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Planning for reliability and resource adequacy under SB100

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SB 100 Modeling Inputs and Assumptions Workshop

February 24, 2020

The following questions were posed to Balancing Authorities

1. How are you planning for reliability and resource adequacy as system resources change?
2. What flexible/dispatchable resources do you need for grid reliability?
3. With a 25-year view, what challenges do you see in moving away from fossil (gas) resources?
4. What technological innovations or cost reductions are most critical in the next 25 years?
5. What are the needs/opportunities for transmission planning?

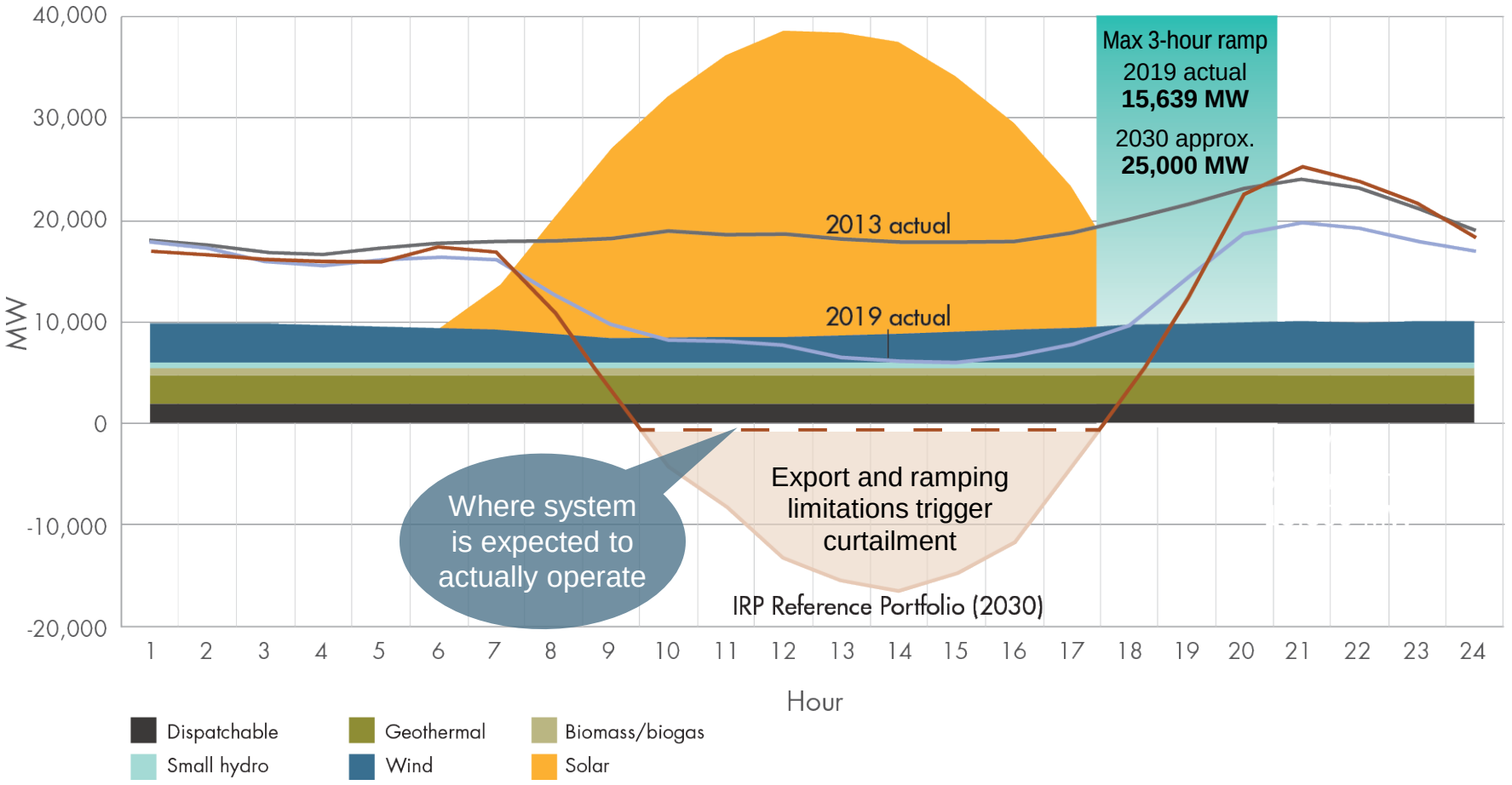
The California Independent System Operator (CAISO) depends on local regulatory authorities for resource adequacy

- The CAISO footprint encompasses 80 percent of California load.
- The CAISO is a:
  - Balancing Authority
  - Regional Transmission Planner
  - Market Operator
  - Reliability Coordinator
- The CAISO is not a:
  - Load serving entity
  - Transmission or generator owner
  - Distribution system owner, operator or planner
  - Utility regulator

Question 2: What flexible/dispatchable resources do you need for grid reliability?

- Today, the grid heavily relies on dispatchable resources (natural gas, hydro) and imports.
- Recent results from the CPUC's Integrated Resource Planning models show a preference to meet flexibility needs via solar paired with batteries in lieu of gas.
- Future import levels remain unknown as the rest of the West sees major thermal retirements.
- If storage is used to provide flexibility, how will it be charged if there are multiple days of cloud coverage? When there may be significant fuel substitution? Charging times increase significantly?

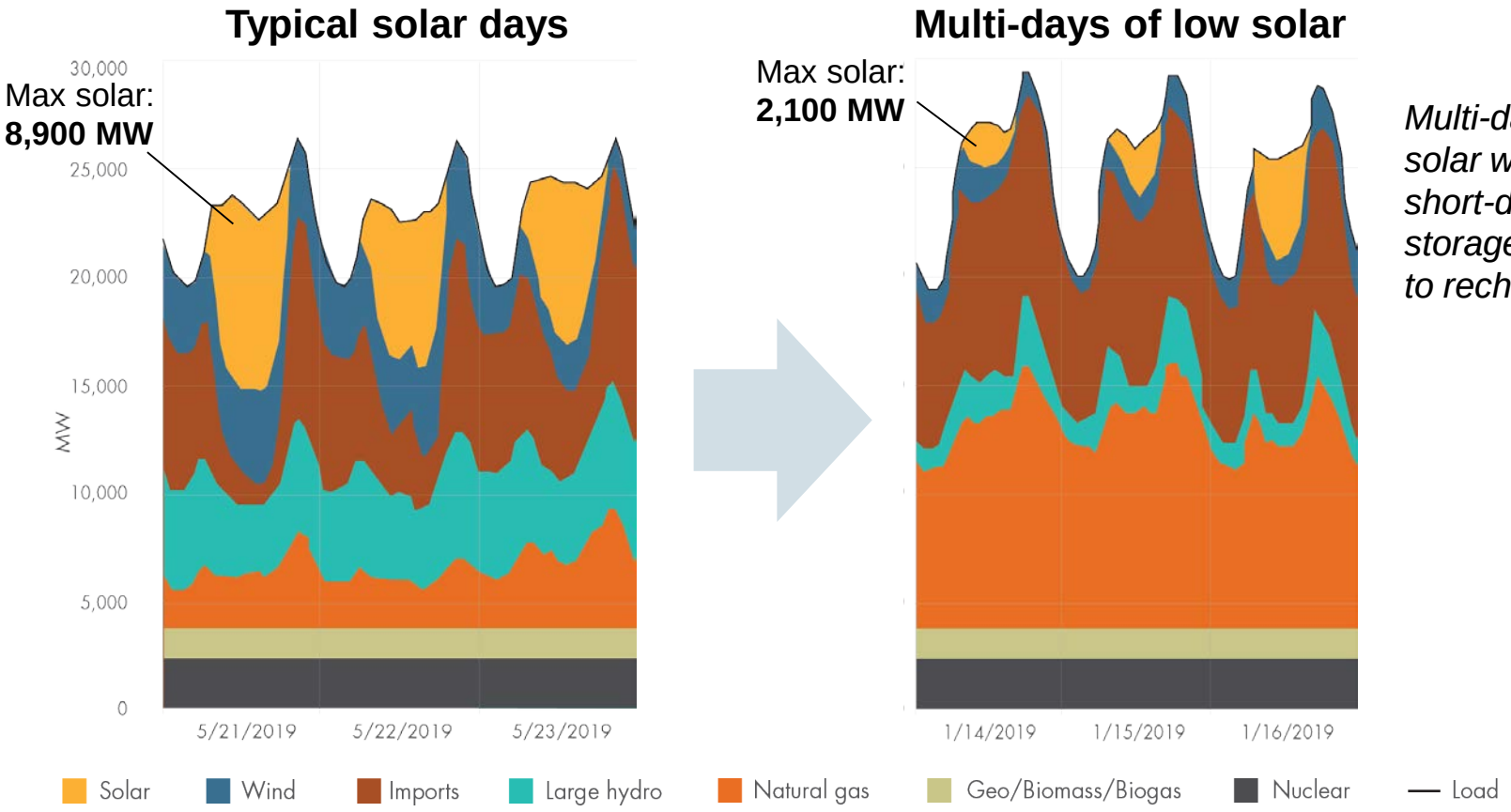
By 2030, solar is expected to contribute to increasing ramping needs



Question 3: With a 25-year view, what challenges do you see in moving away from fossil (gas) resources?

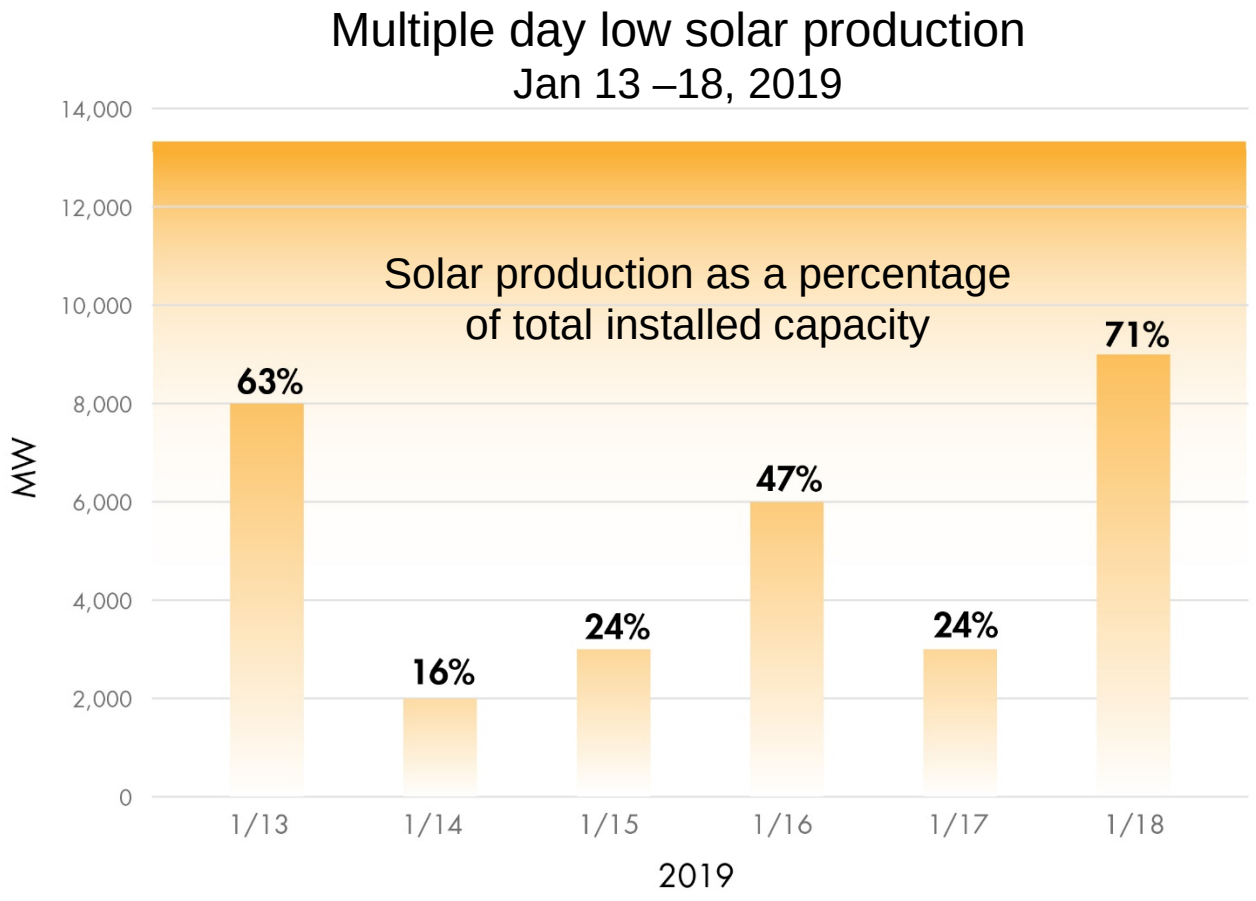
- In addition to ramping needs, the CAISO is exploring the impact of multiple days of cloud coverage.
- Consider strategically maintaining the gas fleet to provide both energy and other grid services as we transition to cleaner future.
  - This includes maintaining the gas transmission infrastructure which will be used less overall but may be more stressed for shorter periods.
- Need to consider and implement plans that ensure local capacity areas maintain reliability before shutting down local gas resources.

Low solar production across multi-day event – high reliance on natural gas and imports



Multi-day low solar will hinder short-duration storage ability to recharge

Multiple days of low solar production hinders ability of storage to recharge



◀ **12,697 MW**
Installed solar capacity

90%
Solar peak output record (7/2/19)

Question 4: What technological innovations or cost reductions are most critical in the next 25 years?

- It is critical for policy makers to act now to diversify the fleet based on energy and reliability needs, rather than wait for technologies to be cost effective.
- Simplified modeling cannot reflect many policy concerns; too much modeling leads to analysis paralysis.
- Most of the “easy” decarbonization is or has already occurred.
- Going further requires intentional steps to unlock value.
- Start with limited testing of a variety of new(er) technologies rather than significant investment in a limited portfolio that reduces diversity.
- Need to prove new technologies at scale before transitioning away from current technology.

Question 5: What are the needs/opportunities for transmission planning?

- Opportunities:
  - Additional transfer capability into local capacity areas and/or disadvantaged communities to allow for thermal generation retirements
  - Offshore wind
  - Out of state resources
- Need: Policy makers need to decide when resources will be retired and/or new resources needed so that transmission solutions can be timely
- Main challenge is timing as permitting, siting, and construction may take 10 years or more