

Our vision

A world in which buildings
consume zero net energy



Energy Efficiency in Buildings

EEB #2
November 2008



World Business Council for
Sustainable Development



Our mission

- Lead a market transformation that reduces building's energy use and CO₂ emissions
- Stimulate innovations and new business models affecting market demand and the supply chain
- Broadly communicate this transformation



Everyone concerned with buildings has to change the way they think about energy



Based on 2050 projections, energy savings in buildings could save more carbon dioxide than the entire emissions of the transport sector.

Knowledge and technology available today could achieve these dramatic reductions in building energy consumption, but it is happening only at a snail's pace. Market and policy failures and behavioral barriers stand in the way of achieving the huge progress that is both necessary and possible. The rapid growth of new buildings in developing countries is a great challenge and an opportunity. The low rate of replacement of inefficient buildings in developed countries means it is essential to refurbish the existing stock. It is not enough just to create new, low-energy buildings.

The World Business Council for Sustainable Development (WBCSD) created the Energy Efficiency in Buildings (EEB) project in 2006 to identify how to overcome the barriers and achieve rapid progress towards a vision of zero net energy buildings. At stake is 40% or so of the world's energy that is consumed in buildings and more than a third of carbon dioxide emissions.

This briefing highlights the project's findings and analysis over its first two years. More detail can be found in a report published early in 2009, including recommendations based on detailed analysis and modeling of key sub-sectors around the world.

Knowledge gaps among professionals

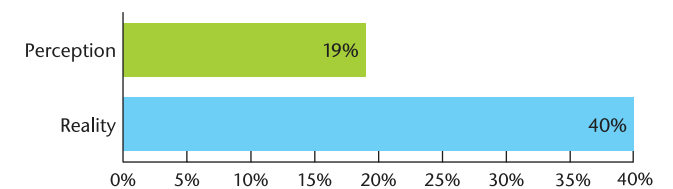
The EEB project has found that building professionals misjudge the cost and benefits of energy efficient buildings. They seriously over-estimate the cost of achieving energy efficiency and underestimate the potential to reduce emissions. The charts on the right show the findings of research commissioned by EEB investigating attitudes towards building sustainability in the six markets covered by the project: Brazil, China, Europe, India, Japan and the US (perception study carried out by Lippincott Mercer in 2007).

Three ways to beat the barriers

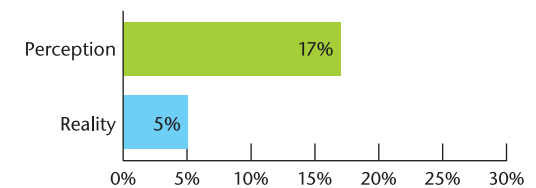
The project has identified three factors that can help businesses achieve dramatic progress in building energy efficiency for new and existing buildings, given a supportive policy platform:

- A holistic design approach – to encourage interdependence and shared responsibility among the many players in the building value chain, from community level to individual buildings
- The right financial mechanisms and relationships – to make energy more valued by those involved in the development, operation and use of buildings
- Behavioral changes as part of wider social development – to achieve action on energy efficiency by building professionals and building users

CO₂ emissions of buildings

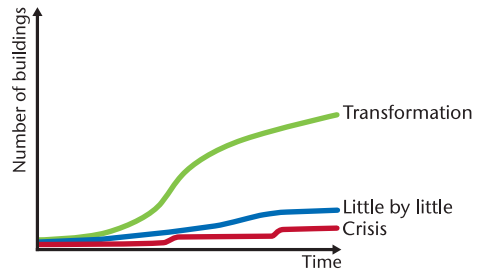


Cost of energy-efficient buildings

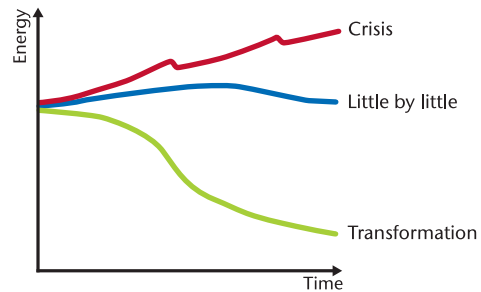


Conceptualization of EEB Scenarios

Realization of zero net energy buildings



Total energy consumption of buildings



Three scenarios

The project has investigated how the world can move effectively towards a zero net energy vision for buildings, using both a top-down and bottom-up approach. The group envisaged three global scenarios:

- **Crisis** – based on a continuation of current trends. The scenario pictures a series of crises due to a scarcity of fossil fuels. It sees a pattern of denial and overreaction, creating volatility and uncertainty that result in lower investment in building energy efficiency, an inefficient transition to lower energy use, and far too little overall progress.
- **Little by little** – increasing awareness of the need to reduce energy use in buildings, but only fragmented action to achieve it. Progress is piecemeal rather than substantial and coordinated. There are small signs of improvement and counter trends, but not quick enough or on a large enough scale.
- **Transformation** – a coordinated global response to transform the existing stock and new buildings. Awareness, fashion and behavioral change result in greater energy responsibility and rapid adoption of low-energy buildings. New building codes and performance labels are written and enforced, new energy and climate change policies are implemented, new design and technology approaches (including passive measures such as shading) are developed and applied, new skills are learned, and new financing mechanisms emerge.



Modeling energy use

The qualitative analysis behind the scenarios was used to test and develop strategies that were explored in the quantitative model, focusing on four key sub-sectors across six markets.

The model is based on an international building energy database constructed by the project in conjunction with four leading universities. The analysis identifies the mix of solutions resulting from decision-makers' criteria and the cost implications. The result is a comparison of available policy options, design and technology combinations and standards. It identifies priorities for building sector participants, the likely results of their actions, and the cost implications.



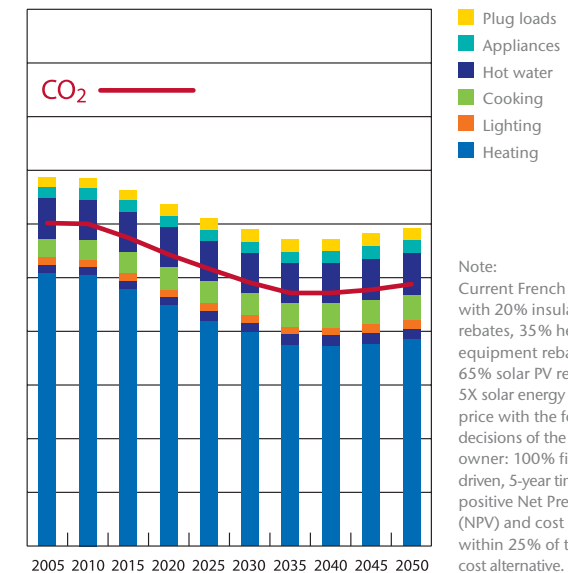
Is the good news real?

Preliminary conclusions are that widespread assumptions about the effectiveness of existing regulations and policies, and the viability of simple energy-reduction measures are over-optimistic:

- What effect will a carbon price tax or value have on building decision-making and how does it vary by sub-sector?
- How are decisions influenced by pay back and amortized costs?
- What is the value of integrated approaches over individual actions?
- How aggressive must actions be to make the real changes needed across the various sub-sectors?



Inadequate emission savings (red line) even with incentives



Transforming the way buildings are designed, built and used

Energy Efficiency in Buildings project members



Next steps

The EEB project's conclusions, published in a report in early 2009, aim to highlight the need for radical measures and the implications for government and business, including all those involved in the building sector.

These conclusions are being developed to produce a manifesto for progress towards zero net energy in buildings, to be published later in 2009.

How we work

The group adopted a multi-faceted approach to understanding and analyzing the issues, including cooperation with organizations such as the International Energy Agency, as well as several hearings and meetings with experts around the world. This included specific workshops in 2008 on three key factors (behavior, finance and a holistic approach). Outputs are available at www.wbcasd.org, including an interim report, *Business Realities and Opportunities*, which is available in six languages and is used as teaching material in several universities. Regular updates are provided through the project director's blog (www.eeb-blog.org).

An Assurance Group, chaired by the former head of the UN Environment Programme, Prof Klaus Töpfer, provides overall scrutiny of the project.

Contact

WBCSD
Christian Kornevall
Project director
kornevall@wbcasd.org
Tel: +41 (0) 79 367 99 73

LAFARGE
Constant van Aerschot
constant.vanaerschot@lafarge.com
Tel: +33 (0) 1 44 34 95 98

UNITED TECHNOLOGIES CORPORATION
Bill Sisson
sissonwm@utrc.utc.com
Tel: +1 860 794 7624