

2nd European Forum on Eco-Innovation Markets for Sustainable Construction

Brussels 11 June 2007

Overview of event



European Commission
DG Environment

European Forum on Eco-Innovation

The European Forum on Eco-Innovation brings together business and policy perspectives in a unique event that explores strategic orientations for eco-innovation and environmental technologies, in support of the EU Environmental Technologies Action Plan (ETAP).

Decision makers and actors from finance, technology development, business, policy development, academia and NGOs debate and discuss relevant topics.

Recommendations of the Forum provide pertinent and timely suggestions for future action aimed at business and finance, as well as National and European policy makers.



Photo credit: Gatis Pavlis, MVA, P. Cluzau-Valeriu

2nd Forum – Markets for Sustainable Construction Summary

The second European Forum on Eco-Innovation focused on the need for sustainable construction and exchanging good practice in sustainable building.

Construction accounts for 10% of EU gross domestic product (GDP) and 7% of employment. However, it is a major consumer of resources, taking 40% of total energy and materials in Europe over the whole life cycle covering construction and use. Therefore, this sector has a key role in ensuring the EU meets targets adopted at the European Council in March 2007. These include support for a global agreement on a 30% cut in CO₂ emissions by 2020 or at least 20% unilaterally.

To achieve such ambitious targets, the construction sector must overcome economic, technical and regulatory barriers to refurbishment and new constructions build. This requires increased collaboration and integration, dissemination of good practice, focusing on the market for sustainable development and contributing to the policy debate at EU and Member State level.

The EU is setting ambitious but achievable targets with a focus on the urban built environment. Innovation is needed to sustain such an effort and to prosper; this requires a joint effort by industry and governments through both new build and refurbishment, with its more demanding challenges.

Industry has established the Europe Construction Technology Platform (ECTP) with a strategic research agenda looking ahead to 2020. It contributes to lead market initiatives in energy-efficient buildings and sustainable materials.

The European Commission is heavily committed to supporting sustainable construction by legislation and through a series of programmes covering building techniques and intelligent energy use as well funding demonstrations and pilot projects both directly and through structural funds. These needs are high on the Commission agenda and forthcoming proposals include boosting consumer involvement.

Key Conclusions

- The construction sector represents an area where large savings in CO₂ emissions and natural resources efficiency can be made.
- Refurbishment (or retrofit) of existing buildings is a key area. Only 2% of building works are new constructions.
- Changing to value-based rather than cost-based processes and taking the whole life cycle of a building into account from construction
- Making sure new and existing technologies work well in the market place
- Improving collaboration and communication between all stakeholders, encouraging knowledge transfer and demonstrating new techniques;
- Developing more dynamic standards at Member State and EU level – and ensuring standards are not barriers but rather serve as benchmarks essential to reward real advances.

Opening Plenary

Policy and visions

THE DRIVE TOWARDS SUSTAINABILITY: RISKS AND OPPORTUNITIES FOR THE PROPERTY CLIENT

Robert Windborne – European Forum for Sustainable Property Development (ESPRO), Sweden

The client is key to the construction sector as he pays the bill. Sustainability is a global issue and involves more than just overcoming technology and economic barriers. The real problem lies in an exploding world population and ever-growing demand for consumer goods. The agricultural society of the 1800s totalled one billion people and generated 250 ppm of CO₂. By 2007, the population has grown to 6.5 billion in a consumer society that produces nearly 400 ppm of CO₂. The problem is that, at 500 ppm CO₂, life becomes unpleasant with ice caps melting, cloud cover reducing and tropical forests becoming scrub land.

Solutions are needed quickly. However, sustainability requires a reduction in the population and its demands – in direct opposition to the idea of growth. One effective measure would be to encourage decentralisation of energy production to escape reliance on fossil fuel. The property sector can play a major role but legislation is needed to get it moving, including labelling of energy performance. Venture capital funds will increasingly look for sustainable buildings as good investments.

The challenges are clear with in terms of awareness, the need to absorb new thinking and slowness in implementing change. Yet the opportunities are great with companies that implement new approaches quickly gaining a competitive advantage. It is a vital issue for building owners and property developers alike, requiring greater collaboration between public and private organisation at local, national and international levels.

EU POLICY DIRECTIONS

Maria da Graça Carvalho – Bureau of Policy Advisors to President of the European Commission

The March 2007 European Council adopted an integrated energy and climate policy. This includes negotiating a global 30% reduction in greenhouse gases from 1990 levels – the EU will go for a 20% reduction unilaterally if there is no global agreement. A series of measures is required that includes an EU plan for improving energy efficiency. Targets by 2020 include: a 20% reduction in energy use; binding targets to increase use of renewable energy from 7% to 20% – but mix depends on individual Member State – and 10% use biofuels; and reinforcement of the internal energy market in terms of efficiency, sustainability and security.

The EU cannot battle climate change alone; multilateral agreement is required. The June 2007 G8 meeting in Germany shows the global importance. New attitudes in both the USA and China now mean when, not if. The long-term aim is to reduce emissions by 50 to 80% by 2050.

With 80% of EU citizens living in cities, a major focus must be on urban buildings and transport. Carbon-neutral cities would use existing and new technologies to reduce living and transport energy needs – including architecture, energy use and road design. This offers tremendous opportunities but requires joint action. At EU level, action is being taken. This includes the Concerto and Civitas initiatives, the Intelligent Energy programme and work in the Framework Programmes on clean vehicles and intelligent controls. But more is still needed, including co-operation with the European Investment Bank.

“Mankind’s greatest challenge is the move to a sustainable society. This cannot be achieved without sustainable property.”

Robert Winborne
European Forum for Sustainable Property Development
(ESPRO), Sweden



VISION OF THE INDUSTRY TOWARDS 2030 AND BEYOND

Jean-Pierre Hamelin – *European Construction
Technology Platform (ECTP), France*

The built environment is a global concern. Buildings have a major impact on the environment during construction and operation – including regular maintenance and upgrading over the long service life. The EU27 construction sector has a turnover of €1 200 billion or 10.4% of GDP. Of the 2.7 million enterprises involved, 97% are SMEs and 93% involve fewer than 10 people. With 15.2 million operatives, it accounts for 7.2% of total EU employment.

A key difficulty is an image as old and slow moving. The complexity of construction with so many small partners is a key barrier to innovation. The European Construction Technology Platform is supported by the Commission and made up of 30 national platforms. It is designed to mobilise the sector, driven by industry and developing a strategy to 2030. The High Level Group that drew up the vision document and helped establish the strategic research agenda (SRA) is made up of the main European contractors. The ECTP has seven focuses: underground construction, cities and building, networks, cultural heritage, quality of life, materials, and processes and information and communications technology.

An implementation plan for the SRA is in progress and will be published soon. Actions include lead market initiatives in energy-efficient buildings and sustainable materials.

BUSINESS AND POLICY PERSPECTIVES FOR ECO- INNOVATION AND SUSTAINABLE CONSTRUCTION

Alfonso González Finat – *Director, new and renewable
sources of energy, energy efficiency & innovation,
Transport & Energy DG, European Commission*

The life cycle of constructing and owning a building involves 40% of total EU energy and material consumption. This sector is crucial to meeting EU environmental objectives. It also involves 10% of EU GDP and 7% of employment, so it is important economically.

EU-level efforts include 2002 regulations on energy efficiency – an important step. The objective is to obtain a 20% saving in energy by 2020 cost effectively. A Green Paper was followed by the European environmental plan in October 2006 that included 75 measures, many related to construction.

Legislative and economic measures have been introduced to support the lead market concept in areas such as energy-efficient materials. However there are many barriers to be overcome. The ETAP event was intended to overcome the problems of disseminating good practice. The Forum provides an opportunity to share what works and what does not, with a specific focus on markets for sustainable development. A key objective is to feed into the policy debate at EU and Member State levels and exchange good ideas for businesses to the future benefit of our living environment.



Opening Plenary

Regional views

EASTERN EUROPE

Bartłomiej Sosna – PMR Publications, Poland

Most Central and Eastern Europe (CEE) countries have implemented the 2002 European Energy Performance of Buildings Directive (EPBD). However, no national strategies have been established in the short term, although Poland has offered 25% funding for 'thermo modernisation' since 1998. Fixed deadlines are essential to stimulate the establishment of such strategies.

CEE countries suffer from growing prices and a lack of skilled workers as they move west to earn more money. Other barriers include the rising cost and scarcity of materials, the growing cost of flats that leaves less money to improve energy efficiency, the unpopularity of sustainability with designers and developers, and the amount of asbestos-containing building materials still in stock.

Drivers should include education and promotion of sustainability as many people are still unaware of the problems. Other drivers include reduction in CO₂ levels, ecologically aware investors, fiscal incentives for property developers, adaptation in public procurement procedures with governments leading by example, and wider use of building energy certification.

Overall, there is less ecological awareness in the CEE countries than elsewhere in the EU, a greater need for education, and a need for governmental and non-governmental organisations to do more.

NORTHERN EUROPE

Mika Lautanala – Finnish Funding Agency for Technology & Innovation (Tekes), Finland

Finland participates in ERABUILD, an EU-funded project that involves government departments around Europe. The aim is to encourage property owners and managers to collaborate effectively in the construction and operation of buildings. The major impact of a building is over time. Moreover the building stock is renewed very slowly – typically no more than 2% a year. So it is necessary to work on old buildings as well.

In Finland, the construction industry is responsible for 23% of national GDP, 22% of employment, 70% of national assets and 40% of energy consumption. The sector consists of subclusters covering building contractors/designers, real estate, building systems, infrastructure, building products and services. Current policies include tougher thermal insulation requirements, keeping greenhouse gases out of emissions trading and a focus on reducing energy despite a cold climate.

Changes needed include: measuring emissions by use not in production; and changing the market, particularly by moving from a cost- to a value-driven process, introducing incentives for innovation, making better use of procurement and ensuring company success depends on ability to do better rather than cheaper.

“The construction phase uses lots of resources but building operation consumes even more, so we need to reflect on the whole life cycle.”

Mika Lautanala
Finnish Funding Agency for Technology
& Innovation (Tekes), Finland



SOUTHERN EUROPE

Alberto Bonilla – LABEIN Tecnalia, Spain

The built environment in Southern Europe has some specificities compared with the rest of the continent. It is highly fragmented with very many SMEs. And challenges are much greater than in other sectors, particularly in terms of competitiveness, social integration and sustainable communities, and climate change.

There is a need to improve communication about sustainability and increase economic incentives as well as to develop co-operation along the line of manufacturer, designer, property developer and administration. Standards and regulations also need to be modified to support the building sector in sustainable construction technologies. Funding for demonstrating activities is crucial.

“The construction sector can contribute to greenhouse gas reduction without affecting the economy. We can offer the most efficient and cost-effective methods.”

John Goodall
European Construction Industry Fed-
eration (FIEC)



Parallel session A *New buildings – Policy instruments*

Main Issues

ENERGY-EFFICIENT BUILDINGS: INTERNATIONAL BENCHMARKING

Jean Carassus – *Centre Scientifique et Technique du Bâtiment (CSTB), France*

The International Benchmark project is part of PREB-AT, the French research programme dedicated to energy-efficient buildings. It deals with: energy-efficient building programmes in Germany, Switzerland, Spain, Denmark, the USA and Japan; innovative components; and R&D programmes in Austria, the Netherlands and Finland.

Overall, the project focuses on a limited number of significant experiences and has adopted a socio-eco-technical methodology aiming for energy-efficient building programmes. It offers a good example of best practice as an interregional dynamic with increased skills and training.

There is a need for a link between R&D and future technical regulations. Governments should be creating action plans that would help develop the market for sustainable buildings.

BUILDINGS OF TOMORROW

Hans-Guenther Schwarz – *Building of Tomorrow Programme, Austrian Federal Ministry*

The Austrian 'klima: aktiv buildings' programme is trying to enhance its network with other countries. The social and economic benefits of this scheme are immense. Now, the project is looking at ways to generate energy, rather than just using it. However, energy systems need to be re-examined as a whole and there is a need for new standards.

Above all, R&D is the key to developing the future of sustainable building so that new concepts can be taken forward. Moreover, all of the components and good policy should be applied specifically to social housing. Citizens would welcome this.

POLICY FOR SUSTAINABILITY IN NEW BUILDINGS

Bernard Cornut – *Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME), France*

Sustainable building can have a major environmental impact on new buildings. Progress can be made by looking at deficiencies in present policies towards sustainable cities. Such policies should also integrate sustainable mobility, urban and regional planning and work-time flexibility.

The problem everywhere is plenty of regulation, but lack of control. Details are very important: for example summer conditions are often neglected as is the place of insulation which means monitoring of existing figures is vital for future policy making.



SUSTAINABLE BUILDING IN THE NETHERLANDS

Ad van der Aa – *Cauberg-Huygen Consulting Engineers, The Netherlands*

Sustainable building requires a performance-based approach with chain management. Sustainable building need no longer be seen as a threat but rather as an opportunity. One main technique for success is effective communication between all parties concerned in a building project: governments, municipalities, property developers, architects, constructors and tenants.

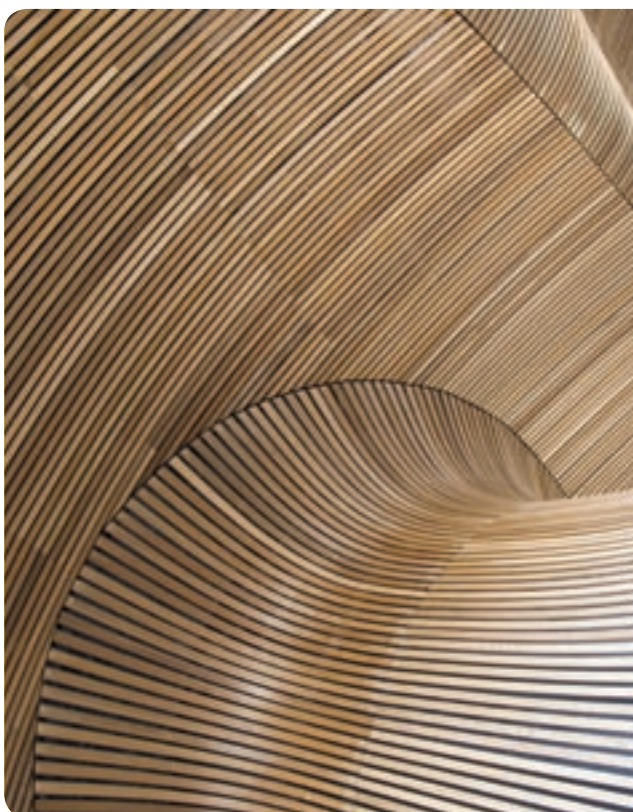
Quality control throughout a project is essential and contractors should understand basic quality standards. A chain of instruments for every phase of a construction project has been developed to overcome several barriers and to facilitate and stimulate the process of sustainable building.

PUSHING THE SUSTAINABILITY AGENDA AT CITY LEVEL

Trevor Graham – *City of Malmö, Sweden*

The positive experiences gained by Malmö in sustainability are being shared with UK stakeholders. Swedish businesses are gearing up to help UK contractors and developers meet ambitious targets on sustainable buildings. Rebranding and developing business opportunities are direct economic and social benefits. While governments may not have the same political objectives, they are still able to exchange technical know-how.

There is a strong need for solidarity, co-operation and to act now to mainstream good practice among Member States. Most of all, collaboration is needed between all stakeholders, but most targets are more relevant at a city rather than an international level.



**“R&D is key to
developing the future
of sustainable building
so that new concepts
can be taken forward.”**

Hans-Guenther Schwarz,
Building of Tomorrow Programme,
Austrian Federal Ministry

Parallel session B *New buildings – Solutions*

Main Issues

NEW BUILDINGS SUSTAINABILITY IN THE UK

Sue Innes – Constructing Excellence in the Built Environment, UK

A sustainable construction strategy has been established in the UK, including: the first national targets; a code for sustainable homes; link to building regulations; and a 'Towards 2016' target for zero-carbon housing.

Financial incentives – such as scrapping stamp duty on house purchase and differential domestic rates for housing – would help pave the way for more zero-carbon houses. There is a need for a passive house approach, instead of just a technological fix.

The construction supply chain is changing rapidly, and architects are taking energy issues into account.

Actions required include:

- Overcoming barriers to adoption: risk-assessment industry; perception of cost; short-term ownership of building – leading to a lack of incentive to invest in the long-term; and lack of skills and knowledge
- Circle of blame needs to be changed to a virtuous circle
- Governments must act by example. They can provide a coherent framework, offer financial incentives and improve legal minimum standards.

LIFE CYCLE COSTING AS A CONTRIBUTION TO SUSTAINABLE CONSTRUCTION

John Connaughton – Davis Langdon, UK

Life-cycle costing (LCC) can make an important contribution to sustainable construction. Davis Langdon has studied reports on LCC over the past few years and concludes it was not being used due to the lack of client engagement. A common methodology needs to be developed – no international standards exist. However, the methodological framework should not be prescriptive.

Sustainability and risk analyses are not widely used. Integration of LCC and life-cycle analysis (LCA) has difficulties but these are not insurmountable. Recommendations include: national indicators; and EMAT – wireless energy monitoring and targeting system.

BENCHMARKING USE OF CONSTRUCTION RESOURCES IN THE MEMBER STATES

Mike Packham – Bernard Williams Association, UK

A pilot study of construction resource costs in 2006 showed Belgium, the Netherlands and the Scandinavian countries use their resources most efficiently.

Common factors included:

- Substantial off-site profit
- Highly mechanised site distribution
- Just-in-time delivery of material and components
- Low load of material waste
- Well-paid onsite workforce
- Well-trained workforce
- High level of R&D
- Flexible relationship between design/architecture and contractors
- Early influence of contractors in the design process
- Use of liability insurance.

There is a tendency to look to new technologies to solve the sustainability agenda, but this is not enough. In reality, much can be learnt from technologies already in use across Europe. Work pressures sometimes mean sustainability must take a back seat. The challenge is how to get the sustainability message across to SMEs.

TOOLS, TARGETS AND PERFORMANCE IN PRACTICE

Bill Gething – Architects' Council of Europe (ACE), UK

ACE through its member organisations represents 450 000 architects in Europe. Members are the professional representative and regulatory bodies in the EU Member States, most of the Accession States, Switzerland and Norway. Architecture in Society is a working group on sustainable architecture.

Changing standards of building can change carbon footprints and reduce 'earthshare' – the amount of land necessary to support a building. Architecture can make a contribution but other areas of society need to make the same effort.

There are several useful tools available:

- BREEAM – a family of assessment methods and tools to help construction professionals understand and mitigate the environmental impacts of developments they design and build.
- Sustainability matrix – allows designers to keep track of progress.

It is also important not to forget basic elements when innovating in one particular area.

There will come a point when it is no longer acceptable to build an air-conditioned building that consumes more energy than a naturally ventilated building. The Stern Review on the Economics of Climate Change showed that ignoring climate change is a market failure.

NEW CONSTRUCTION & SUSTAINABILITY

Prof. Matti Kokkola – VTT Technical Research Centre of Finland

Technology does not generate sustainability, but sustainability cannot be provided without technology. There is a strong desire to be sustainable but there is a lack of know-how. Another difficulty is that it is almost impossible to specify a sustainable building.

LCC is good in theory but not in practice. Daily life is too hurried to remember good principles. One way forward is public/private partnerships with long-term responsibilities. Government subsidies are good for a while but not enough to have a real impact. It is more important to increase the knowledge of stakeholders and to promote regional liability contracts, which reduce the cost of the building.

Recommendations include: community-level decision/agreement – not a building-level agreement; and make purchase of sustainable solutions easier.



**“Technology does not generate sustainability,
but sustainability can’t be provided without technology.”**

Prof. Matti Kokkola, VTT, Finland

Parallel session C *Retrofit – Policy instruments*

Main Issues

THE KLIMA:AKTIV PROGRAMME

Gunter Liebel – Federal Ministry of Agriculture, Forestry, Environment & Water Management, Austria

The klima:aktiv programme, launched in 2004, supports Austria's climate-change strategy by fostering use of environmental technologies and services to reduce CO₂ emissions, create new jobs and save energy. It involves existing stakeholders, particularly on the ground: plumbers, architects, builders, chimney sweeps... The programme works through multipliers to spread information. Targeted training is an important element to provide domestic industry with specialists for a growing market. More than 1 500 people have already achieved recognised qualifications.

Some 22 programmes have been established, covering: energy efficiency and buildings; transport and mobility; local and regional activities; and renewable energies. Targets include increasing the market for environmental products, bringing together stakeholders and contributing to a sustainable economy. Investment is relatively low at only €7.5 million a year with actions co-ordinated by the Austrian Energy Agency and 12 lead partners.

Criteria have been established for comfortable, energy efficient and ecological buildings. The government has adopted the klima:aktiv standards and banks offer better credit terms for such buildings. Programmes have been started to renovate apartment blocks as well as private service and state-owned buildings.

OPPORTUNITIES FROM DYNAMIC DEMAND CONTROL

Terry Wyatt – Hoare Lea, UK

Better control of electricity demand could result in major energy savings. Currently, 2 GW of 'spinning reserves' are on stand by at any one time in the UK to ensure power is available instantly on demand – resulting in one million tonne of avoidable CO₂ emissions annually. Renewable power sources are not the answer, in fact they make the problem worse.

This spinning reserve is necessary to meet tight regulations. Incorporation of relatively inexpensive frequency matching controls in electrical devices, allowing them take power only when capacity is available would lead to highly efficient dynamic demand control that would eliminate the need for this spinning reserve. It would require innovative tariffs to reduce waste but could be introduced across Europe very quickly and cheaply.

ECO RETROFITTING – POLISH APPROACHES

Elzbieta J. Sydra – Polish Construction Platform

Energy consumption in Poland is now a third that of 1985 but still higher than near neighbours Sweden and Germany. EU policies for eco retrofitting have been adopted but there is no real national strategy, although there is support for urban retrofitting, with 'thermo modernisation' funding since 1999. However there have only been 3 000 applications over the past seven years because of a lack of continuous promotion, low awareness, complicated procedures and high costs.

This situation can only be improved by:

- The government playing a key role in setting legal requirements and improving funding;
- Raising awareness of the possibilities and funding available; and
- Provision of new integrated products and services to save clients money.



RETROFITTING POLICIES FROM LOCAL PERSPECTIVES

Kristina Dely – Energie-Cités, Belgium

Studies across the EU show housing is responsible for over 40% of per capita CO₂ emissions, with the average dwelling losing 30 GJ of energy a year. Various policies have been set up at EU and national level. EU legislation includes the Energy Services Directive and the European Energy Performance of Buildings Directive (EPBD) – but most Member States have obtained derogations. There is also important research being undertaken on eco building in the Sixth Framework Programme.

What is required is national legislation on energy reduction, financial incentives in terms of low interest loans and reduced VAT rates for the materials and services necessary, supported by legislative and organisational assistance. Local authorities can help by: removing legal barriers – such as for solar panel installations; providing tax credits and organisational support for local renewable energy projects; and ensuring an integrated approach to fight fuel poverty.

CONTINUOUS COMMISSION FOR SUSTAINABLE RETROFITTING

Jim Ure – ABS Consulting, UK

Technology is available to improve energy use and reduce emissions in building operation. However, much of this is not used to ensure optimum cost and value for the user as management skills and motivation are missing. By retrofitting energy-saving technology with the necessary training and motivation, it is possible to reduce CO₂ emissions and slow down global climate change while saving money and increasing property asset value.

Continuous commissioning is the process by which a building and its services are conceived, designed, constructed, commissioned, operated, maintained and decommissioned to provide the optimum cost and value for the occupier. A pilot programme at a London hospital trust set out to motivate all 5 000 staff and has already enabled major energy savings through measures such as the installation of better lighting controls and variable speed drives. As a result, annual CO₂ emissions have been cut by 8 000 tonne from a total of 28 000 tonne.



“Some 20 million people in Poland live in housing that needs retrofitting – but as they have now become the owners, they do not have money to pay for this.”

Elzbieta J. Sydra
Polish Construction Platform

Parallel session D *Retrofit – Solutions*

Main Issues

WHAT IS SUSTAINABLE BUILDING?

Ronald Rovers – Sustainable Building Support Centre (SBS Centre), The Netherlands

Resources are the priority; profit and policies come afterwards. The objective is to minimise use of resources. There has never been a new building that reduces the environmental load. So something must be done with the existing stock.

Renovating and retrofitting buildings should be the first choice, with demolition only if retrofit is not possible – for example, new offices for the Den Bosch municipality in the Netherlands combined four old buildings into one new one. A ‘flex-desk’ approach was also developed, so that 750 work desks can cater for 1 400 people. Another example is in Tienshen, China, where a series of city buildings had their top layers levelled, then gardens and green spaces created on top.

Getting individual flat owners to agree to a renovation is often a problem. Yet if they do, it is possible to use renewable energy options at reduced cost. There is also a new zero energy prefabricated house designed for placing on top of existing apartment buildings – a rooftop apartment – with all the latest insulation standards.

The future needs to be about ‘space organisation’ and building facilities, not individual buildings. Governments can facilitate the use and wider spread of technologies. There is a lack of knowledge for real environmental performance, and a lack of money for environmental systems. Governments can support organisational instead of technical development – and set environmental targets that focus on performance rather than on supporting individual stakeholders.

BARRIERS TO ECO-INNOVATION IN THE CONSTRUCTION WORLD

Jan Desmyter – Belgian Building Research Institute (BBRI), Belgium

Innovation in the building industry should take into account the fragmented nature of the industry. In 99% of the construction market, construction details are important.

- Standards are essential to good construction practice but there is a lack of knowledge in the construction world.
- SMEs form the largest proportion of the construction industry yet are not well represented among the bodies that develop standards, new practices and best practices
- Development of new technologies requires intensive R&D. There are new practices, such as recycling – yet recycling amounts to less than 1% of industry turnover in most EU countries
- Lots of small SMEs as well as long and complex supply chains lead to fragmentation. Moreover, industry tends to be project-oriented, so learning and knowledge tends not to be passed on outside the small firm and its co-contractors
- Need to focus on the public sector, as it is the largest of clients, and frequently able to choose innovative methods and approaches. The public sector should lead by example.

“Many companies don’t know what is available, and when they do, they don’t know how to use it.”

Andreas Hermelink
Solanova Project
University of Kassel, Germany

THE BENEFITS OF GRANULAR

Daaf de Kok – *De Kok & Partners, The Netherlands*

Concrete has a long history in the field of building construction but it is produced by making cement and extracting sand and gravel, so it is bad for the environment. Now there is an alternative to gravel. 'Granular' is a strong, synthetic material that enables construction to become much more of a sustainable industry.

However, only 1.5% of concrete substrates use Granular. Concrete organisations resist it because of inertia and strong inter-organisational relationships. So the market is hard to enter for Granular producers. Yet several pilots have been completed. There are good examples, fact sheets and specifications available. And there are solutions for each stakeholder group. Governments should ensure that stakeholders are aware of the possibilities of this new material.

SOLANOVA – SYMBIOSIS FOR SUSTAINABILITY

Andreas Hermelink – *Solanova Project, University of Kassel, Germany*

CO₂ emissions are predicted to double. Today, the EU25 generate around 9.5 tonne of CO₂ per capita. The 2050 global target is 1.2 tonne. As 40% of energy use is consumed in buildings, there is a lot to do – particularly in the form of greater efficiency and solar energy.

The Solanova project involved renovation of a block of flats in Hungary and started with space heating and domestic hot water. It measured space heating consumption in several projects and decided to turn from the 'most practised' to 'best practised' solution. After the renovation project was completed, the block of flats had decentralised heating, thicker roof and wall insulation, and better facilities. The total cost of the renovation came out at €240/m².

The experience gained in Solanova has great replication potential, possibly for as many as 100 million people in Eastern Europe alone. In 2050, 75% of existing buildings will still be in use, so there is good economic potential for improvement.

CRAFT AND SMES IN THE CONSTRUCTION SECTOR

Agnès Thibault – *European Builders Confederation (EBC), France*

Only 20% of construction sector turnover involves large companies. SMEs are vital to the health of the sector. Retrofitting of existing buildings represents the majority of the market, yet the focus is still on new buildings. SMEs need encouragement to deal with the retrofit market. The problem is not lack of technologies, but of technicians. So we must organise training programmes for SME employees. Specialists are required in: bio-climatic design; heat and ventilation systems; use of natural methods; and renewable energies.

The most urgent needs are to:

- Establish information and training strategies for SMEs
- Provide more information for young people to show them that the construction sector has a lot of opportunities, and to encourage them to go into it.



Closing Plenary

Case studies

RETROFITTING THE BERLAYMONT BUILDING

Steven Beckers – Art & Build, Belgium

In 1996, Steven Beckers and Pierre Lallemand were asked to redesign the European Commission iconic 1960s Berlaymont building in Brussels. The Commission wanted an efficient, functional, comfortable and sober design. Work was delayed by the need to remove 1 400 tonne of asbestos. Berlaymont had a negative image and only 50% of the building area was usable: every sq. m of space built and not used wastes materials.

The resulting design won a Passive and Low Energy Architecture award in 2000. The two architects took a human-centred global view that included water treatment. A 2-MW tri-generation plant on the roof reduced CO₂ emissions to a minimum. Energy consumption has been halved with 3 ha of solar protection on all sides of the building. A second skin of computer-controlled movable blinds reflects any sun back but ensures a maximum of natural light inside when there is no sun.

Benefits include:

- An increase in usable area from 50 to 75% of overall space;
- Power consumption cut from 800 or 900 kWh/ m²a to 120 kWh/m²a – a marked improvement over average 400 kWh/ m²a in other Commission buildings;
- Almost 100% handicapped access; and
- Much improved lighting.
- Total cost of the retrofit was about the cost of a new building.

BELGIAN EXPERIENCE IN USING INDUSTRIALISED BUILDING TECHNIQUES

John Goodall – European Construction Industry Federation (FIEC), UK

Industrialised building techniques have an important role in driving up quality and value while cutting costs. Belgium has long pioneered this and has one of the most successful approaches to large buildings in Europe.

Sweden uses industrialised techniques – factory prefabrication – to cut housing costs. A factory was set up in an area which lacked housing. It produces 20 different modules allowing the design of fully personalised buildings. The panels are fully finished, including wallpaper, radiators and kitchen units, and are a perfect fit. The building site is protected from the weather and panels assembled by a team of four people wearing white gloves – it is only necessary to add a façade.

Belgium has several factories producing pre-fabricated units. Technology developed in the 1990s makes it possible to build skyscrapers without limit – the highest so far has 37 floors. The Belgian approach involves the building consultant creating a conventional design with steel framework and in-situ concrete construction. The contractor proposes variants based on pre-fabricated units that lead to at least 30% savings in steel and concrete. The core of the building is cast in situ while the rest of the building consists of pre-stressed concrete structures.

Belgian success comes from industrialisation, detailed technical design by the contractor, a well paid and well trained workforce, limited subcontracting and lean management. Belgian strengths include absence of building regulations, an architect required for even the smallest project, a comprehensive insurance package per project scheme since the 1930s that includes independent technical inspection, encouragement of variants or alternative solutions to facilitate industrialisation, and extensive R&D in partnership with universities.

Weaknesses elsewhere in Europe come from design responsibility depending on the consultant rather than the contractor, beautiful but expensive buildings, invisible waste, longer construction times and inferior guarantees. While it is difficult to change national processes, there is a clear need to: promote market-driven innovation; encourage variants, promote project innovation, raise productivity and reduce waste; and prevent contractual conflicts between too many levels.

**“A final thought:
are these targets
attainable without
changing our
behaviour?”**

Brigitte Bach
Arsenal Research
Austria



Refurbishment and renovation

Energy costs can be reduced significantly by use of effective insulation, alternative energy sources, and optimised heating and ventilating systems when refurbishing or renovating existing buildings.

Ecologic renovation of the Nordpool Office Building, Steyrt



- Heating demand cut by 80%
- Heating costs cut by 95%
- Minimal investments (repaid in 15 years with the energy cost savings)
- Various awards

Image © Nordpool

Vegetal roofing at the Center of interpretation of Nature, National Park De Biesbosch, Holland



Image: F Lamiot

Eco-innovation for a sustainable future

Eco-friendly technologies are good for business, reduce pressure on the environment, and can create new jobs.

We live in changing and challenging times. Several international reports since 2005 have now provided ever-increasing evidence of the harmful impact of human activities upon the environment.

At the same time, however, many companies are discovering that they can make a difference and make a profit. Indeed, one of the most exciting developments taking place across all industry sectors is the rise of eco-innovation and environmental technologies – creative solutions that are both good for business and good for the environment.

To help eco-innovation and environmental technologies take-off – to make them an everyday reality – the European Commission has launched an action plan on environmental technologies (ETAP). This plan aims to promote the take-up of new technologies and open up new markets – both at EU and member state level. The action plan works hand-in-hand with legislation, which also acts to protect the environment and spur on innovation.

“The industrial revolution brought about huge societal and economic changes in how we manufacture and produce goods. ICT has created a revolution in how we diffuse and exchange knowledge. We believe that the next technological revolution will be driven by the global drivers of the environment and sustainable development.”

Timo Makela

Director for Sustainable Development
DG Environment, European Commission



For further information

Visit the official ETAP website for latest information on:

- Policy and actions
- Innovative technologies
- Fund resources
- Links and forthcoming events
- ETAP news and other communication tools

http://ec.europa.eu/environment/etap/index_en.htm

Contact: Env-technology@ec.europa.eu

Media partners

We would like to thank the mediapartners of the
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