Forecasting Resource Adequacy in MISO Through 2035

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OBJECTIVE: Model Resource Adequacy & Cost For Three Scenarios

1. Reference Scenario

MISO/EIA planned additions (7.5 GW Gas, 1 GW Wind, 4.2 GW Solar) and retirements (17.6 GW Coal, 4.8 GW Gas, 600 MW Other). Replace rest with modeled wind (64.4 GW), solar (98.7 GW), and four-hour storage (11 GW).

2. Ozone Transport Federal Implementation Plan (FIP) Rule (hereinafter "OTR") Scenario

Loss of 30.3 GW of coal and 9.6 GW of gas by 2035. Replace with natural gas (7.5 GW), wind (130.7 GW), solar (202.8 GW), and four-hour storage (16.2 GW).

ADDITIONAL BENEFIT OF STUDY: Derive more relevant accreditation values for wind and solar given that peak net load has become the time of greatest system stress - Selected the mean of the lowest quartile (MLQ) of wind and solar generation during peak & net peak hours to develop peak & net peak capacity accreditation values called "Highest Certainty Deliverability" (HCD) accreditation.

3. Ozone + Coal Combustion Rule ("CCR") Scenario

Replace with natural gas (7.5 GW), wind (140.8 GW), solar (218.3 GW), and four-hour storage (17.5 GW).

Source	Peak Accreditation	Net Peak Accreditation
Wind	7.1%	5.8%
Solar	12.4%	12.0%







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Costs for Each Scenario Through 2035



Comparing Highest Certainty Deliverability (HCD) Approach to the Approach MISO is Considering With the HCD Approach (ND Study)

- MISO is making well-intended (but potentially insufficient) changes to the accreditation process as they try to account for weatherdependent renewable penetration and shift from away from an Effective Load Carrying Capacity (ELCC) approach to a Direct-Loss of Load (LOL) accreditation approach.
- They are also switching to a seasonal accreditation model, which will require seasonal capacity auctions & significant differences between seasonal reserve margins (which probably won't address over-penetration of weather-dependent resources).
- By contrast, HCD examines wind & solar accreditation values for peak & net-peak hours to provide consistent, year-round metrics for availability & reserve margins and provides a basis for more realistic (apples-to-apples) comparison of renewable-vs-thermal performance.

MISO APPROACH

Direct-LOL results using latest Planning Year (PY), results from the non-thermal evaluation and the 2022 Regional Resource Assessment (RRA) portfolios.



7.1%

12.4%

ND Study's HCD Approach Differ from MISO's Seasonal Accreditation Approach?

How does the

- HCD accreditation values for wind are consistent with MISO's F1-25 values..
- HCD accreditation values for solar are lower than MISO's F1-25 values but higher than their F1-2039 values.

HCD appears preferable for a few reasons:

- HCD provides consistent metrics for evaluating wind & solar that independent on future modeling & not linked to significant adjustment of seasonal reserve margins.
- As more wind & solar are added to the grid, net peak will become more challenging than peak load demand.
- HCD manages the downside of wind & solar at net peak compared to ELCC and is more empirical than the options MISO is considering as they move away from ELCC to a Direct-LOL accreditation approach.

Conclusions

Our findings represent a best-case scenario for reliability due to our HCD accreditation standard, which is more stringent than MISO's prior accreditation process and could enhance their recently-adopted Seasonal Accreditation Construct (SAC). Different standards, such as seasonal accreditation being explored by MISO, will produce varying levels of reliability that must be examined in light of these results.

Wind

Solar

Costs were relatively modest due to the large amount of thermal capacity remaining on the MISO system through 2035, but costs increase substantially as more thermal retirements occur and Load Serving Entities (LSEs) attempt to replace this lost generation with wind, solar, and battery storage.

5.8%

12.0%

Policymakers must understand the challenges regarding reliability, resiliency and affordability that are growing every year.

If EPA Rules Force Early Retirements by 2035

