



Operations Risk Assessment and Uncertainty Management

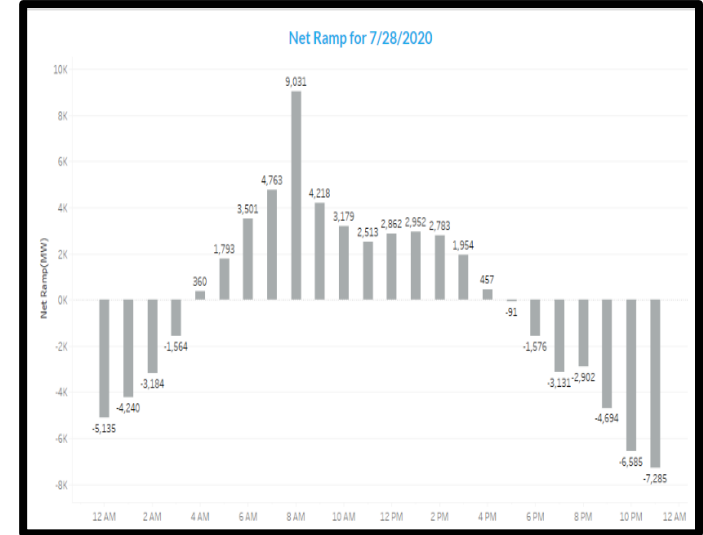
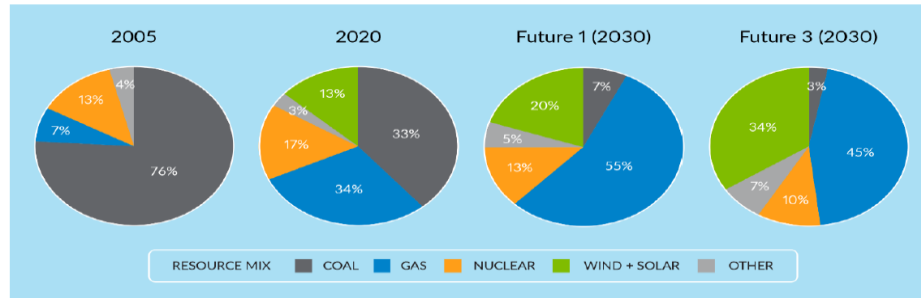
ESIG Probabilistic Forecast User Group

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With a transitioning fleet, MISO is facing increasing variability and uncertainty

- Retirement and decarbonization drives new generation mix and risk profile
- Ramping needs and uncertainty continue to increase and potentially shift to sunset hours

MISO Generation Mix (% of total annual energy by fuel type)



Up to > 9 GW/hr net ramp when wind drop coupled with morning load ramp



Expect the net ramp to increase when coupling with sunset and decreasing imports

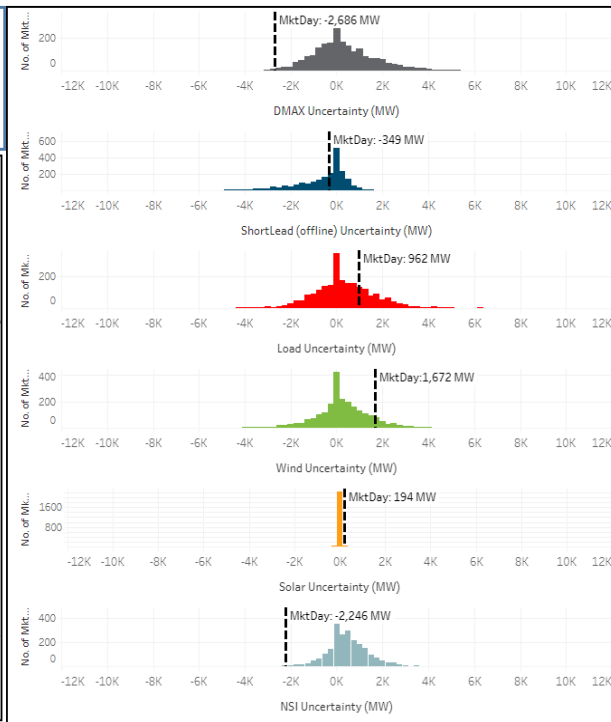
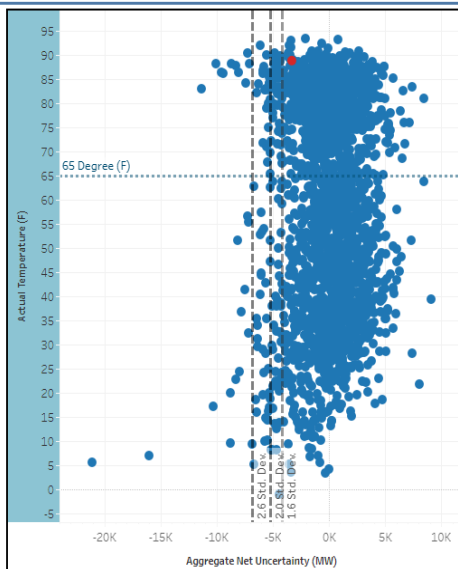
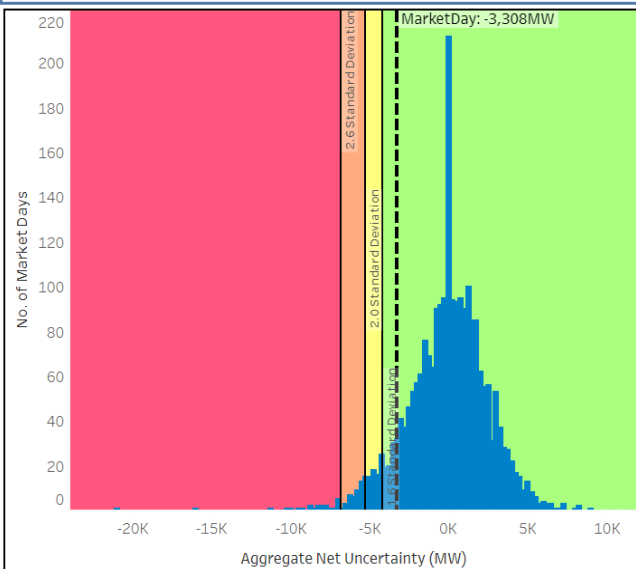
Establish dynamic reserve requirements based on daily risk profile

June 03, 2023 Systemwide

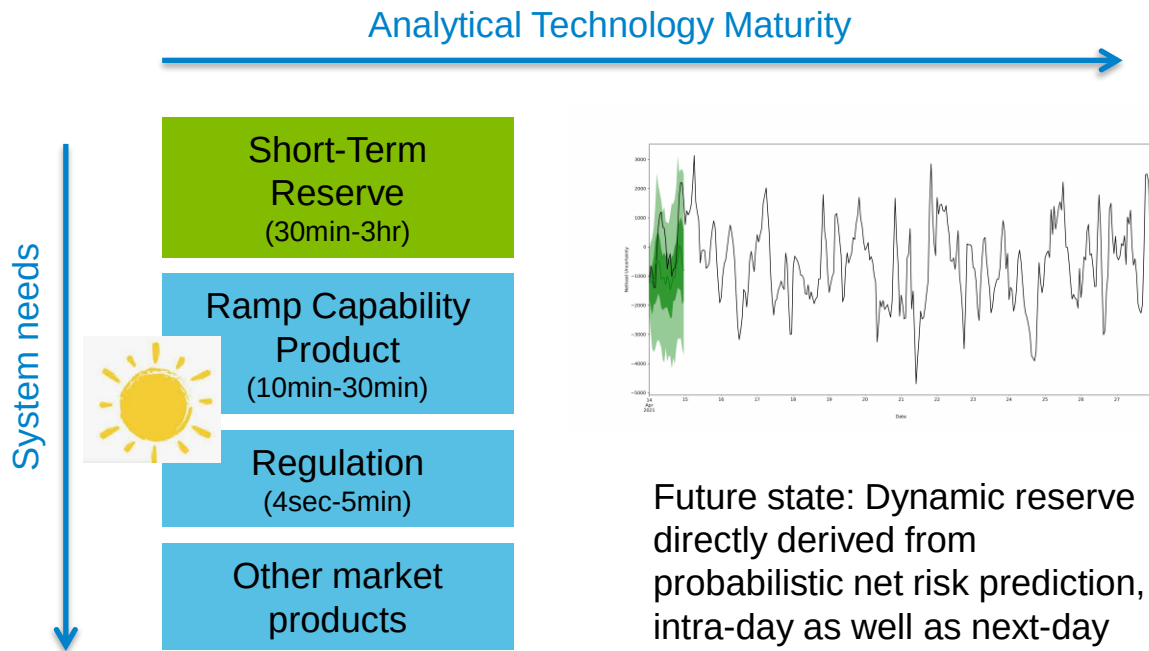
Aggregate Net Uncertainty (MW)

-3,308

DMAX Uncertainty MW	-2,686
ShortLead Uncertainty MW	-349
- Load Uncertainty MW	962
Wind Uncertainty MW	1,672
Solar Uncertainty MW	194
NSI Uncertainty MW	-2,246
- Stranded MW	-856



Roadmap to fully dynamic reserves as system needs and technology mature



Operations Risk Platform will align MISO with industry direction and tie together our risk initiatives

