



*Independent Statistics & Analysis*  
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# 2020 EIA Energy Storage Workshop Summary

July 2020



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**SUBJECT:** Summary of Energy Storage Workshop held on July 16, 2020

This memorandum summarizes the subject matter covered at the inaugural Energy Storage Workshop, which the U.S. Energy Information Administration (EIA) held virtually through WebEx on July 16, 2020. EIA staff, as well as representatives from the Energy Storage Association (ESA), U.S. Department of Energy (DOE), Pacific Northwest National Lab (PNNL), Norton Rose Fulbright, California Independent System Operator (CAISO), and Fluence presented. You can view the presentations online at <http://www.eia.gov/electricity/workshop/batterystorage/>.

The workshop had three primary objectives:

- Bring together experts to share their knowledge and discuss the main short- and long-term challenges associated with integration of energy storage in power markets
- Gain insight into the main data and analysis needs of the energy storage industry that would help solve these challenges
- Showcase EIA's latest available data and analysis related to energy storage, as contained in the *Battery Storage in the United States: An Update on Market Trends* report released July 15, 2020

## Discussion

EIA presented data and analysis drawn from the *Battery Storage in the United States: An Update on Market Trends* report. The major takeaways from the EIA presentation include the following:

- U.S. battery storage grew from 68 megawatts (MW) in 2012 to 869 MW in 2018.
- Storage installations have shifted toward installations with greater energy capacity in recent years; the hours of stored energy increased from 43 megawatthours (MWh) in 2012 to 1,236 MWh in 2018.
- 58% of battery storage occurred in states outside of PJM and CAISO.
- By 2023, 8 gigawatts (GW) of renewable plus storage projects plan to come online.

Participants asked about EIA's views on longer duration batteries (more than eight hours). EIA noted that the longest duration batteries on the U.S. grid that are reported to EIA are two seven-hour systems. EIA also noted that based on current costs and levels of renewable penetration the economic case for

greater than eight-hour duration batteries is not as strong as for four-hour or less systems, but that it may change in future scenarios where large amounts of renewables are deployed.

The first panel included representatives from the U.S. Department of Energy (DOE), the Energy Storage Association (ESA), and the Pacific Northwest National Laboratory (PNNL). DOE presented its Energy Storage Grand Challenge, a mission to focus resources across DOE to create a program that will enhance and accelerate battery storage deployment through informing more effective policy and regulatory decisions regarding battery storage, as well as engaging in many efforts that can assist with this challenge. ESA presented energy storage data and analysis needs from many stakeholders in the industry and provided insight on current resources and analyses. PNNL provided information on the *Grid Energy Storage Report*, as well as insights into energy storage regulatory issues and implications.

The first question posed to this panel was on the definition of the term hybrid. One panelist commented that combined renewable and battery projects have a variety of configurations and operations, with different cost structures and capacity valuations, and thus may require categorizations. Another panelist commented that from a research standpoint it is necessary to understand the different categorizations for hybrid projects. A third panelist commented that possibly an entity like DOE could aid the industry in developing a resource classification for hybrids. DOE shared that it is thinking of trying to develop energy storage definitions, but there are uncertainties around industry acceptance and with confusion in defining technical characteristics defined by parameters versus market aspects.

Participants talked at length about EIA metrics and about where EIA data may fall short. EIA informed the audience that they received feedback in 2015 on changes to battery storage data and added some additional data points that are available publicly. EIA is interested to hear from industry experts about what other attributes they would want or if current EIA battery storage data does not cover their needs. This point brought up further discussion about the definitions of use cases. One panelist said that an emphasis on duration is very helpful in conversation around applications. Another panelist commented that certain use cases are more easily defined as ancillary services where others are not well defined.

Lastly, the panel addressed questions about cost: how does the industry look at cost metrics, such as the levelized cost of electricity for battery storage, and how does is accurate cost data collected? One panelist emphasized that the value of storage pertains more to capacity than energy so it is better to inform capital costs from a megawatt perspective and that duration is an important aspect of cost. All panelists agreed that cost data is a challenge in the industry and that there may be room for a trusted partner to gather this information from the industry.

The second panel included representatives from Norton Rose Fulbright, California Independent System Operator (CAISO), and Fluence. Norton Rose Fulbright provided the scope of its battery storage work and the drivers and challenges in the industry. CAISO provided an update on the battery storage projects in its interconnection queue and where battery storage can play an important role in meeting its load. Fluence provided an overview of its battery storage designs and projects and how storage project durations may change over time.

Participants asked the second panel about revenue streams for battery storage projects, use cases, and financing of battery storage projects. One panelist mentioned that most contracts being requested now are focusing on renewable energy shifting. These contracts are also interested in frequency regulation and resource adequacy in large-scale applications and micro-level arbitrage for behind-the-meter projects. This panelist shared that lenders prefer projects that can do one or two things well, so they are focusing on a few use cases with clear revenue streams. Distributed resources are finding value from many sources, including from California Self Generation Incentive Program (SGIP) revenue, Federal Investment Tax Credits (ITC), ancillary services, and arbitrage.

One panelist said that financing merchant storage projects is not easy, but it is happening. Another panelist commented that storage plants are becoming cost competitive with newer generating plants and that the industry is seeing early signs of some plants closing before their expected life span. A third panelist commented that frequency regulation is the most used and monetized application in California and that frequency regulation is significantly influenced by the considerations of roundtrip efficiency and deep cycling that is required for other applications like arbitrage.

The panel discussed the challenges with ramping to satisfy increases in load, as evidenced by the duck curve. One panelist commented that large fossil-fuel combined-cycle projects cannot ramp smoothly, which requires electric system operators to sequence the dispatch of multiple peaking units where battery storage projects do not have the same challenge. This factor explains why battery storage is a significant asset for combating the duck curve, but it is only part of the solution. Another panelist commented that the speed of the ramp is not an issue for battery storage projects because they can ramp up within seconds.

## **Attendance Summary**

### Presenters

- Angelina LaRose—EIA
- Alex Mey—EIA
- Vikram Linga—EIA
- Jason Burwen—Energy Storage Association (ESA)
- Alejandro Moreno—U.S. Department of Energy (DOE)
- Jeremy Twitchell—Pacific Northwest National Laboratory (PNNL)
- Caileen Kateri Gamache—Norton Rose Fulbright
- William Weaver—California Independent System Operator (CAISO)
- Ray Hohenstein—Fluence

### Panel Moderators

- Christopher Namovicz—EIA
- Glenn McGrath—EIA

### Participants (171)

- EIA (38)
- NREL (21)
- Other government and research (33)

- Industry (79)
- Public Utilities, RTO/ISO's, Professional Organizations, Developers, Manufacturers, etc.
- Some names include AES Corporation, California ISO, Energy Storage Association, Fluence Energy, ICF, IFC, Norton Rose Fulbright LLC, Saft America, Siemens, and Wood Mackenzie