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Battery Storage IN ELECTRICITY



From energy to battery storage

Energy storage can be applied to all steps of the energy value chain, and can decouple energy supply and demand. It is a field with multiple technologies and diverse applications. Until recently, the energy storage sector had been dominated by bulk technologies, with pumped hydro storage representing over 99% of the world's electricity storage facilities.

So, why is battery storage important?



Energy Transition

The global energy transition will be driven by the wide deployment of renewable energy sources into the incumbent, fossil-fuel dominated electricity system. Renewables provide intermitted electricity supply, often destabilising the grid.

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Distributed energy systems

The creation of distributed energy systems will allow flexibility and will reduce reliance on expensive grid infrastructure, also solving problems of grid-integration for renewables.





Battery storage applications are divided into two main categories:



Behind-the-meter (BTM):

Storage technologies used for on-site consumption enabling consumers to regulate when they use their generated electricity and when they export to the grid.



Front-of-the-meter (FTM):

Large scale applications used for utility-scale projects.



he vast majority of utility-scale stationary energy storage capacity worldwide in 2016, mainly due to cost reductions and rapid scale-up of manufacturing capacities.





IEA remarked that a key-defining trend on 2016 was the concerted action of integrated energy companies, manufacturers and equipment providers to expand their storage activities, leading to a more concentrated market.



During **2016**, **battery storage capacity was 500MW**, but 1GW of new capacity was announced in the second half of the year.



Lithium-ion batteries used to cost **\$1,085-4,100** /kWh in 2010, and in 2016 they are said to cost under **\$140**/kWh.









Worldwide trends



in the utility-scale energy storage



As of June 2016, the U.S. had over 21.6 GW of rated power in energy storage, including hydro pumped storage, compared to 1,068 GW of total installed capacity. U.S. energy storage projects increased by 105% from 2013 to 2016.



9: FTM projects that were recorded before 2009.

124: FTM projects that were completed between 2009 and 2014.

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In 2015, the market for grid-scale batteries was four times larger than 2014.

Cost reductions in battery storage were driven largely by R&D for other sectors, mainly for electric vehicles.



In 2011, US Congress passed "Storage Technology for Renewable and Green Energy Act of 2011" to provide energy investment credit for offgrid or on grid energy storage, offering up to 20% allowed credit. Behind-the-meter deployments rose 140% from Q1 2017 to Q2 2017. The residential market rose 89% from Q1 2017, while the non-residential market grew 151% from Q1 2017. Much of this increase resulted from California and Hawaii.

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Australia-focus on distributed energy opportunities



batteries with a capacity of 52 MWh were installed in 2016, more than 13 times the 500 installations in 2015.

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AEMC

Market

Energy

proposal for restricting

Commission (AEMC) has drafted

distribution network operators

in parts of Australia from owning

or operating energy storage

assets in an attempt to stimulate

a "competitive market" market for

behind-the-meter batteries.

Australian

а



Jan. Dec. 2017 The battery storage growth has the potential to triple by the end of 2017.

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Australia's energy storage market

could grow 37-fold until 2020

with regards to 2015 levels,

reaching an annual installation

rate of 244MW with the vast

majority of this rate happening

BTM predominantly as add-ons to

existing residential solar systems.



At the end of August 2017, South Australia called for proposals on **Bulk Energy Storage** and **Firming Renewable Generation projects** that will receive **financial assistance** from its \$150 Renewable Technology Fund.



There are currently **two proposals for the construction of battery storage Gigafactories** in Australia:

1) Energy Renaissance to be built in Darwin

2) Boston Energy to build a gigafactory of 15GWh annual production capacity in Queensland



The Australian Renewable Energy Agency **(ARENA)** has set the acquisition of 'dispatchable' energy as a central element of Australia's future electricity system.



Tesla will build the **world's biggest lithium ion battery** in South Australia, a 129MW battery connected to the 270MW Hornsdale Wind Farm wind farm aimed to stabilise the grid.









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