Northwest **Power** and **Conservation** Council

October 4, 2016

MEMORANDUM

TO: Power Committee

FROM: Gillian Charles

SUBJECT: Incorporating Energy Storage into the Power Planning Process

BACKGROUND:

Presenter: Gillian Charles, energy policy analyst

Summary: Energy storage is emerging as an increasing presence in discussions about the current and future power system. Encompassing a wide range of technologies, including pumped hydro, battery, compressed air, and thermal, energy storage has the potential to impact how we operate and utilize our existing fleet of resources, integrate new variable resources into the system, improve system flexibility, and provide ancillary services that maintain grid and operational stability.

Staff will give a brief introduction on how energy storage will be incorporated into the Council's work over the next few years.

Relevance: There are several energy storage presentations on the October Council meeting agenda, so it is timely to discuss how storage fits into the Council's analysis.

Workplan: Implement Seventh Power Plan and related Council activities. Generation. A.4.1, A.4.3

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
www.nwcouncil.org

Steve Crow
Executive Director

503-222-5161
800-452-5161
Fax: 503-820-2370

Background: In the Seventh Power Plan, energy storage was discussed as an emerging technology in Chapter 13. In addition, it was qualitatively included in a scenario analysis with other emerging technologies that retired all existing coal and inefficient gas plants (heat rates greater than 8500 btu/kWh), with no new gas plants available for development - “Maximum Carbon Reduction - Emerging Technology.”

More Info: From the Seventh Power Plan’s Action Plan,

ANLYS-14. Monitor and track progress on the emerging technologies that hold potential in the future Pacific Northwest power system. (includes energy storage technologies)

ANYLS-16. Research and develop a white paper on the value of energy storage to the future power system.

Incorporating Energy Storage in the Power Planning Process

Gillian Charles

Power Committee

10/11/16

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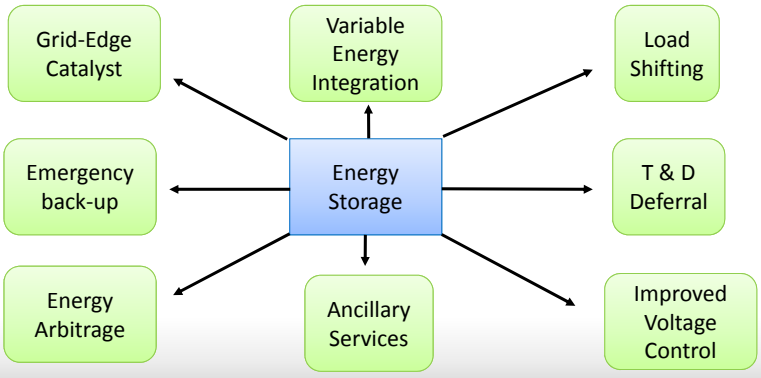
What is energy storage? What are its value streams?

The capture and storage of energy generated at one time, to be discharged and used at another time



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How will the Council incorporate energy storage into our analysis?

Generating Resources Evaluation and Analysis. Identify and analyze energy storage technologies (distributed & utility-scale) that could play a role in the future PNW power system. Includes cost, technical specs, resource potential, flexibility attributes, etc.

Load Forecasting. Identify and analyze distributed solar PV + energy storage and include in the load forecast for the Eighth Power Plan. Distributed solar effectively reduces load, inclusion of storage with solar should shift load and reduce peak demand.

Demand Response. Identify the cost and potential of storage (thermal and battery) that could be used by utilities for demand response programs for the Eighth Power Plan. (Storage is a growing part of many DR programs to shift loads.)

System Analysis and Modeling. Determine how best to model energy storage and its attributes in the Council's models, in particular, Regional Portfolio Model, GENESYS, and the load forecasting model .

Seventh Power Plan Action Items. See next slides.

ANLYS-14

Monitor and track progress on the emerging technologies that hold potential in the future Pacific Northwest power system

- Includes energy storage technologies

ANLYS-16

Research and develop a white paper on the value of energy storage to the future power system

- How to capture the full value stream that energy storage technologies can offer?
- Comprehensive report that captures state of technology and role storage can play in a power system
- Staff to develop report, with input from the GRAC. Scheduled completion for Fall 2017.

Upcoming Work

- Begin work on storage white paper and identification of technologies
- Schedule GRAC meeting for early 2017
- Ongoing load forecasting model updates to incorporate distributed solar + storage