



Energy Storage: Winner of COVID Crash?

May 14, 2020

Solar Media Energy Storage Digital Series

| Post COVID-19 World – A Few Observations

History suggests that every recession coincided with a new wave of technology innovation

- > Each event helped establish a new set of winners and losers

Businesses will adopt telecommuting; business travel will see a relative decline

- > While overall electricity consumption is down, the drop in electricity demand has been offset by increased electricity consumption from residential sector support
- > Higher reliability standards for working-from-home in the regions of chronic transmission and distribution network

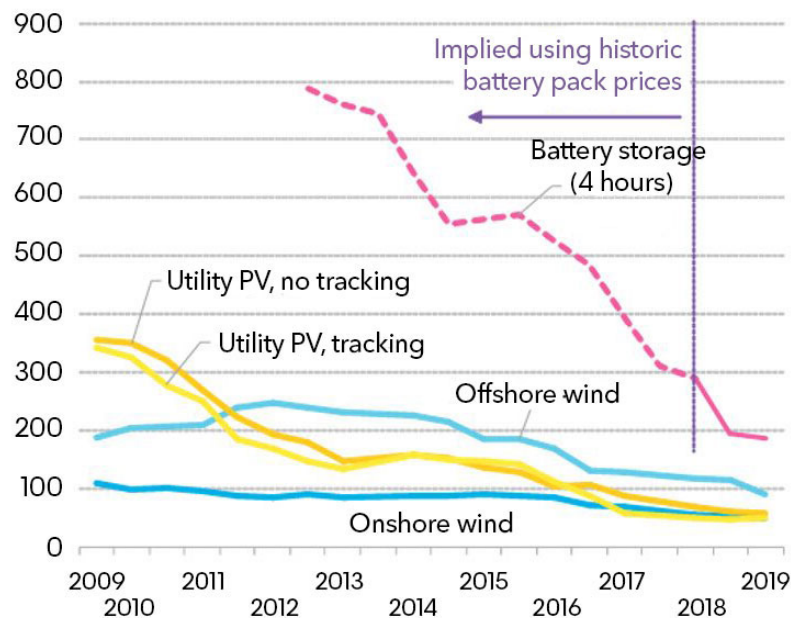
Demand for electric cars will accelerate

- > Venson Automotive Solutions Survey, *Electrek*, April 9, 2020
- > “Coronavirus Got Rid of Smog. Can Electric Cars Do So permanently?” *Wall Street Journal*, April 10, 2020

Historical LCOE for Renewables and Batteries

Global benchmarks - PV, wind and batteries

LCOE (\$/MWh, 2018 real)

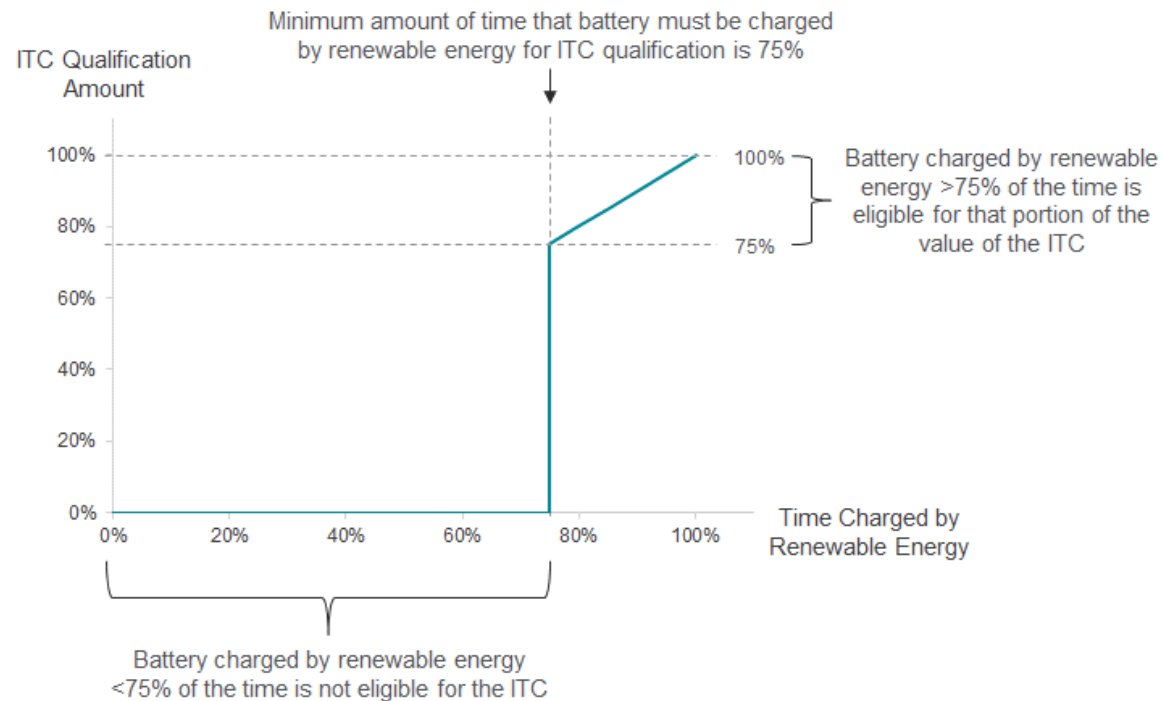


Source: BloombergNEF. Note: The global benchmark is a country weighed-average using the latest annual capacity additions. The storage LCOE is reflective of a utility-scale Li-ion battery storage system running at a daily cycle and includes charging costs assumed to be 60% of whole sale base power price in each country.

BNEF Observations

- > The analysis shows that the LCOE per megawatt-hour for onshore wind, solar PV, and offshore wind have fallen by 49%, 84% and 56% respectively since 2010
- > For lithium-ion battery storage, these have dropped by 76% since 2012, based on recent project costs and historical battery pack prices
- > Batteries co-located with solar or wind projects are starting to compete, in many markets and without subsidy, with coal- and gas-fired generation for the provision of “dispatchable power” that can be delivered upon demand

Tax Benefits for Batteries Coupled with Renewables



- > Stand-alone energy storage systems qualify for 7-year MACRS depreciation
- > However, if the energy storage is used to charge electricity generated by renewable energy projects, the energy storage system can benefit from Investment Tax Credit (ITC), provided that the energy storage system is charged at least 75% of the time annually
- > The ITC increases ratably depending on the amount of time the energy storage system is charged with renewable energy resource
- > ITC is capped at 30% of the capital costs of the energy storage system

| Innovative Solar + Storage Business Models

Engie Will Pay Storage Developers for Wholesale Market Dispatch Rights

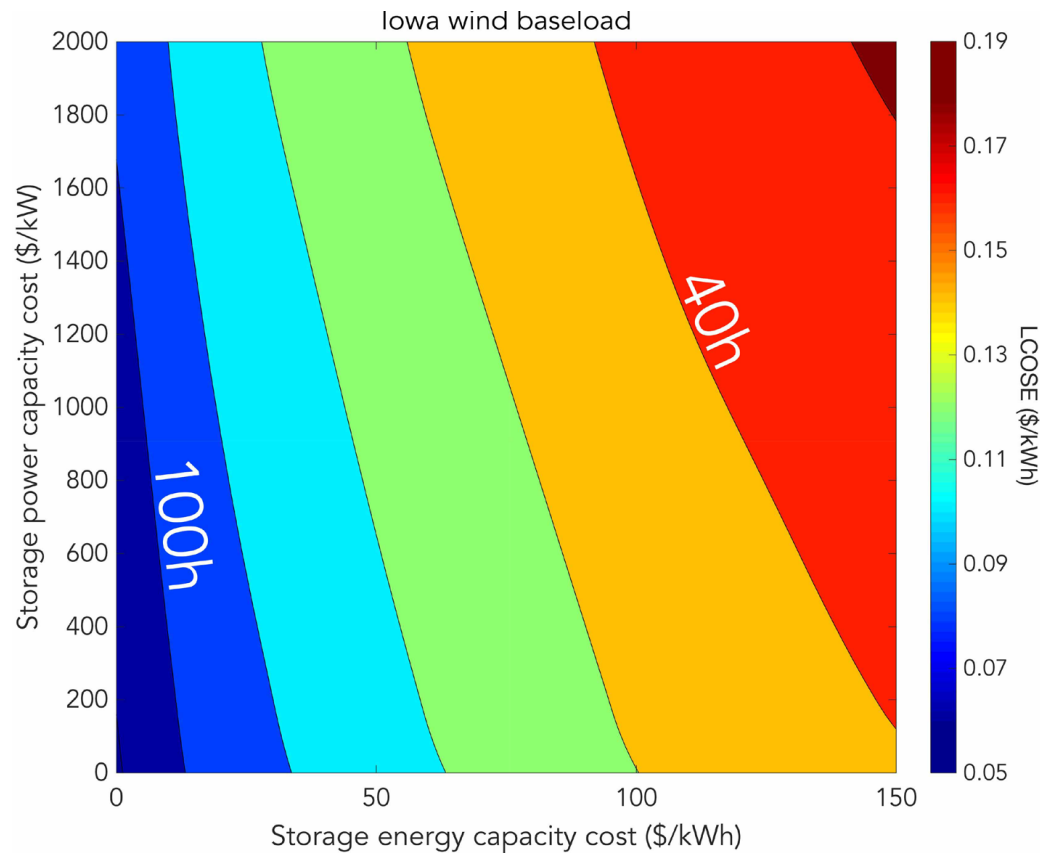
> *Green Tech Media*, July 30, 2019

“Everybody’s been talking about this, but this is it,” Engie Storage CEO Christopher Tilley tells GTM

Storage developers can get paid for letting Engie bid their batteries into New England's wholesale market

Source: AWEA

LCOE for Cost-minimizing Wind + Storage Project



Conditions Modeled

- > Iowa wind with ~52% capacity factor at installed cost of \$1,500/kW

Output

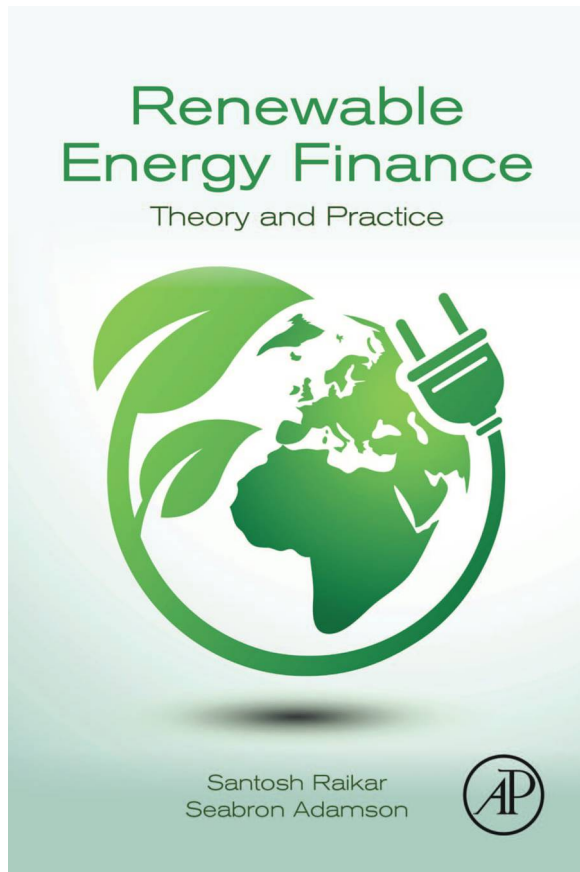
- > Wind + Storage plant configurations that minimize LCOE
- > LCOE over 20 years of output
- > Slope of contour lines gives maximum discharge rate in hours

Results

- > Storage at <\$30/kWh permits lower LCOE for wind + storage than natural gas
- > Maximum discharge rates are only C/100
- > “Coronavirus Got Rid of Smog. Can Electric Cars Do So permanently?” *Wall Street Journal*, April 10, 2020

Source: “Energy Storage requirements for shaping renewable energy toward grid decarbonation”, M. S. Ziegler, et al., Joule, <https://doi.org/10.1016/j.joule.2019.06.012>

Contact Info



The book explains the unique nature of renewable energy projects, their advantages, their potential costs, and how they can attract funding.

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