New Models for Resource Adequacy

November 1, 2019 Workshop

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The Potential Problem/Issue

- **Goals:**
  - Ensuring reliability at least cost with a just-right sized system
  - Facilitating a least-cost transition to a reliable decarbonized electricity supply future

- **Potential Problems:**
  - A capacity framework may not yield the most efficient outcome of balancing the goals of reliability, least cost, and decarbonization (increasing reliance on preferred and use-limited resources)
  - Does a capacity construct send the right signals to the market to incentivize cleaner more cost-effective procurement that meets our energy needs?

Legislative History

- **Assembly Bill (AB) 1890 (Brulte, 1996**) – Deregulated the electricity market, aimed at reducing electricity rates; created the CAISO and the Power Exchange; "encouraged" the IOUs to sell off significant portions of their generation fleet; allowed customer choice.
- **AB 1X-1 (Keeley, 2001)** – Due to energy crisis, authorized the Department of Water Resources to enter into power purchase contracts.
- **AB 57 (Write, 2002)** – Established a regulatory framework with the three large IOUs resuming full procurement responsibilities and filing procurement plans with the Commission (including assessments of portfolio price risk, existing and proposed contracts, open positions to be served by the spot market transactions, etc.). Establishes least-cost-dispatch for IOUs. **However, these rules do not apply to CCAs and ESPs.**
- **SB 380 (Nunez, 2005)** – Added Public Utilities Code Section 380 which requires the Commission in consultation with the CAISO to establish RA requirements for all LSEs.
- **SB 350 (de León,2015)** – requires the CPUC to focus energy procurement decisions on reducing greenhouse gas (GHG) emissions by 40 percent by 2030, including efforts to achieve at least 50 percent renewable energy procurement, doubling of energy efficiency, and promoting transportation electrification. Requires LSEs to file IRP plans showing resource procurement. No forward fixed price energy requirement.

RA Framework Based Capacity (Not Energy)

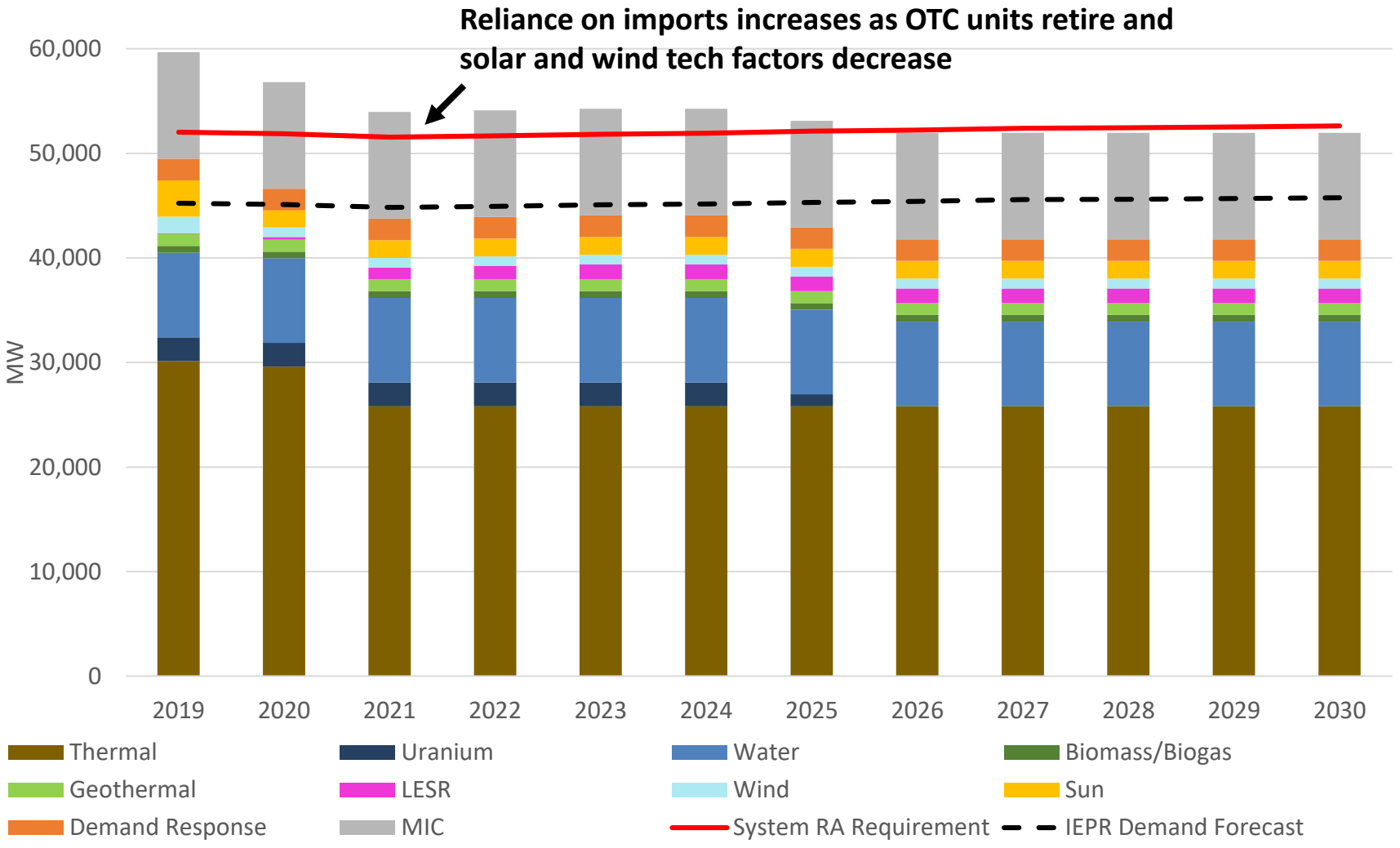
- RA Capacity is only subject to a Must-Offer-Obligation (MOO) into the CAISO markets. That MOO does not dictate the price that that resource must bid. **Energy price bid cap is currently set at $1,000/MWh but will be increased to $2,000/MWh pursuant to FERC Order 831 (Fall 2020).**
- Resources are provided a capacity revenue stream based on their estimated contribution to meeting peak system needs.
- Capacity construct assumes the energy market will be competitive- causing suppliers to offer their energy at marginal costs.
- CAISO has local market power mitigation but no mitigation for system market power. Local market power mitigation assumes the system price is competitive and does not work if it is not competitive.
- **LSE can choose to hedge these risks, however, there is no requirement that they do so. Only IOUs are subject to CPUC hedging requirements under AB57**

Reliance on Use-Limited Resources

- RA system requirements are based on peak load plus a planning reserve margin (these requirements do not look at the hourly needs of the system).
- The hourly needs of the system are partly addressed by some qualifying capacity methodologies and the MCC buckets.
- Qualifying capacity methodologies that use exceedance utilize historical data that looks at hours covering the Availability Assessment Hour window (4 pm – 9 pm). Therefore, the QC value account for hours before and after the peak. QC value for wind and solar is developed using the ELCC methodology, which look at the probability of load loss event over a number days and hours for each month (which include hours before and after peak).
- RA requirements are subject to the Maximum Cumulative Capacity (MCC) buckets which were established to prevent reliance on use-limited resources in meeting peak system needs (in 2013, a DR bucket was added, and the percentages were updated).
- These buckets do not directly apply to Local RA requirement.

Tightening Internal Supply

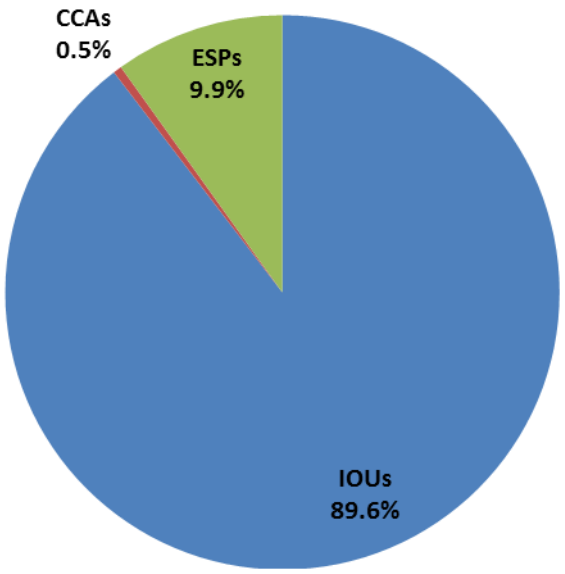
September Supply Stack (by Fuel Type) and System RA Requirement (1-in-2), 2019-2030



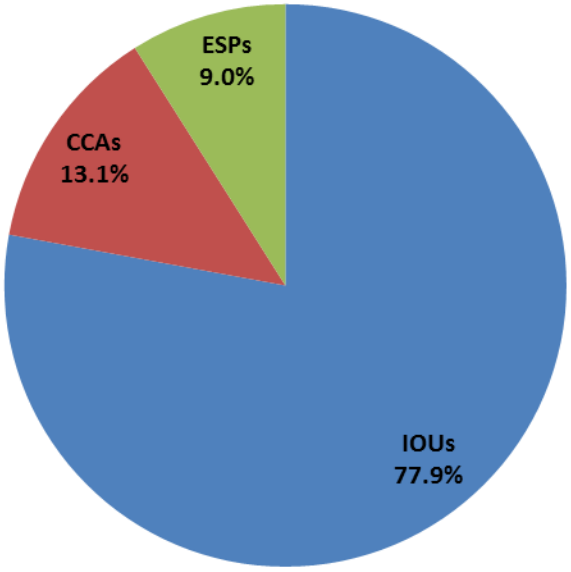
IRP R.16-02-007 June 20, 2019 Ruling Identifying Potential Capacity shortfall

CPUC Jurisdictional LSE Breakdown Growth in Community Choice Aggregation

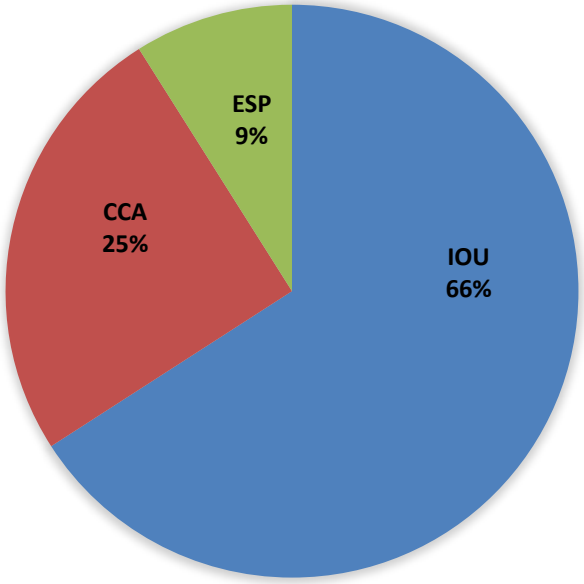
- In 2014 - 18 LSEs serving load (3 IOUs, 14 ESPs and 1 CCA)
- According to our 2020 year-ahead RA forecast 43 LSEs will be serving peak load (3 IOUs, 14 ESPs, 26 CCAs)
- SB 237 will increase Direct Access cap by ~1,000 MW of peak load



Based on **2014** year ahead load forecasts (MWs) from the CEC

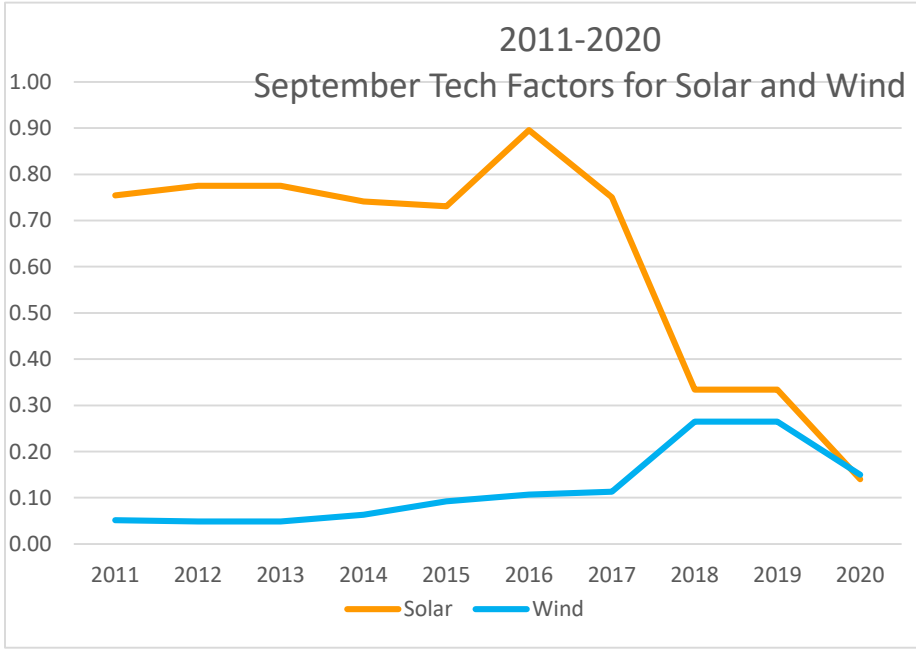


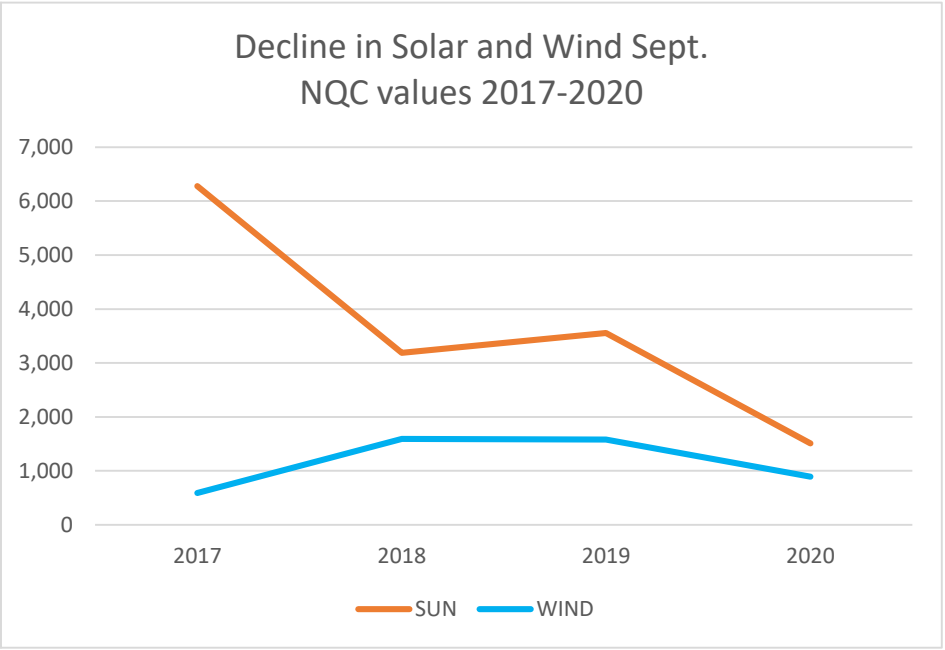
2018 CEC Aug. MA load forecast



2020 CEC YA RA load forecast

Declining Capacity Values for Solar and Wind





- Solar Values sharply declined with the implementation of Effective Load Carrying Capacity (ELCC) in 2018.
- ELCC factors were updated in 2020 leading to another sharp decline in solar values. Wind values were also impacted with this update.

Potential for System Level Market Power Increases Due to Market Trends

- Increasing portion of load being served by CCAs and, thus, more fragmented longer-term bilateral supply and procurement process previously undertaken by major IOUs under PUC guidance/jurisdiction.
- Tightening of internal supply
  - Retiring a significant gas capacity due to OTC requirements
  - Updating ELCC factors (required by law) reduce capacity value of wind and solar by over 50%.
  - Changing load forecast- Peak occurring in September rather than August reduces the value of solar and wind towards peak system requirements. Peak shifting to later in the day where solar has little to no value from an operational perspective
- Fewer energy tolling contracts/power purchase agreements between LSEs and gas units.
- More use-limited resources being relied on to meet RA capacity requirements (RA-only)
- Increasing portion of resource adequacy requirements met by imports not backed by energy contracts or physical resources. May change with the most recent RA import decision. (D.19-10-021)

Findings from DMM's 2018 Annual Report

- "Prices in the day-ahead market were significantly in excess of competitive levels in some hours when net load that must be met by gas-fired units is highest"

- "Market for capacity needed to meet local requirements is structurally uncompetitive in all local areas"

- Documented concerns about the way Proxy DR and imports RA resources were bidding into the CAISO markets

Potential Solutions

1) Revise the MCC Buckets to ensure that they reflect the current system needs and resource limitations (e.g. 4-hour storage) or move to a more granular hourly RA framework (LSE monthly load profiles)

2) Change the definition of RA to include a least-cost-dispatch or economic bidding provision

3) Move from a capacity RA framework to a fixed-price forward energy RA framework

Revise the MCC Buckets

- Update to reflect current load shapes
- Use a net load duration curve to establish buckets
- Assign hours to the buckets
- Cap Demand Response (DR) bucket consistent with its contribution to meeting reliability needs (currently there is no limit on DR)
- Make buckets binding to resource characteristics and contract limitations (to ensure resources are dispatched to meet reliability needs and do not bid at the cap)

Revise the MCC Buckets (cont.)

- Pros- Retaining existing capacity framework allows for implementation in a shorter timeframe, potentially ensures reliability with increased reliance on use-limited resources

- Cons- does not require economic bidding therefore may lead to higher energy costs and or reliability concern (bidding high and/or not showing up, does not address limitations in local areas

Add a Least-Cost Dispatch or Economic Bidding Provision to the RA product

- Least cost dispatch requirement would mean a Must Offer Obligation (MOO) into CAISO markets using least cost dispatch principles or a strike-price contract obligation

  - Pros - mitigates market power in the energy market, ensures structural competitive market

  - Cons - may lead to higher costs for RA, difficult to ensure compliance, will not address over-reliance on use limited resources

Fixed-Price Forward Energy Framework

- LSEs would procure fixed-price energy contracts rather than capacity contracts to meet RA requirements. Obligations could be based on monthly LSE load shapes.

  - Pros - qualifying capacity calculation would be eliminated, would address hourly system needs, could mitigate market power, could help ensure structurally competitive energy market, may help align State decarbonization goals with reliability goals

  - Cons - would require large changes to RA program including; penalty structure, conversion of existing capacity contracts to energy contracts, development of monthly RA requirements, ext.

Back up Slides

PU Code Section §380 (a),(c), and (d)

(b) In establishing resource adequacy requirements, the commission shall achieve all of the following objectives:

(1) Facilitate development of new generating capacity and retention of existing generating capacity that is economic and needed.
(3) Equitably allocate the cost of generating capacity and demand response in a manner that prevents the shifting of costs between customer classes.
(5) Maximize the ability of community choice aggregators to determine the generation resources used to serve their customers.

(c) Each load-serving entity shall maintain physical generating capacity and electrical demand response adequate to meet its load requirements, including, but not limited to, peak demand and planning and operating reserves. The generating capacity or electrical demand response shall be deliverable to locations and at times as may be necessary to maintain electric service system reliability and local area reliability.

(d) Each load-serving entity shall, at a minimum, meet the most recent minimum planning reserve and reliability criteria approved by the Board of Directors of the Western Systems Coordinating Council or the Western Electricity Coordinating Council.

Maximum Cumulative Capacity (MCC) Buckets

- D.04-10-035 orders LSE to acquire a mix of resources capable of satisfying the number of hours for each month that their loads are within 10% of their maximum contribution to system peak.
- To implement this directive D.05-10-042 adopted the modified Mirant Top Down Methodology, establishing the MCC buckets. These buckets were revised by D.12-06-025 which added a DR bucket

Summary of Resource Categories	
Category	Resources may be categorized into one of the five categories shown below, according to their planned availability as expressed in hours available to run or operate per month (hours/month):
DR	Demand Response resources available for "Greater than or equal to" 24 hours per month.
1	Greater than or equal to the ULR [Use Limited Resource] monthly hours. These are for May through September, respectively: 30, 40, 40, 60, and 40.
2	"Greater than or equal to" 160 hours per month.
3	"Greater than or equal to" 384 hours per month.
4	All Hours (planned availability is unrestricted)

Local Market Power Mitigation does not Address System Market Power

- When bid mitigation is triggered by congestion within CAISO, the system marginal energy cost (SMEC) from the market power mitigation run of software is used to set a floor for mitigated bids.
- This provision is based on explicit assumption that SMEC is competitive.
- **When SMEC rises higher than Default Energy Bid of gas units, bids are not lowered by bid mitigation even when congestion occurs.**

Background – Energy Crisis

- CA energy crisis 2000-2001
  - Low hydro year
  - Little forward fixed price contracts = more spot market purchases
  - Reliance on Federal Power Act to mitigate just and reasonable rates
  - Occurred during the winter when load was lowest
- Solutions that stabilized energy prices
  - DWR procures fixed price contracts on behalf of customers stabilizing energy prices (AB1X1)
  - Bundled procurement plan rules (AB 57) limit spot market purchases to 5% of total demand needs and require medium and long term contracting. TeVAR later established. Didn't contemplate retail choice expansion.
  - IOU generation subject to least cost dispatch rules