

E2B EI

**European Initiative
on
Energy Efficient Buildings**

Scope and Vision

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Date Parag. p. Modification

“The overall objective of E2B European Initiative (E2B EI) is to deliver, implement and optimise building and district concepts that have the technical, economic and societal potential to drastically decrease the energy consumption and reduce CO₂ emissions due to existing and new buildings at the overall scale of the European Union.

The E2B EI will speed up research on key technologies and develop a competitive industry in the fields of energy efficient construction processes, products and services, with the main purpose of reaching the goals set forth for 2020 and 2050 to address climate change issues and contribute to improve EU energy independence thereby transforming these challenges into a business opportunity”

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Preamble

Climate change is a reality, many phenomena are observed on our globe everyday, and scientific proofs abound. They demonstrate without any possible discussion that we have entered a new era in which the climate to which mankind was used in the last centuries will change on several important parameters.

The extent to which these changes will influence mankind is yet unknown. The important work produced by IPCC shows “robust findings” and “key uncertainties”, but a significant increase of the average temperature on Earth is expected during this century, whatever we do, as it results from past actions.

In function of our behaviour during the next decades the increase could be much worse or could be stabilized, and other related consequences will follow the same trend (ice caps melt, rise of sea level, desertification, extreme natural phenomena...)

Green House Gases production of our societies have been clearly outlined as the major cause of global warming and have been at the heart of the first real world wide action, the Kyoto protocol. And these gases are essentially the by-products of fossil fuel consumption.

The built environment is the first responsible with an average value estimated in most developed countries around 40% of the energy use and a part of Green House Gases close to 33%. In most industrialized countries, the construction industry is aware of these facts and of its responsibilities.

And we foresee in a near future, that the built environment in Europe could be designed, built or renovated with high energy efficiency, and at the same time improve the quality of life of European citizens. By 2050, most buildings and districts could become energy neutral, and have a zero CO₂ emission.

A significant number of buildings would then be energy positive, thus becoming real power plants, integrating renewable energy sources, clean distributed generation technologies and integrated smart grids at district level.

To reach these goals, the European Construction Technology Platform (ECTP) has decided to propose an industrial initiative on the energy efficiency of buildings and districts. Being seen as a major contribution to European research, it is proposed as a European Initiative, named E2B EI for Energy Efficient Buildings European Initiative. Our approach is in line with:

*The **Lisbon Strategy** of transforming the construction industry from resource-intensive industry to a knowledge-intensive, while improving its competitiveness, producing sustainable growth, creating more industries and more and better jobs through the generation of high added-value products and related processes, technologies and services for energy efficient buildings.*

*The **Strategic Energy Technology Plan** and the goals set forth for 2020 and 2050 on reducing the energy consumption and GHG emissions and increase the share of renewable energy sources to address climate change issues and contribute to improve EU energy independence.*

*The **communication i2010**, achieving the renewed Lisbon agenda, strengthening investment in and the use of new technologies, particularly ICTs, by both the private and public sectors. and the communication “Addressing the challenge of energy efficiency through information and communication Technologies” COM(2008), 241*

The industry around the E2B Association (E2BA), covering the whole supply and value chain of energy efficient buildings and districts, is committed to mobilize the necessary resources to achieve a radical change towards energy efficient buildings and districts at the level of the European Union.

1

The European construction sector, its awareness and vision of future issues in terms of climate change and energy efficiency

1.1 Construction, a responsible sector

Everyday, the construction sector in the European Union builds or renovates places where people work, live, have fun or rest, generally speaking spend most of their life.

Being responsible for the quality of this environment in terms of design, construction, and maintenance is core to our jobs, and social responsibility is a well known factor of our work.

Today, the construction sector is fully aware of a huge responsibility:

Being the highest energy consumer in EU

Being one of the main contributors to GHG emissions

The European Directive of 16 December 2002 recalls:

“The residential and tertiary sector, the major part of which is buildings, accounts for more than 40% of final energy consumption in the Community and is expanding, a trend which is bound to increase its energy consumption and hence also its carbon dioxide emissions.”¹

This is a big responsibility.

It can also be seen as a fantastic opportunity if the right actions are taken. The construction sector could really contribute in a significant way to the fight against climate change issues, in addition to decrease EU fossil fuel dependence on countries outside Europe.



ARUP



D'APOLONIA



Mostostal
WARSZAWA

PHILIPS

SAINT-GOBAIN

STIEBEL ELTRON

In order to respond to the challenges of achieving sustainable development the construction sector has started to implement real changes that are progressively implemented from project inception to final delivery to the client.

It is important to keep in mind the fact that the construction sector is globally, by far the largest employer in EU with 25 million jobs, contributing to about 10,4% of the Gross Domestic Product, with 2,7 millions of enterprises, most of them being SMES. Any significant development of our work or objectives implies a similar effort in training, knowledge transfer and elaborated policies.

We will see here that presently it has an enormous potential of transformation from a resources based industry to a knowledge based one.

On these topics, Europe has launched actions and programs such as ERACOBUILD, CONCERTO, SAVE and many others. There are new associations and working groups. This proposal will take them all into account either through already obtained results or by developing coherent, complementary actions.

European industry leaders in the fields of construction, energy, materials, systems and engineering are present in E2B EI. This proves the commitment and the understanding that the construction sector has, at the highest level, of its responsibilities and of its potential for research and development.

¹ Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings, p.1 (6)

1.2 Act fast, on a large scale

Being at the highest level of responsibility in front of a worldwide problem implies acting in a carefully reasoned, specific way.

The scientific community is well aware from many sources of the climate change issues. Regular reports coming from widely accepted experts are published every year.

The International Panel on Climate Change (IPCC), published recently its Climate Change 2007 Synthesis Report.

For understandable reasons, IPCC experts generally have adopted a prudent, conservative attitude, balanced between “robust findings” and “key uncertainties”. As a result, the actual observed situations are generally worse than those forecasted several years before.

Alarming situations, leading to a significant increase of Earth temperature, potential raise of sea levels are analysed. Impacts on ecosystems, health, food and water are expected. Abrupt or irreversible changes could happen.²

This is a serious warning; we can no longer wait for years: we need to react now in a fast and efficient way.

We should act fast

Having an objective of efficiency brings in light a second point: We should find the ways for a large scale action. And by large scale we mean the overall European Union built environment.

The present rate of construction of new buildings is below 2% in all major European nations. Destruction rates are even lower, in the range of 0, 5%. These figures push the hope of having a truly energy efficient built environment far beyond one century and probably closer to two centuries if action is limited on new buildings. This has been well understood in the European Directive on the Energy Performance of Buildings and also stressed by the European Economic and Social Committee as follows:

“Any measures adopted with a view to securing significant energy savings should take into account the fact that the majority of European live in existing buildings and that new buildings constitute only a small percentage”³

The conclusion is straightforward:

In order to contribute to a significant reduction of CO₂ emissions, the entire building stock should be improved within a reasonable timeframe, i.e. years and not decades.

We need a large scale action, focused on the existing stock

Following the Energy Performance of Buildings Directive⁴, some countries have started to propose coherent measures focused on the renovation of buildings, in particular public buildings in the frame of major national programs.

E2B EI will take advantage of these programs and will propose ways for coherence and rapidity of implementation at EU level.

And logically, the ambition of E2B EI will also be to apply to renovation programs the techniques and knowledge gained from research programs on new buildings.



*We don't need a slightly rejiggered version of the world we now inhabit; we need to start working on changes on the scale of the problems with face”
(Bill Mc Kibben)*

² AR4 Synthesis Report, International Panel on Climate Change

³ Opinion of the European Economic and Social Committee on Energy Efficiency of Buildings – The contribution of end users (2008/C 162/13) February 14th, 2008

⁴ Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings Article 6, Existing buildings

1.3 E2B EI and ECTP Strategic Research Agenda

ECTP has developed a Strategic Research Agenda (SRA) that was published at the end of 2005.

It can be downloaded from ECTP website⁵.

ECTP SRA defines strategic research priorities, around three axes, in 13 chapters:

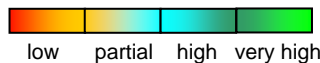
1. Meeting client and user requirements
2. Becoming sustainable
3. Transformation of the construction sector

In June 2007, ECTP published an associated roadmap⁶ proposing an Implementation Action Plan of the SRA. This roadmap introduces a major priority on “New technologies, Concepts and High-Tech Materials for Efficient and Clean buildings”, a theme which is a significant part of E2B EI.

E2B EI initially stemmed from a group of ECTP members, and is now fully supported by ECTP as a logical follow-up to implement several parts of its Strategic Research Agenda.

It is therefore needed and useful to evaluate the adequacy of E2B EI to ECTP vision.

To illustrate the links between E2B EI and ECTP SRA, the convergence of objectives between both has been estimated on each of the SRA 13 chapters and is illustrated on basis of a four level coloured rule:



1/ Meeting Client/User Requirements



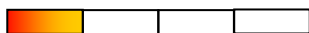
1.1 Healthy, Safe and Accessible Indoor Environment for All

Well-being, comfort, new materials will be by-products of E2B EI, as well as indoor environment quality. Health may be linked to thermal comfort, whereas safety or mobility questions are farther from E2B EI goals.



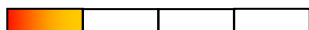
1.2 A New Image of Cities

Holistic approaches, working on district level, introduction of new designs, social housing and renovation are all among E2B EI research areas. Convergence is globally high.



1.3 Efficient Use of Underground City Space

This topic is not part of E2B EI, the only common points may be in the development of new energy sources and storage. Convergence is low.



1.4 Mobility and Supply through Efficient Networks

Common points here include management of networks at district level, some ICT systems related to energy.

From these estimates, the average “converging factor” with ECTP SRA is above average on the first two chapters.

This is fairly logical: meeting clients and users requirements is a very strong concern in E2B EI scope. Listening to the final user is a major starting point in renovation projects and behavioural aspects are known as having an important potential for energy savings.

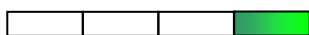
⁵ Strategic Research Agenda for the European Construction Sector, December 23rd, 2005 on: www.ectp.org

⁶ Strategic Research Agenda Implementation Action Plan (Roadmap) for the Construction sector, July 2007, on www.ectp.org

2. Becoming Sustainable

2.1 Reduce Resource Consumption (energy, water, materials)

The very strong convergence on this chapter is obvious; ECTP SRA clearly states the reduction of energy consumption as a first point together with efficient and environmentally friendly construction materials, and low carbon technologies.



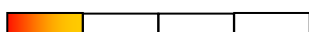
2.2 Reduce Environmental and Man-Made Impacts

This chapter mainly deals with protecting land and water and reducing impact of infrastructures on environment. These points are somewhat linked with the district level approach in E2B EI. But they are not a major focus for E2B EI. Environmental and man-made impacts will mostly take place in E2B EI during the development of new materials.



2.3 Sustainable Management of Transport and Utilities Networks

This chapter deals with transport infrastructures, utilities network and is quite far from E2B EI objectives. Convergence is low.



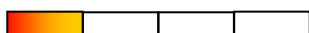
2.4 A living cultural heritage for an attractive Europe

Developing new materials, with a high degree of energy efficiency, improving our knowledge of cultural heritage typologies, monitoring tools, mathematical modelling ...are all topics integrated in E2B EI. Hence convergence is fairly strong.



2.5 Improve Safety and Security

Concerned with natural and man-made hazards, safety and security of infrastructures this chapter has little common points with E2B EI.

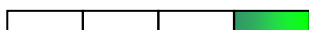


In E2B EI, sustainability will essentially be seen under the angle of the reduction of energy consumption, with low carbon technologies and of the economy in the use of natural resources. Cultural heritage will benefit from some aspects of research on materials and systems.

3. Transformation of the Construction Sector

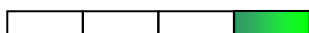
3.1 A New Client-driven, Knowledge-based Construction Process

Developing and spreading energy efficiency on a large scale, at a European Level will require a large amount on knowledge transfer. E2B EI goals are, at least partially, client driven and a very strong need to improve our knowledge has been outlined. Life cycle management, site construction processes, development of sustainable models are objectives of ECTP SRA explicitly included in E2B EI.



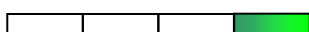
3.2 ICT and Automation

ICT and automation are viewed by ECTP SRA in a larger scope than the one developed in E2B EI. E2B EI plans to develop to its full potential the dimension of ICTs applicable to energy efficiency. Convergence of point of views is very high

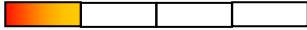


3.3 High Added-value Construction Materials

The entire approach of ECTP SRA to innovative materials is fully coherent with E2B EI. Many objectives and research areas proposed in the SRA will be included in E2B EI. Convergence is here very high.



.../...



3.4 Attractive Workplaces

This last chapter essentially deals with construction sites. Some research will certainly be conducted on energy savings on sites but this is a minor topic in E2B EI. Convergence is low.

It is extremely interesting to see how strong the convergence is in this third axis.

It brings in the light the high potential of change carried by E2B EI concepts for our industrial sector. This should be considered as one of its major justifications.

As a global conclusion to this chapter, it can be said that E2B EI is well in line with ECTP Strategic Research Agenda objectives.

This means that the need to go rapidly to a real energy efficiency of the built environment, recognized by ECTP in 2007 as its major R & D subject, was already well integrated in ECTP Strategic Research Agenda.

It also means that other significant subjects of great interest remain in the fields of progress for the construction sector.

In other terms, the parenthood link between E2B EI and ECTP SRA is clearly reaffirmed after careful analysis.

1.4 E2B EI and the Strategic Energy Technology Plan (SET-PLAN)

The SET-PLAN was presented by the European Commission⁷ in November 2007.

The SET-PLAN draws the lines of a new European policy for energy technologies based on the ambition and targets of the Energy Policy for Europe. Existing measures taken over recent years have provided a foundation for further EU action like European Technology Platforms creation, SRAs definition and deployment, the ERA-Net instrument and networks of excellence.

The SET-PLAN will focus, strengthen and give coherence to an overall effort in Europe, with the objective of accelerating innovation in cutting edge European low carbon technologies.

Through the integration and demonstration at building and district level of new energy technologies and efficiency in energy conversion, E2B EI will contribute to achieve the political vision of Europe with a more sustainable economy, with world leadership in a diverse portfolio of clean, efficient and low-carbon energy solutions.

Furthermore, the scope of E2B EI includes research and demonstration in materials, components, systems and ICTs for energy efficiency in buildings and districts. It should be reminded that E2B EI will also benefit directly from the integration in buildings and districts of the progress made in other technologies such as cogeneration, solar heating and cooling and photovoltaic.

At this point, SET-Plan and E2B EI seem essentially to complement each other, and we will outline the main concerned domains.

But in a closer look, we will also see that E2B EI follows very identical patterns to those proposed by the SET-Plan for converging towards a low carbon future, even if on one side the goal is to save energy while on the other it is to produce it in a more efficient way.

An interesting map (see on next page) has been presented in several documents related to SET-Plan⁸. It combines the challenge for implementation with the time horizon.

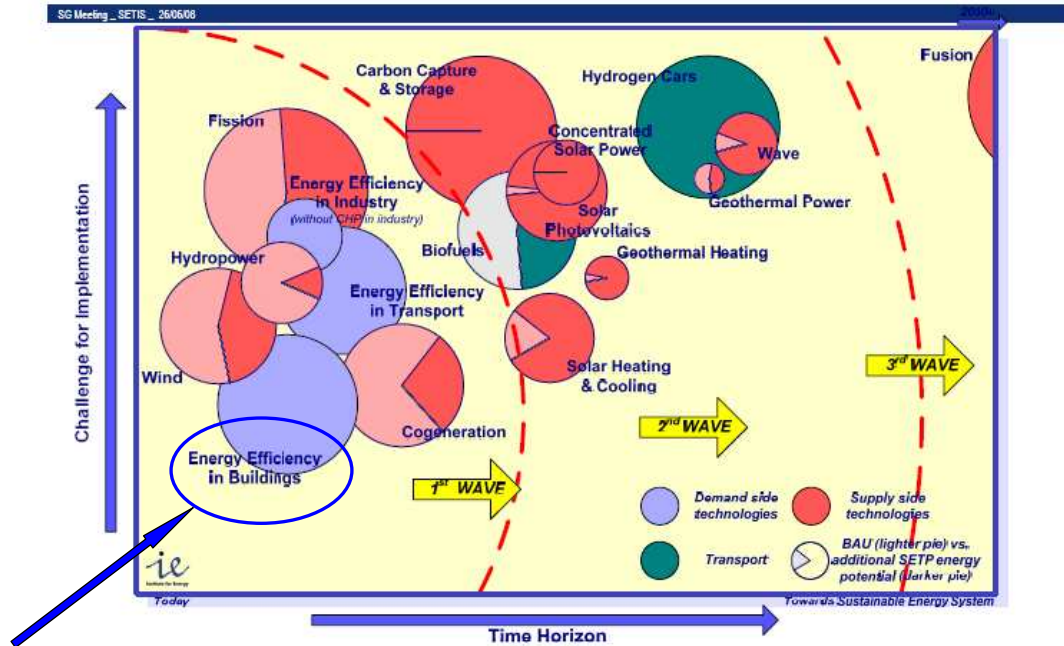
This technology map demonstrates with evidence that energy efficiency in buildings (arrow) is the better located possibility of action when combining the two factors, which is a first important conclusion.

Furthermore, the E2B EI will have a direct impact in the Energy Technologies for which the application domain is buildings, as shown in the Technology Map of the SET-Plan.

The effort put in Energy Efficiency in Buildings (lower left corner of the figure) will reduce the time horizon of other technologies involved also in buildings, such as Cogeneration, Solar Heating and Cooling, Solar, Photovoltaic and Geothermal Heating, due to a demand driven approach.

⁷ Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - A European Strategic Energy Technology Plan (SET-Plan) COM(2007) 723 final Brussels, 22.11.2007

⁸ Inaugural meeting of European Community Steering Group on Strategic Energy Technologies, Presentation by Mr Giovanni De Santi, Director DG JRC, p. 6



Technology Map published by EC Joint Research Centre

In the following pages we will analyse step by step the direct correspondence between the SET-PLAN content of each chapter with E2B EI goals relevant of the same problematic. This analysis is based on the Communication from the Commission made on Nov, 22nd, 2007, referenced before.

The left column gives SET-PLAN extracts that are relevant either of general problematic or of specific points related to energy efficiency, research areas, and potential actions.

The right column either confirms or synthesizes E2B EI views or gives extracts of the present document.

To facilitate reading, all extracted texts are in italics.

1. The need for a European Strategic Energy Technology Plan (SET-Plan)

The first chapter outlines several major points such as harnessing new technologies, developing cost-effective low-carbon technologies, the need for higher research budgets, accelerating the innovation process. Public intervention to support energy innovation is presented as both necessary and justified.

E2B EI is fully in line with the need to develop low-carbon technologies, through the integration and demonstration of cost-effective technologies such as in heating and ventilation systems and/or in insulation materials. The goal to reduce CO₂ emissions due to the built environment is part of E2B EI fundamental definition.

Being based on a public private partnership (PPP) it carries in itself the means for a real public intervention.

Technology is a vital piece of the Energy Policy jigsaw

“Europe needs to act now, together, to deliver sustainable, secure and competitive energy. The inter-related challenges of climate change, security of energy supply and competitiveness are multifaceted and require a coordinated response.”

Chapter 1.1

“The construction sector could really contribute in a significant way to the fight against climate change issues, in addition to decrease EU fossil fuel dependence on countries outside Europe.”

Today we are falling short

“Public and private energy research budgets in the EU have declined substantially since peaking in the 1980s in response to the energy price shocks. This has led to an accumulated under-investment in energy research capacities and infrastructures.”

By mobilizing private and public funding for research in an organised, large scale scheme, E2B EI has the ambition to boost research in a significant way. The whole Chapter 2 of the present document is devoted to this point.

Intrinsic weaknesses in energy innovation

*“The energy innovation process...
...is characterised by long lead times, often decades, to mass market due to the scale of investments needed and the technological and regulatory inertia inherent in existing energy systems.”*

Chapter 4.2

“Basically, implementation of new products is slow for several reasons:

- *A very fragmented market.*
 - *Based on the work of very small companies.*
 - *Small margins.*
 - *Complex assembly of very different techniques.*
 - *An industry that conveys images of the past, slowing the innovation process.”*
-

Europe should lead the world in energy technologies

“Member States working alone will have difficulty in creating the conditions necessary to allow industry to compete in global markets. The main global players... Their market size, investment and research capacities far exceed those of most Member States. This is compounded by the fragmentation, multiple non-aligned research strategies and sub-critical capacities that remain a prevailing characteristic of the EU research base.”

2.4.4 Geo-Clusters

“One of the fundamentals of E2B EI is that energy efficiency will respond to climate change and energy issues providing we are able to trigger large scale actions concerning all Member States.”

Time is of the essence

“...we cannot afford to delay action. Decisions taken over the next 10-15 years will have profound consequences for energy security, for climate change, for growth and jobs in Europe. The cost of action may be high, but the price of inactivity much higher. As an illustration of the scale of the problem, the Stern report estimates that the cost of action could be limited to around 1% of global GDP per year, while inaction could result in losing 5-20% of global GDP annually.”

Chapter 1.2

“This is a serious warning; we can no longer wait for years: we need to react now in a fast and efficient way”

Chapter 4.1

“A large scale action will create jobs, boost research, allow for a decrease of unit prices, and, by the improvement of energy efficiency, will contribute to a reduction of EU dependence with respect to unstable countries.”

2. Achieving the political vision

Energy Efficiency

“In transport, buildings and industry, available technology opportunities must be turned into business opportunities. We need to fully harness the potential for information and communication technologies and organisational innovation, as well as use public policy and market-based instruments to manage demand and encourage new markets.”

“The E2B EI will speed up research on key technologies and develop a competitive industry in the fields of energy efficient construction processes, products and services, with the main purpose of reaching the goals set forth for 2020 and 2050 to address climate change issues and contribute to improve EU energy independence thereby transforming these challenges into a business opportunity”

Achieving the 2020 targets

“A twin-track approach is therefore needed: reinforced research to lower costs and improve performance; and pro-active support measures to create business opportunities, stimulate market development and address the non-technological barriers that discourage innovation and the market deployment of efficient and low carbon technologies.”

Chapter 2.1

“...by simultaneously working on two complementary goals:

Boost research in all fields

Apply new technologies on a very large scale
...It will also include the appropriate structures to deploy and follow-up large trans-national programs for energy efficiency at EU level. Doing so, we believe that we will create the conditions for a “twin-track” approach of the built environment.”

Key technology challenges for the next 10 years to meet the 2020 targets

- Bring to mass market more efficient energy conversion and end-use devices and systems, in buildings, transport and industry, such as poly-generation and fuel cells;

Chapter 2.1

“Therefore, the most important criteria, to decide among different potential actions, should be their capacity to be rapidly applied on a large scale.”

Key technology challenges for the next 10 years to meet the 2050 targets

- Achieve a breakthrough in the cost-efficiency of energy storage technologies

Achieve breakthroughs in enabling research for energy efficiency: e.g. materials, nano-science, information and communication technologies, bio-science and computation.

Chapter 2.3

“Energy storage systems (thermal, electrical...)”

2.2.1 Tools

“Tools for designing and measuring energy efficiency are still missing, particularly at district level. Furthermore, going to higher levels of energy efficiency will require more sophisticated tools than those currently used.”

2.2.2 The building envelope

- “Using thin materials with high insulation capacities for internal insulation.

2.2.2 The building envelope (ctd)

- *New materials for external insulation*

2.2.4 ICTs for Energy Efficiency

"In order to enable ICT techniques to reach their full potential, it is necessary to foster research into novel ICT-based solutions and strengthen their deployment."

E2B EI addresses demonstration in buildings and districts of poly-generation technologies, fuel cells, photovoltaic, solar thermal, wind, geothermal, biomass...and more generally the integration of all potential renewable energy sources.

A collective endeavour to deliver results

"Some technology challenges require critical mass and large-scale investment and bring with them a risk which cannot be met by the market, by Member States acting individually or by the current model of European collaborative research..."

...Achieving our ambitious goals will require a fundamental departure from current practice throughout the innovation system, striking the right balance between cooperation and competition at national, European and global levels."

2.4.4 Geo-Clusters

"One of the fundamentals of E2B EI is that energy efficiency will respond to climate change and energy issues providing we are able to trigger large scale actions concerning all Member States as outlined in § 1.3

Chapter 2.1

"A step change is needed:

It will not happen, unless we build a European roadmap and get all players involved around an industrially led common initiative"

E2B EI will provide the critical mass in terms of resources mobilisation (human and investment) at the European level, thus allowing to reach still unseen results in terms of market penetration.

3. Objectives of the SET-Plan

"The creation of European Technology Platforms has brought together stakeholders to define common research agendas and deployment strategies."

"Building on this momentum, the SET-Plan will focus, strengthen and give coherence to the overall effort in Europe, with the objective of accelerating innovation in cutting edge European low carbon technologies."

Chapter 1.3

"ECTP has developed a Strategic Research Agenda (SRA) that was published at the end of 2005."

"E2B EI...is now fully supported by ECTP as a logical follow-up to implement several parts of its Strategic Research Agenda."

2.4.2 Relation with other ETPs

"The Photovoltaic, Thermal Solar, Wind, Steel, Wood, Sustainable Chemistry, Hydrogen and Fuel Cells, Photonics21, Smart Grids and Smart systems integration are among those platforms that will be invited to work with E2B EI.

They are the one who deal with the latest technologies in their respective fields. By associating them in the various construction processes we should be able to get the best of the new technologies.

The construction industry is willing to play the role of "general contractor" in these technical fields, like it is used to do in its everyday activities."

4. Joint Strategic Planning

“Decision-makers in the Member States, industry, and the research and financial communities have to start to communicate and take decisions in a more structured and mission-oriented way, conceiving and implementing actions together with the EC within a cooperative framework. We need a new governance structure.”

European Community Steering Group on strategic Energy Technologies

European Energy Technology Information System

Chapter 3.2

- *“Cooperate with Member States to build and follow the overall planning compatible with National plans and respect E2B EI vision at the same time.*
- *Maintain a coherent roadmap at EU level, finding the overall coherence for the sake of acting fast and on a large scale.*

...These actions will be very strongly knowledge oriented, giving an output of paramount importance in terms of new techniques, of replication possibilities and of transfer between Member States.”

E2B Association will have a strong interaction with the European Commission and with the Member States. It will also contribute to the European Energy Technology Information system.

5. Effective Implementation –Working Together at Community Level

5.1 European Industrial Initiatives

“They will target sectors for which working at Community level will add most value – technologies for which the barriers, the scale of the investment and risk involved can be better tackled collectively.”

“The European Industrial Initiatives will be implemented in different ways, depending on the nature and needs of the sector and the technologies. For technologies with a sufficient industrial base across Europe they may take the form of public-private partnerships...”

Chapter 2.1

“It will also include the appropriate structures to deploy and follow-up large trans-national programs for energy efficiency at EU level.”

Chapter 1.3

“E2B EI initially stemmed from a group of ECTP members, and is now fully supported by ECTP as a logical follow-up to implement several parts of its Strategic Research Agenda.”

The construction industry, having a wide base all over Europe, has selected the European Initiative, a public-private partnership with the European Commission, as the best solution to bring fast energy efficiency in buildings and districts at the European level.

5.2. Creation of a European Energy Research Alliance

“The Commission proposes to create a European Energy Research Alliance...The mandate will be to bring about a move from today's model of collaborating on projects towards a new paradigm of implementing programmes.”

E2B Association will establish the link with the recently created European Energy Research Alliance.

6. Resources

“It is essential to address the mismatch between the sheer magnitude of the energy and climate change challenge and the current levels of research and innovation effort.”

“Two challenges need to be addressed: mobilising additional financial resources, for research and related infrastructures, industrial-scale demonstration and market replication projects; and education and training to deliver the quantity and quality of human resources required to take full advantage of the technology opportunities that the European energy policy will create.”

Chapter 2.1

“To answer these major issues, the core concept of E2B European Initiative is to “build the engine” that will allow EU to reach its objectives by simultaneously working on two complementary goals:

Boost research in all fields

Apply new technologies

on a very large scale

We urgently need to develop research actions contributing to increase energy efficiency in existing buildings and districts.”

“...E2B EI will include management structures to define the appropriate R & D needs, launch the corresponding programs and ensure that expected goals are reached.

It will also include the appropriate structures to deploy and follow-up large trans-national programs for energy efficiency at EU level.”

E2B EI implementation will lead to an increase in the number and quality of engineers and researchers in all its relevant topics, and will include programmes for training and education by using FP7 instruments such as Marie Curie actions.

7. International cooperation

“International cooperation, for example on research or the setting of international standards, is vital to stimulate the global development, commercialisation, deployment and access to low carbon technologies.”

Other countries (Japan, USA...) have started implementing measures towards greater energy efficiency, and E2B EI intends to establish a link with these programs for the greatest benefit of all.

E2B EI will also get in contact with developing and emerging countries, putting in practice the lessons and experiences learnt from the variety of European countries.

Several Founding Members have an international dimension, working on projects all over the world, and their networks may be used, if needed, to build this international cooperation.

This very preliminary analysis shows that E2B EI objectives, ways of actions, overall vision are in complete agreement with those of the SET-PLAN.

As such, the construction sector is willing to bring a complement to the SET-PLAN approach by providing the means to make a significant step forward in the energy efficiency of districts and buildings in all Member States. Intensive research, large scale programmes, trans-national work and international actions will perfectly fit in the frame of E2B EI.

2

E2B European Initiative, a powerful engine to boost Research and launch large scale actions all over Europe

2.1 The European Initiative: the powerful engine

In March 2007, the European Council has set clear goals:

For 2020 :

“The European Council:

*– stresses the need to increase energy efficiency in the EU so as to achieve the objective of saving 20% of the EU's energy consumption compared to projections for 2020, as estimated by the Commission in its Green Paper on Energy Efficiency, and to make good use of their National Energy Efficiency Action Plans for this purpose;”
.....“a binding target of a 20% share of renewable energies in overall EU energy consumption by 2020”⁹*

And for 2050 :

“The European Council reaffirms that absolute emission reduction commitments are the backbone of a global carbon market. Developed countries should continue to take the lead by committing to collectively reducing their emissions of greenhouse gases in the order of 30% by 2020 compared to 1990. They should do so also with a view to collectively reducing their emissions by 60% to 80% by 2050 compared to 1990.”¹⁰

The question is: How will we get there?

The way to achieve these goals is paved by consensual point of views, as exposed by IPCC and by the European Commission. In a recently published Synthesis Report (Valencia, Spain, 12-17 November 2007) IPCC states:

“The range of stabilisation levels for GHG concentrations that have been assessed can be achieved by deployment of a portfolio of technologies that are currently available and those that are expected to be commercialised in coming decades, provided that appropriate and effective incentives are in place and barriers are removed. In addition, further RD&D would be required to improve the technical performance, reduce the costs and achieve social acceptability of new technologies. The lower the stabilisation levels, the greater the need for investment in new technologies during the next few decades.”¹¹

Whilst the SET-PLAN says:

“For 2020, the technologies that will contribute to achieving the targets are available today or in the final stages of development...A twin-track approach is therefore needed: reinforced research to lower costs and improve performance; and pro-active support measures to create business opportunities, stimulate market development and address the non-technological barriers that discourage innovation and the market deployment of efficient and low carbon technologies.”¹²

The fundamentals of E2B EI are in these sentences

We need to make a significant step forward in the overall energy efficiency of the European built environment.

³ Presidency Conclusions of the Brussels European Council, 8/9 March 2007 p.20 and 21

¹⁰ Presidency Conclusions of the Brussels European Council, 8/9 March 2007 p.12

¹¹ IPCC Climate Change 2007, Synthesis Report, Topic 6 Robust findings, key uncertainties, § 6.3 Responses to Climate Change, p.73

¹² Commission of the European Communities A European Strategic Energy Technology Plan (SET-PLAN) COM(2007) 723 final

All over Europe, new buildings with measured energy consumption figures in the range of 60 kWh/m²/year (primary energy) –or even below- have been built. This is a four to fivefold improvement on previous performances.

Knowledge is gained everyday on appropriate designs, techniques, and the use of these buildings.

Unfortunately, very often, these projects turn out to be prototypes, experiments with a limited range of action, and little replication. Knowledge remains in the hands of those who worked on the project.

To answer these major issues, the core concept of E2B European Initiative is to “build the engine” that will allow EU to reach its objectives by simultaneously working on two complementary goals:

Boost research in all fields

Apply new technologies on a very large scale

We urgently need to develop research actions contributing to increase energy efficiency in existing buildings and districts.

Therefore, the most important criteria, to decide among different potential actions, should be their capacity to be rapidly applied on a large scale.

A step change is needed:

It will not happen, unless we build a European roadmap and get all players involved around an industrially led common initiative.

Therefore, E2B EI will include management structures to define the appropriate R & D needs, launch the corresponding programs and ensure that expected goals are reached.

Business as usual is not an option.

It will also include the appropriate structures to deploy and follow-up large trans-national programs for energy efficiency at EU level.

Doing so, we believe that we will create the conditions for a “twin-track” approach of the built environment.

What can we expect from such an approach?

Energy savings in the range of 154 Mtoe by 2020

A contribution from renewable energies

produced by the built environment around 37 Mtoe

(cf. chapter 4 p. 42)

Knowing that the total energy consumption of Spain, Greece and Ireland is 190 Mtoe demonstrates how important E2B EI action can be.

2.2 Fields of research

Research will be focused on a wide range of topics such as:

- Short to medium term: ICTs for energy-smart buildings and districts, integration of Renewable Energy Sources in buildings and districts.
- Medium to long term: Nanotechnologies, materials, components, systems, construction processes and their integration.

E2B EI will carefully evaluate the embodied energy needed for new materials by themselves. It will not cover however the whole energy used for basic construction materials like cement, glass, steel, and ceramics, in their transport and deconstruction processes.

E2B EI includes the design, development and manufacturing of products and components contributing to the Energy Efficiency of Buildings, such as phase-change materials, insulation materials, smart windows, facades...

Adaptation of design processes, finding adequate financing, initiating new commissioning procedures, tackling behavioural issues, ensuring knowledge transfer will also be treated.

When relevant, holistic approaches will be used.

Industrialisation through new integrated construction processes during construction and in operation is also included.

The main research focus will be energy efficiency in buildings and districts while improving the quality of life (comfort and indoor environment) of citizens.

A brief overview of these subjects follows:

2.2.1 Tools and knowledge

Tools for designing and measuring energy efficiency are still missing, particularly at district level.

Furthermore, going to higher levels of energy efficiency will require more sophisticated tools than those currently used.

In order to reach high energy efficiency we need to develop new methods and adapted tools:

- Overall design processes for renovation of districts or large urban areas, roadmaps, technical and economical models.
- Systemic approaches yielding overall project optimization and ensuring compatibility between technical solutions.
- Knowledge and ways towards bio-climatic architecture favouring global approaches at building and district level.
- Selection and promotion of proper efficiency indicators.
- Decision oriented tools allowing the comparison of multiple solutions for a given project.
- 3D modelling tools. Used first in the design phase, they will be correlated with on-site measurements to improve the modelling accuracy and expertise.
- Modelling tools for existing buildings yielding the energy saving and the CO₂ reduction potential of a given building or district.
- Rapid on site measurement of actual performances.

2.2.2 The building envelope

R & D will be planned and carried for the design and development – including manufacturing processes- of components for new and retrofitted envelopes such as:

- Integration of renewable energies in existing and new envelopes.
- Using thin materials with high insulation capacities for internal insulation.

- New materials for external insulation.
- Easy to apply insulation of bottom slab.
- Local solutions to reduce thermal bridges.
- Multi-functional façade panels.
- Active panels and windows collecting and/or capable of storing energy.
- Highly efficient and smart windows.

2.2.3 Systems and equipments

All components and systems need to be designed to ensure that buildings deliver over the lifetime the energy in use that was expected during the design stage.

- Integrated PV solutions with increased cost-effectiveness and efficiency
- Thermal solar: integration and efficiency
- Small wind turbines
- Efficient appliances (lighting, sensors...)
- Ventilation and Air Conditioning
- Highly efficient heat pumps fit for renovation
- Combined Heat and Power systems
- Energy storage systems (thermal, electrical...)

2.2.4 ICTs for Energy Management

The role of ICT as an enabler of energy efficiency needs to be fully explored and exploited. There is a clear need to ensure that ICT-enabled solutions will be available, fully deployed and operational.

In order to enable ICT techniques to reach their full potential, it is necessary to foster research into novel ICT-based solutions and strengthen their deployment.

R&D efforts will be planned and carried out in the following topics:

- Building Automation: New and improved control and management systems (BMS/EMS) based on smart appliances and communication networks intended to improve energy efficiency while ensuring quality of comfort, health and safety conditions of indoor environments.
- Smart Metering: Meters that measure individual energy demand over time. It will allow to get consumption patterns and permit to implement efficient energy saving measures, to lower costs of electricity bill by reducing peak demand and to improve security of supply.
- User Awareness Tools: There is a need to provide intuitive feedback to users on real time energy consumption in order to change behaviour on energy-intensive systems usage. User friendly awareness tools will be developed in order to ensure the acceptance of these technologies.
- Interoperability / Standards: There is still inadequate development of standardisation for the interfaces and communication.

A promising field of R & D opens here with a triple potential:

- To save energy by active systems
- To give complete information to the user
- To monitor and optimize the energy production of buildings having integrated renewable energy sources.

BEMS could be improved by more user friendly interfaces and more widespread with highly adaptable solutions. Adaptability could be seen on a modular approach.

2.2.5 Social and behavioural aspects

- More accurate and better understanding of the drivers of change and the most appropriate ways to communicate about them.
- Guidelines for improvement of individual behaviours, to raise awareness and concern.
- Promoting change in collective behaviours, tackling large groups.

In order to promote change in individual behaviours, specific awareness campaigns will be needed. As a result, an analysis should be made of the individual energy consumption related to age, gender, social category...It may influence the frame of the data set to be collected in the first phase (see paragraph 2.3.1)

Research should be made to find the proper patterns for groups of individuals that will accept to test the new technologies and their implementation, with respect to the social acceptance.

Involving individuals early in a participative process has proven to be a powerful way for a successful final acceptance, helping to prepare the future new markets and simplifying the end dissemination.

2.2.6 Standardisation

Pre-normative research towards standardisation of components and systems that shall comply with building codes, electrical normative and grid integration (when applicable).

Possible barriers in existing standards and legislation will be analyzed.

Activities will be developed within national and international certification bodies.

The standardisation of components and systems developed will contribute to a wider uptake of the technologies by SMEs as well as a wider deployment in the market.

R&D effort in standardisation will allow moving from small to mass production, therefore reducing costs, while integrating the whole value chain and user and customer requirements.

2.2.7 Towards new business models

The building market is characterised by its diversity, complexity and high fragmentation of the value chain with very different views concerning energy:

Local Authorities influence the value chain through policies but high levels of energy performance are often compromised by cost considerations

Capital Providers are more focused on the short term and reduction of energy consumption is not part of their concerns.

Developers (Designers, Engineers, Contractors, Materials and Equipment Suppliers) as primary actors of the construction are focussed in the short term, and will care about energy efficiency only when implemented in the programme or when it is a key factor in the buying decision

Investors who rent buildings have recently started to consider energy-saving measures as a long term valuable investment.

End Users are often the most sensitive to energy savings but very often are not in the position to commit the necessary investment.

Therefore, new business models must be developed to take into account clients and user's requirements, the entire supply chain, legal and financial framework, technical aspects, geographical and local features and the whole life cycle.

2.3 Implementing research

Fast implementation and performance feedback are key issues, and to answer to this challenge E2B EI needs a structured implementation plan.

In this plan two major steps can be defined

The first one consists in “setting the scene”, knowing more precisely the state-of-the-art, the reality of the built environment all over Europe and getting a general agreement on it.

The second one is a matter of actions. Implementing research on large scale actions, capable of really reducing CO₂ emissions and increasing our energy independence.

2.3.1 Step 1 : Setting the scene

It is first necessary to collect accurate data from all Member States, in order to get a good picture of the overall “scene”.

The ultimate goals are here to be able to evaluate the effort needed in each country to reach the 2020 and 2050 targets, and to identify the most appropriate solutions in each case. This work will be carried out in three main phases as follows:

Phase 1: Review of the existing stock.

Data will be collected and organised around a definite typology of districts and buildings. Figures will be collected by region, to evaluate the renovation potential of existing buildings.

The evaluation will be done in terms of average performance of the outer envelope (walls and openings), heating and ventilation systems, sources of energy.

Characteristics of ownership (public or private) will also be studied, as well as existing renovation programs and available financing sources.

Phase 2: Define technical strategies

In view of the collected data the best scenarios will be put forward. They should lead to a final view of the achievements on expected energy efficiency, of use of renewable energies, and of energy savings by interim goals (e.g. 2014 and 2017).

The resulting strategy should demonstrate in each geo-cluster (see Chapter 2.4) that 2020 and 2050 goals can be reached with a feasible action plan. Sufficient margin should be integrated to deal with uncertainty, unexpected difficulties, potential lack of financing, and abandoned projects. Contingency plans will also be put in place.

Phase 3: Implementation plan

The technical strategy will have defined the needed techniques and their feasibility. At that stage, a roadmap is required. It should pave the way for fast, efficient and immediate actions, and will result from an agreement between EU and The Member States.

In each geo-cluster it will be the backbone of the project and will include the whole set of measures permitting to remove barriers due to regulations, advices related to the local organisation of construction companies, financing sources, new markets, employment and training necessities...

Clearly, the knowledge gained from these three phases will also be very valuable to drive the E2B EI research programs, and set the frame for calls.

.../...

The evaluation of the actual needs of each geo-cluster, of the “scene” on which E2B EI will be developed, is of the highest importance. Its accuracy and relevance will be critical for the success of the initiative.

This first task can be started very soon.

2.3.2 Step 2 : Launching wave actions

Expected performances should be reached at the end, and first “signs” should be perceptible during the course of E2B. Monitoring and proper reactive actions are then major components. Both are included in what we have called a “wave action”

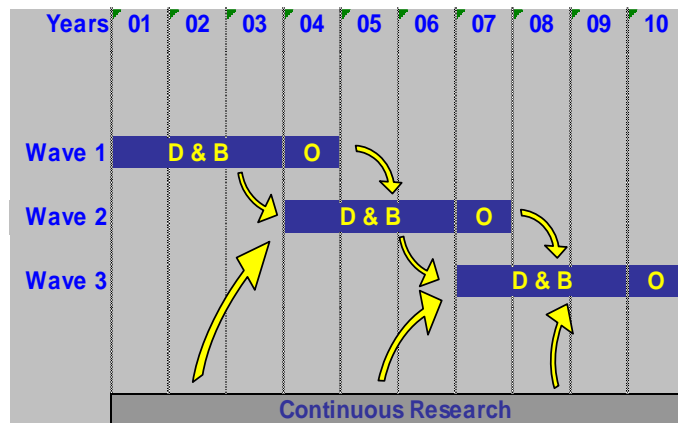
In this “wave action” plan, continuous, on-going research feeds successive waves of projects as stated here below.

The knowledge gained in the first “wave” feeds in the second at the design stage, realising a continuous implementation process.

It is quite common for the design and build phase of fairly large construction projects to last between 18 and 36 months. First significant results in terms of energy measurements cannot be expected in less than a year after completion, i.e. 3 to 4 years after start.

E2B EI proposes:

- Continuous, on-going research feeding successive “waves” of projects as stated her below.
- Knowledge gained in the first “wave” feeding also the second at the design stage, realising a continuous implementation process.
- A specific management structure (see chapter 3) to keep the movement going, to implement necessary changes, and to collect the knowledge.



After ten years, three improvement waves will have been completed. Hopefully a movement will have been started and other waves of implementation will follow. Clearly the work will not stop after ten years!

2.4 Holistic approaches and large scale actions

“There is no silver bullet”

The challenge we face is too complex to be solved by a uniform, single-oriented action. Energy efficiency requires at all levels a refined, multi-faceted approach.

As soon as a combination of many actions is necessary, holistic approaches are the best way to reach the expected goals.

These approaches will yield a proper integration of specific solutions developed in the various technical fields to form a coherent, global solution

This section will explore:

- The technical potential supported by a systemic approach.
- Why we think that the good level of action is situated at district level.
- The concept of geo-clusters.
- Proposed ideas for large scale immediate actions.

2.4.1 Systemic approach in technical fields

Significant and rapid improvements in energy efficiency cannot be reached when working only on individual, piecemeal approaches.

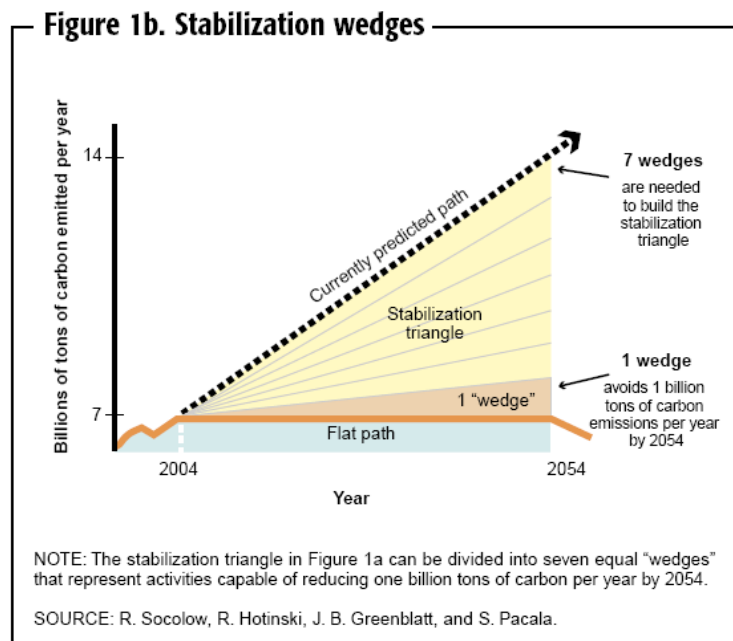
For example, looking just at the integration of renewable energies in the built environment will not in itself be sufficient to decrease Europe energetic dependence.

In a similar way, retrofitting buildings one by one will never solve climate change issues. These are some of the reasons why we need to adopt two holistic approaches:

- On a technical point of view
- On the urban scale level

Technically, we refer at what has been called the “wedge theory”. Curving down the curve of CO₂ emissions will require working simultaneously and in a coordinated manner on many parameters.

This has been clearly stated in several publications like in Environment vol. 46 December 2004¹³ from which we extract the following figure:



¹³ “Solving the Climate Problem Technologies available to curb CO₂ emissions” December 2004 issue of Environment vol.46, n°10, pages 8-19, Heldref Publications by Robert So colow, Roberta Hotinski, Jeffrey B. Greenblatt and Stephen Pacala

In an identical approach, ambitious goals in terms of energy efficiency can be reached by applying simultaneously, and in a coordinated way, many different innovative ideas in terms of various techniques but also of economical or social aspects.

This strong systemic approach will impact the design process from the beginning and up to the end of the construction phase.

General contractors like those present in E2BA are well acquainted with the management of these types of questions. They have the proper experience and tools to answer efficiently to such a challenge.

This has been demonstrated in recent projects in which the goals of energy savings and carbon footprint, sometimes joined with other sustainable construction goals, are explicitly stated from the start of design.

We are then led to:

- adapt the structural concept
- change the overall façade design
- invent specific, highly efficient wall concepts
- optimize the use of air conditioning
- introduce energy production panels as architectural elements
- change lighting systems
- bring in nocturnal fresh air
- use green roofs
- use combined heat and power production
- be able to control integrated energy storage

and many other alternative designs (this is true for all types of buildings).

The design process is in itself changed, and more than ever the architect - engineer team is required, to develop new, innovative concepts.

2.4.2 Relation with other European Technology Platforms

A network of European Technology Platforms.

The Photovoltaic, Thermal Solar, Wind, Steel, Wood, Sustainable Chemistry, Hydrogen and Fuel Cells, Photonics21, Smart Grids and Smart systems integration are among those platforms that will be invited to work with E2B EI.

They are the one who deal with the latest technologies in their respective fields. By associating them in the various construction processes we should be able to get the best of the new technologies. The construction industry is willing to play the role of “general contractor” in these technical fields, like it is used to do in its everyday activities.

It will then be our job to find the satisfactory integration techniques and to make sure that the building (or district) as a whole meets the expected performances.

2.4.3 Working at district level

Working at district level, or on large groups of buildings is certainly the true scale for E2B EI. It will permit to reach much higher energy efficiency, the use of energy will be optimized at many levels:

- whole district (networks and grids, street lighting, urban heat production..)
- groups of dwellings (sharing and managing energy production, social attitudes, involving public owners...)
- domestic: building level (appliances, insulation, building energy management systems...)

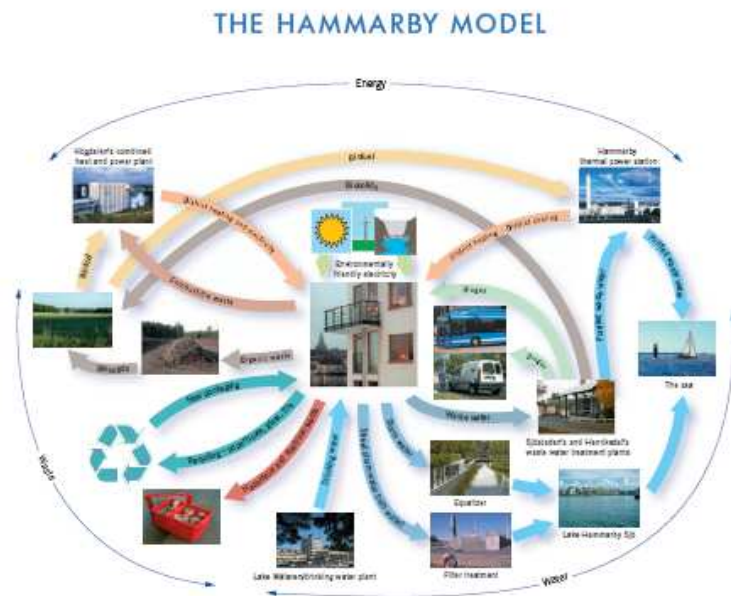
It is also a more logical approach. What would be the impact of renovating some buildings and not its neighbours? Piecemeal approaches are always more expensive than large scale programs. On a social point of view also what could be the criteria justifying the renovation of a building and not the next one?

A good example of what can be done at district level when a strong involvement of actors exists from start is illustrated hereafter with the Hammarby eco-neighbourhood in Stockholm.

It is a new, recently built district but the impressive results obtained could be transferred to renovation programs.

This project was started in 1997 and has benefited, right from the start of a well defined overall environmental program. At the very beginning, notions of environmental footprint, of energy efficiency, of well being of inhabitants were identified as basic constituents of the future district.

As shown in this diagram¹⁴, energy, waste, water but also noise levels have been taken into account in the design and realisation. A very high level of autonomy is reached, and in turn very low levels of energy consumption have been measured (60 kWh/m²/year)



The core of the environmental and infrastructural planning of Hammarby Sjöstad jointly developed by Stockholm Water Company, Fortum and the City of Stockholm Waste Management Administration can be summarised in an eco-cycle model known as the Hammarby Model.
 This model shows the interaction between sewage and refuse processing and energy provision, as well as the added benefits to society of modern sewage, energy and waste processing systems.
 The overall goal "twice as good as the norm" required new ideas for energy, water, waste, transport, building design, construction site logistics – all those systems that we normally take for granted in a modern city.

The results is impressive and is a brilliant demonstration that with a strong initial commitment of all actors, a clear overall view and a good project management, ambitious goals can be reached to the greatest benefits of the end user.

And the lessons learned from these eco-neighbourhoods in various European countries should be transposed on programs dealing with large existing districts.

¹⁴ From Hammarby Sjöstad, www.hammarbysjostad.se

2.4.4 Geo-Clusters

One of the fundamentals of E2B EI is that energy efficiency will respond to climate change and energy issues providing we are able to trigger large scale actions concerning all Member States.

This has led to the concept of “Geo-clusters”

Geo-clusters are basically virtual trans-national areas where strong similarities are found in terms of:

- Climate
- Culture and behaviour
- Construction typologies
- Economy
- Gross Domestic Product

Initial thoughts lead to identify the following geo-clusters:

- 1-Northern
- 2-Continental Northern East
- 3-Continental Centre
- 4-Continental Southern East
- 5-Mediterranean arc
- 6-Western Central
- 7-Northern West

Of course, further analyses on the criteria outlined here over will be needed to confirm or alter these areas, but a first illustration of the concept is given here below:



.../...

2.4.5 Two first large scale programs

From what has been said before, research conducted in various fields should provide solutions (technical, financial, processes...) for large scale actions, dealing with the existing stock, preferably at district level.

In the first years of its development, E2B EI will initiate large scale demonstrations in two specific, important domains:

- Social Housing
- Educational buildings

Social Housing

Many reasons converge towards this initial choice, among which we will just cite a few:

- Risk of poverty for those who rent induced by excessive heating bills
- Large building stock with poor energy efficiency in many European countries.
- High potential for replicability.
- Ownership concentrated in one structure, with technical and economical databases.
- Possibility to work on entire districts.
- Strong social significance.
- Possible synergies with local, regional or state strategies.
- ...

Educational buildings

Education is also an interesting field:

- Work with teachers and pupils, raise their awareness and get their active involvement.
- Ownership often well structured with reasonably good knowledge of their building stock, existing databases, and deep concern about energy bills.
- Potential for large set of buildings with various functions (classrooms, offices, sport halls...) concentrated in a single geographical area.
- Public or private ownership.
- ...

As an example, a typical project would take for objectives to find the ways, and demonstrate the feasibility of reaching a measured efficiency (for ex. 100 or 60 kWh/m²/year) on an entire district (50 000 to 100 000 m²) in a short time frame (2 to 3 years);

Knowledge is expected to be gained in the following fields:

- Design and commissioning processes.
- Business models.
- Refurbishing techniques, including user acceptance
- User's education and behaviour
- Assessment of the relative importance of the various technical, social and economical fields with respect to their actual contribution to the final result.
- Knowledge transfer to SMEs

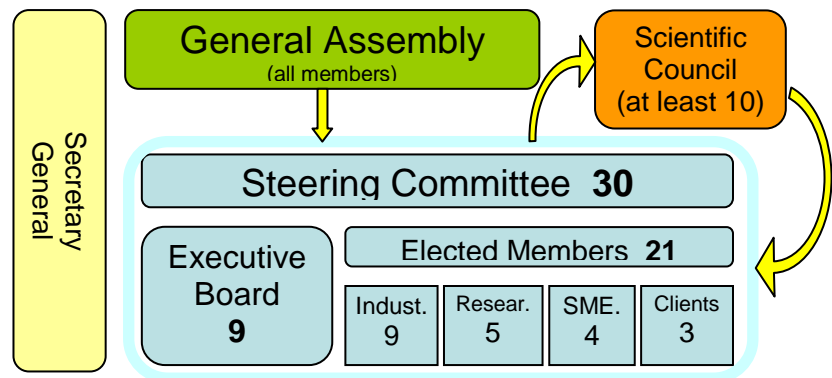
These large programs should be considered as the catalysts, the initiators of regional or national programs. Their capacity to be replicable will be carefully analysed and is of the utmost importance.

3

E2BA organisation, project management, and E2B EI budget

3.1 E2BA organisation

In 2008, E2B EI Founding Members have created an International, non-profit Industrial Association named E2BA. Registered under the Belgian Law, the Association has the objective to prepare a Public Private Partnership with the European Commission. Its statutes identify its main constituting bodies that can be schematically represented as follow :



Four types of Members have been defined:

"A" Members also called "Industry Members" must be large industrial and commercial enterprises and associations.

"B" Members also called: "Research Organisations Members" must be nationally recognized university, research institutes, and/or non-profit research associations

"C" Members also called: "SME Members" must be micro, small or medium sized enterprises, SME associations and professional bodies

"D" Members also called "Organisations and Public Agencies Members" must be public or private organisations (clients) active in the promotion of construction or renovation of buildings.

A brief description of E2BA constitutive bodies is given hereafter.

The General Assembly

- Elects members of the Steering Committee.
- Determines the financial contribution of Members and approves the budget.
- Decides admission of new members and exclusion of members.

The Steering Committee

- Manages all the activities of the Association.
- Reports annually to the General Assembly.
- Appoints the Secretary General.
- Prepares the annual budget.
- Studies the application of new members and proposes decision to the General Assembly.

The Executive Board

- Executes the decisions of the Steering Committee.
- Ensures the day to day management of the Association
- It is initially formed by the Founding Members

|

3.1 E2BA organisation

The Presidium

- Represents the Association in front of the European Institutions

The Scientific Council

- Is an advisory body to the Steering Committee
- Comports at least 10 members, appointed by the Steering Committee
- All categories should be represented, with a majority of "B" Members
- "B" Steering Committee Members are members of the Scientific Council, and President must be a "B" member

At the date of issue of the present document, E2BA constitutive bodies are operational, except for the Scientific Council

- E2BA was adopted by Royal Decree on November 20th, 2008¹⁵
- The First General Assembly was held on September 30th 2008.
- The First Steering Committee, composed of the nine Founding Members (statutes) was held on January 8th, 2009.
- The Presidium is Acciona (President), Bouygues Construction and EDF (Vice-Presidents).
- The Treasurer is Philips Lighting
- An Operational Working Group was officially launched by the Steering Committee on the First Steering Committee meeting held in Paris on January 8th. It will be composed initially by representatives of the Founding Members

¹⁵ Royal Decree 6/CH/15.674/S dated November 20th, 2008

3.2 Project management

Besides the organisation of the Association, we can identify different phases of project management:

The present phase is characterized by the need to communicate, to build a stronger organisation in order to prepare the future steps, and go towards the signature of a PPP.

At the same time we also need to identify the proper thematic technical issues and associated societal and economic impacts for the future calls (working groups), and to prepare a strong management of objectives.

In the present phase, we have identified five main subjects requesting a specific organisation. Each of them is led by one of the Founding Members

1/ Communication

- Build up a corporate image
- Prepare marketing documents, brochures, presentations, logos, business cards, provide material to NLPs
- Manage events for 2009 and 2010
- Update the website
- Provide info for ECTP monthly Newsletter

2/ Preparing the Joint Undertaking

- Understand EC expectations for JU
- Answer to all legal aspects between E2BA and EC
- Benchmark European Initiatives.
- Process for calls
- Check template consortium agreements for Research Programs

3/ National Liaison Points (NLPs)

- Coordination with National Contact Points
- Coordinate the NLPs, create a network of NLPs
- Link with Member States permanent representations
- Get new countries on board.
- Be the first interlocutor of Eracobuild to build the network of contacts with Member States

4/ EC relationship management

- Get full commitment, maintain the fluid relation with EC
- Meet with DG representatives
- Meet with Parliament members
- Report to Founding Members

5/ Connections to International and European Initiatives

- Create the synergy with other Technology Platforms, review SRAs, state convergences
- Use the “NLP network” to build the connection with Eracobuild
- Map and connect with relevant European initiative, National and Regional Programs, and existing JTIs
- Connect with outside Europe on similar programs (USA, China, Japan...)

In order to start the preparation of the first calls, working groups are also needed. For the time being, five have been identified:

1. Coordination of topics (clarify links with DGs, and links among topics)
2. Materials, products and processes (industrialisation)
3. Equipments (HVAC, lighting, etc.)

3.2 Project management

4. ICT (Energy management, design and modelling tools, diagnostic tools etc...)
5. Integration of renewables (in buildings, grid connection, etc.)
6. Systems integration (building envelope, district level, retrofitting)

Later on, a specific management structure will be implemented to keep the movement going, to implement the necessary changes, to collect, synthesize and disseminate the knowledge gained from all projects.

The E2BA will build:

A project management team

- Continuously get knowledge, analyse and make syntheses. First job will be on National plans.
- Cooperate with Member States to build and follow the overall planning compatible with National plans and respect E2B vision at the same time.
- Maintain a coherent roadmap at EU level, finding the overall coherence for the sake of acting fast and on a large scale.
- Centralize relevant data and observations of all on-going construction projects.

A technical team

- Build and maintain a database of best techniques and adapted solutions and processes in particular for district level.
- Monitor construction activities, measure actual performances before and after renovation.
- Analyse results and propose corrective actions if needed.
- Provide a continuous update from actual on site results.
- Propose new management processes and new business models.

A dissemination and communication team

- Builds up adapted solutions for each Member State
- Finds the proper ways of dissemination
- Prepares technology transfer, training, financing tools

In essence, the first two teams will have to work on supra-national objectives, whereas the last one should be more focused on each Member State.

These actions will be very strongly knowledge oriented, giving an output of paramount importance in terms of new techniques, of replication possibilities and of transfer between Member States.

A regular reporting to E2BA Steering Board will be made to present the overall picture of E2B EI progress with respect to its general objectives.

3.3 Budget

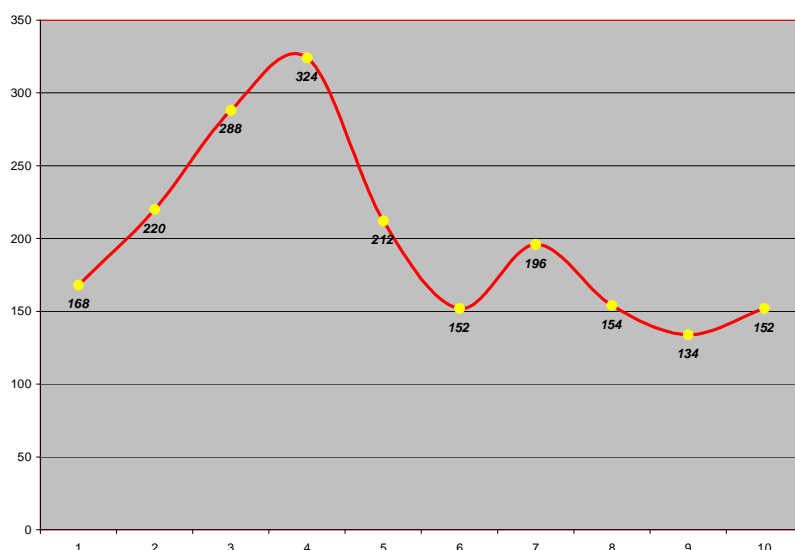
The following table shows the budget distribution for the E2B EI general research domains in the time frame of 10 years. These budget figures have been computed by taking into consideration the ECTP Implementation Action Plan, other ETPs Strategic Research Agendas and the research needs to achieve E2B EI's ambitious objectives, but also the European Economic Recovery Plan proposing funding at the level of 500 M€ for the period 2010-2013. The resulting figures will be more detailed in further documents dealing with the Implementation Action Plan of the E2B EI. (Year Y means 2010, Y+1 to 2011...)

	Y	Y+1	Y+2	Y+3	Y+4	Y+5	Y+6	Y+7	Y+8	Y+9	Total
TOOLS	40	56	76	80	52	34	38	32	28	28	464
MATERIALS	52	68	88	116	64	52	70	54	44	56	664
SYSTEMS	36	44	60	64	48	36	48	32	28	34	430
ICT	24	36	44	44	32	20	24	24	20	20	288
SOCIAL	16	16	20	20	16	10	16	12	14	14	154
	168	220	288	324	212	152	196	154	134	152	2000

E2B EI Budget distribution in 10 years by research domain (in M€)

(Environmental technologies, standardisation and business models are embedded in the five lines of the table)

This proposed budget distribution is in coherence with the “wave action” plan explained in paragraph 2.3.2 (The knowledge gained in the first “wave” feeds in the second at the design stage, realising a continuous implementation process)



E2B EI Budget distribution by year

4

Identification and implementation of E2B EI

4.1 Strategic importance of the topic and presence of a clear deliverable

The European Council of March 2007¹⁶:

- *Stresses the need to increase energy efficiency in the EU so as to achieve the objective of saving 20% of the EU's energy consumption compared to projections for 2020...*
- *Endorses(...) a binding target of a 20% share of renewable energies in overall EU energy consumption by 2020.*

In a recent document published by European Commission¹⁷, 2005 levels of energy consumption are given as 280 Mtoe for households (residential) and 157 Mtoe for commercial buildings (tertiary), rising to 338 Mtoe and 211 Mtoe in 2020.

The corresponding energy saving potentials are estimated to be around 91 Mtoe for households and 63 Mtoe for commercial buildings.

Therefore the building sector must contribute to $91 + 63 = 154$ Mtoe in energy reduction.

But, like other domains of activity, the built environment should also, and can, provide his contribution to the production of energy by renewable energy sources.

In the same document, the total European energy consumption in 2020 has been estimated to 1336 Mtoe inducing an overall, necessary contribution from renewable energy sources of approximately 267 Mtoe (20%).

Taking into account that the renewable energy sector forecasts in their vision documents to reach approximately 230 Mtoe by 2020 by means of conventional RES, non integrated in buildings such as wind, photovoltaic... the remaining **37 Mtoe** should logically come from renewable energies integrated in buildings.

In short, the building sector must contribute to:

154 Mtoe in energy reduction

and to

37 Mtoe (at least) produced by RES

The size of this challenge and its strategic importance is better understood by recalling that the total energy consumption for Spain, Ireland and Greece is 190 Mtoe!

As stated before, we should act fast and at a large scale. It is an absolute necessity to concentrate our action on the problematic of existing buildings.

A large scale action will create jobs, boost research, allow for a decrease of unit prices and, by the improvement of energy efficiency, will contribute to a reduction of EU dependence with respect to unstable countries.

It will definitely improve the competitiveness of the entire value and supply chain of the European construction sector.

These figures demonstrate E2B EI strategic importance and highlight how critical are its deliverables: to deliver, implement and optimize building and districts concepts giving the potential to all Member States to reach rapidly EU goals for the part due to the built environment.

¹⁶ Brussels European Council 8/9 March 2007 Presidency Conclusions chap. IV Energy efficiency and renewable energies

¹⁷ 2020 vision : Saving our energy European Commission, Directorate-General for Energy and Transport, p. 2

4.2 Existence of a market failure

In front of the challenges raised by climate change and energy dependence, the construction industry has until now exhibited several significant weaknesses.

4.2.1 Slow implementation

Going rapidly from successful experiment to large scale, satisfactory application of new materials or systems is always a difficult task in the construction sector.

Basically, implementation of new products is slow for several reasons:

- A very fragmented market.
- Based on the work of very small companies.
- Small margins.
- Complex assembly of very different techniques.
- An industry that conveys images of the past, slowing the innovation process.

But counter-examples exist: one of the most remarkable took place in the years that followed the first oil crisis of 1973. At that time, it took less than two years for the whole building industry to switch from single glazing to double glazing and to introduce insulation materials in facades of all new buildings. This was an exceptional situation, we are probably facing a similar one, but more awareness is still crucially needed.

4.2.2 Concentrating on new buildings

Research and innovation are focused on new buildings: It is easier to start from scratch than to act on a “fixed design”.

Some difficulties:

- Working on an existing building or district fixes design parameters and will prohibit certain solutions.
- Some actors are less interested to work on renovation projects simply because work done is not immediately perceptible from outside.
- Working on existing buildings is more difficult because the building is in use and occupied.

And if we compare to other industries, who would try to implement modern, up-to-date techniques in a fifteen years old car?

But buildings should be made to last, because of the size of the needed investment (it is also a matter of sustainability), and energy savings should be made on the existing stock in order to have a real action as previously explained in this document.

All these reasons bring in a second market failure: until now prototypes, experiments have been made but with very limited replication and dissemination.

4.2.3 Lack of training and expertise

The fragmented market, the very small companies, the complexity of interaction between techniques brings in a third type of market failure: the lack of training and expertise.

Implementing new techniques needs to permeate deeply a tangled web of actors. Most of these actors run their jobs on very small margins and long hours. In these conditions it is not surprising to see that proper training and dissemination of expertise are difficult. The end result is generally that expected performances are not reached, in particular when implementing new techniques.

4.2.4 Insufficient R & D efforts

While the pharmaceutical industry claims a figure of 15,3% of R&D effort versus turnover, the automotive industry 3,6%, the construction remains at a very modest 0,3%.

Until recently, construction activities were not very “R&D oriented”. Research was made for exceptional works like very large civil engineering works, particular high performance structural materials, or very specific topics like seismic behaviour. It remained in the hands of universities, laboratories and of a few large companies.

As a result, the construction industry often exhibits a poor, non-attractive image.

ECTP has been leading a strong action and construction leaders are aware and conscious that significant progress should now be made urgently.

4.2.5 Energy efficiency in construction: a forgotten field

Energy was cheap, awareness was low, so why care for energy efficiency? Saving has never been an attractive business; at first level it does not bring profit.

Awareness that some energy sources will disappear is also quite recent. Even if some experts “raised the flag” in the seventies (Meadows report, Club de Rome) it took more than twenty years for mankind to realize that we may be faced with some kind of energy shortages in a close future.

And the construction industry started to care for energy in the second half of the nineties, when new regulations appeared in several EU countries.

This is obviously a significant market failure.

ECTP and all members of E2BA know these market failures. The creation of E2B Association is a first answer to show that they really want to contribute to find solutions for all of them.

Their nature and importance lead us to firmly believe that a strong, trans-national structure, combining the competences and power of the public sector with the private one, established at EU level, is the best way to solve them all: this is the “basic design” of E2B EI proposal.

4.3 Concrete evidence of Community added value

Climate change, energy and greenhouse gases issues are worldwide problems, and the scale addressed by E2B EI is clearly the European scene. The added value of working at EC level can be outlined on many topics:

- First, E2B EI will contribute to set up a common and coordinated approach for implementing the elements provided by the Strategic Research Agendas of ECTP but also of other European Technology Platforms that are relevant to E2B EI objectives.
- A satisfactory SRA implementation will require the achievement of a European critical mass in terms of financial commitment and research capacities in order to properly and rapidly gather and disseminate experiences, best practices and knowledge; this is also part of E2B EI “genes”.
- In the built environment, Member States often face similar problematic as their neighbours (retrofitting, aging population, energy consumption and dependence...) sometimes without having the ability and capacity to develop and implement on time the adapted solutions.
Energy efficiency represents a major concern for all countries, and many have already allocated R&D funding as well as grants, fiscal incentives or guarantee mechanisms at their national level. Coordination with national programs and their instruments will then play an important role in facilitating an effective SRA implementation, in line with related policies, and by ensuring that adequate legislation, standards and public procurement procedures and international property rights arrangements are set up.
- Community funding will be made more effective through the harmonized use and combination of these financing instruments, bringing improvement to the current fragmented approach of innovation in energy efficient buildings.
- Community policy objectives in health, safety, environment and consumer protection will be facilitated by a co-ordinated approach at European level and greater co-operation between public and private players, giving to Europe a critical competitive advantage for increasing its growth potential and to fight the threat of delocalisation.

And last, but not least, the geo-cluster approach will help solving these issues.

E2B EI has the ambition to be the Community instrument to build a vision, a reference framework at EU level (going from common diagnostic methodologies to performance assessment) thus also emphasizing the concrete evidence of the Community added value.

By addressing innovative R&D challenges at the scale of EU, the European Initiative will increase Europe’s future growth potential, while complying with the main stakes mentioned in political landmarks (Kyoto protocol, Lisbon & Barcelona initiatives or Göteborg objectives).

4.4 Substantial, long term industry commitment

E2BA members have been working since several years on the present proposal and some core members were already active on this topic, within ECTP, as soon as 2005.

Nine “Founding Members” have joined forces in 2008 to create the Energy Efficient Buildings Association, E2BA. They are all major players in their respective fields.

They represent eight different countries and are active in:

- General contracting
- Engineering
- Energy and services
- Electrical Appliances
- Materials
- Ventilation and heating systems

The International Non Profit Industrial Association created under the Belgian Law (E2BA) will group Industrials, Research Centres and Universities, SMEs and Clients.

More than 100 potential members have already expressed their desire to join the Association.

A website has been created¹⁸, documents and presentations are ready and Founding Members are working together regularly.

The objectives of the Association extend beyond the 10 years frame and could be pictured as the promotion of energy efficiency in buildings and districts.

Intensive contacts were made with several European Commission Directorate Generals and have helped to focus E2B into a clear, relevant set of objectives in full coherence with EC 2020 and 2050 goals.

These elements demonstrate the clear and strong commitment of the European construction industry to this initiative.

¹⁸ <http://www.e2b-jti.eu>

4.5 Potential instruments

Energy efficiency in buildings is characterized by a specific problematic at the frontier of strategic fields such as:

- Materials
- Components and systems
- Energy production by integrated renewable energies
- Information and communication technologies
- ...

Consequently, the first main difficulty encountered is represented by the multidisciplinary and transversal approach that need to be adopted by the different stakeholders covering the whole supply and value chain, while ensuring business models implementation from research and development results.

In Europe¹⁹:

- 23 Members States have specific national programs addressing E2B issues.
- 18 countries propose either grants or loans.
- 7 Member States propose some tax exemptions.
- 11 have voted some CO₂ environmental taxes.

All these actions show the real concern for more energy efficient buildings, but also highlight different visions and strategies expressed at national levels.

Research overlapping and results harmonization at a European scale are not ensured, which emphasizes the need for centralization at EU level in order to obtain better synergies between European Member States.

The efficiency of activities performed will be maximized if the whole value chain is addressed in a homogeneous and sustainable way during a long period.

Today, there is not such a programme in Europe to ensure support over a long period of time. With a seven years duration and a main focus on R&D activities, the 7th Framework Program (FP7) is scale limited to provide a satisfactory answer to all E2B issues. And until now, FP7 did not maintain continuous calls on energy efficiency in buildings.

But FP7 also offers the possibility of creating, as instruments of the European research and innovation, the "Technological Platforms" (TP) and the "Joint Technology Initiatives" (JTI).

Tps were conceived for technological sectors, such as wind energy, sustainable chemistry, biofuels... etc, where the members of the platform represent mainly only one industry.

JTIs were conceived for a larger collaboration among many industries and sectors, such hydrogen and fuel cells, where chemistry, steel and car industries, renewable and conventional energy industries, and many other industries work together.

The enormous challenge (energy efficiency and renewable energies and the need for a rapid, large scale change) in the building sector, the technical characteristics of our domain implies to work together in a co-ordinated way with many industries, as previously described, which incidentally is the everyday work of a general contractor.

For these reasons, E2BA supports its objectives by preparing first a European Initiative, contractually established on basis of a PPP, that will ultimately lead to the creation of a Joint Technology Initiative.

¹⁹ Energy Efficiency Report – European Union Member States – Euroace 2001

5

Conclusion

Conclusion

Today, the European Union has three major drivers of change:

- Climate change issues
- Energy independence
- The Recovery Plan²⁰

And in terms of R & D, the Recovery Plan has identified E2B EI has one of the three initiatives that should be funded.

Awareness of its responsibilities and of its potential for change is more and more in the mind of the construction sector, and it crystallizes strongly on the question of energy efficiency of the built environment.

As was demonstrated before, research is needed in many fields, and at the same time we want to make sure that at the end of the road, feasibility and performances are reached on all projects.

Major questions will have to be faced and answered such as:

- How do we get the best from each technique and how do we make them work together?
- How do we simultaneously develop a large market approach, and preserve the energy efficiency goals?
- How do we get everyone involved, particularly all the SMEs that are the heart of our daily activities?

To answer these questions, and many others, the construction industrial sector has created a structure, E2BA, and a vision of a large, motivating project. It can change the face of our industry, bring work to thousands of people, and contribute rapidly to a decrease of CO₂ emissions.

The sizes of the challenge, the worldwide concern, are fantastic opportunities for a major evolution of the construction sector, providing success is at the end of the road.

We can get the people involved, disseminate knowledge and raise the level of innovation of our sector.

Tomorrow can be the day in which the construction industry will clearly become a zero carbon focused industry. This is not a small step but a “quantum leap” for a whole profession.

We can improve the living conditions of million of Europeans.

This will happen if we are able to progress rapidly in a public private partnership, if we never forget our goals, if we are at the same time capable to work on fundamental research and to demonstrate that we have applicable solutions for very large scale projects.

We are at the focal point of a European vision and strategy, backed by a strong industrial commitment on clear, well identified objectives, and we want to find the ways to go from fundamental research to large scale demonstration and then to efficient implementation.

In terms of climate change, it's too late to be pessimistic, let's be bold and innovative, let's dare to be successful, recalling that “Time has come to make changes on the scale of the problems we face”.

²⁰ Communication from the Commission to the European Council, A European Economic Recovery Plan, November 26th, 2008, COM(2008) 800

6

Annexes A1: Founding Members, A2: References

A.1 Founding Members



ACCIONA Infraestructuras is a leading European construction company developing and managing buildings and civil infrastructures under the sustainability principles. It has an international presence in more than 30 countries and its total turnover in 2007 was 3.6 bn euros, employing 14.000 people. It is part of ACCIONA Group, whose business lines are Construction, Real State, Urban-Environmental Services, Energy, Logistic and Transport. Acciona has its own R&D Technological Centre in Madrid, composed by a multidisciplinary team of about 160 high qualified researchers, fully dedicated to R&D activities. Its main research lines are Nanotechnologies, New Construction Materials, Products and Systems, ICTs, Energy Efficiency and Environment Technologies. It has laboratories of nanotechnology and advanced materials, industrialisation, RES integration in buildings, ICT, chemistry analysis, augmented reality and workshops for prototyping infrastructure components. Acciona has a strong presence in European research, participating or having participated, as leader or partner in a large number of FP7, CIP,... research projects, many of them related to energy efficiency in buildings. It also participates and leads a good number of Eureka and National projects.

The development and construction of energy efficient buildings is within the core strategy of Acciona, having built during the last years a large number of residential and non-residential buildings under the EE and affordability basis. In addition, it is co-leading the ECTP FA Cities and Buildings and is member of the Executive Board of the ECTP. Acciona's strategy is in line with the objectives that the E2B EI is to achieve, Therefore, it is actively contributing to the promotion and development of this initiative as one of its co-founding members.



ARUP is a global firm of designers, engineers, planners and business consultants providing a diverse range of professional services to clients around the world. Arup has three main global business areas – buildings, infrastructure and consulting. Arup has over 10000 staff working in more than 90 offices in 37 countries. At any one time, we have over 10 000 projects running concurrently.

Arup has three main global business areas – buildings, infrastructure and consulting – although our multi-disciplinary approach means that any given project may involve people from any or all of the sectors or regions in which we operate. It is a professional consultancy practice providing services in engineering design, management and planning services on projects in all areas of the built environment. Arup have a track record of designing and delivering sustainable buildings that lead the way in showing what is possible, from BedZED, which was completed 10 years ago, to the first two houses to achieve Level 6 of the Code for Sustainable Homes, the Kingspan Lighthouse and Barratt's Green House, which are net zero carbon. Arup was contracted to design and masterplan the world's first sustainable city, Dongtan in Shanghai, China.

Arup is also working on several other large low and zero carbon multi-storey housing and mixed use developments. Many of these projects encompass a wide range of sustainability aspects, including environmental, financial and social. Arup's experience in sustainable procurement ranges from developing the supply chain of sustainable to facilitating commercial delivery mechanisms of sustainable projects such as Energy Service Companies (ESCO's).

Arup is a member of the HLG Executive board of the ECTP and is co-leading the Focus Area processes and ICTs of the ECTP;

A.1 Founding Members



Bouygues Construction is a global leader in building, civil works and electrical contracting and maintenance sectors. Operating in some 60 countries, it combines the power of a large group with the flexibility of a network of companies organised as seven complementary entities. Thanks to its expertise in financing, designing, constructing, maintaining and operating buildings and structures, it offers its customers a vast range of innovative solutions. Employing 49,800 people throughout the world, the Group generated sales of 8.34 billion euros in 2007.

Bouygues Construction has adopted a structured strategy with regards to sustainable development, enabling it to strike a balance between economic profitability and the social, community and environmental impact of its businesses.

Research and innovation are at the core of the Group strategy, and are part of the strategic plans of each entity. A transversal R&D programme, led by the R&D Committee, defines research topics, strengthens the culture of innovation and builds on knowledge between entities.

Among the various fields of R & D, in the last years, Bouygues Construction has developed a structured approach to low energy and positive energy buildings.

Historically present in all building domains, including large housing programs, the group is ready to put its knowledge and capacities in E2B EI, in particular in the fields of design, calculations, retrofitting, project management, global costing and public private partnerships.

Bouygues Construction is currently chairing the Presidency of ECTP High Level Group, and for all these reasons, has decided to be one of the main actors of E2B EI.



D'Appolonia S.p.A. is a major Italian firm providing integrated engineering services to clients mainly in construction, environment, energy, infrastructures and transport. To offer high level services worldwide, D'Appolonia relies on a permanent staff of 320 qualified engineers and scientists, mainly based in the headquarters in Genoa, Italy. Other offices are located in Europe and non European Countries (China, United Arab Emirates, Russia, Korea, US). The multidisciplinary skills allow D'Appolonia to offer a vast range of innovative solutions in several different fields: structural engineering and earth sciences, energy efficiency, analysis of risk, reliability and safety, mechanical and environmental engineering. Among the various fields of R&D, in the last years, the company has developed a structured approach to civil engineering comprehending energy efficiency in buildings, construction management of new buildings and retrofitting of existing buildings. D'Appolonia supports its customers in the identification of innovative solutions in order to reach objectives as reduction of energy consumption and management of buildings and infrastructures. Within the civil engineering framework, D'Appolonia provides services in the field of project management for both the design and construction phases of both construction as well as installation projects. D'Appolonia generally undertakes supervision activities related to construction and installation, thereby providing work supervision, preparation/review of technical specifications, and provision of technical assistance, structural performance monitoring and final verification prior to operation. D'Appolonia is committed to E2B EI and can contribute in particular in the fields of project management, design and modelling, retrofitting, together with programme management and EI calls in design, implementation and monitoring.

A.1 Founding Members



EDF - a leader in the European energy market with a 2007 turnover of 59,6 € bn - is servicing over 36 million clients in Europe and employs over 161,000 people worldwide working in all energy activities.

EDF sells energy - mainly electricity and gas – and offers services related to Energy Efficiency and renewables in order to reduce the energy consumption and the CO₂ emission of its customers.

The yearly R&D program for buildings represents approximately 40 million €. The main topics are renewables, demand side management, local generation; Energy Efficiency in Buildings is the first one. This R&D program is in charge of developing innovative technologies : the most energy efficient and the least CO₂ producer with the target of satisfying the customer's comfort.

As a proof of its strong belief in Energy Efficiency, EDF created a European Centre and Labs for Energy Efficiency Research dedicated to buildings and industry with leading European scientific partners. Its objectives are to speed up research and innovation and to gather complementary skills of scientific partners chosen for their excellence. EDF is also involved in other initiatives in this field. EDF is the leader of the working group on Energy Efficiency in Buildings for the Energy Technology Institute in UK, a member of the executive committee of the ECTP and also a Founding Member of the French foundation of research "Bâtiment Energie".

Due to its significant involvement in Energy Efficiency in Buildings EDF has actually a key role to play in the E2B EI :

- to share a vision and a strategic agenda of research,
- to attract industrial and scientific partners,
- to disseminate these developments to a large number of customers in Europe.



Mostostal Warszawa S.A. is one of the largest construction companies in Poland with a 60-year history rich in traditions. Although its name is linked inseparably to the rebuilding of Warsaw bridges, the company is presently active in all sectors of the construction market in Poland and Europe. During last 15 years, as a consequence of Polish economy transformation and the company commercialization, its range of activities has been broadened significantly. Due to well thought-out and consequent management the opportunity of the economic boom have been taken and nowadays Mostostal is well recognizable as executor of bridges, buildings for public utility, industrial objects, activities from environmental protection area, roads or underground constructions.

Mostostal activities extend to all areas and specialization fields in construction sector, both in project engineering and in works execution. In the civil engineering working area, Mostostal has built roads, was present in urban development, airports, harbours, beach regeneration, execution of dams, water piping, tunnels, gas pipes, water purifiers, metropolitan railways and railroads. Regarding to the building sub sector, Mostostal has executed works like for example: industrial, services, societal utility and real estate buildings.

Currently company aims at increasing competitiveness of the services and implementation of new construction technologies. The company is an active member of Polish Construction Technology Platform and European Construction Technology Platform.

Being conscious of the impact on natural environment produced by construction sector and future high requirements for buildings in scope of very low energy consumption and efficient integration of renewable energy sources, Mostostal engaged itself in co-foundation process of Energy Efficient Buildings Initiative (E2B EI).

A.1 Founding Members



Royal Philips Electronics of the Netherlands is a global leader in healthcare, lifestyle and lighting, delivering products, services and solutions through the brand promise of "sense and simplicity". Headquartered in the Netherlands, Philips employs approximately 121,000 employees in more than 60 countries worldwide with sales of EUR close to 27 billion in 2008. The company is a market leader in medical diagnostic imaging and patient monitoring systems, energy efficient lighting solutions, personal care and home appliances, as well as consumer electronics.

80,000 registered patents illustrate the innovative nature of the company. In a world in which technology increasingly touches every aspect of daily life, we want to bring 'sense & simplicity' to consumers with advanced, easy to use products that are designed specifically to meet their needs, wherever in the world they may be.

At Philips we clearly support sustainable developments. We have been focusing on increasing the energy efficiency of our products along with other environmental improvements since 1994, and in our manufacturing activities since 1984. We've steadily reduced energy consumption of many products in our portfolio, such as TVs and lighting solutions. Indeed, if new lighting technologies were adopted around the world, the savings would include 555 million tons of CO₂ emissions and more than EUR 100 billion in energy costs per year. Moreover we have set ourselves a target to reduce our operational carbon footprint by 25% in 2012.

The lighting solutions of the future will be able to offer more comfort at substantial lower energy usage. This potential will however only materialize when these solutions are developed in close cooperation with the other actors in the built environment. The E2B EI will offer the instruments to make this happen.



Saint-Gobain designs, produces and distributes building materials with the ambition of inventing the materials of the future. Our overview in a flash: 43.4 billions € 2007 sales, 206,000 employees present in 57 countries.

We never cease in our efforts to create more comfortable, economical and sustainable homes in all parts of the world. This is being achieved with innovations such as self-cleaning windows, windows generating solar energy and intelligent insulation systems. Leader in all our sectors, we supply solutions to the major challenges of energy saving and protecting the environment. So whatever kind of new needs may emerge in home building, one thing is certain - the future is made of Saint-Gobain.

Innovation is the driving of Saint-Gobain's strategy. This is why resources dedicated to Research have been increasing by 10% every year since 2004. Recruitment of researchers and technical staff has also gone up, rising in three years from 2,000 to almost 3,500 people in 2007. Saint-Gobain works with over 200 universities and research laboratories worldwide. Every year the Group applies for more than 300 patents.

Our activities : Flat Glass for building and automotive applications, glass specialties, High-Performance Materials such as ceramics, plastics, abrasives, grains & powders, textile solutions and crystals, Construction Products such as glass wool, plasterboard, cast-iron pipe, industrial mortars, exterior products, Distribution of building materials for professionals and general public, Glass bottles and jars for packaging.

A.1 Founding Members

STIEBEL ELTRON

Dr. Theodor Stibel, the founder of the company, started the business in Berlin in 1924 with the intention of developing and building products that would offer maximum comfort whilst consuming the minimum amount of energy, but with the greatest degree of safety - an aim which is still valid for STIEBEL ELTRON today.

The company has successfully developed from a simple hot-water specialist to a fully-fledged system-engineering provider. The main focus in recent years has been to develop systems that provide whole-house ventilation with heat recovery, solar systems and heat pump systems, together with the intelligent linking of one system with another. Thus Stibel Eltron has become one of the leading European heat pump companies.

The STIEBEL-ELTRON-Group with its 3000 employees has its headquarters in Holzminden / Germany. In addition, a high-tech production site is located in Eschwege and factories in Slovakia, Thailand and China. Stibel Eltron is involved in national and European associations in the heating business (BDH), the heat pump business (EHPA, BWP) and the electric appliance business (ZVEI).

The main intention of STIEBEL ELTRON to join the E2B-Initiative is to take the opportunity to contribute to the optimisation of the energy efficiency in the building sector with renewable energy using products for heating and providing hot water. Stibel Eltron believes that it is necessary to speed up the research about using alternative energies in the building sector, to develop a competitive industry in the sector of manufacturing energy efficient products and to develop an integral approach for energy efficiency and the use of renewable energy taking into account the construction business as well as the component industry and building operators.

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