

Two-Way Exchanges in Brazil

Workshops organised by the IEA's NEET initiative (Networks of Expertise in Energy Technology) are reinforcing dialogues between IEA-country energy technology experts and their colleagues in "Plus-5" nations and other partner countries with fast growing energy consumption. By enabling participants to compare experience and explore ways of working collaboratively, these workshops lay the foundations for wider application of innovative energy technology solutions to meet common energy challenges.

Andreas Hauer is Executive Committee Secretary of the IEA Energy Implementing Agreement on Energy Conservation through Energy Storage (ECES). He represented ECES at the 19-20 November energy technology workshop organised in Brasilia (Brazil) by the IEA NEET initiative together with Brazil's Ministry of Mines and Energy. Andreas Hauer reports on his experience in Brasilia. ECES is one of 41 IEA international collaborative programmes.

Following successful NEET events in Johannesburg in February 2007 and Beijing in November 2007, the Brasilia workshop offered another opportunity for specialists from IEA collaborative energy technology R&D programmes to meet key local stakeholders from research bodies, government, industry, commerce and academia.

Before leaving for Brazil, I already knew about this IEA initiative to facilitate integration of the "Plus-5" countries into the IEA international network of energy-related activities. But I was surprised to see how much could be done in such a short time.

The workshop offered an ideal context for presenting the activities of our IEA Energy Storage Implementing Agreement (ECES) programme to an engaged and knowledgeable audience. The reception my presentation received was very encouraging, demonstrating real interest in our work. An invitation was extended to a representative from Brazil's Ministry of Mines and Energy to visit our facilities to discuss our activities and their relevance for Brazil. I am currently discussing follow-up with Brazilian colleagues.

The workshop enabled me to learn much about the specific needs of the host country and develop structured ideas to address current issues. An enormous amount of information was made available to me about the energy supply and demand structure in Brazil, the history of activities in the field of biofuels, as well as the latest steps in exploration of oil fields along Brazil's coastline.

It is extremely important for the ECES energy storage programme to be familiar with current advances in all aspects of energy technology, as well as research and development. While energy storage is always "just a component" in an energy system, this component is in most cases crucial for the performance of the system. In many applications it makes the difference between an "efficient" operation and one that is "inefficient". To decide which type of energy storage is the most suitable for a given application, in both technological and economic terms, specialist know-how is called for. This has been accumulated by the ECES programme since the 1970s. The potential of energy storage technologies in relation to energy conservation and reduction of CO₂ emissions is



Andreas Hauer, Secretary,
IEA Energy Conservation
through Energy Storage
Implementing Agreement

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in general underestimated. The chief objective in my travelling to Brasilia was to make my own contribution to correcting this misconception.

Promoting the interesting possibilities of thermal energy storage for avoiding high electricity demand peaks caused by air conditioning was a major motivation for going to Brasilia. But it was very instructive to learn about another peak in electricity consumption, which might be avoided by thermal energy storage technologies. This is a peak caused by the use of electrical shower heads for hot water production. This is a classic application for a number of thermal energy storage technologies like sensitive and latent heat storage, as well as thermo-chemical processes.

In discussions with workshop participants, a problem was also identified with using solar energy in remote sites, for example to cool agricultural produce and fish, which can be solved with ice storage systems or sorption storages. These systems have been developed over recent years under the ECES umbrella.

Another topic discussed was use of cold released during re-gasification of Liquid Natural Gas or through the expansion of pressurised gas after transportation through a pipeline. A high-capacity thermal energy storage fluid like a phase-change slurry could be used to distribute the cold for refrigeration or air-conditioning purposes.

The NEET initiative workshop in Brasilia demonstrated clearly that challenges faced in Brazil are within the scope of the following current ongoing projects – known as Annexes – within the ECES programme.

- o **Annex 18** on “Transportation of Energy by Utilization of Thermal Energy Storage Technologies”. Its general objectives are to identify state-of-the-art approaches for using different technologies for storing and transporting energy, to broaden and co-ordinate knowledge within the field, and to disseminate information. In particular, research is being encouraged on high-capacity storage materials and high thermal power charging and discharging technologies that are easy to implement in an energy transport system, along with research on system aspects where heat sources are linked to customers’ needs and where the impact of these links on system design is assessed. Potential cost-effective applications are being identified by this project.
- o **Annex 19** on “Optimized Industrial Process Heat and Power Generation with Thermal Energy Storage”, whose objectives are to bring together fragmented research efforts and achieve synergies from existing and future high-temperature thermal energy storage (HTTES) activities. Its aim is to conduct a general review and assessment study of existing and emerging HTTES technologies, to identify obstacles that need to be overcome to make industrial process heat and power generation with thermal energy storage more economically and environmentally viable. The Annex works to identify efficient and economic storage materials, to compare and assess different HTTES concepts and design, to define strategies for efficient storage integration and operation and to support technology transfer.
- o **Annex 20** on “Sustainable Cooling with Thermal Energy Storage”, which works on project-oriented approaches for optimised integration of thermal energy storage in cooling systems by demonstrating and evaluating the sustainability (energy saving and CO₂ emission reduction) of cooling systems with thermal energy storage.

My colleagues and I in the ECES programme are very happy that the topic of energy storage had its place on the agenda of the Brasilia NEET workshop and that we had the chance to meet the very receptive representatives of the Brazilian government and energy supply companies. The NEET event certainly marked the start of a long-lasting, fruitful relationship for both sides. Our thanks go to the Ministry of Mines and Energy of Brazil, and to Antonio Pflüger, Alexandra Niez and Ludmila Garner of the IEA NEET team, whose personal engagement made this event possible.

Andreas Hauer

Secretary, IEA Energy Conservation through Energy Storage Implementing Agreement