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UTILITIES AND ENERGY
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The Metamorphosis of the Energy Sector:

Maintaining Reliability and Affordability on the Road to Decarbonization

Informational Hearing
Background

Overview

The energy crisis serves as a stark reminder that California must continue to closely regulate and monitor the electricity systems to ensure reliability, affordability and compliance with environmental mandates. California's electric system is undergoing – and planning for – significant structural changes. Those changes include integrating greater amount of intermittent renewable resources, retiring or repowering over 16 gigawatts of gas-fired power plants that rely on ocean water cooling technology, an increasing number of resources that will surpass their design life in the coming years, and deployment of customer side generation. Additionally, the number of entities responsible for generation procurement is multiplying exponentially. In 2018, the California Public Utilities Commission (CPUC) reported that, "These trends present challenges that, in the absence of action by the CPUC and stakeholders, will increasingly strain the electric system's ability to maintain reliability."[1]

Resource Adequacy

In 2005, the Legislature recognized the criticality of reliable system operation when it mandated the CPUC to establish the fundamental regulatory requirement of resource adequacy (RA). Simply defined, RA means having sufficient power resources available when needed to reliably serve electricity demands across a range of reasonably foreseeable conditions. Additionally, it ensures that all load serving entities (LSEs)[2] have the right amount and type of resources available to constantly meet their load and demand, while addressing intermittency and ramping challenges resulting from higher penetrations of renewable energy. Electricity consumption is measured using two metrics – peak demand and energy load. All LSEs must

[1] Reference from CPUC emerging trends document
[2] Load serving entities are defined in Public Utilities Code Section 380(k) as all electrical corporations, community choice aggregators, and energy service providers.

demonstrate to the CPUC in both monthly and annual filings that they have purchased capacity commitments of no less than 115% of their peak loads to serve customers.

RA has its origins in the energy crisis of 2001 and has enabled California to maintain a reliable and affordable energy system as the State transitions to a decarbonized energy infrastructure. In the last ten years, California has maintained adequate reserves under the CPUC's RA program to ensure reliable grid operation. The RA program has two goals: first, it provides sufficient resources to the California Independent System Operator (CAISO) to ensure the safe, reliable and predictable operation of the grid in real time; and second, it is designed to provide appropriate incentives for the siting and construction of new generation and storage resources needed for reliability in the future.

Although the RA program has worked effectively for more than a decade, several changes in the electricity marketplace have left the state with insufficient resources under contract to ensure RA. In the last two years, this was evidenced with an uptick in the California Independent System Operator's (CAISO) procurement of generation to cure insufficient generation to meet system needs. The CPUC recognized the need for refinements to the RA and on February 21, 2019 they adopted an order making refinements to the RA proceeding. To the chagrin of many who participated in the proceeding, the CPUC only adopted requirements that require that 50% of the local RA be contracted for in year 3. Most parties in the proceeding advocated for between 70%-100% to be contracted for local RA in year 3. It is difficult to finance maintenance, generation projections and other resources without a longer term contract.

Paradigm Shift

California's electric system is shifting to a paradigm where a majority of the future procurement will be undertaken by community choice aggregators (CCAs). In 2002, the Legislature authorized community choice aggregation which allows municipalities in the territories of the investor owned electrical corporations[3] to purchase power to meet their electricity needs, offering an alternative choice in the market. CCAs are comprised of one or more cities and counties which adopt a resolution to authorize the CCA to procure electricity on behalf of the community and are typically formed as a joint powers authority.

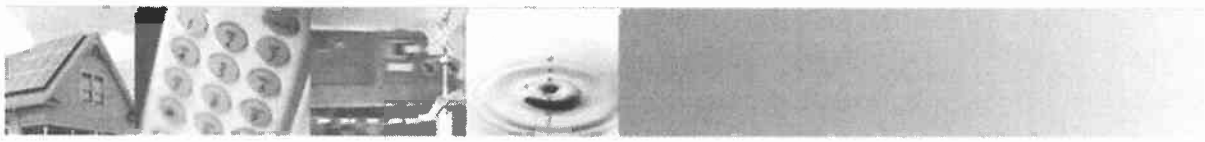
According to the CPUC, in 2004 there were a total of 15 LSEs and by 2018 the number had grown to 38 serving load in the territories of the three largest IOUs as a result of CCA formation. It is generally accepted, that the number of CCAs will continue to increase. The California Community Choice Association reports that there are 19 operational CCAs serving approximately 3.8 million connections in California and dozens more communities who are considering becoming a CCA.

CCAs have transacted to purchase generation resources to serve the needs of their communities. These needs extend to the procurement of resources to meet the local and high voltage electric system needs. The reliability of the high voltage grid is essential in maintaining

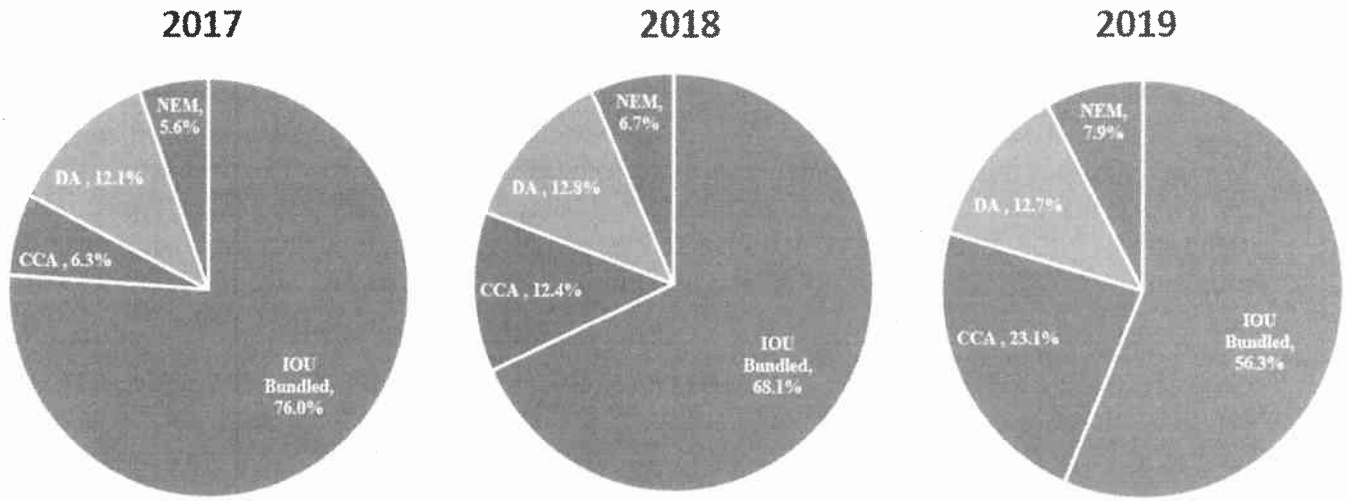
[3] To date CCAs have formed in the territories of San Diego Gas and Electric, Southern California Edison, and Pacific Gas and Electric.

the critical frequency requirements of the whole electrically interconnected grid which includes the distribution system.

Extensive growth in CCAs in recent years which, when coupled with rooftop solar and the Direct Access Program were estimated to make up about 25% of total retail sales to customers in 2017; a number that is estimated to reach up to 85% by the mid-2020s. The chart below represents the increase in electric load moving from IOUs to other providers or resources from 2017-2019.



Departing Load Growth: 2017 - 2019



- *Based on CEC's Energy Demand Forecast Update:*
  - *2017 IEPR demand forecast (GWh): CAISO Load Modifiers (Corrected) Mid Baseline*
  - *2018 IEPR demand forecast (GWh): Final CAISO Load Modifiers Mid Baseline*
  - *2018 IEPR demand forecast (GWh): Corrected LSE and BA Tables Mid Baseline, Form 1.1c*
- *California Distributed Generation Statistics—used in estimation of Net Energy Metering (NEM) load data*
- *DA load does not represented in 2019 does not reflect 4,000 GWh increase (or roughly 2-3% increase) that will be implemented as a result of SB 237.*

Gas Fleet – What's Left?

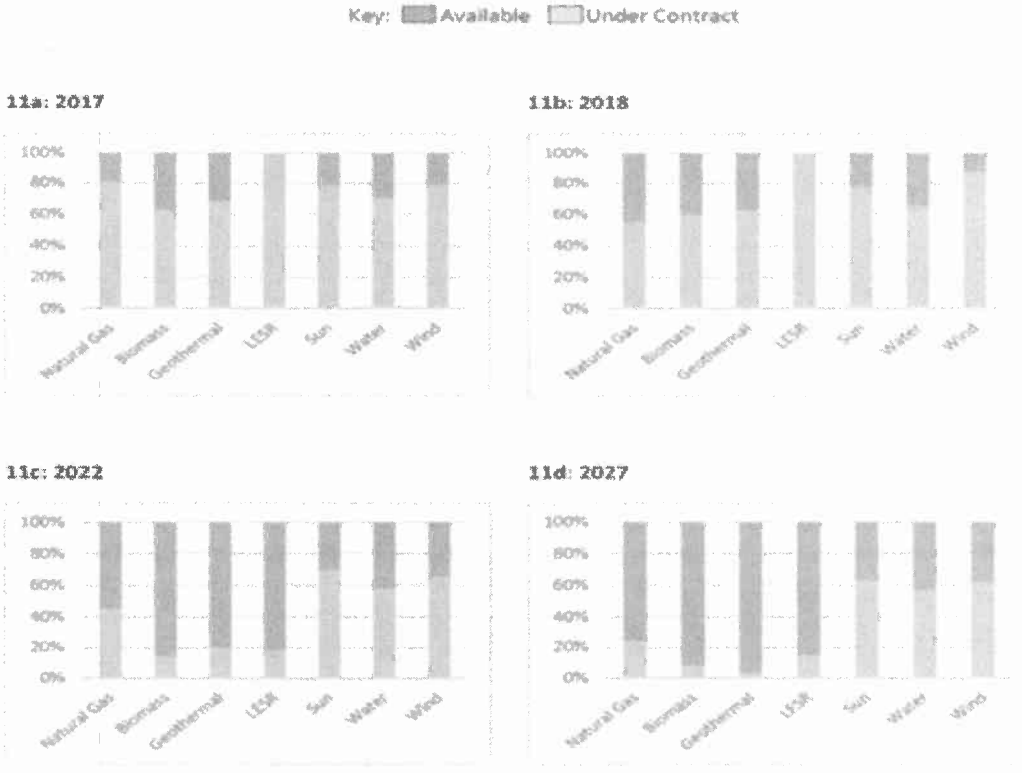
The number of gas plants in the state is steadily declining as is actual use of the plants that remain due to several market and environmental factors. Some plants have been taken off

line by owners unable or unwilling to eliminate once-through-cooling technologies. Many gas plant owners have retired plants because the growth of renewable generation shifted the need for the gas-fired generation off of the grid in certain hours. Some gas plants have likely been supplanted by imports of power. The CAISO market allows out-of-state resources to be bid in to the California market. If out of state electricity comes in at a lower price, the out-of-state plants run and California plants do not. It is important to note that CAISO studies identified potential system-wide reserve margin issues emerging with as a little as 1000 to 2000 MW of retirements beyond the current planned retirements.[4]

It should also be noted that Diablo Canyon Nuclear Power Plant will close in 2024-25 which represents a reduction of 2,200 megawatts of baseload generation. The retirement of Diablo Canyon will provide more headroom in the middle of the day to accommodate existing solar resources and a resource gap in the evening when solar is no longer available.

As shown in the charts below, in 2017 only natural gas and storage had more than 80% of their available local capacity under contract. CPUC analysis of system capacity shows that all local resources experience a decline in the percentage of capacity under contract over time. This decline is particularly pronounced for local natural gas resources, the percentage of the capacity under contract drops from 80% in 2017 to 24% in 2027. Similar declines are apparent for local biomass and geothermal resources; whereas local wind, solar and hydro resources are all over 55% contracted in 2027.

Local Capacity under Contract in Selected Years by Fuel Type



[4] http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf

Refining Resource Adequacy and Identifying Deficiencies

On February 21, 2019 the CPUC adopted a decision refining RA requirements for LSEs. The CPUC is hopeful that the decision will help eliminate the use of the CAISO's backstop procurement mechanism, increase forward procurement, and reduce the need for local RA waivers from LSE's. Specifically, the decision established:

- The minimum percentages required for multi-year local RA procurement should be 100% for Years 1 and 2 and 50% for Year 3; and
- The current local penalty and waiver process for a one-year basis will be applied to 3-year forward requirements for LSE-based procurement.

However, the CPUC did not find a viable option for a central procurement authority and thus delayed the development of that entity until the fourth quarter of 2019. The CPUC is requiring the parties to undertake a minimum of three workshops over the next six months. As part of the workshops the parties must address the following known challenges in meeting local capacity RA requirements: (1) costly out-of-market RA procurement due to local procurement deficiencies, (2) load migration and equitable allocation of costs to all customers, (3) cost effective and efficient coordinated procurement, (4) treatment of existing local RA contracts, (5) opportunity for and investment in procurement of local preferred resources, and (6) retention of California's jurisdiction over procurement of preferred resources.[5]

"*Those who fail to learn from history are condemned to repeat it,*" Winston Churchill

The CPUC will likely administer 550 formal proceedings in 2019. These proceedings range from individual complaints to utility applications, CPUC-initiated investigations, and rulemakings. Among those proceedings is a dedicated track within the RA proceeding to implement multi-year procurement mechanisms designed to ensure electricity reserves are available in certain transmission-constrained areas of the state. The regulatory mandates that the CPUC undertakes are voluminous and many are tied to the economic and environmental well-being of California. Regulators and the grid operator have a unique and holistic vantage point and responsibility to maintain the integrity of the electric system which is only as reliable as the sum of its parts.

The Committee may wish to consider the following questions:

- Are state regulatory processes nimble enough to respond to the rapid rate of change on the grid?
- Do the LSE's have the financial ability to make the necessary procurement to meet local and overall system needs?
- Who will compete against the LSEs if the IOUs are no longer undertaking procurement on behalf of the customers in their service areas?
- How can demand play an increasing important role in balancing the system?

[5] RA decision: http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M266/K785/266785992.PDF