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Facilitating energy storage to allow high penetration of variable renewable energy

Proceedings of the final conference session

2nd of October 2013

Deliverable 6.4

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 WIP.

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Introduction

The final conference session of the stoRE project was organised as a parallel event within the 28th European PV Solar Energy Conference and Exhibition and it took place on the 2nd of October 2013 in Parc des Expositions, Nord Villepinte, Paris, France. The conference attracted 3,756 participants from 77 countries, while the exhibition brought about 12,000 trade and business professionals from 92 countries.

The title of the stoRE event was “PV and Electricity Storage Requirements” and its aim was to promote the results of the stoRE project with a special focus on regulatory and market improvements to deliver the electricity storage necessary for further renewable energy expansion. 126 participants signed-up for the event using the online registration form while 44 attendants provided their business-cards in addition.

Presentations

The programme started with an introduction to the project, followed by three presentations by members of the consortium highlighting the main results so far. A presentation was also given by EPIA to discuss the view of the PV industry, which is very relevant to the conference attendees. In this section we provide a summary of each presentation and give a link to the presentation’s slides.

Introduction

Thomas Maidonis (WIP Renewable Energies) welcomed the participants and introduced them to the topic of the session. He stressed the importance of energy storage in future systems with a high share of variable renewables and informed the audience about the objectives and the work that has been done within the stoRE project. The agenda of the event was then presented and the floor was given to the next speaker.

Link to the presentation

Assessment of electricity storage needs to accommodate 40 and 80% shares of renewable electricity in Austria, Denmark, Germany, Greece, Ireland and Spain

Thomas Weiss (Helmut-Schmidt-University) presented the methodology that has been developed within the project and used for assessing the electricity storage needs in the 6 target countries. It was mentioned that two scenarios have been considered in each case, one with 40% penetration level of renewable and one with 80% till 2050. Attention was given to the fact that the analysis assumes zero bottlenecks in the electricity grid and as a result the study indicates requirements for energy storage in the future systems even if supergrids existed. His presentation was then closed with some possible further improvements of the model.

Link to the presentation

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Case study on electricity storage requirements in the systems of Austria and Germany

The next speaker, Hans Auer (Energy Economics Group, Vienna University of Technology), focused his presentation on the results produced from running the above mentioned model in the systems of Austria and Germany. First, the assumed scenarios for the development of RES penetration and consumption levels in Austria & Germany were presented and then the focus was on the energy storage requirements both seeing the system as a combined one for both countries and as two separated isolated sub-systems.

In his conclusions, Hans mentioned that the development of the high energy storage potential in the Austrian Alps has advantages for both electricity systems of Austria & Germany.

Link to the presentation

Possible EU market and regulatory framework improvements from the perspective of energy storage

Michael Papapetrou (WIP Renewable Energies) presented the regulatory and market framework hurdles that electricity storage is currently facing in Europe and also some recommendations for possible improvements on the regulatory and market framework in order to deal with these hurdles. The analysis was based on literature review and the collected feedback from overall 55 experts through a questionnaire, telephone interviews, four round table discussions and advisory board meetings.

Link to the presentation

Photovoltaic industry's views on electricity storage

Giorgia Concas (European Photovoltaic Industry Association) opened her presentation with a short introduction to EPIA, the current status of PV installed capacity and their projections of PV penetration until 2030. She then talked about the challenges the distribution grid will have to face in the coming years and mentioned the important role storage can play on supporting the distribution grid and increasing the system flexibility. Last but not least, she presented the drivers for future storage deployment.

Link to the presentation

Discussion

After each presentation there was the opportunity for questions from the floor. There was very high interest in the assessment of the future energy storage requirements and the methodology that was followed. Specific questions sought clarifications on the assumptions that were made and the selection of the scenarios for the generation mix in the different countries.

Regarding the presentation on the detailed results from Germany and Austria, there were many questions as the very relevant topic of a limit on the PV penetration was touched upon. Still, mainly clarifications were given at that stage, leaving the debate for the panel discussion scheduled for

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the last 30 minutes of the event.

After the regulatory and market framework presentation the questions were more on the feasibility of storage under the current electricity market, with comments about the situation in different countries.

Finally after the presentation by the PV Industry, questions were raised regarding the complementarity of demand response and storage solutions. Also the future scenarios for solar penetration were commented.

In the end a more general discussion with the panel and the audience was possible. The main conclusions were the following:

There can be a lot of debate regarding the methodology to define future energy storage needs. Making several assumptions is unavoidable. This has to be a dynamic process and update the assessment frequently as new data become available and different technologies are developed. However, we can agree to the fact that a certain amount of additional energy storage will be necessary to facilitate the ambitious development plans of variable renewable energy.

The energy storage needs can be separated to short term and long term storage that are served by different technological solutions.

Demand response is a way to integrate more variable renewables. However, it does not eliminate the need for storage. It is rather the other way around – storage facilities work complimentarily and give more options for demand response.

The current regulatory and market framework are not fully recognising the value of storage. As the framework is changing, there is the opportunity for the renewable energy and storage industries to work together for proposing the adaptations that will provide fair and balanced approaches that help achieving all main energy policy objectives.

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Annex 1: Agenda of the Event

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EU PVSEC 2013

Parallel event

organised jointly by the EU PVSEC 2013 and the stoRE project

PV and Electricity Storage Requirements

Regulatory and market improvements to deliver the electricity storage necessary for further renewable energy expansion

Wednesday, 2 October 2013

Auditorium 311

Parc des Expositions - Paris Nord Villepinte, Paris, France

The event is open to all registered participants of the 28th EU PVSEC
(Exhibition Visitors, Conference Participants and Exhibitors)

stoRE
www.store-project.eu

EU PVSEC 2013

Programme

Wednesday, 2 October 2013

Auditorium 311

10:15 – 10:30	**Introduction** Thomas Maidonis, WIP, stoRE project coordination team
10:30 – 11:00	**Assessment of electricity storage needs to accommodate 40 and 80% shares of renewable electricity** Thomas Weiss, Helmut-Schmidt-University, Germany
11:00 – 11:20	**Case study on electricity storage requirements in the systems of Austria and Germany** Hans Auer, Energy Economics Group, Vienna University of Technology
11:20 – 11:40	**Possible EU market and regulatory framework improvements from the perspective of energy storage** Michael Papapetrou, WIP, stoRE project coordinator
11:40 – 12:00	**Photovoltaic industry's views on electricity storage** Giorgia Concas, Policy Advisor, European Photovoltaic Industry Association
12:00 – 12:30	Q&A and moderated discussion with the panel

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Annex 2: List of Signed-up Participants

No	First name	Last name	Organisation
1	Jinho	Ahn	hyundai heavy industries
2	Julio	Alterach	RSE
3	Antonio	Antonopoulos	REngenuity
4	Tomoko	Aoki	Photovoltaic Power Generation Technology Research Association
5	Angel	Arévalo	Exulans Europe
6	Antoine	Aslanides	EDF
7	Hans	Auer	Vienna University of Technology
8	Heymi	Bahar	
9	Babatunde Oladapo	Balogun	global beetag nigeria limited
10	Efstratios	Batzelis	National Technical University of Athens
11	Nicolas	Beaudoin	Smartenrgy AG
12	Laurent	Bellemare	AGENCE MARTINIQUAISE DE L'ENERGIE
13	Marko	Berginc	University of Ljubljana, Faculty of Electrical Engineering
14	Giovanna	Bianchi	Eni S.p.A.
15	Benoit	Bletterie	Austrian Institute of Technology
16	Andrea	Bodenhagen	CSUN Europe GmbH
17	Nicolas	Bogdanski	TÜV Rheinland
18	Dries	Bossuyt	Origis Energy
19	Maria	Browne	
20	Giovanni	Camorali	OPORTECHNICS
21	Claude	Campion	3C Projects
22	Mickaël	Chabot	
23	Shiny	Chen	PV Guider
24	Andre	Claverie	AC CONSULTANT
25	Regis	Clement	
26	Sophie	De Richecour	TOTAL
27	Laurene	Debesse	TOTAL
28	Vicente	Diaz	
29	Vicente	Diaz	ISOFOTON SA
30	Chris	Eberspacher	
31	Erik	Eikelboom	Centrosolar Benelux BV
32	Boudewijn	Elsinga	Universiteit Utrecht
33	Christopher	Emmott	
34	Ines	Flores Torre	Canadian Solar
35	Franziska	Funck	TU Braunschweig
36	Alfonso	Galan	Canadian Solar
37	George	Georghiou	PV Technology, University of Cyprus
38	Agustin	Gomez	ULMA Innovacion
39	Thomas	Grandon	TOTAL

40	Andreas	Hahn	TRITEC Project Engineering AG
41	Ralf	Haselhuhn	DGS
42	Linda	Hassaine	Centre de Développement des Energies Renouvelables , CDER
43	Gary	Hayes	HGEN Capital Ltd
44	Marco	Hernandez Velasco	University College of Falun
45	Dick	Heslinga	CEA - INES
46	Hendrik	Hoffmann	skytron Energy GmbH
47	Patrick	Hubert	SolarNet
48	Edward	Hunt	Isentropic
49	Cristina	Insignares	IREC
50	Rainer	Isenrich	Edisun Power Europe AG
51	Rui	Jia	Chinese Academy of Sciences
52	Klaus	Joestl	CISS Consulting GmbH
53	Alimamy	Kamara	CNC Watch New Africa
54	Franz	Karg	AVANCIS GmbH
55	Blaž	Kirn	University of Ljubljana, Faculty of Electrical Engineering
56	Iyang	Ko	
57	Roald	Koch	Berlin Partner für Wirtschaft und Technologie
58	Lejo Joseph	Koduvelikulathu	International Solar Energy Research Center, Konstanz
59	Martin	Koßagk	EADS Astrium
60	Jay	Lin	PV Guider
61	Alexander	Los	EKO Instruments Europe BV
62	Shengbo	Lu	
63	Jesus	Lugaro	SAFT
64	Andrew	Machirant	Swedish Solar Energy Trade Association
65	Thomas	Maidonis	WIP
66	Waseem	Malik	Eco Energy Rating Ltd
67	Mauro	Marchi	Silver Ridge Power
68	Patrick	Martel	EDF
69	Hiroshi	Matsukawa	RTS Corporation
70	Sebastian	Mayr	
71	Daniel	Meier	Lightdrop Harvest, LLC
72	Christoph	Metzner	Fraunhofer FEP
73	Oscar Alexis	Monzón Alejandro	National University for Distance Education
74	Dipankar	Mukherjee	BENGAL ENGINEERING & SCIENCE UNIVERSITY
75	Javier	Munoz	Technical University of Madrid
76	Sotirios	Nanou	ICCS/NTUA
77	Lars	Oberbeck	
78	Nicolae	Olariu	"Valahia" University of Targoviste
79	Marc	Oman	
80	James	Palles-Dimmock	
81	Christoph	Panhuber	Energie AG Renewable Power GmbH
82	Michael	Papapetrou	WIP
83	Roque	Pedace	IRESUD

84	Christian	Pho Duc	
85	Diana	Powers	Freelance journalist
86	Radostina	Primova	Institute for European Studies, VUB
87	Rakesh	Ranjan	GGSIPU
88	Philipp	Rathjen	International Energy Agency
89	Thierry	Renard	Storewatt
90	Davide	Rivola	SUPSI
91	Gabriel	Sancho Comes	Yingli Green Energy France
92	Gabriel	Sancho Comes	Yingli Green Energy France
93	Bruno	Santos	ISR-UC
94	Stefano	Saviano	Eni S.p.A.
95	Nilkanth	Shinde	Shivaji University
96	Nicola	Sicchieri	DSM
97	Giovanni	Simoni	Kenergia srl
98	Andy	Skumanich	SolarVision Co
99	Robert	Spandau	HHINV
100	Christian	Stenzel	Astrium GmbH
101	Marion	Steward	EDF
102	Stefan	Stockx	EneRa, smart energy components & solutions
103	Wolfgang	Storm	Wacker Chemie AG
104	Mikkel	Sveen	Markedskraft
105	Hairen	Tan	TU Delft
106	Ioannis Thomas	Theologitis	European Photovoltaic Industry Association
107	Stathis	Tselepis	CRES
108	Theocharis	Tsoutsos	TECHNICAL UNIVERSITY OF CRETE
109	Lourens	Van Dijk	
110	Wilfried	Van Sark	Utrecht University
111	Wilfried	Van Sark	Utrecht University
112	Jan	Vandesande	Activ Solar GmbH
113	Eero	Vartiainen	Fortum Corporation
114	Candido	Vazquez	Isofoton
115	Jose	Vazquez	Isofoton
116	Jose	Vazquez	isofoton
117	Miguel	Vazquez	Isofoton
118	Ton	Veltkamp	ECN
119	Alberto	Visentin	European Patent Office
120	Qi	Wang	
121	Wolfgang	Wiesner	
122	Christopher	Williams	Zentrum fuer Sonnenenergie- und Wasserstoff-Forschung Baden-Wuerttemberg (ZSW)
123	Martin	Wolf	Fronius International GmbH
124	Boukhalfa	Yaïci	EnR Engineering Services
125	Ueda	Yuzuru	Tokyo Institute of Technology
126	Xin	Zheng	Northwestern Polytechnical University

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Annex 3: List of Attendants that provided their Business Cards

No	First name	Last name	Organisation
1	Nicolas	Beaudoin	Smartenrgy AG
2	Giovanna	Bianchi	Eni S.p.A.
3	Benoit	Bletterie	Austrian Institute of Technology
4	Ines	Flores Torre	Canadian Solar
5	Ralf	Haselhuhn	DGS
6	Davide	Rivola	SUPSI
7	Stefano	Saviano	Eni S.p.A.
8	Wolfgang	Storm	Wacker Chemie AG
9	Elisa	Tonelli	Eni S.p.A.
10	Bernard	Lecussan	HPC-SA
11	Georg	Dielmann	SMA Solar Technology
12	Karin E.	Lason	De Gruyter Scientific Publisher
13	Jan	Duerinck	VITO - Vision on Technology
14	Kris	Baert	Catholic University of Leuven
15	Ben	Willis	Solar Media
16	Christof	Bucher	Basler & Hofmann
17	Marina	Temchenko	Madico
18	Ji-Hwan	Choi	STX Solar CO., Ltd.
19	Andrea	Ingenito	Delft University of Technology
20	Karel	De Brabandere	3E
21	Elsa	Laugareil	M-Prime Energy
22	Francisco	Serrano-Casares	UMA - University of Malaga
23	Bart	Verheule	BOREALIS
24	David	Ponce Solano	Advanced Coatings & Constructtion Solutions SCRL
25	Arnaud	Belletoile	Fonroche Energie
26	Sebastian	Oliva Henriquez	University of New South Wales
27	Mara Missouri	Gajic	Muller Group
28	Mika	Long	Delta Energy Systems
29	Markus	Heiss	ecap Solutions GmbH
30	Olivier	O'Nagy	Tudor
31	Carla	Signorini	ESA-ESTEC
32	Susanne	von Aichberger	Solarbuzz
33	Roberto	Rizzo	Artenergy Publishing Srl
34	Antoine	Chamussy	Vol-V Solar
35	Thomas	Helth	EnergiMidt
36	Mohamed	Maaroufi	Ecole Mohammadia d'Ingénieurs
37	Endre	Simonyi	Simon Broadcast
38	Mika	Kambe	Asahi Glass
39	Joachim	Glatz-Reichenbach	ISC Konstanz
40	Christian	Baudon	Domo Helios

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41	Steve	Pester	BRE
42	Astrid	Schneider	Bundesarbeitsgemeinschaft Energie
43	Touria	Barradi	SMADER
44	Yannis	Tripanagnostopoulos	University of Patras

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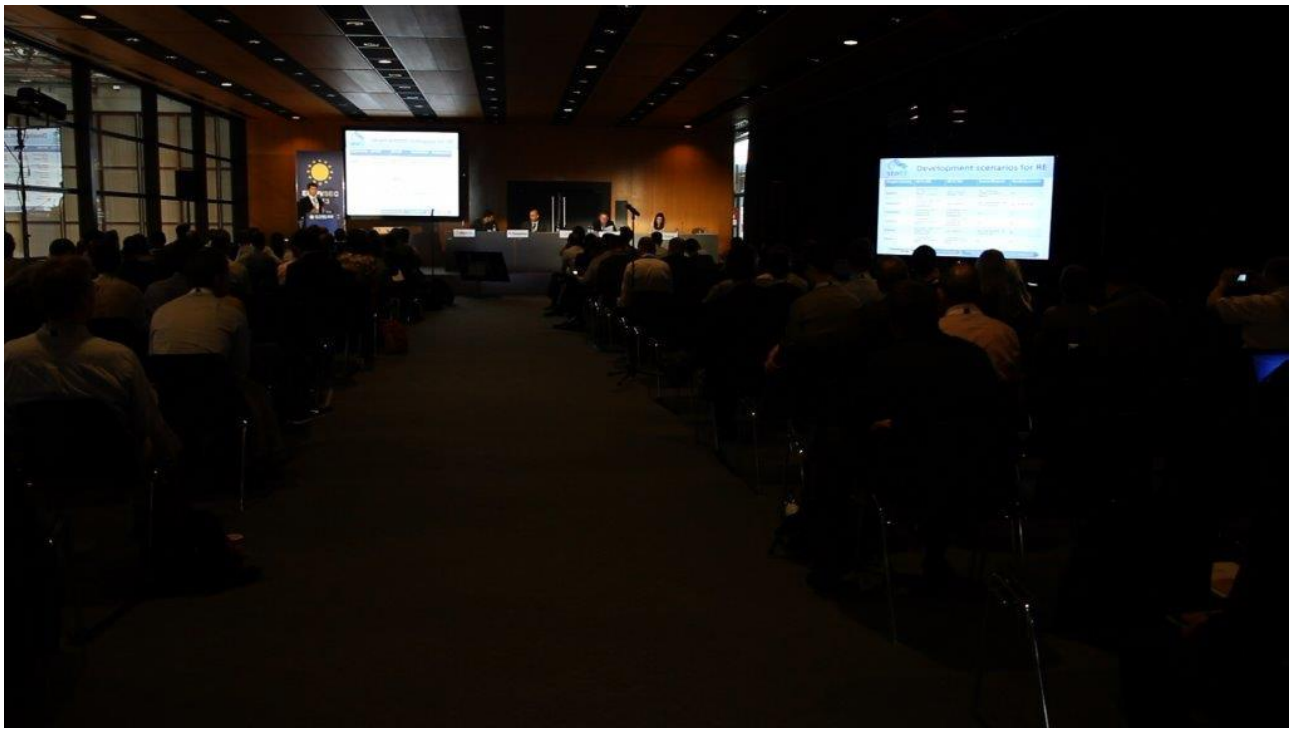
Annex 4: Photos from the Event



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Hall 4
EU PVSEC 2013
28th European Photovoltaic Solar Energy
Conference and Exhibition


System

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