



AARHUS  
UNIVERSITY  
DEPARTMENT OF ENGINEERING

# FLEXIBLE BUILDINGS PROJECT AT AARHUS UNIVERSITY

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U N E R S I T E T

# VVP4SGR - Grundfos Dormatory Lab ForskEi (2013-2016) Michael Dahl Knudsen

Weather forecast

Virtual building model



Energy price

Control strategy

- Heating
- Ventilation
- Solar shading

Actual building

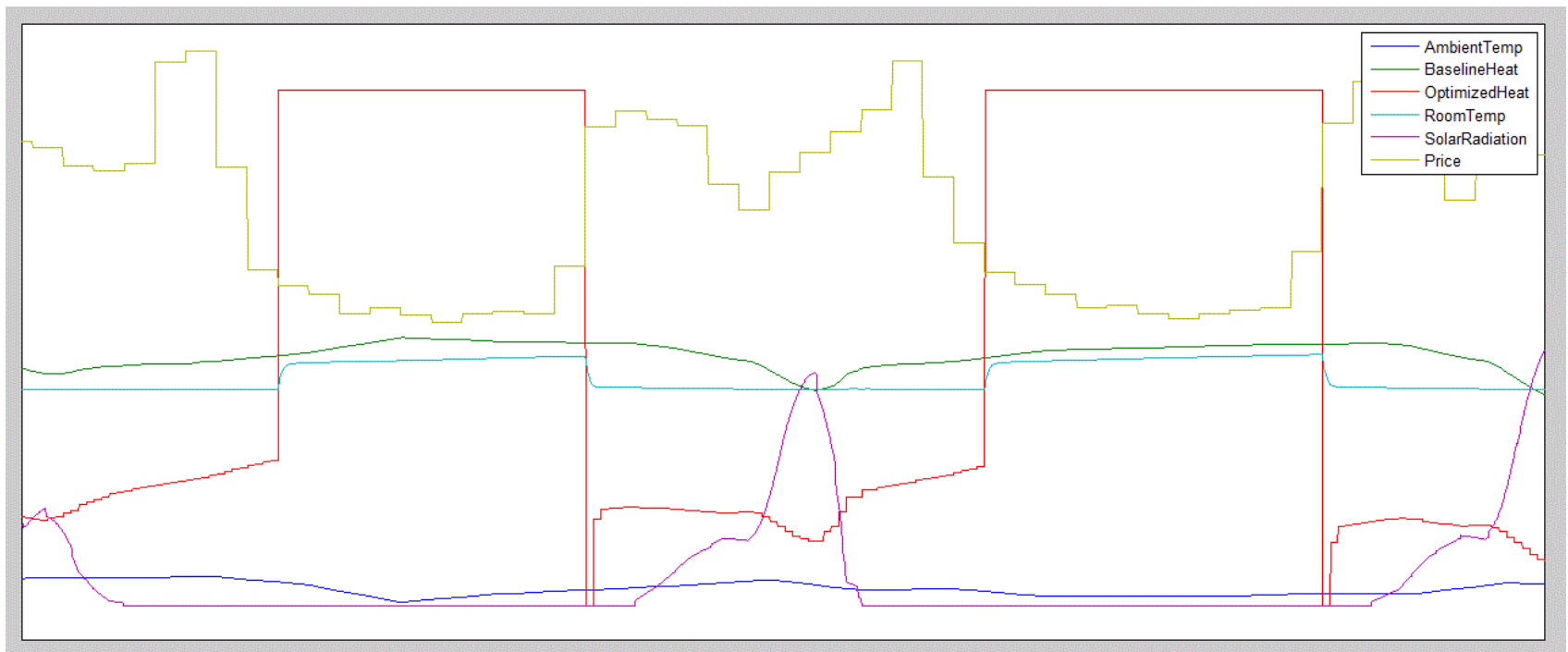


Actual data

- Room temperature
- Air quality (CO<sub>2</sub>)
- Relative humidity
- Heat, electricity and water use

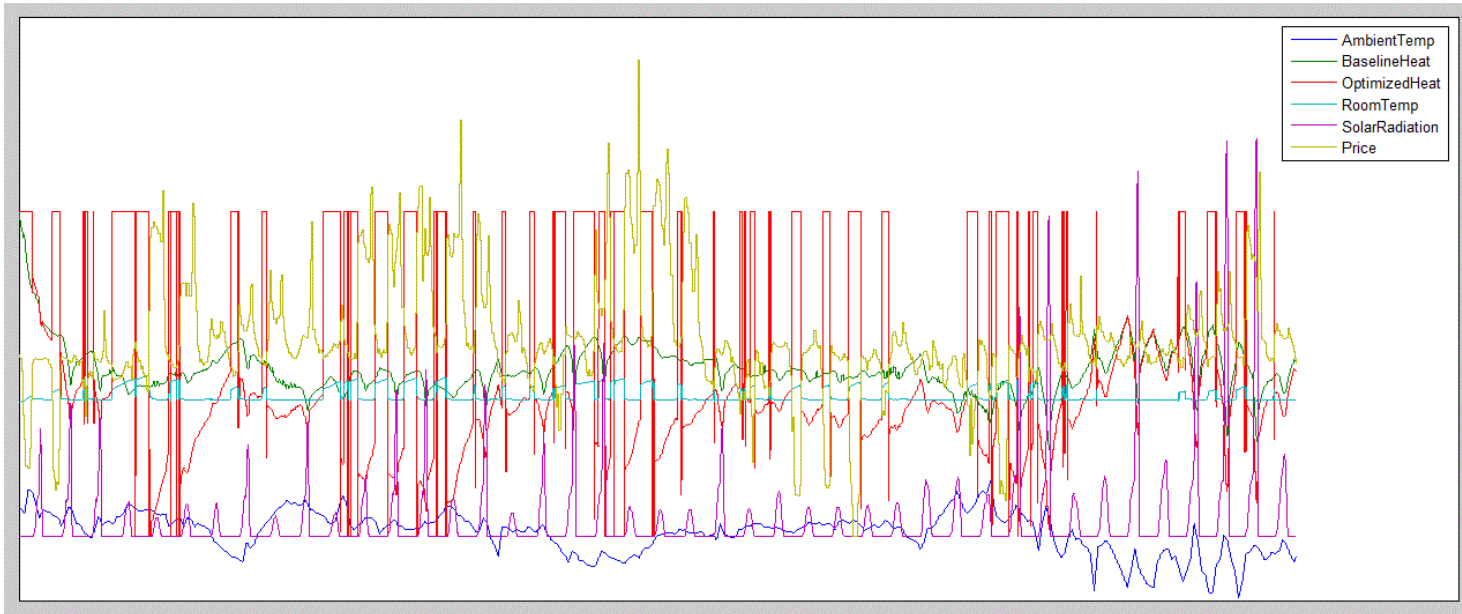
# THE MECHANISM

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- › **Smart building operation**
  - › **NO MORE NIGHT SETBACK – NIGHT BOOST!**
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# THE POTENTIAL



- › **Smart building operation**
- › **Difference in energy use: +5%**
- › **Difference in energy bill: -5%**

# The READY project

## Resource Efficient cities implementing ADvanced smart citY solutions

- 23 partners in four countries including municipalities, universities, energy sector and industries. Budget of 33.5 mio €.



## Objectives

- Demonstration of a balanced and holistic approach towards energy-retrofitting in housing areas of Växjö (approx. 48,401m<sup>2</sup>) and Aarhus (55,492 m<sup>2</sup>).
- Development and demonstration of smart solutions for low-temperature district heating, local storage, new components and management ICT systems.
- Development and demonstration of flexible combined grid balancing/electricity storage solutions for buildings and energy systems.
- Development of smart solutions for kitchens to optimize use of electricity, water and minimize waste from kitchens.
- Solutions for water efficiency and waste water energy recovery.

# READY.DK

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## ForskEL (2015-2018) Theis Pedersen

- › Very experimental – **multi-family houses** buildings from the READY project as case.
- › Smart grid potential before and after refurbishment.
- › Help identify the balance in investments in energy savings and smart energy supply.

# READY (BONUS)

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READY (2014-2019) Rasmus Elbæk

- › Very experimental – **single-family houses** buildings from the READY project as case.
- › Smart grid potential before and after refurbishment.
- › Help identify the balance in investments in energy savings and smart energy supply.



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# THANK YOU

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