



Battery based energy storage roadmap

Draft roadmap workshop

© Ecofys 2017 by order of: European Commission

Subject: Report on the draft roadmap workshop
BATSTORM stakeholder workshop
June 06, 10:00 to 13:00
Brussels, BBH office Rue Marnix 28

From: Ecofys, VITO, Technopolis, Fraunhofer IWES

Project number: POWNL16059

Table of contents

1	BATSTORM – A European R&D strategy for battery based energy storage	2
2	Objectives, agenda and participants of the meeting	3
3	Initial feedback during roundtable discussion	4
4	Interactive session on particular dimensions of the roadmap	6
5	Concluding remarks and key take-aways	7
	Annex: Presentation slides	8



1 BATSTORM – A European R&D strategy for battery based energy storage

The BATSTORM project will support the European Commission in their progress to identify and support RTD&D needs and market uptake of battery based energy storage as one low-carbon technology of the future energy system. This objective shall be met in line with the aims to increase active consumer participation in the energy system and to improve industrial capacity in Europe. To meet this objective, the knowledge on battery based storages must be fostered and exchanged between stakeholders and research in the field as well as demonstration projects need to be collected and efficiently supported. This includes in particular:

- Strategy development
- Knowledge sharing
- Support of the policy design process
- Industrial capacity increase and cost reductions of batteries
- Connect and involve stakeholders (especially via <http://www.batstorm-project.eu>)

This report provides an overview of the main discussion elements and outcomes of the workshop held on 06-06-2017. The workshop is part of a larger process of stakeholder interaction in which we collect input for the development of a 10 year R&I roadmap on battery storage. Besides directly contacting the consortium, stakeholders could provide input through an online survey (2016) and provided feedback in writing on documents in public consultation (on our website). Currently, there is a [draft version of the 10 year R&I roadmap online](#) and the public consultation for the deliverable is open until 16-06-2017. Feedback can be sent in writing to the project team.

Slides of the meeting are in the annex of this report. In the following sections a brief summary and main outcomes are reported.



2 Objectives, agenda and participants of the meeting

This BATSTORM roadmap workshop was held on 06 June 2017 in Brussels with the purpose to:

- > Collect feedback on the **draft 10 year research and innovation roadmap** (main deliverable of the BATSTORM project) through an interactive session.
- > Discuss the **priorities of actions** suggested in the roadmap.
- > Continue a process of periodic interaction with a **panel of experts**.

The meeting was attended by 23 representatives of stakeholder groups, the European Commission and the project consortium (see Table 1). Following agenda was pursued:

- > **Welcome** with round of introduction, project overview and objective of the workshop
- > Structure of the **10 year research and innovation roadmap**
- > **Round table** initial feedback on draft roadmap
- > **Interactive session** to validate a joint roadmap
- > **Recap** and next steps

Table 1: List of participants

Name	Organisation
Christian Folke	Uniper
David Merchin	Umicore
Dudley Stewart	MEGA Ireland
Edel Sheridan	SINTEF
Erwin Marckx	EUROBAT
Jesus Palma	IMDEA
Kevin Bradley	BSEF
Maite Hormigo	Gas Natural Fenosa
Marcel Meeus	EMIRI
Stefan Louis	Leclanché
Thomas Döring	Solar Power Europe
Marcos Ierides	SusChem
Aldo Peeters	SWECO
Benedikt Frieß	Daimler

Name	Organisation
Aleksandra Kronberga	European Commission
Edwin Haesen	Ecofys
Michèle Koper	Ecofys
Benjamin Munzel	Ecofys
Kris Kessels	VITO
Jeroen Büscher	VITO
Andreas Ligtvoet	Technopolis
Asel Doranova	Technopolis
Nathan Kably	Technopolis



3 Initial feedback during roundtable discussion



The 10 year research and innovation roadmap aims at two objectives: the deployment of batteries and the development of a competitive battery industry in the EU. It describes a set of goals and milestones as well as specific (research) actions. These actions have been prioritised.

Based on their initial review of the draft roadmap prior to the workshop, the stakeholders provided some first thoughts and feedback on the document:

General remarks

- > Half of the roadmap actually deals with policy-related challenges and actions, going beyond research and innovation. These are all relevant, but clear labelling of the action or renaming of the roadmap should be considered while paying more attention to actual r&i actions.
- > Safety issues are of very high importance.
- > Software development could be focused by EU.
- > Standardisation work on safety issues is ongoing (e.g. DIN roadmap in Germany) and should be taken into account while paying attention to potentially biased provisions.
- > A description of the state of the art is missing for some actions.
- > Reference to other roadmaps could be useful.
- > Some sections could use technical clarification or deserve rephrasing. Bilateral contact will be taken with some of the organizations who offered review.
- > The importance of advanced materials is overstated.
- > Several points raised are actually addressed in previous deliverables of the BATSTORM project, e.g. referring to past R&I projects, value chain analysis, use case prioritization etc. The earlier published socio-economic analysis and technical analysis reports cover these and are available on the BATSTORM website. Hence a stronger link to the other deliverables should be part of the roadmap. This can be either with cross-references or a more elaborate summary in the Roadmap so it can be used as stand-alone document.



Deployment

- > Actions related to grid integration issues seem hidden. One of the highest priority actions is on expert groups (manufacturers, users, system operators) to review technical grid connection rules. From the description it should be clear this covers grid integration issues, and not just procedures or policy actions.
- > Applications dealing with balancing, black start capability or emergency power could be addressed more.
- > The success of battery based energy storage depends on living labs.
- > Acceptance by DSOs needs to be increased.
- > Questions of ownership and rights to operate energy storage need to be addressed.
- > Price fluctuations complicate investment decisions.
- > Benefits of self-consumption also need to be assessed on a grid/national/economy level (see RWTH study).
- > Self-consumption is described in a very positive way while there are barriers present in many countries.
- > It is unclear in which area or dimension interoperability needs to be addressed.
- > It is unclear whether real-time metering is good or not good for battery deployment.
- > Cycle life is more important than calendar lifetime.

Industrial capacity

- > It is very hard to compete with economies of scale (and subsidies) of production facilities in Asia.
- > Previous research projects focused on materials should be referenced (see EASE roadmap) and the chapter on materials in general may need review (e.g. maintenance, energy density).
- > The lead-based battery market is growing faster than Li-ion.
- > The value chain of the battery industry is not described in detail.



4 Interactive session on particular dimensions of the roadmap



Scope of the roadmap

- > The regulatory framework for battery based energy storage should drive battery innovation.
- > In addition to research-related actions also policy-related actions should be addressed, but such a differentiation and definition needs be made explicit.
- > The technology-neutrality often hinders the articulation of specific targets and innovation needs, which should be technology- and application-specific. Maturity curves and cycle costs per technology could be added to make the section more concrete and provide more insights in technology options.
- > Lead-acid, Li-ion and Flow batteries are all developed and commercial but very different from each other (e.g. materials, recycling process, performance). The energy system will need more than one storage technology.
- > Batteries need to be designed to the needs of the energy system.
- > When drafting a roadmap decisions need to be made.
- > The work and developments made by other DGs should be coordinated, e.g. DG Grow, DG Research. The EC notes that a battery working group has been established within the EC.
- > Innovation aspects should be strengthened.

Prioritisation of the actions

- > Consider using a different scale to express priority, as the term 'very low' could give a negative connotation. At least give a clear description what the labels mean, and in which context the priorities should be regarded.
- > A more elaborate timeline of the roadmap actions was expected.
- > 'Establish large-scale recycling facilities' should be of higher priority or urgency, as soon a massive amount of batteries at the end of their lifetime will need to be recycled. Mention should be made that technology for this is already available in the EU.
- > The descriptions of some actions can be more explicit and precise.



- > More concrete examples or suggestions on 'measures to increase industry collaboration' would be helpful.
- > It would be interesting to see how the development of battery storage is expected to evolve if the suggested actions would be taken or not.
- > With regard to industrial capacity and the battery value chain, a step by step approach is worthwhile to consider, i.e. take on assembly of battery packs earlier and the cell production at a later stage. 60% of the value chain (i.e. integration) is already located in Europe.
- > Financial incentives for deployment are necessary to establish and increase industrial capacity.
- > Patenting is low priority in Europe which is to some extent caused by the open access approach of the EC for research funding.
- > Rephrase action 21 'initiate expert group on battery connection rules' to make it clear that this refers to technical specifications, not general policy or procedures.

5 Concluding remarks and key take-aways

During the workshop several interesting comments were made with regard to the draft roadmap. The **5 main take-aways** are:

- i. The expert panel acknowledges the complexity of pulling all knowledge from various projects, stakeholders and platforms in a single battery specific roadmap. The group is comfortable with the draft roadmap approach and focus. Valuable suggestions to fine-tune the document are given in the meeting and more will be collected in the following weeks of open consultation.
- ii. The 'research and innovation' roadmap contains many policy-related actions, which should be labelled more explicitly. Some more focus should be given to the R&I actions.
- iii. Previous and future deliverables of the BATSTORM project (will) contain very relevant information and should be referenced more prominently in the roadmap as it is the key deliverable.
- iv. Conserving technology neutrality throughout the roadmap makes it hard to set specific targets, but is the right approach for this deliverable. Going into technology specific targets opens a new level of review and discussion.
- v. Representatives of industry or research associations would like to consult their members and provide consolidated feedback later.

Note: Any further feedback in writing by 16 June 2017 is welcome.



Annex: Presentation slides



BATSTORM Project

Towards an R&D strategy for
battery based energy storage.



Directorate-General
for Energy

Draft roadmap consultation

BBH/Ecofys office, Brussels, 10h00CET

06-06-2017

Michèle Koper

Agenda

-
- 10:00-10:20 **Welcome**
 - > Round of introductions
 - > Project overview
 - > Objectives of the workshop

 - 10:20-10:40 **Structure of the draft 10 year research and innovation roadmap**

 - 10:40-11:15 **Round table initial feedback on draft roadmap**
Short break

 - 11:15-12:45 **Interactive session to validate a joint roadmap**

 - 12:45-13:00 **Recap and next steps**





BATSTORM targets roadmap for battery-based energy storage

Objective

to develop a roadmap and implementation plan for battery-based energy storage in Europe starting from energy system needs and to inform decision-making on policies and RTD funding.

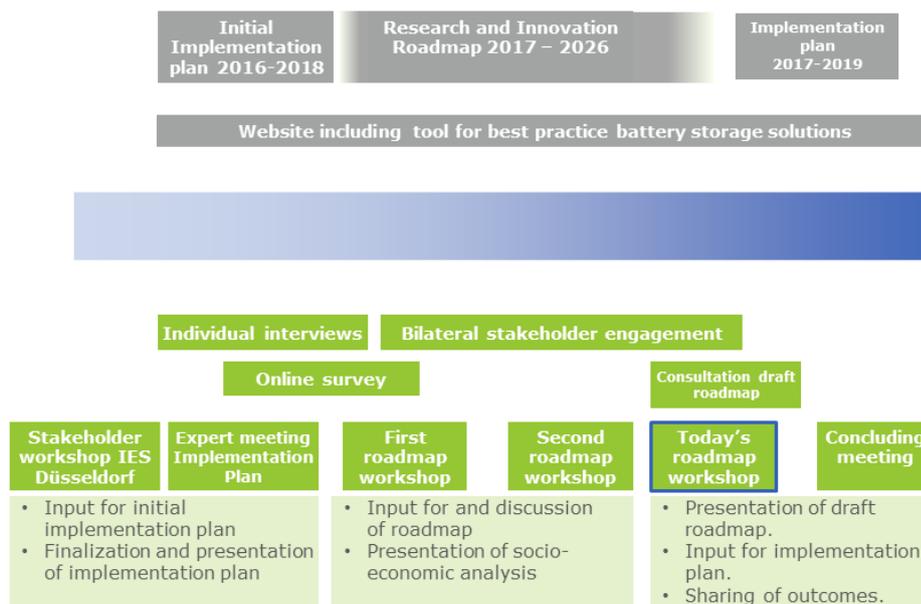
- > Provide consolidated stakeholder views for the R&D needs and market uptake measures.
- > Monitor and review projects, programmes and developments in the sector in EU and worldwide.
- > Organise workshops to foster knowledge sharing.
- > Contribute to the development of an energy system with more active consumer participation.
- > Contribute to the improved industrial capacity in Europe.
- > Develop an outline and recommend on measures to stimulate the market for batteries.

Main deliverables

- | | |
|--|---|
| > Initial Implementation Plan 2016-2018 | June 2016 (available online) |
| > Research and Innovation Roadmap 2017-2026 | 1st half 2017 (draft online at website) |
| > Implementation Plan 2017-2019 | September 2017 |



Overall timeline deliverables and stakeholder interaction





BATSTORM workshop

Objectives

1. Through an interactive session collect feedback on the draft **10 year research and innovation roadmap** (main deliverable BATSTORM project)
2. Discuss **priorities of actions**
3. To continue a process of periodic interaction with a **panel of experts**



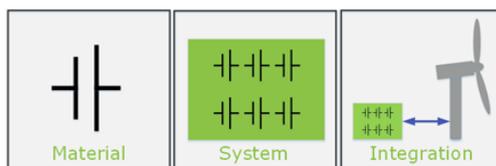
5

© ECOFYS |06-06-2017|

sustainable energy for everyone

The scope of the roadmap

- > 10 year Research and Innovation roadmap
 - Focus is on research and innovation actions
 - But essential actions other than R&I are also included
- > The roadmap is as much as possible battery technology neutral and constructed based on input from a wide range of stakeholders
- > Focus on stationary, but taking into account developments in automotive
- > SET targets are starting points for targets/goals in our roadmap
- > We look at battery-based energy storage, including actions at material, cell and integration level (throughout the whole value chain)



© ECOFYS |06/06/2017|

sustainable energy for everyone



Roadmapping process (iterative)



7

© ECOFYS |06-06-2017|

sustainable energy for everyone

Structure of the roadmap



© ECOFYS |06-06-2017|

sustainable energy for everyone



Prioritization

- > Actions are ranked on impact, urgency and duration
- > This combined resulted in a priority setting
- > 'Very high' and 'high' priorities feed into the implementation plan together with 'medium' priorities with a long duration

#	Action	Impact	Urgency	Duration	Priority
21	Initiate Expert Group on battery connection rules	3	3	1	very high
32	Propose measures to increase industry collaboration (consortia)	3	3	1	very high
3	Develop alternative materials for BESS	3	2	3	high
5	Develop advanced battery management solutions (thermal, electrical)	3	2	2	high
8	Propose duty cycle and testing standards and performance certification	2	3	2	high
15	Adapt regulation to stimulate recycling	3	2	1	high
20	Create and maintain knowledge sharing platform	2	3	2	high
30	Develop safety standards	2	3	2	high
34	Determine the market potential/demand for BESS	2	3	1	high
35	Exploit synergies with (auto)motive sector	3	2	2	high
39	Focus research on cutting edge battery technologies	3	2	3	high

Round table

- > Brief round of initial feedback (maximum 3 main points per person)
 - Are the actions listed suitable?
 - Does the prioritization result in an appropriate ranking?
 - Alternative suggestions for actions, milestones or priorities?
- > Feedback will be included in revision of draft
- > A selection of larger points can be discussed in the interactive session



Interactive session

1. Priorities:

- Feedback on current ranking on impact/urgency/duration?
- General observations?
- Concrete suggestions for alterations?
- You can provide your feedback also on printed hand outs of table

2. Goals 'Industrial capacity' & 'Technology leadership'

- Concrete suggestions for additional actions or milestones?
- For 'leadership' are these actions complementary or already part of existing platforms?
- Who would be initiators/owners of these actions?

3. R&D related actions

- Any R&D components or challenges missing?
- Who would need to promote/partially fund these actions?

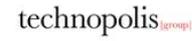
Wrap up & next steps

- > Concise workshop report will be drafted
- > Stakeholder consultation open till Friday 16th of June 2017
- > All feedback is welcome, especially on actions and priority setting
- > Final roadmap aimed 1st half July 2017

- > Draft roadmap available at: <http://www.batstorm-project.eu/>



sustainable energy for everyone



Thank you for your participation.

Please stay in touch and
connect through our website.



batstorm-project.eu

