



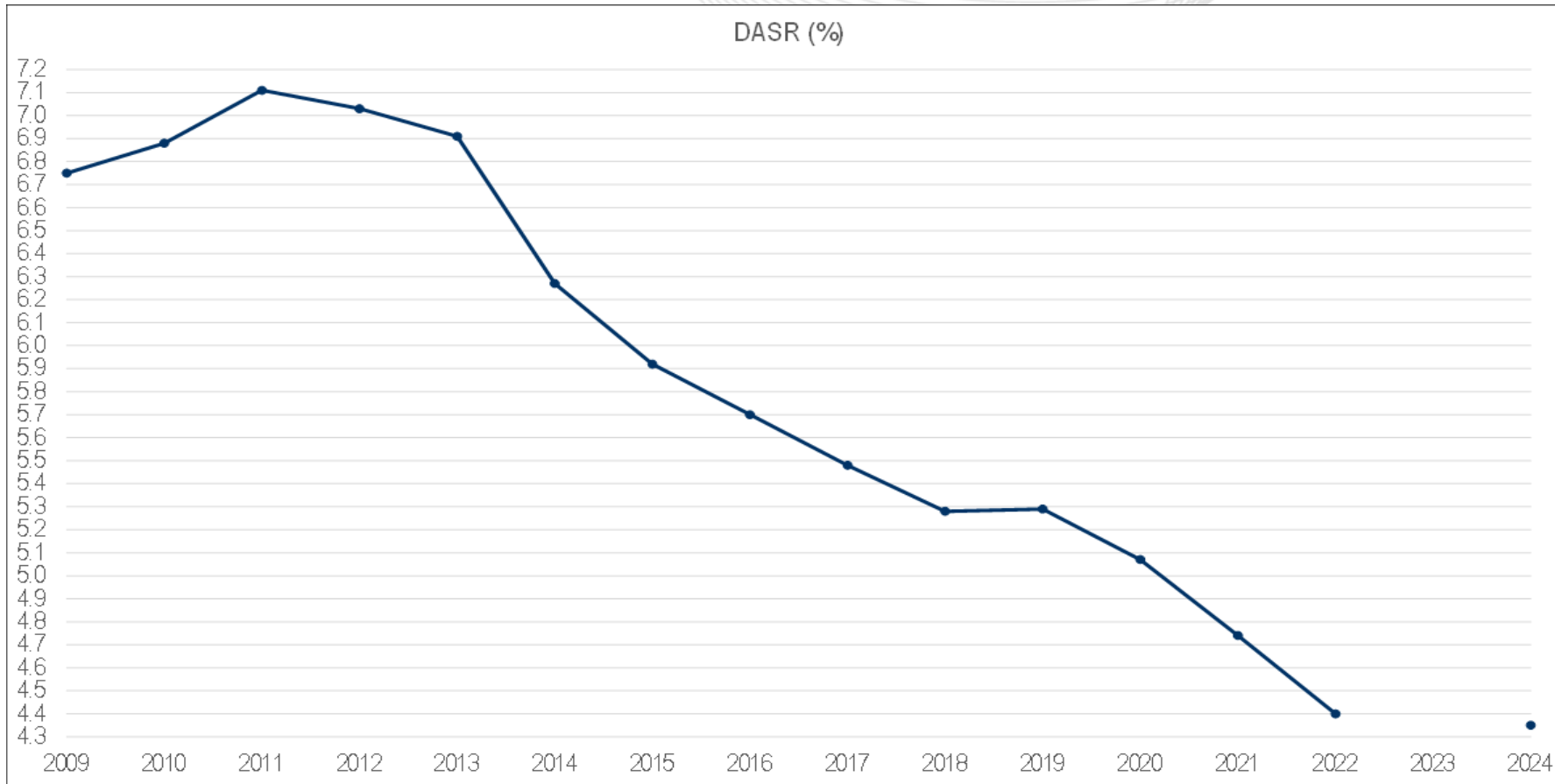
RCSTF PJM Reserve Requirements:

David Souder, Executive Director System Operations

Reserve Certainty Senior Task Force

July 17, 2024

- PJM is the NERC Registered Balancing Authority (and RC, TOP, PC, TSP) and has compliance obligations associated with maintaining system reliability.
- Currently, the 30-minute Reserve Requirement is the greater of:
 - 3,000 MW
 - Primary Reserve Requirement, or
 - Active Gas Contingency
- A flat requirement (i.e., 3,000 MW) does not reflect how risk changes based on operational conditions
- Based on DASR approach, any time peak load is greater than 74,257 MW, 3,000 MW of 30-Minute Reserves is not sufficient to manage operational risk



Year Effective	DASR (%)
2009:	6.75
2010:	6.88
2011:	7.11
2012:	7.03
2013:	6.91
2014:	6.27
2015:	5.92
2016:	5.70
2017:	5.48
2018:	5.28
2019:	5.29
2020:	5.07
2021:	4.74
2022:	4.40
2023:	None
2024:	4.35

DASR approved in 2008 details included in PJM manuals

<https://www.pjm.com/-/media/committees-groups/committees/mic/20140625-energy/20140625-item-04-overview-of-dasr.ashx>

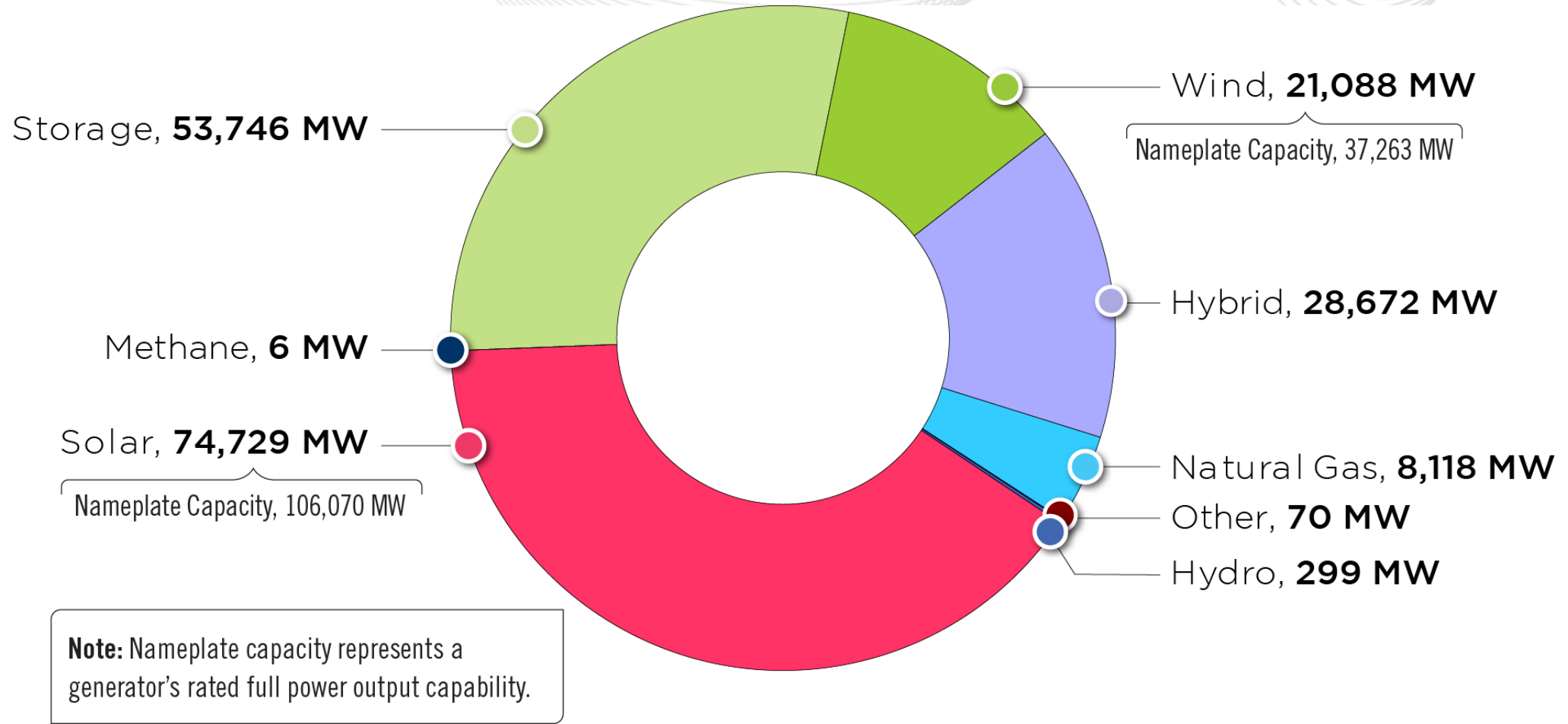


DASR Requirement Calculation from 2022

Season	Load Forecast Error Component 80th Percentile Absolute Error				Forced Outage Rate Component All Forced Outage Tickets				Day Ahead Scheduling
	2019	2020	2021	Rollup	2019	2020	2021	Rollup	Req.
Winter	2.06%	2.05%	1.87%	1.99%	2.81%	2.19%	2.50%	2.50%	4.49%
Spring	1.84%	2.73%	1.95%	2.17%	2.24%	1.71%	2.35%	2.10%	4.27%
Summer	2.48%	1.94%	1.99%	2.13%	2.43%	2.34%	2.81%	2.52%	4.66%
Fall	1.13%	1.37%		1.25%	2.08%	2.38%		2.23%	3.48%
Annual				2.04%				2.39%	4.43%

Source: <https://www.pjm.com/-/media/committees-groups/committees/oc/2021/20211007/20211007-item-09-day-ahead-scheduling-reserve-requirement-update.ashx>

Fuel Security: Queued Generation Fuel Mix



Note: Lack of fuel security creates operational risk that must be addressed.

As of Dec. 31, 2023



ISO/RTO Neighbor Comparison

	PJM	SPP	MISO	CAISO	ERCOT
Peak Load MW	165,000	53,243	130,897	52,061	85,464
Metered Solar MWs	10,700	1,437	6,000	26,000	24,000
BTM Solar MW	7,000	500	5,000	17,000	1,500 (growing rapidly)
Wind MW	11,540	32,000	30,000	8,120	39,000
Storage MWs	0	213	0	13,000	7,000
Total Metered IBRs	22,240	33,650	36,000	47,120	70,000
Operating Reserve Requirement	DASR	Uncertainty Risk Team use Operational Capacity Outlook to evaluate risk as part of Multi-day Reliability Assessment	Risk Based: 4% - 11%	Originally DASR, then Net Load Uncertainty, now Condition Based Approach (percent increases based on risk).	Minimum 6500 MW Probabilistic Risk Based Tool under development

Note: Table compiled based on notes from PJM site visits conducted in April/May 2024.

- Operations will take the actions necessary to ensure reliability.
- Objective is to capture operations reliability needs in the market commitments, dispatch and pricing
 - Operators must maintain the flexibility to take actions outside the markets.
 - Minimizing out of market actions leads to more consistent, cost-effective commitments/dispatches that are reflected in market prices.
- Revise, the 30-minute Reserve Requirement to be the greater of:
 - Load Forecast Peak*(Avg. Load Forecast Error + Avg. Forced Outage Rate),
 - Primary Reserve Requirement,
 - Active Gas Contingency
- Next Steps – Operations will work to quantify future risk / uncertainty and necessary reserves to maintain reliability; working with markets to ensure commitments, dispatch and pricing

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**RCSTF PJM Reserve Requirements
Challenges & Solution Options**



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