

European Standards for Existing & New Buildings

STRENGTHENING NATIONAL CAPACITIES
FOR SUSTAINABLE HOUSING
AND URBAN DEVELOPMENT
9-10 November 2015, Belgrade

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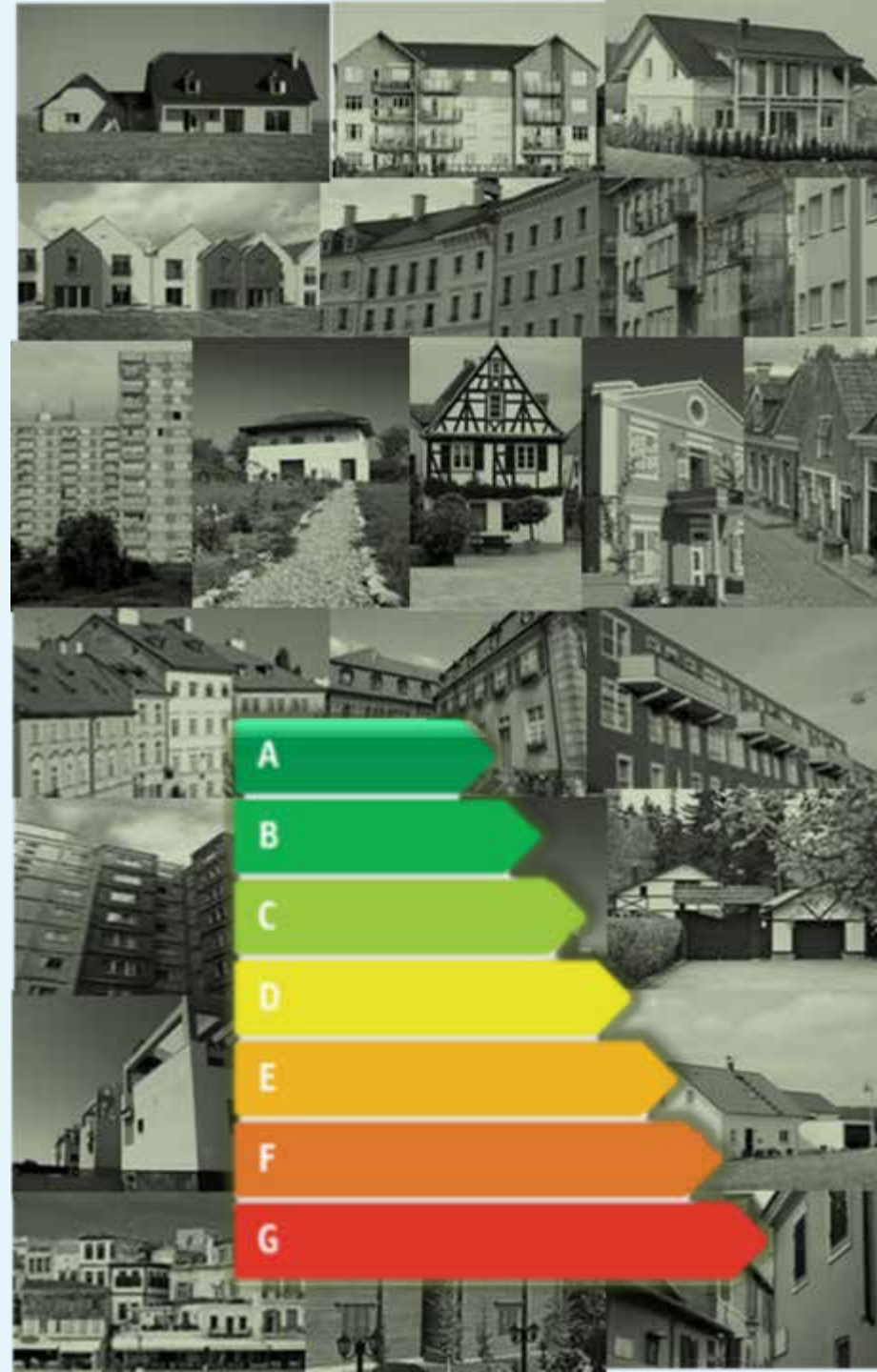
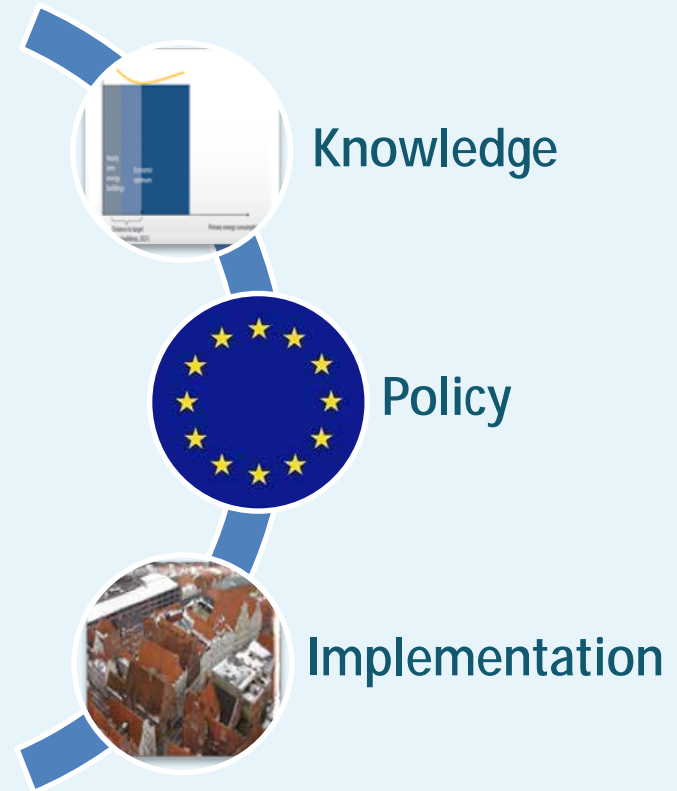


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The Buildings Performance Institute Europe



Great heterogeneity of EU's housing stock



CZ



DE



FR



SW



NL



UK



ES



IT



BE



GR

RO

PT



BUL



AU

LIT



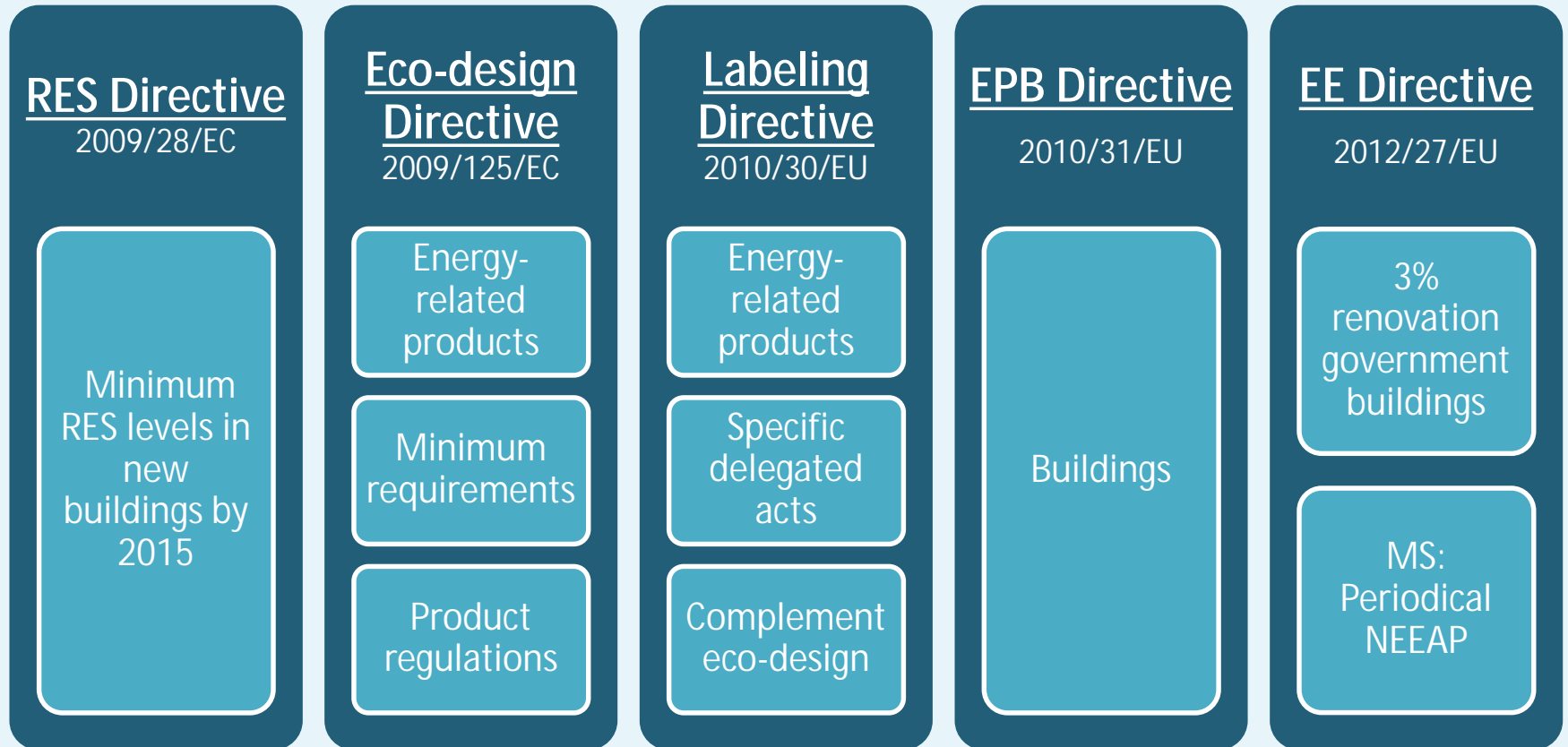
EU policy framework – A long term perspective

- Low-carbon Economy 2050 Roadmap

| GHG reduction vs. 1990 | 2005 | 2030 | 2050 |
|--------------------------|------|-------------|-------------|
| Power | -7% | -54 to -68% | -93 to -99% |
| Industry | -20% | -34 to -40% | -83 to -87% |
| Transport | 30% | +20 to -9% | -54 to -67% |
| Residential and services | -12% | -37 to -53% | -88 to -91% |
| Agriculture | -20% | -36 to -37% | -42 to -49% |

- Roadmap for a Resource-Efficient Europe 2050: buildings influence 42% of the final energy consumption, 35% of the CO₂ emissions, >50% of all extracted materials and 30% of water consumption.
- Energy 2050 Roadmap: “energy efficiency potential in new and existing buildings is key”

A complex EU policy framework for energy performance of buildings



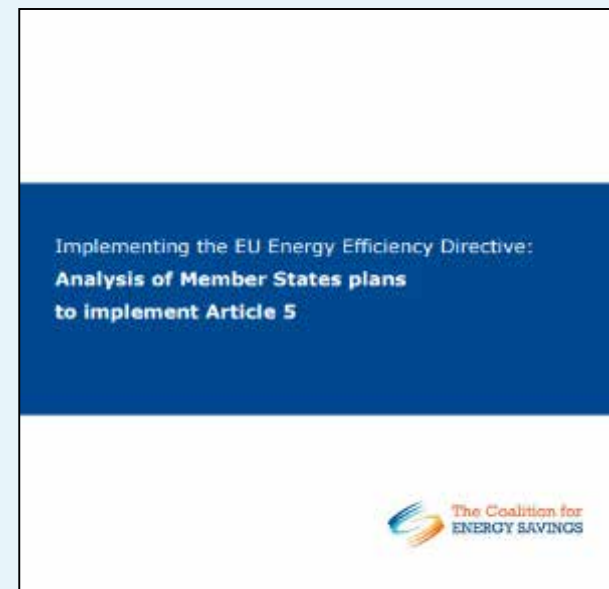
Energy Efficiency Directive – a focus set on buildings

Member States required to develop long-term strategies for building renovation, including:

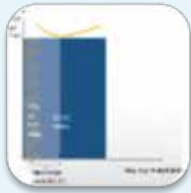
- Policies and measures to stimulate cost-effective deep renovations of buildings
- A forward-looking perspective to guide investment decisions and financial institutions

Public sector to lead by example:

- 3% renovation target for central government buildings (incl. encouragement of public bodies to set local plans and use of Energy Performance Certificates)
- Certain energy efficiency conditions for public procurement



ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE (EPBD)



Energy performance & Cost optimality

- § Minimum energy performance requirements
- § Cost-optimal methodology
- § Requirements for technical building systems



Existing Buildings

- § Major renovation should implement EE measures
- § Minimum requirements for buildings and components



New Buildings



Nearly Zero Energy Buildings

- § 2019: public buildings
- § 2021: all buildings
- § National plans for NZEBs



Energy Performance Certification

- § Implement EPC schemes
- § Recommendation for cost-optimal improvements
- § Independent control systems



HVAC inspection

- § Regular inspections
- § Independent control systems



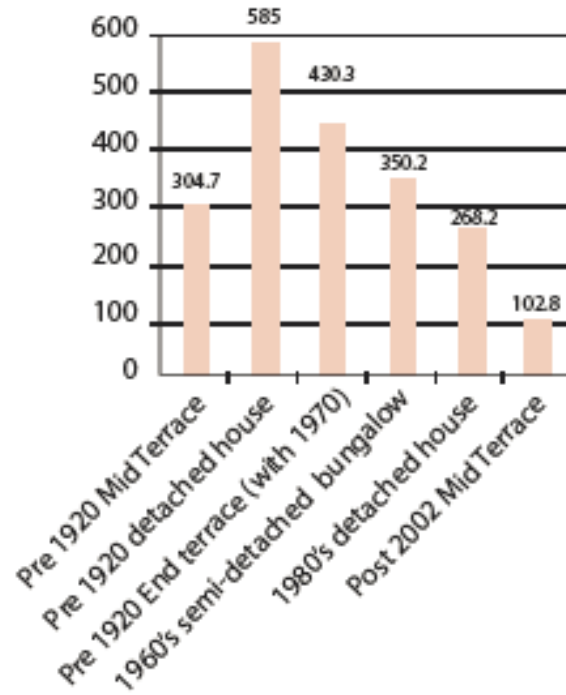
Financial incentives & Market barriers

- § MS: to prepare lists of measures and instruments
- § Take into account cost-optimality for the measures

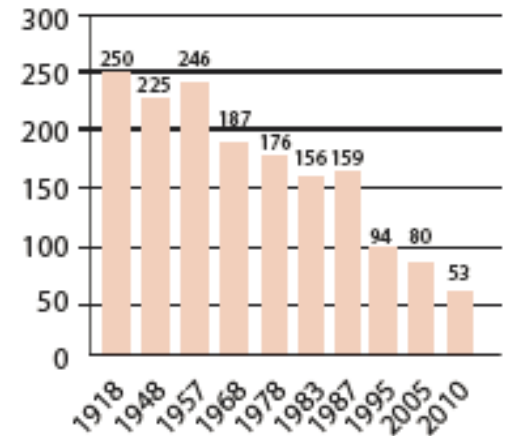
Energy Performance Requirements – (NW Europe)



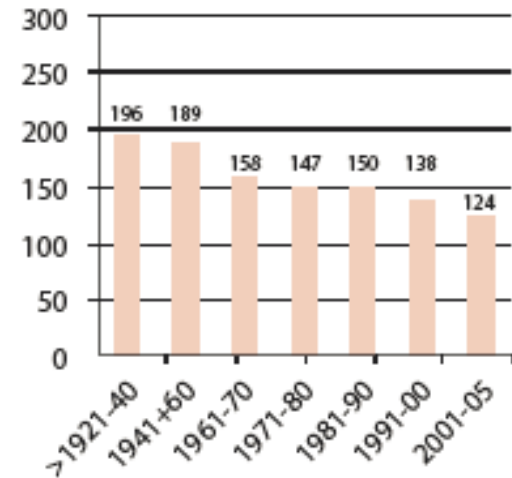
United Kingdom



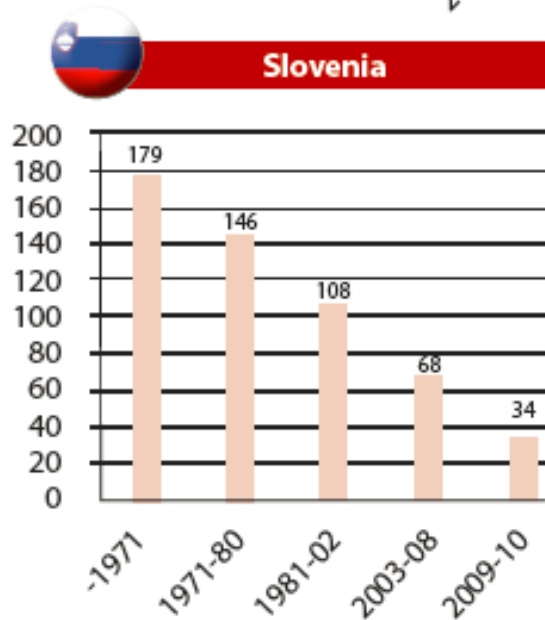
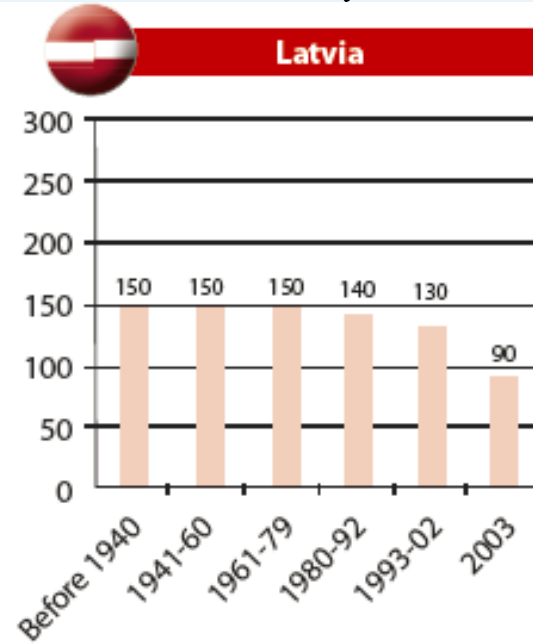
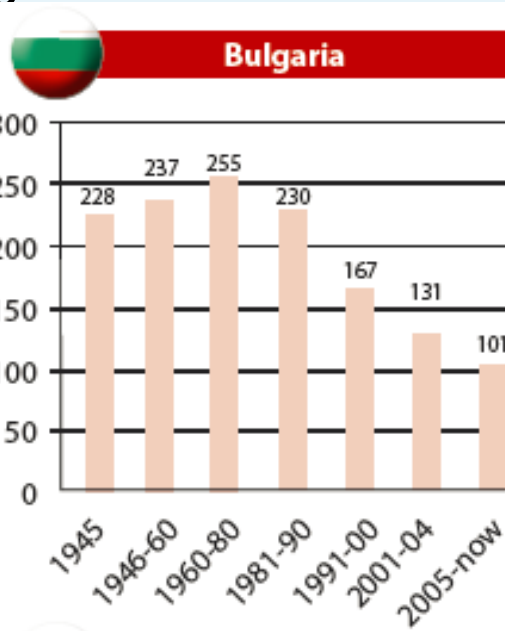
Germany



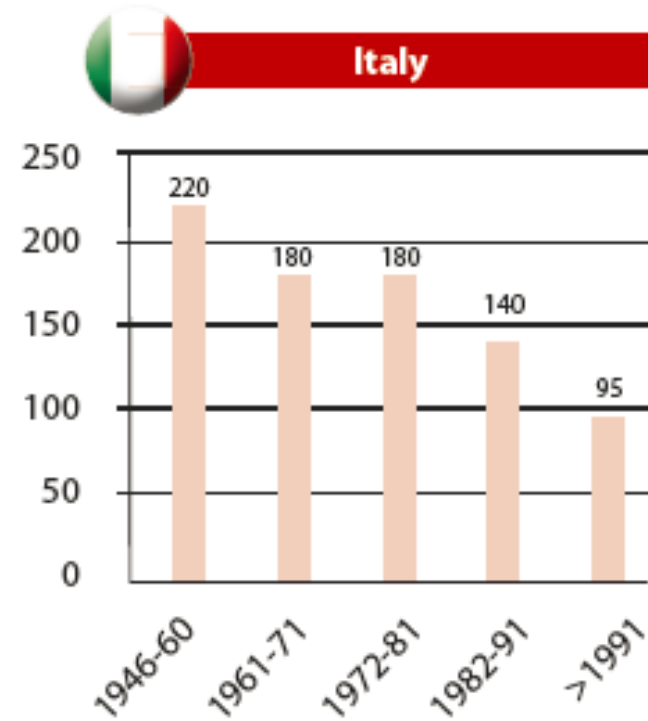
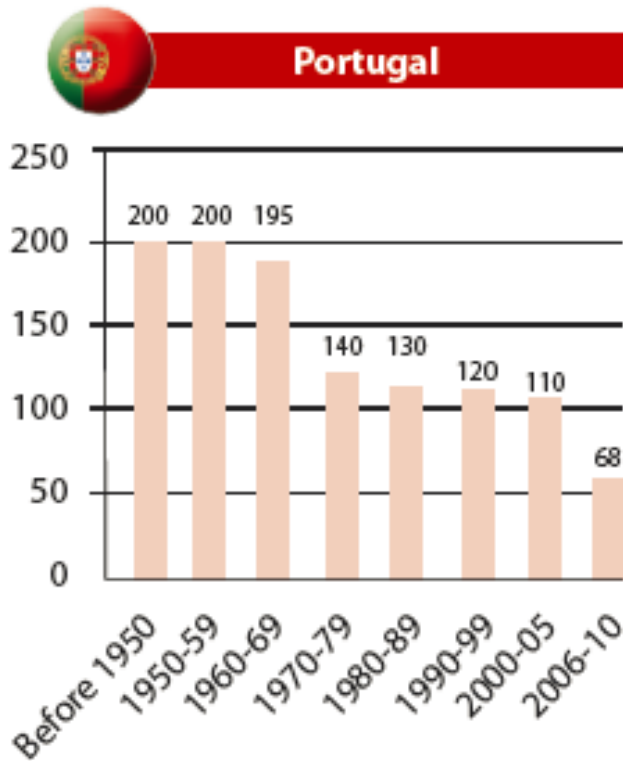
Sweden



Energy Performance Requirements– (C&E Europe)



Energy Performance Requirements– (S Europe)



Moving Towards Mandatory Renovation

- *Within a specific timeframe* - Germany, France
- *When undertaking maintenance work* – France
- *When renting a property* - United Kingdom, Flanders Region of Belgium
- *At change of use of building* - Denmark
- *When changing a boiler* - Baden-Württemberg, Germany, and Bolzano, Italy
- *In case of an extension to the building surface* – A number of regions and cities in Italy

nZEB definition for existing buildings

| Country | Status of the definition | Maximum primary energy [kWh/m ² y] | |
|--------------------|--------------------------|--|---------------------------|
| | | Residential buildings | Non-residential buildings |
| Austria | ✓ | 200 | 250 (from 2021) |
| Belgium - Brussels | ✓ | 54 | ~ 108 [2] |
| Belgium - Flanders | Under development | | |
| Belgium - Wallonia | Under development | | |
| Bulgaria | As for new buildings | ~30-50 | ~40-60 |
| | | Included in the calculation; building needs to comply with class A | |
| Croatia | ND | | |
| Cyprus | ✓ As for new buildings | 100 | 125 |
| Czech Republic | ✓ As for new buildings | 75-80% [2,5] | 90% [5] |
| Denmark | ✓ As for new buildings | 20 | 25 |
| Estonia | ✗ | | |
| Finland | ND | | |
| France | ✓ | 80 [3] | 60% PE [2] |
| Germany | Under development | 55% PE [5] | |
| Greece | Under development | | |
| Hungary | Under development | | |
| Ireland | Under development | 75-150 | |

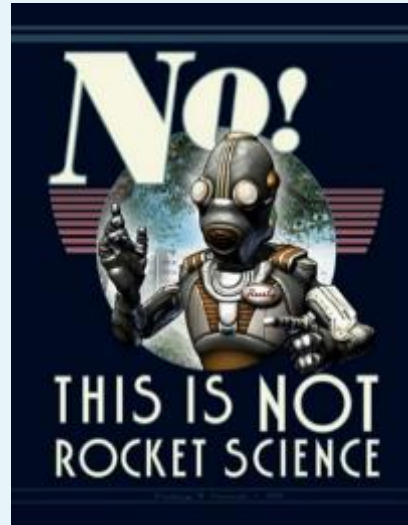
nZEB definition for existing buildings

| Country | Status of the definition | Maximum primary energy [kWh/m ² y] | |
|--------------|--------------------------|--|---------------------------|
| | | Residential buildings | Non-residential buildings |
| Italy | ✓ As for new buildings | Included in the upcoming updated version of the National nZEB Plan [2,3] | |
| Latvia | ✓ As for new buildings | 95 | 95 |
| Lithuania | ✓ As for new buildings | Included in the calculation; building needs to comply with class A++ | |
| Luxembourg | ND | | |
| Malta | ND | | |
| Netherlands | ND | | |
| Norway | ND | | |
| Poland | ND | | |
| Portugal | ND | | |
| Romania | ND | | |
| Slovakia | ND | | |
| Slovenia | Still to be approved | 70-90 [2] | 100 |
| Spain | Under development | | |
| Sweden | ND | | |
| UK (England) | ND | | |

Moving towards nearly Zero-Energy Buildings in the EU

% new NZEBs [2010]

| | |
|----------|------|
| France | 15.1 |
| Poland | 9.1 |
| Italy | 5.7 |
| Germany | 5.4 |
| Slovakia | 3.5 |
| UK | 0.96 |
| Denmark | 0.05 |



% new NZEBs [2013]

| | |
|-----------|-------|
| Austria | 100.0 |
| France | 100.0 |
| Germany | 15.3 |
| Italy | 11.9 |
| Denmark | 10.8 |
| Poland | 8.7 |
| Slovakia | 7.2 |
| UK | 0.74 |
| Lithuania | 0.04 |

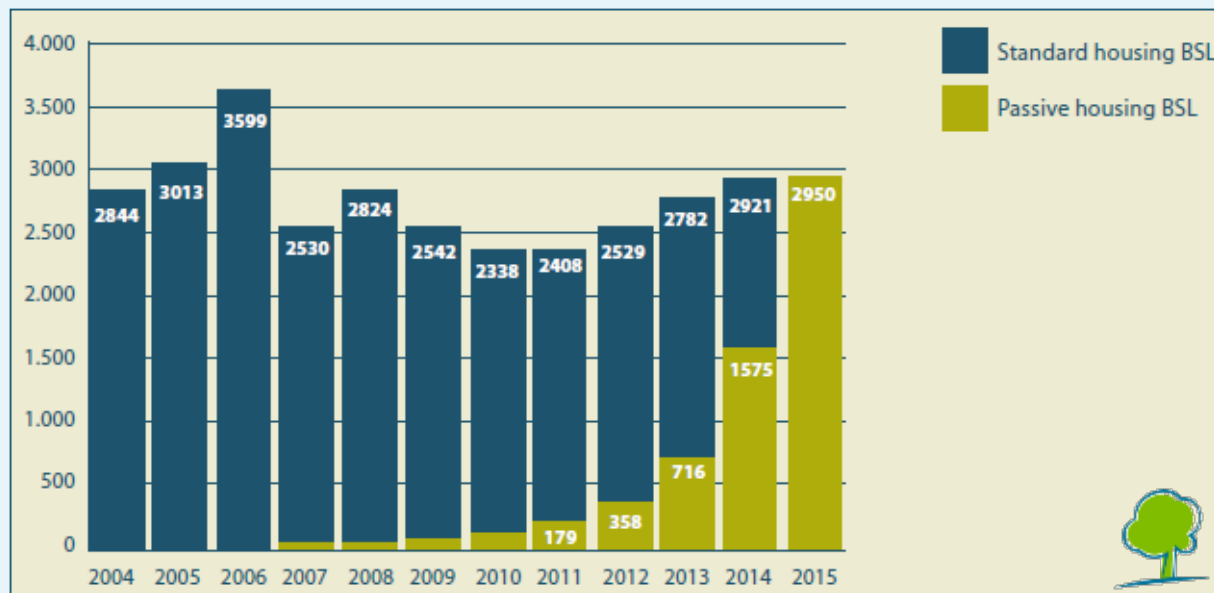


Findings: practical implementation of national NZEB strategies

- Some MS established measures for a gradual transition towards NZEB levels

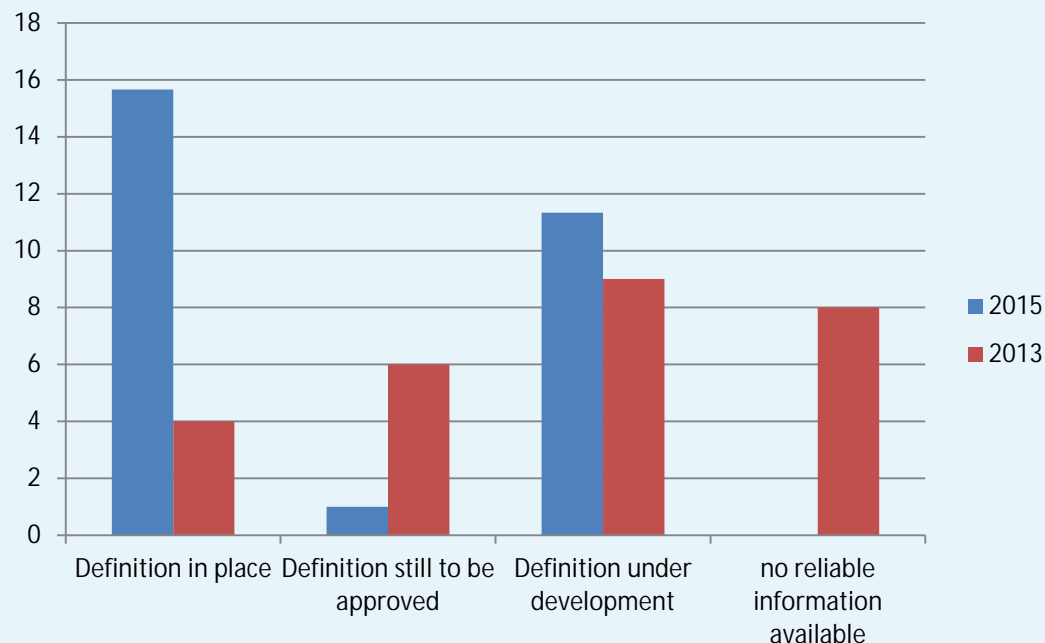
| Maximum required primary energy consumption in new buildings [kWh/m ² y] | | | |
|---|--|--|-------------------------------|
| Country | Before 2015 | 2015 | 2021 |
| Denmark | 52,5 + 1650 (heated gross floor area) | 30 + 1000 (heated gross floor area) | 20 (nZEB) |
| Slovak Republic | 109-216 (Energy Class B) | 55-108 (Energy Class A1) | 54 (nZEB, Energy Class A0) |

- Brussels implemented NZEBs since 2011, enforcement since 2015

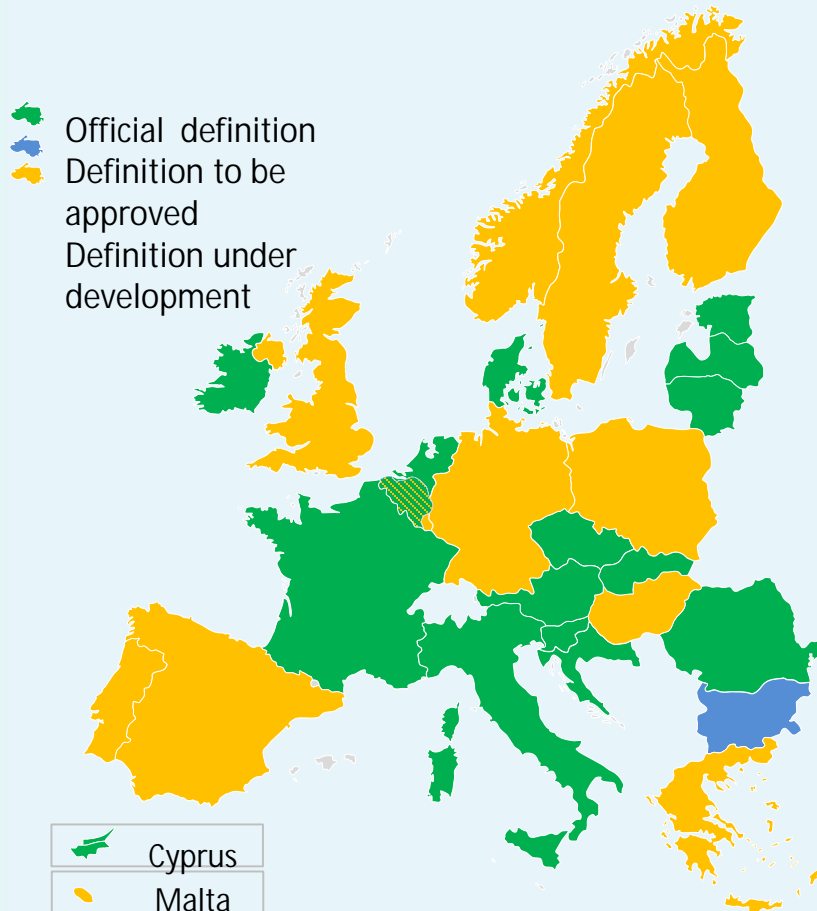


Findings: progress since 2013

- 🏠 2013: only 4 official NZEB definitions
- 🏠 2015: 15 MS have NZEB definitions for new buildings (+ Brussels & Flanders)
- 🏠 Existing buildings: only 8 MS have established NZEB requirements (+ Brussels)



Findings: different ambition levels



NZEB requirements differ considerably

- ⏏ Large variation for maximum primary energy
- ⏏ A final energy limit is often required
- ⏏ In FR, DK and BE: requirements for the performance of the technical systems and to reduce the risk of overheating
- ⏏ In 8 MS the share of RES is explicitly stated, in others it is considered indirectly.

The share of Renewable Energy Sources

- 🏠 The share of RES is explicitly stated in 7+1 MS:
 - CY, LT, LV, RO, SK, IE, FR, Flanders
- 🏠 In other MS, renewable sources are considered indirectly:
 - DE, CZ, EE and Brussels Capital Region
 - DK: planned gradual evolution of primary energy factors and an increase in the share of RES >50% is expected by 2020.

The image shows a screenshot of a data table from the website www.bpie.eu/nzeb_factsheet.html. The table is organized into columns for different categories of energy data, including 'Renewable Energy Sources' and 'Total Energy Consumption'. The rows represent various countries and regions, such as 'Cyprus', 'Lithuania', 'Latvia', 'Romania', 'Slovakia', 'Ireland', 'France', 'Flanders', 'Germany', 'Czechia', 'Estonia', and 'Brussels Capital Region'. The table contains numerical values and percentages, along with some descriptive text in smaller font. The table is partially obscured by an orange banner containing the website URL.

CONCLUSIONS

BPIE proposal for NZEB roadmaps

- 🏠 **Strategic long-term planning:** holistic packages with a strong commitment and vigorous implementation by relevant policy-levels
- 🏠 **Tailored regulations:** NZEB for both new buildings and existing building stock
- 🏠 **Support programmes** to secure transition and upscale the market
- 🏠 **Unburden:** more info and awareness with demo-projects, one-stop-shops, promotion of top runners, market facilitators, best practice exchange...
- 🏠 **Quality matters:** pragmatic quality schemes, competent workforce, stricter enforcement of regulations, higher compliance...
- 🏠 **Excellent marketing opportunities:** NZEBs are futureproof, hot and cool



Definition for nearly zero energy buildings (NZEBs)



1. Definition for nearly zero energy buildings (NZEBs)



- ∅ The current regulation of 2012 (RT2012), enforced in 2013, for **new residential buildings**, requires a primary energy consumption of less than **50 kWh/m²/year** (“**low-consumption buildings**”/Bâtiments Basse Consommation or BBC).
- ∅ For **new non-residential buildings**, the RT2012, enforced in 2013, requires a primary energy consumption lower than **70 kWh/m²/year** for buildings without air-conditioning and **110 kWh/m²/year** for buildings with air-conditioning.
- ∅ “To qualify as **low-consumption buildings, residential buildings that have undergone renovation** must consume less than 80 kWh of primary energy per square metre per year”. (National nZEB plan)
- ∅ For **renovated office buildings**, the target is **40% less energy** than the same buildings consumed when equipped with the reference insulation materials and energy systems. (National nZEB plan)

Primary energy scope: Space heating, domestic hot water (DHW), cooling, auxiliary systems and lighting.

The required consumption levels **are subject to variations**, depending at least on geographical areas and altitudes. For example the annual ceiling of 50 kWh/m²/year is subject to adjustment, based on volumes of greenhouse gas emitted by the utilised energy sources, the purposes for which buildings are used and their characteristics and geographical locations and varies between 40 and 65 kWh/m²/year.

1. Definition for nearly zero energy buildings (NZEBs)



There is not yet a national official NZEB definition.

Ø However, for residential buildings, the NZEB definition is expected to follow the **KfW Effizienzhaus 55*** approach; containing therefore the following standards: Passive house, KfW Effizienzhaus 40, KfW Effizienzhaus55.

Primary energy scope: Space heating, DHW, cooling, ventilation and auxiliary systems.

Ø According to the national nZEB plan, for the highly diverse group of non-residential buildings, no energetic standard has been studied, which might serve as guidance for the nearly zero-energy building standard.

**The number indicates the amount of annual primary energy consumption (QP) in relation (%) to a comparable new building (reference building) according to the requirements of the Energy Conservation Regulation in force; i.e. a KfW Efficiency House 55, does not use more than 55 % of the annual primary energy consumption (QP) of the corresponding reference building.*



1. Definition for nearly zero energy buildings (NZEBs)



No national official nZEB definition has been reported to the EC so far. However, according to the national plan for increasing the number of nZEBs, in the coming years the primary energy demand in buildings has to be lower than the values of the following table:

| Type of building | | Primary energy demand for heating, ventilation and hot water (kWh/m ² /year) | | |
|-----------------------|---|---|---------------|---|
| | | From 1/1/2014 | From 1/1/2017 | From 1/1/2021 From (1/1/2019 for public buildings) |
| Residential buildings | a) Single-family houses | 120 | 95 | 70 |
| | b) Multi-family houses | 105 | 85 | 65 |
| | Collective residential buildings | 95 | 85 | 75 |
| Public buildings | a) Hospitals | 390 | 290 | 190 |
| | b) Other public buildings | 65 | 60 | 45 |
| | Other buildings (agricultural building, warehouse) | 110 | 90 | 70 |

1. (Expected) Definition for nearly zero energy buildings (NZEBs) - Comparison

| Country | Primary Energy (kWh/m ² /year) | |
|---------|---|------------------------------|
| | Residential buildings | Non-residential buildings |
| France | 50 | 70-110 |
| Germany | KfW Effizienzhaus 55 (≈ 30-52) | - |
| Poland | 65-70 | 45-70 (190 for hospitals) |

THANK YOU

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