



Simulation vs Measurements

A comparison of calculated and
empirical energy data for the
Norwegian building Stock

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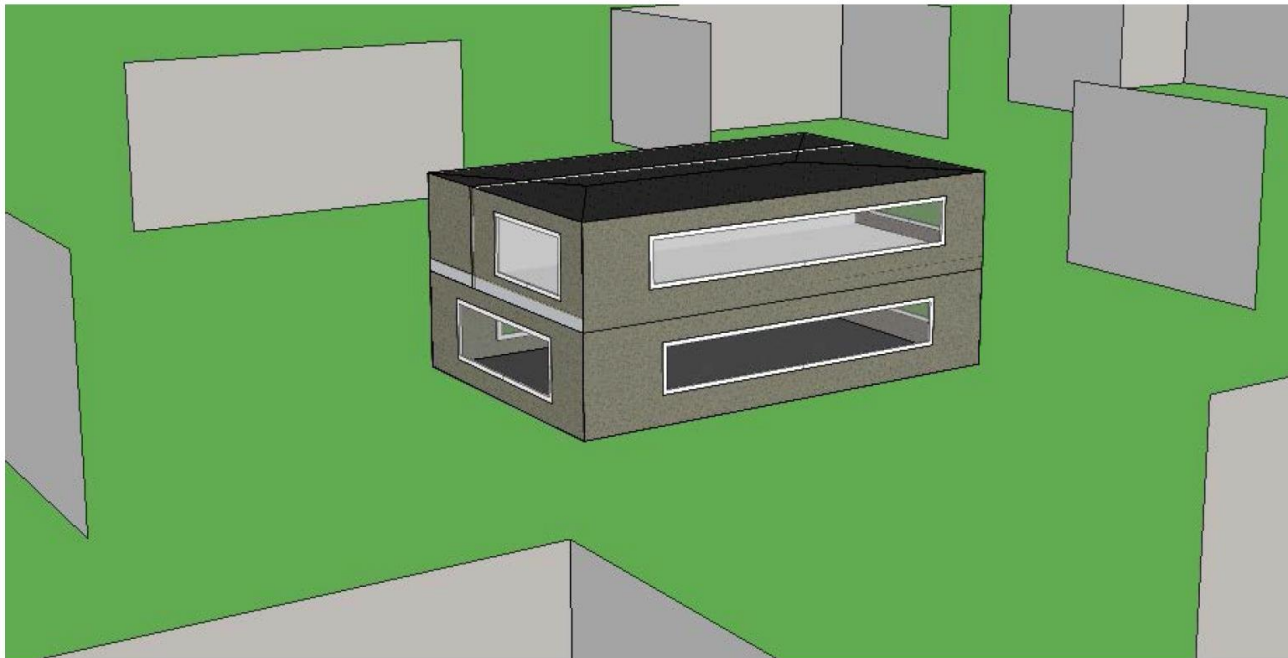




Simulations vs measurements

Description of the zoning.

Room type	Floor area (% of total area)	Heating setpoint
Day room (1 st floor)	81.2 m ² (50 %)	22 °C
Bedroom (2 nd floor)	56.8 m ² (35 %)	18 °C
Bathroom (2 nd floor)	24.3 m ² (15 %)	24 °C

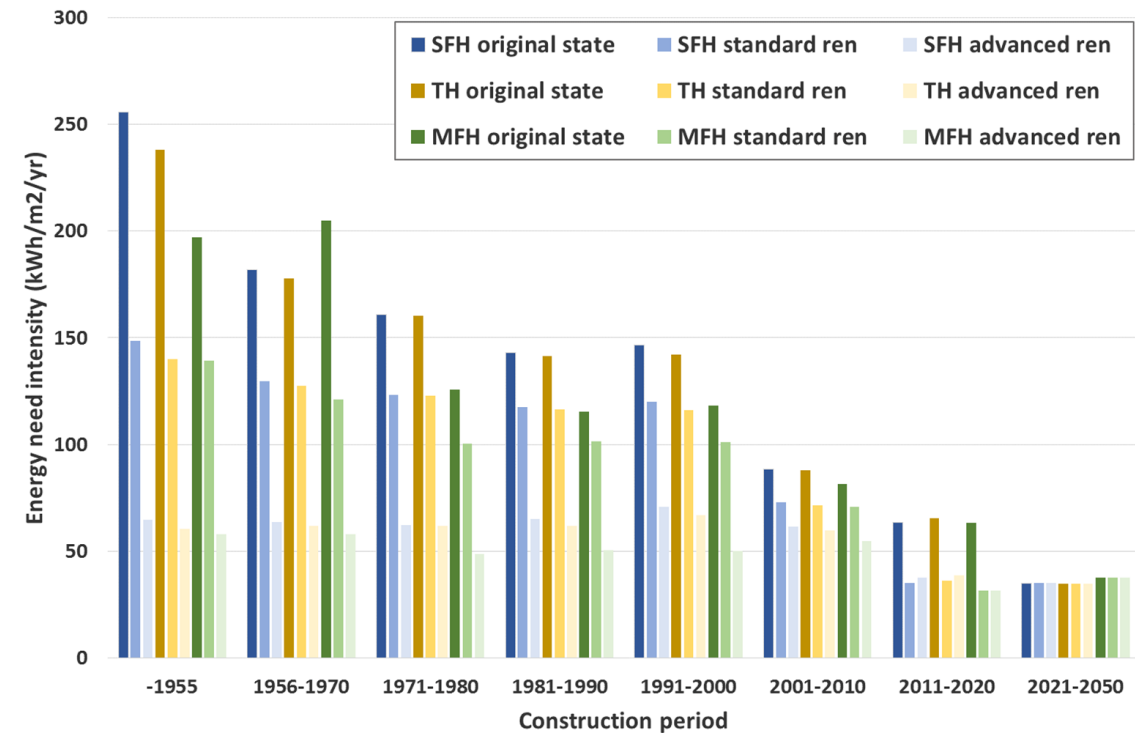











IDA ICE model of the building.



Simulations – residential buildings

- Norwegian dwelling stock described in detail in the EPISCOPE project
 - 3 dwelling types
 - 7 age cohorts
 - Original state, standard renovation, advanced renovation
- Also simulated in IDA ICE within FME ZEN WP4
 - Hourly energy profiles



5	region specific)	1971 ... 2000	generic			
6	National (not region specific)	2001 ... 2010	generic			
7	National (not region specific)	2011 ...	generic			



Simulations – service buildings



Potensial- og barrierestudie

Energieffektivisering i norske yrkesbygg

2/3

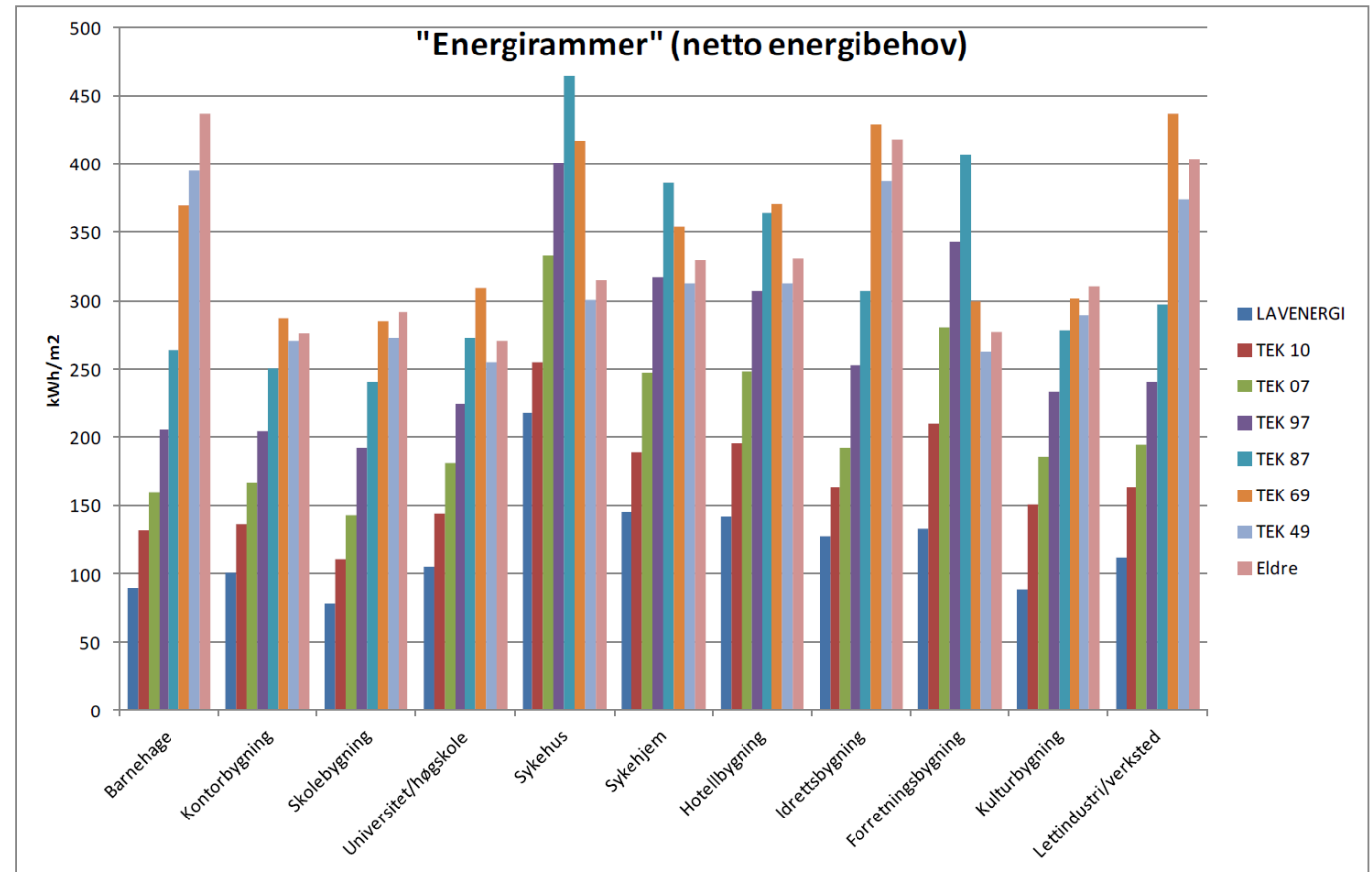
Bakgrunnsrapport
Utført av Multiconsult AS i samarbeid med
Analyse og Strategi AS på oppdrag for Enova



enova
rapport

2012:01.2

Drivkraften for fremtidens energiløsninger





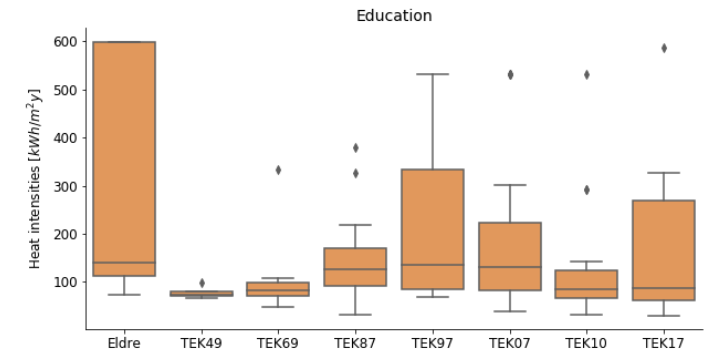
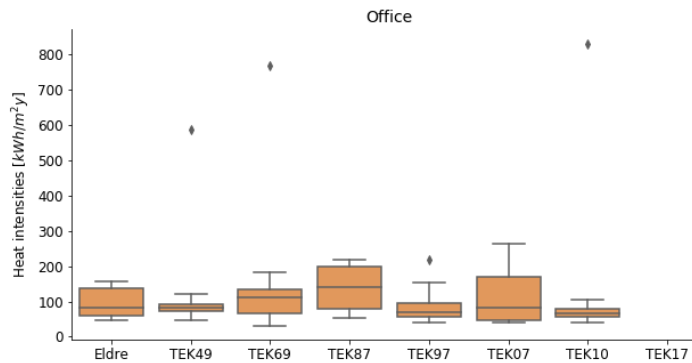
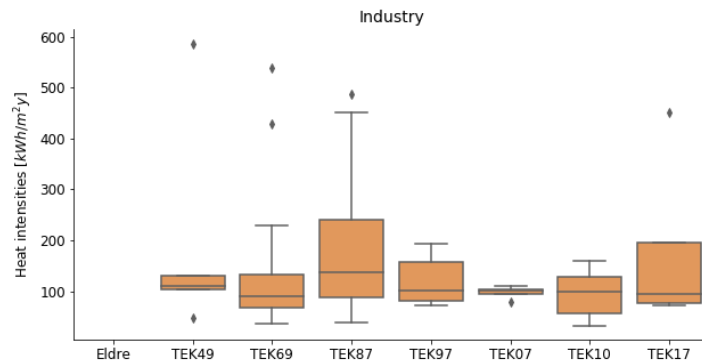
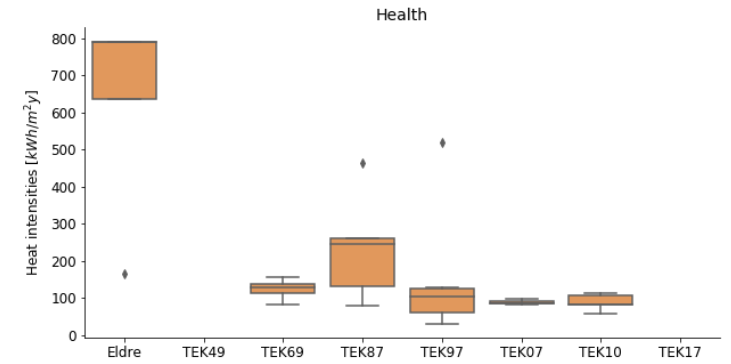
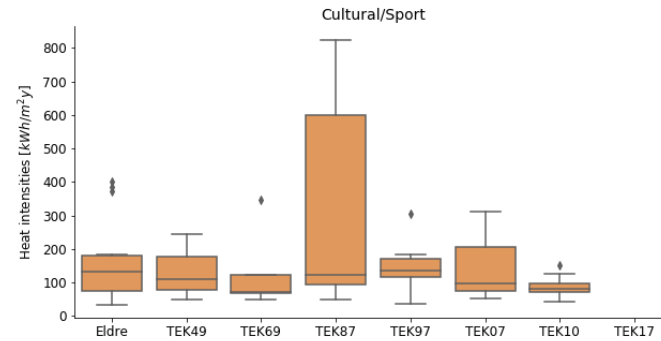
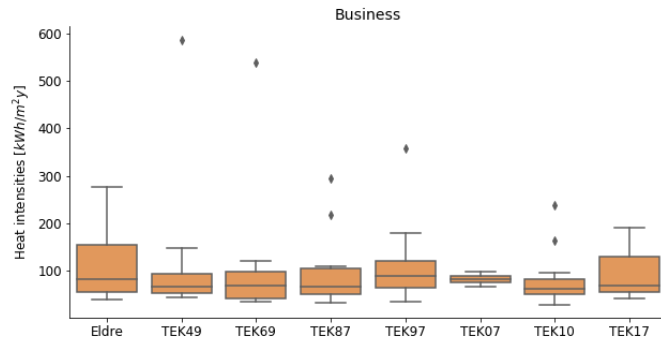
Empirical data

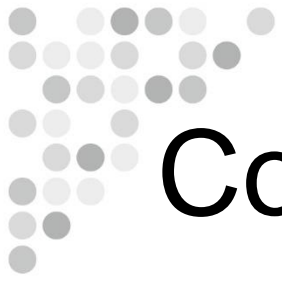
- TrønderEnergi
 - Non-residential: 1717 records
 - Dwellings: 36336 records

- Statkraft Varme
 - Non-residential: 834 records
 - Multi-family houses: 469 records



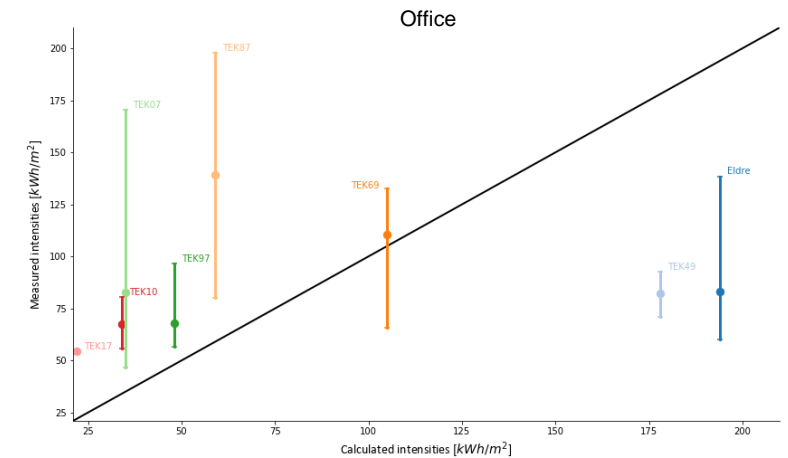
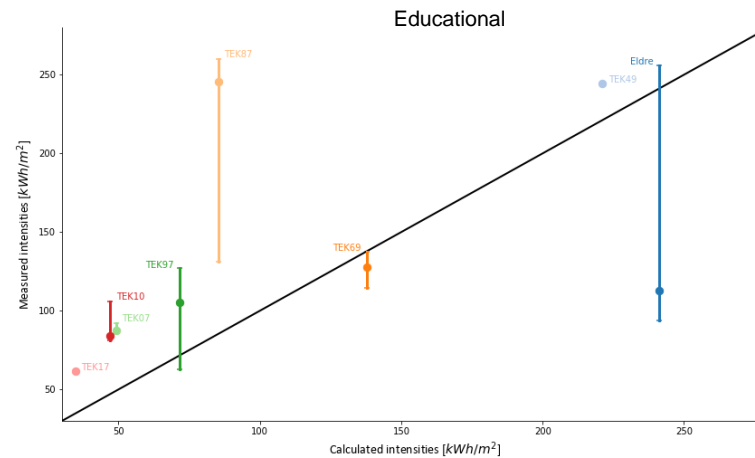
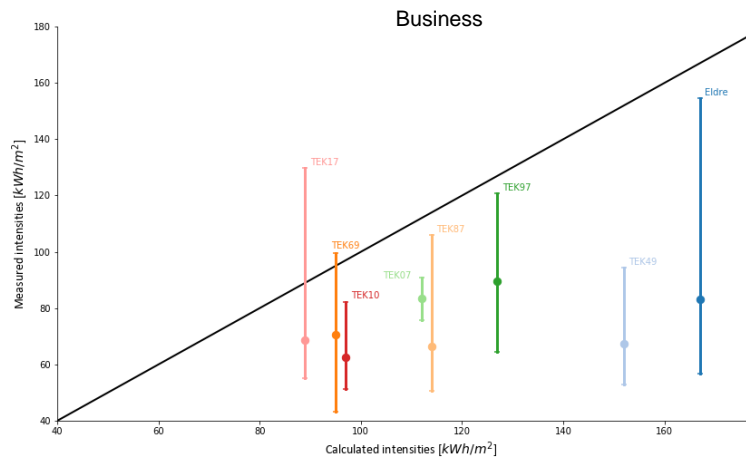
Data analysis – service buildings

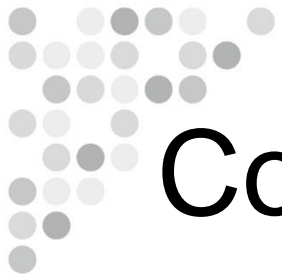




Comparison – service buildings

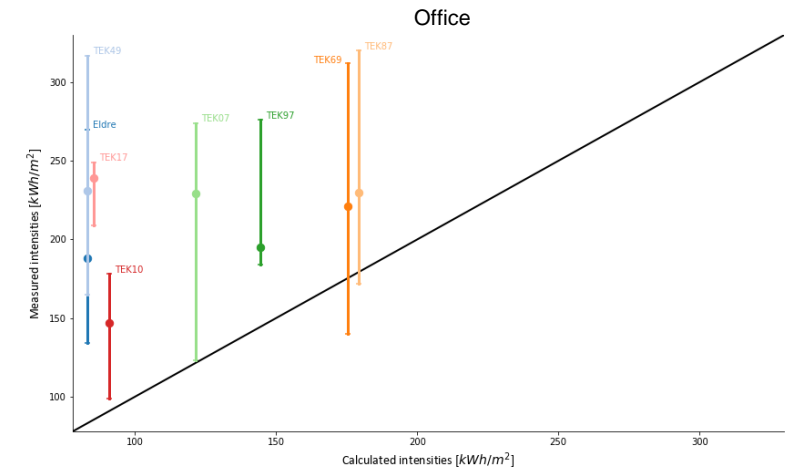
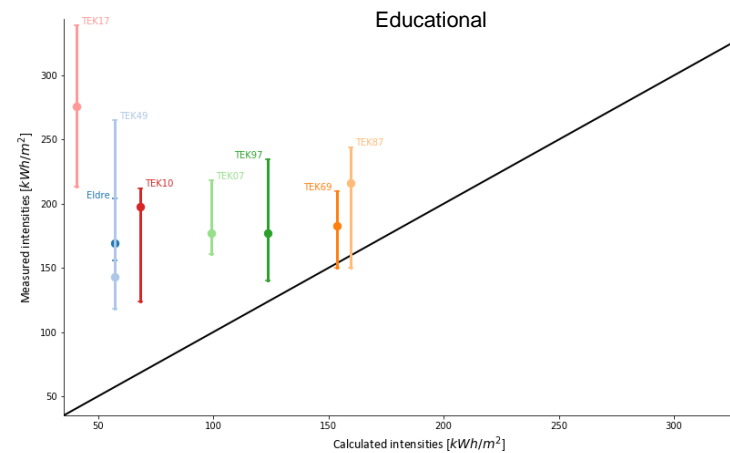
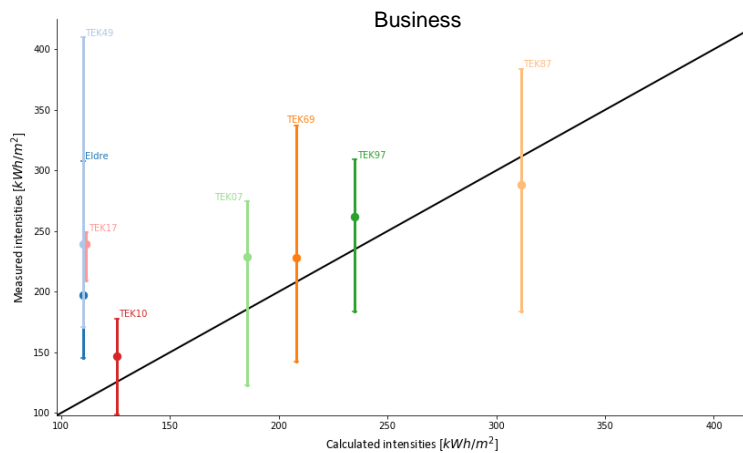
- Real heat demand:
 - Lower than calculated if high energy intensity
 - Higher than calculated if low energy intensity





Comparison – service buildings

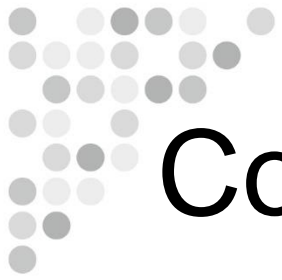
- Real electricity demand:
 - Higher than calculated demand





Data analysis – residential buildings

- Work in progress!
 - Data washing – large and challenging task



Conclusions

- Difference in measured and simulated energy use may differ substantially
- Researchers: Remember this difference when using simulated values in modelling
- Strong need for analyses of empirical data
- Energy suppliers: Please share data with researchers



Thank you!

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