



## CIB NEWS ARTICLE

International Council for Research and Innovation  
in Building and Construction

Providing a global network for international exchange and cooperation in research and innovation in building and construction, in support of an improved building process and of improved performance of the built environment.



Smart-ECO  
Sustainable Smart  
Eco-Buildings in the EU

Sixth Framework Programme  
Priority 6.1.3.1.2.1  
ECO-Buildings



April 2009

### Programmes

## Smart-ECO Innovation

### The Smart-ECO Project

The EU-funded Smart-ECO project brings together experienced organizations that span the full range of stakeholder views to focus on the global issues of sustainable building so that value can be added to the evaluation of current and future RTD activities.

A Smart-ECO building is:

- Designed from a lifecycle point of view
- Constructed with limited resources and minimised energy consumption and waste production
- Adaptable to changes in capacity, type of users and performance requirements
- Minimised operational complexity while monitoring technical and environmental performance
- Facilitates ease of dismantling – reuse, recycle, restore

### Work Package 3 - Identification of Innovations

Work Package 3 of Smart-ECO is led by Mace Group and includes contributing partners: Politecnico di Milano, Servitec, Endosystems, SINTEF and FH Soest.

The goal of WP3 is to identify innovations that can provide significant contributions to the vision of sustainable Smart-ECO buildings in the period 2010-2030.

The approach is from a project lifecycle point of view while considering the impact of scale.

An innovation in the context of WP3 could be applied to a new or existing building. Some areas for identifying innovation include, but are not limited to, the following:

- Process at any point in the life cycle (eco design) of a project
- Integration of existing materials, components or systems to form a product or service whose impact is greater than the sum of its parts.
- Technology – under development or deployed
- New material, component or system
- Design or evaluation tool
- Construction or de-construction technique or approach
- A new way of operating a building to ensure it functions at its designed performance
- A tool or system to educate and involve professionals and users
- A finance or incentive scheme

### Example 1: Sustainable Accreditation Scheme, RIAS Scotland

While there are numerous schemes for assessing the environmental characteristics of buildings around the world, this scheme tests the skills and experience of the designers. The RIAS piloted a scheme to accredit sustainable building designers based on their solid achievement in buildings, which have been successfully used for at least one year. There are six specified criteria for assessment:

- Designing for effective resource use
- Minimising pollution
- Supporting communities
- Promoting biodiversity
- Creating healthy environments
- Managing the build process

The scheme recognises four levels of skill based in built work, with recognition of innovation within each level. Accreditation remains in place for 5 years, subject to upgrading or renewal. Applicants are required to provide evidence of their career, qualifications and specialist areas of knowledge or activity; and a range of project work/case studies.

#### *Finance and incentives*

Policies and financial strategies apt to deliver sustainable buildings in a market driven economy are to be seen as part of the innovation.

Two are the identified levels:

- Financial innovative tools and strategies involving the public sector;
  - Innovative companies operating on the market.
- Project financing is an effective way to satisfy public goals while granting private interest. Public-Private Partnership (PPP) represents a way to develop a mutually beneficial strategy for both the public and the private sector. The Public in profit making operations uses Private Sector financial capabilities. The Public each time determines peculiar rules and goals of each project on behalf of local communities, then invites private companies to bid for delivering them, ensuring a profit potential.
  - PPP can help the public sector in delivering major interventions within limited or zero budgets.
  - Within this scheme innovative companies have grown, such as:
  - Innovative companies - Case Study: Energy Service Companies (ESCO).
  - ESCOs are relatively new on the market, and are service oriented rather than product oriented. They were born within the energy savings professional business, and aim to make a profit out of reducing energy consumption. After a survey they offer to take responsibility of drastically reducing energy consumption in cities, districts or individual buildings in change of a long/medium term energy service contract. The client pays less in energy bills than before, and benefits of a fix rate for a number of years for its business plans. The ESCO makes profit by drastically reducing costs. ESCOs often work in partnership with banks, and are likely to be operated in PPP.

Innovative financial schemes can offset the upfront extra cost of sustainable smart eco buildings and districts. In this way the Public can set the standards, and the private make profit within precise rules designed for generating a virtuous loop.

### **Example 2: CH2 Melbourne – individual Building**

CH2 is a visionary building leading the way in ecologically sustainable design and facility management. It was commissioned by the City of

Melbourne to promote “green building” in oceanic climates (emphasis on cooling).

The result is a building for 540 employees, which uses 74% less energy than a standard public office building. The “smartness” and innovation of the design process combined a clever mix of relatively current technologies to produce an extraordinary integrated result.

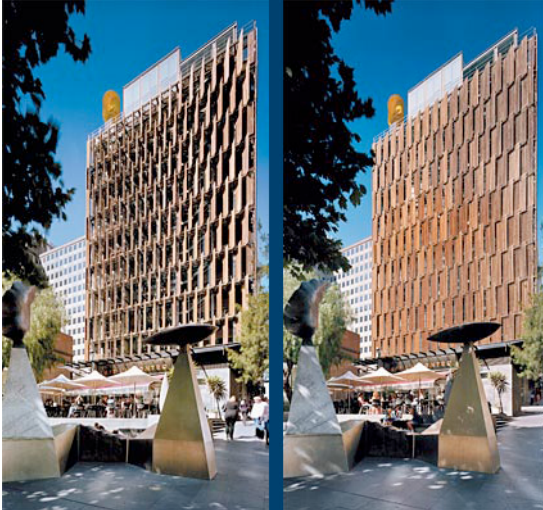


*North façade with wind extractors for hybrid ventilation and larger glazing in the lower parts of the building (optimisation)*

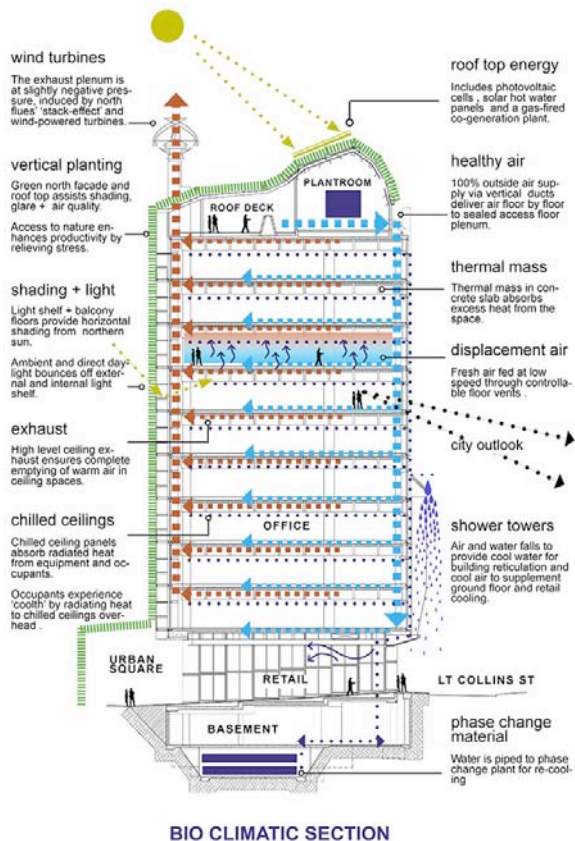
Some of the innovative solutions include:

- Design knowledge - Standard guides for low-energy / sustainable design
- Use of passive design solutions including integrated design of passive (orientation, envelope etc.) and active (services) strategies, artificial heat storage devices (PCM), integrated shading + natural light control / transfer and development of hybrid ventilation system
- Adaptable and flexible design including internal fit out (modular / movable walls and finishes, modular services)
- Materials: non-toxic, recyclable
- Construction systems: maximize use of prefabricated materials and precast concrete sections
- Water conservation and storage: water-efficient fittings, rainwater harvesting, re-use of gray water, sewer mining
- Building monitoring: automatic adjustment of the control unit, depending on the behaviour of the user and energy consumption monitoring.
- Solar thermal: hot water solar collectors

- PV panels on the roof
- Engage stakeholders and users: web based forum for designers, architects, developers, investors to share information, promote training courses, publications
- Communication: dissemination of relevant information to potentially interested parties through publications, web, etc.



West front with rotating, recycled timber shutters activated by PV panels



Section with main sustainability devices

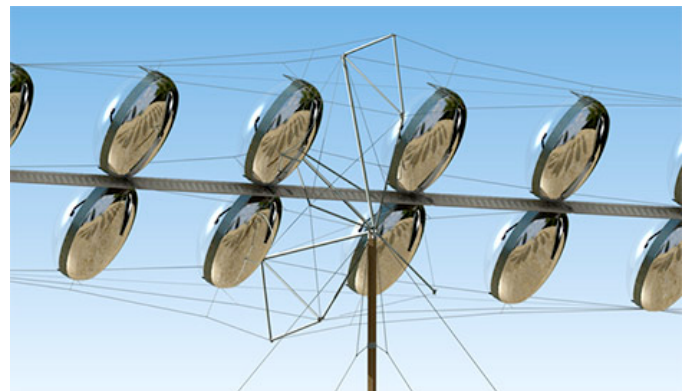
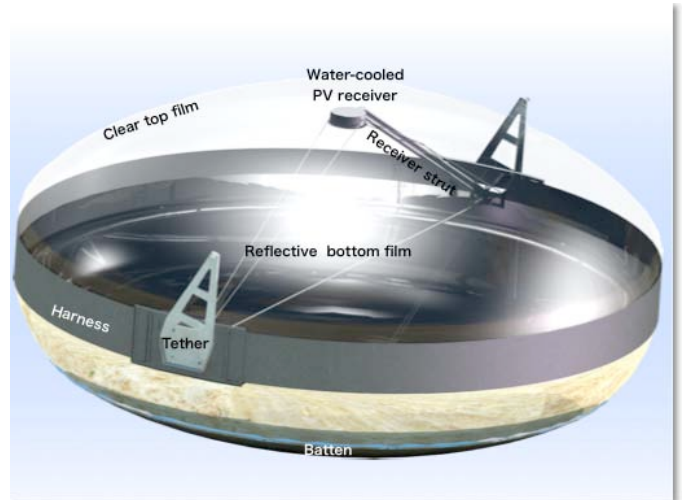
### Example 3: Solar Balloons – District Level

Concentrated-photovoltaic (CPV) technology is being developed by CoolEarth to be used in large-scale solar power plants to deliver gigawatts of power.

CoolEarth has created an inflatable plastic thin film balloon-like solar concentrator which focuses sunlight onto a photovoltaic cell held at its focal point. This clean system scales to district and regional level to meet national power demands at prices competitive with traditional fossil fuels.

Key features:

- Design minimizes resources and makes use of inexpensive, readily available materials
- Design produces 400 times the electricity that a solar cell would create without the solar concentrator.
- CPV system
- Metallised plastic films to focus light
- Mirror shape maintained by inflated air rather than traditional structure
- Tracking system records passage of sun
- Water cooled photovoltaic cells to remove waste heat





## Stakeholder Involvement

Stakeholder involvement is crucial to the progress and success of this work package to ensure the innovative solutions are robust and practical for the building and construction sector.

### *Get involved!*

We welcome stakeholder participation from anyone involved in the sector including universities, R&D organizations, companies that supply and use innovative technologies, consultants, builders, users and government bodies. We are particularly looking for:

- Suggestions on what constitutes an innovation in this context
- Examples of innovative materials, components, systems, design and evaluation tools to name a few
- Case studies
- Stakeholders who are willing to complete questionnaires and provide feedback

If you are interested in being a stakeholder with involvement from low (occasional questionnaires) to high (attend workshops), please email the work package leader, Stefano Saldini at [Stefano.saldini@macegroup.com](mailto:Stefano.saldini@macegroup.com)

## Additional Information

Further details regarding the SMART-ECO project may be found at [www.smart-eco.eu](http://www.smart-eco.eu)

## Overview of earlier published Smart-ECO (and related) News articles

- [Smart-ECO Report 1 - March 2008](#)
- [Cluster ecobuildings - Report 1 - December 2008](#)
- [Smart-ECO Report 2 - December 2008](#)