SBE 2016 Prague

Central Europe towards Sustainable Building

Antonín Lupíšek
Local organizers

- Czech Sustainable Building Society (iiSBE Czechia)
- Czech Technical University in Prague

Faculty of Civil Engineering

University Centre for Energy Efficient Buildings
CESB16 Delegates

353 delegates from 48 countries
Main topics covered

- Sustainable Retrofitting of Existing Building Stock
- Industrial Heritage Regeneration
- Sustainable Urban Development
- Building Design Process
- Materials, Technologies and Components for Sustainable Buildings
- Decision-Support Tools and Assessment Methods
- Sustainable Building in Education
Key themes in the region

- Energy efficiency (almost no fossil fuels left in Central Europe, except low-quality coal)
- Passive House movement very strong
- Ambitions EU regulation on energy efficient buildings
Key themes in the region

- Material efficiency
- EU hot topic – circular economy
- Reduction of waste
- Max utilization of local resources
Key themes in the region

- Population not growing any more
- New construction development limited
- Most of the building stock is already built
- Focus on retrofitting incl. conversions of buildings for new functions
- New ways of retrofitting (prefabrication, automation...)

Axel Föhl
Creating Sustainability: The Re-use of Historic Industrial Buildings in Europe.

ICOMOS/UNESCO specialist for the Industrial Heritage.
Key themes in the region

- Still increasing urbanization
- Sustainable urban development
- Cities for people
- Participative planning

Kees Christiaanse
The Grand Projèt.

Partner of KCAP Architects&Planners, Chair of Architecture and Urban Design at ETH Zurich and Program leader of Future Cities Laboratory (FCL) Singapore.
This award is given in the honour of Professor Aleksander Dariusz Panek to celebrate his lifelong contribution to research and teaching in the area of sustainability in building construction.
1st place
Xabat OREGI ISASI

Techno-economic evaluation of building energy refurbishment processes from a life cycle perspective
DIPLOMA THESES

2nd places:
Luca PARINI: User Centered Retrofit: The Case of KADK Campus, Copenhagen

Marco PAGANO: Life Cycle Assessment (LCA) of seismic retrofit strategies of existing structures: comparative analysis applied to case study

3rd places:
Marianne Gro LINDAU: Identifying densification potential in urban areas

Amarachi Nnenna NDUKWE: A Critical Analysis of The Effect of Part L on reducing CO2 Emissions. How Does Regulation encourage More than What is Required in Domestic Dwellings?
Outstanding papers

- Life cycle GHG emissions of material use in the living laboratory
  Mariane Rose Inman & Aoife Ann-Marie Houlihan Wiberg

- Hygrothermal behaviour of wood-based structures: full scale experiment
  Veronika Buresova & Michal Bures

- Global impulse sensitivity analysis for building energy simulation of residential quarters
  Manuel Lindauer

- Embodied energy and embodied global warming potential in construction: perspectives and interpretations
  Maria Balouktsi, Thomas Lützkendorf, Seongwon Seo, Greg Foliente
Acknowledgements

Auspices

Ministry of the Environment of the Czech Republic

Partners

ARCADIS | Design & Consultancy for natural and built assets

ROCKWOOL | AGC
TEPĚLNÉ A PROTIPOŽÁRNÍ IZOLACE | GLASS UNLIMITED

Exhibitors

ČERVENKA CONSULTING

Media Partners

EARCH. | GREENMATCH | BRI
And that was CESB16...

Sharing knowledge among 353 delegates from 48 countries

Presentations of 217 papers in 34 parallel sessions

iiSBE Forum of Young Researchers in Sustainable Building 2016

Meeting colleagues and friends

iiSBE Panek Award 2016

Social event at Vaclav Havel’s Prague Crossroads
SUSTAINABILITY IN CZECH BUILT ENVIRONMENT

ANTONÍN LUPÍŠEK
Neutral

- The planning policies do not specifically deal with sustainability
- On the other hand, we have quite long tradition in urban planning and what can be built on particular site is quite restricted and controlled
SB IN REGULATION

Extent to which requirements for sustainable building performance are included in building regulations / codes

- Rather positive
  - The actual complex of requirements on buildings does not specifically refer to sustainability, but the standards are quite high (a typical new office building in Prague close to public transport would very probably achieve LEED Silver without much special care)
  - Demanding regulation in operational energy efficiency and healthy indoor environment
  - Water efficiency becoming issue with climate change
  - Less demanding in environmental impacts of materials
ADAPTATION TO CLIMATE CHANGE

Progress in adapting existing and new buildings to risks related to climate change (wind, flooding, heat stress, etc.)

- Rather negative – too late
  - Discussions started the past year (national strategy for climate change adaptation)
  - Already had major floods in the past years – lead to taking this risk seriously
  - Significant drops in ground water levels in past 2-3 year – government starting taking actions (subsidies for water saving features in buildings)
  - Effects of heat islands under discussion
CARBON CONTENT IN FUELS

- Rather negative
  - RES share in electricity production around 13 %
  - Generous feed-in tariffs for PV led to public backlash against RES due to increased price of electricity
  - Legislation for mid-size and small producers unstable
  - Planning new block of nuclear power plant
  - Czech primary energy conversion factor 3.0 (compare to German 1.8)
CARBON CONTENT IN BUILDING MATERIALS

Progress in reducing embodied energy and/or embodied emissions in construction

- Rather negative
  - High conversion factors in electricity production (production could be much cleaner)
  - Embodied figures not taken as a significant topic
  - Missing national EPDs and databases
Neutral

- Regulation for new housing demanding (nearly zero energy standard in the coming year), on the other hand the most of the building stock are older buildings – it will take time
- Government subsidizing energy retrofitting quite massively, but still the target group is the middle class of younger people – for older people and people with lower income the payback times and financing are the deal breakers
Energy and emissions performance of the existing public and commercial stock

- **Neutral**
  - Regulation for new developments demanding (nearly zero energy standard in the coming year), on the other hand the most of the building stock are older buildings – it will take time
EFFICIENCY OF OPERATIONS

Efficiency of management and operations of existing buildings

- **Neutral**
  - In commercial buildings the commerce is the main mantra (problem that the energy bills are paid by the tenants, but the investments in energy efficiency shall be paid by the owners; in combination with relatively high payback times – low willingness to improve)
  - Homeowners do care much more and are trying hard; sometimes complications caused by structure of ownership in block of flats
nZEB

Achievement of nearly-zero operating energy and/or emissions in new buildings

- Rather positive
  - Nearly-zero energy level given by law for most (transition from 2016, after 2020 all buildings)
  - Be aware: the definition of nZEB is not harmonized and each country can have its own specific definition and calculation method
  - Czech implementation of "nZEB" is somewhere between low-energy house and passive house (energy demand 50-15 kWh/m²), but compared to what was in place just 10 years ago, it is significant improvement
Energy efficient appliances

- Rather positive
  - EU regulation is quite ahead in this → it is hard to buy non-efficient appliance
Education

Progress in educating and training key actors (regulators, investors, designers, operators, users)

- Neutral
  - Quite advanced at high schools and universities
  - Less advanced lifelong education
  - Major problem with skilled engineers and workers – lack of skilled workforce
COP21 government policies

- Czechia pledged 20% reduction target, will achieve it this or the next year (result of industry transition after 1990 – most of heavy industry bankrupt)
Future development

4. If current trends are continued, what will be the likely outcomes over the next decade?

Czechia will very probably meet the target. A national study modelling several scenarios of development of energy consumption of national building stock showed that there is a huge potential for savings at the existing buildings. It will depend on the political will and public investments of the future governments to which level the potential will be unleashed.
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Emise pro jednotlivé scénáře [Mt CO2]

Tab. 8: Porovnání uhlíkového rozpočtu na provoz budov pro nepřekročení hranice 2 °C pro jednotlivá období s vypočtenými hodnotami [Mt CO2]

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<th>Klima scénář 8,5</th>
<th>Období</th>
<th>2015-2030</th>
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<th>2051-2075</th>
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<td>Scénář 5: Ideální hypotetický</td>
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Thank you for attention.

See you next time in Prague!