Beyond the business case: buildings for the climate – a global perspective

Diana Ürge-Vorsatz
director

Build Green CEE
April 15, 2010, HAS
Overview

- Introduction: the CC challenge
- The global and regional importance of green buildings in tackling CC
- Co-benefits: the free lunch we are paid to eat
- But who will pay the cover charge?
- The role of GBCs in unlocking the opportunities and recommendations
The climate change challenge

"HOW ON EARTH DO WE TURN IT OFF?"
In order to limit the impacts of CC, GHG emissions have to be reduced significantly

- Stabilizing global mean temperature requires a stabilization of GHG concentrations in the atmosphere -> GHG emissions would need to peak and decline thereafter (SPM 18 WG III)
- The lower the target stabilisation level limit, the earlier global emissions have to peak.
- Limiting increase to 3.2 – 4°C requires emissions to peak within the next 55 years.
- Limiting increase to 2.8 – 3.2°C requires global emissions to peak within 25 years.
- Limiting global mean temperature increases to 2 – 2.4°C above pre-industrial levels requires global emissions to peak within 15 years and then fall to about **50 to 85% of current levels** by 2050.

![World CO₂ Emissions (GtC)](image)

**Stabilisation targets:**
- E: 850-1130 ppm CO₂-eq
- D: 710-850 ppm CO₂-eq
- C: 590-710 ppm CO₂-eq
- B: 535-590 ppm CO₂-eq
- A2: 490-535 ppm CO₂-eq
- A1: 445-490 ppm CO₂-eq

Based on SPM 7, WG III. Emission pathways to mitigation scenarios
The later emissions peak, the more ambitious reductions needed

Source: Meinshausen et al 2009
Certain models forecast alarming summer warming in region:
PRECIS scenario 2071–2100

Forrás: Bartholy Judit: bemutató az IPCC rendezványen, CEU 2008. március
The importance of energy performance of buildings on *local* warming: *new importance of low energy consumption buildings*
The role of green buildings in CC mitigation: global and regional importance

CENTRAL EUROPEAN UNIVERSITY

CENTER FOR CLIMATE CHANGE AND SUSTAINABLE ENERGY POLICY
Perceptions from sector professionals

**CO₂ emissions of buildings**
- Perception: 19%
- Reality: 40%

**Cost of energy-efficient buildings**
- Perception: 17%
- Reality: 5%

Building sector: global importance

In 2004, in buildings were responsible for app. 1/3 of global energy-related CO$_2$ (incl. indirect) and 2/3 of halocarbon emissions.

**GHG emissions from buildings in 2004**
*(in Gt CO2 equivalent)*

- Total energy-related CO$_2$, 8.6 Gt, 81%
- Energy-related direct CO$_2$, 3 Gt, 28%
- Electricity-related indirect CO$_2$, 5.6 Gt, 53%
- CH$_4$, 0.4 Gt, 4%
- N$_2$O, 0.1 Gt, 1%
- Halocarbons, 1.5 Gt, 14%
Specific energy consumption for heating and cooling in the GEA regions by building type, 2005 (kWh/(m²*year))

Source: GEA Model
How much can green buildings help?
Few sectors can deliver the magnitude of emission reduction needed

- know-how has recently developed that we can build and retrofit buildings to achieve 60 – 90% savings as compared to standard practice in all climate zones (providing similar or increased service levels)
Buildings utilising passive solar construction ("PassivHaus")

Source: Jan Barta, Center for Passive Buildings, www.pasivnidomy.cz
Before SOLANOVA

-84%
East European heating & cooling final energy and floor area, 2005 - 2050
State-of-the-Art Scenario

-60%
Opportunity or risk?

The size of the potential lock-in effect
Development of specific heating energy consumption of buildings participating in the Panel Program, Hungary (case study, City A)

Final thermal energy consumption
Eastern Europe, 2005-2050

Using state-of-the-art and cost-effective construction know-how

Sub-Optimal Scenario
State of the Art
Co-benefits - the free lunch we are paid to eat...

Co-benefits of energy-efficient buildings
### Investment needs vs. energy cost savings, Hungarian tertiary sector

<table>
<thead>
<tr>
<th></th>
<th>Energy saving potential</th>
<th>CO(_2) reduction potential</th>
<th>Investment vs. savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GWh</td>
<td>GWh</td>
<td>GWh</td>
</tr>
<tr>
<td><strong>Business-as-usual in year 2030</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suboptimal accelerated</td>
<td>7 633</td>
<td>1 667</td>
<td>22%</td>
</tr>
<tr>
<td>Passive 1%</td>
<td>7 633</td>
<td>1 518</td>
<td>20%</td>
</tr>
<tr>
<td>Passive accelerated</td>
<td>7 633</td>
<td>5 572</td>
<td>73%</td>
</tr>
</tbody>
</table>

**Source:** Katarina Korytarova, dissertation draft
In most new MSs, EE is not primarily a green, but a social and economic agenda

- Fuel poverty is widespread in CEE (Europe?)
- According to a new study, app. 2500 lives are lost in Hungary alone each year
- By the UK definition, the average Hungarian household is fuel poor (has spent 10.4% of its disposable income on energy in 2007, it probably worsened since then)
- App. 1.5 million Hungarians declare that they cannot afford to keep their homes sufficiently heated
- A widespread deep (!) building energy retrofit program can eliminate fuel poverty
EE as an economic/social agenda: employment and other economic benefits

- In energy-efficient buildings:
  - labor **productivity** rises by app. 6–16%;
  - students’ test scores shows ~20–26% faster learning
  - Influenza and cold rates can decrease by as much as 20%, resulting in a USD10 bln/yr savings in US alone
    - better indoor environments related with building EE save annually in the US $6 -14 bill. (reduced respiratory disease); $1 - 4 bill. (reduced allergies and asthma); $10 - 30 bill. (reduced sick building syndrome); and $20 - 160 bill. (direct improvements in worker performance unrelated to health)

- Employment: (local) job creation: Danish trade union study finds twice higher employment intensity than for other mitigation options

- a wide-scale renovation program can create app. 250,000 net jobs in Hu alone (vs. the “1 million” missing – as on political agendas)
Direct and indirect employment impacts of a deep and a suboptimal renovation scenario in Hungary

(induced effects not yet included)
Summary: all arguments are ready for a massive deep green building retrofit program

- Annual investments in building retrofits in Hungary until 2050:
Who could foot the bill

- Significant EU funds available (*structural and cohesion funds*); up to 4% of national funds now available for buildings renovation – but short window of opportunity!
- Emission quota sales (GISs), ETS auctioning revenues, other climate revenues – buildings are one of the most effective ways to spend these
- Remaining funds: innovative financing schemes already operate in several countries (KFW model, ESCOs, etc.)
Distribution of Funding among Operational Programmes and among priorities within “Environment and Energy”

Hungary

...vs. 4% of total that is available now for such purposes
conclusion:
Priorities for CEE Green buildings councils

- Many more CEE best practices needed to demonstrate that very high-performance green building is not expensive and can be cheaper than conventional – green construction should not stay as a luxury market but the mainstream
- Emphasis for next decades in CEE is on renovation rather than new construction from a climate and sustainable development perspective
- Due to the lock-in effect, it is essential to go for the complex, state-of-the-art renovation (close to passive std), and not compromise at suboptimal solutions
- There is lots of financing available, but GBCs need to have a much stronger voice in letting their decision-makers/govts that this is high societal/economic priority and that the money is spent on this
- Adaptation/mitigation: heat-resilient buildings; preventing AC; integrating as much greenery in urban areas as possible; if not possible, apply light-colored, reflective roofs/insolated surfaces
Conclusion: the role of GBCs to unlock these opportunities – but not like this:

Q. How many green building consultants does it take to change a light bulb?

None. Someone else did it. I was at a conference.
Thank you for your attention

Trust me – they just keep promising this global warming; they just keep promising; but they won’t keep this promise of theirs either…

Diana Ürge-Vorsatz Diana

Center for Climate Change and Sustainable Energy Policy (3CSEP), CEU

http://3csep.ceu.hu  www.globalenergyassessment.org

Email: vorsatzd@ceu.hu