



Fuel & Energy Security Update

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Operating Committee
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1. 2022 Fuel & Energy Security Resource Adequacy Assessment Results
2. Updates on related working items in stakeholder process

- Probabilistic “stress test” of the 2027/28 Regional Transmission Expansion Plan (RTEP) portfolio and a “1-in-10” portfolio
 - RTEP Portfolio has 28% Unforced Capacity (UCAP) reserves.
- The portfolio is analyzed under potential “Cold Snap” events
 - Cold Snap is defined as five or more contiguous days where average RTO wind-adjusted temperature in each day is less than 21.5°F
- Three types of thermal/hydro generation unavailability are considered
 - Random Forced Outages
 - Fuel Security (Lack of Fuel) Forced Outages (FS-FO)
 - Generic Disruptions
- For wind and solar, hourly availability profiles are modeled
- RTO-wide results only (ignoring transmission constraints between LDAs)

Inputs

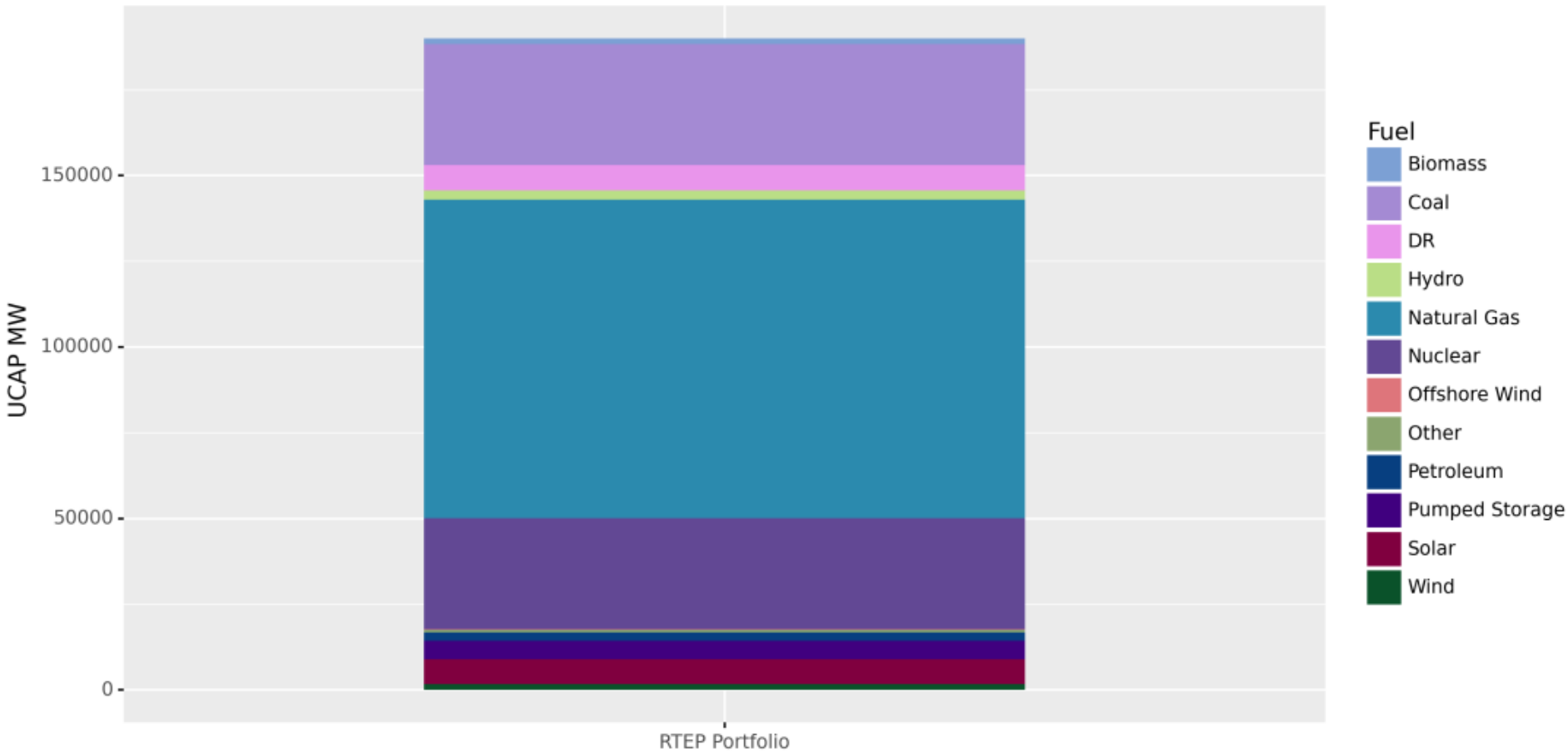
- Winter hourly load shapes derived from historical cold snaps
- Forced outage rates (fuel security-related and random)
- Wind/solar availability profiles
- Generic disruptions of variable impact

Procedure

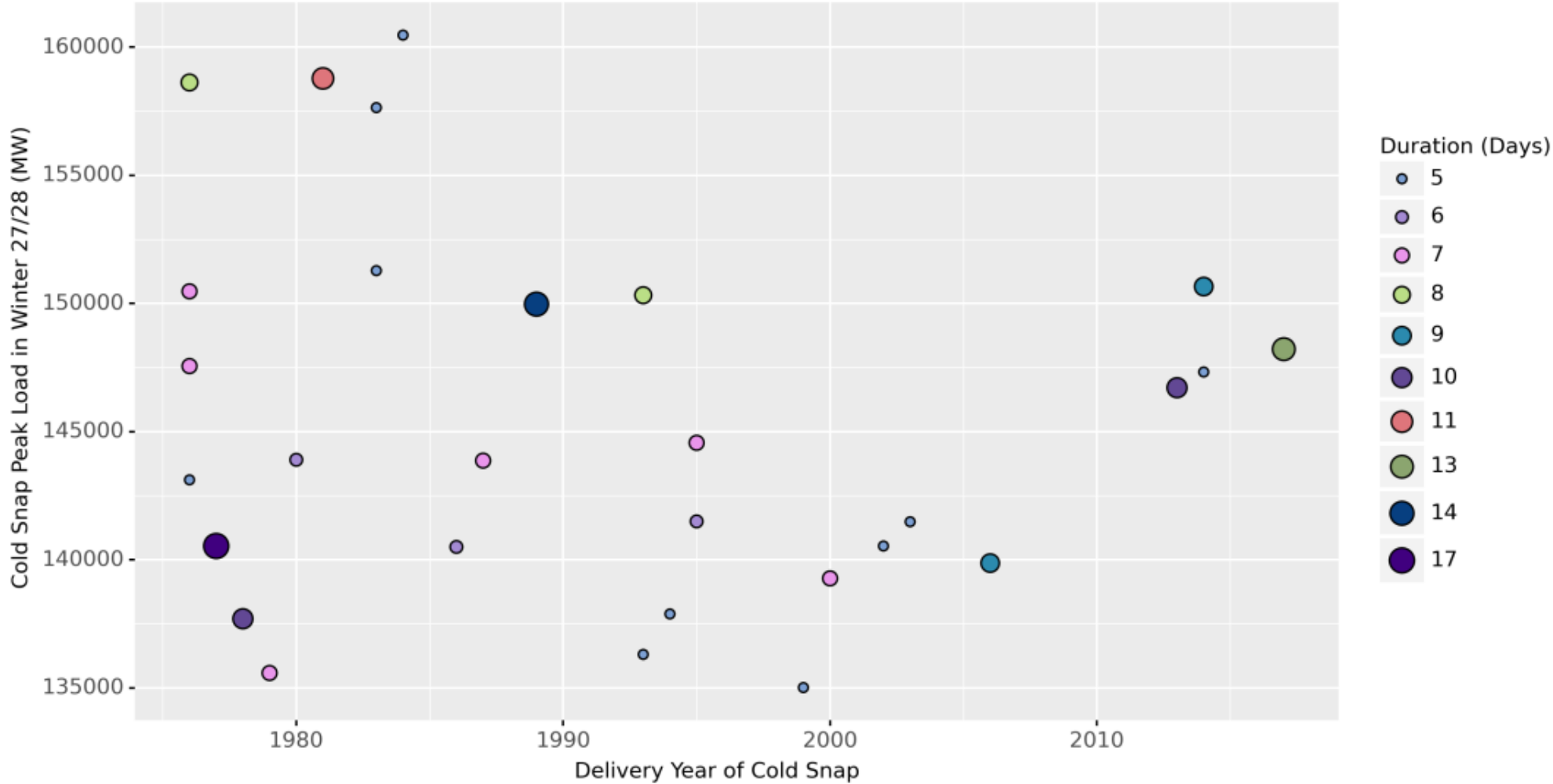
- Set impact of generic disruption at X MW
- Calculate conditional LOLE based on each historical cold snap
- Aggregate LOLE values by delivery year
- Calculate conditional LOLE

Output

Portfolio's LOLE conditional on the occurrence on a generic disruption of size X MW coincident with a cold snap

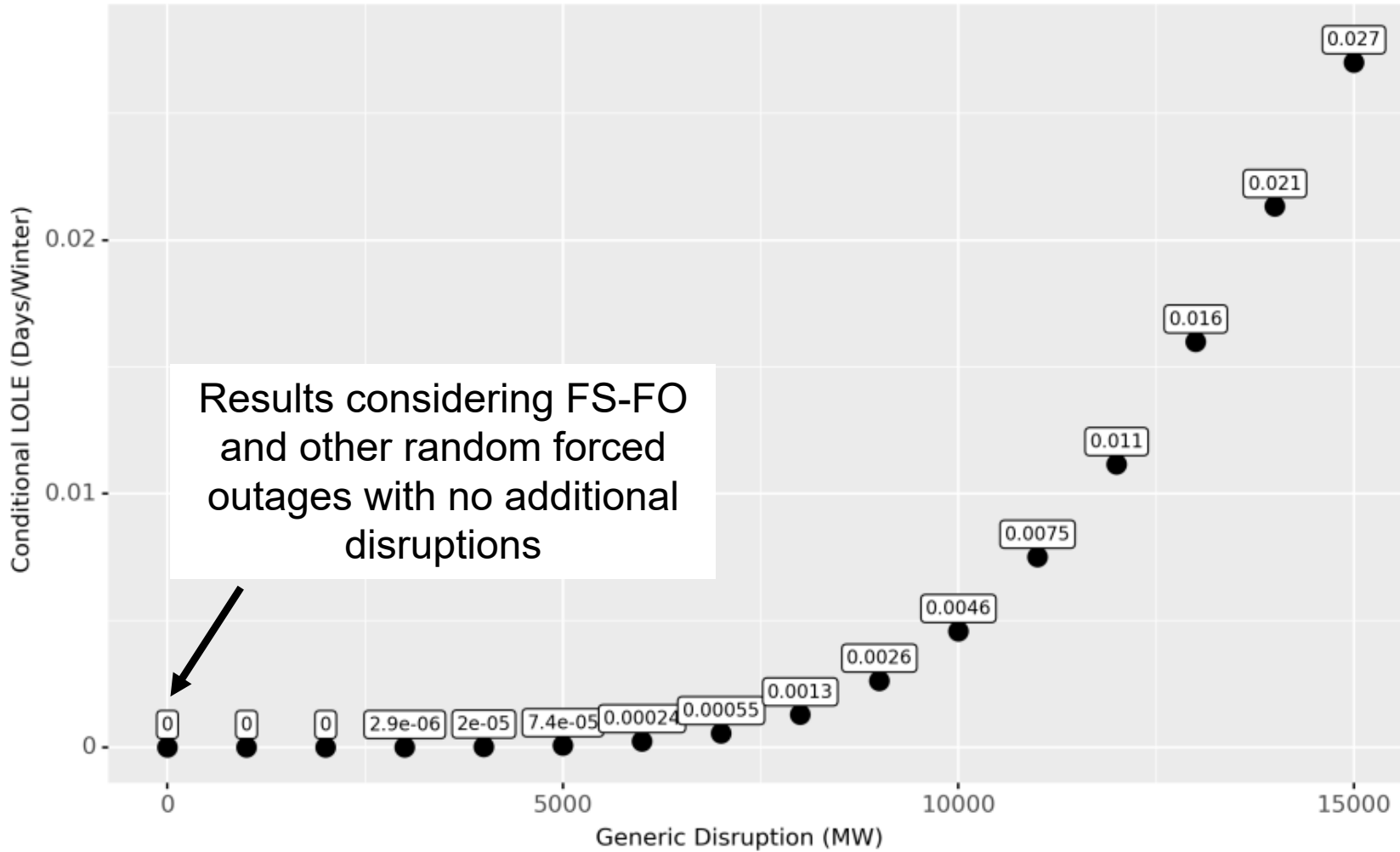


The 2027/28 RTEP Portfolio has 189,961 UCAP MW, which correspond to 24.7% UCAP reserves.



A total of 29 cold snap scenarios were analyzed for 2027/28, consistent with 2022 PJM Load Forecast.

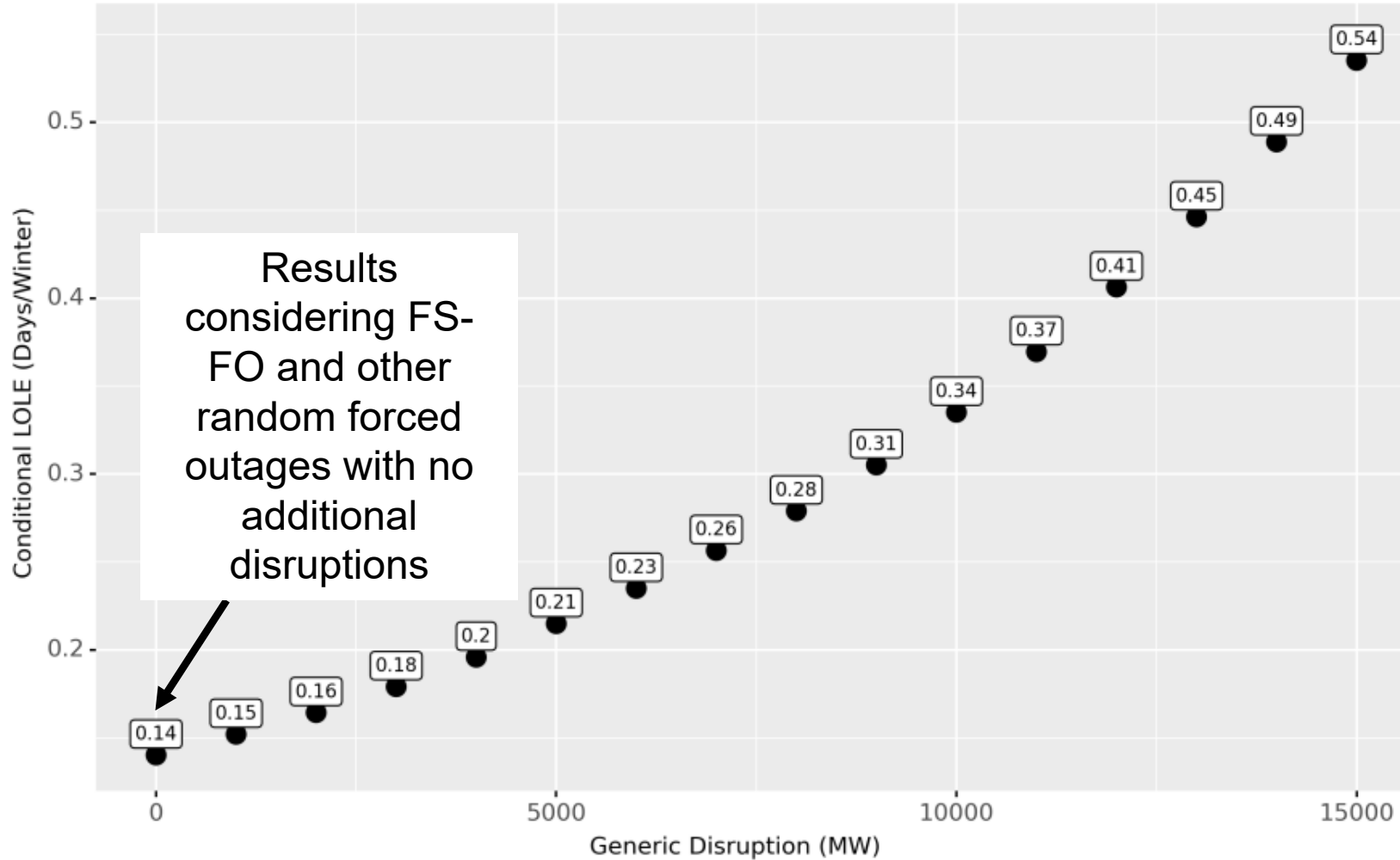
For reference, the 50/50 and 90/10 forecasted peaks for winter 2027/28 are 138,809 MW and 149,676 MW, respectively.



*LOLE values are in addition to portfolio LOLE outside of the winter period.

Non-zero LOLE observed beginning with disruptions of 3,000 MW beyond FS-FO and other random forced outages

- To perform this sensitivity, the 2027/28 RTEP Portfolio was not modified. Instead, hourly loads were scaled up to simulate a scenario in which the UCAP reserves are ~10%.
 - This entails that the fuel mix is the same as in the RTEP portfolio but less UCAP MWs are available
- The “1 in 10” portfolio was then subjected to the same 29 cold snap scenarios



*LOLE values are in addition to portfolio LOLE outside of the winter period.

Key considerations to interpret the sensitivity results:

- Portfolio at 1 in 10 reserves
- FS-FO from 4 most recent cold snaps
- Load shapes derived from cold snaps back to 70s, 80s
- DR performance during performance window, 100%, outside performance window, 0%



Additional Working Items Related to Fuel & Energy Security

| Topic | Forum | Status |
|--|---|--------------------------------------|
| Winter 2022/23 Preparedness <ul style="list-style-type: none"> • Operations Assessment Task Force study • Max Emergency Changes for Resource Limitation Reporting • Fuel Supply Concerns periodic updates • Environmental regulation implementation coordination • Generation Resource Cold Weather Preparation, including 2022 Fuel & Emissions annual data request | OC | Ongoing |
| Reliability risks and drivers considered by the capacity market , including analysis similar to June/July OC updates & Aug MRC update | Resource Adequacy Senior Task Force | Solution Options |
| Procurement metrics and levels to maintain the desired level of reliability , including impacts of seasonal differences | | |
| Qualification requirements and accreditation of capacity resources , including discussion of winterization, dual fuel and seasonal considerations | | |
| Reliability Products & Services Assessment | OC (from RASTF) | Complete |
| Operational and market impacts of misalignment between electric and natural gas markets | Electric Gas Coordination Senior Task Force | Design Components & Solution Options |
| Fuel Requirements for Black Start Resources | OC/MIC Special Sessions | MRC/MC Review |
| Renewable Dispatch | OC & Special Sessions | Solution Options & Package |
| PJM Studies on Energy Transition | Periodic Standing Committee Updates | Ongoing |
| Critical Gas Infrastructure: Demand Response Participation & Removal from Load Shedding Schemes | DRS & OC | Ongoing |

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Fuel / Energy Security Update



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