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Healthy Buildings Day – Velux #HBD19

Mette Mogensen,
Director of urban and residential development



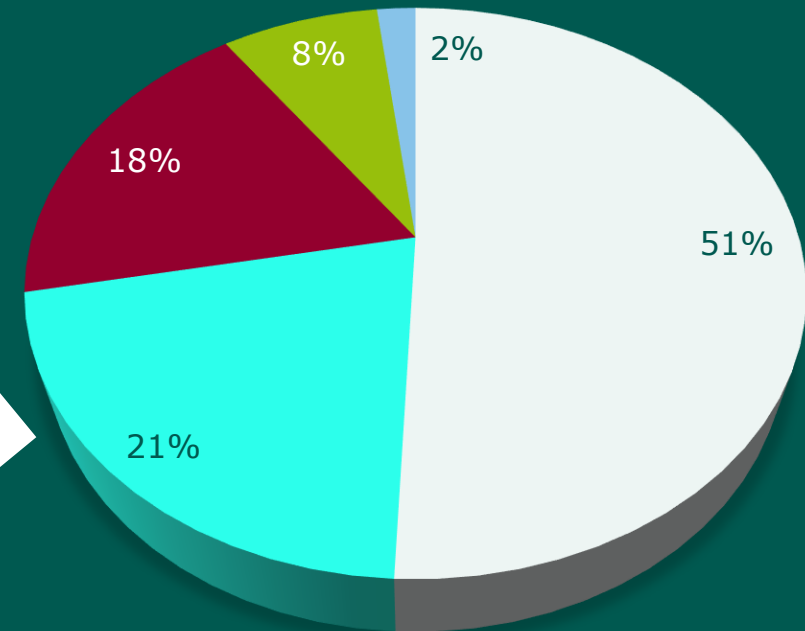
Social housing in Denmark

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~~Social Housing~~ Public housing, Denmark

DK Public housing:

- 1 million tenants
- 513 social housing organisations
- 560.000 dwellings



- Private ejerboliger
- Almene boliger
- Privat udlejning
- Privat andelsbolig



100 housing organizations
58.000 homes in 76 communes
Approx. 70.000 tenants



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3 main pillars of Public housing

- ✓ Non-profit
- ✓ Tenant democracy
- ✓ Stable financial model



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Our Vision

...is to create the most attractive homes.

We achieve our goals by assuring:

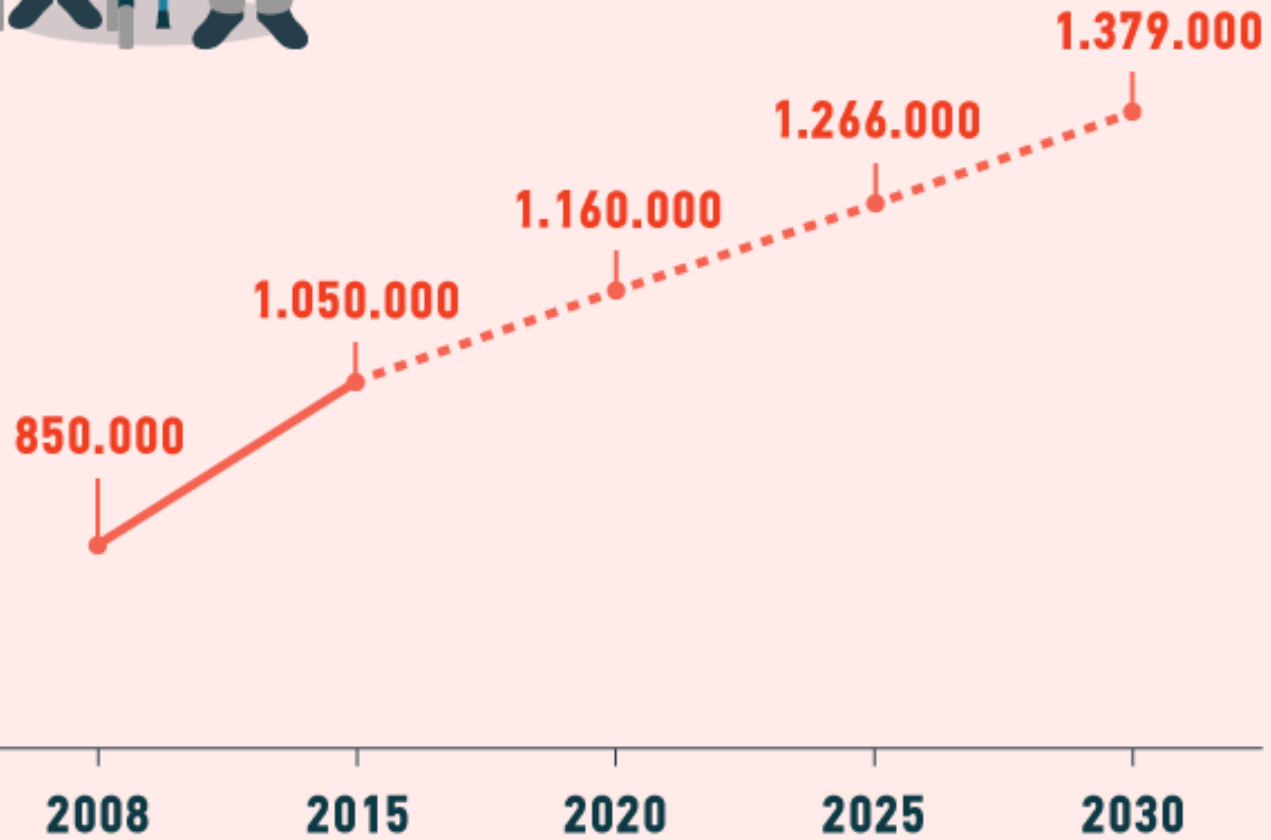
- Good homes, outdoor areas and neighborhood
- Pride, ambition and identity in the architecture
- Sustainable buildings
- Comply with time schedules and budget



Number of Danes older than 65 years



Aging population



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Loneliness

104.000 older people
feels involuntarily lonely
**And the number is
increasing...**



Communities for
both families as
well as for
seniors

Healthy public housing

Short overview of Scandinavian policy objectives



The whole population should be offered healthy, well designed and well equipped dwellings of good quality at affordable costs.



Good and healthy dwellings for all. This should be obtained by a varied supply of housing that give all groups in the population the possibility to find a suitable dwelling in accordance with their needs and financial ability.



Everyone should be in possession of a good and reasonable dwelling in a good housing environment.

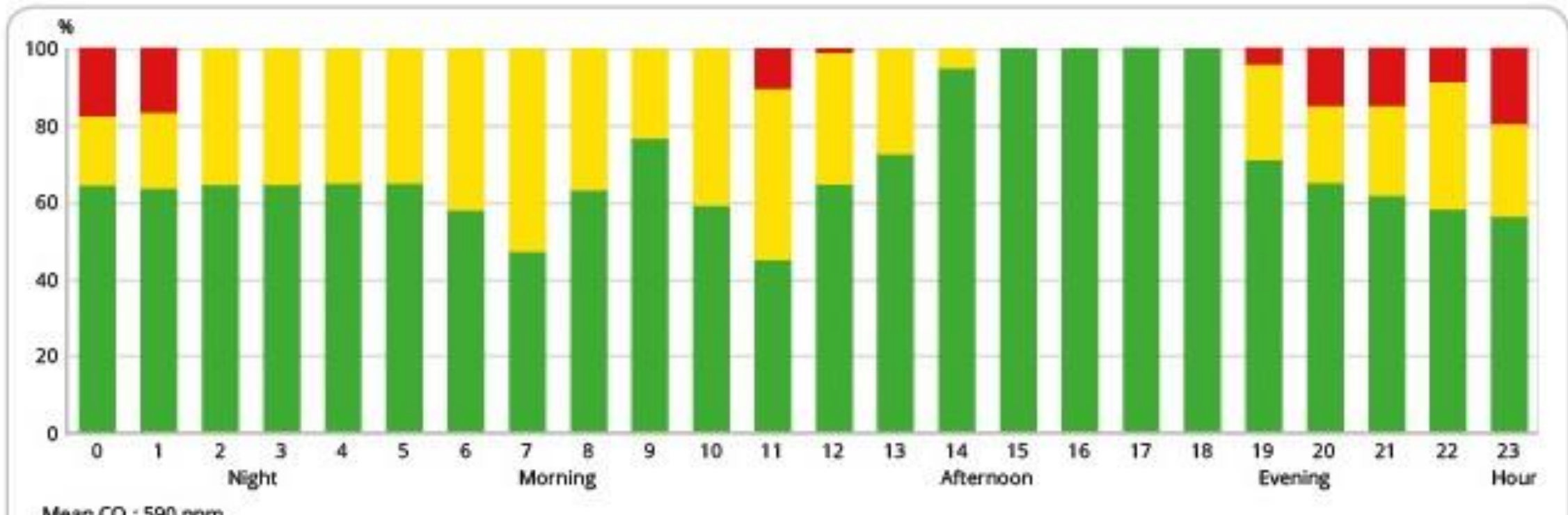


All groups in society should have access to an affordable dwelling, which fulfil certain criteria concerning size and standard, and is located in a good and functional environment.

Indoor Climate Incentive Programme

Indeklimaet på et gennemsnitsdøgn

CO₂ fordeling på timer og klimaklasser



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Hope to gain:

- Healthier indoor climate \implies Healthier tenants \implies increase in quality of life
- Healthier buildings \implies prolonging the life of buildings \implies better CO2 print
 \implies better economy
 \implies cheaper rent



GOAL 3: Good Health and Well-being




Goal 11: Make cities inclusive, safe, resilient and sustainable



Goal 12: Ensure sustainable consumption and production patterns



What is the problem with the ordinary way of measuring?

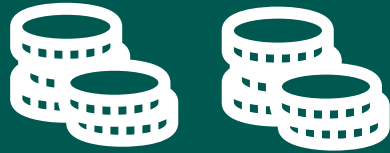
- Very large difference in price interval (kr./m²) and an option to gain up to 70% heat from neighbours heating system*
- unfair cost distribution
- Increasing problems with indoor climate  shortening the life of the buildings

 Change of behaviour requested

* Op til 70%. Reference: Anker Nielsen, Professor, Jørgen Rose, Ph.D.1 Danish Building Research Institute, Aalborg University,

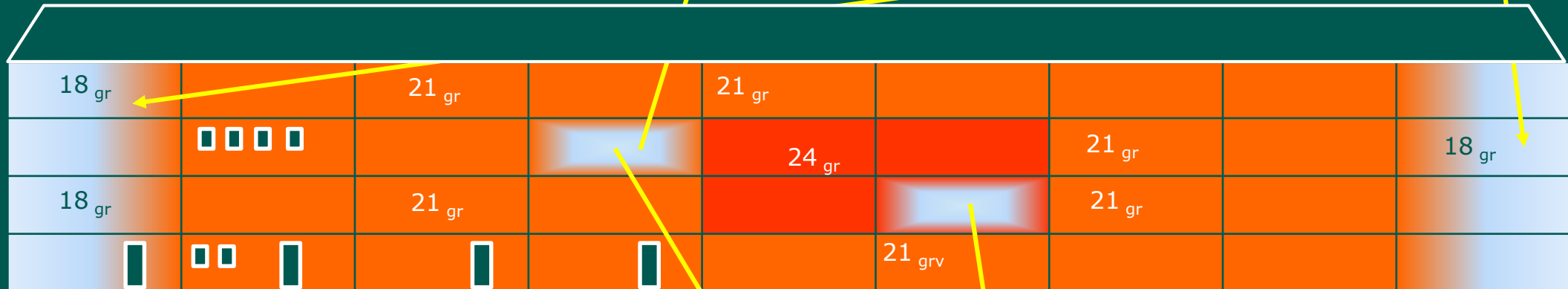
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Basic problems



Difference up to 1 – 17 kr. per sqm

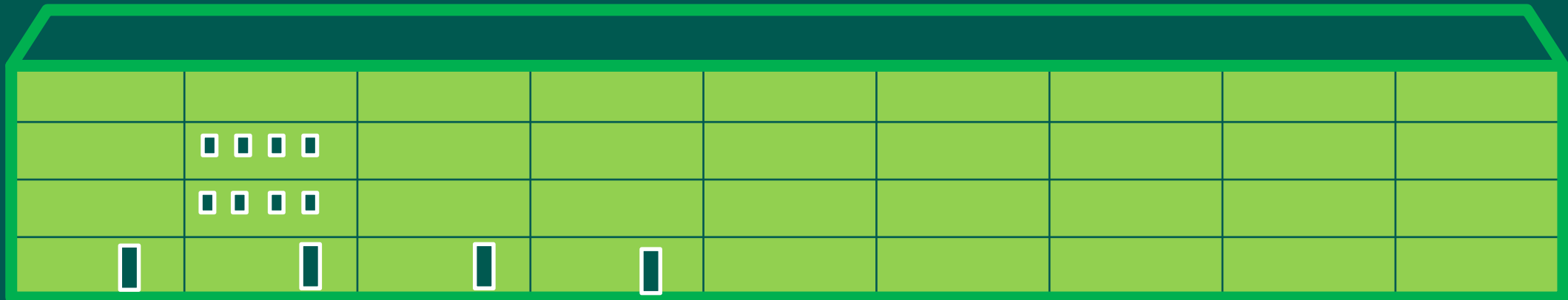
Ineffective heating – tenants experiencing much lower degrees than wanted



Tenant shutting down heat, gaining from neighbours - up to 70%

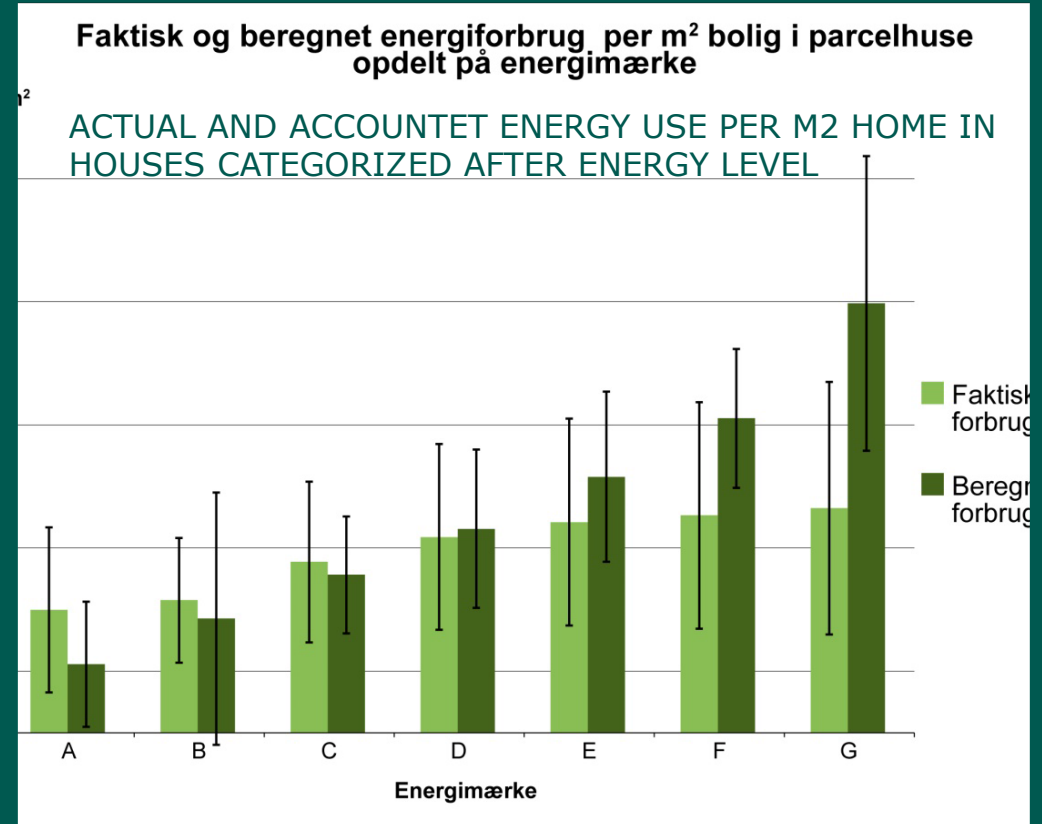
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Energy renovation – ideal scenario



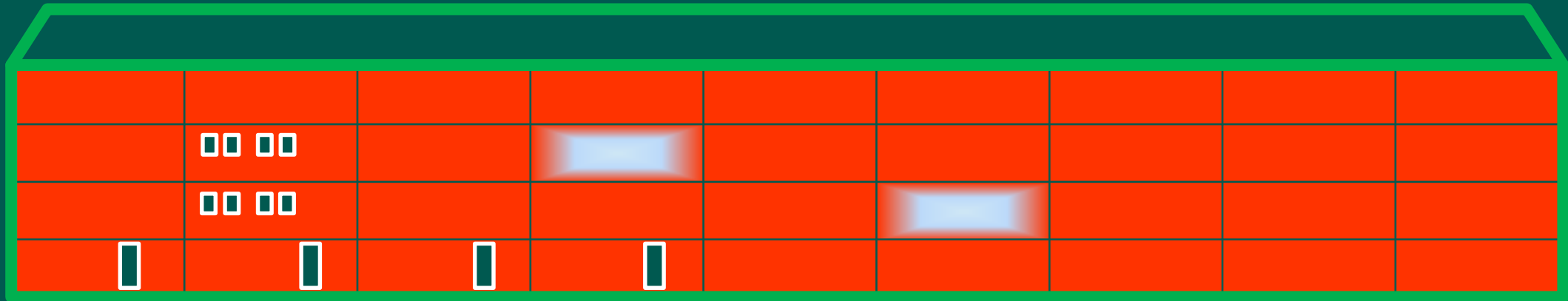
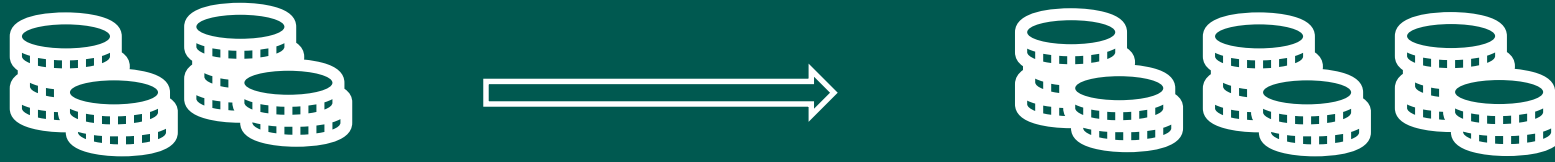
“Rebound-effect”

- From SBI report 2016:09
- (Figur based on data from approx. 135.000 houses)



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Risk that the energy renovation will lead to a consumption increase



Understanding the client

Renters:

Decisions are made in a democratic process: Not all agree with the decisions

Expenses to maintenance are meant to give value not only to the existing but also to future tenants

Person driven maintenance activity both concentrate on avoiding penalties and to preserve

Decisions regarding rent increase tends to concentrate on a short term gain rather than a long-term strategy

Experience rules and regulations others have decided and that do not make sense

Owners:

Decisions area made by the owner himself: 100% agreement with the decisions

Maintenance gives 100% value to the owner either now or when selling

Person driven maintenance activity aims to preserve and modernize the home

Decisions involving expenses holds both short term and long-term strategies

Own house rules – makes sense

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Choose the right solutions – not just good ones

- Choose easy-understandable solutions and products
- Make sure the idea of the product/solution is understandable – and understood
- Make products that intuitively makes sense...not just for the caretaker



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Make sure the idea of the product/solution is understandable
– and understood, when... installing closed balconies

Klaus Petersen (15.11.2003, 11:10)

Hej NG.

Jeg leder p.t. efter en god måde, jeg kan varme min lukkede altan op på.
I'm looking for a good way to heat up my closed balcony...
Altanen er ca. 18 m².

Varmekilden skal dog være flytbar.

Jeg overvejer selv en gas ovn, men da jeg ikke har så meget forstand på det, spørger jeg jer.

Hvad er den mest effektive måde at varme den op på?
Hvad er den billigste?
What is the most effective and cheapest way?
Harald Nyborg har f.eks. denne gasovn [..].

mvh.
Klaus.



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Make products that intuitively makes sense...
not just for the caretaker

- Make it easy to do the right thing



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The indoor climate project = a Development Project

500 – 1.000 homes

Testing period:

2017 – 2022

1.Phase started feb. 2017

Billing phase starts 1.1.2019

Final results from development project
not ready until 2021

All 4 testing areas have been or are at the moment being renovated.

As the tenants moves back the plan is to start the new dynamic heating account system

2. Phase starts 1.1.2019

Change of legislation and subsidize policy

General knowledge

- Rarely profitable only to make energy renovation
- Possible to bring public housing to a good level, but difficult to take it even further
- Energy renovations meets the goals on certain conditions
- Lack of tools to follow up
- Be aware of the "Rebound Effect"
- Planning before implementing
- Visualize
- Communicate
- A strong focus helps

Udvalgte læringspointer

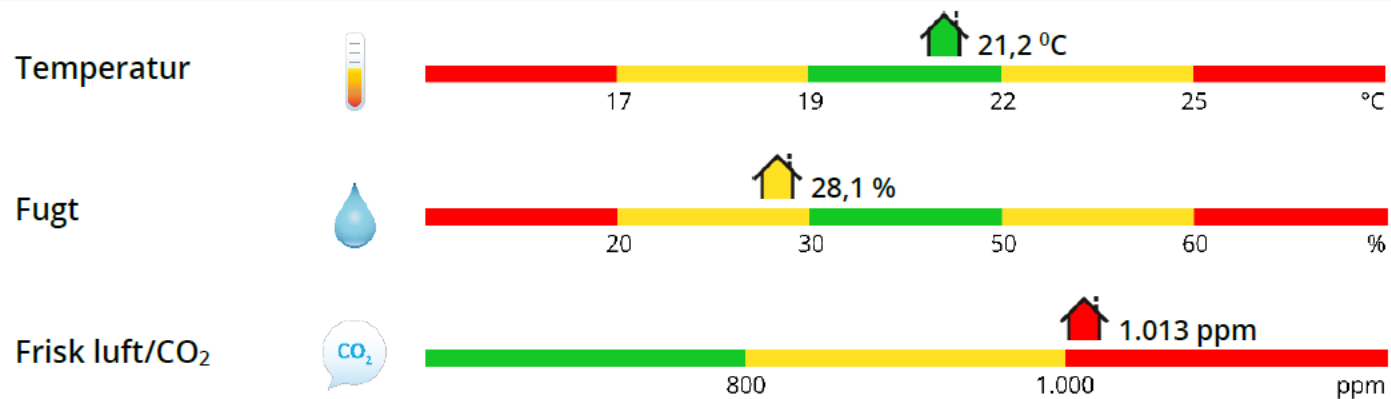
På tværs af de indeholdte forsøgs- og udviklingsprojekter kan en række læringspointer uddrages:

- Det er sjældent økonomisk rentabelt kun at foretage energirenovering af klimaskærmen i ældre ejendomme. Men når der alligevel gennemføres gennemgribende renoveringer, vil der næsten altid være god økonomi i at energirenovere.
- Det er i dag teknisk ladsiggørligt at bringe eksisterende alment byggeri op på niveau, der imødekommer skrappe energikrav, men samtidig må det konstateres, at energirenoveringer, der går længere end til gældende bygningsreglement, ikke er rentable.
- Energirenovering lever som regel op til beregningerne, men kun hvis man modregner komfortforbedringer samt fejl ved indregulering af anlæg, projekteringsfejl mv.
- Mange renoveringsprojekter har udfordringer med at følge op på, hvorvidt den tekniske løsning lever op til det aftalte og mangler 'værktøjer' til viceværter og brugerne.
- Der er en tendens til, at energibesparelser bliver konverteret til komfortforbedringer af beboerne.
- ESCO kan anvendes indenfor den almene sektor, hvor forhold som garanti for besparelsen og tilførelse af ekspertise og kapacitet kan fremskynde en tiltrængt energirenovering. ESCO-modellen indeholder dog ingen elementer ud over garanti-elementer, som almene boligorganisationer ikke selv kan løse.
- Planlægning gennem energihandlingsplaner kan være en god måde at skabe overblik, identificere, forberede og realisere energibesparelser.
- Visualisering af beboernes energiforbrug kan påvirke brugsadfærden i en hensigtsmæssig retning, men langtidseffekten er usikker.
- Der er behov for at se på nye måder at måle og kommunikere energiforbruget til beboerne med henblik på at sikre et sundt indeklima og indhøste energibesparelser.
- Et stærkere fokus på et godt indeklima kan styrke energispareindsatsen og komme beboere og bygning til gavn.

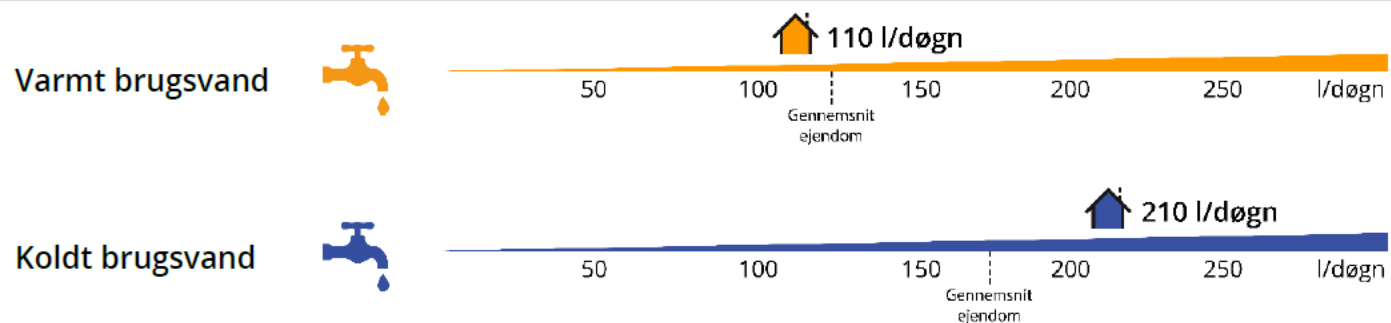
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The project: Dynamic heating accounts

Indeklima:

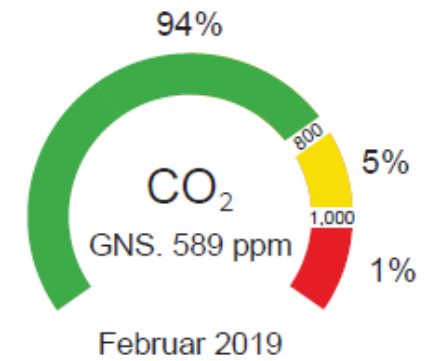
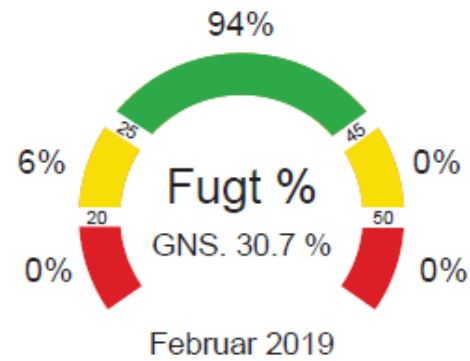
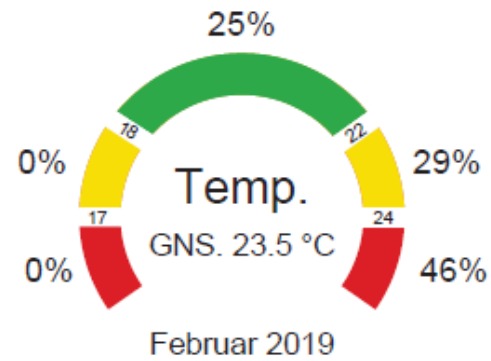


Vandforbrug:



The monthly report

Indoor climate of the month – february 2019



Procenterne angiver månedens fordeling på grøn, gul og rød. 4% svarer til ca. én time pr. døgn.

The screenshot displays the IC-Meter web application interface. At the top, there is a browser window with the URL <https://app.ic-meter.com/icm-mobile2/>. Below the browser window, the application has a navigation bar with tabs for "Indoor Climate", "Weather", and "Report". Under "Indoor Climate", there are sub-tabs for "Status", "Day", "Week", "Month NEW", and "Year".

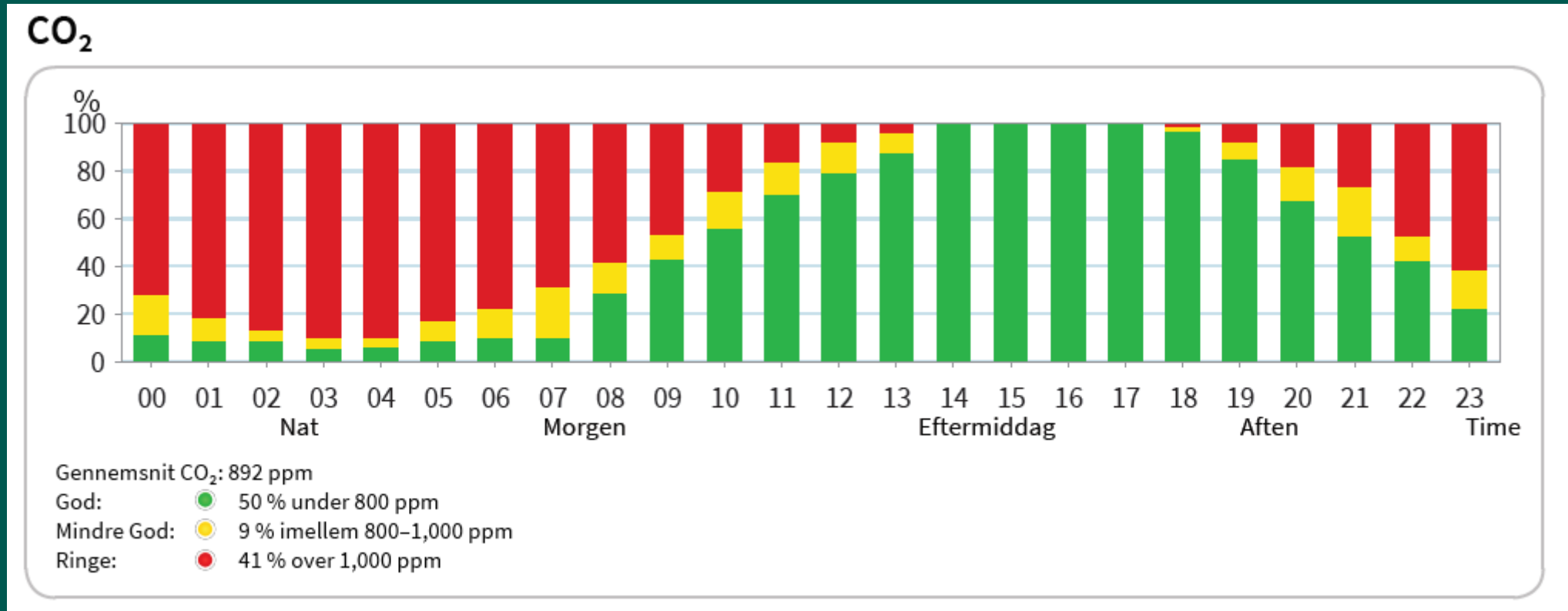
The main content area shows the following information:

- Building:** Domea Landscenter (selected from a dropdown)
- Unit:** ANR måler (selected from a dropdown)
- Time:** 15:14 Sep 28, 2019, Timezone: Europe/Copenhagen

Parameter	Value	Status	Action
Temperature	23.0 °C	Green	▶
Humidity	55.6 %	Yellow	▶
CO ₂	515 ppm	Green	▶
Noise Avg./Peak	36.0 / 43.0 dB(A)	Green	▶
Activity Index - Saturday 14:00 - 15:00	Low	Yellow	▶

At the bottom right, there is a link: [Indoor Climate Classes >>>](#)

A look at a report



Price estimation

Februar 2019

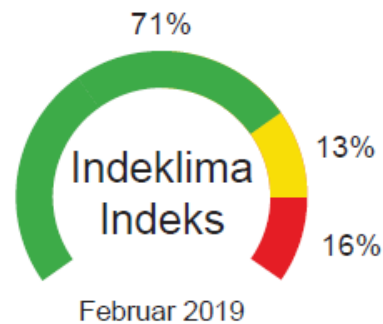
Bygning: Frilandsvej 31 - 35

Areal: 76.0 m²

Enhed: Adresse

Lejlighedsnr.:

Samlet indeklima indeks - februar 2019



Fast betaling for indeklima komfort 3.50 kr./m²:

266.00 kr.

Ekstra betaling Gul: 13% 2.00 kr./m² Rød: 16% 4.00 kr./m² I alt:

68.40 kr.

Samlet betaling for indeklima komfort for februar 2019:

334.40 kr.

Bedst



Ringest *

Indeklima Indeks beregnes som gennemsnit af den relative fordeling for Temp., Fugt og CO₂.

* Placering i forhold til resten af ejendommen

Pricing?

Indeklima	Tarif 1: Den 'forsigtige'	Tarif 2: 'Middel'	Tarif 3: Den 'skrappe'
<i>Grøn - fast betaling</i>	3,5 kr./mån og m ²	3,0 kr./mån og m ²	2,5 kr./mån og m ²
<i>Ekstra for % gul</i>	2,0 kr./mån og m ²	4,0 kr./mån og m ²	6,0 kr./mån og m ²
<i>Ekstra for % rød</i>	4,0 kr./mån og m ²	6,0 kr./mån og m ²	8,0 kr./mån og m ²

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Status and results

Project Copenhagen, status:

- The first testing period has run for 1½ years
- The development-project shows a change in behavior, as in letting in more fresh air
- The testing period has just begun linking behaviour to the bill
- This started 1.6.2019
- Signs of more fair distribution of expenses



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Learning points so far

- Big attention on which colour zone you are in – size of bill comes in second
- Development project reveals over dimensioned ventilation system – call for the engineers!
- Until now: A lot of questions from the tenants
- A spread from 1 kr. per sqm to 17 kr. to a spread from 3,5 kr to 5,5 kr per sqm
- Communication cannot be over estimated

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3 points from the current evaluation:

Changing from consume reduction to healthy indoor climate thinking is a cultural paradigm shift

The building can work against you

Who looks after my indoor climate, when I'm not at home?

TRINE PLAMBECH

Manager, Intelligent Sustainability
Principal Green Urban Designer
MSc in Interaction Design & MSc in
Landscape Architecture

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Hope to gain:

- Healthier indoor climate \implies Healthier tenants \implies increased lift quality
- To reduce energy consumption and at the same time optimize indoor climate
- Enable adequate behavior to enhance balance between energy consumption and letting in fresh air

- Healthier buildings \implies prolonging the life of buildings \implies better CO2 print
- Establish effective and cost reduced administration \implies better economy
- \implies cheaper rent

Attention on:

Communication - dialogue – information: lots and lots
Onboarding the tenants the right way
change in subsidize changes focus and result



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Thank You for listening