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September 9, 2020

MEMORANDUM

TO: Council Members

FROM: Brian Dekiep and Ben Kujala

SUBJECT: What we know about the California rolling blackouts. Initial thoughts on August 2020 challenges with adequacy in California ISO

BACKGROUND:


Presenters: Brian Dekiep; Montana Senior Energy Analyst and Ben Kujala; Power Division Director

Summary: On Friday August 14th through the week starting on Monday, August 17th, the CAISO experienced extremely high temperature and near record load forecasts. This resulting in curtailment of load on the evening of August 14th and 15th. Many factors lead up to this event including: Heavy reliance on import, resource adequacy forecasts not accounting for extreme weather, energy market mechanisms and forced outage of resources. We will go over the circumstances leading up the events and how additional events were mitigated during the week starting Monday, August 17th.

We will also cover the current situation within the Pacific Northwest and how the California events could impact the development of the 2021 NW Power Plan.

What we know about the California rolling blackouts

Initial thoughts on August 2020 challenges with adequacy in California ISO




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ENERGY FUTURE

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Functions of the CAISO:

- Transmission
- Energy Markets
- Reliability Coordination
- Planning



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Resource Adequacy Planning

- The resource adequacy procurement requirements are set by the California Public Utilities Commission (CPUC), to be based on a 1-in-2 peak forecast, i.e., an average year forecast.
- This forecast is developed by the California Energy Commission (CEC) based on an agreed-upon methodology between the CEC, the CPUC, and the CAISO.
- To account for contingencies such as outages, import variability, load forecast error, and reserve requirements, the program requires utilities to procure a 15% planning reserve margin above the monthly 3 peak load forecast.



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Joint response to governor Newsom August 19th CEC, CPUC and CAISO

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Loss of Load Events in California

- CAISO anticipated high loads and temperatures beginning on August 14:
- Issued an order restricting maintenance operations on August 12,
- Issued an alert identifying a possible system reserve deficiency on August 13, and a Flex Alert for August 14. (No load curtailment on the 13th)
- The situation deteriorated on the afternoon of August 14 as well as the 15th, with the unanticipated loss of supply and severe constraints on imports because of a developing, historic west-wide heat wave.
- The imbalance in supply and demand led to the need to order the utilities to turn off power to their customers in the evenings of August 14th and 15th.



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Joint response to Gov. Newsom Aug 19th : CEC, CPUC and CAISO

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Restricted Maintenance Operations: requires generators and transmission operators to postpone any planned outages for routine equipment maintenance, ensuring all grid assets are available for use.

•**Alert** Issued by 3 p.m. the day before anticipated operating reserve deficiencies. The ISO may require additional resources to avoid an emergency.

•**Warning** indicate that grid operators anticipate using electricity reserves. Activates demand response programs (voluntary load reduction) to decrease overall demand.

•**Stage 1 Emergency** is declared by the ISO Contingency Reserve shortfalls exist or are forecast to occur. Strong need for conservation.

•**Stage 2 Emergency** is declared by the ISO when all mitigating actions have been taken and the ISO is no longer able to provide for its expected energy requirements. Requires ISO intervention in the market, such as ordering power plants online.

•**Stage 3 Emergency** is declared by the ISO when unable to meet minimum contingency reserve requirements, and load interruption is imminent or in progress. Notice issued to utilities of potential electricity interruptions through firm load shedding.



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California Flex Alert

NEWS RELEASE

For immediate release | August 19, 2020

Media Email | ISOMedia@caiso.com

For more information, contact:
Ariela Gonzalez | agonzalez@caiso.com
Vanessa Fontaine | vfontaine@caiso.com

Conservation needed earlier in day; Flex Alert issued for 2 to 9 p.m.
Grid operator urges consumers to continue doing their part to keep power on

FOLSOM, Calif. – With the state’s heat wave dragging into its sixth day, the California Independent System Operator (ISO) is asking for the public’s help this afternoon by reducing energy use earlier than a typical Flex Alert.

A statewide Flex Alert, a call for voluntary electricity conservation, will be in effect from 2 p.m. to 9 p.m. today. Consumer response to the Flex Alerts has been instrumental in averting power loss for [two straight days](#).

With temperatures forecast above-normal again today, operators are expecting demand on the system to come in high, particularly in the mid-afternoon hours. California’s record-breaking persistent heat wave has put strain on the ISO electric system, primarily driven by air conditioning use across the state.

Rotating power outages are still possible if system conditions don’t improve. However, expected outages on Monday and Tuesday were prevented partly by consumers using less electricity in the most critical time of the afternoon and early evening, when temperatures remain high and solar production drops.

Conservation efforts during these times can prevent more dire measures, such as rotating power outages, or generator equipment failures that can lead to more serious unplanned losses of power.

The ISO understands that conserving electricity is difficult, especially for those working from home or who have children attending school at home. But if all Californians are thoughtful about their energy use, even in small ways, power interruptions can be avoided or limited.

Between 2 p.m. and 9 p.m., the ISO is urging consumers to:

- Set air conditioning thermostats to 78 degrees, if health permits
- Defer use of major appliances
- Turn off unnecessary lights
- Unplug unused electrical devices
- Close blinds and drapes



- Use fans when possible
- Limit time the refrigerator door is open

Consumers can also take steps to prepare for the Flex Alert by doing the following before 2 p.m.:

- Pre-cool their homes, or lower air conditioning thermostats
- Pre-cook meals
- Charge electric vehicles
- Charge mobile devices and laptops
- Run dishwashers, washing machines and other major appliances
- Set pool pumps to run in the morning or during the night

For information on Flex Alerts, and to get more electricity conservation tips, visit the ISO’s [Flex Alert website](#).

Click [here](#) to learn more about System Alerts, Warnings and Emergencies. Follow grid conditions in real time at [ISO’s Today’s Outlook](#), or download the free ISO Today mobile app.

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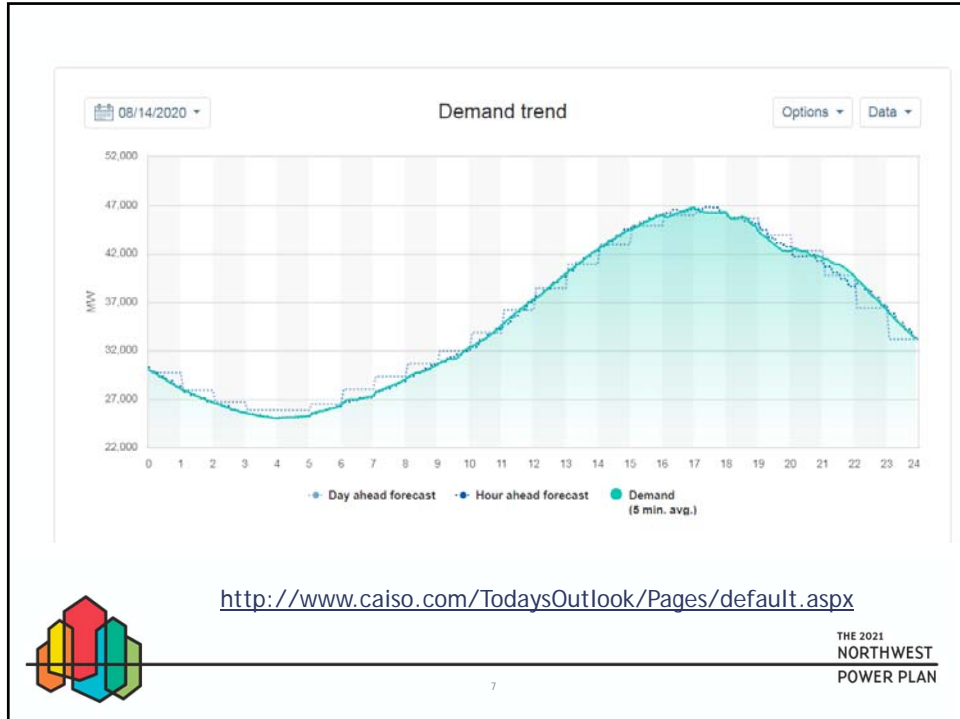


The California Independent System Operator (ISO) is a nonprofit public benefit corporation dedicated, with its partners, to continuous improvement and secure operation of a reliable grid operated for the benefit of consumers. It provides comprehensive grid planning, operation and nondiscriminatory access to one of the largest networks of high-voltage transmission power lines in the world, and operates a \$5 billion competitive electricity market. Recognizing the importance of the global climate challenge, the ISO is at the forefront of integrating renewable power and advanced technologies that will help provide a sustainable energy future efficiently and reliably.

The Western Energy Imbalance Market (EIM) Governing Body is the governing authority designed by regional stakeholders with delegated authority from the ISO Board of Governors to resolve rules specific to participation in the Western EIM.



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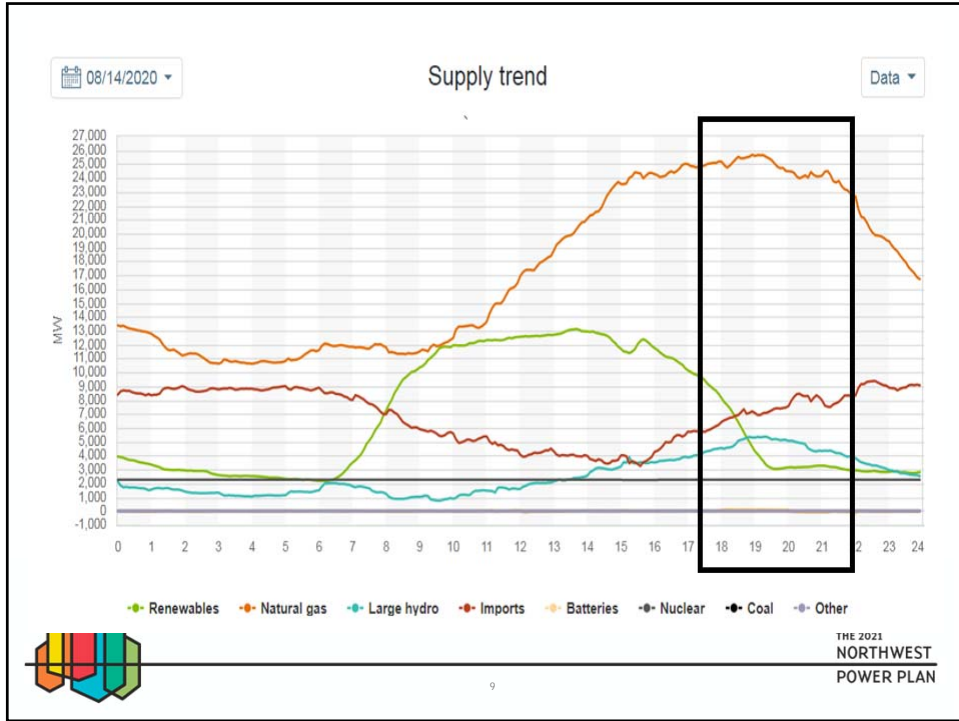
Sequence of events Friday August 14

12:00 p.m.	Unable to secure additional energy, a Warning was issued effective 12:00 p.m. through midnight
2:56 p.m.	Loss of generation – 475 MW
2:58 p.m.	Dispatched contingency reserves to recover
3:20 p.m.	Forecasting a shortage of energy for next few hours - Declared CAISO Stage 2 Emergency, began procuring Emergency Assistance from external entities
5:15 p.m.	Dispatched approximately 800 MW of demand response to maintain load and resource balance
6:36 p.m.	Unable to maintain load and contingency reserve obligation – ordered 500 MW of load shed pro-rata to CAISO Utility Distribution Companies (UDC's) – Stage 3 Emergency declared
6:46 p.m.	Ordered an additional 500 MW of load shed pro-rata to CAISO UDC's
7:56 p.m.	Load decreased and resources were adequate to meet CAISO load and contingency reserve obligations. Ordered all load to be restored.

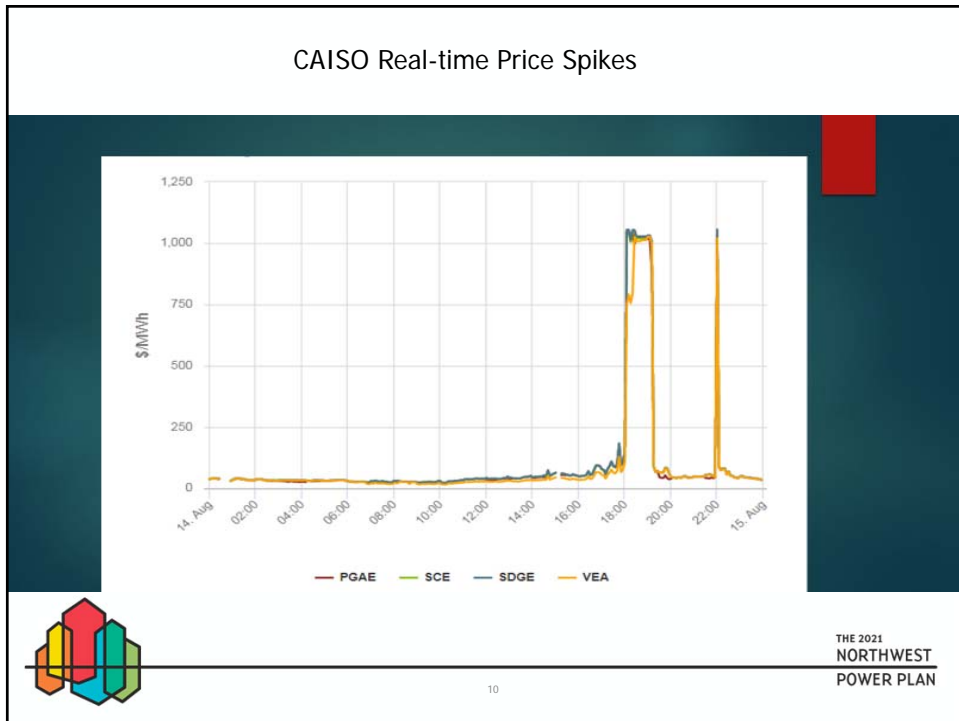
California ISO

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Sequence of events Saturday August 15

4:10 p.m. to 5:10 p.m.	Total wind output increased quickly requiring other generation to ramp down quickly
5:10 p.m. to 6:05 p.m.	Total wind decreased quickly requiring other generation to ramp up quickly. CAISO ACE was -1421 MW.
6:13 p.m.	While recovering our ACE, a generator ramped down quickly from 400 MW.
6:25 p.m.	Ordered 470 MW of load shed pro-rat from UDC's
6:47 p.m.	Received Emergency Assistance, wind ramped back up, load began to trend down, additional resources available. Ordered all load be restored.

<http://www.caiso.com/Documents/BriefingonSystemOperations-Presentation-Aug17-2020.pdf>




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- A major feature of the EIM market is the Flexible Ramp Sufficiency Test.
- If a BA does not pass the Flexible Ramp Sufficiency Test, their real-time EIM transfers are locked at a specific level in real-time.
- CAISO failed this test on August 14th limited imports to 1544MW. CAISO also failed the test on August 15th.

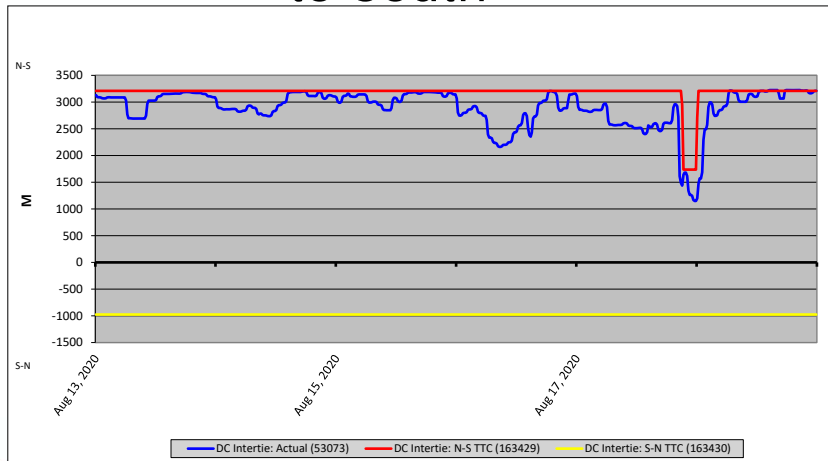


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DC Intertie Flowed Heavily North to South

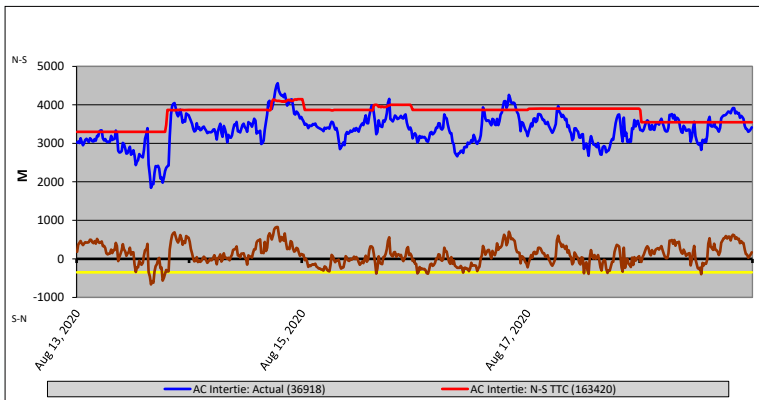


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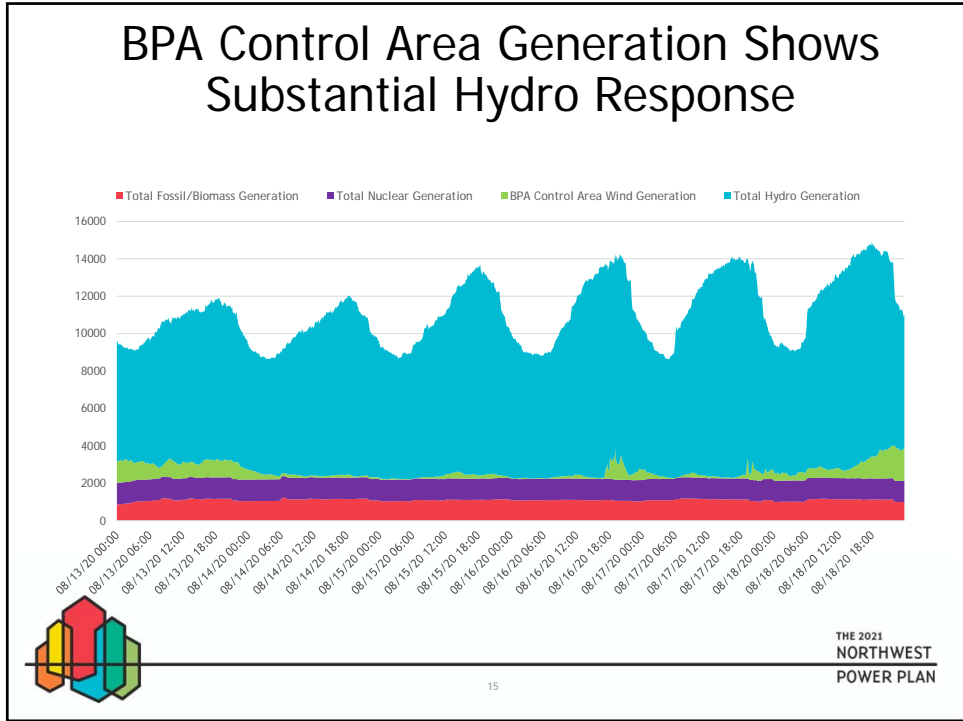
AC Intertie Flowed Heavily North to South



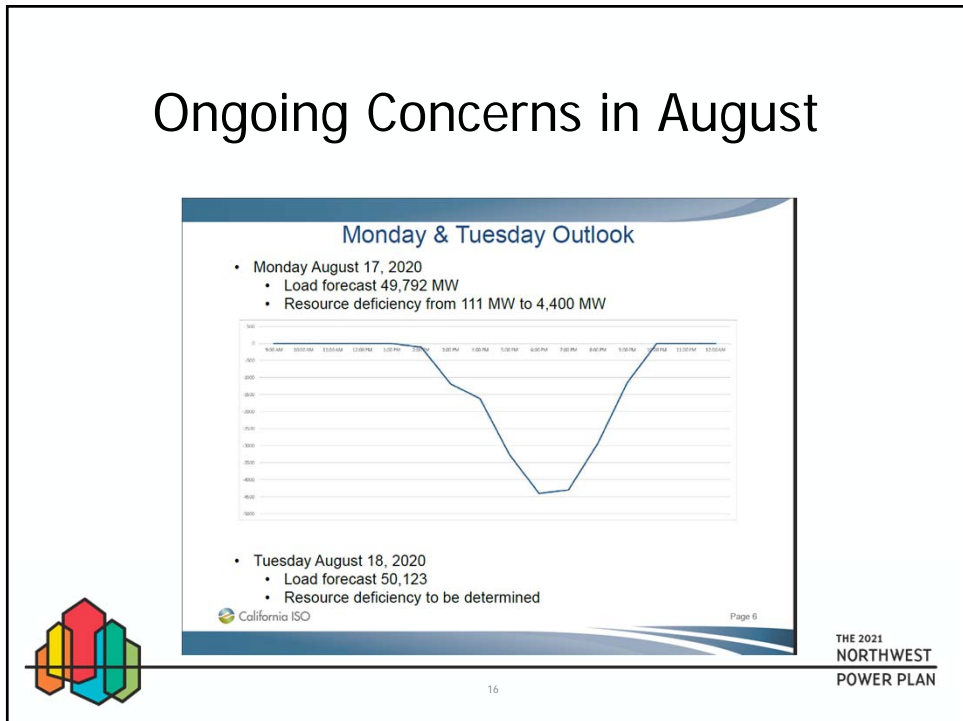
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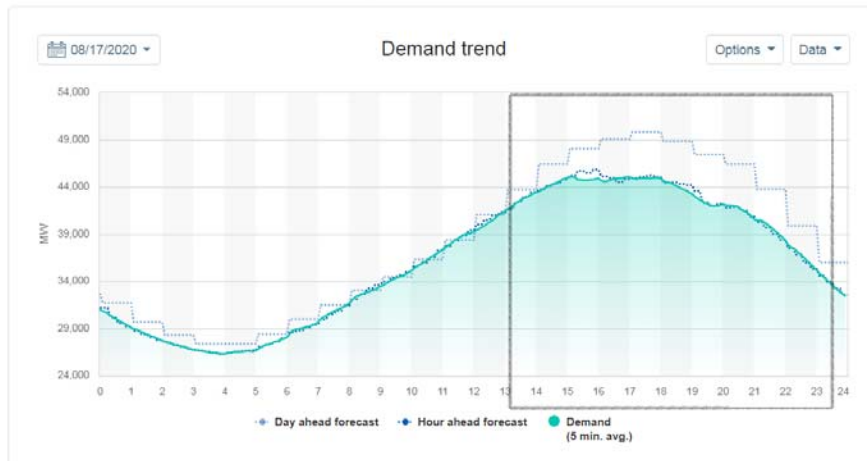
Call to Conserve Response

- August 17th and 18th:
- Reduction of nearly 4,000 MW in demand and addition of 950 MW of “available temporary generation”



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Monday August 17th CAISO BA Demand Curve



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Actions Taken on week of August 17th

Demand Side and Supply Side actions :

- DR and demand relief
- back-up generation,
- Solar and storage
- Navy and Marine Fleet



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Resource Adequacy and Planning

- Outgoing CAISO CEO Steve Berberich on Aug. 17 stated part of the problem is the state's resource-adequacy program regulated by the California PUC, "Berberich stated "the ISO had pointed out issues with capacity procurement "over and over again." "I think it is important to understand the ISO operates the system it is given."
- He also said CAISO should have pointed out the possibility of outages sooner, but was caught by a 500-MW generation unit tripping off line at about 3 p.m. and the loss of wind generation between 4:10 p.m. and 5:10 p.m. on Aug. 14.




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2020 Pacific Northwest Conditions

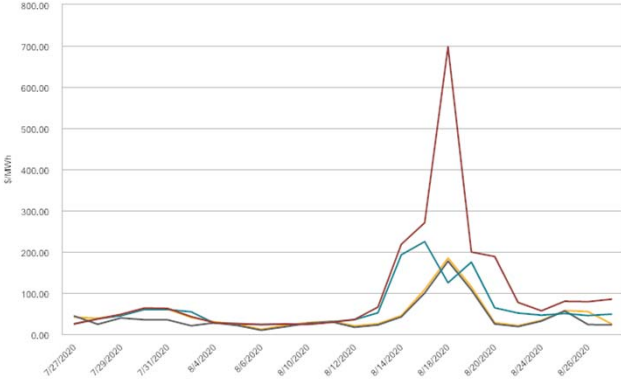


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High Prices in CA Lift Mid-C Prices



Date	SNL Power California-Oregon Border Spot	SNL Power Mid-Columbia Spot Power Index	SNL Power NP15 Spot Power Index On-Peak	SNL Power SP15 Spot Power Index On-Peak
7/7/2020	40	40	40	40
7/20/2020	50	50	50	50
7/31/2020	60	60	60	60
8/1/2020	40	40	40	40
8/8/2020	30	30	30	30
8/10/2020	40	40	40	40
8/12/2020	50	50	50	50
8/14/2020	100	100	100	100
8/18/2020	150	150	150	150
8/19/2020	200	200	200	700
8/20/2020	50	50	50	50
8/24/2020	60	60	60	60
8/26/2020	50	50	50	50

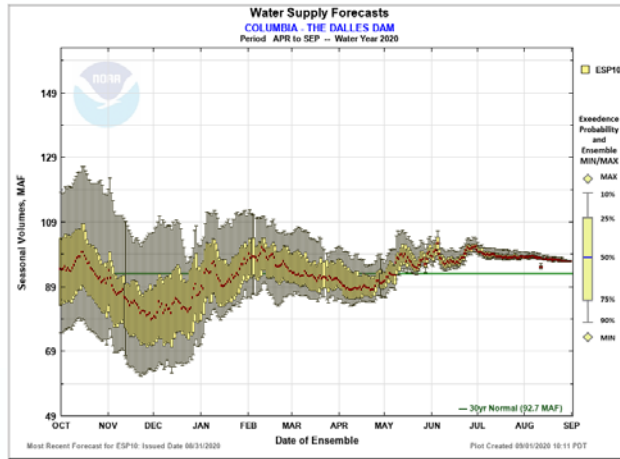


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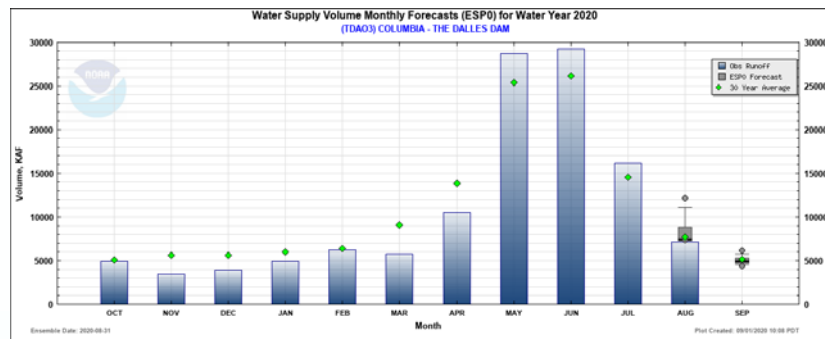
Above Average Water Runoff



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Average August Water Runoff

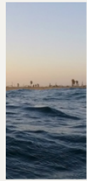


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Markets versus Adequacy

California could face power shortages if these gas plants shut down, officials say



California OKs early end for GE gas plant; big battery peaker planned



Huntington Beach Ge down by Dec. 31, 2020 cooling at power plant
(Allen J. Schaben / Los
By Sammy Roth/Staff 1
Sep. 24, 2019
11:07 AM

GE's Inland Empire Energy Center in Menifee, Calif., will be decommissioned and demolished in 2020. A large-scale battery storage project is planned at the site.
Source: Business Wire

The California Energy Commission on Dec. 11 approved the premature decommissioning and demolition of General Electric Co.'s 10-year-old,

Table S6. Options for assumed import capability for resource adequacy.

RA Import Option	Capacity (MW)
Maximum Import Capability (High)	10,193
Default	5,000
Low	2,000



Does This Impact the Power Plan?

- **Adequacy Assessment**
 - Summer import limits
 - Competition for in-region resources
- **Market Prices**
 - Challenges with California's Planning Reserve Margin
 - Scale of resource builds with different generating technologies



What We'll Be Watching

- Was this an exceptional event or are future Augusts likely to have similar challenges?
- What are any post-mortem conclusions from the California regulators/planners/operators?
- What actions or responses are implemented – how will they impact the Northwest?



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Questions?

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