

Hydropower Resources Bay-Delta Plan (Phase 2)

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**PRESENTATION TO STATE WATER
RESOURCES CONTROL BOARD
NOVEMBER 14, 2012**

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Align Water and Energy Policy

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- **Issue** – State Board Water Quality objectives may be at cross purposes with California energy policy.
- **Energy Policy** – Concerns with Global Climate change lead to AB32 and SB 2X1. Places greater demand on flexible generation.
- **Water Quality Objectives** – Improve water quality for the Sacramento-San Joaquin Delta. Potentially reduces availability of flexible generation.



SWP Generation and Pumping

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- The SWP hydropower plants produce about 1,750 MW of capacity and average 4,000 GWh of energy annually
- SWP pumps consume approximately 7,500 GWh of energy annually
- The SWP is the single largest end user of the CAISO grid
- The SWP hydropower generation and pumping are flexible resources



Evolution of Energy Policy

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1960 to 1998

- Vertically Integrated Utilities
- Bilateral Arrangements for Power and Transmission
- Utilities responsible to keep lights on

1998 to 2006

- AB 1890 Passed (Deregulation Law)
- Create CAISO and CalPX Markets (introduced competition)
- Seams issues with adjacent utility systems
- Significant natural gas price volatility

2006 to Now

- AB 32 (2006) – Carbon Reduction
- SB 1X2 (2011) – 33% Renewable
- Once-Thru Cooling Plants Phase out
- Cap-and-Trade Regulations
- Water Quality Objectives
- WECC Reliability Standards

Big Policy Changes are:

- Increasing Complexity of Operations
- Occurring at an ever increasing rate

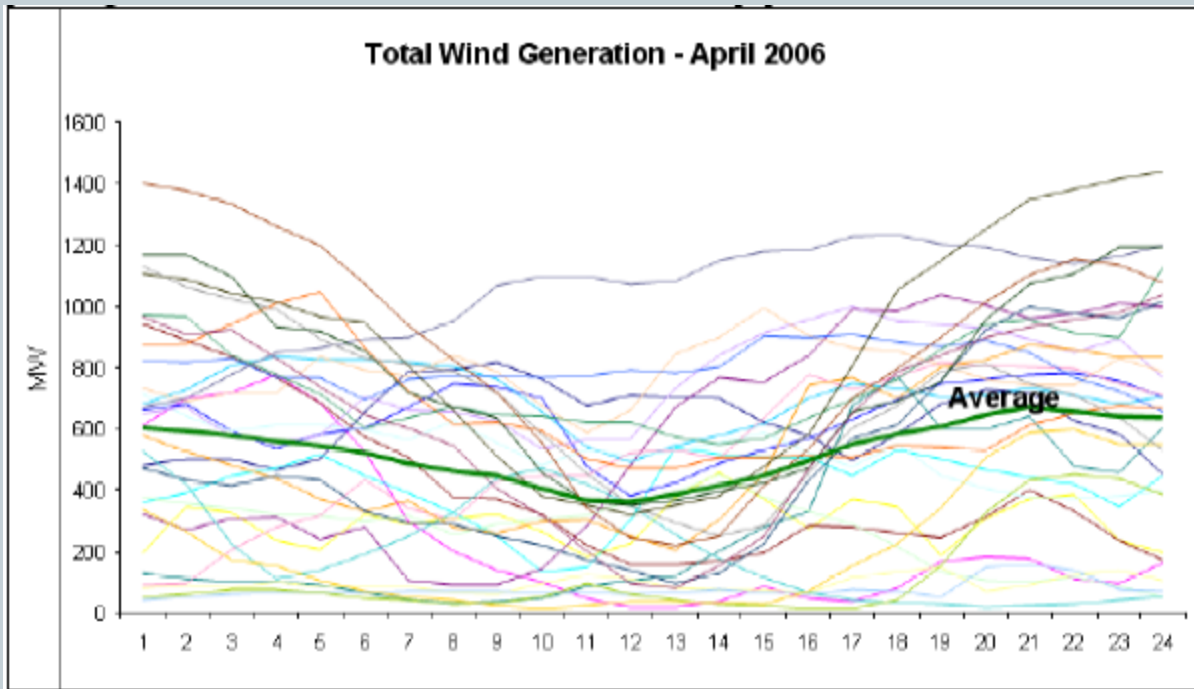
Operation

+ Competition

+ Integration

Need for Flexible Generation

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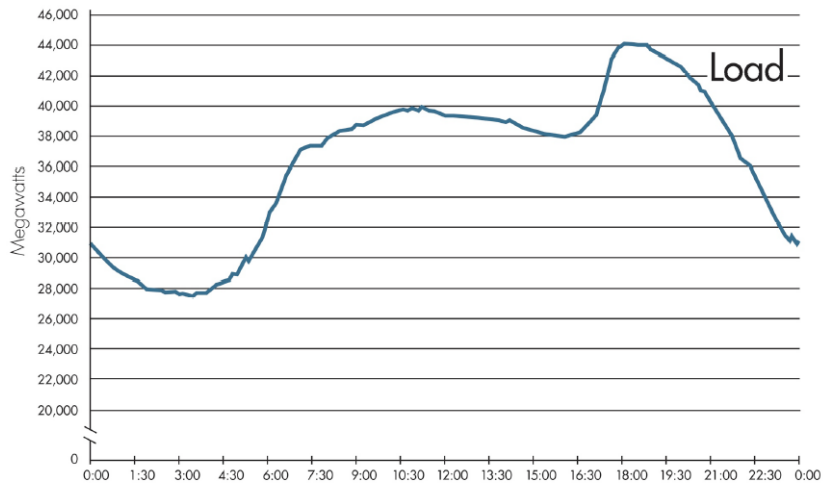
- **CAISO 2010 Studies predict**
 - ❖ Most new renewable generation will be intermittent
 - ❖ More SWP-like power resources will be needed
- **State Water Board Dilemma**
 - ❖ Achieve Delta goals without compromising state energy policy

Need for Flexible Generation

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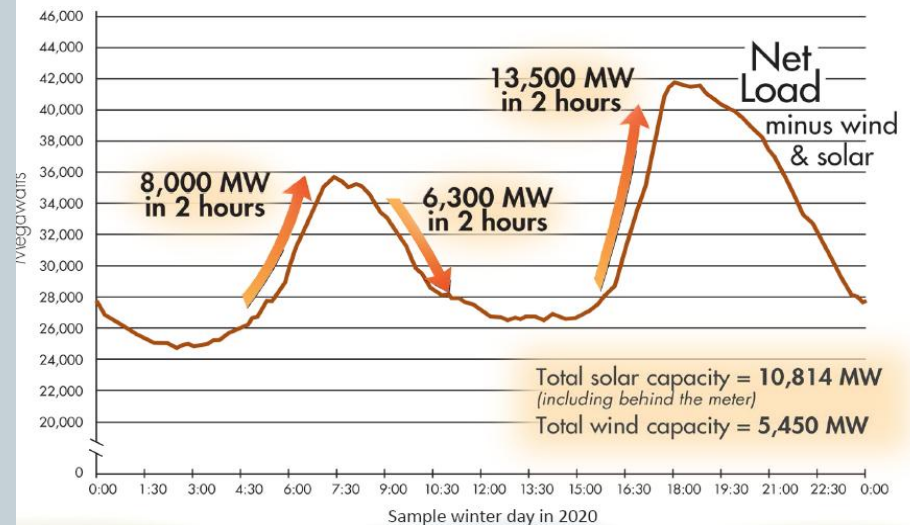
Anticipated Power Demand

Load profile — sample winter day in 2020



Power Demand Net Intermittent

Flexible resources will be essential to meeting the net load demand curve



SWP Flexible Generation and Pumping

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- **Regulation** – Generation that is already up and running and can be increased or decreased almost instantly to keep energy supply and energy use in balance.
- **Spinning Reserves** – Generation that is running at less than full output, with additional capacity that can be increased within minutes.
- **Non-Spinning Reserves** – Generation that is not running, but can be brought up to speed within ten minutes. Pump-drop that can be reduced within ten minutes can also supply non-spinning reserve.
- **Replacement Reserves** – Generation that can begin contributing to the grid within an hour.

SWP Flexible Generation and Pumping (cont.)

- The SWP plays another prominent role in maintaining the reliability of the California power grid.
- The SWP delivers a protection system that is triggered during abnormal conditions.
- The protection system is in lieu of constructing major new transmission in California.
- This protection system was triggered in September 2010 and June 2012.
 - **During each event the SWP curtailed about 1,000 MW of generation and pump load in order to maintain the reliability of the power grid.**
 - **This is equivalent to being able to turn off power to 1/3 of Sacramento.**
 - **There are few, if any, comparable sources of such special protection connected to the California power grid.**

SWP Flexible Generation and Pumping (cont.)

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- SWP generates on-peak and pumps off-Peak. This is a significant reliability and economic benefit to the California power grid.
 - Reliability: The power grid is most stressed during the summer peaks. The power grid is susceptible to over-generation conditions during the spring off-peak.
 - Economic: Power is produced when it is the most valuable and consumed when it is least valuable.
- Water Quality Objectives could cause a shift in SWP operations negating these statewide benefits.

California Carbon Reduction Policy

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- The California carbon reduction requirement, established in AB32, is to achieve 1990 level of emissions by 2020.
- The electricity sector is subject to AB32 regulations.
- The cap for electric sector emissions in 2012 is 97.7 million metric tons (MMt). First auction is being run today.
- Each year beginning in 2013 through 2020, the electric sector emission cap shall be reduced by approximately 2%.
- Hydropower does not produce carbon when power is produced.
- Other flexible generation sources do produce carbon.

Conclusion

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- The Water Quality Objectives may be at cross purposes of state energy policy if:
 - It impacts on flexible hydropower
 - Limits the CAISO ability to manage the grid
 - It increases the statewide cost of power
 - Increases the amount of carbon in the generation fleet
- The Phase 2 of the update to the Bay-Delta Plan should include the proper assessment of hydropower impacts