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www.zebra2020.eu

Monitoring the market uptake of nZEBs across Europe

13:45 Opening: Putting a spotlight on the rise of low-energy buildings in Europe, Raphael Bointner (TU Wien/e-think)

13.55 How nZEB strategies fit into the EPBD revision, Janna Schonfeld (European Commission)

14.10 ***Session 1: Monitoring the market uptake of nearly Zero-Energy Buildings across Europe***

Moderation: Maarten de Groote (BPIE)

Spotlight on:

- *Measuring the maturity of the nZEB market: the nZEB Data Tool, Carine Sebi (Enerdata)*
- *Tracking the evolution of nZEBs: the nZEB Tracker, Andreas Hermelink (Ecofys)*
- *The impact of Energy Performance Certificates on property values and the European housing market, Andrzej Rajkiewicz (NAPE)*

15.05 Discussion

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NEARLY ZERO-ENERGY BUILDING STRATEGY 2020

The rise of low-energy buildings in Europe

Raphael Bointner

Technische Universität Wien

e-think energy research

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Background

Sustainability of the European society and economy will be based on **renewable energy** and **resource efficiency**. This implies the large scale market uptake of nearly Zero-Energy Buildings (nZEBs). The technology is already available and proven; however the large scale uptake of nZEB construction and renovation is a big challenge for all market actors. A substantial **gap in reliable data** on current market activities made it difficult for policy-makers and the building industry to evaluate the success of nZEBs.

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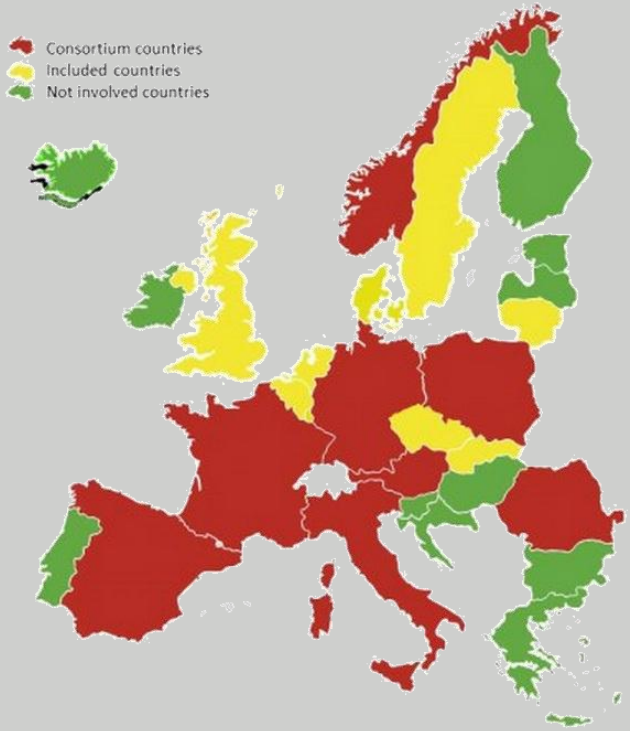
ZEBRA2020 Summary

Key objectives:

- **monitor** the market uptake of nZEBs across Europe and
- provide **data**, as well as
- **recommendations** on how to reach the nZEB standard.



ZEBRA2020 covered **17 European countries** and about **89% of the European building stock**.

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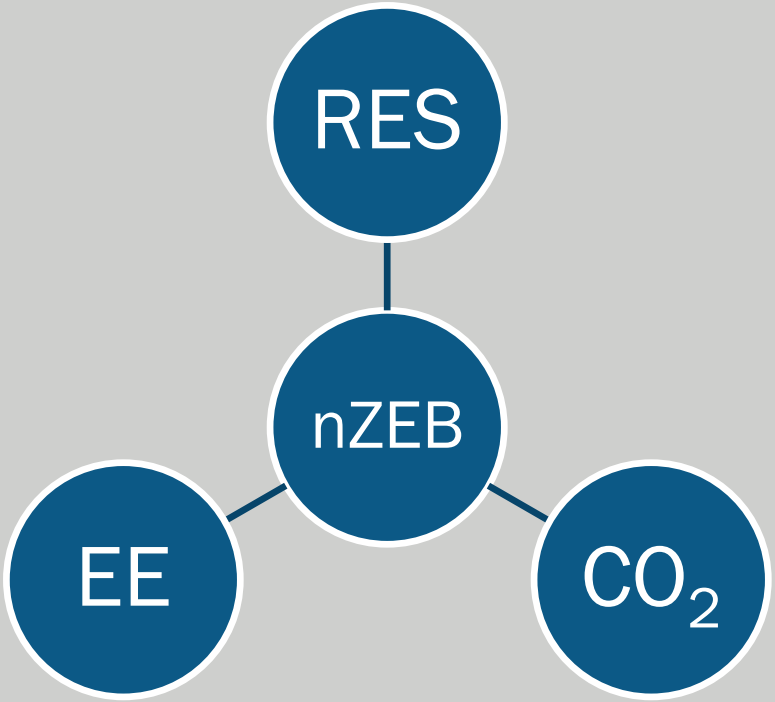
What is a nearly zero-energy building?



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We spend up to 90% of our lifetime in buildings

- Technical configur-ation
- Economics
- Legislation
- Skills and Qualifi-cation
- Social Aspects
- Building standards
- Building traditions
- Climatic Influence
- Availability of energy carriers
- Availability of building compon-ents

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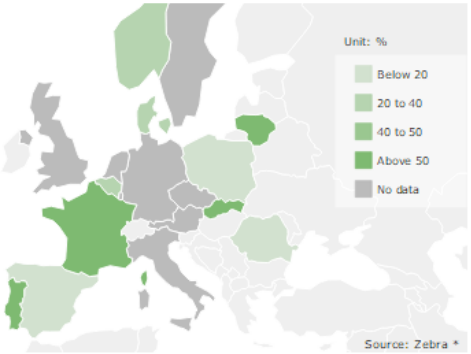
Status of building stock development

- Construction
- Renovation
- Equipment sales
- **Energy Performance Certificates**
  - New buildings
    - **Residential**
    - Non-residential
  - Building stock registered
  - Distribution of EPC labels

Share of new dwellings with EPCs

Year: Last year available. | Last year | Sources | Map | Excel | Highest



Lithuania	80
Portugal	76
Slovakia	64
France	55
Denmark	32
Belgium	24
Norway	22
Poland	18
Spain	7
Romania	0.06

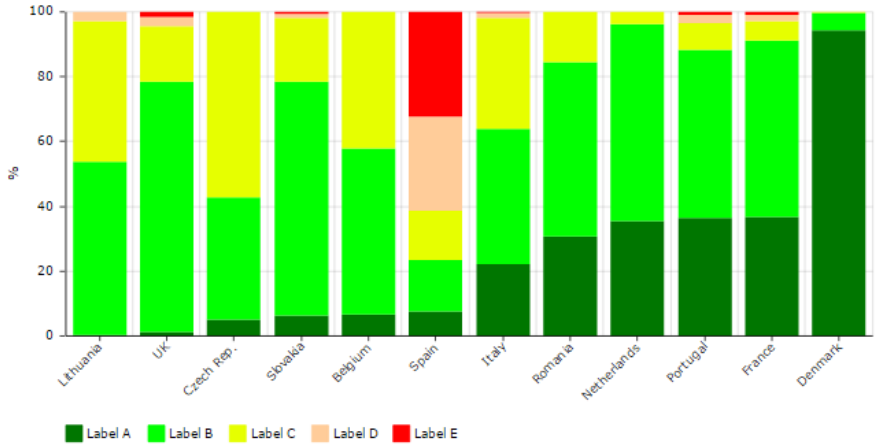
Click on a country to display additional graph below map.

National EPC classification

National EPC registers

Energy performance certificates (EPCs) is an integral part of the EPBD and can be a valuable information tool for owners, occupiers and real estate actors. EPCs shall be issued for buildings or building units which are constructed, sold or rented out to a new tenant; and buildings where a total useful floor area over 500 m2 (lowered to 250m2 from 9/7/2015) is occupied by a public authority and frequently visited by the public. The energy performance certificate shall include the energy performance of a building and reference values such as minimum energy performance requirements, as well as recommendations for the cost-optimal or cost-effective improvement of the energy performance of a building.

Distribution of EPCs in new dwellings (residential) | Graph



* Data collected from national sources.

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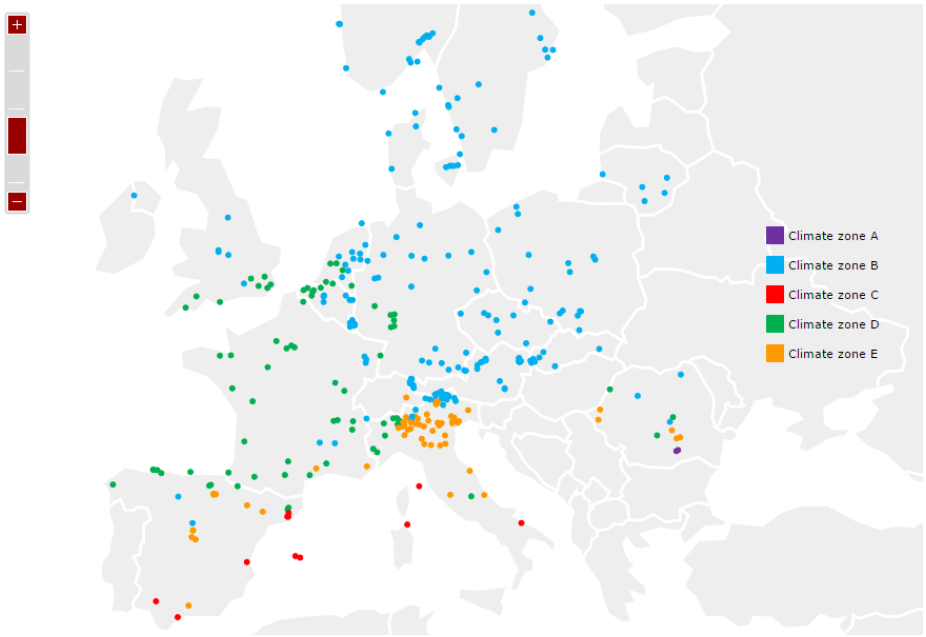
nZEB distribution

Data Tool > nZEB buildings

- Definitions
  - nZEB definitions
  - **Panel distribution**
- Residential buildings
- Non residential buildings

Panel distribution



Climatic zone definitions

Climatic Zone	Heating and cooling degree day	Climate
Zone A	Buildings with Heating Degree Day >= 1962 and Cooling Degree Day >= 525	Cold winters and warm summers
Zone B	Buildings with Heating Degree Day >= 1962 and Cooling Degree Day < 525	Cold winters and mild summers
Zone C	Buildings with Heating Degree Day< 886 and Cooling Degree Day >= 525	Warm winters and warm summers
Zone D	Buildings with Heating Degree Day between 886 and 1962 and Cooling Degree Day < 525	Temperate winters and mild summers
Zone E	Buildings with Heating Degree Day between 886 and 1962 and Cooling Degree Day >= 525	Temperate winters and warm summers

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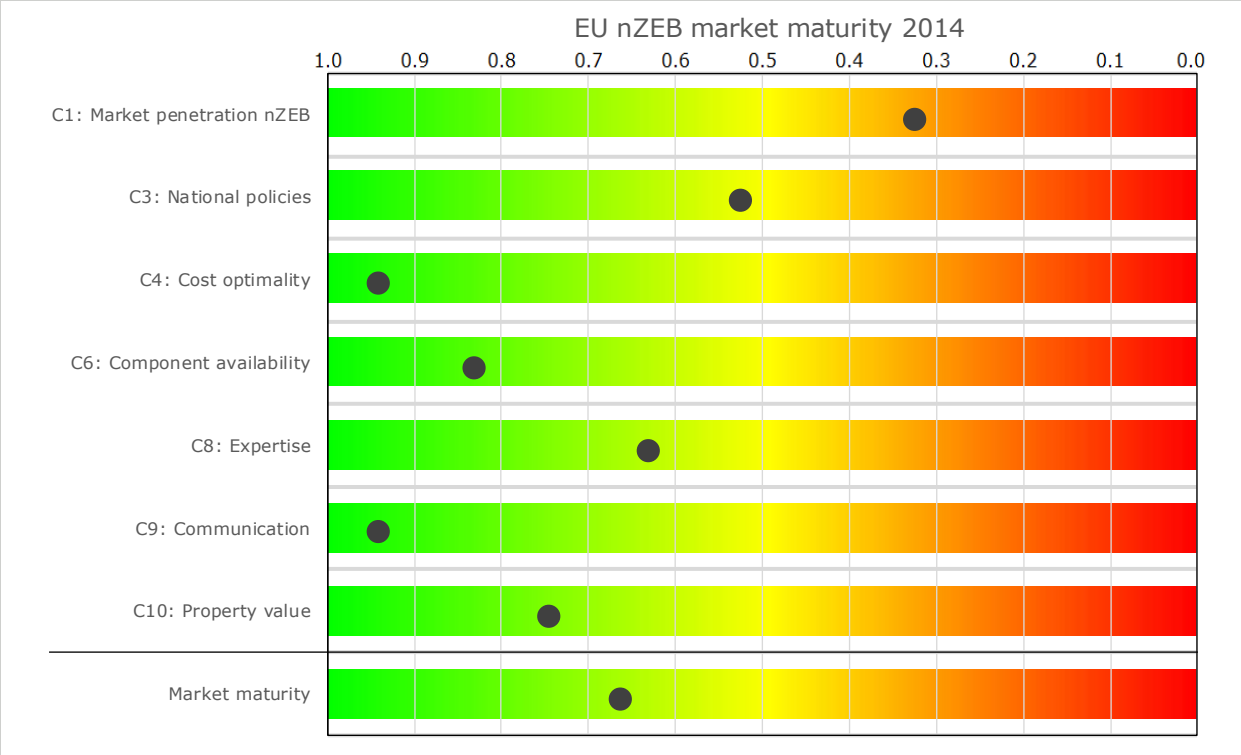
Market maturity: nZEB Tracker



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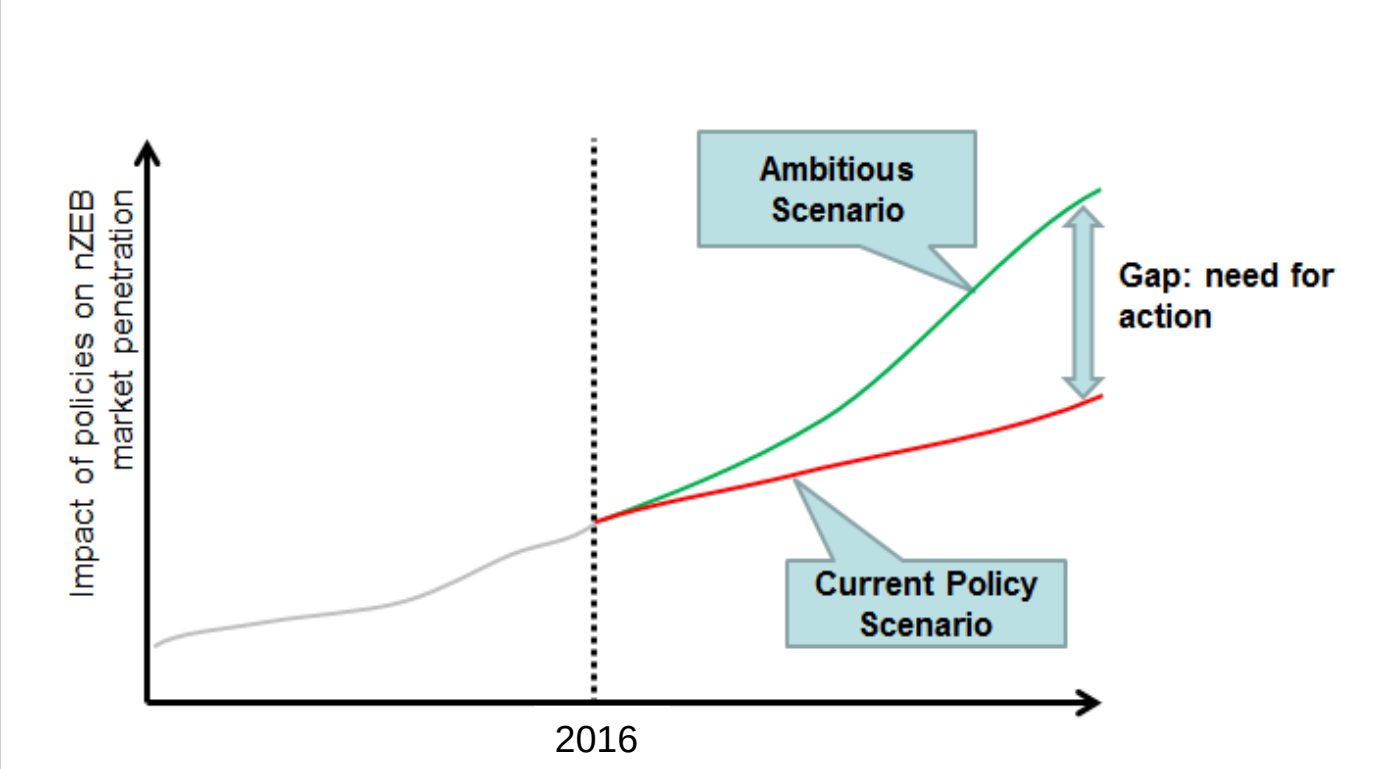
Scenarios to show the need and scope of policy action



... and much more info!

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Project consortium

TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

Energy Economics Group

CIMNE

beegroup

BPIE

Enerdata

EURAC research

ECOFYS
sustainable energy for everyone

NAPE NATIONAL ENERGY CONSERVATION AGENCY

SINTEF

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European Commission

Nearly Zero Energy Efficiency Buildings

Monitoring the market uptake of NZEBs across EU

8 September 2016
Brussels

Vasco Ferreira
Directorate-General for Energy
Energy Efficiency

Climate and Energy Framework

Climate-Energy Framework 2030

[COM(2014)15&COM(2014)520]
European Council 23 et 24/10/2014

- 40% GHG reductions
- 27% Renewable Energy
- 27→30% Improving energy efficiency

2030

2050

Climate-Energy Framework 2020

[COM(2010)639]

- 20% GHG reductions
- 20% Renewable Energy
- 20% Improving energy efficiency

2020

Path roads 2050

[COM(2011)112]

- 80-95% GHG reductions
- 88-91% Reductions for residient thertiares sector

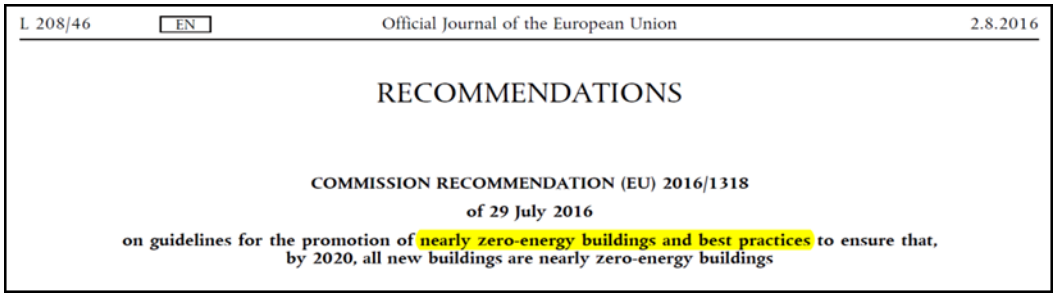
European Commission

NZEB: Commission obligation's

- **Long term plans NZEB** has been reviewed
- **Guidance** to Member States
- Stronger connection between **policies, measures**
- Support transposition and implementation: **Commission Recommendation on NZEB**

European Commission

Commission Recommendation (EU) 2016/1318



L 208/46 EN Official Journal of the European Union 2.8.2016

RECOMMENDATIONS

COMMISSION RECOMMENDATION (EU) 2016/1318

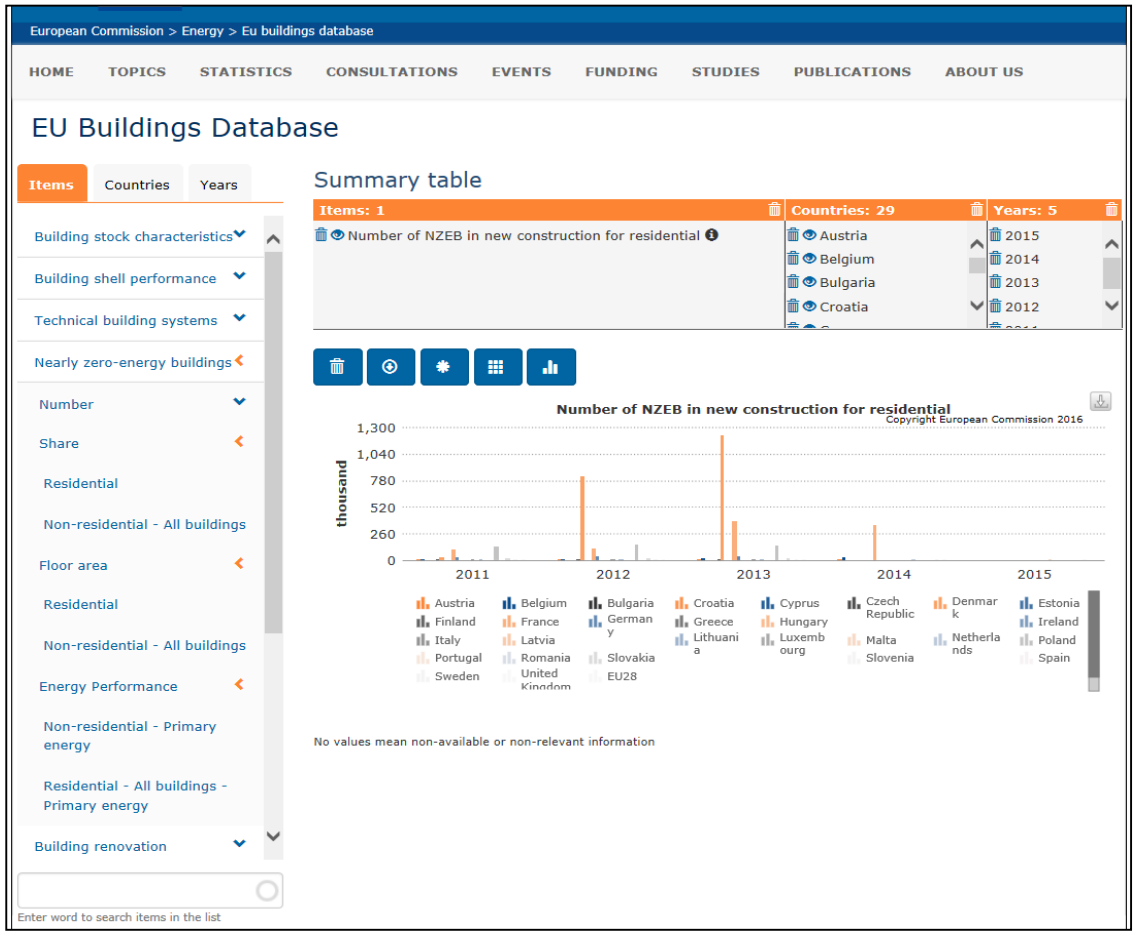
of 29 July 2016

on guidelines for the promotion of nearly zero-energy buildings and best practices to ensure that, by 2020, all new buildings are nearly zero-energy buildings

- MS's progress in **policies support**
- MS's should design packages to **stability to investors**
- **Data collection** from **MS's** to monitor the building stock refurbishment.

European Commission

EU Building Observatory



Measuring the maturity of the nZEB market: the nZEB Data Tools

Carine Sebi, ENERDATA

Septembre 2016 - Brussels

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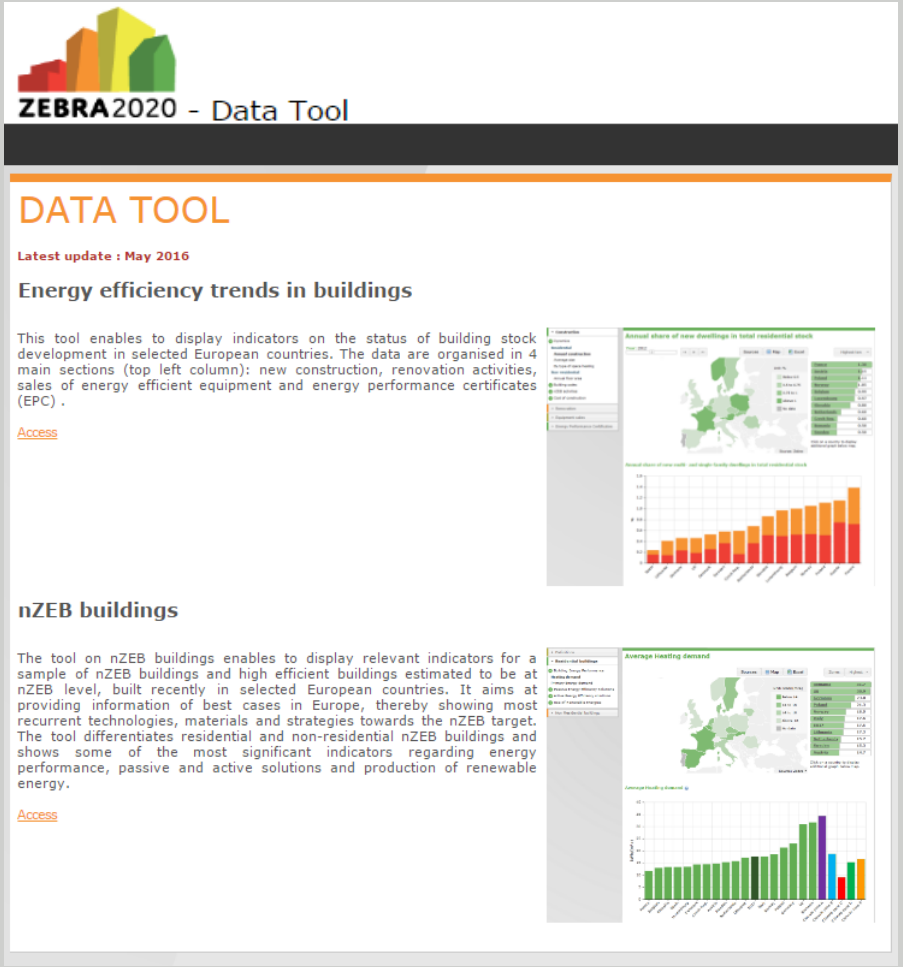
Presentation of the Zebra data tools

Two data tools presenting data and indicators related to:

- **Energy efficiency trends in buildings** (tool 1): overview of current building stock activity, including renovation and construction

- **nZEB buildings** (tool 2): relevant data and indicators of best cases (panel of 410 nZEB buildings).

http://zebra2020.eu/tools/



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Tool 1 - Indicators on the status of building stock development

This tool is composed of four main sections covering both residential and non-residential buildings:

1. Construction:
   - ✓ dynamics (by type, size, heating energy);
   - ✓ minimum standards set by Building Codes;
   - ✓ nZEB activity (nZEB radar);
   - ✓ average cost of construction.

2. Renovation: annual stock renovated (by level + equivalent major renovation); annual investment costs

3. Equipment sales: thermal insulation, glazing, heating solution, renewables, etc.

4. Energy Performance Certificates: new buildings, building stock registered, distribution of EPC by label

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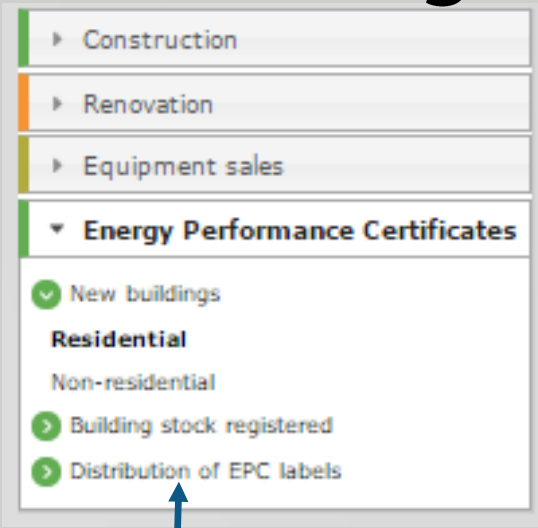
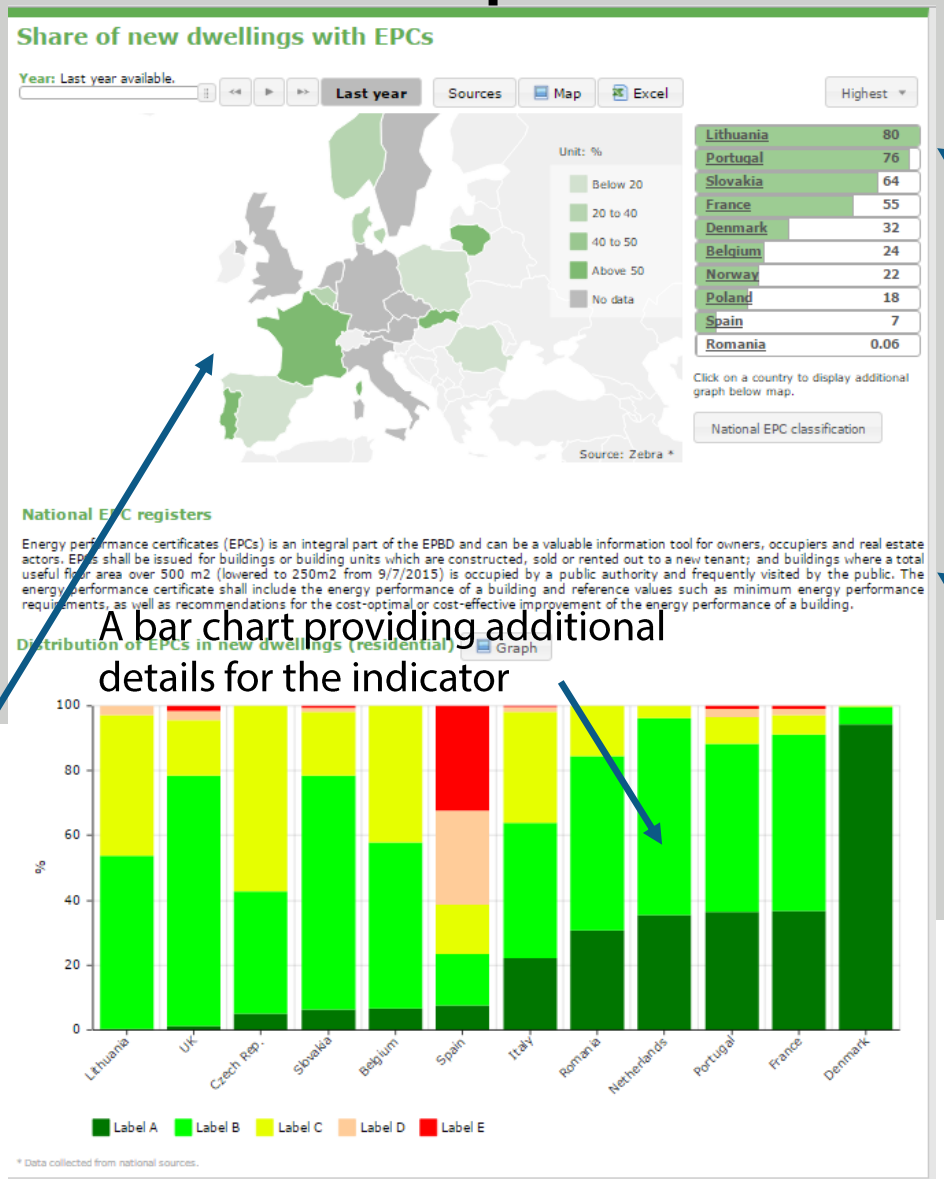
Tool 1 - Indicators on the status of building stock development



Selection of indicators



A table showing the country ranking

Policy link with selected indicator

A bar chart providing additional details for the indicator

A map with the values of the indicator by country + access to detailed data by country (trend, national policy)

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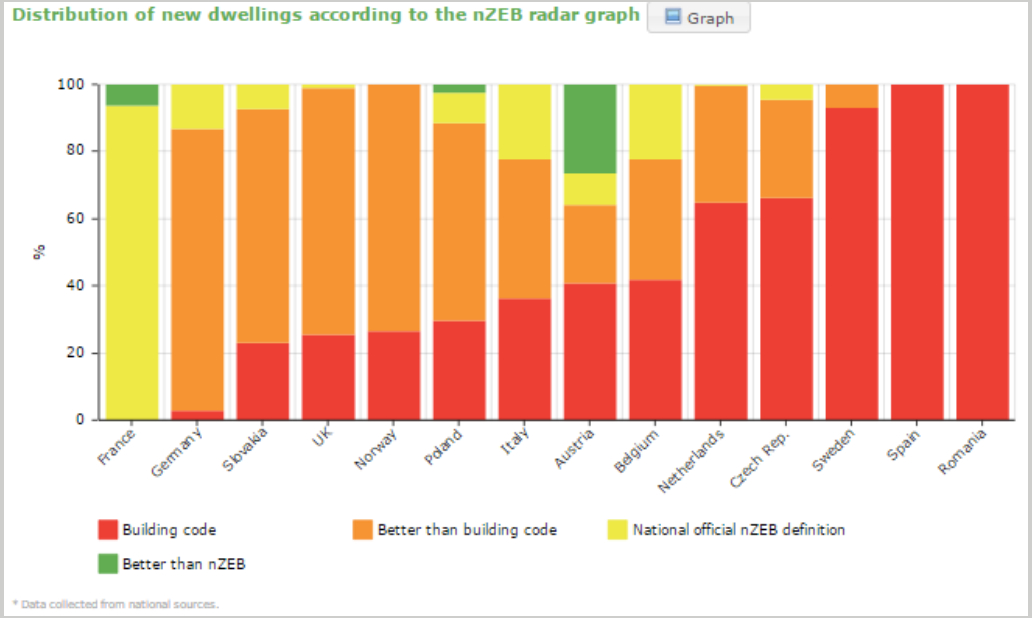
Tool 1 – Focus on nZEB radar

Member States define their nZEB standard in a very flexible way.

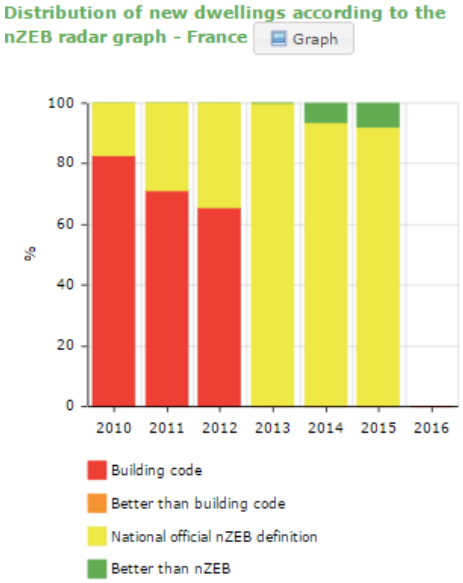
➔nZEB definitions differ significantly from country to country.

nZEB radar clusters buildings in 4 different categories at national level:
1. Net zero-energy buildings / Plus energy buildings;
2. nZEBs according to national definitions;
3. Buildings with an energy performance better than the national requirements in 2012;
4. Buildings constructed/renovated according to national minimum requirements in 2012.



Translating the definition of nZEB radar in WP2 in the case of France gives:

1-Better than nZEB (net ZEB or positive house)	plus energy buildings: any new building built starting from 2013 (the enforcement year of RT2012) with better energy performance than RT 2012. The buildings certified with BEPOS certification and Effinergie + are thus counted in this 1st category group.
2-National official nZEB definition	nZEB buildings according to national definitions: it corresponds to actual thermal regulation, i.e. RT2012 implemented since 2013. From 2008 to 2012, the buildings with BBC-Effinergie certification are counted
3-Better than current building code	Better than current building code = Buildings with an energy performance better than the national requirements in 2012; this is not meaningful in the case of France, as already all buildings are nZEB with the RT2012. Hence, this category is empty since there is no relevant data.
4-According to building code	According to building code = Buildings constructed according to national minimum requirements of RT2005 between 2005 and 2012



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Tool 2 – Indicators on nZEB buildings

This tool is composed of three main sections:

1. Definition: official nZEB definition at EU and national level and panel distribution of buildings given by climatic zones

2. Residential buildings: building energy performance; passive and active energy efficiency solutions; use of renewable energy

3. Non-residential buildings: same list of indicators as for residential

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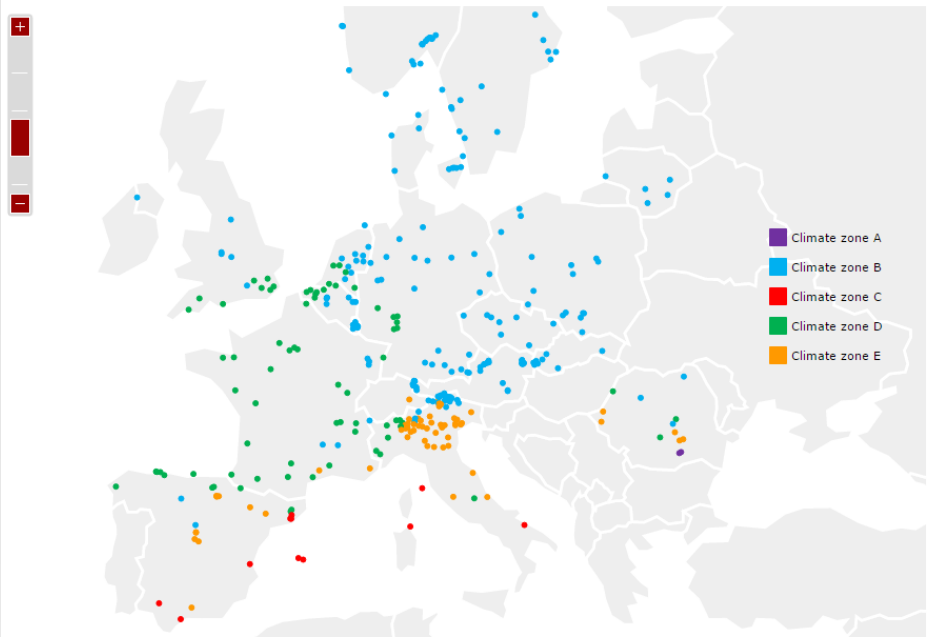
Tool 2 – Indicators on nZEB buildings: Panel distribution

Data Tool > nZEB buildings

- Definitions
  - nZEB definitions
  - **Panel distribution**
- Residential buildings
- Non residential buildings

Panel distribution



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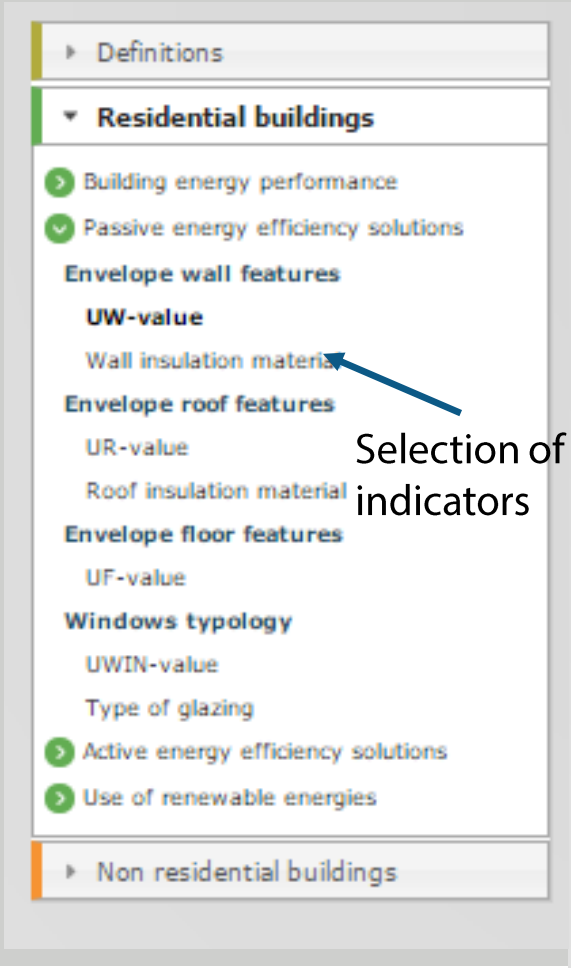
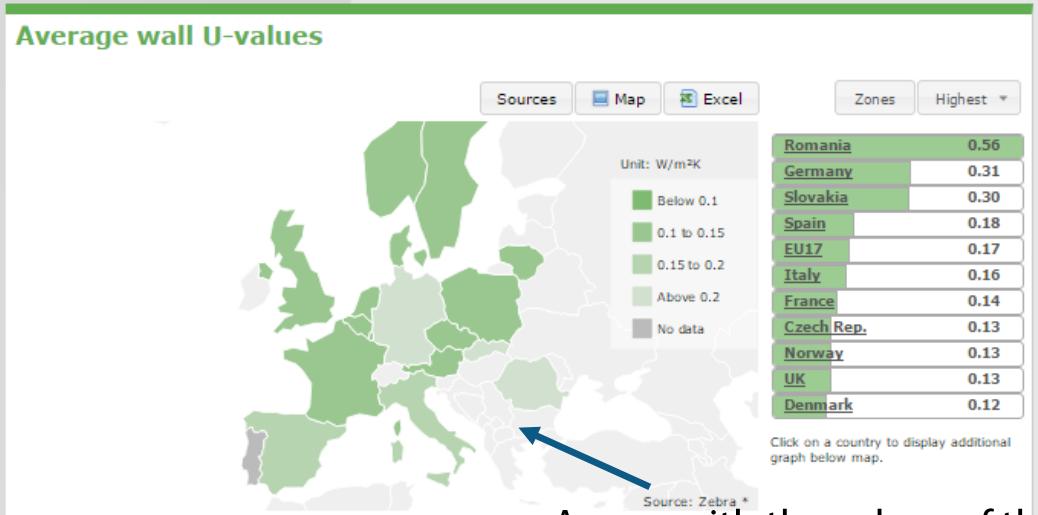
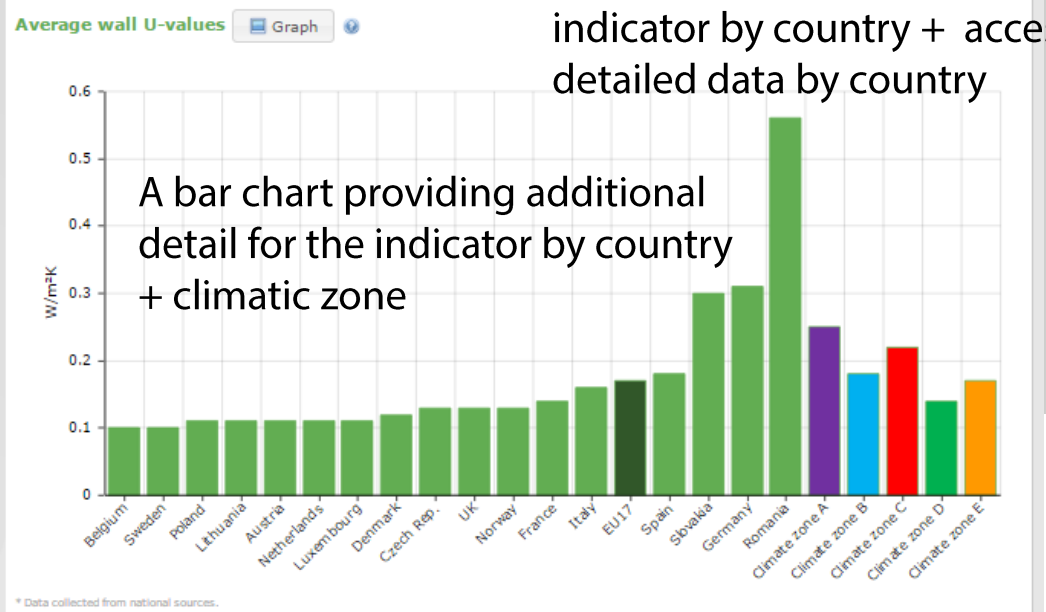
Tool 2 – Indicators on nZEB buildings



Selection of indicators



A map with the values of the indicator by country + access on detailed data by country



A bar chart providing additional detail for the indicator by country + climatic zone

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nZEB tracker: Tracking the evolution of nZEBs in Europe

ZEBRA2020 — nZEB tracker

http://zebra2020.ecofys.com/

Andreas HERMELINK (Ecofys)

September 2016

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Today's Agenda

- Background
- Outcomes
- Required actions

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The nZEB tracker: Why and what for?

- **Situation in the EU**
  - EPBD requirements: all new buildings nZEB in 2019/21
  - Several preconditions must be met in each Member State to make this market transformation happen
  - No clear idea about preconditions and their status, i.e. the maturity of the nZEB market in different EU Member States
  - Due to low data availability, it only could be assumed there are big differences between countries
  - Need for "warning system" to identify market maturity gaps: results help tailor policy-instruments adequately

- **Scope of nZEB tracker**
  - Assess the status of the market maturity for nearly Zero-Energy Buildings (nZEB) across the European Union via comparable tracking criteria
  - Provide dynamic visualization of results

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Your benefits

- Unique comparable approach for all observed countries
  - currently 18 countries; approx. 90% of European building stock
  - easy to add more (also non EU countries)
  - Results derived from hardly/non-publicly available data and newly developed methodology
- The only tool
  - To track/compare maturity of national/EU nZEB markets over time
  - To Identify market barriers/bottle necks (e.g. building components/skills) for each country and whole EU

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The tracker functionality

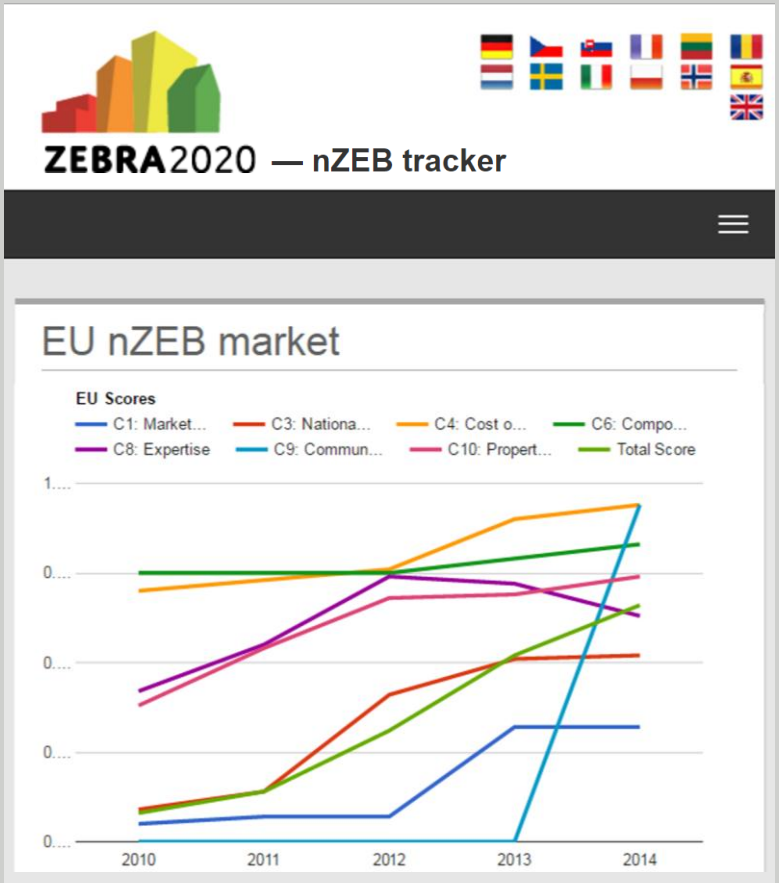
- online Wiki tool based on open-source Semantic MediaWiki Platform

- 7 tracking criteria so far

  (3 more criteria can be added as soon as data will be available/ comparable)

- Aggregations on country and EU level according to methodology outlined in report: "Aggregation of nZEB monitoring criteria"
  available at

  http://zebra2020.eu/project-publications/



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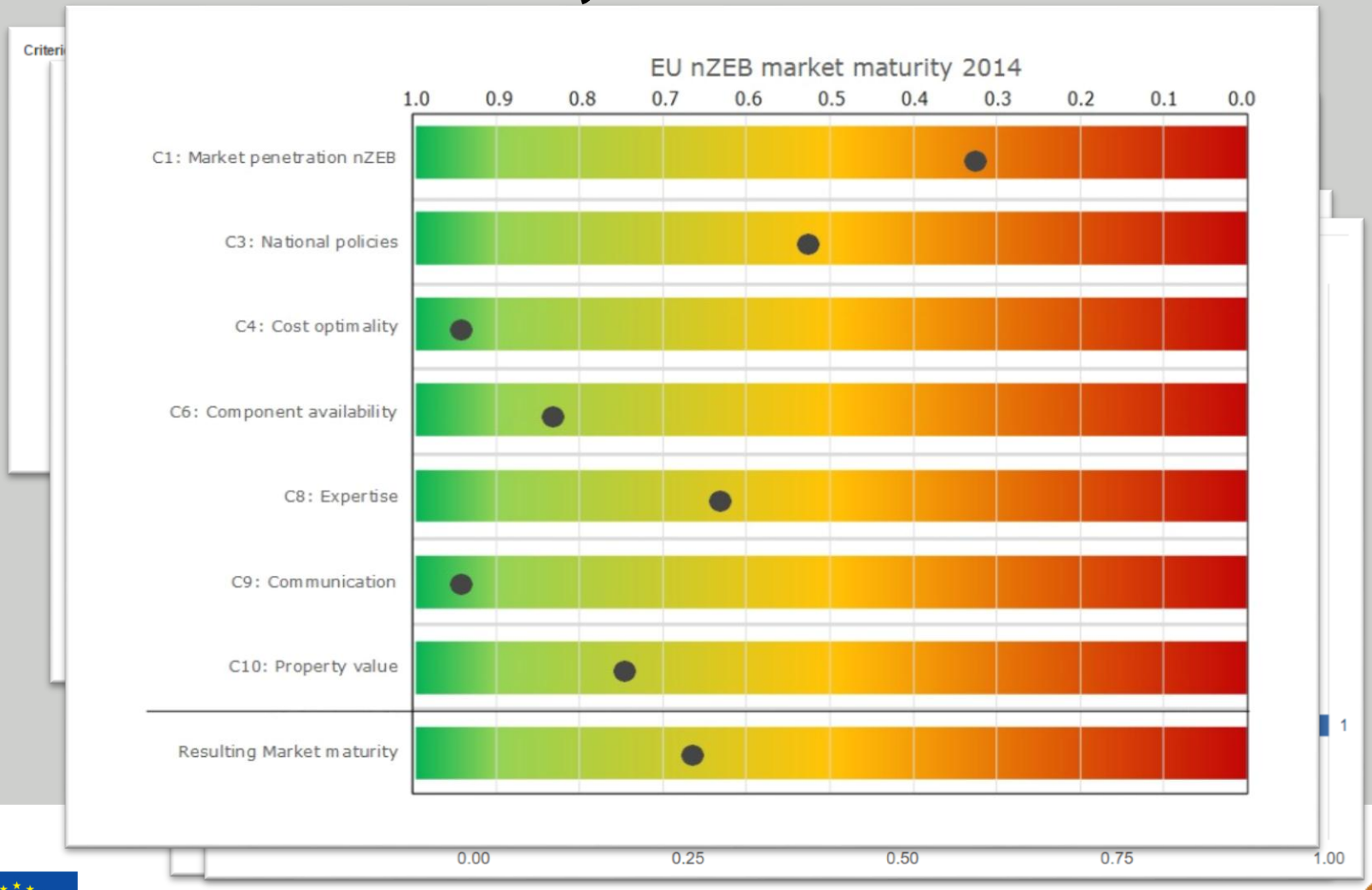
EU market maturity 2014



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Our key findings (2014)

- nZEB had a share of 1/3 on the reported new constructed ZEBRA floor area; yet France accounts for approx. 28% of new built ZEBRA floor area.
- Policies have become more effective and concrete regarding nZEB requirements. Still not every country implemented nZEB standard.
- Building codes in place match (3) or /exceed (6) cost optimal energy performance levels in 9 out of 16 ZEBRA countries.
- nZEB components are well available in most participating countries.
- Only in 2 out of 16 countries, experts think that professionals can cover future demand for nZEB construction/renovation.
- Energy performance of buildings still has minor impact on customers' decision to buy/rent a real estate.

➢ **All findings relative to national conditions**

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nZEB: We are not there yet – Common required actions

- Implement nZEB definition asap > planning security for investors/professionals
- Significantly improve availability/education of professionals for nZEB design /construction
- Increase people‘s awareness for benefits of highly energy efficient buildings.

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Visit the nZEB tracker at Zebra2020.ecofys.com

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www.zebra2020.eu

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The impact of Energy Performance Certificates on property values and the European housing market

Andrzej Rajkiewicz, NAPE

September 2016

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Executive summary

There were two investigations performed:

- assessment of regression study on EPC price surpluses
- survey market analysis among real estate agents

A price surplus due to energy efficiency exists in all but one of the countries analysed

There are many proposals coming from real estate agents on increasing the impact of EPCs on property values and on overcoming obstacles in the wider use of EPCs across Europe.

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Study on EPC surplus – main issues

- As part of a master thesis at TU Wien (De Graaf, 2016), the aim of this assessment study is to obtain an estimation of price surpluses in each country caused by energy efficiency levels (through EPCs) given in sales and rental markets.
- **The energy rating level given in EPCs is used as an indicator for the energy efficiency of a property.**
- The **quality and size of samples vary** from few hundreds to few thousands between the analysed countries.

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Study on EPC surplus – data collection

- Data on the characteristics of dwellings in the selected countries (including EPC ratings) was collected from different real estate agency websites. **Data was collected for both sales and rental advertisements in each country.** In addition to EPC ratings and advertised prices, the useable area was collected for each dwelling and in most cases the construction year.

- The following EU Member States were chosen for analysis in this assessment: Austria, Czech Republic, Denmark, France, Germany, Luxembourg, The Netherlands, Norway, Slovakia, Spain, Sweden and the United Kingdom. Details on Belgium and Italy can be found in the study of De Graaf (2016).

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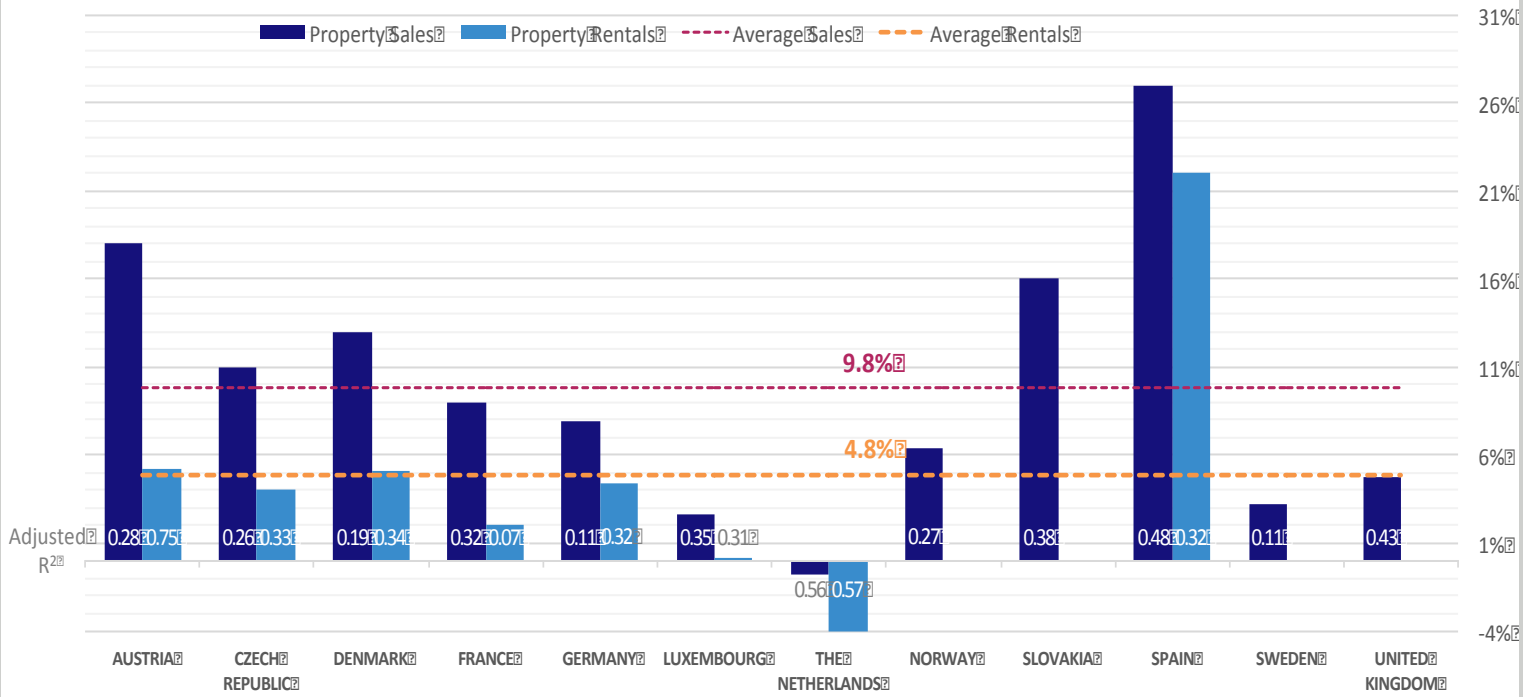
Study on EPC surplus – results

The results for each of the analysed markets are with surpluses given as **percentage values** of the average dwelling price in each of the samples. **Cross-country comparisons must be made with caution due to different EPC systems, real estate market and type of property.**



Results of the linear regression model; results of the dummy variable model providing details for each adjacent letter shift can be found in ZEBRA D3.1 and De Graaf, 2016.

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Real estate agents survey –main issues

The main issues covered by the survey concerned the following:

- Information about energy performance certification
- Factors considered whilst the selection, purchase and lease of real estate
- Evaluation of Energy Performance Certificates (EPC) in terms of the duty of its application, reliability and usefulness during the professional activity of real estate agents.
- The role of the EPCs on the real estate market whilst estimating the real estate value and its connection with the exposure time of the real estate on the market.
- Obstacles in implementing the energy performance certification and improvement of the energy performance of buildings
- Possible actions influencing the improvement of the energy performance of buildings
- Evaluation of the knowledge on the EPBD 2002/91/EC Directive

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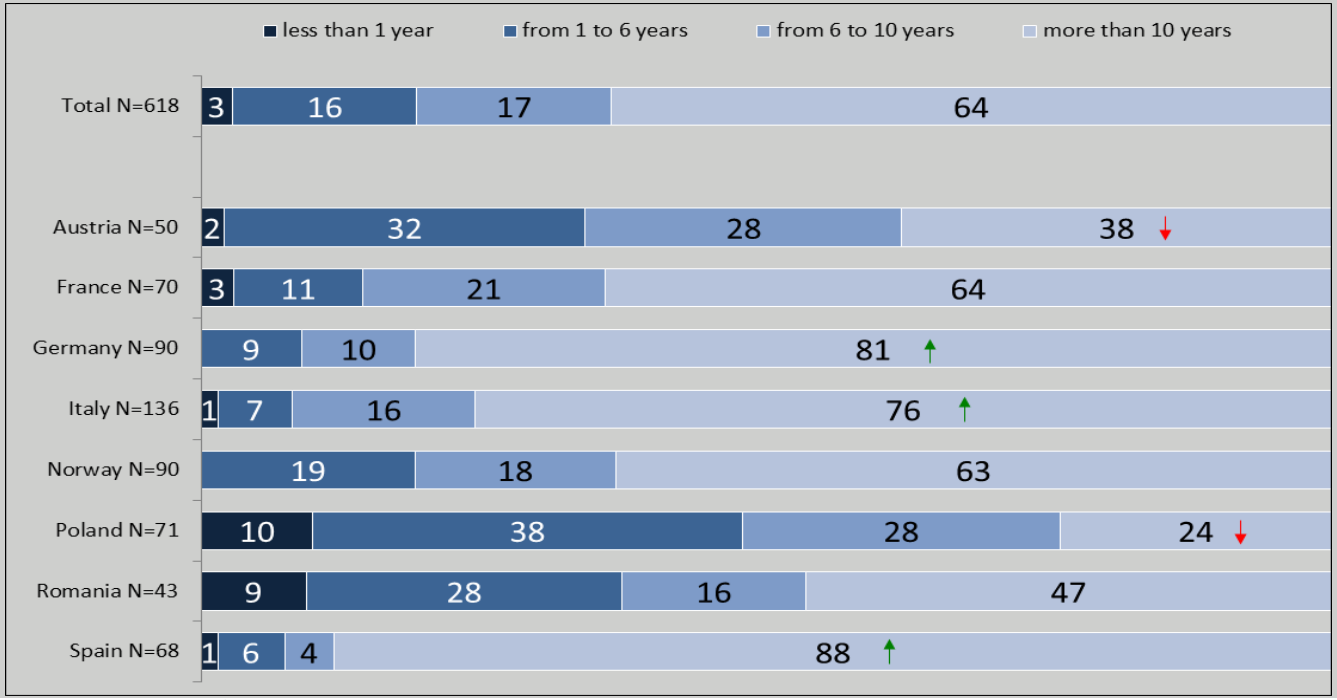
Real estate agents survey – respondents' profile

The survey included 618 interviews in total: Austria N= 50; France N= 70; Germany N= 90; Italy N= 136 Norway N= 90; Poland N= 71; Romania N= 43; Spain N= 68; 64% respondents indicated they have 10 years of professional experience. No correlation between the experience and any answer on the questions asked.



% answers

Significantly higher/ lower score - total vs the country

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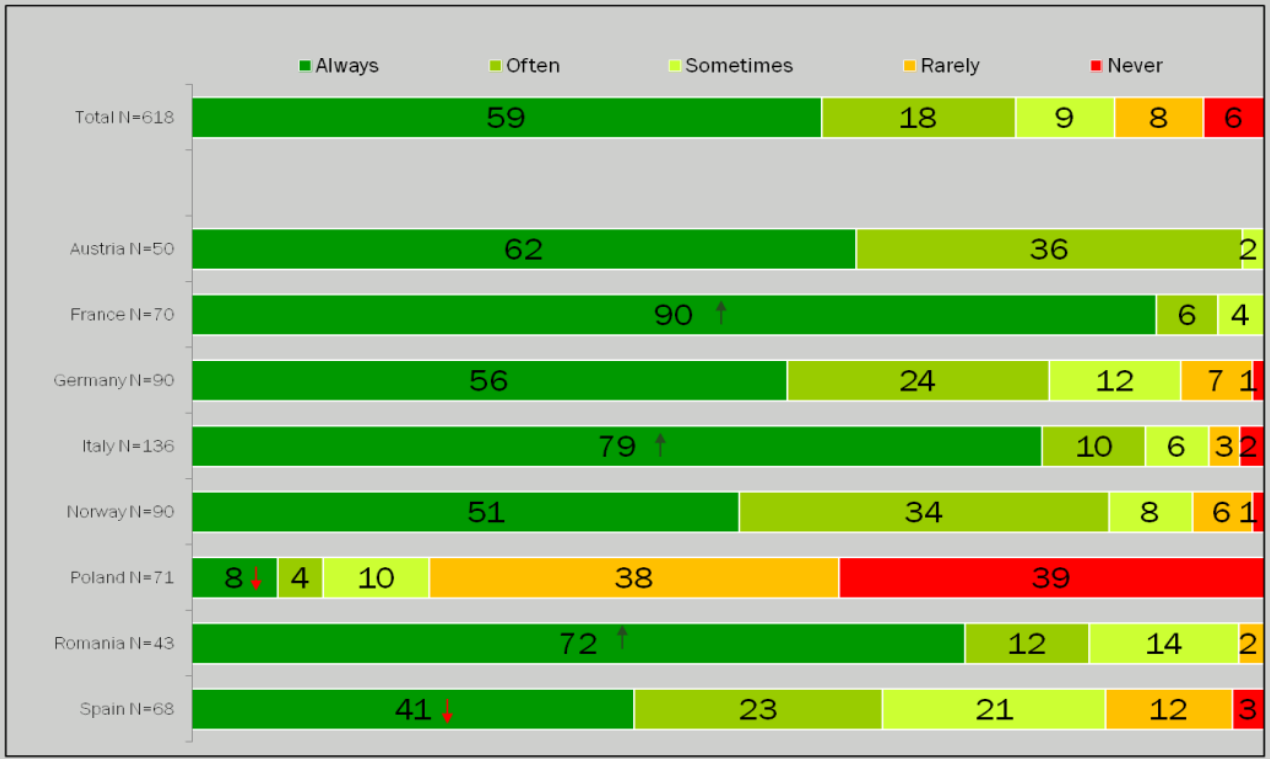
Real estate agents survey – mandatory EPCs

The requirement of presenting certificates by contract parties is not fully accepted and the level of this acceptance varies across countries.



% answers

Significantly higher/ lower score - total vs the country

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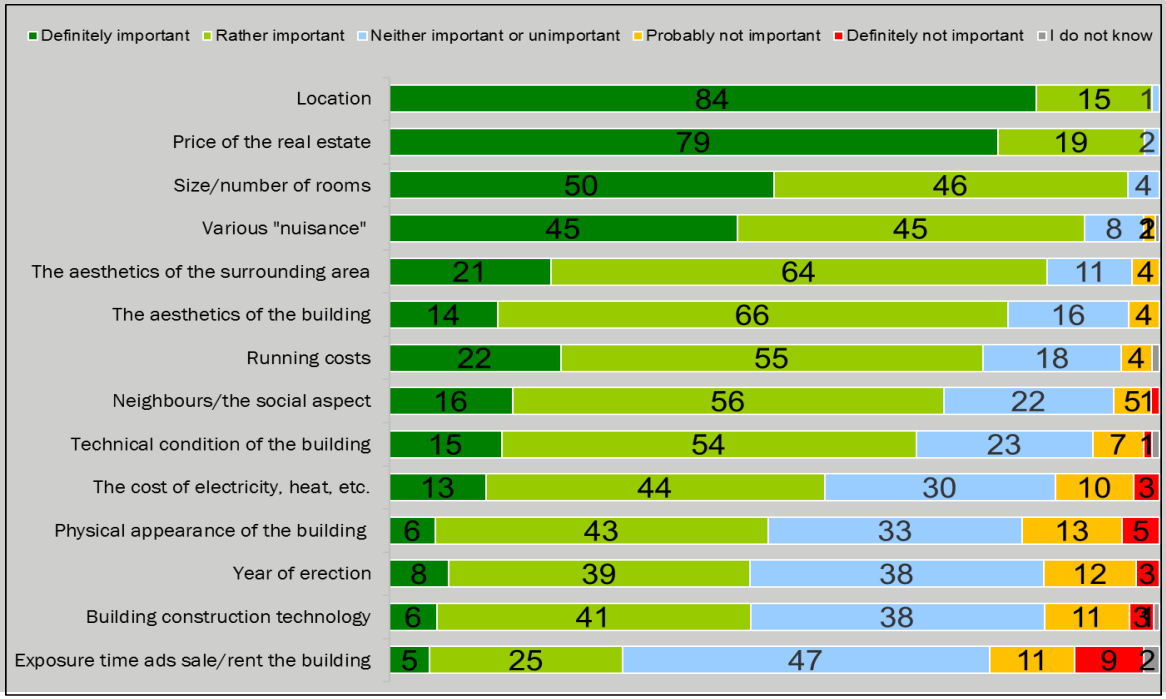
Real estate agents survey – influencing factors when choosing a property

Main elements taken into account in the selection, purchase / lease of real estate are in order: location (99%), price (98%) and the size of the real estate (96%). **The cost of energy is on the 10th place among all factors** (57%) ranked as 'rather important' and 'definitely important'.



N=618 *% answers*

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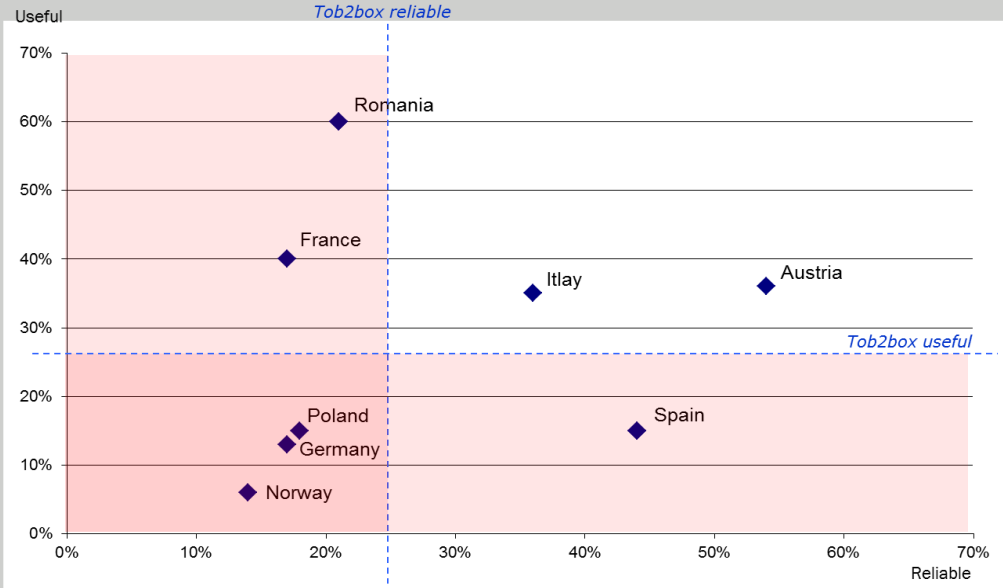
Real estate agents survey – reliability of data and usefulness of EPCs

- Is relatively unreliable and not useful – Norway, Poland, Germany
- Is relatively unreliable, but useful - Romania and France
- Is reliable but relatively not useful – Spain
- Is reliable and useful – Italy and Austria



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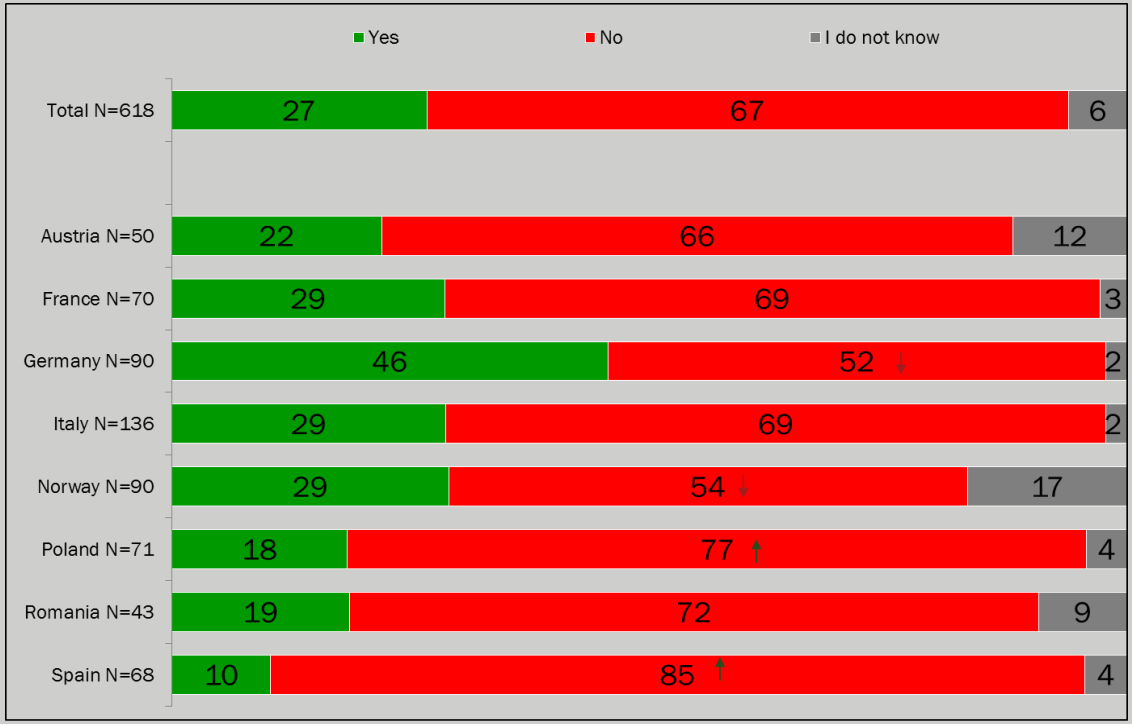
Real estate agents survey – rent/price surplus

The association between the high evaluation of the real estate energy performance and the higher price of a given real estate exists, but it's not very common.



% answers

↑↓ Significantly higher/ lower score - total vs the country

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Real estate agents survey – obstacles of EPC use

Obstacles:

- **Additional costs for the owners** (52% responses);
- **Lack of / insufficient knowledge of the clients** (client awareness) (50% of responses);
- **Practice of issuing unreliable EPCs** (41% responses);
- **Additional paperwork** (unnecessary bureaucracy or procedures) (41% of responses);
- **Unclear and incomprehensive form of the certificate for the client** (38% of responses).

Only 5% respondents do not see any obstacles in implementing EPCs.

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Recommendations

Regarding the regression analysis made of price surpluses due to EPCs:

- the main EPC policy objective is **to increase the extent to which energy efficiency is incorporated into decision-making in the housing market**.
- The success of this aim can be measured through **periodic regression analyses** that, like this report, measure the level of capitalisation of energy efficiency in the market.
- A key limitation with current EPC schemes is the **lack of financial estimations for recommended home improvements.**

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Recommendations

Regarding the real estate agents' survey, the conclusions concerning improvement of main EPC policy objective are as follows:

- **To enforce mandatory presentation of EPCs during the sale/rent procedures,** especially the notaries are requested to act according to regulations and not convince their clients to not request an EPCs.
- **To introduce better country relevant standards for data reliability** covered by EPCs, so that they can be used more frequently by real estate agents in the advertisements.
- **To put more focus on the presentation of most relevant data** for property owners regarding sustainability, which may have an impact on choosing the property.
- **To conduct more market research and analysis of registered EPCs** providing evidence for the impact of the energy performance of buildings on their market value, which could be used by the real estate agents in relations with their clients.

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Recommendations

- **Obstacles in EPC use may be less important, if the cost of improvements and the cost of issuing of EPCs will be reduced by the state policy**, accompanied by awareness raising campaigns and a more fair division of profits from energy savings among stakeholders (landlords, tenants).

- **Expected are economic incentives for those, who are undertaking the energy savings measures,** associated with well-designed information campaigns. Their introduction in a transparent way, not necessarily through regulations and in the form of long-term programmes helps better understanding energy efficiency and climate change goals and the role of EPCs in this context. **The benefits should be shared with final customers.**

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Monitoring the market uptake of nZEBs across Europe

15.35 ***Session 2: Strategies to accelerate the market uptake of nearly Zero-Energy Buildings***

Moderation: Janna Schönfeld (EASME)

Spotlight on:

- *Financing nZEB projects, Berna Bohrer-Topaloğlu (European Investment Bank)*
- *nZEB market development scenarios and the impact of building policies, Agne Toleikyte / Lukas Kranzl (TU Wien)*
- *Recommendations to accelerate the nZEB market transition, Maarten De Groote (BPIE)*

16.20 Discussion

16.35 Panel discussion: Raphael Bointner (TU Wien/e-think), Berna Bohrer-Topaloğlu (European Investment Bank), Ramon Pascual (EURAC), Andreas Hermelink (Ecofys)

17.00 Closing drink

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EIB role
in financing NZEBs

Berna Topaloğlu
Energy Efficiency & Small scale Energy projects Division
Projects Directorate

Bruxelles, 8 Septembre 2016

Outline

- The EIB - Who we are
- The Energy Efficiency lending
- Financing NZEBs

THE EIB - WHO WE ARE

The EIB - the EU bank

- Natural financing partner for the EU institutions since 1958
- Around 90% of lending in the EU
- Shareholders: 28 EU Member States
- Largest multilateral lender and borrower in the world
- Some 450 projects/year in over 160 countries
- Headquartered in Luxembourg
- 33 local offices
- Around 2,600 staff

Investing in Europe's growth

We focus on our key priorities, We are the world's largest provider of climate finance

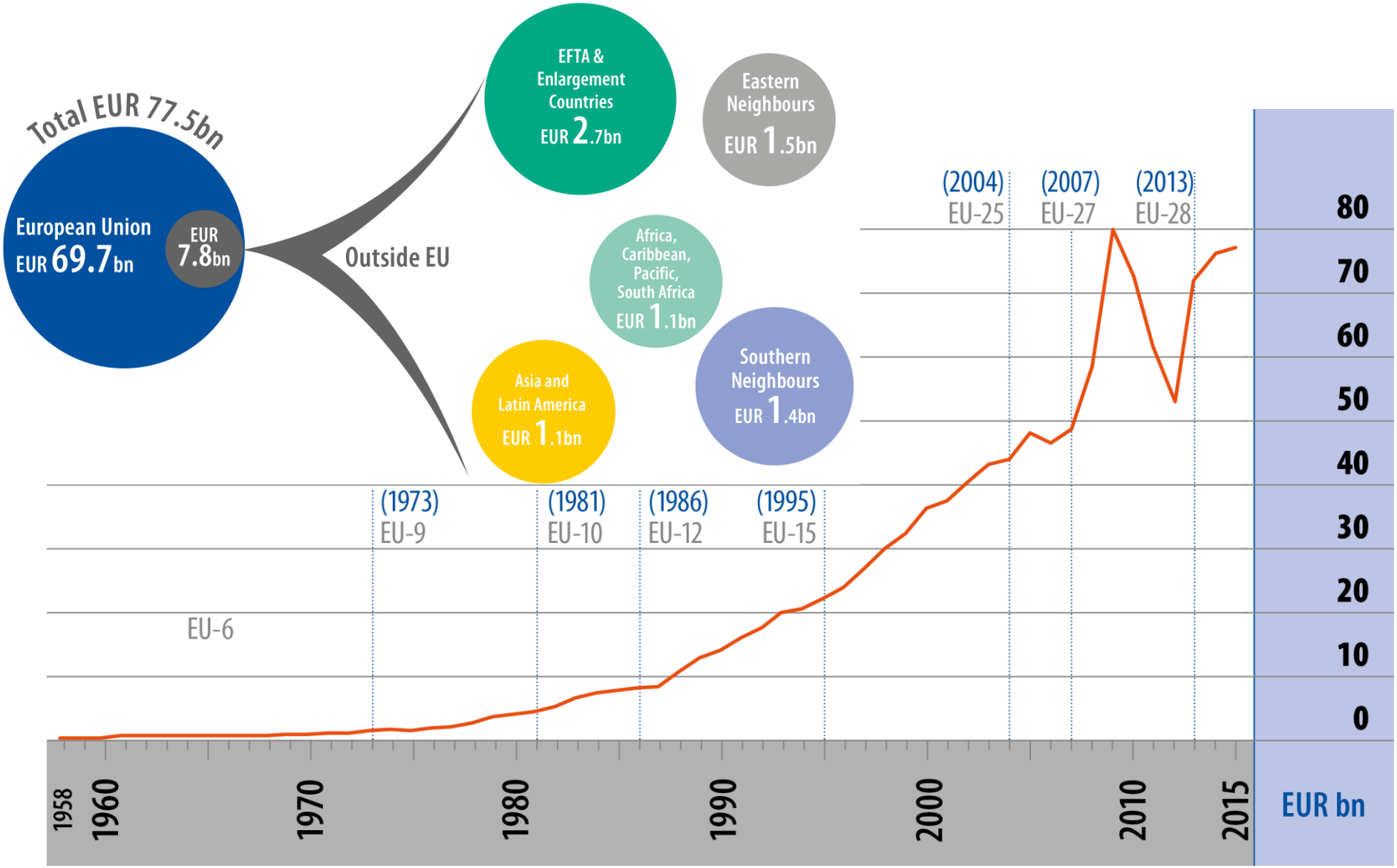
ENVIRONMENT	INFRASTRUCTURE	INNOVATION	SMEs
EUR 19.6bn	EUR 19.1bn	EUR 18.7bn	EUR 28.4bn

>25% worldwide

35% in the world's developing regions

EIB's 2015 Climate Strategy
We are increasing our climate commitment:
USD 100bn over the next 5 years

EIB lending since its foundation

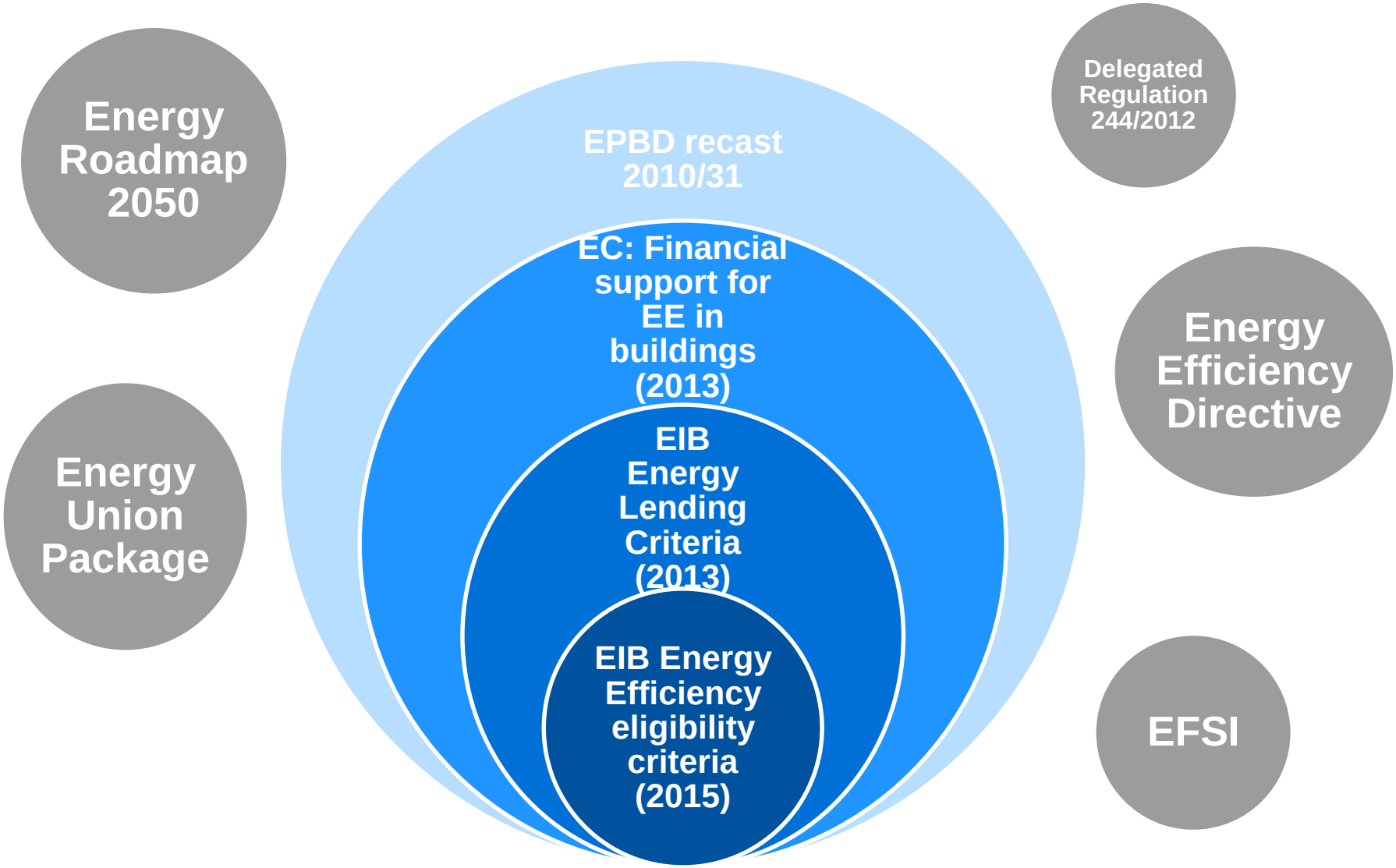


We help catalyse investment

LENDING	BLENDING	ADVISING
Loans Guarantees (trade financing) Equity participation	Combining EIB finance with EU budget (Project Bond Initiative) Higher risk projects for innovation (InnovFin)	Prepare, evaluate and support the implementation of projects (JASPERS) Support for public/private partnerships (EPEC)
Attracting FUNDING for long-term growth		

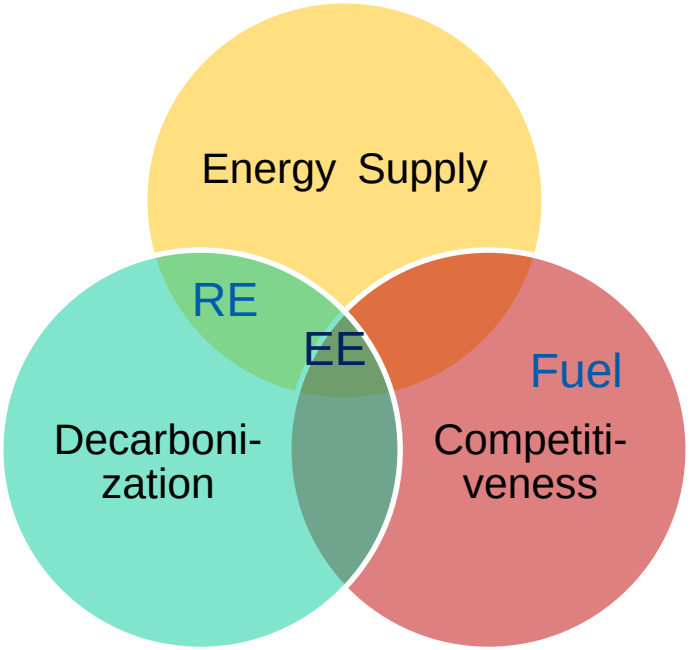
THE ENERGY EFFICIENCY LENDING

EU legal framework & EIB eligibility



Energy Efficiency, why?

- EU imports 53% of energy needs at an annual cost of around €400 billion (first energy importer in the world)
- In the short term, **Energy Efficiency** is the only available solution to the energy trilemma.



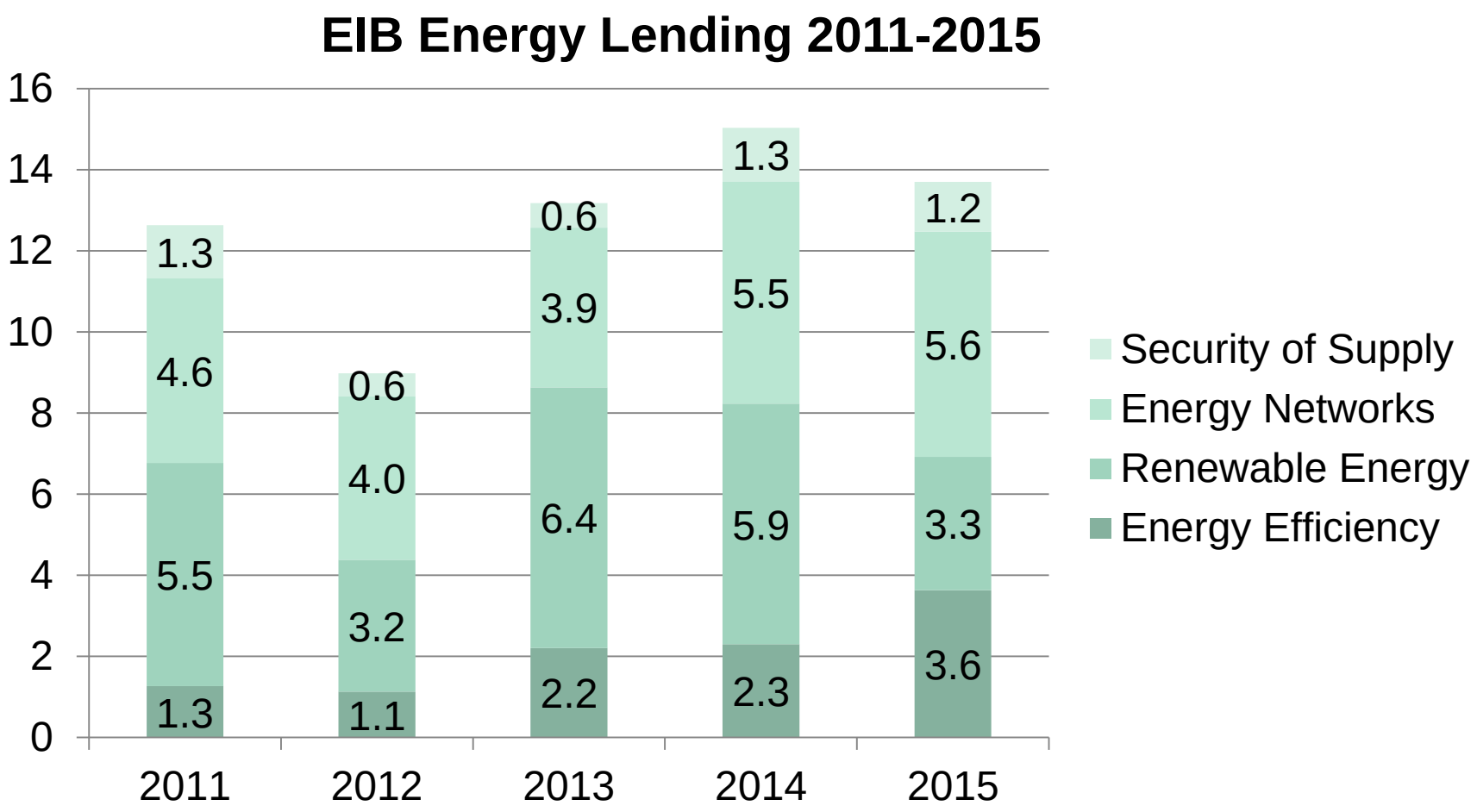
1% of energy saved = 2.6% reduction in gas imports

Energy Efficiency: what are the investment needs?

- Buildings represent the largest investment opportunity within the new 2030 framework
- Buildings account for ~40% of EU final energy consumption (transport 33% and industry 26%). Given low annual new build rate (1.5%), pressure is on building renovation

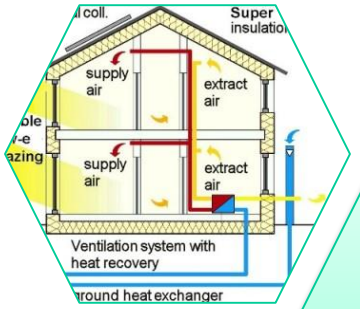
Category	2011-2020	2021-2030 Previous Policy Scenario	2021-2030 40% GHG Target	Difference between GHG40 and Reference scenario
Buildings	656	345	**833**	489
Out of which Residential	454	261	**531**	270
Out of which Tertiary	202	83	**302**	219
Industry	166	222	**313**	91

EIB lending to Energy 2011-2015 (EUR bn)

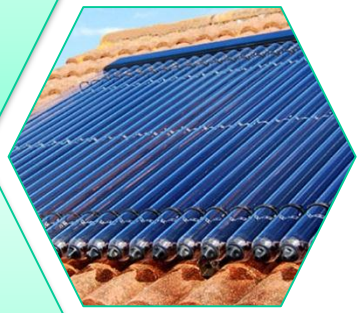


FINANCING NZEBS

NZEB according to EPBD



Very high energy performance



Very significant use of RES

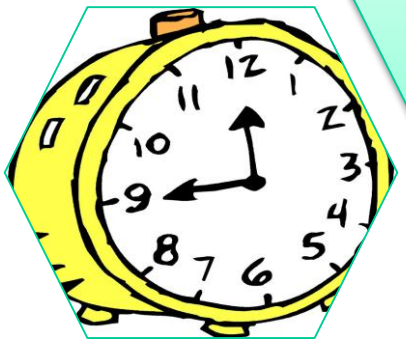
RES onsite or nearby

But the exact definition up to Member States

EIB EE Eligibility Criteria

Three conditions for the Bank's financing:

2019/2021 timeframe



Comply with NZEB criteria

Cost per sqm below benchmark

NZEB Country Outlook: recognize priority MS for financing.

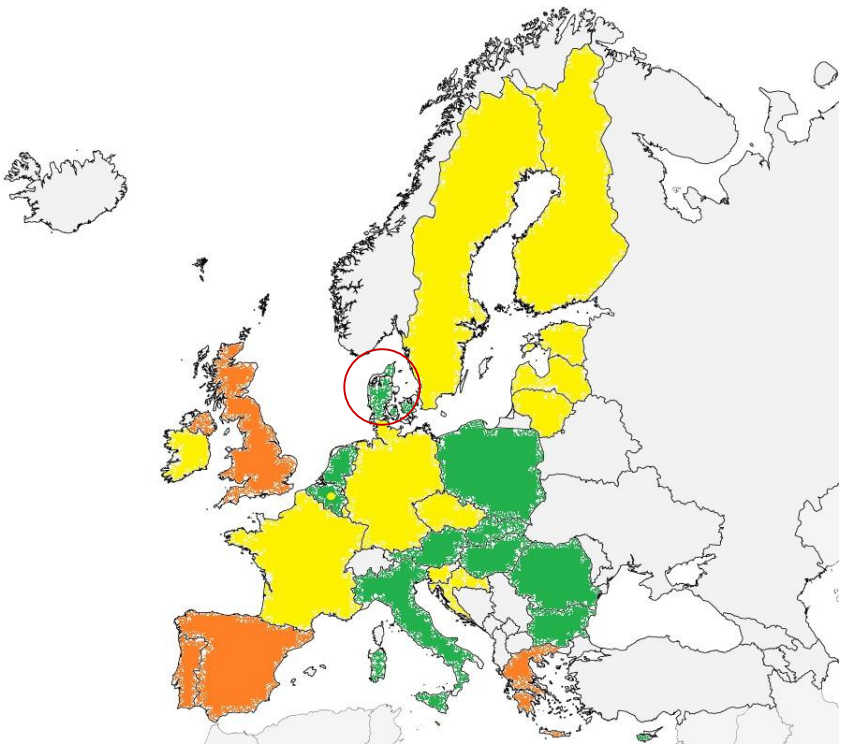
Priority countries for EIB financing

Classification of member states according to the EIB position

1. **Favourable:** Austria, Flanders, Wallonia, Bulgaria, Cyprus, Denmark, Hungary, Italy, Netherlands, Poland, Romania, Slovakia.
2. **Favourable with conditions:** Czech Republic, Brussels, Croatia, Estonia, Finland, France, Germany, Ireland, Latvia, Lithuania, Luxembourg, Malta, Slovenia, Sweden.
3. **Conditional:** Greece, Portugal, Spain, United Kingdom.

Case study: Denmark

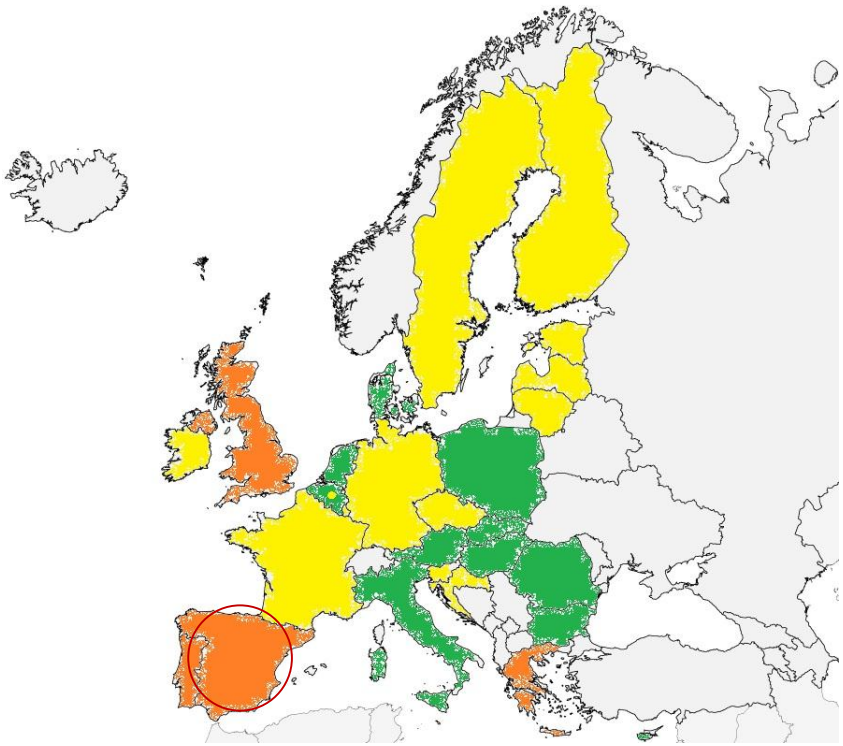
Good example of implementing NZEB regulations: ambitious, clear and in line with EPBD



- Regularly amended energy performance requirements.
- Transparent and simple calculation method of energy performance both in current and NZEB regulations.
- All requirements included in one Building Regulation (BR15).
- Ambitious level of NZEB primary energy requirements (20-25 kWh/sqm/year).
- No specific share of RES.

Case study: Spain

Clear current regulations but lack of implementation of NZEB regulations



- Good current regulations.
- Energy performance requirements vary among the regions, depending on the climate zone.
- RES minimum share requirements in place.
- Requirement for all new buildings to be NZEBs in 2019/2021 but no numerical definition of an NZEB.
- Lack of NZEB definition makes it difficult to assess the costs.

General operational considerations

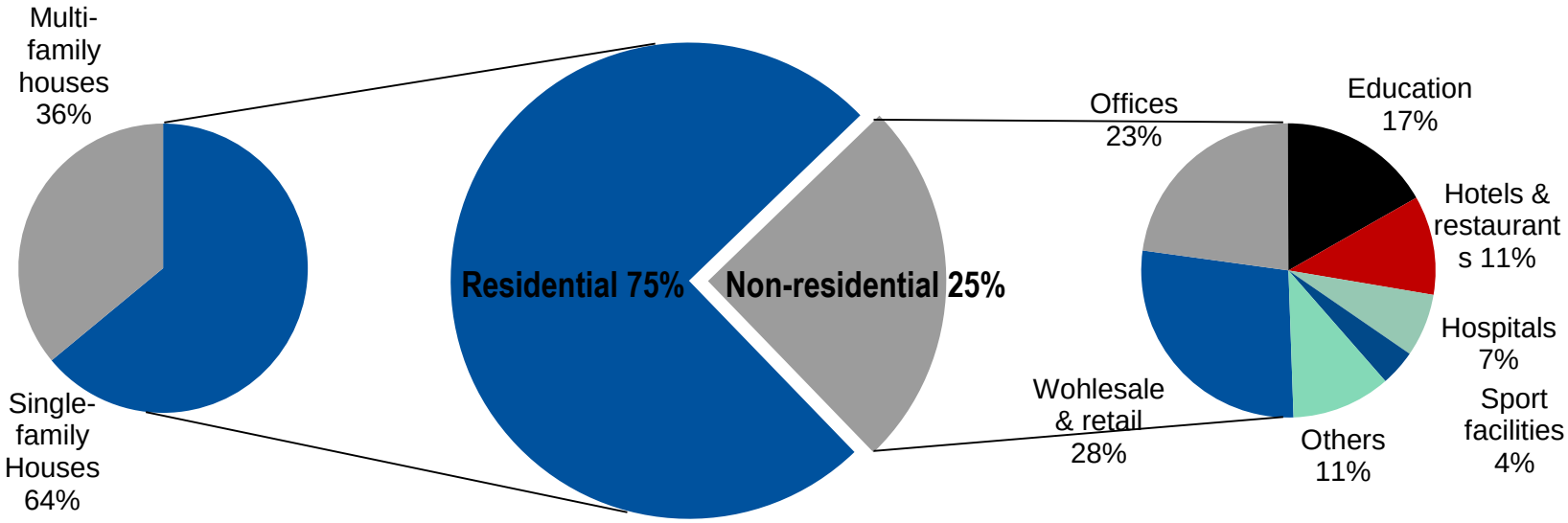
- **Projects financed by the Bank must be**:
  - economically justified
  - technically viable
  - financially self-supporting and
  - environmentally and socially sound
- All projects financed by the Bank are appraised by a multi-disciplinary team; confidentiality is always respected.

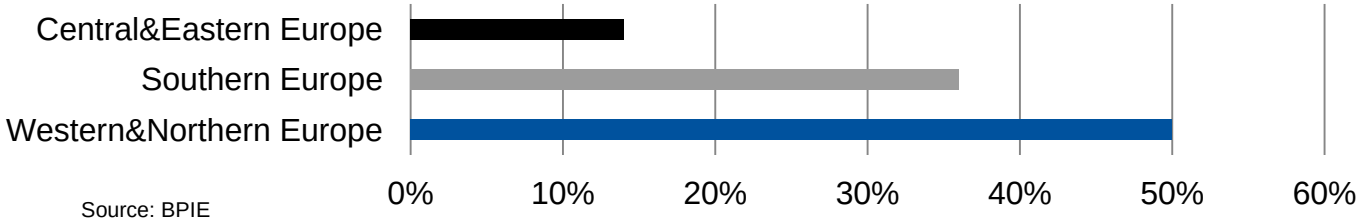
EU Building stock

66% energy use *vs* 185 kWh/m2

33% energy use *vs* 286 kWh/m2

23 bn m²





Source: BPIE

Nearly Zero Energy Building offices in Sweden

- Development of two new large office buildings in the Stockholm region supporting the Swedish strategy for the development of NZEB
- Expected energy consumption level: 42 and 46 kWh/sqm/yr
- BREEAM Excellent and Very Good certifications
- Total investment: EUR 200m
- EIB co-financing: EUR 100m

Nearly Zero Energy Building in Finland

- TRIPLA: shopping mall
- Expected energy consumption level in line with future national definition of NZEBs (101kWh/m2/yr)

- SATO, VVO: residential
- Expected energy consumption level in line with future national definition of NZEBs (82kWh/m2/yr)

Nearly Zero Energy Building in France

- 25.000 rental housing units under a National programme
- Expected energy consumption level in line with current buildings regulations: 50kWh/m²/yr
- Total loan: EUR 1bn

Conclusion

- Energy efficiency is a priority for the EIB
  - EE as a climate action objective
  - EE within an integrated approach led by urban strategy

- NZEBs financing:
  - Support to the Energy Union, the Bank's Climate Action objectives, to IPE and EFSI
  - Clear financing conditions and priority countries
  - Temporary window until 2019 for public sector and 2021 for private sector
  - Substantial untapped market of residential and commercial real estate with growing potential of rental properties
  - Possible further tightening of requirements for new buildings in the future, thus more possibilities for the Bank after 2021?

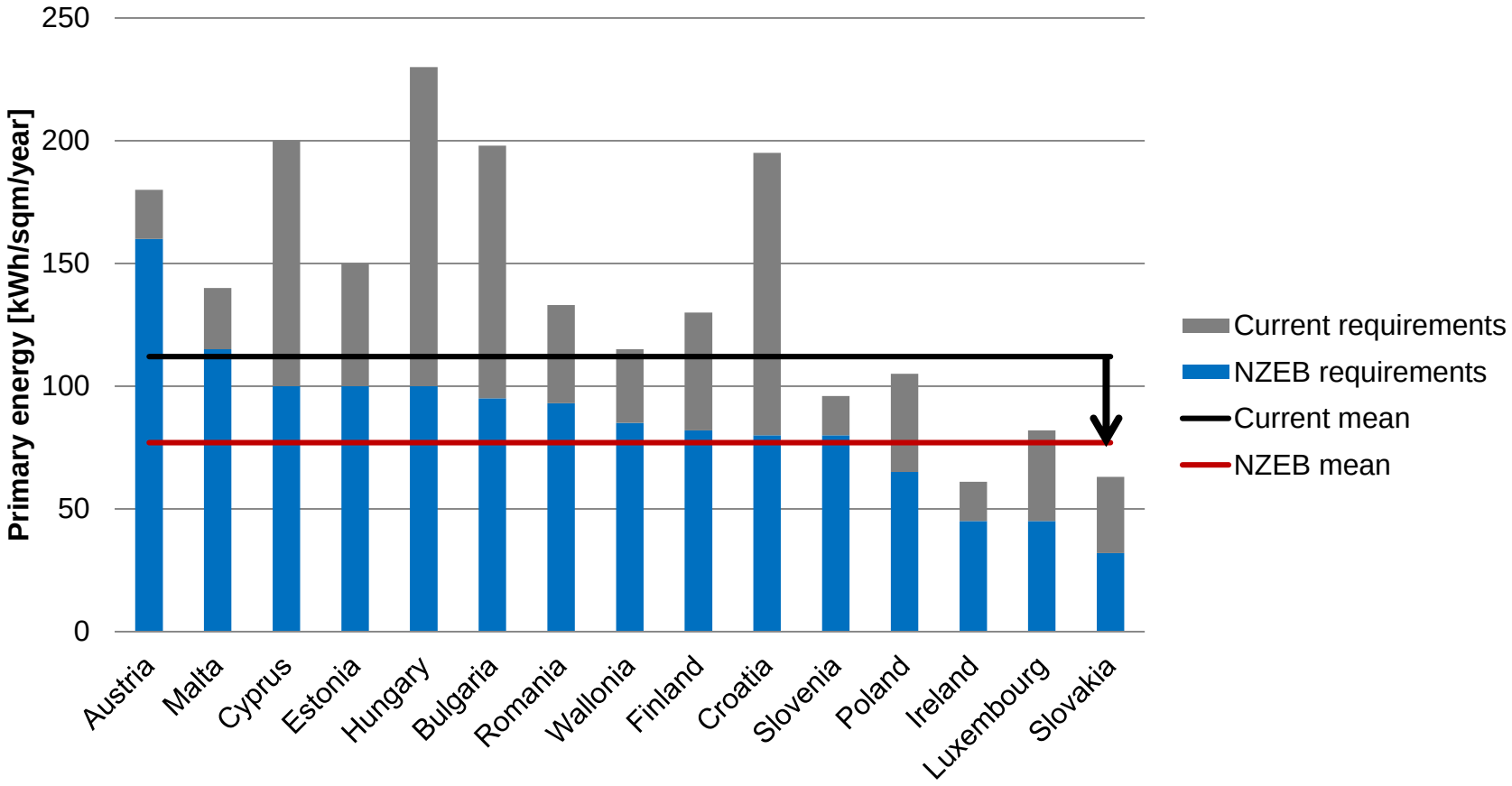
THANK YOU !

Any questions?

More information at: www.eib.org
info@eib.org

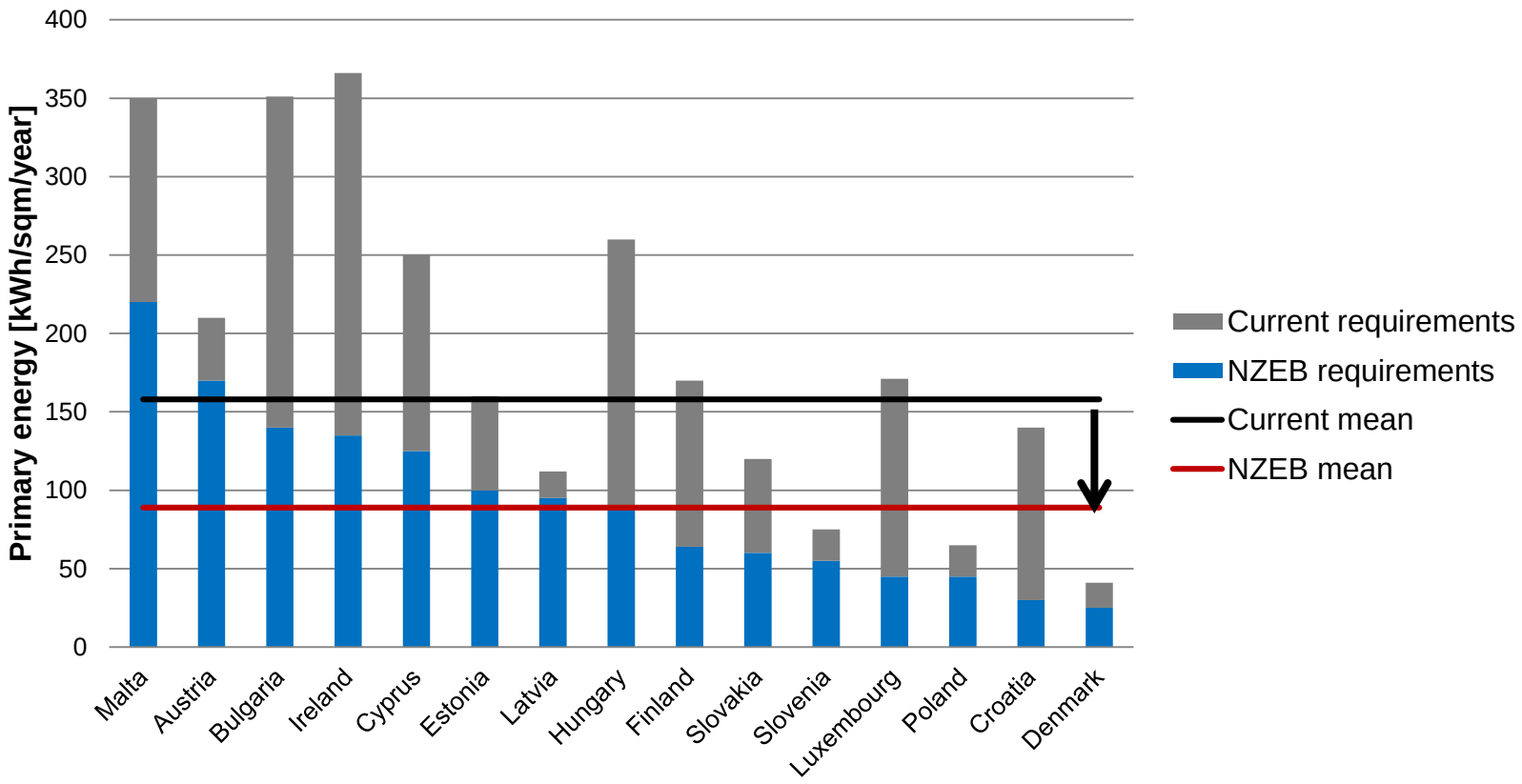
NZEB requirements: residential

On average 31% more strict NZEB primary energy requirements compared to current regulations

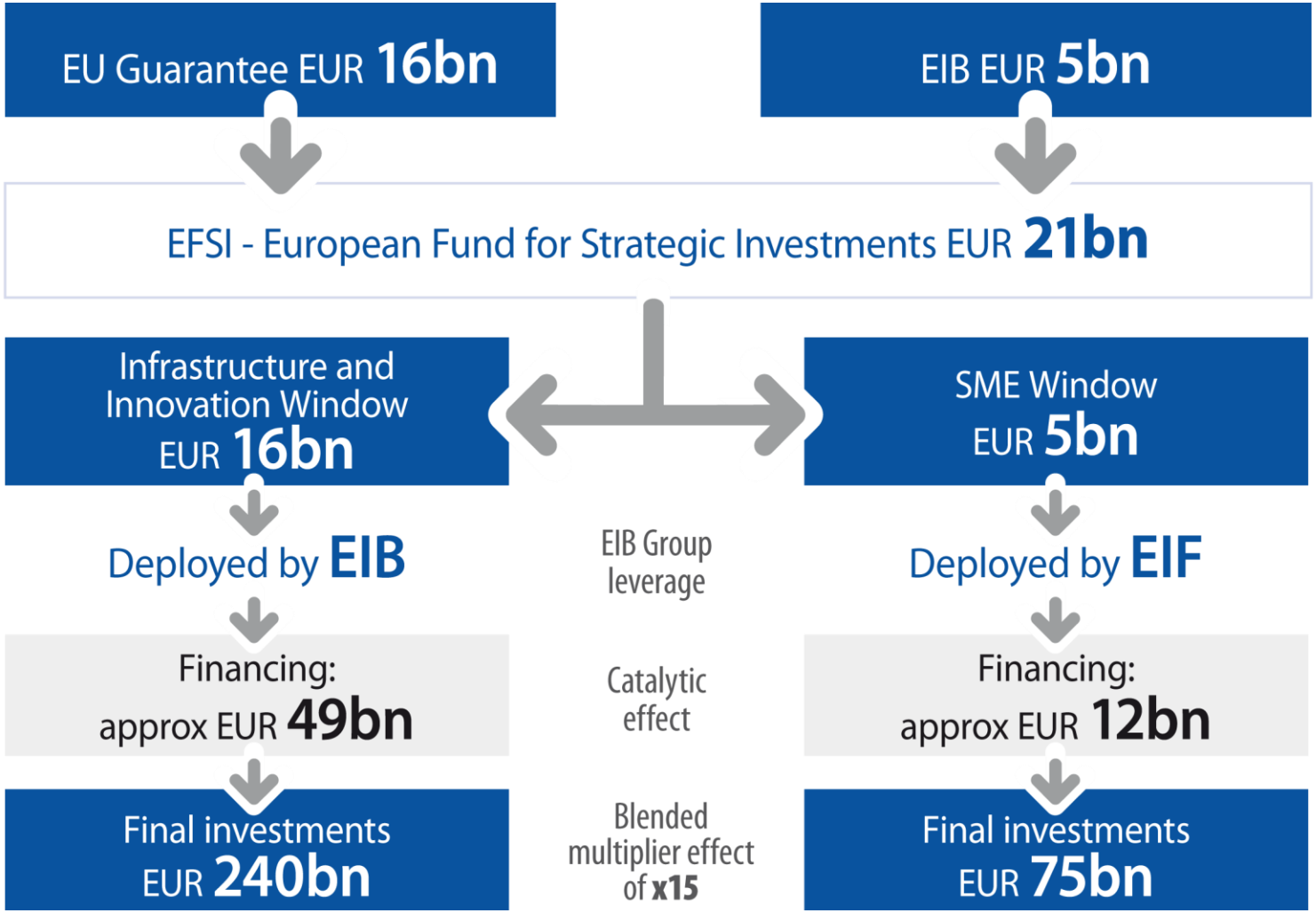


NZEB requirements: office

On average 44% more strict NZEB primary energy requirements compared to current regulations



European Fund for Strategic Investments (EFSI)



nZEB market development scenarios and the impact of building policies

Lukas KRANZL, Agne TOLEIKYTE (TU-Wien)

September 2016

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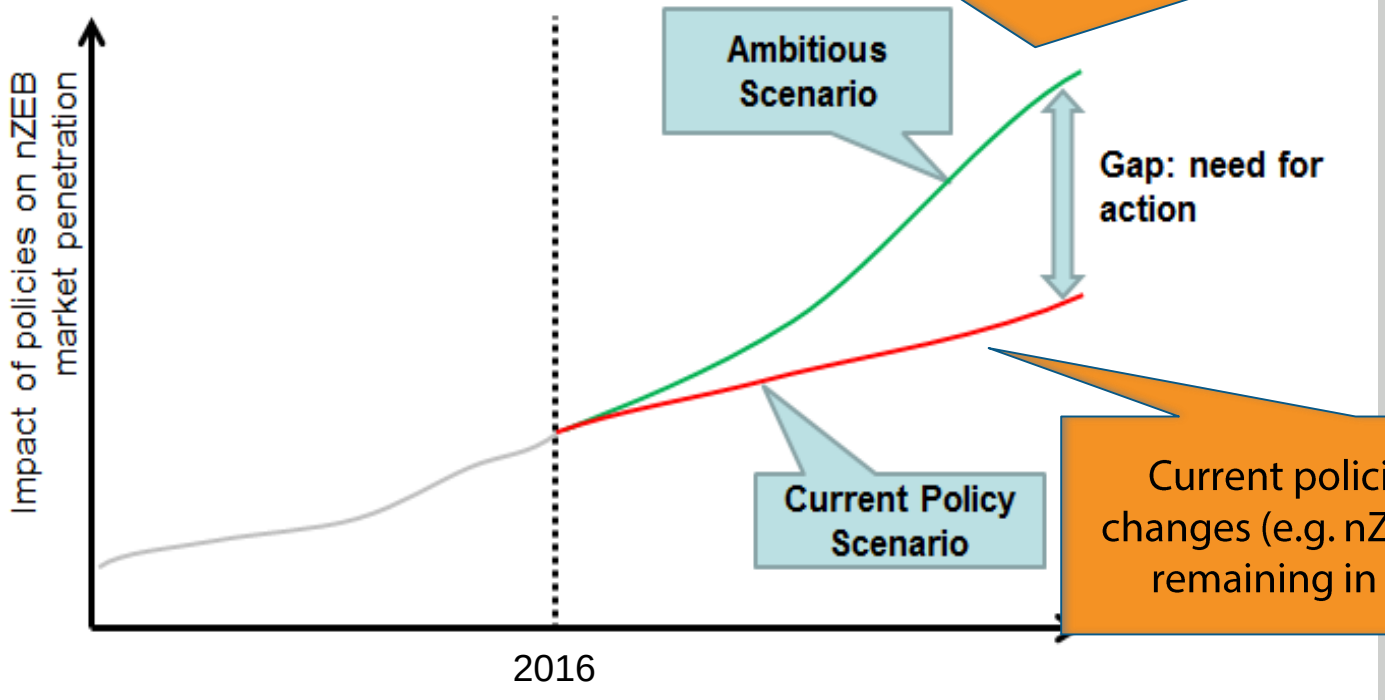
Scenario definition

- Stronger building codes
- Financial and fiscal support policies/programmes
- Obligation for RES-H
- Compliance with regulatory policies
- Modelled policy packages coordinated with stakeholders

  => not a maximum policy intensity scenario!

  => not a scenario in line with climate targets



Current policies and expected changes (e.g. nZEB standards 2020) remaining in place until 2050.

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Scenarios and their role in ZEBRA2020

Scenarios cover uptake of different standards of building construction and renovation as well as RES-H systems and impact on energy demand for space heating, cooling and domestic hot water and related CO2.

- Scenarios for **consortium countries** up to 2050 after detailed discussion and feedback from policy makers

- Scenarios for other **EU Member States**
- Scenarios for **EU-28**
- Presentation of scenarios on the online scenario data tool at www.zebra2020.eu (End of September).

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Modelling impact of policy instruments

Invert/EE-Lab models the decision-making of building owners.
Policy instruments may affect these decisions in the following ways:

- Economic incentives (e.g. subsidy) change the economic effectiveness of different options and thus lead to other investment decisions.
- Regulatory instruments (e.g. building codes or renewable heat obligations) restrict the technological options that decision-makers have.
- Information, advice, etc.: agents have different levels of information. Lack of information may lead to neglecting innovative technologies in the decision-making process or to a lack of awareness regarding subsidies or other support policies.
- R&D can push technological progress. The progress in terms of efficiency increase or cost reduction of technologies.

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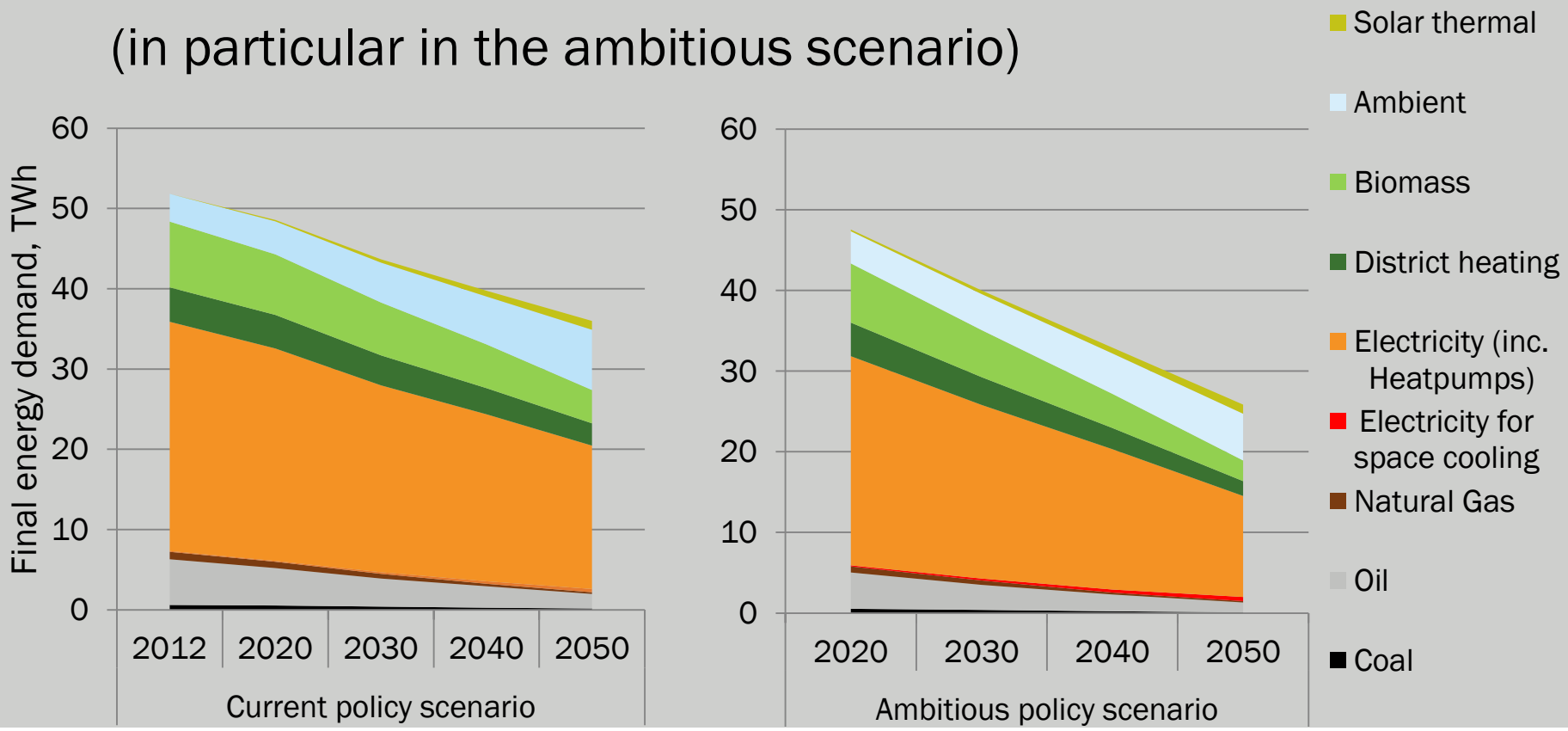
Norway: ambitious RES-H policies

- Effective phase out of fossil heating systems
- Ambitious renovation scenario
  (in particular in the ambitious scenario)



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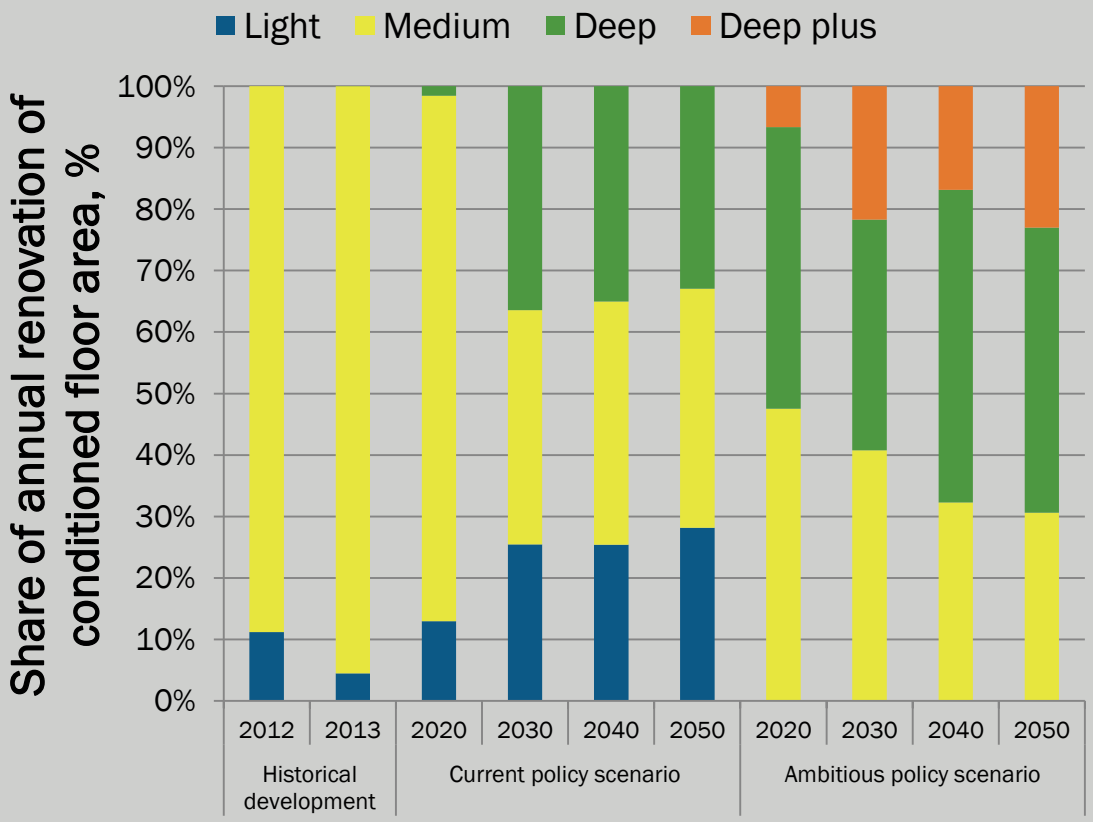
Norway: impact of ambitious renovation activities



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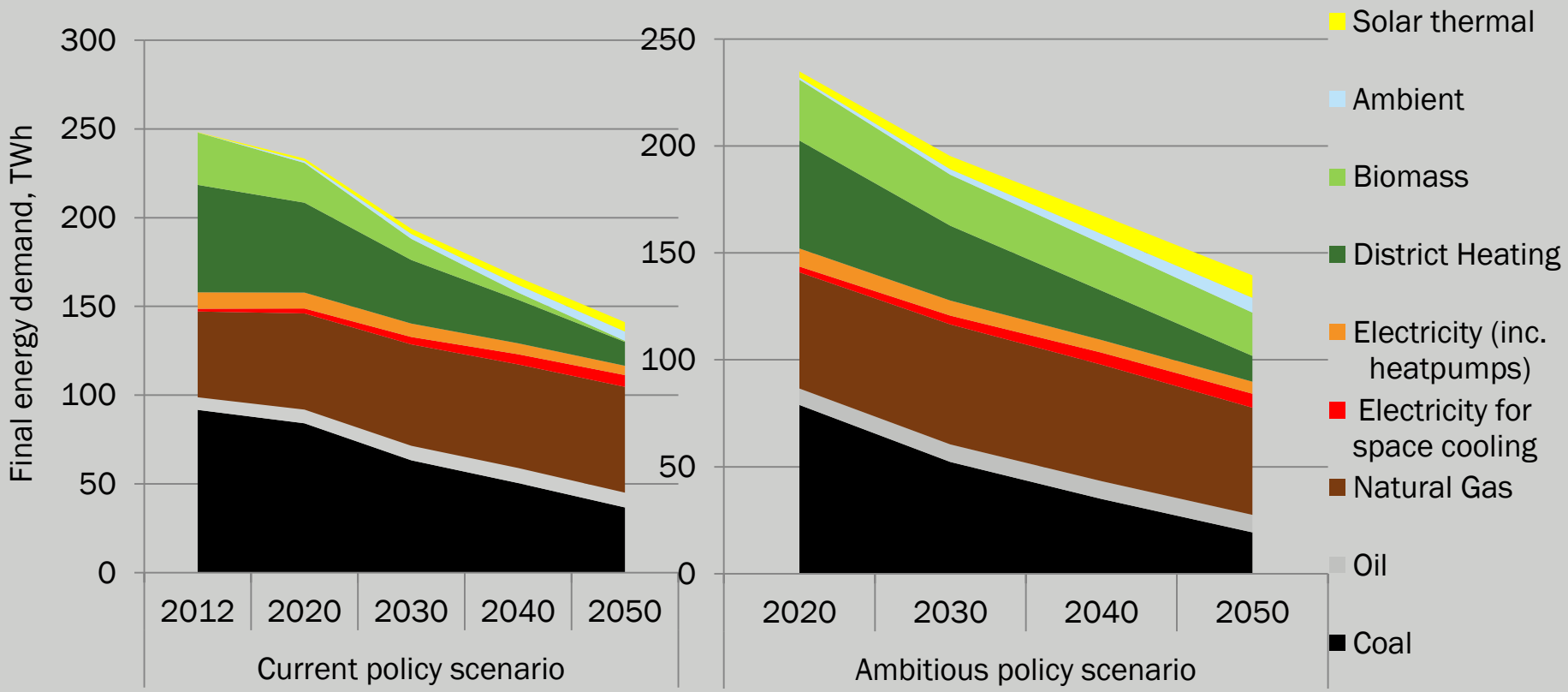
Poland: no focus on RES in current policy discussions



- Policies for building renovation in place
- Stronger policies for RES-H strongly required,
- Shift from coal to gas would lead to lock-in-effect

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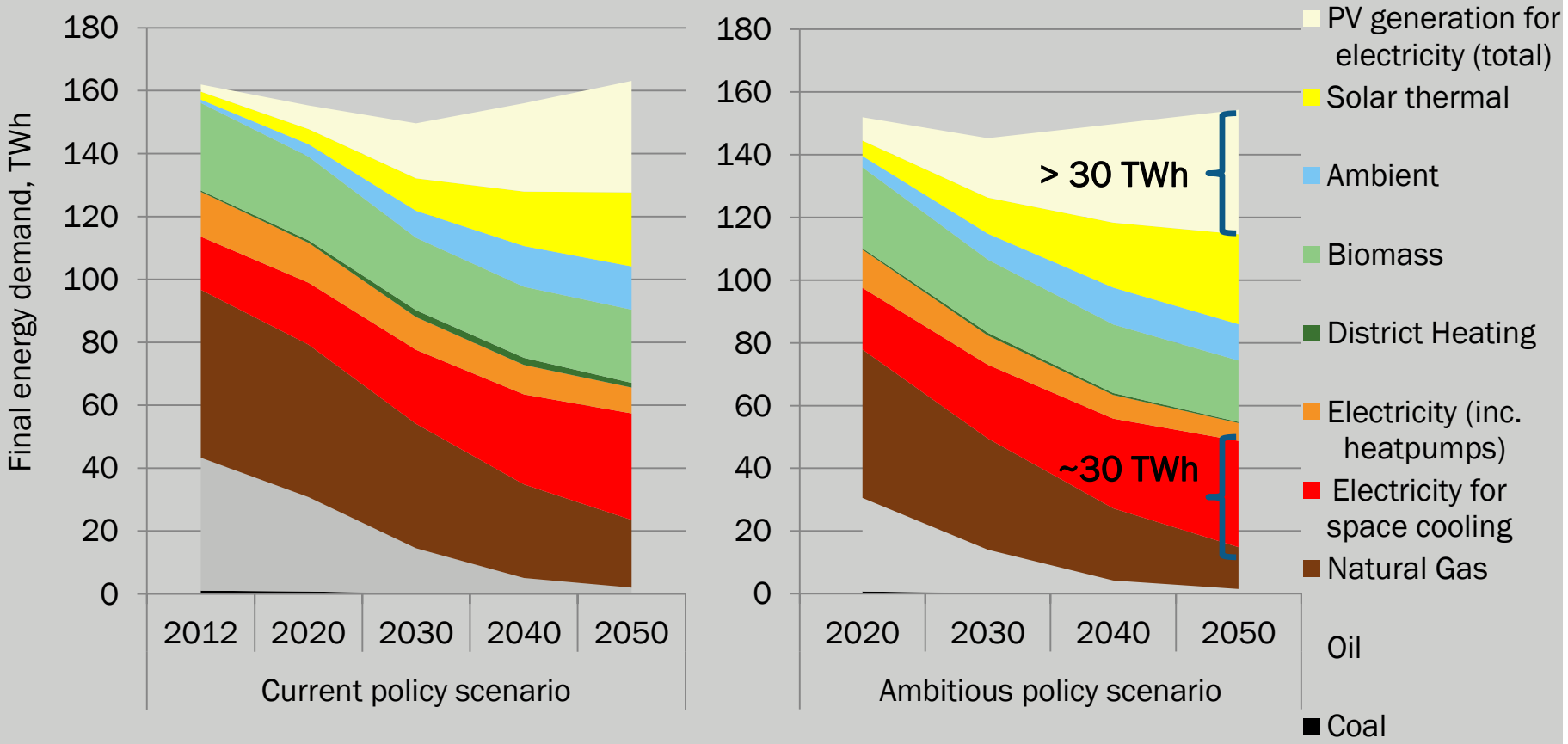
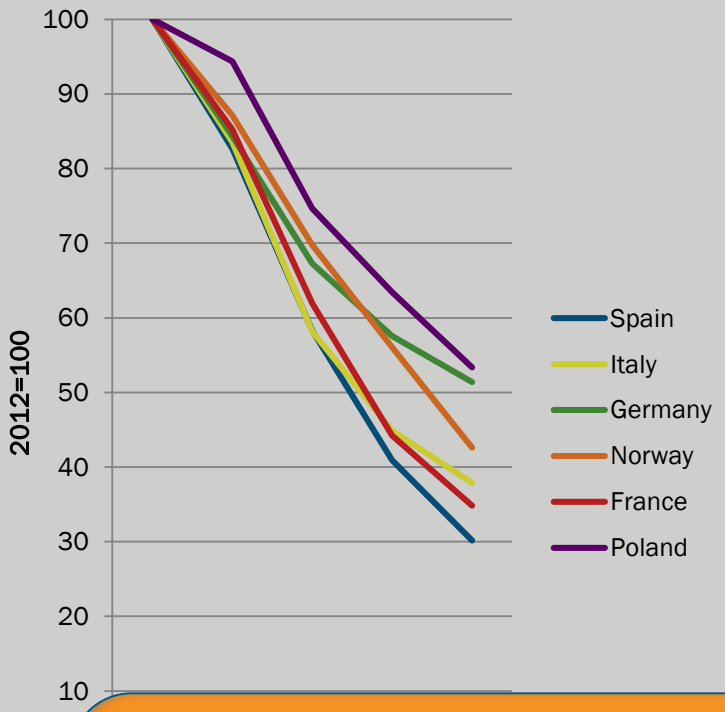
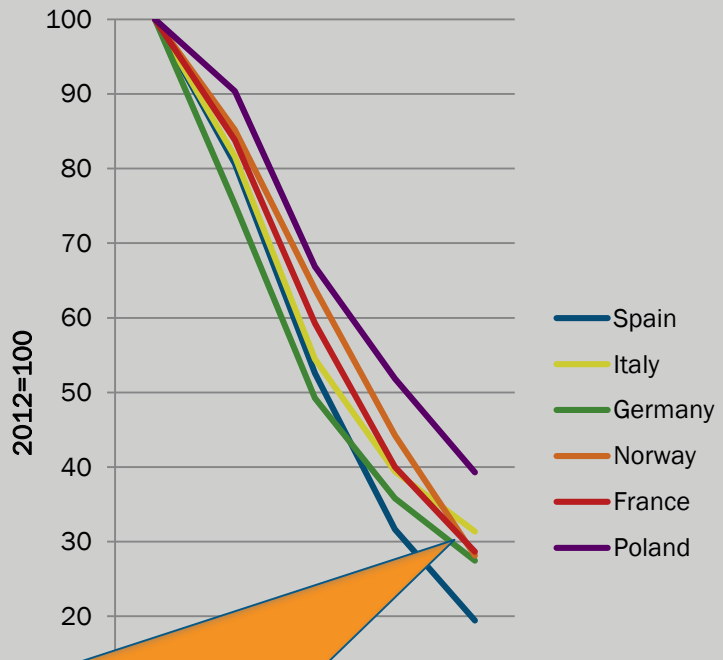
Spain: cooling as an increasingly relevant topic



- Cooling has to be stronger addressed by policies
- PV could play a role also in covering cooling energy demand
- PV and Solar thermal potential relevant, but unclear due to current market development

CO2-emissions





- Not even ambitious ZEBRA policy assumptions are sufficient to reach CO2-emission reductions >80-90%.
- Highest policy intensity required to reach Paris Agreement.

Co-fu
Progr

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Conclusion 1:

There is no competition between energy efficiency and RES-H/C. Both components will be highly required to achieve 2030/2050 targets. Make use of synergies between RES-H and thermal improvement of the building envelope.

The more efficient the building envelope …

- *… the higher the share on heating energy demand that can be covered by limited biomass potentials*
- *… the higher the COP of heat pumps*
- *… the higher the achievable solar fraction by solar thermal collectors*

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Conclusion 2:

Inertia and long life time of building components has to be considered in policy considerations

- *Buildings constructed now will mostly still be in place beyond 2050.*
- *Buildings renovated within the next 10 years will often not be renovated again before 2050.*
- *A considerable part of the heating systems installed in the next 10 years will still be in place in 2050. Absolute phase out of fossil based heating systems in new installations would be required within the next 5-10 years to reach strong decarbonisation levels in 2050.*

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Conclusion 3:

Highest policy intensity required in order to achieve 2030 / 2050 energy and climate targets.

High inertia and long lead-times in the building stock and related technological components do not allow to further postpone radical policy innovations.

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Thank you!

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Recommendations to accelearte the nZEB market transition

Maarten De Groote

Buildings Performance Institute Europe

September 2016

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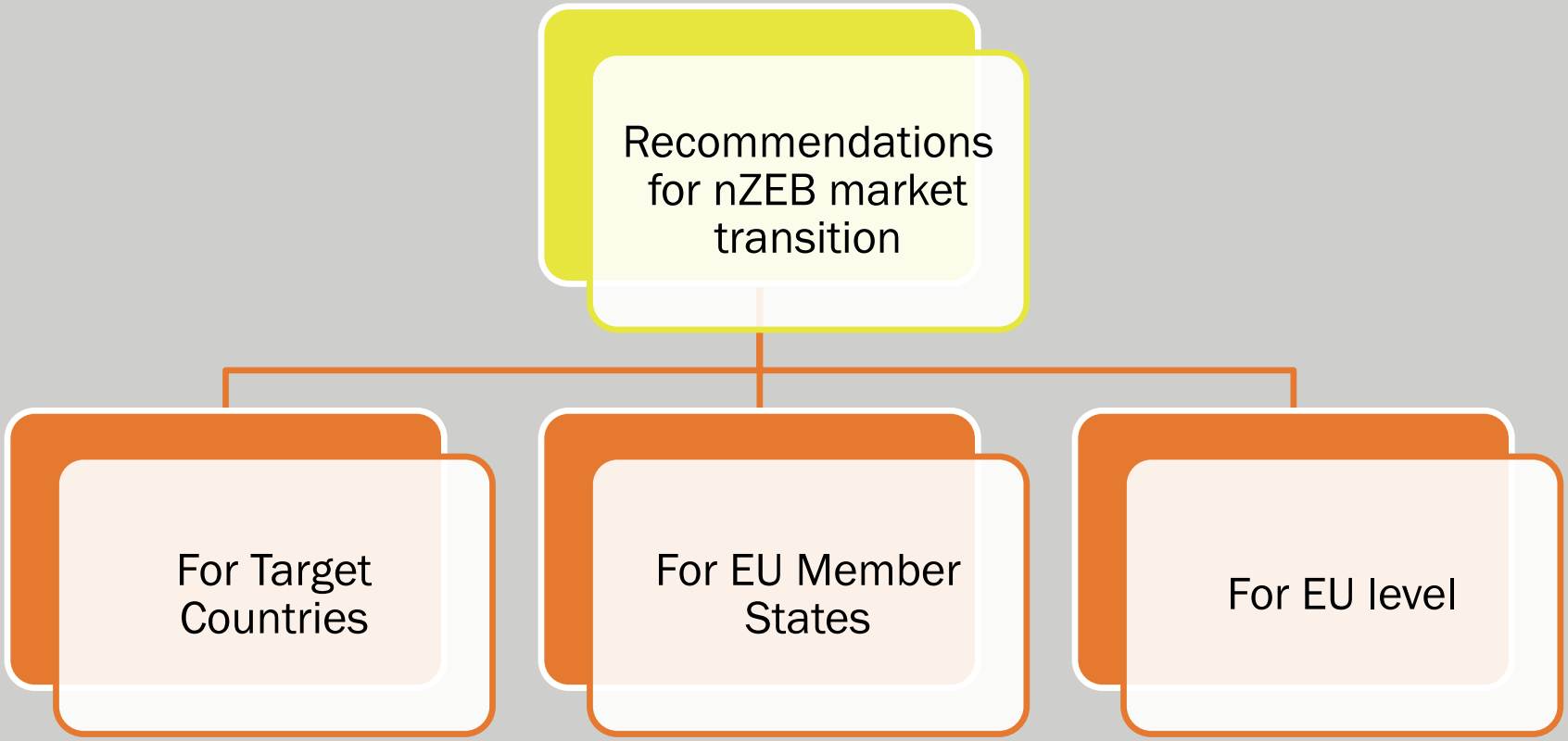

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OVERARCHING CONDITIONS

Stakeholder involvement	Long-term strategy with intermediate targets	Continuous MRV and improvement	Incentivise frontrunners and empower the local level

RECOMMENDATIONS

LEGISLATIVE & REGULATORY INSTRUMENTS	ECONOMICS	COMMUNICATION	QUALITY FRAMEWORK	NEW BUSINESS MODELS & INNOVATION	SOCIAL ASPECTS

EU-WIDE NZEB MARKET TRANSITION

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Long list of recommendations…

A1 - Regulate building performance minimum standards through the building code
A2 - Improve the usage of Energy Performance Certificate, including a robust compliance system
A3 - Define a long term vision to guide the transformation of buildings as integrated parts of the society and the wider energy system
A4 - Provide building owners and investors with tailored advice according to specific renovation roadmaps
A5 - Encourage nZEB with public procurement processes
A6 - Implement standard methodologies for secure data gathering and assessment
A7 - Set long term voluntary targets for existing buildings
A8 - Mandatory upgrades for non-residential buildings, in case of new lease and tenancy
B1 - Incentivize the market uptake of nZEBs through active price signals
B2 - Stimulate the market uptake of Energy Performance Contracting by renovating the public buildings in an ESCO-framework
B3 - Financial support for (holistic or step-by-step) renovation according long term benchmarks
B4 - Adapting new financing products that look long term and entitle nZEB investors with preferential mortgages
B5 - Clever legislation can mitigate the problem of split-incentives
C1 - Brand nZEB buildings as part of a positive sustainability narrative
C2 - Promote demonstration projects to exemplify the benefits and viability of highly performing buildings
C3 - Promote market uptake of nZEB buildings with information campaigns and easy-grasping guidelines
C4 -Facilitate effective knowledge sharing via adequate communication tools
D1 - Develop and consolidate quality frameworks for nZEB techniques and technologies
D2 - Training building professionals with "NZEB and beyond" qualifications preparing them to build and upgrade the building stock for the future
D3 - Set up a detailed data collection of training programmes and cross-learning initiatives
D4 - Enhance the proficiency of certifiers in order to increase the reliability of Energy Performance Certifications
D5 -New technologies (IoT) allow us to collect and analyse performance data in a more effective way that was not possible some years ago
D6 - Improve coherence within and among states through better coordination
D7 - Install "One-Stop-Shops" for high energy performance buildings to reduce complexity and hassle
E1 - Foster the uptake of industrialised renovation through increased market confidence
E2 - Encourage new business models to aggregate demand to provide sufficient scale
E3 - Enable the market to embrace the new features of buildings as micro-energy hubs (nZEB2.0)
E4 - Incentivize the frontrunner entrepreneurs exploring new business models
E5 - Involve and empower local authorities in pilot projects
F1 - Explicitly define energy poverty and set up monitoring mechanisms
F2 - Include the benefits of alleviating (energy) poverty in nZEB decisions
F3 - Specify and increase support measures for vulnerable target groups customized to their profile
F4 - Move from fuel subsidies to energy efficiency measures
F5 - Improve all social housing to nZEB standards, in order to provide comfortable and affordable housing
F6 - Fighting air pollution to be an integrated part in NZEB

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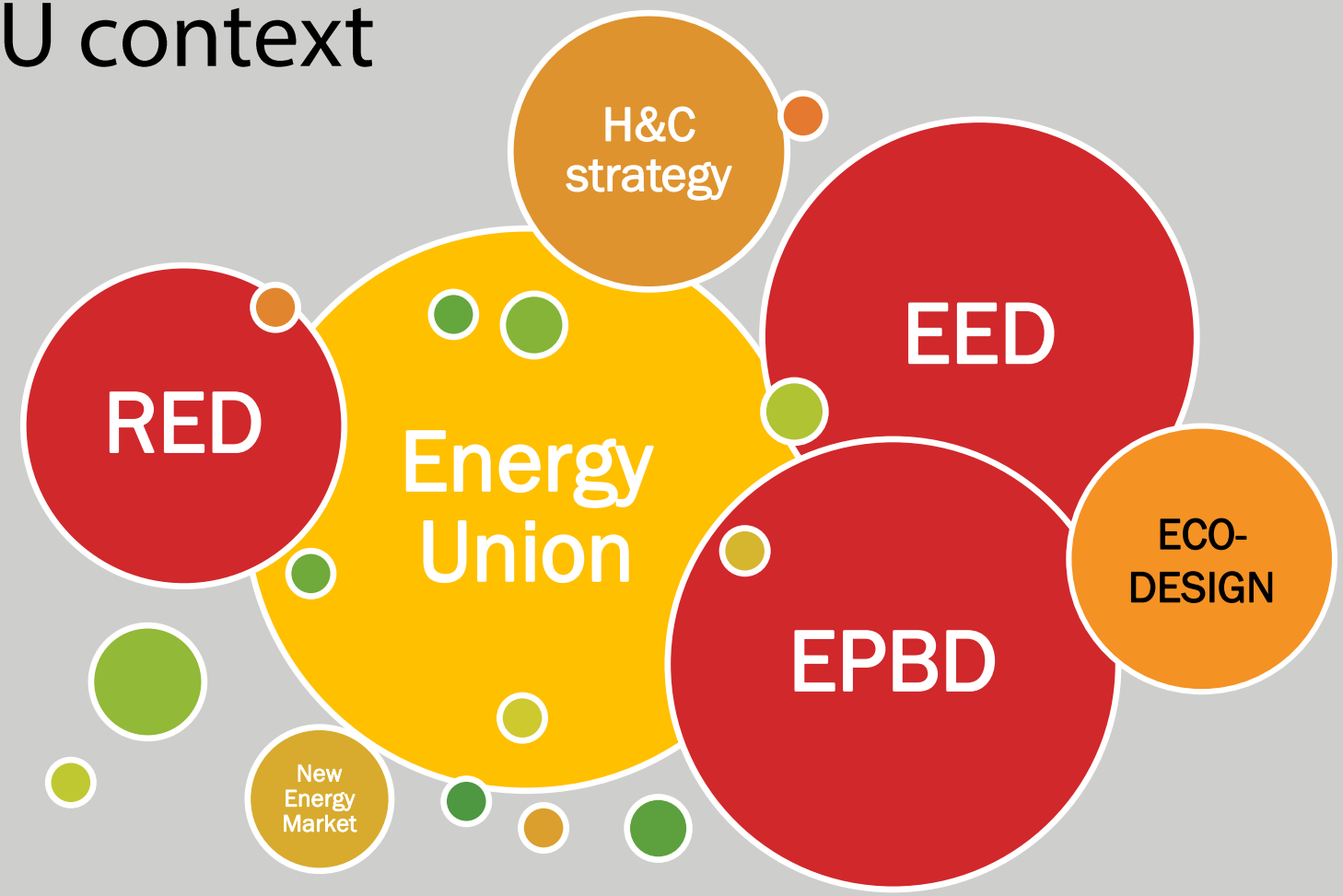
EU context



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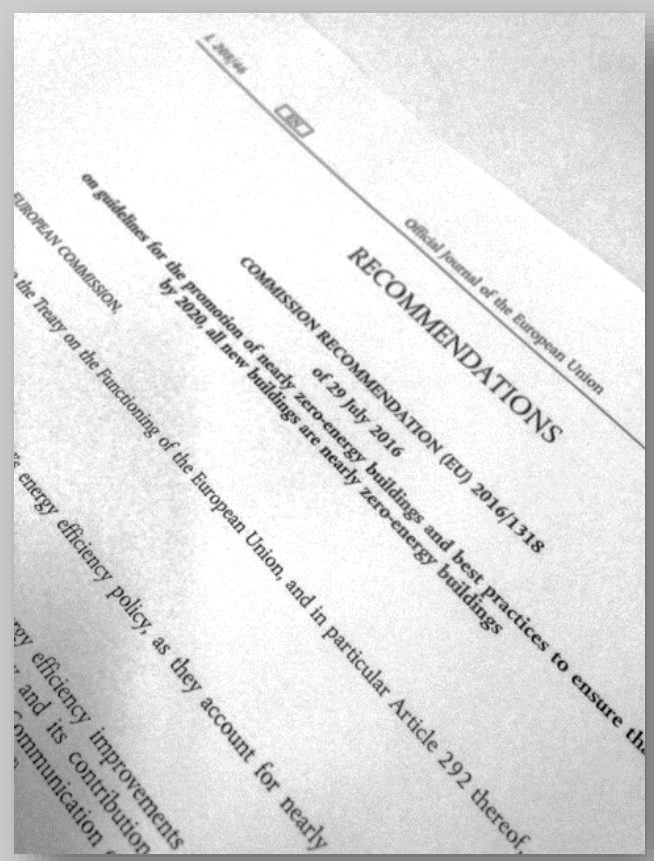
Commission Recommendation



Commission Recommendation 2016/1318 of 29 July 2016

- Guidelines for the promotion of nZEB and best practices to ensure that, by 2020, all new buildings are nZEB
- Member States should follow the guidelines
- In line with ZEBRA recommendations: not reaching designed E-performance, gap existing buildings (Art.4), multiple benefits, sanction mechanisms, reliable data, etc.

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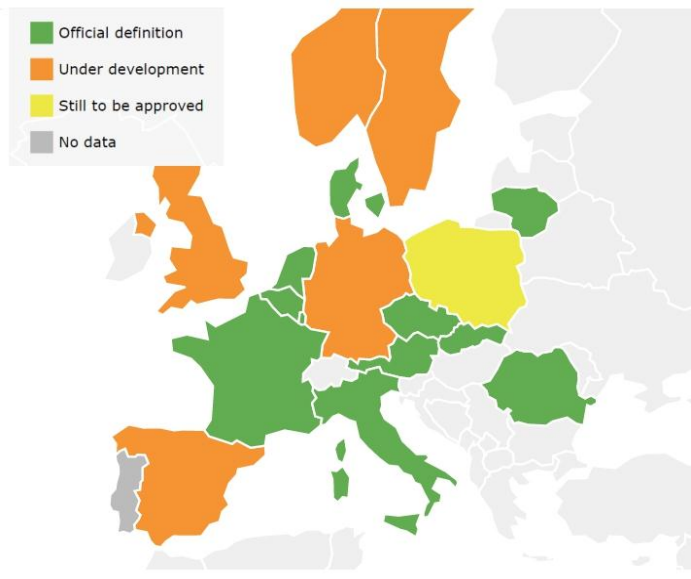
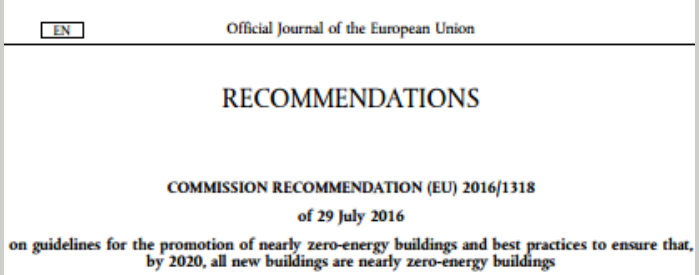
Clarify the nZEB definition

- Priority to set a definition
- What elements are included in the system boundary, e.g. lighting, auxiliary energy, primary energy conversion factor, etc.
- Reflect benchmarks with national definitions
- Contribution of renewable energy in nZEB buildings, e.g. direct vs indirect





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RECOMMENDATIONS

COMMISSION RECOMMENDATION (EU) 2016/1318

of 29 July 2016

on guidelines for the promotion of nearly zero-energy buildings and best practices to ensure that, by 2020, all new buildings are nearly zero-energy buildings

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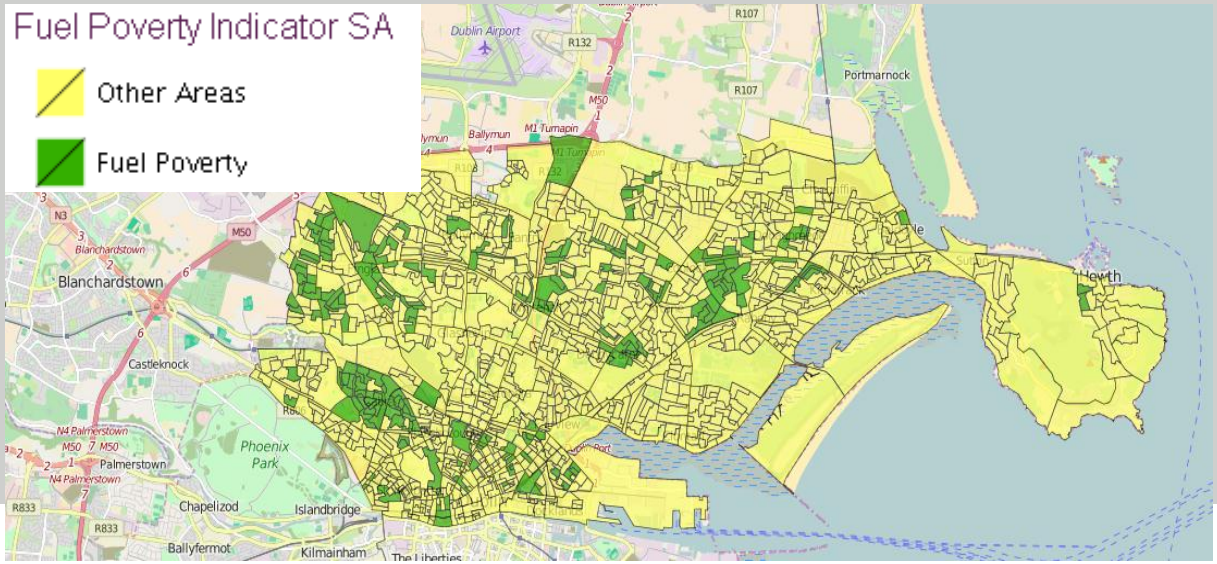
Gather more and better data

- EU building stock observatory
- Rate and depth of renovation
- Maximise use of existing data, e.g. central EPC database, online dynamic energy poverty map Dublin (Ireland)



EPISCOPE

Energy Action
THE WARM CHARITY

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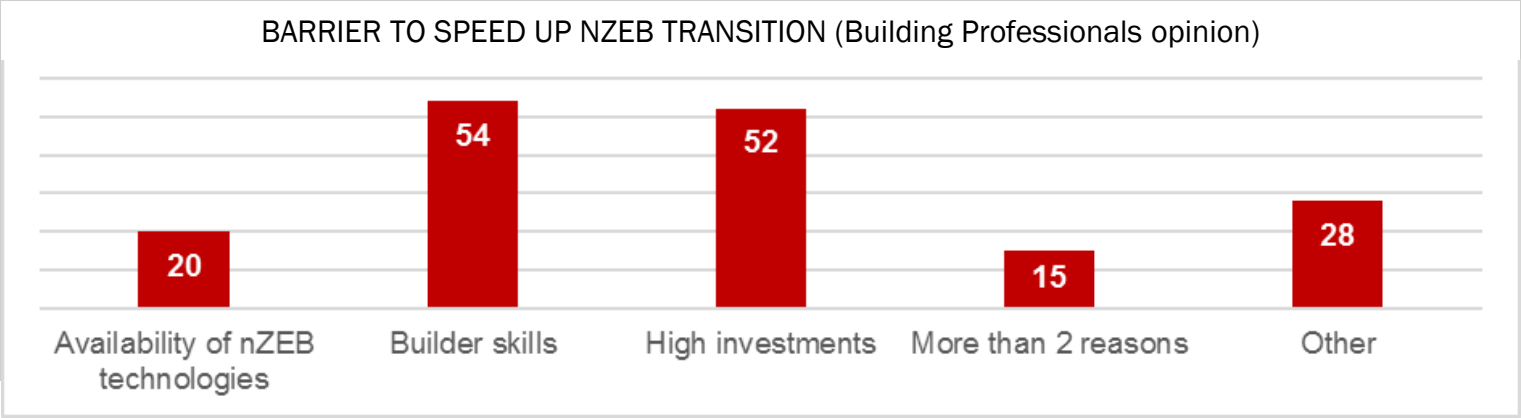
Improve quality and compliance

- Have adequate **compliance and sanction mechanisms** in place in case of non-compliance, e.g. only 50% of the Member States monitor the compliance of new buildings with the energy performance requirements
- New technologies allow to collect and analyse performance data
- Integrated quality frameworks – skills (and investment) are considered largest barriers



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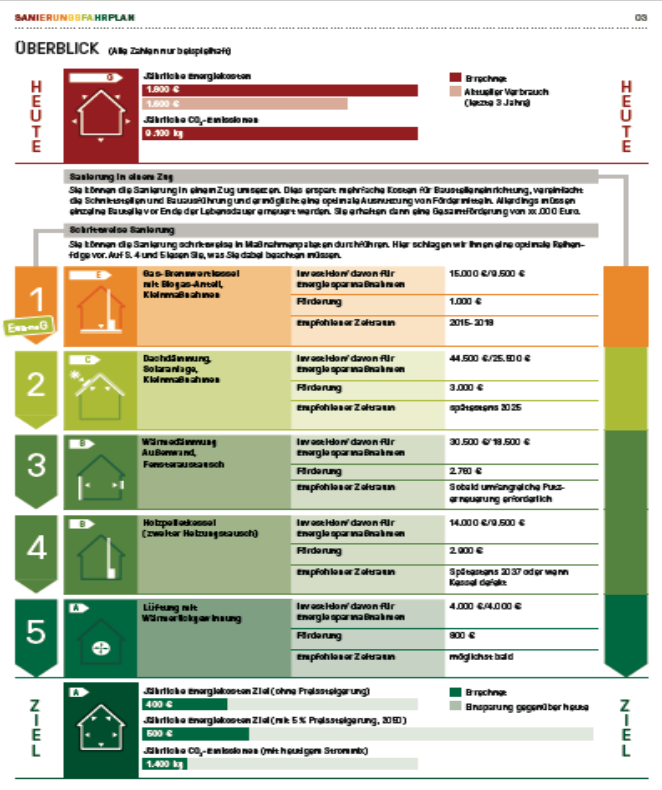
Focus on existing buildings

- nZEB definition for existing buildings
- Strengthen National Renovation Strategies (EED art.4) to push existing buildings on an nZEB track
- Mandatory requirements, e.g. façade insulation in France
- Improving credibility and usability of EPC's, e.g. Building Passport concept



Source: Baden Württemberg – Building roadmaps

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Public buildings should walk the talk

- Strengthen implementation of exemplary role of public bodies' buildings (EED Article 5)
- EU **rules on public procurement** are onerous and create barriers to investment via means such as Energy Performance Contracting
- Make data of public buildings available, e.g. Boston online tool

Building Energy Reporting:

Property Name	City Hall
Reported	Municipal
Property Type	Office
Address	One City Hall Squar
ZIP	02201
Gross Area (sq ft)	511,000
Site EUI (kBTU/sf)	122.20
Energy Star Score	29
Energy Star Certified	
Property Uses	Office
Year Built	1968
GHG (MTCO2e)	5,456.50
GHG Intensity (kgCO2/sf)	10.70
Total Energy (kBTU)	62,421,146.40
% Electricity	69%
% Gas	0%
% Steam	31%
Water Intensity (gal/sf)	2.65
Onsite Solar (kWh)	

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Address vulnerable target groups

- Define energy poverty, map it and develop measures

Country	Dwellings with leakages & damp walls (%)	Arrears on utility bills (%)	Inability to keep home adequately warm (%)	Country	Dwellings with leakages & damp walls (%)	Arrears on utility bills (%)	Inability to keep home adequately warm (%)
Bulgaria	13.2	32.9	40.5	Spain	17.1	9.2	11.1
Greece	13.7	37.3	32.9	United Kingdom	16.6	7.1	9.3
Cyprus	25.5	20.5	27.5	Poland	9.2	14.4	9
Portugal	32.8	8.5	28.3	Estonia	17.5	10.4	2.9
Latvia	27.5	19.6	16.8	Belgium	17.5	5.8	5.4
Hungary	26.9	22.7	11.2	France	13.3	6.3	5.9
Slovenia	29.9	20.3	5.6	Denmark	15	4.6	2.9
Lithuania	18.9	10.4	26.5	Netherlands	15.8	3	2.6
Italy	24.9	11.9	17.8	Germany	12.3	4.2	4.9
Romania	12.7	28.1	12.3	Czech Republic	9.2	4.7	6.1
Croatia	11.7	29.1	9.7	Slovakia	7	6.1	6.1
Malta	11	14.8	22.1	Luxembourg	15	3.2	0.6
Ireland	14.3	17.9	10	Austria	10	3.5	3.2
EU	**15.7**	**10.1**	**10.2**	Finland	5	7.9	1.5
				Sweden	7.3	3.1	0.8

Source: BPIE, based on Eurostat data

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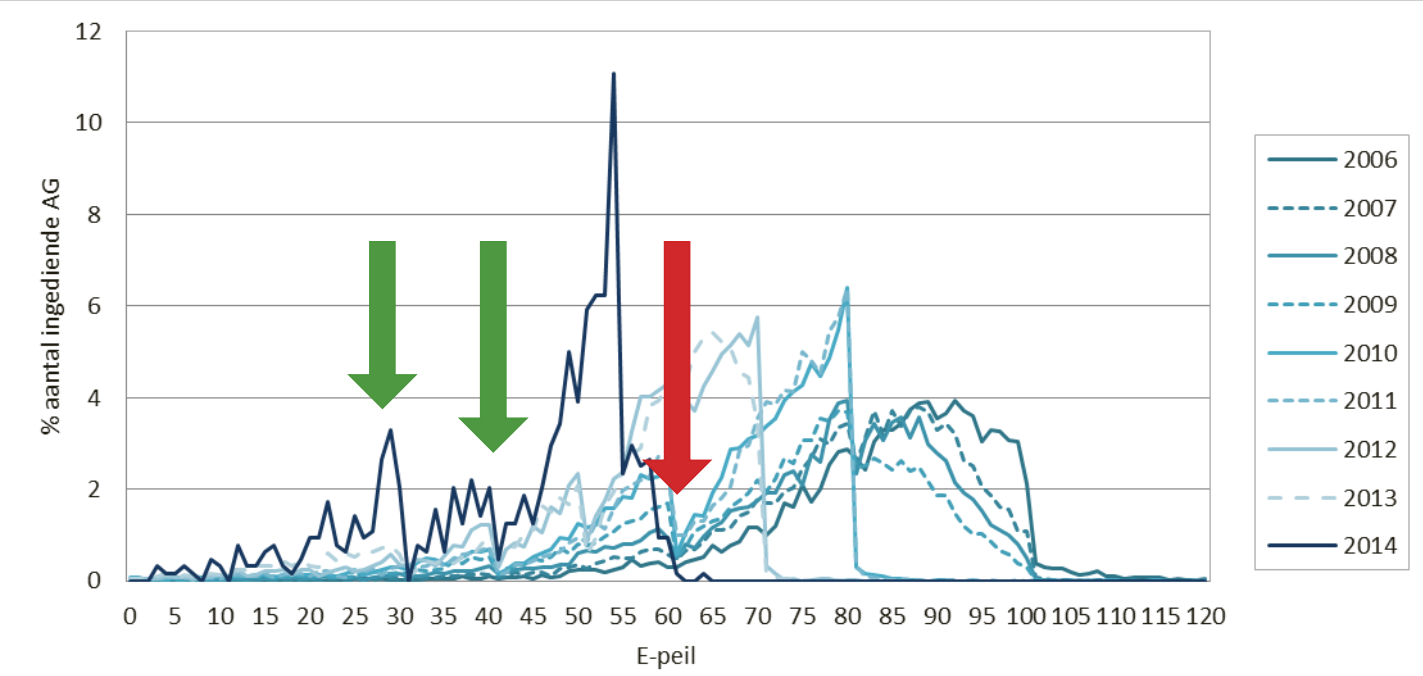
Linking financing with policies

- Streamlining, blending and optimising European funds according nZEB market transition

- Member States should identify the EE funding streams and link them with long-term targets.
  E.g. Belgium – Flanders: energy performance requirements and subsidies



Smart buildings in a decarbonised energy system

- The nZEB definition and corresponding policy measures should be updated to be **smart building and district ready**
- Reflecting the new possibilities that a transforming energy market could bring
- Spatial planning should support the creation of smart building districts, integrating buildings and transport

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Different speeds in the nZEB market transition

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Panel discussion

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