

# **Pnnl energy storage policy database**





## Overview

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Which researchers at PNNL focus on energy storage?

From left to right: Jie Xiao, Yuyan Shao, Jason Zhang, and Jun Liu are a few of PNNL's highly cited energy storage researchers. PNNL's energy storage experts are leading the nation's battery research and development agenda.

What is the focus of PNNL's research?

PNNL's research focuses on providing a clear understanding of the technology needs for integrating energy storage into the grid. We work with utilities and industry to assess the optimal role for energy storage installations under local operational and market conditions.

What is PNNL's Grid Storage Launchpad?

PNNL's Grid Storage Launchpad is an innovation and testing facility that accelerates the development, validation, and commercial readiness of storage systems for the power grid. For transportation applications, PNNL collaborates with researchers across the country on large energy storage initiatives.

What makes PNNL unique?

PNNL is unique in energy storage research and development due to its capabilities to validate emerging technologies at scales that are relevant to end users and that instill confidence for industrial developers.

What is the energy storage Grand Challenge?

As part of the Energy Storage Grand Challenge, Pacific Northwest National Laboratory is leading the development of a detailed cost and performance database for a variety of energy storage technologies that is easily accessible and referenceable for the entire energy storage stakeholder community.

What does pnnl-26492 stand for?



Washington Clean Energy Fund: Energy Storage System Performance Test Plans and Data Requirements Viswanathan V, P Balducci, J Alam, A Crawford, T Hardy, D Wu. 2017. PNNL-26492, Pacific Northwest National Laboratory, Richland, WA. Energy Storage System Safety: Plan Review and Inspection Checklist Cole PC, DR Conover. 2017.



## Pnnl energy storage policy database

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### Energy Storage @PNNL--Energy Cost and Performance ...

As part of the Energy Storage Grand Challenge, Pacific Northwest National Laboratory is leading the development of a detailed cost and performance database for a variety of energy storage ...

### [PNNL: Energy Storage: Publications](#)

Energy & Environmental Science 10 (13) 3620-3632 (September 2020). Abstract: The lithium-sulfur (Li-S) battery is a promising next-generation energy storage technology because of its high theoretical



### Energy Storage @PNNL: Energy Storage Cost and Performance ...

1.62K subscribers. Subscribed. 0. 220 views 1 year ago Energy Storage @PNNL Webinar Series. Featuring: Kendall Mongird, Economist and Vish Viswanathan, Chemical Engineer This presentation

### Publications

A guide to residential energy storage and rooftop solar State net metering policies and utility rate tariff structures Energy Equity Database Researchers at Lawrence Berkeley National Laboratory (LBNL) and Pacific Northwest National Laboratory (PNNL) (e.g



[PNNL: Energy Storage: Publications](#)

Kee Sung Han, Zhou Yu, Hui Wang, Paul C. Redfern, Lin Ma, Lei Cheng, Ying Chen, Jian Zhi Hu, Larry A. Curtiss, Kang Xu, Vijayakumar Murugesan, Karl T. Mueller."Origin of Unusual Acidity and Li + Diffusivity in a Series of Water-in-Salt Electrolytes." Journal of



**Gravitational**

Gravity-based energy storage systems are comprised of pressurized water that lifts a piston within a mined shaft and heavy bricks that are lifted by a crane to store energy. In each case the stored energy is converted into kinetic energy that generates electricity using generators.



**Long-Duration Energy Storage Can't Wait , Feature , PNNL**

Long-duration energy storage gets the spotlight in a new Energy Storage Research Alliance featuring PNNL innovations, like a molecular digital twin and advanced instrumentation.





## PNNL: Energy Storage: Energy Storage Policy Database

Energy Storage Home Types of Batteries Facilities Highlights News Publications Program Areas Grid Energy Storage Vehicle Energy Storage Battery500 JCESR Resources

Energy storage(KWh)  
**102.4kWh**  
Nominal voltage(Vdc)  
**512V**  
Outdoor All-in-one ESS cabinet



**TAX FREE**

### ENERGY STORAGE SYSTEM

**Product Model**  
HJ-ESS-215A(100KW/215KWh)  
HJ-ESS-115A(50KW 115KWh)

**Dimensions**  
1600\*1280\*2200mm  
1600\*1200\*2000mm

**Rated Battery Capacity**  
215KWH/115KWH

**Battery Cooling Method**  
Air Cooled/Liquid Cooled



### Grid Storage Launchpad

The Grid Storage Launchpad (GSL) is a \$75 million national grid energy storage R& D facility that will accelerate development of next-generation grid energy storage technologies that are safer, more cost effective, and more durable.

### Database schema design : Energy Flexibility Environmental

Energy Efficient Technology Integration Home Energy Score Energy Efficient Technology Integration Energy Storage Electrochemical Energy Storage Flexible Loads and Generation Grid Integration, Controls, and Architecture Regulation, Policy, and Valuation



### [Energy Storage Evaluation Tool](#)

PNNL has evaluated more than 30 energy storage systems across the country using ESET TM. A suite of apps for optimal dispatch, evaluation, and sizing of energy storage systems, such as ...





[PNNL: Energy Storage: Reports](#)

Planning Considerations for Energy Storage in Resilience Applications - Outcomes from the NELHA Energy Storage Conference's Policy and Regulatory Workshop JB Twitchell, SF Newman, RS O'Neil, MT McDonnell. 2020. PNNL-29738, Pacific Northwest



[Energy Storage Cost and Performance Database](#)

In support of this challenge, PNNL is applying its rich history of battery research and development to provide DOE and industry with a guide to current energy storage costs and performance ...



[Energy Storage Subsystems and Definitions](#)

Energy Storage Electrochemical Energy Storage Flexible Loads and Generation Grid Integration, Controls, and Architecture Regulation, Policy, and Valuation Science Supporting Energy Storage Chemical Energy Storage Environmental Management



[Energy Storage Evaluation Tool \(ESET\)](#)

According to the U.S. Department of Energy Global Energy Storage Database, there are almost 1,700 operational energy storage projects around the world testing ways to integrate these technologies into existing and evolving electricity infrastructure.





## ESMI Capabilities

PNNL's Automated Robotics for Energy Storage Lab enables ESMI materials scientists to accomplish in a day what used to take weeks or months. (Video: Pacific Northwest National Laboratory) Intelligent Database for Materials Discovery Physics-informed



## [Energy Storage Evaluation Tool](#)

Web site created using create-react-app The Energy Storage Evaluation Tool (ESET™) is a suite of applications that enable utilities, regulators, vendors, and researchers to model, optimize, and evaluate various energy storage systems (ESS). The tool examines a

## [Science Supporting Energy Storage](#)

The U.S. Department of Energy's Energy Storage Grand Challenge is to develop and domestically manufacture the technologies that can meet all U.S. market demands for energy storage by 2030. The end goal starts with science. Pacific Northwest National



## PNNL: Energy Storage

At PNNL, our researchers advance the growing and significant field of batteries through expertise in materials, manufacturing, and design. Our achievements in battery technology range from ...



## [DOE Global Energy Storage Database](#)

The DOE Global Energy Storage Database provides research-grade information on grid-connected energy storage projects and relevant state and federal policies. All data can be exported to Excel or JSON format.



### **A Consumer's Guide to Rooftop Solar and Home ...**

Homeowners must navigate a quagmire of complicated policies to determine whether the energy savings from rooftop solar panels or battery energy storage systems (BESS) are worth the high upfront cost. To help ...

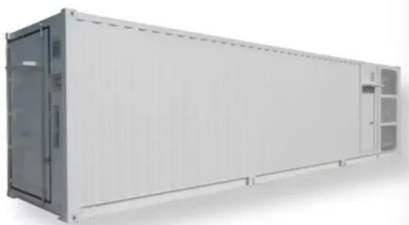
### **Energy Storage**

Understanding the benefits of the wide variety of storage technologies and developing the critical advancements required to bring down the cost of energy storage will help integrate renewable ...



### **2020 Grid Energy Storage Technology Cost and Performance ...**

development of a detailed cost and performance database for a variety of energy storage technologies that is easily accessible and referenceable for the entire energy stakeholder ...





## Maintaining the Energy Storage Policy Database

PNNL's Energy Storage Policy Database provides a comprehensive repository of state level energy storage policies. It brings value to policy makers, regulators, utilities, researchers, and ...



## [Pumped Storage Hydropower \(PSH\)](#)

Pumped storage hydro (PSH) is a mature technology that includes pumping water from a lower reservoir to a higher one where it is stored until needed. When released, the water from the upper reservoir flows back down through a turbine and generates electricity.

## Energy Storage

Examples of PNNL energy-storage technologies include a variety of apparatuses and methods for redox flow, lithium-ion, sodium-ion, and lithium-metal batteries. With our patented innovations, PNNL is knocking down barriers to superior ...



## [PNNL: Energy Storage: Publications](#)

Abstract: Since California adopted its energy storage mandate in 2013, 14 other states have developed energy storage policies designed to encourage adoption or reduce barriers. This paper reviews those efforts to identify what types of policies are being developed, the underlying goals and rationale behind different approaches, and the early outcomes of those policies.



## 2020 Grid Energy Storage Technology Cost and Performance ...

Richard Baxter, Mustang Prairie Energy \*  
vincent.sprenkle@pnnl.gov Technical Report  
Publication No. DOE/PA -0204 development of a  
detailed cost and performance database for a  
variety of energy storage technologies that is  
easily accessible and This



### [PNNL: Energy Storage: Reports](#)

2021. Regulatory Implications of Embedded Grid  
Energy Storage Jeremy Twitchell, Jeffrey Taft,  
Rebecca O'Neil, Angela Becker-Dippmann. 2021,  
PNNL-30172, Pacific Northwest National ...

### [Cost and Performance Estimates](#)

Energy Efficient Technology Integration Energy  
Storage Electrochemical Energy Storage Flexible  
Loads and Generation Grid Integration, Controls,  
and Architecture Regulation, Policy, and  
Valuation Science Supporting Energy Storage  
Chemical Energy Storage



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