



Building Codes – a key part of EE policies in Europe

Tudor Constantinescu
Executive Director
Buildings Performance Institute Europe





EU energy & climate package

20-20-20

- Establishment of legally binding targets to:
 - cut GHG emissions to 20% below 1990 levels by 2020
 - increase the share of renewable energy to 20% by 2020
- Indicative target of improving **energy efficiency by 20%** by 2020 (EU Action Plan 2006 – under revision)
- Top priorities in terms of energy efficiency potential are:
 - - Building sector (40% of EU's energy requirements)
 - - Transport sector (26% of EU's energy requirements)
 - - Manufacturing (25% of EU's energy requirements)



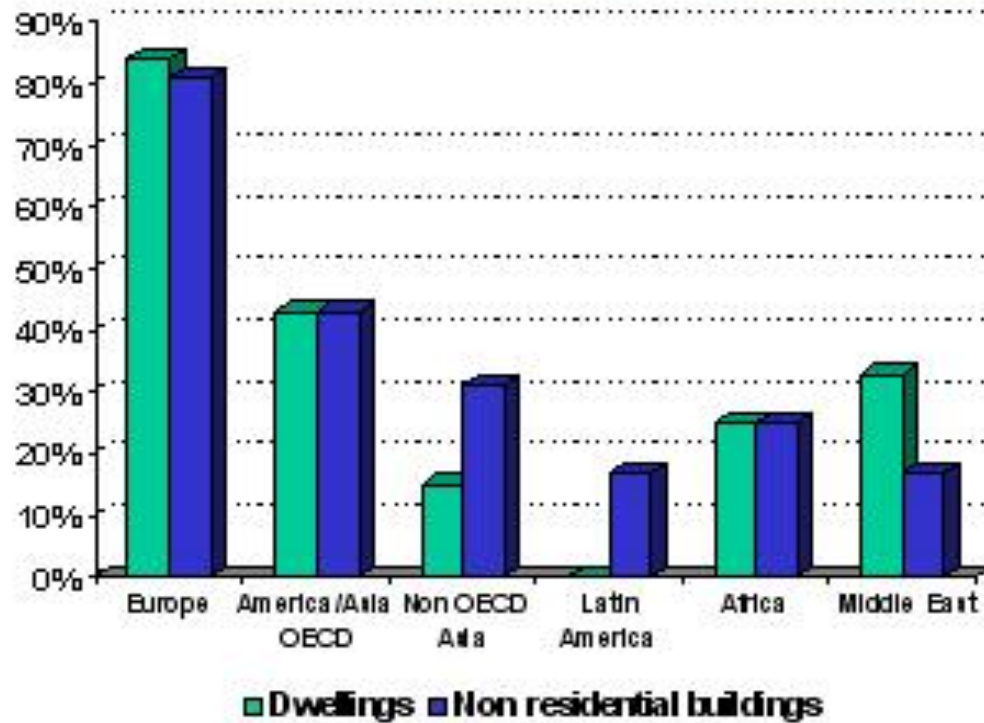
Comprehensive legal framework

- End use efficiency and energy services Directive (ESD)
- Energy Performance of Buildings Directive (EPBD)
- Directive on promotion of cogeneration (CHP)
- Directives for labeling of appliances (e.g. air-conditioners, refrigerators) plus Energy Star regulation for office equipment
- Framework Directive for eco-design requirements for energy using products (boilers, refrigerators, freezers, ballasts for fluorescent lights)
- Directive on energy products and electricity taxation



EE standards for Buildings

Figure 3.4: Countries with efficiency standards on new buildings
Pays ayant des normes sur les bâtiments neufs



Source: WEC/ADEME Survey



Building codes in European countries

Examples

- UK
- Denmark
- Belgium (per region)
- Germany

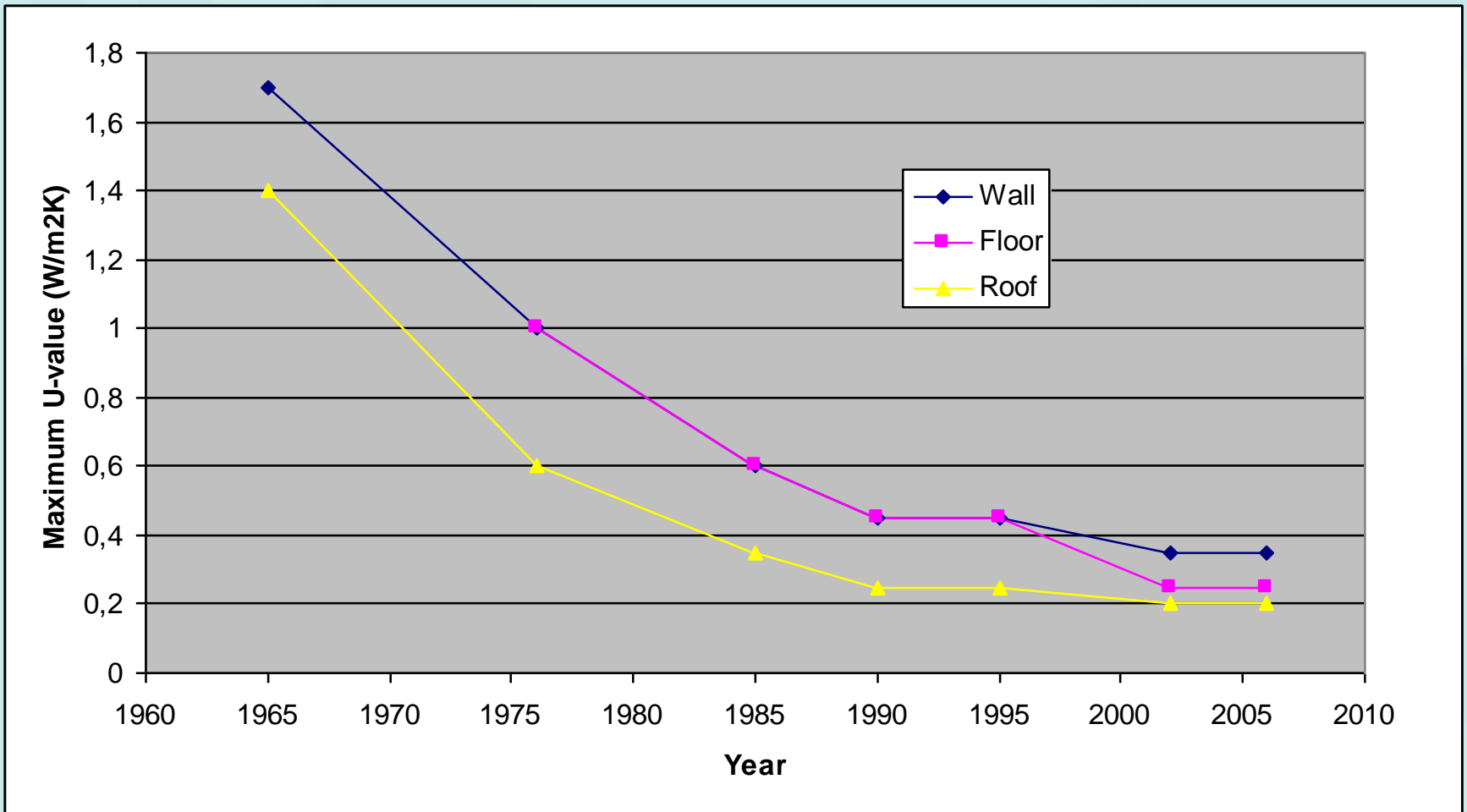


United Kingdom

- Maximum U-values for constructions since 1965 (new buildings)
- 2006: overall Energy Performance requirements for whole building (new buildings, result of implementation EPBD)
- Method to calculate Energy Performance of whole building takes into account insulation, air leakage, heating installation, hot water, etc
- Compliance with the requirements is checked when the building is ready. An energy expert must present the local Building Authority with an assessment of the Energy Performance. The Building Authority can perform a practical check before they give the permit to start using the building.



Maximum U-values in UK



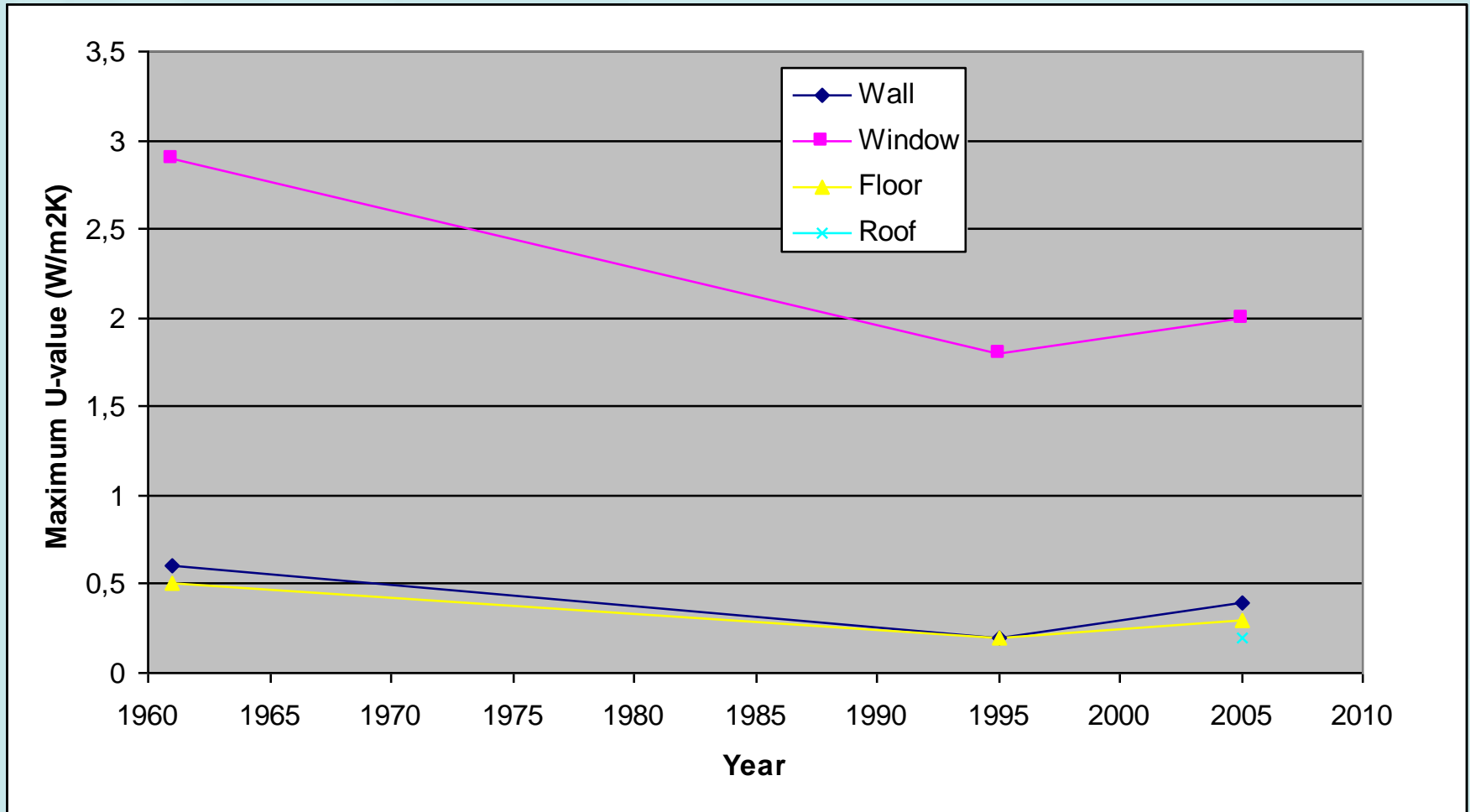


Denmark

- Maximum U-values for constructions since 1961 (wall, roof, floor, window)
- 2006: as a result of EPBD: overall EP requirements on building level (taking into account heating, cooling, hot water, ventilation, renewable energy)
- Compliance is checked when the building permit is requested and when the building is delivered. A calculation of the energy performance has to be presented to the local authorities with the request for building permit. Proof of compliance has to be made when the building is ready, to get a permit to use it.
- In case of “major renovation” (affecting more than 25% of the value of the building, or 25% of the building envelope) all *cost effective* energy saving measures must be performed, regarding the minimal EP requirements.



Denmark: maximum U-values





Belgium

- Maximum U-values
- K level requirements (overall *insulation level* of the building)
- E level requirements (overall *EP requirement* on building level, also taking into account installations)



Belgium (2)

Brussels	Wallon region	Flemish region
<p>Requirements since 2008</p> <ul style="list-style-type: none">▪ K level (overall insulation level)<ul style="list-style-type: none">▪ K40 (before: K55)▪ E level for dwellings<ul style="list-style-type: none">▪ 2008: E90▪ 2011: E70▪ Maximum U-values:<ul style="list-style-type: none">▪ Wall: 0,4 W/m²K▪ Roof: 0,3 W/m²K▪ Windows: 2,5 W/m²K	<p>New requirements since 2008 (EPBD)</p> <ul style="list-style-type: none">▪ K level (overall insulation level)<ul style="list-style-type: none">▪ K45 (Before: K55)▪ E level for dwellings<ul style="list-style-type: none">▪ E100▪ Maximum primary energy demand per m²<ul style="list-style-type: none">▪ In 2011 strengthened from 170 to 130 kWh/m²▪ Maximum U-values:<ul style="list-style-type: none">▪ Wall: 0,5 W/m²K▪ Roof: 0,3 W/m²K▪ Floors: 0,9 W/m²K▪ Windows: 2,5 W/m²K	<p>Requirements since 2006</p> <ul style="list-style-type: none">▪ K45 (2006) <p>E level for dwellings</p> <ul style="list-style-type: none">▪ 2006: E100▪ 2010: E80 <p>Maximum U-values:</p> <ul style="list-style-type: none">▪ Wall: 0,6 W/m²K (in 2010: 0,4)▪ Roof: 0,4 W/m²K (in 2010: 0,3)▪ Floors: 0,4 W/m²K (outside air 0,6)▪ Windows: 2,5 W/m²K



Compliance in Belgium

- With regard to the control of compliance with the EP requirements the three regions all follow the same basic system, with some regional diversions:
 - When receiveing a building permit an energy expert must report the start of the building activities to the regional authorities before the work starts (start declaration)
 - When the building is finished the energy expert must make an EP-declaration, in which he/she has to demonstrate (calculate) that the building complies with the EP requirements
 - The regional building authorities perform random checks of actual practical compliance
 - In case of non-compliance administrative fines are given and the building has to be adapted to the requirements



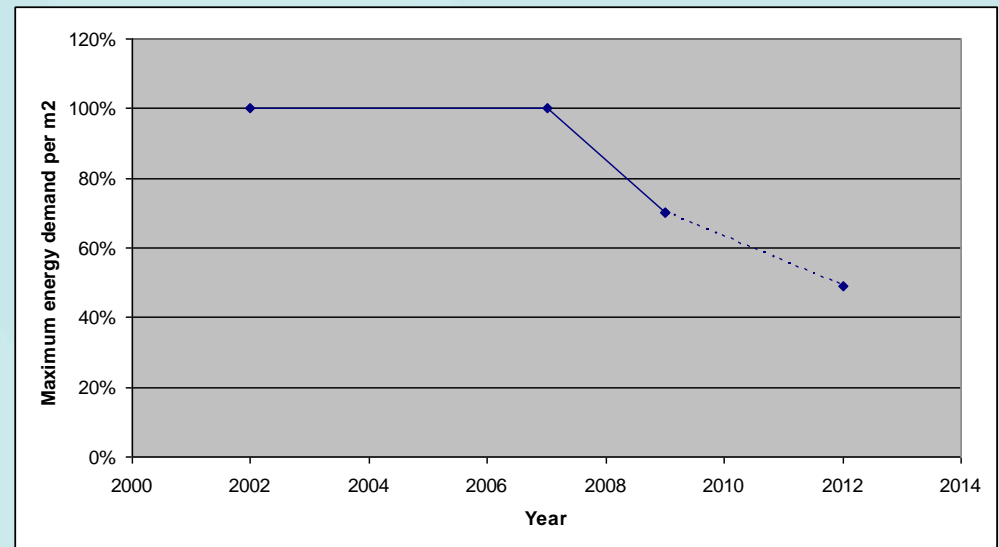
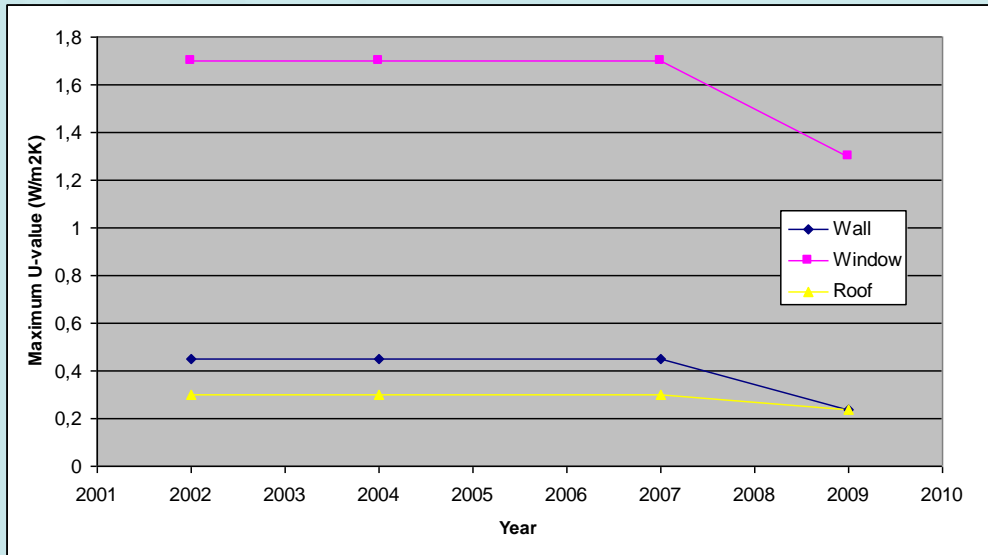
Germany

- 1976 Energy Saving Act
 - Maximum U-values
- 2002 Energy Saving Ordinance
 - Maximum U-values
 - Maximum energy demand per m² for whole (new) building
- Updates in 2004, 2007 (same level of requirements)
- Update in 2009 (higher level overall requirement for whole building: 30% less maximum energy demand per m²)
- Control of compliance is done by local authorities when the building permit is requested. Without an EP calculation no building permit can be issued (but only theoretical check)



Germany:

maximum U-values and maximum energy demand per m²





Standards in the EPBD context

- EPBD (2002) → EC mandate (2004) to CEN: standards for a methodology calculating the integrated energy performance of buildings
- Over 30 CEN standards published by 2008
- Currently used in MS but mixed with national approaches
- Need for separation between common procedures and national elements
- CEN standards will be more usable as direct reference (in the context of the new EPBD)
- Minimum requirements must comply with the results of a « **cost-optimum** » methodology based on life-cycle cost



Major developments in the context of the new EPBD

- Major renovations must implement minimum requirements
- Energy Performance Certificates – part of advertising for sale or rent; display for buildings 1000 m², 250 m² in 2015; include recommendations
- Every new building must be near –zero energy by 2020 (public buildings from 2018)
- Inspections of heating (over 20 kW) and AC (including ventilation) systems followed by reports
- MS to establish ambitious plans to bring the existing building stock to near zero by 2020
- Implementation is the Challenge



Nearly-Zero Energy Buildings

Planned introduction of low energy standards as minimum requirements in building regulations.

Country /year	2009	2010	2012	2013	2015	2016	2020
Denmark		- 25 %			- 50 %		- 75 %
Finland		-30-40%		-20%	LEB - PB (PH)		
France			LEB 2)				E+
Germany	- 30 %		- 30 % 3)				NFFB
Ireland		-60%		NZEB			
Netherlands		- 25 %			- 50 % (PH)		ENB
Norway	20-25%						LEB (PH)
United Kingdom		-25 %		(PH) - 44 %		NZEB	

1) Percentage of the 2006 minimum level, 2) Effinergie standard, 3) Percentage of the 2009 minimum level, 4) Passive House level. LEB: Low Energy Buildings. E+: Energy positive buildings. NFFB: Buildings to operate without fossil fuels. ENB: Energy Neutral Buildings. NZEB: 0 net. CO₂, incl. heating, lighting domestic hot water and all appliances. Source: Rockwool International



Thank you
tudor.constantinescu@bpie.eu