

ELECTRIFICATION TRACK

ELECTRICITY STORAGE

Session overview

Electricity storage is “the original multi-use asset in the energy and power sector”, stated Mark Higgins, Chief Operating Officer at Strategen, in his presentation. Electricity storage is expected to play a key role in facilitating the next stage of transformation of the electricity sector. Storage is of growing importance in grid applications thanks to the increased demand for flexibility in power systems, caused by the rising share of variable renewable energy (VRE) in the electricity supply mix. In addition, energy storage is a main enabler for distributed renewable energy systems and plays an important role in broadening energy access.

This session involved a variety of experts on electricity storage technologies and discussed the role of storage as well as the current state of deployment of battery energy storage systems (BESS) and their use in various applications. The session was moderated by **Emma Gibson (Director of Operations, Highview Power)** and comprised three presentations followed by a panel discussion.



Presentation 1:

Battery energy storage systems – ancillary services and beyond

Vlad Duboviks (Senior Engineer, GE Power) provided insights into the contribution that storage can play in addressing some of the increasing demand for ancillary services, as a consequence of the growth in the share of electricity from VRE. Key points included:

- » Batteries are a key technology needed to solve the challenge of sector coupling. The use of BESS has grown rapidly, but only in selected applications such as ancillary services and transmission and distribution services. Its use in renewable energy balancing and capacity services is at an early stage.
- » Reserve assets can be a valuable tool to reduce curtailment before there is an economical case for higher-cost, long-duration BESS to shift loads.
- » Key barriers include high investment costs (could be overcome through financial incentives); market rules (need to be designed considering battery storage); and lack of awareness of technical benefits.

Presentation 2:

Emerging applications of storage

Mark Higgins (Chief Operating Officer, Strategen) presented various examples of battery energy storage deployment and the main factors hindering the full potential of BESS. Key points included:

- » Storage is a central component of grid transformation around the world (and is now considered economically competitive with traditional grid solutions).
- » Regulations create artificial barriers to storage development: regulatory and market design reforms are needed (our current rules are for 20th century applications, not 21st century ones).
- » It is not just a matter of bringing costs down – there is a need to give storage a role in grid transformation through thorough reform of the regulatory system.

Presentation 3:

Digitalising energy for innovative business models

Kátrin Schweren (Head of Regulatory and Public Affairs, Tiko) presented on how Tiko is aggregating storage to provide services to the grid and its related challenges. Key points included:

- » Being in a pool is essential for individuals to become prosumers.
- » Tiko is a network of smart home energy management systems that utilise the assets in consumers' houses (like heaters and storages) to provide various grid services, while consumers reduce their energy bills.
- » The European Union's (EU) regulatory frameworks are improving and increasingly favoring active customers. The EU's proposals for the clean energy transition (the Winter Package) define a framework for local energy communities that may engage in distribution, aggregation, storage, etc. The package can bring improvements but still faces challenges, such as harmonisation of standards and procedures and their implementation by transmission and distribution system operators at a national level, transposition of EU rules to national systems, and problems in frequency regulation (for which capacity markets could be a possible solution).

Panel discussion

In addition to the presenters mentioned above, the panel included:

- » Gauthier Dupont, Director, Power Business Batteries, NGK Europe GmbH
- » Rachid Bayed, Head of Implementation, Masen
- » Emma Gibson, Director of Operations, Highview Power
- » Dong Hui, Chief Expert, China Electric Power Research Institute

Highlights from the discussion:

- » **Storage is vital to accelerate electricity deployment and grid transformation.**
- » **There are multiple applications and benefits.** Among the wide-ranging potential applications, electricity storage systems can provide ancillary services like frequency regulation and voltage support, provide local capacity peaker replacements, match supply and demand profiles, and transmission and distribution infrastructure deferral – and thereby facilitate the integration of higher shares of VRE. Islands and other off-grid communities are already relying on electricity storage in combination with renewables for reliable and cheap electricity, and large markets (e.g., in the US) are proving the commercial case.
- » **It is not just about cost, but a value story.** As more and more power markets and sector players realise the value of electricity storage applications, grid-scale deployment is growing rapidly. In the long term, load shifting and peaking capacity is the largest potential market for BESS. However, competitive advantages in high-value ancillary services provision and stacked revenue streams are providing a short-term avenue for BESS deployment that should drive down costs far enough to reach competitiveness with conventional peaking capacity. Batteries providing reserves can also enable greater VRE generation, by first reducing curtailment and then offering load-shifting opportunities.
- » **With new business models, storage applications are not just grid-scale, but behind-the-meter.** Even without helpful financial incentives for behind-the-meter applications (such as rebates, tax credits or grants), new business models are emerging – for example, where the upfront investment cost barrier is reduced through leasing-type arrangements or flat-rate electricity contracts.

Electricity storage still faces key challenges:

- » **Artificial barriers hindering market penetration.** A well-designed and tailored market design is still missing. Treatment of batteries in markets varies, and this has a big impact on their prospects from a regulatory and policy perspective.
- » **A level playing field.** Policy needs to adjust rapidly to the growing competitiveness of storage and to ensure that regulations reflect the full value of storage to the energy system and that providers are compensated. There are similarities and differences in electricity markets around the world, but reform challenges are similar everywhere. Exchanges among peers and networks are fundamental, as solutions around the world can be duplicated and adapted to the local context.
- » **High investment costs and costs of batteries.** The costs of batteries have not yet steeply declined; however, reductions are expected. Electric vehicle (EV) development is seen as key for cost reduction in the battery segment. EVs have the potential to drive the market for storage in both the short and long terms.
- » **Lack of awareness.** Awareness of the benefits of storage is still missing among consumers and policy makers alike.

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