# Forum: IEA EBC Annex-68
## *Design and Control Strategies for Low Energy and High IAQ Residential Buildings*

### Carsten Rode

Technical University of Denmark
2800 Kgs. Lyngby, Denmark

**IBPC2018**
**SYRACUSE, NY, USA**
September 23 - 26, 2018

Healthy, Intelligent and Resilient Buildings and Urban Environments

# Motivation

- Awareness of changes in the global climate has put increasing pressure on the reduction of energy consumption in buildings.

- As the general standard of insulation has been increasing, the focus is on other means to reduce energy consumption.

- Ventilation (naural or mechanical) is another obvious candidate.

- Less ventilation, however, can lead to increased levels of pollutants indoors.

- How do we ensure that future low-energy buildings provide a comfortable and healthy indoor environment?

*Prof. Geo Clausen, DTU*
*Building Green Fair, Copenhagen, 30 Oct. 2014*

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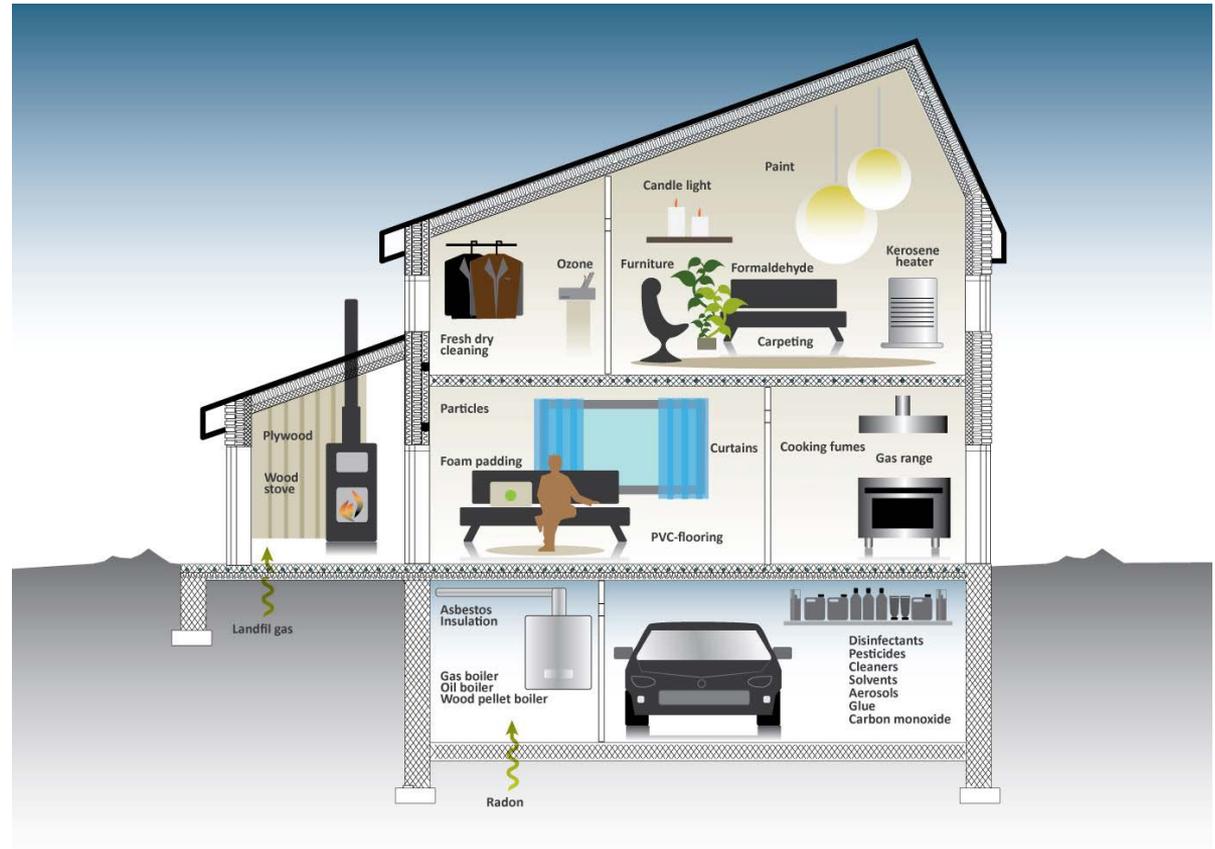
# Problem Statement

- Highly energy efficient buildings are airtight buildings, and their need for ventilation should be optimized
  - but may be energy consuming

- Risk of high levels of pollutants indoors: Humidity, $CO_2$ and chemical compounds
  - Influence of materials in the building fabric and inventory of buildings

Energy ⬌ IAQ

Knowledge Gap

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# Indoor Atmospheric Situation

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# Mission

- With a basis in scientific data and tools, the project shall provide guides for design and operation of buildings towards highest energy efficiency while ensuring good & healthy indoor conditions
- Specific target: New and refurbished residential buildings

**P A 0 +**

# Subtasks

- ST1 - Defining the metrics
- ST2 - Pollutant loads in residential buildings
- ST3 - Modeling
- ST4 - Strategies for design and operation
- ST5 - Field measurements and case studies
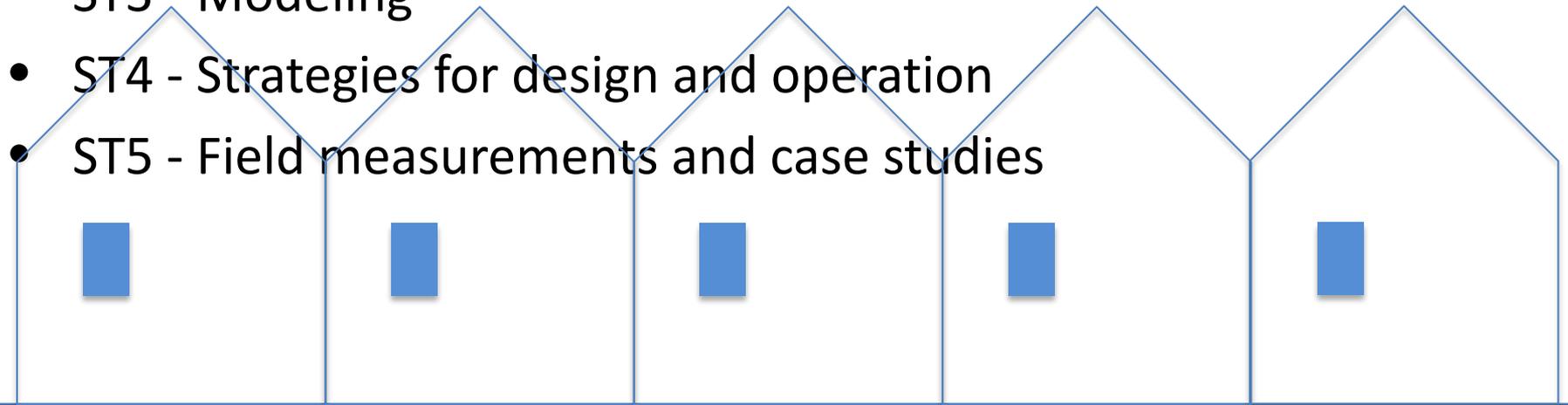
# Deliverables

- Data – especially on emission and sorption properties of building products – focusing on combined effects

- Tools and paradigms to analyze, design and manage energy- and IAQ-optimized buildings

- Field test results

- Guidelines and recommendations

- Overall, "Annex 68" shall deliver data and tools that can and will be used by practitioners

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# Target Audience

The project addresses the following stakeholders:

- Building designers (engineers and architects)
- Suppliers of HVAC and control systems
- Suppliers of materials used in building construction and indoor furnishing
- Providers of building management systems

The project shall also address the interests of <u>building owners</u>, <u>facility managers</u> and <u>users</u>, as well as <u>authorities</u>

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# Subtask leadership

|  | Subtask leader | Co-lead |
|---|---|---|
| ST1 – Metrics | France (Abadie) | Denmark (Wargocki) |
| ST2 – Pollutant loads | Denmark (Qin) | USA (Zhang) |
| ST3 – Modeling | Germany (Grunewald) | USA (Zhang) |
| ST4 – Strategies | Denmark (Kolarik) | Norway (Cao) |
| ST5 – Field tests and case studies | Belgium (Jelle) | Canada (Tariku) |

# Schedule

| | 2015 | | 2016 | | 2017 | | 2018 | | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preparation Phase** | X | X | | | | | | | | |
| **ST1** | | | X | X | | | | | | |
| **ST2** | | | X | X | X | X | X | X | X | |
| **ST3** | | | X | X | X | X | X | X | X | |
| **ST4** | | | X | X | X | X | X | X | X | |
| **ST5** | | | X | X | X | X | X | X | X | |
| **Reporting** | | | | | | | | | X | X |

# Agenda – September 26, 2018

The first part of the seminar will be to present the project and its specific subtasks, activities and intended deliverables.
Subsequently, to discuss the Annex project with the audience and gathering comments.
Focus on the metrics for IAQ with a view to implementation in policies, standards, and practice.

| | |
|---|---|
| IEA EBC Annex 68 Introduction | *Carsten Rode, Denmark* |
| Subtask 1: Defining the Metrics | *Marc Abadie, France* |
| Subtask 2: Pollutant Loads in Buildings | *Menghao Qin, Denmark* |
| Subtask 3: Modeling | *John Grunewald, Germany* |
| Subtask 4: Strategies for Design and Control of Buildings | *Jakub Kolarik, Denmark* |
| Subtask 5: Field Measurements and Case Studies | *Jelle Laverge, Belgium* |
| Discussion | |

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# Information

Carsten Rode, Operating Agent

car@byg.dtu.dk

http://www.iea-ebc-annex68.org/

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