

# Energy Efficient Buildings Association

[www.e2b-ei.eu](http://www.e2b-ei.eu)

**ENERGY EFFICIENT BUILDINGS**  
AN **ECTP** COMMITTEE

**ECTP**  
INNOVATIVE BUILT  
ENVIRONMENT



## “Expectations from the building sector”

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*Co-chairman EeB cPPP Partnership Board*

**Reaching out for opportunities in BIPV – technology and industry  
developments – Hamburg 15 September 2015**

# The relevance of buildings

- Buildings use 40 % of total EU energy consumption
- The built environment generates 1/3 of GHG in Europe
- Replacement rate is very small (1 to 2 % per year)
- The renovation of the existing stock is a real challenge
- The built environment affects life and work of citizens



# PPPs in Horizon 2020



## Joint Technology Initiatives

- Innovative Medicines (IMI)
- Clean Sky
- Single European Sky ATM Research (SESAR)
- Fuel Cells and Hydrogen (FCH)
- Electronic Components and Systems (ECSEL - old ARTEMIS + ENIAC)

New:

- Bio-based Industries (BBI)

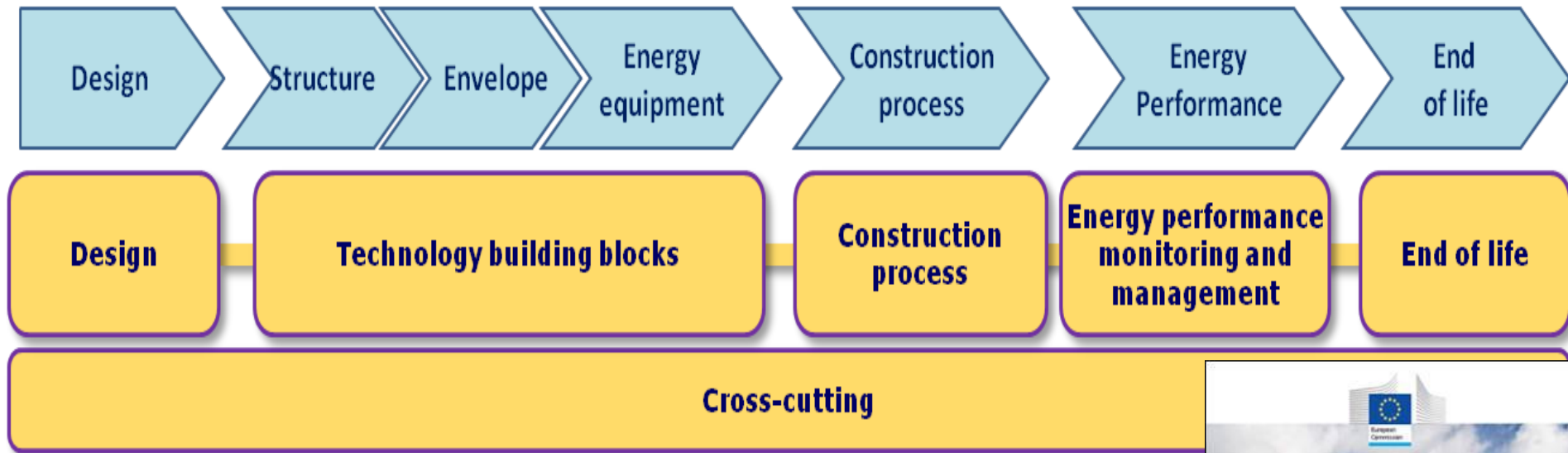
## Contractual PPPs

- Factory of the Future (FoF)
- Energy-efficient Buildings (EeB)
- Green Vehicles (EGVI)
- Future internet (5G)

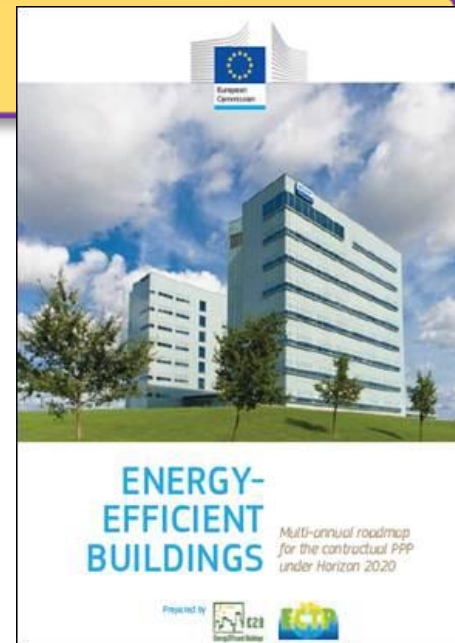
New:

- Sustainable Process Industry (SPIRE)
- Robotics
- Photonics
- High Performance Computing

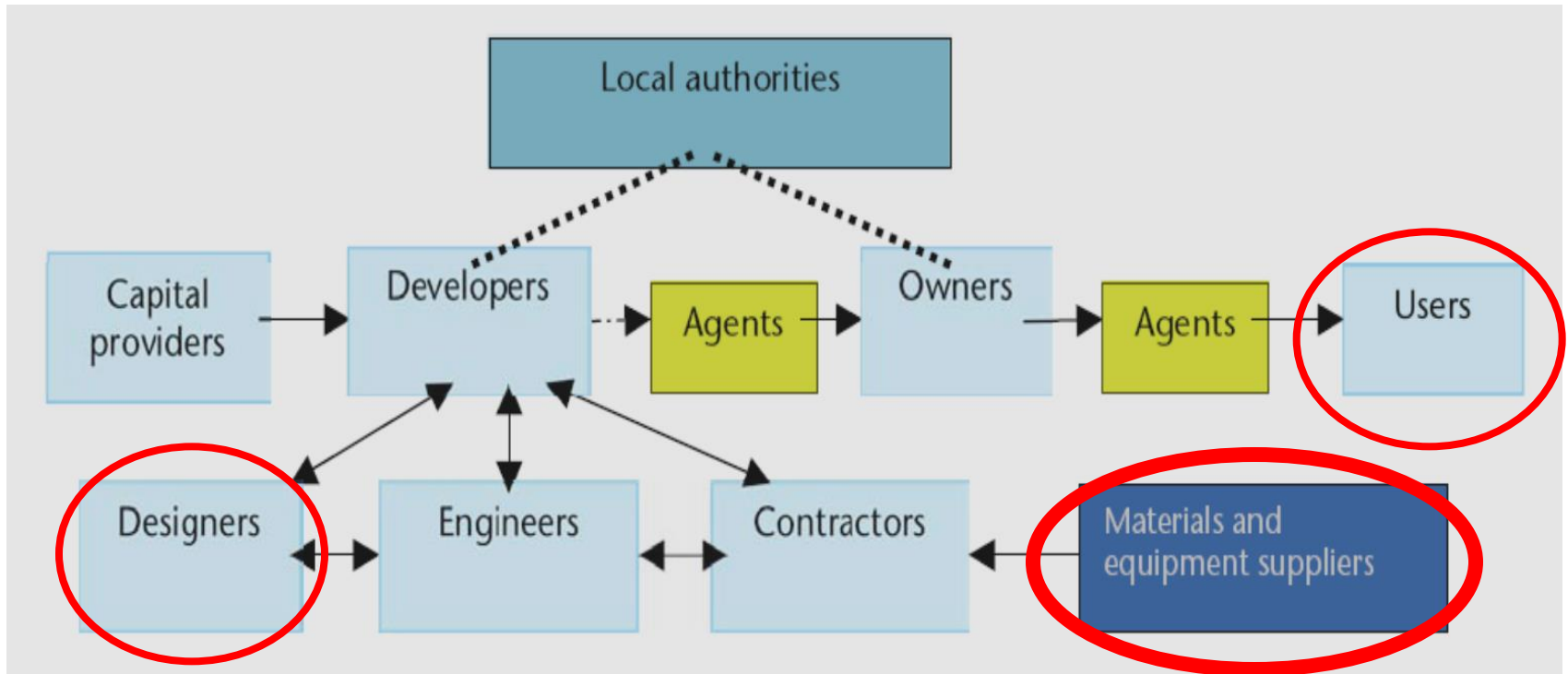
# A value chain approach...



## Roadmap 2014-2020



# ... fostering an innovation eco-system



**ESCOs**

**Insurance  
Companies**

**Service  
Providers**



# Some expectations: it would be great if ...

Smart systems and control could allow energy usage optimization whilst guaranteeing optimal comfort, a healthy environment and numerous other services (security, assistance to elderly people...)

Existing buildings could have high insulating envelopes to reduce energy use much below 50 kWh/m<sup>2</sup>/year while achieving indoor comfort

Buildings could satisfy their own energy needs or even contribute excess power to the community (zero/positive energy buildings)

Renewable and non polluting energy sources could be easily integrated

Equipment could be operated at optimal energy performance level (lighting, HVAC...)

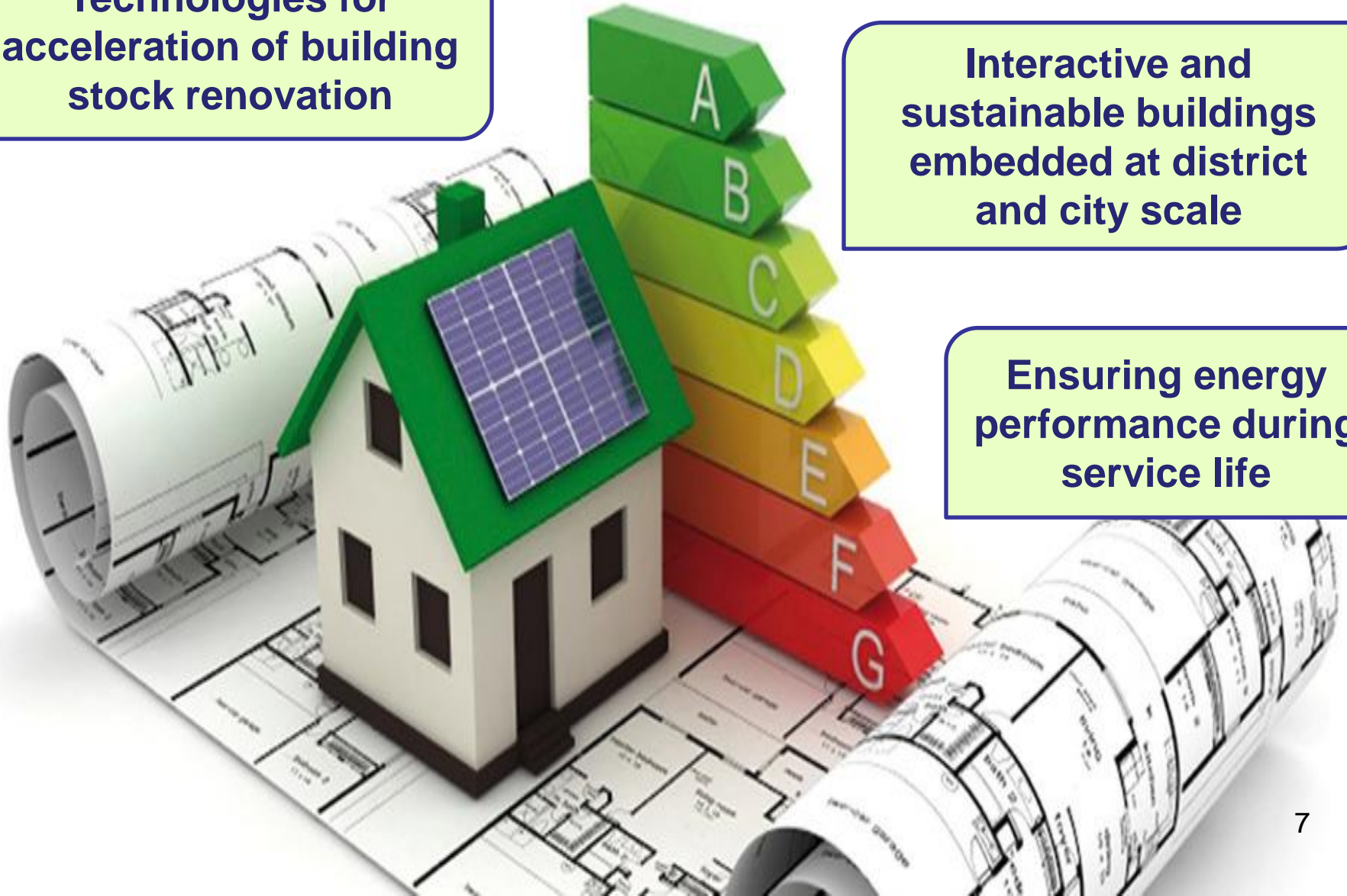
Users could change their behavior towards a reasoned usage of energy and being proactive

# Key research areas

**Technologies for acceleration of building stock renovation**

**Interactive and sustainable buildings embedded at district and city scale**

**Ensuring energy performance during service life**



# Some Innovation targets related to BIPV...

## Target 8: Envelopes are adaptable to a dynamic and complex environment

- TA8.2: Development and manufacturing of energy storing converting materials (e.g. Phase Change Materials and **switchable glazing** (e.g. thermochromic, photochromic or electrochromic) **combined with PV** in glazing panes)

## Target 9: Envelopes are able to integrate generation and conversion of incoming solar radiation

- **Both PV and thermal conversion** can be smartly integrated to recover further solar incoming radiation, together with **storage** solutions. **Façades can then be made active or reactive to signals from energy management systems.** System integration must then be based on **interoperable IT systems** and interfaced with building energy management systems, **smart grids** or smart cities.
- TA9.2: Integration of existing and **innovative PV components** (e.g. OPV, DSSC) into building envelopes

## Target 10: Energy efficient, interoperable, self-diagnostic and scalable storage, HVAC, lighting and energy solutions ... are available for integration into new and refurbished buildings

- TA10.7: **Renewable energy production** (heating, cooling, **electricity**) integrated at building level



# ... and topics on the « horizon »

## **EEB-07-2017: Integration of energy harvesting at building and district level**

Specific Challenge: Integration of energy harvesting approaches is a major challenge, in particular the development and integration of different renewable energy sources at building and district scale.

The envelope should be considered as an active and/or adaptive skin that interacts with the external environment and strongly influences the building energy performance and indoor comfort. Indeed, in view of a large-scale deployment of nearly-zero energy solutions in existing buildings, besides reducing energy demand through highly insulating materials and reduction measures, the possibility to harvest energy in the building envelope is of great importance.

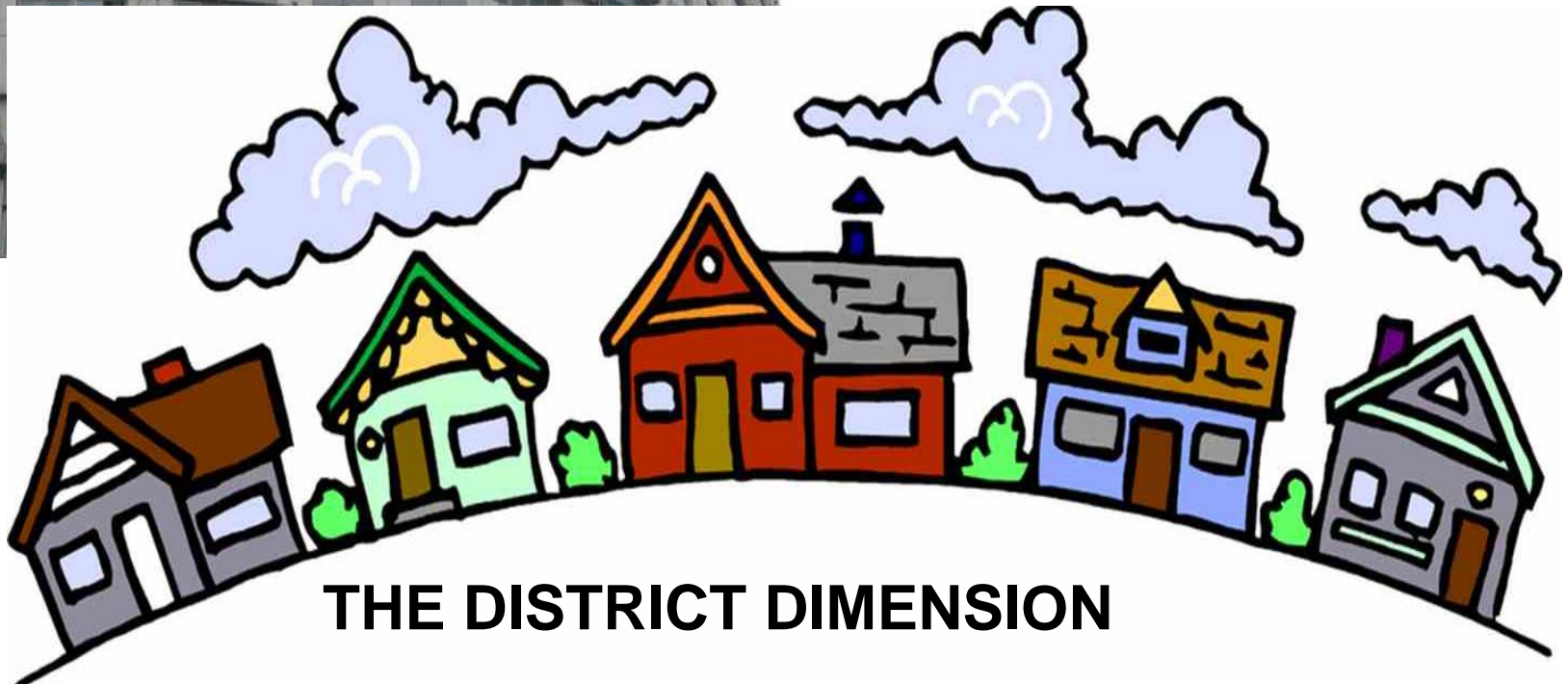
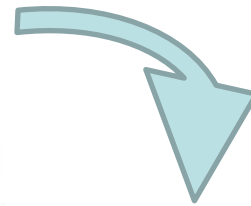
The district dimension should be taken into account, both because of a higher potential for integration and optimisation of renewable energy sources, and because of the potential of additional energy harvesting approaches.

[https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/05ii.%20LEIT%20NM\\_BP\\_2016-2017\\_pre-publication.pdf](https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/05ii.%20LEIT%20NM_BP_2016-2017_pre-publication.pdf)

# A systemic approach

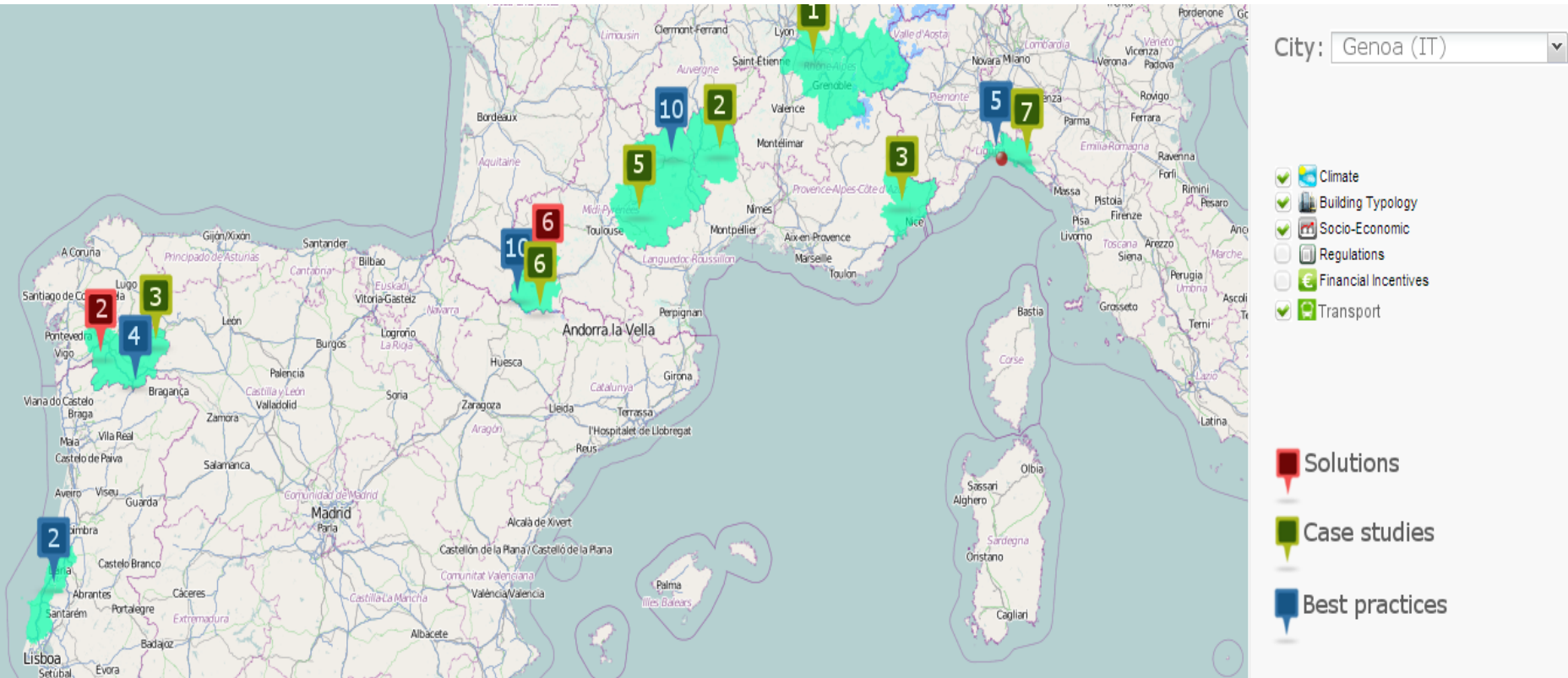


Active role of  
architects, designers,  
users and clients in  
retrofitting/  
refurbishment projects



**THE DISTRICT DIMENSION**

# Targeting markets from a different perspective: Geo-clusters



- **Global solutions locally optimised**
- **Connect the industrial players (SMEs as innovation engine but they play locally)**



# Sharing best practices to overcome non tech barriers



## Thematic Area

**TECNALIA**

High performance **insulation materials, systems & Nanotechnologies for HVAC systems**

**CETMA**

Materials with reduced **embodied energy**

**UBT**

Novel materials for **smart windows**

**NTUA**

Nanotechnologies for multifunctional **lightweight construction** materials and components

**UBAH**

Technologies and materials for a healthier **indoor environment**

**NTUA (tentative)**

Pilot Production

# Getting involved



**Next PPP Info Day on 16<sup>th</sup> October 2015**

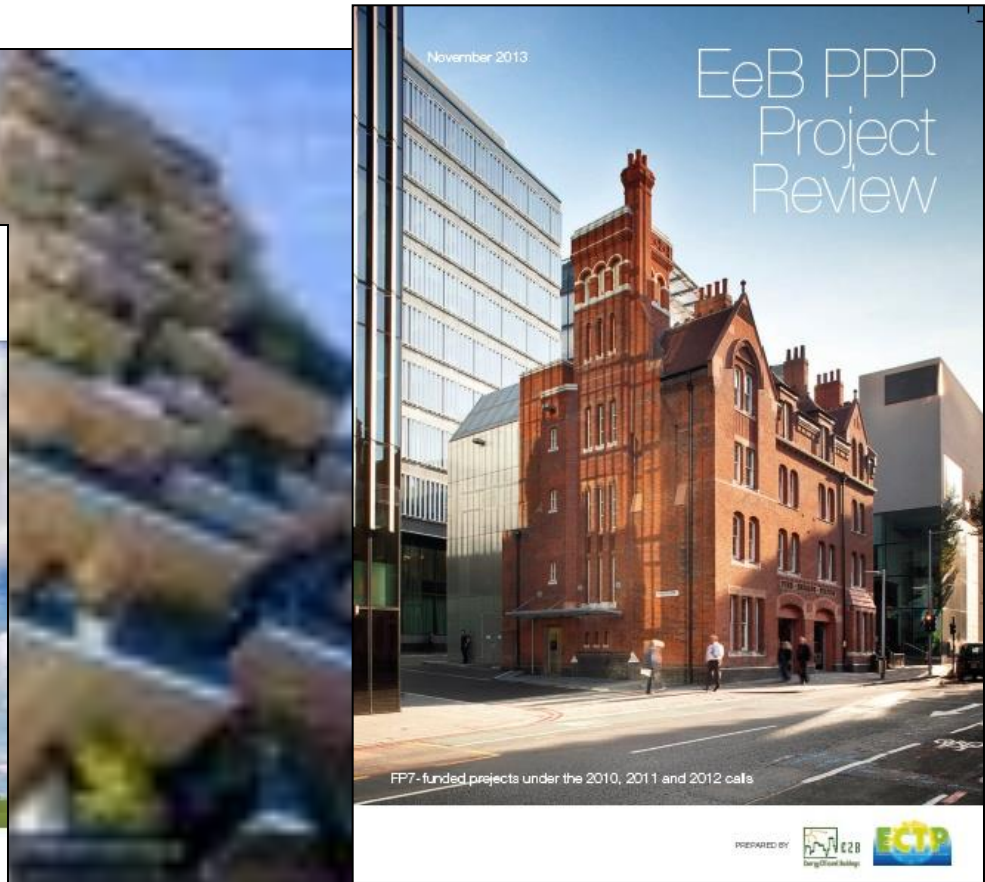
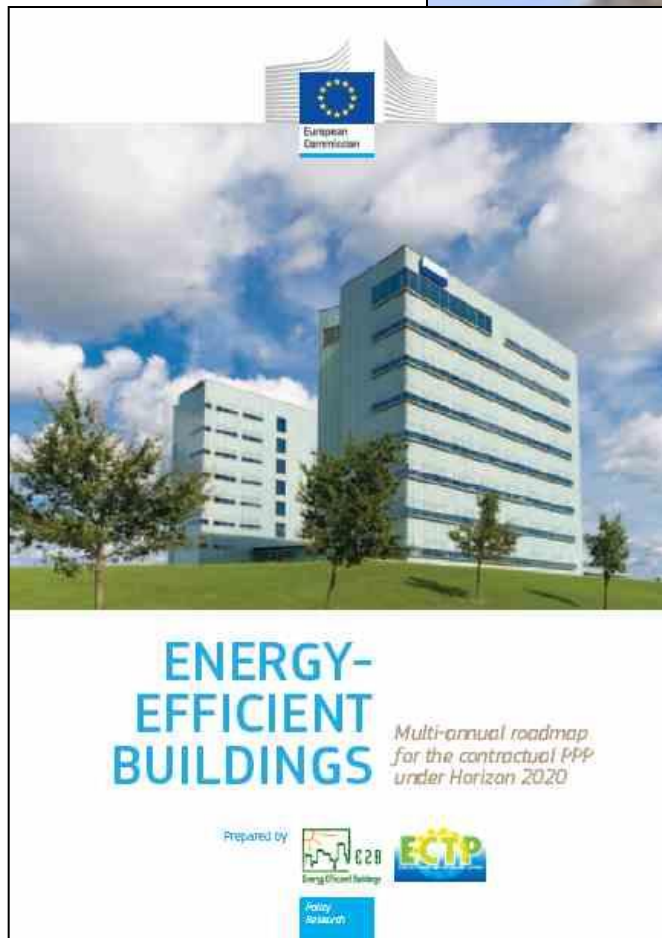


# En. Eff. buildings and districts as key part of smart cities





# Thanks for your attention



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