EASE Input to SET Plan Issues Paper 7 "Become competitive in the global battery sector to drive e-mobility forward"

Introduction

EASE welcomes efforts to support European industry in becoming competitive in the global battery sector, as laid out in SET Plan Issues Paper 7. Batteries have been utilised as convenient power sources for about two centuries. The application range of batteries has expanded dramatically over the past decades because of increasing demand for stationary and mobile power sources. Batteries are likely to play a central role in the EU's future energy system, alongside other Energy Storage technologies, due to the challenges of increasing renewable energy generation and the electrification of the transport sector.

Furthermore the future electrical grid is expected to benefit from the battery developments made for the automotive field:

- Electric vehicles (EVs) are expected to contribute to grid balancing by charging and discharging their batteries at the right time.
- Second-hand batteries are expected to be used for some grid applications such as RES integration.
- EV battery cells are expected to be used by some Energy Storage systems.
- Some specific Energy Storage systems are expected to be based on some electrochemical principles and manufacturing process developed for the automotive sector.

Amidst strong international competition, European policy-makers should support European battery manufacturers in building upon their considerable expertise, with increased R&D directed towards the development of batteries for new markets related to Energy Storage and e-mobility. These efforts should focus not only on Li-ion batteries, but also support R&D and market roll-out of other battery technologies because the Energy Storage battery technology is very large due to the diversity of the different grid applications.

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TABLE 8 - Comparison among different electrochemical storage systems for the key grid applications

Application	Pb acid	Ni/MH	Na/S	$Na/NiCl_2$	Redox Flow	Li/ion	Super capacitor
Time-shift	●	●	●	●	●	●	●
Renewable integration	●	●	●	●	●	●	●
Network investment deferral	●	●	●	●	●	●	●
Primary Regulation	●	●	●	●	●	●	●
Secondary Regulation	●	●	●	●	●	●	●
Tertiary Regulation	●	●	●	●	●	●	●
Power System start-up	●	●	●	●	●	●	●
Voltage support	●	●	●	●	●	●	●
Power quality	●	●	●	●	●	●	●

● Suitable ● Less suitable ● Unsuitable

(Joint EASE/EERA recommendations for a European Energy Storage Technology Development Roadmap towards 2030 – 2013)

EASE supports the approach laid out in Issues Paper 7, particularly the efforts to "reinforce existing and build new strategic alliances between public and private stakeholders to promote Energy Storage in the transport, power, gas and residential sectors." EASE is fully committed to supporting the European Commission in these endeavours.

EASE Position on Recommended Targets

As the battery targets are mainly dedicated to the automotive sectors, EASE cannot take position on them apart on the fact that such targets are expected to increase the battery positioning against the other Energy Storage technologies on the one hand and the other Flexibility means on the other hand.

Furthermore, as EASE has a technological neutral position towards its members, who have different positions in the electrical value chain and provide different Energy Storage technologies, it is chiefly concerned by:

- The development of the ES demand that is driven by the intermittent RES use
- The setting up of some relevant regulation in order to allow Energy Storage to compete fairly with the other flexibility means.

Recommended Research Priorities

The EASE/EERA Energy Storage Technology Development Roadmap[1] identified the following research priorities for grid batteries, which could be incorporated into SET Plan Issues Paper 7 as they support efforts to enhance Europe's competitiveness in the global battery sector:

- Research should be directed to existing, already industrially applied technologies, in order to realise their full technical potential and make them available in high volume, low-cost versions, on highly automatised production lines ensuring highest levels of quality and reliability. Immediate priorities are improvements to the cycle life and overall calendar life of advanced batteries.
- Advanced lead, Sodium, and Lithium batteries have high potentials that should be further developed. Research should be directed both at improving performances at the battery cell level, and battery system design level (connectors, interaction with the grid, etc.). Research on the chemistry itself also has high potential as it has not been carried out sufficiently for these new functionalities.
- Increased applicability for batteries to grid applications for all mature battery technologies (Lead-based, Lithium-based, and Sodium-based batteries) should be considered, as each technology has the potential for significant further technical improvement, and all can provide distinctive and important functions to grid operators. Efforts should include focussed research on intelligent battery management, including the electronics and systems for quality control and battery "smartness".
- A deeper understanding of degradation mechanisms subsequently leading to knowledge about how to prevent the relevant reactions is an important step towards better battery properties and more competitive products for European industry. A dedicated research effort will be needed based on advanced joint European research and characterisation facilities (e.g. synchrotron and neutron sources).
- Exploratory research is strongly recommended on novel materials for completely new electrochemical systems (e.g., metal-air, fluoride and chloride ion batteries, liquid batteries, Mg-based batteries, battery cell voltage up to 5V,) with the additional targets for the 2020-2030 period to further reduce the battery cost of more than 40%.

[1] Joint EASE/EERA recommendations for a European Energy Storage Technology Development Roadmap towards 2030 – 2013

- Research on environmental issues (raw materials, clean manufacturing processes, sustainable utilisation of resources, recycling possibilities, internal and external environment, land use, emissions) would be valuable to minimise the environmental impact of batteries.
- Since safety risks are inherent in storing energy, safety testing must be an integrated part of battery R&D. Testing aiming at characterising electrochemical cells under abnormal or heavy duty operating conditions/environments must be done to identify potential risks and describe mitigation measures to be used in design, control and usage of future batteries. Similarly safety testing to study thermal performance of electrochemical cells and batteries must be done to generate data crucial for designing battery management systems.

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The European Association for Storage of Energy (EASE) is the voice of the Energy Storage community, actively promoting the use of Energy Storage in Europe and worldwide. EASE supports the deployment of Energy Storage as an indispensable instrument to improve the flexibility of and deliver services to the energy system with respect to European energy and climate policy. EASE seeks to build a European platform for sharing and disseminating Energy Storage-related information. EASE ultimately aims to support the transition towards a sustainable, flexible and stable energy system in Europe.

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