

Informational Base Scenario Update (Order No.1920 Scenario Development Track)

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Lead Engineer

Resource Adequacy Planning

TEAC Special Session - Order 1920

October 10, 2025

- Review of Stakeholder feedback from September 5, 2025
- Updated assumptions
- Next steps

Review feedback on Informational Base Scenario Input assumptions

- Comment: Possibility of counting energy storage targets toward 1-in-10.
- PJM's response: PJM has updated its input assumptions to consider the energy storage targets in satisfying the 1-in-10 resource adequacy constraint.
- Comment: Possibility of considering long-duration energy storage technologies in addition to the 4-hour battery.
- PJM's response: PJM will add 10-hour battery storage technology as one of the build candidates in the capacity expansion and will use NREL's Annual Technology Baseline assumptions to model the technology.

Review feedback on Informational Base Scenario Input assumptions (cont.)

- Comment: Why all solar units being added between 2035 and 2045 are projected to come online in one region (Dominion).
- PJM's response: The model favors building in areas with better solar prospects including lower costs and higher capacity factor.

	Solar	Onshore	Offshore	Battery	Hybrid
Delaware	1.07	1.07	1.06	1.01	1.06
DC	1.01	1.03		1.01	1.01
Illinois	1.13	1.20	1.19	1.07	1.12
Indiana	1.00	1.02		1.02	1.00
Kentucky	1.00	1.01		1.02	1.01
Maryland	1.01	1.01	1.01	1.01	1.01
Michigan (Grand Rapids)	1.00	1.00	1.00	1.00	1.00
New Jersey	1.12	1.19	1.18	1.06	1.11
North Carolina	0.99	0.99	0.99	1.00	0.99
Ohio	0.99	0.98		0.99	0.99
Pennsylvania (Philadelphia)	1.11	1.18		1.06	1.10
Pennsylvania (Scranton)	1.02	1.03		1.01	1.02
Tennessee	1.00	1.02		1.04	1.01
Virginia (Alexandria)	1.00	1.02	1.02	1.01	1.01
Virginia (Roanoke)	0.99	0.98	0.98	1.00	0.99
West Virginia	1.01	1.00		1.00	1.01

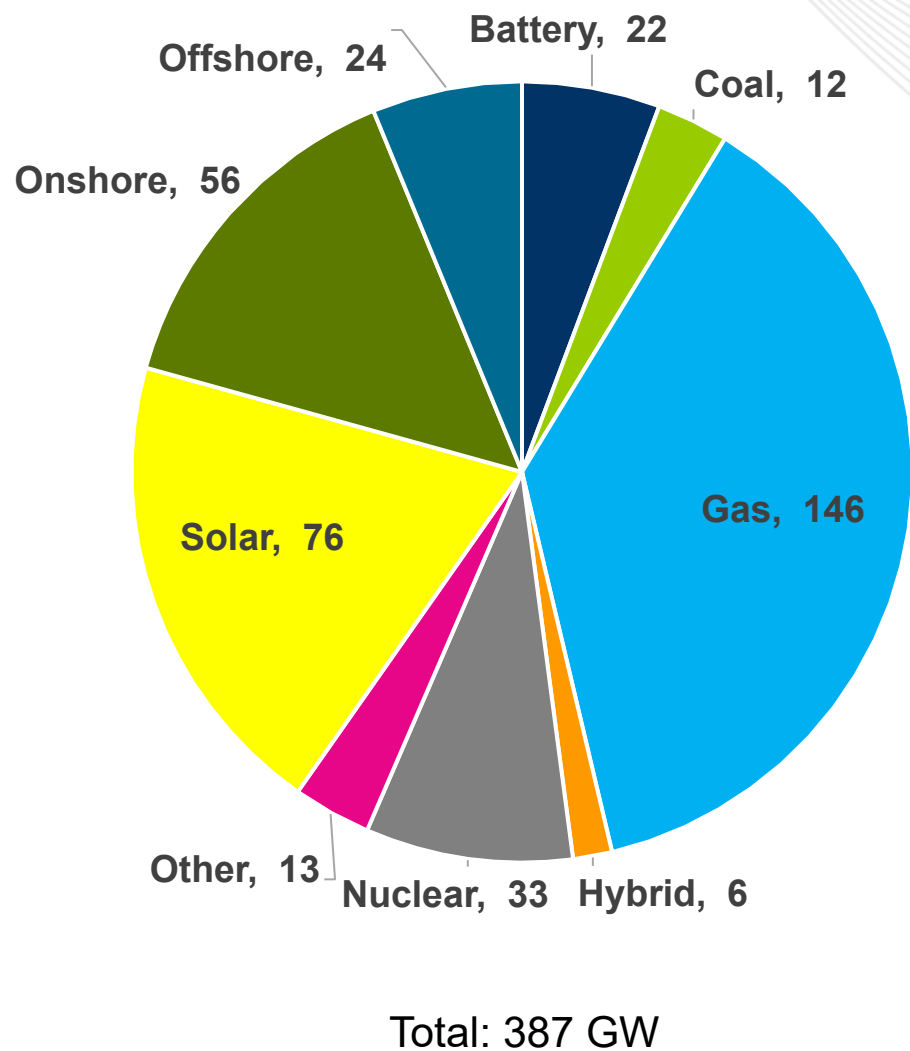
Sargent & Lundy (2024) "Capital Cost and Performance Characteristic Estimates for Utility Scale Electric Power Generating Technologies"

Area	Solar capacity factor
AEP	0.222
APS	0.218
AE	0.245
BGE	0.253
COMED	0.236
DAYTON	0.242
DPL	0.196
VEPCO	0.261
DUKE	0.199
DQE	0.228
EKPC	0.239
ATSI	0.214
JCPL	0.198
METED	0.235
PENLC	0.193
PL	0.193
PEPCO	0.256
PECO	0.256
PS	0.256
RECO	0.198

- Update the capacity expansion study for Informational Base Scenario by the end of the year

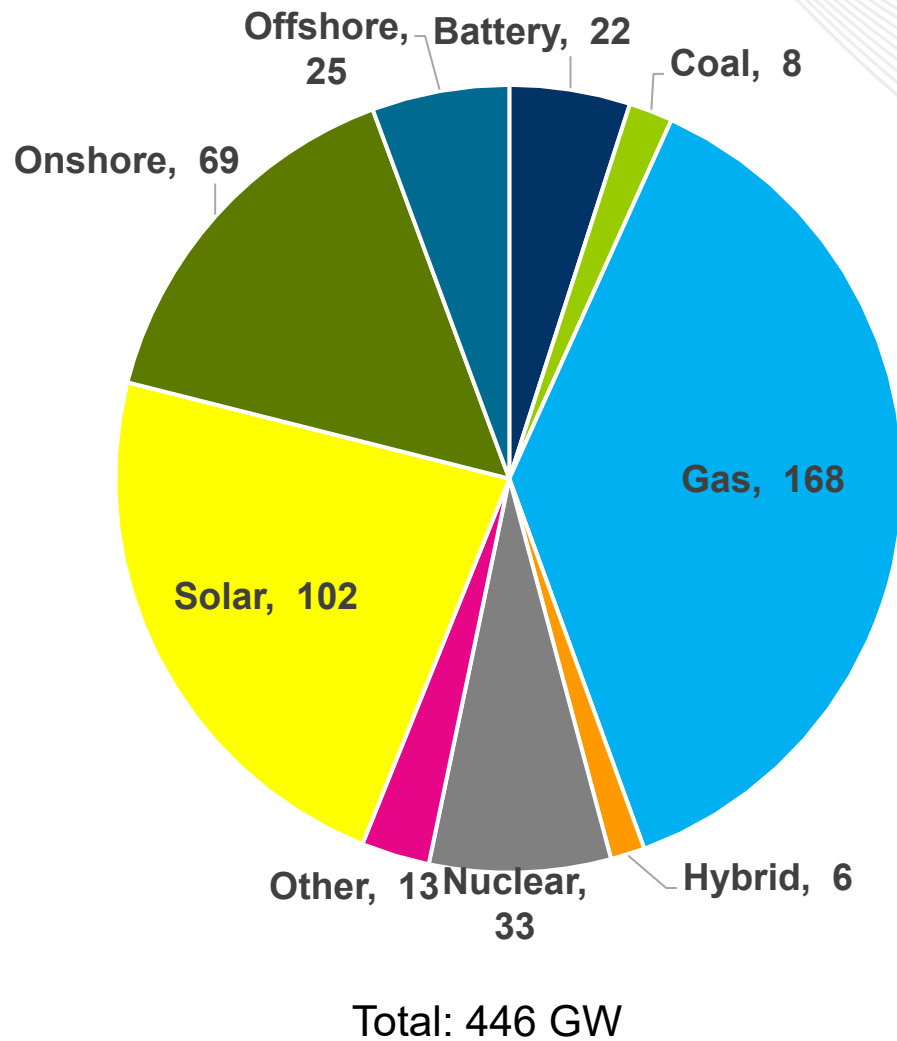
Appendix

Capacity Expansion Results: 2035 Resource Mix



Zone	Battery	Coal	Gas	Hybrid	Nuclear	Offshore	Onshore	Solar	Other
AEP	5.9	1.6	33.0	2.2	2.2	-	21.5	25.8	1.0
APS	2.8	-	19.6	0.8	-	-	15.6	3.5	0.2
AE	0.7	-	0.8	0.1	1.2	0.4	-	0.5	0.0
BGE	0.9	-	0.3	-	1.7	-	-	1.5	0.3
COMED	2.2	-	5.5	0.5	10.5	-	9.3	8.1	0.3
DAYTON	0.2	-	3.3	0.1	-	-	0.8	2.3	0.0
DPL	0.2	0.7	3.0	0.0	-	8.8	-	1.7	0.8
VEPCO	5.7	0.9	17.5	1.6	3.6	5.2	0.8	19.8	4.0
DUKE	0.1	-	7.5	-	-	-	-	0.3	0.2
DQE	0.1	-	4.1	0.0	1.8	-	-	0.1	0.0
EKPC	0.1	1.6	2.5	0.2	-	-	5.0	3.4	0.1
ATSI	0.6	0.3	20.8	0.2	2.1	-	1.6	3.0	0.2
JCPL	0.3	-	2.4	0.1	-	0.8	-	0.7	0.6
METED	0.3	0.0	2.7	0.1	-	-	-	0.5	0.4
PENLC	0.5	0.6	2.4	0.3	-	-	1.2	3.5	0.6
PL	0.2	4.7	6.6	0.1	2.5	-	0.2	1.2	0.7
PEPCO	0.5	1.2	3.0	-	-	-	-	0.1	0.3
PECO	-	0.0	4.2	-	4.8	-	-	0.0	2.5
PS	0.5	-	4.7	-	2.3	8.9	-	0.3	0.2
RECO	0.4	-	1.9	-	-	-	-	-	-
Total	22.1	11.6	145.6	6.2	33.2	24.1	56.1	76.3	12.5

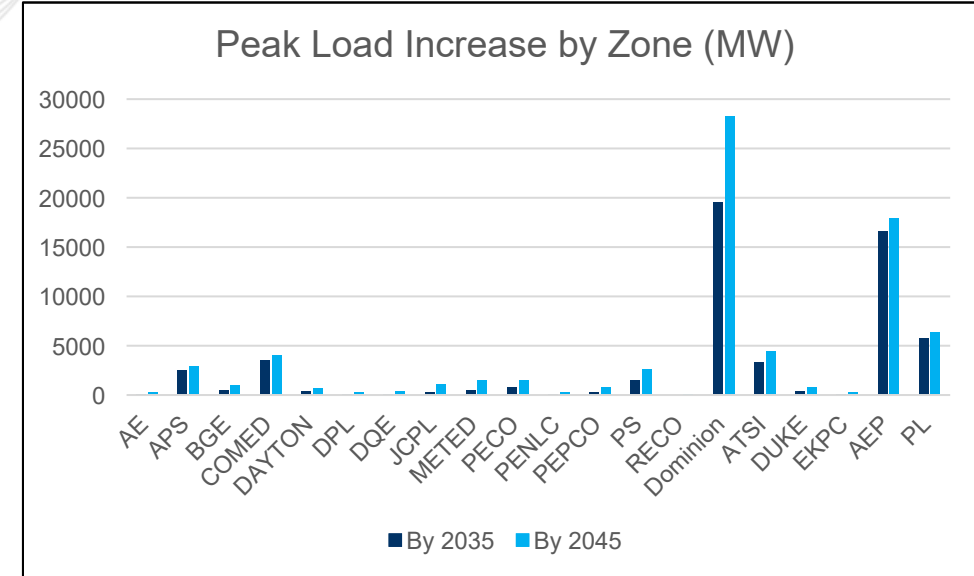
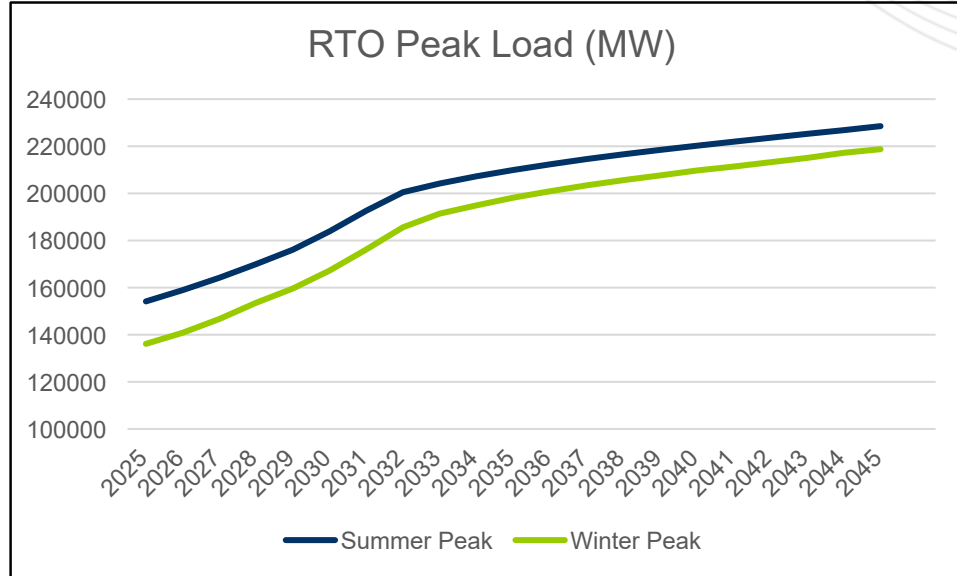
Capacity Expansion Results: 2045 Resource Mix



Zone	Battery	Coal	Gas	Hybrid	Nuclear	Offshore	Onshore	Solar	Other
AEP	5.9	0.5	47.3	2.2	2.2	-	21.5	25.8	1.0
APS	2.8	-	26.6	0.8	-	-	15.6	3.5	0.2
AE	0.7	-	0.8	0.1	1.2	0.4	-	0.5	0.0
BGE	0.9	-	0.3	-	1.7	-	-	1.5	0.3
COMED	2.2	-	3.7	0.5	10.5	-	22.1	8.1	0.3
DAYTON	0.2	-	4.7	0.1	-	-	0.8	2.3	0.0
DPL	0.2	0.7	3.0	0.0	-	8.8	-	1.7	0.8
VEPCO	5.7	-	9.5	1.6	3.6	5.2	0.8	46	4.0
DUKE	0.1	-	11.7	-	-	-	-	0.3	0.2
DQE	0.1	-	5.9	0.0	1.8	-	-	0.1	0.0
EKPC	0.1	-	3.4	0.2	-	-	5.0	3.4	0.1
ATSI	0.6	0.3	23.0	0.2	2.1	-	1.6	3.0	0.2
JCPL	0.3	-	2.4	0.1	-	0.8	-	0.7	0.6
METED	0.3	0.0	2.7	0.1	-	-	-	0.5	0.4
PENLC	0.5	0.6	2.4	0.3	-	-	1.2	3.5	0.6
PL	0.2	4.7	6.6	0.1	2.5	-	0.2	1.2	0.7
PEPCO	0.5	1.2	3.0	-	-	-	-	0.1	0.3
PECO	-	0.0	4.2	-	4.8	-	-	0.0	2.5
PS	0.5	-	4.7	-	2.3	10.0	-	0.3	0.2
RECO	0.4	-	2.3	-	-	-	-	-	-
Total	22.1	8.0	168.1	6.2	33.2	25.2	68.8	102.5	12.5

- Load assumptions
- Generation and storage technologies
- Fixed and Variable costs components
 - Fixed: Capital, fixed O&M, geographic adjustments coefficients
 - Variable: Heat rates, fuel costs, variable O&M
- Financial assumptions (fixed charge rate and discount rate)
- Renewable capacity factors
- Policy assumptions (new generation and deactivations)
- Resource adequacy
- Starting resource mix
- Build limits for capacity expansion (Generation Interconnection data and siting opportunities)

- PJM's 2025 Demand forecast



- Solar PV
- Onshore Wind
- Offshore Wind
- Battery Energy Storage
- Hybrid (Solar + Battery)
- Combustion Turbine
- Combined Cycle

- Fixed Costs, Variable Costs, and Financial assumptions based on available resources in the following order:
 - 2025 PJM Quadrennial Review
 - Energy Exemplar Eastern Interconnection data
 - NREL (Annual Technology Baseline) and NETL (Cost and Performance Baseline studies)
- Changes to note (relative to the assumptions provided during the May 9 Special TEAC):
 - Initially planned to use some input elements from S&P North American Power Market Outlook
 - Incorporated changes to align with the newly passed legislation (the "Big Beautiful Bill")

	Overnight Capital Cost (2028\$/kW)	FOM (2028\$/kW-year)
Combined Cycle		
EMAAC	1517	41.0
SWMAAC	1411	61.0
Rest of RTO	1419	57.0
WMAAC	1476	48.0
COMED	1649	38.0
Combustion Turbine		
EMAAC	1395	21.0
SWMAAC	1339	33.0
Rest of RTO	1361	25.0
WMAAC	1390	21.0
COMED	1495	21.0
BESS 4-hr		
EMAAC	1832	57.0
SWMAAC	1753	62.0
Rest of RTO	1750	55.0
WMAAC	1784	57.0
COMED	1980	59.0

Brattle 2025 CONE Report for PJM (Quadrennial Review)

<https://www.pjm.com/-/media/DotCom/committees-groups/committees/mic/2025/20250411-special/item-01-2-cone-report-final.pdf>

	<i>VOM (2028\$/MWh)</i>	<i>Heat Rate (Btu/kWh)</i>
Combined Cycle		
EMAAC	2.6	6318
SWMAAC	2.6	6345
Rest of RTO	2.7	6303
WMAAC	2.7	6314
COMED	2.6	6294
Combustion Turbine		
EMAAC	1.1	9166
SWMAAC	1.1	9161
Rest of RTO	1.0	9141
WMAAC	1.1	9149
COMED	1.1	9133

Heat rate for combined cycle is without duct firing

Brattle 2025 CONE Report for PJM (Quadrennial Review)

<https://www.pjm.com/-/media/DotCom/committees-groups/committees/mic/2025/20250411-special/item-01-2-cone-report-final.pdf>

- Fixed charge rate: Annualization coefficient for overnight capital cost (referred to as “Capital Charge Rate” in Quadrennial Review)

	<i>Combined Cycle</i>	<i>Combustion Turbine</i>	<i>Battery</i>	
EMAAC		17.0%	16.0%	9.6%
SWMAAC		16.9%	15.9%	9.6%
Rest of RTO		16.9%	15.9%	9.6%
WMAAC		16.9%	15.9%	9.6%
COMED		18.8%	17.8%	9.6%

Capital charge rate shown for Battery incorporates the 30% ITC

Brattle 2025 CONE Report for PJM (Quadrennial Review)

<https://www.pjm.com/-/media/DotCom/committees-groups/committees/mic/2025/20250411-special/item-01-2-cone-report-final.pdf>

- Discount rate: 20-year treasury rate 4.8% as of May 5, 2025

- Many regulations governing the siting of wind and solar projects are established at the county or township level. Local zoning ordinances might affect the availability of land for wind and solar development.
- The most common zoning ordinances include setbacks from structures, roads, and property lines; sound restrictions; height limitations; and an increasing number of moratoriums or bans.
- PJM will use NREL's Limited Access siting scenario for wind and solar¹.
 - The Limited Access scenario uses environmental constraints, and national defense concerns, as well as conservative wind and solar setbacks based on local ordinances surveyed in Lopez et al.²

1 "Renewable Energy Technical Potential and Supply Curves for the Contiguous United States: 2024 Edition" <https://www.nrel.gov/docs/fy25osti/91900.pdf>

2 "Impact of siting ordinances on land availability for wind and solar development" <https://www.nature.com/articles/s41560-023-01319-3>

Initial position 2025 RTEP* (2030) (MW)

Zone	Battery	Coal	Gas	Hybrid	Nuclear	Offshore	Onshore	Solar	Other
Total	4.2	31.8	82.9	2.8	32.7	5.1	15.4	39.8	12.8

(*Between 2025 and 2030 there are ~10GW of anticipated coal and ~5GW of anticipated gas retirements)

Build Limits based on Siting Constraints (MW)

Zone	Onshore Wind	Solar
AEP	17,491	270,701
APS	14,138	115,161
AE	198	12,839
BGE	-	4,847
COMED	25,890	93,898
DAYTON	777	35,807
DPL	-	28,726
VEPCO	9,838	357,969
DUKE	-	12,977
DQE	-	3,257
EKPC	4,965	116,648
ATSI	1,351	91,782
JCPL	69	8,742
METED	1,116	13,425
PENLC	10,192	91,961
PL	6,086	40,963
PEPCO	-	5,217
PECO	54	2,238
PS	-	3,768
RECO	27	1,560
Total	92,190	1,312,489



North Carolina Offshore and Michigan Energy Storage Targets

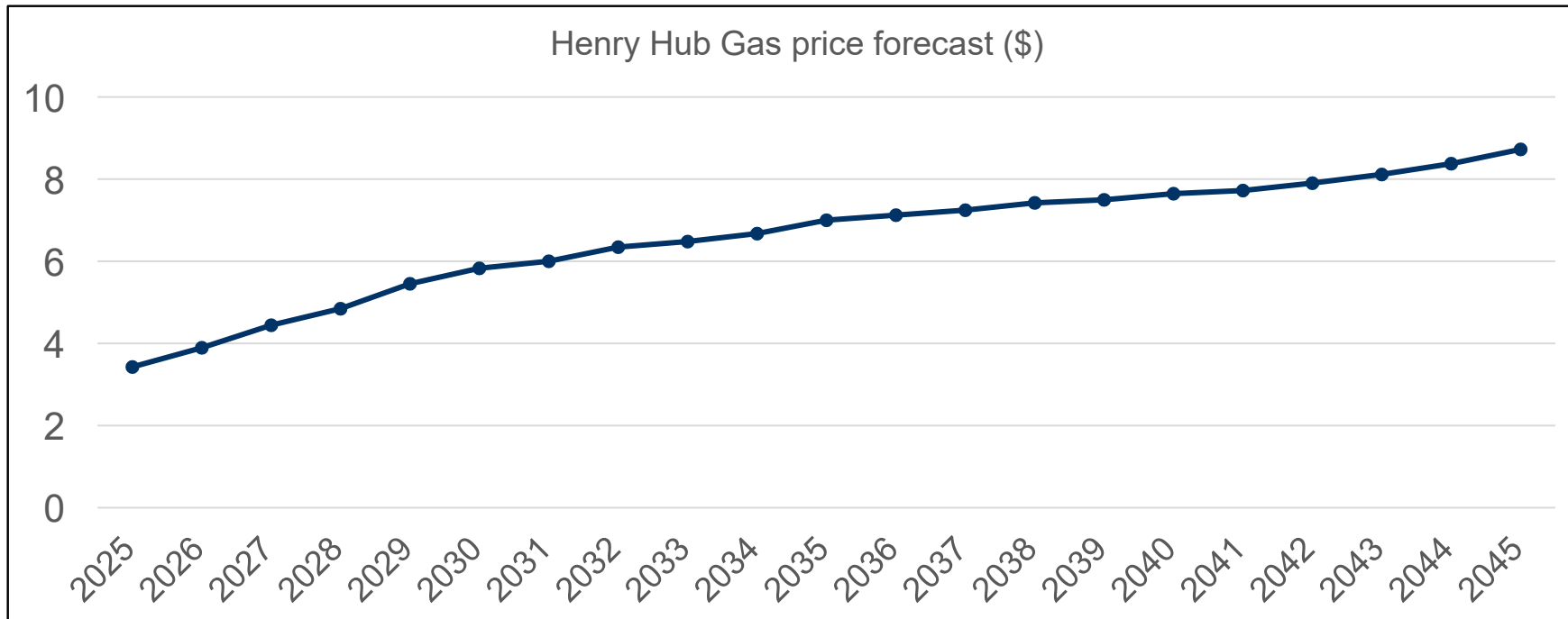
- PJM is not currently modeling North Carolina's offshore wind target as interconnecting into PJM.
- PJM will model a portion of Michigan's energy storage target based on the share of battery storage capacity in the Michigan portion of PJM's interconnection queue relative to that in MISO.

Geographic Adjustment Coefficients for Renewables

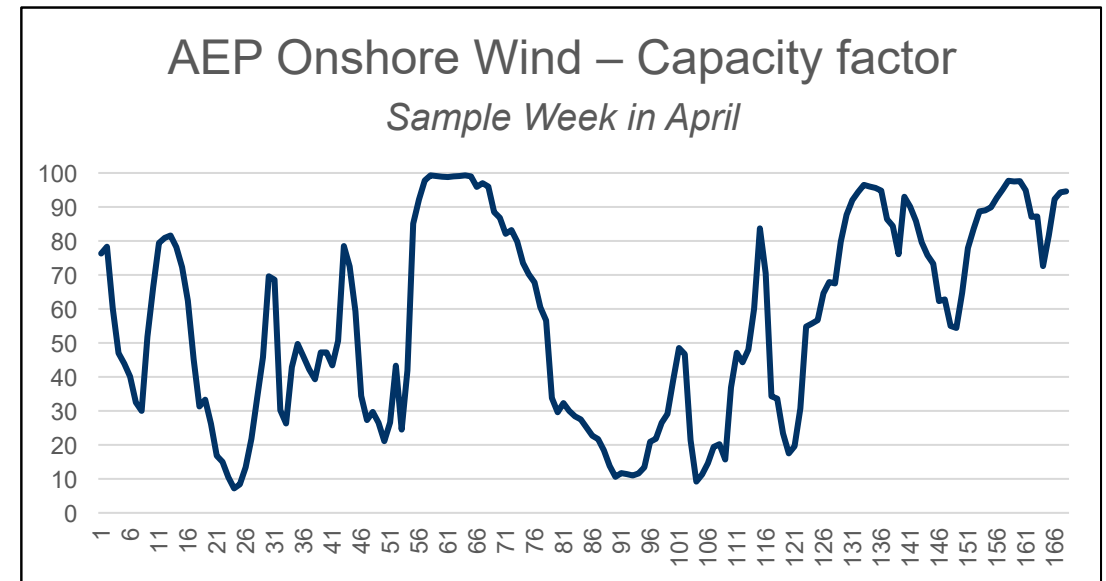
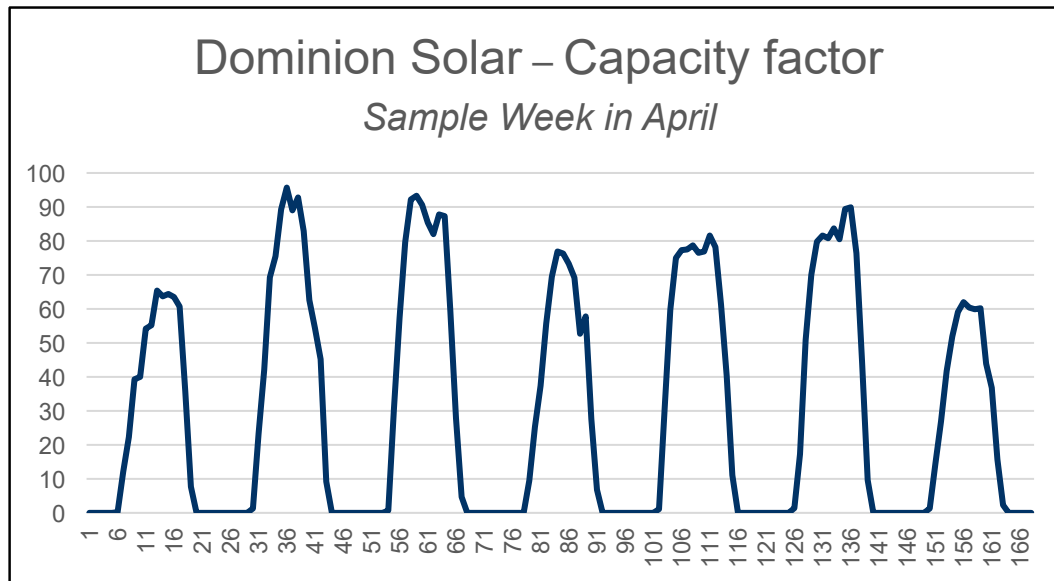
	Solar	Onshore	Offshore	Battery	Hybrid
Delaware	1.07	1.07	1.06	1.01	1.06
DC	1.01	1.03		1.01	1.01
Illinois	1.13	1.20	1.19	1.07	1.12
Indiana	1.00	1.02		1.02	1.00
Kentucky	1.00	1.01		1.02	1.01
Maryland	1.01	1.01	1.01	1.01	1.01
Michigan (Grand Rapids)	1.00	1.00	1.00	1.00	1.00
New Jersey	1.12	1.19	1.18	1.06	1.11
North Carolina	0.99	0.99	0.99	1.00	0.99
Ohio	0.99	0.98		0.99	0.99
Pennsylvania (Philadelphia)	1.11	1.18		1.06	1.10
Pennsylvania (Scranton)	1.02	1.03		1.01	1.02
Tennessee	1.00	1.02		1.04	1.01
Virginia (Alexandria)	1.00	1.02	1.02	1.01	1.01
Virginia (Roanoke)	0.99	0.98	0.98	1.00	0.99
West Virginia	1.01	1.00		1.00	1.01

Sargent & Lundy (2024) "Capital Cost and Performance Characteristic Estimates for Utility Scale Electric Power Generating Technologies"

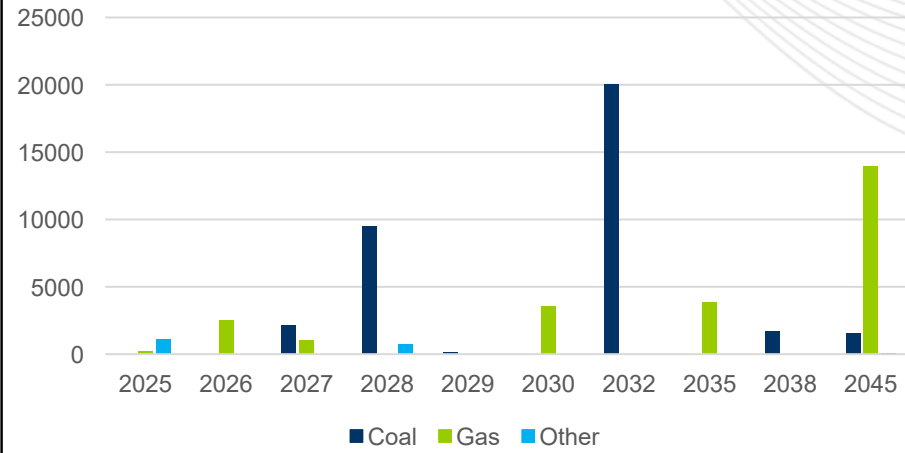
From PJM's Market efficiency:



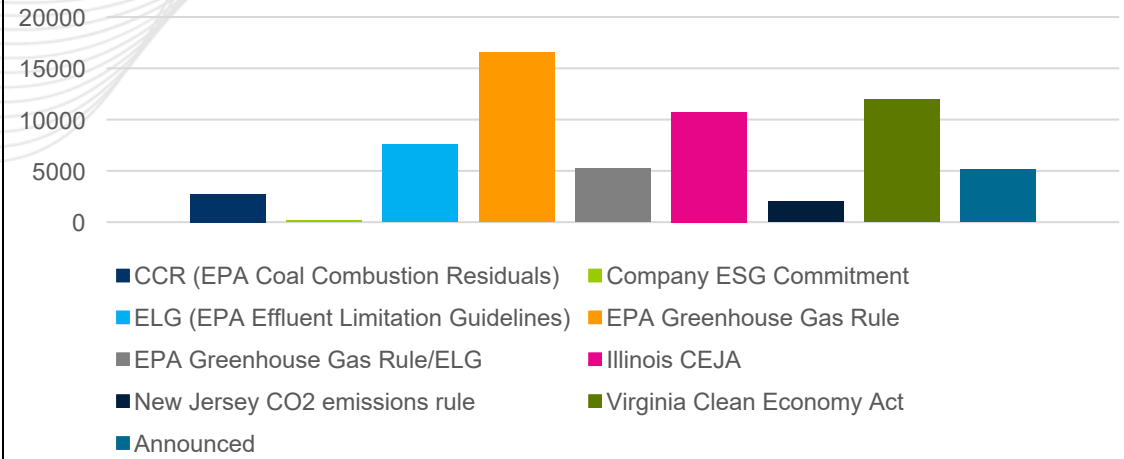
- Use Energy Exemplar's Eastern Interconnection hourly profiles for renewable capacity factors which are defined at the zonal level



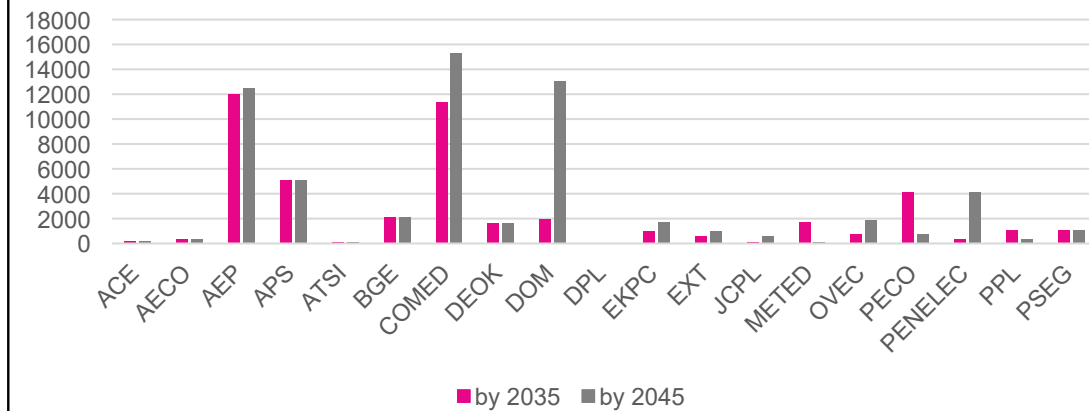
Retirements by year (MW)

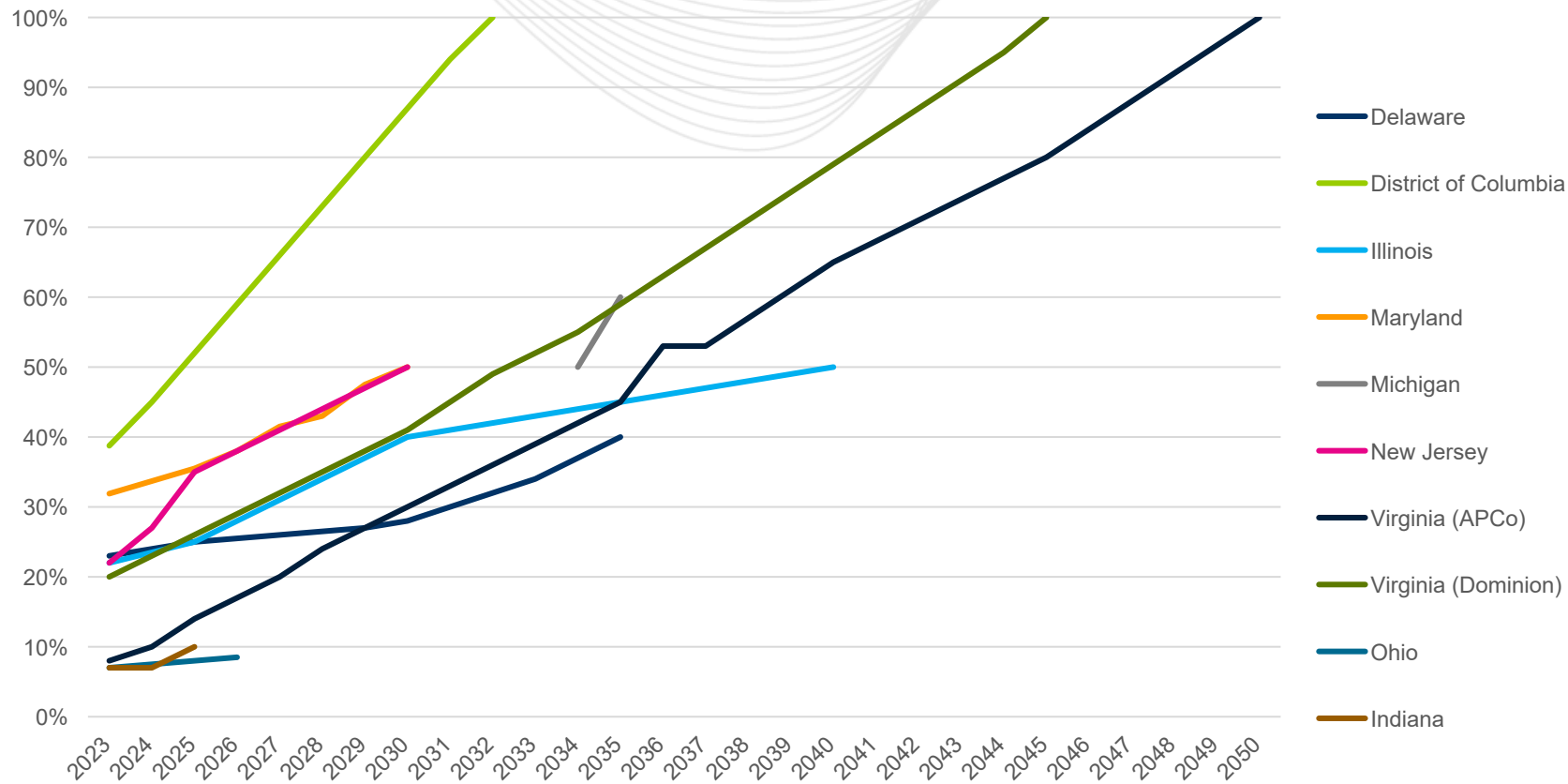


Retirements by policy (MW)



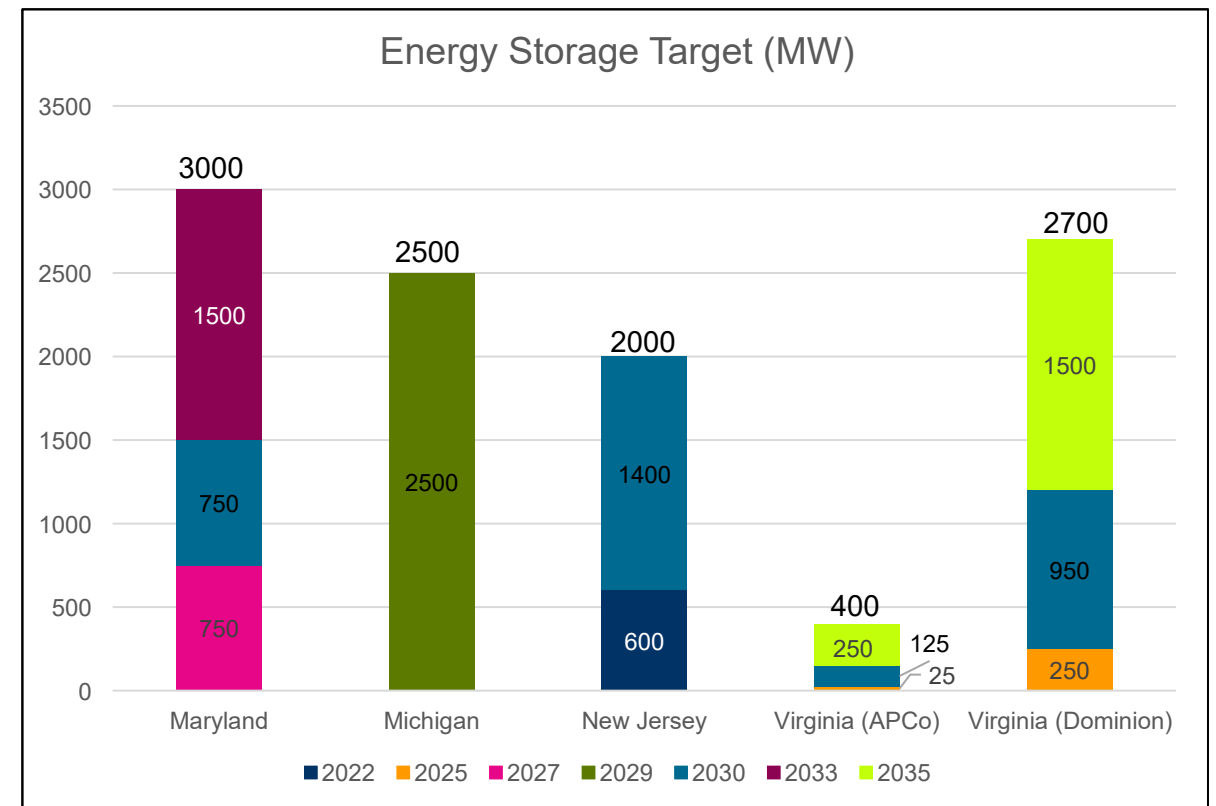
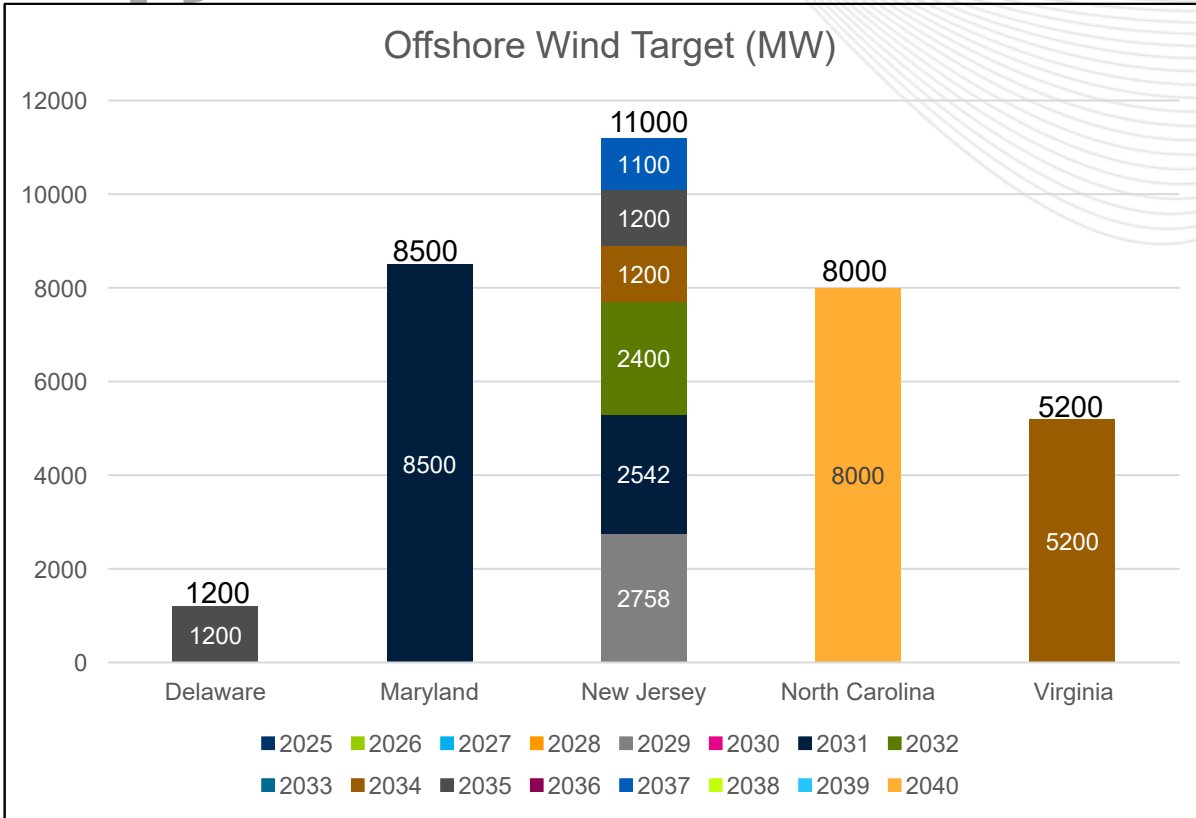
Retirements by zone (MW)



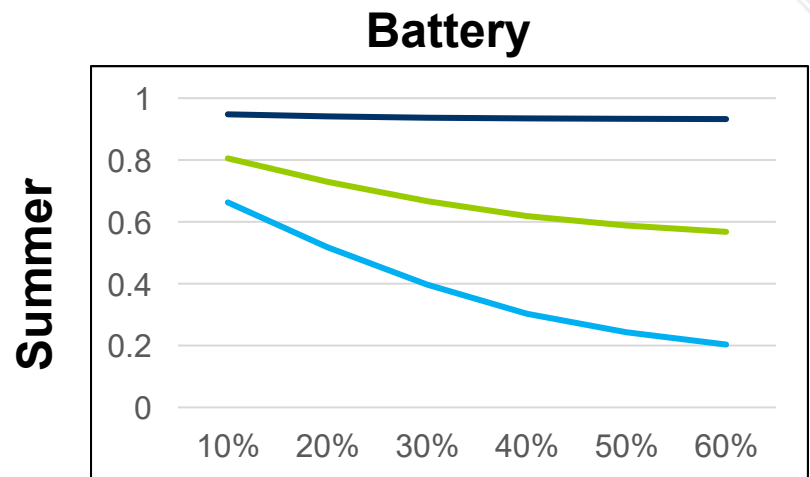


*PJM will model the geographic and technology eligibility rules for RPS Policies

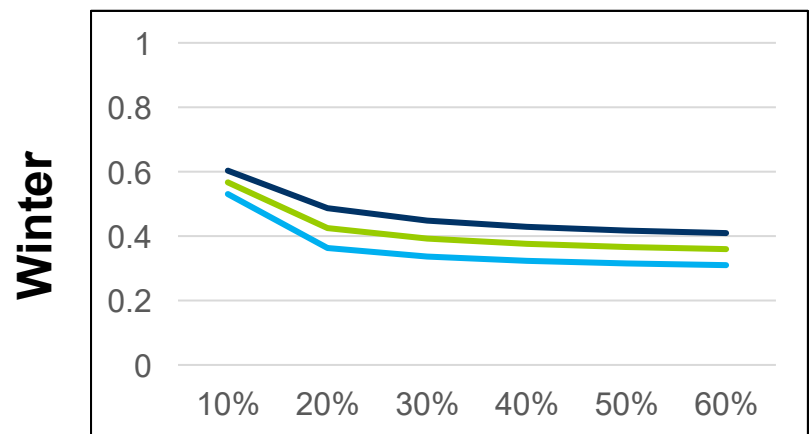
Offshore and Energy Storage Targets



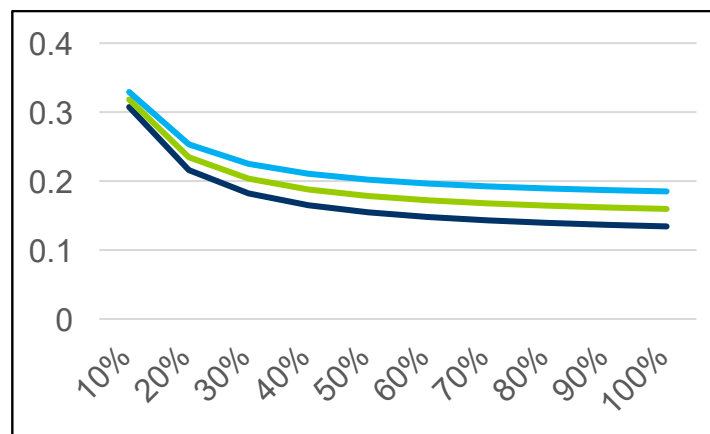
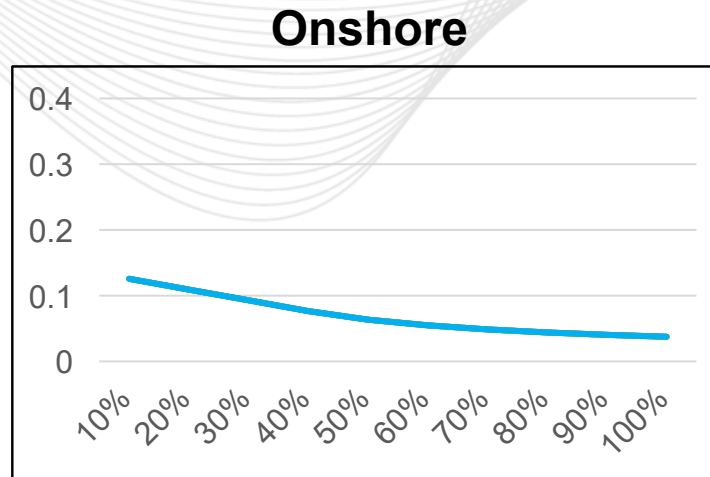
- Enforce the 1-in-10 resource adequacy constraint in the model
 - Resource specific targets will not be considered in satisfying this constraint
- Set ELCC-based capacity constraints to obtain resource adequate expansion (see next slide for ELCC curves)



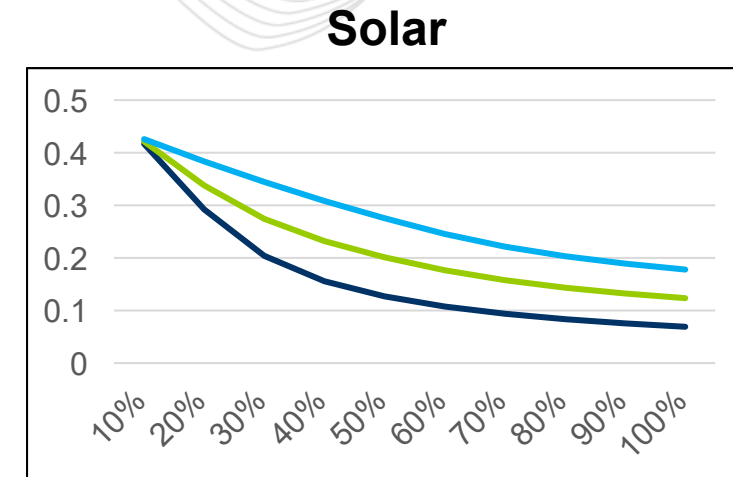
— Battery Low — Battery Medium — Battery High



percent of nameplate to annual peak load

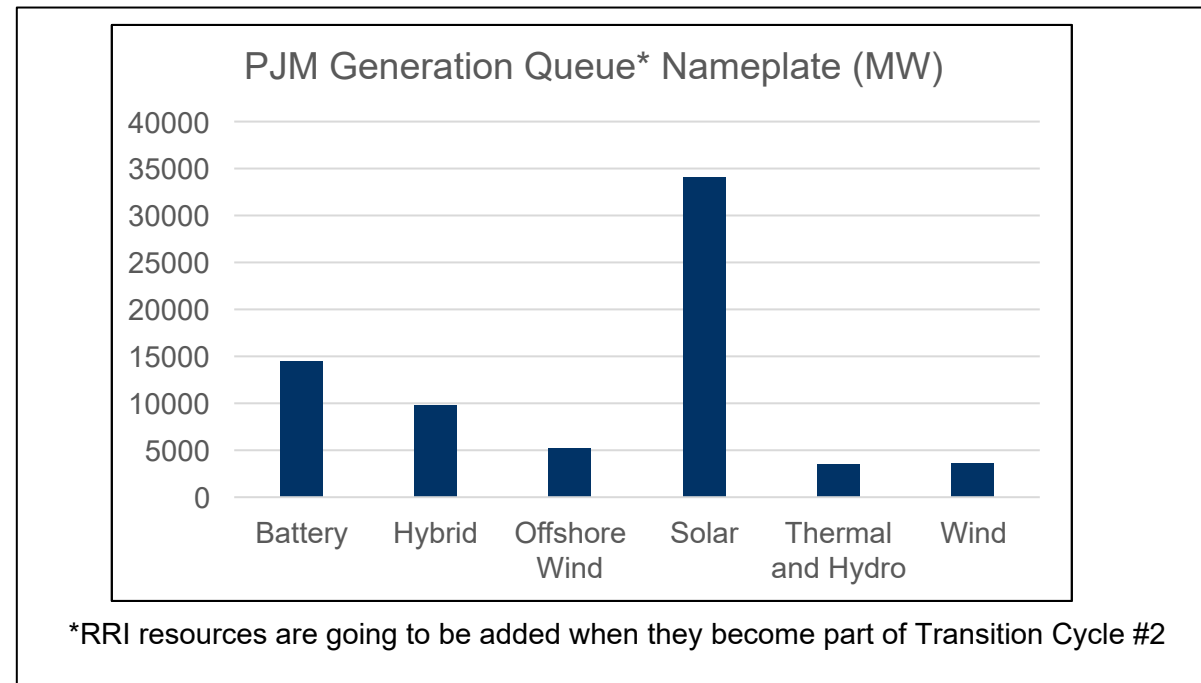


percent of nameplate to annual peak load



- Solar winter ELCC set to 0
- Hybrid: solar ELCC + 0.5 battery ELCC
- Offshore: $1.7 \times$ onshore ELCC
- CC and CT: 0.95 summer, 0.85 winter
- Coal: 0.87
- Nuclear: 0.99

- Starting resource mix: Consistent with 2025 RTEP model-year 2030 (Existing generation, GIA/ISA generation, Suspended ISA generation, Fast Lane Queue, CVOW and Chesterfield plants)
- The build limits through year 7 are based on the PJM's generation interconnection queue
- After year 7, the model is allowed to build beyond the queue (earlier, if the queue is insufficient)



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Member Hotline

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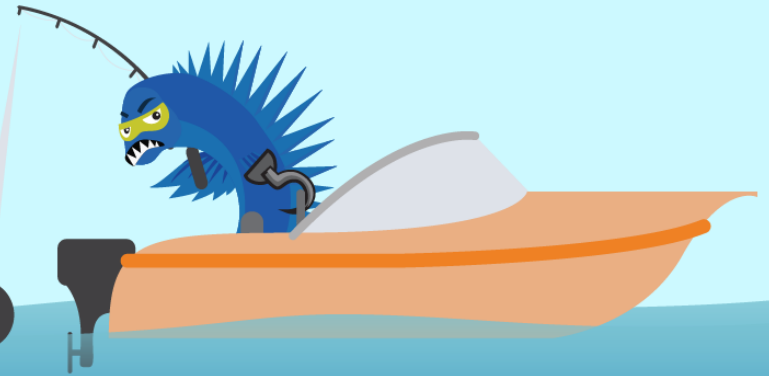
(866) 400-8980

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**PROTECT THE
POWER GRID**
**THINK BEFORE
YOU CLICK!**



**BE ALERT TO
MALICIOUS PHISHING
EMAILS**



Report suspicious email activity to PJM.
Call (610) 666-2244 or email it_ops_ctr_shift@pjm.com