



Conference Venue University of Lleida, Spain.

# Innostock 2012 Conference in Spain focused on latent energy storage

Innostock 2012 is the 12th conference in the so-called Stock Conference series, starting in Seattle in 1981. The first Stock conferences were dominated by studies on energy storage in aquifers. As aquifer thermal energy storage (ATES) technology developed and matured, borehole thermal energy storage (BTES) came to dominate the conferences. The latest conferences, however, have had increasing focus on latent energy storage, such as phase change materials (PCM) and thermochemical energy storage. More than half of the Innostock conference papers dealt with latent energy storage. Several sessions were dedicated to energy storage with PCM in buildings. For the first time in the Stock conference history, electrical storage was also included in the conference programme. The next Stock conference will be called Greenstock 2015 and it will take place in Beijing, China, in May 2015.



**Signhild Gehlin**  
Swedish HVAC Society - Society of Energy and  
Environmental Technology  
Signhild.Gehlin@emtf.se

Professor **Marc A. Rosen**, from the University of Ontario in Canada, gave an example from his own university where a BTES system with 400 boreholes was installed six years ago. It saves 40 percent of heating costs and 16 percent of cooling costs compared to a conventional system. The biggest challenge was the initial cost, according to Rosen.

Conference proceedings from Innostock 2012 may be ordered from [www.innostock2012.org](http://www.innostock2012.org)

Canada has taken a decision that 50 percent of the building stock must be NZEB buildings in 20 years. One project on the way is the Drake Landing Solar Community with 52 high performance buildings reaching a solar fraction of 90 percent. The project has been so successful that Drake Landing II with 2 000 buildings is now under consideration.

Professor **Bo Nordell**, from Luleå University of Technology, has attended all Stock conferences since the start in 1981. He gave a brief overview of the development of underground thermal energy storage since the 1980s. ATES started with a small workshop in Berkeley in October 1978. The technology developed rapidly in the first two decades and is now a mature technology. However the number of persons with deep knowledge in ATES is very limited. Thermal energy storage in pits and caverns (CTES) is a marginal technology with few examples. The technique works well, but is generally too expensive. A couple of papers on CTES applications in abandoned mines and strip mines in North America were presented at Innostock. CTES can also be used for snow storage for cooling purposes.

BTES applications continue to increase worldwide and spread to new regions. According to Nordell, BTES is today a well-developed technology and few fundamentally new ideas are brought forth.

An increased interest in high temperature storage with BTES has arisen lately. There is also some ongoing work on combinations of CTES and BTES, called “combistores”.

**Alfredo Fernández** from INGEO Investigación Geotérmica, Spain, presented the BTES project at the new IKEA retail store in Jerez de la Frontera in southwest Spain, installed in 2010. Its main design goal was to achieve a 56 ton CO<sub>2</sub> emission cut compared to conventional energy systems. The warm climatic conditions at the location led to an annual energy imbalance, with a heating load of 75 MWh/a compared to a cooling load of 4 100 MWh/a. The solution was a borehole field with 54 boreholes at a depth of 130 meters, covering 100 percent of the heating and 13 percent of the cooling. The boreholes store free cooling in the winter and also “night cold” in the summertime.

Long term monitoring of buildings with energy storage is rare, hence there was significant interest in a German study, presented by Dr **Burkhard Sanner** of eight non-residential buildings with underground thermal energy storage for heating and cooling. The study has taken place

### innostock 2012

The 12<sup>th</sup> International Conference on Energy Storage

Innostock 2012 – the 12th international conference on energy storage was held at the University of Lleida in Catalonia, Spain, in May this year. The conference gathered 330 participants from 36 countries around the world, and conference host Professor Luisa Cabeza had every reason to be pleased with the outcome.



Conference host Professor Luisa Cabeza.

between September 2007 and June 2012. Three BTES and five ATES systems in western Germany were included in the study. Data from the study have also been used to validate the design tool EED, with good results.

**Aitor Urresti** from the University of the Basque Country in Spain presented the first study of ventilated facades with PCM in the outer facades. Earlier studies of ventilated facades have focused on PCM in the inner layers. Results from the experimental study show that PCM in the outer parts of the ventilated facades increases the thermal inertia and contributed significantly to heating the building.

**Justin Ningwei Chiu** and **Viktoria Martin** from the Royal Institute of Technology in Sweden showed in their study of passive school buildings in Stockholm a decrease in the risk of over-heating in summer when an HVAC system with free cooling and latent heat energy storage with PCM is introduced. Simulations in TRNSYS show that comfort levels can be maintained 75 percent of the time with 40 percent less power consumption and less than half the cost of a conventional AC system. **3€**

Conference proceedings from Innostock 2012 may be ordered from [www.innostock2012.org](http://www.innostock2012.org)