Energy Storage Subcommittee Update

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The Ohio State University

Electricity Advisory Committee
28 May, 2020

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Outline

1. 2020 Biennial Storage Review
2. 2021 Energy Storage Review

2020 Biennial Storage Review

Statutory Requirement

- Energy Independence and Security Act of 2007 (EISA)
  - ➥ Energy Storage (Technologies) Subcommittee of EAC was formed in March 2008 in response to Title VI, Section 641(e)
- Title VI, Section 641(e) imposes two mandates on this subcommittee
  1. 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.'
  2. 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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EISA Requirements

- The '2012 Storage Report: Progress and Prospects: Recommendations for the U.S. Department of Energy,' approved 24 January, 2014, fulfilled both requirements
- The '2014 Storage Plan Assessment: Recommendations for the U.S. Department of Energy,' approved 25 September, 2014, fulfilled the second
- The '2016 Storage Plan Assessment: Recommendations for the U.S. Department of Energy,' approved 29 September, 2016, fulfilled both requirements
- The '2018 Biennial Energy Storage Review,' approved 20 June, 2019, fulfilled the second
- The '2020 Biennial Energy Storage Review' fulfills the second

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2020 Biennial Storage Review

Scope

- The 2012 review focused on storage-related activities of OE
- The 2014 review expanded this scope to include OE, EERE, ARPA-E, and SC
  - The report examined also co-ordination between the Department and other Federal agencies (*e.g.*, NSF and DOD)
  - This was in line with offices and agencies included in the Department's overall strategy
- The 2016 review maintained the same broad programmatic scope
  - Technological scope was expanded beyond electricity in/electricity out storage
  - Includes power-to-gas, thermal, and virtual storage
- The 2018 and 2020 reviews maintain this same breadth

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2020 Biennial Storage Review

Process

1. DOE program update
2. 2019 DOE/OE Energy Storage Program Peer Review
3. Outside Interviews
4. Drafting by working group (Laney Brown, Flora Flygt, Lola Infante, and Ramteen Sioshansi)
5. Energy Storage Subcommittee review, discussion, and vote
6. EAC review, discussion, and vote

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2020 Biennial Storage Review

DOE Program Update

- 20 September, 2019 webinar
- Full EAC membership invited
- Presentations by each program office (OE, EERE, SC, ARPA-E) on energy storage-related research, development, and deployment (RD&D) activities

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2019 DOE/OE Energy Storage Program Peer Review

- 23–26 September, 2019, in Albuquerque, New Mexico
- Flora Flygt, Clay Koplin, and Ramteen Sioshansi attended
- Reviewed the totality of OE's energy-storage RD&D portfolio

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Interviews

- Outside interviews: users and implementers of the Department's energy-storage program to inform assessment and recommendations
- Interviewee groups:
  1. Energy-storage industry
  2. Generation industry
  3. Utility industry
  4. State regulators, energy officials, and legislators
  5. Consumer advocates
  6. Energy and environment think tanks and NGOs
  7. Department and National Laboratory program managers

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2020 Biennial Storage Review

Findings

1. Program goals are appropriate and activities are beneficial. A key grand challenge that remains is the development of viable technologies for long-duration and seasonal energy storage.
2. Effective handling of low- and high-TRL technologies. A lingering challenge is mid-TRL technologies and the 'valley of death.'
3. Energy-storage-modeling exercises and -valuation tools are helpful. They can be used to inform investment decisions and engage key stakeholders and regulators of energy-storage value and applications.
4. Energy Storage Grand Challenge (ESGC) will help develop a DOE-wide strategy for addressing energy-storage RD&D needs and coordinate activities among the program offices. Additional funding requested in fiscal year 2020 budget will help challenges, particularly *vis-à-vis* long-duration energy storage.

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2020 Biennial Storage Review

Recommendations

1. EAC supports ESGC. A key strength is cross-cutting approach to coordinating activities across offices. The approach could and should be expanded to coordinate activities with other pertinent agencies.
2. Additional resources and emphasis should be directed toward dissemination of RD&D products and greater engagement of state-level and industry stakeholders.
3. Emphasis on batteries in the RD&D portfolio should remain, but portfolio should be expanded to include economically viable technologies for long-duration and seasonal energy storage. One possible existing technology is advanced pumped hydroelectric energy storage, which can be built immediately to utility scale.

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Recommendations

4. Pursue tailored stakeholder input to RD&D
    1. Pursue 'full-bore' low-TRL technologies with technical and economic viability.
    2. Seek input from developers and deployers of mid-TRL technologies, to identify critical gaps that RD&D can address.
    3. Seek input from skeptics of high-TRL technologies, to identify remaining technical and economic barriers.
5. Expand dissemination of tools that can be used for modeling the value and performance of different applications and energy-storage technologies in different energy-system contexts.

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2021 Energy Storage Review

Energy Storage Grand Challenge (ESGC)

- The Department's 10-year strategic roadmap
- EAC engaging in all phases of ESGC to provide input and feedback throughout the process
  - Public regional workshops
  - EAC input to initial draft of ESGC
  - EAC comments on ESGC RFI
- EAC will rely on member engagement throughout the ESGC process as well as on additional appropriate stakeholder input
- Timeline will co-incide with ESGC schedule

Thank you

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