

## DOCKETED

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**BPA Comments - Joint Agency Workshop on Increasing Need for Flexibility in the Electricity System**

*Additional submitted attachment is included below.*

## California Energy Commission – 2017 Integrated Energy Policy Report (IEPR)

### May 12 Joint Agency Workshop on the Increasing Need for Flexibility in the Electricity System

#### Bonneville Power Administration

The Bonneville Power Administration (Bonneville) is a federal power marketing administration within the U.S. Department of Energy that markets electric power from 31 federal hydroelectric projects and some non-federal projects in the Pacific Northwest with a nameplate capacity of 22,500 MW.

Bonneville currently supplies 30 percent of the power consumed in the Northwest. Bonneville also operates 15,000 miles of high voltage transmission that interconnects most of the other transmission systems in the Northwest with Canada and California. Bonneville is obligated by statute to serve Northwest municipalities, public utility districts, cooperatives and then other regional entities prior to selling power out of the region.

**We are already helping today.** Bonneville reliably delivers low-carbon Northwest hydroelectric generation into the California market and fully utilizes its share of transmission assets that tie the Pacific Northwest and California electric grids together.

**We and others can help more.** Three things would better enable Bonneville and other Northwest hydro resources to provide additional flexibility to California: 1) clearer definition of **what** types of flexibility are needed, 2) earlier notice of **when** to provide it, and 3) greater compensation for **how** the fuel, generation and transmission assets necessary to provide flexibility are utilized.

**These actions will expand California’s cost-effective supply of highly flexible resources** by preparing Bonneville and other Northwest entities to stand ready to provide flexible, low-carbon hydroelectric power to California in a manner that better balances our contribution to more reliably integrating renewable energy for California with our systems’ reliability, hydraulic and environmental obligations in the Northwest.

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## Federal Columbia River Power System



### FCRPS is a partnership

- US Army Corps of Engineers (Corps)
- US Bureau of Reclamation (Reclamation)
- Bonneville Power Administration (BPA)

### FCRPS 31 hydro plants

- 21 Corps (14,651 MWs)
- 10 Reclamation (7,807 MWs)
- 209 Generating Units ranging from 1 MW (Boise Diversion) to 805 MW (Grand Coulee)

**Canadian and Non-Federal entities also operate significant hydro facilities on these rivers**

## Purpose of the Intertie

The Pacific Northwest-Pacific Southwest Intertie was constructed in 1964 to provide the benefits of coordinated markets to the two regions. One of the products envisioned by Congress, the sale of surplus peaking capacity from the Federal Columbia River Power System (FCRPS), could potentially meet several California needs for integrating renewables:

- Provide planned amounts of energy to California during the daily ramp;
- Provide some load to use surplus California renewable energy when the peaking energy is returned to the Pacific Northwest;
- Provide the above benefits without exacerbating California's net load ramping concerns through must-run requirements in hours when not needed; and
- Meet those requirements with surplus capacity produced by primarily hydroelectric resources that have no or minimal carbon use.

The transmission assets that make up our interties can be described by how flexible they can be: 400 MW are flexible within 5-minute intervals to support 5-minute dispatch and delivery of regulating resources; 4,800 MW are flexible from one 15-minute scheduling interval to the next; and, with the 3,100 MW direct current intertie from the Northwest to Los Angeles included, 7,900 MW are flexible from one hourly scheduling interval to the next.

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## Northwest & California Intertie Transmission

Flexibility increases as commitments move earlier and longer

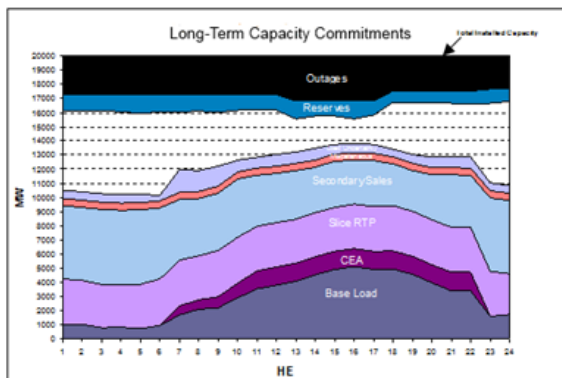
- California-Oregon Intertie (COI) has 400 MW of dynamic transfer capability for 5 minute dispatch
- The entire COI capacity totals 4800 MW that can be used in 15 minute or longer increments
- The Pacific DC intertie has 3100 MW of transfer capability and can be scheduled hourly or longer

**The CEC asked for feedback on three questions:**

1. What is the near-term (1-3 years) and long-term capacity potential for each option? How quickly can they be called upon? What are the costs?

In the near-term, Bonneville has the potential to offer **variable amounts** of flexibility depending on the time of year and the time of day. Historically, Bonneville has made available to multiple parties hundreds of megawatts of surplus capacity with a forward commitment, appropriate compensation and allowances for flexible energy deliveries to those parties on one-to-four hour notice while honoring hydraulic and transmission constraints.

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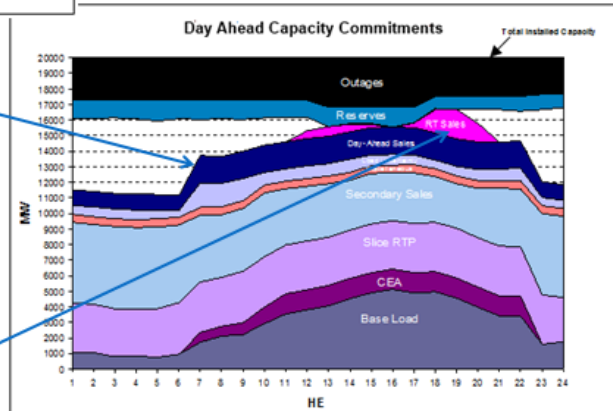


## Example Hydro Resource Commitment

Flexibility increases as commitments move earlier and longer

- Fuel supply is committed over time to meet water requirements & load
- Managed across connected projects to meet needs now and in the future

- Major capacity commitments day ahead (see navy blue)
- Forecastable vs. Non-forecast flexibility have different impacts
- Flexibility decreases as real time approaches (see pink)



The **cost** of Bonneville’s assets (fuel, generation and transmission) necessary to stand ready must be compensated. Historically, Bonneville’s cost recovery for this type of product/service has come in the form of a capacity payment in the range of \$9 per kW-month that covers a pro-rata share of the fixed costs of the generation and an energy payment that covers the opportunity cost of the fuel and transmission used.

Bonneville continues to implement its transmission rules in a way that facilitates movement of flexible capacity and energy in the ISO, EIM and bilateral markets. Therefore, in addition to the flexibility Bonneville could make available, **other Pacific Northwest operators** of hydroelectric projects may also deliver their flexible capacity and energy across Bonneville’s transmission system into California, which further enhances renewable energy integration.

2. What is needed to increase capability of each option? For example, what regulatory, market or other changes are needed to advance this mechanism to help integrate renewables?

**Equal access for external and internal resources.** A similarly capable resource should be similarly compensated whether it resides in the ISO, EIM or bilateral market footprint:

- In its FRACMOO2 stakeholder process, CAISO proposes to change its existing rules that compensate long-start resources for ramping up for the evening peak demand. Hydroelectric generation is capable of fast-starts and fast-ramps.
- Existing rules in the CAISO exclude external resources from groups of qualified generation used to provide California flexibility. We anticipate Northwest hydroelectric generation would be capable of qualifying if the CAISO allowed external resources to participate.

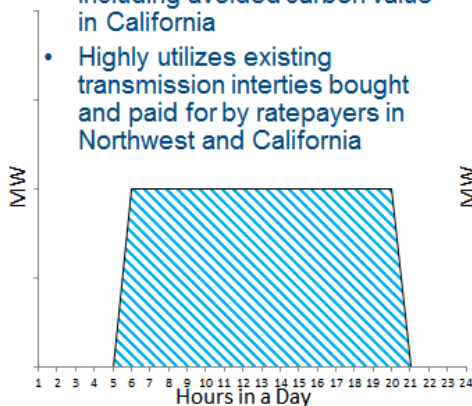
**Clearly define the need.** Bonneville and other Pacific Northwest hydro providers have historically separated the definition of total flexible capacity requirements into the amount that can be forecast ahead of time (forecast net load ramp) and the portion that is not known until real-time (within-hour uncertainty and variability). It is expected that the portion of the three-hour net load ramp that is forecastable could be reduced on a forward basis with any resource or contract that is deliverable in a shaped hourly or 15-minute schedules. Incorporation of a flexible ramping product into CAISO’s day-ahead commitment process may be one mechanism to better meet the forecast net load ramp.

**Use multiple dispatch horizons.** Increased deliveries from the Northwest to help meet California’s flexible capacity needs requires use of binding dispatch awards in multiple time horizons – such as day-ahead, hourly, 15-minute and 5-minute – so that availability of dynamic transmission is less of a constraint.

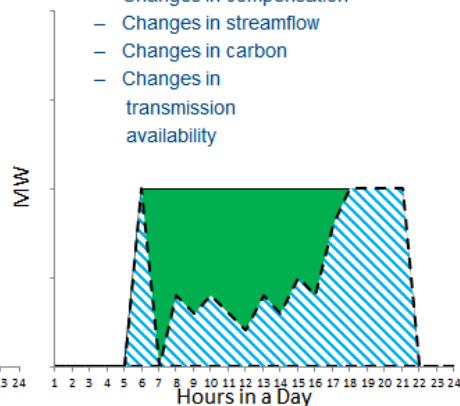
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### Current CA Block Product vs. Future CA Flexible Product

- Provides carbon benefit to California
- Facilitates hydro management
- Compensation reflects Northwest opportunity cost – including avoided carbon value in California
- Highly utilizes existing transmission interties bought and paid for by ratepayers in Northwest and California



- If a more flexible, shaped product is desired, then we must work together to address:
  - Commitment in a day-ahead market
  - Qualifying external resources
  - Changes in compensation
  - Changes in streamflow
  - Changes in carbon
  - Changes in transmission availability



3. Are pricing signals adequate to encourage investment in ramping capabilities that are not natural gas fired?

**No.** Current price signals compensate for fuel on the five-minute interval in which the resource is deployed and may provide limited compensation for fuel in adjacent intervals for units that need to ramp in or out via the flexible ramping product. There is no compensation for transmission or fixed costs of the flexible unit unless it is included in the awarded energy settlement. However, compensation for avoided carbon is valued in California energy prices. Historically, this has translated into an incremental \$6 per megawatt-hour compensation for low-carbon energy Bonneville has sold into California. This incentive for low-carbon energy has also historically outweighed other components of CAISO's energy prices that seek to incent greater flexibility. Therefore, Bonneville – and likely other low-carbon providers as well – typically satisfy operational and commercial objectives in the current markets by selling a flat block of low-carbon Northwest hydroelectric generation into California. Whereas entities with low-fixed cost fossil-fuel generation inside the ISO and inside the EIM are currently incented to provide flexibility and therefore remain on to help meet daily ramps.

A daily shaped product eligible to be moved with a daily flexi-ramp product would better accommodate Bonneville's operational and commercial objectives while addressing California's net load ramp and providing the flexibility to address within-hour uncertainty through the 15-minute market.

#### Summary

**Addressing the time frame of resource commitment, clarifying with more specificity the need for flexibility, and considering compensation for standing ready to meet these flexibility needs will increase California's cost-effective supply of highly flexible resources.**

It will also better prepare Bonneville and other Northwest entities to help provide flexible, low-carbon hydroelectric power to California in a manner that better balances our contribution to more reliably integrating renewable energy for California with our systems' reliability, hydraulic and environmental obligations in the Northwest.

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