



# Regulatory framework and instruments to improve the energy performance of buildings in Europe

## 提升欧洲建筑能源绩效的监管框架和工具

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Sino-German Energy Efficiency Expert Roundtable

中德能效专家圆桌论坛

Afternoon Session 下午场

Expert Roundtable on “Strategies and Instruments to Improve Energy Efficiency in Buildings”

“提升建筑能效战略和工具”专家圆桌论坛

Beijing, 5 December 2017 2017年12月5日, 北京

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# **Some statistics about the European building stock**

## **关于欧洲存量建筑的一些统计**

# Total floor area of buildings 建筑物总建筑面积



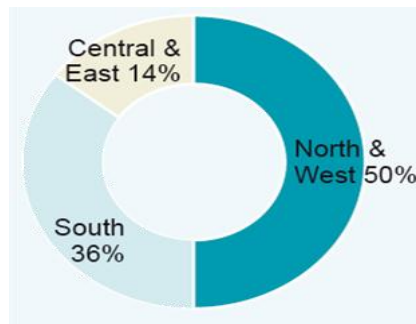
Total useful floor area:

总可用建筑面积:

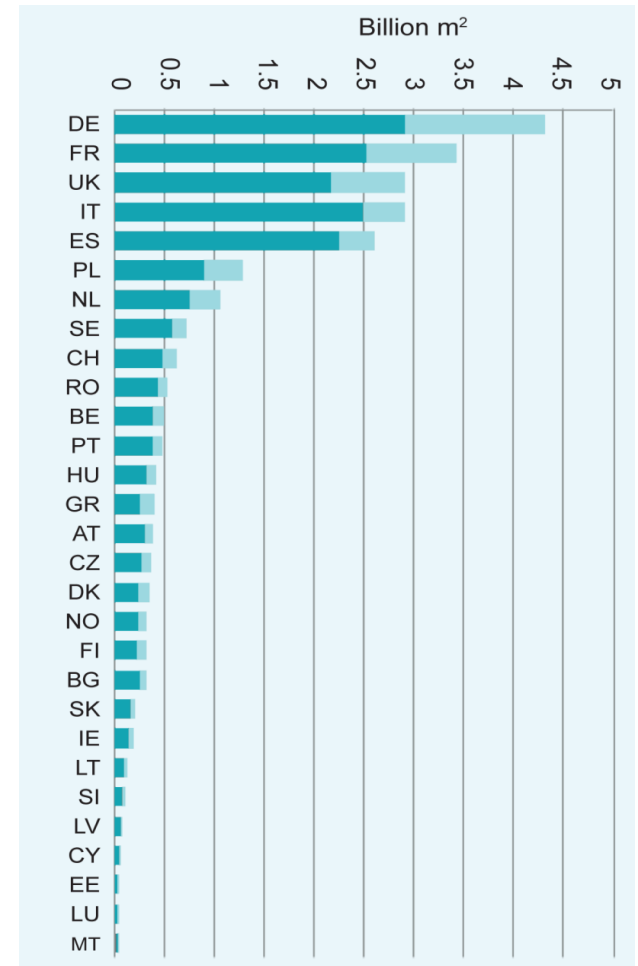
- 24 billion m<sup>2</sup> for EU 27  
欧盟27国共计240亿平方米
- 25 billion m<sup>2</sup> with Norway and Switzerland added  
挪威和瑞士增加250亿平方米

The 5 most populated countries (DE, FR, UK, IT and ES) account for 65% of total floor space.

人口最多的5个国家（德国、法国、英国、意大利和西班牙）占总建筑面积的65%。



Floor space distribution per region  
各地区建筑面积分布

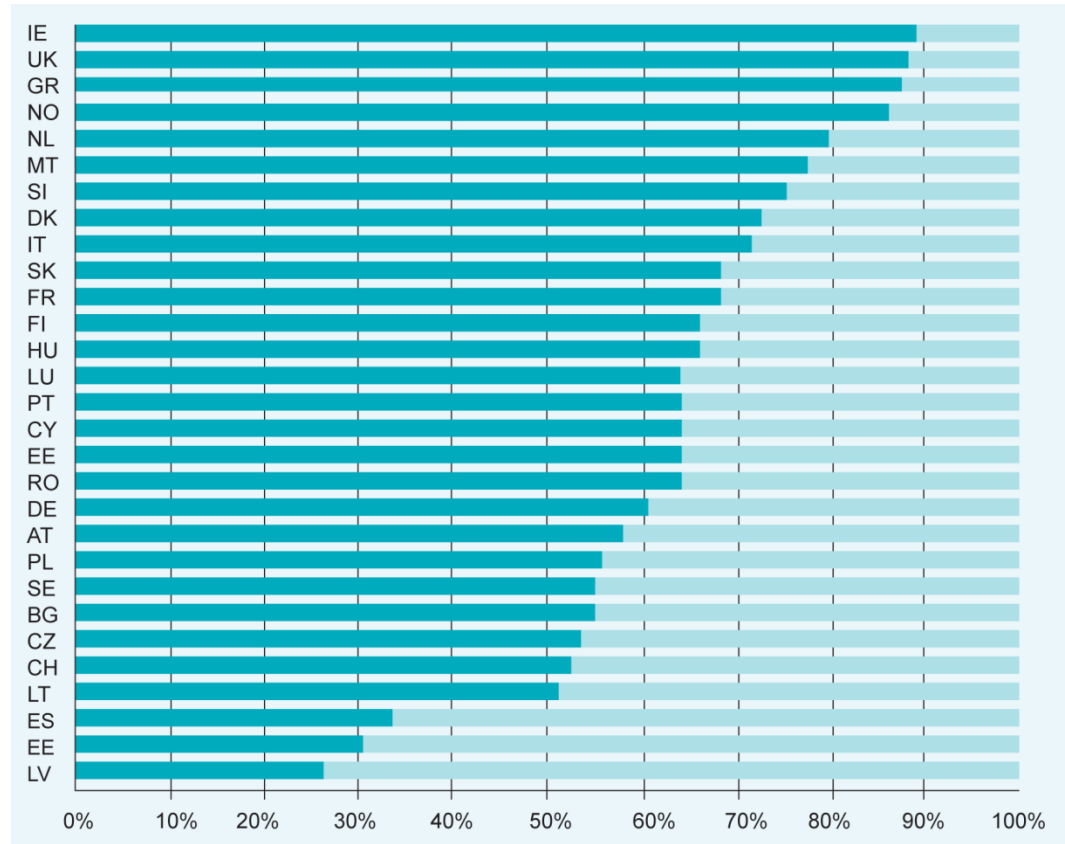


Floor space distribution per country  
各国建筑面积分布

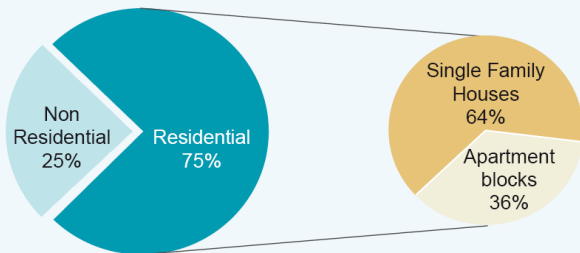
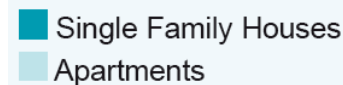
■ Residential  
■ Non Residential

# Residential floor area distribution 住宅建筑面积分布

- Wide range of floor area contributions from single- and multi-family houses
- 独户和多户住宅的建筑面积比重大
- Proportion of floor areas for **single-family houses** is highest in Greece, Ireland, Norway and the UK
- 希腊、爱尔兰、挪威和英国的**独户住宅**建筑面积比例最高
- Proportion of floor areas for **apartments** is highest in Estonia, Latvia and Spain
- 爱沙尼亚、拉脱维亚和西班牙的**公寓楼**建筑面积比例最高



Floor area share for residential buildings 住宅楼建筑面积比例

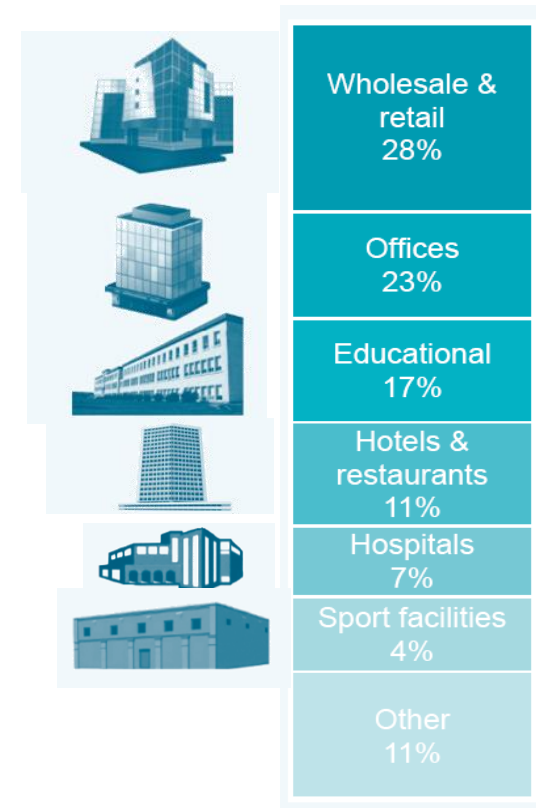


Floor areas share for the covered countries  
覆盖国建筑面积比例

# Non-residential floor area distribution

## 非住宅建筑面积分布

- Wholesale & retail buildings heating and cooling conditions may differ substantially from other categories due to large areas of wholesale buildings often being used only for storage purposes
- 由于批发建筑的大部分面积往往只用于仓储目的，因此批发和零售建筑的供热和供冷条件可能与其他类别的建筑差异较大
- Offices and educational buildings together account for 40% of the entire non-residential floor space. These buildings have similar heating and cooling conditions to residential buildings (although they are of shorter use)
- 办公和教学建筑共占整个非住宅建筑面积的40%。这些建筑的供热和供冷条件与住宅建筑类似（尽管它们使用时间较短）
- Hospitals (7% of total non-residential floor space) have continuous usage patterns, where energy demand can vary substantially depending on the services provided (from consultation rooms to surgery rooms)
- 医院（占非住宅建筑总面积的7%）为连续用能模式，能源需求因所提供的服务（从诊察室到手术室）不同而大相径庭



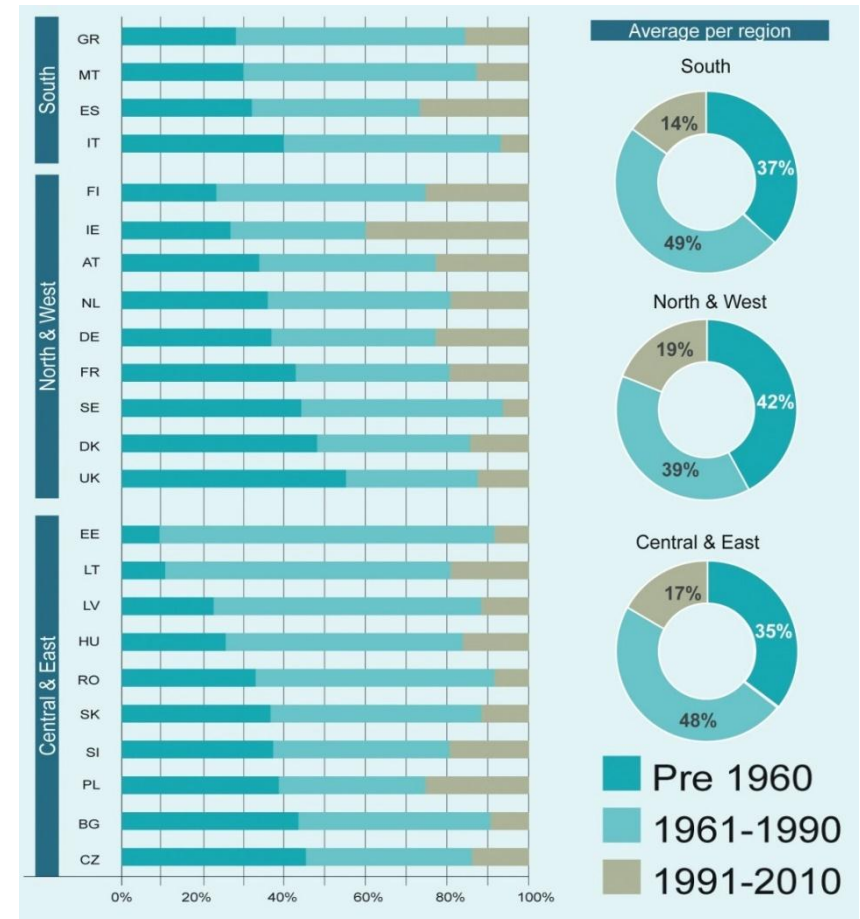
Non-residential buildings by floor area  
非住宅楼建筑面积比例



# Residential age profile

## 住宅年龄概况

- Variations in the age profile between the 3 regions are relatively small. Nonetheless, older buildings (before 1960) have the biggest share in the North & West region
- 三个地区的住宅年龄变化相对较小。然而，旧建筑(1960年之前)在西北地区所占比例最大。
- It is evident that all countries experienced a large boom in construction between 1961 and 1990 (with a few exceptions, the housing stock more than doubled in this period)
- 很明显，从1961年至1990年，所有国家经历了大规模的建筑热潮（除了少数例外，大多数国家在这一时期的住房存量增加了一倍以上）
- Countries with the biggest share of recently constructed buildings (1990–2010) appear to be Ireland, Spain, Poland and Finland
- 最近建造的建筑（1990–2010）占比最大的国家似乎是爱尔兰、西班牙、波兰和芬兰
- Countries with the biggest share of residential stock dating from 1961 to 1990 seem to be Estonia, Hungary, Latvia and Finland
- 1961年至1990年期间的住宅存量占比最高的国家似乎是爱沙尼亚、匈牙利、拉脱维亚和芬兰



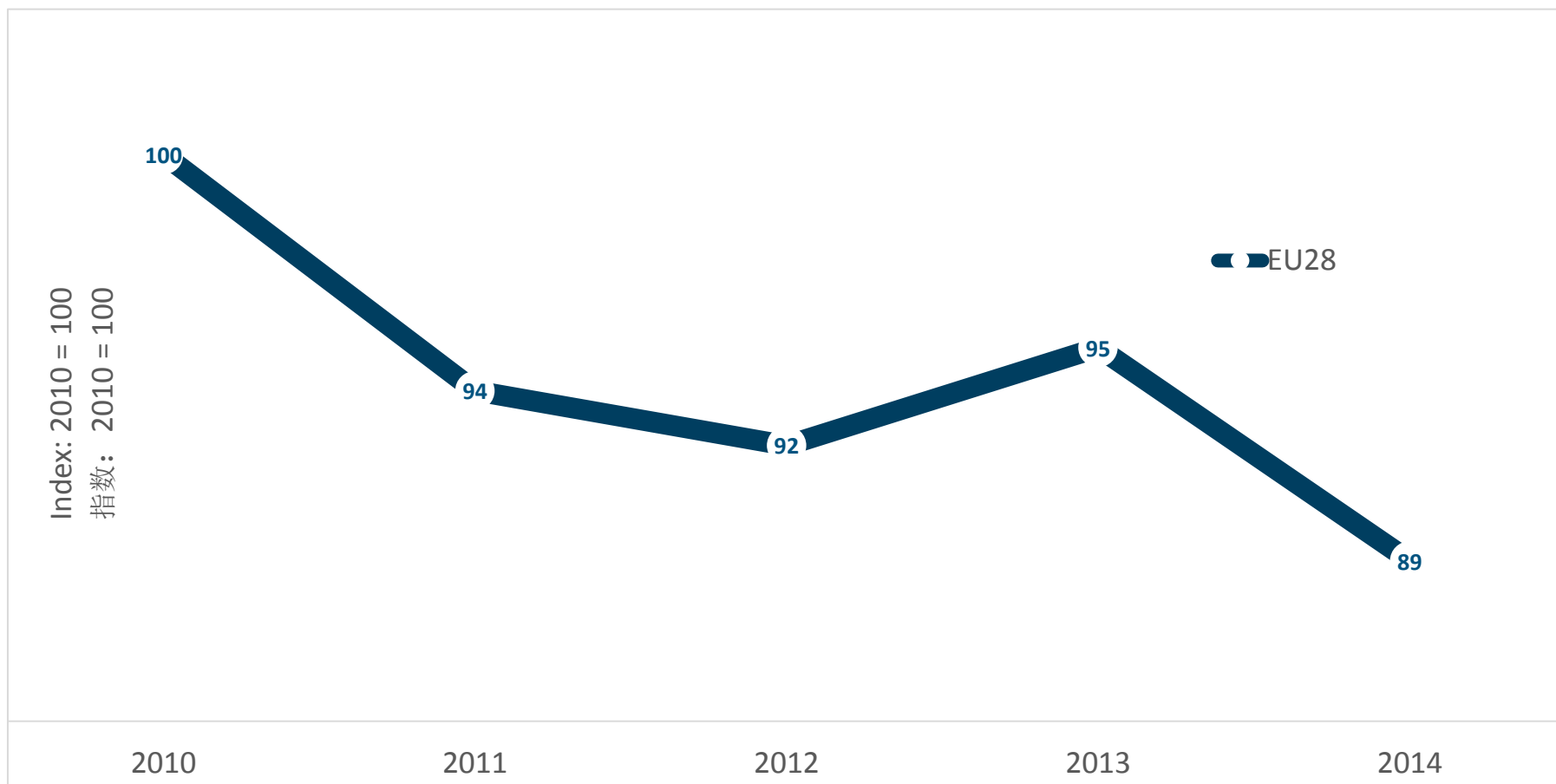
Age profile of residential floor space住宅建筑的年龄概况

EE: Data only from 1951 onwards. 爱沙尼亚：仅有1951年后的数据。  
IT: Data excludes heritage buildings before 1950. 意大利：数据不包括1950年前的建筑。  
LT: Data only from 1941 onwards. 立陶宛：仅有1941年后的数据。  
ES: Data excludes secondary houses 西班牙：数据不包括二手房。  
SE: Data only from 1921 瑞典：仅有1921年后的数据。

# Evolution of final energy consumption in residential buildings per m<sup>2</sup> since 2010 (EU28)

Adjusted to normal climate

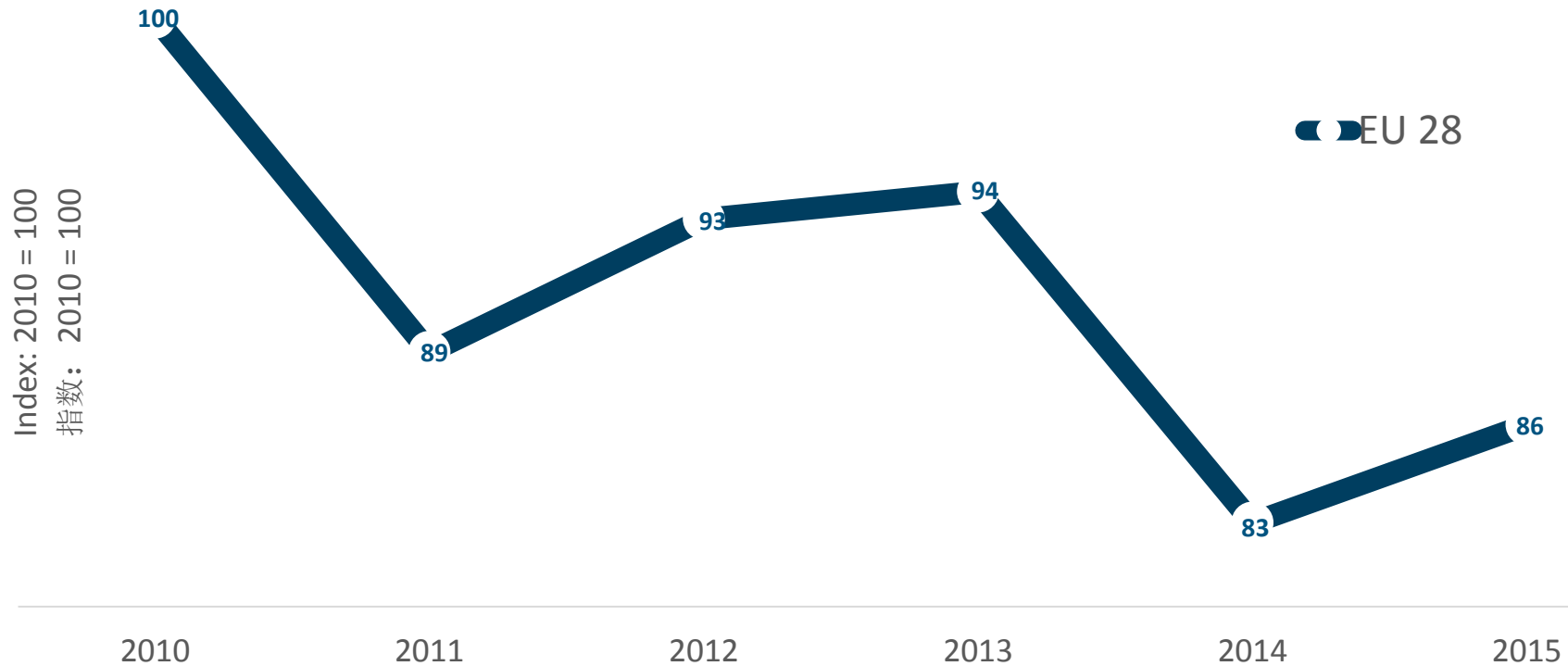
2010年来每平方米住宅建筑终端能源消费量的演变（欧盟28国）  
调整至正常气候



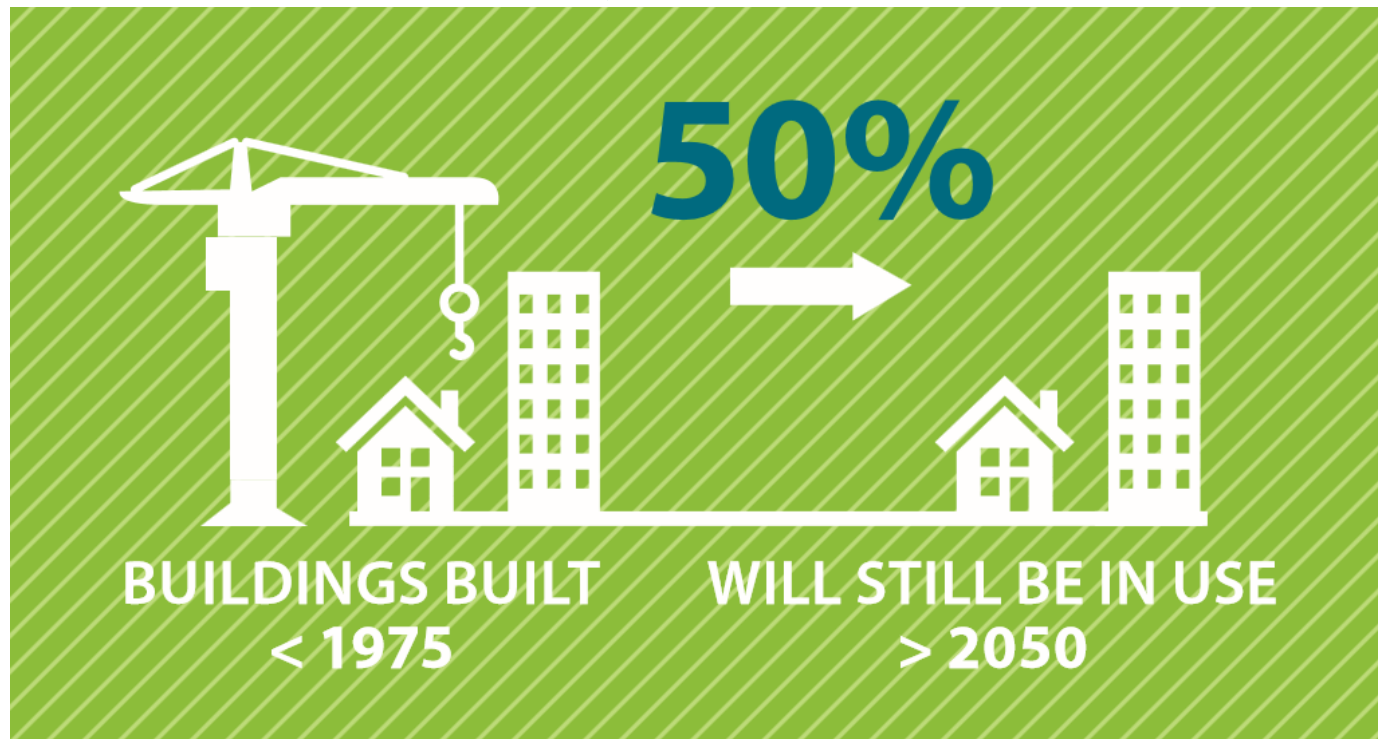


# Evolution of total final energy consumption in residential buildings since 2010

## 2010年来住宅建筑总终端能源消费量的演变



# The existing building stock 既有存量建筑



**75-90% of the current building stock  
will remain in use in 2050**  
**75-90%的既有存量建筑将继续使用至  
2050年**

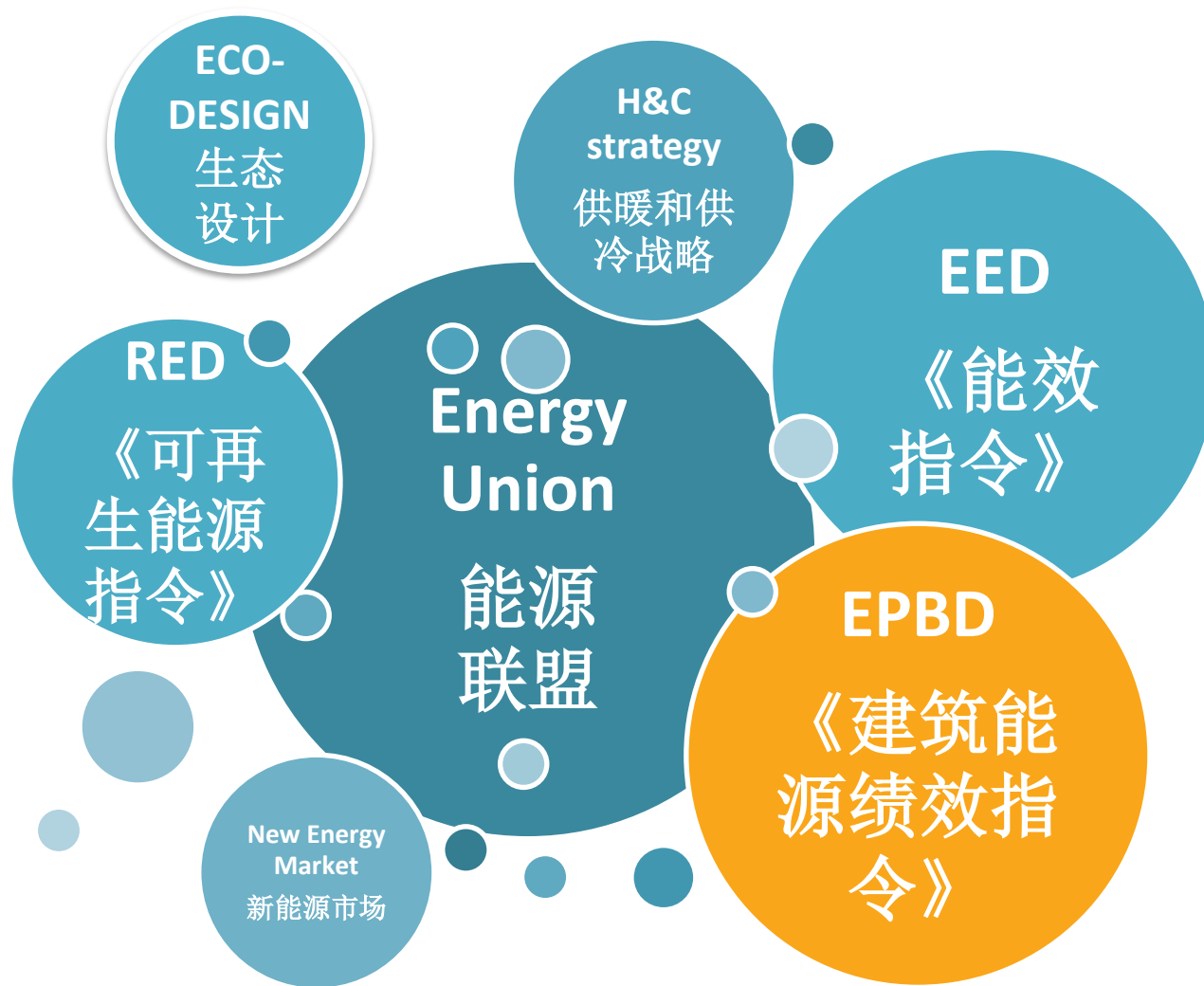
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# Building related EU policy framework 欧盟建筑政策框架



# Current EU Legislative drivers to improve energy performance of buildings

## 现行欧盟立法助推建筑能源绩效改善



### Energy Performance of Buildings Directive

2010/31/EU

- Setting of minimum energy performance levels, based on cost optimality
- Major renovations to meet minimum performance requirements
- Nearly zero energy buildings
- Energy Performance Certification
- Inspection of heating ventilation and air conditioning systems
- Provision of financial incentives
- Tackling market barriers

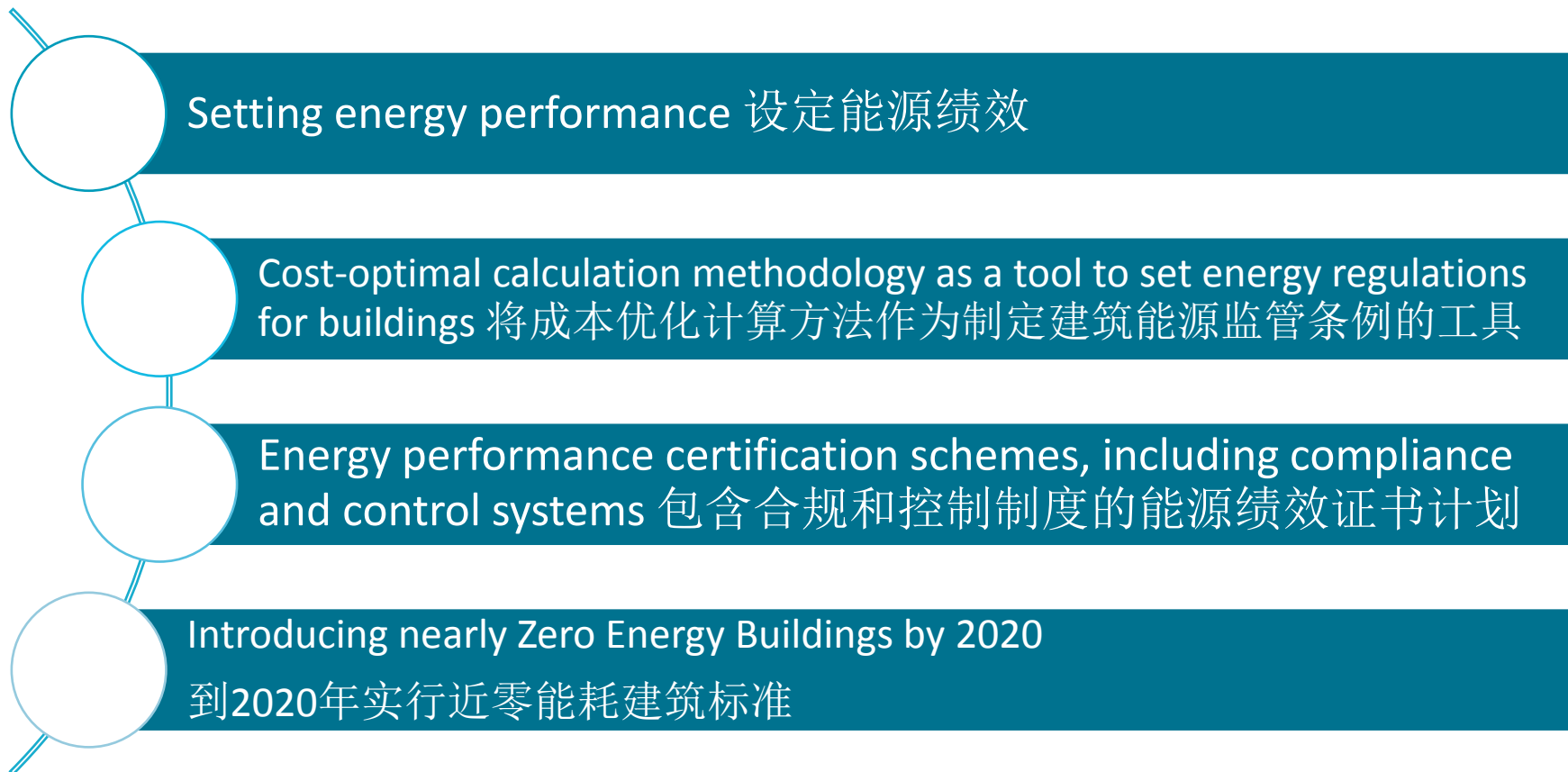
### Energy Efficiency Directive

2012/27/EU

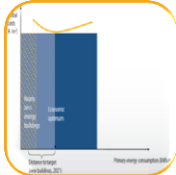
- Annual energy saving target
- National building renovation strategies
- 3% p.a. renovation rate for central government buildings
- Energy efficiency obligations on energy suppliers
- Energy audits
- Metering and billing
- Promotion of efficiency in heating and cooling
- Promotion of energy services
- Facilitate the establishment of financing facilities

# Important requirements of the current EPBD

## 现行《建筑能源绩效指令》的重点要求



# Energy Performance of Buildings Directive (EPBD, 31/2010/EU) 《建筑能源绩效指令》（EPBD, 31/2010/欧盟）



## Energy performance & Cost optimality 能源绩效&成本最优

- MSs: Minimum energy performance requirements MS: 最低能源绩效要求
- Cost-optimal methodology (common framework) 成本最优方法（通用框架）
- Requirements for technical building systems 技术建筑系统要求



## Existing Buildings 既有建筑

- All the buildings undergoing major renovation should implement energy efficiency measures  
所有正在进行重大修缮的建筑都应实施能效措施
- Minimum requirements for buildings and components  
建筑和构件的最低要求



## New Buildings 新建建筑

### Nearly Zero Energy Buildings 近零能耗建筑

- By 31 Dec. 2018 public admin. Buildings 到2018年12月31日，适用于新建公共行政建筑
- By 31 Dec. 2020 all buildings 到2020年12月31日，推广至所有新建建筑
- National plans for nZEB 近零能耗建筑国家计划



## Energy performance certification 能源绩效证书

- Implement EPC schemes 实施EPC计划
- Recommendation for cost-optimal improvements  
成本最优改进建议
- Independent control systems 独立控制系统



## HVAC inspection 暖通检测

- Regular inspections (heating > 20kW, AC>12kW)  
定期检查（供暖> 20kW, AC> 12kW）
- Independent control systems 独立控制系统



## Financial incentives & Market barriers 财政激励 & 市场壁垒

- MSs: to prepare lists of measures and instruments  
MS: 编制措施和工具清单
- Take into account cost-optim. for these measures  
将成本最优化的考量纳入这些措施



# Minimum building performance requirements

## 最低建筑性能要求

- 🏠 Minimum energy performance requirements for new buildings are a key element in European building codes
- 🏠 新建建筑的**最低能源绩效要求**是欧洲建筑规范的关键要素之一
- 🏠 The European Commission has introduced requirements to set standards in all Member States through the 2002 EPBD
- 🏠 通过2002年《建筑能源绩效指令》，欧盟委员会提出了在所有成员国制定标准的要求
- 🏠 In 2002 no guidance on the ambition level was provided
- 🏠 2002年《建筑能源绩效指令》并未提供关于严苛程度方面的指引
- 🏠 The recast of the EPBD in 2010 included a provision that national energy performance requirements should be set with the view to **achieving cost optimum levels**
- 🏠 2010年重新制定的《建筑能源绩效指令》包含了一项规定，即应确定国家能源绩效要求，以期**达到成本最优水平**
- 🏠 Member States to **use and apply a methodology** to calculate cost-optimal levels for their specific country
- 🏠 成员国**采用并应用一种方法**计算本国的成本最优水平
- 🏠 Compare cost-optimal levels with the national requirements set in national building regulations
- 🏠 将成本最优水平与国家建筑规定中的国家要求相比较

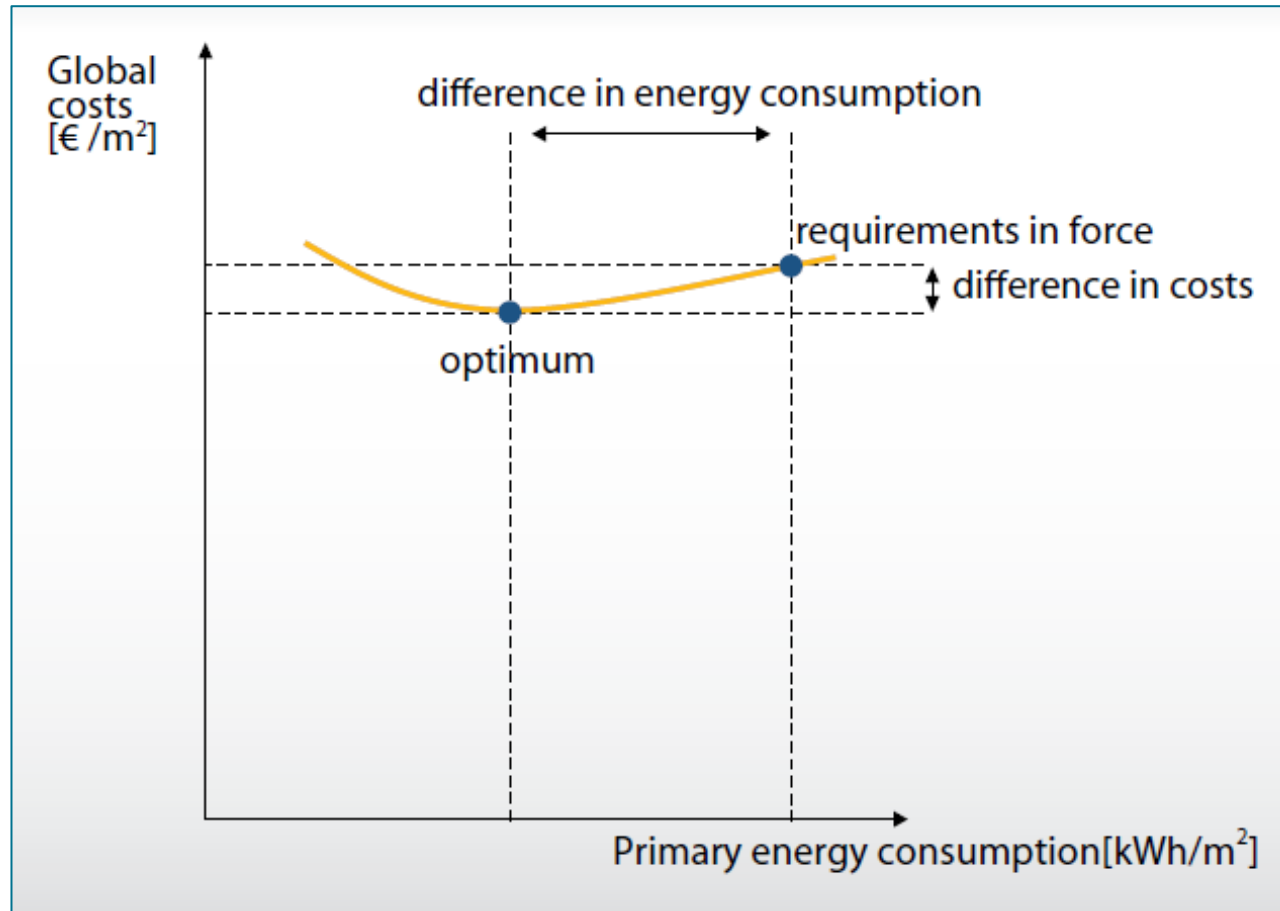
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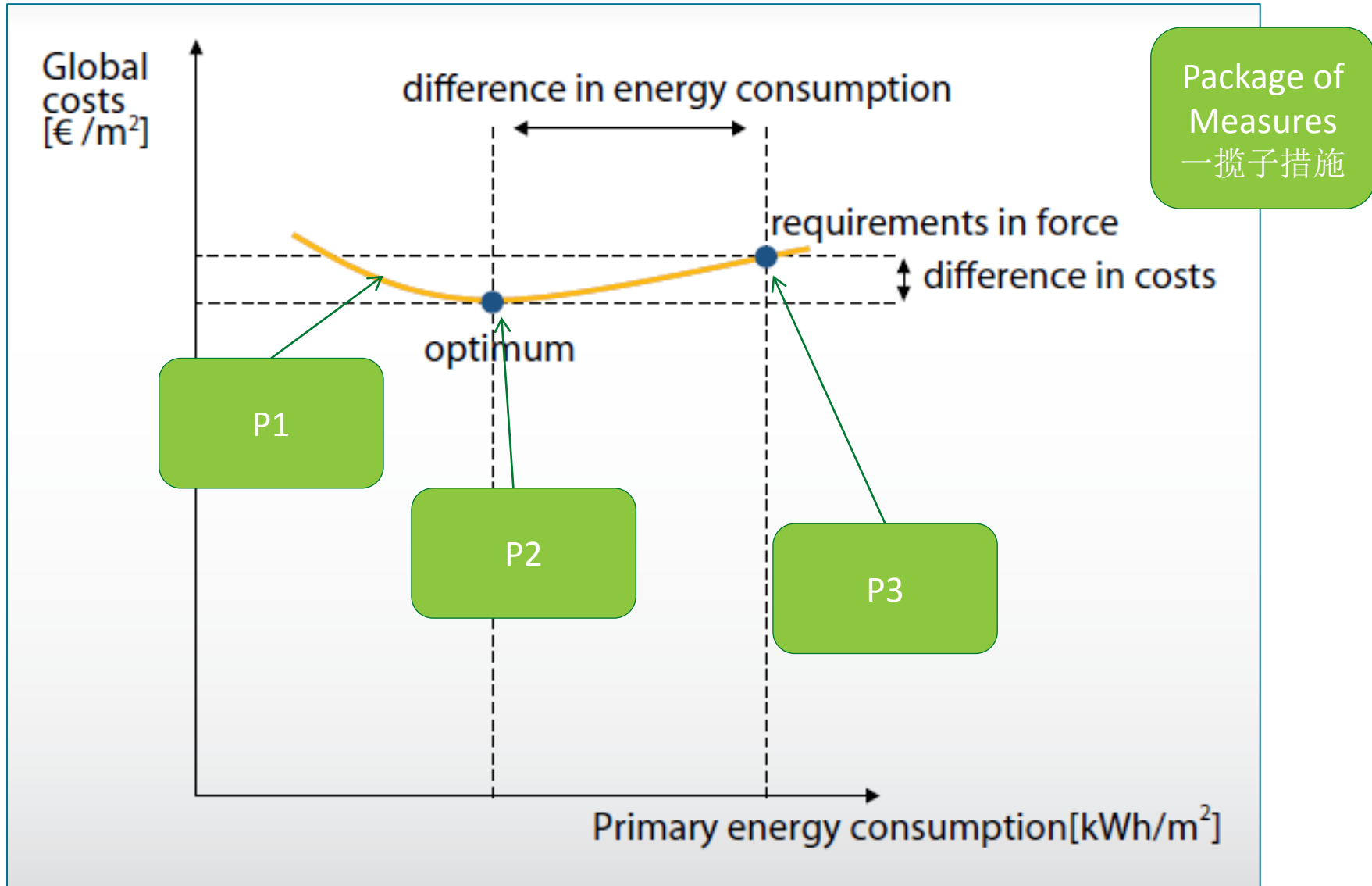


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# Cost optimal building performance requirements 成本最优建筑性能要求



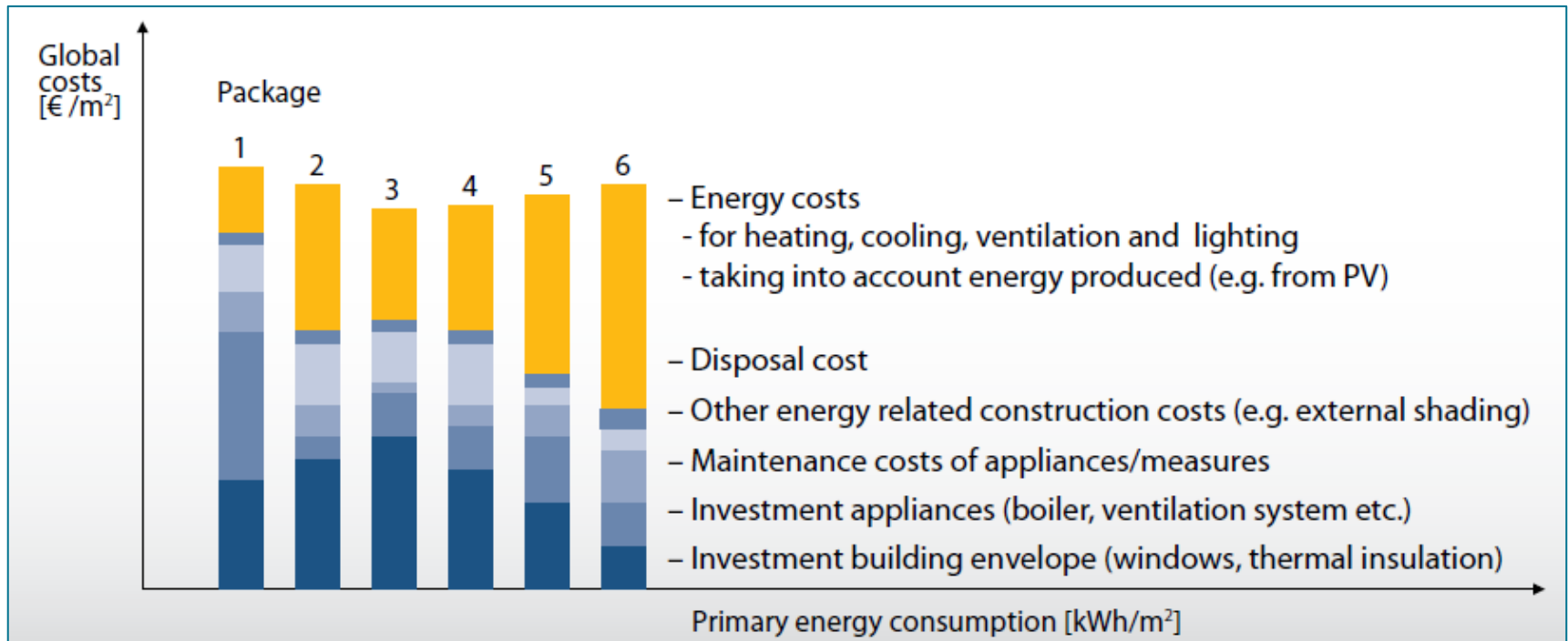
# Cost optimal building performance requirements 成本最优建筑性能要求



# Cost optimal building performance requirements 成本最优建筑性能要求

## Example cost calculations for different packages

### 不同的一揽子措施的成本计算示例



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# Nearly Zero Energy Building in the Energy Performance of Buildings Directive



## 《建筑能源绩效指令》对近零能耗建筑的规定



‘nearly zero-energy building’ means a building that has a very high energy performance, as determined in accordance with Annex I. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby;

**One EU requirement → 28 national implementation rules !**

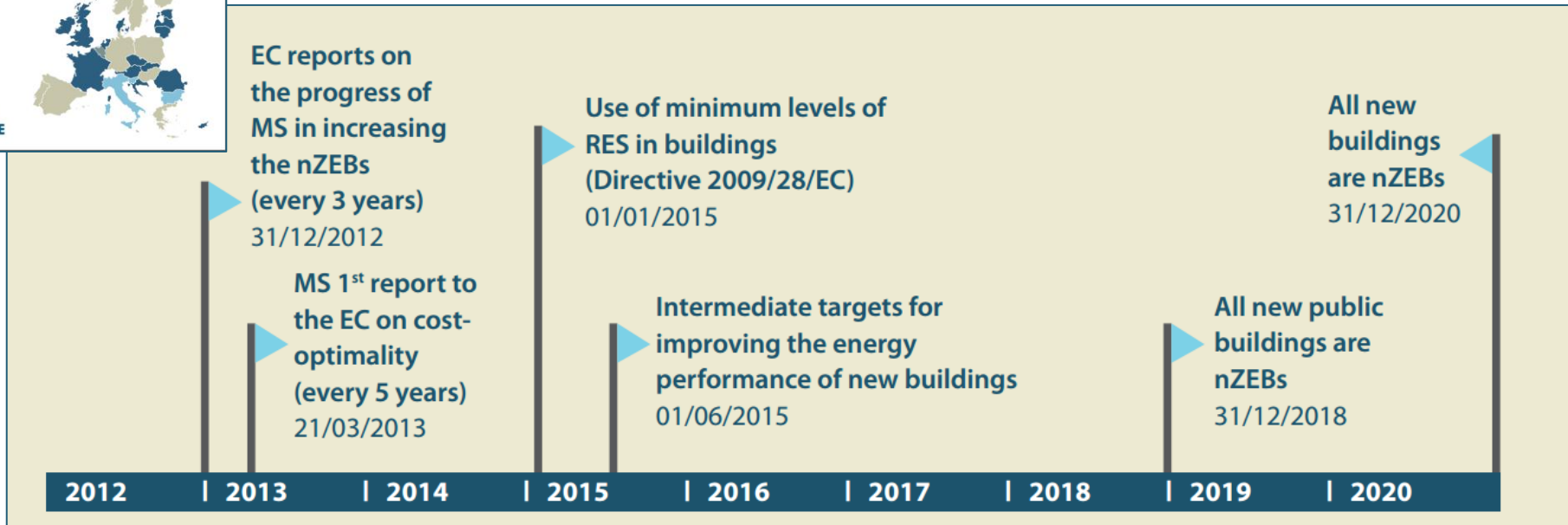
**一项欧盟要求 → 28国实施细则 !**



# Timeline for introducing nZEB 实行近零能耗建筑标准的时间线



[www.bpie.eu/nzeb\\_factsheet.html](http://www.bpie.eu/nzeb_factsheet.html)



# Impact of setting building standards and subsidies

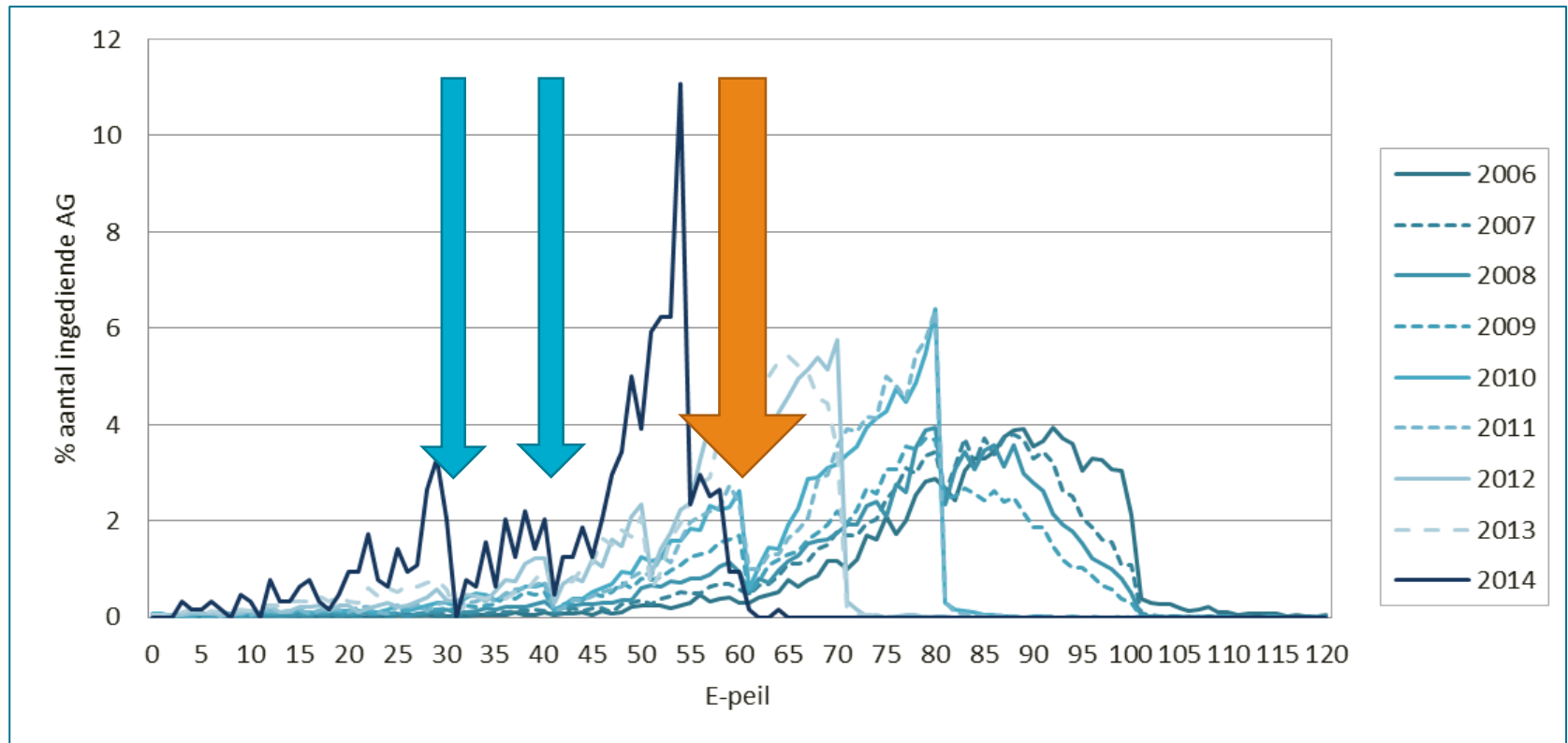
## 制定建筑标准和补贴的影响

- Progressive standards that tighten over time combined with subsidies

随着时间的推移标准和补贴逐渐收紧

- Example Flanders Belgium for energy standards new single family houses

例如：比利时法兰德斯地区新建独户住宅能源标准



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# ENERGY PERFORMANCE CERTIFICATES ACROSS THE EU



A MAPPING OF NATIONAL APPROACHES



# Evolution of EPC instrument in the EPBD

from information to market transformation tool

从信息到市场转型工具 - EPC工具在《建筑能源绩效指令》中的演变



## □ EPBD I (2002/91/EC)

《建筑能源绩效指令 I》(2002/91/欧共体)

- Integrated EPC methodology; 综合EPC方法;
- Mandatory energy performance certification system for new and existing buildings; 针对新建筑和既有建筑的强制能源绩效认证制度;
- Display of EPC for buildings occupied by public buildings (>1000 m<sup>2</sup>). 公共建筑 (>1000平方米) 必须展示EPC

4 January 2009; deadline  
for implementation of EPBD I  
2009年1月4日;  
实施《建筑能源绩效指令 I》的最后期限



2000

2005

2010

2015

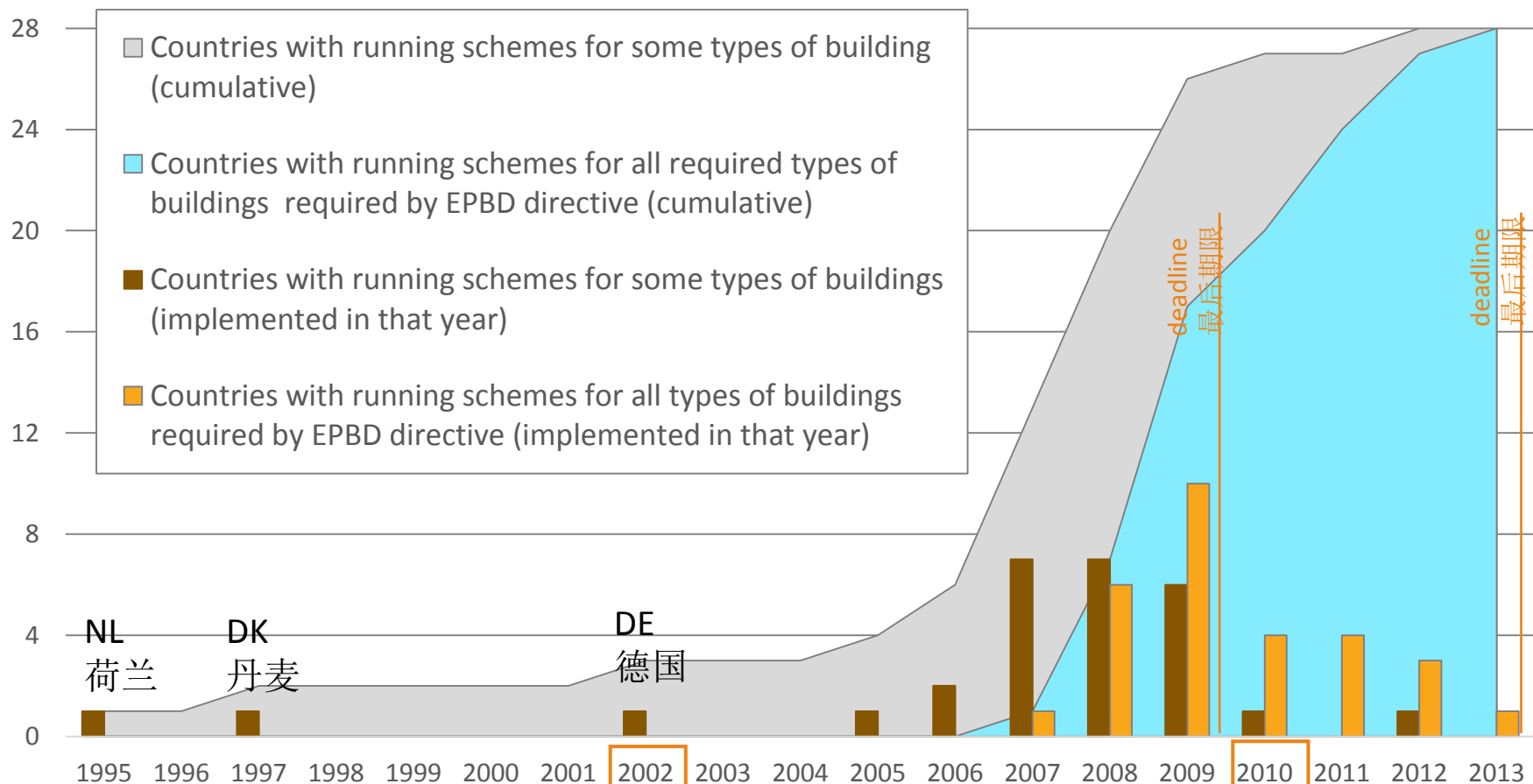
## □ EPBD (2010/31/EU) 《建筑能源绩效指令》(2010/31/欧盟)

- Independent quality control of EPC; EPC 的独立质量控制;
- Penalties for non-compliance; 违规处罚;
- Display of the energy label in the advertisements; 广告中显示能源标识;
- Display of the EPC on the frequently visited public buildings (>500m<sup>2</sup>; >250 m<sup>2</sup>); 在访问频繁的公共建筑 (>500平方米; >250平方米) 上显示EPC。
- Mandatory requirement to hand out the copy of the EPC at the sale and rent transactions; 强制要求在出售和出租交易时出示EPC复印件;
- Improvement in EPC recommendations (cost effective and cost optimal measures); EPC 改进建议 (成本效益和成本最优化措施);
- Verification of expert competence in the accreditation procedure. 认证程序中专家能力的验证

9 January 2013; deadline  
for implementation of EPBD  
2013年1月9日;  
实施《建筑能源绩效指令》的最后期限

# Implementation of EPC scheme across EU-28

## 欧盟28国全境实施EPC计划



### Note: 备注:

Hungary will introduce a mandatory EPC for rented buildings by 2015, the system is currently voluntary; 匈牙利将在2015年之前对出租的建筑物实行强制EPC计划, 目前为自愿制度;

In Slovakia certification for building units (i.e. dwellings) will come in force in 2016; 在斯洛伐克, 建筑单位(如民居)的认证将于2016年生效;

In Belgium (Flanders and Wallonia), energy performance certification for non-residential buildings is foreseen for 2015. 比利时(法兰德斯和瓦隆地区)预计于2015年实行非住宅建筑的能源绩效认证。

EPBD 2002/91/EC

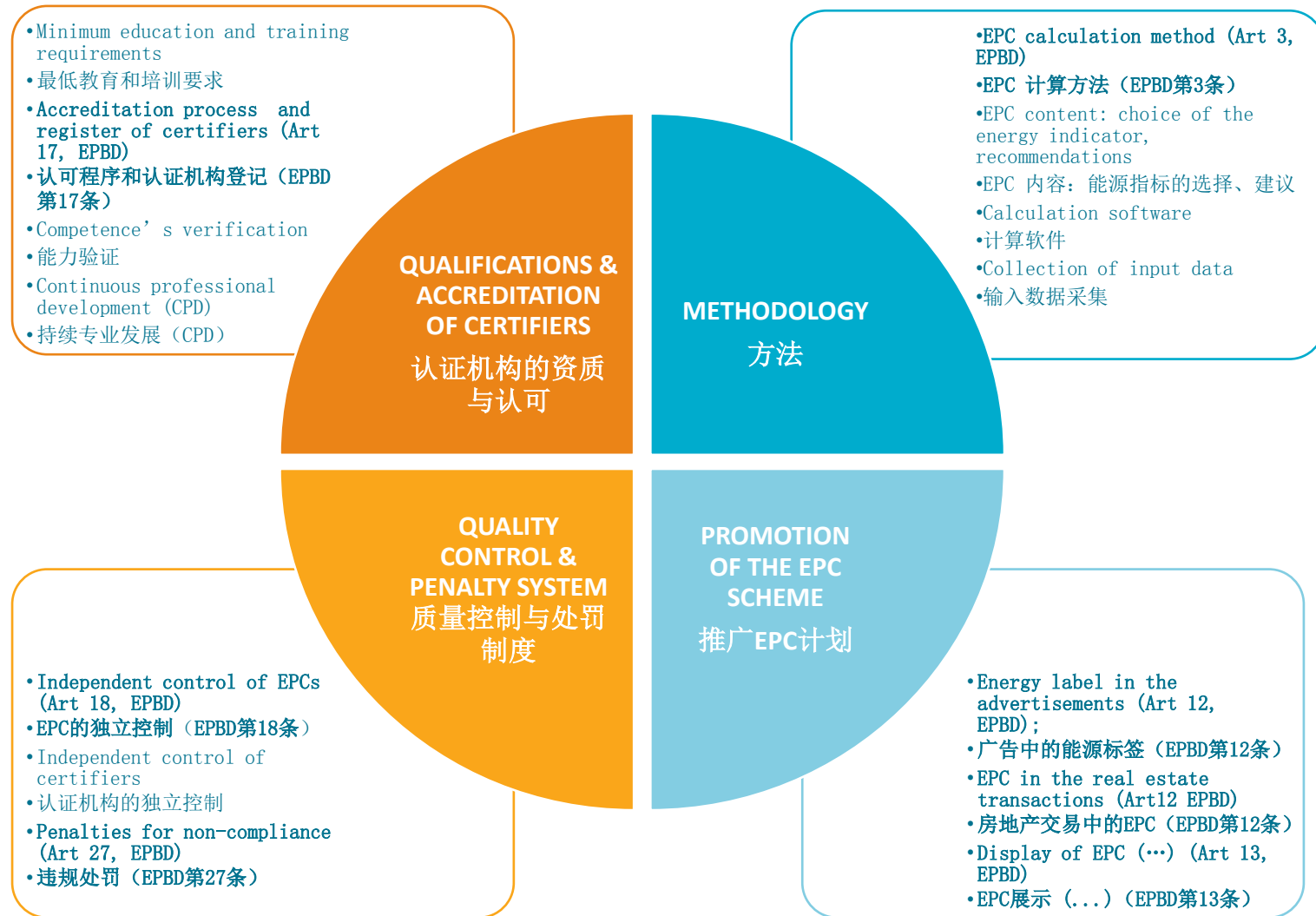
《建筑能源绩效指令》2002/91/欧共体

EPBD Recast 2010/31/EU

《建筑能源绩效指令》2010/31/欧盟

# An architecture of the EPC scheme

## EPC计划的架构



SYSTEMATIC BUILDINGS DATA COLLECTION IN THE EPC REGISTERS

EPC 登记中的建筑数据系统化收集



# What is the EPC content?

## EPC的内容是什么？



**Art 11, EPBD :** The energy performance certificate **shall** include the **energy performance of a building and reference values**, as well as the recommendations for the cost-optimal or cost-effective improvement of the energy performance of a building or building unit;

**EPBD第11条：** 能源绩效证书应包括**建筑物的能源绩效和参考值**，以及建筑物或建筑单元能源绩效的**成本最优或成本效益改进建议**；

The recommendations included in the energy performance certificate **shall** be technically feasible for the specific building and may provide an estimate for the range of payback periods or cost-benefits analysis;

对具体建筑而言，能源绩效证书中的建议在技术上应是可行的，并能对投资回收期或成本效益分析范围作出估计；

The energy performance certificate **may** include additional information such as the annual energy consumption for non-residential buildings and the percentage of energy from renewable sources in the total energy consumption.

能源绩效证书**可能**包含附加信息，如**非住宅建筑的年能耗以及可再生能源在总能耗中所占的百分比**。

In some countries in addition it consists of:

在另外一些国家，EPC包括：

- 📦 Tailor-made vs. standardised recommendation;

量身定做vs. 标准化建议；

- 📦 Recommendation to consider the thermal, visual, acoustic comfort & air quality;

考虑热、视觉、声适感和空气质量的建议；

- 📦 Recommendations to take into account life-cycle cost (e.g. waste disposal);

将生命周期成本（如废物处理）纳入考量的建议；

- 📦 Heat losses and solar gains of the building component;

建筑构件的热损失和太阳能获取；

- 📦 CO2 estimation factor, carbon footprint;

- 📦 二氧化碳估算因子、碳足迹；

# EPC Examples - Greece

## EPC 范例 - 希腊



Α.Π.: ..... Α.Α.: .....

**ΧΡΗΣΗ:** .....

Κτίριο ☐ Τμήμα κτιρίου ☐

Αριθμός ιδιοκτησίας: .....

Κλιματική Ζώνη: .....

Διεύθυνση: ..... Τ.Κ. ....

Πόλη: .....

Έτος κατασκευής: .....

Συνολική επιφάνεια [m<sup>2</sup>]: .....

Θερμαινόμενη επιφάνεια [m<sup>2</sup>]: .....

Όνομα ιδιοκτήτη: .....

(Φωτογραφία κτιρίου)

---

**ΒΑΘΜΟΛΟΓΗΣΗ ΕΝΕΡΓΕΙΑΚΗΣ ΑΠΟΔΟΣΗΣ**

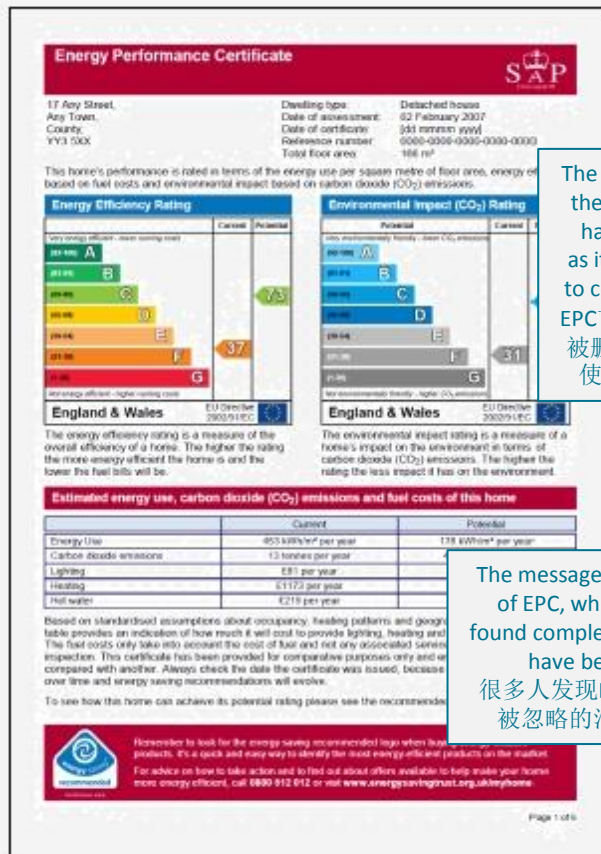
ΜΗΔΕΝΙΚΗΣ ΕΝΕΡΓΕΙΑΚΗΣ ΚΑΤΑΝΑΛΩΣΗΣ	ΕΝΕΡΓΕΙΑΚΗ ΚΑΤΗΓΟΡΙΑ
$EP \leq 0,33 \cdot R_R$ <b>A+</b>	
$0,33 \cdot R_R < EP \leq 0,5 \cdot R_R$ <b>A</b>	
$0,5 \cdot R_R < EP \leq 0,75 \cdot R_R$ <b>B+</b>	
$0,75 \cdot R_R < EP \leq 1,0 \cdot R_R$ <b>B</b>	<b>B</b>
$1,0 \cdot R_R < EP \leq 1,41 \cdot R_R$ <b>Γ</b>	
$1,41 \cdot R_R < EP \leq 1,82 \cdot R_R$ <b>Δ</b>	
$1,82 \cdot R_R < EP \leq 2,27 \cdot R_R$ <b>Ε</b>	
$2,27 \cdot R_R < EP \leq 2,73 \cdot R_R$ <b>Ζ</b>	
$2,73 \cdot R_R < EP$ <b>Η</b>	
<b>ΕΝΕΡΓΕΙΑΚΑ ΜΗ ΑΠΟΔΟΤΙΚΟ</b>	
Υπολογιζόμενη ετήσια κατανάλωση πρωτογενούς ενέργειας κτιρίου αναφοράς [kWh/m <sup>2</sup> ]: .....	
Υπολογιζόμενη ετήσια κατανάλωση πρωτογενούς ενέργειας [kWh/m <sup>2</sup> ]: .....	
Υπολογιζόμενες ετήσιες εκπομπές CO <sub>2</sub> [kgCO <sub>2</sub> /m <sup>2</sup> ]: .....	
<b>ΠΡΑΓΜΑΤΙΚΗ ΕΤΗΣΙΑ ΚΑΤΑΝΑΛΩΣΗ ΕΝΕΡΓΕΙΑΣ &amp; ΕΚΠΟΜΠΕΣ CO<sub>2</sub></b>	
Ηλεκτρική ενέργεια [kWh/m <sup>2</sup> ]: .....	Καύσιμα [kWh/m <sup>2</sup> ]: .....
Συνολική ετήσια κατανάλωση πρωτογενούς ενέργειας [kWh/m <sup>2</sup> ]: .....	
Συνολικές ετήσιες εκπομπές CO <sub>2</sub> [kg/m <sup>2</sup> ]: .....	

Θερμική άνεση <input type="checkbox"/>
Οπτική άνεση <input type="checkbox"/>
Ακουστική άνεση <input type="checkbox"/>
Ποιότητα αέρα <input type="checkbox"/>

- ☒ thermal comfort  
热舒适
- ☐ visual comfort  
视觉舒适
- ☒ acoustic comfort  
声适感
- ☐ air quality  
空气质量

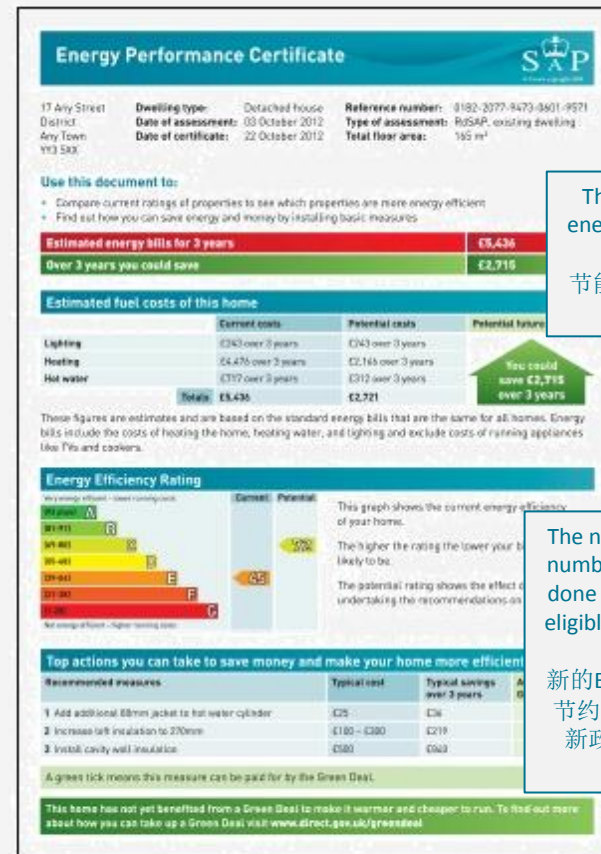
# EPC Example - UK

## EPC 范例 - 英国



The second graph from the front page of EPC has been removed, as it had the potential to confuse consumers. EPC首页的第二张图已被删除,因为它可能使消费者感到困惑

The messages at the front page of EPC, which many people found complex or ignored, were simplified. 很多发现EPC首页上复杂或被忽略的消息都被简化了



The savings of having an energy-efficiency home are made cleaner. 节能家居的节省效果更加一目了然

The new EPCs highlight a small number of things which can be done to achieve savings (many eligible for the Green Deal, and will no upfront cost). 新的EPC强调了一些可以实现节约的事(许多都符合绿色新政,并且不会有前期成本)

EPC before 1st April 2012

EPC after 1st April 2012

# EPC impact on the market transformation

## EPC对市场转型的影响

**A European Commission (2013)** study found positively correlated price signals with energy class rating increases in 8 out of 9 regions examined;

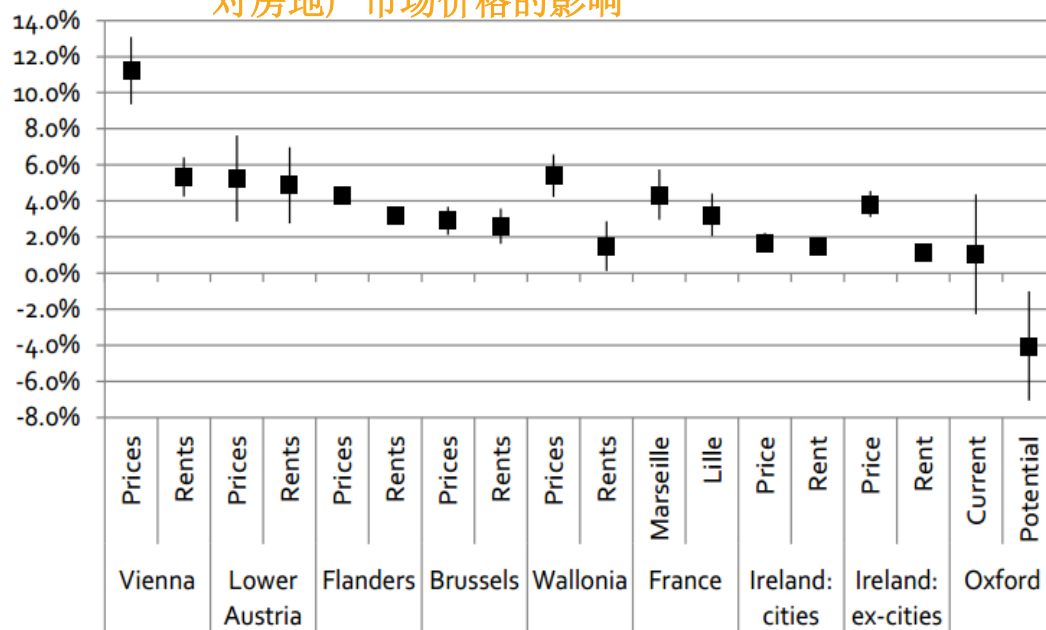
欧盟委员会在2013年的一份研究发现，9个调查地区中有8个地区的价格信号与能源等级评级的上升呈正相关关系。

Importance of energy labels among the decision criteria on sale and rent transaction grows;

能源标识在出售和出租交易决策标准中的重要性与日俱增；

### Effects on prices in the property market

### 对房地产市场价格的影响



Energy performance certificates in buildings and their impact on transaction prices and rents in selected EU countries

FINAL REPORT  
European Commission (DG Energy)  
19 April 2013



# Table of Content

## 主要内容



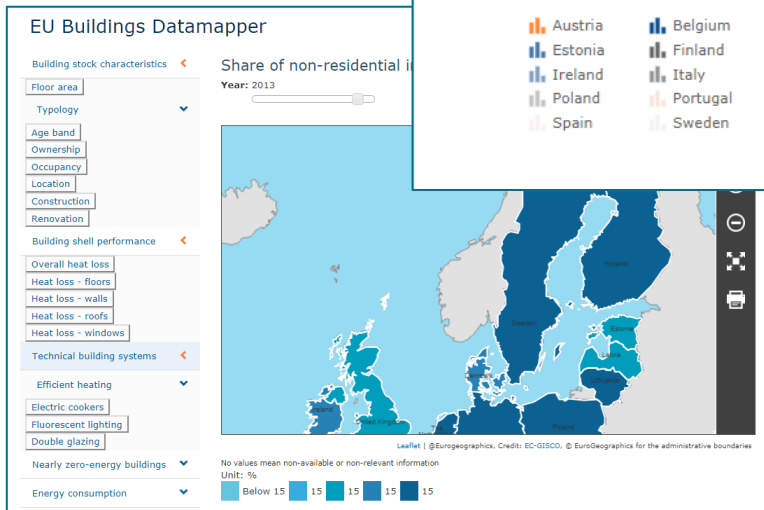
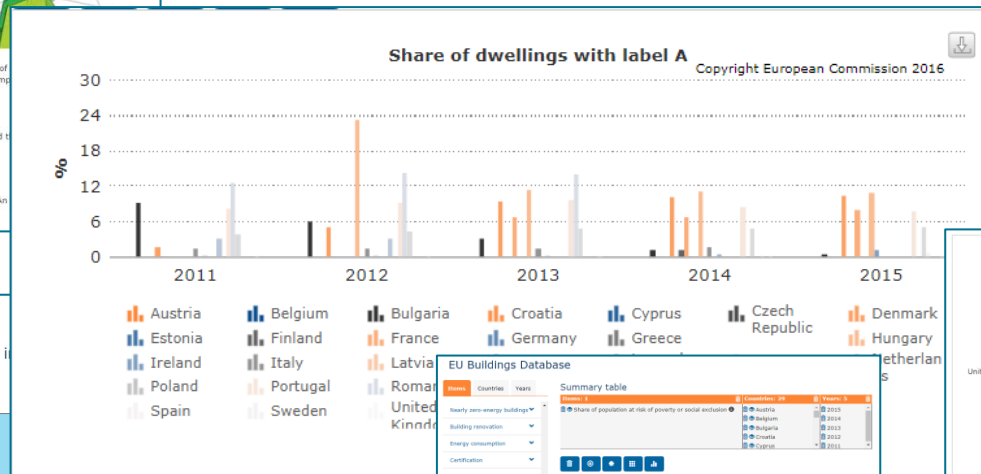
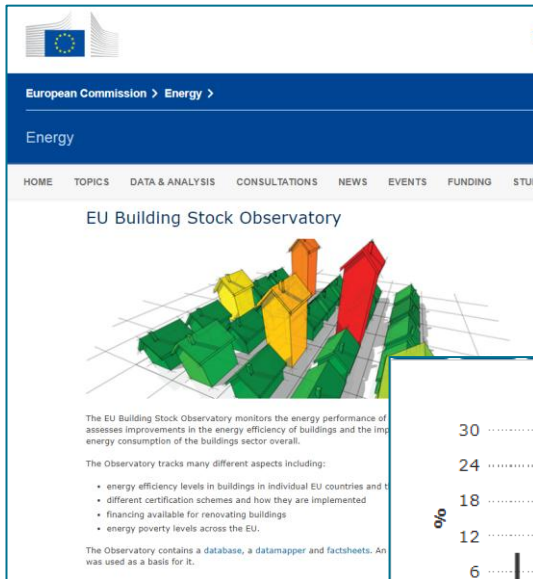
- 🏠 Statistics about the European Building Stock 欧洲存量建筑统计
- 🏠 The EU Regulatory Framework in relation to buildings' energy performance  
建筑物能源绩效的欧盟监管框架
- 🏠 Requirements of the legislation 立法要求
  - 🏠 Cost-optimal methodology 成本最优化方法
  - 🏠 Nearly-Zero Energy Buildings (nZEBs) 近零能耗建筑 (nZEBs)
  - 🏠 Energy Performance Certificates 能源绩效证书
  - 🏠 Data in support for policies - examples of EU initiatives 支持政策的数据 – 欧盟倡议示例
- 🏠 Trends in energy and technology development in the building sector  
建筑行业的能源和技术发展趋势

# EU Buildings Observatory 欧盟建筑观察站



- Led by BPIE
- 5 partners
- 19 subcontractors
- 250 indicators
- 28 EU member states

BPIE牵头：  
5家合作伙伴  
19家分包商  
250项指标  
28个欧盟成员国

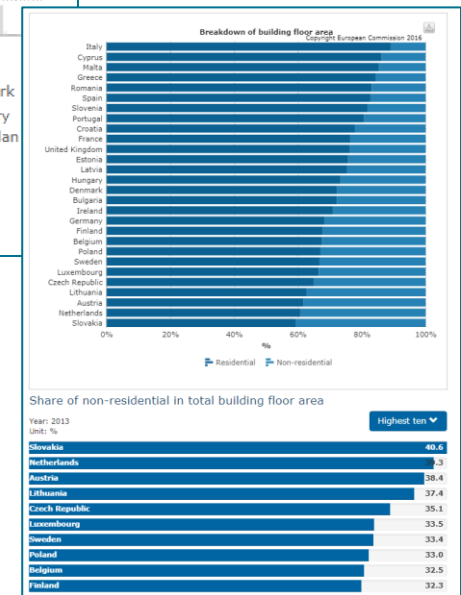


EU Buildings Database

Summary table

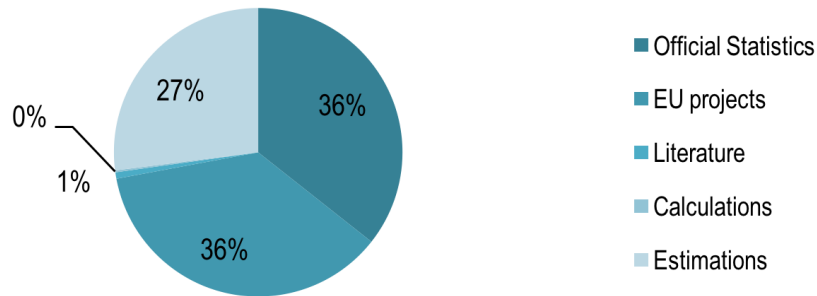
Share of population at risk of poverty or social exclusion

Country	Year	Share of population at risk of poverty or social exclusion (%)
Austria	2011	18.00
Austria	2012	18.00
Austria	2013	18.00
Austria	2014	18.00
Austria	2015	18.00
Belgium	2011	21.00
Belgium	2012	21.00
Belgium	2013	21.00
Belgium	2014	21.00
Belgium	2015	21.00
Bulgaria	2011	49.10
Bulgaria	2012	49.10
Bulgaria	2013	49.10
Bulgaria	2014	49.10
Bulgaria	2015	49.10
Croatia	2011	22.80
Croatia	2012	22.80
Croatia	2013	22.80
Croatia	2014	22.80
Croatia	2015	22.80
Cyprus	2011	24.60
Cyprus	2012	24.60
Cyprus	2013	24.60
Cyprus	2014	24.60
Cyprus	2015	24.60
Czech Republic	2011	15.30
Czech Republic	2012	15.30
Czech Republic	2013	15.30
Czech Republic	2014	15.30
Czech Republic	2015	15.30
Denmark	2011	18.00
Denmark	2012	18.00
Denmark	2013	18.00
Denmark	2014	18.00
Denmark	2015	18.00
Estonia	2011	23.10
Estonia	2012	23.10
Estonia	2013	23.10
Estonia	2014	23.10
Estonia	2015	23.10
Finland	2011	17.90
Finland	2012	17.90
Finland	2013	17.90
Finland	2014	17.90
Finland	2015	17.90
France	2011	18.30
France	2012	18.30
France	2013	18.30
France	2014	18.30
France	2015	18.30
Germany	2011	18.00
Germany	2012	18.00
Germany	2013	18.00
Germany	2014	18.00
Germany	2015	18.00
Greece	2011	23.00
Greece	2012	23.00
Greece	2013	23.00
Greece	2014	23.00
Greece	2015	23.00
Hungary	2011	15.10
Hungary	2012	15.10
Hungary	2013	15.10
Hungary	2014	15.10
Hungary	2015	15.10
Ireland	2011	28.40
Ireland	2012	28.40
Ireland	2013	28.40
Ireland	2014	28.40
Ireland	2015	28.40
Italy	2011	28.10
Italy	2012	28.10
Italy	2013	28.10
Italy	2014	28.10
Italy	2015	28.10
Latvia	2011	48.10
Latvia	2012	48.10
Latvia	2013	48.10
Latvia	2014	48.10
Latvia	2015	48.10
Lithuania	2011	33.10
Lithuania	2012	33.10
Lithuania	2013	33.10
Lithuania	2014	33.10
Lithuania	2015	33.10
Luxembourg	2011	18.80
Luxembourg	2012	18.80
Luxembourg	2013	18.80
Luxembourg	2014	18.80
Luxembourg	2015	18.80
Malta	2011	22.10
Malta	2012	22.10
Malta	2013	22.10
Malta	2014	22.10
Malta	2015	22.10
Netherlands	2011	15.70
Netherlands	2012	15.70
Netherlands	2013	15.70
Netherlands	2014	15.70
Netherlands	2015	15.70
Ireland	2011	27.20
Ireland	2012	27.20
Ireland	2013	27.20
Ireland	2014	27.20
Ireland	2015	27.20
Portugal	2011	24.40
Portugal	2012	24.40
Portugal	2013	24.40
Portugal	2014	24.40
Portugal	2015	24.40
Romania	2011	40.30
Romania	2012	40.30
Romania	2013	40.30
Romania	2014	40.30
Romania	2015	40.30
Slovakia	2011	20.60
Slovakia	2012	20.60
Slovakia	2013	20.60
Slovakia	2014	20.60
Slovakia	2015	20.60
Slovenia	2011	18.20
Slovenia	2012	18.20
Slovenia	2013	18.20
Slovenia	2014	18.20
Slovenia	2015	18.20
Spain	2011	26.70
Spain	2012	26.70
Spain	2013	26.70
Spain	2014	26.70
Spain	2015	26.70
Sweden	2011	18.10
Sweden	2012	18.10
Sweden	2013	18.10
Sweden	2014	18.10
Sweden	2015	18.10
United Kingdom	2011	12.70
United Kingdom	2012	12.70
United Kingdom	2013	12.70
United Kingdom	2014	12.70
United Kingdom	2015	12.70
EU28	2011	24.20
EU28	2012	24.20
EU28	2013	24.20
EU28	2014	24.20
EU28	2015	24.20



# Data collection process: sources 数据采集过程：来源

**Building stock characteristics**



🏠 Population and Housing Census

人口和住房普查

🏠 European Statistical Office

欧洲统计办公室

➤ housing stock 住房存量

➤ energy consumption 能耗

➤ energy poverty 能源贫困

🏠 Business & housing surveys

商业和住房调查

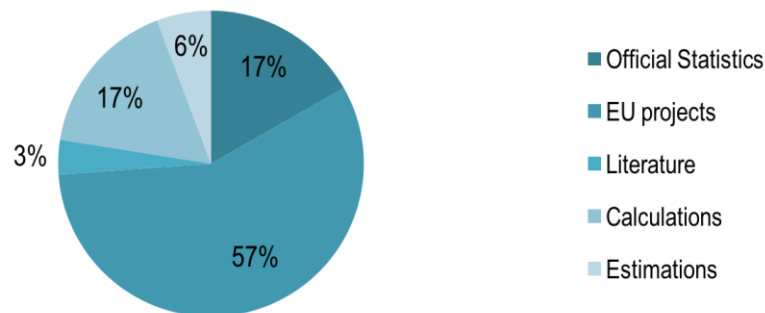
🏠 Administrative data

管理数据

🏠 Research project, i.e. modelling & in situ measurements

研究项目，即建模和原位测量

**Technical systems**





# The EU Building Stock Observatory: results

## 欧洲存量建筑观察站：结果

Figure 1: Breakdown of building floor area (2013)

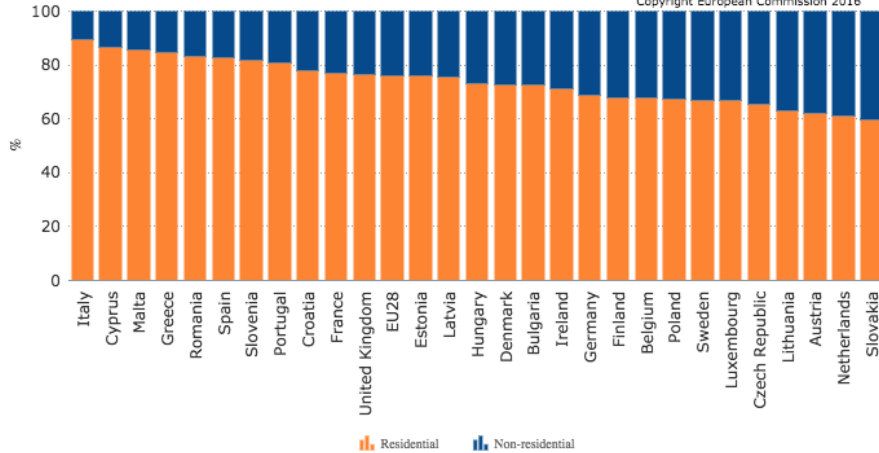


Figure 2: Breakdown of residential building by construction year (2014)

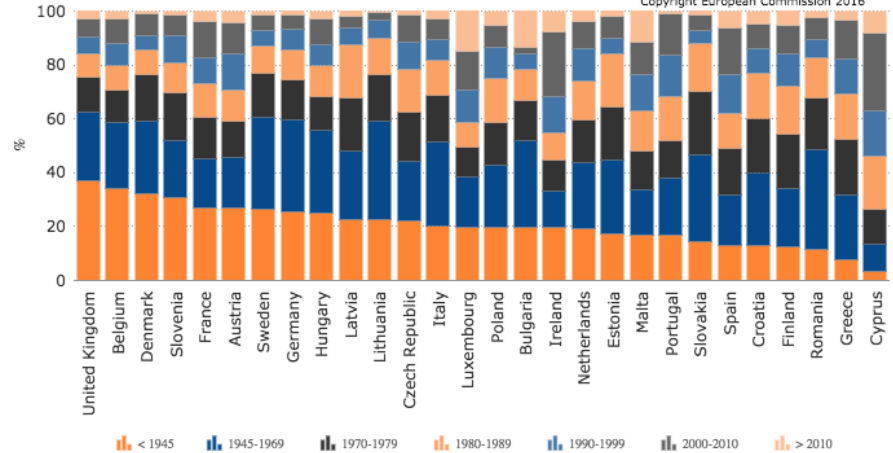


Figure 2: Share of population living in a dwelling not comfortably cool during summer time (2012)

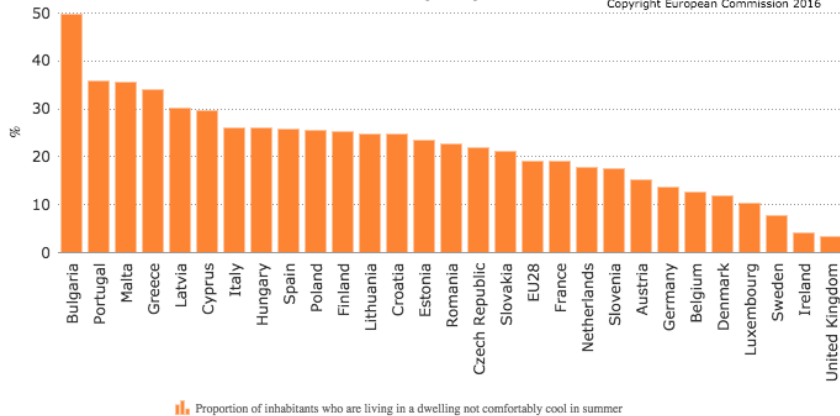
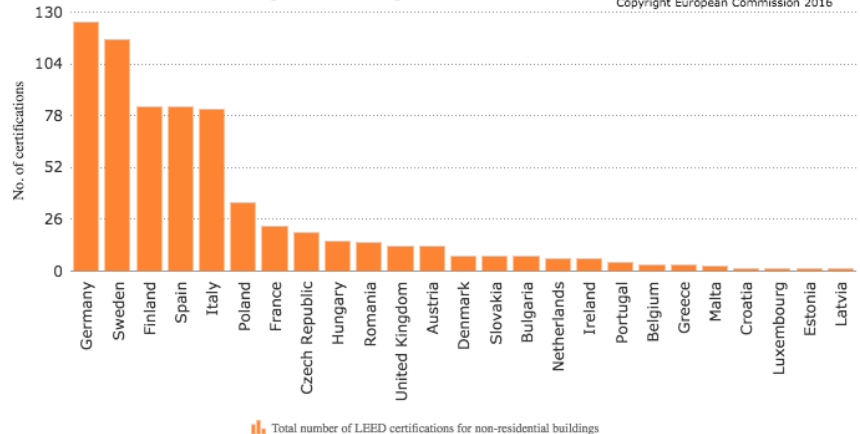
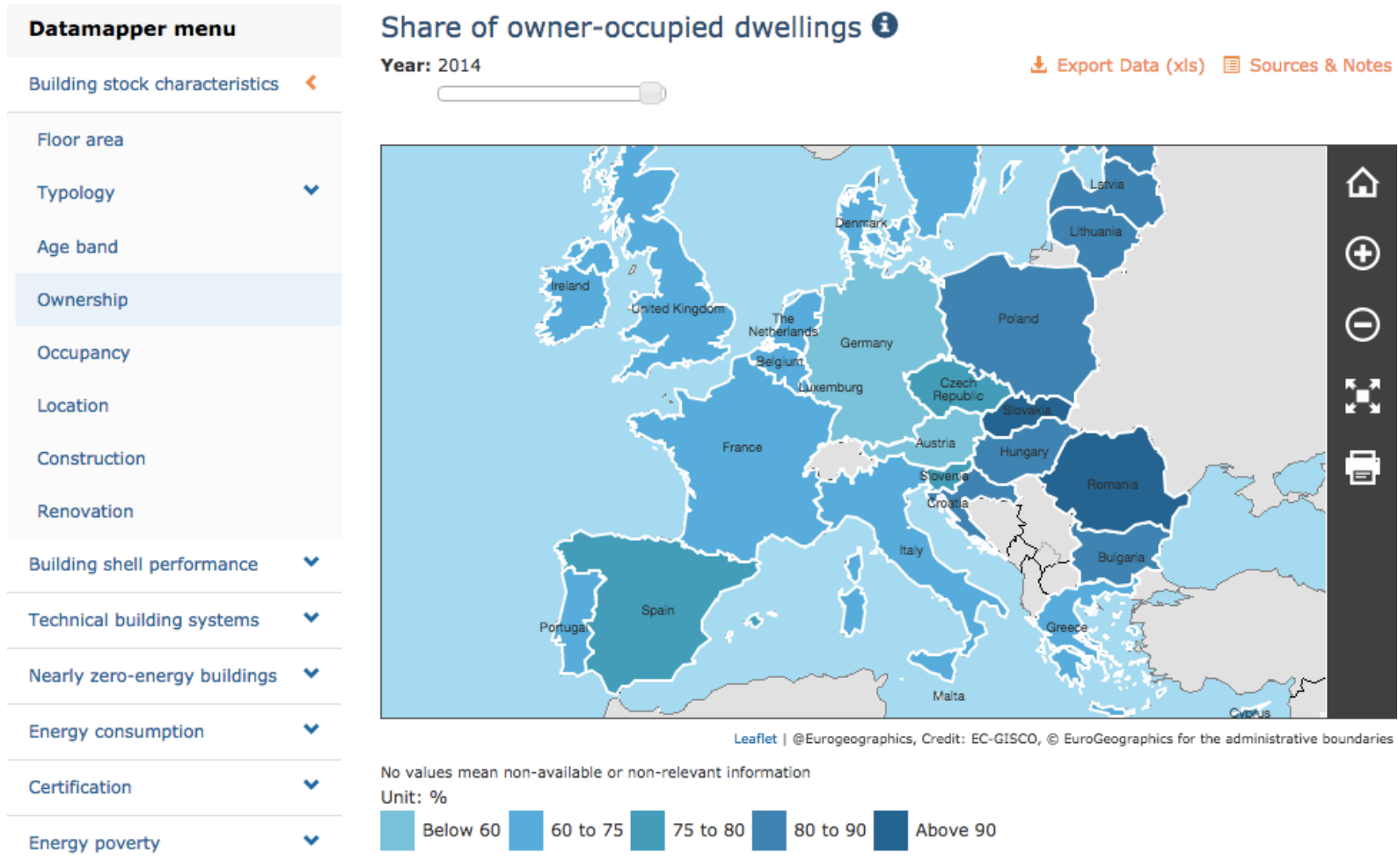


Figure 2: Buildings with LEED certification (2014)



# The EU Building Stock Observatory: results

## 欧洲存量建筑观察站：结果



# The EU Building Stock Observatory: results

## 欧洲存量建筑观察站：结果



### EU Buildings Factsheets

Topics **Countries** Austria

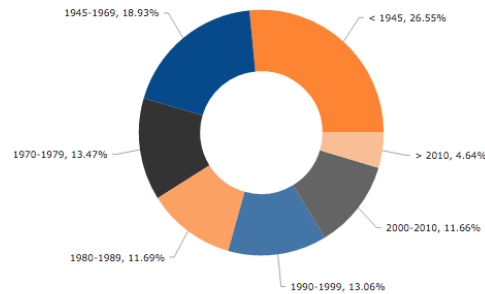
Austria
Belgium
Bulgaria
Croatia
Cyprus
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Ireland
Italy
Latvia

Disclaimer: The graphs below show data available in the EU Building Stock Observatory; some data was not available for this specific country.

#### Building Stock Characteristics

The average age of buildings and the share of new buildings in the total stock represent good indicators of the average efficiency of the building stock: the higher the share of recent dwelling, i.e. built with more efficient standards, the higher the energy performance of the stock.

Figure 1: Residential buildings according to construction date (2014)  
Copyright European Commission 2016



### Country factsheets (28)

### 国家情况报告 (28)

### EU Buildings Factsheets

Topics **Countries**

Building stock characteristics
Building shell performance
Technical building systems
Technical systems
On-site renewable energy
Appliances and lighting
Embodied energy
Nearly zero-energy buildings
Building renovation
Energy consumption
Certification
Financing
Energy poverty
Energy market
Back to Home - EU Buildings

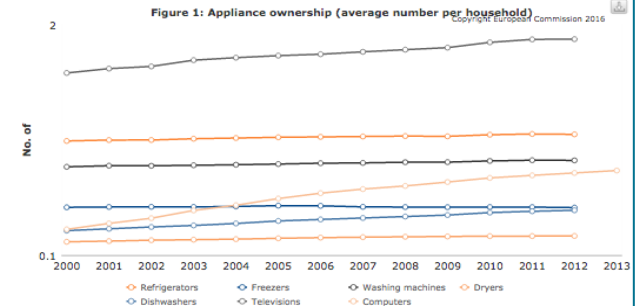
#### Appliances and lighting

Disclaimer: The graphs below show data available in the EU Building Stock Observatory; a country not represented only means data was not available for this specific country.

#### Introduction

Although in many countries building-related energy consumption makes up the major share of the total energy consumption. In most countries, this energy consumption is steadily growing, as shown by the increasing share of electrical appliances (including cooking and lighting as well) in the total residential consumption in Figure 1. This is due to a growing number of appliances in the households. The introduction of the Eco-design standards has compensated for this growth by making appliances more efficient. Because of these standards, the energy consumption of individual large appliances like refrigerators, freezers, washing machines etc., has decreased significantly. The types of appliances addressed by norms is increasing. Because of this reason, the stand-by use of smaller appliances, such as light bulbs and others is becoming more efficient.

#### The average number of appliances in EU homes is steadily rising



### Thematic factsheets (19)

### 专题报告 (19)

# EEFIG De-risking Project EEFIG风险规避项目



- De-risking Energy Efficiency Platform (DEEP)

## 风险规避能效平台（DEEP）

- Launched November 2016      2016年11月推出
  - > 7,500 projects and growing      项目数量超过7500个，并不断增加
- <http://deep.eefig.eu>



### Project partners: 项目合作伙伴:



# De-risking Energy Efficiency Platform (DEEP)



## 风险规避能效平台 (DEEP)

🏠 Key Figures      关键数字

🏠 Data Overview      数据一览

🏠 View Charts      图表查看

🏠 Add & Manage Projects

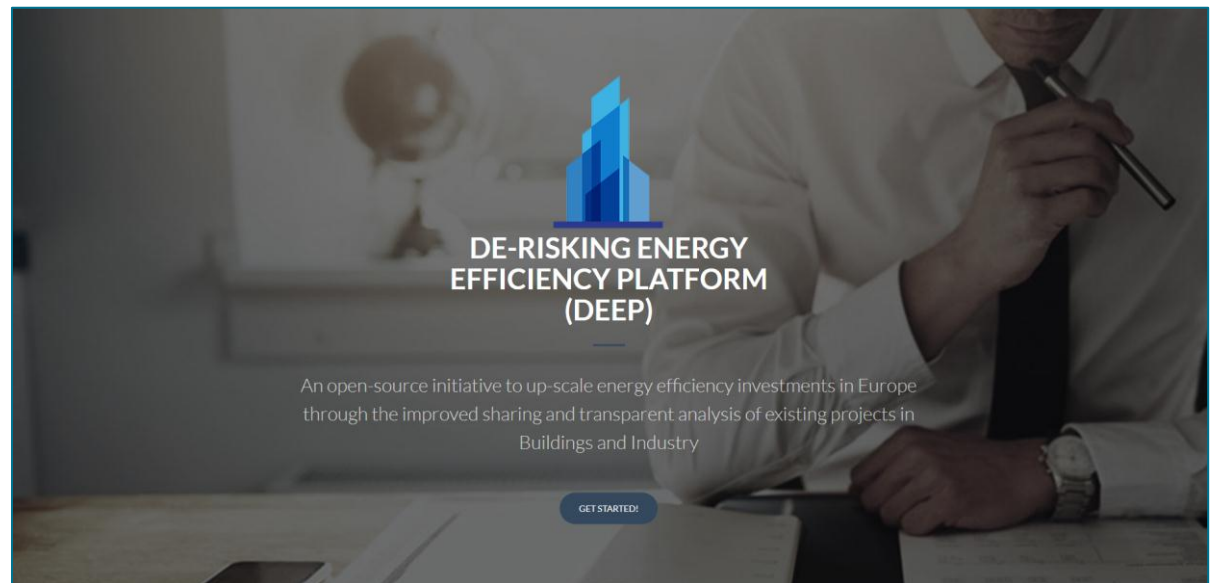
添加 & 管理项目

🏠 Analysis Toolbox

分析工具箱

🏠 Benchmarking

基准



# De-risking Energy Efficiency Platform

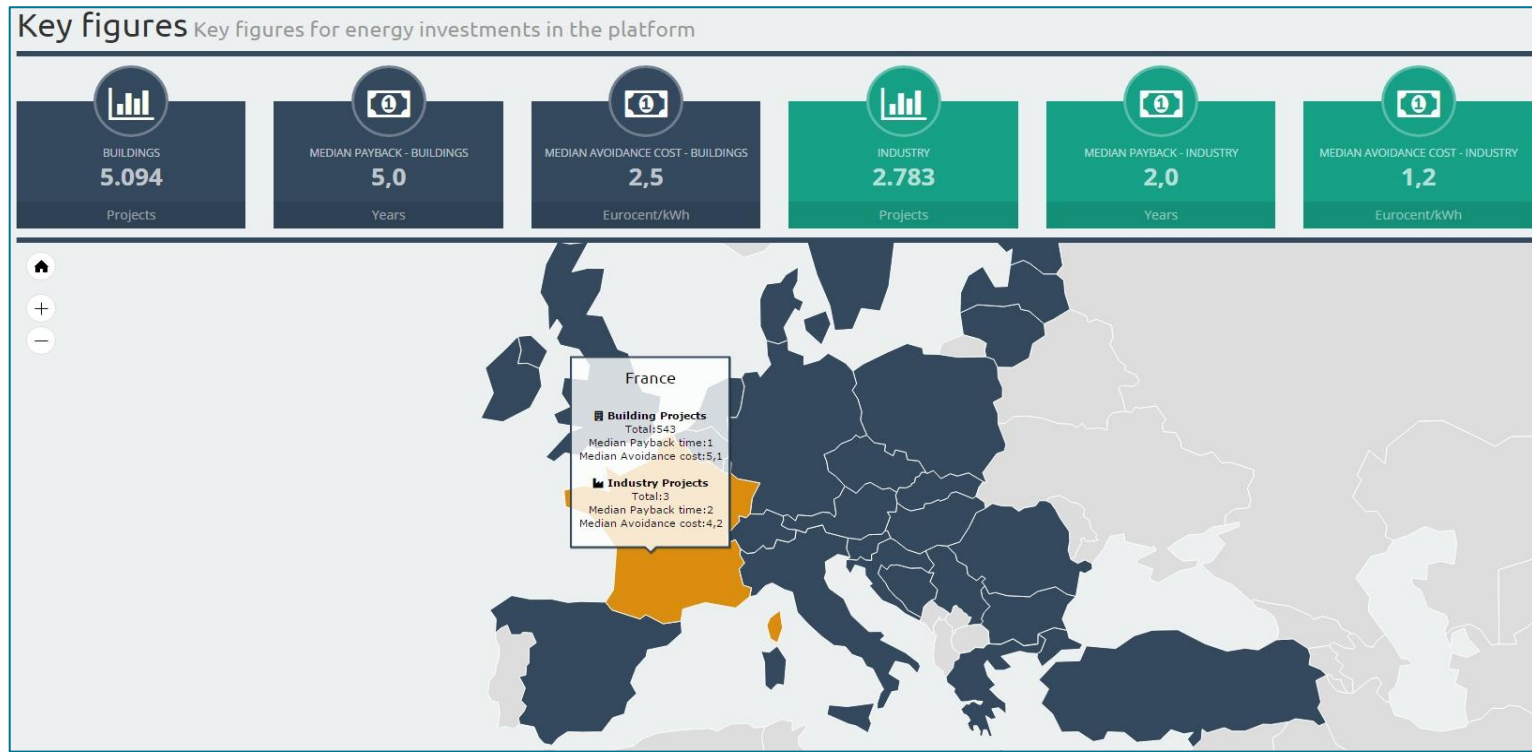
## Key Figures

### 风险规避能效平台 - 关键数字



➤ Quick overview of the Buildings and Industry projects

建筑和工业项目速览



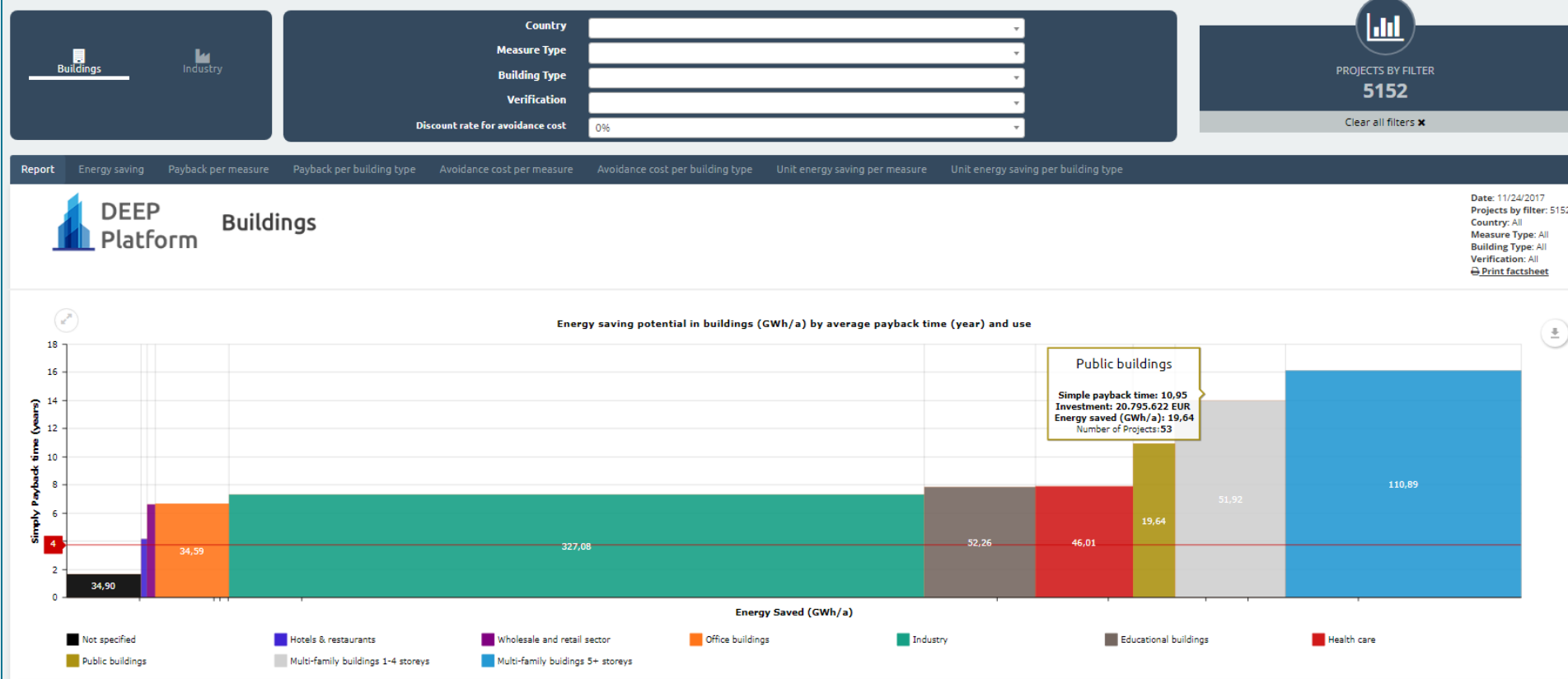
# De-risking Energy Efficiency Platform View Chart

## 风险规避能效平台 - 图表查看



- Country 国家
- Measure type 测量类型
- Building type 建筑类型
- Verification method 验证方法

### View Charts - Buildings



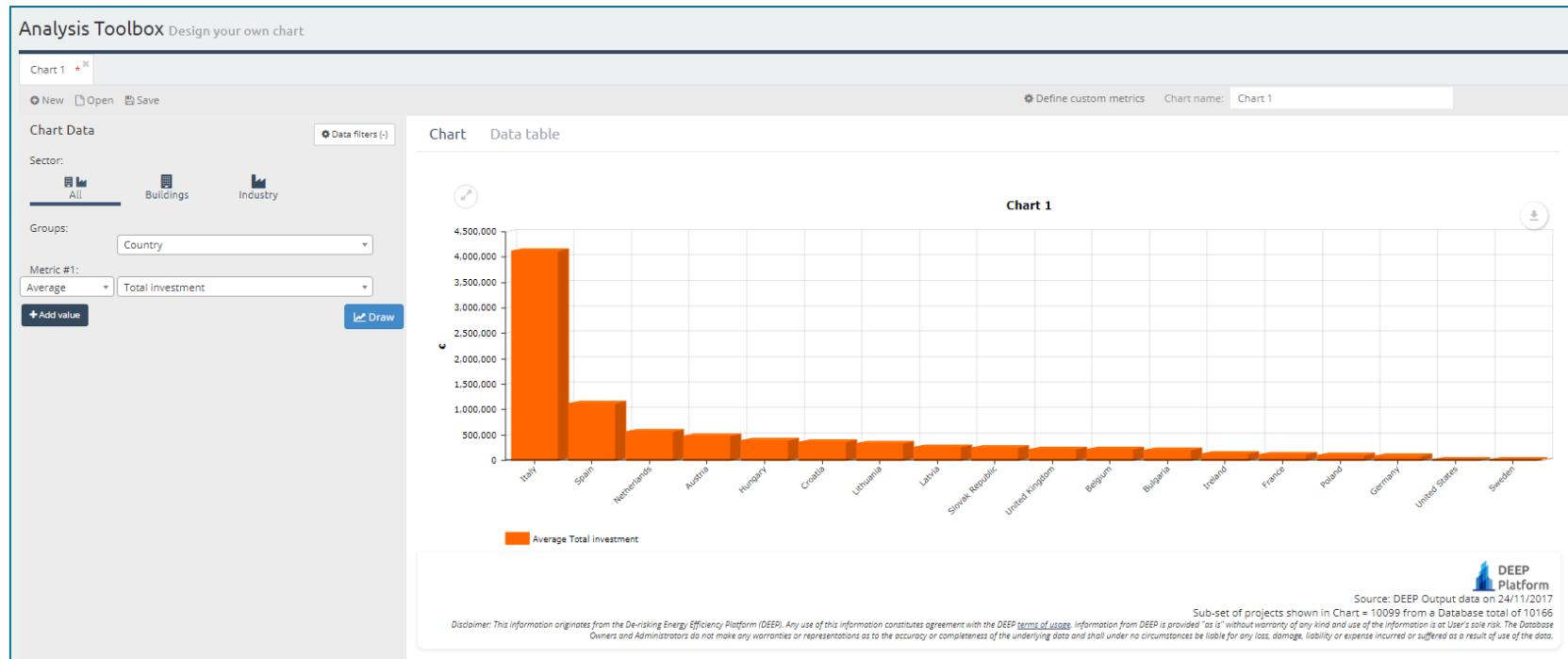
# Derisking Energy Efficiency Platform (DEEP) Analysis Toolbox



## 风险规避能效平台（DEEP）－ 分析工具箱

### ➤ Creation of charts

### 创建图表





# Table of Content

## 主要内容



- 📦 Statistics about the European Building Stock 欧洲存量建筑统计
- 📦 The EU Regulatory Framework in relation to buildings' energy performance  
建筑物能源绩效的欧盟监管框架
- 📦 Requirements of the legislation 立法要求
  - 📦 Cost-optimal methodology 成本最优化方法
  - 📦 Nearly-Zero Energy Buildings (nZEBs) 近零能耗建筑 (nZEBs)
  - 📦 Energy Performance Certificates 能源绩效证书
  - 📦 Data in support for policies - examples of EU initiatives 支持政策的数据 – 欧盟倡议示例
- 📦 Trends in energy and technology development in the building sector  
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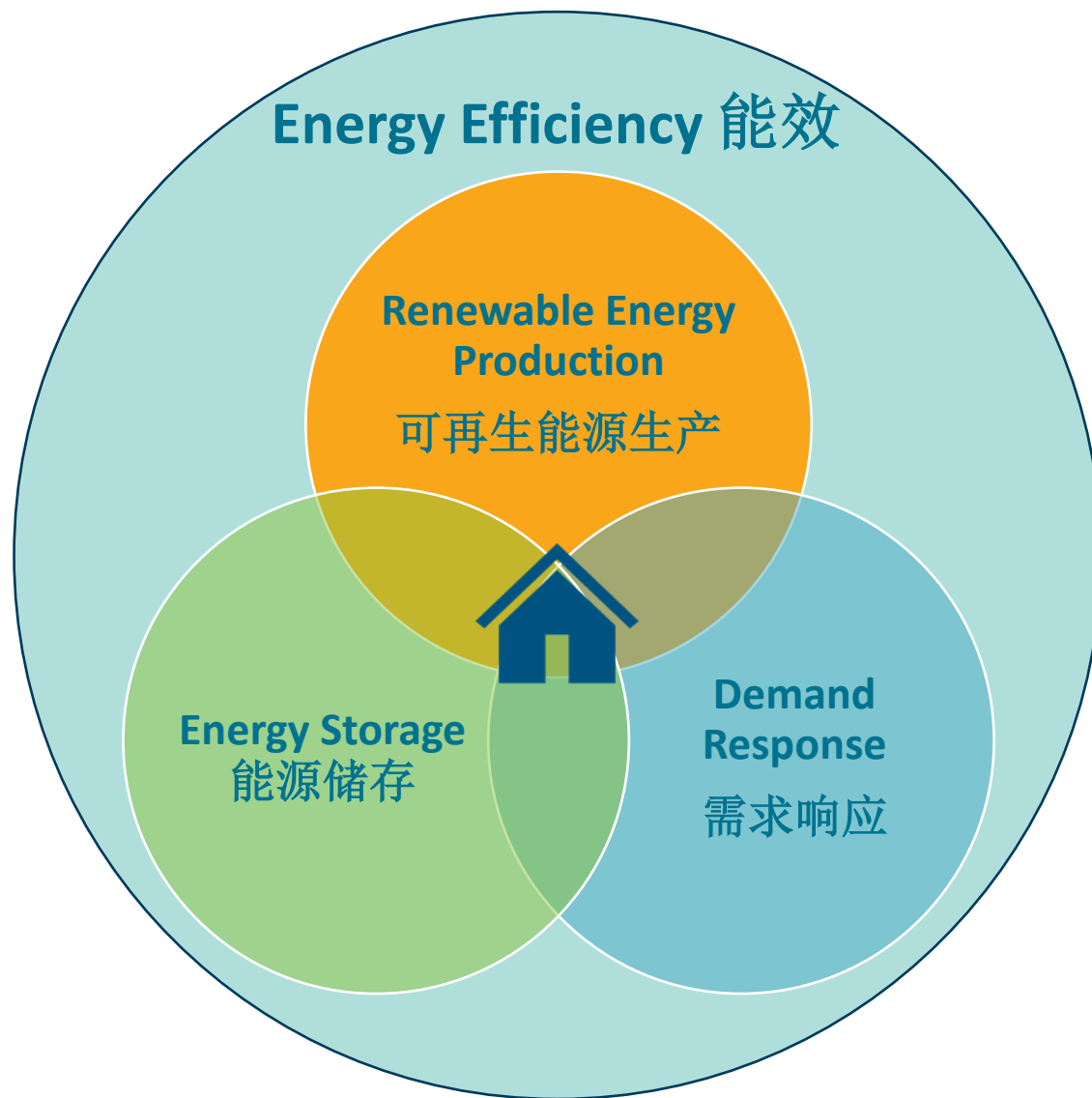
**Beyond nearly Zero Energy  
Buildings.....  
赶超近零能耗建筑...**

# SMART BUILDINGS IN A DECARBONISED ENERGY SYSTEM



10 PRINCIPLES TO DELIVER REAL BENEFITS FOR EUROPE'S CITIZENS

# Buildings are becoming micro-energy hubs 建筑正在成为微型能源枢纽



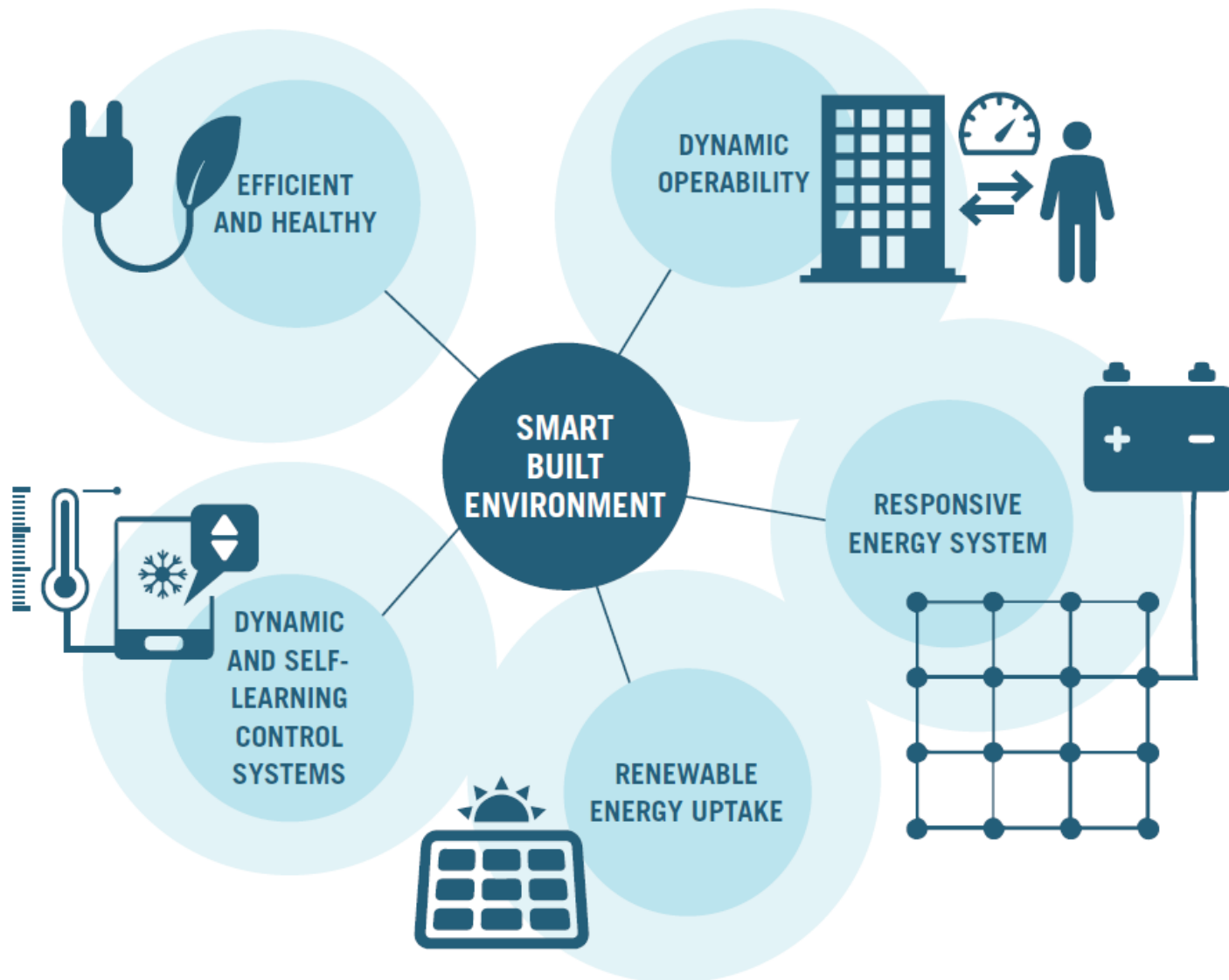
# WHAT IS A SMART BUILDING?

A smart building is highly energy efficient and covers its very low energy demand to a large extent by on-site or district-system-driven renewable energy sources.

A smart building (i) stabilises and drives a faster decarbonisation of the energy system through energy storage and demand-side flexibility; (ii) empowers its users and occupants with control over the energy flows; (iii) recognises and reacts to users' and occupants' needs in terms of comfort, health, indoor air quality, safety as well as operational requirements.

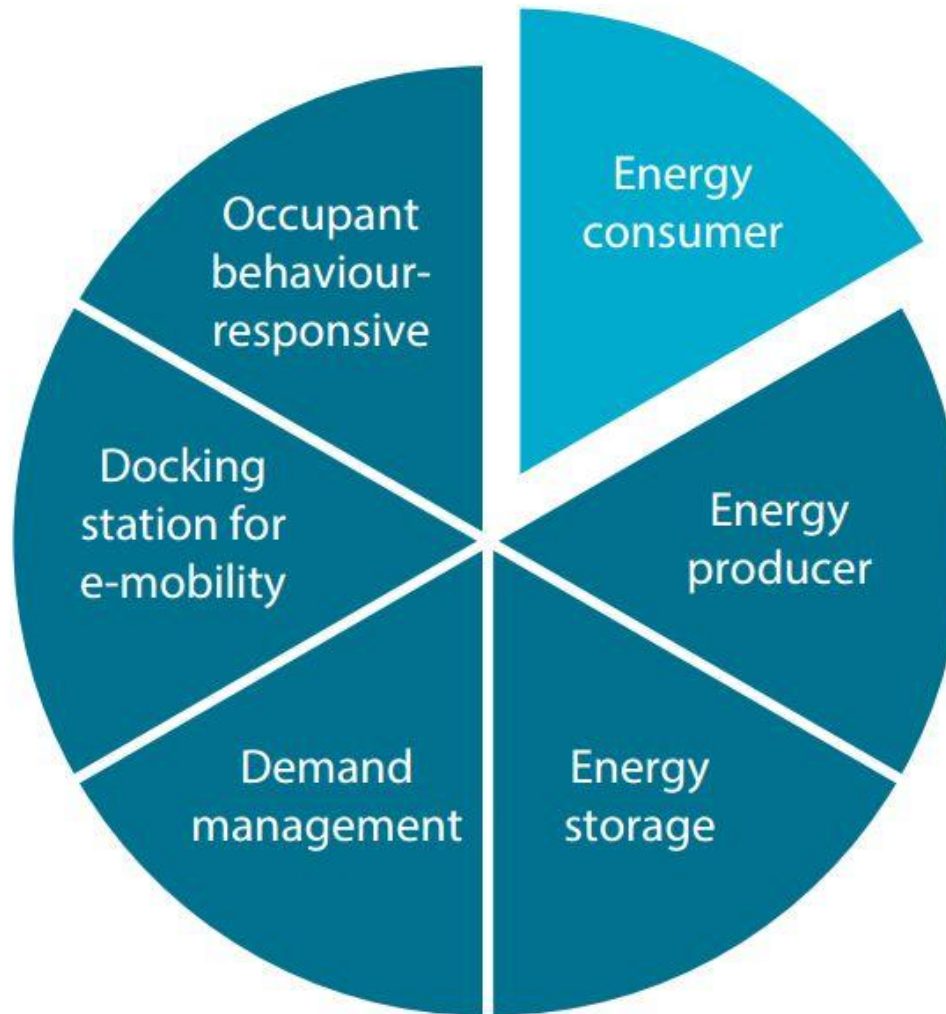


# Mapping a smart-ready built environment 智能建筑环境蓝图

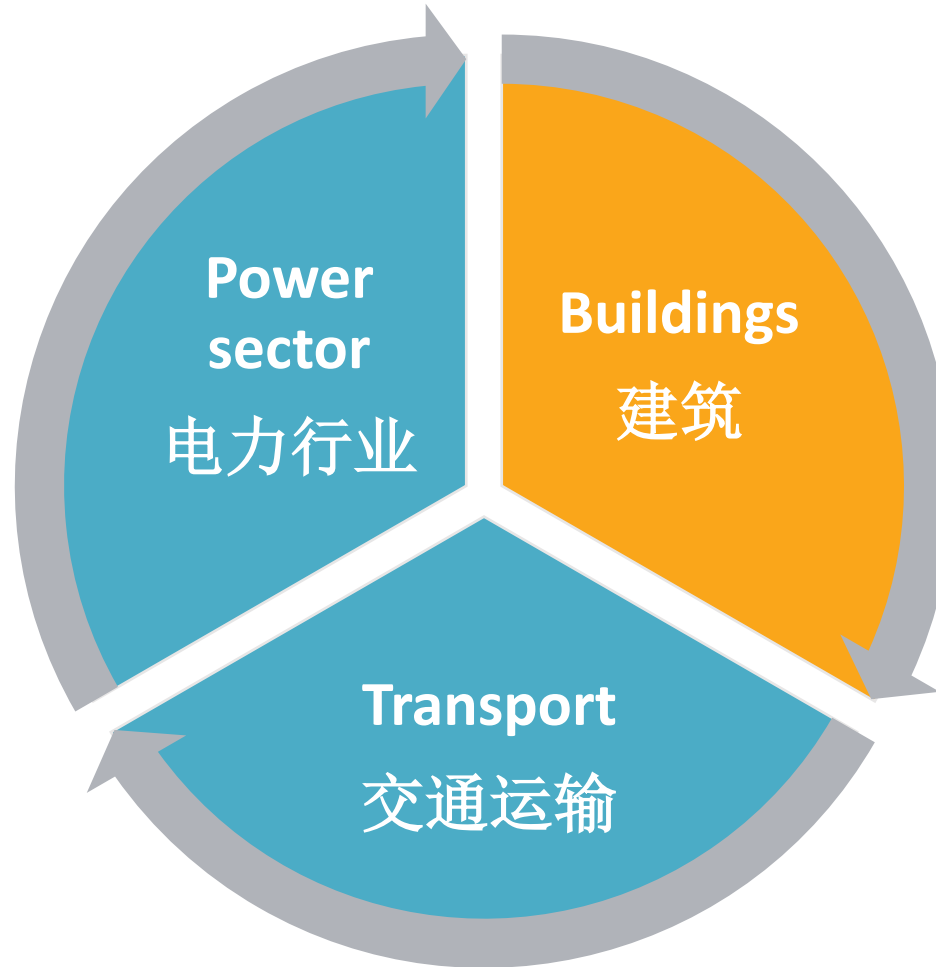


# New functions of smart buildings

## 智能建筑的新功能



# Buildings leading the way towards a decarbonised energy system 建筑引领能源系统去碳化



# An Outlook for the EU policy framework for energy efficiency 欧盟能源效率政策框架的前景



## Energy Efficiency Directive 《能效指令》

Binding 30% energy efficiency target for 2030  
到2030年能效提高30%的  
约束性目标

Access for consumers to consumption information  
为消费者提供  
消费信息

Extension of annual energy savings obligations for Member States beyond 2020  
将成员国的年度节能义务延长至2020年之后

## Eco-design Directive 《生态设计指令》

Energy-related products  
能源  
相关产品

Product regulations  
产品监管条例

Reviews of existing measures and studies for new measures for other products  
对现有措施的审查以及  
对其他产品配套新措施的研究

## Governance Regulation 治理监管

Requirements for Member States' Integrated National Energy and Climate plans for 2021 to 2030  
对2021至2030年成员国  
综合性国家能源和气候计划的要求

## Market Design 市场设计

Provision to reward flexibility for generation, demand-response and storage  
对生产、需求响应和存储给予灵活奖励的规定

Provisions for the protection of vulnerable customers  
为弱势客户提供保护的规定

## Energy Performance of Buildings Directive 《建筑能源绩效指令》

Smartness indicator  
智能指标

Electro-mobility infrastructure  
电动交通  
基础设施

Member States - Long-term national renovation strategies  
成员国 - 长期国家改造战略

## Renewable Energy Directive 《可再生能源指令》

Obligations for renewable energy use in heating and cooling  
关于在供暖和供冷领域使用可再生能源的义务

Renewable energy target for 2030  
2030年可再生能源目标



Thank you!  
谢谢!

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