

# The Equitable Regulatory Environment Program at PNNL

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DOE OE Energy Storage Peer Review

# Acknowledgment

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- ▶ **Equitable Regulatory Environment Overview**
  
- ▶ **PNNL's Strategic Objectives**
  
- ▶ **2018 Program Efforts**
  - ▶ Energy Storage Seminar for Western State Regulatory Staff
  - ▶ Technical Assistance to States
  - ▶ Energy Storage Policy Database
  - ▶ Report: Energy Storage in Integrated Resource Plans
  - ▶ Valuation Handbook
  
- ▶ **Looking ahead**

## Grid Energy Storage

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U.S. Department of Energy

The Department of Energy's [Grid Energy Storage report](#) (2013) determined that “value propositions for grid storage depend on reducing institutional and regulatory hurdles to levels comparable with those of other grid resources.”



December 2013

# Equitable Regulatory Environment Program Tasks

- ▶ **Document** federal, state and local policies affecting storage deployment
- ▶ **Review** integrated resource plans (IRPs) and similar analytic processes affecting storage development and deployment
- ▶ **Explore** alternative policies that may affect technology attributes and deployment
- ▶ **Maintain** publicly available information on storage technology and attributes affecting its deployment
- ▶ **Disseminate** comprehensive information on storage technology status, experience, and realizable contributions to grid resilience, emergency response, renewable deployment, and asset utilization
- ▶ **Provide** best practices for installation and use of energy storage to regulators, policy makers and industry

- ▶ **Strategic Objective:** Support regulatory commission decisionmaking as an independent, credible, and objective entity
  - ▶ **Actions:** convene workshops, provide technical assistance
  - ▶ **Task Link:** disseminate comprehensive information
- ▶ **Strategic Objective:** Serve as a resource for current storage regulatory efforts
  - ▶ **Actions:** establish a policy database
  - ▶ **Task Link:** document policies, maintain publicly available information
- ▶ **Strategic Objective:** Incorporate the unique benefits of energy storage into resource planning and other regulatory processes
  - ▶ **Actions:** produce valuation handbook, IRP baseline study
  - ▶ **Task Link:** review integrated resource plans, provide best practices

# Support Regulatory Decisionmaking: Energy Storage Seminar

**In November 2017, DOE and the labs convened a seminar for staff from state regulatory commissions in the Western U.S., held at the offices of the Western Electric Coordination Council (WECC) in Salt Lake City. The seminar had three goals:**

- To facilitate discussion about the challenges that staff face in current regulatory proceedings involving energy storage;
- To provide training to establish a baseline understanding of current energy storage technology and economics; and
- To solicit feedback from program participants about how future research and training can be designed to meet state needs.



## Please Rate the Overall Quality of the Seminar



## Four key themes emerged in participant feedback:

- ▶ Participants want more content from the Energy Storage Program
- ▶ Regulators are keenly interested in learning about the practical impacts of energy storage on the work that they do
- ▶ Regulators highly value the ability to network with counterparts in other states
- ▶ Involving stakeholders early in planning processes may improve outcomes



## Future seminars should:

- ▶ Be longer
- ▶ Streamline and shorten technical sections
- ▶ Increase content in the valuation and regulatory models section; emphasize practical examples
- ▶ Provide structured networking opportunities
- ▶ Engage participants well in advance to establish an information baseline and identify topics of interest

## The Energy Storage Program should:

- ▶ Embrace the objectivity of DoE and the national labs
- ▶ Consider the policy and regulatory implications of technological advances
- ▶ Research best practices for including energy storage in resource planning and procurement processes and cost benchmarking data
- ▶ Facilitate stakeholder group discussions
- ▶ Involve stakeholders in the development of program objectives and research projects

# Support Regulatory Decisionmaking: Technical Assistance to States

## Oregon

- ▶ Assisted the Oregon Public Utilities Commission in the implementation of HB 2193, which required the state's two largest utilities to acquire at least 5 MWh of energy storage

## Nevada

- ▶ Assisted the Nevada Public Utilities Commission in implementing SB 204, which directs the PUC to set a procurement target for energy storage if deemed appropriate

## Hawaii

- ▶ In partnership with the Hawaii Public Utilities Commission, developing a regulatory workshop for the Natural Energy Laboratory of Hawaii Authority's 2<sup>nd</sup> Energy Storage Conference in December

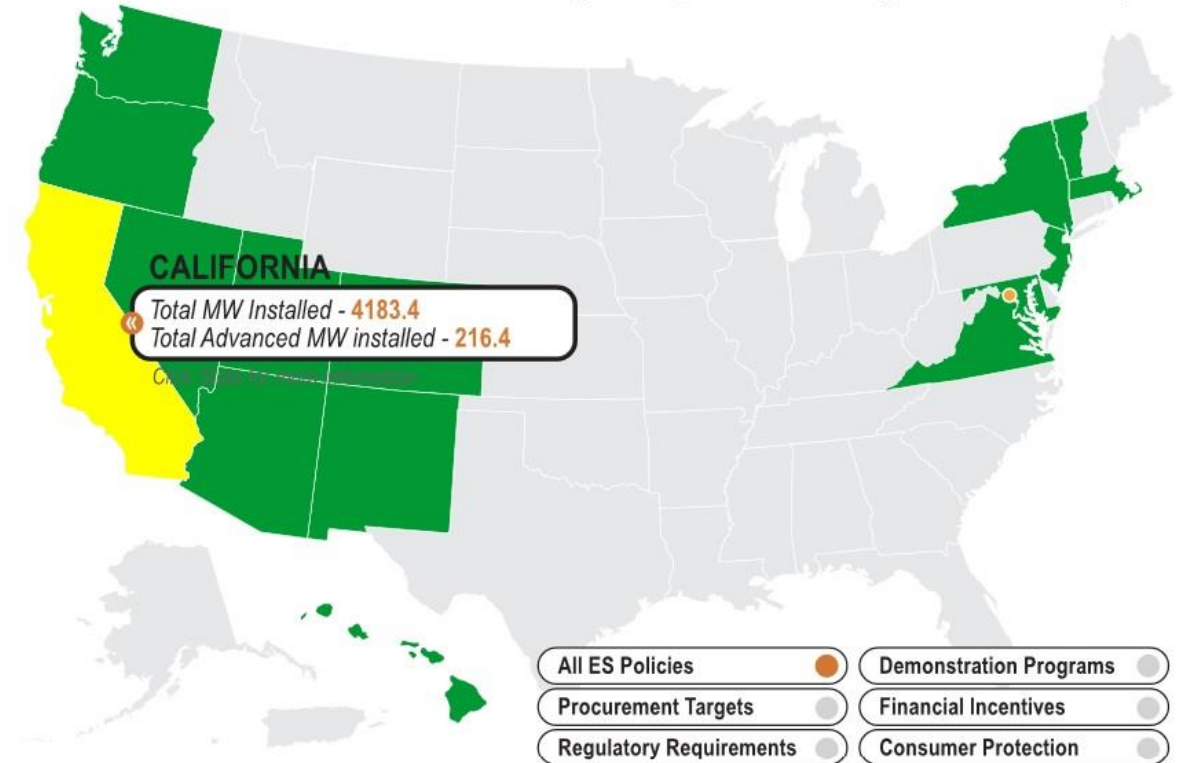
## Energy Storage Policy Database

- ▶ Documents five types of state-level energy storage policies
  - ▶ Procurement Targets
  - ▶ Regulatory Requirements
  - ▶ Demonstration Programs
  - ▶ Financial Incentives
  - ▶ Consumer Protection
- ▶ State-level storage installation data obtained from DOE's Global Energy Storage Database.
  - ▶ "Advanced MW" excludes pumped hydro and compressed air

### Energy Storage

#### Regulatory Activities

Funded by the Department of Energy, Office of Electricity



## Energy Storage Policy Database

- ▶ State boxes provide brief summary of policies with links to underlying information
- ▶ Target audiences
  - ▶ Regulators: Understand the actions being taken by peers and the information used in making those decisions
  - ▶ Policymakers: Review different mechanisms for enabling energy storage
  - ▶ Developers: Understand which markets are most favorable for development

### Energy Storage

#### Regulatory Activities

Funded by the Department of Energy, Office of Electricity

#### California



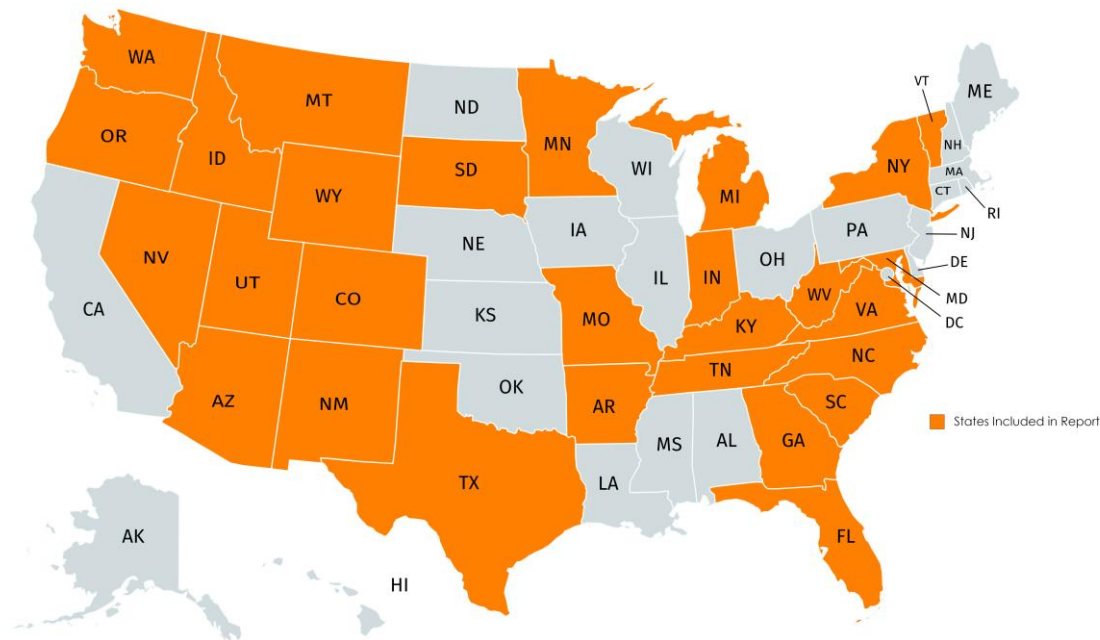
**Procurement Target** - 1325 MW by 2020 ([AB 2514](#)) | 500 MW (distribution-connected) by 2020  
**Regulatory Requirements** - The California Public Utility Commission issued **11 rules** in January 2018 requiring utilities to include the full economic value of energy storage in resource planning by evaluating multiple benefits.  
**Financial Incentives** - The Self-Generation Incentive Program ([SGIP](#)) has set aside \$378 million for customer-sited energy storage projects from 2017-2021.

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# Incorporate Storage into Regulatory Practices:

## Report: Energy Storage in IRPs

Researchers reviewed 21 integrated resource plan (IRP) filings from utilities around the country, with the goal of understanding how utilities view energy storage and to what degree it is being included in the resource planning and procurement process.



- ▶ Goal: Provide broad geographic coverage and include utilities of different sizes
- ▶ 21 utilities have service territory in 28 states
- ▶ Focused on plans filed in 2015 or later
- ▶ Report forthcoming

# Incorporate Storage into Regulatory Practices:

## Report: Energy Storage in IRPs

### Why study IRPs?

- ▶ IRPs are a primary tool used by many utilities to identify future resource needs and the optimal mix of investments – the “preferred portfolio” – that minimize costs and risks
- ▶ Traditional IRP modeling practices create two significant barriers for energy storage:
  - ▶ System-level view precludes analysis of locational benefits (i.e. distribution infrastructure deferral, voltage support)
  - ▶ Hourly resource dispatch limits analysis of flexible benefits (i.e. spinning reserve, frequency response)
  - ▶ Report provides insight into how the industry is responding to those barriers
- ▶ Gain insight into potential future investment levels in energy storage
- ▶ There has been growing activity around energy storage in regulatory and legislative circles in recent years; IRPs are the where implementation of those decisions begins

# Incorporate Storage into Regulatory Practices:

## Report: Energy Storage in IRPs

### Storage outcomes in the IRPs

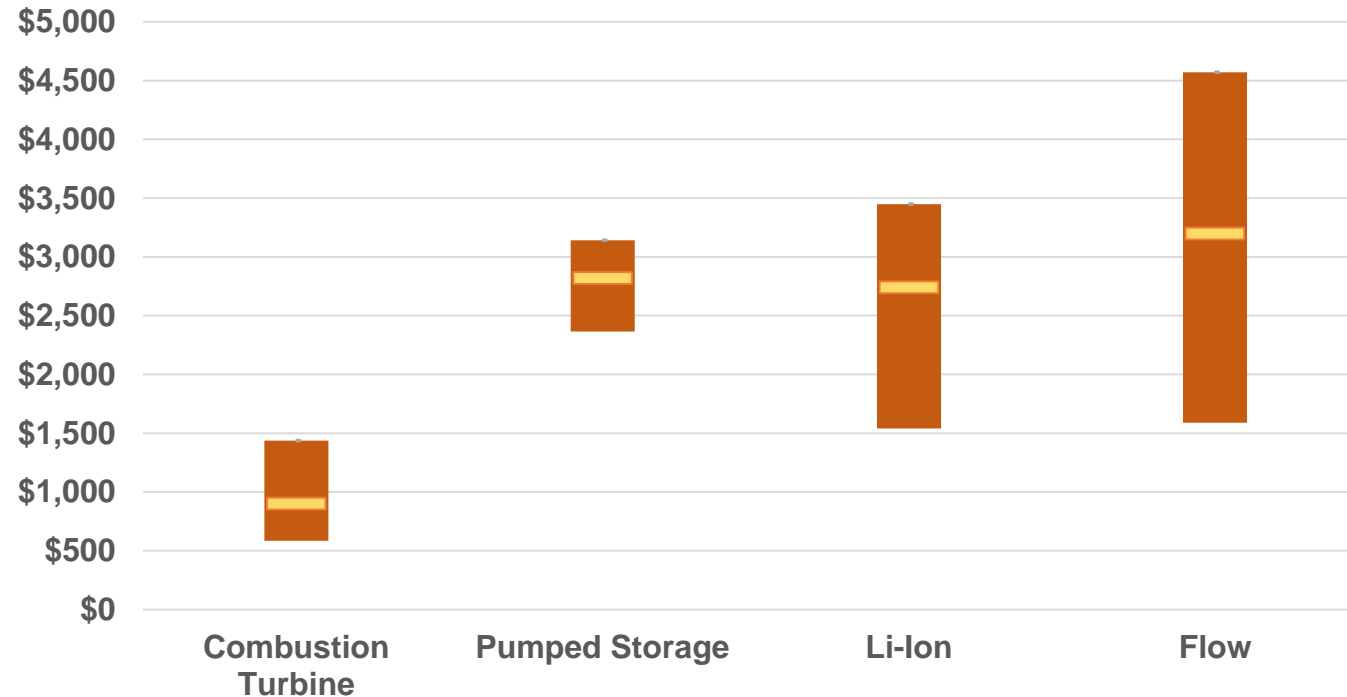
- ▶ Battery storage was included as a resource option in 15 of 21 plans. Of those 15:
  - ▶ Eight plans did not select batteries in any portfolio
  - ▶ Five plans selected batteries in the preferred portfolio
  - ▶ Two plans selected batteries in an alternate portfolio
- ▶ Pumped storage was included as a resource option in 10 of 21 plans. Of those 10:
  - ▶ Seven plans did not select pumped storage in any portfolio
  - ▶ Two plans selected pumped storage in the preferred portfolio (upgrades to existing facilities)
  - ▶ One plan selected pumped storage in an alternate portfolio

# Incorporate Storage into Regulatory Practices:

## Report: Energy Storage in IRPs

**Cost assumptions for newer resources are less certain than those for more mature resources:**

**Resource Cost Assumptions, 2017 \$ per kW**



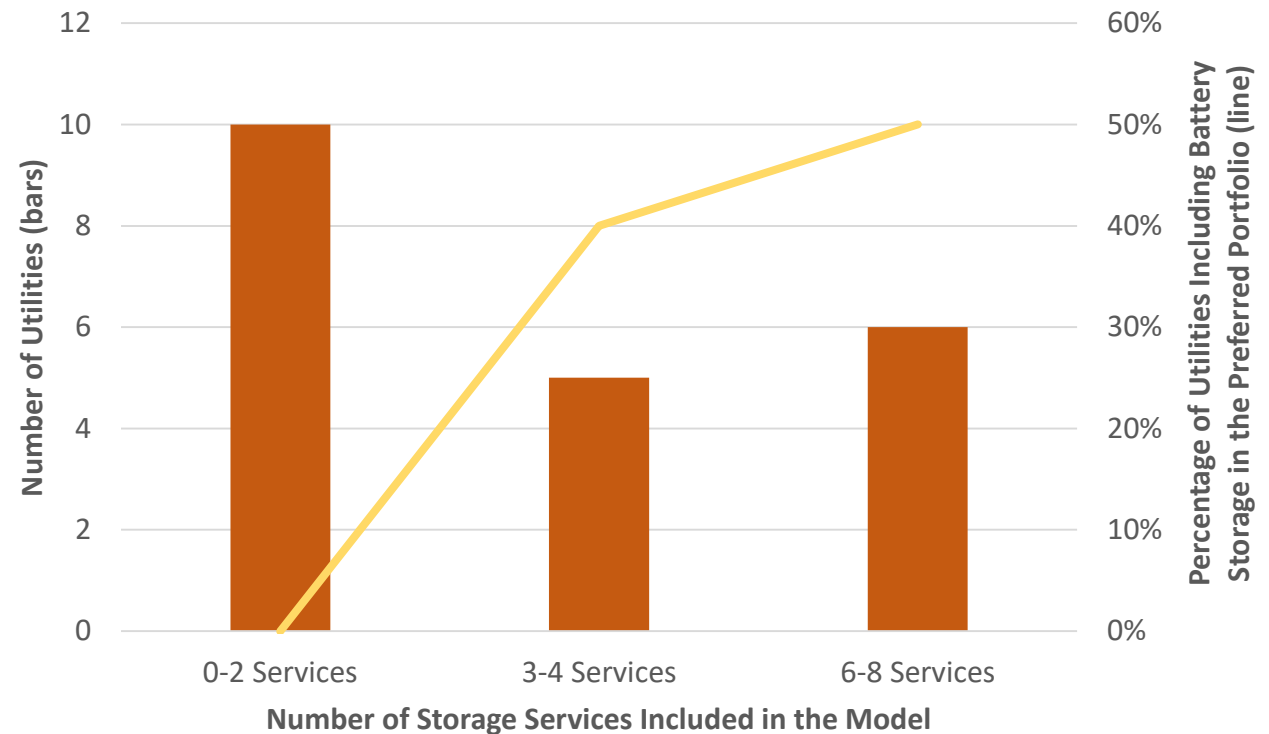


# Incorporate Storage into Regulatory Practices: Report: Energy Storage in IRPs

Energy storage can provide multiple grid services, many of which are not captured in traditional IRP modeling.

But as utilities expand IRP models to include more of those services, the likelihood of selecting energy storage increases.

## Percentage of Utilities Including Battery Storage in the Preferred Portfolio, by Number of Services Modeled



# Incorporate Storage into Regulatory Practices:

## Valuation Handbook

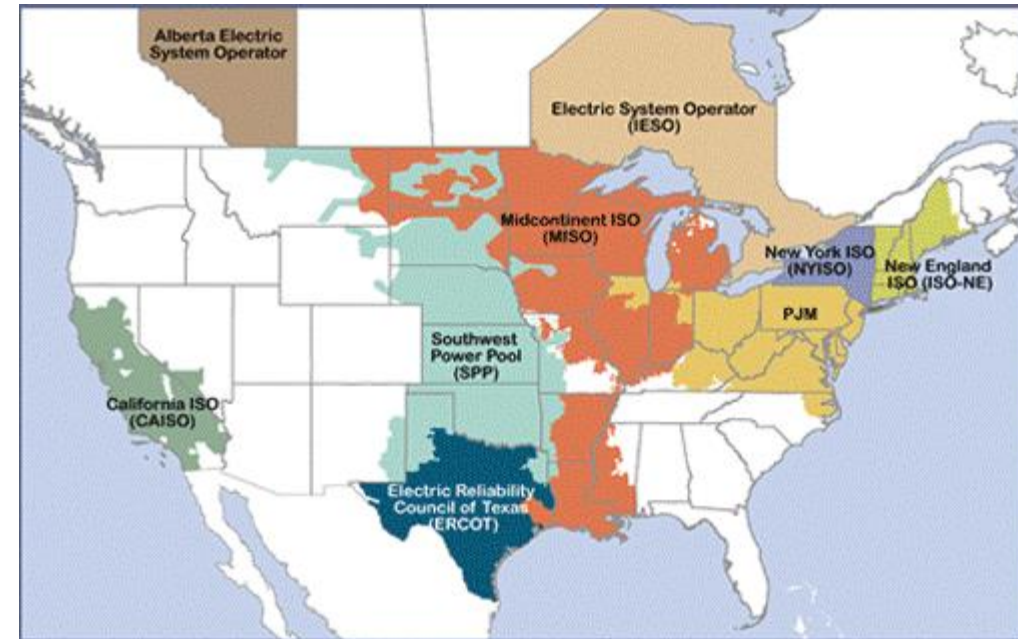
**PNNL is developing an Energy Storage Valuation Handbook, designed to distill all of the lessons learned across the Storage Program's research efforts into basic principles of energy storage analysis for utility planners, regulators, and policymakers.**

- ▶ Document Current Practice
  - ▶ Identify constraints
  - ▶ Pilot projects
- ▶ Use cases
  - ▶ Subhourly values
  - ▶ Locational values
- ▶ Economic co-optimization
  - ▶ Value stacking
  - ▶ Modeling approach
- ▶ Policy Alternatives
  - ▶ Procurement targets
  - ▶ Planning requirements
  - ▶ Demonstration projects
- ▶ Developing storage applications
  - ▶ Resilience
  - ▶ Behind the meter
  - ▶ Equity from grid modernization

## Planned activities for 2019:

- ▶ Complete Valuation Handbook
- ▶ Additional regulatory seminar
  - ▶ Target vertically integrated states
- ▶ Continued technical assistance
  - ▶ Hawaii
  - ▶ Mexico
  - ▶ Colorado
- ▶ Focused research on informing planning paradigms
  - ▶ Storage as transmission
  - ▶ Storage for grid optimization

## North American Regional Transmission Organizations



**Thank you!**

# Questions?

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