Battery Energy Storage Projects & Developments

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1. Introduction

The last time I covered the title subject was in October with the post described and linked below.

Battery Day – Part 2: In Part 2 of this paper, I covered: other (non-Tesla) battery developments, the new current largest battery energy storage system (BESS) in the world (also non-Tesla), the upcoming new largest BESS (Tesla), and finally any other recent or near future major BESS projects (mainly in California).

https://energycentral.com/c/cp/battery-day-%E2%80%93-part-2

With this post we will focus on new grid-scale BESS projects and other developments for BESS technology.

One other comment: After considering the issue, I decided not to include virtual power plants (distributed energy resources) that include battery systems in this post. I will probably cover that in a later post.

2. Developments

2.1. U.S. BESS Market

The U.S. market for grid batteries passed the $1 billion mark and the 1-gigawatt threshold for the first time according to the latest Energy Storage Monitor report from Wood Mackenzie. Overall capacity installations were double those for 2019.[1]

Battery capacity is frequently used to store solar and wind energy when there is low demand, and respond in times of peak demand.

2.2. BESS Safety

Readers that have been following BESS Market developments for a while know about the 2019 explosion in McMicken facility, which injured four firefighters near Phoenix, Arizona. Although it was clear early on that this was caused by a build-up of flammable gasses in the container where batteries were stored, investigators formally identified the causes last summer.

- Once (at least) one battery had a thermal runaway, the fire-suppression equipment was not sufficient to keep it from expanding to the whole rack of batteries
- First generation BESS designs (like this one) used large shipping container-like enclosures with minimal ventilation, allowing flammable gasses to accumulate.

[1] Julian Spector, Greentech Media (GTM), "Greentech Media's Must-Read Energy Storage Stories of 2020", Dec 28, 2020, https://www.greentechmedia.com/articles/read/the-top-10-energy-storage-stories-of-2020?utm_medium=email&utm_source=Daily&utm_campaign=GTMDaily

- Any oxygen supply (like a first responder opening the door) could cause an explosion.

The solutions to the above issues are obvious, but one development is using smaller standardized enclosures like Tesla's Powerpack and Megapack (links below) rather than larger structures. This allows protective components to be baked into the standard design and evaluated using computer models. Fluence also appears to be following this practice (link below).

https://www.tesla.com/powerpack

https://www.tesla.com/megapack

https://fluenceenergy.com/energy-storage-technology/

LG Chem, which made the batteries for McMicken, disputes the finding that a cell failure kicked off the problem. In the final months of 2020, GM and Hyundai each recalled roughly 70,000 electric vehicles due to safety concerns about LG Chem cells, and GTM broke the news that LG Chem recently spun off (Their BESS Division) *as LG Energy Solution and recalled some of its home battery systems as well.*[1]

I tried to look at the current LG Chem BESS solution, but the site for the LG Energy Solution was confusing, the only product information were some short videos and there were no product details.

2.3. A Big BESS Fan Lives in a White House

President Biden is on the record saying he wants more energy storage. His energy platform referenced the technology numerous times, and it fits well in his strategy to jump-start the coronavirus-battered economy through investing in clean energy.

Congress jumped in first, though, passing a stimulus package just before Christmas that includes renewable tax credit extensions and $35 billion for energy research and development, including some storage-specific programs. [1]

Biden's pick of former Michigan Gov. Jennifer Granholm to run the Department of Energy bodes well for storage. In the aftermath of the 2008 recession, Granholm ran a strategic analysis of where Michigan could grow its economy and concluded that electric vehicle manufacturing was a top priority for industrial growth. That knack for spotting growth industries years before they hit their stride could lead to some savvy investments at DOE. And thanks to Congress, Granholm will have an extra pot of money to dispense...

Also since the VP is the former Junior Senator from California (and now has a big say in running the U.S. Senate), and of course the Speaker of the U.S. House is from California, and this is a trifecta. California is (and has been for many years) the state deploying the largest number of BESS projects (see below).

3. Projects

Each of the subsections below describes new, very large BESS project(s) from a specific state.

3.1. New York

Business partners Consolidated Edison Inc. (ConEd) and 174 Power Global decided on Astoria, Queens as the site for the largest battery storage project in New York.[2]

174 Power, a company that specializes in renewable energy projects, will be building the battery near the East River. The batteries will discharge 100 MW of electricity, which is enough to power the World trade center for around a day. The 100 MW/400 MWh East River Energy Storage System will hold enough electricity to run more than 16,000 homes for several hours during a summer heatwave.

3.2. Indiana

The Northeastern Rural Electric Membership Cooperative has announced plans for a utility-scale battery storage system it says will save consumers more than $35 million over 20 years. The co-op cites data from Bloomberg Energy Finance, which says the 108 MWh system will be the largest on record for Indiana or surrounding states.[3]

The NREMC says battery storage allows additional power to be exported onto the grid when it's most needed, such as times of peak demand or weather-related disruptions. The co-op says the new system would be able to deliver enough on-demand energy to supply three hours of emergency power to 3,200 homes.

Additionally, the system could be used during times of heavy demand to reduce overall usage and lower consumer rates over time.

The NREMC is partnering with California-based FlexGen on the project. The effort will include five battery sites throughout the co-op's six-county service area.

3.3. California

Most of the new capacity described in subsection 3.1 is headed to California, where batteries are the new go-to resource for meeting peak demand. Also, as Californians push to increase our renewable percentage, Wind and PV variability plus climate change impacts have increased the need for this most flexible of all capacity-types. [1]

3.3.1. PG&E

Pacific Gas and Electric Co. (PG&E) has requested California Public Utilities Commission (CPUC) approval of six additional battery energy storage projects totaling 387 MW of capacity, intended to further integrate clean energy from renewable generation sources while helping to ensure future reliability of the electric system.[4]

The project agreements resulted from a competitive request for offers (RFO) PG&E launched in July. The six new projects listed below all feature lithium-ion battery energy storage technology, each with a four-hour discharge duration.

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[2] Travis Mcmillan, Natural Gas Intelligence, "New York Energy Storage Systems Make Progress Towards Clean Energy Goals", Dec 30, 2020, https://www.naturalgasintel.com/new-york-energy-storage-systems-make-progress-towards-clean-energy-goals/

[3] Alex Brown, Inside Indiana Business, "Co-Op Planning Major Battery Storage Project", Dec 17, 2020, https://www.insideindianabusiness.com/story/43076077/coop-planning-major-battery-storage-project

[4] Matthew Mercure, North American Windpower, "PG&E Looks to Expand California Energy Storage Portfolio", Dec 28, 2020, https://nawindpower.com/pge-looks-to-expand-battery-energy-storage-portfolio

Nexus Renewables U.S. Inc. *– The AMCOR project is comprised of a 15-year agreement for a fleet of behind-the-meter battery energy storage resources totaling 27 MW located across a variety of sites in PG&E's service area*

Lancaster Battery Storage LLC *– The Lancaster Battery Storage project is comprised of a 15-year agreement for a 127 MW transmission-connected stand-alone battery energy storage resource located in Lancaster, Calif.*

LeConte Energy Storage LLC (a subsidiary of LS Power Associates L.P.) *– The LeConte Energy Storage project is comprised of a 15-year agreement for a 40 MW transmission-connected stand-alone battery energy storage resource located in Calexico, Calif.*

North Central Valley Energy Storage LLC (a wholly owned subsidiary of NextEra Energy Resources Development LLC) *– The North Central Valley Energy Storage Project is comprised of a 15-year agreement for a 132 MW transmission-connected battery energy storage resource located in Linden, Calif.*

Daggett Solar Power 2 LLC (a subsidiary of Global Infrastructure Partners) *– The Daggett 2 BESS project is comprised of a 15-year agreement for a 46 MW transmission-connected battery energy storage resource co-located with the Daggett 3 BESS Project in Daggett, Calif.*

Daggett Solar Power 3 LLC (a subsidiary of Global Infrastructure Partners) *– The Daggett 3 BESS project is comprised of a 15-year agreement for a 15 MW transmission-connected battery energy storage resource co-located with the Daggett 2 BESS Project in Daggett, Calif.*

The AMCOR project, the Lancaster Battery Storage project and the LeConte Energy Storage project – totaling 194 MW – are scheduled to come online by August 2022.

The North Central Valley Energy Storage project and both Daggett projects – totaling 193 MW – are scheduled to be online by August 2023.

3.3.2. SCE

Southern California Edison (SCE) has signed long-term contracts for four projects totaling 590MW of battery energy storage resources. The four contracts expand the utility's total amount of installed and procured battery energy storage capacity to approximately 2,050MW.[5]

Company	Project Name	Size (MW)	Online Date
Recurrent Energy	**Crimson**	200	8/1/2022
174 Power Global / Hanwha Group	**Eldorado Valley**	60	8/1/2022
NextEra Energy	**Desert Peak**	325	8/1/2023

[5] Smart Energy International, "Southern California Edison expands battery storage capacity with 590MW deals", Dec 10, 2020, https://www.smart-energy.com/industry-sectors/storage/southern-california-edison-expands-battery-storage-capacity-with-590mw-deals/

Southern California Edison (SCE) also signed a contract for lithium-ion battery-based energy storage — to enhance the regional grid's reliability and replace four large coastal once-through cooling plants.[6]

SCE wants these energy storage resources online by August 2021, an aggressive timeline unthinkable for any type of fossil fuel project of this size.

Most of the winning storage projects are co-located with nearby solar power plants to charge the battery over the term of the contract, help integrate renewable energy into the grid, and furnish resource adequacy during peak demand.

In an era of plunging battery costs, these awards point to the end of intermittent renewables and the dawn of dispatchable solar and wind.

Southern Power, a subsidiary of U.S. utility Southern Company, was awarded two projects, both coupled with PV plants.

88 MW/352 MWh **Garland Project**

72 MW/288 MWh **Tranquility Project**

Also, the 100 megawatt / 400 megawatt hour **Ventura Energy Storage** grid-scale battery, near Oxnard, CA has commenced construction.[7]

The Project, developed by Strata, was approved by Ventura County in April 2020. Tesla was subsequently awarded an Engineering, Procurement and Construction (EPC) contract to supply the state-of-the-art Megapack battery system.

Ventura Energy Storage was selected by SCE for a 20-year Power Purchase Agreement (PPA) to supply local capacity to the Ventura and Santa Barbara region. Operations are expected to commence in Q1 2021.

The AES Corporation has commenced operations of the Alamitos battery energy storage system (BESS), one of the world's largest battery storage systems in operation today. The BESS, a stand-alone energy storage facility for local capacity, will provide up to 400 megawatt-hours (MWh) of energy to ensure greener, smarter and more reliable power to Southern California Edison (SCE) customers…[8]

Note that ground-breaking of the Alamitos BESS was covered in the *Battery Day – Part 2* post which is linked in the Intro. Also not the peak output of this facility is 100 MW.

[6] Eric Wesoff, PV Magazine, "Southern California Edison wants its new, huge 770 MW battery storage procurement online fast", May 2, 2020, https://pv-magazine-usa.com/2020/05/02/southern-california-edison-wants-huge-770-mw-battery-storage-procurement-online-fast/

[7] Strata Solar, "Largest Battery Energy Storage Project in Southern California Starts Construction", Sep 2, 2020, https://stratasolar.com/news/news/largest-battery-energy-storage-project-southern-california-starts-construction

[8] AES News Release via PR Newswire, "AES Commissions Alamitos Energy Storage Facility in Long Beach, California", Jan 27, 2021, https://www.prnewswire.com/news-releases/aes-commissions-alamitos-energy-storage-facility-in-long-beach-california-301215792.html