L'efficienza energetica negli edifici storici: alcuni esempi di progetti finanziati nell'ambito dell'iniziativa EeB PPP

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Introduction

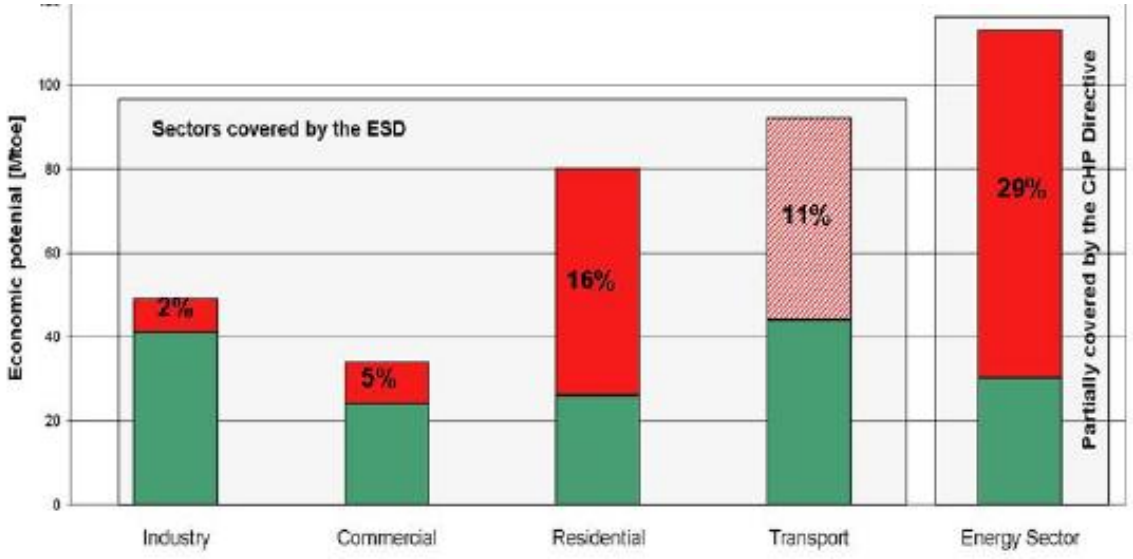
- **The Energy-efficient Buildings (EeB) Public Private Partnership (PPP) is a joint initiative of the European Commission and the Energy Efficient Buildings Association (E2BA)** reduce the energy footprint and CO2 emissions related to new and retrofitted buildings across Europe

- **E2BA** is an initiative that span out of the European Construction Technology Platform (**ECTP**)

- Stakeholders from the whole value chain have joined the Energy Efficient Buildings Association (E2BA) which is the industrial interlocutor of the European Commission in the EeB PPP

Relevance of buildings

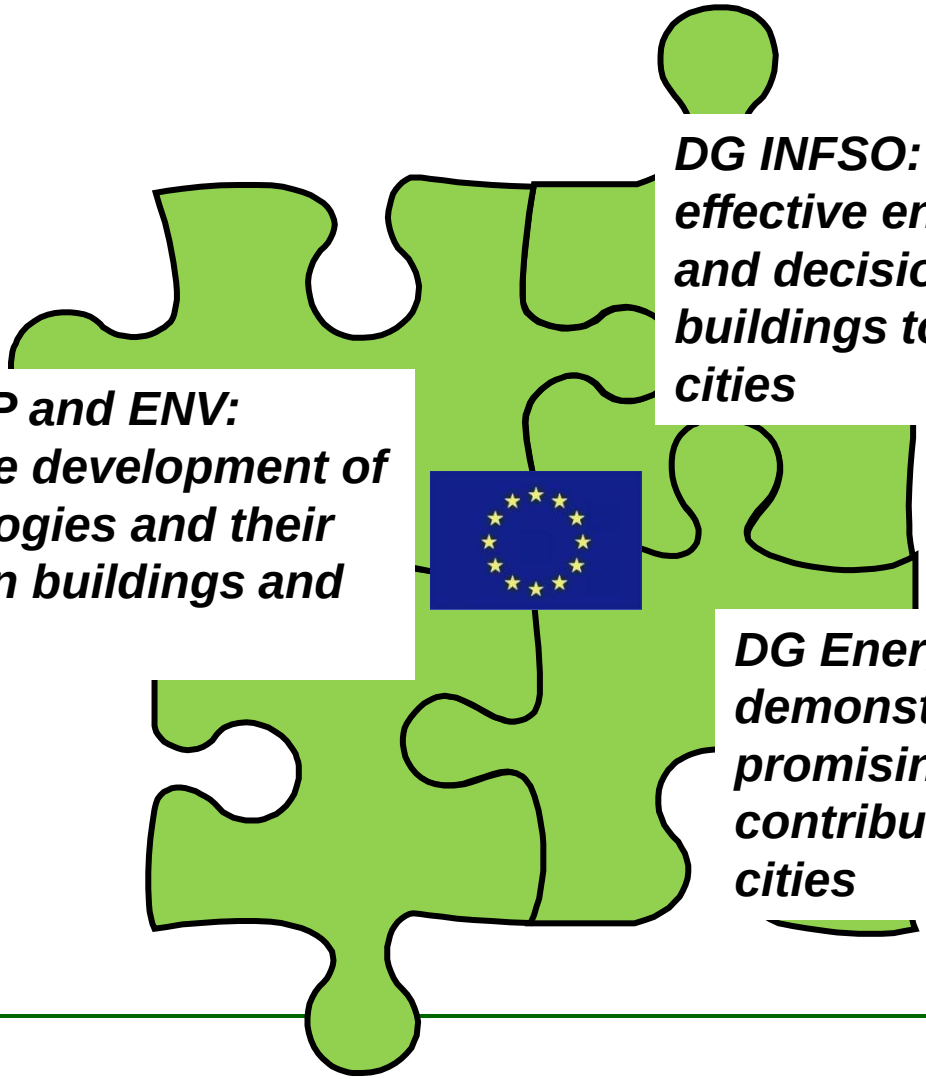
- Buildings use 40 % of total EU energy consumption
- The built environment generates 1/3 of GHG in Europe
- Even new buildings are far from being all energy efficient
- Replacement rate is very small (1% per year), 1.5% energy-related renovation rate per year
- Buildings provide the second largest untapped cost-effective potential for energy savings after the energy sector



Savings expected to be achieved with already existing measures

Remaining saving potential to be addressed with new measures

A working PPP is in place (1/2)



DG INFSO: ICT integration for effective energy management and decision making from buildings to neighborhoods and cities

DG RTD NMP and ENV: Fostering the development of new technologies and their integration in buildings and districts

DG Energy: Large scale demonstration of most promising solutions and their contribution to future smart cities

A working PPP is in place (2/2)

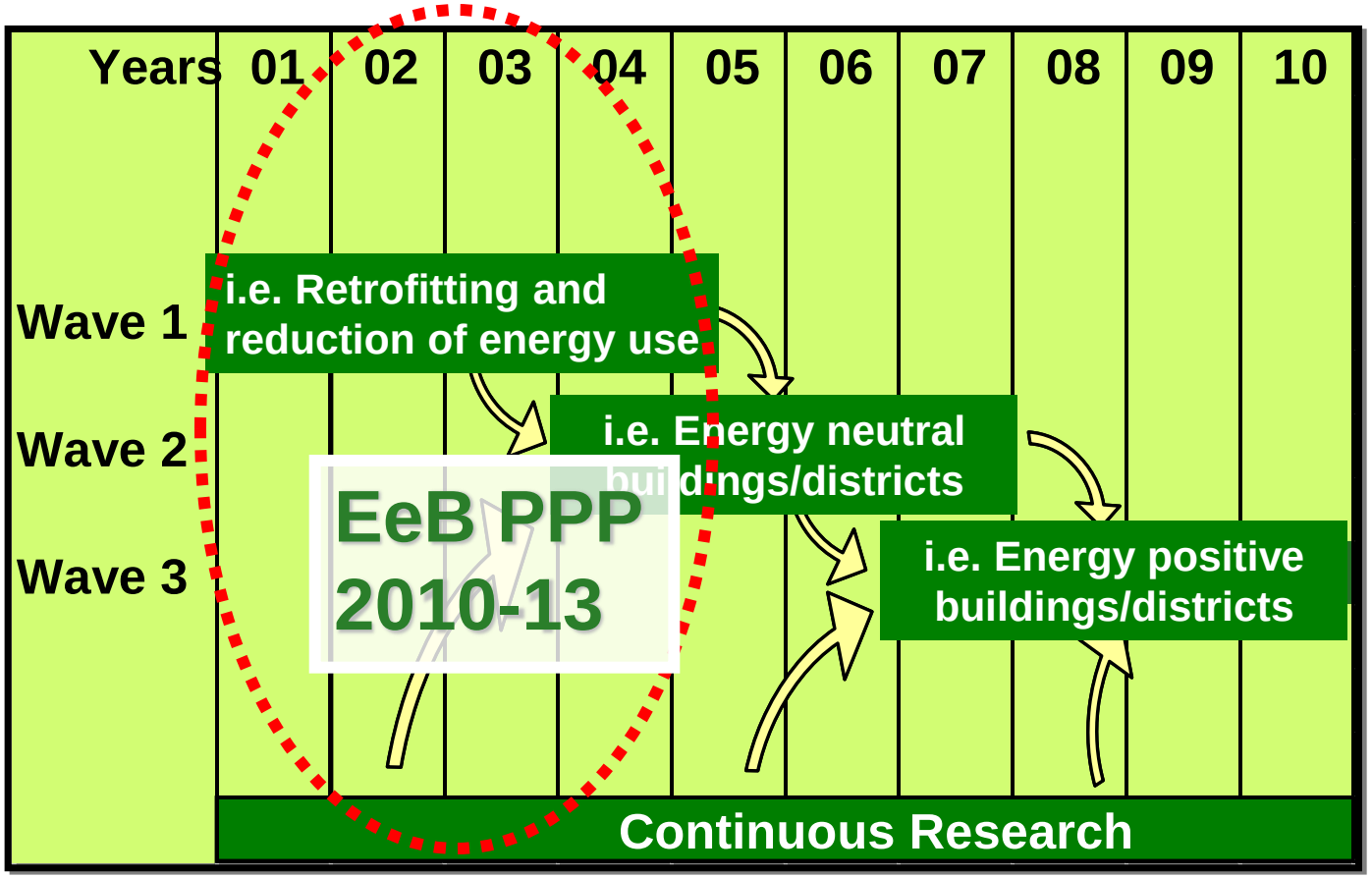
- Industry has succeded in engaging all key stakeholders from planning to project implementation
- High industry participation within FP7 traditional instruments with high SME involvement

Results of EeB Calls

	July 2009	July 2010
Success rate:	**28% 17 funded of 60**	**20% 24 funded of 120**
• **Share by Org. Type:**		
- Higher Education:	**18%**	**15%**
- Private for Profit:	**48%**	**53%**
- Research Org.:	**26%**	**24%**
• **Share of Funding of SMEs:**	**24%**	**30%**
• **Countries of funded partners:**	**24**	**26**

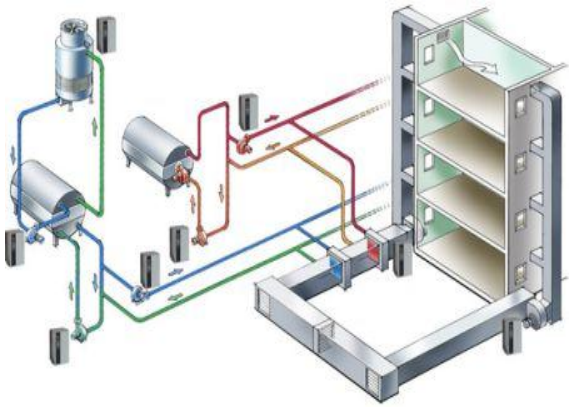
A long term programme

EeB PPP as first wave of a Long Term Strategy



Innovations under research

- Sustainable, Innovative and Energy-Efficient Concrete
- Smart windows with multi-functional approaches
- High Performance Biocomposites for Buildings components
- Component and systems for buildings: multi-functional façade panels, nano-tech enabled HVAC systems, …



Historic buildings: overview

There are numerous historic buildings in European cities, towns and villages. Historic centres and quarters **add uniqueness** to our cities and are a **living symbol** of Europe's rich cultural heritage and diversity.

Historic buildings are an area where the high level of energy inefficiency is **contributing to the release of greenhouse gas emissions**. With climate change posing a **real and urgent** threat to people, environment and historic buildings, it is necessary to have an improved approach to their refurbishment.

EFFESUS

ENERGY EFFICIENCY FOR EU HISTORIC DISTRICTS SUSTAINABILITY

- Type of funding scheme: SME-targeted Collaborative Project

- Work programme topics addressed:

  EeB.ENV.2012.6.6-2 Concepts and solutions for improving energy efficiency of historic buildings, in particular at urban district scale

The need

- The construction market is currently facing significant challenges, not only in terms of **its influence on energy and climate change**, but also in terms of its **impact on natural resources** (energy, water and materials) and **users' convenience and welfare**(accessibility, safety & security, indoor air quality, etc.).

- This is particularly relevant for the **existing building stock in urban** areas which has a significant socio-cultural value for the society and at the same time accounts for the most of the carbon emissions and the largest energy saving potential.

The EFFESUS concept

- The EFFESUS concept is to reduce the environmental impact of Europe's valuable urban heritage by making significant **improvements to its energy efficiency while conserve and even promote the cultural, historic, urban and architectural value** of European's historic cities

- Energy efficiency improvement of historic urban areas will contribute to a better **urban environment, including social, economical and environmental progress**. However, this challenge requires rapid t**echnological, policy and legislative** breakthroughs focusing on the following particular aspects:

The EFFESUS concept

- The need to find a balance among
  - energy saving
  - comfort improvements
  - impact of the interventions on cultural values

  requires **data management** which connects, at district, building and component scales, energy behaviour together with building and district typologies and weathering conditions;
- A **dynamic repository** of available and novel energy efficiency technologies
- As the existing solutions do not fully cover cultural heritage requirements and needs, development of new **specific systems** and technologies is needed;

The EFFESUS concept

- The need to develop adequate intervention criteria, methodological approaches and tools able to achieve the required value between c**omfort improvement, energy efficiency, economical, technical and normative feasibility and respect of the cultural, architectural and environmental value**;
- **Analysis of the barriers** hindering the application of the developed solutions that implies the socioeconomic and environmental assessment of available solutions and modification of regulations;
- **Education about benefits** on energy efficient solutions

The overall objective

The overall objective of the project **is to develop and demonstrate, through case studies, a methodology and criteria for selecting and prioritizing energy efficiency interventions, based on existing and new cost-effective technologies and systems compatible with heritage values, for significant life cycle energy efficiency improvements in the rehabilitation of historic districts.**

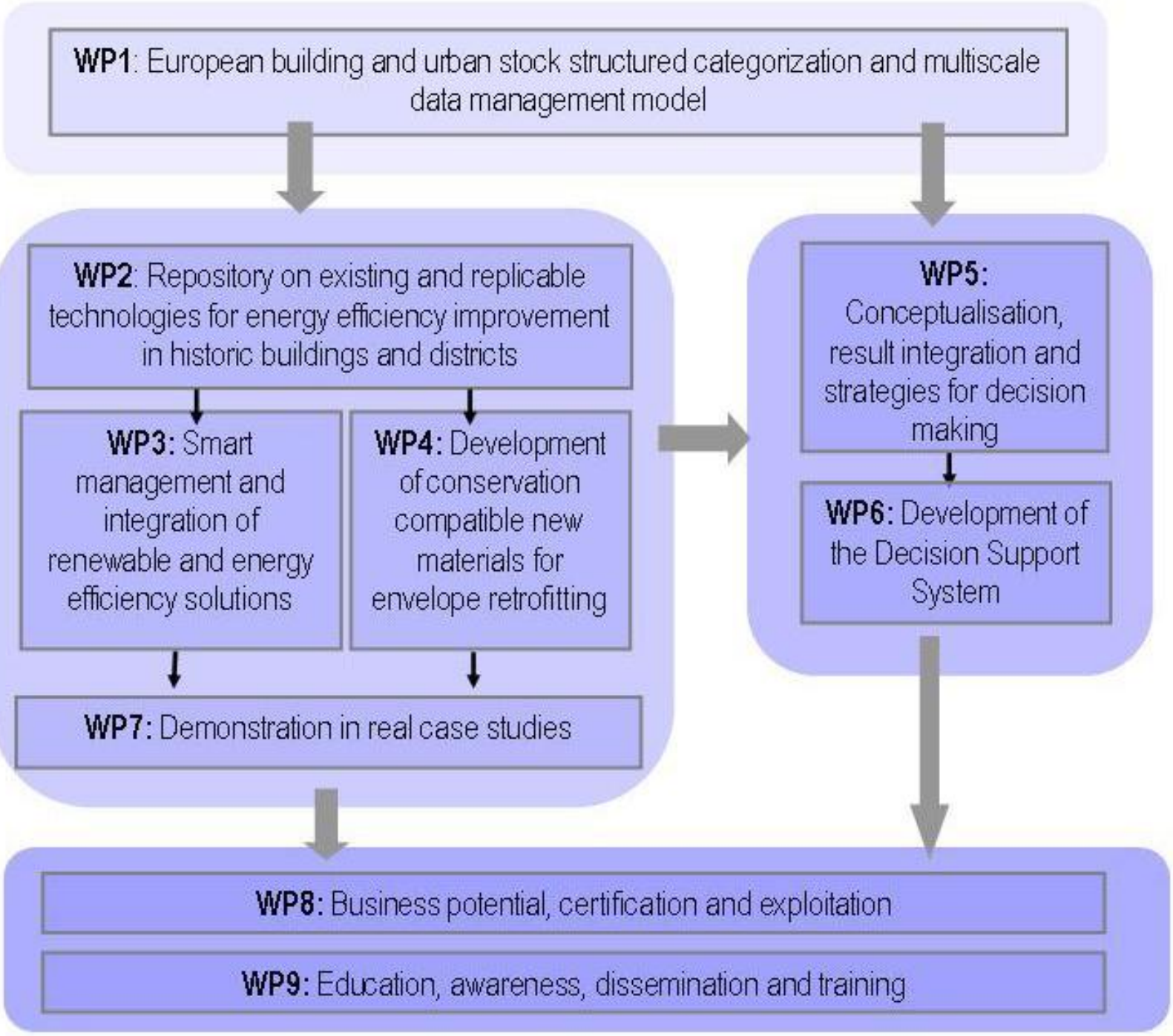
Main objectives

The **main deliverable of the project will be a decision support system (DSS) which includes all the parameters needed to** select energy efficiency interventions in historic districts. This methodology includes:

- Overview of the various status and **protection levels** of categories of historic buildings and historic urban areas in the EU
- The EU historic district **stock categorization** and the multiscale data model which connects energy behaviour of components, buildings and districts with weathering conditions, architectural typology and materials

Main objectives

- **The dynamic and flexible energy efficiency solution repository** of existing and new energy saving technologies, systems and architectural solutions suitable for historic buildings and districts which will allow in future to introduce new solutions and technologies as they appear;
- **Life cycle analysis** including quantification of energy saving for the proposed interventions;
- **The tool to assess the user** for the proper selection, prioritisation and management of the most appropriate solutions, considering the balance between energy saving, feasibility and cultural values.


WP1: European building and urban stock structured categorization and multiscale data management model
WP2: Repository on existing and replicable technologies for energy efficiency improvement in historic buildings and districts
WP3: Smart management and integration of renewable and energy efficiency solutions
WP4: Development of conservation compatible new materials for envelope retrofitting
WP5: Conceptualisation, result integration and strategies for decision making
WP6: Development of the Decision Support System
WP7: Demonstration in real case studies
WP8: Business potential, certification and exploitation
WP9: Education, awareness, dissemination and training

Case studies 1/2

COUNTRY & CITY	PHOTO OF LOCATION	DESCRIPTION AND ARCHITECTURAL TYPOLOGY	WEATHER	LEVEL OF IMPLEMENTATION
Turkey (Assoc. Country) **Istambul**		**UNESCO CITY**: The district of Beyoglu is one of the oldest townships, from the Middle Ages. The area is very homogeneous in terms of similar architectural characteristics, which gives it a high replication potential.	Eastern Mediterranean climate	**Urban rehabilitation** Radiant reflective coating for indoor application and energy storage technologies.
Spain (Western Europe) **Santiago de Compostela**		**UNESCO CITY**: With its Romanesque, Gothic and Baroque buildings, the Old Town of Santiago is one of the world's most beautiful urban areas. Granite stone is the most common building material	Oceanic climate	**Urban rehabilitation** Recovery of old architectural solutions (passive retrofitting) and the implementation of a smart grid.
Hungary (Eastern Europe) **Budapest**		**UNESCO CITY**: Lagymanyos is a dense area characterized by multi level residential buildings and public buildings, mainly constructed at the beginning of the XX Century. Early concrete structures	Humid continental	**Building intervention** Improvement of existing components, such as windows upgrading and integration of optimized intelligent indoor climate solutions
United Kingdom (Northern Europe) **Glasgow**		The historic district of Govanhill is dominated by traditional sandstone tenements, a building type very typical for Scottish cities and towns.	Temperate	**Building intervention** New advanced insulation aerogel The demonstration of the new material will feed the repository and will give results that will be integrated in the DSS.

Case studies 2/2

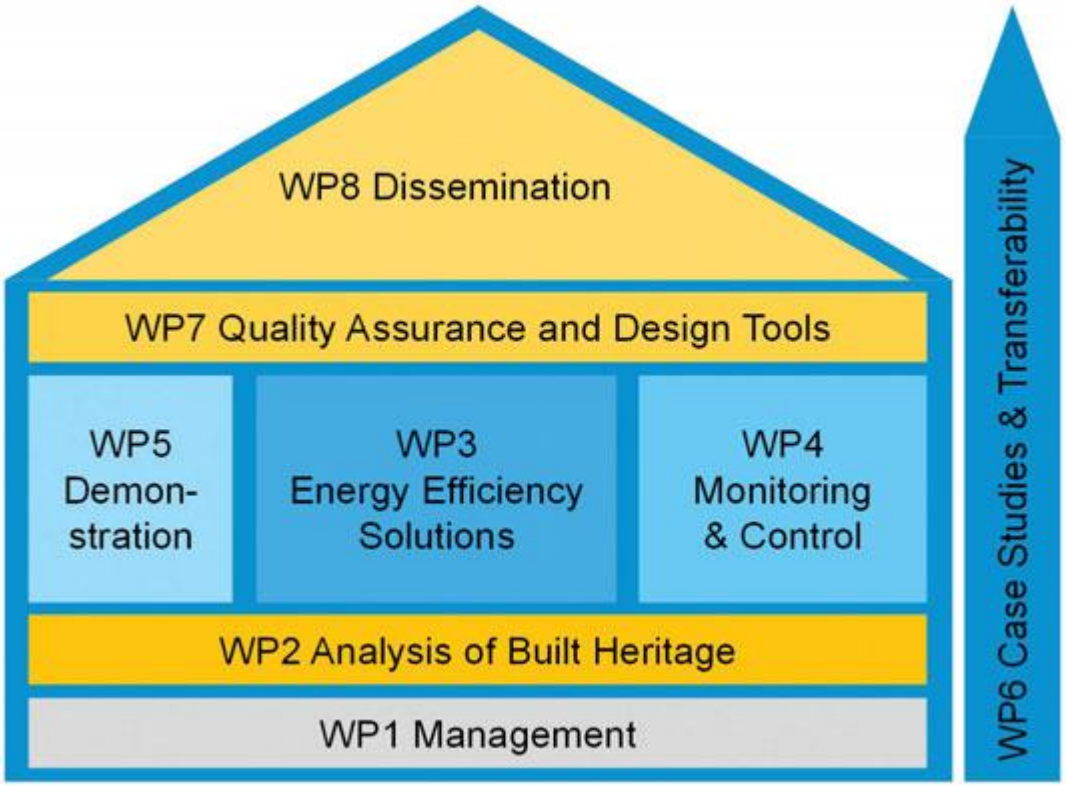
COUNTRY & CITY	PHOTO OF LOCATION	DESCRIPTION AND ARCHITECTURAL TYPOLOGY	WEATHER	LEVEL OF IMPLEMENTATION
Germany (Central Europe) **Leipzig**		Leipzig is famous for the significant architectural heritage, 53% of the building stock is from the period before 1949.. The city takes also part in the *"European Energy Award"*.	Continental	**Building intervention** New mortar for indoor and outdoor application. The demonstration of the new material will feed the repository and will give results that will be integrated in the DSS.
Sweden (Northern Europe) **Visby**		**UNESCO CITY:** North European medieval walled trading town with high-quality ancient buildings mostly built of wood.	Humid continental	**Analysis** Analysis and collection of information to develop the structured categorization method. This will feed the multiscale data model for the energy data management at district scale. The model will be connected to the DSS.
Italy **Genova**		**UNESCO CITY:** The historical district of "Via Garibaldi" is one of the most impressive examples of 16th century European urban residential planning, symbolising Genoa's economic and financial power in the 16th and 17th centuries. Stone is the most common construction material.	Western Mediterranean	**Analysis** Analysis and collection of information to develop the structured categorization method. This will feed the multiscale data model for the energy data management at district scale. The model will be connected to the DSS.

Web site: http://www.3encult.eu Coordinator: EURAC Research, Italy

The FP7-project 3ENCULT bridges the gap between conservation and climate protection.

Conservation, technical and urban development experts, industry partners and stakeholder associations work on:

- Passive and active energy-retrofit solutions as well as diagnosis,monitoring and control instruments
- Criteria for the assessment of energy efficiency measures regarding their conservation-compatibility and tools to support the multidisciplinary design approach
- 8 case studies which will demonstrate and verify the approach and solutions



Historic buildings will only survive if maintained as a living space.
Energy-efficient retrofit is important not only for structural protection in heritage buildings but also to improve the comfort of the building.

Thank you for your attention!

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