

The state of the Implementation of the European Energy Performance of Buildings Directive (EPBD) in Austria

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ABSTRACT

The process of implementation of the EPBD in Austria is now carried out for several years. The calculation scheme for asset rating is finished, the operational rating procedure is still being discussed. One of the major problems in Austria is the fact that most building laws are under the responsibility of the nine Austrian provinces. Therefore all political decisions like baseline and limits of the energy demand for the building codes are difficult to achieve. These values are therefore still under discussion. A federal law (civil law) on the certificate itself has passed the Austrian parliament. The related issues like training courses and examinations for issuers of the certificate and independent experts for regular inspection of boilers and ventilation/cooling systems are still under discussion. A first preliminary Austrian certificate was issued for the Berlaymont Building in Brussels in May 2005.

KEYWORDS

EPBD, Austria, Calculation Scheme, Implementation, Laws.

INTRODUCTION

The European Commission released the DIRECTIVE 2002/91/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2002 on the Energy Performance of Buildings (EPBD). The directive had to be set into force in January 4 2006, but there is the possibility to use a 3 year implementation period. In Austria the implementation process will be (hopefully) performed by 2007. One big difficulty in Austria is the fact that most building laws are under the responsibility of the nine Austrian provinces, only the issuing of the certificate itself (not the baselines and limits) is national state law.

This means that Austria had so far

- nine different building codes
- nine different regulations concerning new or refurbished buildings
- nine different conditions in the subsidy schemes for new and existing buildings

Since several years, a process is on its way to harmonize the building laws of the provinces. This also affects the implementation of the EPBD.

The Authors are involved in the Austrian implementation process especially in comparing the results of the monthly calculation approach of EN 13790 to dynamic

building simulation with hourly values and the set up of the calculation scheme for the non-residential buildings for the EPBD implementation.

AUSTRIAN SITUATION OF THE CALCULATION SCHEME FOR ASSET RATING BY JUNE 2006

Several items are addressed by the harmonized introduction of the EPBD in Austria

- National implementation via the Austrian Institute for Building Technology (OIB) and the Austrian Energy Agency (AEA) using CEN, relevant national Austrian standards and parts of German standard DIN 18599.
- Possible methods of energy demand evaluation (state of discussion April 2006)
 - Simple calculation with tables (Old buildings, renovation)
 - Calculation following OIB (Multi zone – detail or single zone - default) (monthly approach)
 - Detailed simulation (dynamic simulation)
 - Measurement of energy demand and calibration to standard conditons (climate, user demand)
- The calculation method (asset rating) for the energy performance for residential buildings is finished (useful energy following the calculation procedure of EN 13790 for heating; algorithms for heat production and delivery was implemented by Austrian Institute for Building Physics and Austrian Energy Agency)
- The calculation method for non-residential buildings is set up following prEN 13790 for the useful energy for space heating and cooling and using parts of the German DIN 18599 for useful energy of ventilation air, cold production and distribution, lightning, and standardized user behaviour) adapted to the Austrian situation.
- In order to have a better acceptance Austrian Standards are now taking over the calculation scheme developed for the EPBD

THE AUSTRIAN EPBD CALCULATION SCHEME

- Chapter I: General calculation information
- Chapter II: Useful energy demand
 - Part A: Calculation of useful space heating and cooling demand (HWB, KB) (very close to prEN 13790)
 - Part B: Useful energy demand of energetically air treatment (heating, cooling, humidification/dehumidification (air conditioning plant) (close to DIN 18599 Part 3)
- Chapter III: End use energy demand
 - Part C: End use energy demand for space heating and domestic hot water (HEB)
 - Part D: End use energy demand for space cooling (KEB) and air transport (close to DIN 18599 part 6 and 7)
 - Part E: End use energy demand for lighting (close to DIN 18599 part 4)
 - Part F: Calculation of total end use energy demand (EEB)
 - Part G: Reference HVAC system

- Chapter IV: Energy certificate
 - Part H: Template of the energy certificate (work in progress)
- Chapter V: Attachments
 - Part I: Climate data (is being delivered by Zentralanstalt für Meteorologie und Geodynamik ZAMG)
 - Part J: Catalogue of heat bridges (has to be delivered)
 - Part K: User demand profiles (similar to EN, 10 sets for whole buildings)
 - Part L: Simplified data acquisition for old buildings (work in progress)

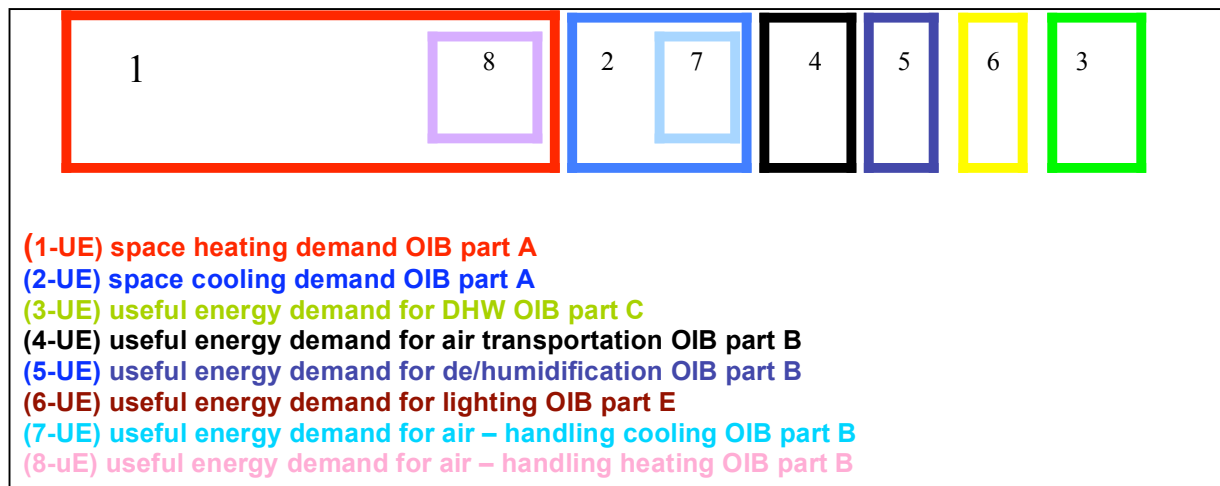


Figure 1 Parts of useful energy demand for the Austrian calculation scheme

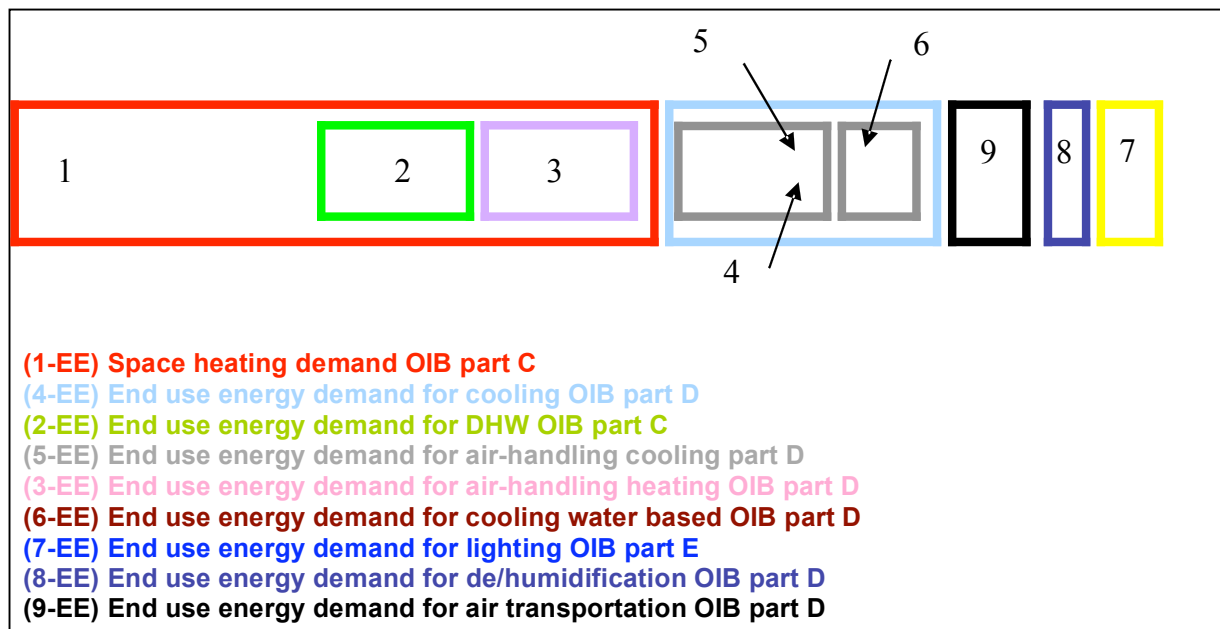


Figure 2 Parts of end use energy demand for the Austrian calculation scheme

ZONING RULES

- At the level of **useful energy demand**

- User profiles (e.g. more than 4°C difference in the indoor air set temperature)
- Orientation of rooms (external solar load)
- At the level of **end-use energy demand**
 - HVAC system (heating, cooling, lightning, ventilation)
- *Zones that account for less than 5 % of the total useful area of a building can be neglected*

TEST OF CALCULATION SCHEME FOR USEFUL ENERGY DEMAND

The monthly calculation method for the useful energy demand for heating and cooling was compared to dynamic simulations by the Institute of Thermal Engineering for its limits concerning control strategies depending on indoor and outdoor daily climate. It could be shown, that for an office building with different thermal masses, window areas and internal loads the procedure for space heating and cooling fits very good for most cases. Limits occurred for control systems using the indoor air temperature like temperature controlled shading or ventilation. Here the monthly approach has limits in showing the right effects.

DETAILED VERSUS SIMPLIFIED CALCULATION

Case 1: New building/renovation – residential building (detailed calculation, only space heating)

Case 2: New building/renovation – non-residential building (detailed calculation, heating and cooling)

Case 3: Issuing of the energy certificate for existing residential buildings (simplified calculation heating, part L)

Case 4: Issuing of the energy certificate for existing non-residential buildings (simplified calculation heating and cooling, part L)

PROPOSED LIMITS AND BENCHMARKS

- Several steps of limits
 - Maximum allowed U-values
 - Maximum allowed useful energy demand
 - Maximum allowed end use energy demand (only residential buildings)
- For residential buildings cooling demand is NOT allowed (building must be build in a way that NO summer cooling load occurs, ÖNORM B 8110 part 3)
- Also for non-residential buildings NO cooling demand is allowed when the internal gains and the ventilation are not taken into account in the calculation (glass-palaces are not allowed with this in the future).
- First values for baseline and colours for heat demand (end-use energy) are presented for residential buildings.
- No maximum allowed values for the end-use of non-residential buildings are given (lack of experience)

STATE OF IMPLEMENTATION OF OTHER REQUIREMENTS OF THE EPBD

- Structure and design of the energy certificate is under discussion.
- Creation of a method how to train independent experts for the calculation and issue of the energy certificates is under discussion.
- Creation of a method how to train independent experts for regular inspection of boilers and ventilation/cooling systems is under discussion.
- Procedure how to use measurement data of the energy demand for the certificate (operational rating) is under discussion.

STATE OF EPBD LAWS IN AUSTRIA

- Energy certificate: After long discussion a common layout and common key figures are accepted by 8 provinces (1 province not (yet))
- Law about the certificate (EAV-G) law has passed the parliament. This is governmental competence: civil law
 - Certificate maximum 10 years old
 - When only a dwelling in a multi family house is sold, the certificate of the whole building can be used.
 - If no certificate is available a standard value according age and type of building is used (normally worse than reality)
- The discussion about liability for the certificate is still ongoing. In the moment the issuer is liable according to civil law.
- If everything runs well, the implementation can be finalized by the end of 2007

COURSES IN AUSTRIA

- There are several courses already ongoing to train future issuers of the certificate
- A general Austria-wide course-system is in preparation
- There will be no limitations in the profession of future issuers but they will have to pass an examination.
- Courses will NOT be mandatory, each applicant can chose, which course he/she still need and which not.

FIRST CERTIFICATE FOR THE BERLAYMONT BUILDING IN BRUSSELS

A first preliminary certificate was produced for the Berlaymont Building (EU Commission in Brussels) by the Institute of Thermal Engineering, TU Graz in April 2005. It was a joint study of Austria, France, Germany, Netherlands, Poland and Portugal, participating in a so called Berlaymont Working Group to issue their own certificates and/or analysis of the building. The Member State experts used their own calculation methods to determine the energy performance of the Berlaymont building. The final report can be downloaded from

http://ec.europa.eu/energy/demand/legislation/doc/2005_07_26_report_energy_certification_berlaymont_en.pdf

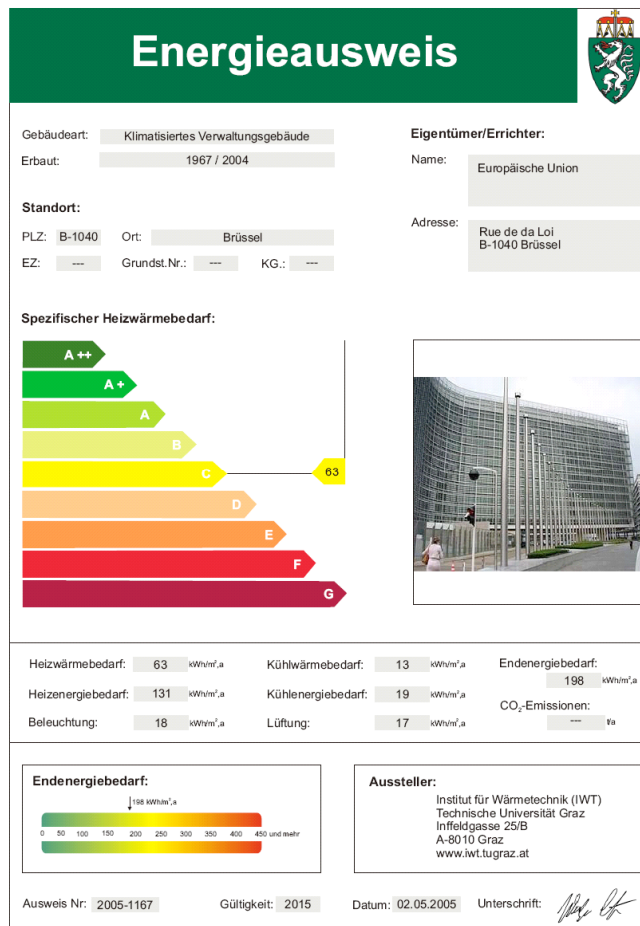


Figure 3 Austrian preliminary certificate for the Berlaymont building, May 2005 (Eiper, Streicher, 2005)

CONCLUSIONS

The complete calculation scheme according to the EPBD is near its finalisation. Nevertheless, all political decisions (key-values for energy limitations, baselines, values for the certificate, format of the certificate) and the requirements for independent experts for issuing the certificate and for the inspections are still under discussion within the nine Austrian provinces. Therefore the implementation of the EPBD will be earliest by mid 2007 in Austria.

REFERENCES

Eiper, Th., Streicher, W. (2005). Berechnung des Energieausweises über die Gesamtenergieeffizienz des Berlaymont Gebäudes (EU-Kommissionsgebäude in Brüssel) in Anlehnung an das in Österreich in Entwicklung befindliche Berechnungsverfahren für Nichtwohngebäude (OIB-Leitfaden). Project Report for Bundesministerium für Wirtschaft und Arbeit BWA Stubenring 1, Austria

OIB (2006). Leitfaden energietechnisches Verhalten von Gebäuden Version 2.4, 13. Juni 2006. Austrian Institute für Building Technology.