Energy and Building Technologies

A look into the future

http://www.compute.dtu.dk/-/media/Institutter/Compute/nyheder/2015/Big_Data_fra_jord_til_bord_-_Sektorudviklingsrapport_-_DTU.ashx

Alfred Heller, DTU
alfh@byg.dtu.dk
Chief Consultant at Niras
ahr@niras.dk

Panagiota Giannou, DTU Byg
Kyriaki Foteinaki, DTU Byg

DTU Civil Engineering
Department of Civil Engineering
Innovation for the world

Cloud

Markets
Future buildings as components of districts/cities

From a demand to a active component

Kilde: https://ixquick-proxy.com
Now it’s the time to bring it together

Automation in Buildings

Sensors & IoT

Data Cloud Computing

Big Data Analytics

Kilde: https://www.google.dk
Big Data Analytics In the Cloud
Distributed – Trend og platform

• Vi kan opsamle data
  – automatisk
  – Manuelt

• Vi kan renses data m.m.

• Vi kan beregne på data m.m.

The Science Cloud for CITIES
Wireless Sensor Networks in Buildings

- Sensors as enabler
  - > game changer in the building industry
  - > supporting during the whole lifecycle
    - Identification
    - Information (cradle-to-cradle)

- Wireless Sensor Networks (wsn)
  - Reconfigure automatically, by fault, by new entries etc. (robust)
  - Communication over hubs


https://www.researchgate.net
Application Examples from R&D
Example: Energy Demand Communication

Demonstration: Picodat
- Demand
- Potentials for renewables
- Potentials for renovation
- Consulting services

Example: Methodology Development

Research: Henning Larsen Architectures

Kilde: Intelligent (early) Building Design Approach by Peter Andreas Sattrup, Danish Association of Architectural Firms

Estimation of thermal autonomy of different building types

No preheating strategy

![Graph showing operative temperature and water-based heating power for different houses with no preheating strategy.](image)

4h preheating

![Graph showing operative temperature and water-based heating power for different houses with 4h preheating strategy.](image)

(Gianniou, Dominkovic, 2017)
From variation to classes
DTU and MIT cooperation – Panagiota Gianniou

- Identify building classes
- Create templates in Umi representing archetypes
- Utilize additional geo-spatial data (ArcGis, GML)

Source: Kortforsyningen
The devil lies in the complexity

How to make a **robust** solution of so many technologies?