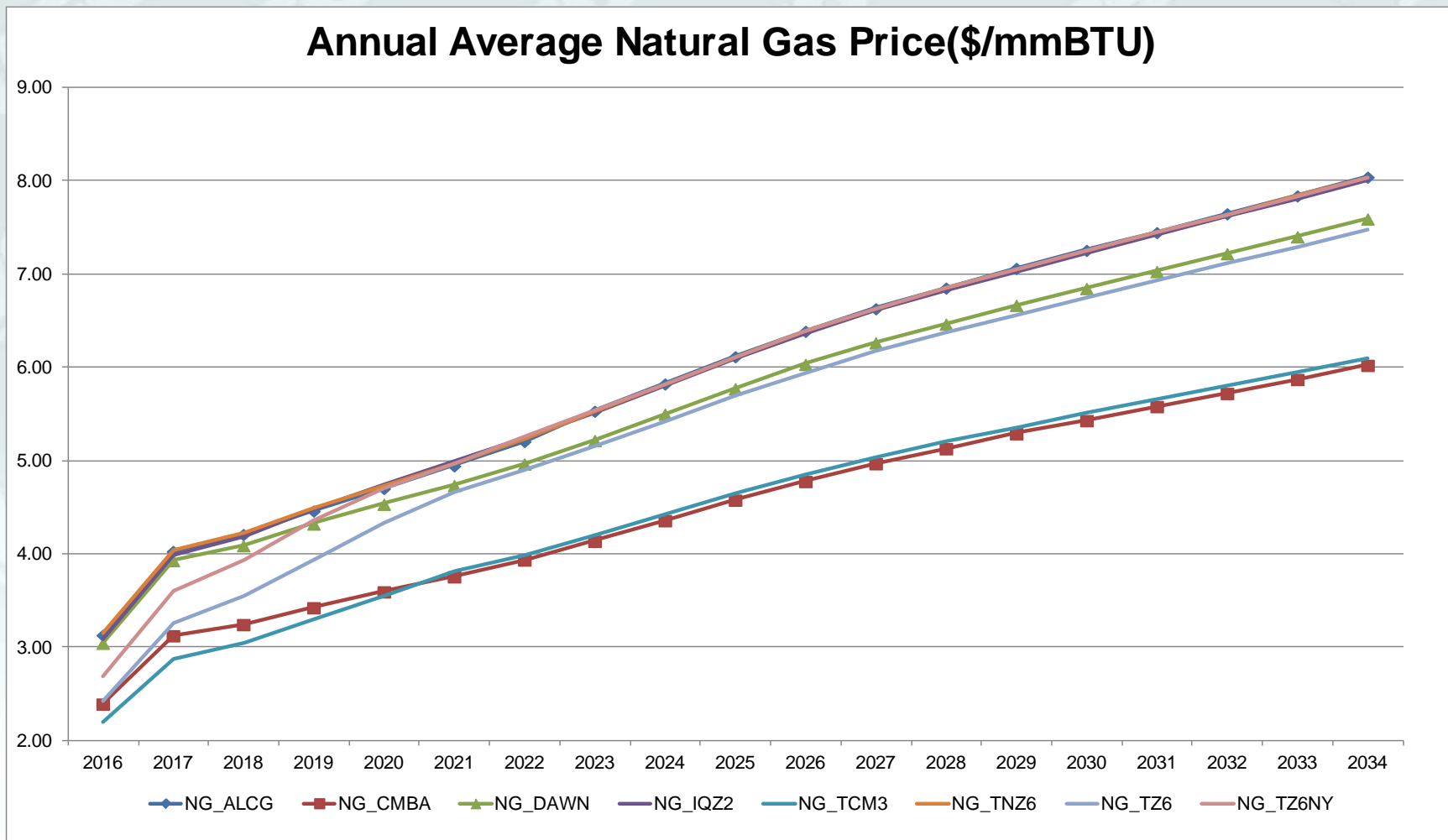
Natural Gas Region Mapping

POOL	Area/Zone	GAS_REGION
NYISO	A-E	TCM3
NYISO	F-I	TNZ6
NYISO	J-K	TZ6NY
PJM	West	CMBA
PJM	East	TZ6
ISONE	North	ALCG
ISONE	South	IQZ2
IESO	All	DAWN

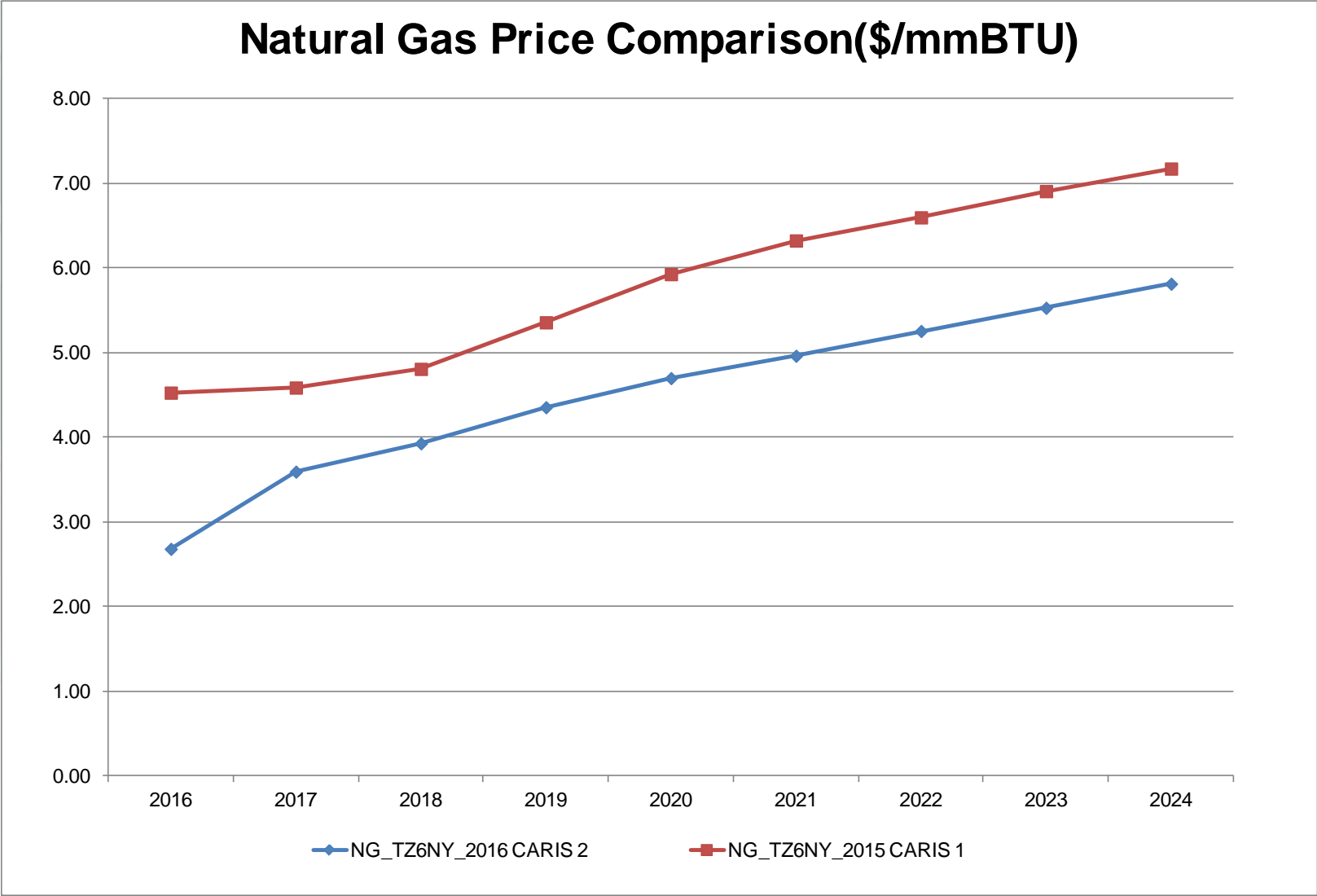
Natural Gas Price Updates



Natural Gas Price Updates

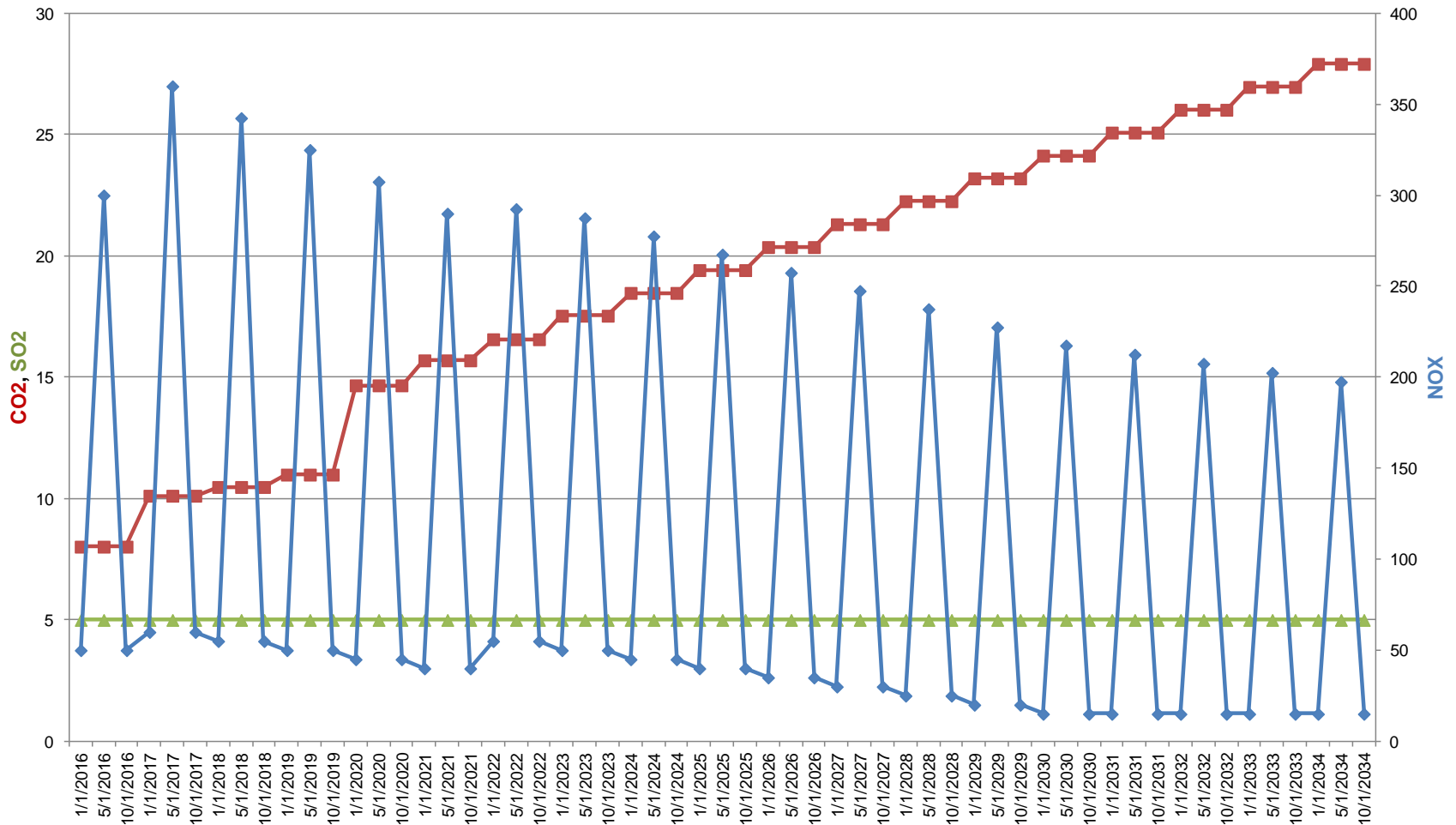


Natural Gas Price Comparison



Emission Forecast Updates

Projected Emission Price for New York (\$/Ton)



Commitment Hurdle Rates

Commitment Hurdle Rate	Export (from NYCA)			Import (into NYCA)		
	Transaction Cost**	2015 CARIS 1	2016 CARIS 2	Transaction Cost**	2015 CARIS 1	2016 CARIS 2
PJM	8.0 \$	8.0 \$	8.0 \$	5.0 \$	5.0 \$	5.0 \$
Linden VFT	8.0 \$	8.0 \$	8.0 \$	5.0 \$	5.0 \$	5.0 \$
Neptune	8.0 \$	8.0 \$	8.0 \$	5.0 \$	5.0 \$	5.0 \$
HTP	8.0 \$	8.0 \$	8.0 \$	5.0 \$	5.0 \$	5.0 \$
ISONE	2.0 \$	2.0 \$	2.0 \$	2.0 \$	2.0 \$	2.0 \$
Cross Sound Cable	2.0 \$	2.0 \$	2.0 \$	2.0 \$	2.0 \$	2.0 \$
Northport Norwalk Cable	2.0 \$	2.0 \$	2.0 \$	2.0 \$	2.0 \$	2.0 \$
IMO	6.0 \$	6.0 \$	6.0 \$	4.0 \$	8.0 \$	8.0 \$

** Transaction Costs are annual average costs per CRA report

(Export Transmission Service (ETS) Tariff Study, IESO, Charles River Associates, May 16, 2012)

Same as 2015 CARIS 1.

Dispatch Hurdle Rates

Dispatch Hurdle Rate	Export (from NYCA)				Import (into NYCA)			
	Transaction	2015 CARIS	2016 CARIS	Transaction	2015 CARIS	2016 CARIS		
	Cost*	1	2	Cost*	1	2		
PJM	6.0 \$	6.0 \$	6.0	3.0 \$	3.0 \$	3.0		
Linden VFT	6.0 \$	6.0 \$	6.0	3.0 \$	3.0 \$	3.0		
Neptune	6.0 \$	6.0 \$	6.0	3.0 \$	3.0 \$	3.0		
HTP	6.0 \$	6.0 \$	6.0	3.0 \$	3.0 \$	3.0		
ISONE	0.0 \$	- \$	-	0.0 \$	- \$	-		
Cross Sound Cable	0.0 \$	- \$	-	0.0 \$	- \$	-		
Northport Norwalk Cable	0.0 \$	- \$	-	0.0 \$	- \$	-		
IMO	4.0 \$	4.0 \$	4.0	2.0 \$	6.0 \$	6.0		

***Dispatch Hurdle Rate = Commitment Hurdle Rate - \$2.0**

Same as 2015 CARIS 1.

CARIS Phase 2 Assumption Matrix

Parameter	Modeling for 2015 CARIS 1 Base Case	Modeling for 2016 CARIS 2 Base Case
Peak Load	Based on 2015 Load & Capacity Data Report (“Gold Book”) Baseline Forecast of Non-Coincident Peak Demand, including Energy Efficiency, Distributed Generation, and Other Behind-the-Meter Impacts (Table I-2b). The impact of Solar PV is captured in the Other Behind-the-Meter Impacts	Based on 2016 Load & Capacity Data Report (“Gold Book”) Baseline Forecast of Non-Coincident Peak Demand, including Energy Efficiency, Distributed Generation, and Other Behind-the-Meter Impacts (Table I-2b). The impact of Solar PV is captured in the Other Behind-the-Meter Impacts
Load Shape Model Energy Forecast	2002 Load Shape. Based on 2015 Load & Capacity Data Report (“Gold Book”) Energy Forecast Baseline Forecast of Annual Energy, including Energy Efficiency, Distributed Generation, and Other Behind-the-Meter Impacts (Table I-2a). The impact of Solar PV is captured in the Other Behind-the-Meter Impacts	2002 Load Shape. Based on 2016 Load & Capacity Data Report (“Gold Book”) Energy Forecast Baseline Forecast of Annual Energy, including Energy Efficiency, Distributed Generation, and Other Behind-the-Meter Impacts (Table I-2a). The impact of Solar PV is captured in the Other Behind-the-Meter Impacts
Load Uncertainty Model	Only Base Level Forecast utilized; the impact of energy or peak forecasts may be utilized in scenarios	Same
Generating Unit Capacities	Updated to reflect 2015 Gold Book winter and summer DMNC values	Updated to reflect 2016 Gold Book winter and summer DMNC values
New Units	Updated as per 2015 Gold Book (Application of inclusion rules identified in Reliability Planning Process Manual, Section 3.1.1 and procedures)	Updated as per 2016 Gold Book (Application of inclusion rules identified in Reliability Planning Process Manual, Section 3.1.1 and procedures). Consistent with 2016 RNA.
Wind Resource Modeling	Units and capacities updated as per 2015 Gold Book. Wind resources are modeled based on unit capacities and synthesized wind shapes developed as part of 2010 Wind Study.	Units and capacities updated as per 2016 Gold Book. Wind resources are modeled based on unit capacities and synthesized wind shapes developed as part of 2010 Wind Study.

CARIS Phase 2 Assumption Matrix (cont.)

Parameter	Modeling for 2015 CARIS 1 Base Case	Modeling for 2016 CARIS 2 Base Case
Non-NYPA Hydro Capacity Modeling	Updated as per 2015 Gold Book; unit output is modeled consistent with historic levels.	Updated as per 2016 Gold Book; unit output is modeled consistent with historic levels.
Special Case Resources	Not utilized in MAPS production cost modeling; incorporated in ICAP Metric calculation	Same
EDRP Resources	N/A for production cost modeling	Same
External Capacity – Purchases and Wheel-Throughs	Flows across schedulable and non-schedulable transmission lines are based on economics.	Same
Retirements	Updated as per 2015 Gold Book (Application of inclusion rules; specific assumptions concerning mothball announcement post-CRP; units with completed studies indicating that the unit is required for reliability are retained in the Base Case; units whose studies are pending are retained in the Base Case; others are excluded from the Base Case)	Updated as per 2016 Gold Book.
Generator Outages	Scheduled to levelize reserves.	Same
Gas Turbines Ambient Derate	Modeling utilizes summer and winter DMNC ratings for all units.	Same
Environmental Modeling Externalities Allowances	<p>Allowance costs based on projected RGGI costs. SO₂ and NO_x Allowance Prices reflect new CSAPR markets.</p> <p>SO₂ based on CSAPR price (\$100 / Ton) decreased 10% until 2017, at which point Phase II will increase price by 25% and decrease thereafter at 20% per annum.</p> <p>Annual (\$100 / Ton) and Ozone Season NO_x (\$125 / Ton) follow same trend as SO₂ Allowance Prices.</p> <p>Detailed allowance costs are provided in the 5/4/15 ESPWG meeting materials.</p> <p>National CO₂ program in 2020.</p>	<p>Allowance costs based on projected RGGI costs. Due to regulatory uncertainties, CO₂ price forecasts have not been updated. National CO₂ program in 2024.</p> <p>SO₂ projected at \$5/ton nominal through study period, reflecting current lower prices (even with MATS implementation in April 2015).</p> <p>Annual NO_x costs lower to reflect recent price reductions and higher Ozone Season NO_x allowance costs due to the new Ozone NAAQS regulations.</p> <p>Detailed allowance costs will be provided with the July 5, 2016 ESPWG meeting materials.</p>

CARIS Phase 2 Assumption Matrix (cont.)

Parameter	Modeling for 2015 CARIS 1 Base Case	Modeling for 2016 CARIS 2 Base Case
Commitment and Dispatch Options Operating Reserves	Each Balancing Authority commits to serve its own load, firm transactions, and potential transfers Hurdle rates – flat Operating Reserves as per NYCA requirements.	Same Hurdle rates unchanged from CARIS 1. Same
Fuel Price Forecast	Annual bases updated to more heavily weight recent trends (2012-0.100, 2013-0.325, 2014-0.575). Seasonality and spikes based on five-year history (2010-2014). Fuel oil and coal price forecasts are developed utilizing the EIA's annual forecast of national delivered prices. Regional bases are derived using EIA Form 923 data. The seasonality for fuel oils is based on an analysis of New York Harbor Ultra-Low Sulfur Diesel (ULSD) prices. Coal has no seasonality. Illustrative fuel costs are presented in the 5/4/15 ESPWG meeting materials.	Annual bases updated to more heavily weight recent trends (2013-0.100, 2014-0.325, 2015-0.575). Seasonality and spikes based on five-year history (2011-2015). Fuel oil and coal price forecasts are developed utilizing the EIA's annual forecast of national delivered prices. Regional bases are derived using EIA Form 923 data. The seasonality for fuel oils is based on an analysis of New York Harbor Ultra-Low Sulfur Diesel (ULSD) prices. Coal has no seasonality. Illustrative fuel costs are included in this presentation.
Cost Curve Development (including heat rates and emission rates)	Unit heat rates (and emission rates) developed from vendor supplied data, USEPA CAMD fuel input and emissions data matched with NYISO production data for NYCA and USEIA production data for non NYCA units.	Same
Local Reliability Rules	List and develop appropriate nomograms. Fuel burn restrictions, operating restrictions and exceptions, commitment/dispatch limits	Same
Energy Storage Gilboa PSH Lewiston PSH	Scheduling checked to conform to historical operations.	Same

CARIS Phase 2 Assumption Matrix (cont.)

Parameter	Modeling for 2015 CARIS 1 Base Case	Modeling for 2016 CARIS 2 Base Case
Transmission System Model		
Power Flow Cases	As per CRP.	Updated to reflect Leeds-Hurley Series Compensation.
Interface Limits Monitored/ contingency pairs Nomograms Joint, Grouping Unit Sensitive Voltage	Data from the results of internal and external planning studies; vendor-supplied data; operational voltage studies; operational limits; transfer limit analysis for critical interfaces. Athens SPS in service through June 1, 2024.	Updated to reflect Leeds-Hurley Series Compensation and CPV Valley. Athens SPS in service through June 1, 2024.
New Transmission Capability	Updated as per 2015 Gold Book (Application of base case inclusion rules)	Updated as per 2016 Gold Book (Application of base case inclusion rules)
Internal Controllable Lines (PARs,DC,VFT)	Optimized in simulation,	Same
Neighboring Systems		
Outside World Area Models Fuel Forecast	Power flow data from CRP, “production” data developed by NYISO with vendor and neighbor input. Fuel forecasts developed utilizing same methodology as NYCA fuel forecasts.	Same
External Capacity And Load Forecast	Neighboring systems modeled consistent with reserve margins in the RNA/CRP analysis. Neighboring systems data reviewed and held at required reserve margin.	External systems updated with projects under construction. Minimum reserve margin maintained for neighboring systems. Load and capacity of external areas fixed for 2025-2034.

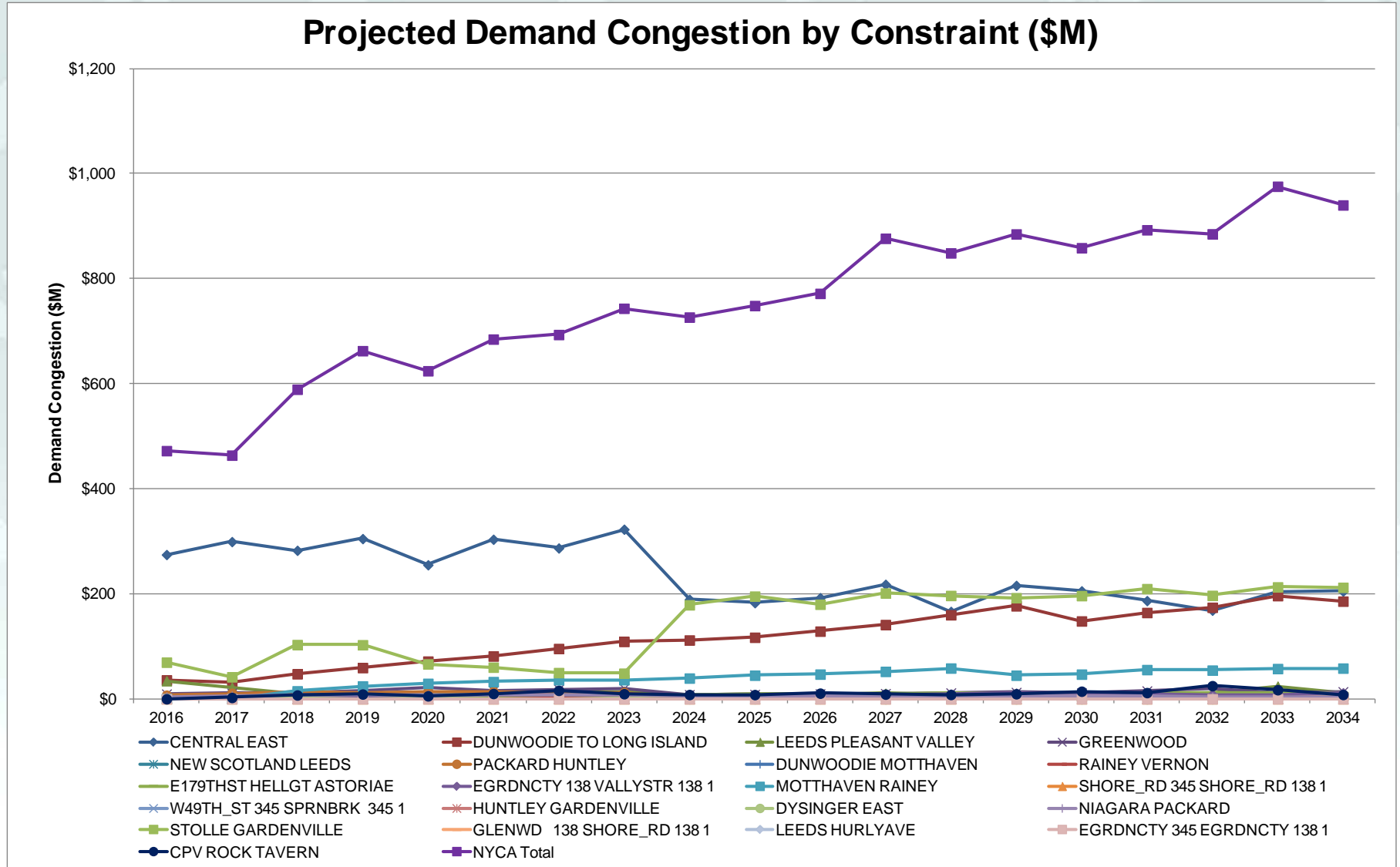
CARIS Phase 2 Assumption Matrix (cont.)

Parameter	Modeling for 2015 CARIS 1 Base Case	Modeling for 2016 CARIS 2 Base Case
System representation in Simulation	HQ modeled as fixed hourly schedule, synchronized with all other external injections. Full Representation/Participation NYISO ISONE IESO PJM Classic & AP,AEP,CE,DLCO, DAY, VP Proxy Bus Injection: HQ-NYISO, HQ-NE-ISO, NB-NEISO, HQ - IESO Transmission Only/Zeroed Out: MECS,FE,SPP, MAR, NIPS,OVEC,TVA, FRCC,SERC,ERCOT,WECC	Same
External Controllable Lines (PARs,DC,VFT, Radial lines)	Ramapo “wheel” reflects current updated protocols, tariff and market operations, including NYISO Technical Bulletins and inter-control area operating agreements. 61% of Interchange Schedules across NY-PJM AC ties flow across Ramapo PARS. In addition, 80% of RECO load is served across Ramapo PARS. Norwalk (-200MW, +200MW) L33,34 (-300MW, +300MW) PV20 (0MW, +150MW) Neptune (0MW, +660MW) CSC (0MW, +330MW) CSC and Neptune optimized subject to “cost of use” HTP (0, 660) Linden VFT (-315,315)	Ramapo “wheel” reflects 2016 RNA topology. Details included in this presentation. Norwalk (-200MW, +200MW) L33,34 (-300MW, +300MW) PV20 (0MW, +150MW) Neptune (0MW, +660MW) CSC (0MW, +330MW) CSC and Neptune optimized subject to “cost of use” HTP (0, 660) Linden VFT (-315,315)

Projected Demand Congestion by Constraint (\$M)

Demand Congestion (\$M)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
CENTRAL EAST	\$275	\$299	\$283	\$305	\$255	\$304	\$287	\$323	\$189	\$183	\$192	\$218	\$166	\$216	\$206	\$187	\$169	\$204	\$205
DUNWOODIE TO LONG ISLAND	\$36	\$32	\$48	\$59	\$72	\$81	\$96	\$109	\$112	\$117	\$129	\$141	\$160	\$177	\$148	\$164	\$174	\$196	\$186
LEEDS PLEASANT VALLEY	\$34	\$22	\$9	\$8	\$8	\$12	\$12	\$14	\$8	\$8	\$8	\$11	\$7	\$6	\$6	\$11	\$11	\$24	\$11
GREENWOOD	\$9	\$11	\$12	\$16	\$22	\$16	\$18	\$20	\$8	\$9	\$10	\$10	\$12	\$13	\$11	\$15	\$19	\$12	\$14
NEW SCOTLAND LEEDS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
PACKARD HUNTLEY	\$7	\$10	\$13	\$12	\$14	\$14	\$12	\$12	\$2	\$4	\$5	\$5	\$3	\$2	\$3	\$5	\$7	\$3	\$4
DUNWOODIE MOTTHAVEN	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1	\$0	\$0	\$1	\$1	\$2	\$1	\$1	\$1	\$1	\$1
RAINEY VERNON	\$1	\$1	\$1	\$2	\$3	\$3	\$3	\$3	\$1	\$0	\$0	\$1	\$1	\$1	\$2	\$2	\$1	\$1	\$1
E179THST HELLGHT ASTORIAE	\$0	\$0	\$3	\$5	\$6	\$6	\$7	\$7	\$8	\$9	\$9	\$10	\$11	\$9	\$9	\$11	\$11	\$11	\$11
EGRDNCTY 138 VALLYSTR 138 1	\$2	\$3	\$3	\$4	\$6	\$7	\$7	\$8	\$5	\$6	\$9	\$8	\$9	\$11	\$12	\$9	\$8	\$7	\$11
MOTTHAVEN RAINEY	\$0	\$0	\$15	\$24	\$29	\$33	\$36	\$36	\$39	\$45	\$47	\$52	\$59	\$45	\$47	\$56	\$55	\$58	\$58
SHORE_RD 345 SHORE_RD 138 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
W49TH_ST 345 SPRNBRK 345 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
HUNTLEY GARDENVILLE	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DYSINGER EAST	\$0	\$0	\$1	\$0	\$1	\$0	\$0	\$1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1
NIAGARA PACKARD	\$4	\$6	\$7	\$8	\$7	\$7	\$8	\$7	\$5	\$5	\$5	\$5	\$3	\$5	\$5	\$5	\$4	\$4	\$4
STOLLE GARDENVILLE	\$70	\$42	\$103	\$103	\$66	\$60	\$50	\$49	\$179	\$195	\$180	\$201	\$197	\$192	\$196	\$210	\$197	\$213	\$212
GLENWD 138 SHORE_RD 138 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
LEEDS HURLYAVE	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
EGRDNCTY 345 EGRDNCTY 138 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
CPV ROCK TAVERN	\$0	\$3	\$7	\$9	\$6	\$10	\$16	\$10	\$8	\$8	\$11	\$9	\$8	\$10	\$14	\$12	\$25	\$17	\$8
NYCA Total	\$472	\$464	\$589	\$663	\$624	\$685	\$693	\$743	\$727	\$749	\$772	\$877	\$849	\$885	\$859	\$893	\$885	\$976	\$940

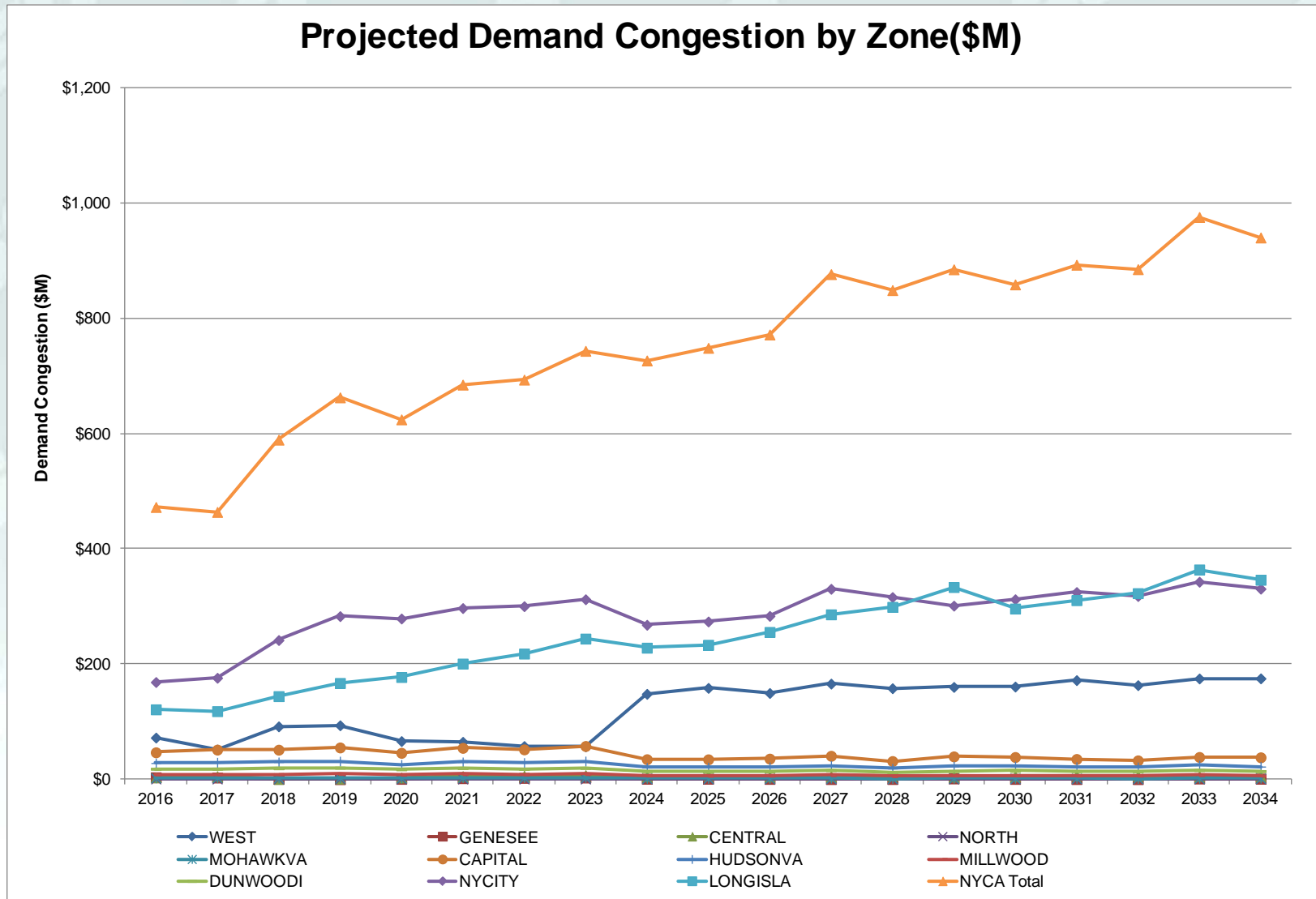
Projected Demand Congestion by Constraint (\$M)



Projected Demand Congestion by Zone (\$M)

Demand Congestion (\$M)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	\$72	\$51	\$92	\$94	\$66	\$65	\$57	\$57	\$148	\$158	\$150	\$166	\$158	\$160	\$161	\$172	\$163	\$175	\$175
GENESEE	\$3	\$3	\$1	\$0	\$1	\$2	\$2	\$3	\$1	\$1	\$0	\$0	\$0	\$1	\$0	\$0	\$0	\$1	\$1
CENTRAL	\$3	\$5	\$0	\$1	\$3	\$5	\$6	\$7	\$5	\$7	\$5	\$5	\$6	\$4	\$5	\$6	\$6	\$5	\$5
NORTH	\$1	\$1	\$0	\$0	\$0	\$0	\$0	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1
MOHAWKVA	\$2	\$2	\$2	\$2	\$2	\$3	\$3	\$3	\$1	\$1	\$1	\$2	\$1	\$2	\$1	\$1	\$1	\$2	\$2
CAPITAL	\$47	\$51	\$51	\$55	\$46	\$54	\$52	\$58	\$35	\$34	\$36	\$41	\$31	\$39	\$38	\$35	\$33	\$38	\$38
HUDSONVA	\$28	\$29	\$30	\$31	\$25	\$30	\$29	\$31	\$20	\$21	\$21	\$24	\$19	\$22	\$22	\$22	\$21	\$24	\$22
MILLWOOD	\$8	\$9	\$9	\$9	\$8	\$9	\$8	\$9	\$6	\$6	\$6	\$7	\$5	\$6	\$6	\$6	\$6	\$7	\$6
DUNWOODI	\$18	\$18	\$19	\$20	\$17	\$19	\$18	\$19	\$14	\$13	\$14	\$16	\$12	\$14	\$15	\$14	\$14	\$16	\$14
NYCITY	\$169	\$176	\$241	\$283	\$279	\$297	\$300	\$312	\$268	\$274	\$283	\$330	\$316	\$301	\$312	\$325	\$318	\$343	\$331
LONGISLA	\$121	\$118	\$144	\$167	\$177	\$201	\$218	\$244	\$228	\$233	\$255	\$286	\$299	\$333	\$296	\$311	\$323	\$364	\$346
NYCA Total	\$472	\$464	\$589	\$663	\$624	\$685	\$693	\$743	\$727	\$749	\$772	\$877	\$849	\$885	\$859	\$893	\$885	\$976	\$940

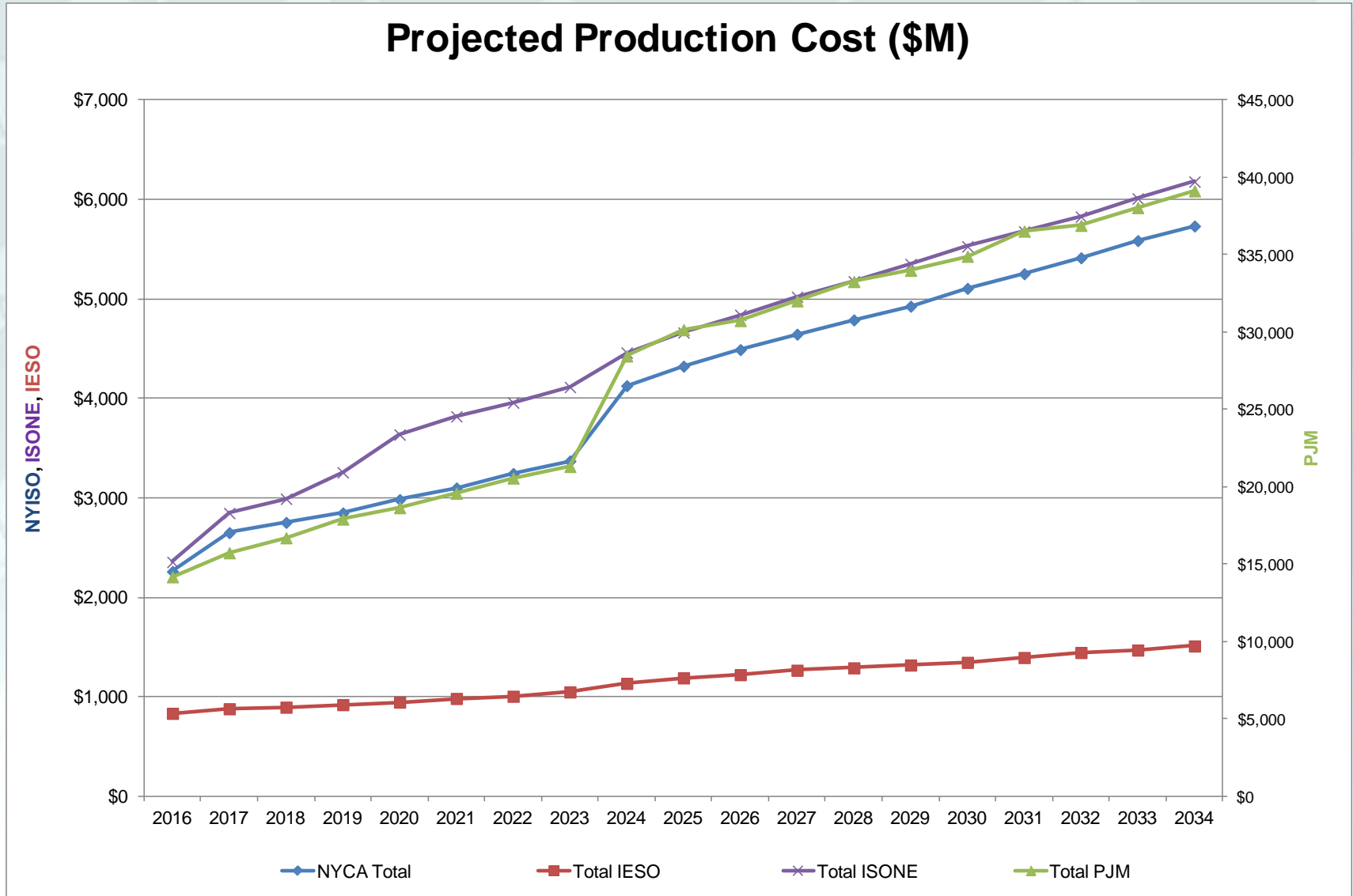
Projected Demand Congestion by Zone (\$M)



Projected Production Costs (\$M)

Production Cost (\$M)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	\$66	\$84	\$93	\$106	\$95	\$102	\$112	\$103	\$192	\$185	\$199	\$209	\$183	\$207	\$217	\$232	\$229	\$237	\$241
GENESEE	\$40	\$23	\$13	\$13	\$13	\$12	\$12	\$13	\$19	\$19	\$20	\$20	\$22	\$23	\$24	\$22	\$24	\$26	\$26
CENTRAL	\$360	\$390	\$389	\$407	\$414	\$430	\$445	\$470	\$553	\$566	\$587	\$614	\$638	\$648	\$660	\$689	\$716	\$734	\$753
NORTH	\$31	\$42	\$39	\$38	\$36	\$32	\$35	\$39	\$53	\$59	\$62	\$61	\$65	\$66	\$72	\$69	\$75	\$76	\$79
MOHAWKVA	\$28	\$37	\$35	\$35	\$34	\$33	\$34	\$35	\$51	\$54	\$57	\$52	\$58	\$58	\$60	\$61	\$64	\$70	\$66
CAPITAL	\$471	\$583	\$573	\$626	\$681	\$711	\$756	\$773	\$936	\$966	\$1,011	\$1,048	\$1,077	\$1,093	\$1,151	\$1,163	\$1,204	\$1,249	\$1,287
HUDSONVA	\$51	\$91	\$196	\$188	\$204	\$215	\$223	\$230	\$265	\$280	\$292	\$317	\$324	\$332	\$347	\$351	\$368	\$378	\$378
MILLWOOD	\$109	\$111	\$115	\$117	\$120	\$124	\$126	\$130	\$132	\$136	\$138	\$142	\$147	\$150	\$152	\$156	\$161	\$165	\$169
DUNWOODI	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
NYCITY	\$755	\$923	\$941	\$953	\$1,002	\$1,039	\$1,079	\$1,129	\$1,357	\$1,444	\$1,495	\$1,531	\$1,596	\$1,649	\$1,694	\$1,757	\$1,805	\$1,861	\$1,922
LONGISLA	\$349	\$368	\$360	\$366	\$385	\$403	\$424	\$451	\$571	\$615	\$630	\$653	\$681	\$701	\$731	\$753	\$769	\$791	\$813
NYCA Total	\$2,262	\$2,651	\$2,755	\$2,850	\$2,984	\$3,101	\$3,246	\$3,373	\$4,129	\$4,325	\$4,492	\$4,647	\$4,790	\$4,928	\$5,107	\$5,254	\$5,414	\$5,587	\$5,734
Total Imports	\$627	\$958	\$1,044	\$1,146	\$1,283	\$1,346	\$1,422	\$1,539	\$1,435	\$1,473	\$1,551	\$1,621	\$1,713	\$1,747	\$1,813	\$1,858	\$1,924	\$1,937	\$2,010
Total Exports	\$173	\$203	\$213	\$214	\$193	\$197	\$187	\$228	\$210	\$213	\$230	\$252	\$234	\$247	\$262	\$264	\$277	\$267	\$279
NYCA+Imports-Exports	\$2,715	\$3,407	\$3,586	\$3,782	\$4,075	\$4,250	\$4,480	\$4,683	\$5,354	\$5,585	\$5,813	\$6,016	\$6,269	\$6,428	\$6,659	\$6,848	\$7,061	\$7,257	\$7,465
Total IESO	\$836	\$882	\$897	\$923	\$948	\$985	\$1,007	\$1,051	\$1,137	\$1,192	\$1,224	\$1,269	\$1,293	\$1,321	\$1,348	\$1,396	\$1,447	\$1,472	\$1,513
Total PJM	\$14,196	\$15,748	\$16,715	\$17,925	\$18,660	\$19,595	\$20,575	\$21,324	\$28,464	\$30,163	\$30,750	\$32,025	\$33,274	\$33,999	\$34,906	\$36,534	\$36,902	\$38,051	\$39,132
Total ISONE	\$2,358	\$2,849	\$2,993	\$3,258	\$3,638	\$3,821	\$3,959	\$4,116	\$4,462	\$4,664	\$4,842	\$5,023	\$5,177	\$5,352	\$5,530	\$5,679	\$5,828	\$6,011	\$6,181
Total System	\$19,747	\$22,206	\$23,442	\$25,051	\$26,332	\$27,611	\$28,914	\$29,997	\$38,384	\$40,542	\$41,525	\$43,176	\$44,762	\$45,830	\$47,141	\$49,116	\$49,831	\$51,357	\$52,795

Projected Production Costs (\$M)



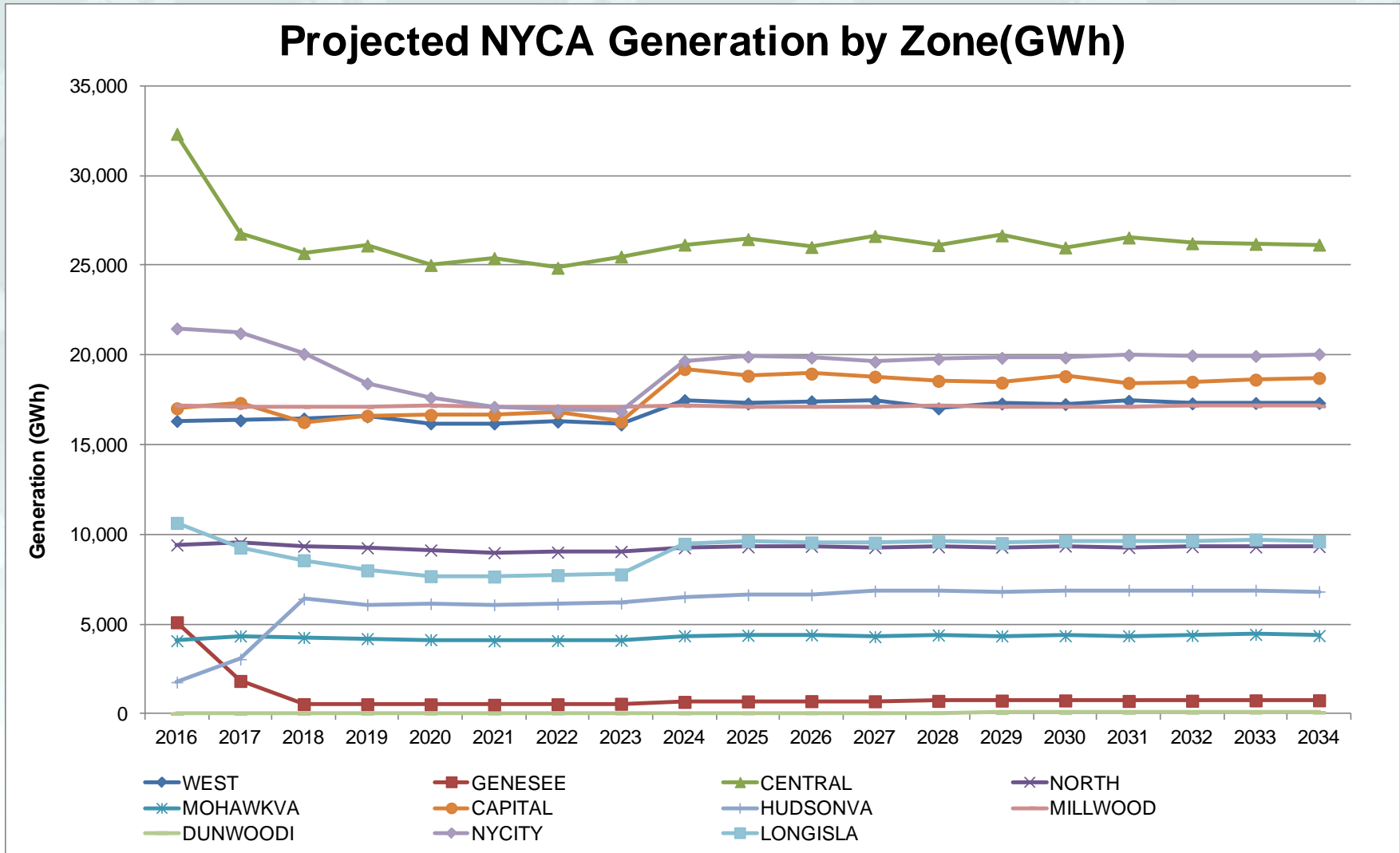
Projected Generation by Zone (GWh)

Generation (GWh)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	16,328	16,362	16,465	16,582	16,193	16,189	16,293	16,132	17,490	17,303	17,424	17,451	17,029	17,301	17,269	17,455	17,311	17,330	17,333
GENESEE	5,110	1,838	546	539	534	510	539	566	673	697	714	707	728	744	752	725	738	756	760
CENTRAL	32,330	26,766	25,688	26,109	25,023	25,412	24,868	25,494	26,158	26,464	26,026	26,640	26,129	26,674	26,002	26,555	26,235	26,200	26,157
NORTH	9,423	9,531	9,356	9,260	9,135	8,987	9,016	9,059	9,264	9,318	9,345	9,280	9,320	9,296	9,364	9,281	9,327	9,311	9,333
MOHAWKVA	4,084	4,349	4,263	4,197	4,139	4,074	4,087	4,105	4,357	4,386	4,405	4,310	4,399	4,353	4,359	4,356	4,374	4,435	4,366
CAPITAL	17,034	17,330	16,268	16,621	16,668	16,676	16,832	16,289	19,222	18,849	18,969	18,798	18,564	18,466	18,823	18,451	18,516	18,632	18,725
HUDSONVA	1,772	3,053	6,416	6,090	6,142	6,083	6,133	6,175	6,527	6,643	6,644	6,853	6,876	6,822	6,866	6,898	6,893	6,897	6,821
MILLWOOD	17,174	17,115	17,125	17,117	17,183	17,125	17,135	17,127	17,183	17,125	17,142	17,134	17,194	17,139	17,144	17,139	17,206	17,164	17,167
DUNWOODI	26	30	33	37	41	43	46	49	53	57	60	65	69	73	77	81	85	89	93
NYCITY	21,485	21,219	20,069	18,422	17,628	17,116	16,936	16,861	19,675	19,916	19,864	19,633	19,793	19,850	19,866	20,010	19,980	19,953	20,054
LONGISLA	10,649	9,270	8,566	8,003	7,678	7,658	7,736	7,775	9,485	9,633	9,557	9,546	9,608	9,522	9,641	9,634	9,650	9,727	9,613
NYCA Total	135,415	126,865	124,794	122,977	120,361	119,874	119,622	119,635	130,088	130,391	130,150	130,417	129,708	130,241	130,163	130,584	130,315	130,495	130,422
Total IESO	158,871	158,375	157,142	156,879	157,039	156,752	156,761	157,470	157,940	157,778	157,654	157,724	158,053	157,589	157,754	157,676	158,033	157,478	157,644
Total PJM	804,822	821,665	833,359	839,995	843,831	844,975	850,055	857,216	850,468	850,196	850,709	850,992	850,517	850,749	850,431	850,009	850,382	850,572	850,474
Total ISONE	112,361	113,385	113,727	114,395	114,703	114,320	113,994	113,105	115,369	115,648	115,548	115,285	115,634	115,611	115,519	115,762	115,565	115,685	115,744
Total HQ*	24,638	24,674	24,622	24,586	24,643	24,581	24,691	24,674	24,659	24,581	24,576	24,581	24,753	24,622	24,586	24,581	24,644	24,691	24,674
Total System	1,239,456	1,247,622	1,256,430	1,261,937	1,263,751	1,263,827	1,268,869	1,275,947	1,282,021	1,282,064	1,282,294	1,282,482	1,282,257	1,282,352	1,282,182	1,282,268	1,282,297	1,282,154	1,282,083

* Only interchange flow is modeled.

Projected Generation by Zone (GWh)

Projected NYCA Generation by Zone(GWh)

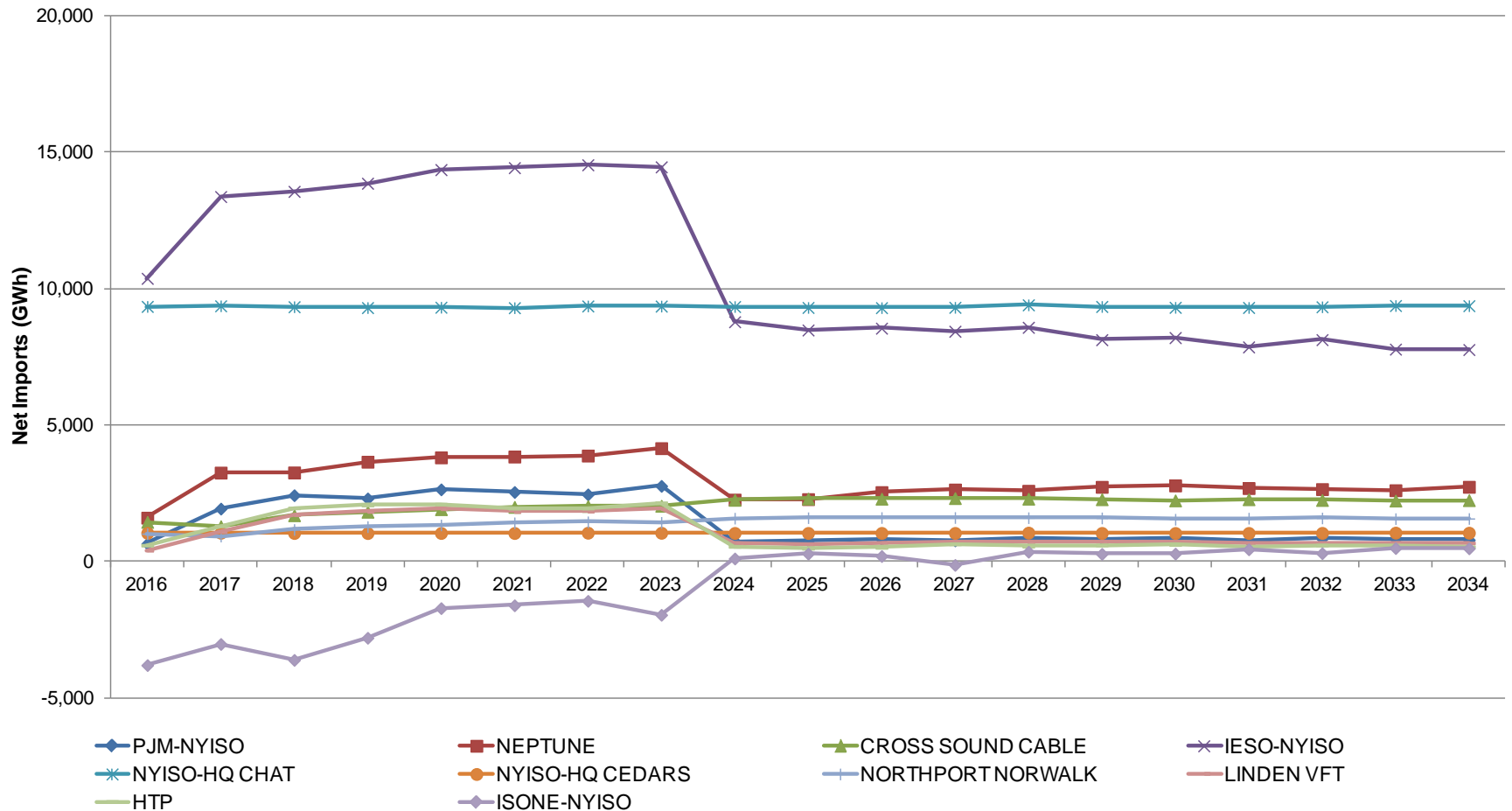


Projected NYCA Net Imports (GWh)

Net Imports (GWh)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
PJM-NYISO	654	1,935	2,426	2,307	2,640	2,543	2,455	2,767	735	767	817	771	876	832	854	771	840	825	791
NEPTUNE	1,603	3,254	3,260	3,653	3,812	3,842	3,878	4,149	2,265	2,282	2,539	2,634	2,589	2,732	2,783	2,688	2,650	2,608	2,734
CROSS SOUND CABLE	1,447	1,289	1,692	1,820	1,915	1,998	2,031	2,039	2,256	2,302	2,298	2,320	2,298	2,278	2,236	2,278	2,251	2,230	2,245
IESO-NYISO	10,370	13,366	13,554	13,853	14,353	14,424	14,530	14,452	8,780	8,477	8,544	8,430	8,577	8,123	8,200	7,857	8,124	7,776	7,762
NYISO-HQ CHAT	9,342	9,364	9,330	9,298	9,311	9,294	9,357	9,354	9,337	9,303	9,296	9,309	9,399	9,339	9,308	9,303	9,328	9,373	9,368
NYISO-HQ CEDARS	1,046	1,050	1,041	1,039	1,043	1,041	1,052	1,049	1,043	1,043	1,044	1,044	1,055	1,043	1,041	1,043	1,046	1,055	1,052
NORTHPORT NORWALK	1,016	929	1,169	1,275	1,336	1,414	1,449	1,432	1,584	1,602	1,608	1,608	1,601	1,593	1,545	1,585	1,592	1,568	1,572
LINDEN VFT	408	1,092	1,707	1,829	1,928	1,825	1,839	1,932	687	621	693	715	699	711	708	653	674	692	677
HTP	594	1,301	1,959	2,065	2,098	1,949	1,953	2,149	550	481	513	643	557	601	619	552	599	561	540
ISONE-NYISO	-3,797	-3,024	-3,607	-2,797	-1,711	-1,607	-1,444	-1,955	108	285	197	-128	356	277	286	444	301	489	479
Total Net Imports	22,684	30,556	32,531	34,343	36,724	36,723	37,100	37,369	27,346	27,164	27,550	27,345	28,007	27,531	27,582	27,174	27,403	27,178	27,219

Projected NYCA Net Imports (GWh)

Projected Net Imports(GWh)

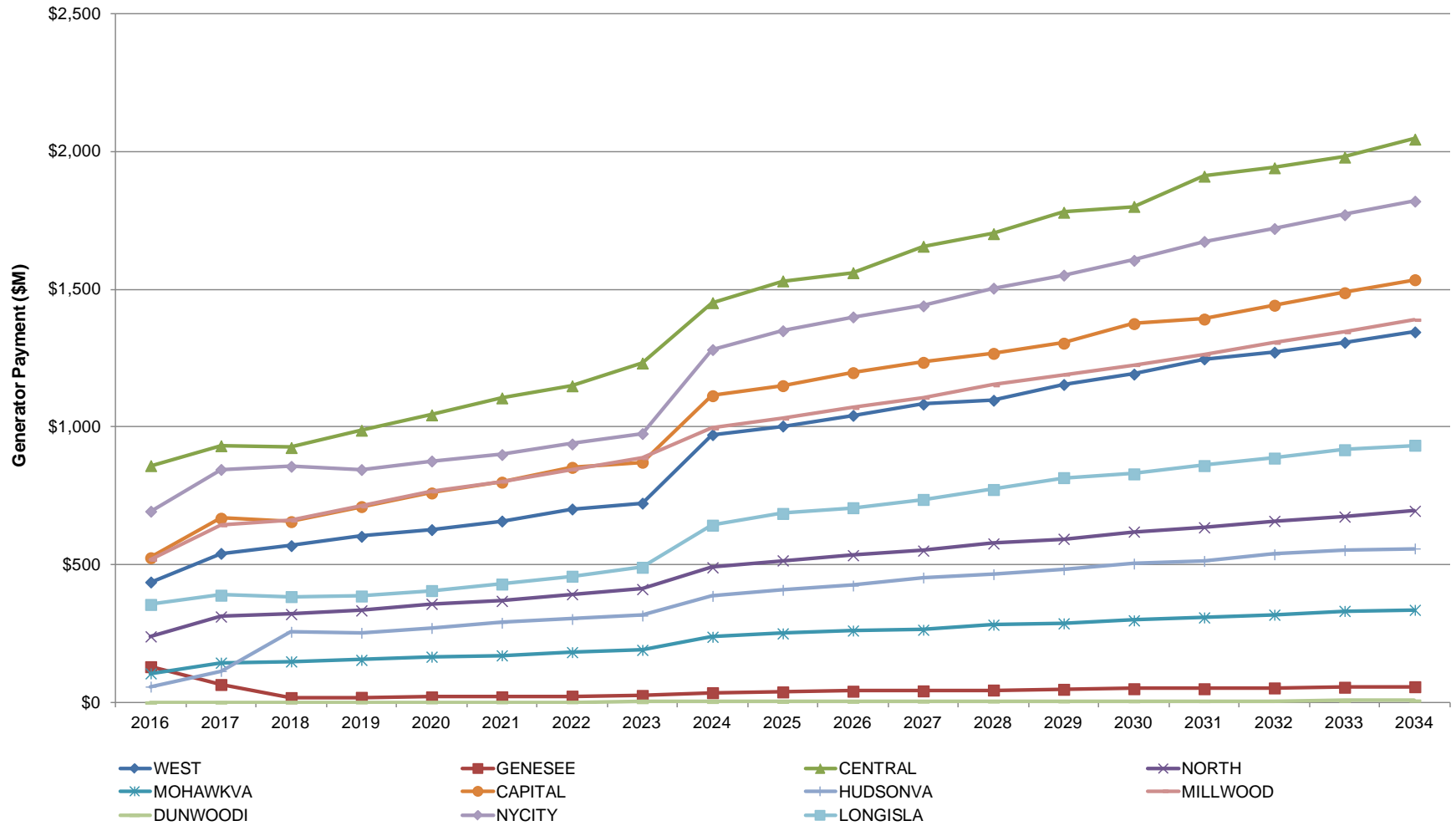


Projected Generator Payments (\$M)

Generation Payment (\$M)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	\$438	\$542	\$570	\$604	\$628	\$659	\$703	\$724	\$972	\$1,004	\$1,042	\$1,083	\$1,097	\$1,154	\$1,192	\$1,247	\$1,272	\$1,307	\$1,345
GENESEE	\$131	\$66	\$19	\$20	\$21	\$21	\$24	\$26	\$36	\$39	\$42	\$43	\$46	\$49	\$51	\$51	\$54	\$56	\$58
CENTRAL	\$860	\$932	\$926	\$989	\$1,044	\$1,106	\$1,150	\$1,232	\$1,451	\$1,530	\$1,560	\$1,656	\$1,702	\$1,779	\$1,800	\$1,910	\$1,941	\$1,979	\$2,045
NORTH	\$241	\$313	\$322	\$335	\$359	\$369	\$394	\$412	\$491	\$516	\$535	\$552	\$578	\$595	\$621	\$636	\$659	\$675	\$696
MOHAWKVA	\$107	\$145	\$150	\$155	\$167	\$172	\$183	\$192	\$239	\$251	\$262	\$265	\$283	\$288	\$299	\$309	\$319	\$333	\$337
CAPITAL	\$526	\$669	\$657	\$711	\$761	\$800	\$854	\$872	\$1,114	\$1,150	\$1,197	\$1,235	\$1,267	\$1,304	\$1,375	\$1,392	\$1,442	\$1,487	\$1,534
HUDSONVA	\$58	\$115	\$257	\$254	\$271	\$290	\$304	\$316	\$387	\$409	\$425	\$454	\$466	\$484	\$505	\$514	\$538	\$554	\$560
MILLWOOD	\$519	\$644	\$661	\$713	\$767	\$803	\$847	\$888	\$996	\$1,031	\$1,070	\$1,107	\$1,152	\$1,191	\$1,225	\$1,263	\$1,306	\$1,345	\$1,389
DUNWOODI	\$1	\$1	\$1	\$2	\$2	\$2	\$2	\$3	\$3	\$4	\$4	\$4	\$5	\$5	\$6	\$6	\$7	\$7	\$8
NYCITY	\$695	\$846	\$857	\$846	\$877	\$900	\$939	\$976	\$1,281	\$1,349	\$1,399	\$1,440	\$1,504	\$1,551	\$1,605	\$1,673	\$1,720	\$1,770	\$1,819
LONGISLA	\$357	\$390	\$385	\$387	\$407	\$430	\$459	\$491	\$644	\$687	\$707	\$737	\$773	\$817	\$830	\$860	\$887	\$918	\$934
NYCA Total	\$3,932	\$4,664	\$4,805	\$5,014	\$5,304	\$5,553	\$5,858	\$6,133	\$7,615	\$7,971	\$8,244	\$8,576	\$8,873	\$9,217	\$9,509	\$9,862	\$10,145	\$10,432	\$10,725

Projected Generator Payments (\$M)

Projected Generator Payment by Zone (\$M)

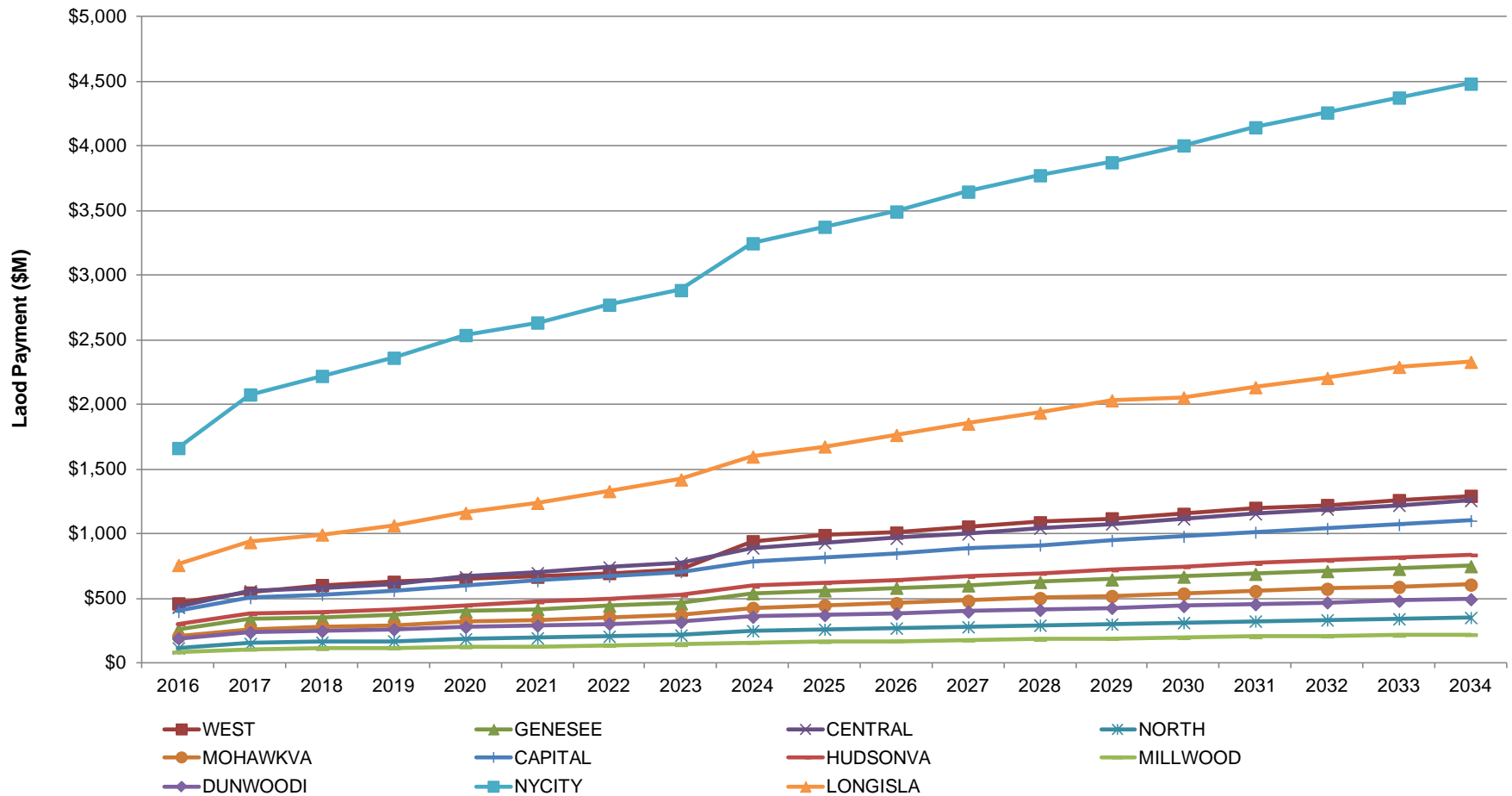


Projected Load Payments (\$M)

Load Payment (\$M)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	\$461	\$544	\$603	\$628	\$645	\$667	\$696	\$723	\$942	\$990	\$1,008	\$1,055	\$1,088	\$1,119	\$1,154	\$1,200	\$1,222	\$1,260	\$1,293
GENESEE	\$261	\$336	\$349	\$366	\$399	\$417	\$442	\$461	\$539	\$562	\$582	\$600	\$627	\$646	\$668	\$690	\$711	\$728	\$749
CENTRAL	\$431	\$558	\$579	\$609	\$666	\$697	\$742	\$774	\$890	\$930	\$965	\$999	\$1,043	\$1,077	\$1,115	\$1,154	\$1,191	\$1,221	\$1,257
NORTH	\$115	\$150	\$160	\$169	\$186	\$194	\$206	\$215	\$249	\$261	\$270	\$280	\$292	\$301	\$312	\$324	\$333	\$341	\$351
MOHAWKVA	\$202	\$262	\$275	\$290	\$318	\$332	\$354	\$370	\$426	\$446	\$463	\$481	\$502	\$518	\$537	\$556	\$574	\$588	\$606
CAPITAL	\$398	\$505	\$530	\$561	\$600	\$636	\$671	\$705	\$782	\$817	\$847	\$883	\$912	\$948	\$980	\$1,012	\$1,041	\$1,070	\$1,101
HUDSONVA	\$302	\$380	\$395	\$416	\$447	\$472	\$499	\$524	\$593	\$620	\$644	\$669	\$693	\$719	\$744	\$769	\$793	\$814	\$836
MILLWOOD	\$84	\$106	\$110	\$115	\$124	\$128	\$135	\$140	\$158	\$164	\$170	\$176	\$182	\$188	\$195	\$201	\$208	\$213	\$219
DUNWOODI	\$190	\$238	\$248	\$260	\$278	\$289	\$303	\$317	\$357	\$370	\$383	\$398	\$410	\$426	\$440	\$454	\$468	\$481	\$493
NYCITY	\$1,663	\$2,078	\$2,221	\$2,362	\$2,538	\$2,634	\$2,772	\$2,886	\$3,248	\$3,375	\$3,494	\$3,648	\$3,774	\$3,875	\$4,005	\$4,146	\$4,260	\$4,376	\$4,483
LONGISLA	\$758	\$935	\$994	\$1,065	\$1,162	\$1,239	\$1,330	\$1,420	\$1,597	\$1,675	\$1,765	\$1,852	\$1,937	\$2,033	\$2,055	\$2,134	\$2,206	\$2,292	\$2,330
NYCA Total	\$4,865	\$6,092	\$6,463	\$6,842	\$7,361	\$7,706	\$8,151	\$8,535	\$9,780	\$10,211	\$10,590	\$11,040	\$11,461	\$11,849	\$12,204	\$12,641	\$13,006	\$13,384	\$13,718

Projected Load Payments (\$M)

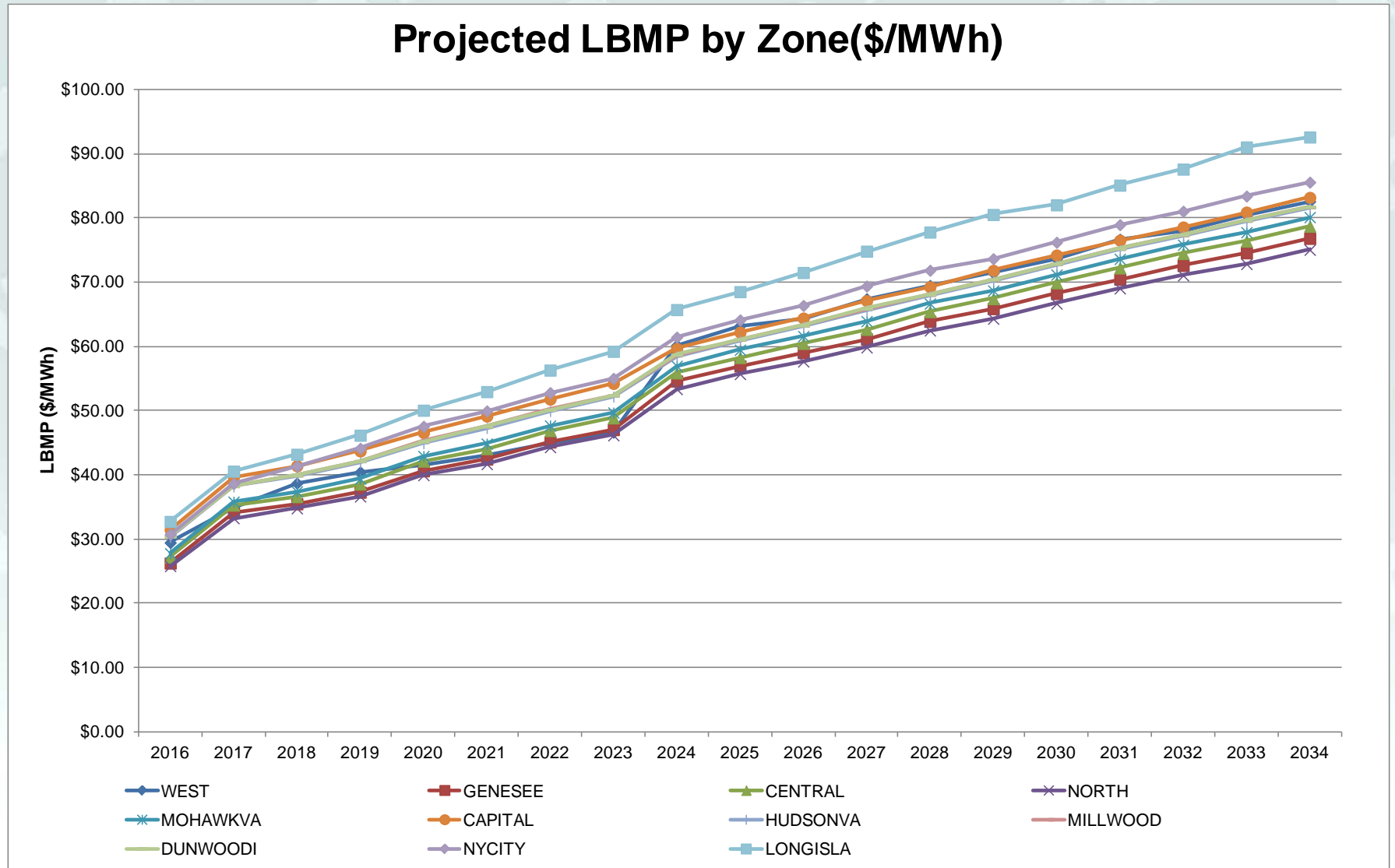
Projected Load Payment by Zone (\$M)



Projected LBMPs (\$/MWh)

LBMP (\$/MWh)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	\$29.48	\$34.94	\$38.72	\$40.46	\$41.58	\$43.08	\$44.94	\$46.66	\$60.20	\$63.25	\$64.38	\$67.42	\$69.49	\$71.45	\$73.66	\$76.69	\$77.98	\$80.45	\$82.60
GENESEE	\$26.28	\$34.13	\$35.50	\$37.31	\$40.64	\$42.46	\$45.12	\$47.06	\$54.62	\$56.96	\$59.03	\$61.16	\$63.91	\$65.89	\$68.24	\$70.47	\$72.61	\$74.58	\$76.83
CENTRAL	\$27.20	\$35.31	\$36.62	\$38.58	\$42.15	\$44.09	\$46.90	\$48.87	\$55.89	\$58.28	\$60.47	\$62.66	\$65.42	\$67.44	\$69.91	\$72.22	\$74.46	\$76.40	\$78.71
NORTH	\$25.82	\$33.27	\$34.81	\$36.66	\$39.98	\$41.70	\$44.33	\$46.18	\$53.37	\$55.72	\$57.67	\$59.86	\$62.50	\$64.33	\$66.69	\$69.05	\$71.07	\$72.85	\$75.06
MOHAWKVA	\$27.80	\$35.83	\$37.43	\$39.42	\$42.94	\$44.87	\$47.69	\$49.71	\$56.98	\$59.49	\$61.61	\$63.94	\$66.68	\$68.70	\$71.19	\$73.63	\$75.84	\$77.79	\$80.14
CAPITAL	\$31.50	\$39.72	\$41.42	\$43.73	\$46.60	\$49.16	\$51.80	\$54.25	\$59.68	\$62.22	\$64.41	\$67.13	\$69.28	\$71.84	\$74.23	\$76.54	\$78.59	\$80.91	\$83.20
HUDSONVA	\$30.35	\$38.21	\$39.78	\$41.98	\$44.94	\$47.31	\$49.96	\$52.19	\$58.44	\$60.95	\$63.08	\$65.63	\$67.88	\$70.24	\$72.65	\$75.03	\$77.16	\$79.40	\$81.54
MILLWOOD	\$30.48	\$38.33	\$39.95	\$42.18	\$45.23	\$47.56	\$50.17	\$52.42	\$58.70	\$61.10	\$63.27	\$65.90	\$68.07	\$70.40	\$72.86	\$75.23	\$77.36	\$79.62	\$81.70
DUNWOODI	\$30.43	\$38.26	\$39.95	\$42.18	\$45.22	\$47.55	\$50.16	\$52.40	\$58.72	\$61.13	\$63.28	\$65.92	\$68.10	\$70.43	\$72.88	\$75.26	\$77.40	\$79.64	\$81.73
NYCITY	\$30.77	\$38.66	\$41.37	\$44.14	\$47.57	\$49.96	\$52.81	\$55.03	\$61.45	\$64.13	\$66.38	\$69.40	\$71.86	\$73.66	\$76.22	\$78.96	\$81.05	\$83.41	\$85.58
LONGISLA	\$32.75	\$40.58	\$43.21	\$46.18	\$50.07	\$52.97	\$56.32	\$59.24	\$65.74	\$68.53	\$71.51	\$74.83	\$77.81	\$80.54	\$82.05	\$85.11	\$87.61	\$91.05	\$92.61

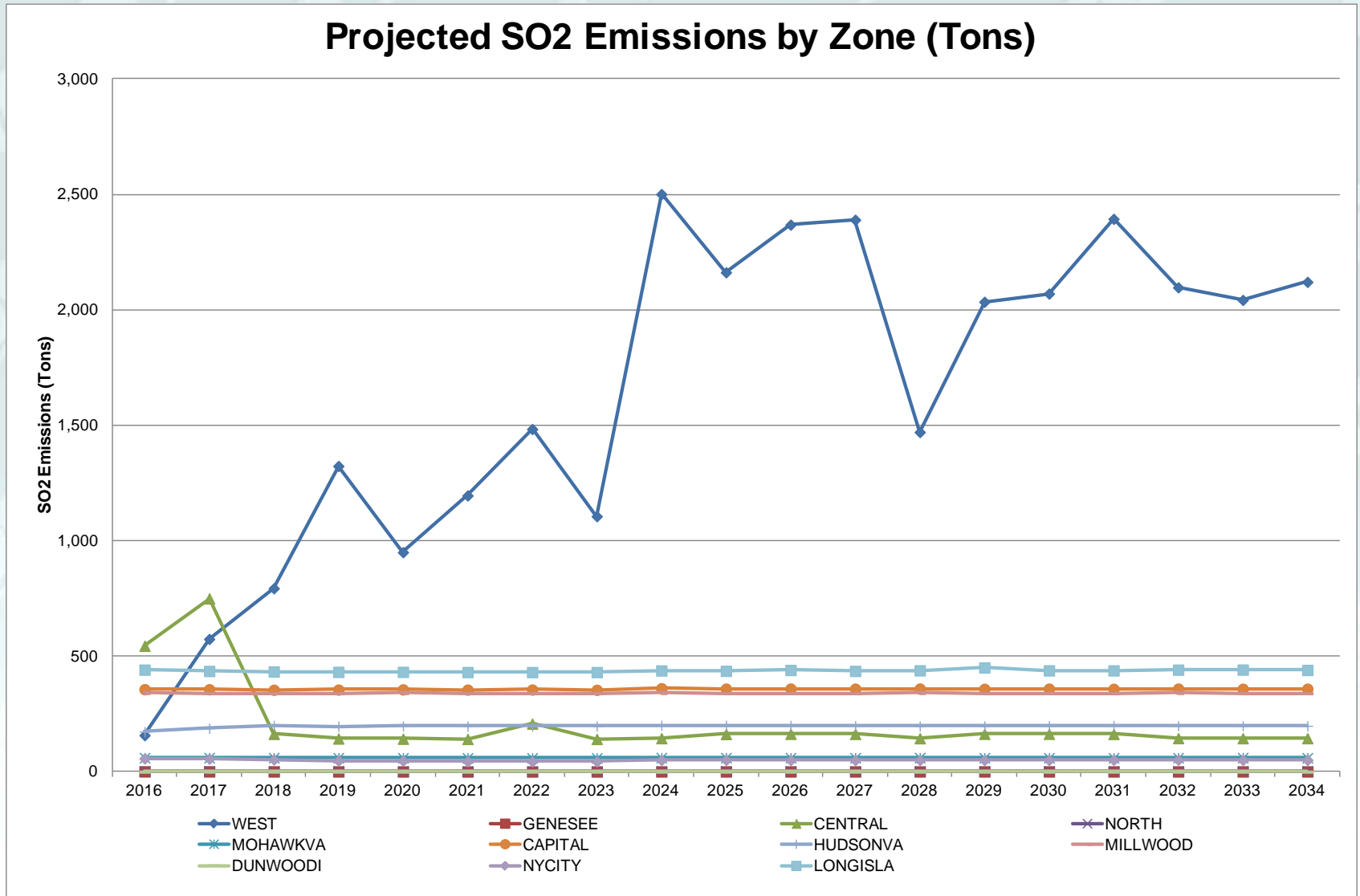
Projected LBMPs (\$/MWh)



Projected SO₂ Emissions (Tons)

SO ₂ Emissions (Tons)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	158	575	794	1,324	950	1,196	1,484	1,106	2,501	2,162	2,369	2,390	1,471	2,035	2,070	2,394	2,097	2,043	2,121
GENESEE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CENTRAL	545	750	163	143	143	142	208	142	145	163	164	163	145	164	164	163	145	145	145
NORTH	3	3	3	2	2	2	2	2	2	3	3	2	3	2	3	2	3	3	3
MOHAWKVA	60	61	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
CAPITAL	357	357	354	355	356	355	355	354	361	359	360	359	360	359	359	359	360	359	359
HUDSONVA	173	188	200	197	198	197	197	198	201	201	199	199	197	198	199	200	199	199	198
MILLWOOD	341	340	340	340	341	340	340	340	340	340	340	340	341	340	340	340	341	340	340
DUNWOODI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NYCITY	57	56	53	48	48	45	45	44	50	51	50	50	50	50	50	51	52	51	51
LONGISLA	442	436	433	432	432	431	431	431	438	436	440	436	439	451	438	438	442	442	440
NYCA Total	2,136	2,765	2,401	2,902	2,530	2,767	3,121	2,676	4,100	3,776	3,985	4,000	3,066	3,659	3,684	4,007	3,698	3,641	3,717

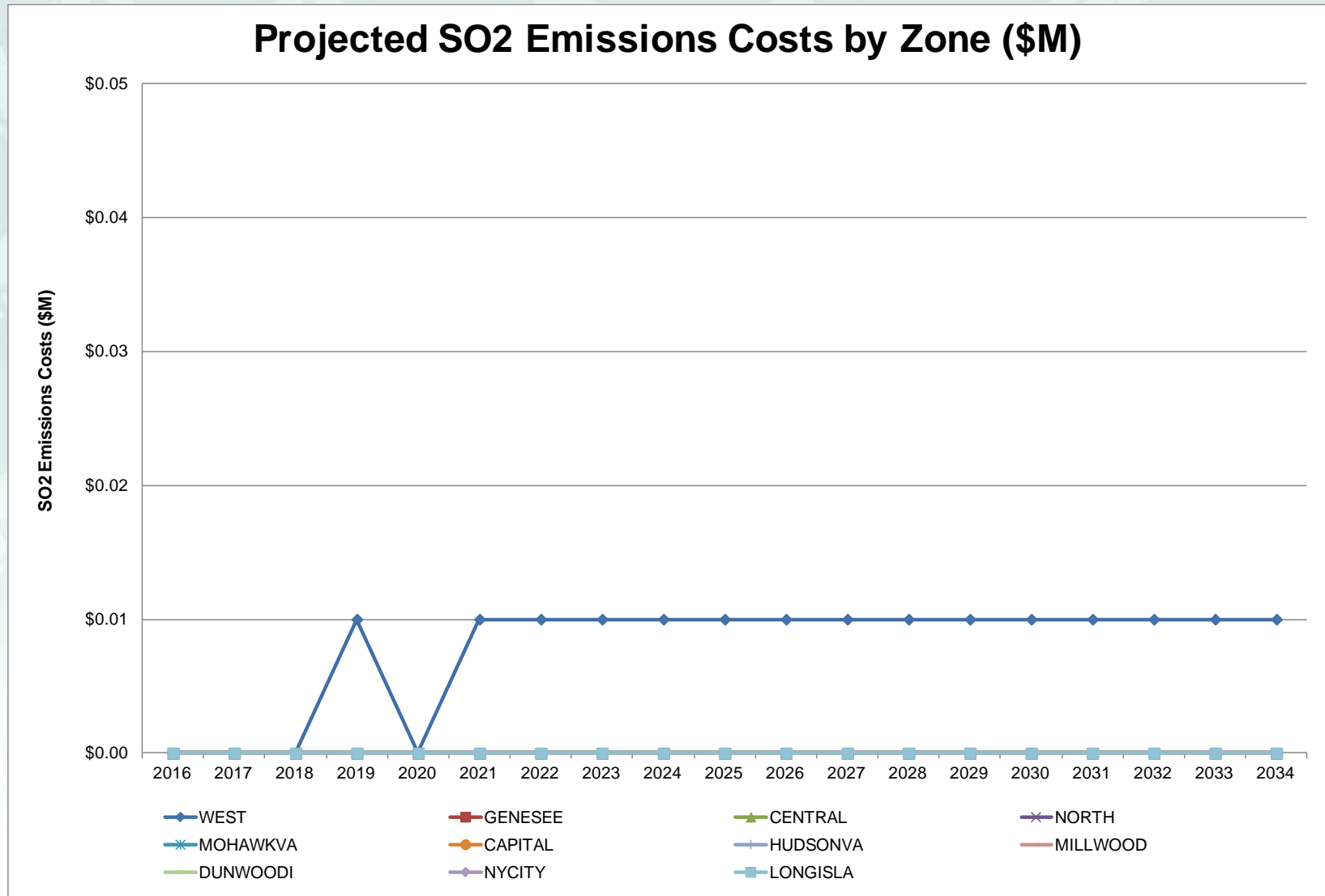
Projected SO₂ Emissions (Tons)



Projected SO₂ Emission Costs (\$M)

SO ₂ Emissions Costs (\$M)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
GENESEE	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
CENTRAL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
NORTH	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
MOHAWKVA	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
CAPITAL	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
HUDSONVA	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
MILLWOOD	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
DUNWOODI	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
NYCITY	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
LONGISLA	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
NYCA Total	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0

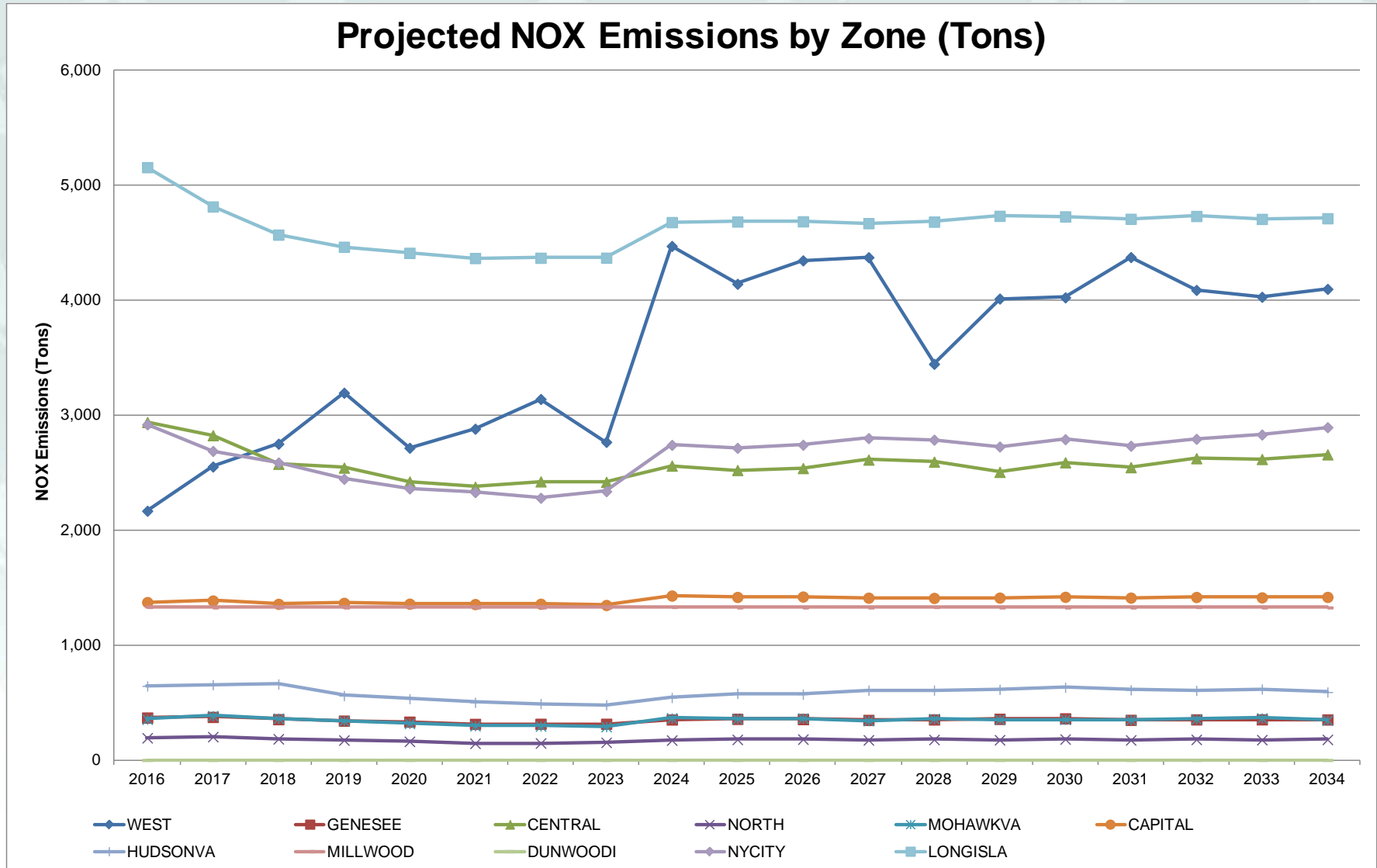
Projected SO₂ Emission Costs (\$M)



Projected NO_x Emissions (Tons)

NO _x Emissions (Tons)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	2,167	2,551	2,750	3,193	2,715	2,880	3,139	2,766	4,469	4,140	4,344	4,372	3,444	4,012	4,022	4,373	4,087	4,027	4,096
GENESEE	369	374	355	342	333	314	315	315	352	357	356	348	352	357	362	349	353	353	352
CENTRAL	2,938	2,824	2,575	2,542	2,421	2,376	2,422	2,418	2,559	2,521	2,538	2,612	2,594	2,505	2,588	2,546	2,624	2,617	2,657
NORTH	193	203	184	173	162	145	148	153	173	179	181	175	178	175	182	174	179	176	179
MOHAWKVA	354	385	363	341	318	298	295	290	365	360	364	342	359	352	353	350	357	365	347
CAPITAL	1,373	1,386	1,358	1,366	1,359	1,355	1,358	1,348	1,429	1,418	1,421	1,411	1,409	1,412	1,419	1,412	1,417	1,414	1,418
HUDSONVA	644	655	660	560	533	501	491	481	543	579	573	607	607	614	633	610	605	617	591
MILLWOOD	1,330	1,326	1,326	1,326	1,330	1,326	1,326	1,326	1,330	1,326	1,326	1,326	1,330	1,326	1,326	1,326	1,330	1,326	1,326
DUNWOODI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NYCITY	2,918	2,687	2,587	2,445	2,361	2,329	2,280	2,337	2,740	2,714	2,741	2,799	2,785	2,725	2,789	2,732	2,792	2,830	2,893
LONGISLA	5,154	4,812	4,568	4,462	4,410	4,364	4,367	4,367	4,677	4,682	4,684	4,667	4,680	4,731	4,727	4,705	4,730	4,705	4,710
NYCA Total	17,441	17,204	16,726	16,751	15,941	15,889	16,140	15,800	18,638	18,277	18,528	18,659	17,739	18,210	18,401	18,577	18,474	18,430	18,570

Projected NO_x Emissions (Tons)

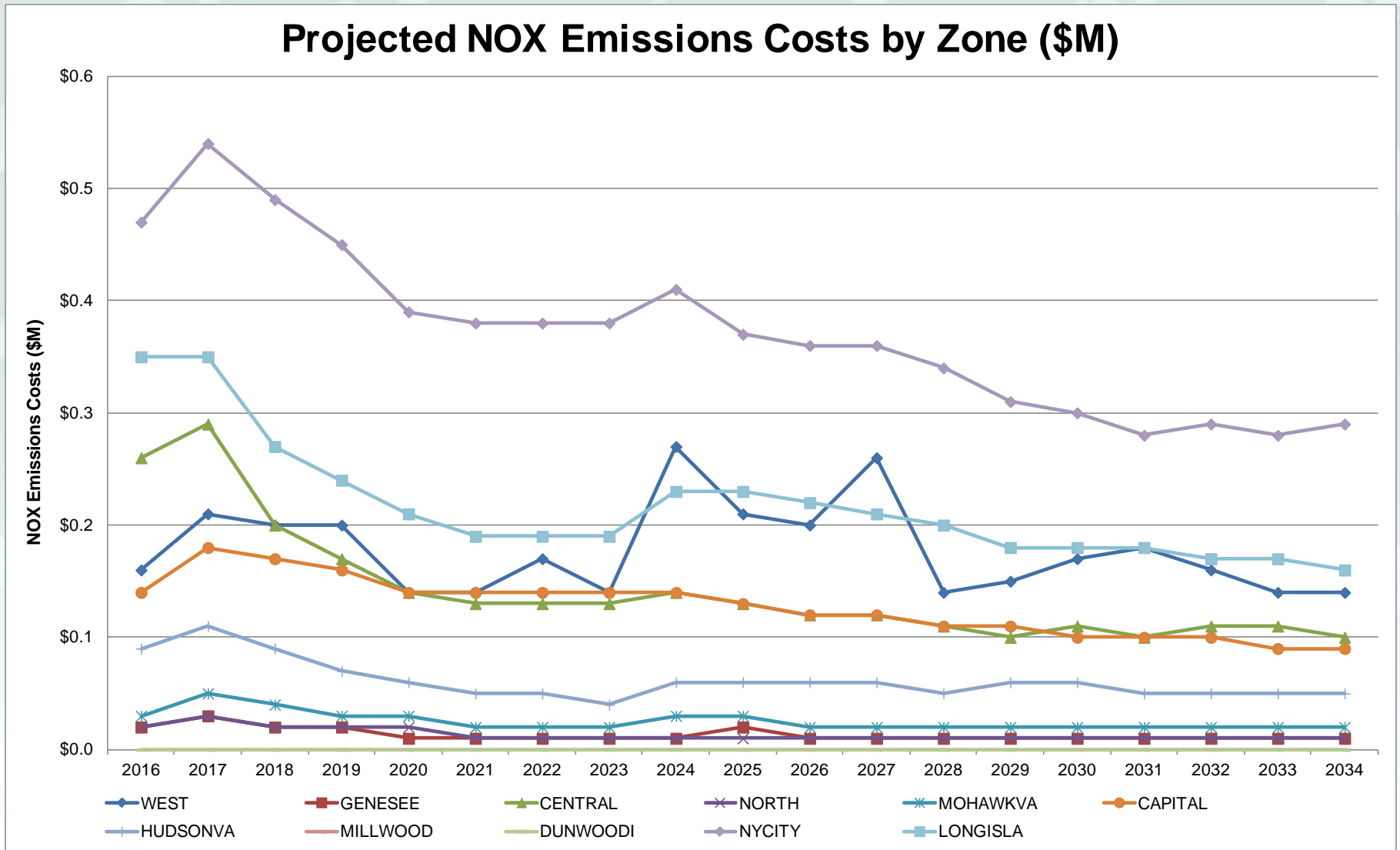


Projected NO_x Emission Costs (\$M)

NO _x Emissions Costs (\$M)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	\$0.2	\$0.2	\$0.2	\$0.2	\$0.1	\$0.1	\$0.2	\$0.1	\$0.3	\$0.2	\$0.2	\$0.3	\$0.1	\$0.2	\$0.2	\$0.2	\$0.2	\$0.1	\$0.1
GENESEE	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
CENTRAL	\$0.3	\$0.3	\$0.2	\$0.2	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
NORTH	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
MOHAWKVA	\$0.0	\$0.1	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
CAPITAL	\$0.1	\$0.2	\$0.2	\$0.2	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
HUDSONVA	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.0	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
MILLWOOD	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
DUNWOODI	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
NYCITY	\$0.5	\$0.5	\$0.5	\$0.4	\$0.4	\$0.4	\$0.4	\$0.4	\$0.4	\$0.4	\$0.4	\$0.4	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3	\$0.3
LONGISLA	\$0.3	\$0.3	\$0.3	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2
NYCA Total	\$1.5	\$1.8	\$1.5	\$1.4	\$1.1	\$1.1	\$1.1	\$1.1	\$1.3	\$1.2	\$1.1	\$1.2	\$1.0	\$1.0	\$1.0	\$0.9	\$0.9	\$0.9	\$0.9

Projected NO_x Emission Costs (\$M)

Projected NO_x Emissions Costs by Zone (\$M)

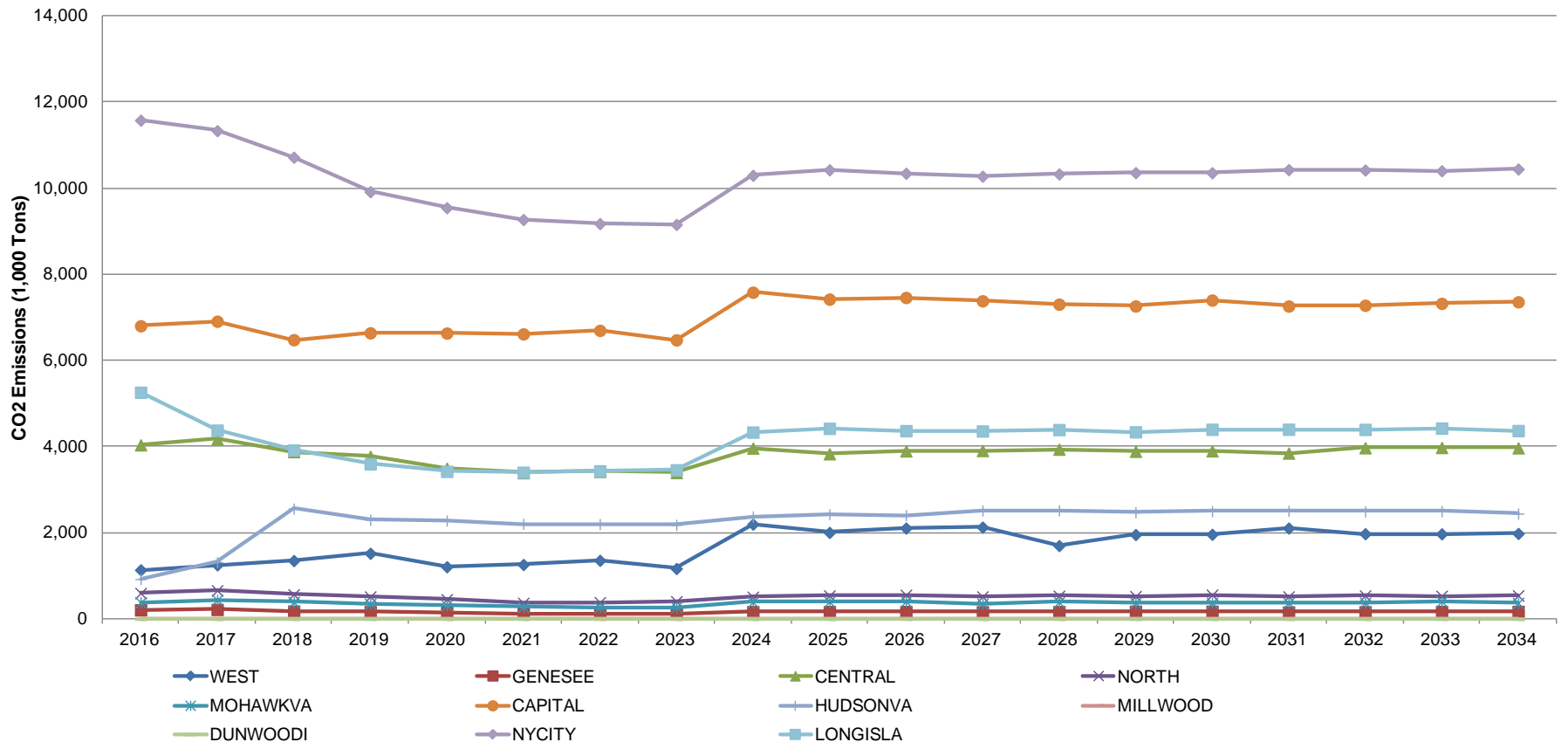


Projected CO₂ Emissions (1,000 Tons)

CO ₂ Emissions (1000 Tons)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	1,135	1,250	1,350	1,518	1,206	1,258	1,355	1,165	2,196	2,003	2,104	2,127	1,697	1,955	1,959	2,105	1,973	1,970	1,979
GENESEE	205	216	175	162	147	121	121	123	164	166	167	160	165	173	172	155	161	169	169
CENTRAL	4,037	4,171	3,879	3,770	3,494	3,390	3,420	3,393	3,962	3,829	3,896	3,905	3,936	3,887	3,898	3,846	3,969	3,976	3,967
NORTH	594	656	564	513	448	367	382	403	506	537	552	515	529	522	555	515	537	528	539
MOHAWKVA	379	438	388	345	308	271	267	267	386	397	403	350	387	370	371	367	373	403	366
CAPITAL	6,801	6,907	6,478	6,637	6,632	6,613	6,694	6,474	7,580	7,420	7,458	7,380	7,303	7,260	7,398	7,259	7,277	7,321	7,357
HUDSONVA	921	1,315	2,556	2,299	2,281	2,204	2,195	2,179	2,374	2,425	2,404	2,511	2,516	2,471	2,496	2,505	2,495	2,498	2,442
MILLWOOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DUNWOODI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NYCITY	11,575	11,332	10,715	9,915	9,542	9,268	9,173	9,154	10,295	10,423	10,342	10,274	10,326	10,356	10,353	10,427	10,418	10,400	10,441
LONGISLA	5,258	4,378	3,916	3,597	3,421	3,401	3,433	3,456	4,333	4,420	4,366	4,359	4,390	4,339	4,397	4,399	4,395	4,426	4,368
NYCA Total	30,904	30,661	30,021	28,757	27,477	26,891	27,039	26,615	31,797	31,618	31,693	31,581	31,251	31,333	31,600	31,578	31,597	31,693	31,627

Projected CO₂ Emissions (1,000 Tons)

Projected CO₂ Emissions by Zone (1,000 Tons)

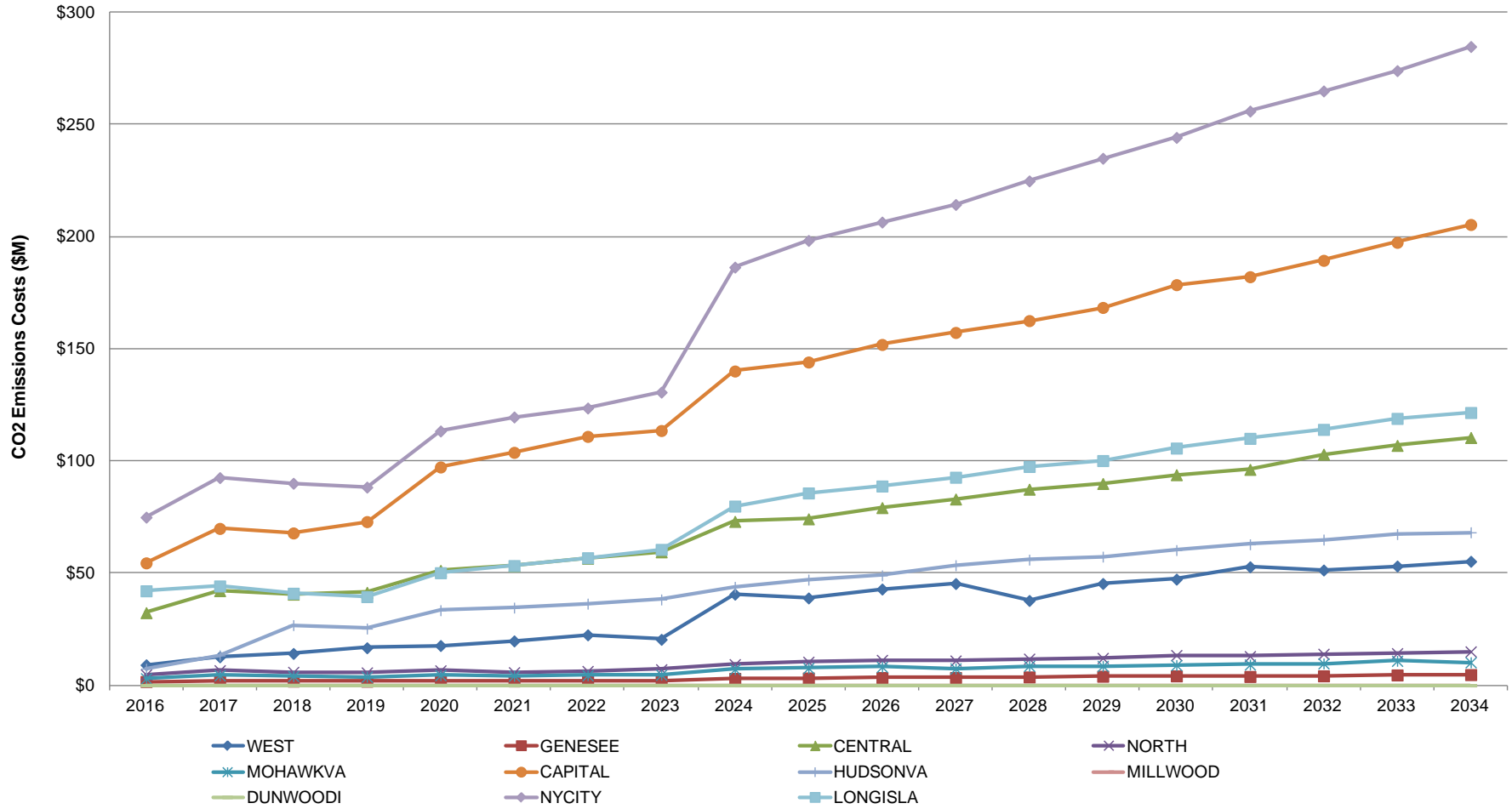


Projected CO₂ Emission Costs (\$M)

CO ₂ Emissions Costs (\$M)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
WEST	9.1	12.6	14.1	16.7	17.7	19.8	22.5	20.4	40.6	38.9	42.9	45.3	37.8	45.3	47.3	52.8	51.4	53.1	55.3
GENESEE	1.6	2.2	1.8	1.8	2.2	1.9	2.0	2.2	3.0	3.2	3.4	3.4	3.7	4.0	4.2	3.9	4.2	4.6	4.7
CENTRAL	32.3	42.2	40.6	41.4	51.2	53.2	56.6	59.5	73.0	74.2	79.2	83.0	87.4	89.9	93.8	96.2	103.0	106.9	110.4
NORTH	4.8	6.6	5.9	5.6	6.6	5.8	6.3	7.1	9.4	10.4	11.3	11.0	11.8	12.1	13.4	12.9	14.0	14.3	15.1
MOHAWKVA	3.0	4.4	4.1	3.8	4.5	4.3	4.4	4.7	7.1	7.7	8.2	7.5	8.6	8.6	9.0	9.2	9.7	10.9	10.2
CAPITAL	54.5	69.9	67.9	72.9	97.3	103.8	110.9	113.6	140.1	144.1	151.9	157.3	162.6	168.4	178.6	182.1	189.4	197.5	205.4
HUDSONVA	7.4	13.3	26.8	25.3	33.5	34.6	36.4	38.2	43.9	47.1	49.0	53.5	56.0	57.3	60.3	62.8	64.9	67.4	68.2
MILLWOOD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DUNWOODI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NYCITY	74.9	92.6	90.0	88.3	113.3	119.6	123.6	130.7	186.4	198.3	206.5	214.3	224.9	234.9	244.2	256.0	265.0	274.0	284.8
LONGISLA	42.1	44.2	41.0	39.5	50.2	53.3	56.8	60.5	79.9	85.7	88.8	92.7	97.5	100.2	105.7	110.1	114.1	119.0	121.6
NYCATotal	229.8	288.0	292.3	295.3	376.4	396.2	419.5	436.8	583.4	609.6	641.1	668.0	690.2	720.9	756.5	786.1	815.6	847.6	875.6

Projected CO₂ Emission Costs (\$M)

Projected CO₂ Emissions Costs by Zone (\$M)



The mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefit to consumers by:

- *Maintaining and enhancing regional reliability*
- *Operating open, fair and competitive wholesale electricity markets*
- *Planning the power system for the future*
- *Providing factual information to policy makers, stakeholders and investors in the power system*

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