

NY Renewables Overview and YTD Operation

Reposted in Response to Stakeholder Feedback – Content with Green Text is New or Revised Material

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Agenda

- Overview of NY Wind
- Economic Wind Curtailment Statistics
- Overview of NY BTM Solar
- Coincident Wind and BTM Solar
- Questions

Background on Metrics

- Unless otherwise stated, Wind data accounts for all wind plants installed in the NYCA.
- Unless otherwise stated, Wind and Solar Capacity Factors are inclusive of ALL hours in 2021 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.
- All BTM solar production is measured in DC (direct current).
- Capacity Factors are calculated as follows:

$$\text{Capacity Factor} = \frac{\text{Total Generated Energy}}{(\text{Nameplate Capacity})(\text{Total Hours})}$$

Past Presentations and Datasets

For those interested, 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

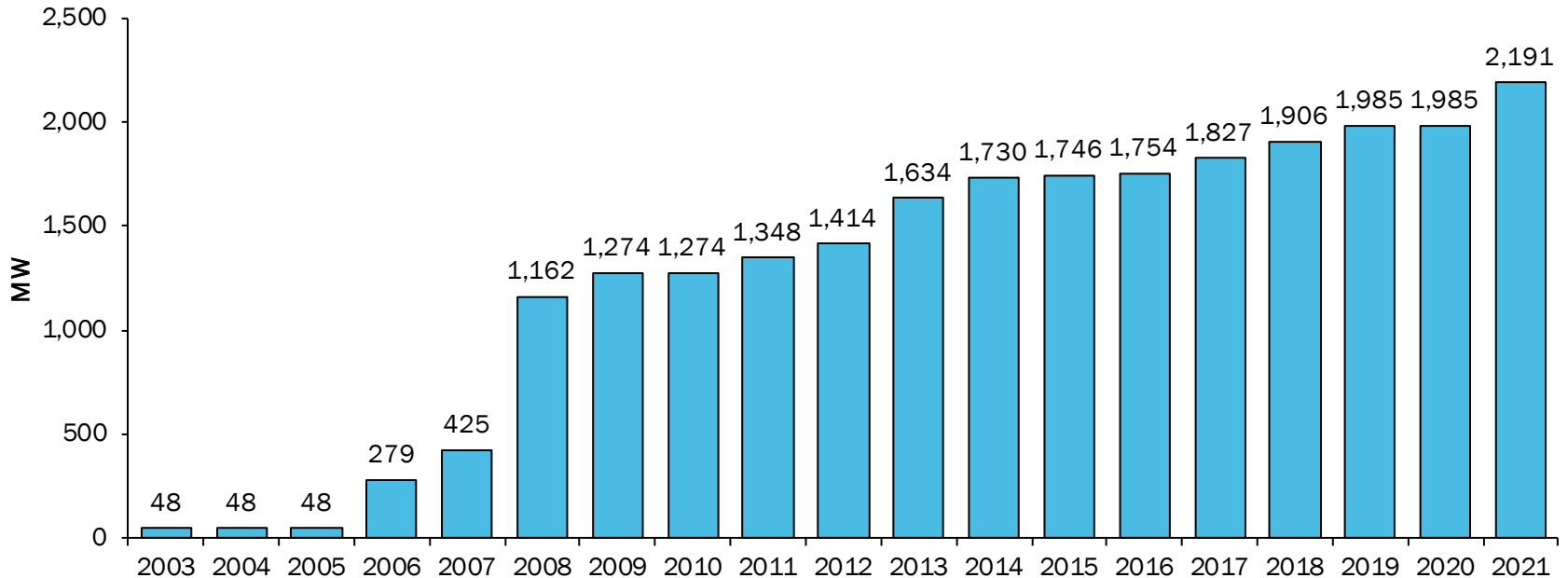
More information on the wind curtailment process can be found within the presentation below.

https://www.nyiso.com/documents/20142/1394222/agenda_06_MC_1272009_v1_WindResourceMgmt.pdf/10de5bc1-cbae-c2c1-ac50-57223ae45956

NYCA Wind 2021

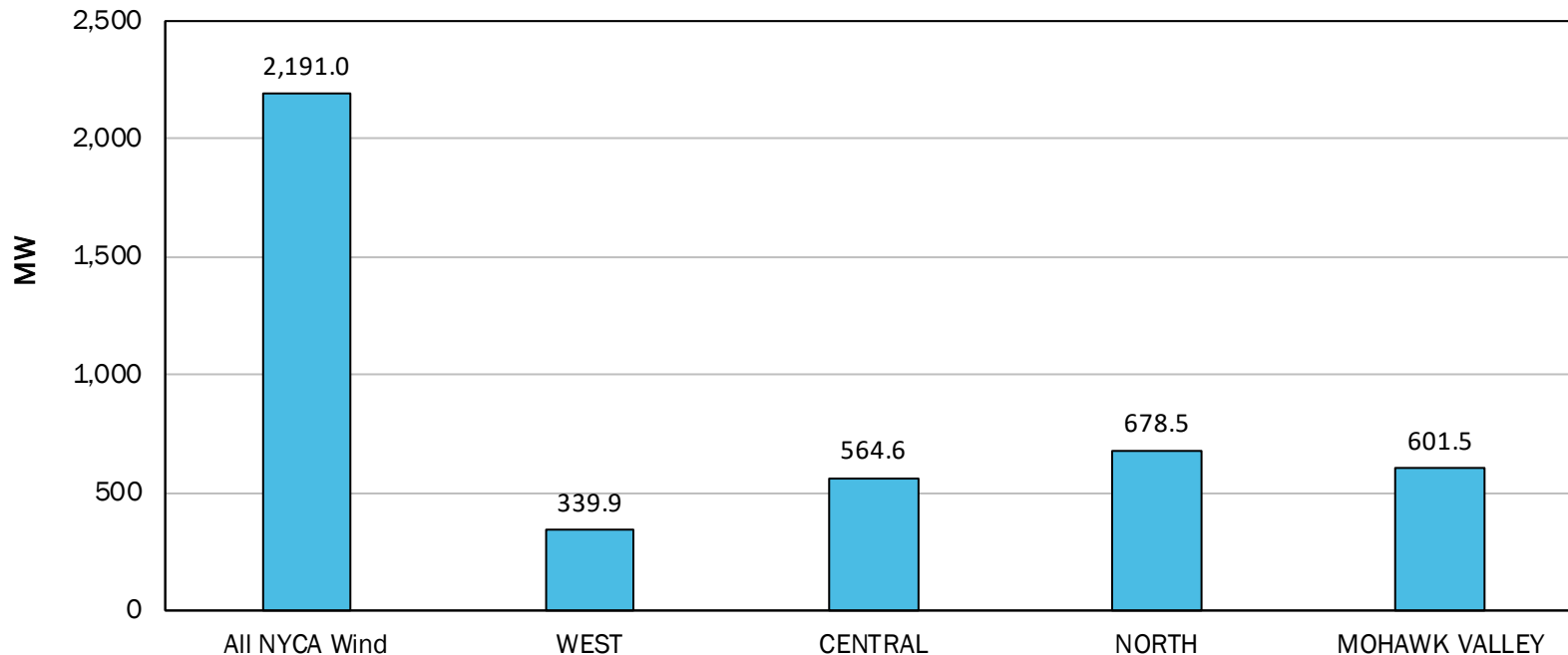
Overview

NYCA Wind Nameplate Capacity



Zonal Wind Capacity

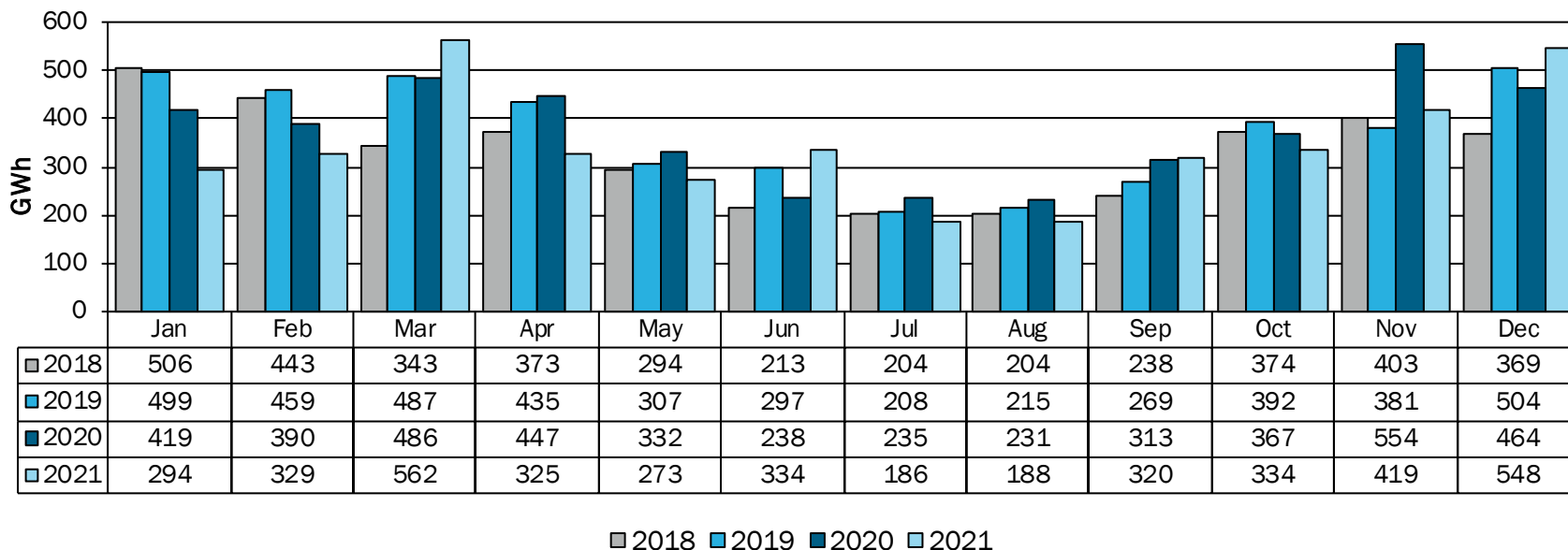
2021 End of Year Installed Nameplate Wind Capacity



NY Wind Generation

Total Annual Wind Production (GWh)			
2018	2019	2020	2021
3,965	4,453	4,476	4,111

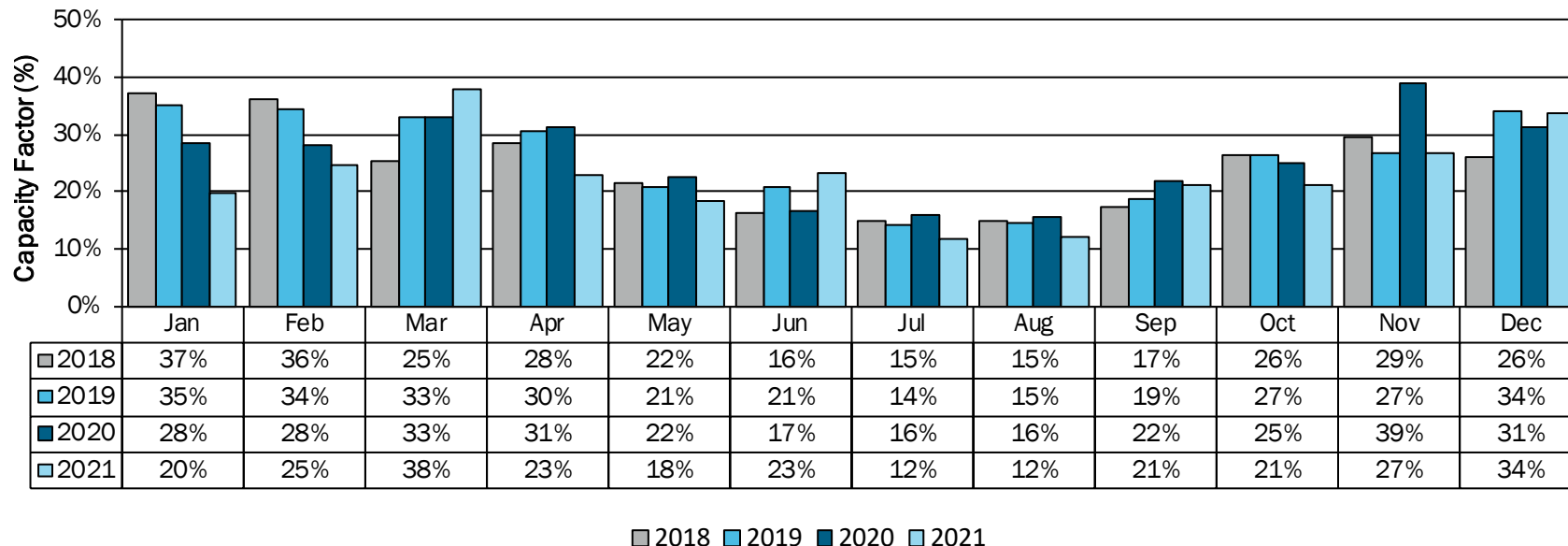
NYCA Wind Plants - Monthly Production



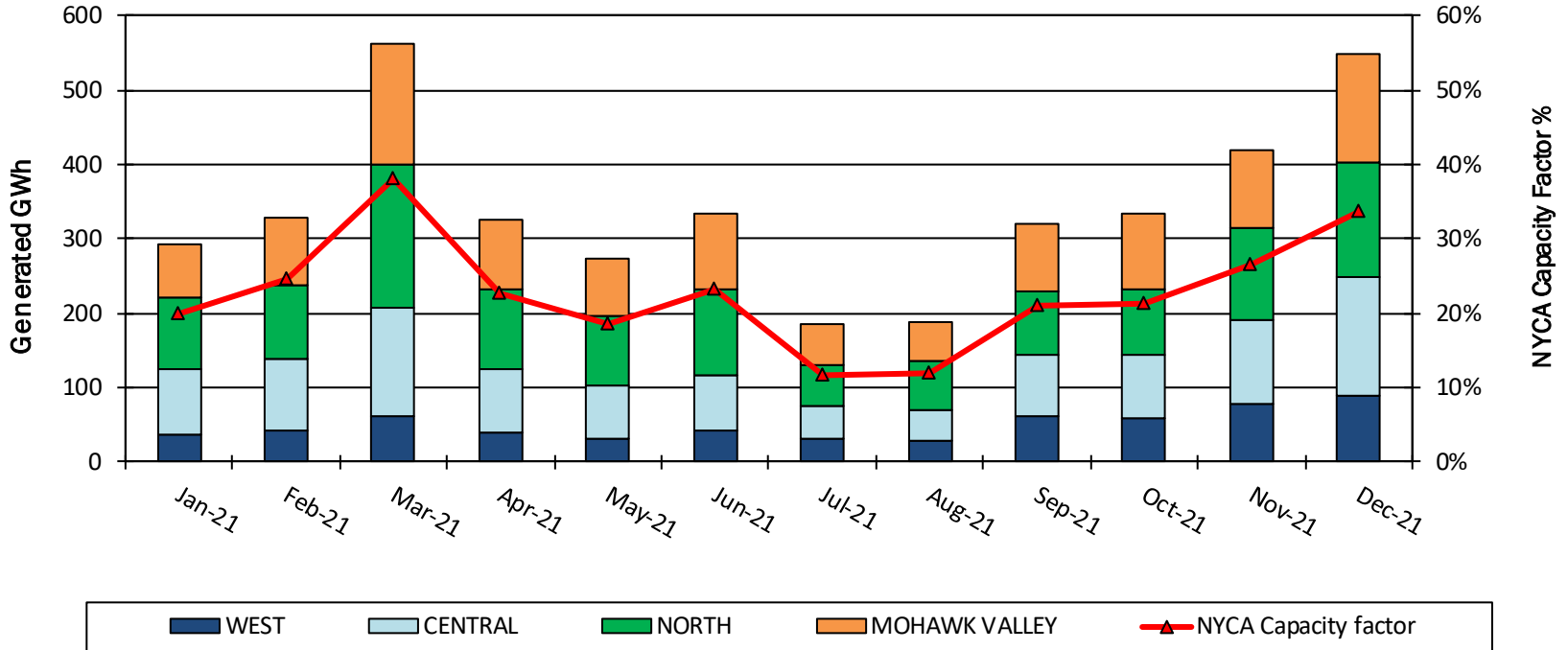
NY Wind Capacity Factors

Annual Wind Capacity Factor			
2018	2019	2020	2021
24%	26%	26%	23%

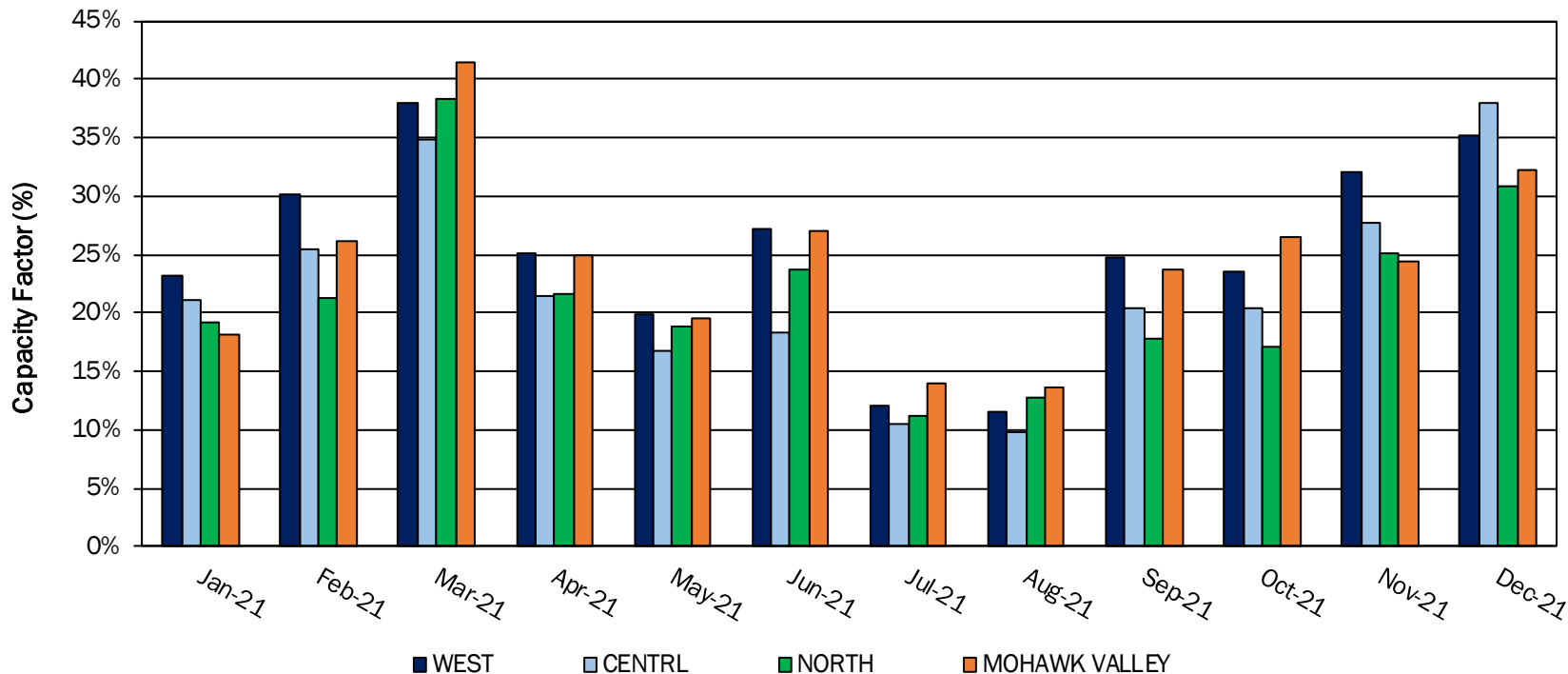
NYCA Wind Generation – Monthly Capacity Factor



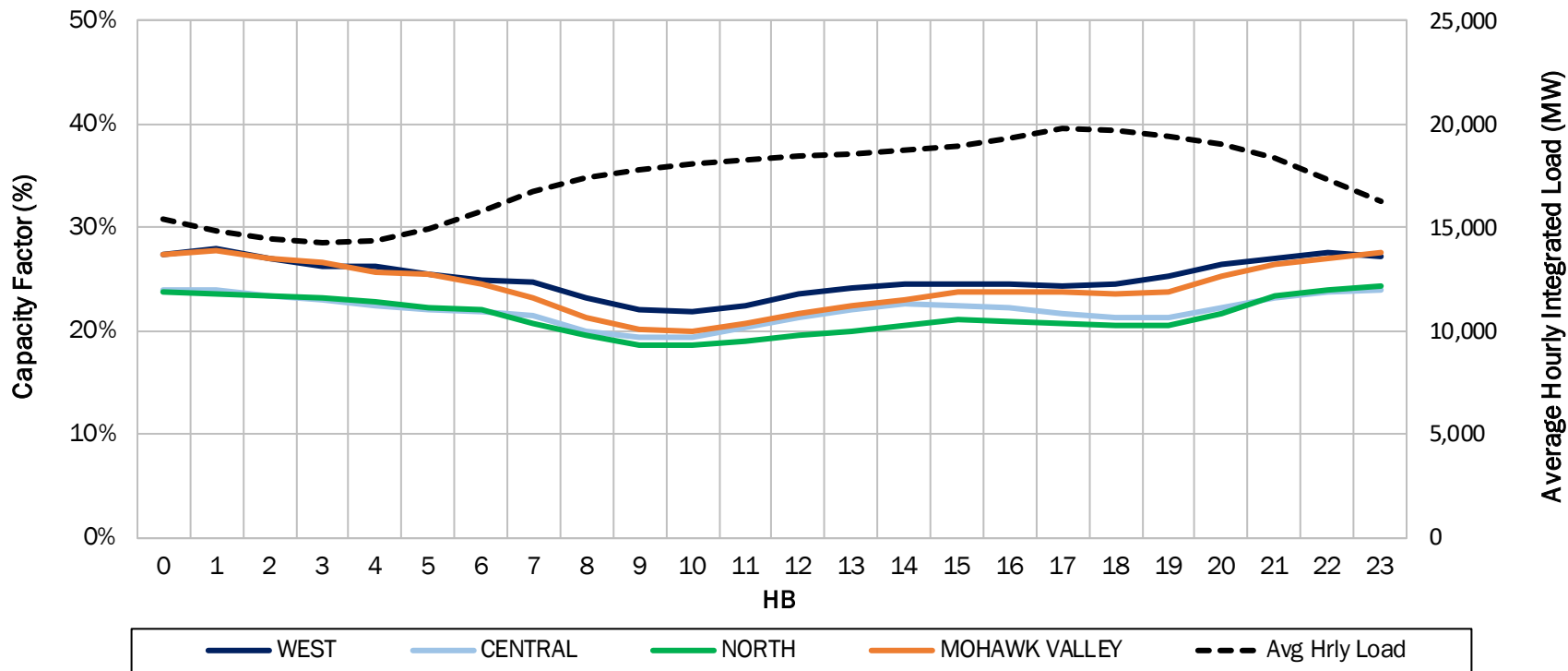
Monthly Wind Production by Zone



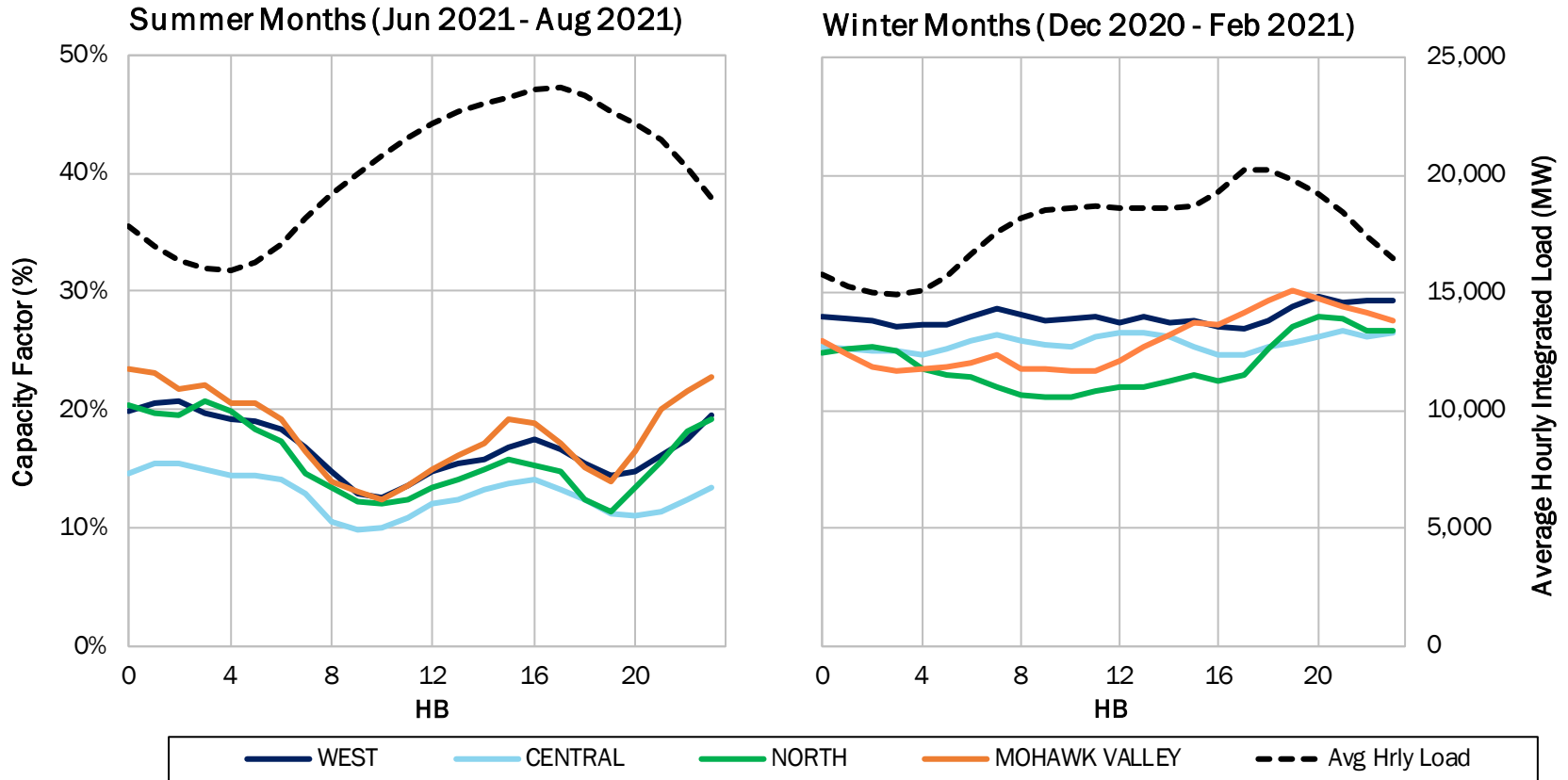
Monthly Wind Capacity Factors by Zone



2021 Average Hourly Wind Capacity Factors by Zone

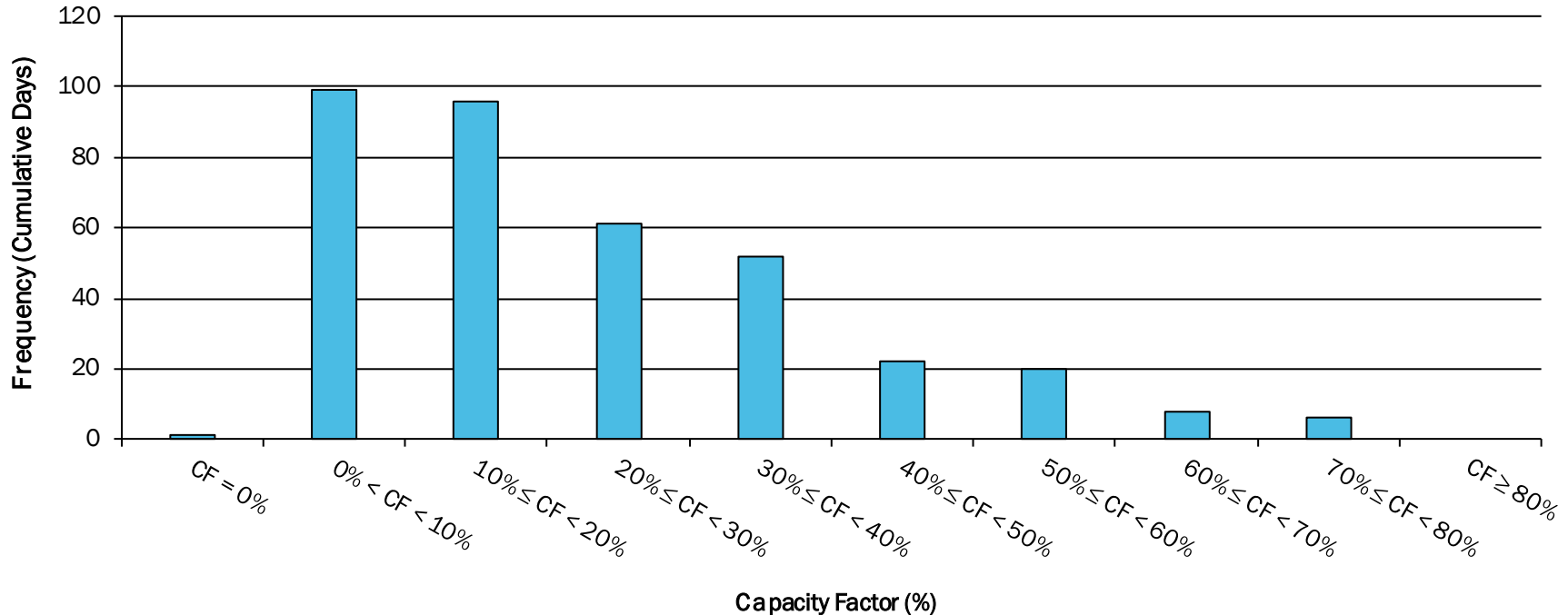


2021 Seasonal Average Hourly Wind Capacity Factors by Zone



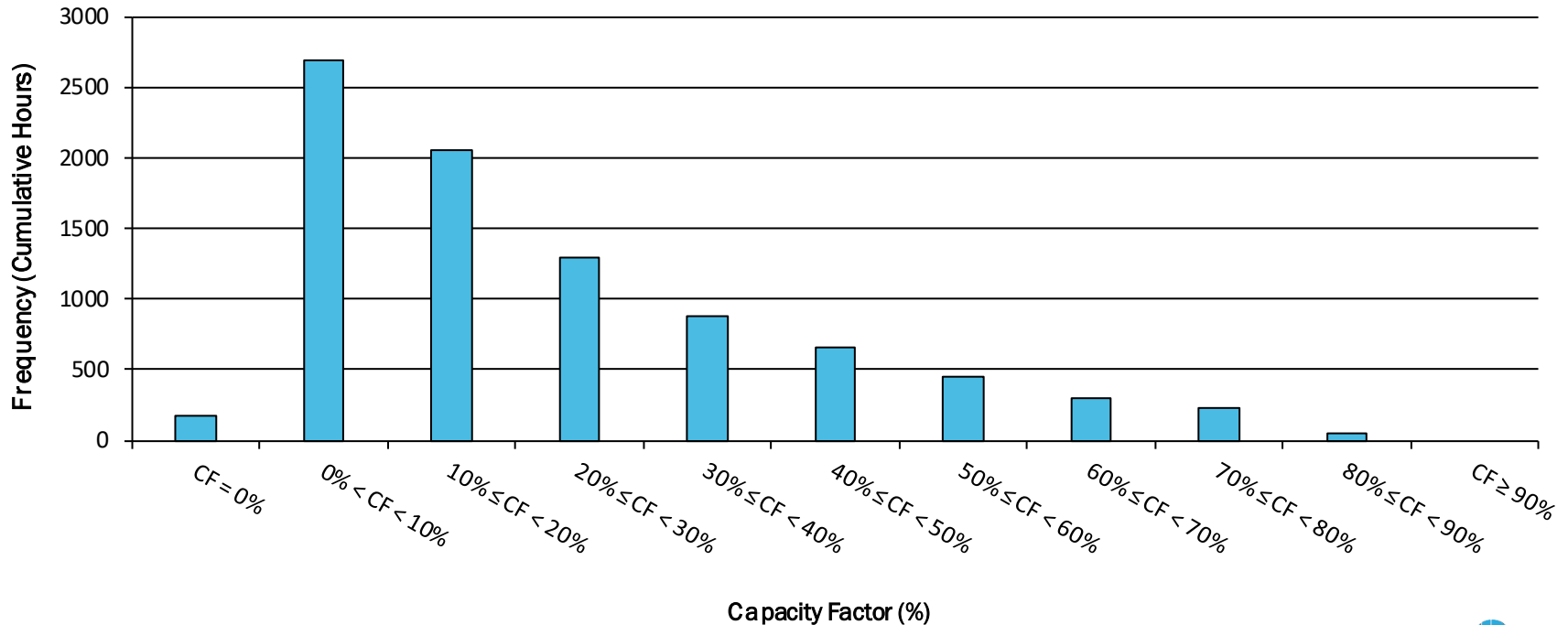
2021 NY Wind Capacity Factor Distribution

Daily Capacity Factor (CF) Distribution for 2021



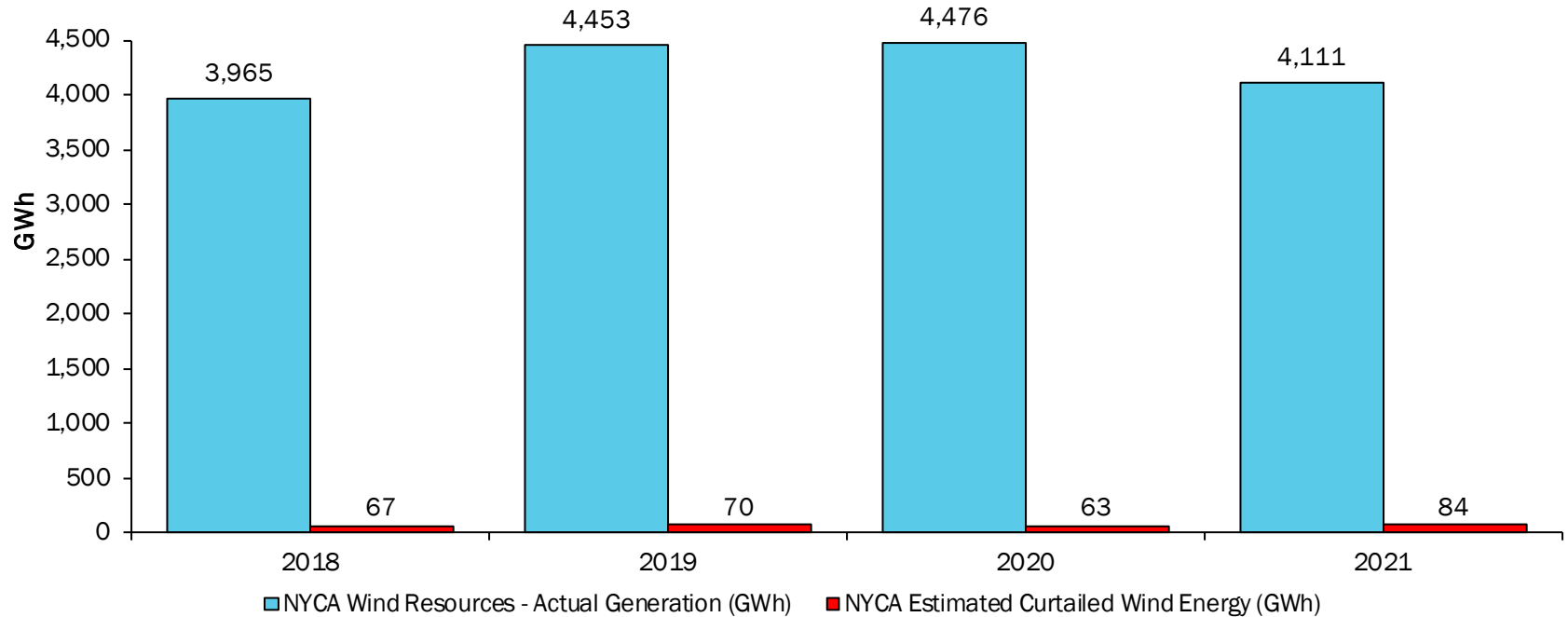
2021 NY Wind Capacity Factor Distribution

Hourly Capacity Factor (CF) Distribution for 2021



NY Economic Wind Curtailments

NYCA Wind Plants - Annual Production & Economic Curtailments*

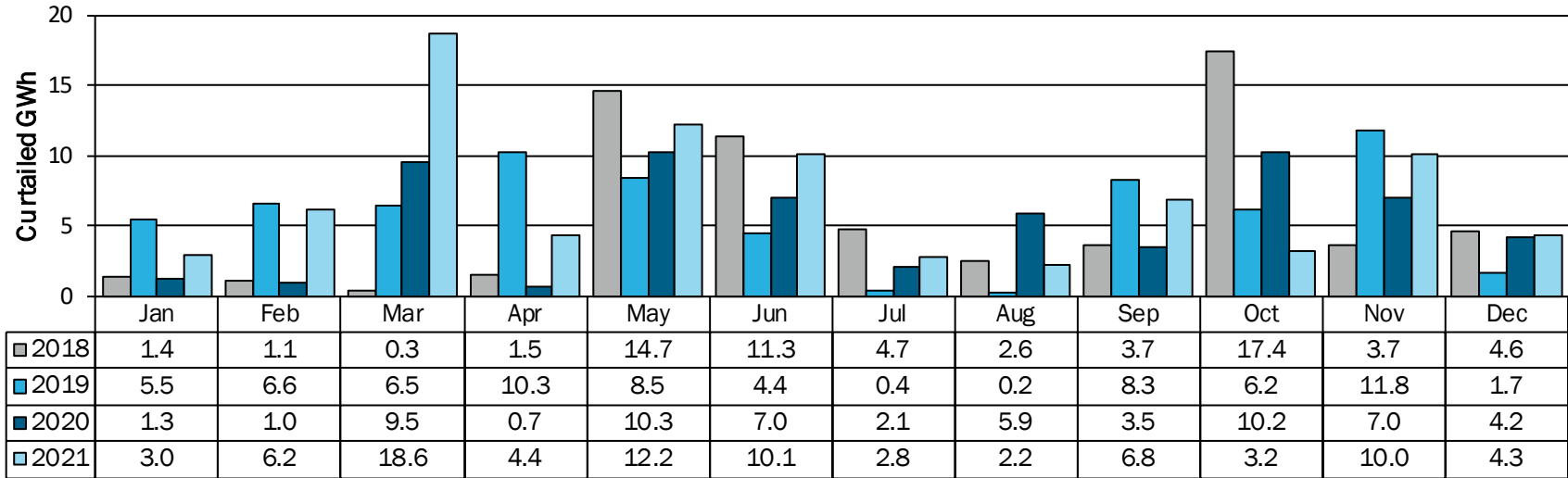


*Economic Curtailments are instructions sent to Wind Units to limit their output. The instructions come from NYISO's real-time dispatch market evaluation and are most often associated with transmission constraints or gen-to-load balancing constraints.

NY Economic Wind Curtailments

Total Annual Wind Curtailments (GWh)			
2018	2019	2020	2021
66.9	70.5	62.7	84.0

NYCA Wind Plants - Monthly Estimated Curtailed Energy

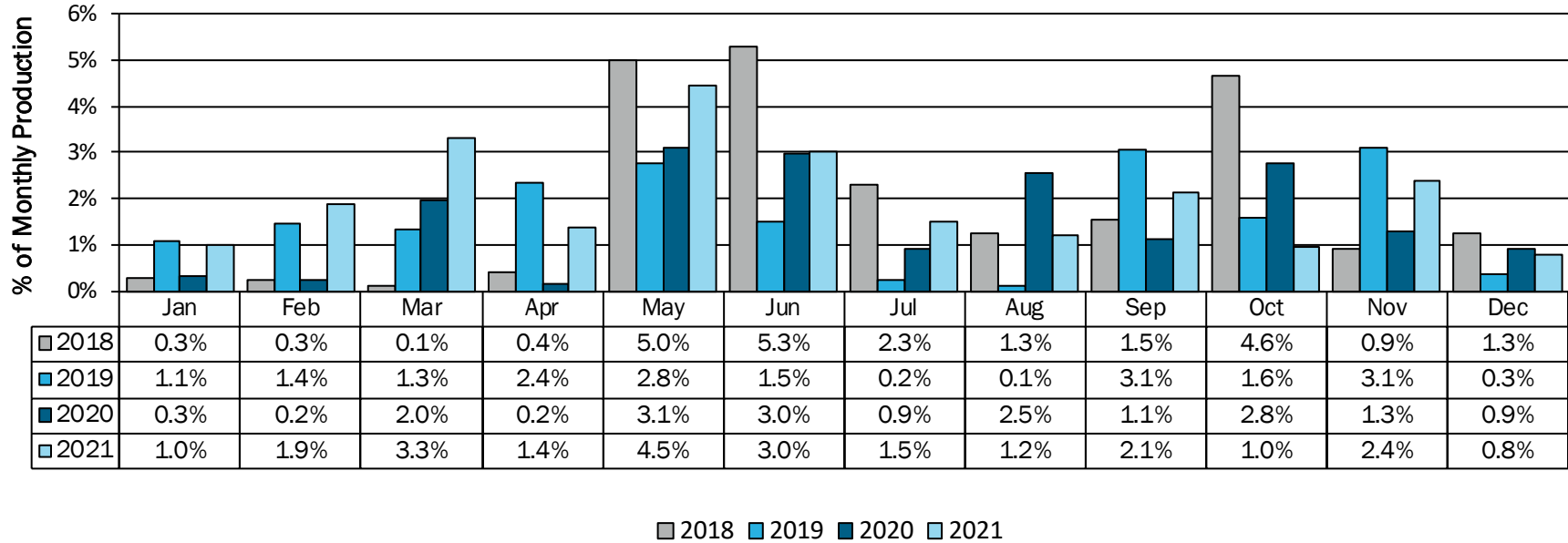


■ 2018 ■ 2019 ■ 2020 ■ 2021

NY Economic Wind Curtailments

Total Estimated Curtailed Energy %			
2018	2019	2020	2021
1.7%	1.6%	1.4%	2.0%

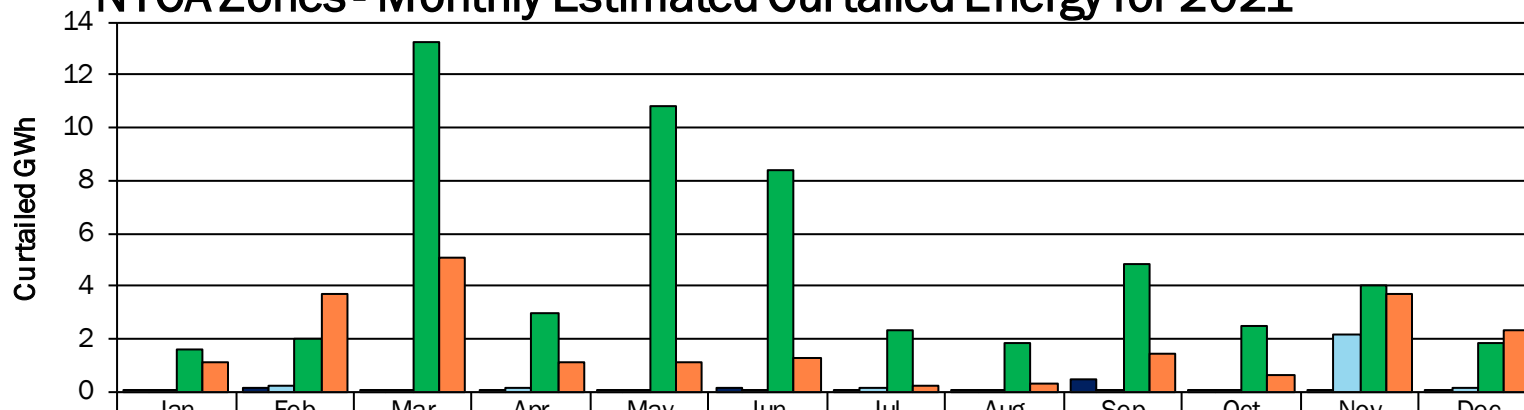
NYCA Wind Plants - Monthly Estimated Curtailed Energy %



NY Economic Wind Curtailments

Total Annual Estimated Curtailed Energy (GWh)			
West	Central	North	Mohawk Valley
1.12	3.20	56.54	22.18

NYCA Zones - Monthly Estimated Curtailed Energy for 2021*



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
■ WEST	0.03	0.12	0.04	0.08	0.04	0.18	0.04	0.01	0.45	0.01	0.02	0.09
■ CENTRAL	0.04	0.24	0.05	0.15	0.10	0.06	0.11	0.02	0.06	0.04	2.20	0.12
■ NORTH	1.64	2.03	13.26	3.02	10.80	8.40	2.32	1.81	4.85	2.50	4.02	1.89
■ MOHAWK VALLEY	1.14	3.70	5.06	1.15	1.11	1.31	0.22	0.35	1.41	0.67	3.75	2.30

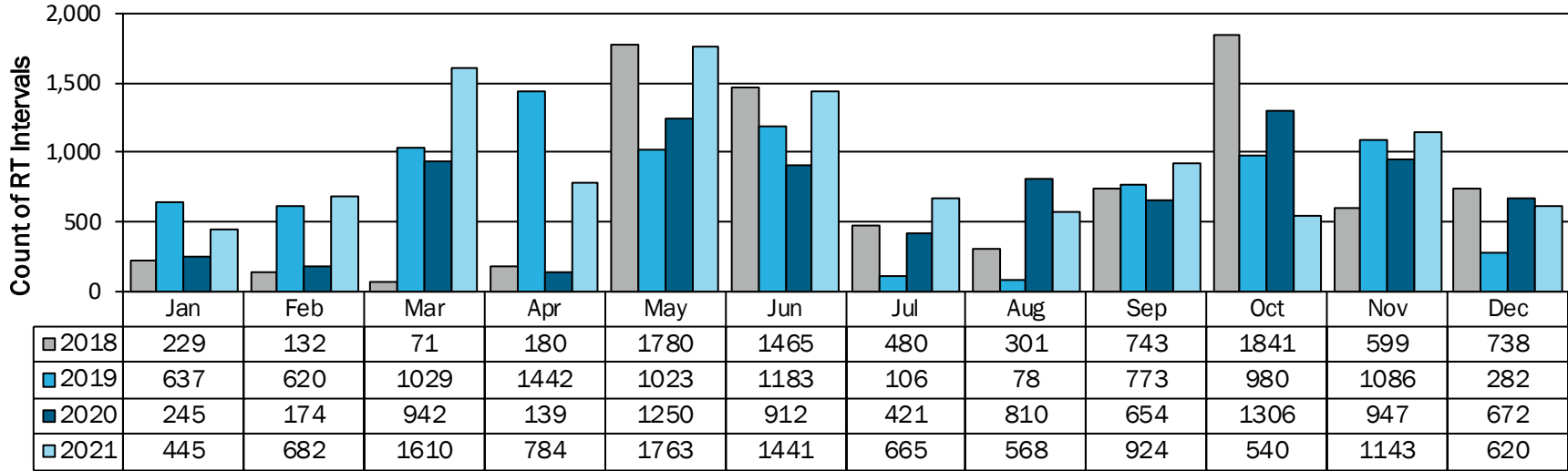
*North Zone curtailments in 2021 are coincident with several long-term facility outages related to transmission upgrades.

NY Economic Wind Curtailments

Total Estimated Curtailed Interval Count			
2018	2019	2020	2021
8,559	9,239	8,472	11,185

NYCA Wind Plants - Monthly Estimated Curtailed Interval Count

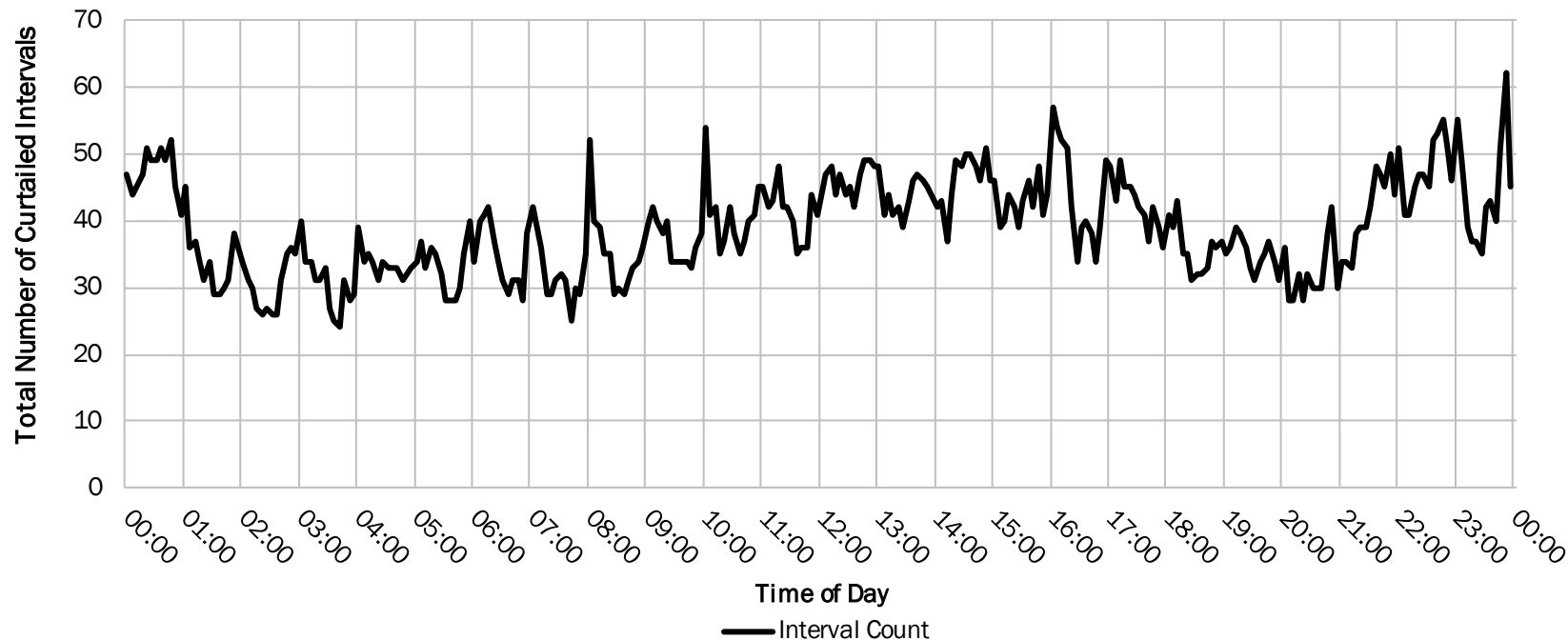
(12 Intervals = 1 Hour)



2018 2019 2020 2021

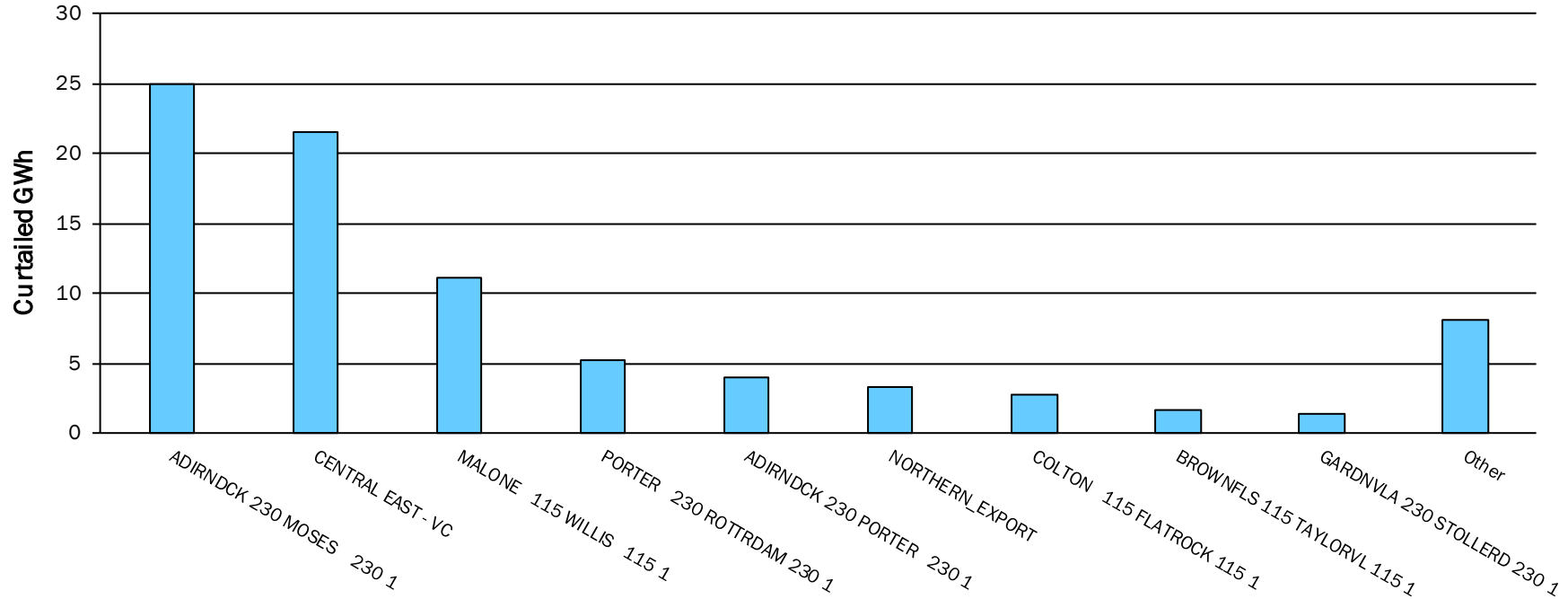
NY Economic Wind Curtailments

Interval Count of Curtailments by Time of Day (all of 2021)



NY Economic Wind Curtailments

NYCA Wind Plants 2021 - Annual Curtailed Energy by Limiting Facility



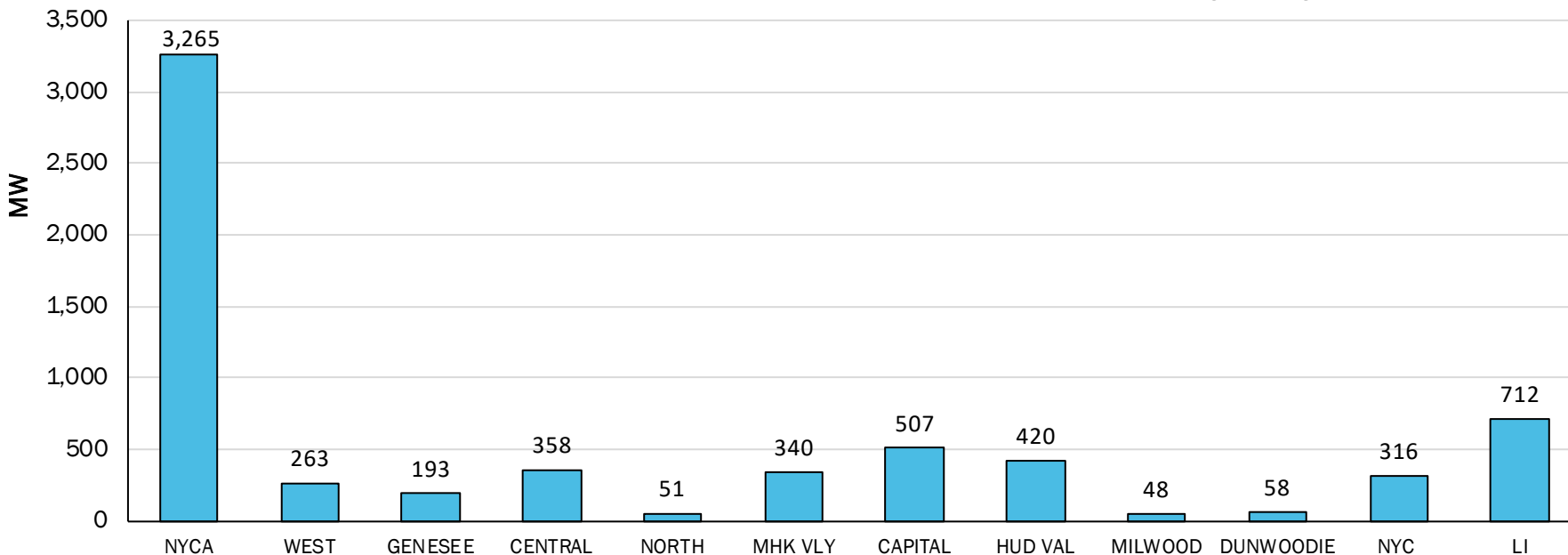
Behind the Meter (BTM) Solar 2021

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
 - Sampling is taken from approximately 9,234 individual solar production sites across NY representing over 100 MWs
- 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 installations in the NY SUN and NY DPS Standard Interconnection Request (SIR) databases to develop an accurate estimate of BTM solar installed capacity
- At the end of 2021, BTM Solar Capacity was estimated to be 3,265 MWs

Zonal BTM Solar Capacity

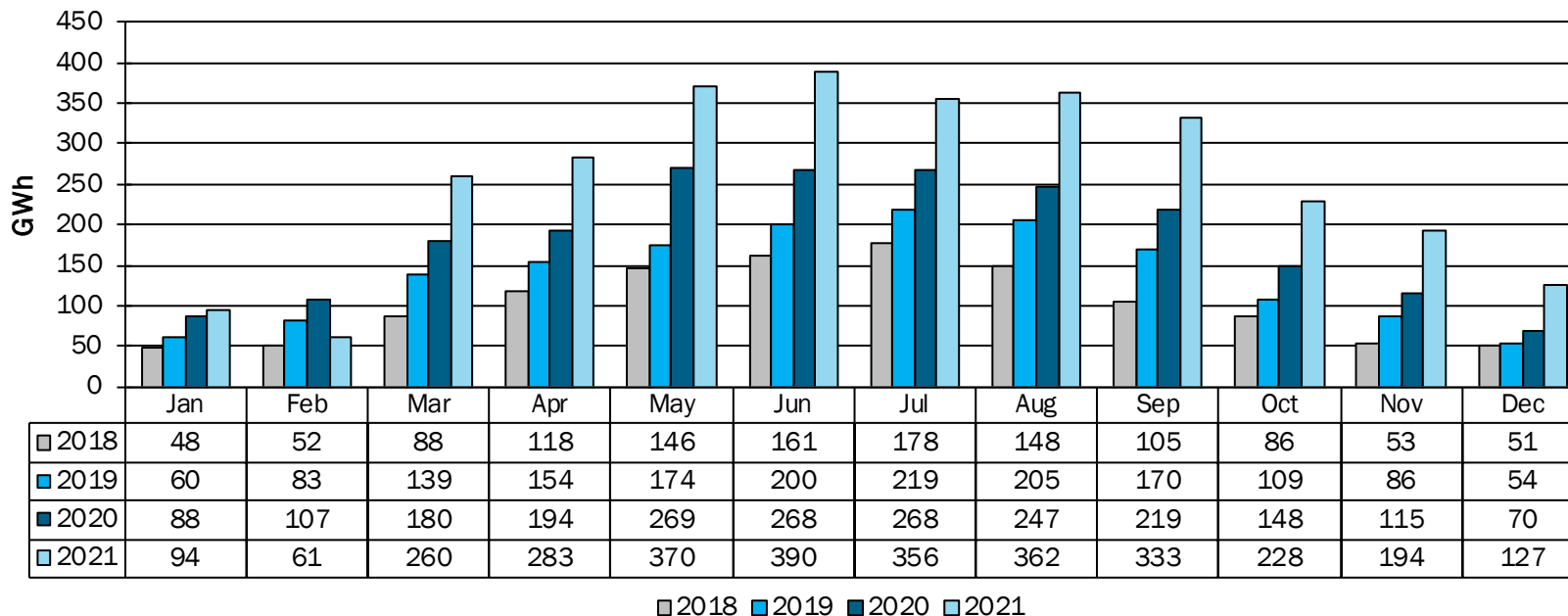
Estimated 2021 End Of Year BTM Solar Capacity



NY BTM Solar Generation

Total Annual BTM Solar Production (GWh)			
2018	2019	2020	2021
1,234	1,652	2,172	3,057

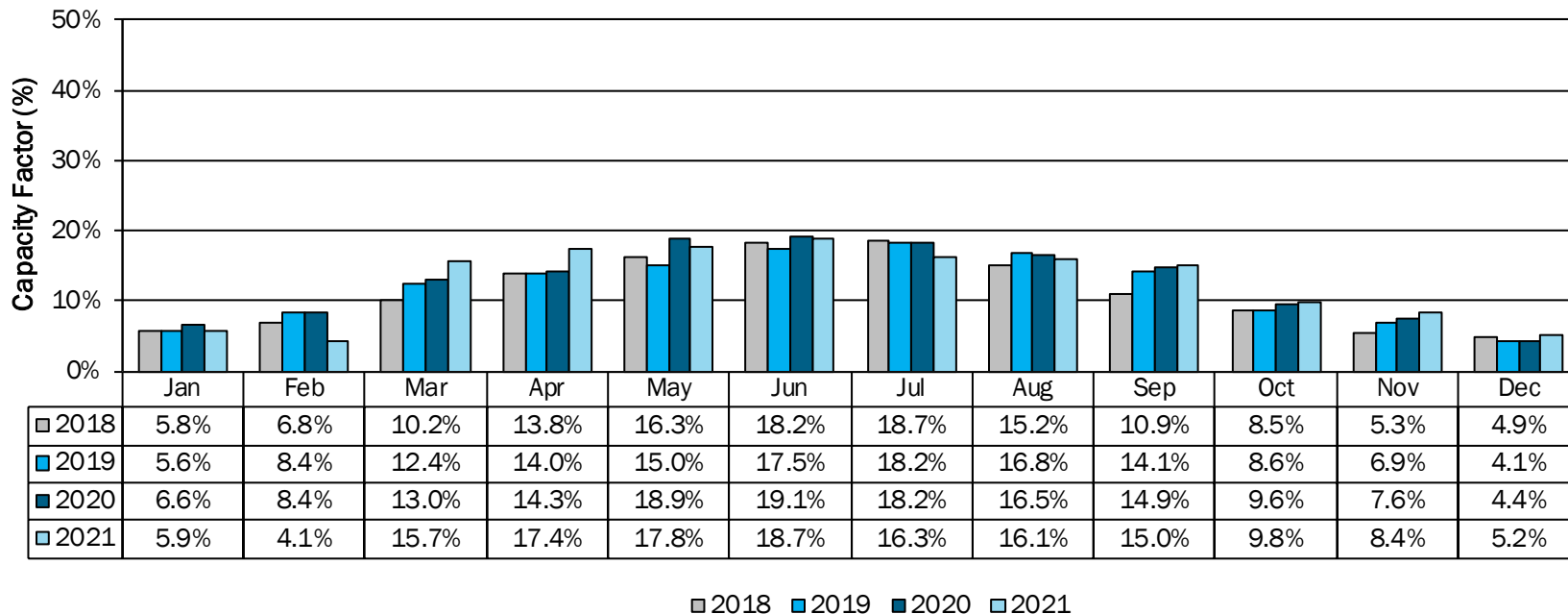
NYCA BTM Solar - Estimated Monthly Production



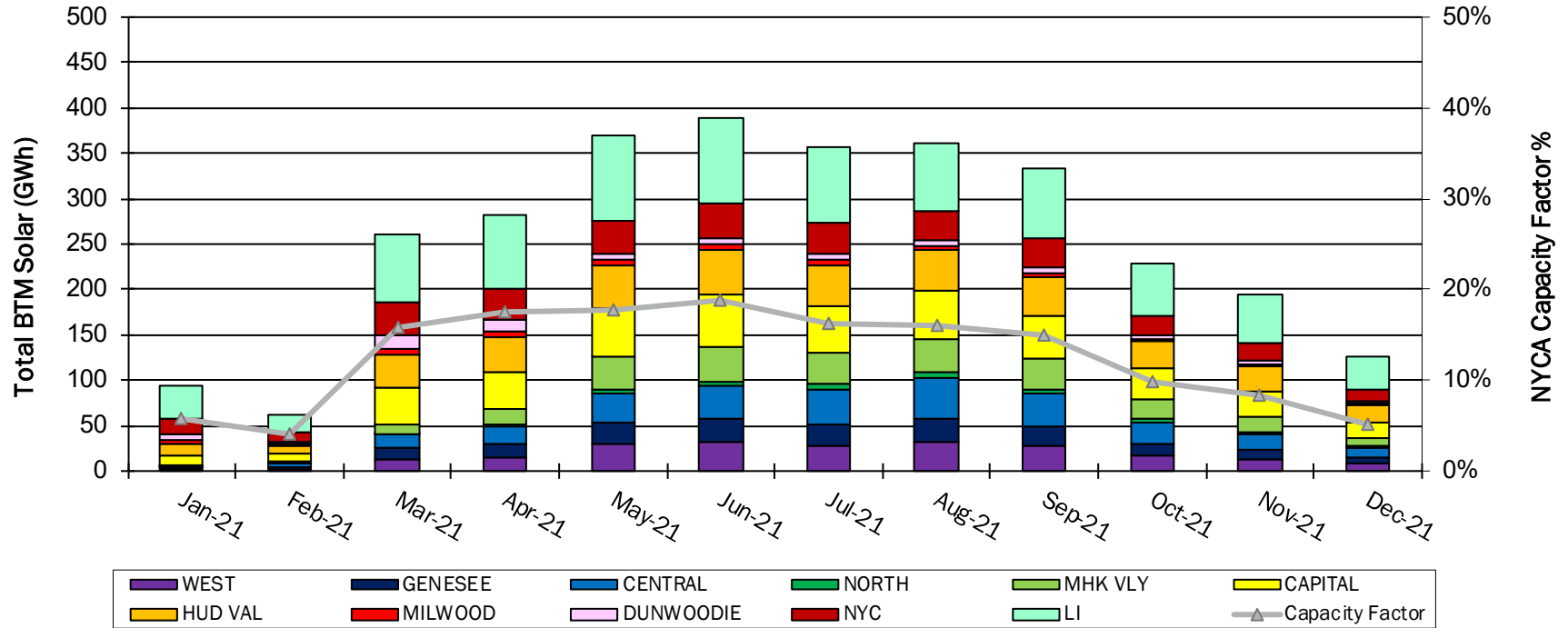
NY BTM Solar Capacity Factors

Annual BTM Solar Capacity Factor			
2018	2019	2020	2021
11%	12%	13%	13%

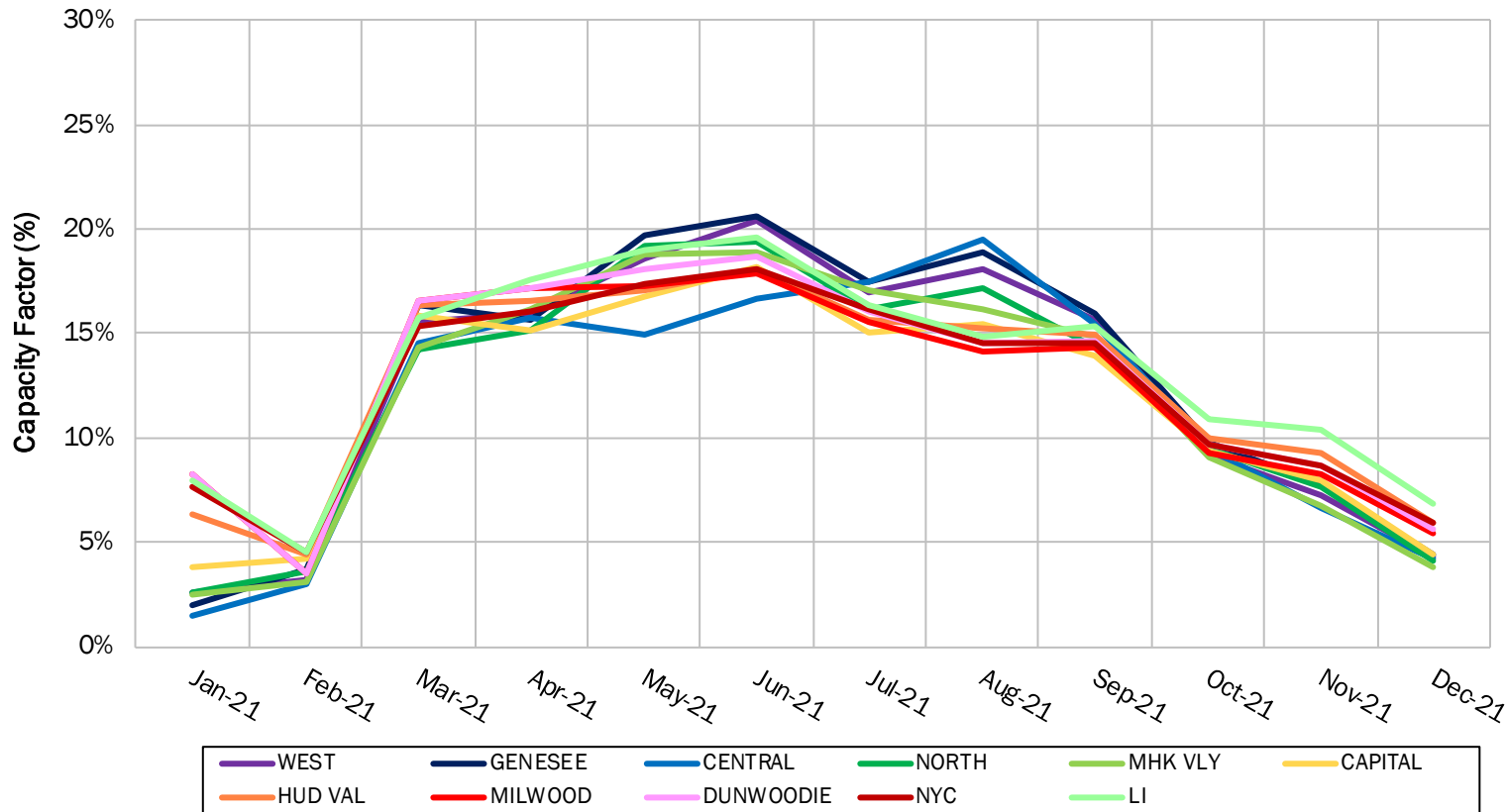
NYCA BTM Solar Generation - Estimated Capacity Factor



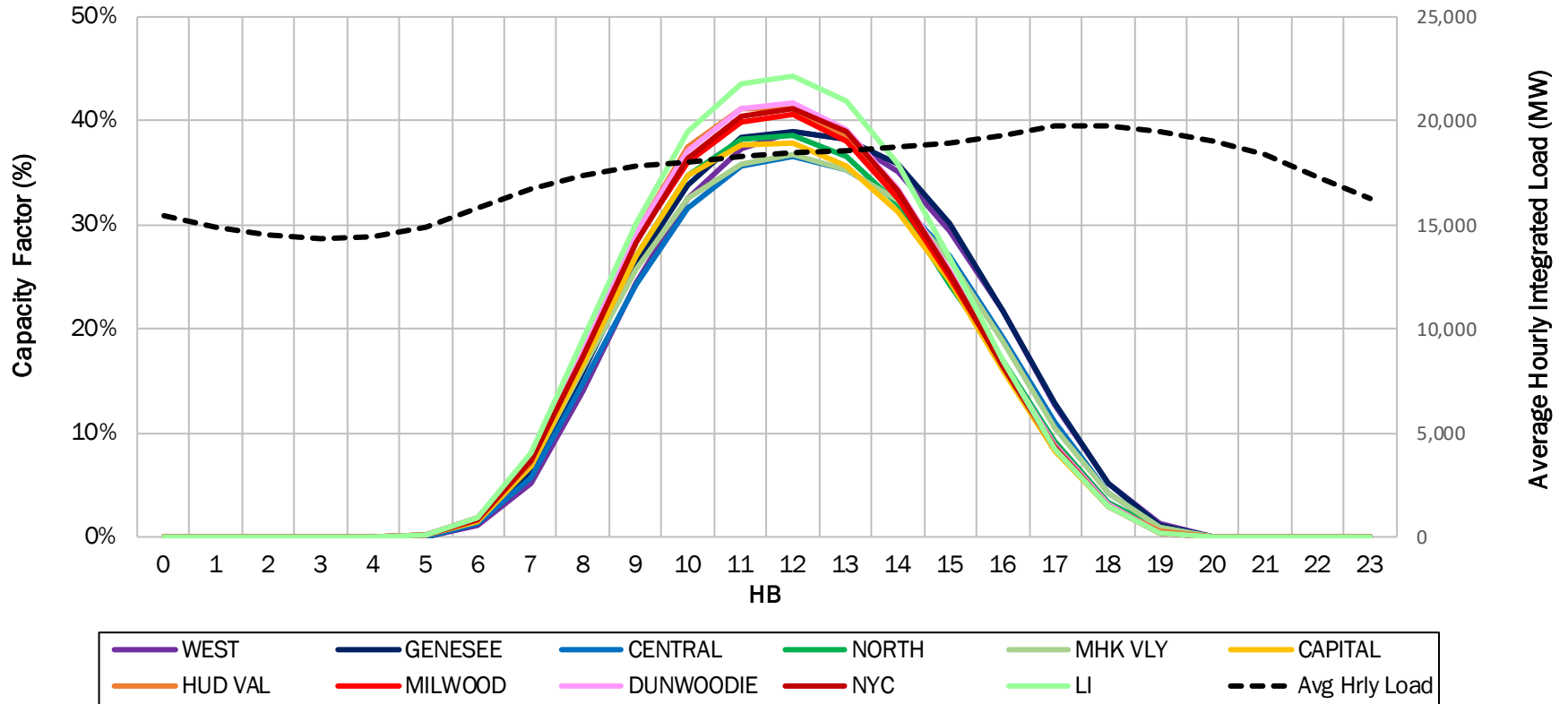
Monthly BTM Solar Production by Zone



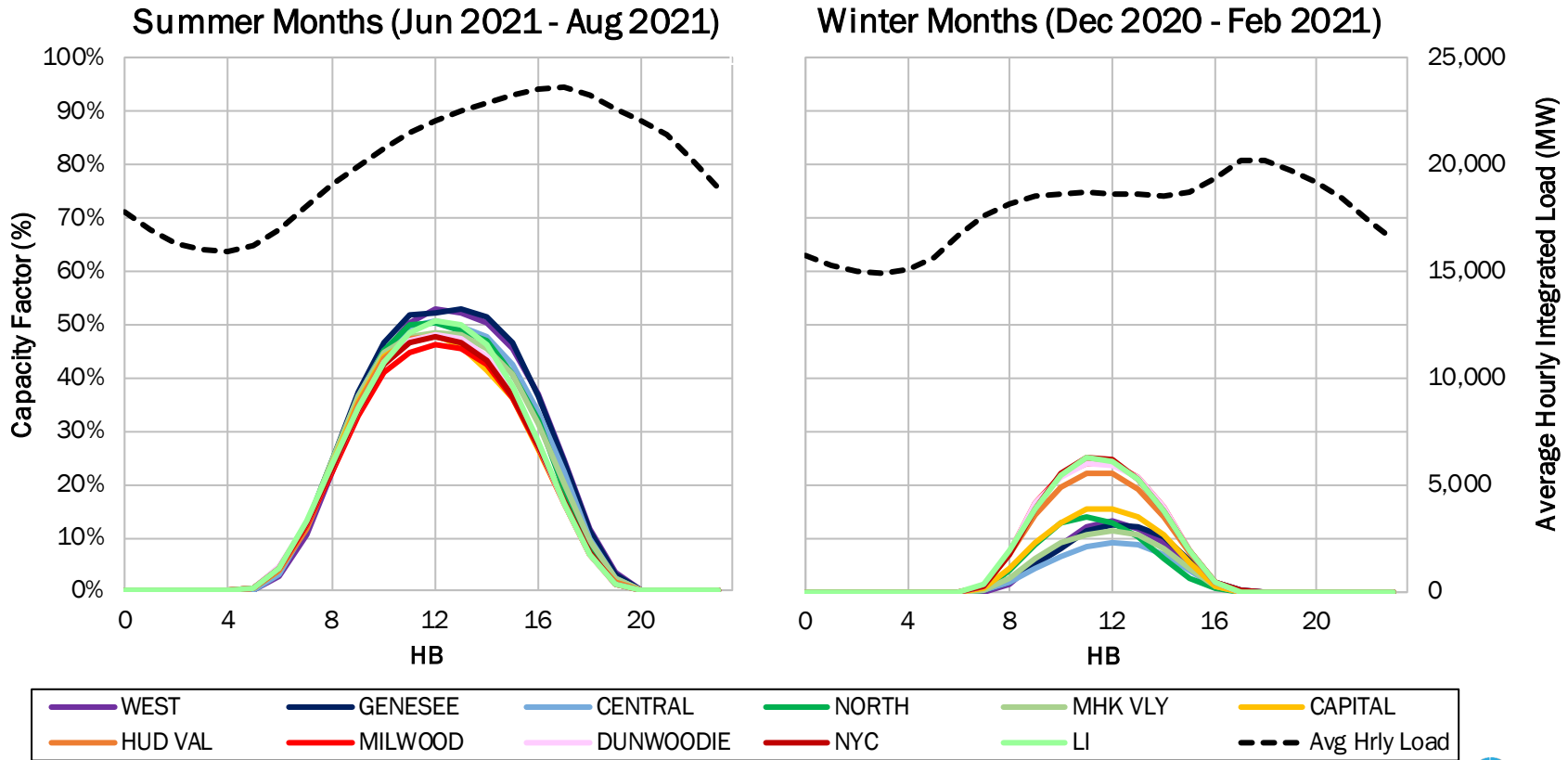
Monthly BTM Solar Capacity Factors by Zone



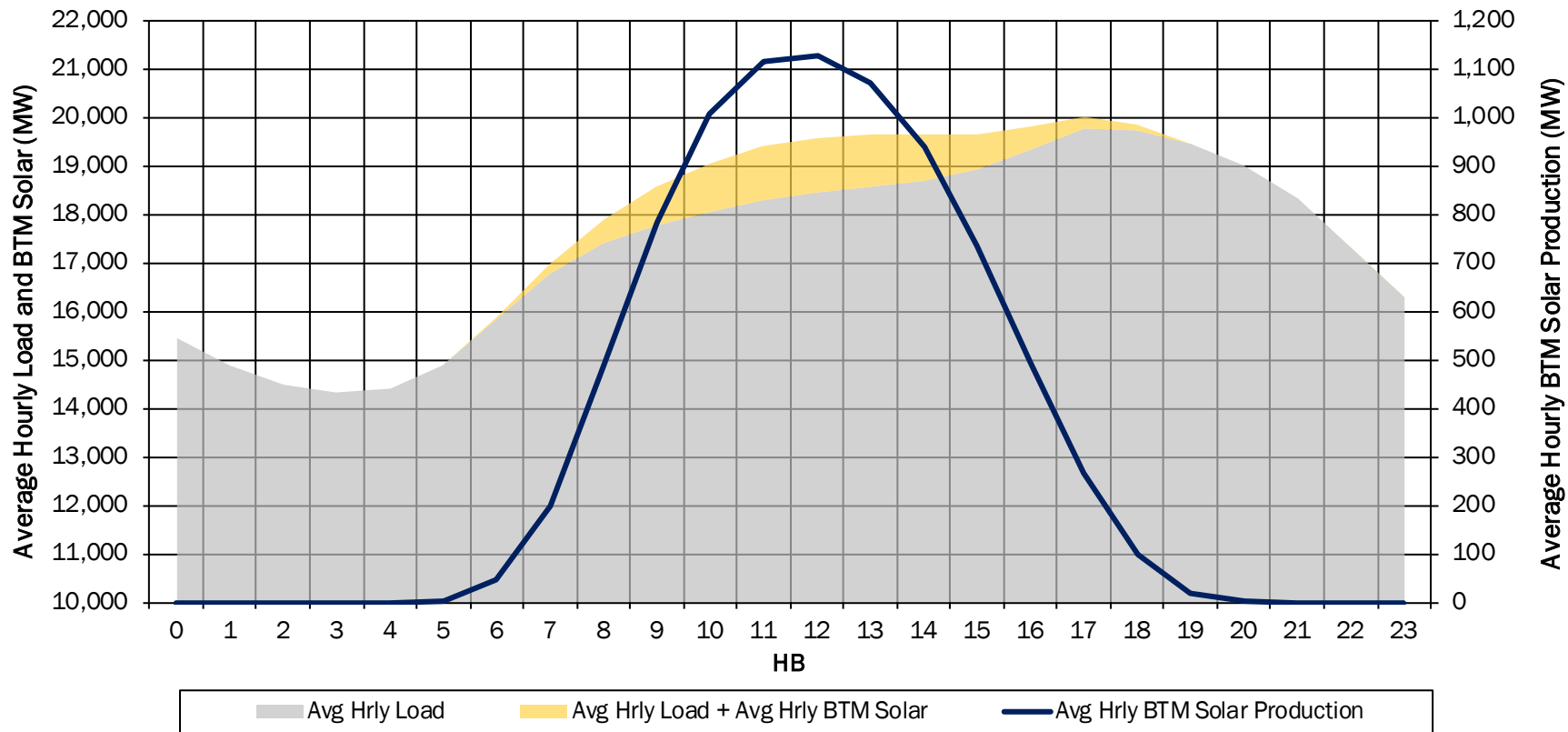
2021 Average Hourly BTM Solar Capacity Factors by Zone



2021 Seasonal Average Hourly BTM Solar Capacity Factors by Zone

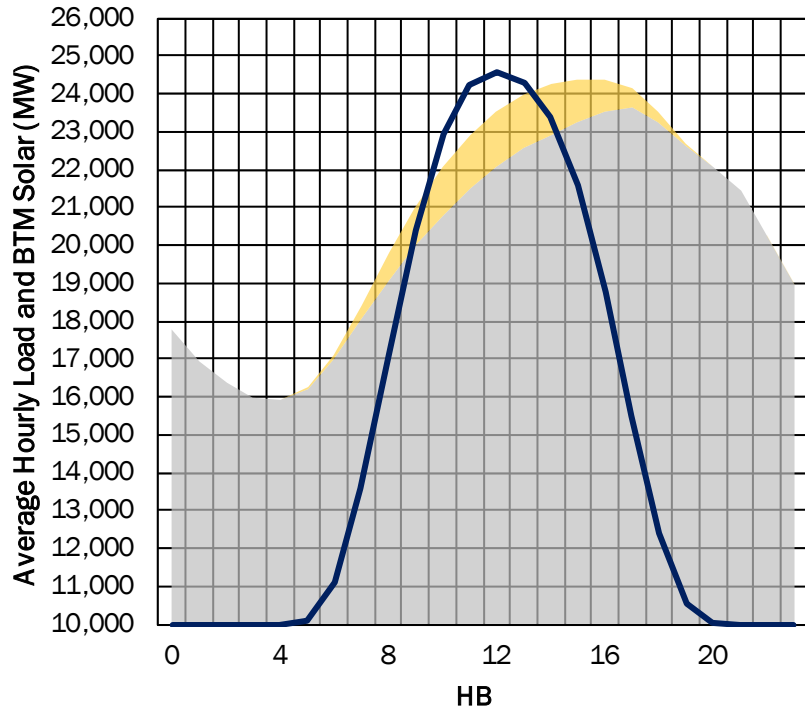


2021 Average Hourly Load with BTM Solar Production

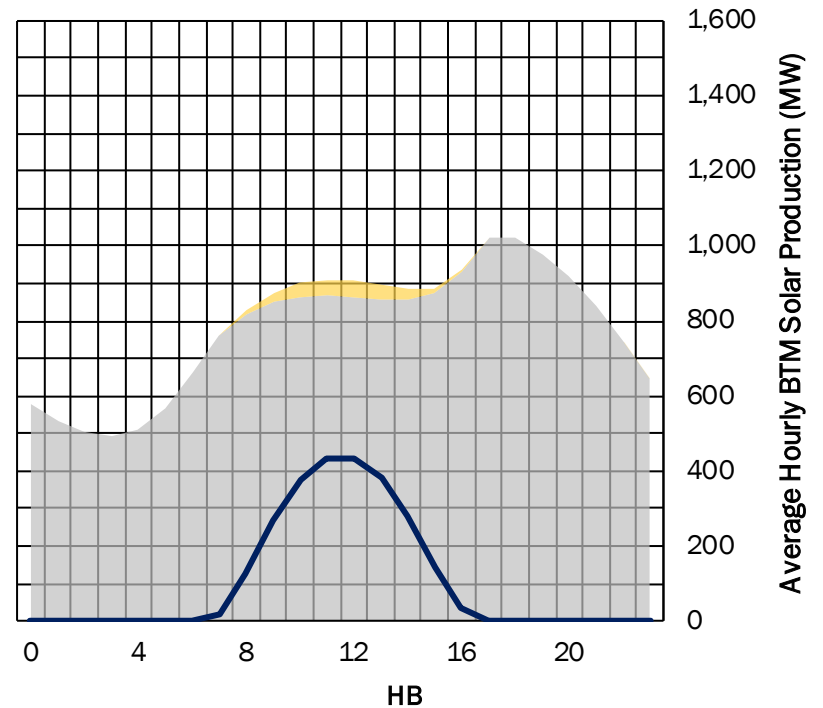


2021 Seasonal Average Hourly Load with BTM Solar Production

Summer Months (Jun 2021 - Aug 2021)



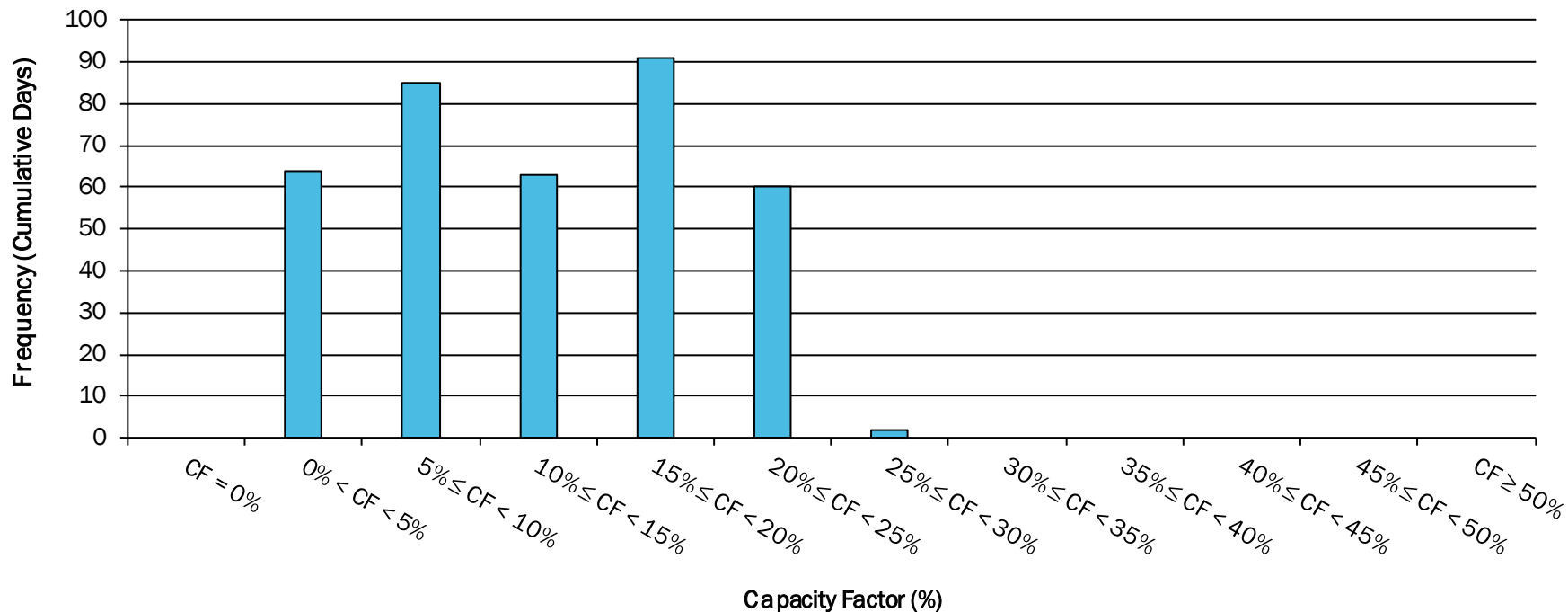
Winter Months (Dec 2020 - Feb 2021)



Avg Hrlly Load
 Avg Hrlly Load + Avg Hrlly BTM Solar
 Avg Hrlly BTM Solar Production

BTM Solar Capacity Factor Distribution

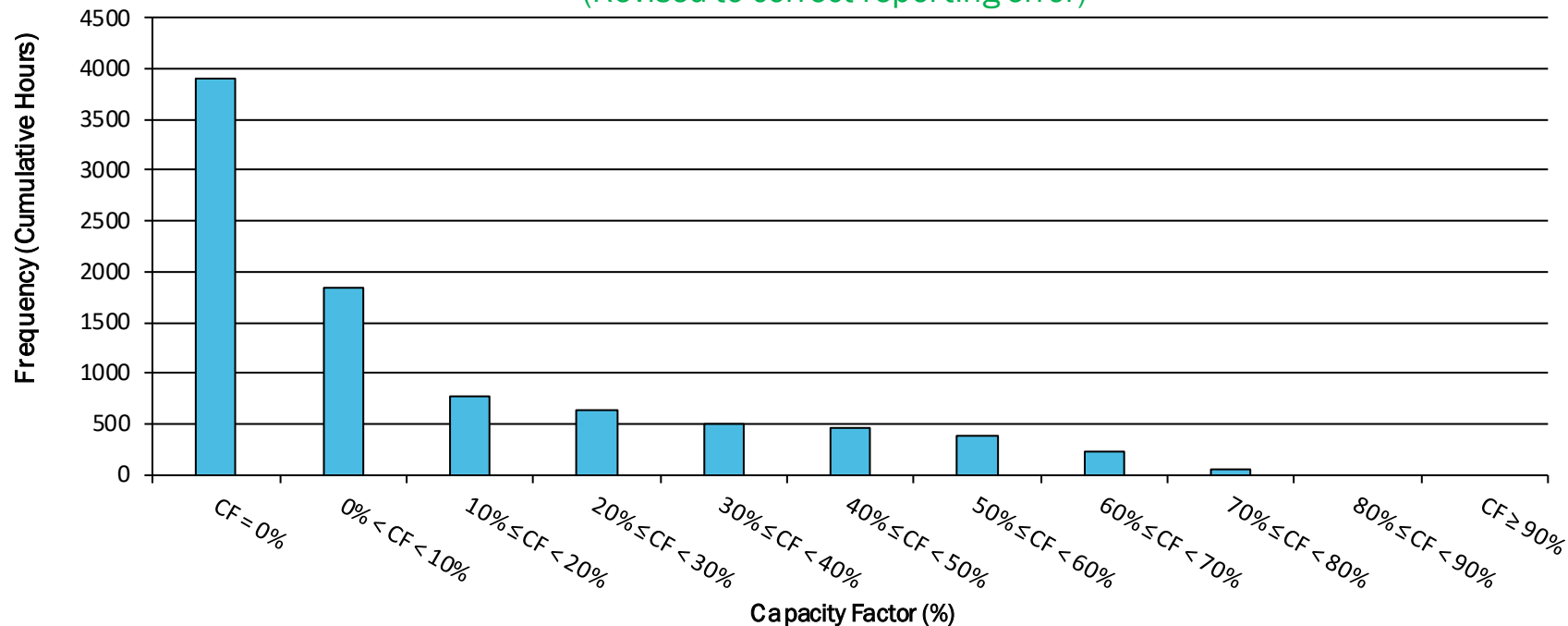
Daily Capacity Factor (CF) Distribution for 2021



BTM Solar Capacity Factor Distribution

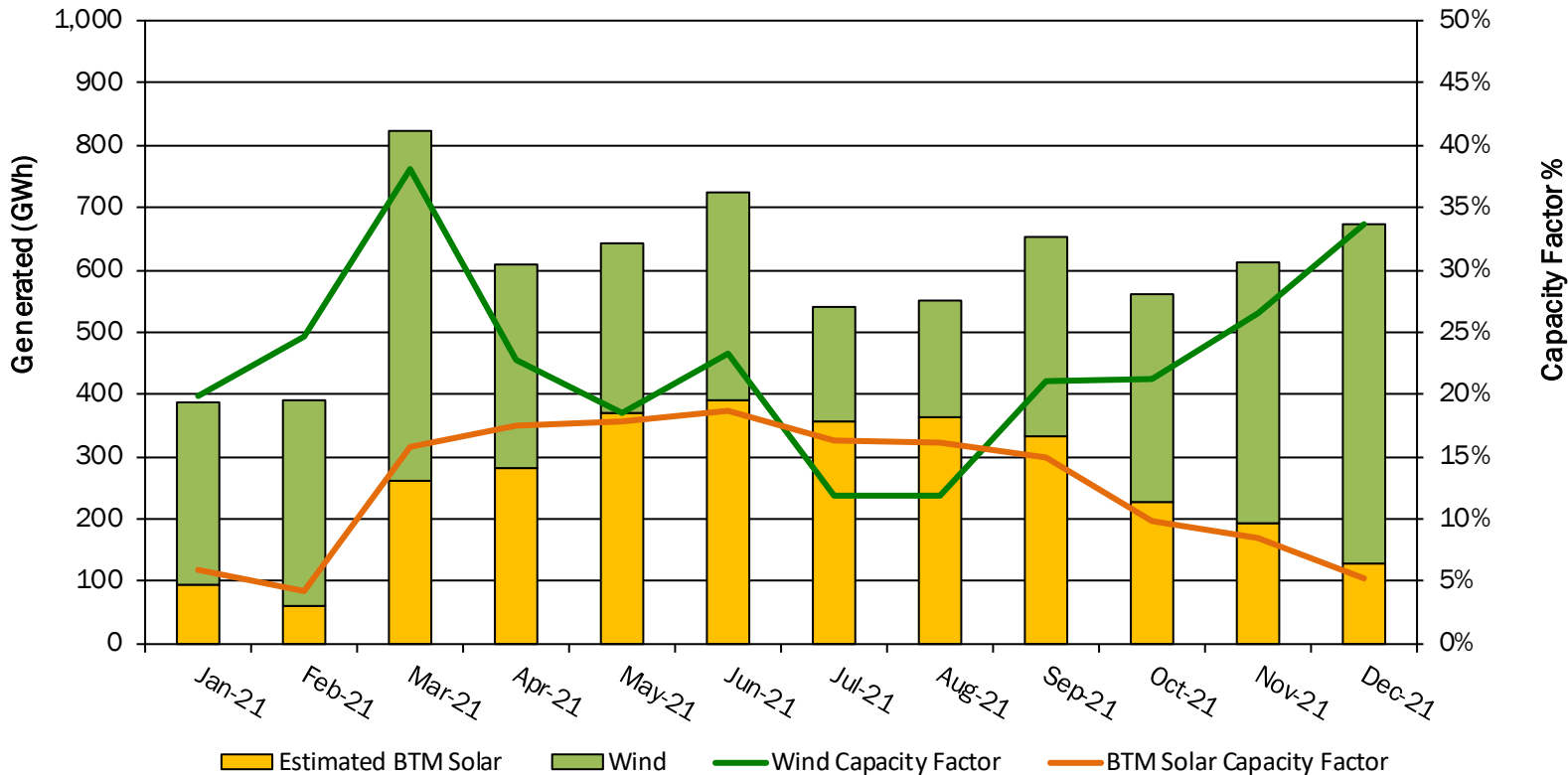
Hourly Capacity Factor (CF) Distribution for 2021

(Revised to correct reporting error)

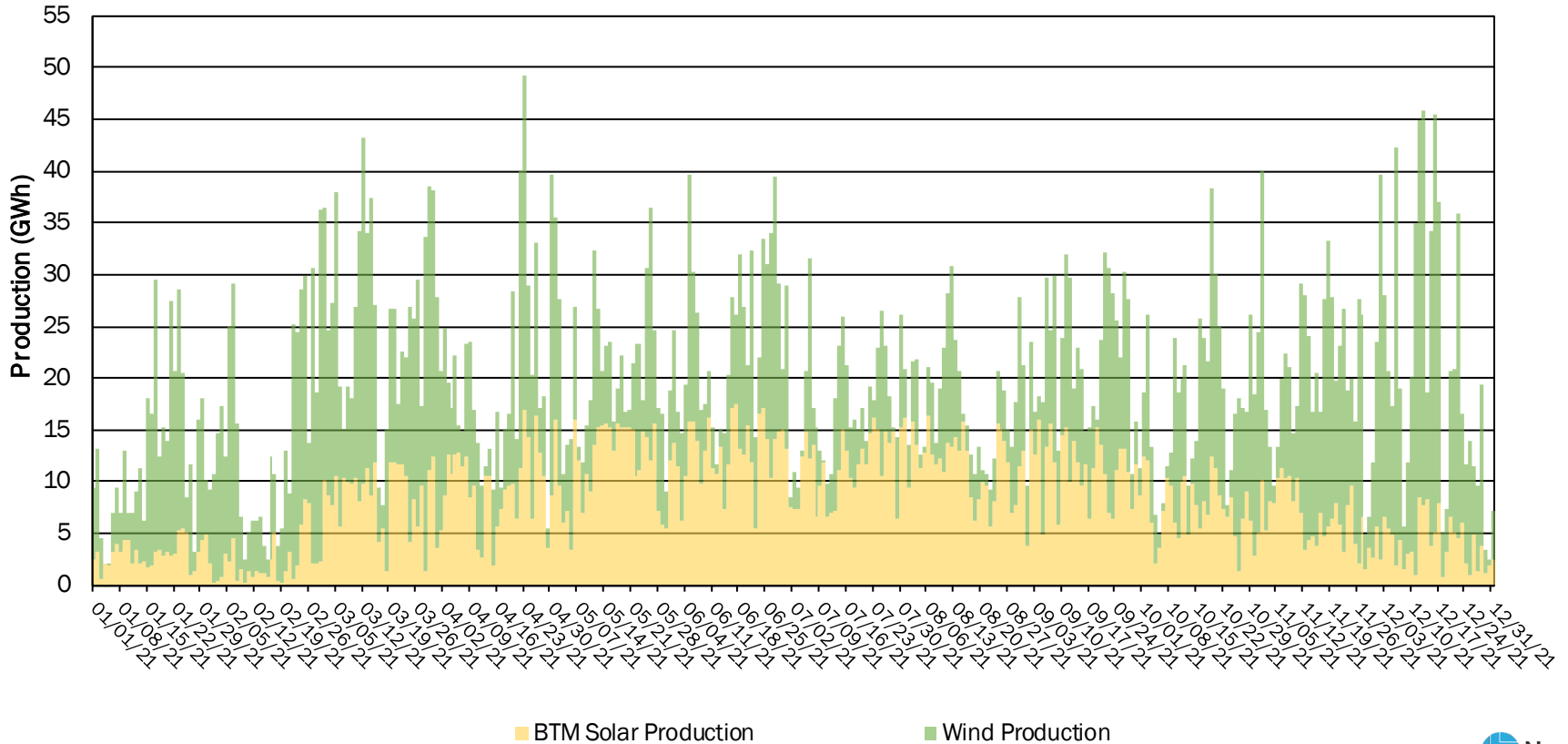


Coincident Wind and BTM Solar

Monthly Wind and BTM Solar Performance (2021)

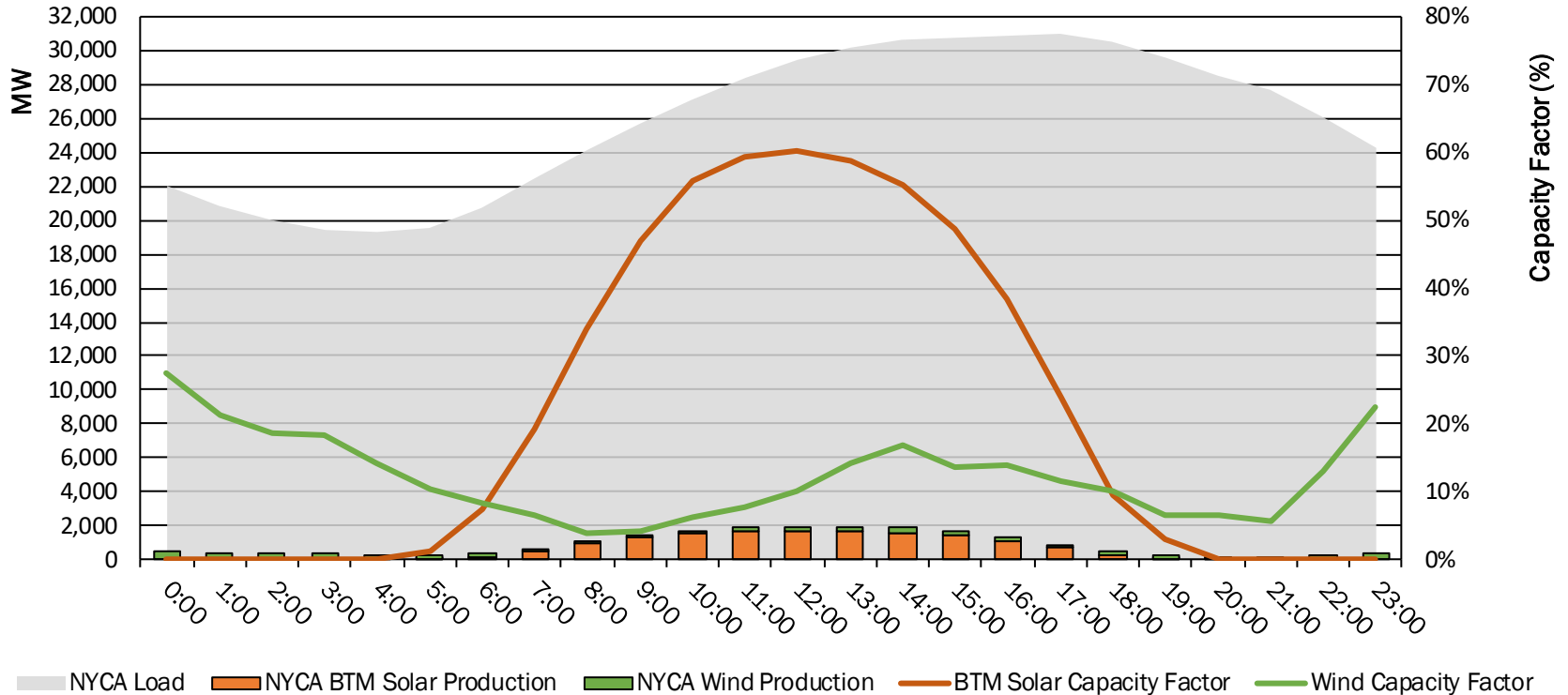


Daily Wind and BTM Solar Performance (2021)



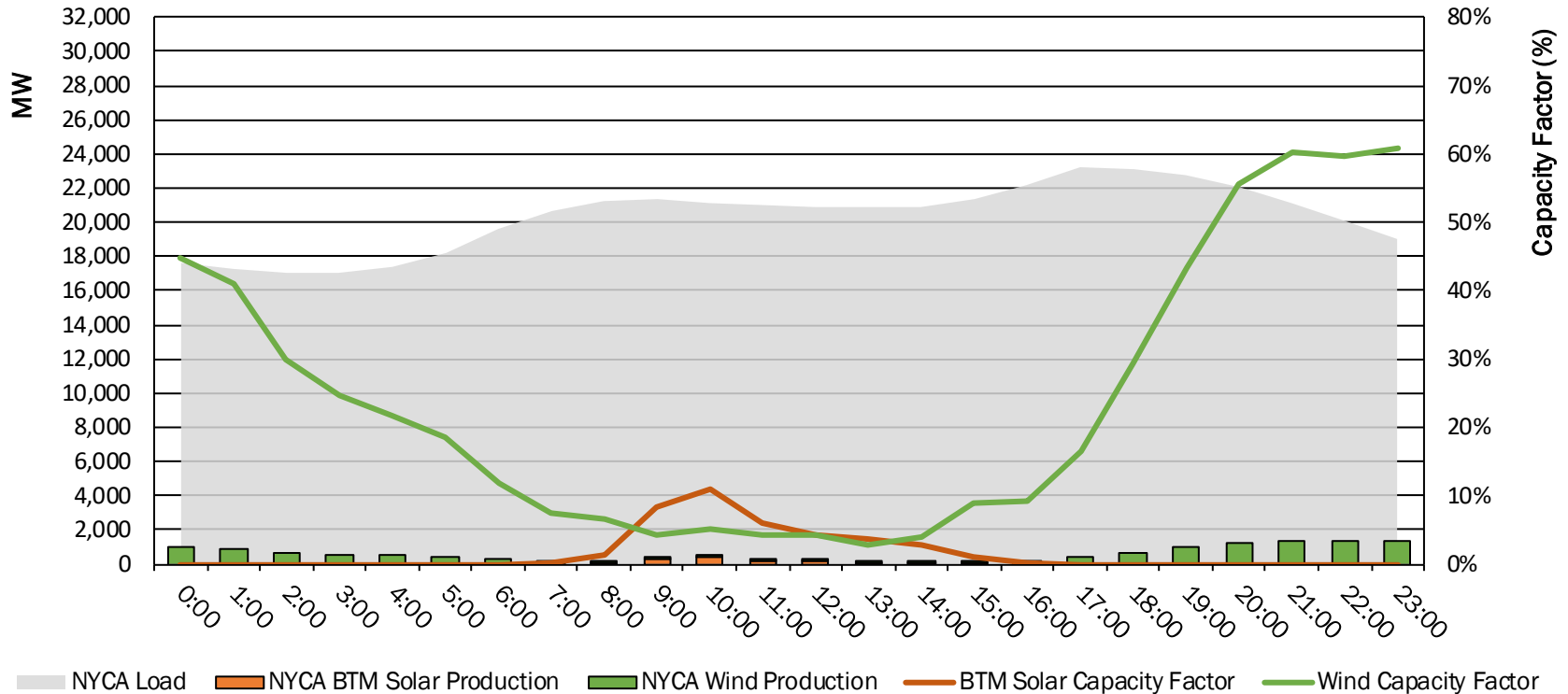
Wind and BTM Solar Performance During Summer Peak Load

6/29/2021



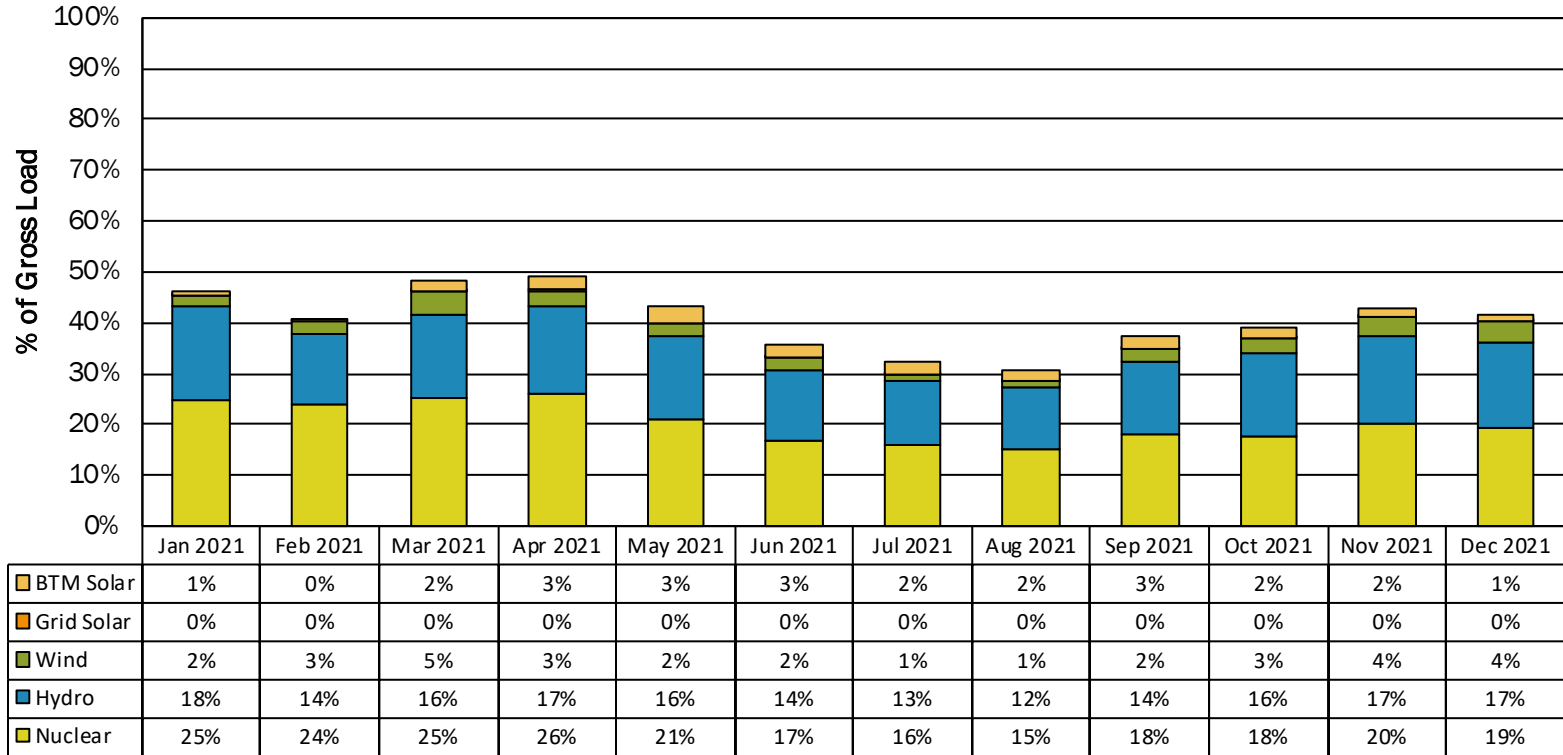
Wind and BTM Solar Performance During Winter Peak Load

1/11/2022



NYCA Emissions-Free Generation

Annual % Gross Load				
Nuclear	Hydro	Wind	Grid Solar	BTM Solar
20.12%	15.32%	2.66%	0.03%	1.95%



■ Nuclear ■ Hydro ■ Wind ■ Grid Solar ■ BTM Solar



Questions?

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