

Energy Storage – The game changer for future energy

Paper on a strategy for long-term EU greenhouse gas emissions reductions

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Summary

- **The challenges for products and processes resulting from the energy transition are enormous: a new approach is needed for the efficient use of existing and new infrastructure.**
- **With regard to R&D measures and the development of the European energy framework there should be a focus on further enabling energy storage**
- **Shifting the optimal use of energy infrastructure into the pure sphere of grid operators will increase costs and affect the efficient integration of market participants in the energy system negatively.**
- **New, low-cost storage systems are needed, and therefore the potential for flexibility in the supply and consumption of electricity and other energy sources need to be explored**
- **In the future the demand for system services must be covered by new technologies and the grid management systems must be further developed and brought into line with changing generation and consumption structures.**
- **The development of efficient, systemic integrated energy storage will be the game changer in the energy system.**

A successful energy transition is not only about the future provision of capacity and electrical power from a technical point of view. Rather, the future development has to be oriented towards the overall process chains in an application-oriented, cross-technology and interdisciplinary manner. Setting a too strict technological focus will restrict the needed development. The stigmatization or prohibition of technologies is counterproductive in terms of an economically optimum solution. Interdisciplinarity is an essential goal in view of the major challenges facing us. Openness to technology is of paramount importance for a sustainable and economic response to energy policy issues.

Widening the roles of grid operators to fix the unsolved duties in the energy systems will have the same or even a worse impact on efficient innovations.

Key for an innovative development which helps to follow the climate goals is the framework for energy storage in a competitive manner. Storage is placed between sectors and can serve the needs of load management and ancillary services.

Basis should be removal of obstacles in the existing framework.

STEAG in research and development

STEAG is working on developments in the energy sector which are suitable for rapid implementation. In the form of the 90 MW large-scale battery system, for example, it has been possible to complete a project within only a few years on the basis of technical options in the field of lithium ion technology which is cost-effective without subsidies and state funding. In the course of the implementation-oriented research work, discussions were also conducted with the transmission system operators on how batteries could be incorporated in the transmission grid from a regulatory point of view.

STEAG is an enthusiastic participant in several parts of the Designetz project covered by the Smart Energy Showcases - Digital Agenda for the Energy Transition (SINTEG) funding program. The aim is to investigate flexibility potential covering various energy sources (electricity, heat and mine gas).

STEAG now envisages good opportunities to produce innovations in the field of synthetic fuels for vehicles. It is already possible to capture CO₂ and feed it into a CO₂ circuit. In comparison with electrification, it has the advantage that existing infrastructure can be used and no conversion to a different fuel is required as with fuel cells and hydrogen technology. The special feature of the STEAG approach is that, in the spirit of integrated energy solutions, low CO₂ district heating is to be generated at the same time.

Research on storage and converters

Research into storage facilities and converters should focus on technologies that are as close as possible to profitability, in order to achieve rapid implementation. In economic terms, Power2Gas is clearly outperformed by Power2Heat, since the overall efficiencies inherent in the process are already immutable without any further technological leap. Short-term storage batteries are now becoming technically mature and no longer require funding. The focus here should be on systemic improvements. On the other hand, storage technologies with higher capacities, which can relieve conventional power plants cost-effectively in the long term, still need to be further developed. Focus of R&D in converters should be synthetic fuels that can be produced on the basis of CO₂. For sure, cross media thinking is technologically necessary but without mixing up the regulatory framework.

System approach: efficiency, flexibility and system services

The use of infrastructure or the new requirements resulting from adaptive, fluctuating or reduced use of infrastructure should be a focal point of energy research. Storage can take responsibility for systems and security of supply if the rules regarding priority dispatch, the structure of grid fees and feed-in tariffs especially in times of negative prices are rethought.

What is relevant is that there are considerable interactions between efficiency and the provision of system services in the power grid. Storage and converters can be in the center, following a systemic approach. It is necessary to investigate not only the interactions, but also the alternative methods of provision and the further development of system services. The potential for flexibility can also be investigated in connection with power plants and storage facilities as well as in connection with consumers.

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