Energy Storage – Proposed policy principles and definition

Energy Storage is recognized as an increasingly important element in the electricity and energy systems, being able to modulate demand and act as flexible generation when needed. It can contribute to optimal use of generation and grid assets, and support emissions reductions in several economic sectors.

Supporting the energy security, internal market and the low carbon pillars of the Energy Union, storage could become a more prominent determinant of the characteristics of the new energy system, balancing centralized and distributed power generation. It can also strengthen energy security in emergency cases. Storage will contribute through various levels of the energy system and complement other flexible elements and grid development.

Background and EU support

Electricity storage was not considered a priority in the past for energy system development, partially because in a fossil fuel based electricity system the benefits of storage were limited and partially because the emerging technologies were not economical for large scale storage. Storage solutions are becoming an important cornerstone in the energy system with rapid progress in new technological solutions (for example batteries and hydrogen) and an increasing share of variable renewable power. EU supports storage related R&D with several initiatives, mainly under Smart Grids activities under SET Plan and under the Fuel Cells and Hydrogen JU.

Current status

A Roundtable on Energy Storage organised by DG ENER in 2015 marked a substantial input to the discussions on the future of energy storage. Broadly the conclusions were that the market and legislative framework is lagging behind technological progress and needs. A number of barriers to energy storage have been identified, such as access to networks, double/excessive grid fees, or inability to combine value streams from interaction with other sectors (industry, agriculture, etc). The wide range of identified issues indicate that further development of the storage related regulatory framework and market mechanisms are required to enable full contribution of storage to a cost-efficient energy system.

Energy storage for back-up and renewable integration

Energy storage could provide an option to supply power when needed without necessarily reverting to fossil energy sources. At the same time, some of the new solutions enable integration of higher shares of variable power also in other economic sectors, thereby contributing to the development and decarbonisation of the whole energy system. Electricity can also be converted to heat or gas and

stored for a subsequent use in heating, mobility or industry. To enable an optimal and cost-effective contribution from these storage solutions a broader understanding in defining storage appears to be required.

The definition of energy storage

Energy storage in the electricity system would be defined as **the act of deferring an amount of the energy that was generated to the moment of use, either as final energy or converted into another energy carrier.**

High-level principles for future framework for storage

While storage technologies are either mature or developing, a number of principles need to be defined to support optimal investments in energy storage. These investments should be based on market revenue, rather than subsidies, and should be enabled by improved predictability in relation to the contracted services and allow storage facilities to build on the various value streams that they provide (e.g. balancing services to the grid, avoidance of curtailed variable power, decarbonisation).

Development and financing of energy storage could therefore rely on a number of principles:

- Energy storage should be developed to the extent the overall costs of the new energy system are lower with storage than without storage
- In relation to the electricity grid energy storage should be rewarded for the services provided on a peer basis with the alternative suppliers for those services, being demand response or flexible generation;
- Energy storage as a supporting mean for integrating variable renewable energy (vRE) should be rewarded for the contribution to improving energy security and decarbonisation of the electricity grid or other economic sectors; the avoided costs of vRE curtailment and the carbon reductions of the backup capacities could support the business case of large scale energy storage
- When a generator or a consumer choses to integrate a storage facility at its location, this should not lead to less favourable treatment, neither in terms of obligations nor in terms of eventual support that it receives in the energy system

In implementing the Energy Union, Energy Storage will have to be supported through R&D projects and gradually deployed as an enabler for renewables integration and more cost-effective energy markets.