Energy Transition: Smart, Interconnected, Sustainable

KIT at Intersolar and ees: Intelligent Energy System of the Future – Energy Lab 2.0 Research Platform / Efficiency and Safety of Today's Home Storage Systems

Measuring the efficiency of a storage system. (Photo: KIT)

KIT Energy Center: Having future in mind

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Many elements are required for making the energy system more sustainable. Among them are smart solar storage systems, smartly interconnected energy grids, and electricity-based synthetic fuels (e-fuels). KIT studies the related technologies and will present latest findings and outlooks at the Intersolar and ees Europe exhibitions (May 31 to June 02, 2017, Munich). The main topics covered at the KIT booth will be the Helmholtz "Energy Lab 2.0" research platform, the "SafetyFirst" project for efficient home storage systems, and experience gained from the operation of Germany's largest solar power storage park for research at KIT (hall 1B, booth B1.154 and special exhibit "Smart Renewable Energy").

"SafetyFirst" and the Solar Power Storage Park

The lower the costs of home storage systems are, the more are they used in private households. The technology is about to enter mass market. But are the systems as good as promised by the manufacturers? It is not only the purchase price that significantly influences current costs of home storage systems, but also quality, i.e. performance

in operation. “Within the framework of the “SafetyFirst” project, we measure the performance of 20 commercial storage systems,” project head Nina Munzke, KIT, says.

Performance is determined by the efficiency of the system components as well as by standby consumptions, the storage system’s speed of response to changes of load and production, and the intelligence of the overall system control unit. “Our measurements reveal: Home storage systems on the market differ considerably. For better comparability, we have set up a checklist with the most important criteria and the results measured by KIT as benchmarks. This checklist is to enable customers and craftspeople to ask the right questions to storage system manufacturers and suppliers.” KIT’s experience gained from the “SafetyFirst” project has also been incorporated in the “Effizienzleitfaden für PV-Speichersysteme” (efficiency guidelines for photovoltaic storage systems) of the German Energy Storage Association (BVES) and the German Solar Association (BSW Solar). These guidelines were published in March to standardize measurements of energy efficiency of PV storage systems.

The “SafetyFirst” project does not only cover the quality of storage systems, but also transport and functional safety as well as their contribution to grid stability. Based on the results, development recommendations can be made for the benefit of all grid and storage system operators as well as for the consumer. The “SafetyFirst” project is funded by the Federal Ministry for Economic Affairs and Energy with about EUR 4 million and coordinated by Karlsruhe Institute of Technology. Project partners are the Fraunhofer Institute for Solar Energy Systems in Freiburg and the Center for Solar Energy and Hydrogen Research in Ulm.

At Intersolar and ees Europe 2017, the lessons learned from comparative tests of performance, safety, and contribution to grid stability will be presented. In addition, latest results obtained from the solar power storage park of KIT will reveal how energy power self-supply can be maximized.

Visit our KIT booth B1.154 in hall B1.

For more information and the checklist, click:

http://www.competence-e.kit.edu/english/eeseurope2017

https://www.competence-e.kit.edu/downloads/Li-Ionen_Checkliste_EN.pdf

Special Exhibit "Smart Renewable Energy":

From Individual Solutions to a Smart Integrated System

The energy transition is a big challenge: Increasing amounts of electricity from the fluctuating renewable sources of sun and wind have to be used efficiently and affordably, with the required grid stability and supply security being ensured. "For the energy transition to be successful within the terms envisaged, we now have to analyze the entire energy system and to interconnect the different energy sources much more efficiently than today," Roland Dittmeyer of KIT says. He heads the "Energy Lab 2.0" project. "I am convinced that we will have to courageously apply existing technologies and to develop new technologies to maturity. With the "Energy Lab 2.0", we can support this development in an ideal way."

The "Energy Lab 2.0" as a real-world laboratory and simulation platform allows to test new approaches to integrating various technologies into the energy system. For the first time in Europe, larger experimental facilities are interconnected. Among them are facilities for the production of renewable electricity, systems for storage and conversion into heat, synthetic natural gas, and synthetic fuels (e-fuels) with minimum pollutant production, and plants for fuel- and load-flexible power production from easily storable chemical energy carriers. Designs of a cellular, smart overall energy supply system are derived and studied comprehensively. Apart from the interconnection of electric, thermal, and chemical energy flows and the integration of storage systems, particular attention is paid to the development and testing of new information and communication technologies for the control of these smart energy grids. The project partners of the "Energy Lab 2.0" are Karlsruhe Institute of Technology (KIT), the German Aerospace Center (DLR), and Forschungszentrum Jülich (FZJ), all of which are members of the Helmholtz Association. The project is funded by the Baden-Württemberg Ministry of Science, Research and the Arts and the Federal Ministry of Education and Research (BMBF) as well as the Federal Ministry for Economic Affairs and Energy (BMWi).

At Intersolar and ees Europe 2017, the "Energy Lab 2.0" will present its research activities at the special exhibit "Smart Renewable Energy."

Visit the Energy Lab 2.0 at booth B2.140 in hall B2.

Further information is available at:

http://www.elab2.kit.edu/english/index.php/

http://www.intersolar.de/en/program/special-events/smart-renewable-energy-special-exhibit.html

Smart Renewable Energy Forum

Parallel to the Smart Renewable Energy special exhibit, experts will present current research efforts for the energy transition at the KIT-organized presentation series “Beschleuniger der Energiewende: neue wegweisende Forschungsinitiativen” (accelerator of the energy transition, new trendsetting research initiatives) at the “Smart Renewable Energy Forum” on Thursday, June 01, 10 am to 12 am in hall B2, booth B2.131.

Program:

Grußwort (Welcome address), *MinR. Dr. Christoph Rövekamp, Federal Ministry of Education and Research, Leiter des Referats 722 Grundlagenforschung Energie*

„Energy Lab 2.0 - Eine Forschungsplattform für intelligent verknüpfte Energiesysteme“ (Energy Lab 2.0 – Research platform for smartly interconnected energy systems), *Prof. Dr.-Ing. Roland Dittmeyer - Leiter des Institutes für Mikroverfahrenstechnik am KIT, Projektleiter „Energy Lab 2.0“*

„Kopernikus-Projekt ENSURE“ (Kopernikus project ENSURE), *Prof. h.c. Dr.-Ing. Joachim Knebel, Bereichsleiter „Maschinenbau und Elektrotechnik“ am KIT, Mitglied des Direktoriums des Kopernikus-Projektes „ENSURE“*

„Power-2-X – Grundlage der Sektorkopplung“ (Power-2-X – Basis of sector coupling), *Prof. Dr. Kurt Wagemann, Geschäftsführer der DECHEMA Gesellschaft für Chemische Technik und Biotechnologie e.V. und einer der Koordinatoren des Kopernikus-Projektes „Power-to-X“*

„Das SINTEG-Projekt C/sells“ (The C/sells SINTEG program), *Prof. Dr. rer. pol. Wolf Fichtner, Leiter des Instituts für Industriebetriebslehre und Industrielle Produktion (IIP), Lehrstuhl für Energiewirtschaft, am KIT, Vorstandsmitglied der Smart Grids-Plattform Baden-Württemberg e.V.*

The program can be found at:
http://www.intersolar.de/de/conference/session/smart-renewable-energy-forum-beschleuniger-der-energiewende-neue-wegweisende-forschungsinitiativen-1599.html (in German only)

Other KIT Presentations at the Exhibition
"Performance benchmark: battery home storage systems put to the test", *Nina Munzke, KIT*
ees Europe Conference, May 30, 2017, 12.30 am, ICM - International Congress Center Munich, hall 13 A

„Performance von Heimspeichersystemen: aktuelle Ergebnisse"
(Performance of home storage systems: Latest findings), *Bernhard Schwarz, KIT*
ees Forum, May 31, 2017, 11.20 – 11.40 am, booth B1.151

More about the KIT Energy Center: http://www.energy.kit.edu

Karlsruhe Institute of Technology (KIT) pools its three core tasks of research, higher education, and innovation in a mission. With about 9,300 employees and 25,000 students, KIT is one of the big institutions of research and higher education in natural sciences and engineering in Europe.

KIT – The Research University in the Helmholtz Association

Since 2010, the KIT has been certified as a family-friendly university.

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