TECHNISCHE UNIVERSITÄT WIEN
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Impact of Outdoor Climate and Life Style on the Total Energy Use in Office Buildings

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Outline

- calculation model

- comparison between measurements simulation and probabilistic model

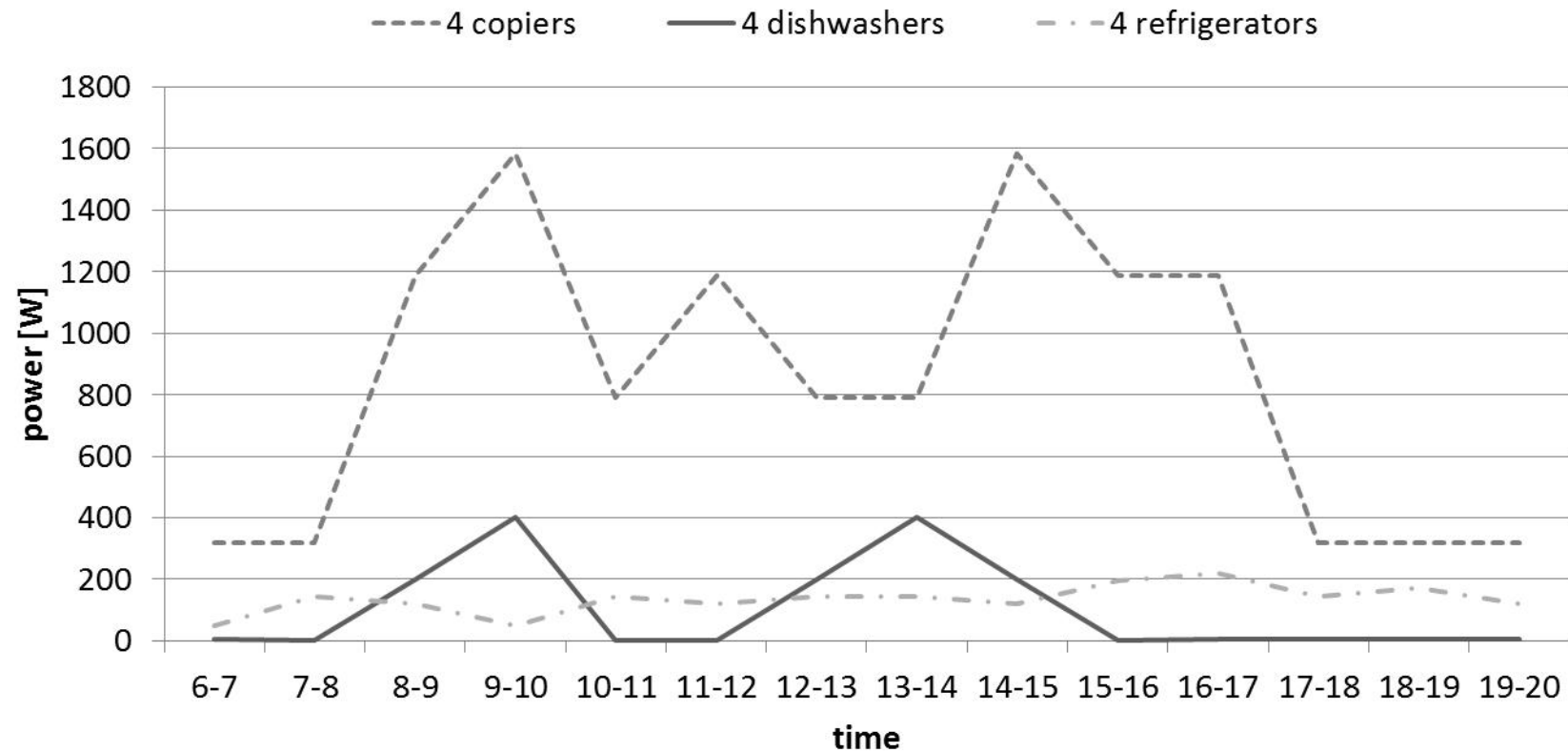- influence of climate, presence probability and efficient appliances and lighting

Calculation Model

- monthly balance method

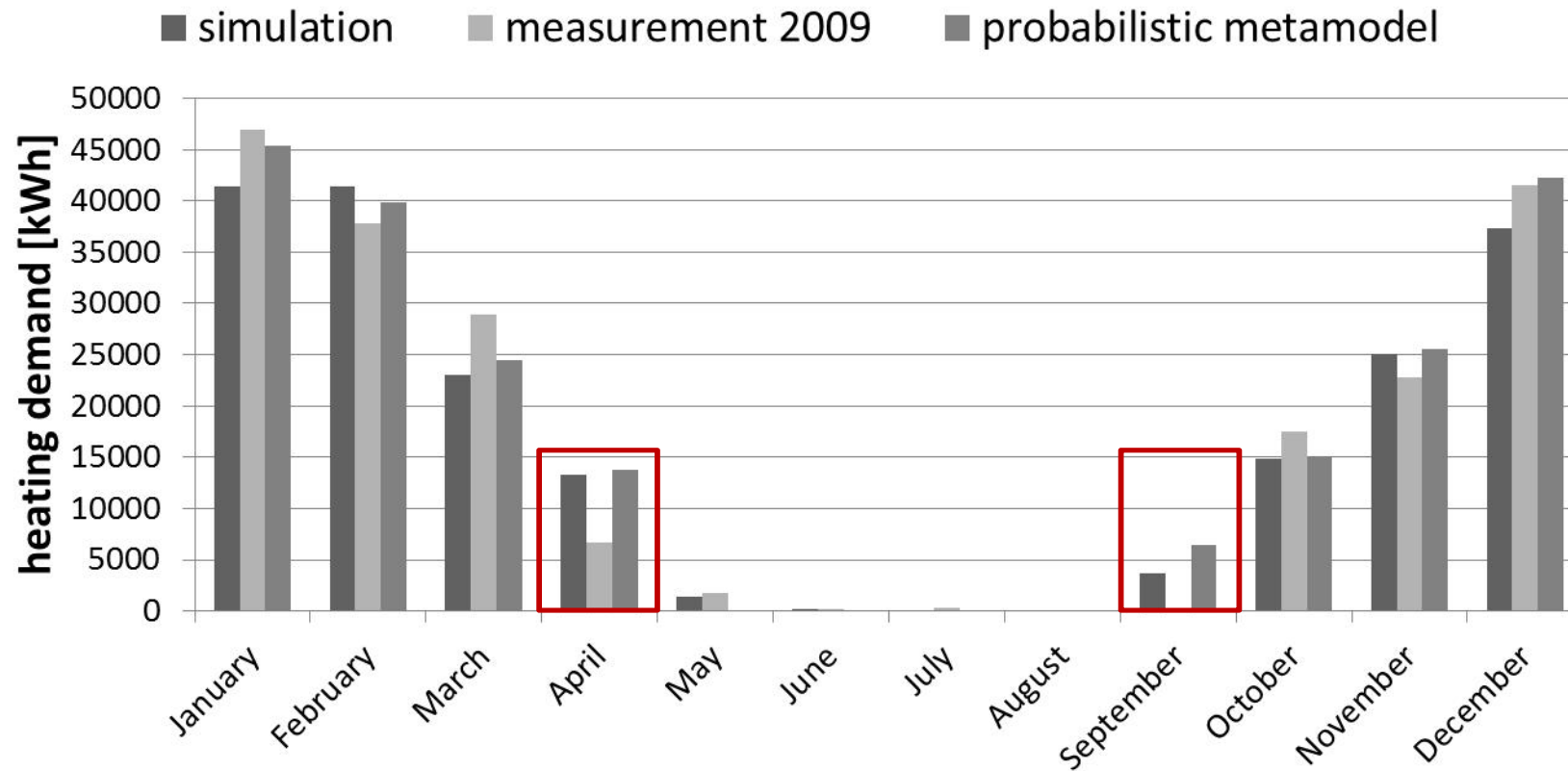- hourly calculation of internal loads

- random numbers

- probabilistic model
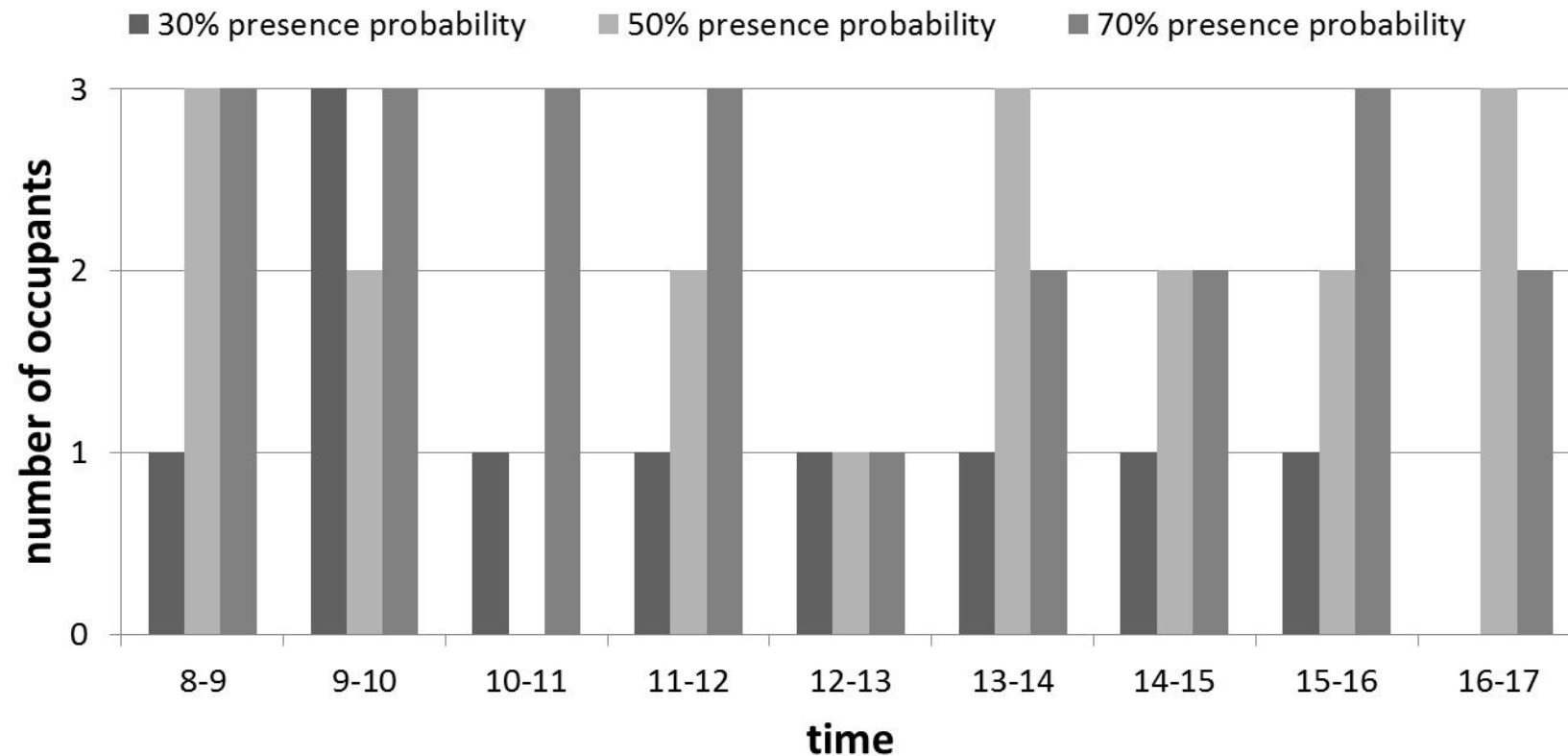
Number of occupants depending on presence probability in a 3 person office for one day
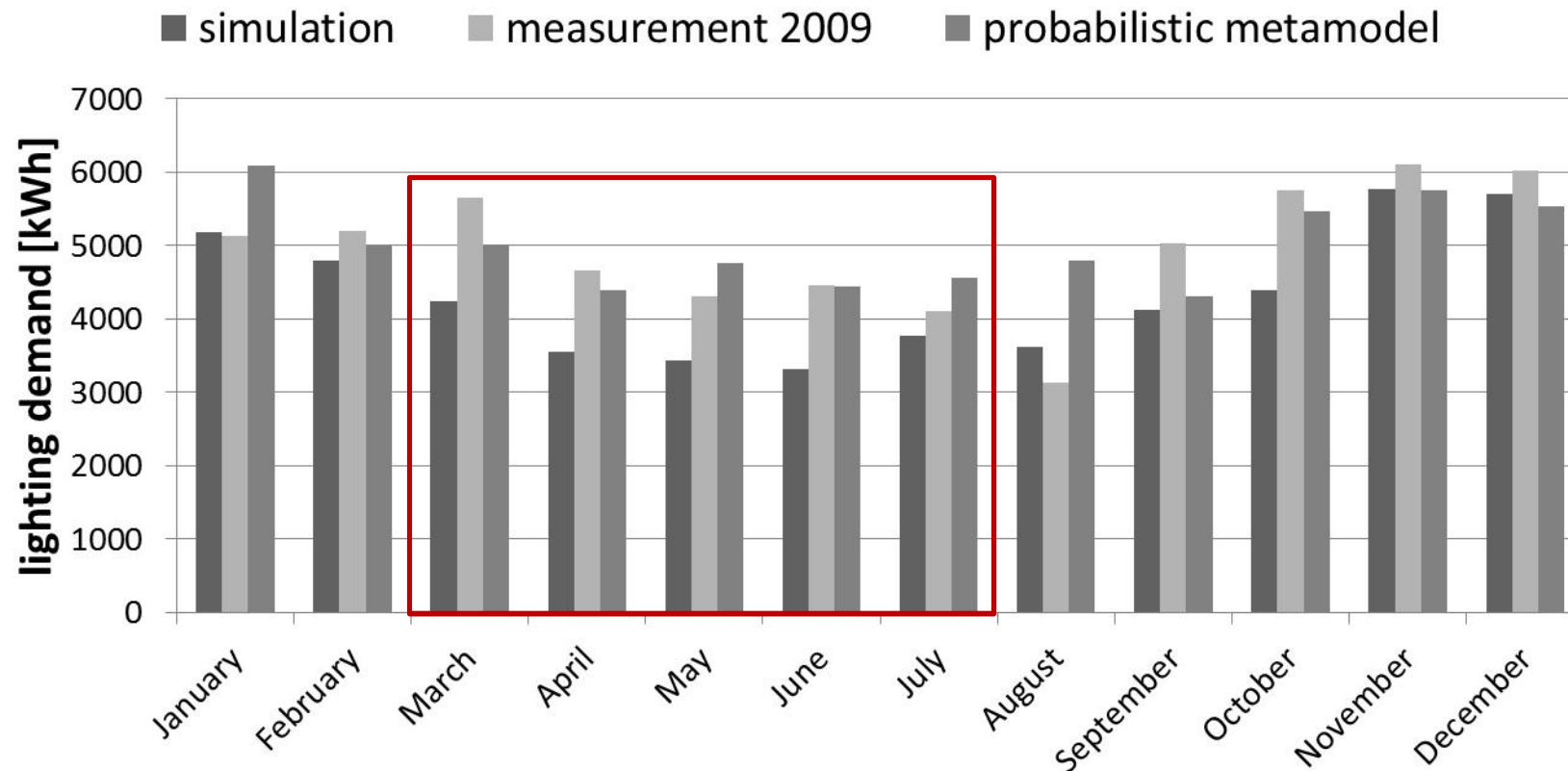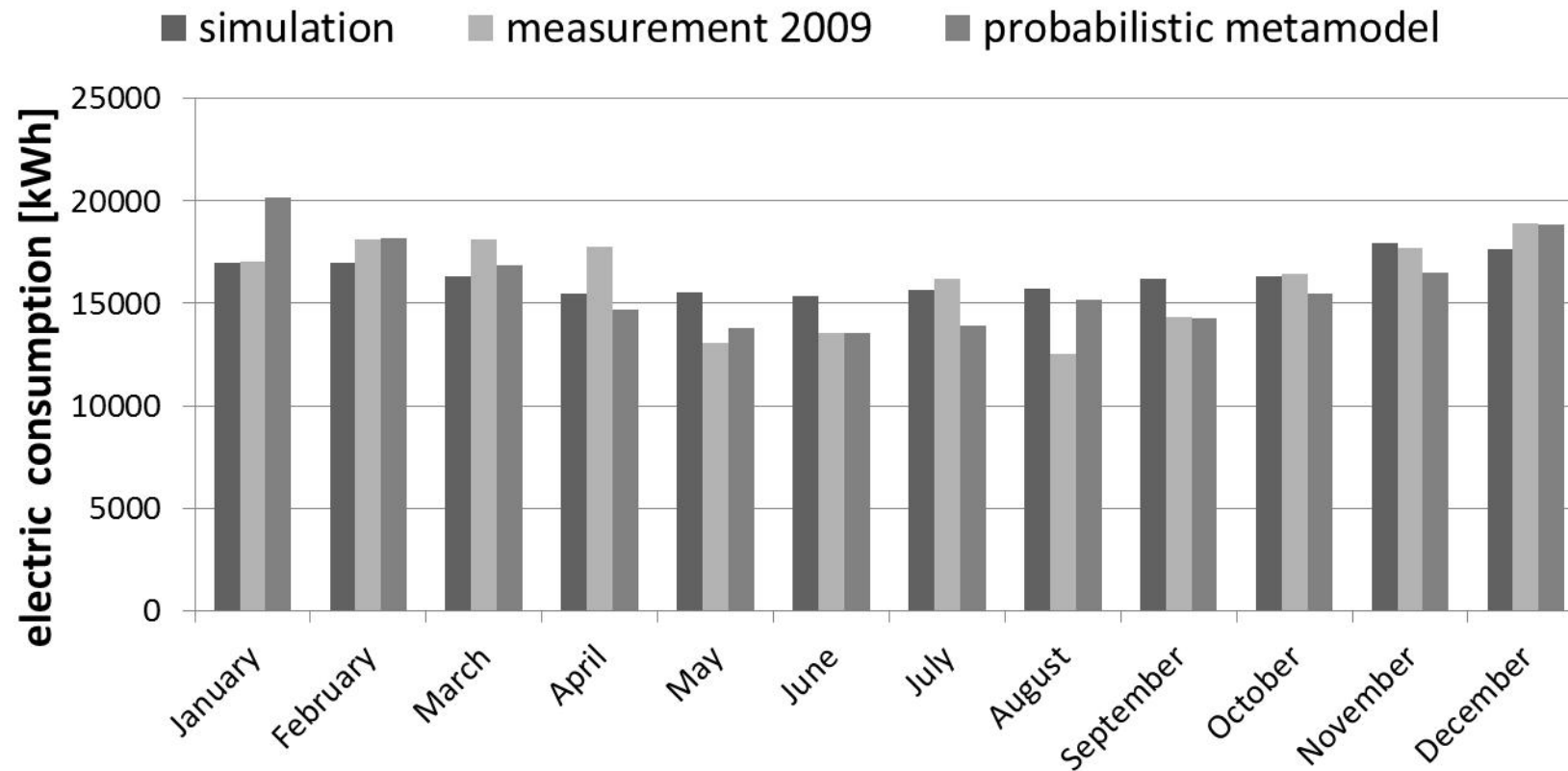
Calculation Model

- probabilistic model

Power of various appliances

Comparison

Comparison of the heating demand

Comparison of the lighting demand

Comparison

Comparison of the electric consumption

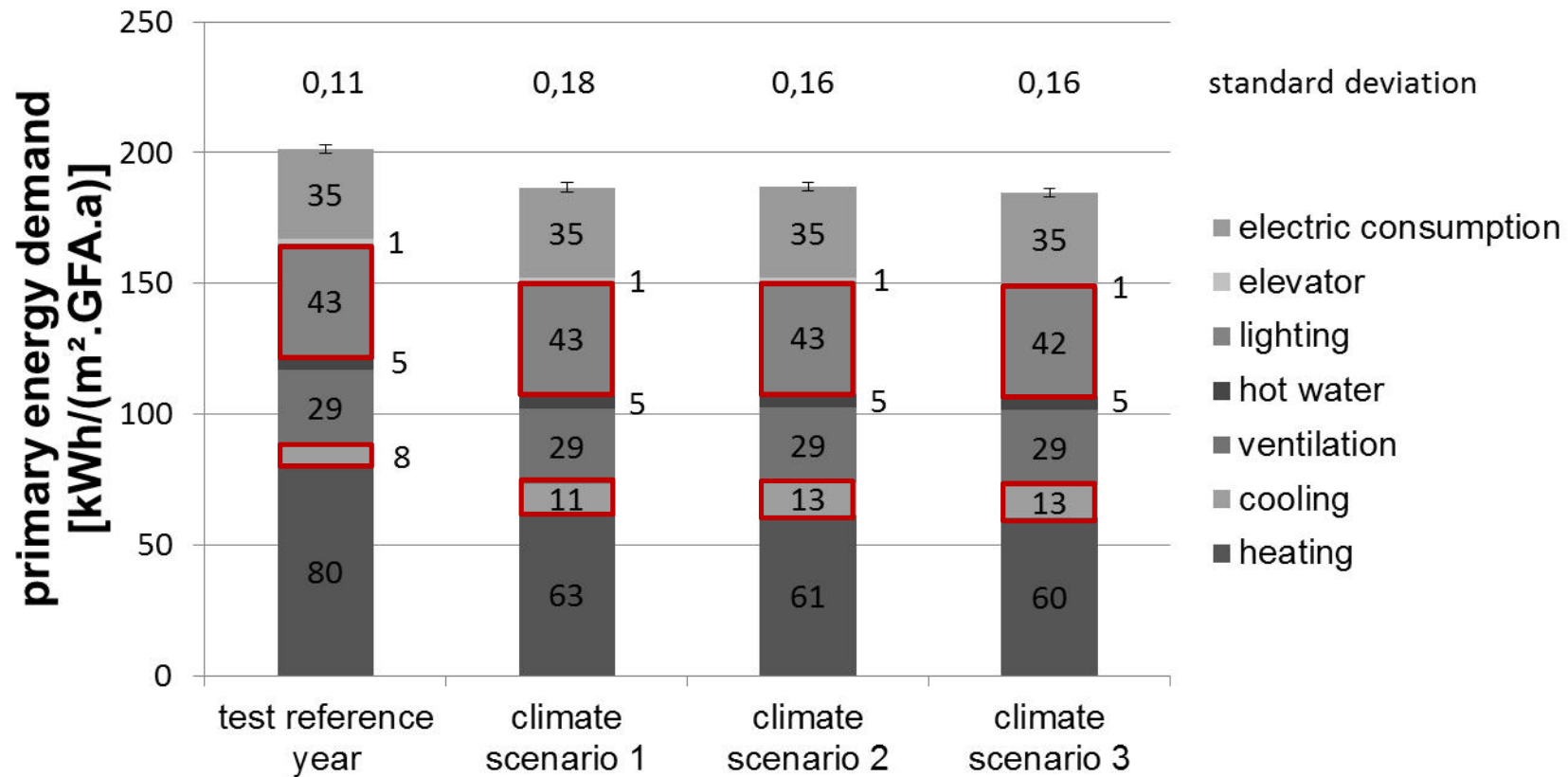# Primary Energy Demand

- heating
- cooling (only for the computer server)
- ventilation
- hot water
- lighting
- elevator
- electric appliances

Primary Conversion Factors

- electricity
  - 3.5 kWh/kWh

- district heating
  - 1.0 kWh/kWh

Climate Scenarios

- test reference year St. Pölten

- climate scenario 1
  - plus 3K

- climate scenario 2
  - plus 3K
  - higher absolute humidity

- climate scenario 3
  - plus 3K
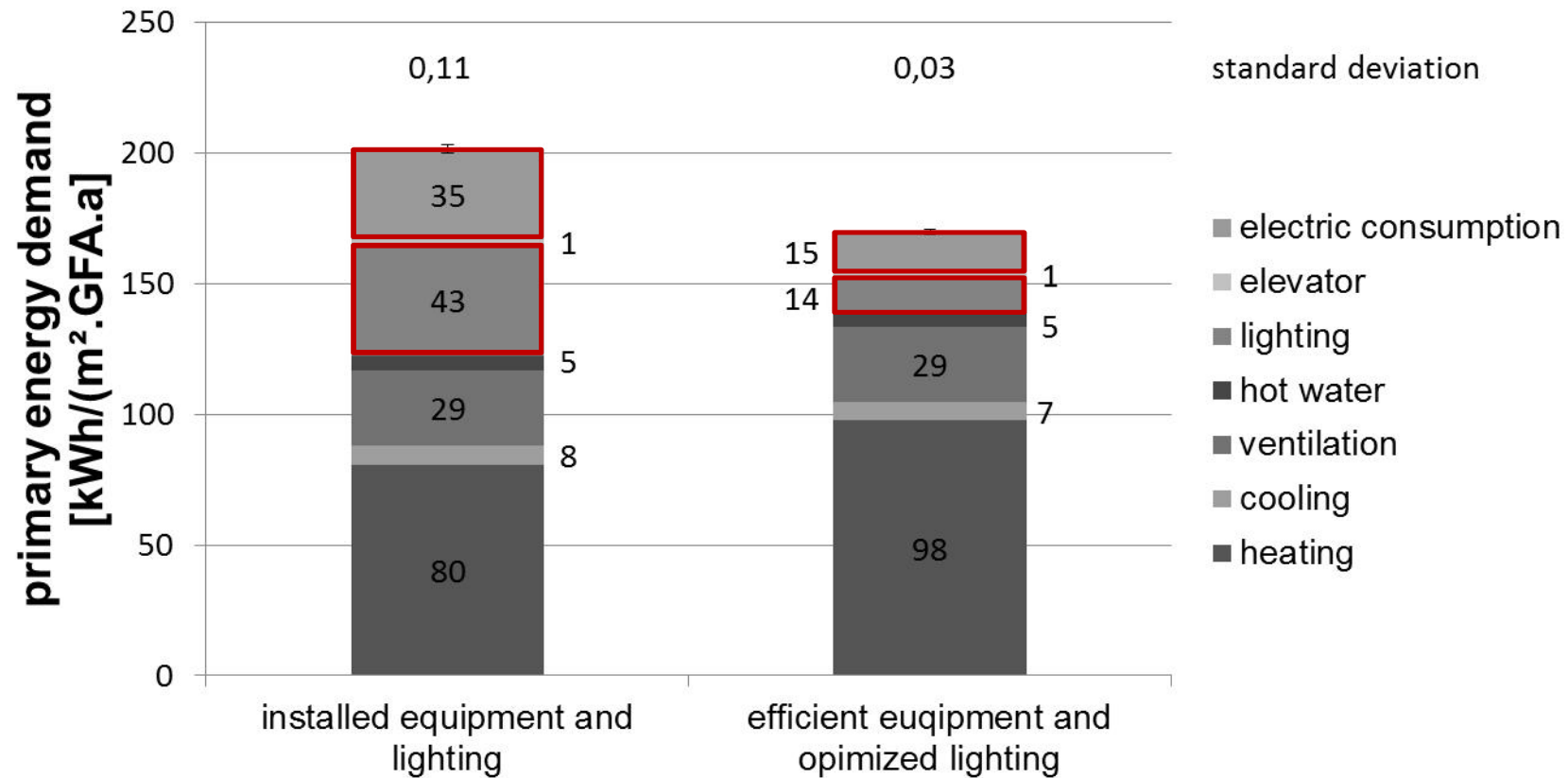 - higher absolute humidity
  - solar radiation plus 20%

Climate

Impact of climate scenarios on the primary energy demand

Presence Probability
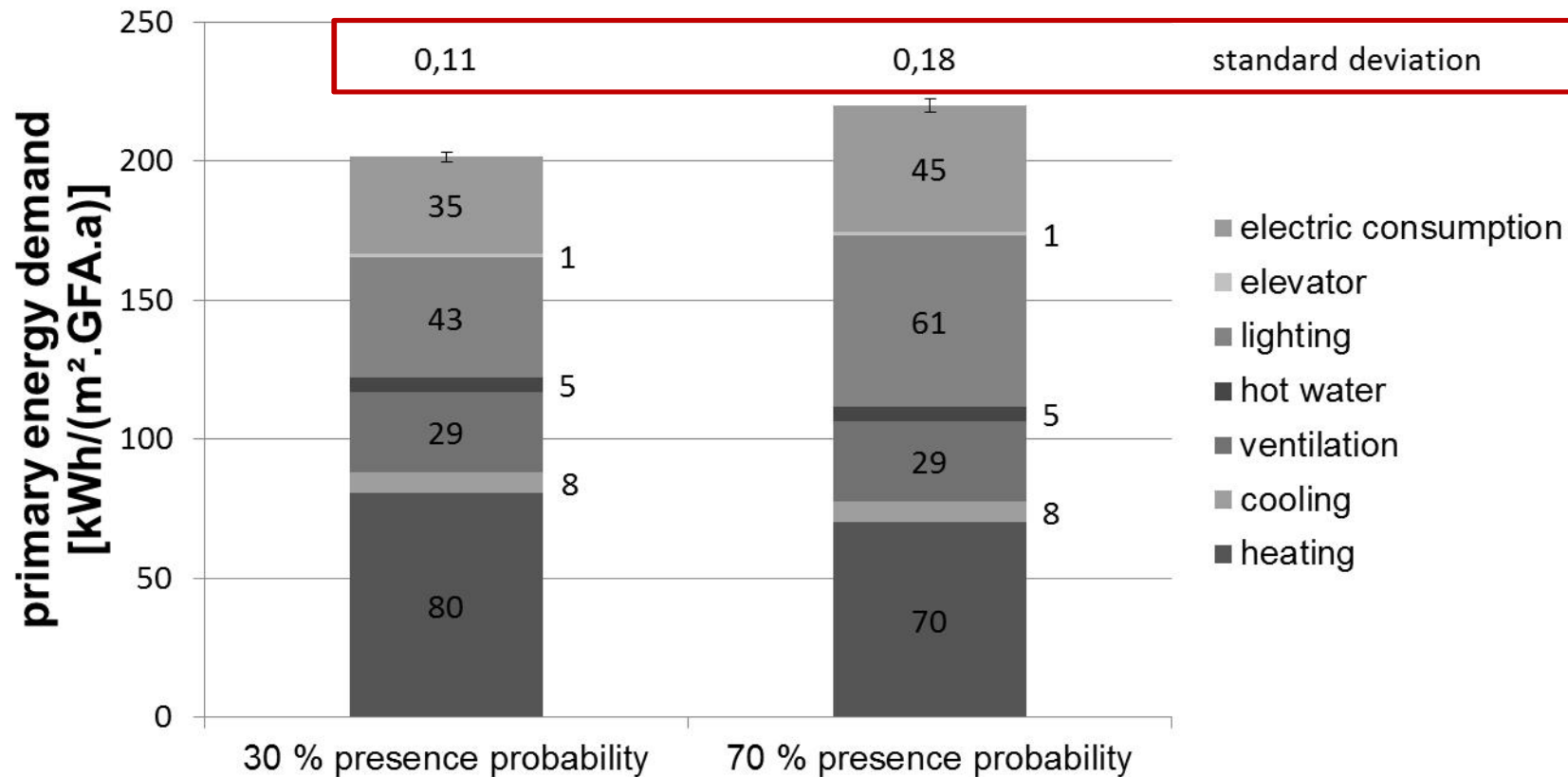
Impact of various presence probability on the primary energy demand

Efficient Appliances and Lighting

Impact of efficient appliances and lighting on the primary energy demand

Conclusions

- low standard deviation
  - not important for the annual energy demand

- influence of climate
  - increasing when using AC

- presence probability
  - direct influence

- efficient appliances and efficient lighting
  - saves money, reduce costs

Thank you for your attention!