

TECHNICAL GUIDELINES FOR VENTILATION SYSTEMS (based on HealthVent project)

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on behalf of REHVA

AIVC Workshop

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Who am I?

- Born in 1985 in Ljubljana, Slovenia
- Degree in mechanical engineering, University of Ljubljana
- **Until 2011:** HVAC design engineer, Slovenia
- **2011 – 2012:** REHVA - Research engineer
- **2012 – present:** Project leader / consultant at studiebureau boydens, Belgium



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HealthVent project

- Objective: Health-based ventilation guidelines
- Work Package 5 entrusted to REHVA. Objectives:
 - Identification of most common ventilation systems in the EU
 - Summary of ventilation regulations and standards in the EU
 - Performance of existing ventilation systems in the EU
- Work was performed in 2010 – 2011
- HealthVent final report expected in March 2013



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« Those who ignore history are doomed to repeat it. »

Modification of a quote originally by
Edmund Burke (1729 – 1797)



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Ventilation science in 1893

de nous, et tout le monde sait qu'un animal enfermé sous une cloche fermée ne tarde pas à périr.

« ...everyone knows that an animal closed under a bell will not take long to perish. »



Le chauffage (1893)

Prof. Julien Lefèvre

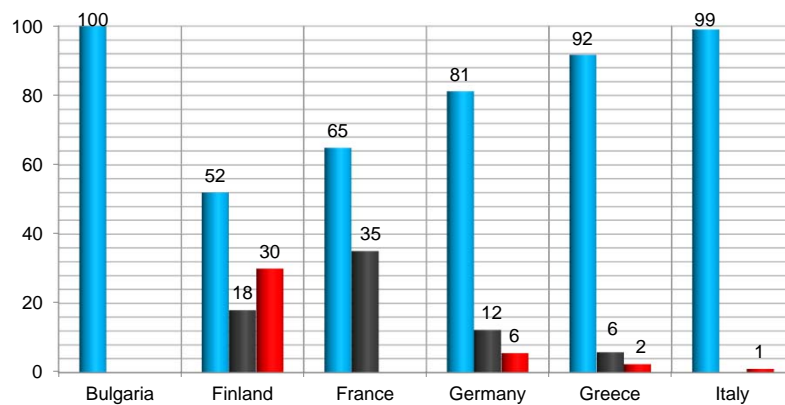


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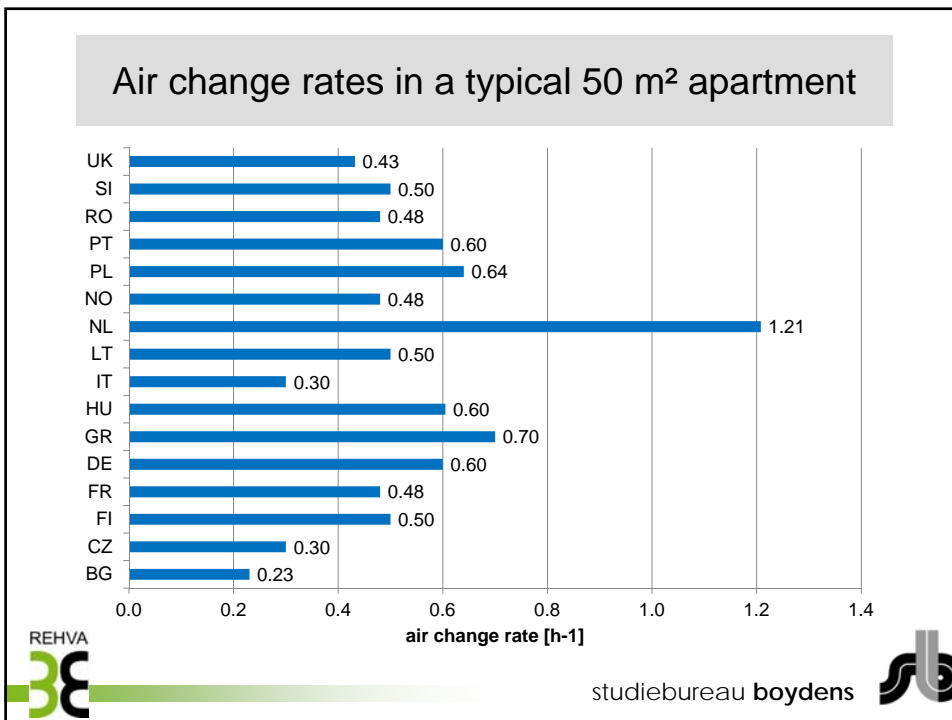
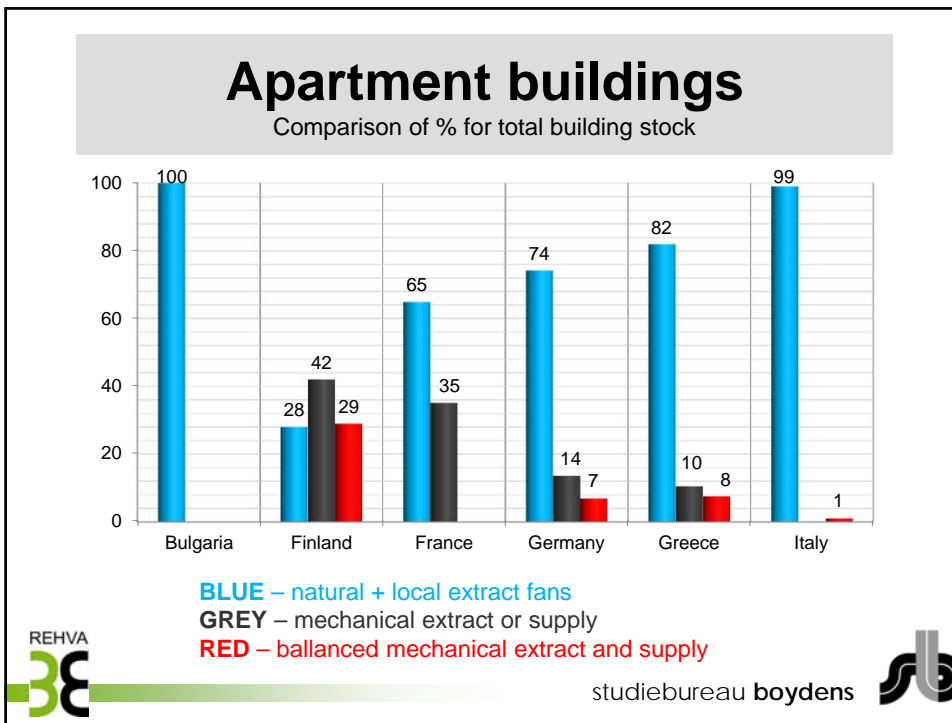
Houses

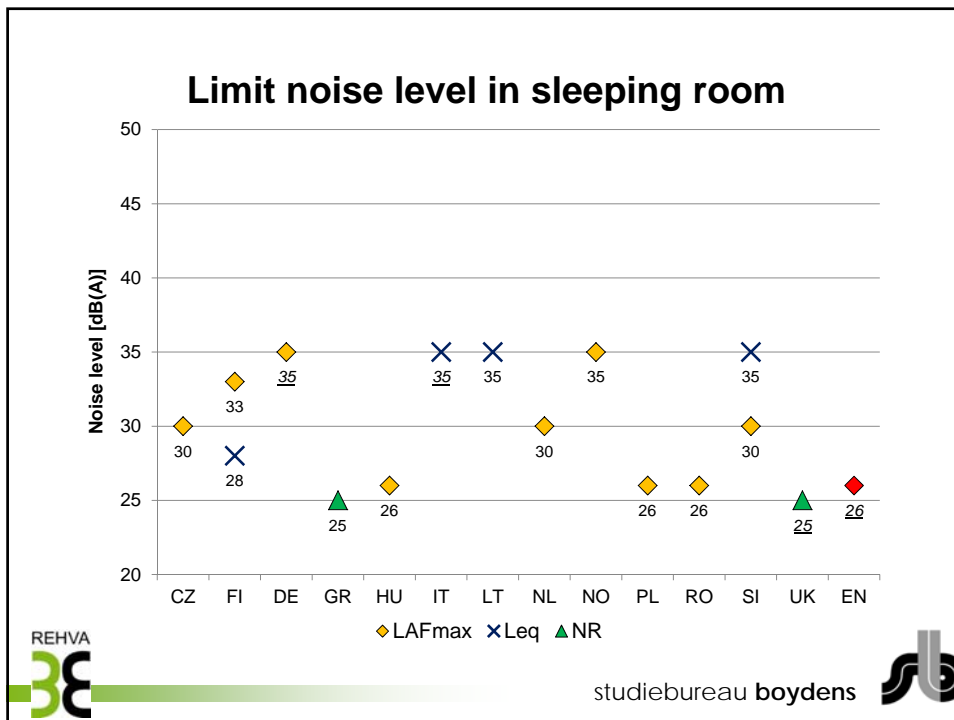
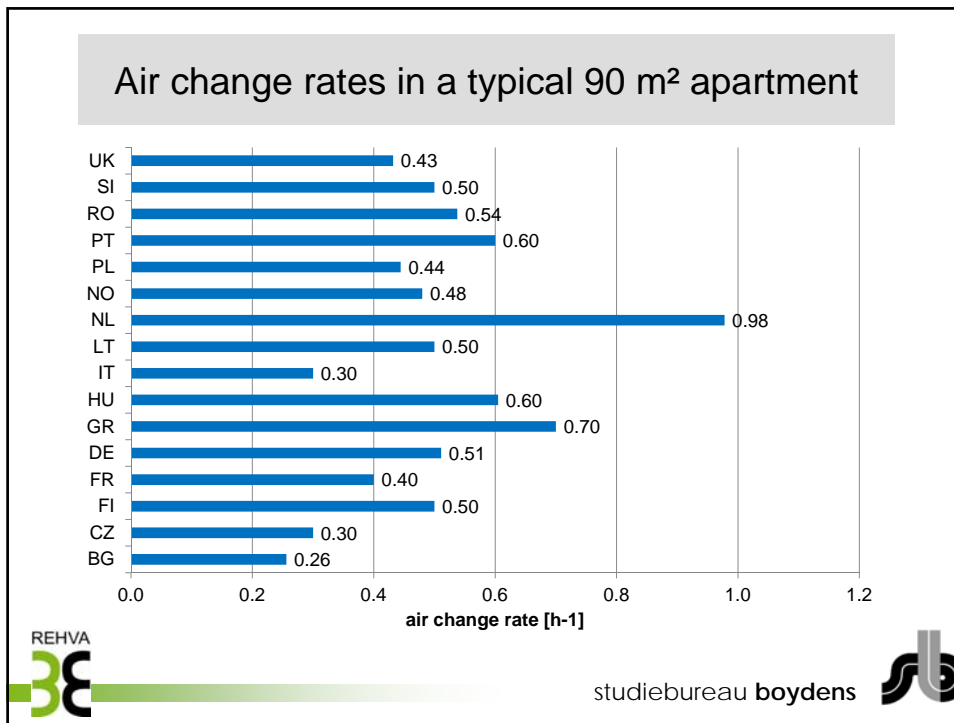
Comparison of % for total building stock



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Noise - reality

Measured noise levels in Dutch dwellings (van Dijken, Boerstra (2010))

	Balance sup./exh. N = 150	Mechanical exh. N = 149
> 30 dB(A) living room	72 %	54 %
> 30 dB(A) bedrooms	86 %	21 %

Measured noise levels in new Finnish houses (Kurnitski (2007))

	Balance sup./exh. N = 102
> 28 dB(A) living rooms and bedrooms	72 %



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Technical features in EU regulations % of countries without any requirements:

- 90% – location of outdoor air intake
- 60% – balancing of air flows
- 60% – uncontrolled condensation
- 55% – operation personnel qualification
- 50% – protection against outdoor pollutants indoors
- 50% – cleaning the system during lifetime
- 40% – filter replacements during lifetime



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Tell what has to be done : descriptive guidelines

Based on the performance of ventilation systems in existing buildings

- **A** – Avoiding specific sources of pollution
- **B** – Ventilation as a mean to reduce exposure
- **C** – Enforcing compliance regarding operation and maintenance



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Examples (1/2)

- **A1** – Avoid uncontrolled condensation in HVAC components
- **A5** – Enforce minimum distances between outdoor pollution sources and fresh air intakes
- **B10** – Always provide ventilation to meet IAQ requirements
- **B11** – Filter outdoor air for ventilation



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Examples (2/2)

- **C14** – Enforce commissioning
- **C15** – Enforce regular maintenance and inspection of systems
- **C17** – Enforce education (qualification) for HVAC designers
- **C20** – Control system should be easy to operate and provide user override possibility



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Descriptive guidelines: Advantages (1/2)

- Based on experience and actual need
- Can be applied in practice immediately after the publication
- Can be applied to new and existing buildings
- Are attainable by using existing technology and knowledge
- Common guidelines help construction industry and reduce costs on EU level



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Descriptive guidelines: Advantages (2/2)

- Measures/detailed regulations can be presented in the order of importance
- Universal for all existing types of HVAC systems
- Implementation can be controlled
- Independent of climate and building practice
- An important and necessary step towards IAQ based guidelines



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Descriptive guidelines: Disadvantages

- Do not relate health effects directly to actual pollutants – not air quality based
- They don't provide an actual ventilation rate needed
- They don't take the ambient air into account as a possible pollutant
- Target levels of pollutants are not included
- They have to be updated regularly to keep up with the advance of technology



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Conclusion

- Ventilation itself does not solve the IAQ related problem
- Descriptive guidelines would help to solve basic design and operation problems
- To fight the capital interest the guidelines should be implemented in regulation
- A common European regulation would (probably) be the best solution



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Thank you for your attention!



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