

NYCA Renewables 2025

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ICAPWG/MIWG

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Agenda

- Wind Performance
- BTM and FTM Solar Performance
- Real-Time Market Curtailments
- Coincident Wind and Solar
- Load Ramps
- Questions

Background on Metrics

- Wind and FTM solar data accounts for all units installed in the NYCA. Due to confidentiality concerns, offshore wind is not reported within zonal metrics.
- Unless otherwise stated, Wind and Solar Capacity Factors are inclusive of ALL hours in 2025 and do not adjust for periods of resource outages or derates.
- Behind-the-meter (BTM) Solar production and capacity factors are based on estimates from NYISO's Solar/PV monitoring vendor. They are influenced by the pitch and tilt of the sampled installations being used to scale up production estimates. They are not a direct measurement of total solar production.
- Capacity Factors are calculated as follows:

$$\text{Wind and FTM Solar Capacity Factor} = \frac{\text{Total Generated AC MW Energy}}{(\text{AC MW Nameplate Capacity})(\text{Total Hours})}$$

$$\text{BTM Solar Capacity Factor} = \frac{\text{Total Generated AC MW Energy}}{(\text{DC MW Nameplate Capacity})(\text{Total Hours})}$$

Past Presentations and Datasets

Annual Renewable Presentations and hourly data sets from prior years can be found at the locations below.

<https://www.nyiso.com/reports-information>

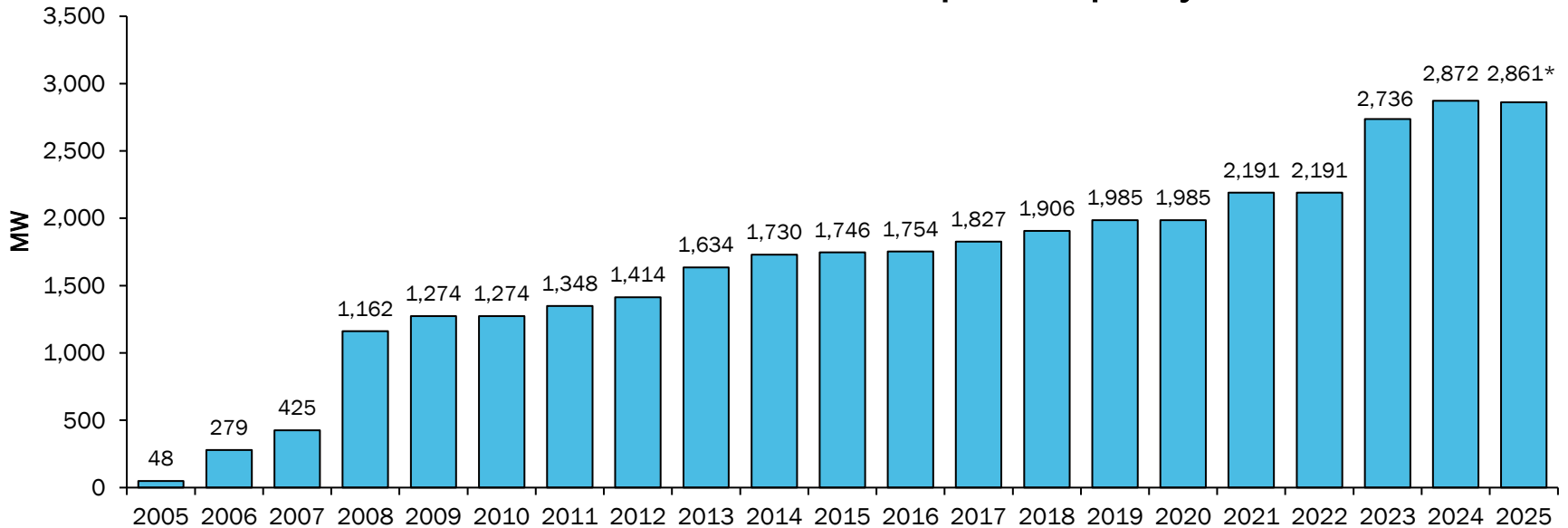
- Under ‘Links’
 - BTM Solar Information

- Under ‘Reports’
 - Annual Wind and Solar Information

NYCA Wind Performance

Wind Overview

End of Year NYCA Wind Nameplate Capacity

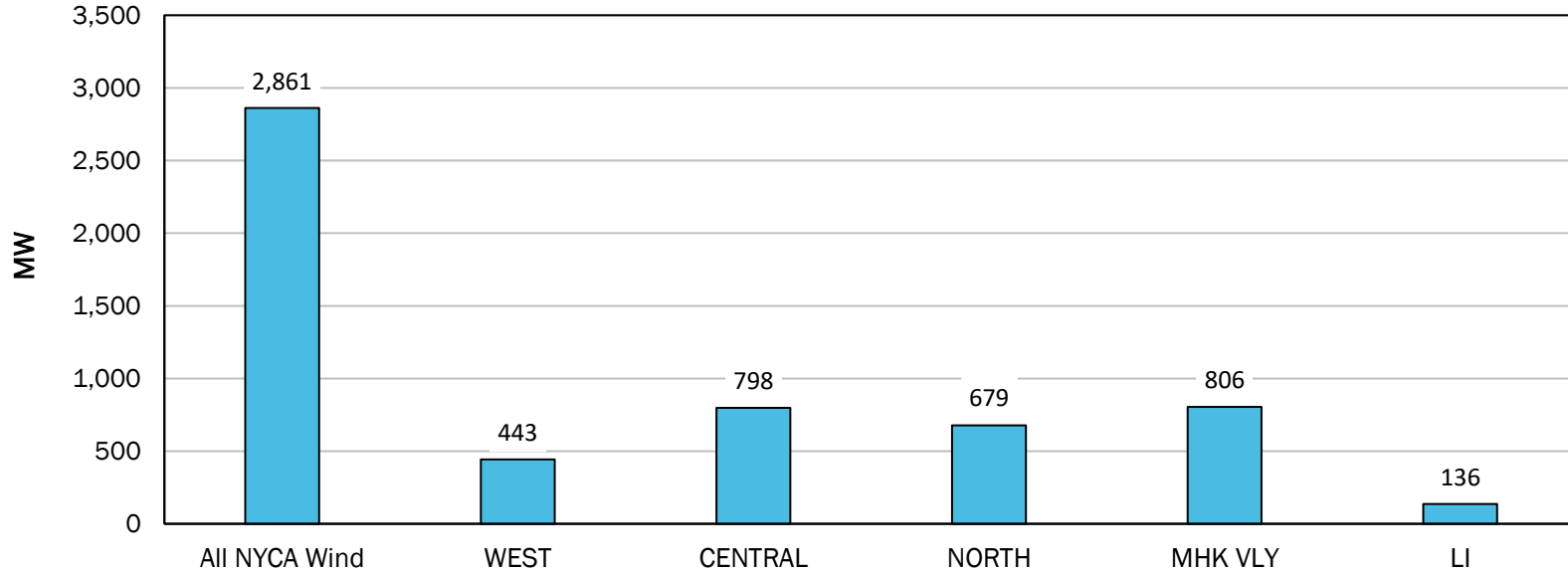


*Madison Wind (11.6 MW, Zone E) was officially retired in September 2025.

Information on Generator Status Updates can be found at www.nyiso.com/ny-power-system-information-outlook

Zonal Wind Capacity

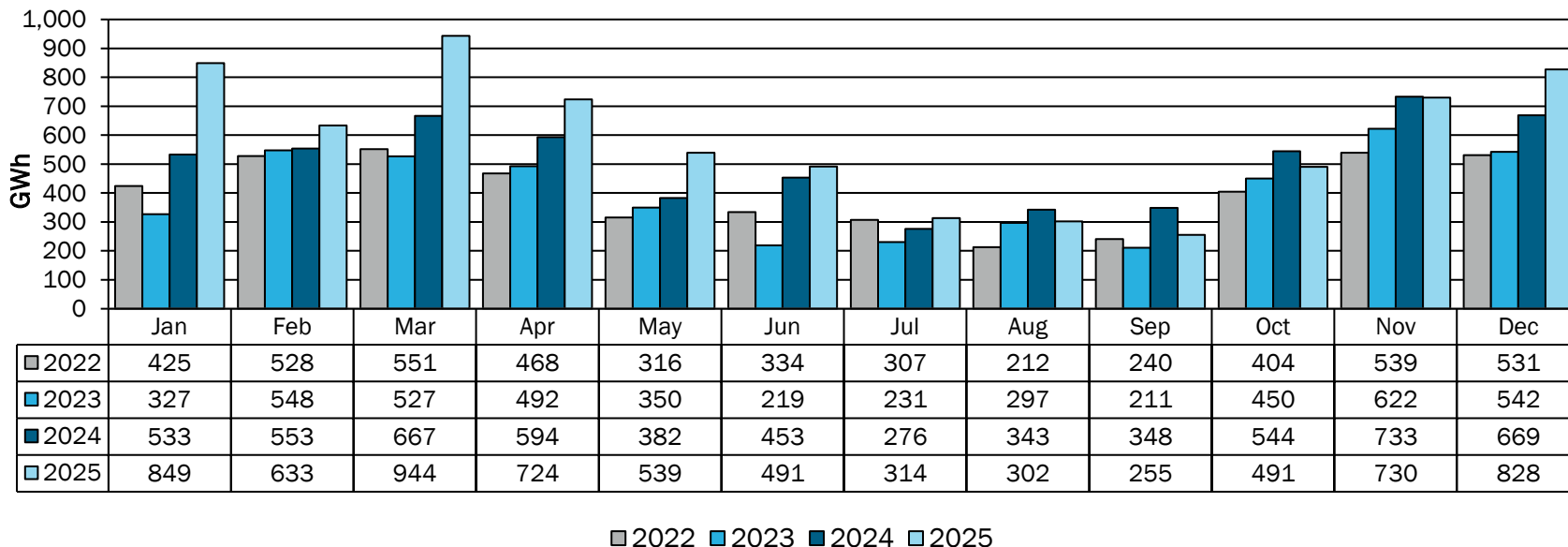
2025 End of Year Installed Nameplate Wind Capacity



NY Wind Generation

Total Annual Wind Production (GWh)			
2022	2023	2024	2025
4,856	4,815	6,096	7,099

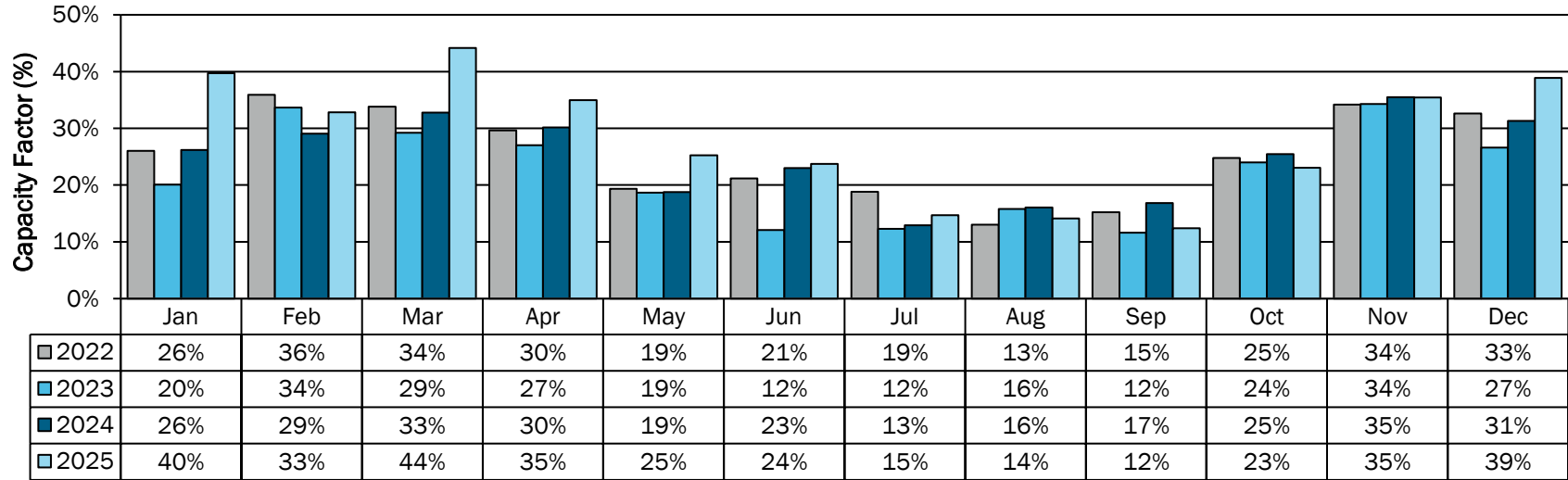
NYCA Wind Plants - Monthly Production



NY Wind Capacity Factors

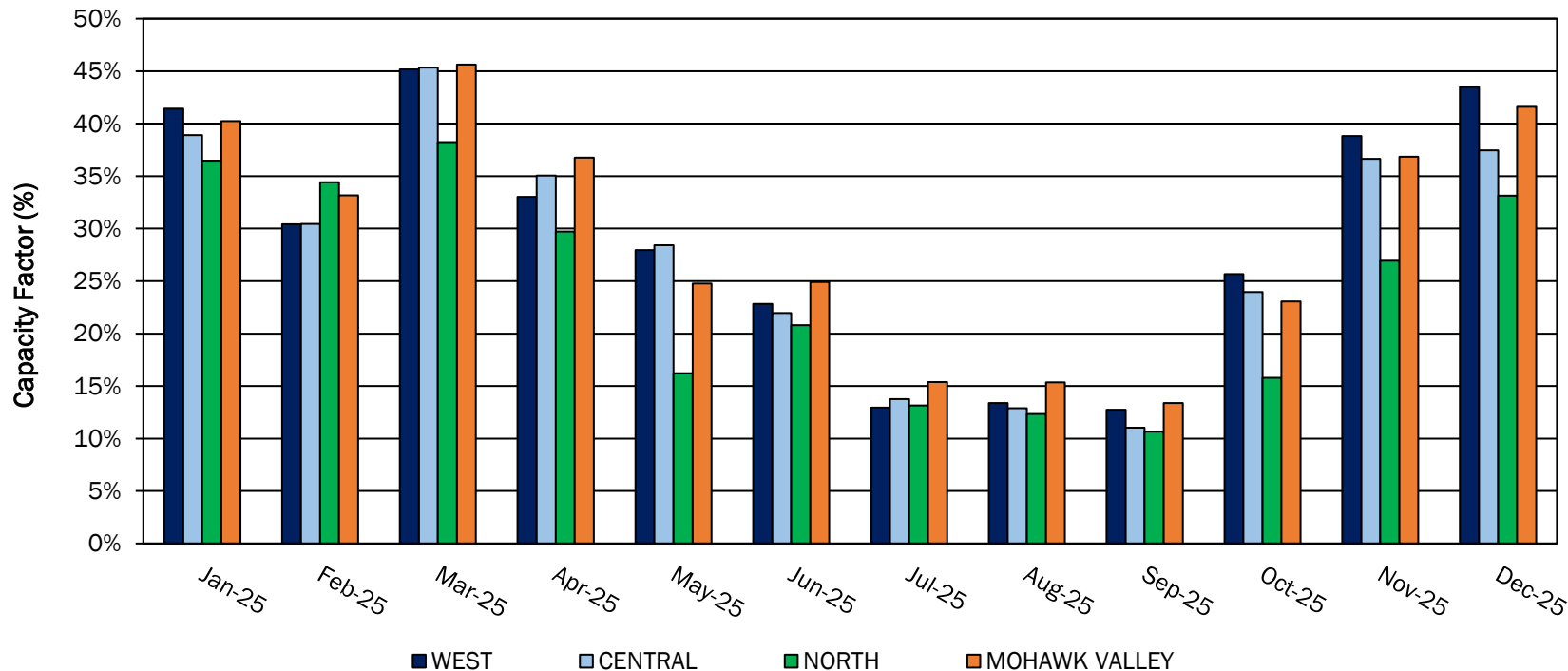
Annual Wind Capacity Factor			
2022	2023	2024	2025
25%	22%	25%	28%

NYCA Wind Generation – Monthly Capacity Factor

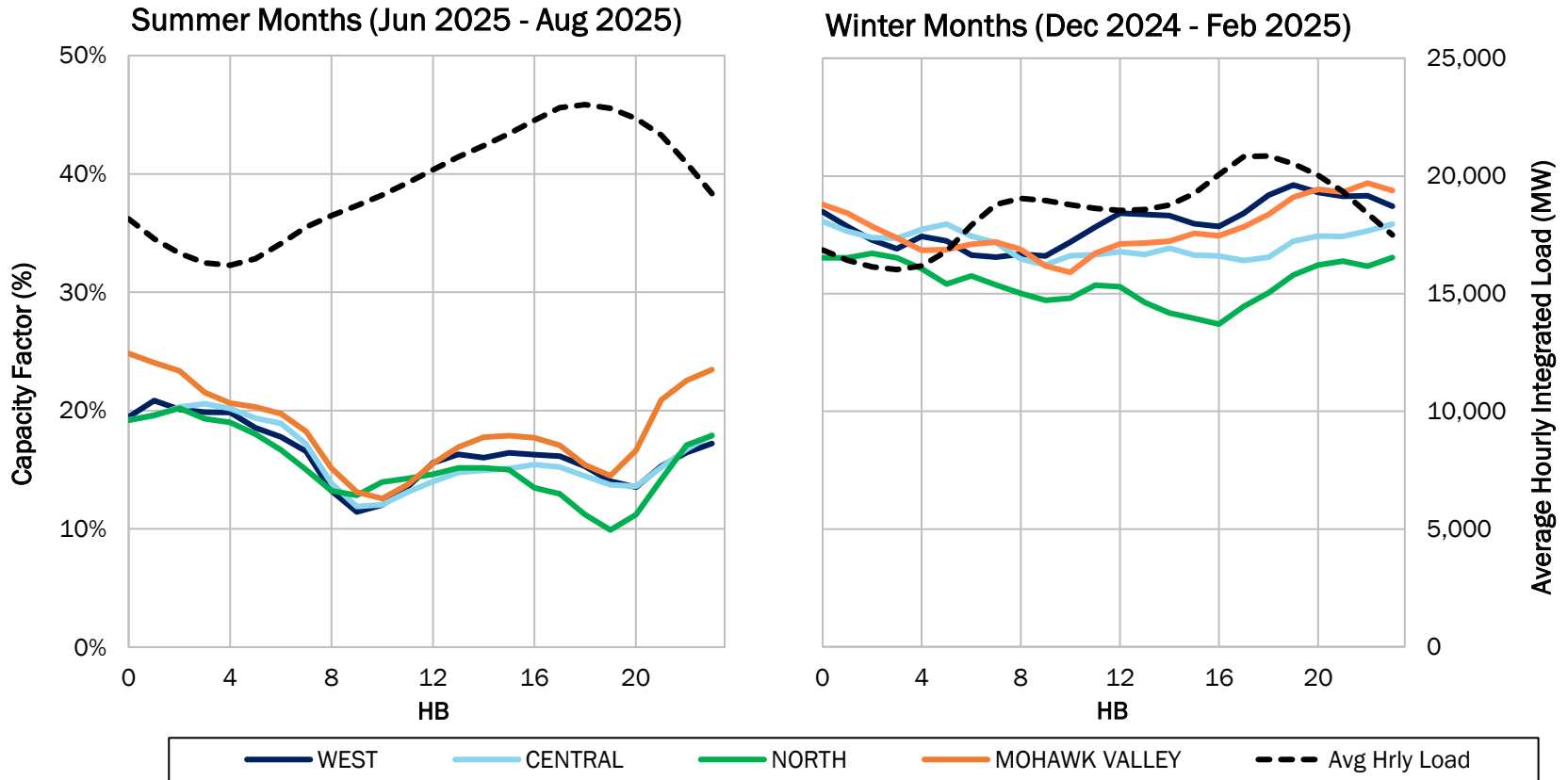


■ 2022 ■ 2023 ■ 2024 ■ 2025

Monthly Wind Capacity Factors by Zone

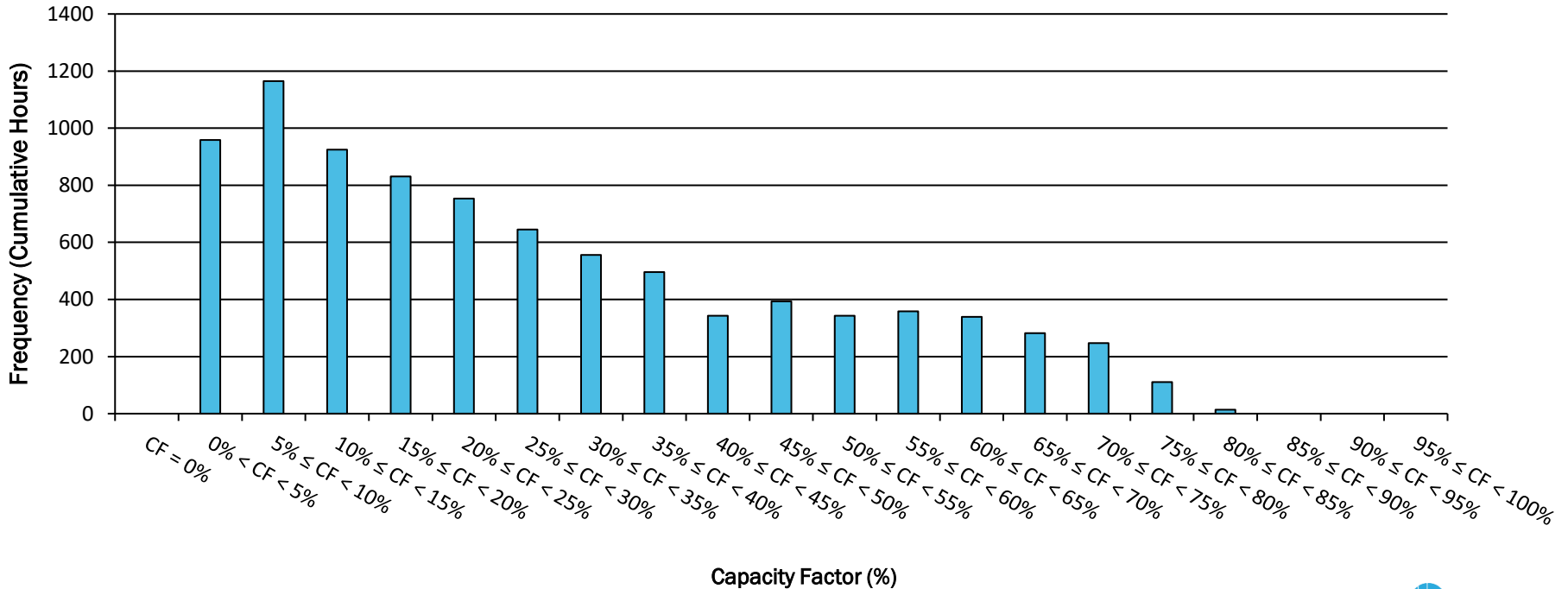


2025 Seasonal Average Hourly Wind Capacity Factors by Zone



2025 NY Wind Capacity Factor Distribution

Hourly Capacity Factor (CF) Distribution for 2025



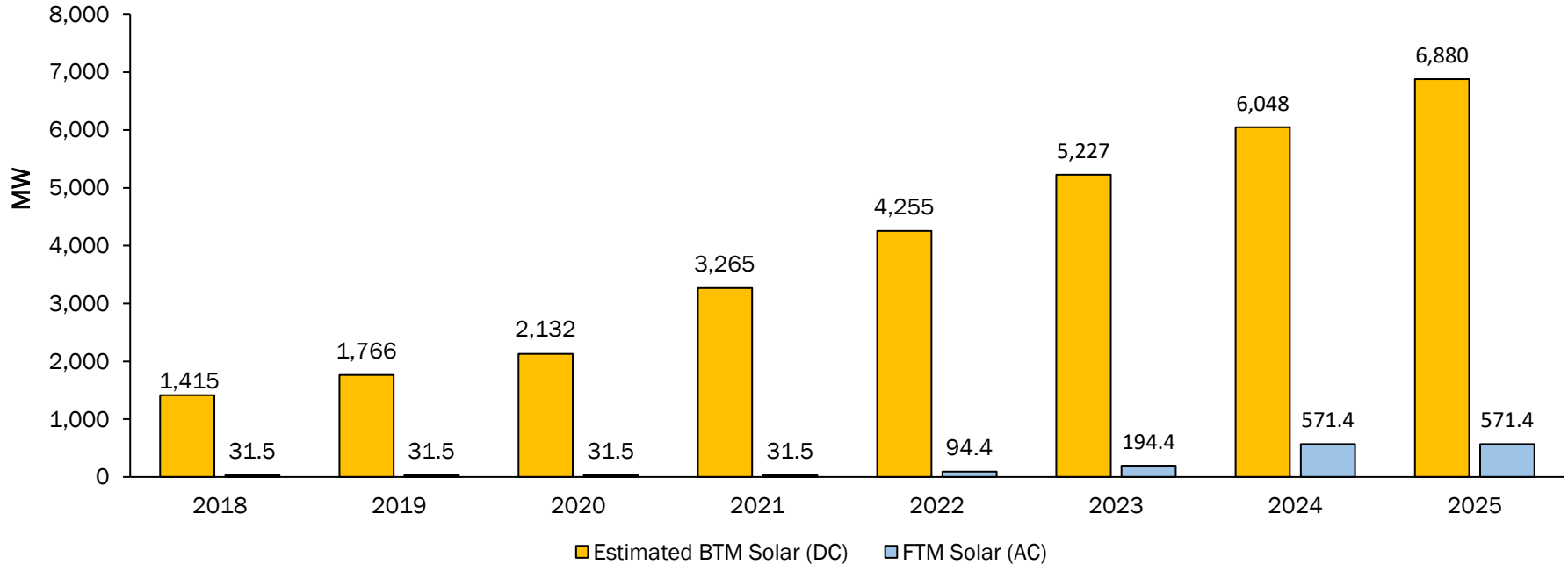
NYCA Solar Performance Behind-the-Meter (BTM) & Front-of-the-Meter (FTM)

BTM Solar Data Monitoring

- The NYISO's Solar/PV monitoring vendor automatically tracks the real-time power output of a sampling of solar production sites across NY
- The sampled sites are geographically distributed substantially the same as the total BTM facilities in the state
- BTM solar production, at the zonal level, is calculated by scaling up the vendor's readings to the estimated BTM solar installed capacity
- NYISO closely tracks BTM solar PV installed capacity in the NY SUN (MW DC) and NY DPS Standard Interconnection Request (SIR) databases (MW AC) to develop an accurate estimate of BTM solar installed capacity in MW DC
- Inverter and module information are available from the NYSERDA NY Sun database and California Energy Commission datasets. The latter two datasets are used to estimate the total DC installed capacity in the NYCA.
- At the end of 2025, BTM Solar Capacity was estimated to be 6,880 MW (DC)

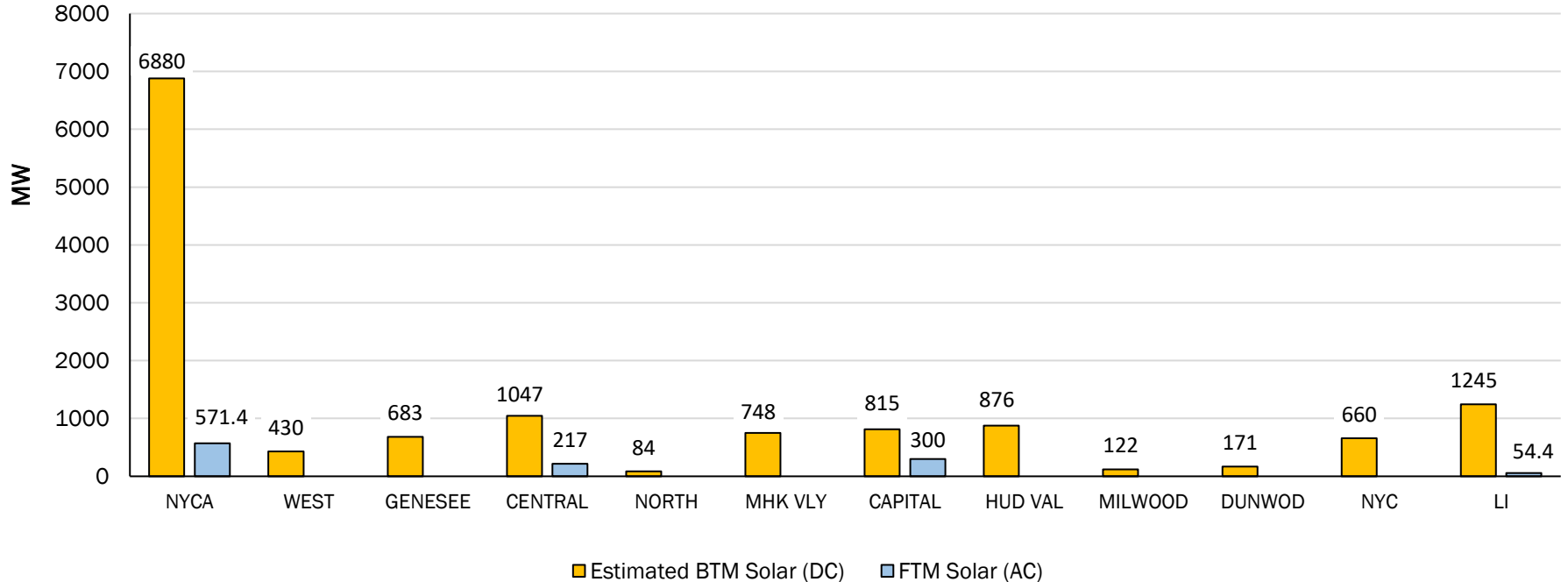
Solar Overview

End of Year NYCA Solar Nameplate Capacity



Zonal Solar Capacity

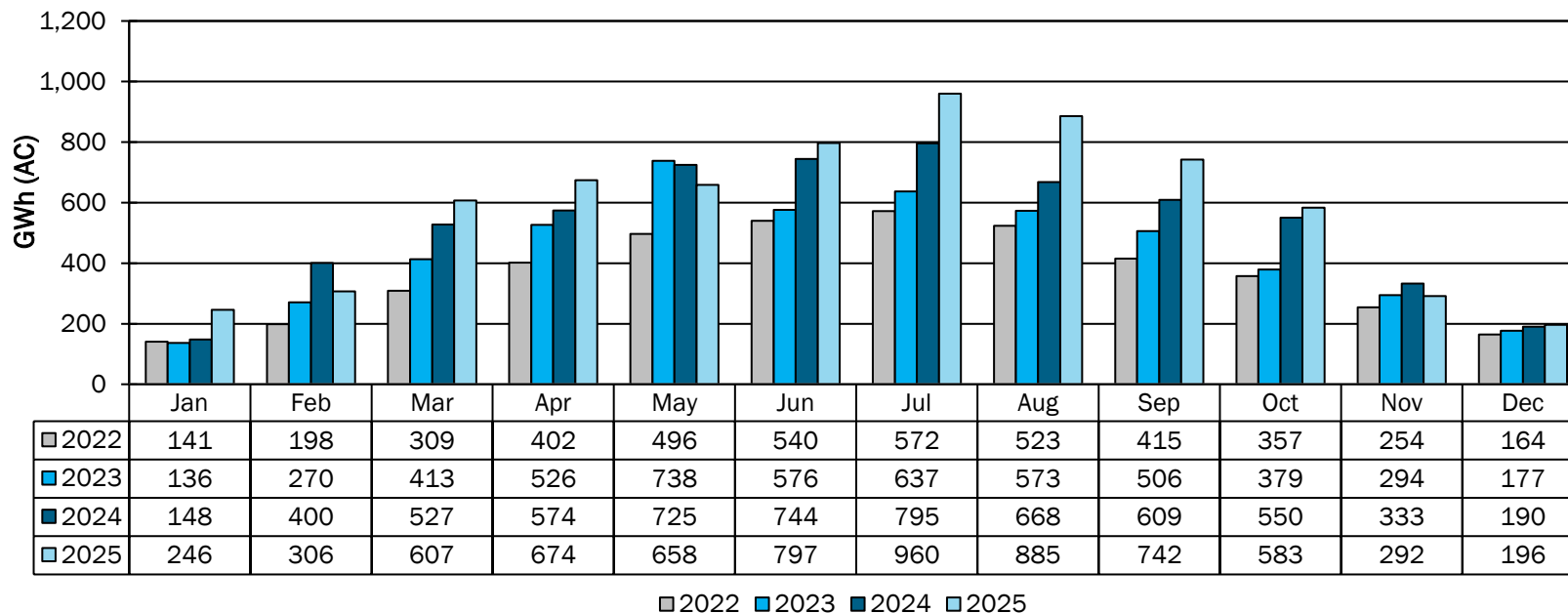
Estimated 2025 End Of Year Solar Capacity



NY BTM Solar Generation

Total Annual BTM Solar Production (GWh)			
2022	2023	2024	2025
4,372	5,228	6,263	6,947

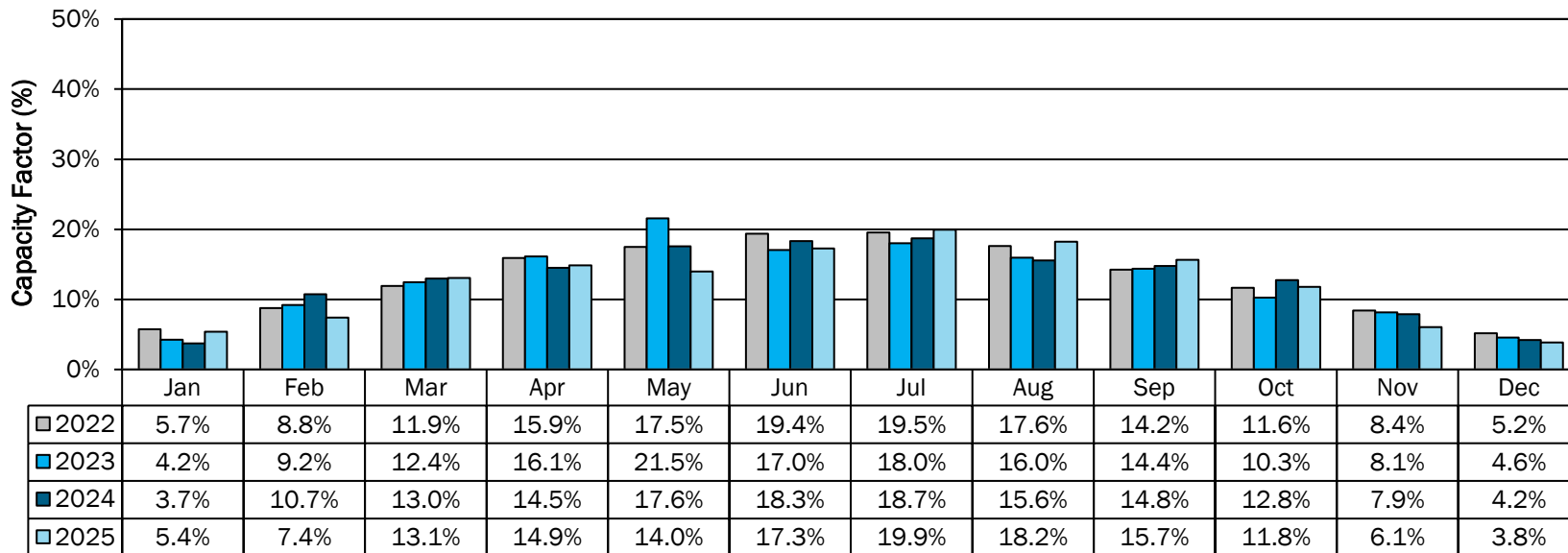
NYCA BTM Solar - Estimated Monthly Production



NY BTM Solar Capacity Factors

Annual BTM Solar Capacity Factor			
2022	2023	2024	2025
13.0%	12.7%	12.6%	12.3%

NYCA BTM Solar Generation - Estimated Capacity Factor

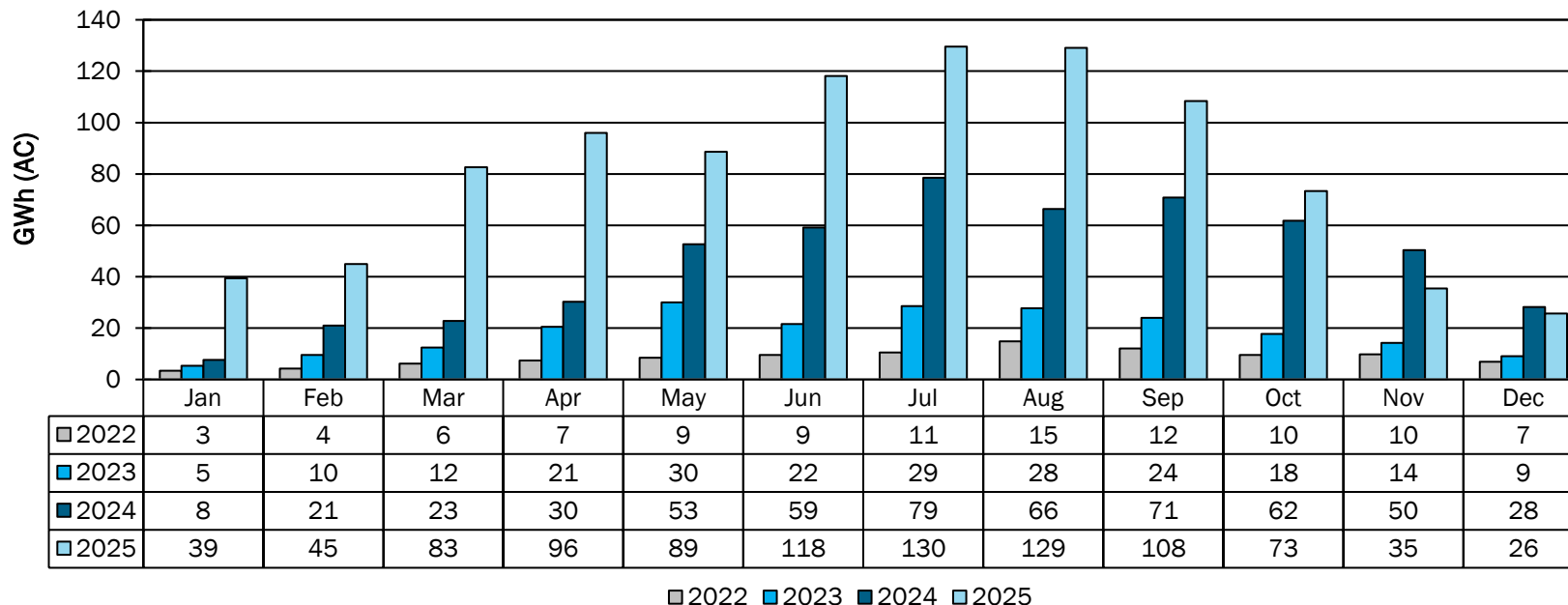


2022 2023 2024 2025

NY FTM Solar Generation

Total Annual FTM Solar Production (GWh)			
2022	2023	2024	2025
103	221	550	971

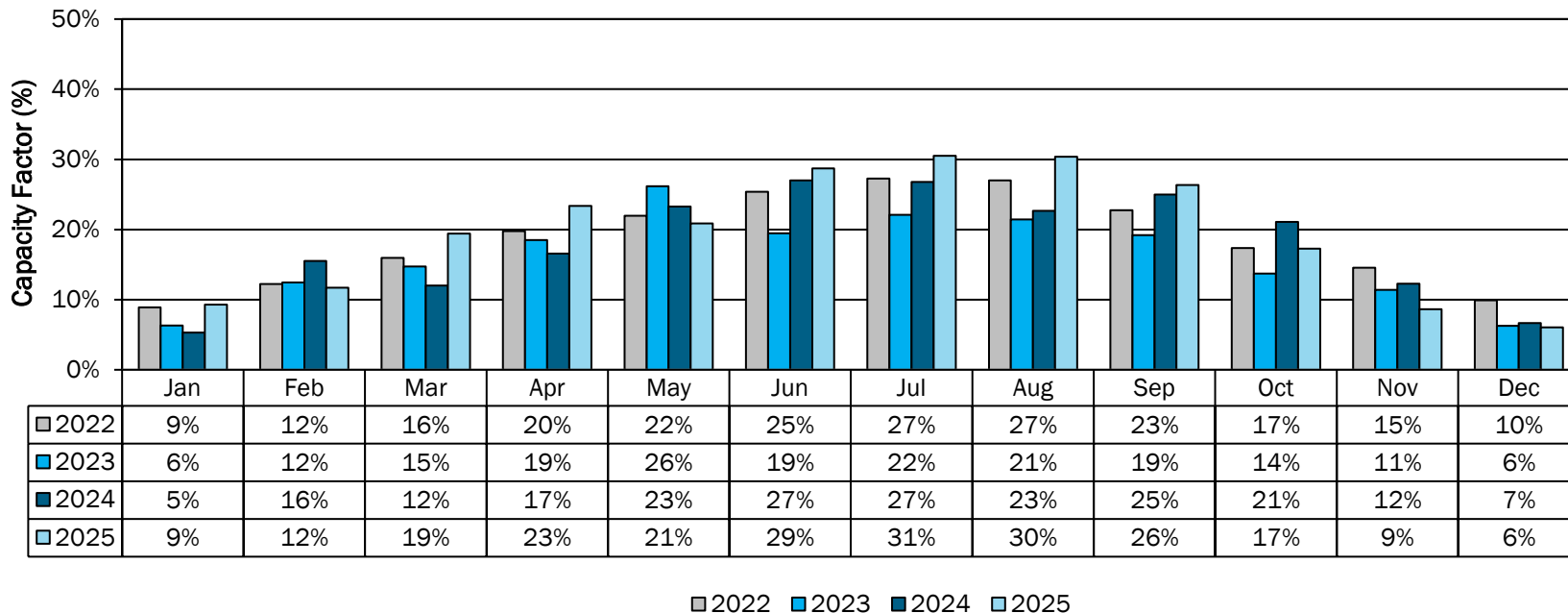
NYCA FTM Solar - Monthly Production



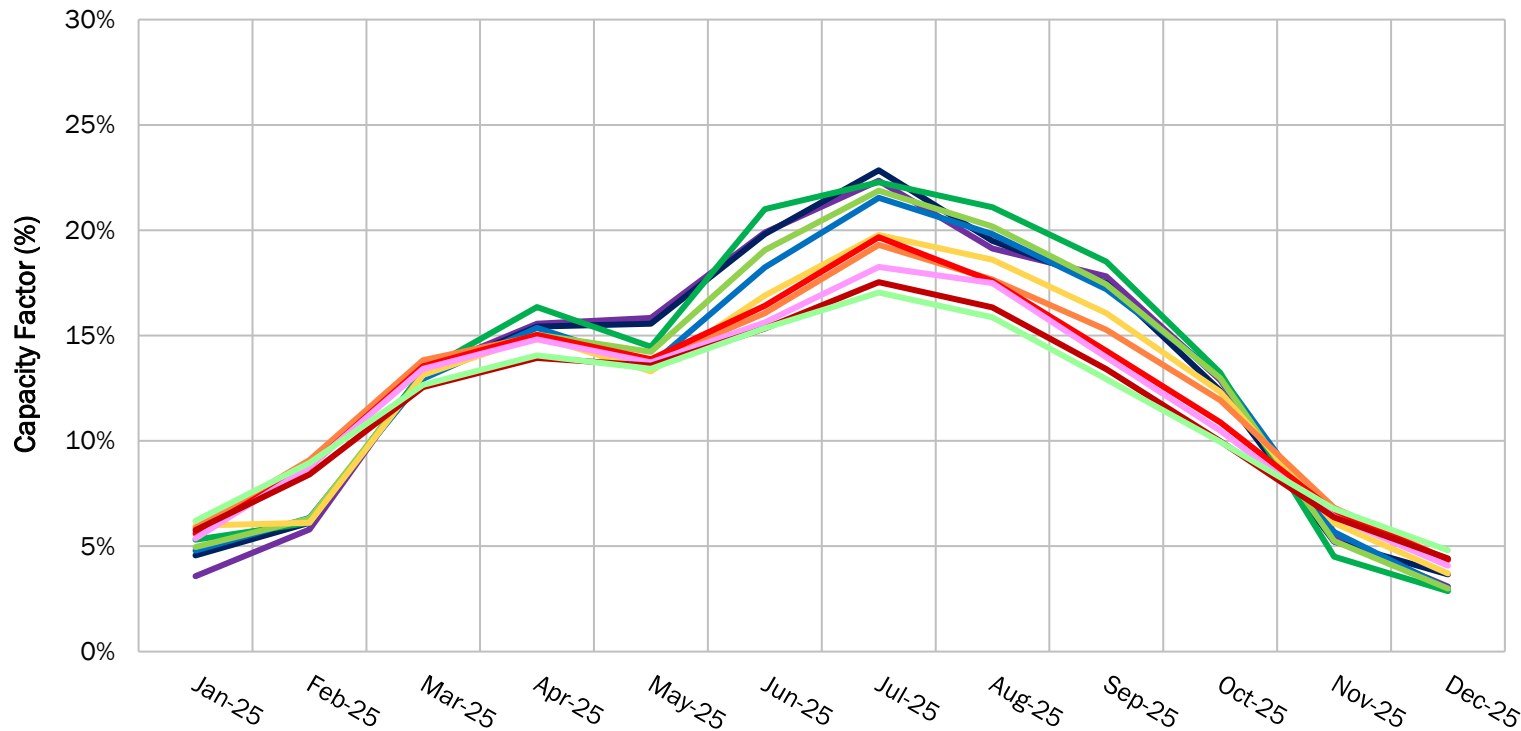
NY FTM Solar Capacity Factors

Annual FTM Solar Capacity Factor			
2022	2023	2024	2025
19%	16%	18%	19%

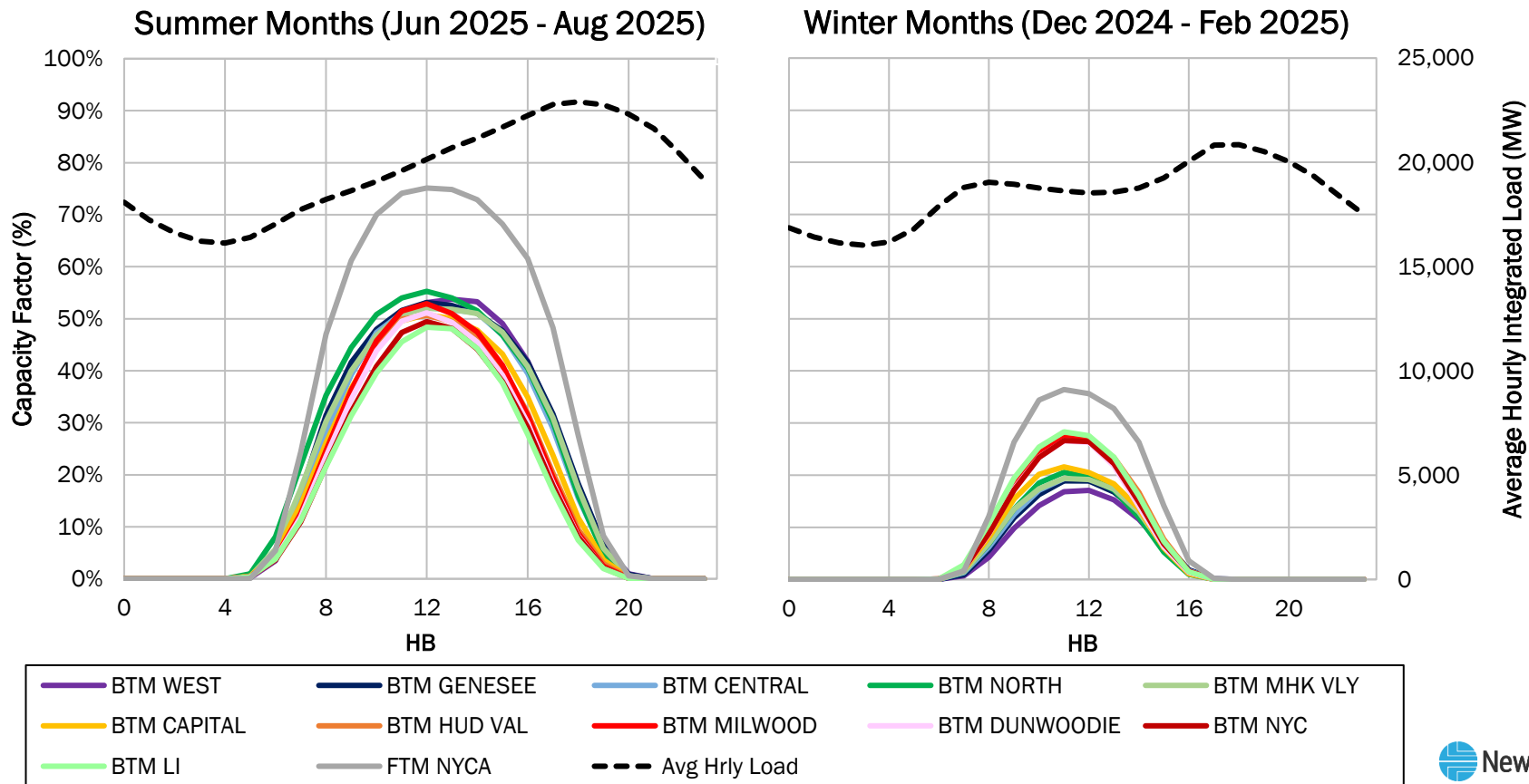
NYCA FTM Solar Generation - Capacity Factor



Monthly BTM Solar Capacity Factors by Zone



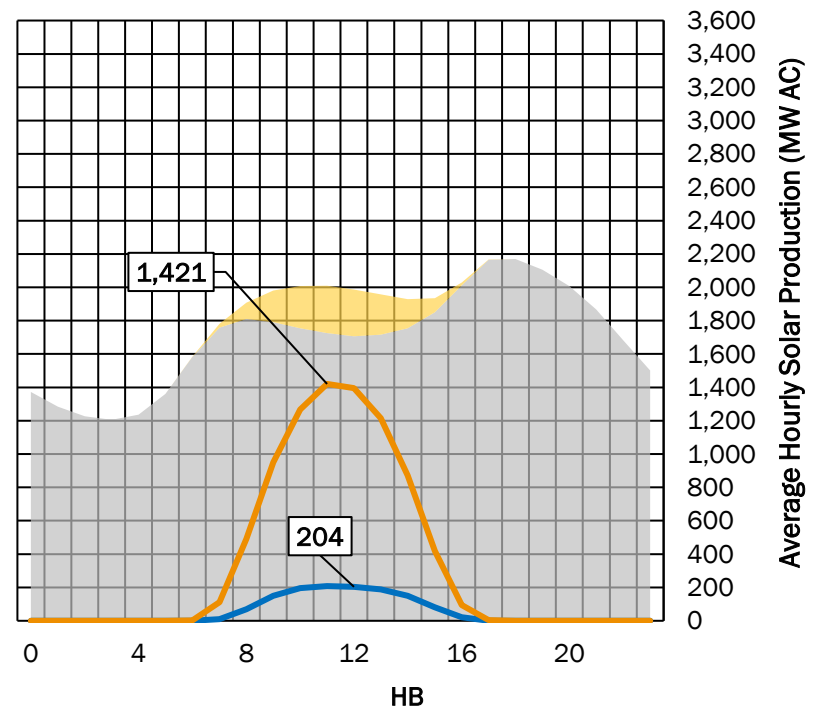
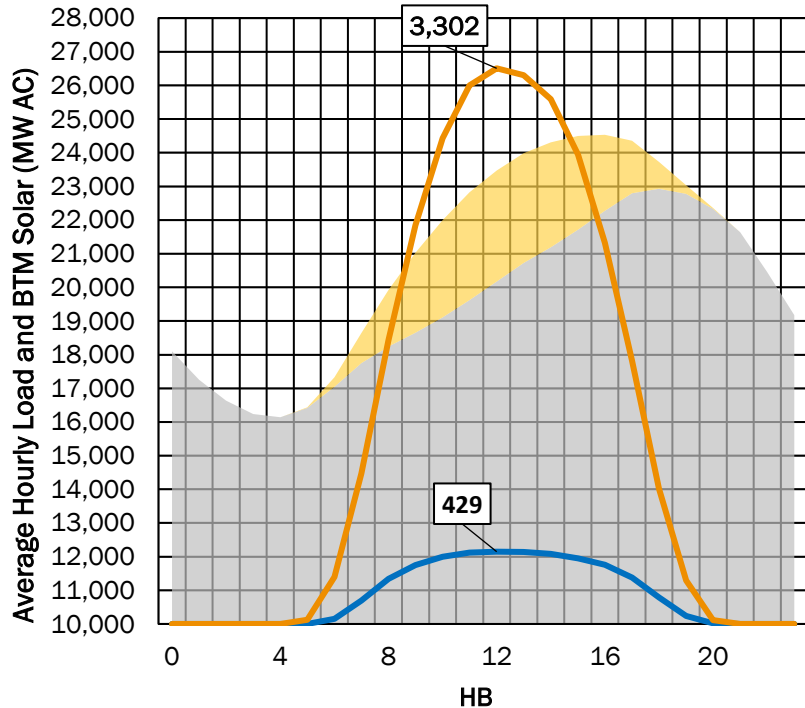
2025 Seasonal Average Hourly Solar Capacity Factors by Zone



2025 Seasonal Average Hourly Load with Solar Production

Summer Months (Jun 2025 - Aug 2025)

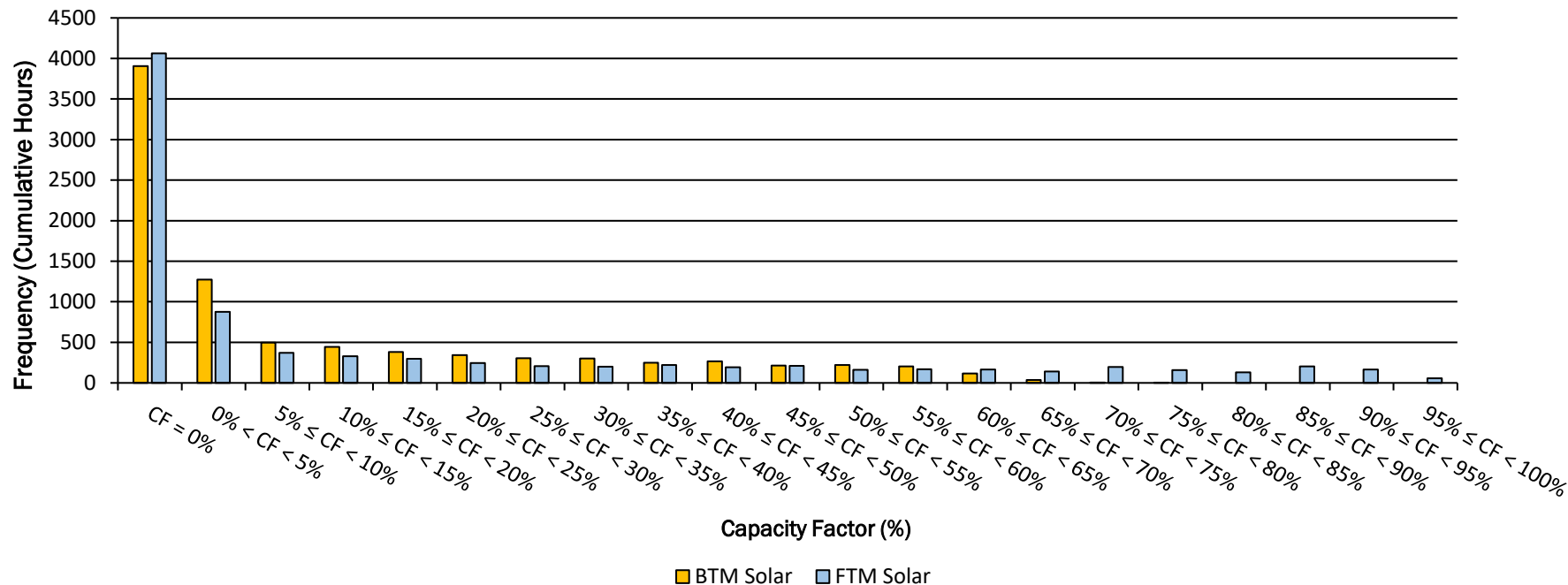
Winter Months (Dec 2024 - Feb 2025)



Avg Hrly Load
 Avg Hrly Load + Avg Hrly BTM Solar
 Avg Hrly FTM Solar Production
 Avg Hrly BTM Solar Production

Solar Capacity Factor Distribution

Hourly Capacity Factor (CF) Distribution for 2025



Real Time Market Curtailments 2025

Background on Curtailment Metrics

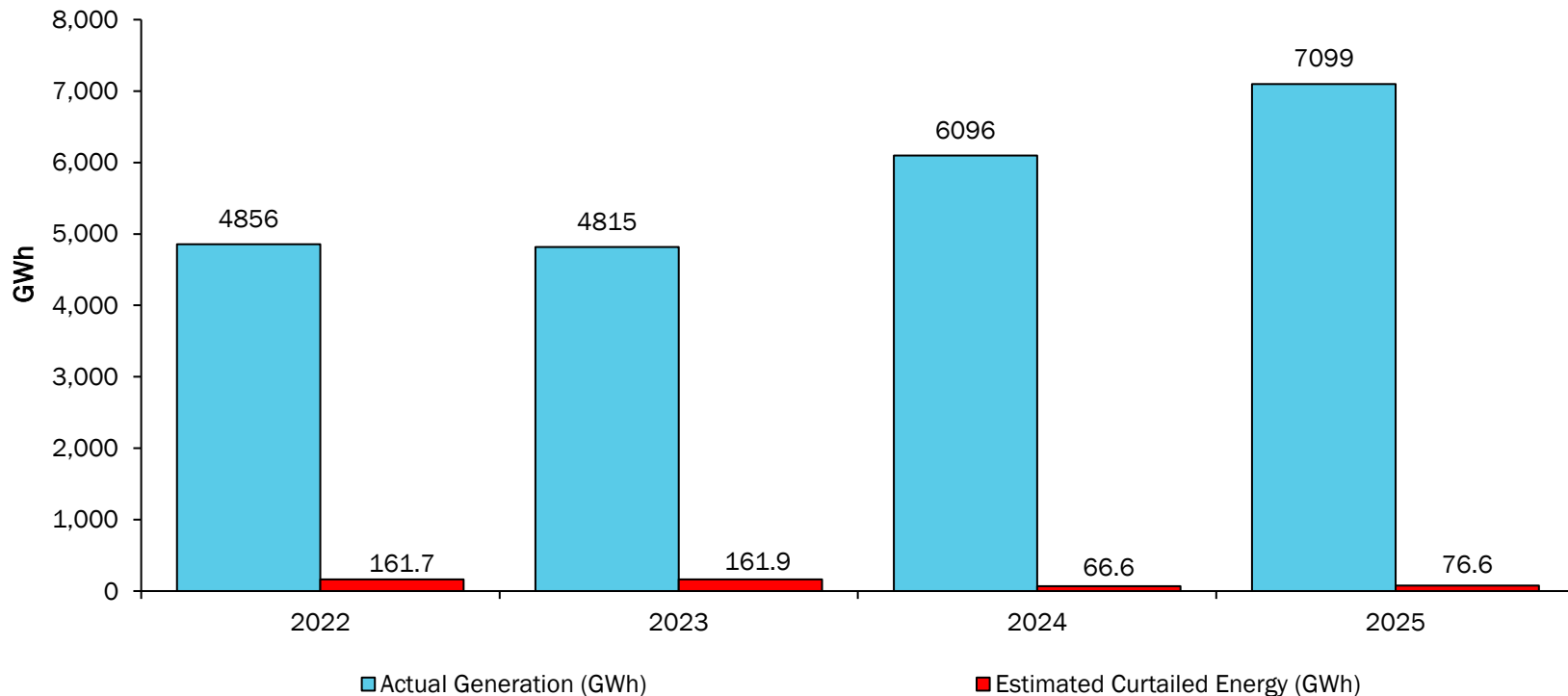
- The NYISO's real-time market economically evaluates bids submitted by wind and FTM solar resources
- When forecasted generation is uneconomic, wind and FTM solar resources are instructed to limit their output to economic levels
- The following metrics use these output limits to estimate quantities of curtailed energy
- Real-time market curtailments are associated with:
 1. Transmission constraints driven by
 - a. Short term transmission outages for maintenance or repair
 - b. Long term transmission outages for system upgrades
 - c. Transmission limitations that may be addressed as part of future system upgrades
 2. Uneconomic bid costs
 3. Generation-to-load balancing constraints

Notable Transmission Upgrade Efforts

- **PPTN Segment A and B completion**
 - Placed in-service across 2021 – 2023
 - Dover PAR additions in 2025
- **Smart Path Connect and Northern NY Priority Transmission Project**
 - Various transmission outages 2023 – 2025
 - Transmission outages continuing into 2026
 - Expected in-service date of 2026
- **Meyer Station Upgrades (NYSEG Local Transmission Plan)**
 - Expected in-service date of 2029

RT Market Curtailments: Wind

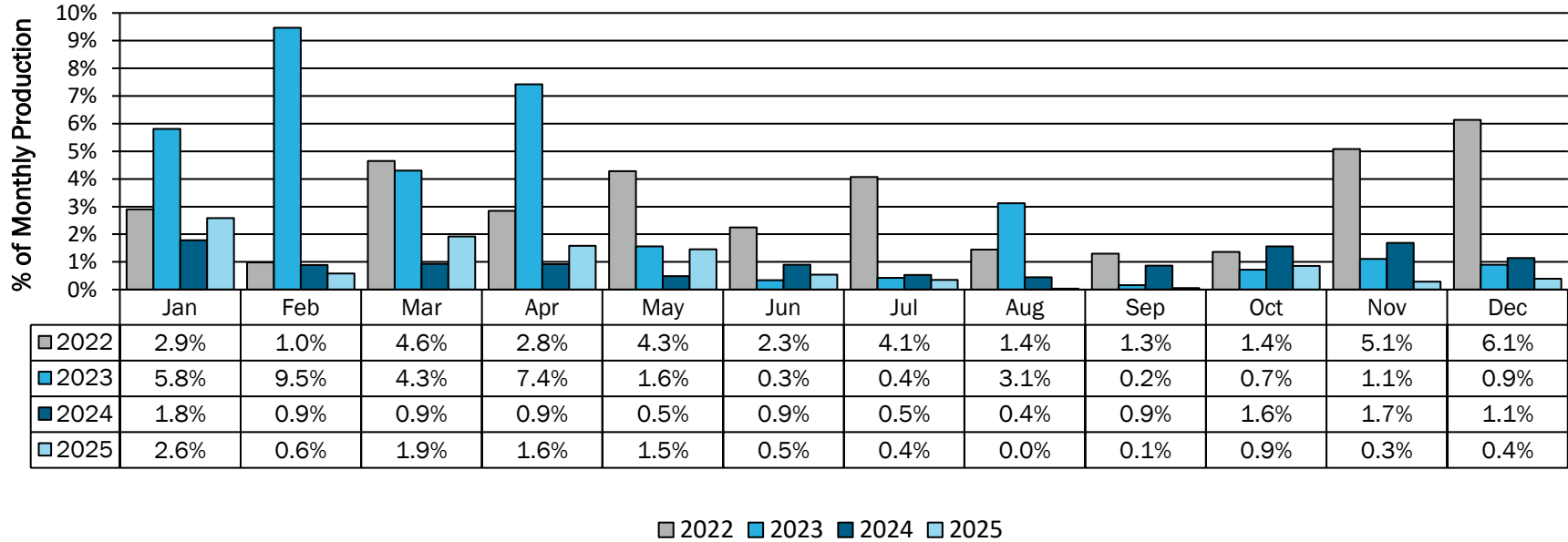
NYCA Wind Plants - Annual Production & Curtailments



RT Market Curtailments: Wind

Total Estimated Curtailed Energy %			
2022	2023	2024	2025
3.3%	3.4%	1.1%	1.1%

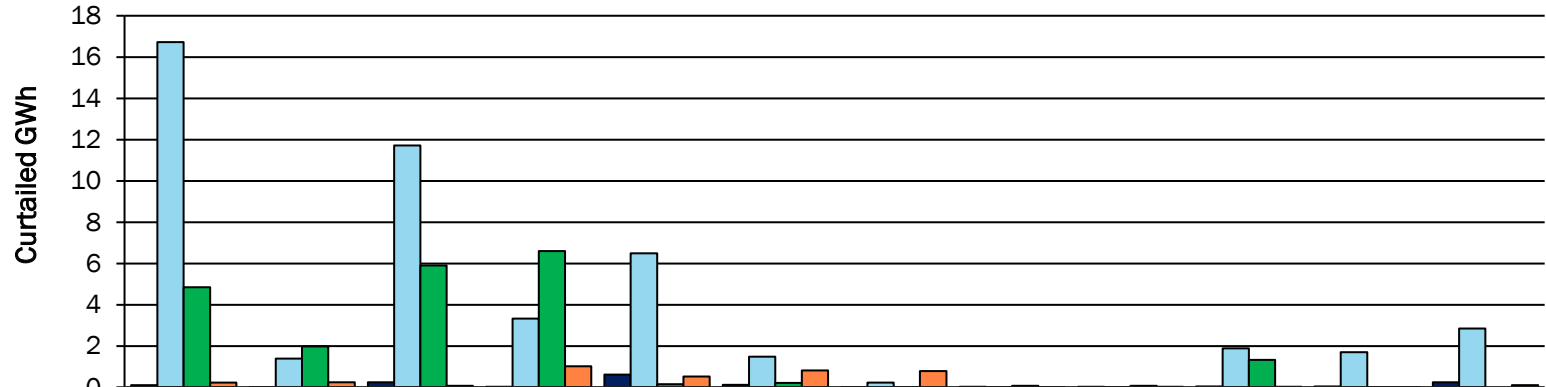
NYCA Wind - Monthly Estimated Curtailed Energy %



RT Market Curtailments: Wind

Total Annual Estimated Curtailed Energy (GWh)			
West	Central	North	Mohawk Valley
1.53	47.82	21.22	3.85

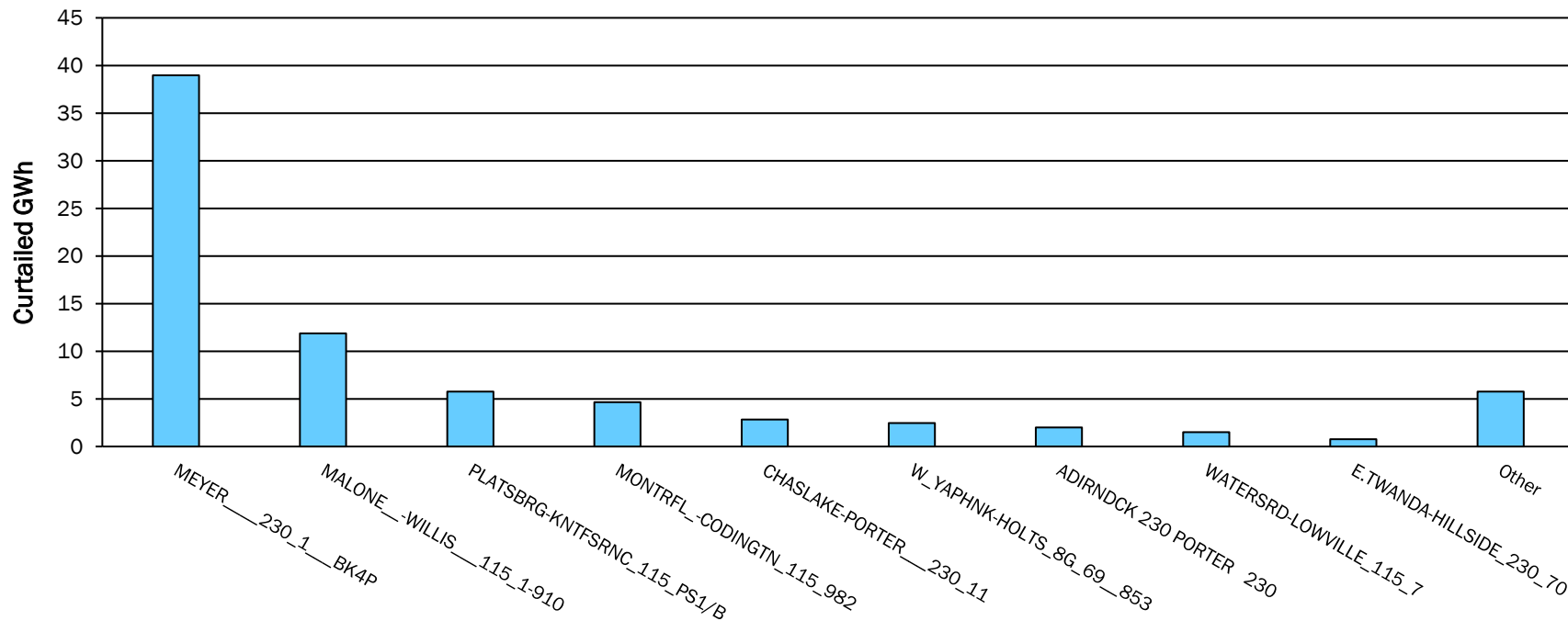
Zonal Wind - Monthly Estimated Curtailed Energy for 2025



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
■ WEST	0.11	0.01	0.25	0.02	0.62	0.12	0.00	0.02	0.03	0.05	0.05	0.24
■ CENTRAL	16.72	1.39	11.72	3.32	6.49	1.49	0.23	0.00	0.01	1.89	1.71	2.85
■ NORTH	4.85	1.98	5.91	6.60	0.15	0.21	0.02	0.08	0.08	1.33	0.01	0.00
■ MOHAWK VALLEY	0.22	0.24	0.07	1.02	0.52	0.81	0.79	0.01	0.02	0.03	0.00	0.11

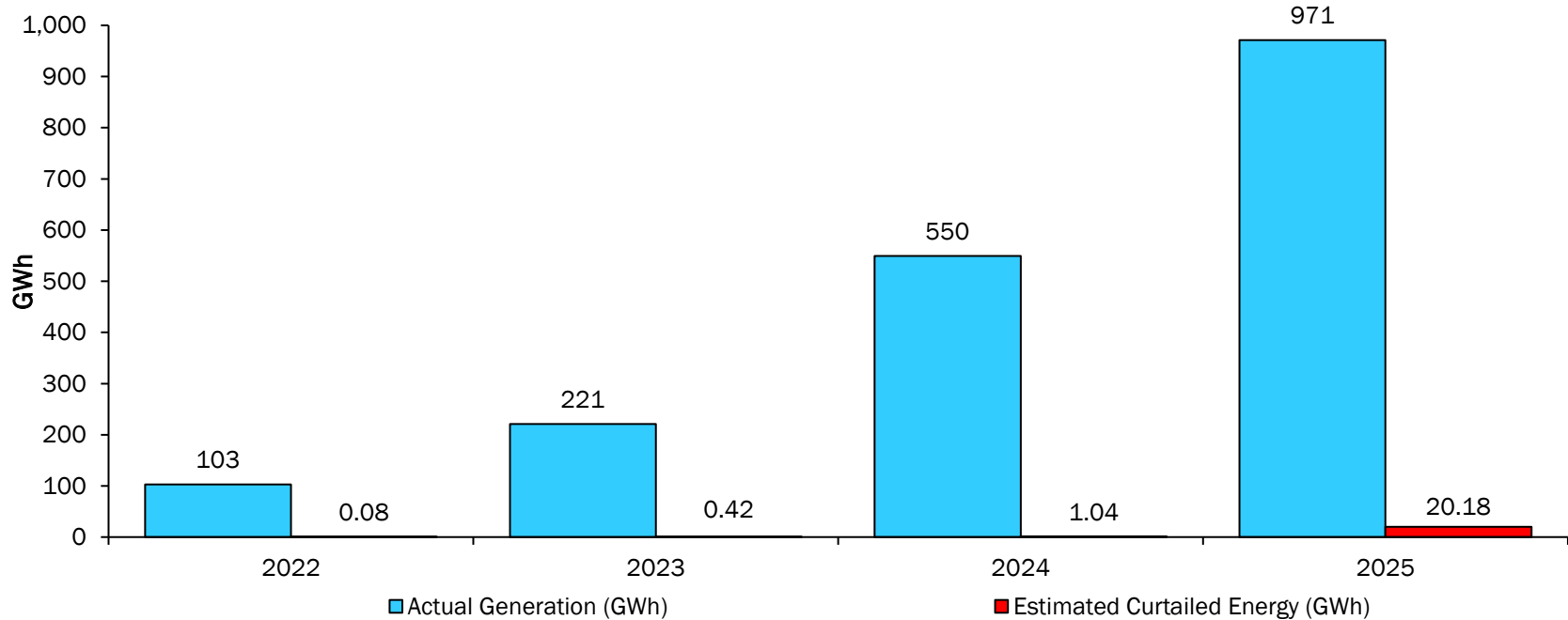
RT Market Curtailments: Wind

NYCA Wind 2025 - Annual Curtailed Energy by Limiting Facility



RT Market Curtailments: FTM Solar

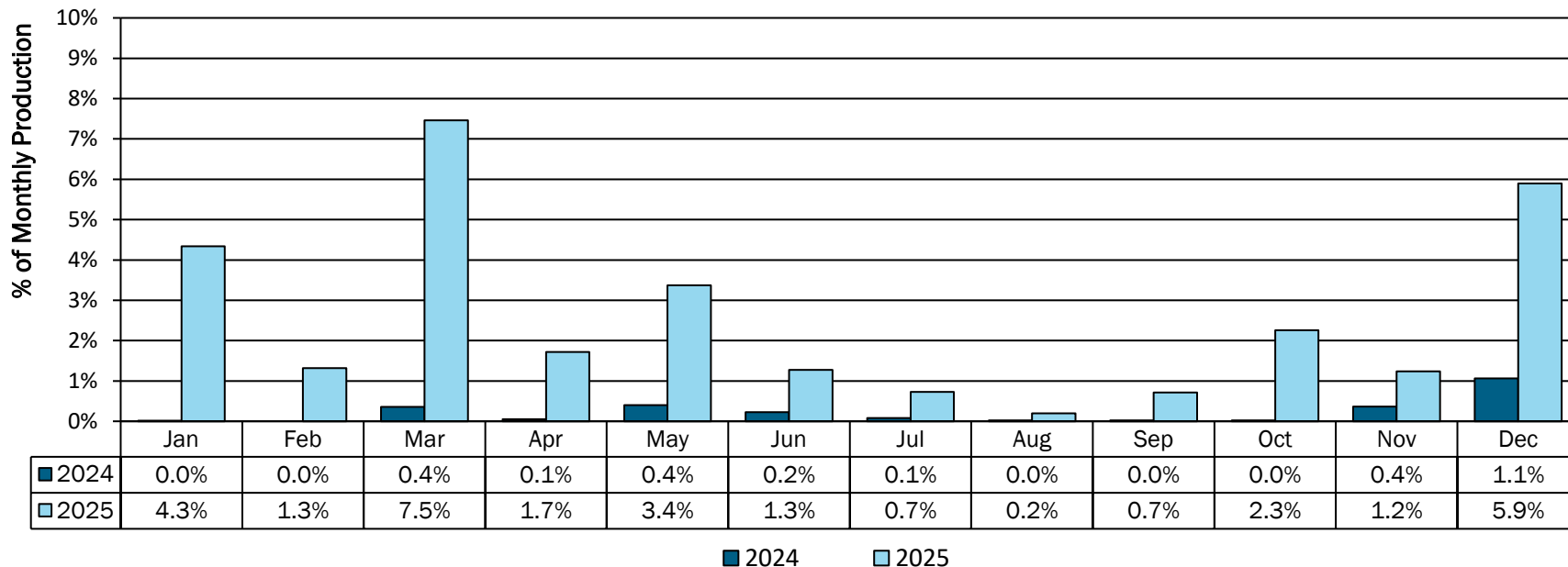
NYCA FTM Solar Plants - Annual Production & Curtailments



RT Market Curtailments: FTM Solar

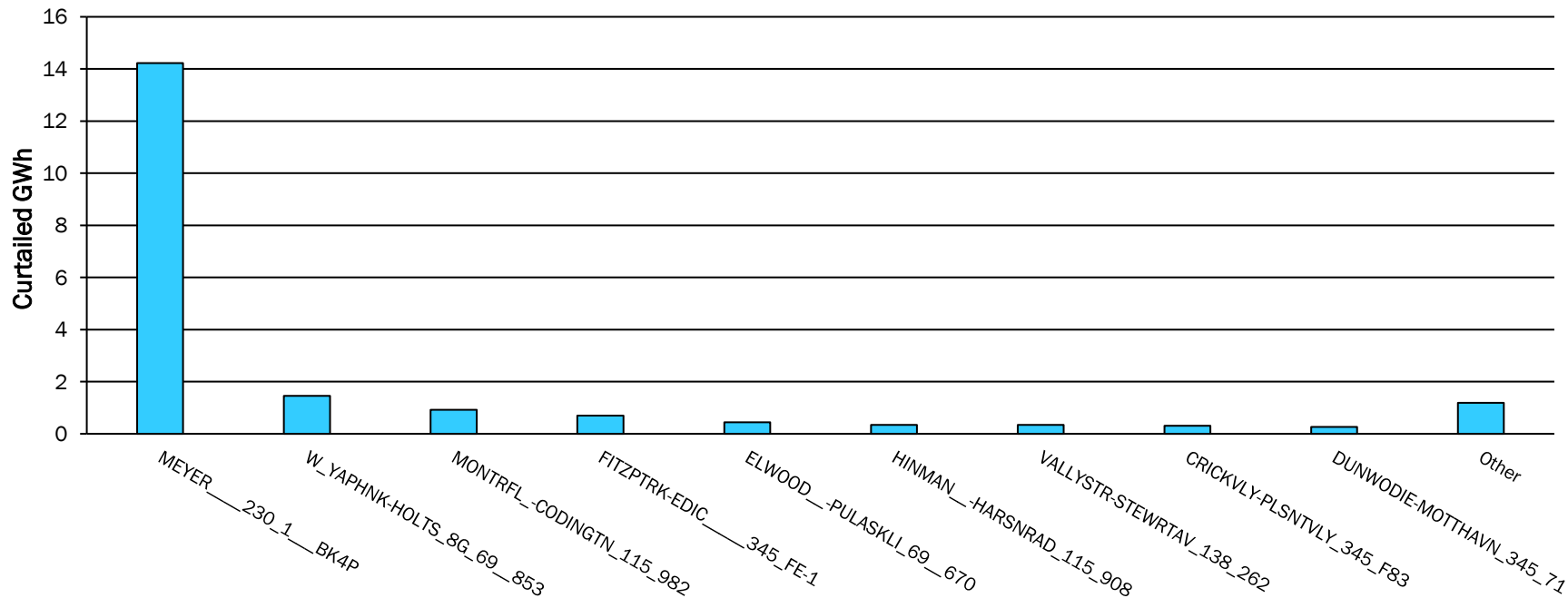
Total Estimated Curtailed Energy %	
2024	2025
0.2%	2.1%

NYCA FTM Solar - Monthly Estimated Curtailed Energy %



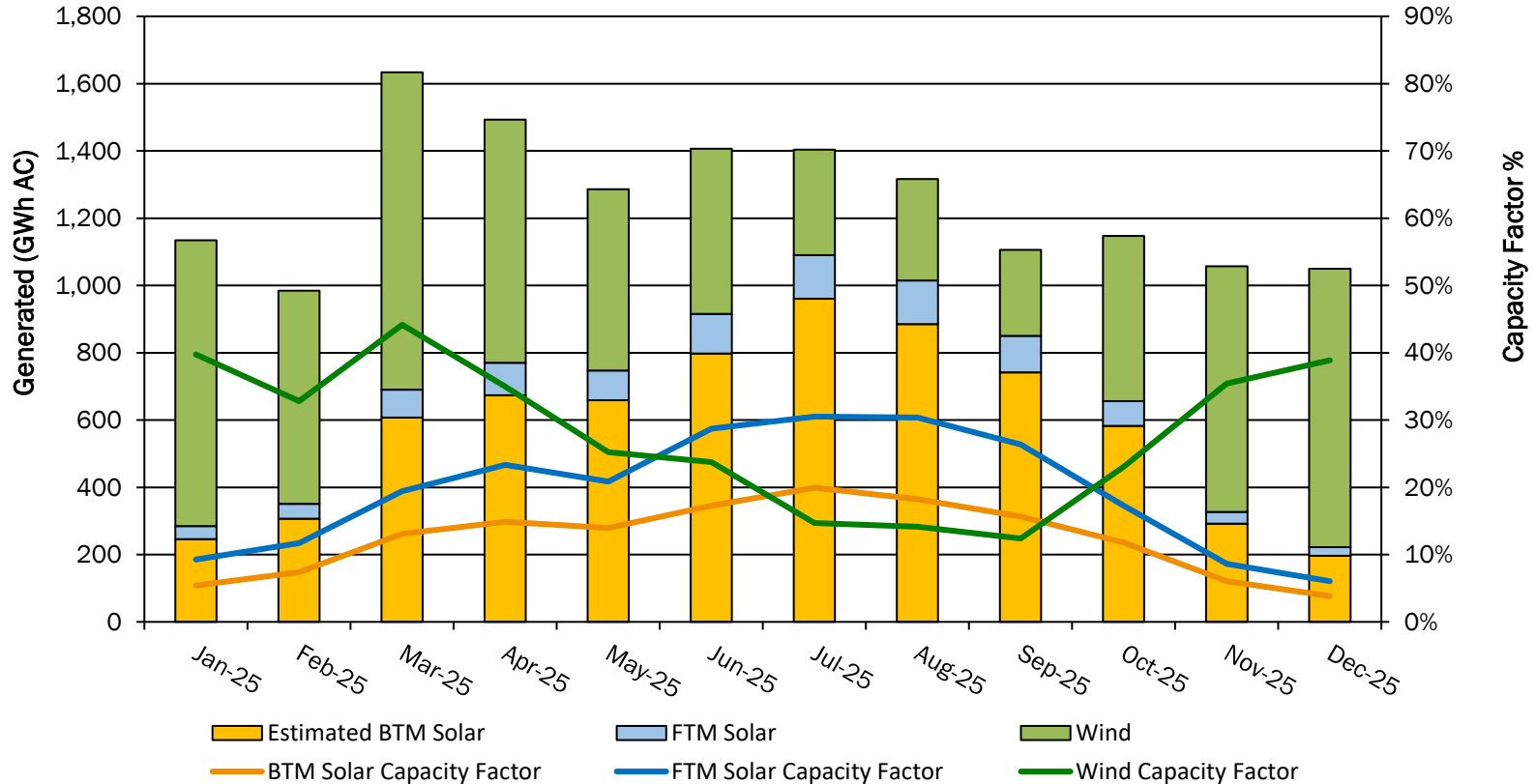
RT Market Curtailments: FTM Solar

NYCA FTM Solar Plants 2025 - Annual Curtailed Energy by Limiting Facility

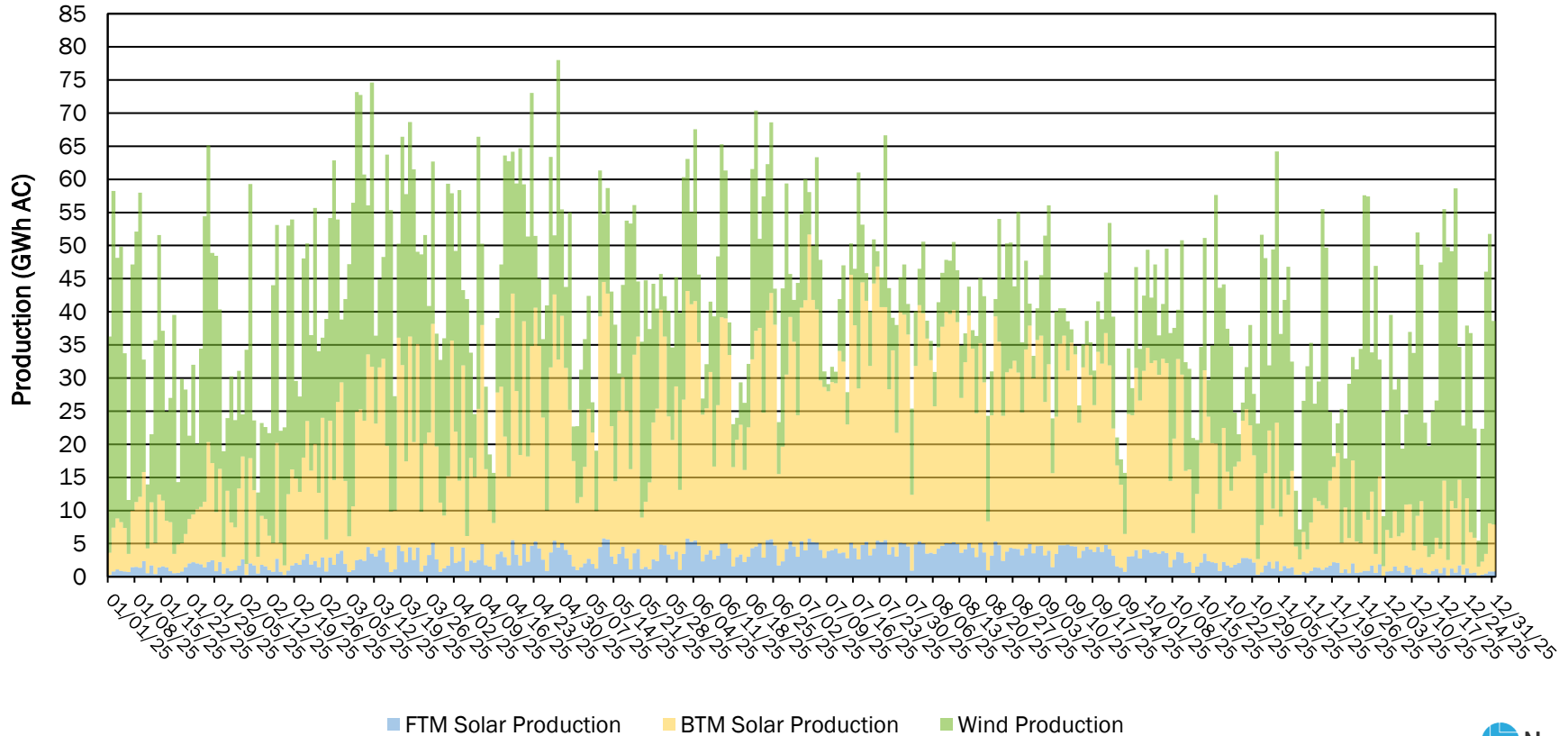


Coincident Wind and Solar

Monthly Wind and Solar Performance (2025)

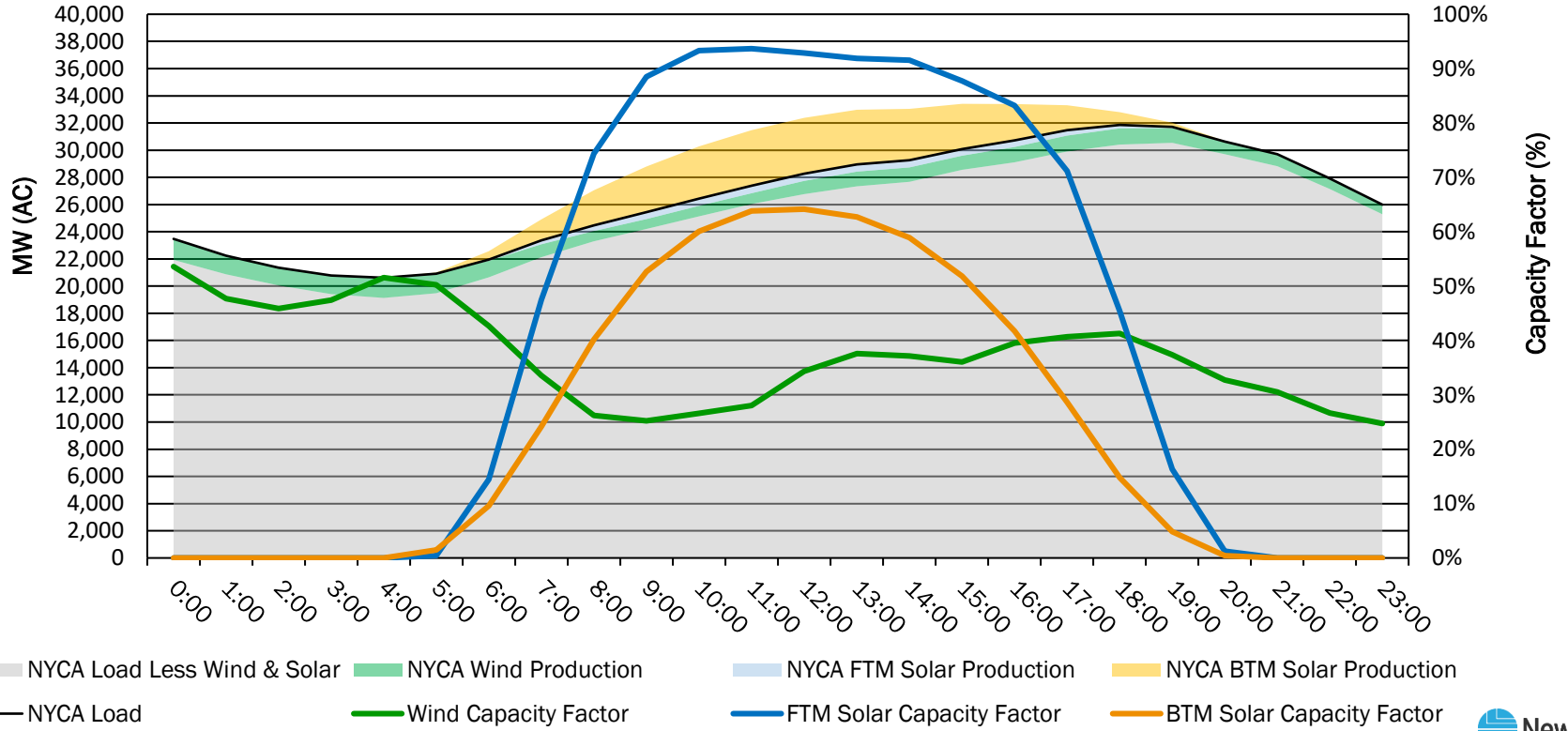


Daily Wind and Solar Performance (2025)



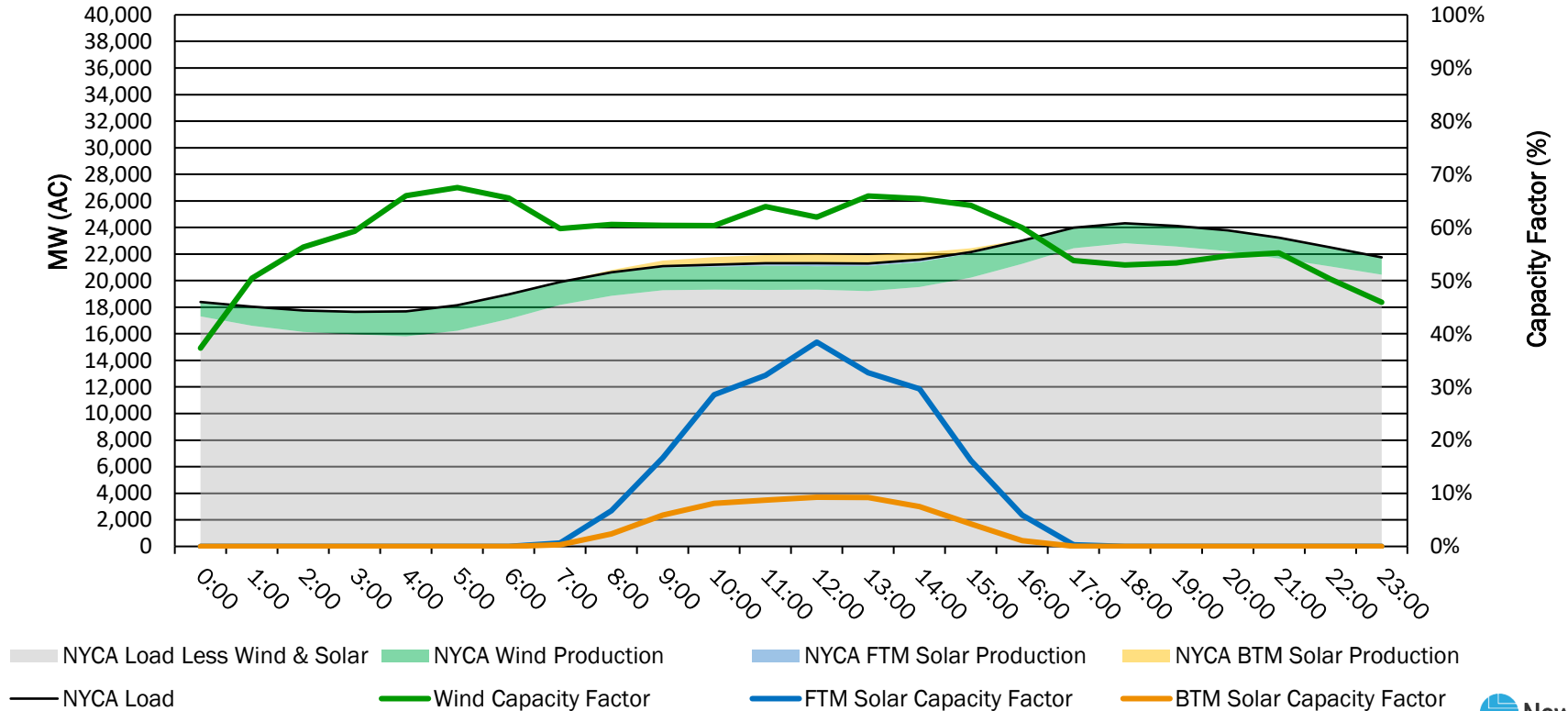
Wind and Solar Performance During Summer Peak Load

6/24/2025



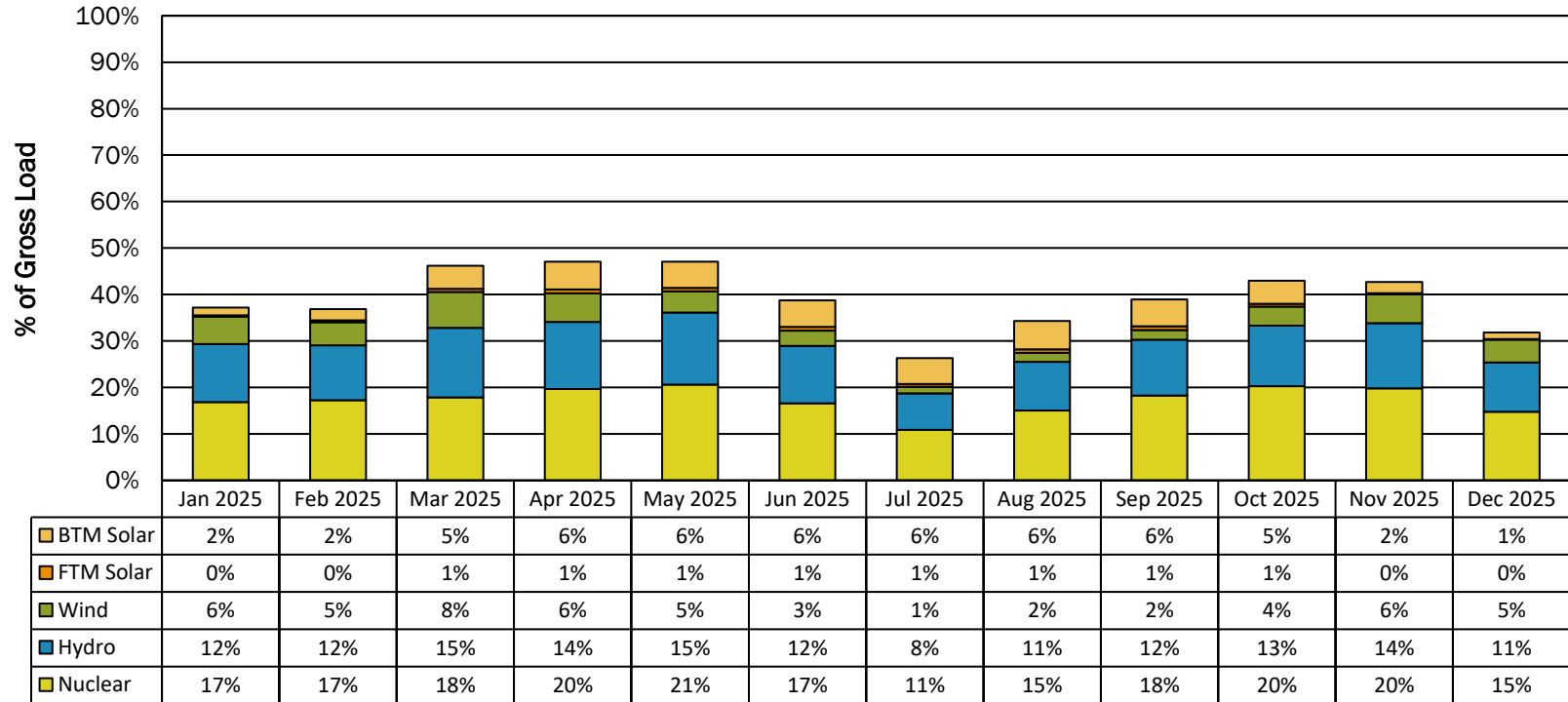
Wind and Solar Performance During Winter Peak Load

2/7/2026



NYCA Emissions-Free Generation

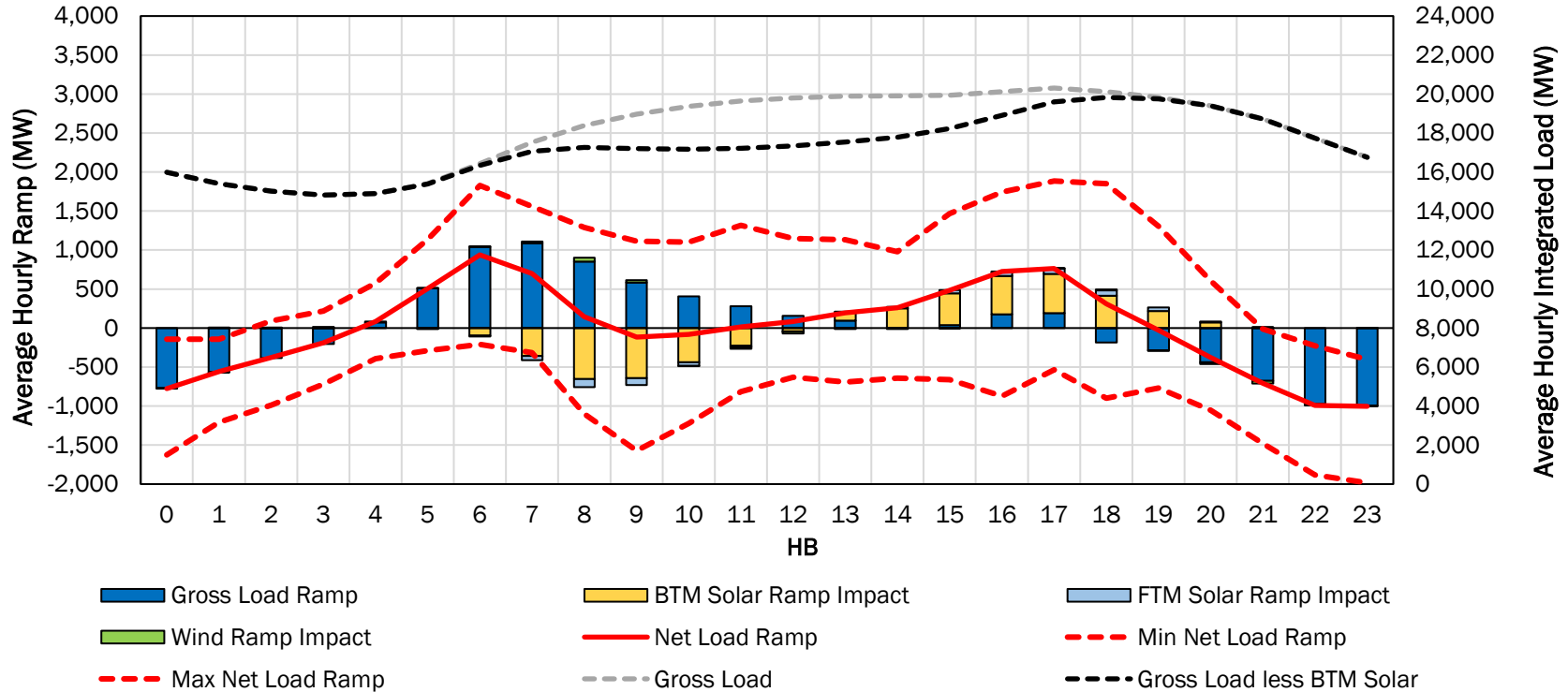
Annual Contribution to Gross Load (38.51%)				
Nuclear	Hydro	Wind	FTM Solar	BTM Solar
17.03%	12.25%	4.30%	0.58%	4.36%



■ Nuclear ■ Hydro ■ Wind ■ FTM Solar ■ BTM Solar

Load Ramps

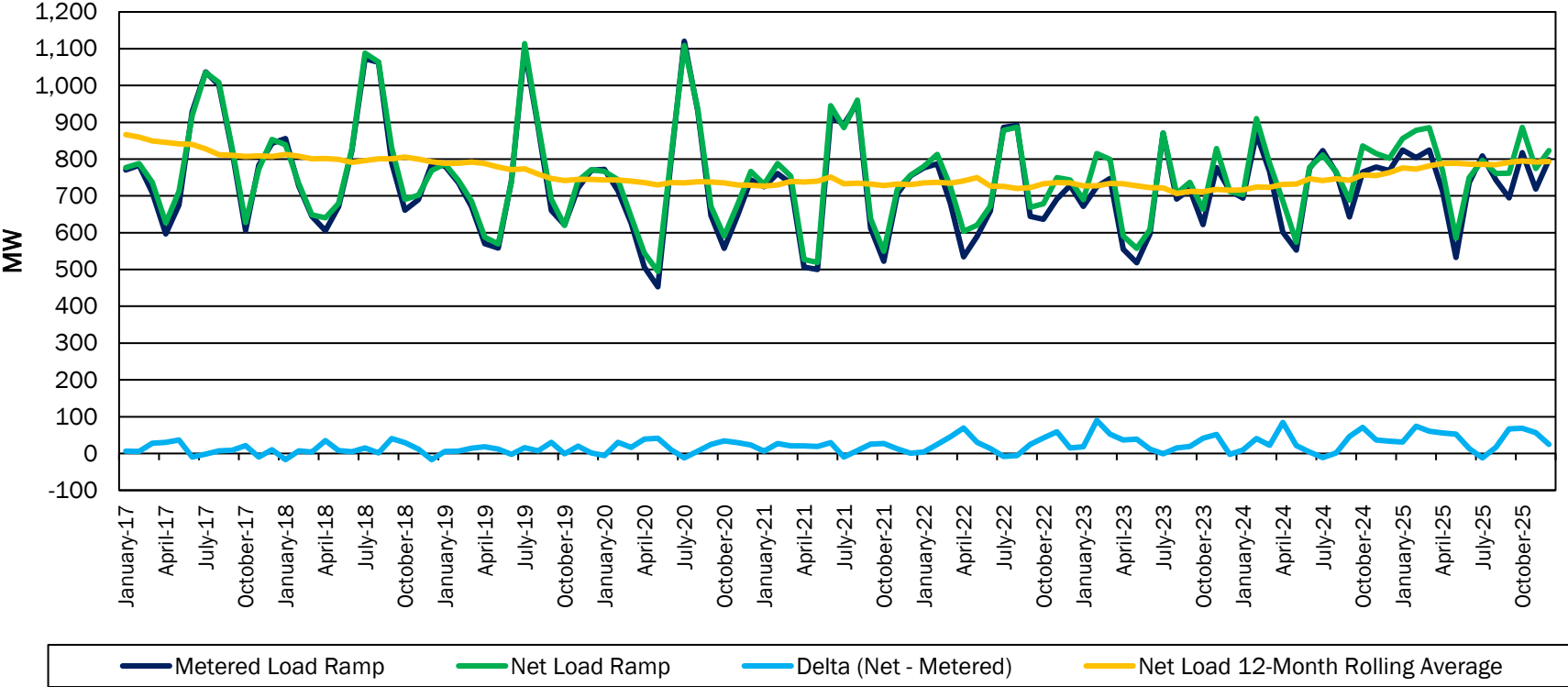
Average Hourly Net Load Ramps (2025)



Ramps are calculated as the difference between the previous and current hour (HB)
 Net Load is defined as Gross Load less Wind and Solar Generation
 Wind and Solar ramps are negated to indicate their impact on Net Load Ramp

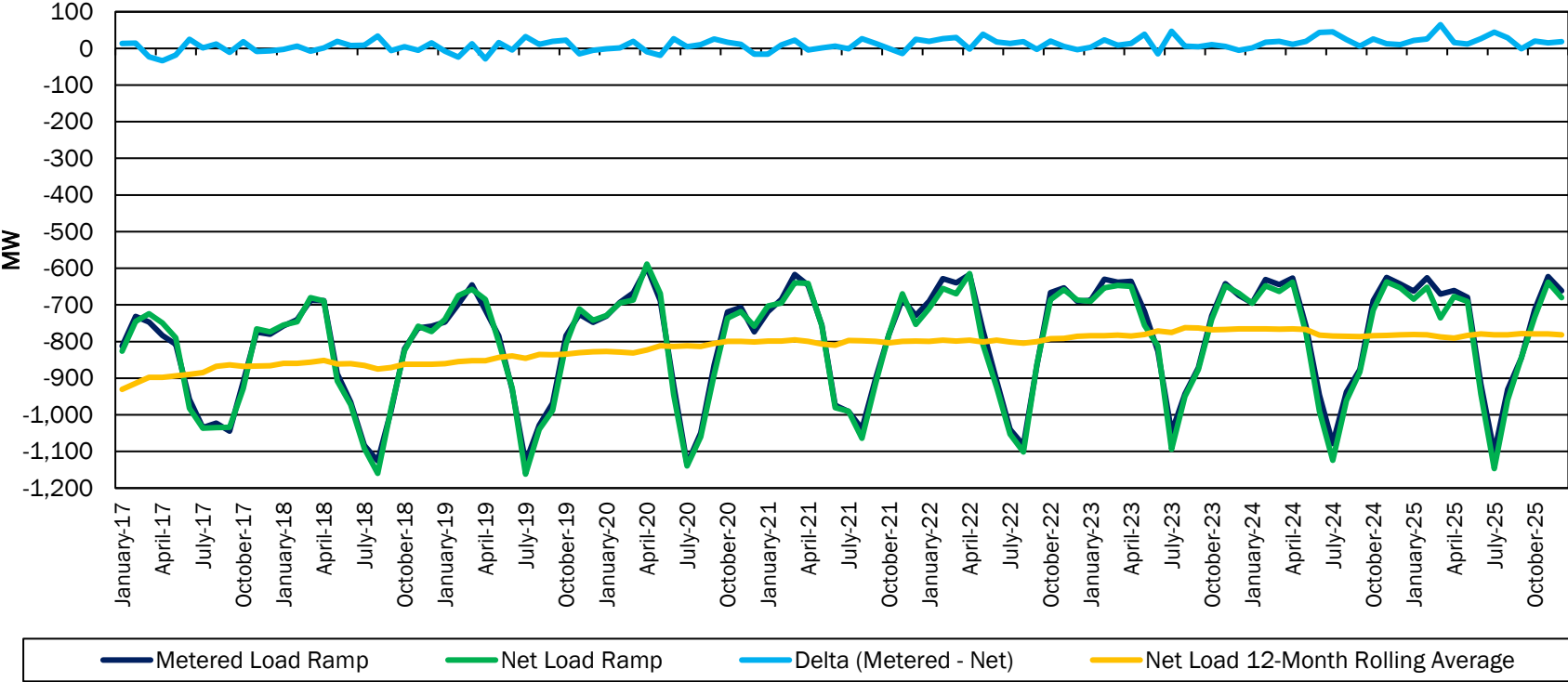
Metered Load vs Net Load Hourly Ramps

(75th Percentile Upward Ramps Only)



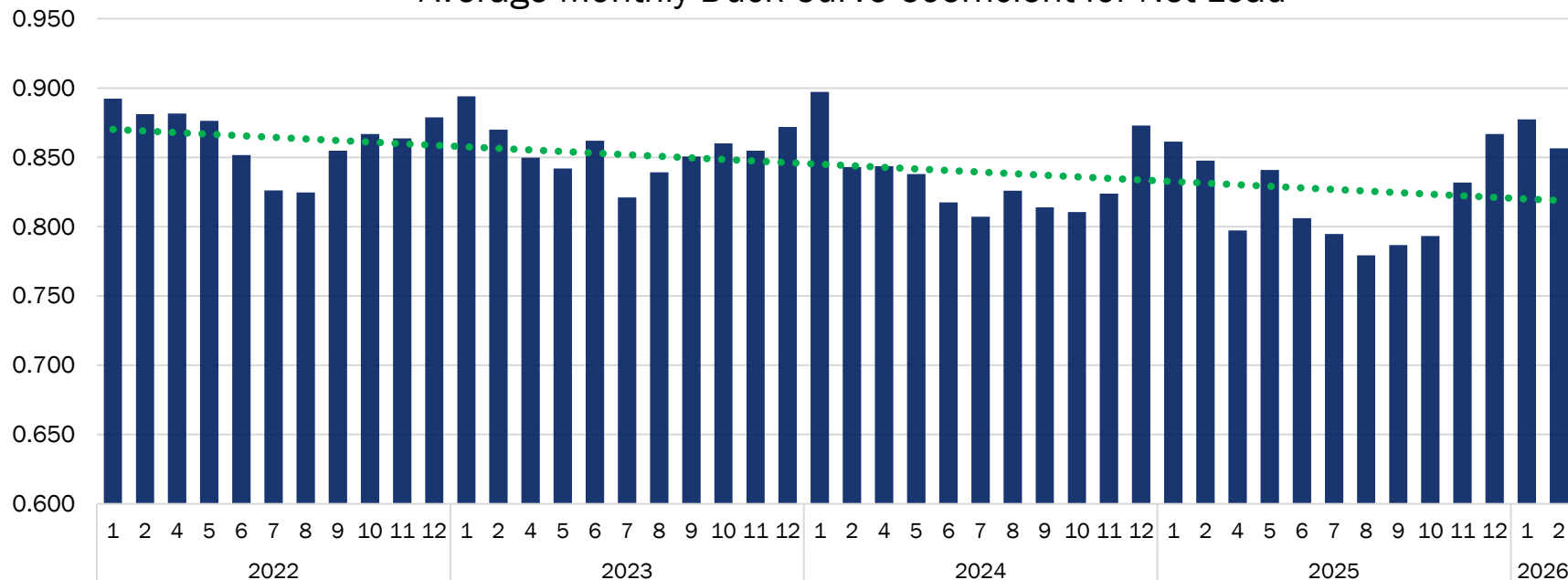
Metered Load vs Net Load Hourly Ramps

(75th Percentile Downward Ramps Only)



Net Load: Mid-day vs Evening Peak

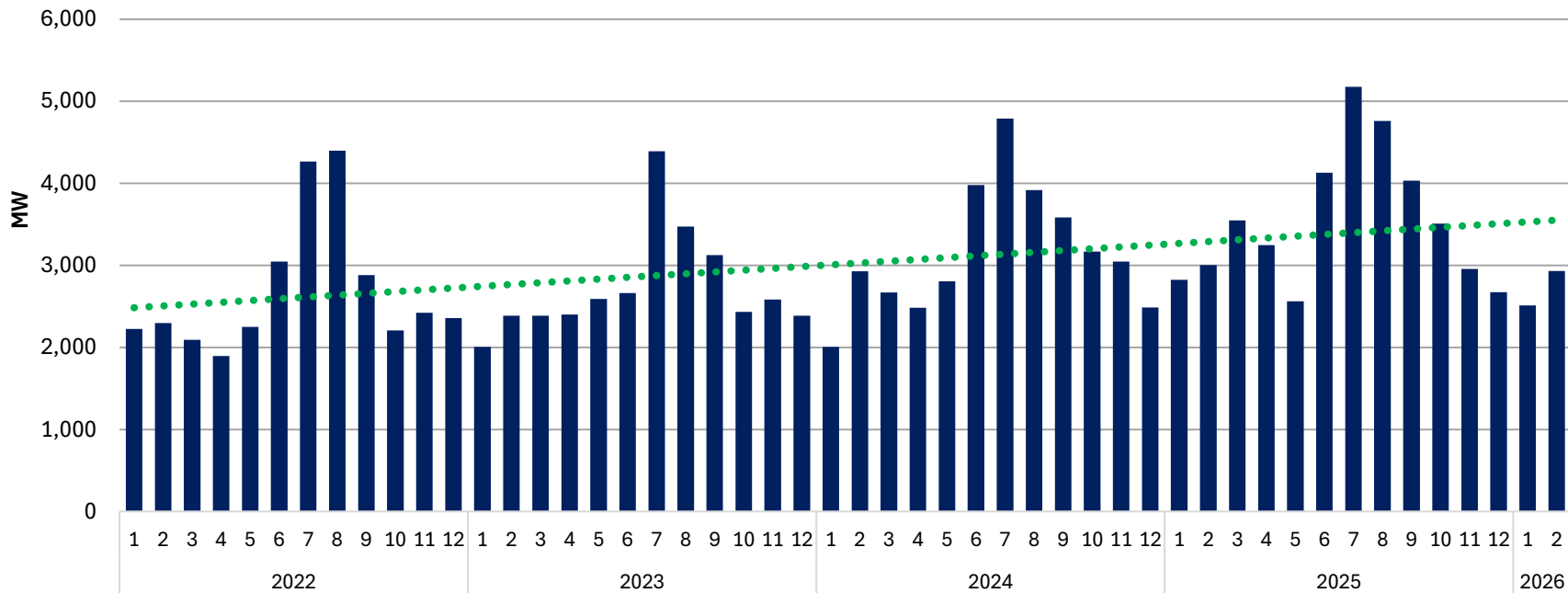
Average Monthly Duck Curve Coefficient for Net Load



$$\text{Duck Curve Coefficient} = \frac{\text{Minimum Net Load for Hours 9 to 15}}{\text{Evening Peak Net Load}}$$

Net Load: Mid-day vs Evening Peak

Average Monthly Duck Curve (MW) for Net Load



Duck Curve (MW) = Evening Peak Net Load – Minimum Net Load for Hours 9 to 15

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



Questions?