



Energy Efficiency in public buildings

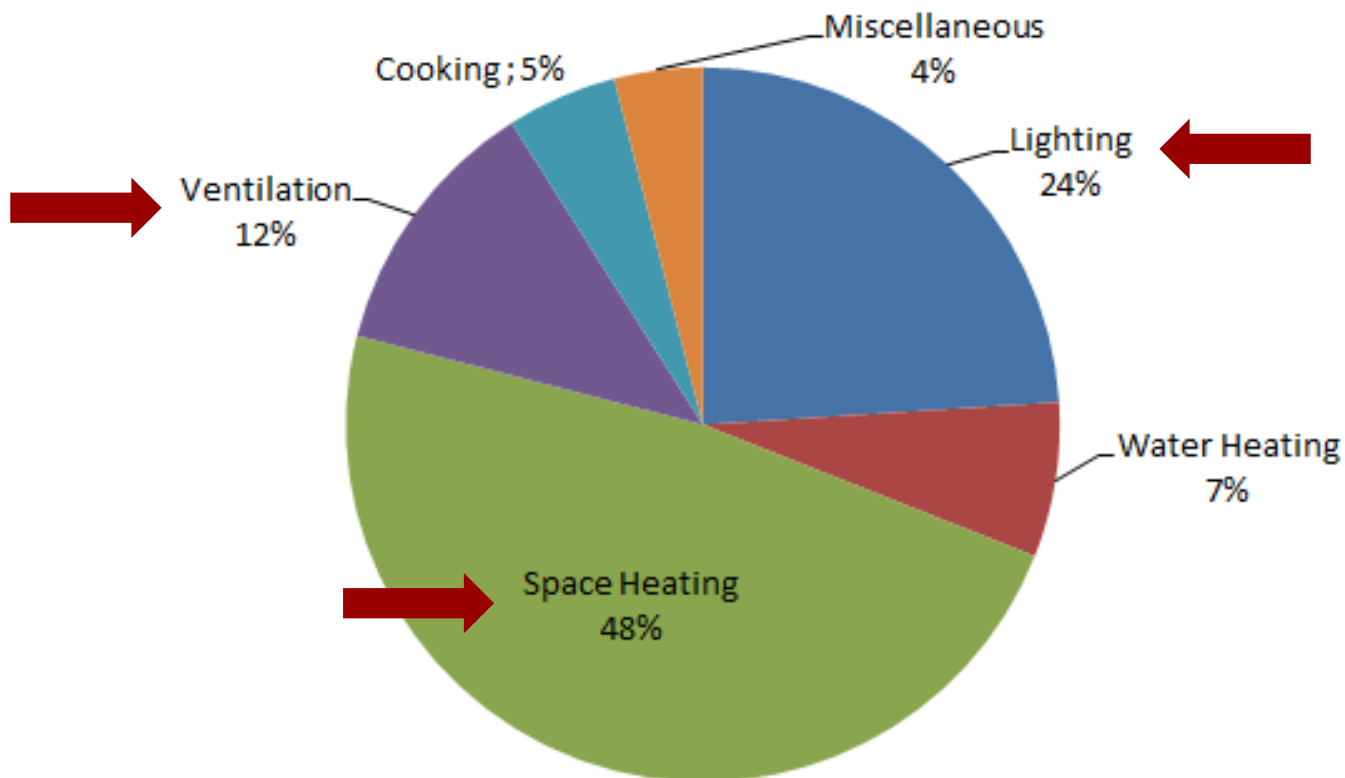
Lessons learnt: Indoor Air Quality

November 2016

Content

- Building Energy Use
- Indoor Air Quality: Factors
- Indoor Air Quality: Negative Effects
- CO2 content & Examples
- Air quality
- Relationship IAQ and energy use
- EE potential
- EE and IAQ a contradiction

Building energy use



More than 50% is for Indoor Air Quality

Air quality: Factors

- Humidity
- Ventilation rate
- Building materials and other sources
- Indoor air quality



Air quality: Negative effects

Negative effects on occupants'

- Health
- Comfort and Productivity

In case of moisture and mold

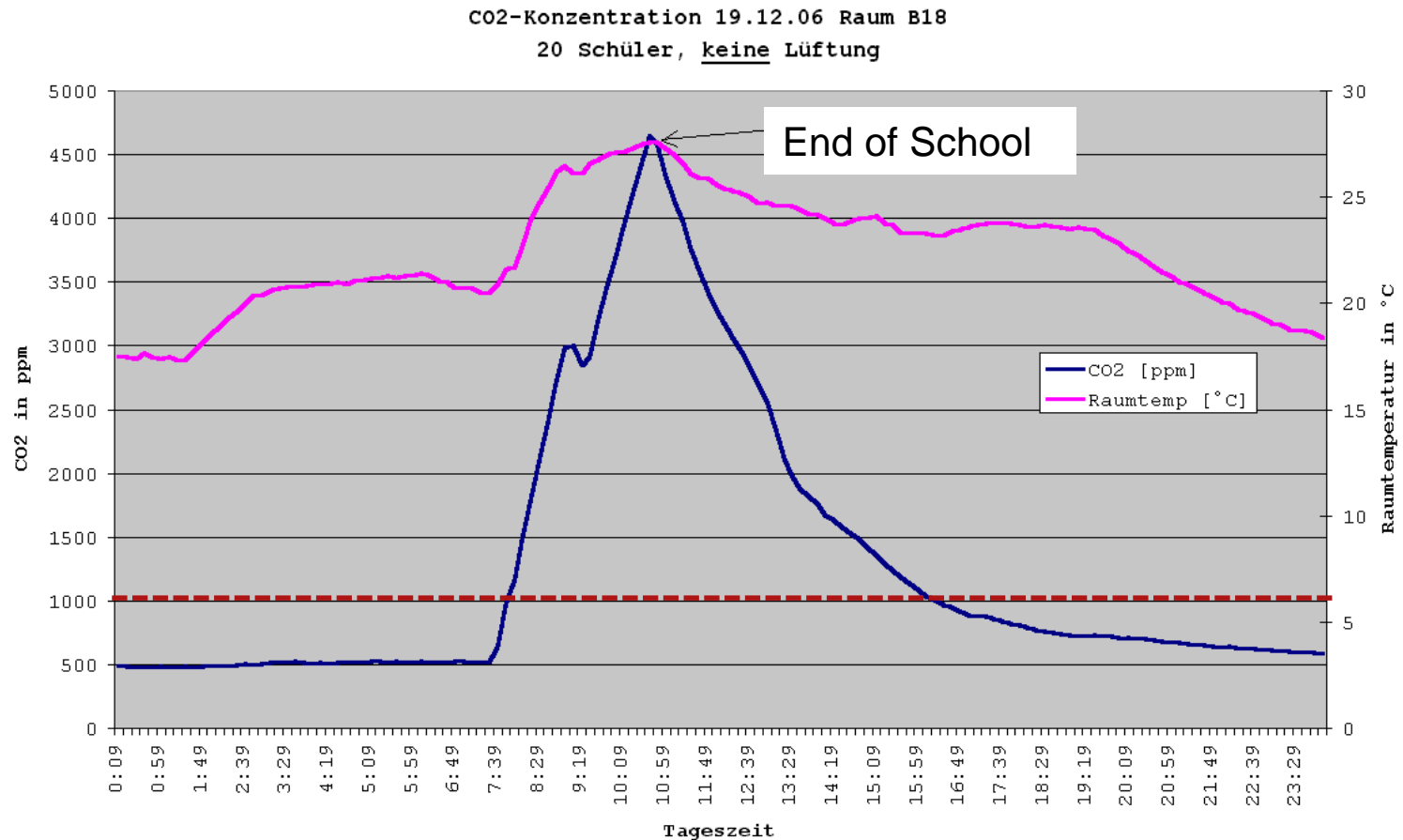
- Structural damage to the buildings
- Serious health problems for especially young children -> lungs and other organs are still developing

Air quality: CO2 Content

CO ₂ [ppm]	Air Quality
2100	BAD Heavily contaminated indoor air Ventilation required
2000	
1900	
1800	
1700	
1600	
1500	MEDIOCRE Contaminated indoor air Ventilation recommended
1400	
1300	
1200	
1100	
1000	FAIR
900	
800	
700	GOOD
600	
500	EXCELLENT
400	

<http://www.ventilationcontrolproducts.net/>

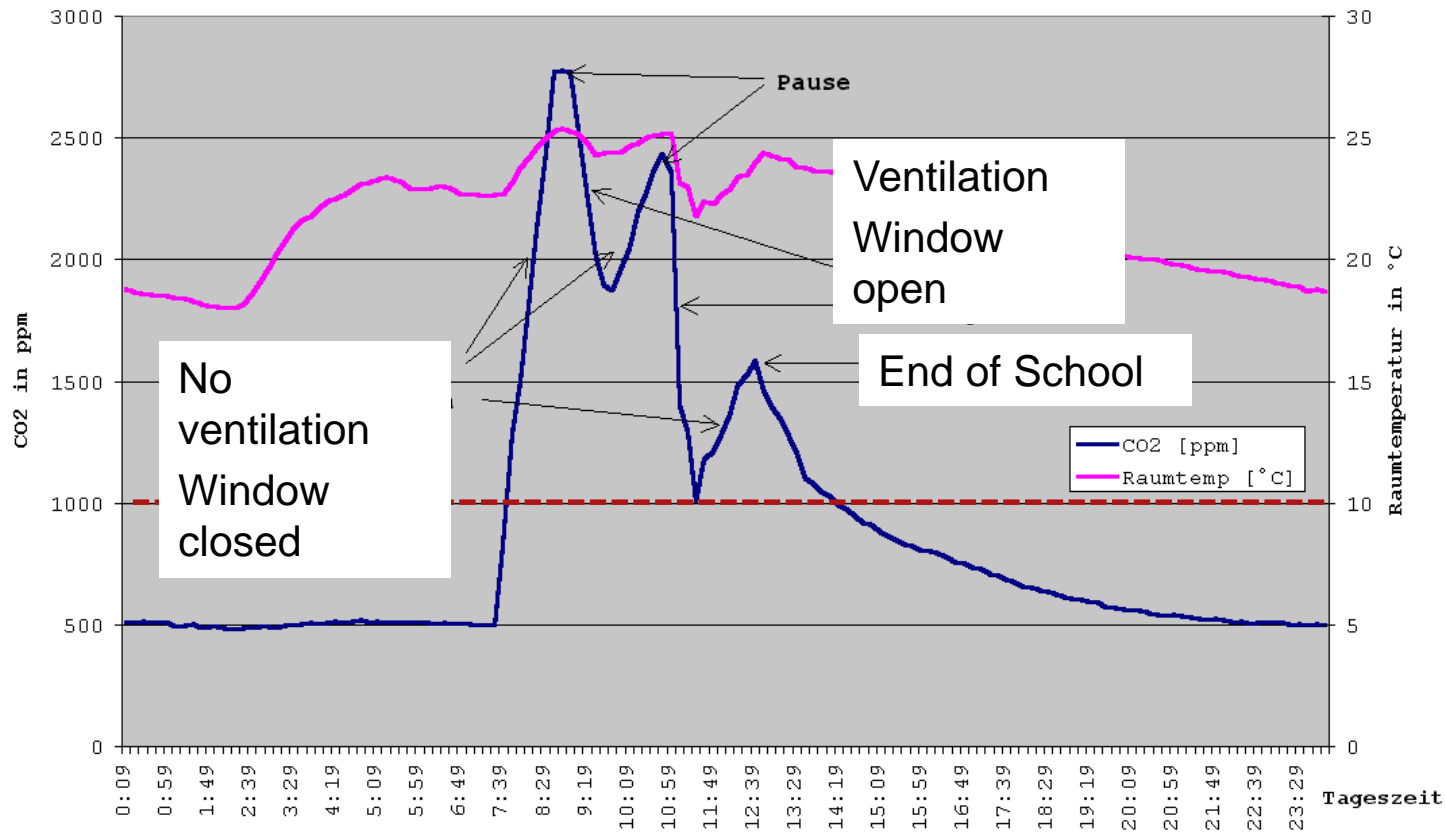
Air quality: CO2 Content



<http://www.solar4ever.de/>

Air quality: CO2 Content

CO2-Konzentration 15.12.06 Raum B18
20 Schüler, zeitweise Lüftung



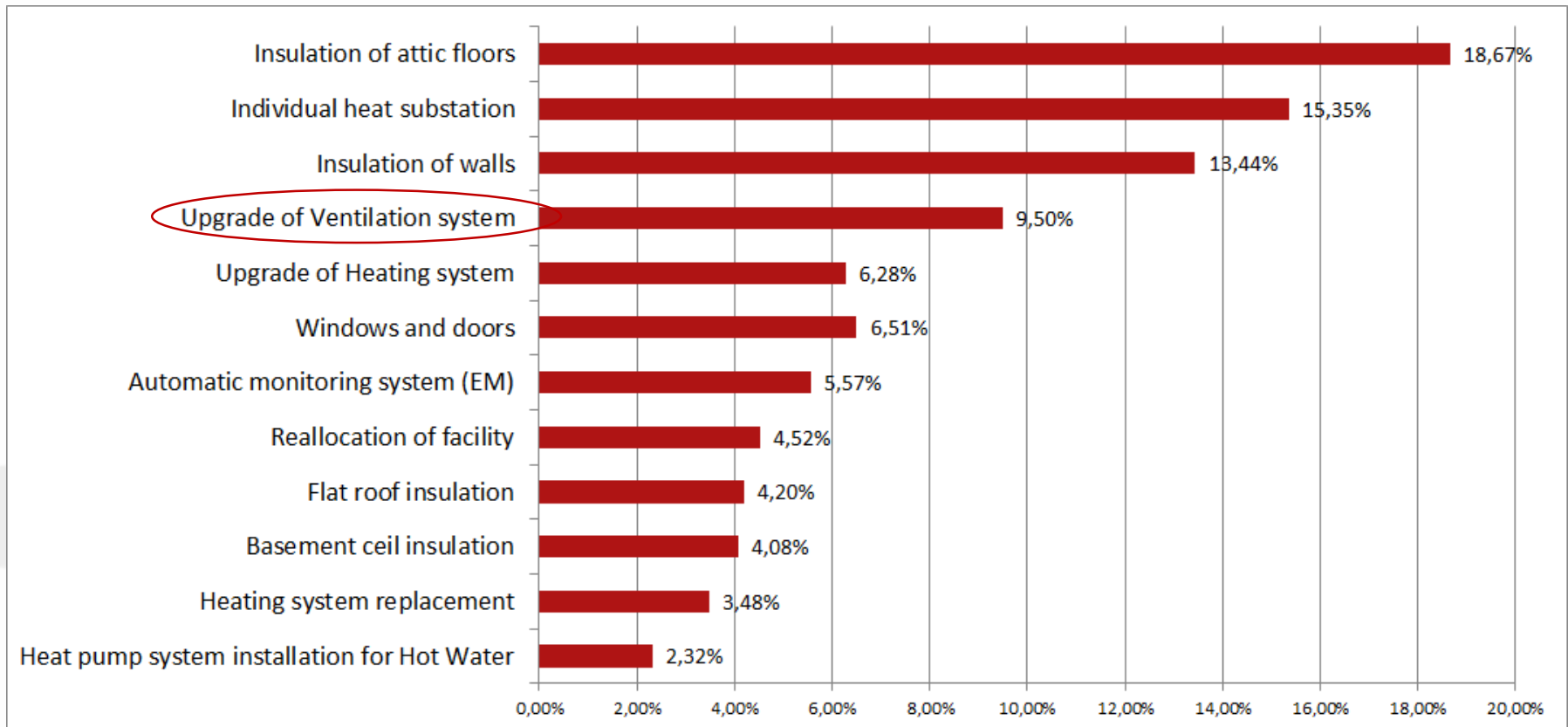
<http://www.solar4ever.de/>

Relationship IAQ and energy use

Air exchange rate between indoor and outdoor.
Exchange rate can result from

- In(Ex)filtration of air through envelope
- Natural ventilation through doors and windows
- Mechanical ventilation system

Energy Efficiency Potential



EE and IAQ a contradiction?

Energy consumption can be reduced by:

- Reducing the energy demand

 - Demand/Sensor controlled Ventilation system saves energy but increase indoor air quality**

- Increasing the technical energy efficiency

 - Increase air exchange rate may increase energy consumption but maybe compensated for by heat recovery**

- Integrating renewable energy sources of energy in the building system

**We are looking forward to the future.
Wherever!
Whenever!
Together with you.**



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