eco buildings Newsletter

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www.ecobuildings.info

Eco-buildings is an energy demonstration initiative of the European Commission (DG TREN) within the Sixth Framework Programme

2006: Eco-buildings looking ahead

The four EC supported Eco-buildings projects are now well underway. Some buildings are already completed, occupied and are being monitored. In most, construction has started whilst a few have yet to start work on site. 2006 will be a decisive year for them all.

2006 is also the year when the EC Directive on Energy performance in Buildings should be implemented in all members states. For this reason, this newsletter focuses on the Directive.

Read on to find out more…

There is a growing recognition of the benefits of investment in Eco-buildings and also demand for practical solutions for demand side energy management.

Causes for this include increasing energy prices and concerns over security of energy supplies and climate change.

Also, the requirement for energy certification included in the European legislation on the Energy Performance of Buildings is expected to stimulate demand for higher performance buildings.

From 2006, all large public buildings in the European Union will be required to display energy certificates for the visiting public to see.

Buildings account for 40% of the energy consumed in the Union and more than 1/5 of this energy could be saved by applying tougher standards on buildings. This is also a sector where the energy efficiency measures could have important job-creation impacts as highlighted in the EC's Green Paper on Energy Efficiency".

The full implementation of this directive over the next three years, presents unique opportunities for progress in the building sector, applying innovation in building and energy technology. Those working in the buildings and energy use sector need to find a common and united approach to ensure that these opportunities are fully exploited.

News in Brief

Eco-buildings at the Solar Cities Conference

Solar Cities for Sustainable World

All four current EC eco-buildings projects will be presented and discussed in a dedicated session on 5th April within the Solar Cities conference to be held in Oxford, UK. The full conference programme is now available at www.solarcities.org.uk

Public consultation on "Doing More with Less"

There is a pubic consultation currently open with regard to the EC green paper on energy efficiency "Doing more with less". If you haven't already given your opinion you have until 31st March 2006 to do so. The paper is available in many languages from http://europa.eu.int/comm/energy/efficiency/index_en.htm.

An on-line questionnaire is available on the same web site.

Energy Performance in Buildings Directive implementation

At the time of writing, only ten of the 25 EU member states have met the EU deadline (4th January 2006) for national implementation of legislation following the energy performance of buildings directive (EPBD) . The countries that have transposed the directive fully or partially are: Germany, Italy, Portugal, Austria, Denmark, Lithuania, Belgium, Latvia, Poland and Slovakia.

Katrien Prins, officer at the European Commission, is disappointed: "Not only because of the lack of legislation right now. Also several countries have indicated that they will use the opportunity within the EPDB to postpone the implementation of the key elements of energy certificates by up to three years." (source: www.greenprices.com).

See page 7 for a report on the application of the directive in Germany.

Contents

BRITA in PuBs Progress

The table below shows the state of advance in January 2006. Updated information is also available on the project web site.
Photography credits: Fraunhofer Institut für Bauphysik on behalf of the BRITA in PuBs Partner Consortium

Stuttgart (Germany) Nursery Home "Filderhof"

Renovation on the building structure has been started in autumn 2005. Installations work is expected to start soon.

Plymouth (UK) Educational College

Feasibility work has been completed and the design is in the latter stages of implementation planning. The Wind turbines are installed on roof.

Borgen (Norway) Community Centre

Traditional construction finished. All systems operational. Work is now concentrated on innovations.

Hol (Norway) Church

Building permission for project is ready, some tenders submitted, the executive project will start in 2006.

Copenhagen (Denmark) Cultural Centre "Proevehallen"

Construction has finished and the building is in use. Monitoring has started after the building was "handed over".

Milano (Italy) Student Hostel "Daniels".

The project has been withdrawn due to uncertain national co-financing

Athens (Greece) Library "Evonymos"

The project design of the innovative elements is on-going. Execution or construction of the project will not start before late 2006.

Brno (Czech Republic) Cultural Centre "Brewery"

Feasibility work is mostly completed and the design is in the latter stages of implementation planning. The building has been awarded a grand design prize.

Vilnius (Lithuania) University Building

Construction has finished apart from the ventilation system. The building is in use and monitoring has started.

www.brita-in-pubs.com

The project website has a public and a private area. The public area is an information resource for all those interested in the project in order to keep up to date with progress.

The website is mirrored in all languages from the participating countries. A news column informed on additional relevant activities around the ECOBUILDINGS

All comments and contributions to the web-site from both participants and others interested in the project are welcome.

Demohouse Progress

Monitoring and evaluation of the energy performance of both renovated and new buildings is an important theme in the Demohouse project. For this reason, a common evaluation protocol has been developed during recent months as a common basis for evaluation of the effect of the measures to be adopted in the project. Namely:

1. measures to improve sustainability in general
2. measures to reduce energy consumption in particular
3. measures that relate to socio-economic aspects.

All these three categories will be subject to two types of evaluation:

1. **Pre-evaluation** to be carried out before the start of renovation works, on the basis of theoretical components and parameters. In most cases, the instrument for carrying out the pre-evaluation is simulation using a (validated) building simulation model. If the evaluation results in a rating, it is called the 'asset rating'. These calculations can also be used to optimise the dimension of components installed (e.g. depth, diameter, airspeed of ground heat exchangers).

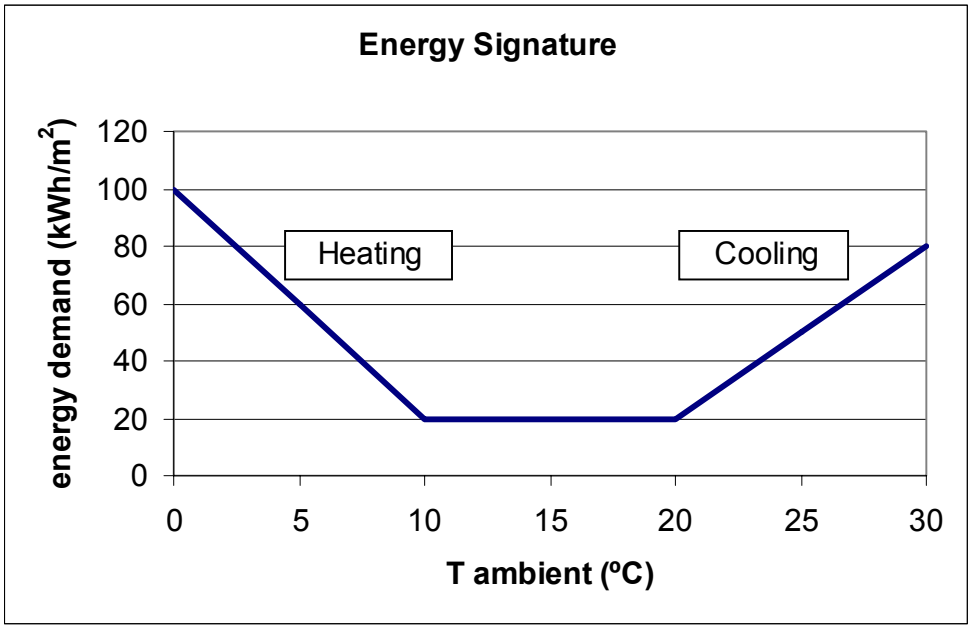
2. **Post-evaluation** to be carried out after the end of renovation works, on the basis of actual components and parameters. Post evaluation will be carried out by monitoring, using meters and sensors. If the evaluation results in a rating, it is called the 'operational rating'.

Energy Signature

As for the energy part, the objective is to use the energy signature procedure. This is a graph showing the heating and cooling demand (if applicable) versus ambient temperature, shown schematically below.

Of particular interest are the values of ambient temperature where heating or cooling is required. This is the case at temperatures below 10°C and above 20°C respectively in the example shown.

The advantage of using the energy signature procedure is that the post evaluation can be related to pre-evaluation without the need for normalization (corrections for the differences between ambient temperatures in the simulations and actual or measured ambient temperatures). A further advantage of using the energy signature procedure is that it is relative simple and straightforward and could be integrated in a Decision Support Tool (DST) in the future.

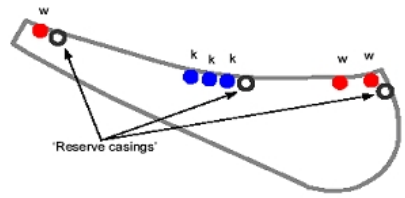


In order to make an energy signature, it is necessary that simulations be carried out on an hourly basis.

Lists of indicators will also be made for sustainability issues and for the socio-economic aspects. Regarding these socio-economic aspects, questionnaires will be distributed among the occupants of the housing projects to provide the input required to calculate the indicators.

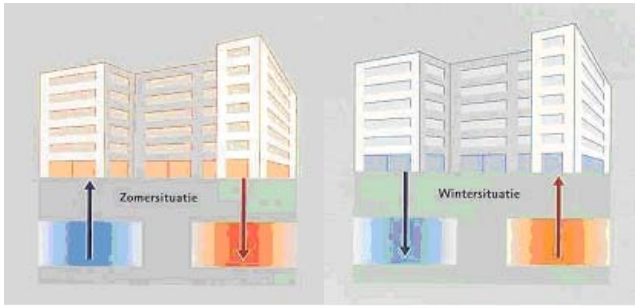
ECO culture progress

November 2005: top left: Library. top right: Opera House. bottom: Playhouse.



The boreholes of the Oosterdokseiland. The library is situated near the cold wells in the centre of the island

The top of the 120 m deep cold well.



Operation during summer and winter.

This section describes ECO-Culture progress up to November 2005. More information is available on the project web site.

The three ECO-Culture demonstration buildings - the Royal Danish Playhouse Theatre, the Oslo Opera House, and City Library of Amsterdam - are all in the construction phase.

All three buildings have now completed the concrete construction work and the HVAC installation is ongoing.

Focusing on the long-term energy storage in Amsterdam

A priority objective of the Amsterdam Library has been to design and construct the long-term energy storage system, which will supply heating and cooling to the library and other buildings of the Oosterdokseiland.

The long-term energy storage consists of warm wells and cold wells. In summer, the cold wells will be used for cooling the buildings and the surplus heat from the buildings will be stored in the warm wells and vice versa in the winter.

In order to operate the system as efficiently as possible, a heat pump is part of the system.

The capacity of the long-term energy system is about 3,2MW heating and 2,4MW cooling.

ECO-Culture workshop

The next ECO-Culture workshop will be held in Copenhagen in September 2006. The date will be announced on the ECO-building web-site. The workshop will include a public part.

www.cowiprojects.com/ecoculture/

SARA Progress

The table below shows the state of advance in January 2006. Updated information is also available on the project web site..
Photography credits: - Estates and Facilities, Southampton University, Universitat de Barcelona; Estates & Facilities; Hespul; N. Detry

Barcelona (Spain) Primary Health Care Centre

The concrete structure is above ground level and growing fast. Installations work is expected to start in summer 2006.

Sinabelkirchen (Austria) Office and Laboratory building

Work on site is now ready to start, pending administrative matters. All construction work is now expected in 2006.

Southampton (UK) University Services Building

Construction finished. All systems operational. Building inaugurated 12/2005. Work now involves integration of monitoring and BMS and user satisfaction surveys.

Ljubljana (Slovenia) Supermarket

The project for building permission is finished and the executive project will be finished by the end of 2005. Construction is expected to start March 2006 and the building to be finished at the end of 2006.

La Tour de Salvagny (France) School building

Construction has finished and the building occupied. Work on monitoring will start as soon as the building is officially "handed over" to the local authority.

Napoli (Italy) Cultural Centre

All plans have been approved by the Ministry of Culture and Heritage. Completion is expected by May 2007.

Bukhara (Uzbekistan) Cultural Centre

Refurbishment of the existing structure is on-going. Final energy strategy design will be completed once this is finished. Construction will start before May 2006.

www.sara-project.net

The project website has a public and a private area. The public area is an information resource for all those interested in the project in order to keep up to date with progress.

Note: a more detailed report of the completed SARA building in Southampton was published in the 2nd SARA project Bulletin and can be downloaded from the website.

All comments and contributions to the web-site from both participants and others interested in the project are welcome.

The Berlin Symposium of Eco-building projects

The first ECO-BUILDINGS SYMPOSIUM was held in the "Deutsches Technikmuseum Berlin" on November 22nd - 23rd, 2005 and supported by the German Federal Ministry for Economy and Technology.

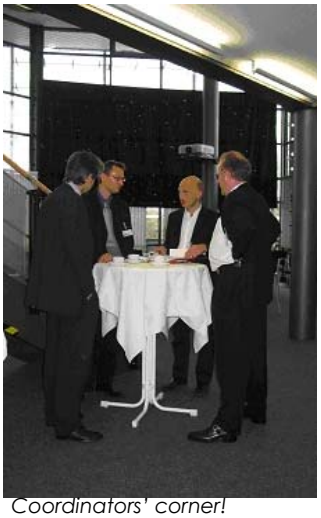
As the building sector is still responsible for more than 40% of EU energy consumption, there is great expectation in the improvement of the building stock in Europe. There are technologies under development, which could substantially improve (up to 30%) the energy performance of buildings, reducing the conventional energy demand in new and existing buildings and reducing energy intensity, through a combination of rational use of energy and integration of renewable energy technologies.

The Eco-buildings concept is expected to be the meeting point of short-term development and demonstration in order to support legislative and regulatory measures for energy efficiency and enhanced use of renewables within the building sector beyond the Directive on the Energy Performance of Buildings.

Participants at the Symposium.

The projects aim at **a new approach for the design, construction and operation of new and/or refurbished buildings**, which is based on the best combination of the double approach:

1. to reduce substantially, and, if possible, to avoid the demand for heating, cooling and lighting
2. to supply the necessary heating, cooling and lighting in the most efficient way and based as much as possible on renewable energy sources and poly-generation.



Coordinators' corner!

In the common symposium of the FP6 Eco-buildings projects the first results of the four projects BRITA in PuBs, SARA, DEMOHOUSE and ECO-CULTURE were presented and discussed.

About 65 people participated in the meeting of which 20 were lecturers. As it was suggested that about 150 people should be interested in a meeting on energy saving buildings the real number indicates that there is still a lot to do to achieve a higher interest for the Eco-Buildings approach in EU.

The symposium was evaluated based on a questionnaire which was given out. The responses revealed a high degree of general satisfaction amongst the participants and also identified the potential for future improvements.

The **conclusions of the discussions sessions** of the symposium included the following key comments:

- If European Union (EU) policy wants to strengthen energy efficient building technologies and their practicability, it is essential to give out a programmatic focus on that in FP7.
- The general public's knowledge about eco-buildings concepts is judged to be not very high (also indicated by about 60% of the feedback questionnaire responses).
- The key factor for achieving effective energy performance in buildings continues to be the people in those buildings.

The representative of the European Commission (DG TREN) challenged the buildings community to offer convincing arguments and ammunition to support continued EU support for demand side building energy initiatives and to work to create a more united voice in Brussels for the very heterogeneous sector of building industry, housing companies and engineers.

Implementation of the Energy Performance in Buildings Directive: focus on Germany

Hans Erhorn,
Chairman of the EPBD related German standardisation committee and coordinator of the BRITA in PuBs project offers an insight to the application of the directive in Germany.

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The German implementation of the European Energy Performance of buildings Directive (EPBD) foresees two different possible methods for the treatment of existing buildings: the certification on the basis of operational data and the certification on the basis of asset rating. For new buildings it is clear that only asset rating can be applied. A certificate for existing buildings may use both options.

Certification

Operational rating (possible for existing buildings)

The certification works by using measured data for heating and electricity. This data can be either obtained from monitoring results (e.g. BEMS systems) or by taking the data from the bill of the energy supplier. The space heating consumption has to be adjusted by climatic factors, so that every year will produce a standard value even though the data may represent an untypical warm or cold year. If no complete year is available, the data can be summed up from different years or be mathematically extended. The values will be assessed by reference data for different building types.

Operation rating allows a quick and rather inexpensive assessment of the building including the user behaviour. The building itself is not clearly assessed, as the user influence and the type may have a big impact. Additionally it is very difficult to assess possible energy efficiency improvements through retrofits, which are also asked for in the EPBD.

Asset rating (possible for all buildings)

In the case of new buildings the energy performance has to be assessed by using a calculation method, which includes the energy demand for heating, ventilation, cooling, lighting and the auxiliary energy demands. With residential buildings this can be reduced to heating and ventilation plus the respective auxiliary energy. As Germany has already in use a calculation standard that provides as result the primary energy demand for these 3 parts (EnEV 2002 with DIN 4108-6 and DIN 4701-10), no adjustment was necessary. The certification for dwellings will be realised with the EnEV also after 2006. For non-residential buildings it was however necessary to develop a new calculation standard that includes the cooling and lighting energy demands plus the interaction between the different energy parts. This was realised by the DIN V 18599, which is available at Beuth publishing. The results (primary energy demand of the building) have to be compared to the same building with defined so-called reference building components and reference technical systems ("reference building"). The reference components and systems represent the state of the art technologies for different building types. In the case of existing buildings, the resulting primary energy demand is multiplied by 1.4 for the reference data. This will facilitate the requirements for existing data by 40 %.

The calculation of energy demands (asset rating) gives a value for the performance of the building by using a standard climate data and user behaviour. Therefore the resulting value can not always be compared to the real consumption of the building. On the other hand it is very simple to calculate the influence of energy efficient retrofit measures.

Field tests

Field test studies are partly ready and partly on the way

The German ministry of buildings has started field test studies for both residential

…/cont

Implementation of the Energy Performance in Buildings Directive: focus on Germany

(finished) and non-residential buildings based on the listed implementation rules. The results have influenced the implementation procedure. Some of the certified buildings act as Eco-buildings. The results have reflected the high level of requirements very well.

First software tools on DIN V 18599 already available

The work on the new German calculation standard DIN V 18599, a holistic assessment tool, developed for the implementation of the Energy Performance of Buildings Directive (EPBD) for non-residential buildings, was completed in March 2005. The standard is available at Beuth publishing since July 2005. As the standard includes 10 parts on 753 pages it is expected that computer tools will be used for the calculation. However there is no commercial tool available yet. The Fraunhofer Institute of Building Physics has developed an Excel® based tool for the first applications and tests of the standard. This tool is available for download for free at: www.ibp.fraunhofer.de/wt/normen.html

The tool is also used in the German field study on the implementation non-residential buildings as described above. The institute offers a two-day seminar including the introduction to the standard and the use of the tool (www.ibp.fraunhofer.de/veranstaltungen).

At the same time Fraunhofer-IBP is developing the calculation core of the standard called "Kernel DIN V 18599" for the use in commercial computer tools. A group comprised out of industry (building and systems) and commercial tool sellers are the clients for this work.

Additional interested organisations may get in contact via the indicated e-mail address.

Energy certificate for EC HQ

The recent refurbishment of the Berlaymont building offered a good opportunity for the European Commission to lead the way by arranging for the energy certification of this building in advance of the Directive's full implementation. In 2004, Austria, France, Germany, Netherlands, Poland and Portugal agreed to give the Commission's headquarters building an energy rating, as if the Berlaymont was located in their own country. Experts from the participating Member States came to Brussels to receive the data and to undertake an inspection of the building.

All the certificates awarded today give "good" to "very good" energy efficiency ratings to the building and conclude that it performs considerably better than the average equivalent building in their country. Its consumption per square metres is about half of the current average for comparable buildings.

The final results vary from country to country. In fact, as the work was completed in advance of the Directive's full implementation, the Member States used this opportunity to test national or new methods which emphasise different energy saving aspects of the building. The exercise is also now an opportunity to compare their results. The format and content of the certificates prepared for the Berlaymont are not final or legally-binding. Some Member States have not yet decided how their certificates will look, what benchmarks and the information they will contain.

When implemented in Belgium, Bruxelles-Capital will be responsible for ensuring that the Berlaymont and other public buildings in its jurisdiction comply with the Directive.

More information:

Tren-Building-Directive@cec.eu.int

This Newsletter is a Joint Dissemination activity of the Four Eco-buildings projects currently co-financed by DG TREN:

BRITA in PuBs
TREN/04/FP6EN/SO7.31038 /503135

ECO-Culture
TREN/04/FP6EN/S07.30902/ 503079

DEMOHOUSE
TREN/04/FP6EN/503186

SARA
TREN/04/FP6EN/SO7.31838 /503183

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