

Sustainable Refurbishment to Sustainable FM

Challenges and tools

CMB
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Goals and Today's Agenda

GOAL

- Present our results and discuss with you
- What are the challenges and how to solve them?
- What are the competences needed?

PROGRAM

Who are we?

Presentation of the project

Challenges as identified by the practitioners and the academics

Example of sustainable practice?

Group work

Sharing and reflection

Summing up

Bygningskonstruktør uddannelsen i Danmark



VIA University
College

kea
KØBENHAVNS ERHVERVSAKADEMI



Master i bygg- og miljøteknikk

DCPM Master

CHALMERS
UNIVERSITY OF TECHNOLOGY

 **NTNU** Kunnskap for en bedre verden

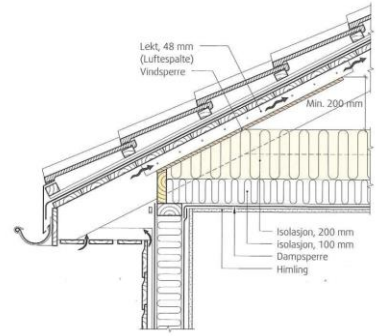
Our project

- Work across boundaries :
 - Nordic Built
 - Countries: DK, NO, SE
 - Schools: Chalmers, KEA, NTNU, VIA
 - Language: Danish, Norsk, Svensk, and English
 - Educations: bygningskonstruktør and master students in FM and CM
- Aim: creating teaching material to support sustainability FM



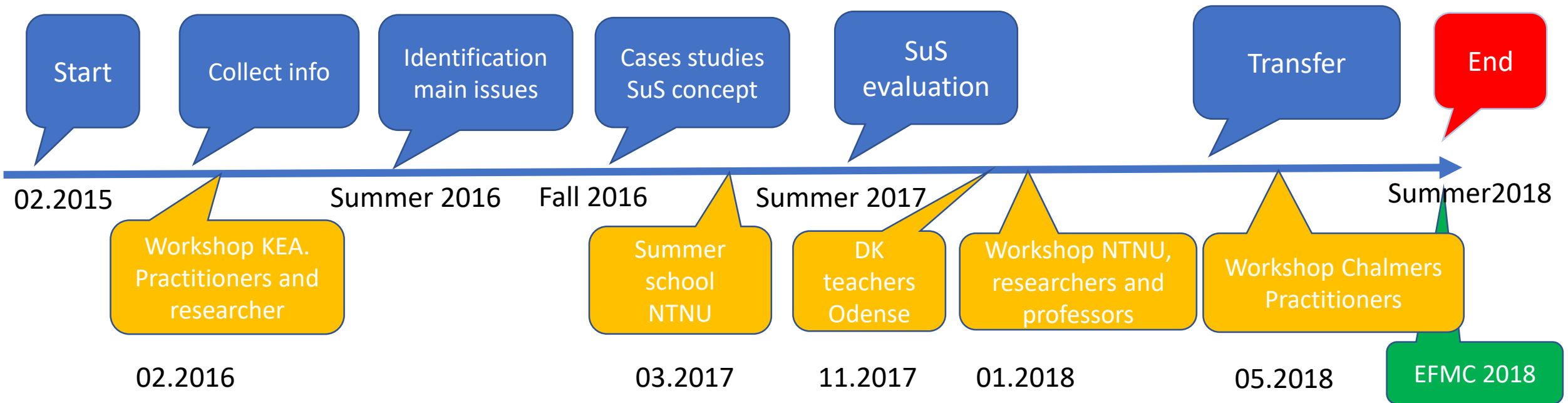
Topic : sustainability in FM

Himling
Innertak
Loft



- Scandinavian countries common understanding of FM and sustainability (flat hierarchy, well organized labour, social values)!
- If clear that FM can contribute to sustainable agenda, not clear how to handle it
- Our educations address sustainability but not sufficient within FM
- The complexity of these issues requires multidisciplinary competences.

Project time line (2015-2018)



Workshop Del 1: København, 4. februar 2016



Barriers (st		Theory	Practice
Business organization	<ul style="list-style-type: none"> • Cost-effectiveness (F) 	yes	no
	<ul style="list-style-type: none"> • Lack of consensual understanding and focus on individual and organisational understanding of sustainability (S) 	yes	yes
	<ul style="list-style-type: none"> • Concise decision-making framework due to complex processes (S,E and F) 	yes	yes
	<ul style="list-style-type: none"> • Conflicting stakeholder requirements and agreement of sustainable goals for retrofit (S, E and F) 	yes	yes
	<ul style="list-style-type: none"> • Lack of distribution of power, empowerment and capacity building (S, F) 	Yes	no
	<ul style="list-style-type: none"> • Lack of information and knowledge about the building – at a strategic level (S/F) 	yes	yes
	<ul style="list-style-type: none"> • Lack of understanding of contextual issues (S) 	yes	yes
	<ul style="list-style-type: none"> • Lack of integration of stakeholder knowledge (S) 	yes	no
	<ul style="list-style-type: none"> • Lack of strategic leadership and responsibility of driving essential change (S) 	yes	yes
	<ul style="list-style-type: none"> • Lack of information and communication between the FM organization and client/user at tactical and operative level 	yes	yes
Users	<ul style="list-style-type: none"> • Awareness of the behaviour of different users of space (S, E and P) 	yes	no
	<ul style="list-style-type: none"> • Lack of understanding of contextual issues (S) 	yes	no
	<ul style="list-style-type: none"> • Lack of commitment to project goals, as well as enhanced process legitimacy through transparency and credibility of the decision-making process (S) 	yes	no
	<ul style="list-style-type: none"> • Lack of competence and knowledge about the building (S and F) 	yes	no
	<ul style="list-style-type: none"> • Perception that a certified building is the same as a sustainable building 	no	yes
Competences	<ul style="list-style-type: none"> • Awareness of the behaviour of the building's users (S, E and P) 	yes	no
	<ul style="list-style-type: none"> • Lack of FM professional competence and information (S and F) 	yes	yes
	<ul style="list-style-type: none"> • Lack of competence and information about the building 	no	yes
	<ul style="list-style-type: none"> • Lack of strategic leadership and responsibility of driving essential change (S) 	Yes	Yes
Technology	<ul style="list-style-type: none"> • Perception that sustainability-certified buildings do not guarantee energy savings (S) 	Yes	no
Policies and instruments	<ul style="list-style-type: none"> • Lack of incentives for private investors (also called the landlord/tenant dilemma (S, F) 	yes	yes
	<ul style="list-style-type: none"> • Lack of funding for private owners (F) 	yes	no
	<ul style="list-style-type: none"> • Reluctant stakeholder commitment due to low energy prices (S and F) 	yes	yes

Temaer

Langtids perspektivet	Visuel kommunikation som adfærdsændre	FM som facilitator	Brugerinvolvering	Digital driftsoptimering
Behov for anvendelse af Cost/ benefit analyser i program- og designfasen	Behov for systemer, der visualisere anvendelsen og forbrug i bygningen	Fokus på commissioning i programfasen	Større involvering af brugerne i program- og designfasen	For meget kompleksitet i teknikken hæmmer brugervenligheden i driftsfasen
LCA analyser i design- og projekteringsfasen	Nye måder at kommunikere med brugerne på, fordi ingen læser manualer	Behov for velholdenhed i forhold til vedligeholdelsesaktiviteter og kompetencer på bygninger i driftsfasen	Manglende træning af slutbrugerne i idriftsættelsen	Manglende anvendelse af moderne teknik f.eks. apps. hæmmer nytænkning i driftsfasen
	Nye måder at måle bæredygtighed på– f.eks. komfort og brugernes sygdomsfrekvens i driftsfasen		Mangel på kreative løsninger, der involvere lejer og udlejer i driftsfasen	Svært at få brugeren til at tage ansvar for bygningen

Hva er fremtid utfordringene innenfor bæredyktig FM? – Workshop 31.1.18, NTNU

Strukturelt niveau	Aktør niveau	Opgaver for FM	Teknologi
Globalisering	At FM er med værdiskabende proces på at ledelsesniveau	At FM skal kunne kommunisere	BIG data
En nordisk begrepsdefinisjon af bæredygtig FM mangler i dag	Behov for mer helhetlig tankegang	Der er behov for kompetanseutviklingsprosjekter (samarbeid mellom nærings- og forskningsaktører, f.eks. Oscar projektet)	De digitale verktøjer og den digitale projektering, kunne hjelpe til med at få fokus på FM i byggeriet
Accept af, at FM er en værdiskabende ressource for branchen	Læring – utfordrende å holde seg oppdatert	At få kommuniseret det økonomiske i projektet	
Der findes viden og kompetencer på området, men denne deles ikke blandt de involverede	Betalingsvillighet	Det sociale fylder mere	
Ofte stort sprik mellom bærekraftsmål på strategisk og operasjonelt niveau		Gevinstrealisering og verdi forståelse- hva gir verdi? Konkretisere verdirealisering	

Hvilke fremtidige kompetencer er der behov for? - Workshop, 31.1.18, NTNU

Strukturelt niveau	Aktør niveau	Opgaver for FM	Teknologi
Erfaring/evaluering med sociale «benefits» Evaluere sociale indikatorer som er foreslått i de nye CEN standardene ved å prøve de ut i praksis	Uddannede skal forstå hvad er bæredygtigt og kunne kommunikere dette	Kommunikere begrebet og mulighederne i FM ud gennem uddannelse og forskning.	Digitale kompetencer
Sosial bærekraft – indikatorer og begrebsbruk, metoder og evaluering	Der er behov for sociale kompetencer	At kunne håndterer balancen mellem økonomi, miljø og sociale perspektiver	Digitalisering og BIG DATA kunne være en del af designet i FM
	Man skal kunne arbejde med IOT	At arbejde flerfaglighed som kan fagene FM på en bred palette	Digitalisering er en vigtig kompetence som skal udvikles
	Udvikle nye forretningsmodeller		
	FM kompetencer skal sætte fokus på andre kompetencer blandt dem der skal udføre dette, bl.a. de sociale overvejelser skal mere i spil.		
	FM rollen som kommunikator og «oversetter»		



Main tools to achieve Sustainable FM

- Certification
- Legislation
- Smart building
- Space management
- Financial incitement (bonus, competition...)
- User participation in the design phase
- Campaigning (SABO)
- Nudging
- Social trend or movement

Green certification in Sweden

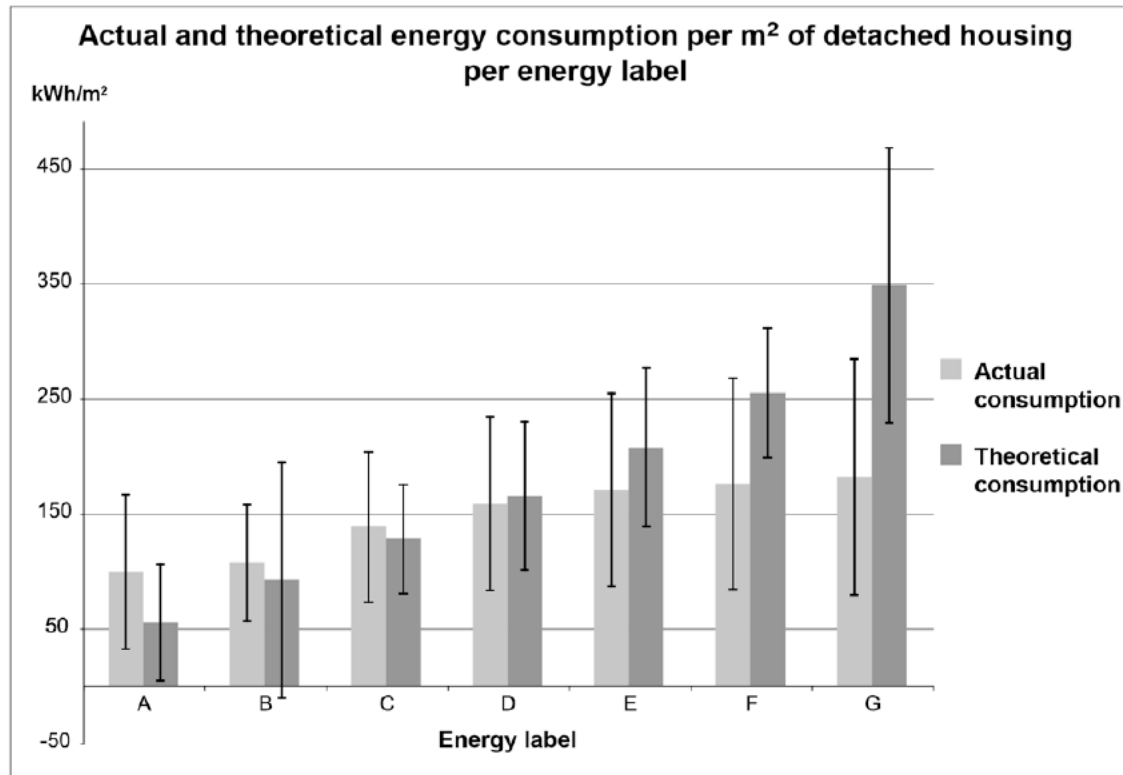
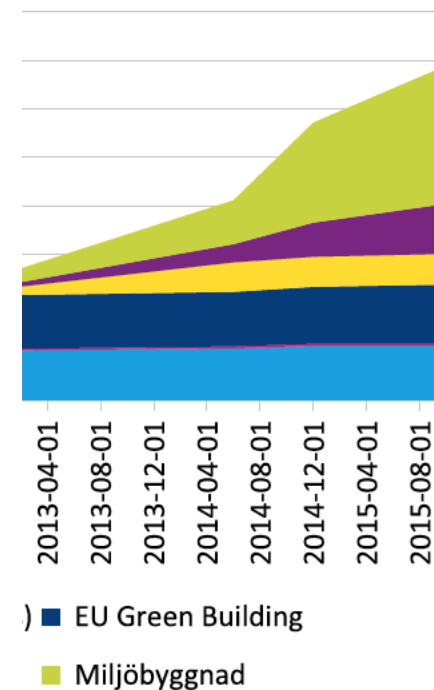


Figure 3. A comparison of average actual consumption and average calculated consumption for each type of energy label with the spread plotted on each column. Adapted from (Gram-Hanssen & Hansen, 2016).

Källa: Sweden Green Building Council, Miljömärkning Sverige AB



However theoretical calculation rarely match with the building in use (Gram-Hanssen, 2017)

4 Case studies

Focus the users' aspects of environmental sustainability

1. Hotel in Norway



3. Social housing DK



2. University, Sweden

4. Eco housing in DK



Case	1 Hotel, Norway	2 University, Sweden	3 Social housing, DK	4 Eco housing, DK
Context	Large ambitious renovation of a hotel built in 1870	Retrofit of a university building, the creation of small open offices and new meeting area	Designing retrofit for social housing targeting inner climate issues	New built of sustainable housing, users participation in operation and maintenance
Goal	How to integrate sustainable solutions including the hotel's guests	How to engage users (students and employees) to behave according to the sustainable goals integrated in the building	To solve inner climate issues and engage the residents to act accordingly to new standards	To motivate the residents' association to take responsibility, operate and maintain the buildings and surrounding
Client	Contractors	Facilities management company	Public housing company	Public housing company
Challenges	To create a luxury hotel which builds on sustainable principles and engage clients to behave accordingly	To create an attractive environment that inspires and supports the interaction between researchers, students and companies.	To engage and motivate residents to take an active role	To motivate the residents to do self-management and operation of housing and common areas
Certification	One of three buildings is passive house	Miljöbyggnad silver		

The University case, Sweden

Tools :

- Miljöbyggnad silver
- Participation in the design phase
- Smart building (light, windows, blind, inner climate)
- Space management
- Nudging (cafeteria, printer, etc...)

INDIKATOR		OMRÅDE		BYGGNAD
1 Energianvändning	SILVER	Energi	SILVER	SILVER
2 Värmeeffektbehov	SILVER			
3 Solvärmelasttal	SILVER			
4 Energislag	GULD			
5 Ljudmiljö	SILVER	Innemiljö	SILVER	
6 Radonhalt	SILVER			
7 Ventilation	GULD			
8 Kvävedioxid	GULD			
9 Fuktsäkerhet	BRONS			
10 Termiskt klimat vinter	BRONS			
11 Termiskt klimat sommar	BRONS			
12 Dagsljus	SILVER			
13 Legionella	SILVER			
14 Dokumentation av byggvaror	SILVER	Material	SILVER	
15 Utfasning av farliga ämnen	SILVER			
16 Sanering av farliga ämnen	BRONS			

Preliminär bedömning av Samhällsbyggnad I, enligt Miljöbyggnad 2.0

Results

- Low attendance in the offices
 - Low or (felt like) temperature in the offices, lot of complaints
 - Automatic blinds
 - Access system
 - Domestification of technology (light, heating system)
-
- 80 % of the people working in this building have sustainability as a research topic!

User as one of the bottlenecks of sustainable FM or child disease?

- If clear that FM can contribute to sustainable agenda, not clear how to handle the users
- Sustainable FM not optimised yet, focus on renovation of building not on operation
- Focus on measurable achievement!
- To achieve sustainability goals user behaviours need to be integrated
- Would be interesting to collect your best practices !

Grupparbeten

- Vilka är dagens utmaningar för en hållbar fastighetsförvaltning?
- Vilka är de tre viktigaste utmaningarna?
- Vilka möjliga lösningar finns?
- Vilka nödvändiga kompetenser krävs för att möta framtida utmaningar?

