EFFICIENT ENERGY MANAGEMENT OF BUILDINGS

CITIES - SECOND GENERAL CONSORTIUM MEETING

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THE COMPANY TODAY

- Denmark's largest utility company within our core areas
  - Drinking water
  - Waste water
  - District heating
  - District cooling
  - Town gas
- +1.000 employees
- More than a million customers in Greater Copenhagen
- More than 700 mill. euro in gross turnover
- 200-250 mill. euro invested annually in pipelines, cables and wind turbines
- Total fixed assets: 2,3 billion euro

SUSTAINABLE UTILITY

- Green district heating is a cornerstone in achieving City of Copenhagen CO_2 neutral capital by 2025.
- 30 percent CO_2 neutral biogas in town gas
- Open water bathing in harbor due to underground waste water basins
- Clean and untreated drinking water from pure groundwater
- District cooling saves up to 40% cost and reduce CO_2 emissions by up to 70% compared with traditional cooling
- Growing windturbine business: 62 MW in 2015 and 360 MW in 2025

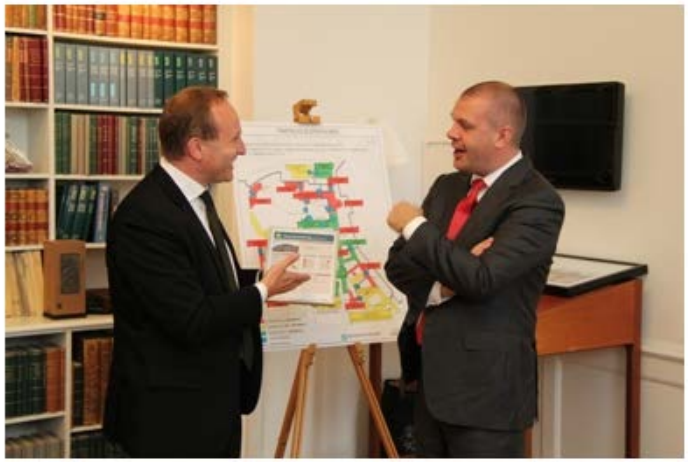
INTELLIGENT ENERGY MANAGEMENT BEFORE INTELLIGENT INVESTMENTS

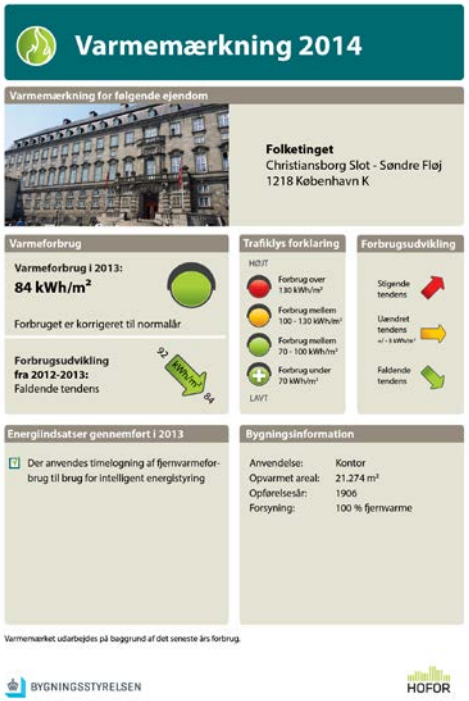
- **NIRAS rapport based on study of 13 buildings covering 100.000 m2:**
  Energy renovation leads to change in heating consumption from 39 % less to 18 % higher
- **Energy renovation is not a guarantee for lower heating consumption!**

- **Apartment building awarded with Danish energy renovation price 2013.**
- **Calculated reduced heating consumption of 75 %!**
- **Measured reduced heating consumption of 29 %!!**

MANAGEMENT ATTENTION FIRST - THEN TOOLS AND OPERATIONAL KNOW-HOW

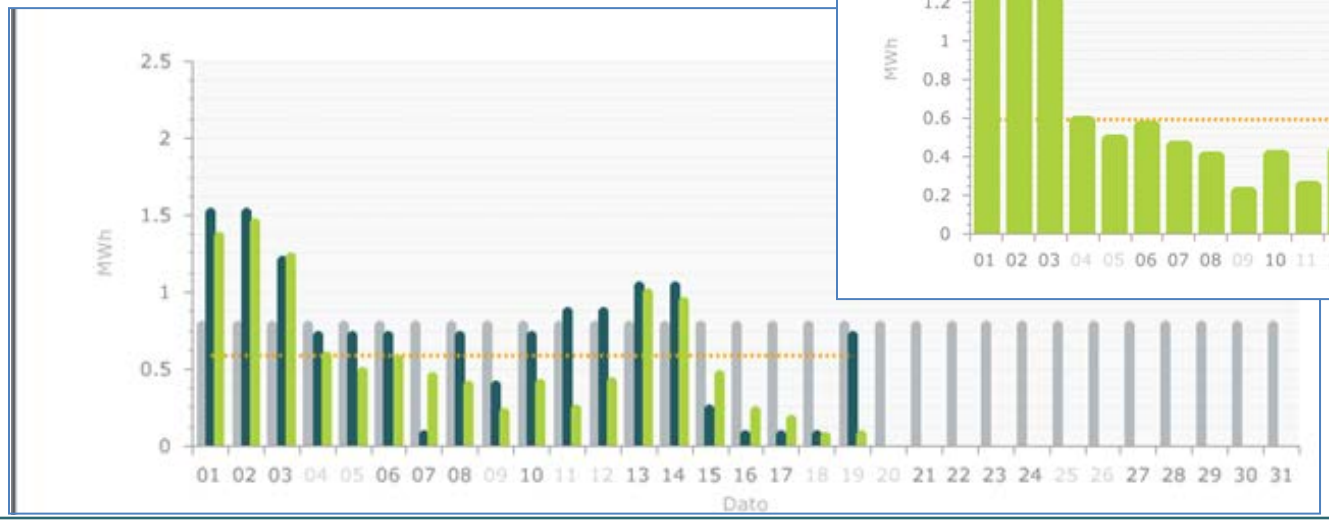
- **Simple heat label with focus on consumption, benchmark and effect of initiatives.**
- **Based on very detailed knowledge of the use of the building and smart meters.**

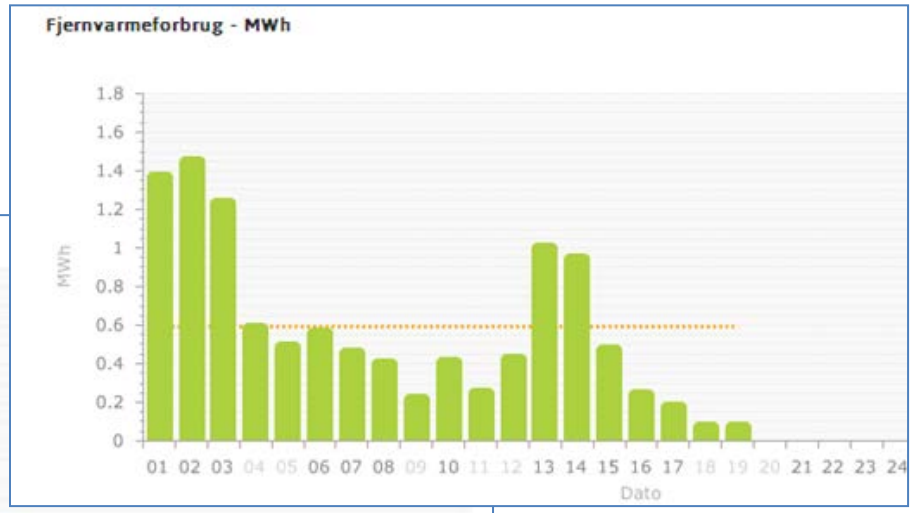




SIMPLE AND CORRECT FOLLOW-UP & KNOW-HOW

- **Data from smart meters, consumption budgets and degree days based reporting ensures the right knowledge and focus.**
- **Training of operational staff is essential!**



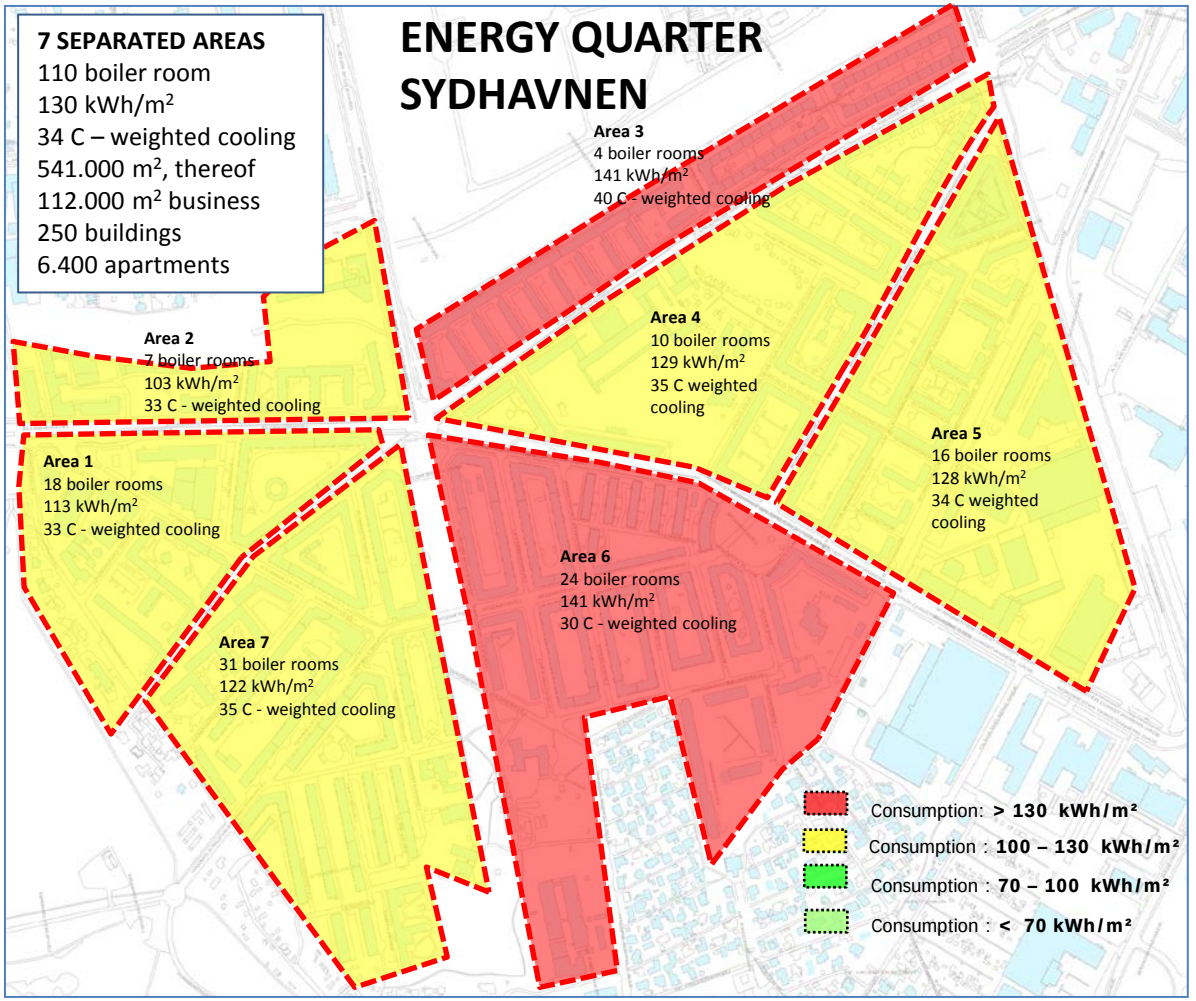


DOES IT MATTER?
EXAMPLE – DANISH PARLIAMENT

- Close Cooperation with Bygningsstyrelsen and the operational staff
- 15 % reduced heat consumption after 3 years with Intelligent Energy Management
- Heat consumption per m2 ‘has no age’…

NEXT STEPS…..ENERGY QUARTER ‘SYDHAVNEN’

- **250 buildings combined business and apartments divided in 7 separate areas**
- **Using our experience with simple traffic light indicators, simple tools, training of the operational staff and consistent follow up**
- **If this is a success we will roll it out in larger scale**



HEAT CONSUMPTION IN BUILDING SEGMENTS

Let's ensure better correlation between calculations and measurements!

SBi 2013:08

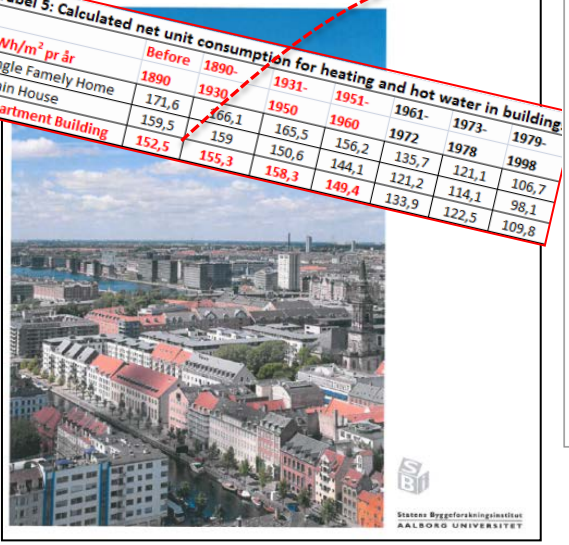
Varmebesparelse ved løbende bygningsrenovering frem til 2050

Netværk for energirenovering

"Heat savings by continuously building renovation 2050"

Tabel 5: Calculated net unit consumption for heating and hot water in building

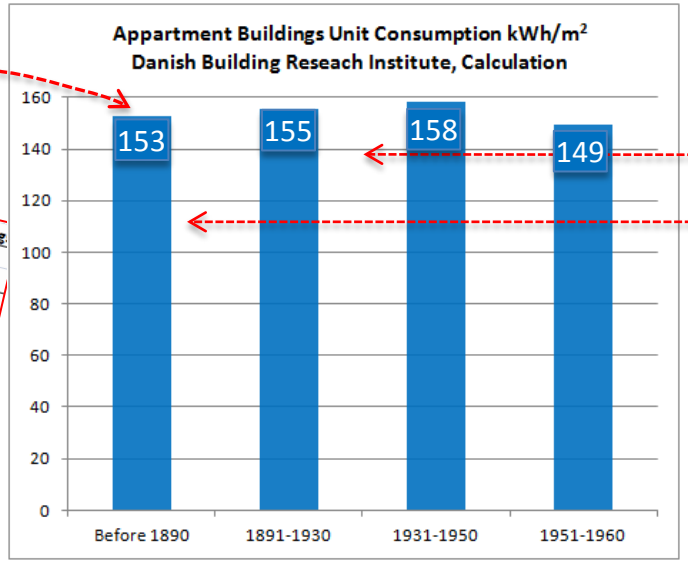
kWh/m² pr år	Before 1890	1890-1930	1931-1950	1951-1960	1961-1972	1973-1978	1979-1998
Single Famely Home	171,6	166,1	165,5	156,2	135,7	121,1	106,7
Chain House	159,5	159	150,6	144,1	121,2	114,1	98,1
Appartment Building	152,5	155,3	158,3	149,4	133,9	122,5	109,8

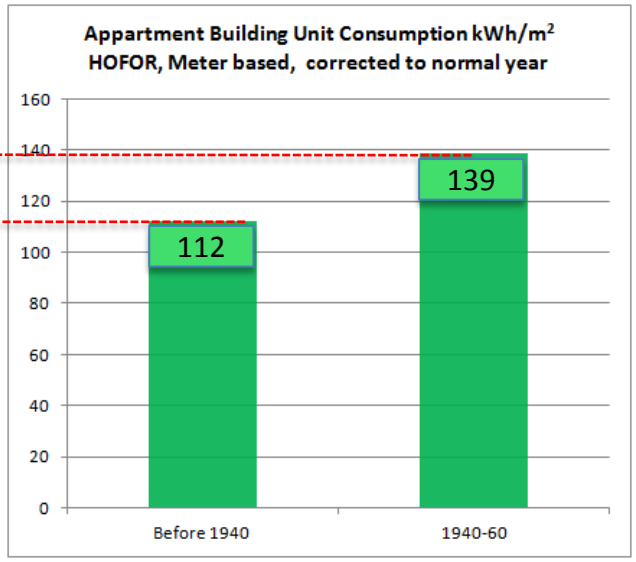


Statens Byggeforskningsinstitut AALBORG UNIVERSITET

Segment: Appartment Buildings

Calculations! ⟷ **Measurements!** (in Copenhagen)





14,6 mio. m²
App.7.600 stk inst.

2,3 mio. m²
App. 550 stk inst.

'OFFICIAL' DATA INDICATES 10-30% HIGHER CONSUMTION THAT REALITY (IN COPENHAGEN)

ENERGY EFFICIENCY – WHAT DO WE NEED

Motivate decision-makers and educate technical staff to crate a demand for energy efficiency systems as a tool for generating savings without loss of comfort

Accept that valid data is essential for valid decisions

It's all about people - focus on small achievements to generate a large success, and make it simple

Create national uniform rules for degree days, standards and norms to ensure consistency, comparable calculations and prevent misinformation

Generate new services based on valid remote metering data and energy efficiency systems – there is great potential !

- HOFOR -
WE CREATE SUSTAINABLE TOWNS AND CITIES