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Facilitating energy storage to allow high penetration of intermittent renewable energy

Report with conclusions and proceedings of the policy promotion event

26 June 2013

Deliverable 4.4

Co-funded by the Intelligent Energy Europe Programme of the European Union

Acknowledgements

This report has been produced as part of the project “Facilitating energy storage to allow high penetration of intermittent renewable energy”, stoRE. The logos of the partners cooperating in this project are shown below and more information about them and the project is available on www.store-project.eu

The work for this report has been coordinated by ESHA and WIP.

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Table of Contents

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Introduction

The stoRE Policy promotion event was organised in two parts in Brussels on 26 June 2013.

The first part was dedicated to the policy recommendations from WP3 (environmental aspects) and the second to the recommendations from WP4 (regulatory and market framework analysis). Both took place in the framework of the European Sustainable Energy Week.

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Part 1 – Brussels Seminar "What are the Environmental effects of Pumped Hydro Energy Storage (PHES) and how can future development proceed?"

On Wednesday 26 June 2013 the stoRE project team organised in the framework of the 'European Union Sustainable Energy Week' (EUSEW) a seminar on "What are the Environmental effects of Pumped Hydro Energy Storage (PHES) and how can future development proceed?" at the European Wind Energy Association, Rue d'Arlon 80, B-1040 Brussels, Belgium.

About 30 stakeholders attended the event, which included a presentation and interactive session examining the environmental effects of Pumped Hydro Energy Storage (PHES) and Compressed Air Energy Storage (CAES).

The **presentations** of the event can be found here.

Presentation 1 – The PHES and CAES technologies

Monica Kane (Malachy Walsh & Partners) from the project stoRE team shortly welcomed the participants and gave a short overview on the stoRE project and the agenda of the seminar.

She then presented the functioning of the various PHES and CAES technologies, since public interest is rising more and more for these technologies along with the increase of the share of variable RES in the European and global electricity mix.

She also pointed out that Europe was lacking technical and regulatory experience on that topic. One participant suggested that the stoRE project should look more closely to Switzerland where PHES projects have flourished. Michael Fink (Schluchseewerk) pointed out however that Switzerland only partially implements the Water Framework Directive and does not implement Natura 2000.

A representative from Stadtkraft mentioned that flexibility can be achieved without investing in a

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pumping station just by optimising the operation of already existing large reservoirs. Michael Papapetrou (WIP), added that this option can be seen as a source of flexibility, however it does not help deal with accommodating excess generation from RES entering into the electricity system. Hydropower without a pumping device able to process this electricity is therefore outside of the scope of this project.

Interactive session – Assessing the environmental impacts of PHES technologies

The audience was divided into groups of three which discussed the possible impacts of PHES on the environment. Each group was in charge of a specific technology (close-loop, semi-open and open) and had to assess the deviation from the existing environmental baseline conditions. A list of evaluation criteria was provided to the participants.

The session was followed by a debriefing with a presentation from each group where the impacts of the different technologies were compared. It was debated whether a closed-loop or an open system had the overall highest impacts on the environment. It appeared however no definite conclusion can be drawn as the potential impacts depend on the specific site and project characteristics. Some participants also mentioned that “positive” impacts had to be assessed.

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Presentation 2 – Recommendations

Annicka Wänn (University Cork College) from the stoRE project presented the set of 5 recommendations to further the sustainable development of bulk energy facilities (with a major consideration of the environmental dimension), based on a large consultation process:

1. Establish a need for bulk EST – create appropriate policy
2. Develop Plans and Programmes for Bulk EST
3. Identify viable sites at Strategic Level
4. Develop clear guidelines and document best practice
5. Facilitate planning and approval procedures

Discussion

The presentation was followed by a panel discussion and a broader discussion with the audience. The debate was moderated by Dirk Hendricks (ESHA) from the project team.

Sergey Moroz (WWF) insisted on the need of an integrated approach on this issue and therefore pleaded for stronger strategic pre-planning to better protect the environment but also the potential investor. There are some good examples, like the process followed in the framework of the Danube Convention. The Kaunertal project is a bad example because it was built in the wrong location from the very beginning. He also insisted on the fact an effective process that brings together the right people is more important than a good paper (policy or planning).

Michael Fink (Schluchseewerk) presented the point of view of a PHES project development company. He agreed with the stoRE recommendations as he did not believe in the “bottom-up”

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approach. A strategic approach is good but is not enough. He also insisted on the need to involve the developers and operators locally in all the process to ensure a “reality-check” as the outcome of a planning process will not be accepted if all sensitivities of the local population have not been taken on board. He mentioned that storage should be a full chapter of the European RES policy and that specific targets should be set for storage at the EU level. He admitted that there should be no-go areas for PHES development as a site-specific approach can be costly for the potential investor. Finally, he mentioned that he had learned that the environmental aspect is important but also asked for more sympathy for the projects which are underway.

One participant said that local administrations are often reluctant to do (costly) plans at their level, which leads to economic uncertainty. Another mentioned that it is often difficult for administrations to ensure the right coordination in the process.

Michael Papapetrou admitted that recommendations 3 and 4 should be further developed and that this could be done in the framework of new European projects.

Dirk Hendricks thanked all the participants for their contribution and shared his belief that there was a space for policy action at the macro (European) level.

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Part 2 – Brussels High Level Policy Conference "Facilitating energy storage to allow fast growth of sustainable energy"

On Wednesday 26 June 2013, the European Association for Storage of Energy (EASE) in cooperation with Eurelectric and the stoRE project hosted a High Level Policy Conference in the framework of the EU Sustainable Energy Week (EUSEW) on "*Facilitating energy storage to allow fast growth of sustainable energy"* at the Committee of the Regions (CoR). It was attended by more than 100 participants.

Introduction

Michael Papapetrou from the stoRE project welcomed the participants and presented the agenda of the Conference.

Bernard Delpech, President of EASE presented his organisation and views on storage. Hans ten Berge, Secretary General of EURELECTRIC presented his organisation and views on storage. Raquel Garde, Responsible of Energy Storage Area of CENER presented the stoRE project.

Session 1 - Market design effects on the development and operation of different energy storage technologies

This session was chaired by Gunnar Lorenz, head of unit DSO in Eurelectric. He mentioned from the very beginning that there are two levels with different market realities: the transmission level and the distribution level. Storage at the distribution level allows DSO's to be active electricity managers.

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The following **presentations** were given during this session:

- Batteries - Decentralised Storage by Reinout Wissenburg, European Affairs Manager at SSE
- Power-to-Gas by Christian Folke, Portfolio Manager of the E.ON Innovation Centre Energy Storage
- CAES by Erik Hauptmeier, Corporate Research & Development - Manager Technologies , RWE
- PHS by Karl Wimmer, Director, Head of Operation, VERBUND Hydro Power AG

Here are highlighted the parts of the discussion with elements relevant to the stoRE project:

- It is debated whether subsidies for renewables offer the right signals to the market for investing into storage;
- The societal value of storage is increasing and there is more and more a business-case for decentralised electricity storage, especially in Germany;

Session 2 - Possible improvements in the market and regulatory frameworks from the perspective of energy storage

This session was chaired by Heyko Donath, Chairman of EASE Strategy Committee.

The following presentations were given during this session:

- TSO Perspective by Manuel Galvez, R&D Officer at the Innovation and Knowledge Management Department, ELIA
- Utility Perspective by Juan José Alba Rios, Director Regulatory Affairs of Endesa and Vice-Chair of EURELECTRIC's Markets Committee
- stoRE Project Recommendations by Michael Papapetrou, Senior Project Manager for WIP-

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Renewable Energies and stoRE project coordinator

- European Commission perspective – Jean-Marie Bemtgen, New energy technologies, innovation and clean coal, DG Energy, European Commission

Relevant elements for the stoRE project coming out of the subsequent discussion:

- Storage or any balancing technology needs to be made attractive for the investor;
- Storage is only one means for flexibility and it is important to look at the whole picture when improving the market and regulatory frameworks. According to certain speakers and participants, since the market does not provide the right signals today for storage, we need to re-design the whole electricity market and avoid any subsidies. The new market should however look at how to store the overproduction from RES although a certain amount of spill appears to be unavoidable;
- There is a need to clarify the question of the ownership of storage infrastructure, both for the present and the future, taking into account the specificity of each technology (owing a battery is not the same as owning a PHES plant);
- There is a commitment from the Commission at the highest level to put storage high on the EU policy agenda. The EC is also looking at interventions from the Member States on the energy market. The EC believes that much progress has been made on batteries which can now have a bigger capacity, are cheap and quick to set up;
- It is urgent to change the market, but for the better;
- A market with a certain level of uncertainty is desirable, because this is the only way to maintain innovation;
- One concrete European policy objective concerning storage could be how to improve cross-border flexibility.

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Annex I: Agenda of the WP3 event

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What are the environmental effects of Pumped Hydro Energy Storage (PHES) and how can future development proceed?

EUSEW Energy Day

Wednesday, 26th of June 2013

Address: EWEA (European Wind Energy Association)

Rue d'Arlon 80, B-1040 Brussels, Belgium

Purpose of the Event:

This satellite event invites all those interested to participate in a presentation and interactive session examining the environmental effects of Pumped Hydro Energy Storage (PHES) and Compressed Air Energy Storage (CAES). These are large scale civil projects with significant environmental implications. It will include a technology overview and examination of how future sustainable PHES development should proceed. Finally, it will conclude with a panel discussion.

Wednesday, 26th of June 2013		
Time	**Content**	**Responsible**
10.30	Introduction	stoRE Project Team: Monica Reidy (Malachy Walsh & Partners) Annicka Waenn (University College Cork)
10.40 – 11.10	Presentation of PHES and CAES technologies, the large scale nature of these civil projects, and the assessment of their various environmental impacts.	
11.10 – 11.40	Interactive Session on Environmental Impacts of PHES and CAES	
11.40 – 12.00	Coffee Break	

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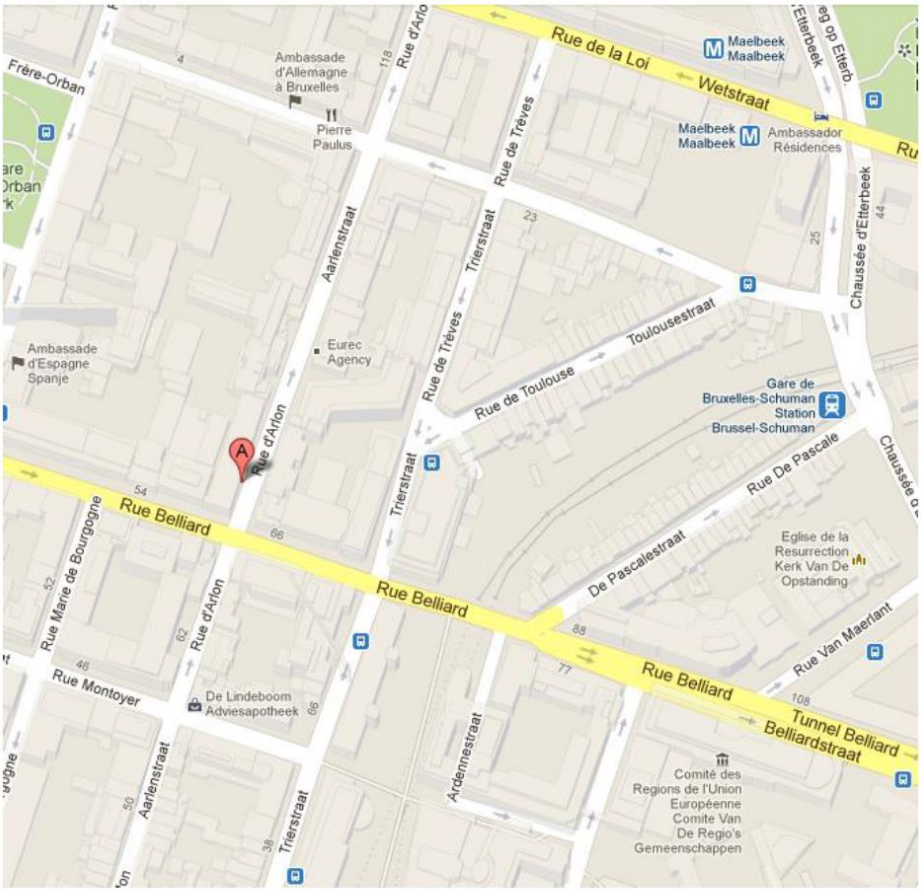
12.00 – 12.30	Presentation of the recommendations on how the future sustainable development of PHES and CAES projects should proceed. The recommendations of the stoRE project are the results of a wide consultation process and can be found in a report here	Monica Reidy (Malachy Walsh &Partners) Annicka Waenn (University College Cork)
12.30 – 13.00	Panel discussion, where each member of the panel will introduce their view on the recommendations, followed by a Q&A and moderated discussion.	*Moderator:* Dirk Hendricks (ESHA) *Panellists:* Michael Fink (Schluchseewerk) & Sergey Moroz (WWF)

Registration:

This event is open and free to attend. Registration is necessary under this link or by email to oliver.jung@esha.be



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Annex II: Signed list of participants to the WP3 event

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What are the environmental effects of Pumped Hydro Energy Storage and how can future development proceed?

Energy Day event

Wednesday, 26th of June 2013

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Last Name	First Name	Company/Organisation	Email	Signature
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Wasberg	Johan	Mesinova	Johan.Wasberg@mesinova.t	

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Annex III: Agenda of the WP4 event

EASE
European Association for Storage of Energy

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Facilitating energy storage to allow fast growth of sustainable energy

High Level Policy Conference

Wednesday, 26th of June 2013

Committee of the Regions (COR): Rue Belliard 99-101, B-1040 Brussels, room JDE 51

Purpose of the Event:

Because of the changing energy landscape, including the variability of major renewable energy sources the electricity storage requirements are growing. Fast development of storage infrastructure is crucial to allow the accommodation of the ambitious renewable energy targets in the EU. However, in the current market the profitability of electricity storage is marginal at the best case and the regulatory framework adds uncertainty on how this will develop, making the development of energy storage projects more difficult. The event will debate on how to deal with these policy issues fast and effectively.

Wednesday, 26th of June 2013	
Time	**Content**
14:30 – 14:45	**Introduction** Bernard Delpech, President of EASE Hans ten Berge, Secretary General of EURELECTRIC Raquel Garde, Responsible of Energy Storage Area of CENER, stoRE project
14:45 – 15:30	**Market design effects on the development and operation of different energy storage technologies,** the session will be chaired by Koen Noyens, EURELECTRIC *i. Batteries/Decentralised storage – Reinout Wissenburg, European Affairs Manager at SSE* *ii. Power to Gas – Christian Folke, Portfolio Manager of the E.ON Innovation Centre Energy Storage* *iii. CAES – Erik Hauptmeier, Corporate Research & Development - Manager Technologies , RWE* *iv. PHS – Karl Wimmer, Director, Head of Operation, VERBUND Hydro Power AG*
15:30 – 16:00	Q&A and moderated discussion with the panel

SUSTAINABLE ENERGY WEEK 24 - 28 JUNE 2013

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16:00 – 16:15	Coffee Break
16:15 – 17:20	**Possible improvements in the market and regulatory frameworks from the perspective of energy storage,** the session will be chaired by Heyko Donath, Chairman of EASE Strategy Committee *i. TSO perspective - Manuel Galvez, R&D Officer at the Innovation and Knowledge Management Department, ELIA* *ii. Utility perspective - Juan Jose Alba Rios, Director Regulatory Affairs of Endesa and Vice-Chair of EURELECTRIC's Markets Committee* *iii. stoRE project recommendations - Michael Papapetrou, Senior Project Manager for WIP-Renewable Energies and stoRE project coordinator* *iv. European Commission perspective - Andreea Strachinescu, Head of Unit of New energy technologies, innovation and clean coal, DG Energy, European Commission*
17:20 – 18:00	Q&A and moderated discussion with the panel

Registration:

This event is open and free to attend. Registration through the EUSEW website is necessary. Registration is expected to be open from mid-May onwards.

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Annex IV: Registrations on the EUSEW website for the WP4 event

Lastname	Firstname	Organisation
Aas	Kyrre	University of Stavanger
Alba Rios	Juan Jose	Endesa
Anagnostopoulos	John	national technical university
Antoons	Eric	Self employed
Arcipowska	Aleksandra	BPIE
Barth	Frederic	TGC
Bennett	Kearon	Ottawa Engineering Limited
Berg	Johannes	TUEV NORD Group
Bertoncini	Massimo	Engineering Ingegneria Informatica
Błażewicz-Stasiak	Anna	Office of the Marshal of the Pomorskie Voivodeship
Boesmans	Bart	LABORELEC
Böger	Florian	EUTurbines
Bornas Cayuela	Damian	EUROPEAN COMMISSION - DG RTD
Bortolotti	Michela	EASE European Association for Storage of Energy
Brito	Nuno	Boa Energia
Buyle-Bodin	Zoe	Basse-Normandie Brussels Office
Camorali	Giovanni	Oportechnics
Castro	Juan-Pedro	Endesa
Cavaliere	Gemma	ECBrussels
Chichinato	Orsetta	REDINN
Concas	Giorgia	EPIA
Costea	Mihai	bromotion consultancy/ep
Courcoux	Baptiste	AKKA Benelux
Dedicova	Tereza	CEZ Group
Delpech	Bernard	EASE - European Association for Storage of Energy
Desbazeille	Yves	EDF
D'Hollander	Julien	Elia
Doligé	Sébastien	Eurelectric
Donath	Heyko	E.ON SE
Druet	Christophe	Elia Group
Duarte	Maria Joao	EASE-European Association for Storage of Energy
Dutianu	Dana	European Commission - EACI
Engelke	Thomas	Hanse-Office
Folke	Christian	E.ON Innovation Center Energy Storage
Fulcieri	Maltini	FM Consultants Associates
Gajic	Mara	Muller Group
Gálvez	Manuel	Elia
Gammon	Rupert	De Montfort University
Garde	Raquel	CENER
Geeraert	Tomas	Keppel Seghers
Gibson	Emma	Highview Power Storage
Ham	laurent -philippe	Greenfish
Hamnaberg	Håvard	Norwegian Water Resources and Energy Directorate
Hansen	Xavier	EASE
Hashimoto	Masakazu	New Energy Foundation
Hauptmeier	Erik	EASE - European Association for Storage of Energy
Haverbeke	David	Field Fisher Waterhouse
Hemetsberger	Walburga	VERBUND AG
Hendricks	Dirk	European Small Hydropower Association
Horak	Jiri	CEZ, a.s.
Iemmi	Matteo	Edison
Janssen	Rainer	WIP Renewable Energies
Jemelkova	Ivana	FTI Consulting
Jung	Oliver	European Small Hydropower Association
Jurado	Sergio	Sensing&Control Systems S.L.

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Koch	Claire	ESHA asbl
Kumięga	Jarosław	Urząd Marszałkowski Wojewodztwa Pomorskiego
Küpper	Gerd	GDF Suez
Kurlyak	Petro	Burshtyn City Council
Lauber	Matthias	RWE AG Liaision Office Brussels
Lembrecht	Malte	Siemens AG
Lorenz	Gunnar	EURELECTRIC
Lucio-Villegas	Antonio	RED ELECTRICA DE ESPAÑA, SAU
Luis-Ruiz	Teresa	ENDESA
Maidonis	Thomas	WIP Renewable Energies
Mandatova	Pavla	EURELECTRIC
Mardaras	Javier	Acciona Infraestructuras
Martens	Deborah	EASE - European Association for the Storage of Energy
Martens	Carolien	imec vzw
Meeus	Marcel	SUSTESCO
Minett	Simon	Challoch Energy
Miniewicz	Joanna	Pomorskie Regional EU Office
Miró Baz	Luis-Carlos	Alliance for Rural Electrification
Missfeld	Tanja	Deloitte & Touche GmbH Wirtschaftsprüfungsgesellschaft
Miyanaga	Yoichi	Central Research Institute of Electric Power Industry
Moroz	Sergiy	WWF
Mulder	Kees	Ascolo
Novikoff	Ivan	Fives
Noyens	Koen	EURELECTRIC
Omland	Lars Erik	Agder Energi
Palada	Philipp	GIE
Papapetrou	Michail	WIP GmbH & Co Planungs-KG
Pastleitner	Ralf	Oesterreichs Energie
Peyhorgue	Stéphane	EIE Bretagne - Pays de la Loire - Poitou-Charentes
Pitteri	Silvio	SiP, Sustainable innovation Partners
Plainemaison	Valérie	EFIEES
Rajh	Andrej	HSE INVEST d.o.o.
Rechsteinre	Eva	E.ON
Reid	Fraser	Lighthouse Global Technologies
Renard	Thierry	Storewatt
Rey Porto	Milagros	Gas Natural Fenosa
Reynaert	Johan	Capricorn Venture Partners
Rocher	Viola	EnBW Energie Baden-Württemberg AG
Rongé	Kris	Flemish Government - Environment, Nature and Energy department
Roos	Philippe	Energy Intelligence Group
Rousseau	Xavier Lorenzo	McKinsey
Sabeva	Elena	Johnson Controls
Santos	Bruno	ISR-UC
Sente	Frederic	DE SIMONE sa
Seriatou	Eleni	HyER, Hydrogen, fuel cells and Electro-mobility in European Regions
Stelzer	Volker	Karlsruhe Institut of Technology
Stewart	Neil	Glen Dimplex
Stockx	Stefan	EneRa
Strachinescu	Andreea	European Commission
ten Berge	Hans	EURELECTRIC
Testard-Vaillant	François-Xavier	EDF R&D
Thies	Frauke	EPIA
Torres	Albert	LEITAT
van de Vreede	Gerdien	NEN
Van den Bergh	Peter	DEME
van Oldeneel	Christine	Hydro Equipment Association
Venturini	Elsa	Bernard EnergyAdvocacy
Weiss	Thomas	Helmut Schmidt University
Whist	Bendik Solum	EFTA
Wilczek	Paul	EWEA
Wimmer	Karl	VERBUND Hydro Power AG
Wissenburg	Reinout	SSE
Wuertenberger	Uwe	Linde AG