Interest Identification for Wind and Solar Resources

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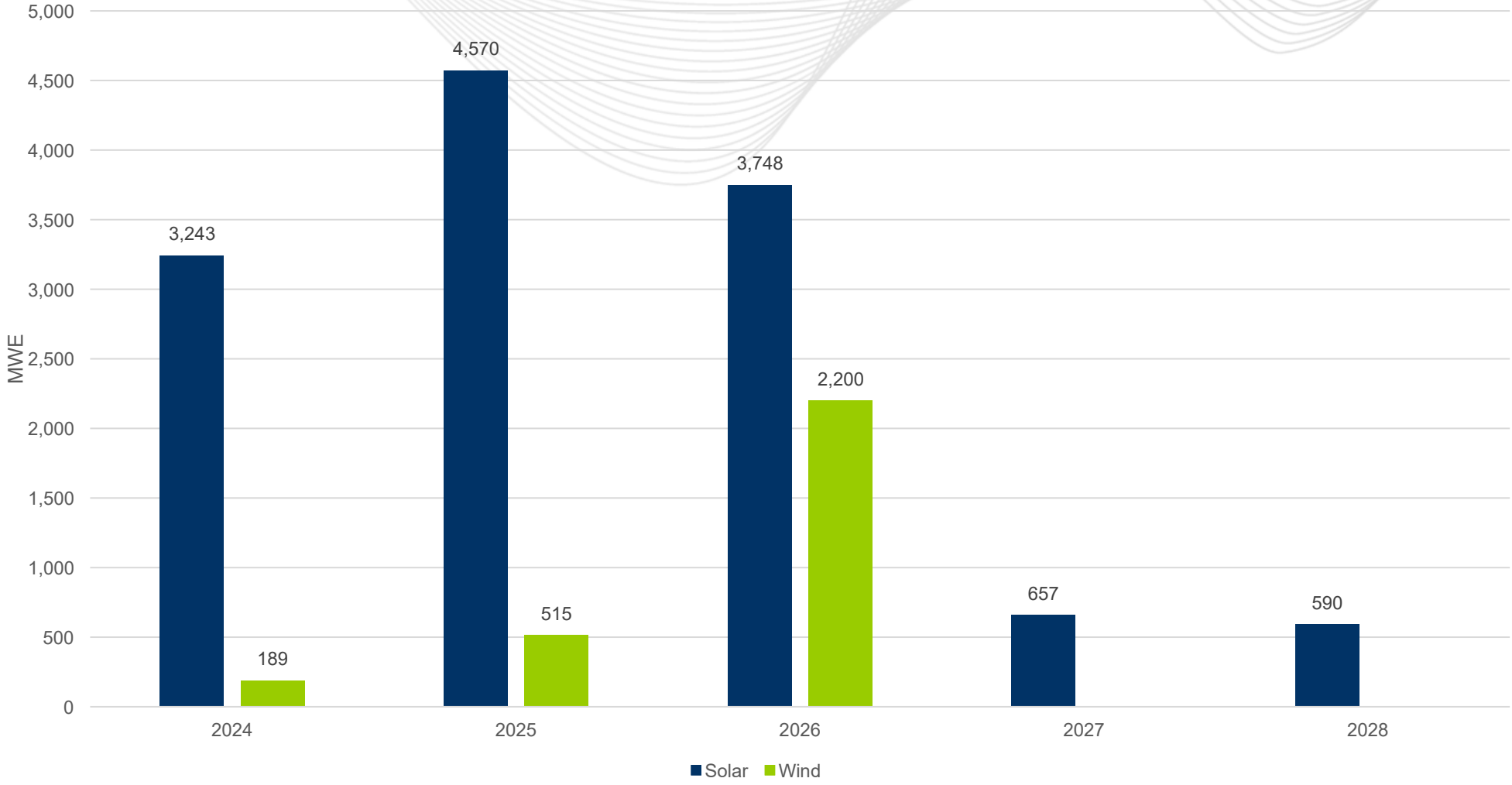
Overview

- Address questions and concerns from August meeting
- Highlight areas of concern in existing RT SCED logic
- Review interest identification

Wind and Solar Actual Totals (2021-2024)

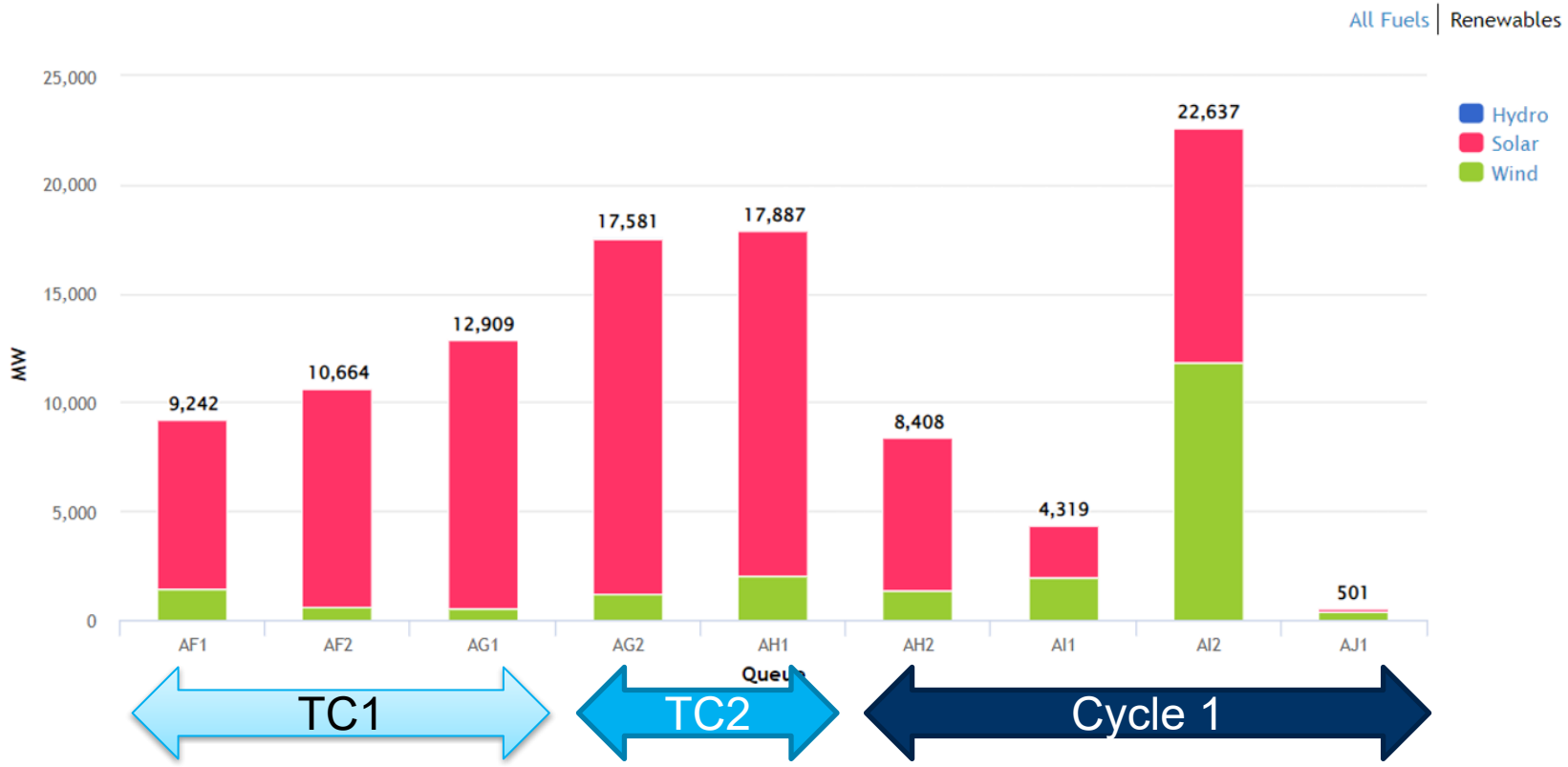
Maximum Wind and Solar penetration in PJM has increased to 8-10 GW each in recent years

Renewable Projects in Construction Coming Online



Renewables Interconnection Request
As of September 1st, 2024

Generation Interconnection Requests by Fuel Type



Ramp Rates

- 72% of Solar resources do not submit a ramp rate or utilize the default ramp rate of 9999

- 35% of Wind resources do not submit a ramp rate which or the default ramp rate of 9999

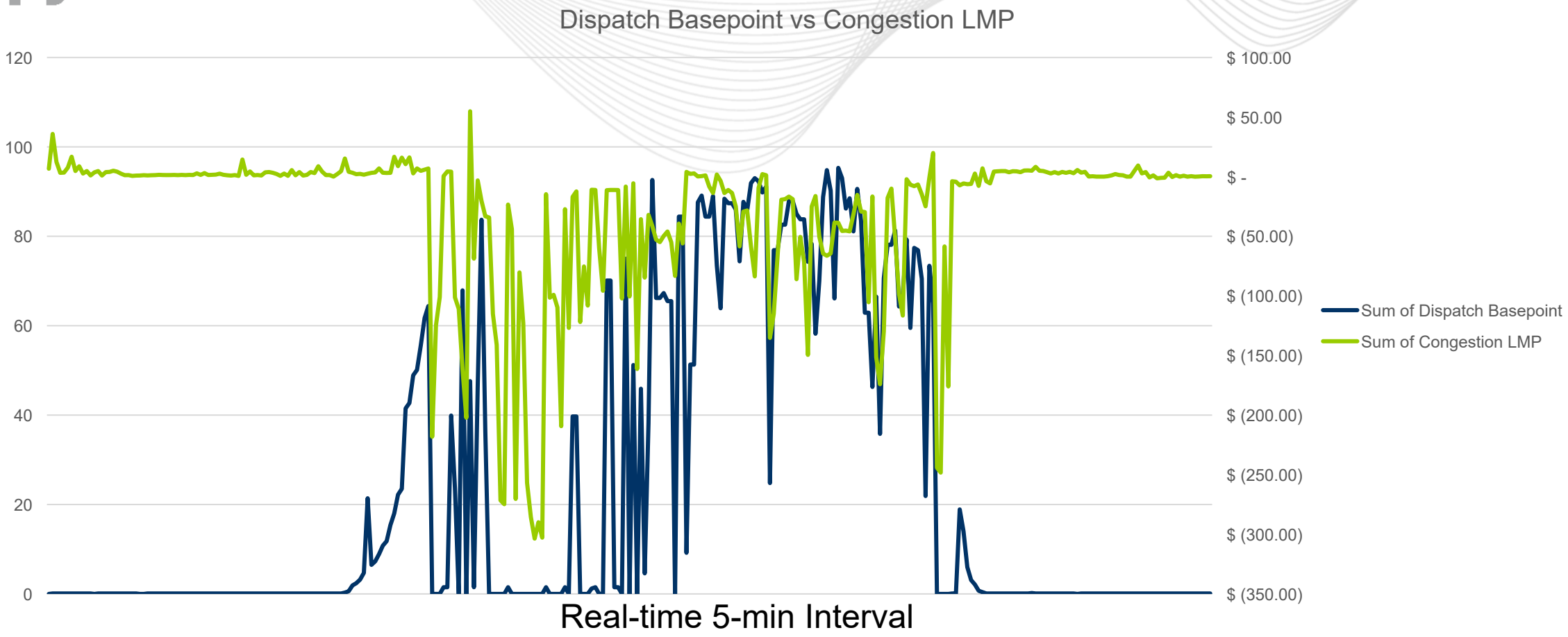
Unit Type	Number of Units	Number of units with default RR	% of Units with default RR
Solar	337	244	72%
Wind	110	38	35%

Key Takeaway: Fast ramp rates can lead to constraint volatility, price fluctuations and may lead to ACE swings

RTSCED - Today

- Bid-In Parameters – Resources can only be dispatched within the economic minimum and economic maximum bid-in parameters
  - Basepoint has to be within their bid-in parameters, even if SE Solution is outside of their range
- Ramp Rates – Utilize bid-in ramp rates for resources, however if resource does not submit a ramp rate, a default rate of 9999 is utilized
  - Resources can swing very fast from interval to interval
- At a high level, SCED is required to perform co-optimization while maintaining power balance, reserve requirement(s), constraint control

Example: Dispatch Basepoint vs Congestion LMP



Key take away: Existing SCED dispatch logic and input parameters create volatile RT pricing and control issues for PJM Dispatch. This pattern on a larger scale can lead to ACE swings.

Interest Identification #1

- Concern: Resources that operate inconsistent with their economic maximum can cause reliability issues by creating discrepancies between RT SCED results and actual system conditions.
- Interest: “Market clearing engines should have ability to utilize most up-to-date information.”
  - Interpretation: Based on the tariff today, resources can only be dispatched according to their bid-in parameters. PJM is looking for ways to improve SCED, when parameters do not align with the forecast and/or SE solution.

Interest Identification #2 and #3

- Concern: Default ramp rates and ~72% of solar and 35% of wind resources utilize a 9999 ramp rate
- Interest: “Minimize large MW swings from interval to interval”
- Interest: “Ensure reliable operations”
- Interpretation:
  - Today, the default is 9,999 MW/minute when no ramp rate is submitted.
  - Dispatchable Wind and Solar resources can “out perform” dispatch solutions, contributing to constraint control volatility (binding/un-binding)
  - Given the above, are their opportunities to improve what happens from one dispatch interval to another?

Acronyms

Acronym	Term & Definition
RT SCED	**Real-Time Security Constrained Economic Dispatch** is the application responsible for dispatching resources in real-time for a target five minute interval as a result of a co-optimization of Energy and Reserves for the forecasted system conditions..
LPC	**Locational Pricing Calculator** performs a pricing run solution to determine the Real-time LMP values and Regulation and Reserve Clearing Prices on a five (5) minute basis.
ASO	**Ancillary Service Optimizer** performs the joint optimization function of Energy, Reserves and Regulation in the dispatch run. The main functions of ASO are the clearing and commitment of Regulation resources and inflexible Reserve resources for a one hour time period
IT SCED	**Intermediate Term Security Constrained Economic Dispatch** solves a multi-interval, time-coupled solution to perform functions that include but not limited to resource commitment recommendations for Energy and Reserves, resource commitment decisions for economic Demand Resources, execution of the Three Pivotal Supplier Test for Energy

PJM Glossary

Acronyms

Acronym	Term & Definition
LMP	**Locational Marginal Price** is defined as the marginal price for energy at the location where the energy is delivered or received. For accounting purposes, LMP is expressed in dollars per megawatt-hour ($/MWh). LMP is a pricing approach that addresses Transmission System congestion and loss costs, as well as energy costs.
AGC	**Automatic Generation Control** is equipment that automatically adjusts generation.
Basepoint	**Basepoint** is calculated output for a given resource from approved RTSCED based on co-optimization of Energy and Reserves. The basepoint is a MW value a resource should be able to achieve within 5 minute.
MW	A **Megawatt** is a unit of power equaling one million watts (1 MW = 1,000,000 watts) or one thousand kilowatts (1 MW = 1,000 KW). To put it in perspective, under non-severe weather conditions, one MW could power roughly 800 to 1,000 average-sized American homes.

PJM Glossary

Acronyms

Acronym	Term & Definition
ATM	**Achievable Target Megawatt** is range that is calculated within RTSCED that a given resource may be able to reach within a given timeframe (typically 5 minutes).
SE	**State Estimator** generates a network state estimation solution, every 1 minute within the PJM Energy Management System. The solution is used to determine the initial MW of a resource that RTSCED will use to dispatch for a look ahead timeframe.
DFAX	**Distribution Factor** is a calculated impact of a resource on a constraint by raising or lowering its output by 1 MW, commonly referred to as Raise help and Lower help.

PJM Glossary

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Interest Identification for Wind and Solar Resources

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