



CAISO exceedance analysis and planning reserve margin discussion

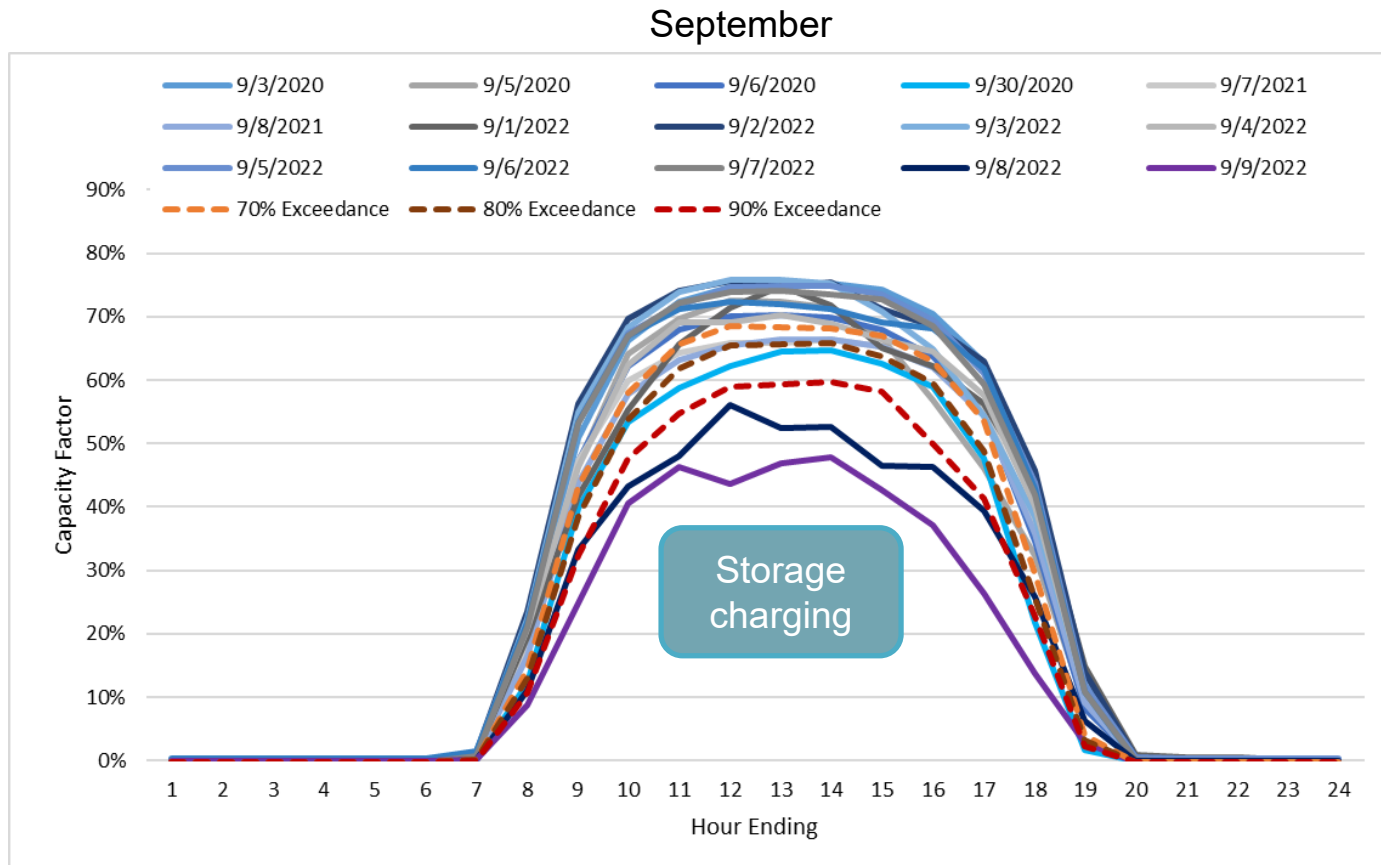
CPUC Workshop
October 6, 2022

Background

- Party exceedance proposals to date:
 - PG&E – 70% exceedance for wind and solar
 - CalWEA – 50% exceedance for wind using effective net load reduction data
 - Pattern/ACP – average of worst day profiles for existing wind; synthetic IRP data for new wind
 - SEIA – 50-60% exceedance for solar
 - NRDC – average worst day profiles for solar and wind

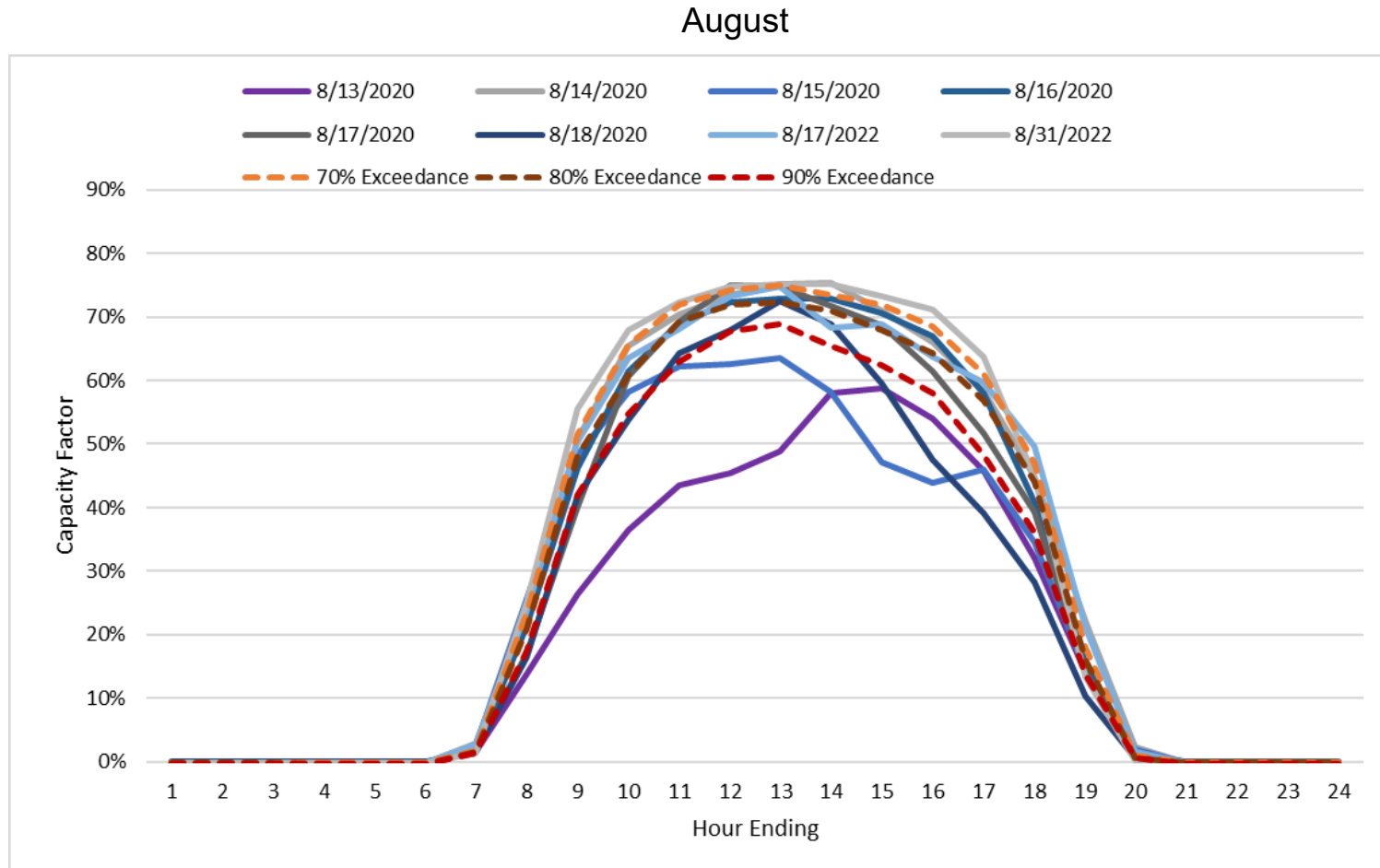
Exceedance analysis on stressed system days

- Stressed system day – day where CAISO issued a Flex Alert or emergency notification
- Solar stressed day production compared to 70%, 80%, 90% exceedance



Exceedance analysis on stressed system days

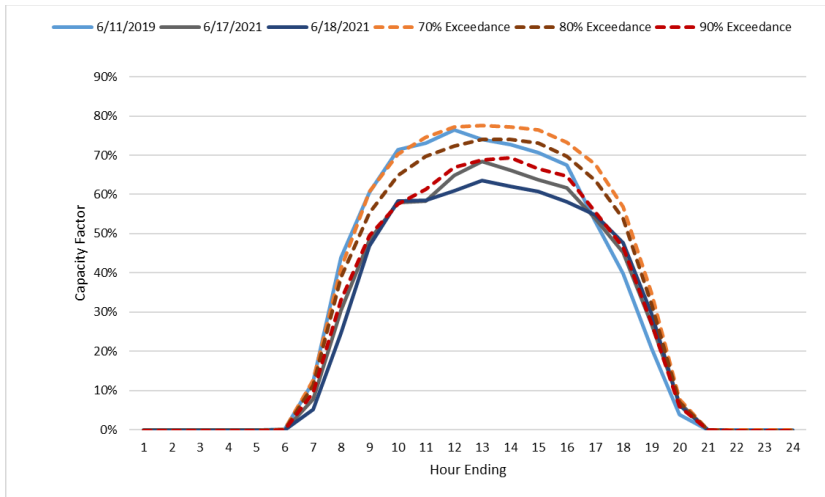
- Solar stressed day production compared to 70%, 80%, 90% exceedance



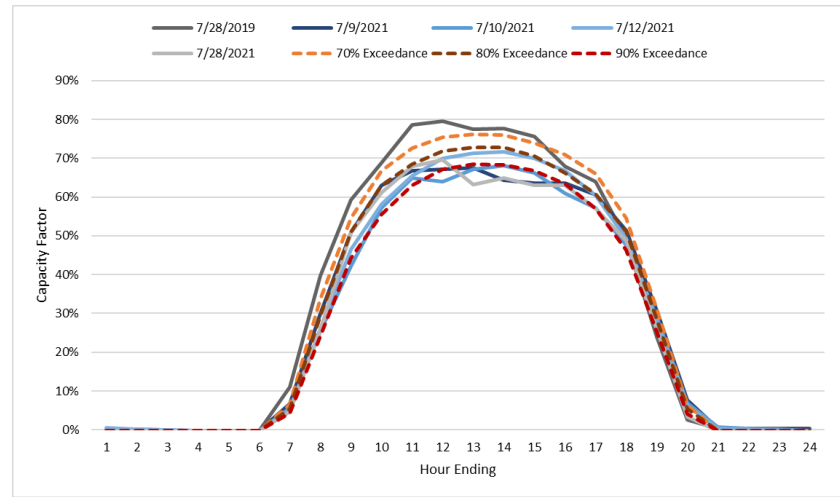
Exceedance analysis on stressed system days

- Solar stressed day production compared to 70%, 80%, 90% exceedance

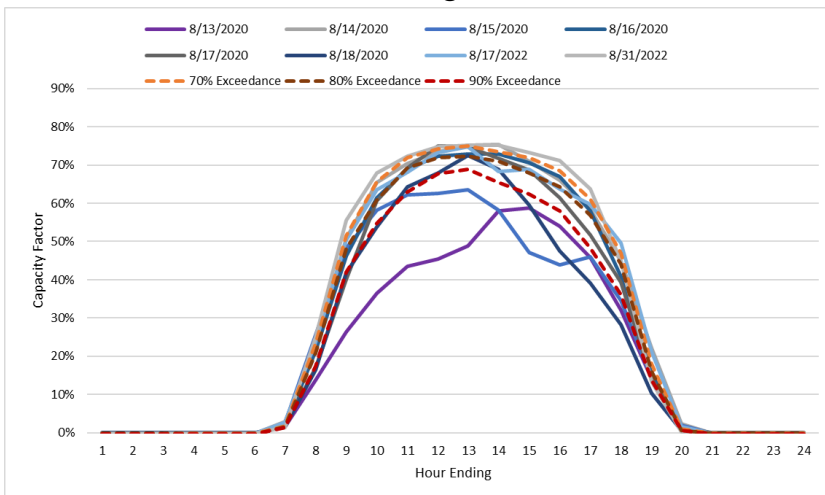
June



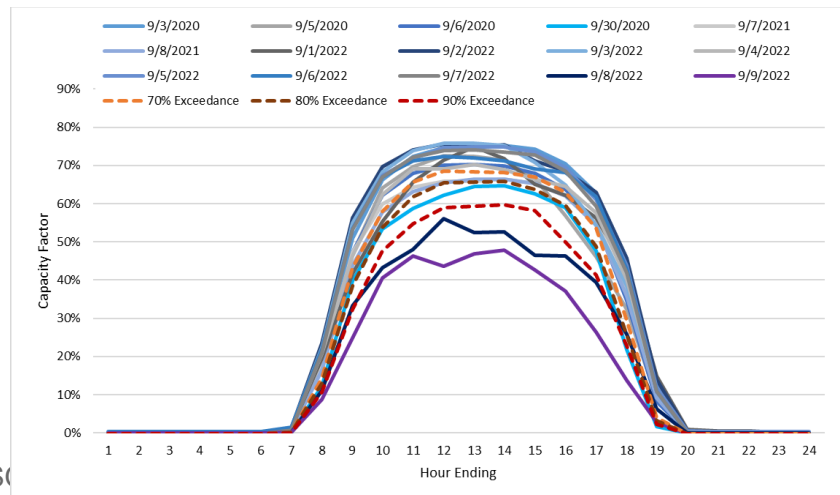
July



August



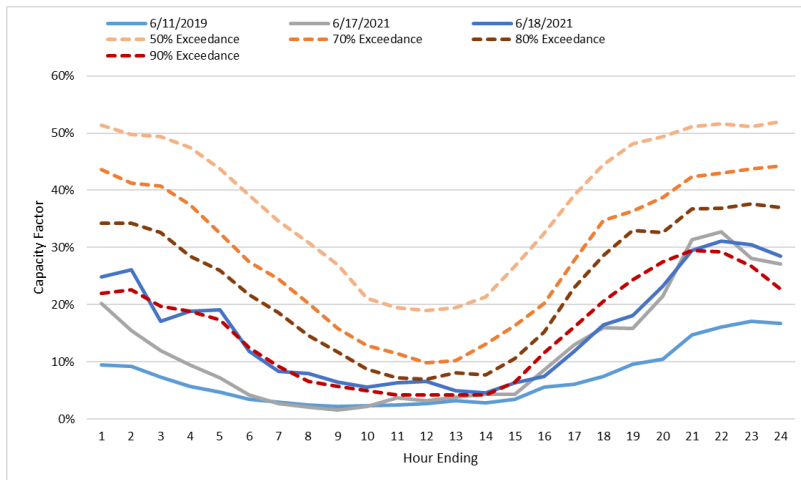
September



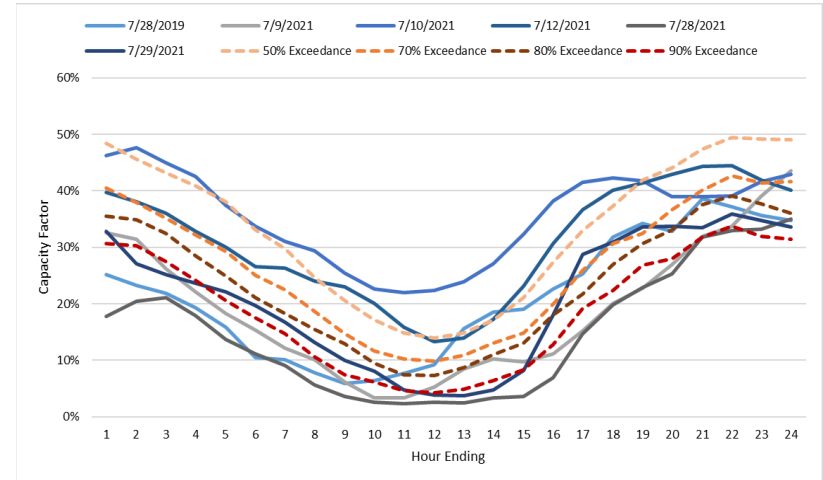
Exceedance analysis on stressed system days

- Wind stressed day production compared to 50%, 70%, 80%, 90% exceedance

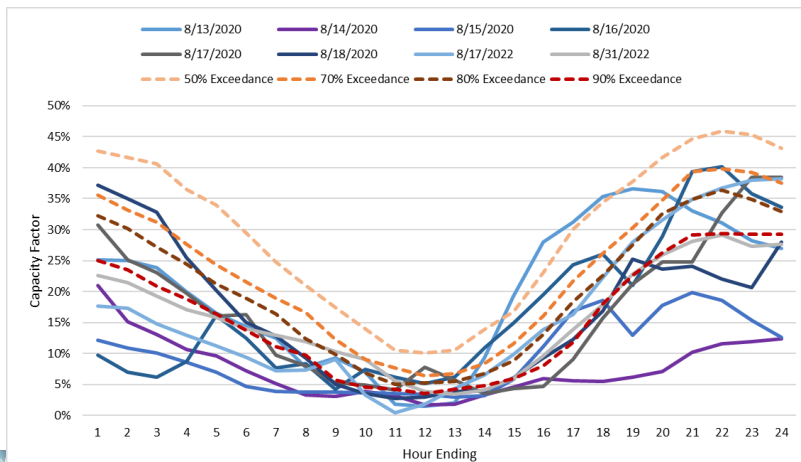
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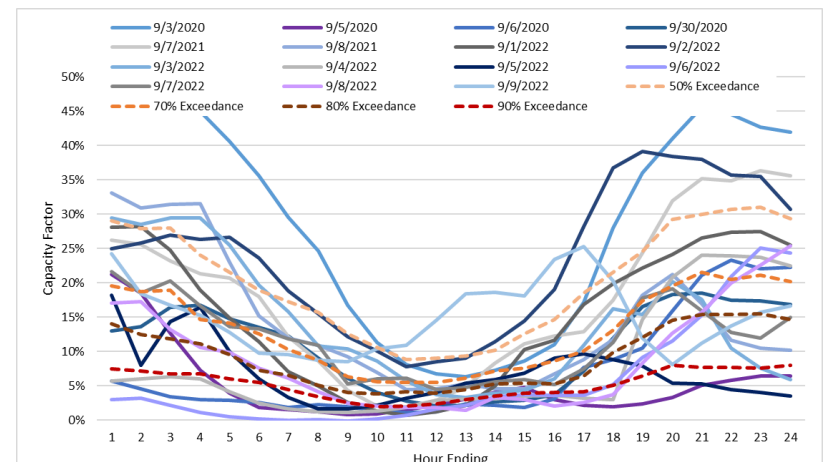
July



August



September



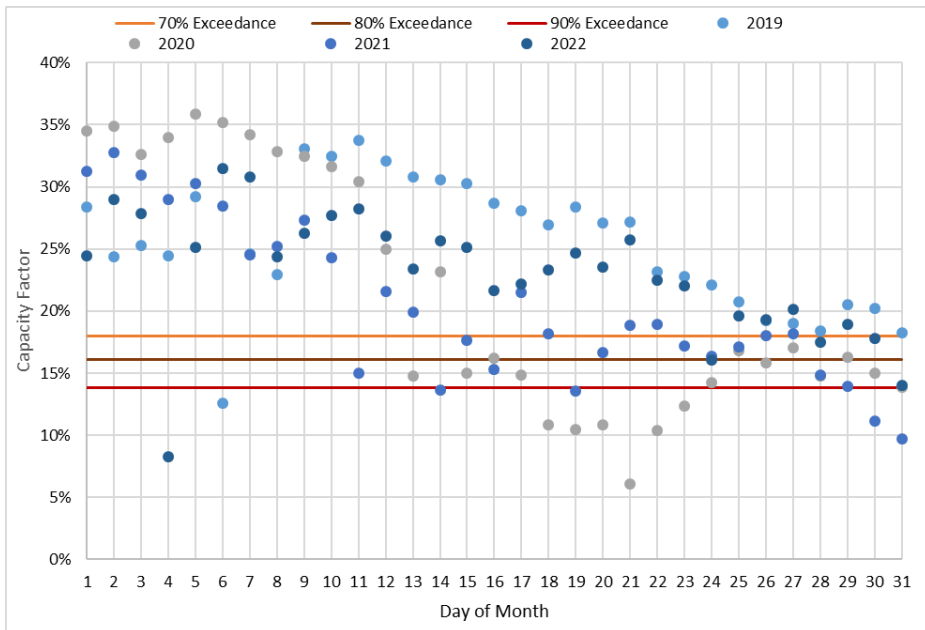
Exceedance analysis on stressed system days

- 70% and 80% wind and solar exceedance did not cover production during several hours on past stressed system days
- Prolonged heatwaves in August 2020 and September 2022
- Not captured by 90% exceedance:
 - Low solar production on 8/13/2020, 8/15/2020, 9/8/2022 and 9/9/2022
 - Low wind production on 8/14/2020, 8/17/2020, and 9/5/2022

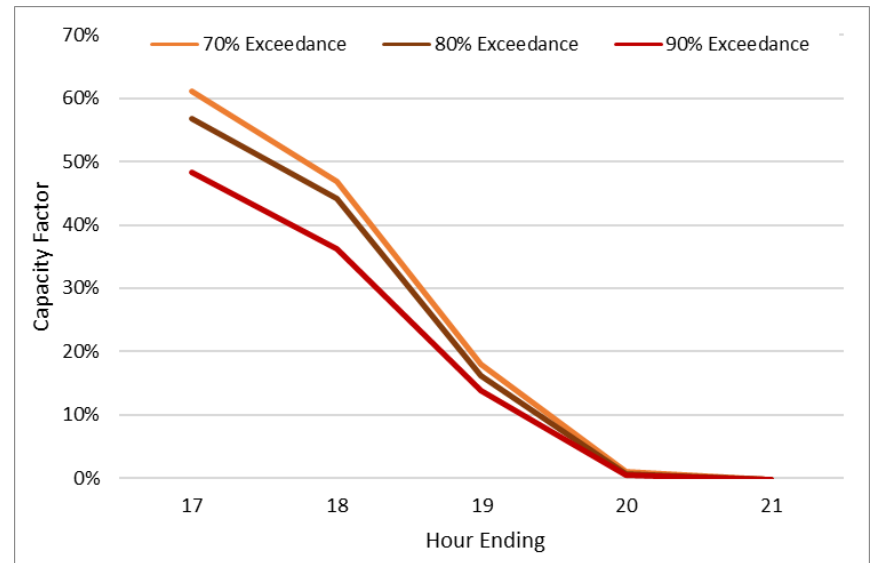
Solar production across months and hours

- Across the month - Solar production in hour 19 (net peak) drops off through the month of August
- Across hours and within the hour - Solar production drops off quickly across hours and within the net peak hour as the sun sets
- Simple averages across the month or hour could leave the system short at the end of August or at the end of an hour where solar ramps off quickly

HE 19 for all days in August (2019-2022)



August HE 17 to HE 21 (2019-2022)



Discussion

- The relationship between counting rules and PRM is critical to ensure reliability
- For example, based on the NRDC PRM Translation Tool, lowering exceedance for wind and solar increases the PRM
 - The resulting changes to the September PRM are:

Exceedance Change	PRM Delta	PRM MW Delta
90% → 80%	+1.7%	+850 MW
80% → 70%	+1.5%	+800 MW

- Critical to ensure the PRM adjustment also covers storage charging needs

Discussion on exceedance

- Challenges that support more conservative exceedance values:
 - Stressed system days may have much lower renewable production
 - During August when load is high, solar production drops off through the month and very quickly across hours and within the net peak hour
 - Reliability value shifts to ensuring renewable-paired storage will be sufficiently charged, especially if storage can only charge from its paired renewable, and is critical in both summer and non-summer months as the storage fleet grows
 - If exceedance values are based on forecast or production data with curtailments added back in, more conservative counting could better account for actual production when wind and solar is subject to curtailments
 - Although a relationship exists between the PRM and exceedance values, establishing the PRM is complicated and may be adjusted to consider other factors, dampening the direct relationship between PRM and exceedance values

Discussion on planning reserve margin

- Topic: Use of a single PRM based on the peak hour could surface loss of load events across the rest of the year
 - Is it reasonable to accept that a PRM based on the peak load hour in the year is sufficient for the rest of the year?
 - The RA program must meet reliability standards across the entire year
- Topic: Reliance on non-RA resources in non-summer months is implicit in relying on a PRM determined based on the peak (summer) load
 - It is likely that not all resources in the annual portfolio will be contracted or shown outside of the peak month
 - Does CAISO lose access to must offer obligations on resources necessary to meet reliability outside of the peak month?
 - Does an annual PRM based on a single month impact generator fixed cost recovery?
- Topic: Does a single annual PRM and related issues erase the added precision that slice of day reform intends to capture?