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NREL has released an inaugural report highlighting utility scale energy storage costs with various methods of tying it to solar power: co-located or not, and DC- vs AC-coupled.

2018 U.S. Utility-Scale Photovoltaics Plus-Energy Storage System Costs Benchmark (pdf) breaks down various ways that solar+storage is applied: co-located versus separate, as well co-located that is DC-coupled versus AC-coupled, and various hours of duration ranging from 4 to 0.5 hours.

For the standalone systems, a constant per-energy-unit battery price of $209/kilowatt-hour (KWh) is assumed, with the system costs vary from $380/kWh (4-hour duration system) to $895/kWh (0.5-hour duration system). The battery cost accounts for 55% of total system cost in the 4-hour system, but only 23% in the 0.5-hour system.

One notable feature of these numbers is that for shorter system durations developer fees – the second-largest category at any scale – become an increasingly important component of overall system costs. One might expect, at the scale of these projects, that developer fees would be more competitive.

The second batch of analysis looks at a single axis tracker 100 MWdc solar pv system coupled with the above 60 MW / 240 MWh energy storage system. The storage systems are located off-site relative to the solar, as well onsite with the solar, and the onsite systems are DC or AC coupled.

The costs for the DC-coupled system was $186 million, the AC-coupled system $188 million, and the systems tied together – but from separate interconnection locations – cost $202 million (7-8% higher than the co-located systems).

Co-locating the PV and storage subsystems produces cost savings by reducing costs related to site preparation, land acquisition, permitting, interconnection, installation labor, hardware (via sharing of hardware such as switchgears, transformers, and controls), overhead, and profit.

AC- versus DC-coupled systems were very close in pricing. However, NREL noted that there will be other considerations driving this installation technique rather than installation costs alone: retrofit considerations, system performance, design flexibility, and operations and maintenance. And with hardware getting more efficient, the losses associated with AC versus DC systems are getting lower.

This report complements NREL’s concurrently released U.S. Solar Photovoltaic System Cost Benchmark: Q1 2018, which focused on historical costs of solar power without storage, as compared to the prior year.

John, thanks for the article, very helpful in showing additional opportunities in the utility scale renewable energy business.Do you know how many years is the expected life of the battery modules on a container (5 MW) ?What are the O& M costs per each container?Looking forward to hear from you eers,Enrique

Contact us for free full report

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