



# Regulation Impacts from Influx of Renewable Resources

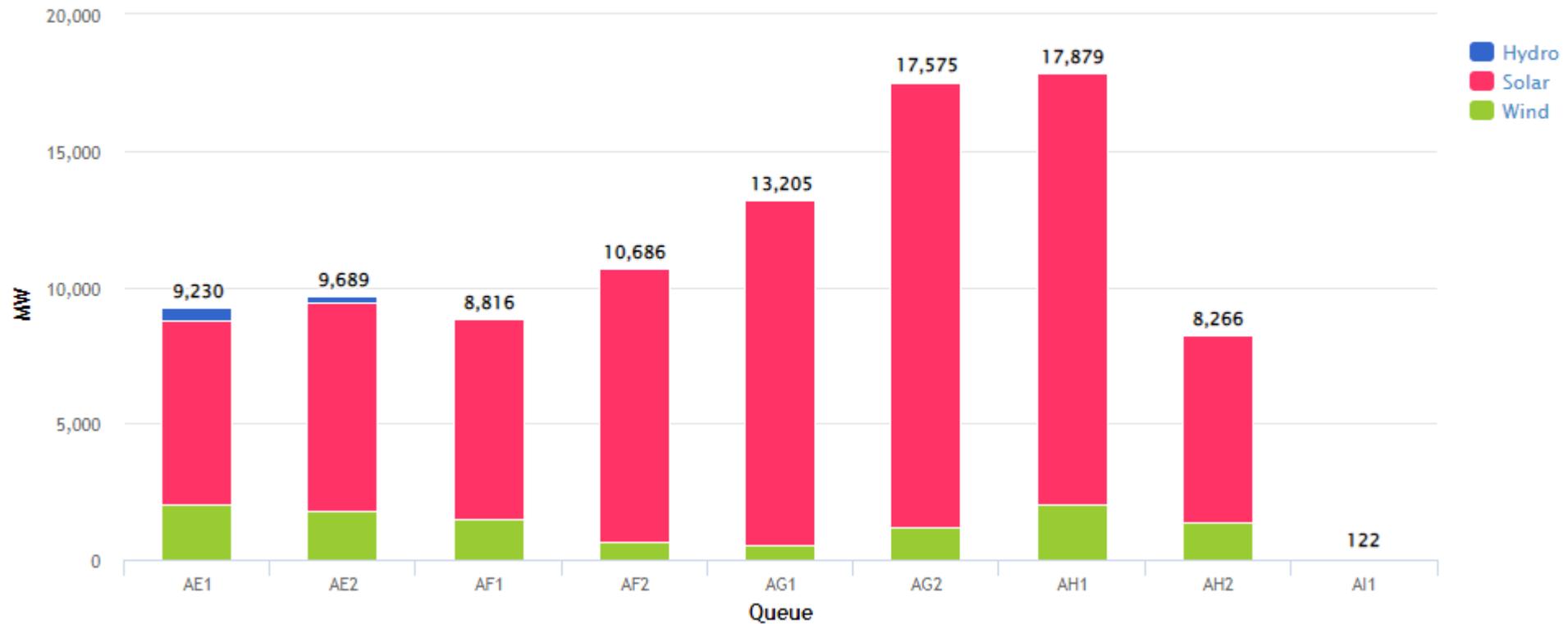
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RMDSTF  
May 24, 2022

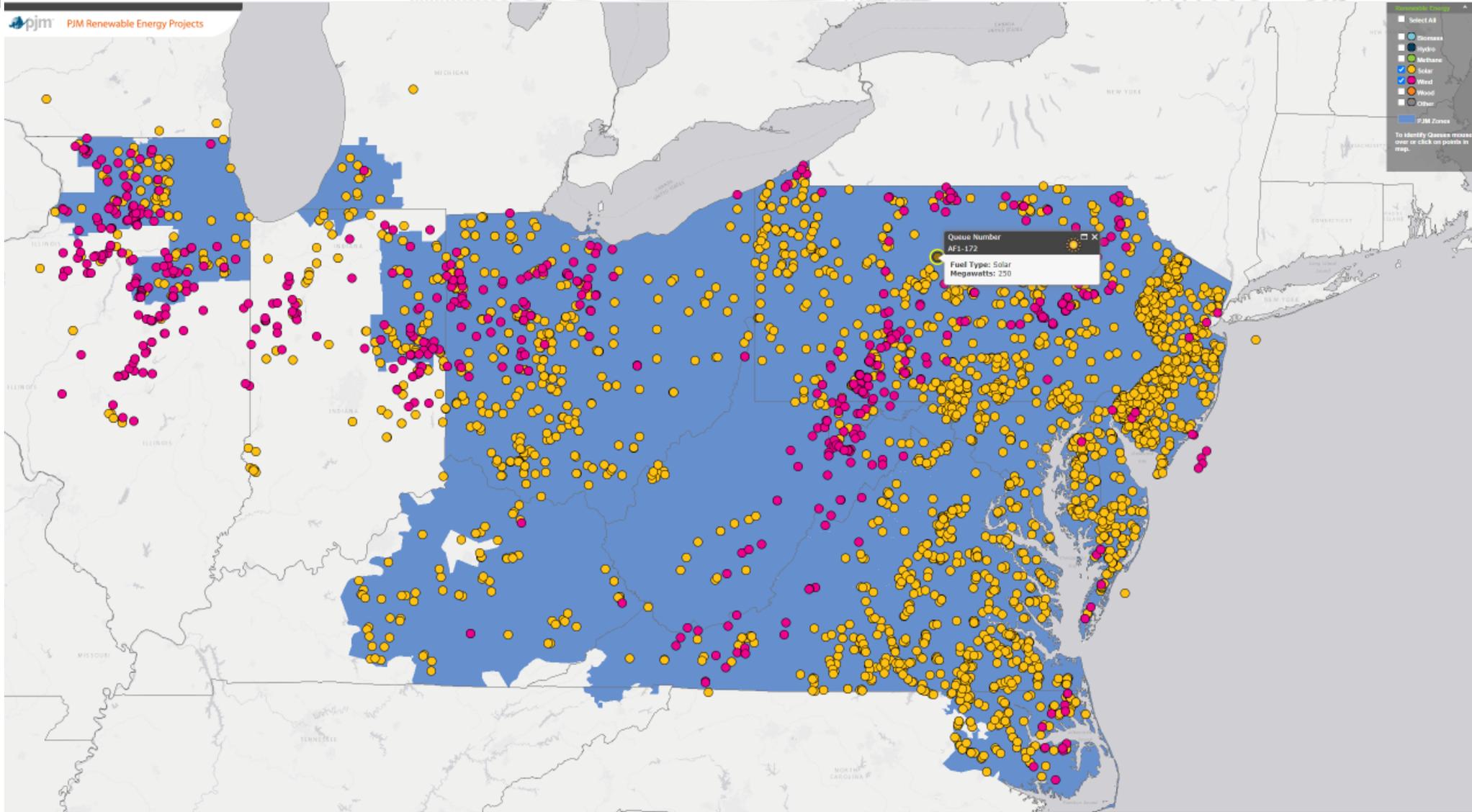
- Multiple ongoing initiatives at PJM to evaluate and adapt to various impacts from the influx of renewable resources.
- Renewable Integration Study (RIS) 2.0
  - Multiphase, multiyear effort to study potential impacts associated with evolving resource mix
- Grid of the Future Report
  - Outline a vision for the grid of the future and identify factors to consider when planning for that future
- Renewable Dispatch Issue at the Operating Committee
  - Ensuring renewable resources can follow dispatch instructions in real-time to maintain reliable operations

## Generation Interconnection Requests by Fuel Type

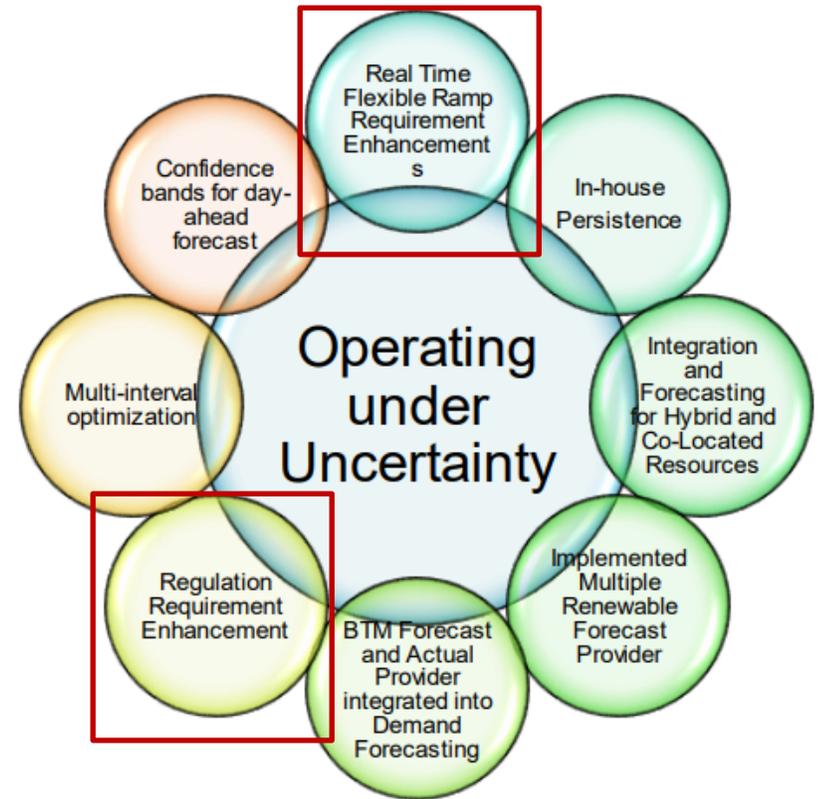
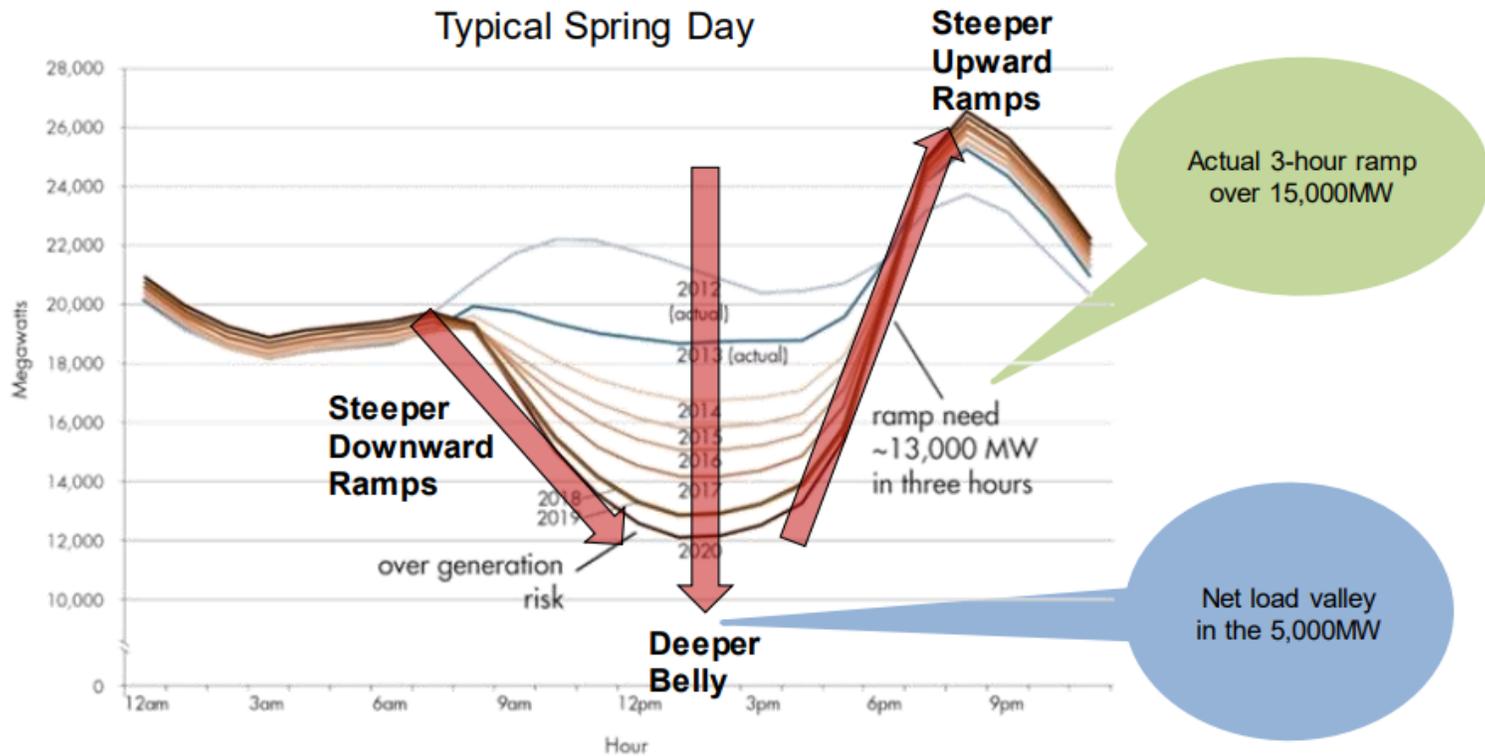
As of 10:24 p.m. EPT

All Fuels | Renewables





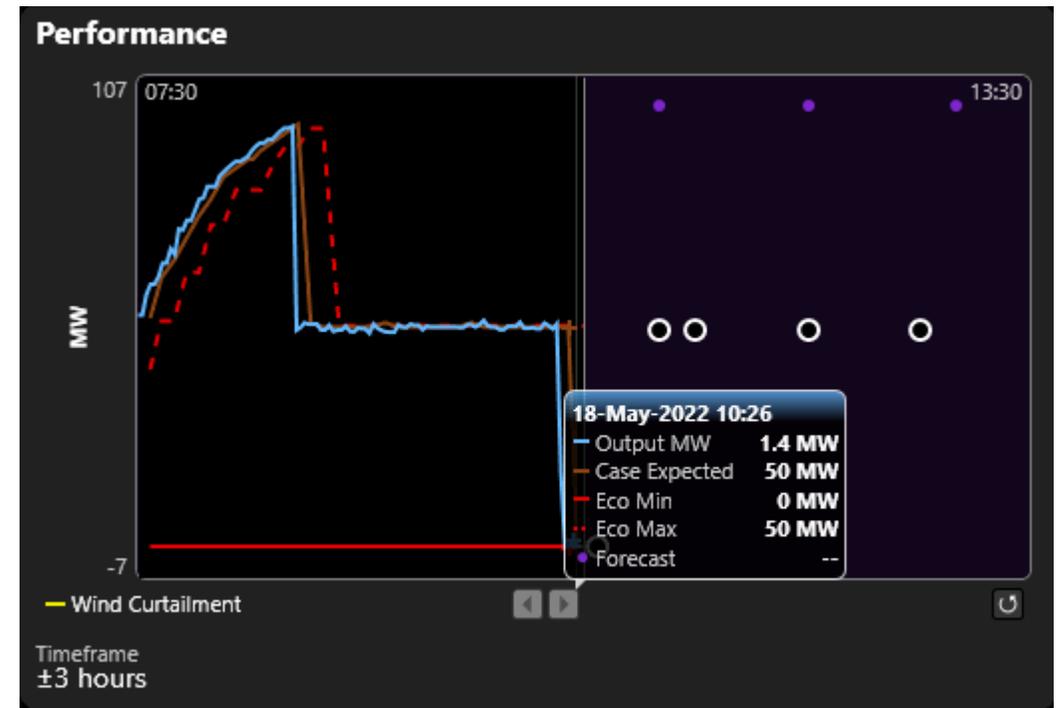
The duck turns 10 years old: Actual net-load and 3-hour ramps are approximately four years ahead of the CAISO's original estimate



- 300 MW Wind Unit
- Sharpest drop at 15MW/min
- SCED still expecting output due to lag time for ecomax



- 100 MW Solar Unit
- Sharpest drop at 50+MW/min
- SCED reflects back unit output but still slow to see drop



- Existing level of renewable penetration creating control issues.
  - ~10-15% of daily resource mix
  - Lack of sun/wind across large concentration of resources
  - Fluctuations of large 100MW+ resources throughout PJM
- Usage of SCED biases to account for renewable volatility.
  - SCED only runs every 5-minutes with delays to see unit MW changes
  - SCED will look to dispatch renewable resources based on bid in parameters, delays in updating economic limits impacts solution
- Regulation utilized to quickly respond to existing volatility.

- Evaluate the regulation requirement.
  - Amount of regulation needed based on additional volatility on system
  - Changing needs based on time of day and amount of renewable resources anticipated for day/hour
  - Existing requirements based on historical factors and does not account for project levels of renewable penetration
- Flexibility in regulation market design/rules.
  - Adaptability for upcoming changes beyond RMDSTF (ex. Offshore Wind, Hybrids)

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