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Newsletter

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Applying the EPBD to improve the Energy Performance Requirements to Existing Buildings – ENPER-EXIST

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First results of ENPER-EXIST: official comments on CEN draft standards

One of the tasks within the ENPER-EXIST project is to examine the most important draft CEN standards, which have been developed last year to apply the EPBD. During the development of these standards, the focus heavily lay on new buildings and it was often forgotten to take into account the effects, which are especially important for existing buildings. We examine if the standards can be used for existing buildings and give advice about possible changes which the CEN working group can make to the standard to make it more applicable to existing buildings.

This results amongst others in a list with comments on the draft standard, which is forwarded as part of the official public enquiry to the responsible CEN working group.

An example: To illustrate the kind of advice we give to the CEN working groups, we'll use one of the central standards in the EPBD CEN standard package: the prEN ISO 13790. This standard handles the heating and cooling demand of residential and non-residential buildings.



General conclusion: In general the examination of this particular standard results into a positive conclusion: "The standard gives a calculation method which can be used for existing buildings provided that for various input parameters a list with default values shall be given". The fact is that in case of quick inspection of an existing building often a lot of information about the building is missing. So our comments to the CEN working group contain the suggestion that such lists are developed, containing defaults for various typologies, building

functions and/or different construction dates. Because of the large differences between countries, we suggest that these lists are produced on national level. But it would be very helpful and good for harmonisation if a procedure is given in the standard to derive such a default table or at least if an example is given in the standard of such a default table. However, in all cases it should be made clear that these tables shall only be used in case of a quick inspection of an existing building, and/ or only if more detailed information cannot be obtained quickly. The lists should not be used as an easy escape for new buildings.

More detailed remarks: In addition to this general point a lot of detailed advice is given to the CEN working group on various points. A selection of the subjects and the advice is given below:

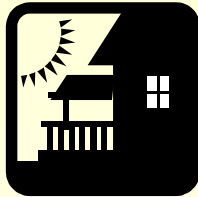
- A problem with heating systems in existing buildings is that old houses often have a local heating system. This can result in a poor thermal comfort, but also in low energy consumption because large parts of the house are not heated at all. This low energy consumption may lead to a relatively good energy performance. For some purposes and in certain climatic regions it is a question whether it is a desirable situation that the good energy performance is not compensated by a penalty for bad comfort. Our advise is to create a possibility to introduce on a national level e.g. a 'comfort correction' to take this aspect into account. Another solution is to assume that all spaces that are intended to be heated (living spaces, etc.) are considered as heated as a standard condition, even if they are not heated in practice.
- Taking into account thermal bridges can be a time consuming task. The effect of a thermal bridge depends on the type of thermal bridge and on the insulation value of the construction



First results ENPER-EXIST: official comments on CEN draft standards (cont.)

surrounding the thermal bridge. For poorly insulated buildings, the effect of thermal bridges is very small. In moderately insulated buildings the effect of poorly designed connections can be as huge as small thermal bridges in well-insulated buildings. So ignoring thermal bridges in existing buildings is no solution. Taking into account all thermal bridges is not efficient either. There should be a method which gives a good balance between the insulation value of the building and the type of thermal bridge (which may be ignored and which have to be taken into account), preferably using as much default values as possible and as few input parameters as possible.

- The effect of sunspaces is divided in a transmission part and a solar radiation part. The calculation of this coefficient is described in other standards, but the method (data acquisition) is too labour intensive for existing buildings. Suggested is to introduce a simplified method in prEN ISO 13790 to determine the effect of sunspaces in which these two parts are combined, preferably using as much default values as possible and as few input parameters as possible. Because of large national differences, default values have to be determined on national level.
- The supply temperature of the airflow from mechanical ventilation should not be a value to be measured during building inspection, because this data is hard to collect. It should be a default value dependent on system characteristics.



The effect of the project results: The comments are considered by the CEN working group. The working group agreed with a lot of the comments and is working on an updated version of the standard at this moment, taking into account the suggestions of ENPER-EXIST.

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WP3 of ENPER-EXIST - Building stock knowledge

The objective of work package 3 in the ENPER-EXIST project is to conduct a survey of the existing European building stock to obtain a better knowledge of the potential of energy savings. Furthermore proposals will be given on how to gain improved knowledge of the building stock using new certification schemes.

The work is divided into three tasks. *The first task* is to make a survey of the data available regarding the existing building stock in each member state (MS). It concerns data like the characterisation of buildings and the energy consumption divided into different building types. The information of data available in each MS will be obtained from the project partners and also with help from the industry with their marketing investigations. Furthermore results from earlier EU projects will be included.



The work was begun in August 2005 by circulating a pre-questionnaire to the participants of the ENPER-EXIST project. The questions were aiming at finding the level of available information and to indicate the sources and quality of this information.

The results showed that in general more information is available for the residential sector compared with the non-residential sector. In the case of electricity consumption, there is more information available for the non-residential sector. Some countries like Denmark has a lot of information mainly because they have had a mandatory labelling scheme since 1997.

The next step will be to create a map showing the availability of data with respect to the countries and not necessarily to collect all data. Focus will centre on how to obtain this information. Furthermore some selected data will be collected for all the MS or at least some examples from countries having this information.

In *the second task* analysis will be made of how decisions regarding regulations are based on this information. This can be done by a new enquiry among decision-makers or maybe to use already done studies. This process will have to be discussed by the project partners.

In *the third task* a synthesis of the collected knowledge will be made, which will lead to a proposal of how to gain improved knowledge of the building stock from the new certification schemes.

In the ENPER-EXIST project co-operating with Concerted Action and other projects e.g. with EPLABEL and EPA-NR will continue to operate. In EPA-NR a large investigation concerning the non-residential sector has been made and the results will be included as much as possible.

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German implementation of the EPBD

The planned German implementation of the 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.

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 unexpensive 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. In an earlier ENPER-EXIST newsletter we have informed in more detail on the new standard (see www.enper-exist.com). The article on the right gives links and additional information on the available and planned computer tools that shall simplify the application of the new standard. 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 case of existing buildings the resulting primary energy demand shall be 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 test study partly ready, partly on the way

The German ministry of buildings has started field test studies for both residential (finished) and non-residential buildings based on the listed implementation rules. (see newsletter no. 3). ENPER-EXIST will report on the result of the studies.

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Germany: Excel-Tool on DIN V 18599 for free download 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-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 organised by dena. 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.



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Concerted Action and SAVE projects: EIE initiatives closely related

The last EPBD Concerted Action meeting held in Brussels on September 2005 was followed by a 3 days international EPBD conference (in conjunction with the AIVC conference): during this conference, a special afternoon was dedicated to the EIE projects closely related to the implementation of the EPBD. A private meeting allowed almost all the SAVE coordinators to present their work to CA and EIE participants.



During the same meeting, Eduardo Maldonado, coordinator of the Concerted Action, presented the objectives and the functioning of this project. Peter Wouters from BBRI, in charge of the communication and the exchange of information within the CA-participants, presented the CA-webzine and the CA-project centre.

The **CA-webzine** is a monthly magazine created to keep all the CA-participants well informed about the developments of the EPBD in other MS, about the CEN standards and about any other items having a potential impact on the common work of transposition of the EPBD (SAVE projects, conferences, technical events, ...). In addition to this public, the target group of this support is actually extended to anyone concerned by the development of the EPBD and interested in the issues covered by this magazine. It is now sent to nearly 450 readers. All contributions, from the CA-participants and from the SAVE co-workers, are welcome to develop its content. Articles with 6 lines summaries have to be sent to the BBRI (dla@bbri.be).

The **CA-project centre** is a dissemination tool allowing the CA-participants to share and archive interesting documents in a single location, divided in:

- Major rooms dedicated to the agenda and to documents from the plenary sessions;
- Sub-rooms with all the documents concerning topics under discussion in the CA-Core themes (Certification, Inspection, Procedures and CEN standards, Training requirements for experts);
- Sub-rooms dedicated to specific national issues or to IEE projects closely related with the EPBD implementation.

All the coordinators of the IEE projects can receive a username and a password allowing them to access at the project centre and to create a specific room dedicated to their project (the ENPER-EXIST room has already been created a few months ago). But not only the project-leaders are able to read and share information: also other participants from the SAVE projects can reach the project centre, thanks generic usernames that they have to ask to their SAVE coordinator.

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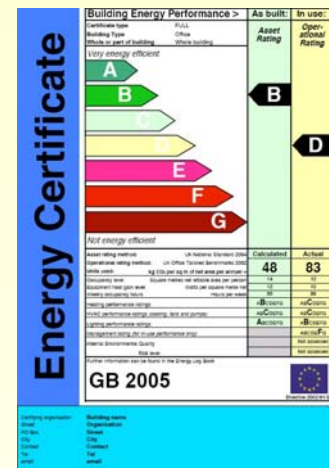
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Introduction into the EIE-Project EPLabel

EPLabel is a two-year project involving nineteen countries, ten with full partners¹, supported by the EC's EIE SAVE programme. It addresses the EPBD's Article 7.3 requirement for 'Public Buildings' over 1,000 m² to display an Energy Certificate prominently. Its main technical objective is to develop a methodology for energy benchmarking and certification of a diverse range of non-domestic buildings based on their actual annual energy consumption, thereby supporting Member States planning to implement Operational Ratings under the EPBD.



The project aims to identify the key steps in the procedure for building energy certification based on an Operational Rating and to propose a clear, robust and pragmatic way for Member States to implement these steps, offering sufficient flexibility to accommodate national diversity whilst seeking the harmonisation the EC desires. The method offers an easy entry level for cases where few if any benchmarks are currently in use, plus more detailed assessments where current knowledge is more advanced, including customised benchmarks based on schedules of accommodation and usage. Customised benchmarks will allow more meaningful and fairer assessments of the energy use and CO₂ emissions of individual buildings than can be done by comparison with bulk energy statistics for a diverse sector.



EPLabel represents one of the options for energy certification of occupied non-residential buildings, and its work should contribute to ENPER-EXIST providing a complete view of the application of the EPBD to existing buildings.

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¹The project Co-ordinator is the UK Partner, Energy for Sustainable Development Ltd, who are supported by sub-contractors Target Energy Services and William Bordass Associates. The other partners are BBRI (Belgium), Energiereferat Frankfurt (Germany), Esbensen (Denmark), CSTB (France), NKUA (Greece), NUID (Ireland), DHV (Netherlands), Enerma (Sweden) and Motiva (Finland).

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First Prototypes of EPA-NR tools (including calculation tool) expected end of 2005

Towards the prototype tools

The EIE-project EPA-NR is running since January 2005 and will develop a method and tools for the Energy Performance Assessment of existing Non Residential buildings relating to the implementation of the EPBD. During the past months a lot of preparative work has been done like a survey on national context and need for instruments, focussing on an overview of the non-residential buildings sector, policies, legislation and other requirements, existing building energy audit methodologies, software, maintenance strategies and sources for financing in relation to the implementation of the EPBD in the 25 EU Member States. In the seven countries participating in EPA-NR policy makers and other stakeholders have been interviewed to find out their needs with respect to the implementation of the EPBD. Based on these surveys and interviews a brief for the EPA-NR method and tools have been developed, including extended formula structures for the software tool. The brief was the starting point for the development of the actual software tool and the other instruments like a checklist for the intake interview and an inspection protocol. The prototypes of these instruments are expected to be ready end of December 2005, so they can be tested in over 20 pilot projects in seven countries. The software tool will be flexible and optimally tuned to the EPBD and new CEN-standards. Because of its modular set up functionalities can be added according to national or regional requirements and future CEN-standards.

Observer countries

A very special feature of the EPA-NR project is the involvement of observer countries. Observer countries are EU Member States not directly participating in the project but who are interested in the EPA-NR method and tools and the experiences collected within the project with respect to the implementation of the EPBD. The intention is to focus on those countries that still have a lot to do to complete the implementation. Observer countries get access to the prototype tools and are invited to take part in our project meetings and workshops. They will get a chance to provide feedback on draft documents. To apply for the status of observer country policy makers and other stakeholders are invited to send an e-mail to bpoel@ebm-consult.nl.

Combined workshop in Spring 2006

Another activity to involve target audiences is the combined workshop that is planned in Spring 2006. It will be organised by three EIE-projects together: ENPER-EXIST, EPA-NR and EPLABEL. For further details see the article below.

For more information on the project please visit www.epa-nr.org. All reports will be downloadable here once they have been approved by the consortium. The partners participating in EPA-NR are: arsenal and ÖÖI from Austria, SBI from Denmark, CSTB from France, Fraunhofer IBP from Germany, NOA from Greece, ENEA from Italy and TNO and EBM-consult from the Netherlands.

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Next workshop of ENPER-EXIST at EPBD conference in Budapest, May 2006

The three EIE-projects ENPER-EXIST, EPA-NR and EPLABEL will organise a common workshop at the EPBD conference, which will take place in Budapest on May, 10-12, 2006. The projects will present the first useful project results and findings on EPBD implementation items such as:

- Building assessment methods used in the member states
- Usability of CEN work in the national energy performance certification procedure
- Legal, economic and organisational aspects of the EPBD implementation in the member states
- Improving the knowledge of the existing building stock and its energy performance
- Software solutions for the calculation of the energy performance of the building stock in the member states
- Pilot tests on real buildings in the member states

The workshop will reflect actual topics of the daily discussions in the implementation teams in the member states and could therefore act as a creative information exchange platform.

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