



WCRE

World Council for Renewable Energy

International
Renewable
Energy
Storage
Conference

IRES



EUROSOLAR and the World Council for Renewable Energy (WCRE)
invite you to attend the

6th International Renewable Energy Storage Conference and Exhibition (IRES 2011)

November 28 – 30, 2011

bcc Berlin Congress Center, Berlin / Germany



Organizers: **EUROSOLAR**
World Council for Renewable Energy (WCRE)

In cooperation with:

EnergieAgentur.NRW

EUROBAT

IFBF
The International
Flow Battery Forum

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American Council On Renewable Energy

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6th International Renewable Energy Storage Conference and Exhibition (IRES 2011)

The global renewable energy potential enables us to achieve an all-encompassing substitution for fossil fuels and nuclear energy in the fields of heat, electricity and mobility.

This substitution requires a complementary mix of intermittent and dynamic sources of renewable energy, power grids and grid management tailored to the needs of renewable energy generation, and of course the storage of heat and electricity for different timescales, performance levels and applications.

Ground breaking opportunities will thereby emerge for the dynamic exploitation of renewable energy in manifold energy-autonomous forms: for enterprises, in residential construction, residential developments, cities, regions and countries. Herein

also lies the chance of achieving numerous technological innovations along with new prospects for the industries.

In 2006 EUROSOLAR and the World Council for Renewable Energy (WCRE) started the IRES conference series, intended to contribute to the developments in energy storage and to popularize the resulting applications and solutions. The view in the professional energy storage world is that IRES has meanwhile developed into the central platform for sharing knowledge and exchanging ideas on one of the key issues of future energy supply.

Because of its huge success IRES will take place for the sixth time in November this year. We would be delighted to welcome you at IRES 2011 in Berlin.

Scientific Steering Committee:

- Dr. Wolfgang Palz, World Council for Renewable Energy (WCRE), Paris/Brussels
- Dr. Bernhard Riegel, EUROBAT, Brilon, Germany
- Prof. Dr. Dirk Uwe Sauer, RWTH Aachen University, Germany (Scientific Conference Chair)
- Dr. Peter Schossig, Fraunhofer ISE, Freiburg, Germany
- Prof. Dr. Ingo Stadler, Cologne University of Applied Sciences, Germany
- Dr. Michael Sterner, Fraunhofer IWES, Germany
- Wim van Helden, Renewable Heat, Schagen, The Netherlands

Conference language: English

Organizers: EUROSOLAR, World Council for Renewable Energy (WCRE)

Conference manager: Irm Scheer-Pontenagel (Managing Director EUROSOLAR), Valentin Hollain (Scientific Director EUROSOLAR)

Day one Monday, November 28, 2011

8:30 **Registration**

10:00 **Opening and welcome**

- Wolfgang Palz, Committee of Chairpersons, World Council for Renewable Energy (WCRE), Paris/Brussels
- Lothar Schneider, Managing Director EnergyAgency.NRW, Wuppertal, Germany
- Johannes Rommel, Minister for Climate Protection, Environment, Agriculture, Nature Conservation and Consumer Protection of the State of North Rhine-Westphalia, Düsseldorf, Germany

Plenary session

10:30 **Introductory lectures**

- **The effective political framework in Germany and its importance for energy storage**
Martin Altmann, Becker Büttner Held, Berlin, Germany
- **For a 100,000 storage systems installation programme**
Jörg Mayer, German Solar Industry Association (BSW-Solar), Berlin, Germany
- **Operational flexibility through smart grid storage**
Rick Winter, Vice-Chairman, Electricity Storage Association (ESA), Washington, D.C., USA
- **Long-term storage options – overview of current developments**
Michael Sterner, Fraunhofer IWES, Kassel, Germany
- **Thermal storage: state of the art and current questions**
Peter Schossig, Fraunhofer ISE, Freiburg, Germany
- **Storage demand in different scenarios**
Dirk Uwe Sauer, RWTH Aachen University, Germany

13:00 – 14:00 **Lunch**

Parallel session B 1

14:00 **Sensible thermal Storage**

- **Houses heated entirely by solar energy all year round**
Josef Jenni, Jenni Energietechnik AG, Oberburg, Switzerland
- **Sensible heat storage in district heating networks: using the network as storage**
Daniele Bascotti, AIT Austrian Institute of Technology, Vienna, Austria
- **Energy bunker Wilhelmsburg – innovative technology, intelligent integration**
Joel Schrage, HAMBURG ENERGIE GmbH, Hamburg, Germany

Parallel session B 2

14:00 **RES and storage system demand**

- **100% renewable power system for Europe**
Martin Greiner, Aarhus University, Denmark
- **Storage demand for an electricity supply based on wind and sun**
Matthias Popp, Engineering Consultant, Wunsiedel, Germany
- **Options for increasing flexibility in the electricity generation system**
Gunnar Kaestle, Technical University Clausthal, Germany

Parallel session B 3

14:00 **Pumped hydro and compressed air storage systems**

- **Planning and permitting process to build pumped storage facilities**
Thorsten Gottwald, LUTHER NIERER, Berlin, Germany
- **Energy storage in federal waterways**
Thomas Schomerus, Leuphana University, Lüneburg, Germany
- **Why underwater compressed air energy storage (UW-CAES) will capture significant market share**
Curtis VanWalleghem, Hydrostor, Ontario, Canada

Parallel session B 1 (continued)

- **Large-scale heat storage**
Thomas Schmidt, Solites, Stuttgart, Germany and Per Alex Sørensen, PlanEnergi Nordjylland, Skørping, Denmark
- **First solar district heating grid with seasonal heat storage in a redevelopment project**
Markus Pfeil, Pfeil & Koch ingenieurgesellschaft, Stuttgart, Germany

Parallel session B 2 (continued)

- **Design of a community energy system integrating renewable energy supply, demand management and storage**
Yangang Xing, Welsh School of Architecture, Cardiff, UK
- **Storage management with a redox flow battery**
Florian Noll, IZES gGmbH – Institut für ZukunftsEnergie Systeme, Saarbrücken, Germany
- **Smarter grid or smarter storage – where do business and technology meet?**
Anthony Price, Swanbarton Limited, Malmesbury, UK

Parallel session B 3 (continued)

- **Adiabatic CAES: theoretical efficiency improvements & industrial considerations**
Mathieu Rouzeyre, EDF – R&D, Chatou, France
- **LTA-CAES – Adiabatic low temperature compressed air energy storage plants**
Daniel Wolf, Fraunhofer UMSICHT, Oberhausen, Germany
- **Initial analysis of a hybrid concentrating solar-compressed air energy storage system**
Guillermo Ordorica-Garcia, Alberta Innovates, Edmonton, Canada

16:00 – 16:30 Coffee break

Parallel session C 1

16:30 Thermal storage: Phase change materials

- **Thermal energy storage in Swedish single family houses – A case study**
Johan Heier, Dalarna University, Falun, Sweden
 - **Latent thermal storage in heating systems with air/water heat pumps**
Fabian Rösler, Bayreuth University, Germany
 - **Mobile PCM heat storage for waste heat recovery-optimization for a stable commercial operation**
Samir Binder, ATZ Entwicklungszentrum, Sulzbach-Rosenberg, Germany
 - **Materials for heat accumulation**
Tereza Zemlova, VŠCHT Praha, Ústav energetiky, Czech Republic
 - **High performance PCM storage based on paraffin-polymer-compounds**
Dirk Büttner, Rubitherm Technologies GmbH, Berlin, Germany
- Industrial-scale heat storage with high-power PCM units**
Thomas Grünberger, SGL CARBON GmbH, Meitingen, Germany

Parallel session C 2

16:30 Policy and funding schemes

- **The German feed-in tariff law (EEG) and its framework for the self-consumption of PV energy**
Thorsten Gottwald, LUTHER NIERER, Berlin, Germany
- **Grid parity and cheaper storage bring disruptive change in electricity markets**
Ruggero Schleicher-Tappeser, sustainable strategies, Berlin, Germany
- **What do the regulators care about? How to make the cost effectiveness case for storage**
Laurence G. Chaset, Sustainable Energy Futures, Oakland, USA
- **Influence of different political frameworks on the financial feasibility of electric energy storage in Germany and the United States**
Florian Schubert, Renewable Analytics LLC, San Francisco, USA
- **Interdisciplinary perspectives of storage technologies at a high penetration of renewable energy in the electricity system**
Bert Droste-Franke, Europäische Akademie Bad Neuenahr-Ahrweiler GmbH, Germany

Parallel session C 3

16:30 Life cycle assessment

- **Long-term environmental and resource aspects of energy storage technologies**
Bert Droste-Franke, Europäische Akademie Bad Neuenahr-Ahrweiler GmbH, Germany
- **The European whitebook on grid-connected storage**
Nicolas Martin, INES, Le Bourget-du-Lac, France
- **Assessment of lead acid, vanadium redox flow, and sodium sulfur batteries for wind energy storage**
Rudolf Zauner, VERBUND Renewable Power GmbH, Vienna, Austria
- **Vanadium flow battery energy storage – a mature, enduring technology – displacing oil with wind and solar power**
John Samuel, Renewable Energy Dynamics (REDT), Wokingham, UK
- **Mobility costs analysis and life cycle assessment of Power-to-Gas as alternative fuel**
Tobias Trost, Fraunhofer IWES, Kassel, Germany

18:30 End of day one

Day two Tuesday, November 29, 2011

Parallel session D 1

8:30 Thermal storage: thermo-chemical storage solutions

- **Solar combisystems and storage: Different systems configurations and performance criteria**
Gwennyn Tanguy, CEA-INES
LETH, Le Bourget du Lac, France
- **Modelling thermal energy storage in adsorbent beds for solar heat**
Sheida Stephens and F. Handan Tezel, University of Ottawa, Canada
- **Investigation and up-scale of a closed thermochemical heat storage technology for use in industrial processes and heating applications**
Mike Blicher, Fraunhofer IGB, Stuttgart, Germany
- **Thermochemical heat storage based on $\text{CaO}/\text{Ca}(\text{OH})_2$**
Marc Linder, German Aerospace Center – DLR e.V., Stuttgart, Germany

Parallel session D 2

8:30 Grid-connected (PV-) battery systems

- **The profit of PV-battery systems depending on the prices and market conditions**
Grietus Mulder, VITO - Flemish Institute for Technological Research NV, Boeretang, Belgium
- **Integration of distributed storage units in the low voltage grid**
Aleksandra-Sasa Bukvic Schäfer, SMA Solar Technology AG, Niestetal, Germany
- **The SOL-ION system: 1st experience with a PV storage system in private households**
Armin Schmiegel, voltwerk electronics GmbH, Hamburg, Germany
- **Economic integration of li-ion storage units in central inverter systems: the S10 systems from E3/DC**
Andreas Piepenbrink, E3/DC GmbH, Osnabrück, Germany
- **Energy revolution in German: Challenges and decentralized methods of resolution**
Udo Möhrstedt, IBC Solar AG, Bad Staffelstein, Germany
- **Progress on Recent Utility-scale energy Storage Systems for Integration of Solar and Wind Power**
Jarl Pedersen, Xtreme Power, Austin, USA

Parallel session D 3

8:30 Electric vehicles

- **E-mobility and renewable energy – application areas, requirements and risks considered from a car perspective**
Lars Hollmotz, P3 Ingenieuregesellschaft, Stuttgart, Germany
- **Vehicle to grid and demand side management - an assessment of different strategies for the integration of electric vehicles**
Christine Krüger, Wuppertal Institut für Klima, Umwelt, Energie GmbH, Germany
- **Economic feasibility of renewable powered fast charging stations**
Ralf Bengel, TU Clausthal, Germany
- **Mobile Metering – An efficient infrastructure for electric mobility**
Knut Hechtfisher, ubitricity GmbH, Berlin, Germany
- **Using electric vehicle charging strategies to maximize PV-integration into the low voltage grid**
Astrid Nieße, OFFIS, R&D Division Energy, Oldenburg, Germany
- **Project e-SolCar**
Harald Schwarz, BTU Cottbus, Germany

10:30 – 11:00 Coffee break

Parallel session E 1

11:00 High temperature thermal storage

- **Air sand heat exchanger**
Joachim Götsche, Solar-Institut Jülich (SIJ), Germany
- **Design and test results of latent heat storage for concentrating solar thermal power plants and process heat**
Doerte Laing, German Aerospace Center – DLR e.V., Stuttgart, Germany

Parallel session E 2

11:00 Multi-source power plant and grid integration

- **Optimized operation and system design of a storage device for post-feed-in tariff sales of wind energy at the spot market**
Annedore Kanngießer, Fraunhofer UMSICHT, Oberhausen, Germany
- **The virtual power plant: a decentralized approach to direct renewable energy delivery**
Valerie Speth, Juwi R & D Research & Development GmbH, Wörrstadt, Germany

Parallel session E 3

11:00 Hybrid energy storage solutions by COST (European Cooperation in Science and Technology)

- **Pan-european network on hybrid energy storage solutions in frame of the COST organisation**
Dalik Sojref, WTTC, Berlin, Germany
- **Innovative materials for hybrid energy storage devices**
Elzbieta Frackowiak, Poznan University of Technology, Poznan, Poland

Parallel session E 1 (continued)

- **Simulation and optimization of a high temperature (+ 800 °C) packed bed heat storage system**
Luigi Mongibello, ENEA: Italian National agency for new technologies, energy and sustainable economic development, Portici, Italy
- **High temperature (+ 400 °C) latent heat storage module and system**
Dong Zhang, Tongji University, Shanghai, China
- **A new approach to high temperature latent heat for CSP**
Werner Platzer, Fraunhofer ISE, Freiburg, Germany

Parallel session E 2 (continued)

- **Techno-economic performance of a new double storage concept for integrating compression heat pumps in distributed cogeneration**
Morten Boje Blarke, Aalborg University, Denmark
- **Seasonal heat storage as an optimization tool for the operation of CHP plants**
Dan Bauer, ITW, Stuttgart University, Germany
- **Biogas generation to compensate for intermittent wind and sun in a superordinate energy management system**
Nadine Senkel, CUTECH Institut GmbH, Clausthal Zellerfeld, Germany
- **Grid integrated storage systems - applications, advantages, economic efficiency**
Karl Nestmeier, Gridlands GmbH, Aub, Germany

Parallel session E 3 (continued)

- **Intelligent hybrid energy storage systems**
Yonghua Cheng, VITO - Flemish Institute for Technological Research, Mol, Belgium
- **Hybrid energy storage solutions for mobile applications**
Gerard Coquery, IFSTTAR - French institute of science and technology for transport, Versailles, France & Paul Borza, Transilvania University of Brasov, Romania
- **Hybrid energy storage solutions for stationary applications**
João Martins, Universidade Nova de Lisboa-FCT-DEE and UN-INOVA-CTS, Monte de Caparica, Portugal & Mihai Sanduleac, ECRO SRL, Bucharest, Romania

13:00 – 14:00 Lunch

Parallel session F 1

14:00 **Hydrogen**

- **Facility based on H₂ to manage the production of a wind farm**
Milagros Rey Porto, GAS NATURAL, Barcelona, Spain
- **Decentralised electrolysis – linking the power and transport sectors**
Simon Bourne, ITM Power, Sheffield, UK
- **Construction and operation of a wind electricity electrolyzer to increase the share of decentralized energy supply**
Carsten Kolligs, Evonik Industries AG, Marl, Germany
- **H₂ energy storage development**
Erik Wolf, Siemens AG, Renewable Energy Division, Nuremberg, Germany
- **Water electrolyzer for storage systems – study on the state of the art of the technology and future development trends**
Tom Smolinka, Fraunhofer ISE, Freiburg, Germany

Parallel session F 2

14:00 **Batteries – various technologies for stationary applications**

- **The stationary UltraBattery™ for smart grid applications**
Masaru Miura, The Furukawa Battery Co. Ltd., Nikko-City, Japan
- **Is there a need for new lithium-ion cathode materials in large-scale lithium-ion batteries?**
David Merchin, UMICORE Cobalt & Specialty Materials, Brussels, Belgium
- **Field experience with NAS battery systems - at the 3/11 earthquake disaster in Japan**
Kenji Tanaka, NGK Insulators, Ltd., Nagoya, Japan
- **Economic grid storage**
Cord-Henrich Dustmann, Battery Consult sagl, Sagno, Switzerland
- **Cost-effective renewable energy firming and time shifting using a breakthrough Redox-flow battery storage technology**
Craig R. Horne, EnerVault Corporation, Sunnyvale, USA

Parallel session F 3

14:00 **Product and concept innovations**

- **Development and application of intelligent stationary energy storage devices - StoRegio**
Peter Eckerle, Metropolregion Rhein-Neckar GmbH, Mannheim, Germany
- **The energy autarkic house from HELMA – intelligent self-supply with electricity and heat**
Timo Leukefeld, Consultant, Freiberg, Germany
- **Sewage purification plants as a component of decentralized energy systems**
Henri Riße, RWTH Aachen University, Germany
- **Leclanche cells „Swiss made in Germany“**
Uwe Höfling, Leclanché GmbH, Wilstätt, Germany
- **From the automotive lithium-ion battery to a stationary storage for PV energy**
Björn Eberleh, Akasol Engineering GmbH, Darmstadt, Germany

Parallel session F 1 (continued)

- **Long-term storage of renewable energy via liquid organic hydrogen carriers**
Daniel Teichmann, BMW Group Research and Technology, Munich, Germany

Parallel session F 2 (continued)

- **FIAMM Green Power Island prototype plant of Almisano/Italy (Vicenza)**
Giorgio Crugnola, FIAMM SoNick, Stabio, Switzerland

Parallel session F 3 (continued)

- **Future of LIB (lithium ion battery): ESS as DESS and its smart grid implementation in Korea**
Andrew Kwon, Samsung SDI Co., Seoul, South Korea

16:00 – 17:00 **Coffee break and Poster Session**

17:00 Panel discussion followed by poster award presentation

How much storage do we need and which incentives/policies are necessary for the implementation of storage devices?

18:30 **End of day two**

Day three Wednesday, November 30, 2011

Parallel session G 1

9:00 Power-to-Gas (PtG)

- **Storing excess electricity as hydrogen in the natural gas grid**
Gert Müller-Syring, DBI Gas-und Umwelttechnik GmbH, Leipzig, Germany
- **proWindgas for the energy transition**
Robert Werner, Greenpeace Energy, Hamburg, Germany
- **Analysis of PtG as long term storage depending on electricity- and CO₂-sources**
Mareike Jentsch, Fraunhofer IWES, Kassel, Germany
- **Business model and market introduction strategy for PtG-facilities in the German market**
Hermann Pengg-Bührlen, Solar-Fuel GmbH, Stuttgart, Germany
- **Hybrid PV-wind-renewable power methane plants – an economic outlook**
Christian Breyer, Reiner Lemoine Institut gGmbH, Berlin, Germany
- **Biological energy storage as carbon neutral fuel**
Alexander Krajete, Green Thitan, Linz, Austria

Parallel session G 2

9:00 Zinc-based batteries, zinc flow and redox flow batteries

- **Store electricity in zinc**
Gregory X. Zhang, International Zinc Association, Toronto, Canada
- **The nickel-zinc battery**
Dan Squiller, POWERGENIX, San Diego, USA
- **Zinc flow batteries**
Bjorn Jonshagen, Jonshagen Consulting Pty Ltd, Bibra Lake, Australia
- **The zinc-air battery technology**
Michael Oster, Eos Energy Storage (formerly Grid Storage Technologies), New York, USA
- **An overview on redox-flow batteries**
Kolja Bromberger, Fraunhofer ISE, Freiburg, Germany
- **The CellCube vanadium redox flow battery system**
Martha Schreiber, Cellstrom GmbH, Wiener Neudorf, Austria

Parallel session G 3

9:00 Off-grid power supply systems

- **Sustainable off-grid power station for rural applications**
Jos van der Burgt, KEMA Nederland BV, Arnhem, The Netherlands
- **Lithium-ion technology for off-grid use and rural electrification**
Billy Wu, Amperex Technology Limited, HongKong, China
- **Mobility concepts for the use of excess power from the renewable energy supply system on the island of Graciosa (Azores Archipelago)**
Oliver Arnhold, Reiner Lemoine Institut gGmbH, Berlin, Germany
- **The potential of battery energy storage for grid connected domestic renewable sources of energy**
Joseph Cilia, ABERTAX GROUP, Corradino, Malta
- **Hybrid energy storage solutions for renewable power supplies**
Dietmar Geckeler, Heliocentris Energiesysteme GmbH, Berlin, Germany

11:00 – 11:30 **Coffee break**

11:30 Final Plenary Session H

- **Synopsis of the conference for electricity storage / Synopsis of the conference for thermal storage**
- **Renewable energy: Perspectives, visions and goals**
Eric Martinot, Institute for Sustainable Energy Policies (ISEP), Tokyo, Japan

13:00 – 14:00 **Lunch / End of plenary conference**

14:00 Excursion to Heliocentris

- 14:00 **2-hour seminar: Systematic cost calculation and classification of markets for electricity storage**
by Dirk Uwe Sauer, Scientific Conference Chair

Conference and Exhibition Registration

I hereby submit a binding registration for the
6th International Renewable Energy Storage Conference and Exhibition (IRES 2011)

Registration fee November 28-30, 2011
if registering **before October 1, 2011**

☐ _____ 850 €uro
☐ EUROSOLAR/WCRE members 625 €uro
 (Membership number _____)

Registration fee November 28-30, 2011
if registering **after October 1, 2011**

☐ _____ 950 €uro
☐ EUROSOLAR/WCRE members 725 €uro
 (Membership number _____)

☐ **Short seminar: Systematic cost calculation and classification of markets for electricity storage**
by Dirk Uwe Sauer: Wednesday, November 30, 2011, 14:00 - 16:00 _____ 75 €uro

☐ **Excursion to Heliocentris/Berlin, November 30, 2011** (included in registration fee)



Please complete and kindly remit the registration fee to:

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www.eurosolar.org, www.wcre.org

Venue:



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berliner congress center

**Alexanderstr. 11
10178 Berlin**



Online registration and further information: www.eurosolar.org

Registration terms and conditions: The registration fee includes conference materials, lunch and beverage breaks and an excursion (optional). Once we have received your registration you will be sent a confirmation. If you need to cancel after registering (only accepted in written form) we charge a handling fee amounting to 50 % of the registration fee. No-shows or registrants who cancel on the day of the conference will be charged for the full registration fee. You may transfer the registration to a substitute attendee without additional cost. The organizers reserve the right to change the programme should circumstances so require.