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Regulatory Status of Energy Storage

Northwest Power and Conservation Council Meeting
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SPONSOR:
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U.S. Department of Energy

PNNL at a glance

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- 4,300 scientists, engineers, and non-technical staff
- $1.02 Billion operating budget

Energy Storage: Federal Research Agenda

- **Cost competitive energy storage technology** - Achievement of this goal requires attention to factors such as life-cycle cost and performance (round-trip efficiency, energy density, cycle life, capacity fade, etc.) for energy storage technology as deployed.
- **Validated reliability and safety** - Validation of the safety, reliability, and performance of energy storage is essential for user confidence.
- **Equitable regulatory environment** – Value propositions for grid storage depend on reducing institutional and regulatory hurdles to levels comparable with those of other grid resources.
- **Industry acceptance** – Industry adoption requires that they have confidence storage will deploy as expected, and deliver as predicted and promised.

Grid Energy Storage, US DOE, December 2013.

http://energy.gov/sites/prod/files/2014/09/f18/Grid%20Energy%20Storage%20December%202013.pdf

What is the basis for regulatory investigation into energy storage?

Federal Energy Regulatory Commission –

To understand and possibly address "barriers to the participation of electric storage resources in the capacity, energy, and ancillary service markets in the RTOs and ISOs potentially leading to unjust and unreasonable wholesale rates"

- AD16-20, *Electric Storage Participation in Regions with Organized Wholesale Electric Markets*, April 11, 2016.
- Requests jurisdictional organized markets to respond with information regarding storage access to market participation, in particular specified eligibility, technical qualification and performance requirements, bid parameters, and charging for later use.

Energy Storage Docket History at FERC

- **Order 755 on frequency regulation compensation in organized wholesale power markets (October 2011).** Directed ISOs and RTOs to develop frequency regulation tariffs that compensate market resources for the full range of services provided. Often called the "pay for performance" order, the 2011 action found that organized wholesale market operators were inconsistently and inadequately compensating frequency regulation services, in particular for a resource's ramping ability and signal accuracy.

- **Order 784 on third-party provision of ancillary services (July 2013).** Extended the Order 755 organized wholesale power market reforms to public utility transmission providers to amend the Open Access Transmission Tariff (OATT) *pro forma* to specify that public utility transmission providers will account for the speed and accuracy of frequency response and regulation resources in its practices. The order also revised the accounting and reporting requirements to improve reporting of transactions associated with the use of energy storage.

- **Order 792 on interconnection (November 2013).** Adopts revisions to the Small Generator Interconnection Agreement and Procedures *pro forma* to account explicitly for the interconnection of storage devices in order to ensure that storage devices are interconnected in a just and reasonable and not unduly discriminatory manner.

Bringing the Approach to Ground: Pacific Northwest Workshop

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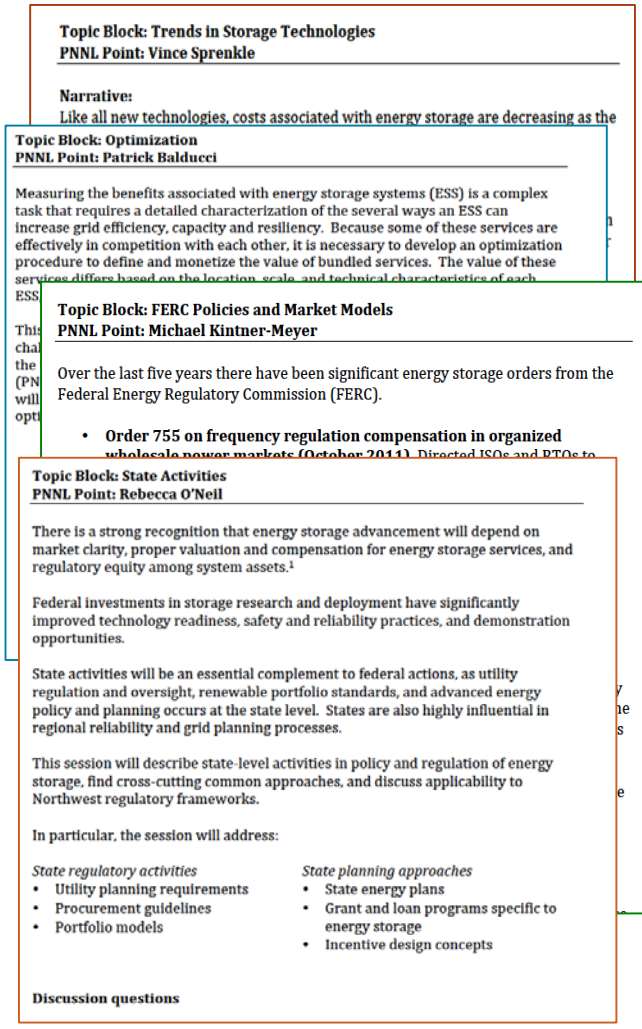
Key presentations:

- How storage works: components, definitions, system type to services
- Siting and sizing systems, value stacking and optimized dispatch in the Northwest U.S.
- Battery chemistries: cost, performance, what we know and where we still need to conduct research

What we learned:

- *State-by-state engagement*: There is value in regional outreach, but regulatory actions are state- and market-specific.
- *New tools and methods needed:* Storage is not well-characterized in existing Commission processes.
- *Independent review:* There is a need for fair and independent arbiters of information about energy storage.



Topic Block: Trends in Storage Technologies
PNNL Point: Vince Sprenkle

Narrative:
Like all new technologies, costs associated with energy storage are decreasing as the

Topic Block: Optimization
PNNL Point: Patrick Balducci

Measuring the benefits associated with energy storage systems (ESS) is a complex task that requires a detailed characterization of the several ways an ESS can increase grid efficiency, capacity and resiliency. Because some of these services are effectively in competition with each other, it is necessary to develop an optimization procedure to define and monetize the value of bundled services. The value of these

Topic Block: FERC Policies and Market Models
PNNL Point: Michael Kintner-Meyer

Over the last five years there have been significant energy storage orders from the Federal Energy Regulatory Commission (FERC).

- **Order 755 on frequency regulation compensation in organized**

Topic Block: State Activities
PNNL Point: Rebecca O'Neil

There is a strong recognition that energy storage advancement will depend on market clarity, proper valuation and compensation for energy storage services, and regulatory equity among system assets.[1]

Federal investments in storage research and deployment have significantly improved technology readiness, safety and reliability practices, and demonstration opportunities.

State activities will be an essential complement to federal actions, as utility regulation and oversight, renewable portfolio standards, and advanced energy policy and planning occurs at the state level. States are also highly influential in regional reliability and grid planning processes.

This session will describe state-level activities in policy and regulation of energy storage, find cross-cutting common approaches, and discuss applicability to Northwest regulatory frameworks.

In particular, the session will address:

State regulatory activities
- Utility planning requirements
- Procurement guidelines
- Portfolio models

State planning approaches
- State energy plans
- Grant and loan programs specific to energy storage
- Incentive design concepts

Discussion questions

State by State Approaches

- Diverse approaches to energy storage evaluation in regulatory forums observed:
  - R&D set-aside
  - Resource planning
  - Required procurement

Washington

Washington Utilities and Transportation Commission (UTC)

- In 2011, the Commission directed its regulated utilities (Avista, Puget Sound Energy, and Pacific Power) to address energy storage comprehensively in integrated resource planning
  - Docket UE-100961 (Puget Sound Energy IRP)
  - Avista IRP UE-101482 and Pacific Power IRP UE-100514

- After another round of utility IRP submissions, UTC Staff issued a draft white paper (*Modeling Energy Storage: Challenges and Opportunities for Washington Utilities*, May 2015) and initiated a docket requesting feedback.
  - Docket UE-151069
  - Purposes of the docket are “even-handed modeling approach” and “level playing field” for storage. Regulated utilities should “account for the benefits of energy storage in their planning and procurement activities.”
  - Workshop on August 25, 2015.

Washington Utilities and Transportation Commission (UTC)

- In 2016, the UTC issued a notice of Rulemaking for Integrated Resource Planning and indicated energy storage as one of several issues to be addressed in this rulemaking.
  - Docket No. UE-161024, notice issued September 6, 2016.
  - Requested additional comment before issuing a draft policy statement (anticipated early 2017) with associated comment period.
  - Final policy statement anticipated mid-2017.

- Policy statements
  - Unique instrument to give additional broad direction to regulated utilities outside of dockets.
  - Previously issued UTC policy statements include natural gas energy efficiency and early acquisition of renewable energy resources for RPS compliance purposes.

Oregon

- Oregon legislature passed HB 2193 in 2015 session
- Directs Oregon PUC to create procurement guidelines for storage by 2017 and for jurisdictional utilities to propose projects that meet those guidelines.
- Capacity/energy terminology in law: projects should have “the capacity to store at least five megawatt-hours of energy” but constitute no greater than 1 percent of peak load (38 MW PGE; 26 MW PacifiCorp)

78th OREGON LEGISLATIVE ASSEMBLY--2015 Regular Session

Enrolled

House Bill 2193

Introduced and printed pursuant to House Rule 12.00. Presession filed (at the request of House Interim Committee on Energy and Environment)

CHAPTER .....

AN ACT

Relating to energy storage; and declaring an emergency.

Be It Enacted by the People of the State of Oregon:

Oregon

Recap of HB 2193, UM 1751

Phase 1	Phase 2	Phase 3
PUC adopts guidelines by 1/1/17 for proposals submitted in Phase 2 • Rule or Order, PUC staff prefer Order • Docket UM 1751 • Workshops started January 2016	Utilities submit one or more ES project proposals to the commission by 1/1/18 • Data to identify potential system locations • Complements other planning efforts • Project details and cost-effectiveness evaluation • Treatment of confidential information	Commission may authorize projects • Capacity up to 1% peak 2014 load • Consistency with guidelines • Reasonable and in the public interest • May have above market cost
2016	2017	By 2020

National Laboratory Regulatory Engagement

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- **Analysis of resource planning applicability to energy storage**

How well traditional resource planning tools evaluate energy storage opportunities and alternative methods to revealing energy storage system benefits within utility regulatory frameworks.

- **State utility regulatory Commission direct engagement**

Work with Commissions and/or Staff to educate and support informed docket outcomes.

- **Incentive design evaluation**

Suitability of existing incentive mechanisms to energy storage development for maximum impact, considering cost drivers for technology deployment.

Analysis of resource planning applicability to energy storage

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- Problem Statement: Traditional resource planning approaches do not provide visibility into energy storage contribution to system benefits. Resource plans evaluate the costs and risks of various resource portfolios in meeting forecasted load profiles. The purpose of resource planning is primarily reliability and adequacy, with some accounting for flexibility.

- Challenges with IRP common practice revealing energy storage benefits:
  - Resource plans are not designed to look at location-specific benefits that accrue to the transmission or distribution system (e.g. deferral).
  - System models are not intended to review services on short-term time intervals, often not accommodating sub-hourly services.

Analysis of resource planning applicability to energy storage

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- Objective: a report that provides state Commissions and Staff with perspective on how well traditional resource planning tools evaluate energy storage opportunities, and describes alternative methods to revealing energy storage system benefits within *existing* utility regulatory frameworks that support utility decision-making and investment.

- Builds on and sharpens available literature (Bhatnagar 2012; Dragoon 2014) for the applied purpose of regulatory engagement.

- Final report in federal FY17
  - Formal review from committee of state Staff and industry.
  - Tool to change common practice and spur new investigations of energy storage.

Thank you!

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