Towards a better indoor air quality with low energy buildings

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EnVIE Conference

Policies for millions of indoor Environments

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### EURIMA

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**EURIMA** represents the interests of all major mineral wool producers throughout Europe.

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#### 2. Energy efficiency in buildings

The most cost-effective and sustainable solution.

- 40% energy consumption
- 460 million tonnes CO2
- 3.3 million barrels of oil
- 270 billion €
- 560,000 jobs

**0 SACRIFICE!**
Let’s be Ambitious!

- New built
  - very low energy/environmental standards by 2015

- Renovation
  - Accelerate cost efficient energy saving measures in all buildings

- Cost-effective
  - Ensure that new build and renovation are cost-effective

- Secure financial incentives for energy efficiency in buildings

3. Low energy building

- It is
  - Bioclimatic design, Low U value, air tight construction, controlled ventilation, efficient heating and cooling equipments, renewable energies

- Some labels
4. Complexity of indoor air quality

- Indoor environment has to fulfill two basic requirements
  - Health risk should be negligible
  - Indoor environment should be comfortable and pleasant
- Perception of comfort
- Indoor air quality: interactions between many parameters
- Indoor air quality problems
  - May arise from many causes
  - A lot of air contaminants: VOCs, allergens, mould, ...
  - Several symptoms often linked to poor indoor air quality

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Indoor climate
Not only a technical topic

Indoor climate in low-energy houses—an interdisciplinary investigation
Charlotte Isaksen*, Fredrik Karlsson5*  

- “A sociotechnical and interdisciplinary approach, […] is of great importance when developing the next generation of low-energy houses.
- It makes possible to improve the design and the technology in use, and in the long term to work out how to stimulate a market with low-energy solutions in the built environment.”

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*European Institute for Research in Building and Architecture (Eurima)
5. Ventilation
Conclusions of ECA report n° 23

- **Research**
  - To develop environmental friendly ventilation methods for better indoor air quality and climate

- **Information**
  - Collect to evaluate the guideline values for ventilation rates
  - Information programs for public

- **Standards, Guidelines**
  - Standards for ventilation
  - Guidelines for best practice in ventilation
  - Procedure for periodical inspection of IAQ and ventilation systems

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An optimum to find

- In case heating or cooling is required, the energy penalty is the most important reason to minimise the amount of ventilation air
6. Health benefits of better buildings

WHO - LARES, 2007

- LARES: Large Analysis and Review of European housing and health Status
- Thermal comfort-related problems (Cold indoor temperatures, Heating system, Inadequate insulation) associated with respiratory problems
  - Elderly (65 years and older) Increased respiratory problems when living in dwellings with
    - subjectively perceived cold temperature in winter (OR = 2/CI 1-3.8)
    - or inadequate insulation (OR = 2.4/CI 1.1-5.4).
- The general perception of thermal problems in the dwelling
  - strongly associated with bad self-reported health (OR = 2.6/CI 2.1-3.1).

6. Health benefits of better buildings

Study in New Zealand, 2006

Effect of insulating existing houses on health inequality: cluster randomised study in the community

BMJ, doi:10.1136/bmj.39070.573032.80

- Improving the thermal properties of older houses
  - led to warmer houses and had demonstrable health benefits
  - When focusing on low income communities and poorer quality housing, it has the potential to reduce health inequalities
- Fitting insulation
  - Is a cost effective intervention for improving health and wellbeing
7. Some examples of good air quality in low energy buildings

• Basic recommendations
  - Good ventilation and air conditioning control
  - Low emitting building products

Health risk associated with passive houses: An exploration

• Major recommendations
  - design of hybrid ventilation system, reduction of the noise level of HRV ventilation, frequent cleaning of the components of the air inlet system, good sun shading and innovation for flexible heating sources.

Conclusion

• We need to save energy, including in our buildings
• We need to have good indoor environment including a good indoor air quality
  It is possible!
• Let’s continue to work on
  - Better knowledge on indoor air quality
  - Lower emitting building products
  - Better management of ventilation
  - Better training of designers and builders
  - Better information of buildings occupants
  - ...
Thank you

Aymon de Reydellet