

2023-2042 System & Resource Outlook Update

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Electric System Planning Working Group (ESPWG)

Tuesday, December 19, 2023

Agenda

- **Scope & Schedule Review**
- **Reference Case Updates**
 - Contract Case
 - Policy Case
- **Next Steps**
- **Outlook Data Catalog**
- **Appendix**

Scope & Schedule Review

System & Resource Outlook Scope



Preliminary Targeted Study Schedule

2023 Q4	Month	October					November				December			
	Week	1	2	3	4	5	1	2	3	4	1	2	3	4
	Benchmarking													
	Assumptions Development	X	X	X	X	X	X	X	X	X				
	CapEx Model Development	X	X	X	X	X	X	X	X	X	X	X	X	X
	Production Cost Model Development	X	X	X	X	X	X	X	X	X	X	X	X	X
	CapEx Results													
	Production Cost Results													
	Analyses													
	Report													

2024 Q1	Month	January					February				March			
	Week	1	2	3	4	5	1	2	3	4	1	2	3	4
	Benchmarking													
	Assumptions Development													
	CapEx Model Development	X	X	X	X	X								
	CapEx Results	X	X	X	X	X	X	X	X	X				
	Production Cost Model Development	X	X	X	X	X	X	X	X	X				
	Production Cost Results	X	X	X	X	X	X	X	X	X				
	Analyses	X	X	X	X	X	X	X	X	X	X	X	X	X
	Report										X	X	X	X

Contract Case

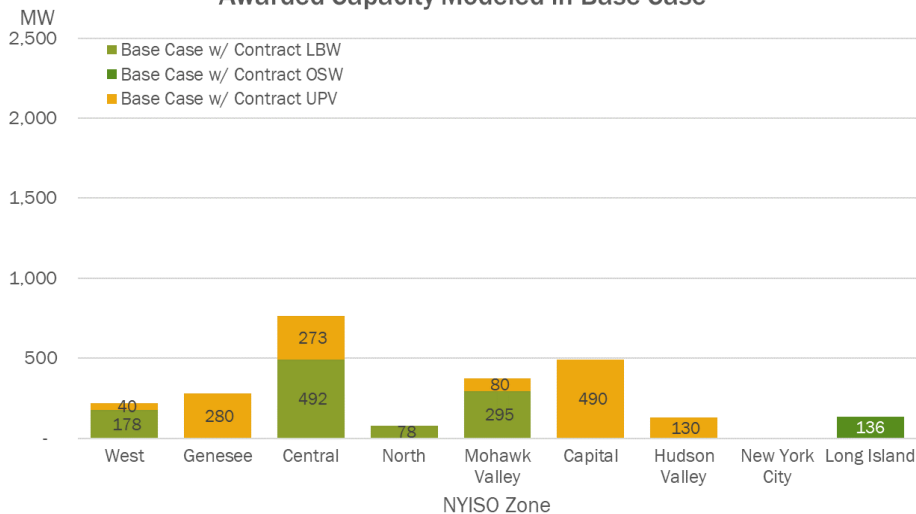
Contract Case Assumptions

- Load, fuel price, and emission allowance price assumptions are the same as the Base Case forecasts
- Renewable generation resource additions are based on the current NYSERDA Renewable Energy Certificate (REC) contracts database and announced awards as of 10/30/2023
 - In addition to details presented at 10/24/23 ESPWG, the REC and OREC awards announced on 10/24/2023 are included in the Contract (and Policy) Case
 - Incremental additions consider resources already included in the Base Case based on the inclusion rules
- Inclusion of approved Phase 1 and 2 transmission projects approved in February 2023 PSC Order, including the Brooklyn Clean Energy Hub

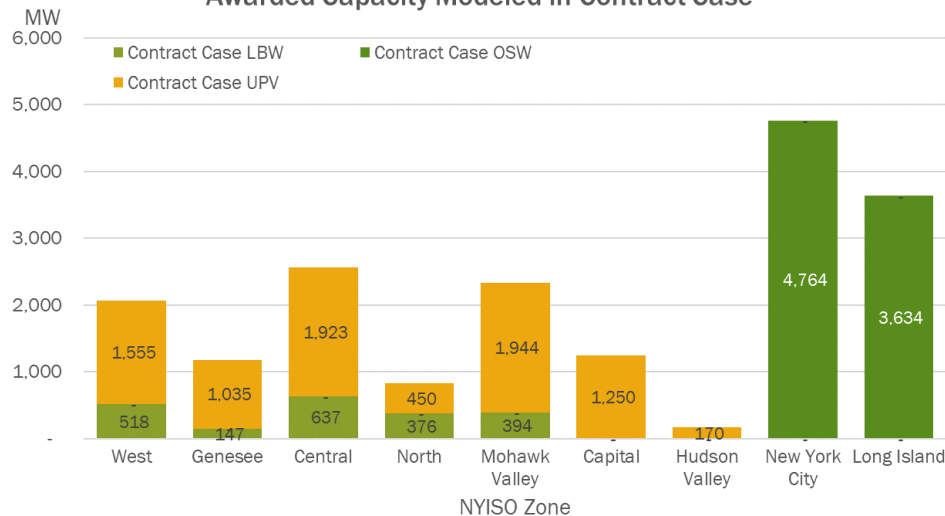
Summary of REC Awarded Capacity Additions

- Figures show awarded capacity assumed in the Base Case, as well as total awarded generation resources that meet filter criteria in the Contract Case

Awarded Capacity Modeled in Base Case



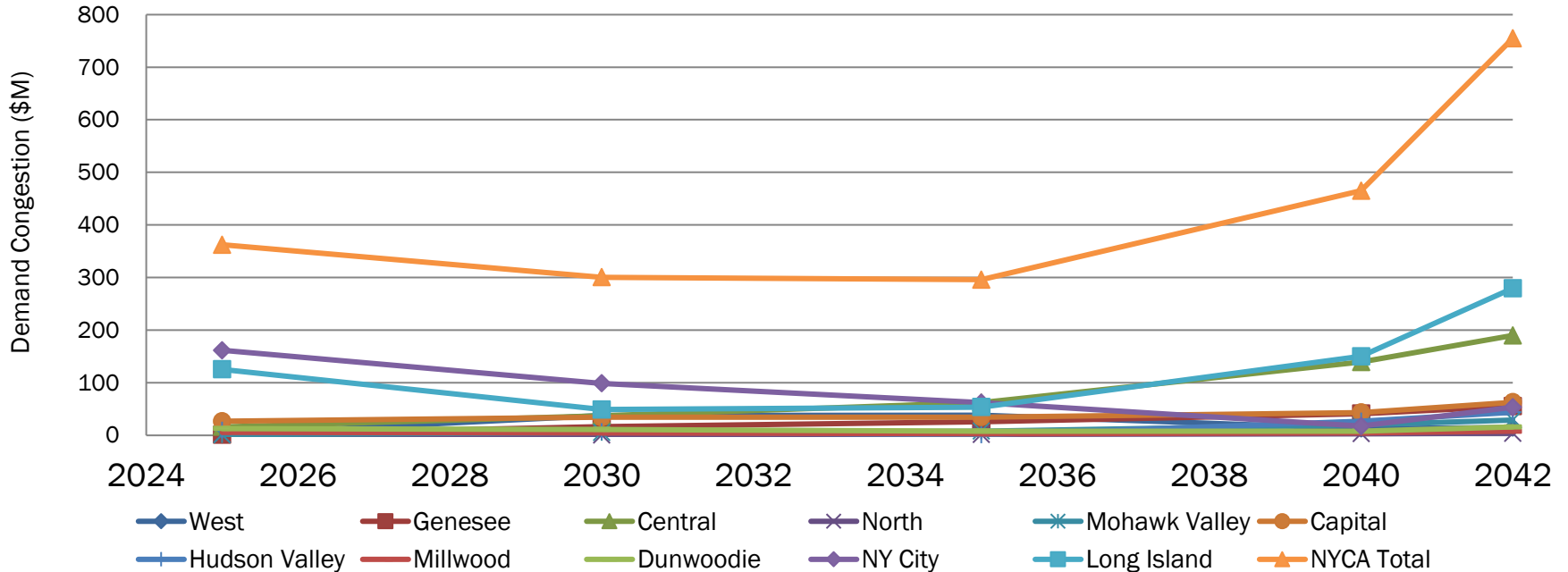
Awarded Capacity Modeled in Contract Case



Preliminary Contract Case Key Considerations

- Large amounts of LBW and UPV resources added to the model in upstate zones and awarded OSW resources modeled in New York City and Long Island
- Clean Path NY HVDC line modeled as in-service in 2027
- Local upgrades that are part of CLCPA Phase 1 and 2 projects modeled as per information provided by TOs
 - See [11/21/23 ESPWG](#) for additional detail
- Load, fuel price, and emissions price forecast and retirement assumptions consistent with the Base Case
- The Contract Case is not intended to meet full achievement of CLCPA policy objectives

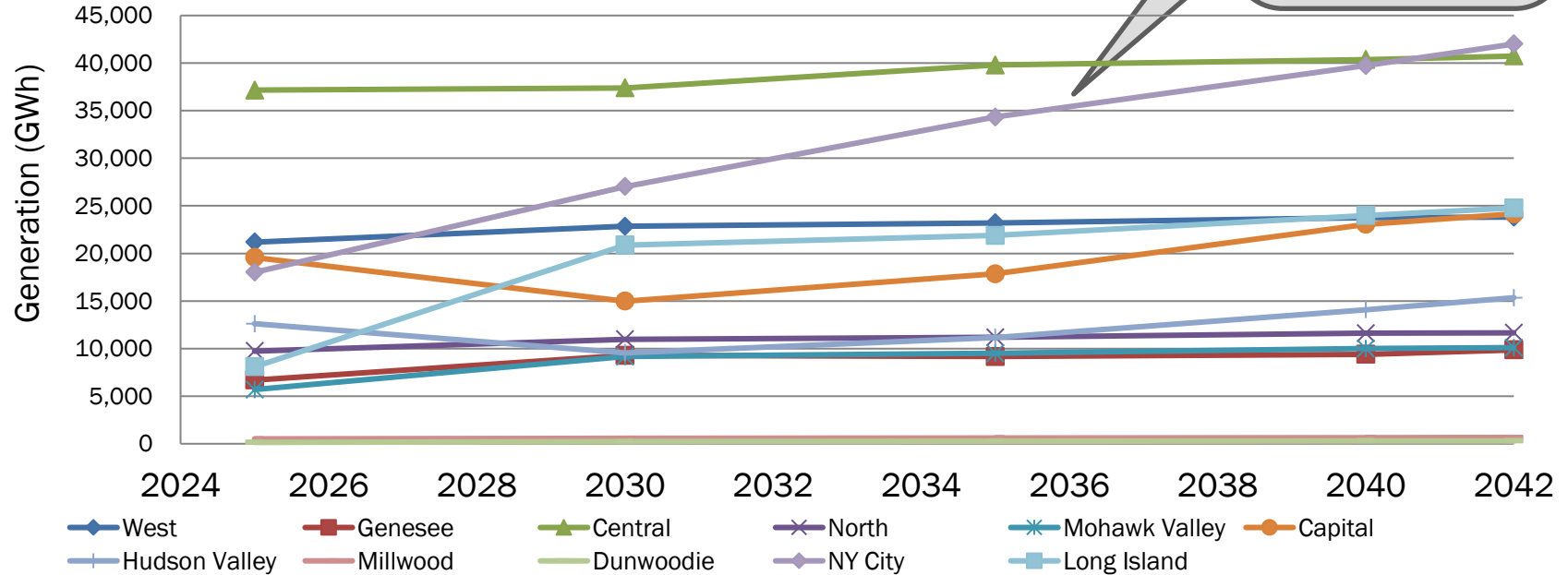
Zonal Demand Congestion (nominal \$M)



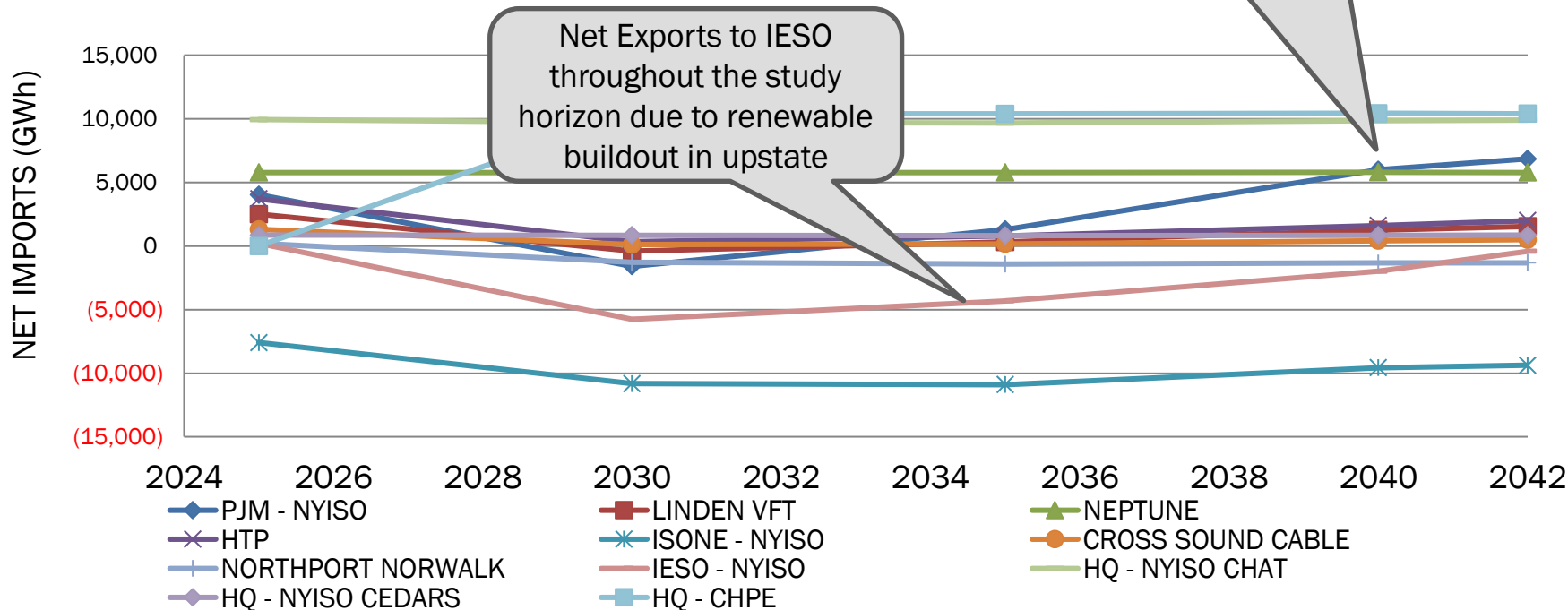
$$\text{Zonal Demand Congestion} = \sum_{\text{hour } 1}^{8760} \left[\sum_{\text{constraint } j}^n \text{Shadow Price}_j \times \text{Zone GSF} \times \text{Zone Load} \right]$$

Zonal NYCA Generation (GWh)

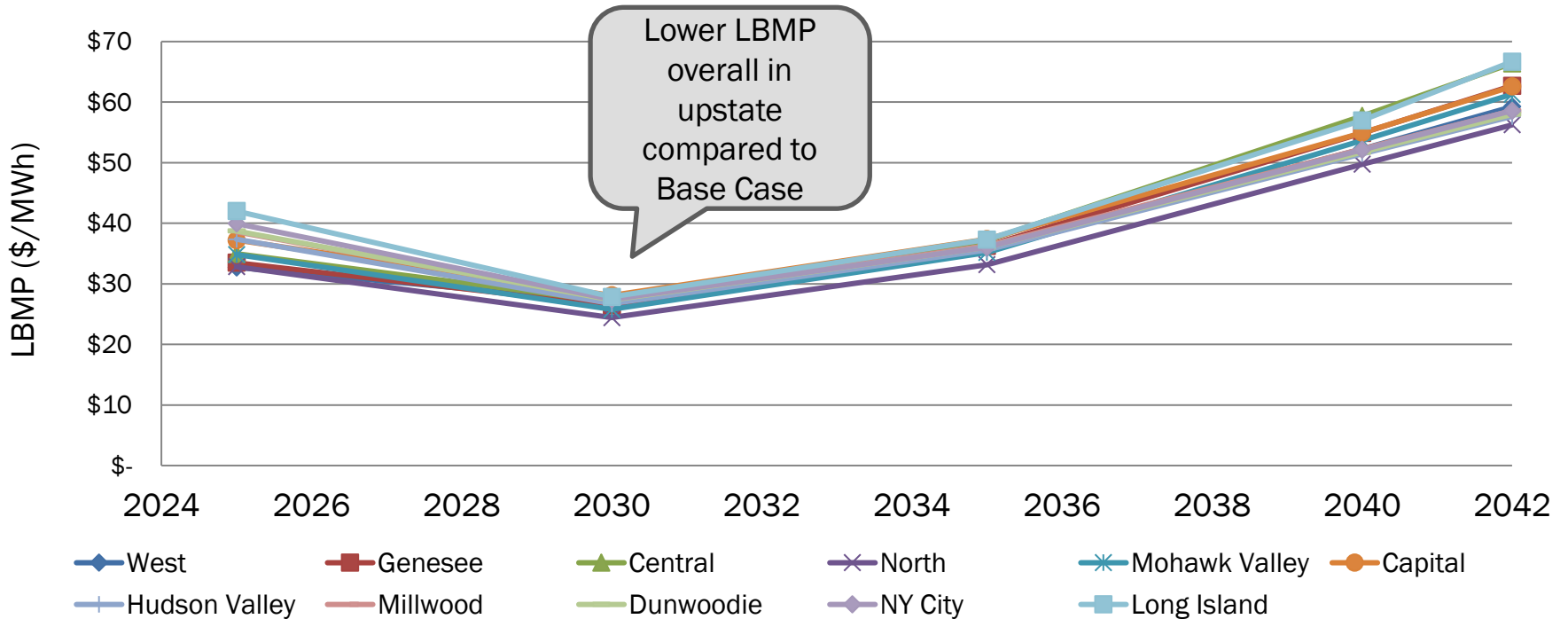
New York City and Long Island show increased generation due to OSW resources coming online



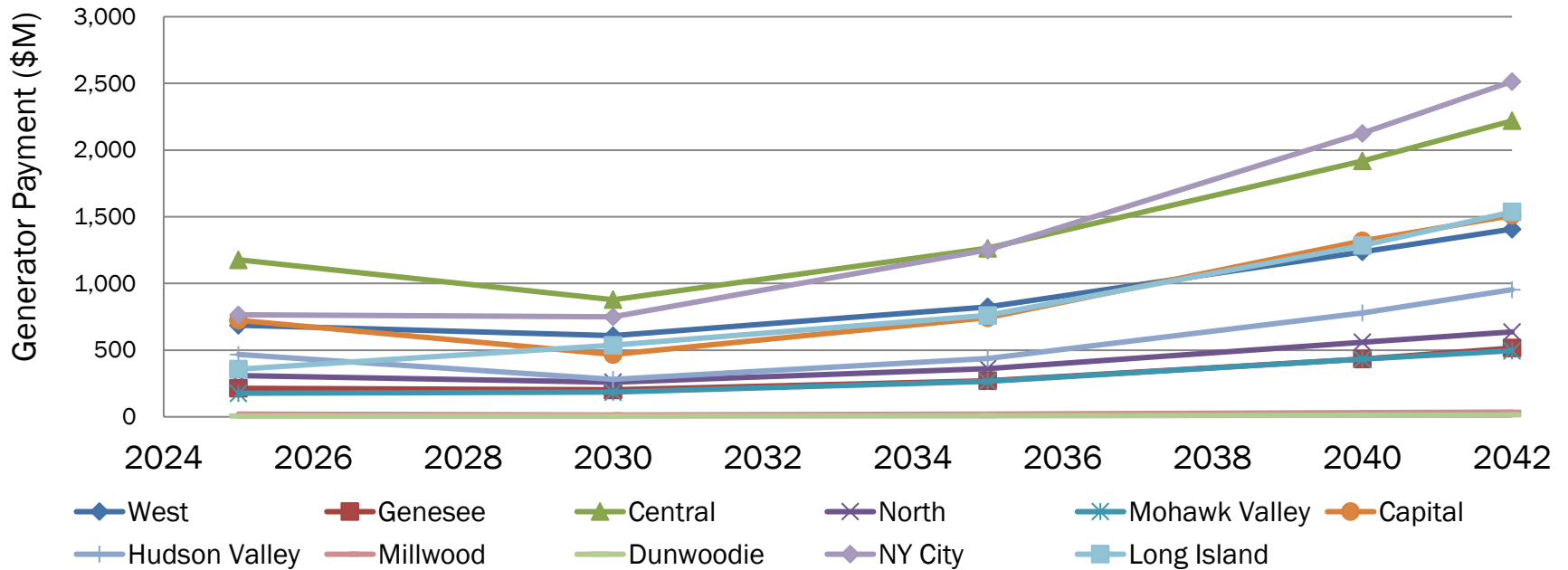
Projected Net Imports (GWh)



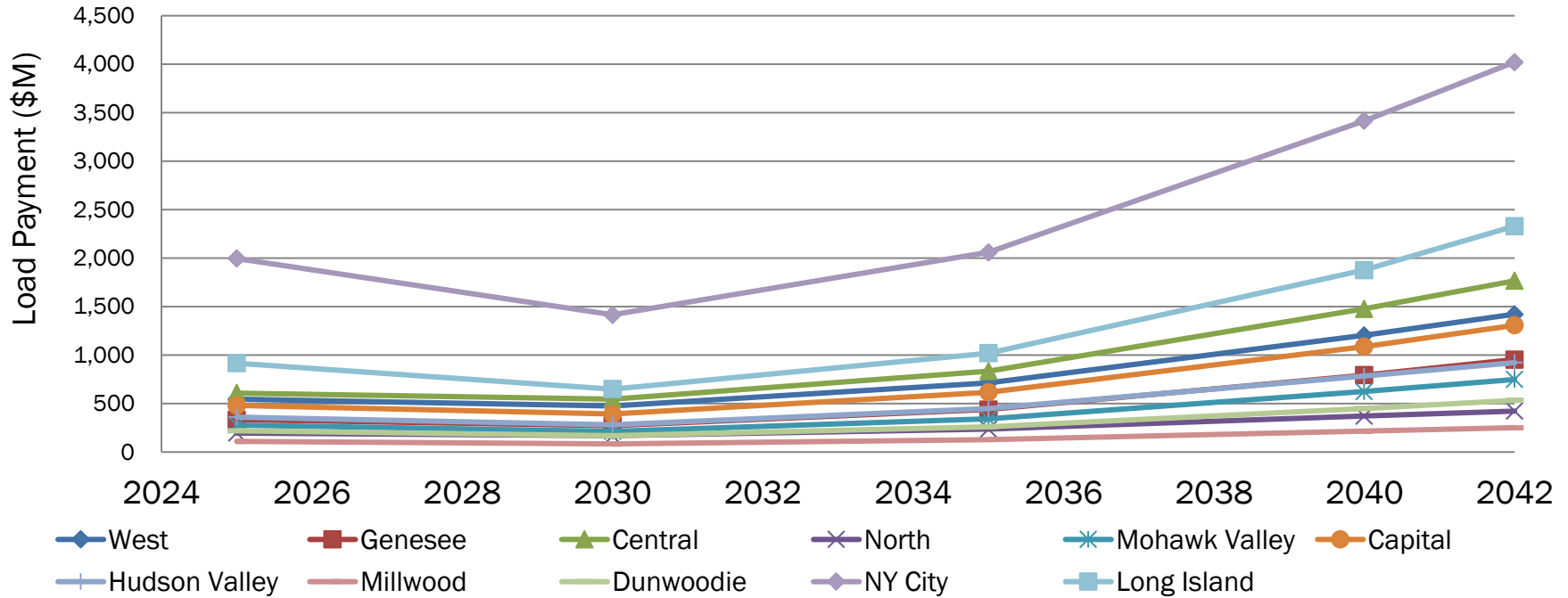
Zonal NYCA LBMP (\$/MWh)



Zonal Generator Payments (nominal \$M)

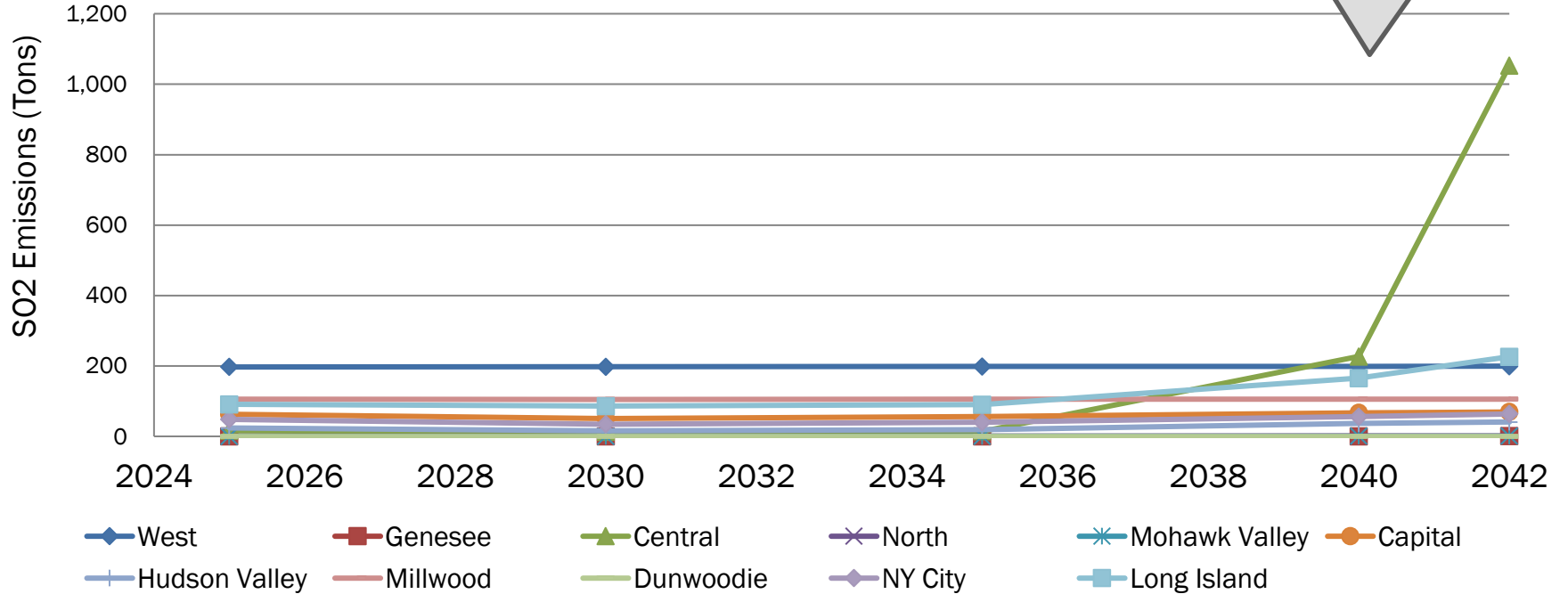


Zonal Load Payments (nominal \$M)

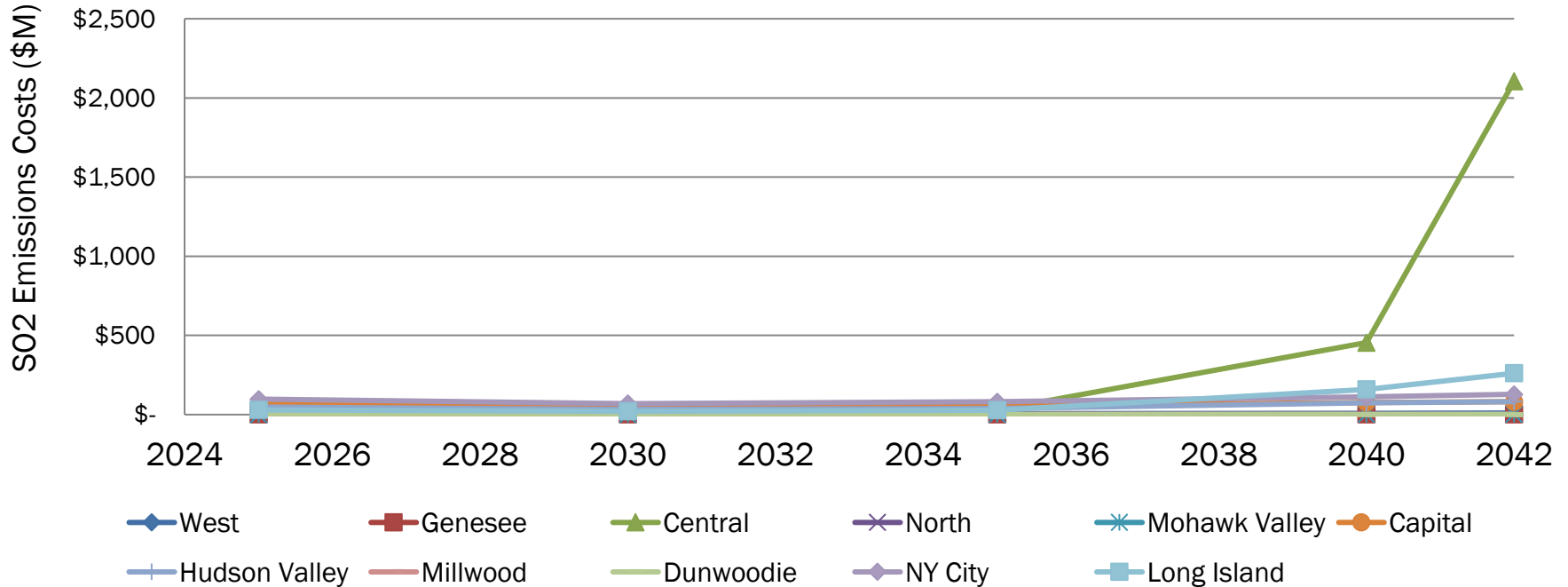


Zonal SO₂ Emissions (Tons)

Fossil-fuel generators in Zone C online due to higher demand

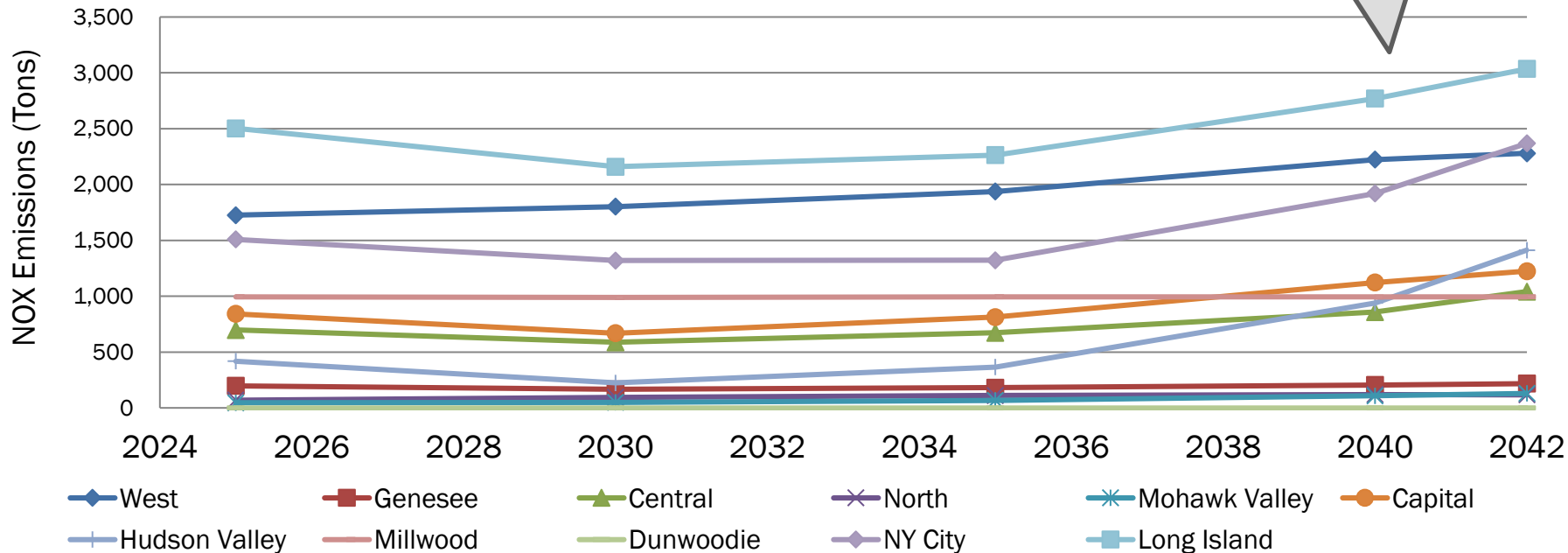


Zonal SO₂ Emissions Costs (nominal \$)

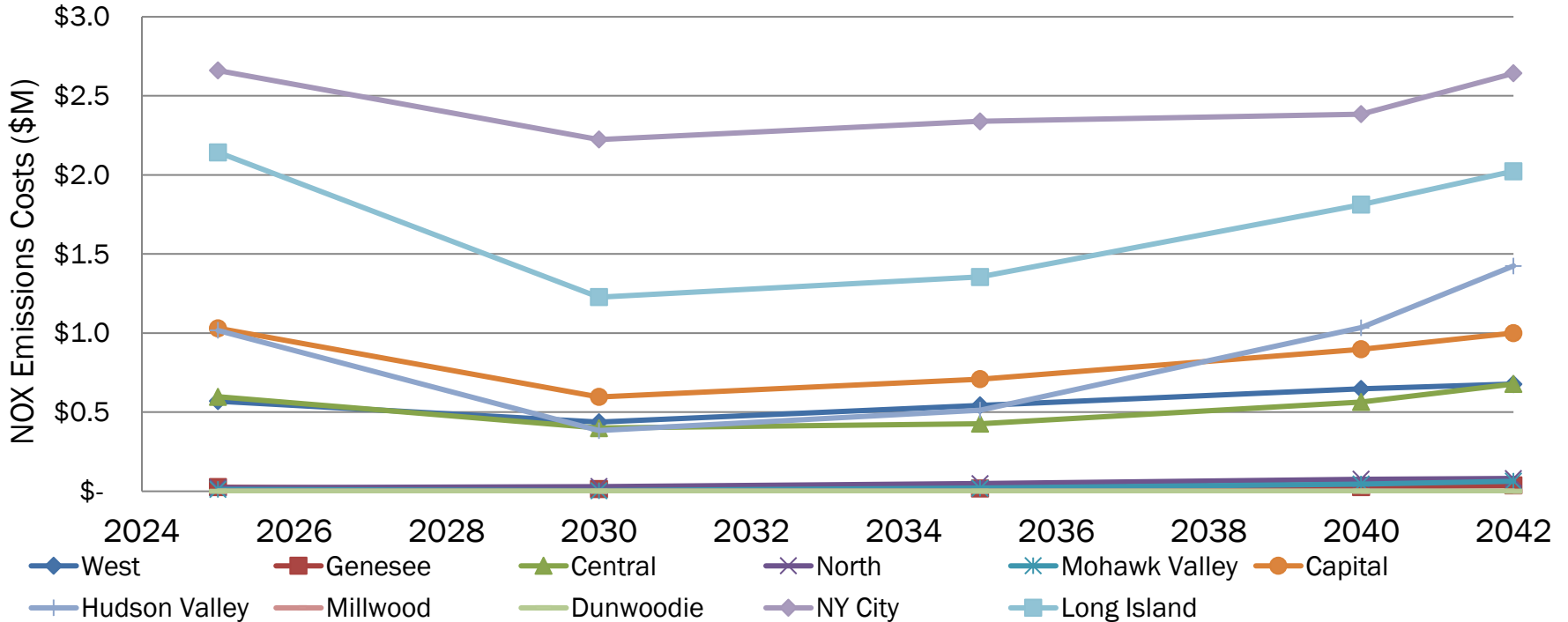


Zonal NO_x Emissions (Tons)

Overall lower NO_x emissions NYCA-wide compared to Base Case

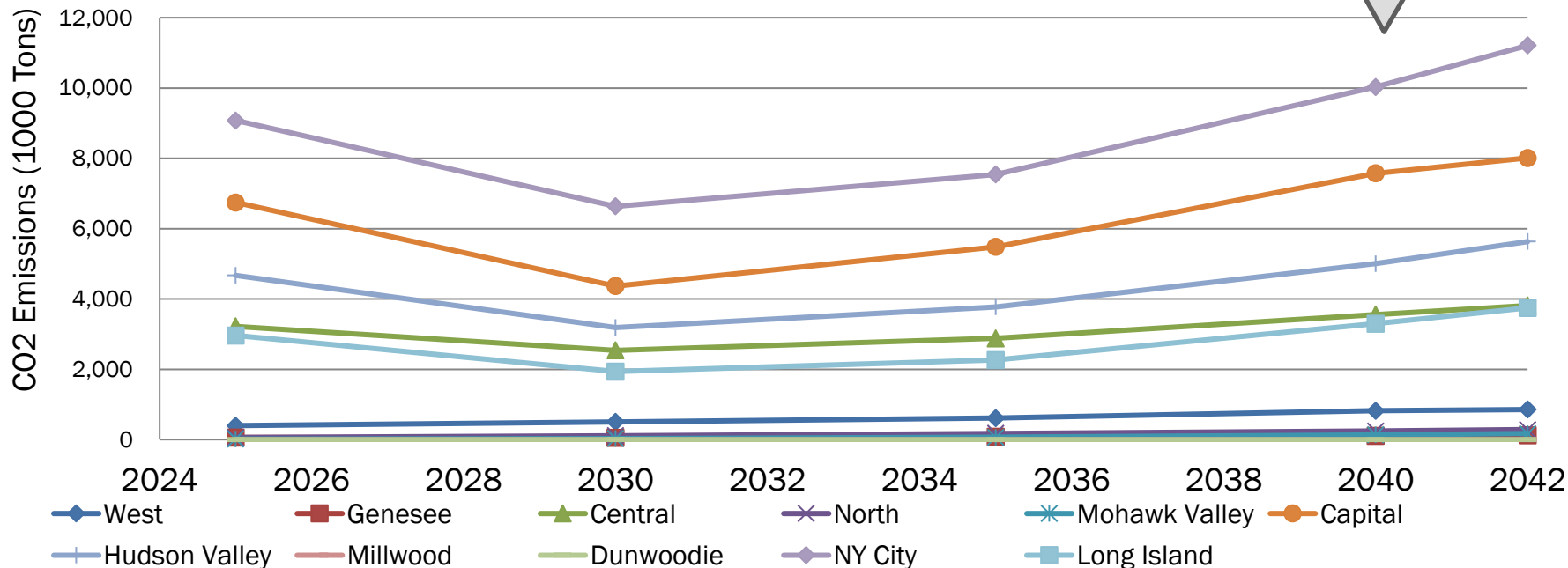


Zonal NO_x Emissions Costs (nominal \$M)

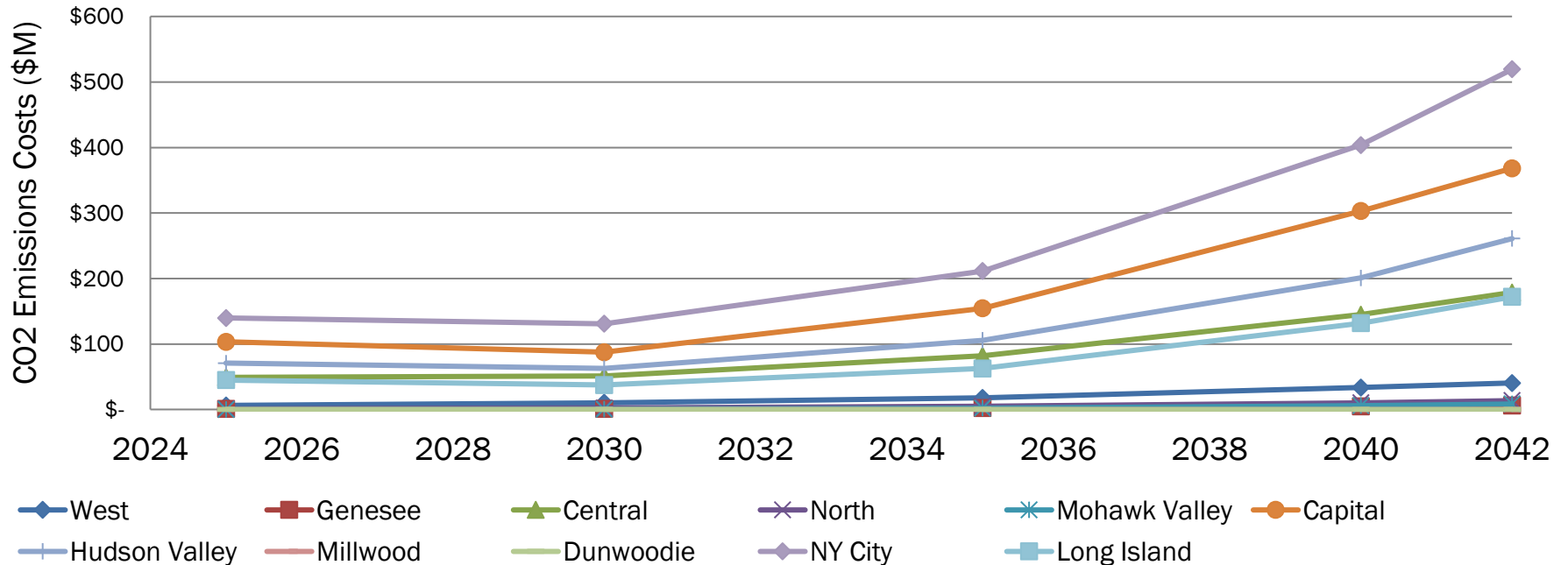


Zonal CO₂ Emissions (1000 Tons)

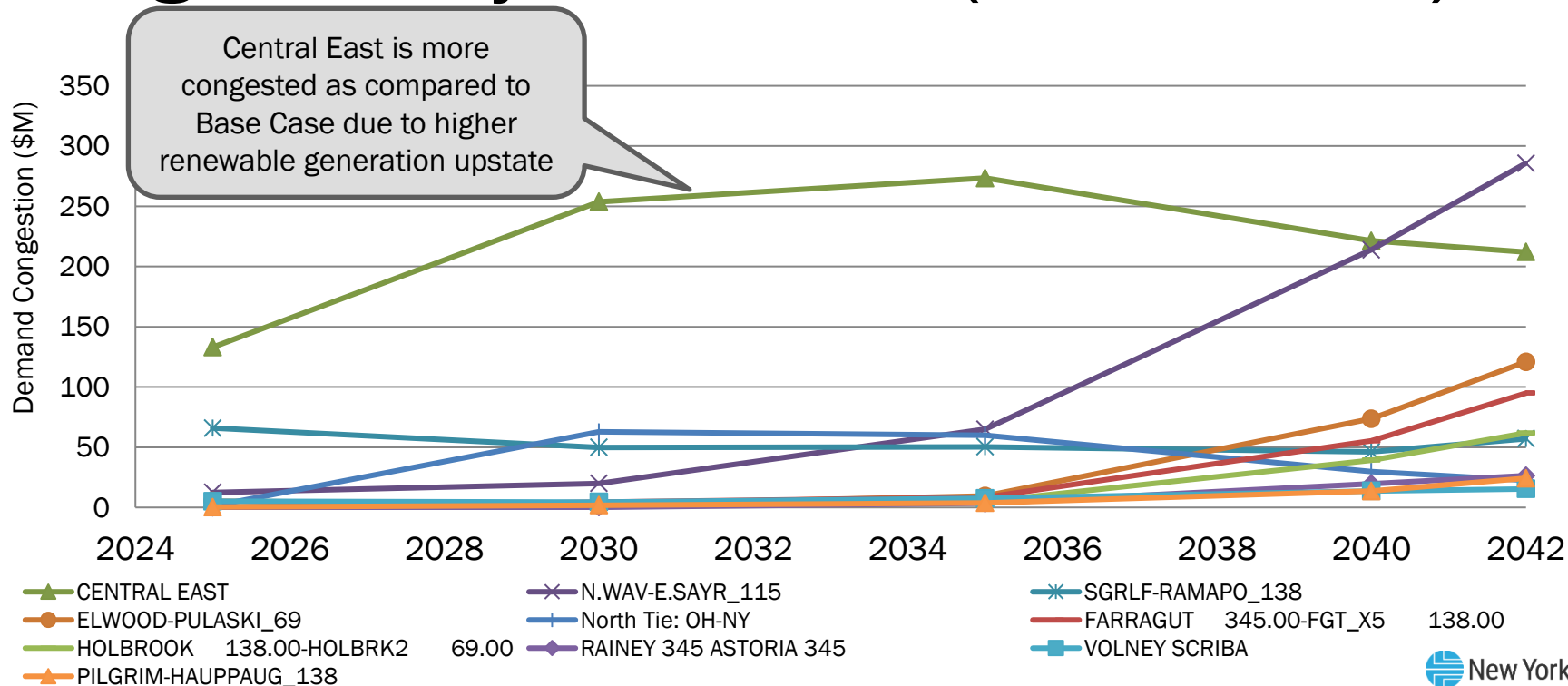
Overall lower CO₂ emissions NYCA-wide compared to Base Case



Zonal CO₂ Emissions Costs (nominal \$M)



Projected NYCA-Wide Demand Congestion by Constraint (nominal \$M)



Key Takeaways

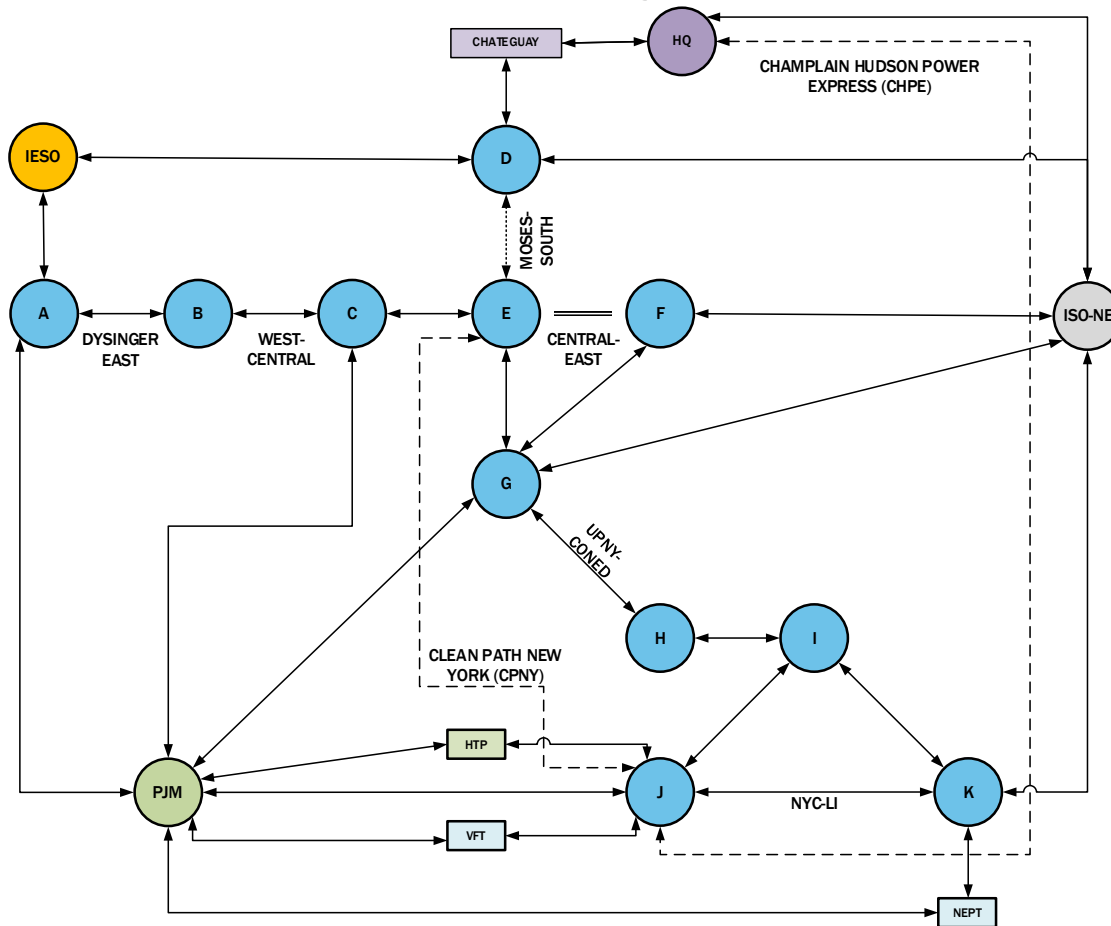
- Approximately 16 GW of renewable generation added to the Contract Case compared to Base Case displaces internal fossil fuel generation and net imports
- Additional generation in upstate zones increases congestion on Central East compared to the Base Case
- Additional generation in downstate zones (e.g., OSW) leads to a reduction in net imports and demand congestion in those zones compared to the Base Case
- Additional renewable generation results in overall decrease of emissions in NY
- LBMP decreases across the state due to lower cost resources displacing higher cost resources throughout NY

Policy Case

Policy Case Update

- **Development of the three Policy Case scenarios in the capacity expansion model is ongoing**
 - Development of the production cost model for the Policy Case will begin following the completion of the Contract Case
- **In addition to many assumptions that have been updated since the 2021-2040 Outlook, several enhancements have been incorporated into the capacity expansion model for each of the three Policy Cases in the 2023-2042 Outlook as presented at previous ESPWG meetings**
 - Changed methodology for time representation
 - Addition of external pools
 - Addition of generation supply curves for renewable technologies
 - Addition of 8-hour battery storage as candidate for expansion
 - Updated marginal ELCC curves (specific to each scenario)
- **Additionally, the following enhancements will be incorporated into the State Scenario:**
 - Hydrogen repowered units are candidates for expansion, including electrolysis load
 - Subzonal constraints modeled to reflect estimated transmission headroom of local transmission & distribution system and conceptual marginal upgrade costs

Capacity Expansion Model: Preliminary Pipe & Bubble Representation



Legend

- Interface
- Interface w/ Dynamic Ratings
- Future connections
- Future upgrades

*Note: An interface is considered to not have a MW limitation if no number is specified

Next Steps

Next Steps

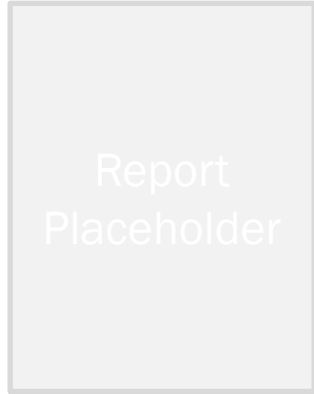
- **Continue model development of production cost and capacity expansion models**
- **Preliminary capacity expansion model results for Policy Cases**
- **Continue stakeholder engagement**
 - Next presentation: January 2024 ESPWG

Questions, Comments, & Feedback?

Email additional feedback to:
SCarkner@nyiso.com
one week prior the next ESPWG

2023-2042 System & Resource Outlook Data Catalog

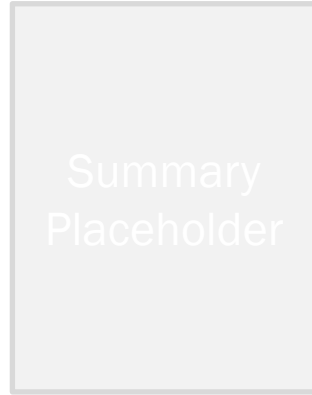
Report



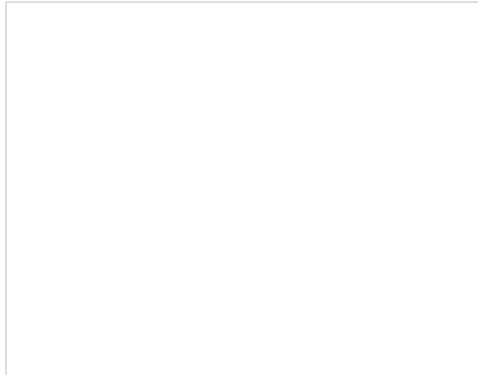
Report Appendices

[Production Cost Model Benchmark DRAFT](#)
[Production Cost Assumptions Matrix DRAFT](#)
[Capacity Expansion Assumptions Matrix DRAFT](#)

Study Summary



Data Documents



Stakeholder Presentations

November 18, 2022

[2021 Outlook Lessons Learned](#)
[NYSERDA Outlook Suggestions](#)

June 16, 2023

[2023-2042 Outlook Kickoff](#)

July 17, 2023

[2023-2042 Outlook Benchmark](#)
[2023-2042 Outlook Update](#)

August 22, 2023

[2023-2042 Outlook Preliminary Reference Case Assumptions](#)

September 21, 2023

[2023-2042 Outlook Reference Case Assumptions Update](#)

October 24, 2023

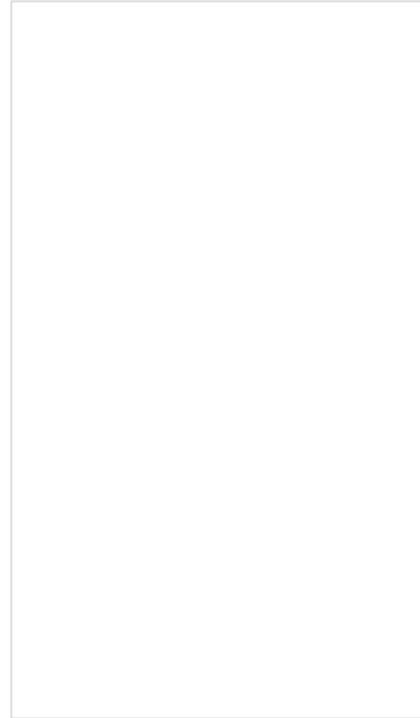
[2023-2042 Outlook Reference Case Assumptions Update](#)

November 2, 2023

[2023-2042 Outlook Reference Case Assumptions Update & Preliminary Base Case Results](#)

November 21, 2023

[2023-2042 Outlook Reference Case Updates & Final Base Case Results](#)

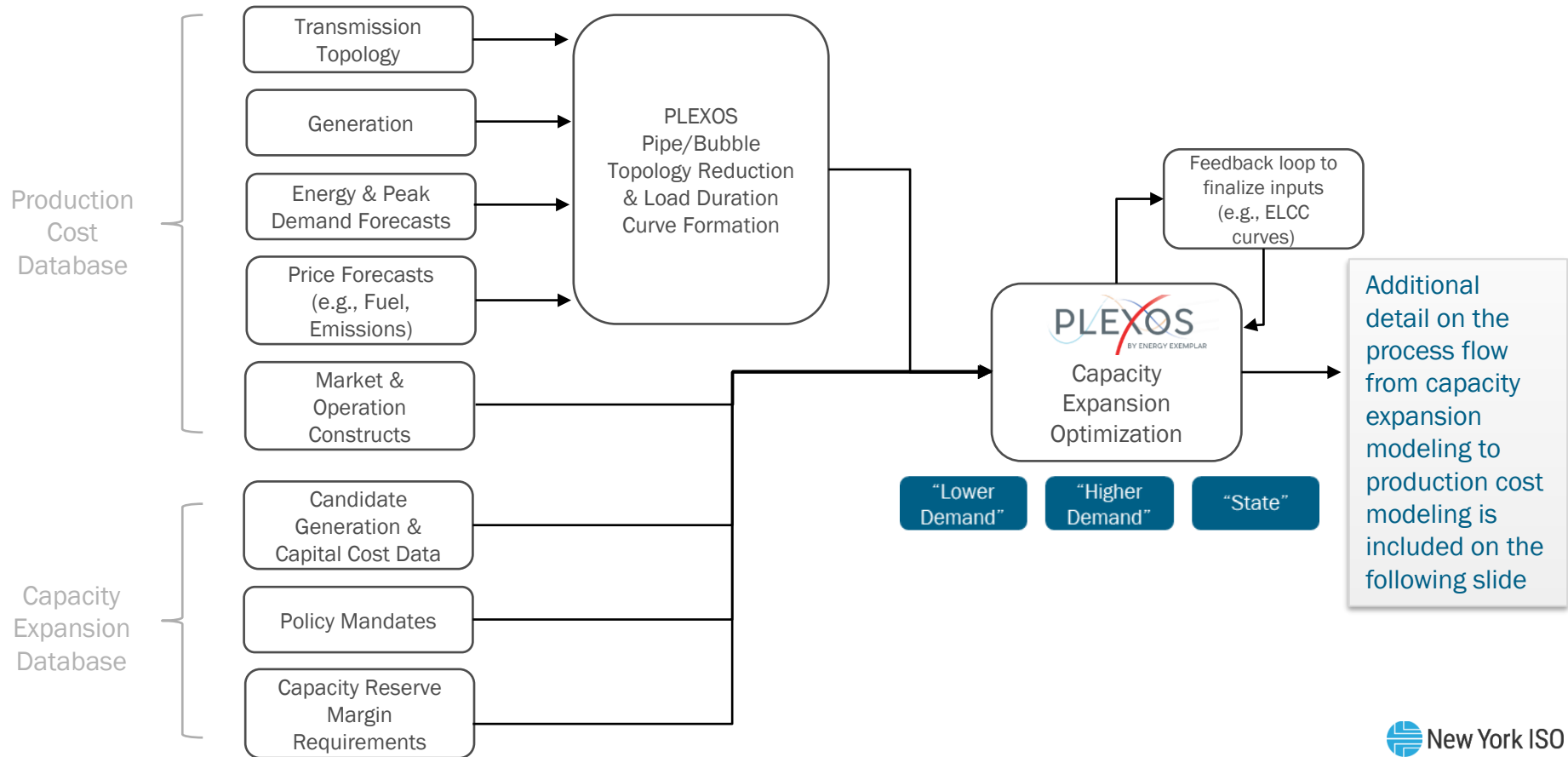


[2021-2040 System & Resource Outlook Data Catalog](#)

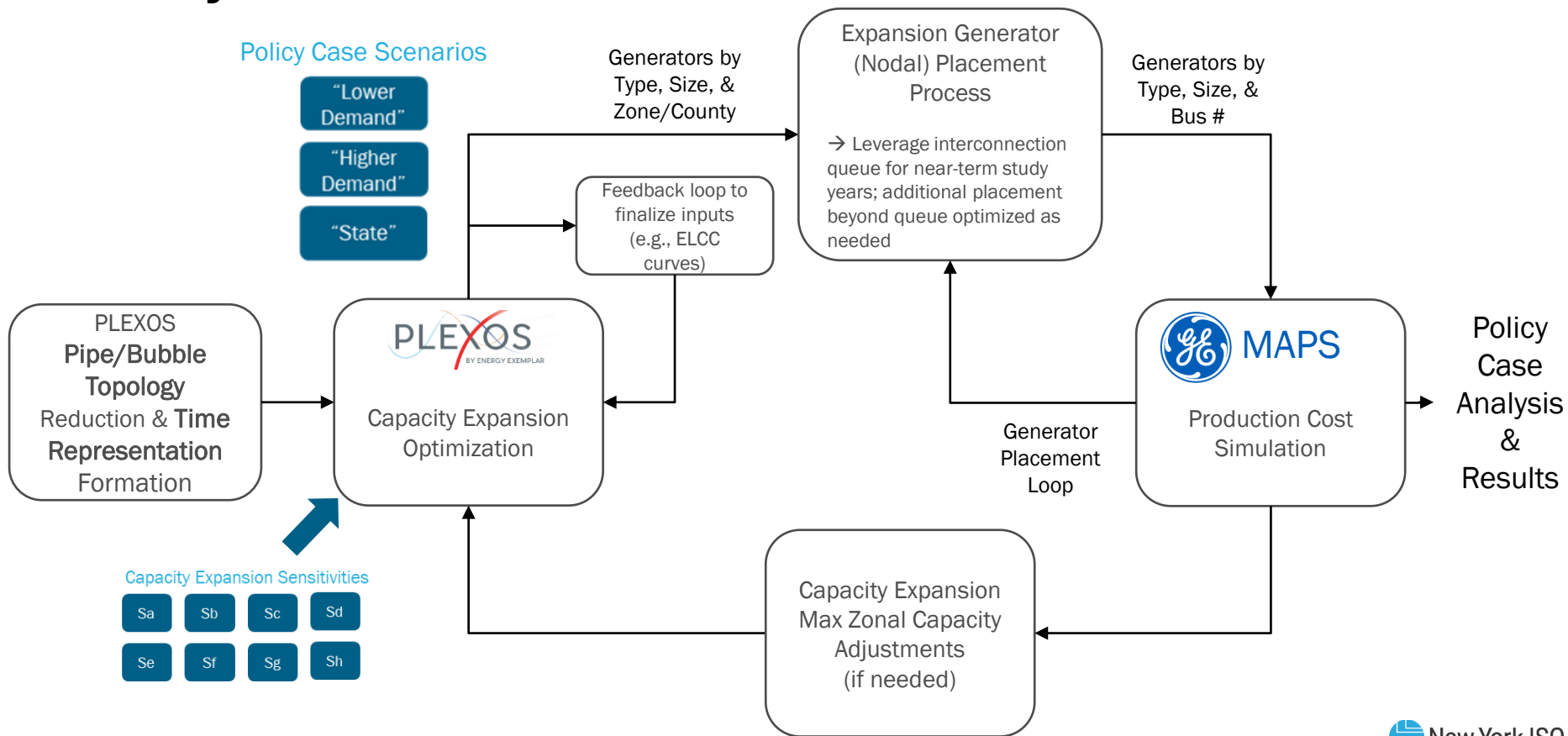


Appendix

Policy Case Process Flow



Policy Case Simulation Framework



Our Mission & Vision



Mission

Ensure power system reliability and competitive markets for New York in a clean energy future



Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation