DOE Electricity Advisory Committee

Energy Storage Subcommittee Update Biennial Storage Review

February 2023

2022 Biennial Energy Storage Review

STATUTORY REQUIREMENT

Energy Independence and Security Act of 2007 (EISA)

Energy Storage (Technologies) Subcommittee of EAC formed in March 2008 in response to Title VI, Section 641(e)

Title VI, Section 641(e) imposes two requirements on the energy storage subcommittee

Section 641(e)(4): '. . . every five years [the Energy Storage Technologies Subcommittee], in conjunction with the Secretary, shall develop a five-year plan for… domestic energy storage industry for electric drive vehicles, stationary applications, and electricity transmission and distribution.'

Section 641(e)(5): '. . . the Council shall (A) assess, every two years, the performance of the Department in meeting the goals of the plans developed under paragraph (4); and (B) make specific recommendations to the Secretary on programs or activities that should be established or terminated to meet those goals.'

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SCOPE

2012 review focused on energy storage-related activities of OE

2014 review expanded this scope to further include EERE, ARPA-E, and SC

Also examined coordination between the Department and other Federal agencies (*e.g.*, NSF and DOD). In-line with offices and agencies included in the Department's overall strategy

2016 review maintained the same broad programmatic scope

Technological scope was expanded beyond electricity in/electricity out storage

Included power-to-gas, thermal, and virtual storage

2018 review maintained the same broader scope

Relied extensively on industry interviews. Was more succinct than previous years'

2020 review maintained the same broader scope

Relied more heavily on EAC expertise. Kept the streamlined format

2022 review

Maintain scope and consider broad, holistic view of energy storage industry, applications and impact

New developments: ESGC, IIJA

Leveraging the work of the ESGC into the BSR

EAC and Industry inputs

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PROCESS

Background

2020 Biennial Energy Storage Review
EAC Recommendations on the ESGC

2021 Energy Storage Five-Year Plan

Information gathering

- Panel March: Facilitating the Integration and Commercialization of Energy Storage- How DOE can Leverage its Role and Resources
- Panel June: Supply Chain Considerations for Energy Storage
- EAC Biennial Energy Storage Review Briefings
  - ESGC & Long Duration Energy Storage for Everyone, Everywhere Initiative
  - EVs as a grid storage asset
  - ES resilience demos
  - Hydrogen
- Energy Storage Peer Review
- Industry interviews
- EAC internal expertise

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UPDATED TIMELINE

Draft plan

RESEARCH		**DRAFTING**	
Mar:	EAC kick-off	Jul:	Outline
Mar-Jul:	Info gathering / Briefings	Sep:	1st draft
Sep-Oct:	Info gathering / Interviews	Jan:	EAC Adopt
Nov:	Peer review	Feb:	EAC Vote

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Overview

Organized Into Five Development Tracks

- Technology Development
- Manufacturing and Supply Chain
- Technology Transition
- Policy and Valuation
- Workforce Development

Considered 7 Use Cases

- Facilitating an Evolving Grid
- Serving Remote Communities
- Electrified Mobility
- Interdependent Network Infrastructure
- Critical Services
- Facility Flexibility, Efficiency and Value Enhancement:
  - Commercial and Residential Buildings
  - Energy-Intensive Facilities

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Overview

Organization of Use Cases

- Identifies Obstacles and Challenges
- Identifies Development Track
- Identifies Current Status in DOE Programs

Organization of Findings

- Tabulated for each Use Case
- Summary of Findings for each Use Case
- Additional Comments Section
- Recommendations
- Conclusion and Gaps

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Overview

Recommendations

- Conduct Macro-Energy Storage Analysis
- Coordinate with Industry to Promote Market Efficiency
- Support Efforts to Remove Barriers Energy Storage
- Support Energy Storage Deployment for Interdependent Infrastructure
- Support Bidirectional Storage Capacity of Electrified Mobility
- Promote Standards that Support Industry Best Practices
- Support Timely Interconnection and Integration of Storage Assets

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Overview

Macro Energy Storage Analysis Summary

"DOE should conduct a macro-energy storage analysis to determine the power and duration of energy storage needed and where it is needed."

"This analysis should be communicated to policymakers and regulators to reduce the risk of becoming overly dependent on energy storage if it is not available on the needed timeline."

Coordinate with Industry to Promote Market Efficiency

"DOE should coordinate the development of high-level ownership rules and intrinsic value propositions for energy storage systems."

"The goal should be to optimize the use of energy storage to benefit end-use customers while balancing a highly reliable electric grid with reasonable cost and equitable opportunities for ownership."

"A change in systems thinking from a central push of power model paradigm to a push/pull network resource model is critical."

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Overview

Support Efforts to Remove Market Barriers to Energy Storage

"It is imperative and productive to redouble efforts to help policymakers, regulators, and utilities understand the critical interdependence of energy storage in facilitating VRE resources, such as wind and solar, and the limitations on how much energy storage and VRE resources can be integrated into a grid without compromising reliability."

"Federal guidance on best practices and standards for integrating energy storage can assist state regulators in facilitating the highest and best value of energy storage integration and remove regulatory and structural barriers and disincentives."

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Overview

Support Energy Storage Deployment for Interdependent Infrastructure

"Recognition of the interdependencies of electric supply and a wide range of other critical infrastructure services is an important next step in ensuring the resiliency of both the grid and those important services."

"DOE can play a leadership role in helping to define those interdependencies…. this information can then be used to create potential roadmaps for integrating energy storage to facilitate mutual improvements…"

Support Bidirectional Storage Capability of Electrified Mobility

"Electrified mobility through EVs and emerging electrification of marine and aviation transportation should be acknowledged and quantified in the macro-energy storage analysis."

"DOE should lead in ensuring that electrified mobility supports grid stability and contributes to the macro storage needs of the grid and not contribute to peaking magnitude and variability that undermines and competes with fixed storage."

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Promote Standards that Support Industry Best Practices

"DOE should play a leadership role in promoting the development of standards for the entire spectrum of the energy storage industry, including the compatibility of communications and controls, regulatory consistency, siting and safety considerations, obsolescence, disposal and recycling, reliability, and cyber and physical security."

Support Timely Interconnection and Integration of Storage Assets

"DOE can assist in accelerating the deployment of storage assets by promoting a two-pronged approach of showcasing successful use cases and best practices, and by assisting state and federal regulators, end users, and industry in recognizing and confronting the barriers to energy storage integration."

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Gaps

EAC members have identified three primary gaps that would benefit from intentional federal support:

- Supporting policymakers and regulators in efforts to remove barriers to adoption, showcase successful use cases and best practices to promote feasible deployments, and develop plans that appropriately value and integrate energy storage into energy, resilience, and climate policy.
- Supporting efforts to overcome the technical and practical challenges of interconnecting energy storage systems to the grid or behind-the-meter.
- Focusing on technology development challenges around mid-stage technology development (TRLs 5–7) with regard to improving performance, safety, reliability, and cost outcomes for adopters.

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Conclusion

"While the Department has focused extensively on early-stage technology development, primarily around battery chemistry research, to reduce costs, there is a driving need across the country for additional work and support to solve the core business and regulatory challenges with deployment…"

2022 Additional Projects

June EAC Energy Storage Subcommittee Planning
In Progress

Anything else?
Pending subcommittee discussion


Questions?
Comments?