



Danish status on EPBD implementation

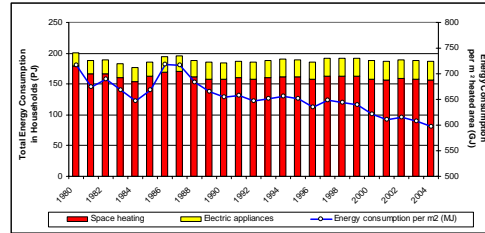
"European Perspective on the Energy Performance of Buildings Directive"
Seminar arranged by Sustainable Energy Ireland
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Energy and Environment



Energy Consumption

Total energy consumption in households and consumption per m² heated space in Denmark
Climate adjusted



Based on Energy Statistics 2003 (Danish Energy Authority, 2004)



New requirements for new buildings

- New energy requirements for new buildings in relation to EPBD (Article 5) in addenda to existing Danish Building Regulations
- New energy requirements issued 16 June 2005
- Requirements came into force 1 January 2006 with a transposition period of 3 months until 1 April 2006 when the new requirements must be complied with to obtain a building permit

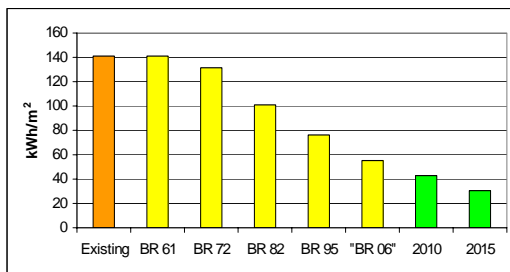


Energy savings for new buildings

- The new energy requirements are not only an implementation of EPBD
- The new energy requirements also impose also stricter energy performance in buildings according to current Danish action plans to save 25 % energy in new buildings (compared with new buildings, meeting requirements existing before 1 January 2006)



Net heating consumption in relation to Danish Building Regulations



Requirements for new buildings

- For buildings heated to at least 15 °C there is an energy frame requirement based on the energy supply needed for operating the building
- There is one frame for housing (not including lighting) and another for non-domestic buildings (including lighting)
 - In non-domestic buildings with high ventilation requirements, high lighting requirements, long operation hours or large hot water demand, an addition is given to the basic energy frame

Low energy buildings



- Low energy buildings Class 2 have an energy demand of 75 % compared with a normal house
- Low energy buildings Class 1 has an energy demand of 50 % compared to a normal house
- The low energy building classes are also used to obtain exemption from obligatory connection to public natural gas or district heating networks

Supplementary requirements



The energy frame is supplemented by specific requirements for:

- U-values
- minimum boiler efficiency
- pipe insulation
- heat recovery
- fan power efficiency
- automatic control
- low temperature heating

Proof of compliance



- Compliance with the energy requirements must be verified after the completion of the building to obtain a use permit
- Control of compliance with regulations is the responsibility of the local authority
- In practice control of the building in relation to the energy requirements is exercised by the energy consultant who also issues the energy certificate

New requirements for existing buildings



- New requirements for existing buildings in case of renovation (Article 6) in addenda to Danish Building Regulations
- In multi-family houses and non-domestic buildings, the 25 % rule (Preamble 13) in the EPBD is implemented in all buildings independent of floor area
- To comply with the requirements, all cost efficient energy saving measures must be taken

Concept of cost-effectiveness



Cost-effectiveness can be described as:

$$\frac{\text{Value of annual saving} * \text{Lifetime}}{\text{Investment}}$$

Requirements to components

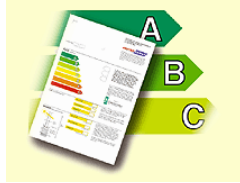


Cost efficient energy saving measures are required in all buildings for specific components in the case of:

- renovation of roof
- renovation of climate shield on external walls
- renovation or change of windows
- installation of a new boiler
- change of heat supply



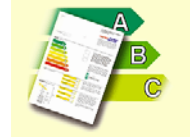
New Energy Certification in Denmark



Energy Certification from 2006

Based on use - not size of buildings

- One family houses
 - at sale or renting
- Buildings with flats
 - combination of building and flats
 - large, regularly every 5 year – small, at sale or renting
- Public buildings – trade and services
 - regularly, every 5 year



Danish experience of labelling

- Very difficult to estimate savings if based on metered values
 - Two consultants might get very different results +/- 70 %
 - Consultants might hesitate to propose savings
 - What is gained by metered consumption might be lost on adjustment and on advising
- Need for detailed and accurate handbooks for consultants
 - Inspection must be specified
 - Standard values
 - Typical or common used values must be given
 - Clear rules for inspection, but also for advising



Danish experience - 2

- Use standard calculation principles to ensure that reports are reproducible
- Very complex methods do not raise quality
- Effective software and database solutions are very important – preferably Internet on-line solutions



Block of flats

Identification of building Date

Measured consumption

Energy label based on calculation
Energy label after improvements


Most important recommendations including possible savings, investments, prices in DKK and payback period



Continued Recommendations for the building

Recommendations at general improvement of the building

Comments




The consultants registration of

- The building constructions
- Systems of ventilation and refrigeration
- Heating system
- Electric components
- Water installations

and

- Description of the building
- Data of the calculation
- More information by Internet
- Signature



First a description of how the individual payment for each flat is being done for this building

Second the average energy consumption for flats

Energy labelling scale

- There are 14 classes on the labelling scale ranging from A1 to G2, where A1 is the best
- The 14 classes are needed to have a sufficient number of classes reflect relevant energy saving measures taken
- New buildings must at least be labelled as Class B1 to get a use permit. Classes A1 and A2 are the low energy buildings


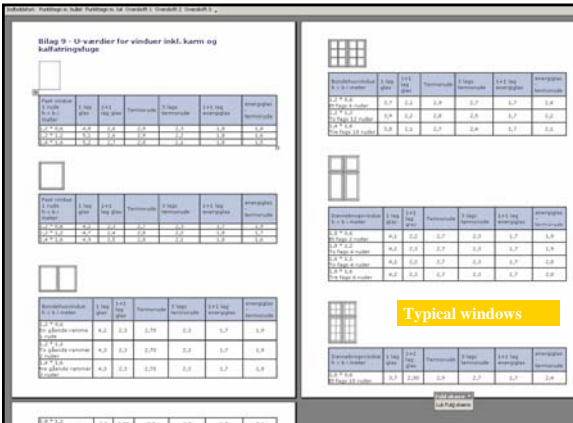
Management

- The daily operation of the labelling scheme is delegated to a secretariat also operating the other schemes related to the EPBD
- The specific rules for labelling are in Handbook for Energy Consultants
- The handbook is public available
- The handbook includes tabular data for typical constructions and installations in building to facilitate the uniformity of the labels issued by different consultants

Handbook for energy consultants

Handbook is the daily guide for the energy consultants

- Base for quality assessment
- Guide for assessment of building etc.
- Guide for calculation
- Guide for advising on savings
- Guide for filling in energy labels
- Guide for reporting / procedures etc.

Typical windows


Bilag 12 - Typiske konstruktioner i "Danskernes huse"
 Løsningsforslag i forbindelse med den nye energiregulation af bygninger (Bilag 9)

Noter fra 1940'erne - Stålbjælkestue osv.

Bygningsdel	Bygningsdelens funktion/beskrivelse	Materialer	Typisk bygningsdel	Udvalgte oplysninger
Væge	Væge i stue og 1. etage med udførelse af gulv	Plastrør mur	U.S. stens eller mur af teglsten eller teglsten med teglsten	1.2
				1.3
				1.4
Væge	Væge i 2. etage og 3. etage med udførelse af gulv	Rude mur	Rude mur med teglsten eller teglsten med teglsten	1.5
				1.6
Løfter og andre tekniske installationer	Løfter og andre tekniske installationer	Løfter og andre tekniske installationer	Løfter og andre tekniske installationer	1.7
				1.8

Bygningsdel	Bygningsdelens funktion/beskrivelse	Materialer	Typisk bygningsdel	Udvalgte oplysninger
Løfter og andre tekniske installationer	Løfter og andre tekniske installationer	Løfter og andre tekniske installationer	Løfter og andre tekniske installationer	1.9
				2.0

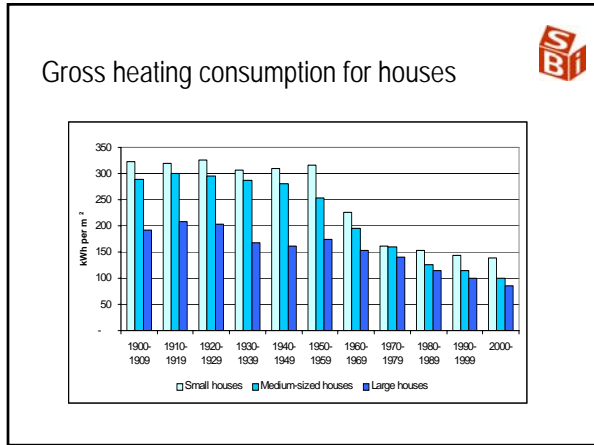
Typical houses and constructions




Energy saving measures

The energy consultant must identify two types of energy saving measures:

- Energy saving measures that can be executed immediately
- Energy saving measures that are only feasible if carried out as a supplement to a renovation





Inspection schemes

- The inspection of boilers and heating systems was put into force on 1 September 2006
- It is expected that the new scheme for inspection of air conditioning systems will also include inspection of large ventilation systems
- The new scheme is expected to be put in force on 1 January 2007