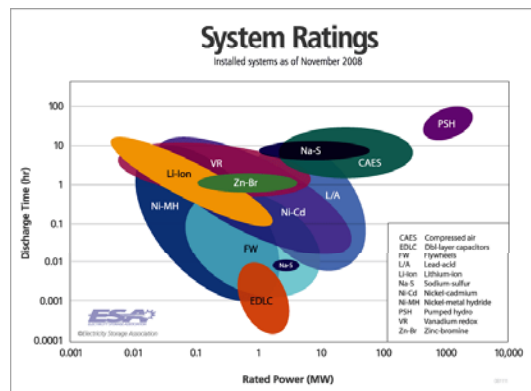


2020 Energy Storage Vision for California

Ethan Elkind
University of California, Berkeley, School of Law

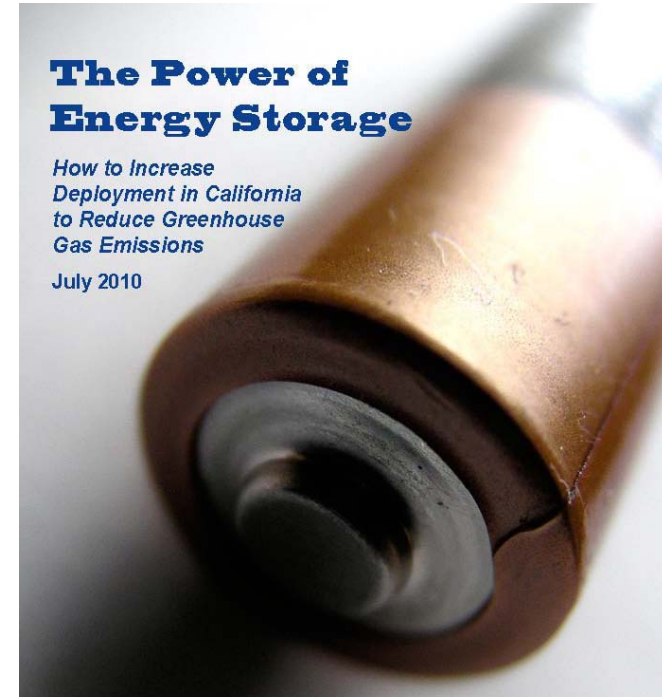
Byron Washom
University of California, San Diego



2011 Integrated Energy Policy Report
Committee Workshop on Energy Storage for Renewable Integration
April 28, 2011
Sacramento, California

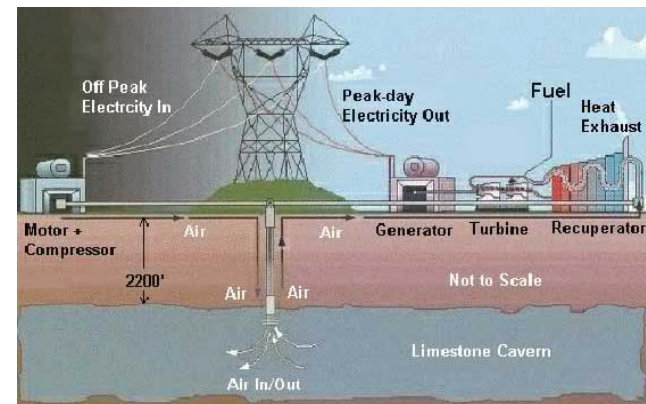
Energy Storage Policy Overview

- UC Berkeley/UCLA Law White Paper on Energy Storage
- Gathering of industry stakeholders
- Key barriers
- Recommended policies



Why Energy Storage?

- Definition: “A physical system with the ability to capture energy for dispatch or for displacement of electricity use at a later time”
- Integrating 33% renewables by 2020
- Reduces need for peak load power and spinning reserves
- Grid operational support



Key Barriers to Deploying Energy Storage



- Regulations & Utility Processes
- Monetizing the Ratepayer, Utility, & Societal Benefits
- Technology Maturity/High Capital Costs
- Lack of Public Awareness of Energy Storage Benefits

Regulatory Considerations

- FERC rules for energy storage asset class
- CAISO “unbundling” ancillary services
- CEC and CPUC add energy storage to energy loading order
- CPUC establish “resource adequacy” value
- Method for energy storage value to be reimbursed to providers
- 33% Renewable Portfolio Standard



Considerations to Lower Costs

- Continued R&D
- Tax credits and incentives
- CPUC standardized contracts for customer provided storage
- Rate basing substation and utility scale storage systems
- Encourage large-quantity, long-term commitments

Deploy at the *“speed of total value”*

Energy Storage Vision Project

- Sponsored by the California Energy Commission PIER Program
- Research Team:
- California Institute for Energy and Environment (CIEE)
- University of California, Berkeley School of Law
- University of California, Los Angeles
- University of California, San Diego

Energy Storage Vision Project (Cont.)

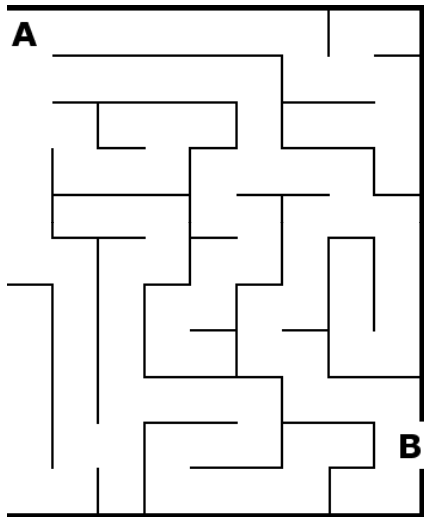
- Project Partners and Advisory Committee:
- CA IOUs
- CA ISO
- CPUC
- CESA / ESA
- CA POU's
- Energy Storage Industry
- EPRI
- National Labs, and
- Other energy storage interested parties

2020 California Energy Storage Vision

- Part 1: Technical status review of various technologies and remaining research and development needs
- Part 2: Strategic vision of energy storage scenarios over next ten years
- Highlights value of energy storage to meet future state energy goals



Goals and Project Timeline



- Support CPUC AB 2514 process
- Input to CEC 2011 IEPR process
- Input from utilities, energy storage system manufacturers, and other stakeholders
- Findings by June 2011
- Final report Summer 2011

Energy Storage Vision Project Approach – Technical Survey

- Survey existing technical and cost data
 - Highly vetted current publications
 - Publicly disclosed energy storage contracts
- Identify on-going R&D needs so that
 - “procurement targets and policies that are established are technologically viable and cost effective.”
- Analyze feasibility of accelerated deployment by 2015 and 2020

Energy Storage Vision – Policy Analysis

- Analyze state and federal policies affecting energy storage
- Highlight policies from other jurisdictions
- Identify most critical policies

Envisioning 2020

- Evaluate scenarios for potential CPUC targets under AB 2514
- 3 to 5 most promising applications for energy storage to address likely grid problems/ opportunities in 2020
- Business-as-usual scenario vs. accelerated deployment from policy changes
- Potential for disruptive events
- Ongoing research needs

Project Progress since February 2011

- Participation in CPUC AB 2514 Proceedings (March 9, 2011)
- Meeting with Energy Storage Stakeholders (March 30, 2011 at 4th Annual Energy Storage Summit)
- Ongoing input and feedback from stakeholders
- Technical survey of technologies mostly complete
- Framework developed for vision analysis

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