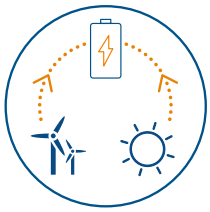
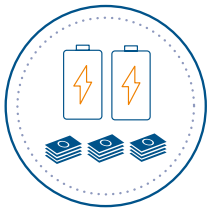
World Energy Resources

E-storage: Shifting from cost to value

2016

Rapid cost reductions and significant improvements in capacity and efficiency captivated the global energy sector with the promise of deploying energy storage alongside renewables. Storage is seen as a game-changer which could contribute to solving the intermittency challenge of wind and solar electricity generation. However, business models are not always fully understood and there are not many studies on cost data.





Key messages

- The costs of energy storage technologies are forecasted to reduce by as much as 70% by 2030.
- Levelised Cost of Energy (LCoE) is useful as a metric, but its limitations need to be clearly understood: in particular, it depends not only on the energy storage technology and the location (which are relevant for costs of generation technologies), but also on the application. Therefore a case by case approach is necessary.
- From a country and societal perspective, the value of storage lies in the ability to provide power reliability and improve power quality, adding to security of supply. This can be in the form of uninterrupted power supply to end-users, providing some reserve margin, or initial power to restart the grid after a blackout. In this context, high reliability is more important than high costs.
- Storage creates additional value through its function to level the load, it enables deferral of grid investment, especially at congestion points and creates the possibility of price arbitrage for operators.

Recommendations

- To consider more than a narrow levelised cost approach for storage technology assessment, where only technologies with the lowest LCoE are rewarded. Cheapest is not always best, or possible.
- To examine storage through total system case studies within a specific context, rather than place faith in generic cost estimations.
- To establish supporting policies and an enabling regulating framework to facilitate further commercial deployment of storage technologies.
- To accelerate the development of flexible markets, working with transmission and distribution system operators and regulators to help quantify and realise the true potential value of increasing system flexibility.
- To consider storage as a key component when planning for grid expansion or extension.

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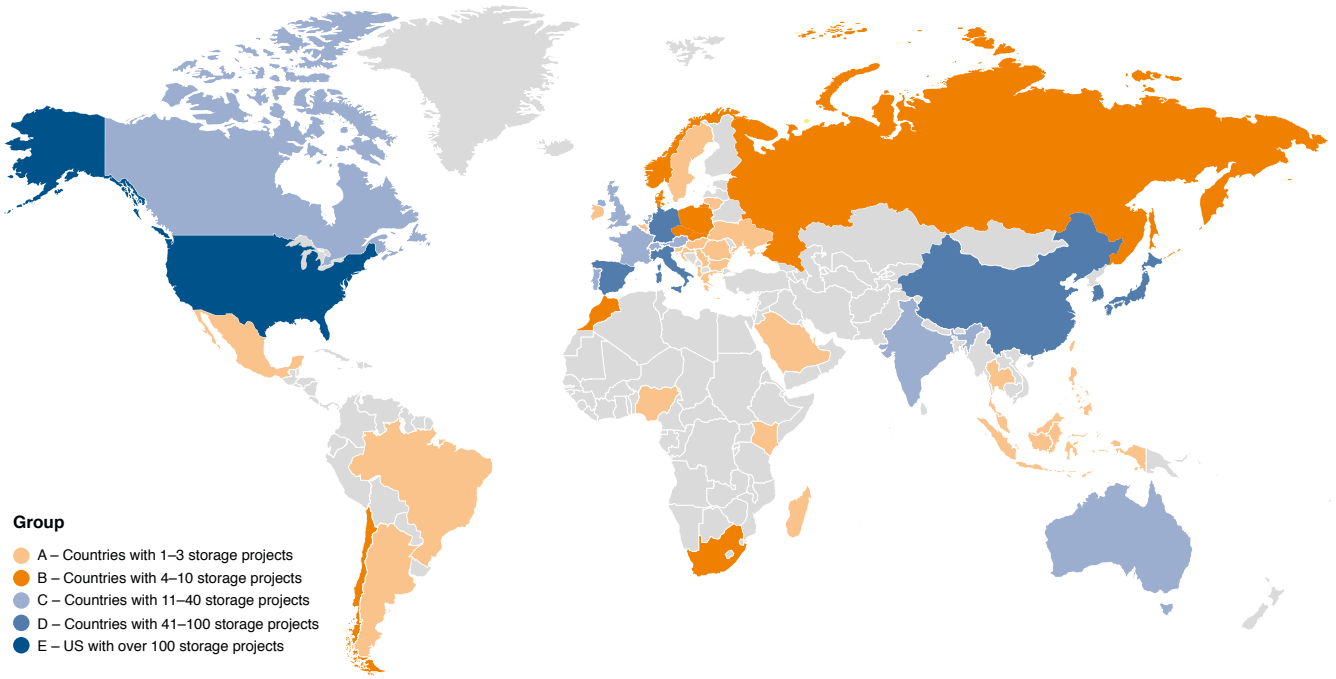
Graphic 1 – Installed energy storage projects across the world

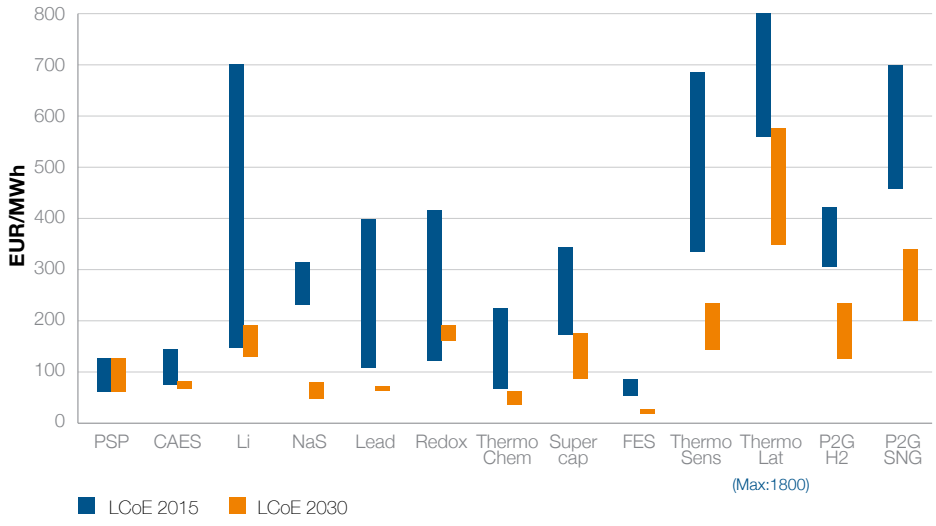


This chart shows the global number of installed storage projects as of June 2015. The range of storage capacity for the mapped storage projects is from 2kW to 3003000kW. Pumped hydropower storage plants constitute over 90% of all installed storage capacity, inlcuding the 3GW representing the maximum capacity. It should be noted that Lithium-ion batteries, a relatively new technology, constitute about one third of all installations in the world and will continue to grow.

Source: DOE Global Energy Storage Database, June 2015
http://www.energystorageexchange.org/

Figure 1 – Comparing levelised cost of storage for 2015 and 2030

This comparison of storage technologies highlights the broad technical area technologies cover and that they are at different points in their maturity journey, with different strengths. This chart shows a general minimum maximum LCoE of each storage technology. Some storage technologies, such as pumped hydropower storage and CAES, are location-constrained, meaning that even though they might have attractive LCoE, their deployment might in practice be unfeasible in some regions. These kinds of constraints are not captured in LCoE charts. Conducting a meaningful comparative analysis of storage technologies is challenging.



World Energy Council
62–64 Cornhill, London EC3V 3NH,
United Kingdom

Phone: +44 20 7734 5996
www.worldenergy.org

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Contact World Energy Resources Team
E-mail: resources@worldenergy.org

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