Online seminar om Ventilation, Indeklima og Energi
1.10. 2020

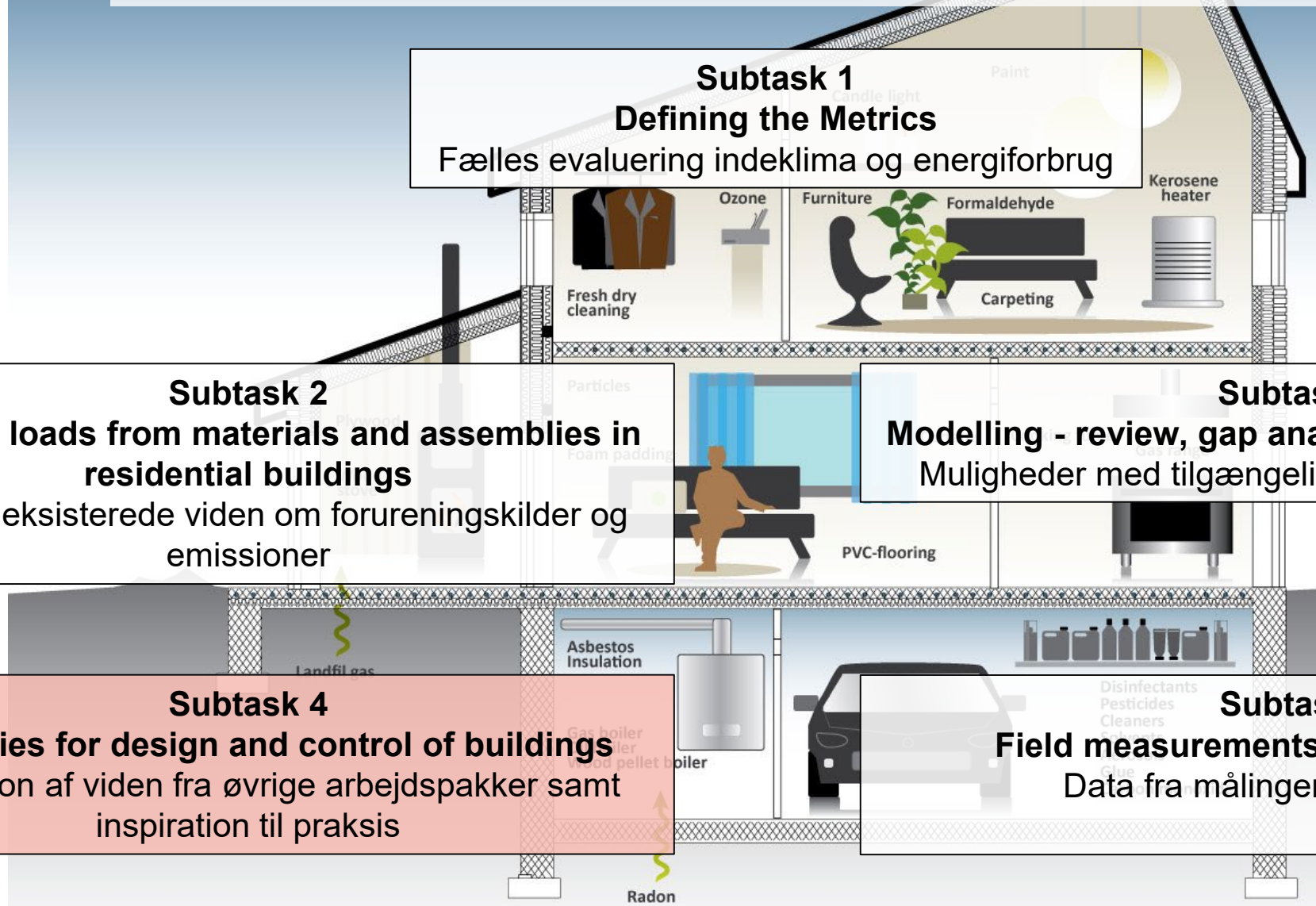
Aktuelle udfordringer, udvalgte casestudier og innovative løsninger med hensyn til indeklima, ventilationsdesign og regulering i boliger

Jakub Kolarik; jakol@byg.dtu.dk

Anerkendelser:
Daria Zukowska, Gabriel Rojas, Esfand Burman, Gaelle Guyot, Maria del Carmen Bocanegra-Yanez, Jelle Laverge, Guangyu Cao, Carsten Rode

The Annex 68 - Indoor Air Quality Design and Control in Low Energy Residential Buildings

Subtask 1
Defining the Metrics
Fælles evaluering indeklima og energiforbrug



Subtask 2
Pollution loads from materials and assemblies in residential buildings
Ny samt eksisterede viden om forureningskilder og emissioner

Subtask 3
Modelling - review, gap analysis and categorization
Muligheder med tilgængelige simuleringsværktøjer

Subtask 4
Strategies for design and control of buildings
Integration af viden fra øvrige arbejdspakker samt inspiration til praksis

Subtask 5
Field measurements and case studies
Data fra målinger og felt studier

Subtask 4
Strategies for design and control of buildings

FORMÅL

- Opsamling af resultater fra øvrige ”subtasks”
- Tag fat på praktiske og optimale design- og kontrolstrategier for høj luftkvalitet i boliger
- Præsenter resultater i sammenhæng med eksisterende viden

Fokus og struktur

Energieffektiv og komfortabel mekanisk ventilation i lufttætte lavenergi boliger

Activity 4.1

State of the art – written knowledge & stakeholder survey (the reality)

Activity 4.2

Design strategies – case studies/research focused on design

Activity 4.3

Operational strategies – case studies/research focused on operation

Activity 4.4

The Subtask 4 report: Current challenges, selected case studies and innovative solutions covering indoor air quality, ventilation design and control in residences

Design relaterede krav og standarder kontra virkeligheden

- Fokus på lande involverede i Annex 68
- Gennemgang af krav og standarder vedrørende luftkvalitet og ventilation
- Undersøgelse af vejledningsmuligheder for rådgivende ingeniører, installatører og facility managere (FM)
- Stakeholder Survey = en rundspørge til fem grupper af interessenter
  - Rådgivende ingeniører
  - Bygningsadministratorer & FM
  - Myndigheder
  - Developere
  - Producenter

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Taylor & Francis
Taylor & Francis Group
Check for updates

Ventilation in low energy residences – a survey on code requirements, implementation barriers and operational challenges from seven European countries

Daria Zukowska[a], Gabriel Rojas[b], Esfand Burman[c], Gaelle Guyot[d,e], Maria del Carmen Bocanegra-Yanez[f], Jelle Laverge[g], Guangyu Cao[h] and Jakub Kolarik[a]

Stakeholder survey – nogle resultater

- 44 interviews Østrig (6), Belgien (10), Danmark (5), Estland (4), Frankrig (5),Norge (7), Storbritanien (7)
- Mekanisk ventilation med varmegenvinding er dominerende. Frankrig & Belgien – hybrid behovstyret ventilation (ifølge RF); Østrig – naturlig ventilation samt mekanisk udsugning
- Nogle lande tillader reduceret ventilation når beboerne ikke er til stede
- Mekanisk Ventilation accepteres godt i lande med økonomiske incitamenter, og hvor klimatiske forhold og strenge energikrav gør varmegenvinding næsten uundværlig
- Kun Danmark, Norge og Estland har krav vedrørende varmegenvindings virkningsgrad
- Behovstyret ventilation er ikke påkrævet og anvendes sjældent på grund af højere omkostninger og kompleksitet, undtagen Frankrig og Belgien

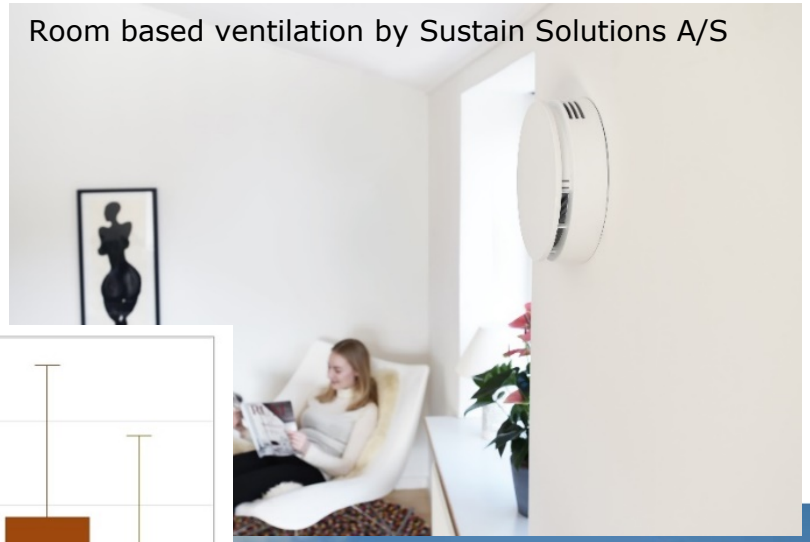
Stakeholder survey - udfordringer

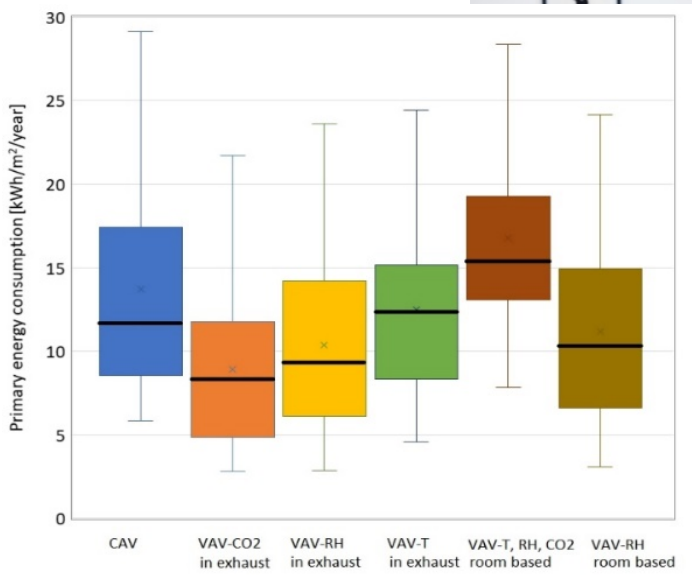
- **Udfordringer ved mekanisk ventilation:**
  - Plads mangel
  - Høje installationsomkostninger
  - Vedligeholdelse
  - Støj og højere driftsomkostninger
- **Hvad skal til for at sikre høj luftkvalitet?**
  - Mere fleksibilitet i krav (bygningsreglement) og standarder
  - Koordineret tilgang til energieffektivitet og indeklima
  - Sikring af korrekt installation, commissioning og drift
- **Hvordan skabes forbedring?**
  - Teknologiske ”skub”: certificering af installatører, robust design, brugervenlighed
  - Økonomiske incitamenter: tilskud ved installation af effektive systemer, forsikringsincitamenter med hensyn til drift og vedligehold
  - Marked relaterede incitamenter: kvalitetsmærkning, strengere lovkrav, markedsinterventioner
  - Informations kampagner: klar vejledning vedr. luftkvalitet, feedback på faktisk præstation

Subtask 4
Case studier

- Online publikation – tilgængeligt fra DTU BYGs hjemmeside (cirka december 2020
- Fokus på kontekst
  - Krav & vejledning
  - Reel design or installation: udfordringer or forhindringer

- Målgruppe
  - Rådgivende ingeniører
  - Arkitekter
  - Bygningsadministratorer & FM
  - Myndigheder
  - Bygningsejere


Room based ventilation by Sustain Solutions A/S



Evaluating ventilation control strategies by simulations (Kolarik et al. 2019)


Evaluation of Mechanical Extract Ventilation systems in 'low-energy' dwellings in the UK (Innovate UK 2013 & 2014)

Indhold

Addressed topics:
- Health & Comfort
- Spatial requirements
- Cost & Energy consumption
- Refurbishment
- Comissioning
- Quality of installation
- Maintenance
- User satisfaction

Chapter	Case study	Design: Assessment methods	Design: Assessing ventilation concepts	Design: Novel ventilation solutions	Construction, Comissioning & Operation: Quality assurance	Construction, Comissioning & Operation: Assessing in-use performance
3.1	Alternative ducting options for balanced mechanical ventilation systems in multifamily housing			Refurbishment		
3.2	Ambient air filtration in highly energy efficient dwellings with mechanical ventilation		Health & Comfort			
3.3	Development of a compact ventilation system for facade integration			Refurbishment		
3.4	Volatile Oorganic Compounds exposure due to Floor heating systems versus Radiator heating	Health & Comfort				
3.5	Control strategies for mechanical ventilation in Danish low-energy apartment buildings		Health & Comfort / Cost & Energy consumption			
3.6	Response of commercially available Metal Oxide Semiconductor Sensors under air polluting activities typical for residences			Comissioning		
3.7	Impact of multi zone air leakage modelling on ventilation performance and indoor air quality assessment in low-energy houses		Health & Comfort			
3.8	Towards a b	Health & Comfort				
3.9	List of key po	Health & Comfort				
3.10	Definition of a Reference Residential Building Prototype for Evaluating Indoor Air Quality and Energy Efficiency Strategies	Health & Comfort				
3.11	Temperature dependent emissions of Volatile Organic Compounds from building materials	Health & Comfort				
3.12	Detailed modelling of Indoor Air Quality to improve ventilation design in low energy houses		Health & Comfort			
3.13	Mechanical ventilation system in deep energy renovation of a multi-story building with prefabricated modular panels			Spatial requirements		
3.14	Simplifying Mechanical Vventilation with Heat Recovery systems			Cost & Energy consumption / Refurbishment		
3.15	Design of room-based ventilation systems in renovated apartments			Comissioning / Refurbishment		
3.16	Introduction to the Coupled Heat, Air, Moisture and Pollutant Simulation CHAMPS modeling platform	Health & Comfort / Spatial requirements				
4.1	House owners' experience and satisfaction with Danish Low-energy houses - focus on ventilation					User satisfaction
4.2	Development and test of quality management approach for ventilation and indoor air quality in single-family buildings				Quality of installation	
4.3	Applications of the Promevent protocol for ventilation systems inspection in French regulation and certification programs				Comissioning	
4.4	Long-term d				Quality of installation	ng in residential buildings
4.5	Practical use of the Annex 68 Indoor Air Quality Dashboard					Health & Comfort
4.6	Performance evaluation of Mechanical Extract Ventilation (MEV) systems in three 'low-energy' dwellings in the UK					Quality of installation
4.7	Indoor air quality in low energy dwellings: performance evaluation of two apartment blocks in East London, UK					Quality of installation
4.8	Continuous-commissioning of ventilation units in multi-family dwellings using controller data				Maintenance	Maintenance

Ways to design residential ventilation in the future

Towards better performance and user satisfaction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