Summary

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1. Being aware

1.1 Energy

Fossil fuels known reserves*:

- Oil = 40 to 80 years
- Coal = 200 to 250 years
- Natural gas = 70 to 100 years
- Uranium = 85 years (IAEA)

* At the present growing rate of consumption, and actual techniques

**It's a matter of few human generations**

except for:

- Sun and Wind = 5 Billion years

And we should not forget that:

EU imports **50%** of its energy from unstable countries!
1. Being aware
1.2 CO₂

CO₂ levels on earth:
- 280 ppm before industrial revolution
- 315 ppm in the late 1950s
- 380 ppm in 2006
- 2 ppm more each year (maybe more)

Experts recommend to stay below 450 ppm

It's only three decades from now!
All countries must drastically and rapidly reduce their CO₂ emissions, and doing so, Europe will also increase its energy independence.

1. Being aware
1.3 Buildings

What about the construction sector?
- Buildings use 40% of total EU energy consumption
- Construction industry generates 1/3 of GHG in Europe
- Even new buildings are far from being all energy efficient
- Replacement rate is very small (1 to 2% per year)

We have a clear responsibility:

to provide NOW solutions for new and existing buildings
2. The Big Challenge

A huge challenge is thus in the hands of the European construction sector:
- It is of strategic and vital importance for our countries
- It should be seen at transnational level
- Construction market organisation is not ideal
- Existing Community instruments are inadequate

This challenge raises high hopes because it could:
- Significantly contribute to CO₂ reduction
- Bring new knowledge, raise awareness of all
- Solve market failures
- Provide competitive advantages to European companies

**Business as usual is not an option**
20th June 2007

ECTP High Level Group Meeting

ECTP High Level Group decides to fully support the preparation of a Joint Technology Initiative (JTI)
2. The Big Challenge

What is a JTI?
JTI is a long-term, Europe-wide public-private partnership combining:
- Private sector investment (~50%)
- National and European public funding (~50%)

JTIs are:
- Very large scale research programs
- Driven by the industry
- Focused on clear technological and economic objectives

The first two JTIs have been adopted this year by EC:
- *Embedded Intelligence and systems (eur 2.7 Billion, 10 years)*
- *Innovative Medicines Initiative (eur 2 Billion, 10 years)*
2. The Big Challenge

**E2B JTI stands for: Energy Efficient Buildings Joint Technology Initiative**

"The overall objective of E2B JTI is to deliver and implement building and district concepts that have the technical, economic and societal potential to drastically cut the energy consumption and reduce CO₂ emissions due to existing and new buildings within 2030, thereby contributing to improve EU energy independence."
3. E2B JTI

3.1 Main strategic objectives

- Boost research programs
  - Accelerate programs in energy saving and CO$_2$ reduction
  - Succeed in a faster integration of existing new technologies
  - Remove contractual and regulatory barriers

- Think Big
  - Disseminate widely for a real impact
  - Create mass markets and decrease unit prices
  - Get a strong social significance

- Use sustainable ways
  - Use PPP approaches to ensure long-term commitment
  - Develop life-cycle analysis and global costing

This will be supported by an ambitious program of demonstrators
3. E2B JTI
3.2 Boost research (1)
A more efficient envelope:
- Improved materials (insulation, glazing, energy storage)
- Bioclimatic architecture (natural ventilation, solar radiation, color, vegetation and water…)
- Improve design, new concepts
Better equipment and systems:
- Highly efficient HVAC equipment
- More efficient electric appliances
- Improved monitoring
- Stronger systemic approach

- Phase Change Materials
- Aero-nano gels
- LED Lighting
- Wireless Sensors Networks
3. E2B JTI
3.2 Boost research (1)

New concepts:
Hypergreen (J. Ferrier)
3. E2B JTI

3.2 Boost research (2)

Stronger integration of renewable energies
- Solar PV
- Solar thermal
- Wind turbines
- Biomass

New performance based commissioning

Change collective and individual behavior
- By harmonized EU regulations
- Promotion of EE by public sector
- Disseminate global costing, think long-term
- Improve individual behavior
3. E2B JTI
3.2 Boost research (2)

New designs: Offsite 2007 Event (UK)
3. E2B JTI
3.2 Boost research (2)

New designs: Green Office (Bouygues Immobilier)
3. E2B JTI
3.2 Boost research (3) : the Wave Concept

We should go fast, so during JTI duration, continuous on-going research will feed demonstration projects.

With Design and Build lasting ~ 36 months and one year of operation for first feedback, 3 "waves" can be expected in a ten-year program.

Research, Demonstrate, Get Feedback
GeoClusters are geographical areas with strong similarities in terms of:
- Climate
- Culture and behavior
- Construction typologies
- Economic systems
- Gross Domestic Product

About 8 potential GeoClusters have been identified. They are basically transnational.
3. E2B JTI
3.3 Think Big: Work at district level (1)

E2B also has the ambition to address the district level:
- With a holistic approach, at the scale of the challenge
- Interaction between buildings, networks and society, will be considered
- Some solutions of energy production are efficient only at this level
- A significant impact is more easily reached.
3. E2B JTI
3.3 Think Big: Work at district level (2)

E2B JTI foresees renovation programs:
- In the range of 10,000 to 50,000 sq.m
- Simultaneously coordinated in several countries
- Under the leadership of a general program management
- With clear objectives, performance based, to reach very low energy consumption, and when possible go positive
- Carefully monitored to provide valuable feedback
- Followed by appropriate corrective actions if needed

This would yield a considerable amount of knowledge and lead to a **Quantic Leap**
in terms of innovation and energy efficiency in renovation
3. E2B JTI

3.3 Think Big: An example

One program will focus on Social Housing and School Buildings.

Social Housing because:

- It represents **55 million dwellings** in EU
- It is generally well adapted to global packages and replication
- Poverty resulting from energy prices is a major risk
- Energy savings potential is huge

School and educational buildings because:

- It concerns **130 million young people** below 24 and more than 10 million teachers
- We address awareness of future generations
- It's in the hands of a public client
3. E2B JTI
3.4 Take sustainable ways

We have experienced PPP in France and PFIs in UK. PPP are very powerful ways to introduce sustainability as a major design factor. Life-cycle models have been developed and optimisation is reached by whole life costing. With these data, construction elements are then selected for an optimum use, no longer for a minimum cost.

*Using does not mean owning...*
3. E2B JTI
3.4 Take sustainable ways

With PPP or PFI, **TIME** as a dimension comes back in construction

*West Middlesex Hospital*
3. E2B JTI

3.5 Some deliverables

- From boosting and applying research
  - Improved new materials and systems
  - Increased use of renewables
  - New, alternative designs, eco solutions
  - Better behavioral knowledge

- By thinking "Big"
  - Exemplary Energy Efficient Districts
  - Raised people awareness
  - New financing modes

- From sustainable ways
  - Expertise in life cycle analysis
  - Experience of global costing
  - Transformation of the construction sector
4. Roadmap 2008

4.1 Action 1 = Build an organisation
- Get founding members together and create a Non Profit International Association (NPIA) under Belgian law
- Formalize membership rules and financial contributions for all
- Build up constitutive elements
- Implement the necessary tools
- Mobilize additional members

4.2 Action 2 = Develop the concepts
- Finalise and agree on a more accurate definition of objectives
- Detail and validate an action plan
- Set up Working Groups
- Write down a more detailed, founding document
4. Roadmap 2008

4.3 Action 3 = Finalise the budget

- Financing is EC = 1 MS = 2 PS = 3
- Expected duration ~ 10 years
- Resources will come from ECTP, from other ETPs and from NTPs
- Mobilisation of potential funds will be among the first NPIA tasks
- With 200 members, expected budget range is 1,2 to 2,3 Billion €

4.4 Action 4 = Communicate

- Create adapted presentations
- Prepare leaflets and written supports
- Build up the calendar of formal contacts with EC representatives, Member States and Parliament members
4. Roadmap **2008**
4.5 Proposed structure

![Diagram of organizational structure](image-url)
4. Roadmap 2008

4.6 Members

- **European construction leaders:**
  - Acciona, Arcelor, Bouygues, Dragados, EDF, FCC, Ferrovial, Hochtief, Keraben, Knauf, Maxit, Mostostal, St-Gobain, Uponor, Vinci

- **Research and Engineering organisations:**
  - CSTB, Arup, BBRI, Ciemat, CNR-ISAC, Labein, TNO, VTT

- **SMEs**
  - D’Appolonia, Zag

- **Universities**
  - NTUA, Un. delle Marche

- **Associations**

- **Clients and Users**

Other potential members have expressed their interest, and E2B Core Group is also working to reach a larger support.
5. Conclusion

In less than a century, human genius has led mankind to unexpected heights in human and technical domains. But in the same time, a small part of mankind has:

- Forever consumed some major natural resources
- Altered the thermal equilibrium of the planet.

Human intelligence should now find efficient ways to:

Build sustainable development and solve the energy equation for more than 6 billion people

Energy Efficient Buildings are a part of the solution.

With E2B JTI, we hope to start the demonstration...
"We need to start working on changes on the scale of the problems we face"

(Bill McKibben, environmentalist)