



**Conference 2011**



**Let's Construct Europe's Future  
With Innovative Buildings and Infrastructures  
*Construction and Societal Challenges***

**Radisson Blu Centrum Hotel - WARSAW  
04 / 05 October 2011**

## **BUILDING UP**

Trans-ETPs approach for identifying technical  
and non-technical opportunities and barriers  
towards innovation



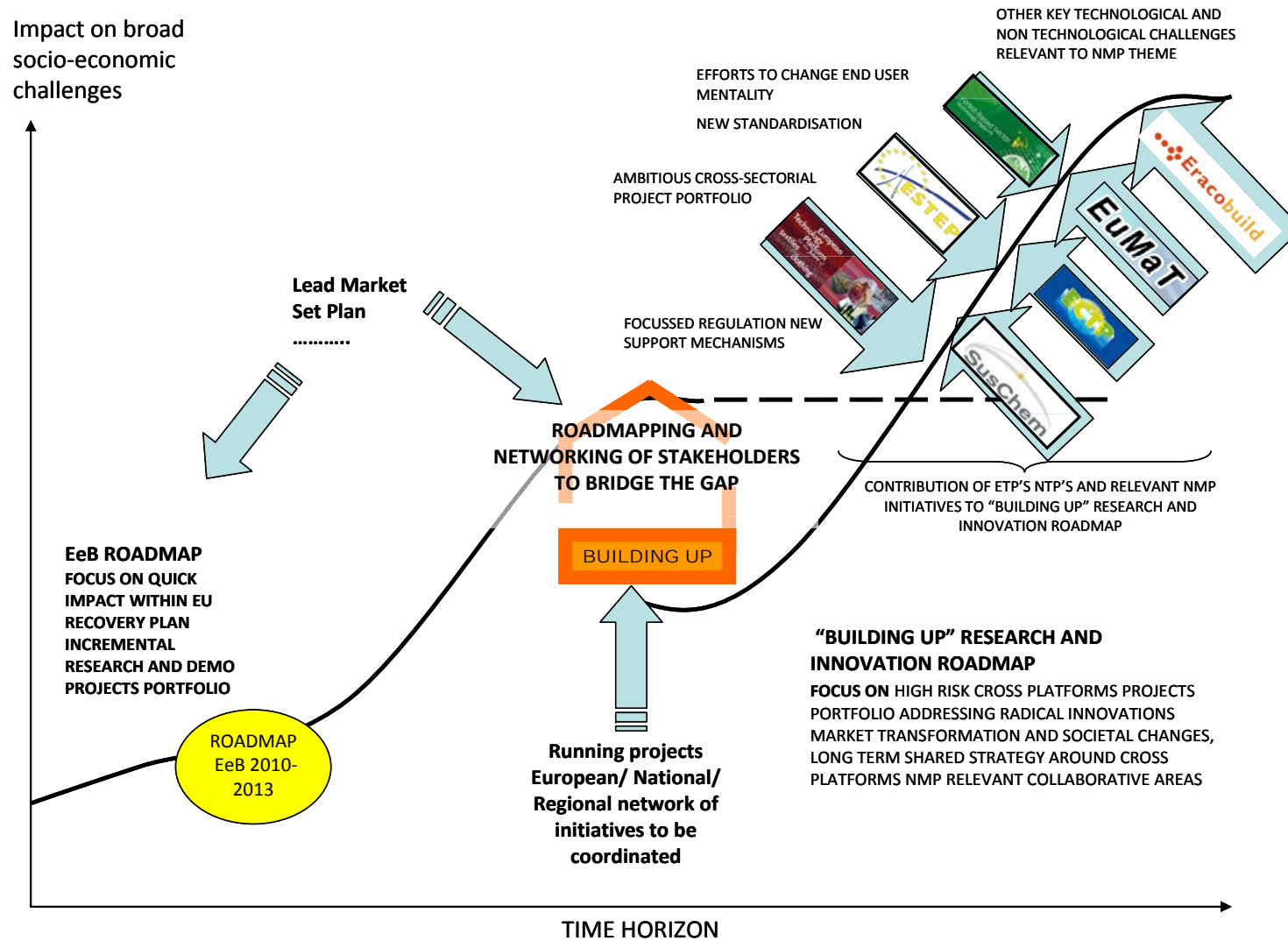
## BUILDING UP General Aims

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- The EeB PPP (2010-2013) aims at mobilising smart investment in research with a short term perspective
- BUILDING UP wants to address a longer term scenario (20/40 years) going clearly beyond the current EeB objectives.

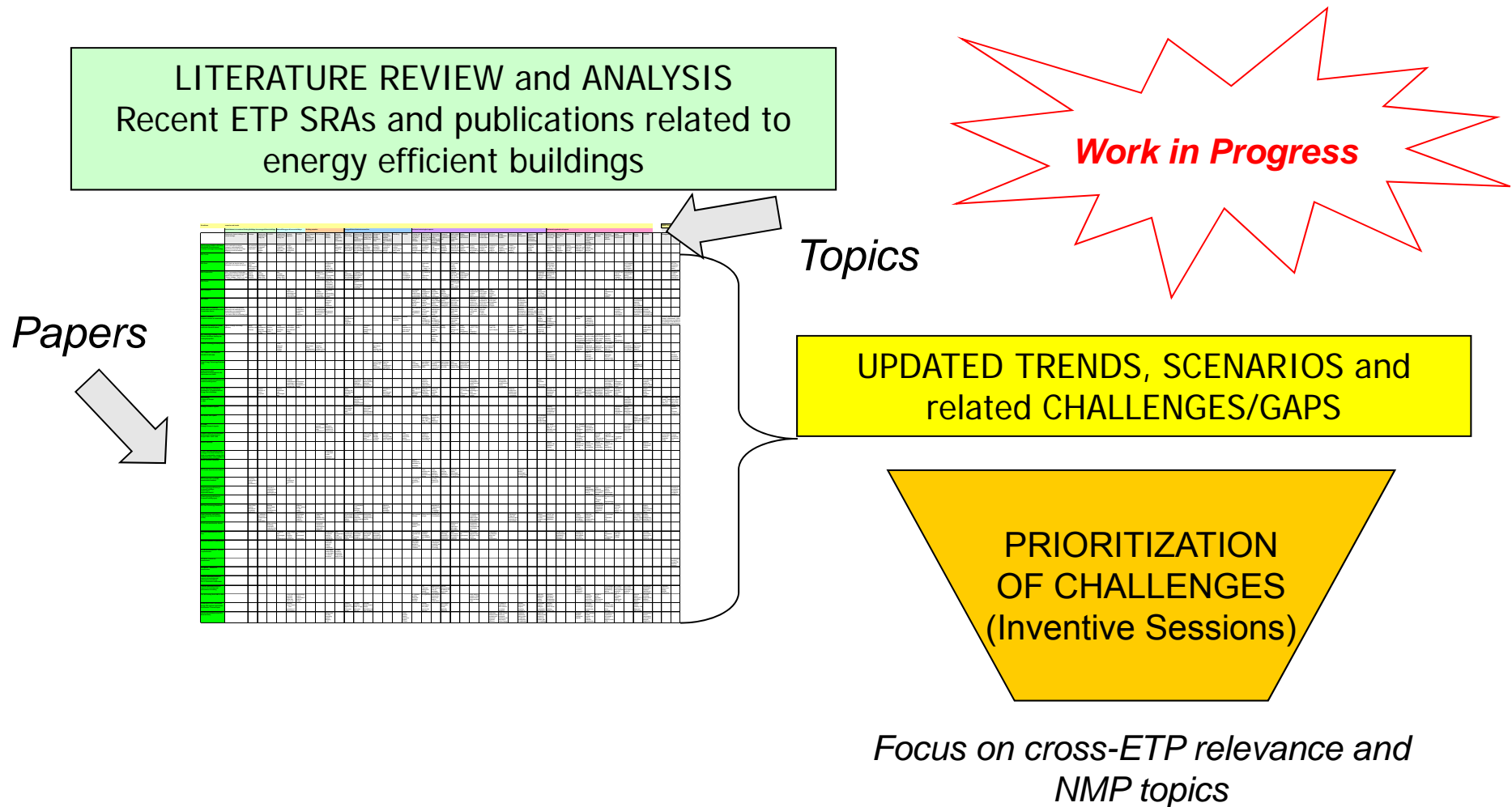


# BUILDING UP Environment





# BUILDING UP WP1 Activities and Methodology





# BUILDING UP Deliverable 1.1

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## ***Report on Scenarios and Trends – Content***

- D1.1 “**Report on scenarios and trends**” presents a broad review of foresight studies, as well as definitions of scenarios and trends.
- **Background information on drivers, barriers and trends** with regard to energy efficiency in buildings was collected and assessed.
- Studies were reviewed in the light of the goal of this project: **Foresight studies** launched by the NMP theme, **EU-funded** work and **reports and research agendas from ETPs, ERA-Nets** and other multinational initiatives, plus various major national sources
- **List of scenarios** from different sources was collected



# Global Drivers

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- **Climate Change** – construction has to play a major role in reducing greenhouse gas emissions
- **Resource scarcity** – an absolute reduction of the global footprint has to be achieved (e.g. through increased efficiency, endured consistency, eco-sufficiency strategies, recycling)
- **Demographic change** – rise of population of EU27 from 497.8 million to 527.7 million in 2030 with population aged 65+ rising from 17.2 % to 23.7 % (VID 2010), growth of cities, changes in household structure



# BUILDING UP Deliverable 1.1

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## ***Deliverable Results***

Analyzed scenarios have been condensed into five major groups:

- Climate Change and CO<sub>2</sub> emissions
- Growth and competitiveness
- Efficiency (measures) and technological innovation
- Demographic and social aspects, including labor force
- Renewable and non-renewable resources



# Climate Change and CO<sub>2</sub> emissions

- While there is general agreement on the need to decrease CO<sub>2</sub> emissions in order to prevent climate change, broad variations on CO<sub>2</sub> targets are provided by the different reports.
- D1.1 summarizes forecasted CO<sub>2</sub> targets/scenarios.

CO <sub>2</sub> target/scenario	Source
-50% in EU until 2050	SRA-EuMaT 2006
reduction of building related CO <sub>2</sub> emissions by 2Gt by 2050	IEA EEB H&C Roadmap 2011
“zero environmental impact”	SMR EU Policy 2010
reduction of global CO <sub>2</sub> intensity per GDP emissions by 1/3 <sup>rd</sup> of today’s level by 2050 and reduction to less than 1/10 <sup>th</sup> of today’s level by 2100	Japan Tech. Roadmap 2006
“climate neutrality” of the building sector by 2035	PHI 2010
60% reduction until 2050 in UK	Hinnelis: UK Housing stock 2007
70% reduction compared to 1990 in Japan. A 70% CO <sub>2</sub> emission reduction below the 1990 level can be achieved by reducing 40% the energy demand and by introducing low-carbon energy supply.	Fujino: Japan Scenarios 2008
“substantial reductions in CO <sub>2</sub> emissions” (a global potential to reduce approximately 29% of the projected baseline emissions by 2020 cost-effectively in the residential and commercial sectors)	IPCC SRREN 2011
By 2050, carbon emissions in the EU will have to be reduced by 80 to 95 percent to reach global climate protection goals.	PHI 2010
Overall, in terms of residential & tertiary (buildings), the roadmap develops scenarios for EU GHG emissions towards an 80% domestic reduction (100% =1990)	EC Low Carbon Roadmap 2011
The main target for energy consumption is to quarter the sector’s CO <sub>2</sub> emissions by 2050, to halve the final energy c	SRA Construction 2005





# Growth and competitiveness

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There are two contradictory tendencies:

- The **general internal market trend of the building sector leads towards continuous growth** within the built environment.
- The other tendency manifests in two ways.
  - In the general, natural understanding that unlimited growth can not endure in a limited natural environment and that therefore all growth-orientated scenarios are to be considered unsustainable on a long-term scale.
  - The reduction of available resources, mainly fossil fuels, and the enforced necessity to **reduce consumption**.



# Growth and competitiveness

## Examples of target growth

growth target/scenario	Source
“boosting competitiveness, economic growth and the related impact on employment in Europe.” “to assume a global leadership in the coming 30 years”	SRA Steel 2005
“Increasing the competitiveness”	SRA Forest 2006
“become the leading centre of expertise by 2030 [...]” “world market growth rates varying between 5 and 20% in the various subsectors in the coming decades	SRA Water 2010U
Very steep increase in cooling demand: 82% increase in the residential sector and 60% increase in the service sector from 2007 till 2020.	ETT-RHC Vision 2011
“stimulating the European economy [...] and creating new wealth”	SusChem IAP 2006
“Demand for energy and associated services, [...] is increasing”	IPCC SRREN 2011



# Efficiency and Technological Innovation

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- An **increase of efficiency** is required in many areas:
  - Building components and envelop, energy production (efficiency of energy conversion), efficiency of storage (reduction of storage and conversion losses), energy use ( e.g. through power-heat cogeneration), embodied energy in building materials, building site logistics and management as well as nearly all further stages of building development and usage.
  - Increased efficiency is a necessity regarding the capabilities to disassemble buildings (keyword: urban mining).
- The challenge is no longer just to create **sustainable cities, but truly regenerative cities**: To assure that they do not just become resource-efficient and low-carbon-emitting, but that they positively enhance rather than undermine ecosystem services they receive from beyond their boundaries.



# Demographic and Social Aspects

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Demographic and social aspect scenarios to be taken into account for scenarios in the building sector include:

- Changes in lifestyle: more households with more energy-using interior, less persons living per household but more living area per capita
- Change in awareness of energy and resource subjects in the population
- Human resource concerns of the ETP's to attract and secure qualified employees for the future.
- General demographic tendencies: the earth is calculated to have about 8 billions inhabitants by 2030 (+80 millions per year in 2010), demographic tendencies show strong regional differentiations.
- In Europe, a general trend towards an aging society is visible.



# Renewable and Non Renewable Sources

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Scenarios on renewable and non renewable sources and related targets present a certain degree of variation. The most important are:

- Natural resources (water, minerals) must be saved. 50% of all materials extracted from the earth's crust are transformed into construction materials and products. When these materials enter the waste stream, they account for 22 % of all final waste.
- Assumption of oil production peak: 2050 (Japan Tech. Roadmap 2006). Other estimates said that Peak Oil is impending and will hit around 2020. Long term oil-prices could reach up to 200\$/bbl or 300\$/bbl. This will lead to strong pressure towards increased energy efficiency and resource use efficiency.
- Assumption of natural gas production peak: 2100



# BUILDING UP Next Activities

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- **Inventive Session**, 6<sup>th</sup> October, Warsaw:
  - Analysis and Prioritization of BUILDING UP challenges.
  - Preliminary Identification of cross-ETP research areas where to focus the roadmap.
  - Possible Interactions with EeB PPP Roadmapping activities:
- **Scheme of the Roadmap**: late October 2011
- **Draft Roadmap**: December 2011 (validation meeting)