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Middle River Power LLC Comments on July 8 and 9 Workshops

Additional submitted attachment is included below.

July 23, 2021

California Energy Commission
Docket Unit, MS-4
Docket No. 19-SB 100
1516 Ninth Street
Sacramento, California 95814-5512

Via electronic submittal

Re: Middle River Power LLC Comments on July 8 and 9, 2021 Summer 2021 Electric Reliability and Natural Gas Reliability, Docket No. 21-IEPR-04

Dear Docket Unit, Commissioners and Commission Staff:

Middle River Power LLC ("MRP") is pleased to submit these comments on, and responses to questions posed in, the July 8 and 9 Integrated Energy Policy Report Joint Agency Workshop on Summer 2021 Electric and Natural Gas Reliability.

Introduction

MRP owns approximately 2 GW of natural gas-fired generation operating within the bulk power system under the operational control of the California Independent System Operator Corporation ("CAISO"). MRP has developed and is currently deploying with the current owners two battery energy storage systems ("BESS") totaling 110 MW and a 100 MW solar photovoltaic system at or connecting into the same interconnection facilities at MRP-owned generating plants; these projects, which are slated to come on-line in 2021, will help ease California's current capacity challenges.

Comments

MRP commends the joint agencies for a thorough and illuminating set of analyses, which show that, in the future.

Responses to Questions

MRP replicates the questions posed in the workshop in blue Calibri font.[1] MRP's responses are in black Times New Roman font.

MRP first responds to the key questions regarding the proposed studies from the workshop.[2]

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[1] The reference to slides is a reference to the slide numbers from TN238735, *Presentation – Multi-Year Reliability Scope, Inputs and Assumptions* ("Multi-Year Reliability Presentation", available at https://efiling.energy.ca.gov/getdocument.aspx?tn=238735.
[2] Multi-Year Reliability Presentation at slide 2.

Key Study Questions

- Is additional capacity beyond current procurement orders needed to meet the standard LOLE of 1 day with unserved energy every 10 years, or 0.1days/year?
  - If so, how much and when?

The implied question underlying these questions is: does the procurement directed in the current procurement orders[3] result in a system resource mix that meets the 0.1 Loss of Load Expectation (LOLE) metric? The need for additional procurement seems obvious given the blackouts that occurred in August 2020. However, MRP submits that the answer to that question is not yet known, because the procurement directed in those orders was not supported by any LOLE analysis. The stack analysis performed by the Energy Division simply added net qualifying capacity (NQC) values to meet an RA requirement of forecasted load plus a 15 percent planning reserve margin (PRM). MRP recommends the Commission to first perform a robust LOLE analysis to determine whether the supply mix, accounting for new expected generation and retirements of existing generation, meets the 0.1 LOLE standard. MRP looks forward to this analysis finally answering the question of whether the current procurement directives meet the 0.1 LOLE metric; that question must be answered before the question of whether additional procurement is required can be answered.

Whether the procurement directed in the current procurement orders meets the 0.1 LOLE will depend on the resource mix that is assumed to satisfy the procurement orders.

The procurement directed in recent CPUC decisions is shown below:

Once-Through Cooling Extensions requested in D.19-11-016[4]

Facility	MW	To
Alamitos Generating Station	~1200 MW	Up to 12/31/2023
Huntington Beach Generating Station	~200 MW	Up to 12/31/2023
Redondo Beach Generating Station	~850 MW	Up to 12/31/2023
Ormond Beach Generating Station	~1500 MW	Up to 12/21/2021
TOTAL	~3750 MW	

Procurement directed by D.19-11-016[5]

Product: incremental RA capacity (NQC) by	Total %	Incremental MW
8/1/21	50%	1650 MW
8/1/22	75%	825 MW
8/1/23	100%	825 MW
TOTAL		3,300 MW

[3] CPUC Decisions D.19-11-016, 21-03-056 and D.21-06-035.
[4] D.19-11-016 at page, OP 1.
[5] D.19-11-016 at page 3, OP 3.

Procurement directed by D.21-03-056

	MW
Modifications to Critical Peak Pricing programs[6]	
Emergency Load Reduction Program[7]	
Modifications to SCE Existing DR Programs[8]	
Modifications to PG&E Existing DR programs[9]	
Modifications to SDG&E Existing DR programs[10]	
Modifications to the Planning Reserve Margin[11]	
Additional Capacity Procurement[12]	

Procurement directed by D.21-06-035:[13]

Procurement Category	**2023**	**2024**	**2025**	**2026***	**Total**
Zero-emissions generation, generation paired with storage, or demand response resources, required *by* 2025, not necessarily in 2025**	-	-	2,500	-	2,500
Firm zero-emitting resources*	-	-	-	1,000	1,000
Long-duration storage resources*	-	-	-	1,000	1,000
Total annual capacity requirements	**2,000**	**6,000**	**1,500**	**2,000**	**11,500**

**LSEs may request an extension by February 1, 2023 up to 2028 for the LLT resources.*

*** The zero-emissions resources required to replace Diablo Canyon must be procured by 2025, but may occur in any of the years 2023-2025; therefore, the columns do not add to the total.*

The amount of incremental procurement directed in D.19-11-016 and D.21-06-035, while all denominated in NQC MW, could be supplied by different technologies with very different operating characteristics and limitations. As a result, different portfolios with very different system impacts yielding different LOLEs all could be deployed to satisfy these generic procurement targets. Moreover, the additional resources that may need to be deployed in addition to these procurement directives to meet the 0.1 LOLE metric will be different depending on what portfolios are assumed to satisfy the initial procurement directives.

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[6] *See* Attachment 1 to D.21-03-056 ("Attachment 1") at pages 2-3. This attachment is available at https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M373/K973/373973362.PDF.
[7] Attachment 1 at pages 3-16.
[8] Attachment 1 at pages 17-18.
[9] Attachment 1 at pages 18-19.
[10] Attachment 1 at pages 19-20.
[11] Attachment 1 at pages 20-21.
[12] Attachment 1 at pages 21-23.
[13] D.21-06-035 at page 48.

In sum, whether and to what extent the procurement already directed meets the 0.1 LOLE metric, and whether and what types and amounts of additional capacity may be required to meet the 0.1 LOLE metric, will depend on the mix of resources assumed to satisfy these procurement directives. Moreover, it is important that the LOLE analysis accurately models the operating characteristics and limitations or the projected new resource buildout; otherwise, the results would project a more reliable system than what would be determined using realistic resource models.

- If so, does new incremental gas capacity improve reliability compared to a portfolio of new preferred resources with equivalent NQC values?

MRP is not aware of any reliability metric that would not show that deploying dispatchable, duration-unlimited gas capacity improves reliability relative to the deployment of the same NQC amount of variable, use- or duration-limited preferred resources. Current NQC methodologies value the reliability contributions of duration-limited resources (e.g., four-hour battery energy storage) similar to how the reliability contributions of duration unlimited resources (e.g., fossil fuel resources) are valued. By failing to account for duration, the resulting NQC values fail to distinguish the true reliability contributions of these resources. To make this question useful for informing procurement directives, the corollary questions that should be asked are:

  - How much preferred resource nameplate capacity must be built to yield the same NQC amount of incremental gas capacity? and
  - How much will that resource buildout cost compared to the equivalent amount of NQC and duration that is provided by a natural gas resource?

Six sets of four-hour resources whose NQC values are independent (i.e., the NQC in one "slice" does not depend on the resource operating in a particular way in a different "slice") can provide reliability comparable to a single duration-unlimited natural gas resource. Such portfolios, however, may have very different costs, and the Commissions must also consider affordability as California seeks to ensure reliability while also transitioning towards a cleaner grid. It may be more cost effective to hybridize the existing fossil fleet with energy storage to reduce emissions and keep overall costs down while preserving the capacity and energy duration of the existing thermal resource, while focusing new build mandates on zero-emitting resources rather than new fossil resources.

MRP now responds to other questions posed during the workshop.

Demand Response Questions[14]

- What is the best way to characterize demand response in the model?
- What dispatch restrictions should be placed on demand response?
  - No more than X hours in a year, month, day, or consecutively?
  - Energy limitations?

[14] Multi-Year Reliability Presentation, slides 5 and 16.

- Should the use of demand response by the model in peak hours result in increased load during other hours? If so, when and how much?
- Should uncertainty related to DR be incorporated into the model? If so, how?

Currently, several factors are prompting the re-evaluation of DR as a reliability tool. First, while no resource performed perfectly during the August 2020 stage 3 rolling blackout events, DR's performance during these events was among the worst as chronicled in the joint agency Final Root Cause Analysis ("FRCA").[15] Second, in response to the CAISO's recommendation that DR capacity value be set using Effective Load Carrying Capability ("ELCC") analysis, the CPUC has requested that the CEC develop recommendations for a comprehensive and consistent DR measurement and verification strategy, including a new methodology for assigning Qualifying Capacity ("QC") values to DR.[16]

Given the current uncertainty surrounding the reliability value of DR, the Commission is right to ask questions as to how DR should be included in models used to assess reliability. But, given that the process for assigning capacity values to DR is just underway, and not expected to provide recommendation until Q2 2022, DR should be modeled in a conservative way in any studies conducted before then to ensure that its true reliability contribution is not overstated.

DR uncertainty should be addressed by (1) assigning DR a conservative capacity value – a value which affords a very high probability that the DR will show up when dispatched, and (2) accounting for customer and performance fatigue, such that either DR is dispatched a limited number of events and hours over the course of a year, or, that the DR performance is appropriately discounted if the DR is dispatched over a given number of events over a given period.

Imports Questions[17]

- How should imports be included in the analysis?
- Options:
  - Historic RA showings
  - Historic economic imports
  - At what level (min, max, mean, median)
  - Something else
- Should availability of imports change through the study horizon? If so, how?

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[15] *See* California ISO, California Public Utilities Commission and California Energy Commission January 13, 2021, Final Root Cause Analysis Mid-August 2020 Extreme Heat Wave ("RCA") at pages . This report is available at http://www.caiso.com/Documents/Final-Root-Cause-Analysis-Mid-August-2020-Extreme-Heat-Wave.pdf. See also California ISO Department of Market Monitoring Report on System and Market Conditions, issue and performance: August and September 2020, at pages [ ]. This report is available at http://www.caiso.com/Documents/ReportonMarketConditionsIssuesandPerformanceAugustandSeptember2020-Nov242020.pdf.

[16] CPUC D.21-06-029 at OP 11. The CEC launched this process on July 19, 2021.

[17] Multi-Year Workshop Presentation, slides 7 and 17.

- Should uncertainty related to imports be incorporate into the model? If so, how?

For decades, the Western Interconnection collectively, and regions within that footprint individually, enjoyed a surplus of capacity. This surplus enabled and promoted capacity sharing that took advantage of seasonal diversity (i.e., the Desert Southwest providing capacity or surplus energy to the Pacific Northwest during the winter, and the Pacific Northwest providing capacity or surplus energy to the Desert Southwest during the summer. Load serving entities and regulators could generally rely on such seasonal surplus to bolster their resource adequacy programs, and there seemed little need to robustly test or validate assumptions regarding the availability of import supply. That has all changed. Extreme weather, such as the early summer heatwaves experienced by the Pacific Northwest just weeks ago in mid-June, coupled with the accumulated retirement of fossil-fuel capacity, now makes it dangerous for any region to assume they can tap into another region's capacity or energy surplus, because those surpluses are now gone.

As a result, using historic levels of import energy, or even historic levels of RA imports, may, and almost certainly will, overstate the availability of imports on a going-forward basis.

The increasingly tight supply within California and across the Western Interconnection surface a new issue - the potential for energy and capacity from resources within California to be exported to other regions within the West. This issue arises from two new supply/demand fundamentals. First, California's development of nearly 25 GW of grid-connected and behind-the-meter solar and the solar surplus that is available across the afternoon hours during the lower demand months now means that California now is a net exporter of power many hours a year.[18] Moreover, as very high prices experienced last August demonstrated, other regions within the West are willing to pay to secure power from within California when conditions warrant. Consequently, as California considers issues related to importing power, it should bear in mind the additional demand that the West is placing on power generated within California, and evaluate net imports, not just gross imports, in its analyses.

MRP offers the graphs of CAISO data to demonstrate these points. The first graph, Figure 1, shows, from 2011 through 2021, the level of net import energy during the hour in which the monthly ***net*** peak demand occurred. While there is a substantial (more than 4 GW) variation across the years during the summer months, both 2020 and 2021 show a significant decrease from the historical trends.

[18] CAISO hourly data indicates that the CAISO was a net exporter 125 hours in 2019, 94 hours in 2020, and 254 hours in 2021 through July 21.

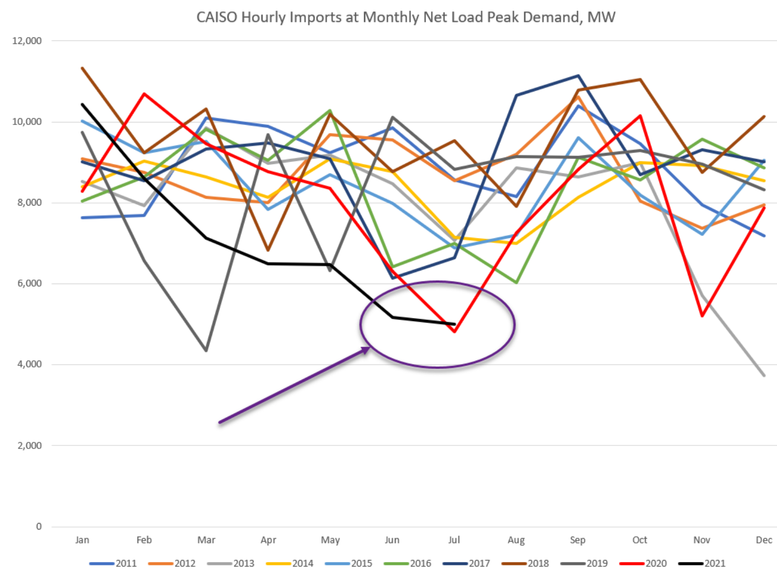

Figure 1- CAISO Hourly Imports at the Time Of Monthly Net Load Peak Demand

The same data presented for the monthly ***gross*** demand peak shows an even more surprising result for 2021:

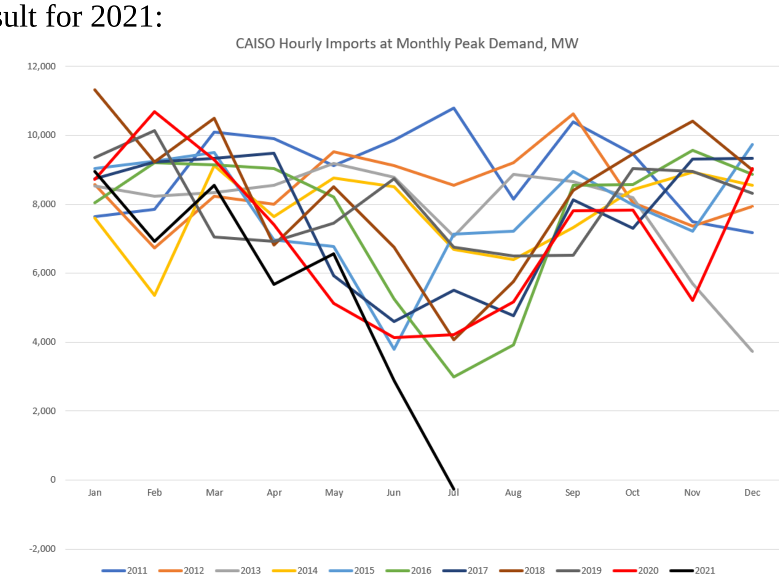

Figure 2 - CAISO Hourly Imports at the Time Of Monthly Gross Load Peak Demand

On Friday, July 9, 2021, the Bootleg fire in Southern Oregon threatened the California-Oregon Intertie and forced that transmission line, as well as the parallel Pacific DC Intertie, to be de-rated. As a result, during the gross load peak demand on July 9, the CAISO was a net **exporter** of power – a highly unusual, if not unprecedented, happening.

While the July 9 event may be anomalous due to the concurrent wildfire, the potential for wildfires to compromise the ability to import power, coupled with the tightening supply conditions in the West, offer that it would be irresponsible to incorporate into the analysis anything other than conservative assumptions about the availability of import supply.

The Western Electricity Coordinating Council's ("WECC's") recent resource adequacy report recommends coordinating resource planning efforts on an interconnection-wide basis to ensure that entities are not all relying on the same imports from other Balancing Authority Areas to maintain resource adequacy.[19] Consequently, the availability and reliability of California import supply should be determined using a west-wide supply-demand balance that appropriately factors in the potential unavailability of import transmission.[20]

In sum, MRP recommends that the Commission evaluate west-wide supply/demand conditions to determine a reliable level of California net imports. If that is not possible, the Commission should use conservative forward levels of contracted RA net imports, not spot market energy net imports, to develop the import assumptions.

Wind, Solar and Hydro Questions[21]

- Should solar and wind weather years be linked to each other or demand?
- Should historic profiles or artificially generated solar and wind shapes be used?
- How should hydroelectric generation be modeled?
- Options:
  - Monthly NQC value, with no restrictions on generation up to that capacity.
  - Historic average fixed shape.
  - Distribution of historic profiles to account for uncertainty.
    - Should these profiles be linked to wind and solar weather years?

California's increasing dependence on variable resources[22] also increases the importance of modeling these resources in a way that does not overstate their reliable contributions to electric system reliability. In August 2020, the CAISO initiated rolling blackouts not across the *gross* load peak (which occurs in the late afternoon while solar generation is still robust) but across the *net* load peak, when solar generation is greatly reduced. The two days during which the CAISO implemented rolling blackouts in August 2020 also demonstrated how much CAISO solar can vary from day to day, as shown in the graph below (in this case, due primarily to smoke resulting from lightning-caused wildfires).

[19] *See* WECC December 18, 2020 *The Western Assessment of Resource Adequacy Report*, Recommendation 3, at pages 4-5. This report is available at https://www.wecc.org/Administrative/Western%20Assessment%20of%20Resource%20Adequacy%20Report%2020201218.pdf.
[20] Reduced import capability from the Pacific Northwest played a role in the August 2020 rolling blackouts. *See* the FRCA, page 48.
[21] Multi-Year Workshop Presentation, slide 8 and 18.
[22] Per http://www.caiso.com/informed/Pages/CleanGrid/default.aspx, as of April 11, 2021, 14,106 MW of solar and 6,952 MW of wind resources were interconnected to the CAISO-controlled grid. Additionally, per https://www.californiadgstats.ca.gov/, through April 30, 2021, 10,640 MW of distributed solar generation has been installed.

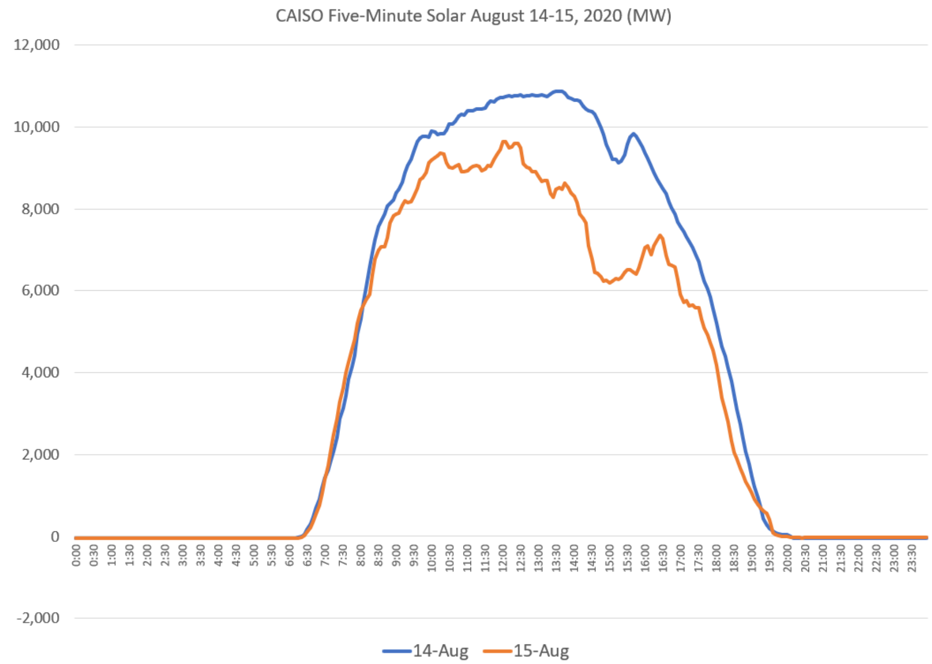

Figure 3 - CAISO Five-Minute Solar from August 14 and 15, 2020

The events of August 2020 also demonstrate how sudden changes in wind output can detrimentally affect system operations. The FRCA noted that a sudden decrease in wind output, as shown in the graph below, factored into the sequence of events on August 15.[23]

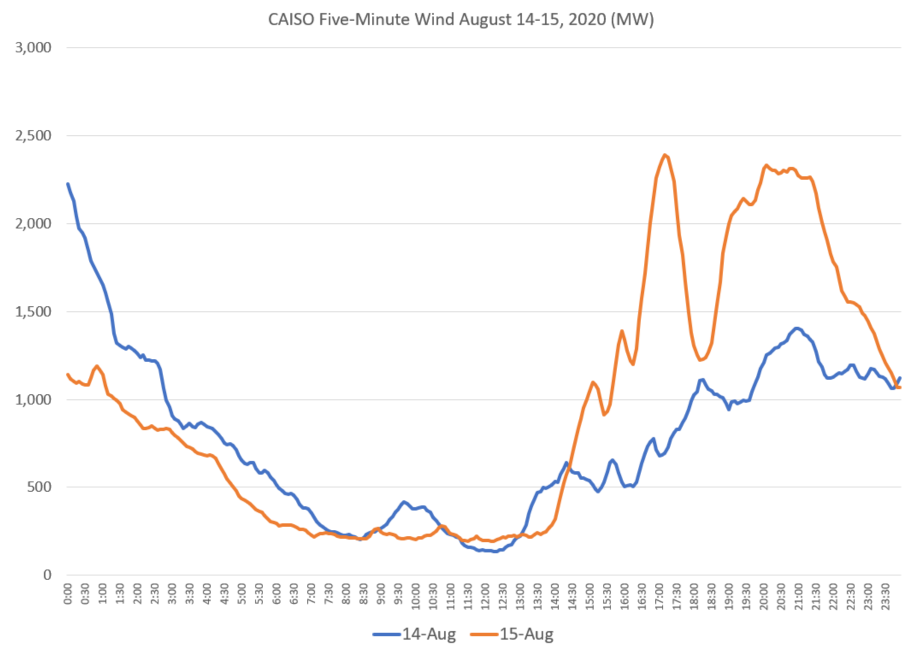

Figure 4 - CAISO Five-Minute Wind from August 14 and 15, 2020

[23] See FRCA at pages 30-31, 49-50.

No matter how wind and solar profiles are established, either by using history-informed profiles factoring in projected increases in capacity, or by some other approach, failing to fully account for these resources' intra-day and day-to-day variability will cause their contribution to reliability to be overstated.

With regards to hydro, while the potential moment-to-moment variability of these resources is not as severe as of solar and wind, there is significant year-to-year and month-to-month variability. The graph below shows total hydro production (MWh) by month from 2011 through last month:

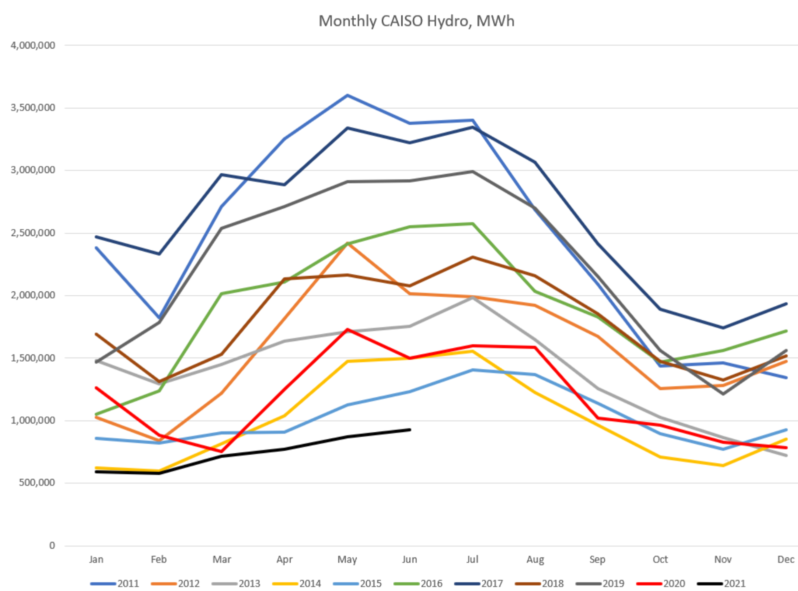

Figure 5 - Monthly CAISO Hydro Production (MWh)

As this graph shows, there is a wide variation (six to one) in monthly total hydro production. A different measure of hydro's contribution to reliability, hydro production in the hour of system peak or net load peak, also shows a wide variation, though not as wide a variation as in monthly total energy production:

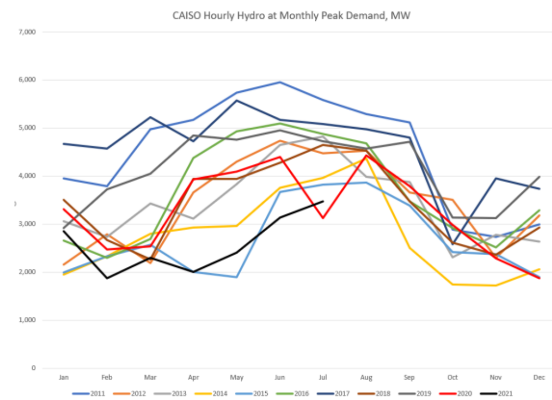

Figure 6 - CAISO Hourly Hydro at Time of Monthly Peak Demand (MW)

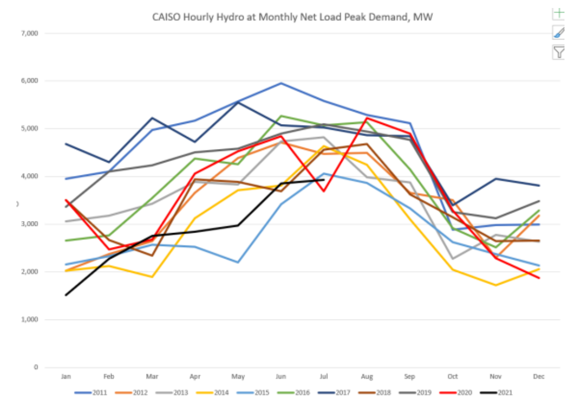

Figure 7 - CAISO Monthly Hydro at Time of Monthly Net Load Peak Demand (MW)

Finally, while it is not a variable resource *per se*, given the expected rapid increase in the deployment of battery energy storage,[24] the analysis must account for this expected deployment, including providing for reliable charging of these resources (e.g., it might be overly optimistic to assume that there will always be surplus solar available for charging).

In sum, to account for these resources' variability, and to ensure these resources' reliability values are not overstated, any analyses should use conservative assumptions about their dependable reliability contributions.

Forced Outages Questions[25]

- Should forced outages be applied to other technology types?
    - Forced outages are incorporated into profile shapes for wind and solar.
- Should more specific technology types be used?
- What forced outage rates should be used for each technology?
- What average outage duration should be used?
- If an estimated standard unit size is used, what should it be for each technology type?

Any stochastic analysis should incorporate rational forced outage rates and durations for all resources. MRP notes that while California will continue to rely on the natural gas fleet to ensure reliability for the foreseeable future, recent changes to CAISO rules (such as requiring substitution for all planned outages) and tightening supply conditions will make it increasingly difficult and expensive for thermal resources to take necessary maintenance and recover those costs through short-duration RA contracts.

[24] The CAISO's interconnection queue now includes approximately 144 GW of battery energy storage, either as a standalone resource or as part of a hybrid configuration. *See* CAISO July 15, 2021 presentation *Briefing on renewable and energy storage in the ISO generator interconnection queue* at slide 4. This presentation is available at http://www.caiso.com/Documents/Briefing-Renewables-Generator-Interconnection-Queue-Presentation-July-2021.pdf.

[25] Multi-Year Workshop Presentation, slides 10 and 19.

Additionally, with regards to incorporating forced outage rates for wind and solar, the analysis should transparently and quantitatively demonstrate how forced outages are incorporated into wind and solar profiles, not simply assert that they are.

Planned Resource Build:[26]

- What resource mix should be used when adding capacity to meet the ordered procurement from all outstanding procurement orders?
- For hybrid resources, what should be the ratio of energy storage and generation capacity?
  - Should this be different for wind, solar, etc.?
- Is it reasonable to expect significant capacity will come online prior to the required dates?

As noted above, the resource mix assumed will greatly affect LOLE and PRM calculations. For this reason, it is probably necessary to build several "bookend" portfolios that lean heavily towards particular types of resources (such highly variable, or use-limited or energy-limited resources on the one hand, and thermal resources on the other) in order to "bracket" a series of potential procurement outcomes. Once the Commission selects a portfolio mix, it must re-run its analysis to ensure that its future portfolio mix still meets the 0.1 LOLE standard. If the results of the chosen mix maintains reliability, then the Commission should order procurement that fits that mix, otherwise, additional resources must be added and restudied.

For hybrid systems, "right-sizing" the ratio of energy storage and generation capacity requires looking at a complex array of affecting variables, including overall portfolio mix, variable generation type and specific project inverter loading ratios.

Finally, it is not reasonable to expect capacity to come on-line sooner than the required dates, especially in the near- to mid-term. Supply chains recently disrupted by the COVID-19 pandemic may, for various reasons, remain stretched for years to come. Adding increased pressure to already-strained supply chains will increase costs and jeopardize the California's ability to meet its procurement targets.

Next Steps:[27]

- Please include sources, rational, and numbers in your response to the stakeholder questions.

The graphs included in these comments use data taken from the CAISO's web site – http://www.caiso.com.

- Hourly data comes from the "Daily Renewables Watch" section of this CAISO web site page: http://www.caiso.com/market/Pages/ReportsBulletins/RenewablesReporting.aspx.

[26] Multi-Year Workshop Presentation, slides 12 and 20.
[27] Multi-Year Workshop Presentation, slide 13.

- Five-minute supply data is taken from this CAISO web page: http://www.caiso.com/TodaysOutlook/Pages/supply.html.

- Are there things we need to consider as we develop this analysis?

MRP offers the following list of other considerations for the analyses:

First, the analyses must consider how building and transportation electrification will affect future electric demand.

Second, extreme weather events require looking more at "tail events", not average (1-in-2) operating conditions. Moreover, the studies should factor in how extreme weather affects both supply and demand.

Third, the process for preparing and conducting the analyses should allow an opportunity to comment on study design and inputs before the analyses begin.

Fourth, the studies should cover a range of scenarios or potential inputs (such as extreme weather, electrification demand, and technology costs).

Finally, forward-looking analyses focused on new procurement that assume, but do not ensure, that needed existing resources are procured to serve California load over the same time horizon may be dubious value. A necessary adjunct to far-reaching procurement of new resources is to create a structure that ensures the cost-effective retention of existing resources over the same time horizon. This is especially important now that west-wide capacity surpluses are dwindling and California finds itself competing more intensely with other regions to secure resources adequate to reliably serve its demand.

Comments on Other Workshop Topics

Meeting California's decarbonization goals is a cost-effective manner warrants taking a holistic, economy-wide approach rather than focusing on just the electricity sector. The electric sector plays an outsized role in California's overall economy and should not be compromised by targeting carbon reduction only to that sector. According to the most recent data from the California Air Resource Board, in-state electricity generation amounts to 9% of overall California carbon emissions, and the electric sector overall amounts only to 15% of economy-wide carbon.[28] For 2018, wildfire carbon release (39.1 MMT) exceeds the GHG emissions from in-state generation (38.5 MMT). Given that the 2020 wildfire GHG emissions estimate (106.7 MMT) greatly exceeds the 2018 total emissions for the electric sector (63.1 MMT), it is highly likely that the 2020 wildfire

[28] See 2000-2018 GHG Inventory Data, available at https://ww2.arb.ca.gov/ghg-inventory-data.

emissions will also greatly exceed the 2020 electric sector GHG emissions when those numbers become available.[29]

As the discussion at the workshop noted, natural gas storage and diversity of supply allowed California, and PG&E in particular, to better weather Winter Storm Uri this past February. This reality must factor into in any Aliso Canyon analysis.

Finally, as noted above, California's procurement process (RA and IRP) must be better integrated, use consistent inputs and reliability requirements, and not focus on the procurement of new resources to the detriment of existing resources.

Conclusion

MRP again commends the Joint Agencies for the July 8 and 9 workshop and thanks them for the opportunity to provide these comments.

Respectfully submitted,

/s Brian Theaker

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[29] 2018 In-state GHG emissions are taken from: https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2018/2000_2018_ghg_inventory_trends_figures.xlsx. Wildfire GHG emissions are taken from https://ww2.arb.ca.gov/sites/default/files/2021-07/Wildfire%20Emission%20Estimates%20for%202020%20_Final.pdf.