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Executive summary of the “Energy Storage: Matching the Supply and Demand in Future” Workshop, 14th -16th July 2010, Bad Tölz, Germany

Scope of the Workshop

Energy storage is one of the key linchpins for the future integration of renewables, and for increasing energy efficiency, in all energy systems.

The Implementing Agreement “Energy Conservation through Energy Storage” (ECES) of the International Energy Agency (IEA) has just held a second workshop on the future role of energy storage. This workshop took place from July 14th until 16th, 2010 in Bad Tölz, Germany.

In 2009, an initial meeting with representatives from IEA Implementing Agreement international collaborative programmes (IAs), the IEA End-Use Working Party (EUWP), the IEA Renewables Working Party (REWP) and the IEA Committee on Energy Research and Technology (CERT) expressed the view that the main focus should be put on co-ordinating activities in the field of energy storage as a cross-cutting issue. This is due to the fact that energy storage is able to match the power supply by conventional and renewable sources and the energy demand by all end-use sectors. Storage technologies can also be important for any distribution system.

Participants decided to continue with the process of co-ordinating further research activities on energy storage within the IEA and to work out the main topics and suitable ways of co-operating in each case. This was the reason for a second workshop, to which experts from both inside and outside the IEA community were invited.

Different views on energy storage – its potential as well as its limits – were discussed during the workshop. Key issues and suitable ways of collaborating were also discussed. The results of these discussions, as well as pointers for next steps, are outlined below.

Participation

The workshop was attended by Peter Cunz, Chair of the CERT, Hermann Halozan, Chair of the EUWP and the Irish delegate of REWP.

The following Implementing Agreements sent representative to the workshop:

- Ocean Energy Systems (OES)
- District Heating and Cooling (DHC)
- Greenhouse Gas (GHG)
- Solar Heating and Cooling (SHC)
- Photovoltaic Power Systems Programme (PVPS)
- Demand Side Management (DSM)
- Industrial Energy-Related Technology and Systems (IETS)

- Energy Technology Systems Analysis Programme (ETSAP)
- Energy Conservation through Energy Storage (ECES)
- Solar Power and Chemical Energy Systems (SolarPACES)
- Heat Pump Programme (HPP)
- Electricity Networks Analysis, R&D (ENARD)

All presentations, as well as the agenda of the workshop, are available on the ECES webpage (<http://iea-ec.es.org/energy-storage/news/workshop-2010.html>).

Summary of Workshop

The leading question at the workshop was “Do you need energy storage?” Presentations given by the Implementing Agreements highlighted individual energy storage needs. The ensuing discussion made clear that it would be very valuable to have a characterisation of the different storage demands in order to identify suitable storage technologies.

The characterisation should follow the list of energy storage properties: Storage capacity (kWh/kg, kWh/m³), charging/discharging power (W/kg, W/m³), storage efficiency, storage period (time), price (€/kWh, €/kW) and storage cycles (per year, day...). Important for the economical evaluation is the question of competing technologies. What are alternative solutions concerning the storage technology itself, and also concerning the complete energy system? For example, in the case of concentrated solar power (CSP) the energy can be stored as thermal energy to allow continuous electricity production. Storage of electrical energy seems not to be an interesting alternative. Concerning complete systems, technologies like photovoltaics or carbon capture and storage (CCS) power plants could be an alternative.

It was decided to provide templates to all relevant IAs and to ask them to fill in their energy storage requirements and boundary conditions. The results will be the basis of discussion for the next meeting of this group. At this meeting the question will be “What **kind** of energy storage do you need?” The result could be identification of suitable storage technologies and possible synergies, as well as better focussed R&D activities and fruitful collaboration among the IAs. The next workshop is planned for the end of January 2011.

An estimation of future application potentials for the visibility of energy storage technologies is most important. This can come from national or international energy scenarios, which makes it possible to calculate overall storage demand. However, this has to be subdivided further into electrical/thermal, central/distributed, high/low power output or long/short term energy storage. It was proposed to start a joint Annex activity between the ECES and the ETSAP IAs.

Participants agreed on the need for future co-operation between the different IAs. Therefore, one output from the workshop was entitled “**Concept Development and Best Practice**” and can be described as follows. The main idea is to develop a best-case scenario for a storage-based system using renewables in the most efficient way for a real situation in an emerging economy, and to realize this in a demonstration project.

In order to reach this ambitious goal, a strong exchange between the experts from the relevant IAs and the different levels within the IEA is necessary. The International Low-Carbon Energy Technology Platform (Technology Platform) being developed by the IEA could play an important role to enhance the dialogue between representatives from emerging economies, investors, political decision takers and IEA experts.

The plan was approved to develop an energy system concept for a simplified situation based on a real situation. This so-called “virtual concept” will form the basis for a first workshop in the frame of the Technology Platform. This concept should demonstrate the expertise of the IA experts and has to be the starting point to identify a real situation in an interested country, e.g. non-IEA country.

In the next phase, the boundary conditions and the specific demand and supply situation have to be analyzed by the IA experts together with national representatives. After that, a best-case concept with regard to the maximum integration of renewables has to be worked out. This concept has to be presented at a second workshop in the Technology Platform process to convince the representatives from the business and investor sector as well as the policy makers and the national experts from the addressed country.

In a best-case scenario the developed concept could be put into practice afterwards. At the workshop, all IAs as well as the Representatives from the CERT and the Working Parties agreed to this proposal, which can be summarized as follows, including a first approach for the time-schedule.

Correspondence with Techn. Platform	ECES	Until Sept. 2010
Developing "virtual concept"	ECES Other IAs	Until June 2011
Possible organising of a workshop within the Techn. Platform	IEA/ECES Other IAs	Until Nov. 2011
Developing "real concept"	ECES Other IAs	Until June 2012
Possible organising of a workshop within the Techn. Platform	IEA/ECES Other IAs	Until Nov. 2012
Starting demonstration Phase	All	Starting 2013

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