

INSIGHT_E Policy Report: How can batteries support the EU Electricity Network?

Expert Workshop Summary - Tuesday 28 October 2014 - 10.00-11.30

Main points gathered from the discussion

- The pace of costs reduction is beyond expectations.
- The regulatory framework should contain more incentives for batteries.
- Frequency regulation was highlighted as one of the most promising application of batteries, along with combined PV solar + batteries for buildings.
- Demonstration projects should be encouraged at EU level.

1. General information

Moderator: Bo Normark, KIC InnoEnergy, Thematic Leader for Smart Grids and Energy Storage, Lead Author of the report.

Panel:

- M. Michael Lippert - SAFT Batteries
- Dr. Johannes Kostka and M. Kevin Schimschar - Robert Bosch GmbH
- M. Matthias Leuthold - RWTH Aachen University, Germany

Participants:

- M. Willy Tomboy – Recharge, EU Association
- M. Jean-Marie Bemtgen – European Commission, DG Ener
- Mrs. Catherine Ponsot Jacquin - IFPEN
- M. David Fraboulet – CEA
- Ms. Daniel Chartouni & Timothy Patey – ABB
- Aurélie Faure, Ifri, INSIGHT_E consortium, co-author of the report
- Audrey Dobbins, University of Stuttgart, INSIGHT_E consortium, coordinator of the Policy report
- Claude Ayache, KIC InnoEnergy, INSIGHT_E consortium

Objective: This webinar aimed to gather feedback on achieved results and input for the report's conclusions, on the basis of the three following questions:

- 1) What are your expectations regarding the regulatory framework, at EU level, and at national level?
- 2) How do you see the market for battery storage on home level, distribution level and transmission level?
- 3) What are the main barriers or drivers for a battery industry in Europe, in particular :
 - a. for a recycling battery industry in Europe?
 - b. for the battery system industry in Europe, in particular the Battery Management System industry?

Programme:

10.00-10.05: Introduction of the policy context of this INSIGHT_E report

10.05-10.25: Presentation of the report's main findings by Bo Normark

10.25-10.30: Introduction of the panelists and reminder of the 3 questions

10.30-10.40: German academic perspective on the 3 questions (M. Leuthold)

10.40-10.50: Industrial perspective on the 3 questions (SAFT)

10.50-11.00: Practical perspective on the 3 questions (Robert Bosch GmbH)

11.00-11.30: Intervention of the other participants, starting with the European Commission

2. Summary

Presentation of Bo Normark: see slides

Catherine Ponsot-Jacquín (IFPEN)

Questions posted during presentation:

- Do you think the utility market will be covered by batteries or PHS?
- Why and how the price of batteries decrease so much?
- What could be the business of aggregators in Europe?
- What is the link between thermal storage and batteries?

M. Leuthold (RWTH Aachen)

- Regarding costs' developments, it is worth looking at research from 2014, because even since the data presented here from 2013, the prices have already decreased again.
- German car manufacturers also agree that the price per kWh will decrease greatly by 2025, down to less than 100 dollars/kWh.

Answer to Question 1:

- Taxation of electricity is not supportive to storage, especially in Germany. Cannot have fossil energy otherwise it counts as grey so not allowed to charge battery with other sources.
- Regarding the estimates that Germany could feasibly store electricity without subsidies, this is true as long as storage prices decrease and electricity prices continue to increase.
- But there is uncertainty
- Should grid fees be on energy or power?

Answer to Question 2: Batteries will change economics of home storage. There is a major hindrance to grid storage. Self-consumption is a niche market, but not a sustainable market – the regulatory framework should ensure people buying storage have security for 20-25 years, with clear accountancy of grid fees.

Answer to Question 3: The main barriers to battery system optimization are that battery manufacturers push for cheaper materials which in turn reduce the incentive for recycling. BMS could be optimized, but the total value creation in this field is not that big.

Dr. Kostka (Bosch)

Answer to Question 1: The regulatory barriers are important, and the legislation is not supportive enough.

- Frequency regulation is one of the most important applications for storage today, and where storage has the most important value added.
- US example of pay for performance could provide interesting read through.
- Demo projects in Germany are funded by public money. There is a need for dismantling of barriers in order to allow more integration.
- Who is allowed to own and operate storage?
- Grid operators should play a more important role.
- Example of German legislation (EEG) -> self-consumption is taxed in the commercial sector, but this is counterproductive and does not help the market, as it mainly results in giving self-consumption a bad feeling.

- Direct demonstration projects need more funding (notably large-scale ones, with EU funding). There are ways to improve costs and storage operation.

Answer to Question 2: Market -> there is demand but also uncertainty. Need high electricity prices to make the business case work. As for capacity markets, see UK developments.

Mr. Lippert (SAFT)

Answer to Question 1:

- Energy storage is closely linked to the drivers of each country's energy mix.
- With the fading of FIT schemes, energy will receive the highest value when it comes in a predictable and high quality way, and a lower value when it is intermittent.
- Need help on R&D, but more for regulatory side and market support.
- See US example and national programs in Japan and Korea.
- This drives industry to act, and drives prices down.
- Support certain markets directly

Answer to Question 2:

- Battery storage has a role to play at all levels of the value chain.
- SAFT has projects mainly in Ireland, Switzerland and Greece where there is a high level of penetration of renewables, because curtailment is not considered as an optimal solution anymore.
- Frequency regulation is one of the most promising applications, but mainly combined with other services.
- The combination PV solar/storage also has a strong potential.

Mr. Tomboy (RECHARGE):

- The business case for batteries for mobile storage is very different from the business case for stationary electricity storage.
- Re-use implies the transfer of ownership (producer and user of storage).
- The second use or double use of batteries is not mentioned in any legislation. In case of RE-use there is an obligation to go through UN testing procedures.
- Li-ion batteries have a short life cycle and lost their efficiency after 7-8 years.
- The low material value makes recycling market difficult.

Remy Denos (European Commission):

- The Roadmap for the report should include a structure around the different axes: regulation, business cases and technologies and discuss the biggest barriers for each with how to overcome them.
- The report should focus on how the regulatory framework should evolve to support batteries.
- Business models: what should the EU test and investigate so batteries can provide a service?
- Technological aspect: the EC agrees that demo projects are needed. Projects are now being selected for 2014; the calls for 2015 focus on large scale storage, but calls for 2016 could include small scale storage.

Timothy Patey (ABB):

- Distinguish EU grid from other isolated grid examples.
- What makes the EU specific is that its grid is most stable and qualitative compared to Asia and North America.

- Demonstration of technical benefits is needed.
- Challenges with frequency regulation.
- Thanks to storage, consumers pay less for CO2-free electricity.
- Belgium (Umicore) is quite successful in battery recycling, but recycling is not possible for all materials.
- In Japan, batteries cannot be exported because of the high value of cobalt.

David Fraboulet (CEA)

- Price is higher with short-term services.
- The issue with batteries for energy storage is not so much energy, but power available.
- Power will be a limited factor. The level of use of batteries will depend on power.
- Maturity of various technologies should be taken into account.

Chat discussion:

Willy Tomboy: Europe should quickly move from demonstration projects to full deployment of technologies - time is running out....

Catherine Ponsot-Jacquín: Without subsidiaries, how could Renewable + storage be competitive for instance with gas or even coal plants in Europe? The competitiveness wouldn't be connected to a very high price of electricity? Is that what we expect for European people?

Matthias Leuthold: @Catherine Ponsot-Jacquín: I agree - balancing or buffering of renewable on a local basis is - from the system point of view the most expensive solution. Interconnection for fluctuation compensation is more effective. Compensation of fluctuations by conventional energy is cheaper than storage. However, as of now conventional generation does not pay for its external costs. If these are billed to the polluter, then renewables plus storage could compete on a fair basis.

Catherine Ponsot-Jacquín: I totally agree with M Tomboy: we need batteries specially built for stationary purpose but we just have batteries done for mobile or automotive purpose at the base.

Willy Tomboy: I believe that SAFT/France is producing lithium-type batteries for stationary energy storage purposes, and that they have a lot of expertise in this field.

Matthias Leuthold: The el. mobility market is 10x larger than the stationary => cost reduction for Li-Ion-cells and some other components will probably come from e-mobility market.

Catherine Ponsot-Jacquín: sorry, I have to leave. Thank you for this workshop.

Willy Tomboy: The e-mobility market for bicycles at the moment - yes - but for vehicles, not yet - expected to really take-off by 2020 (H2020) - but still to be seen - a lot of hybrids (NiMH) and some plug-in and pure electric cars (until now, mostly marketing from OEM's - how serious are the European OEM's to move from diesel to electric? that's the key!)

Willy tomboy: Agree with the comments on strategic materials - but free-trade does not allow 'protectionism' or export to outside of EU.

Willy tomboy: Can we get a cc of the presentation and the comments raised by all participants to this webinar - thanks for the valuable discussion to all - WT

3. Executive summary of the report

The incremental penetration of variable energy production, the growing trading of electricity and new demand patterns indicate that energy storage will play an increasing role in the energy system. Even if its benefits must be measured against alternative solutions – such as demand-side management, back-up generation and flexible loads, it is to be found all across the value chain, from end-user to distribution, transmission, and markets. In particular, batteries offer cost-efficient solutions for innovative models of decentralized energy systems. They can indeed foster the development of micro-grids, while the home storage market combined with PV Solar enables to increase self-consumption.

Battery storage could become a game-changer in the electric industry. The recent years have seen a significant shift towards the Li-Ion battery technology, not only for small-scale storage but also for large scale storage. According to the DOE database, about 45% of all installed capacities of utility-scale electrochemical storage are now based on Li-Ion technology. The production is growing exponentially, reaching over 30 GWH in 2013. As a result, lithium batteries encounter a strong and faster than expected cost reduction, which is expected to continue in the next two decades for EVs and home storage batteries, even though major disruptive technological breakthrough are not likely to happen before 2020.

However, most of the production is happening in Asia, which raises the question of how the EU can be competitive on the global market. Because battery storage brings flexibility in the system, and is adaptable to different electrical systems, it can contribute efficiently to the achievement of the EU 2020 and 2030 targets. Battery storage can also interact easily with other storage possibilities, notably thermal storage. Business cases exist for end users in relation to self-consumption, energy arbitrage or peak shaving, but they are strongly driven by regulation.

With the Third Package legislation on Energy and Climate, storage (defined in very general terms without any reference to specific technologies) is recognised as a strategic asset in the integration of intermittent renewable energy to grid infrastructures. However, the development of storage facilities is left to the Member States. Batteries are especially approached by EU regulators from the environmental perspective (recycling and environmental efficiency). This report shows that there is room for incorporating battery storage, in conjunction with other smart grid equipment, in the reform of market design models likely to improve adequacy of flow (a responsibility of DSOs and TSOs). In particular, battery storage used as a reserve provider could improve liquidity in the balancing markets, and could play a role through the provision of short term ancillary services. In future policy developments, battery storage should be included as a credible service provider of frequency regulation and voltage support, even though its benefits will be very different depending on each country electricity mix.

The future of electrochemical storage in the EU will depend on the evolution of market barriers. Ancillary service markets should be reformed in order to take into account the increasing share of renewable energy. Market rules should be modified such that they relax minimum bidding requirements (Pozo, 2011) and rules requiring symmetric up and downward bids in order not to impede market access for small, decentralized market players. Regulatory barriers should also be reduced: for instance, a “ring-fencing” of market interferences solutions should be put in place for DSOs and TSOs owning batteries, and DSO Regulation could be improved so as to better incentivise smart grid investments. More structural evolutions, such as the integration of batteries in an e-mobility scheme, or the change from conventional drivetrains to electric drivetrains may also change the landscape for battery storage. Finally, integrating batteries in roadmaps for R&D can also foster technological development and investment.