Buildings of the future in Munich

Last Saturday, the BAU 2011 trade fair came to a close in Munich. A clear focus this year was on concepts and solutions for sustainable and climate-neutral buildings. This applied both for the actual trade fair itself and the extensive support programme. For example, the EnOB research initiative presented new concepts, methods and model projects in a research symposium that was held on 18 and 19 January 2011. A highlight here was without doubt the presentation of pioneering building prototypes from the European university competition, Solar Decathlon Europe. It was also possible to view the highest ranked German building from Rosenheim in the flesh – which for many trade fair visitors was both an astonishing and thought-provoking experience.

Although the weather became increasingly fresh – even frostier – during the course of BAU 2011 in Munich, many visitors managed to make it outside. This was because a small, highly interesting house had been constructed on the outdoor space. It achieved a highly respected second place at the Solar Decathlon Europe (we reported) and it demonstrates the new opportunities provided by research and innovation for buildings of the future. Ranging from the movable and sinkable serrated facade to the flexible “Plugit” LED lamps that can be slotted into a ceiling grid, the elegant house is full of innovations.

“Buildings of the future”

On the first day of the Research Symposium (18 January), more than 300 delegates were given an insight into new concepts, developments and design methods for “buildings of the future”. The symposium presented, for example, new strategies for improved occupant comfort and optimised operation management, new methodologies for comprehensive economic viability analyses, current trends in building and system simulations as well as new building components and systems.
Keynote speech from Brussels

In an evening event, Dr. Stefan Tostmann from the European Commission’s Directorate-General for Energy talked about “Research trends for energy efficient buildings and cities in the European context”. In a pleasant lecture free of overhead transparencies, Mr Tostmann outlined the enormous energy policy challenges that will be faced during the next few decades, and in so doing made one thing clear: without the committed work of architects and designers, as well as developers and investors, all politically determined efficiency goals are doomed to failure.

Architectural decathlon

On the second day (19 January), the university teams from Berlin, Rosenheim, Stuttgart and Wuppertal presented their residential projects with which they very successfully competed in the Solar Decathlon Europe 2010 in Madrid. The European-wide competition is conceived as an architectural decathlon with the aim of constructing zero-energy and energy-plus buildings. In his citation, Professor Manfred Hegger (TU Darmstadt) praised the excellent performance of the teams and specifically their results in the individual Architecture, Construction and Engineering, Comfort Conditions and Sustainability disciplines. The next round of the competition takes place in 2012. It has recently been revealed that twenty universities from fifteen countries have managed to qualify. These include two German universities: students from Constance University of Applied Sciences and RWTH Aachen will compete in the 2012 architectural decathlon, which is again taking place in Madrid. It was already clear from the presentation of their two projects, which were shown as part of the event, that new focal points and exciting building concepts can be expected next year.

All-electric world?

The experimental homes in the Solar Decathlon Europe competition require very little energy, since they can be supplied with electricity and heat using just the sun. Electricity is entirely relied on here as the sole means for exchanging energy between buildings – fossil fuels and heating networks are no longer needed. However, do these ‘electricity-only buildings’ offer a model for our cities? This was an issue that the illustrious discussion panel sought to clarify. Chaired by Johannes Lang (BINE Information Service), the panellists included Professor Manfred Hegger (HHS, TU Darmstadt), Professor Dirk Müller (E.ON Energy Research Center), Professor Jürgen Schmid (Fraunhofer IWES), Klaus Preiser (Badenova) and Dr. Knut Kübler (German Federal Ministry of Economics and Technology).

Professor Hegger would like to see durable, simple and robust technical solutions for the building services technology. Ideally, they would be as durable as the building itself and just as easy to use. For him, purely electrically operated buildings are just one of several options.

Professor Müller believes that there will ultimately be two types of energy concepts for buildings: firstly the “electricity building”, which in particular uses heat pumps to supply heat and cooling; secondly, there will be co-generation buildings that utilise different types of combined heat and power generation – all electricity-led and with electrical efficiencies of more than 40%.

Klaus Preiser views heat pumps as key components in electricity-only buildings. However, he considers this technology to be ecologically questionable because – given the widespread, preferential rates offered by the electricity suppliers – it ultimately consolidates the current power plant structure with centralised coal-fired and nuclear power stations. Moreover, he believes that in most cases heat pumps make neither commercial nor economic sense.

According to Professor Schmid, electrically operated heating systems should only be deployed in highly energy efficient buildings such as passive houses. He also sees this as the preferred application area for heat pumps. For the existing building stock, there is considerable potential for co-generation, whereby the fuels should come from renewable sources, in particular from biomass.
For Dr. Knut Kübler, there is much to be said for an energy future that comprises an "all-electric world". He believes that this trend can already be seen in the building sector. However, he advises against putting all the eggs in one basket. Other possible energy worlds must also be explored through "sustainability research".

After joint refreshments, the event came to a close and many delegates took the opportunity to visit the fair.