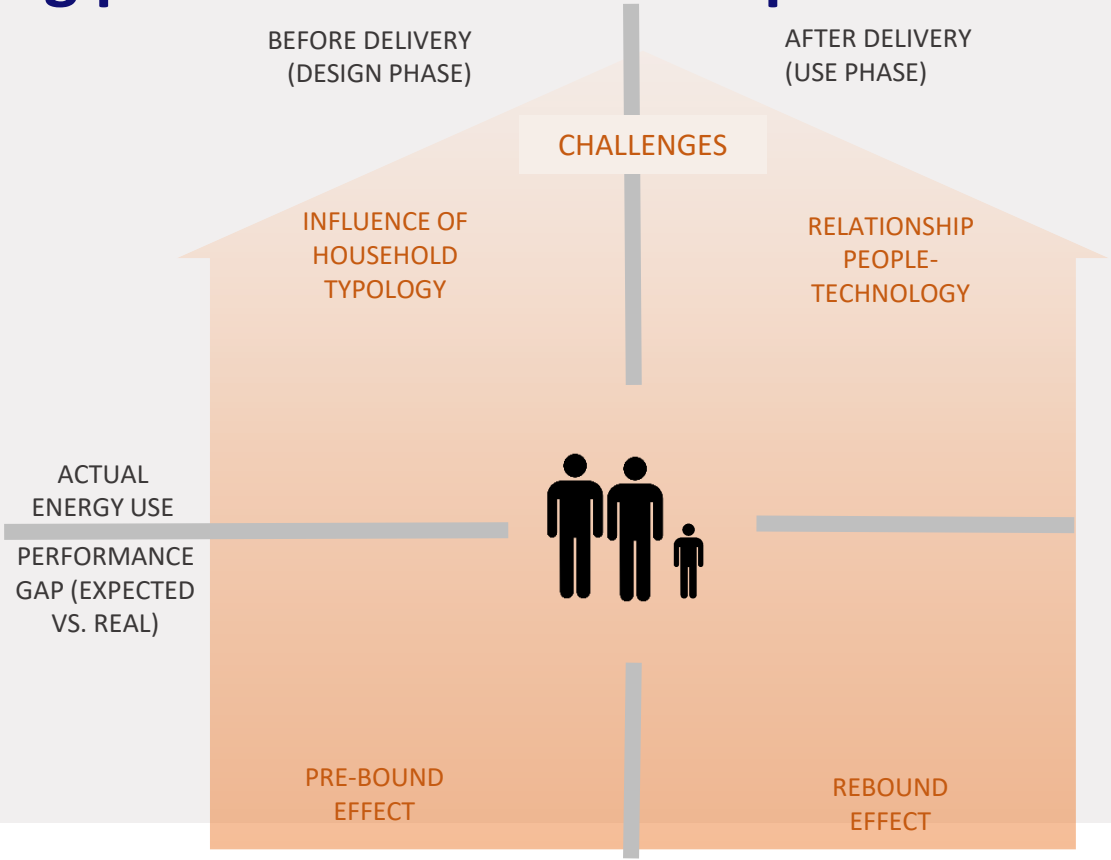
Data-driven occupancy patterns

What occupancy factors are important to predict building performance?

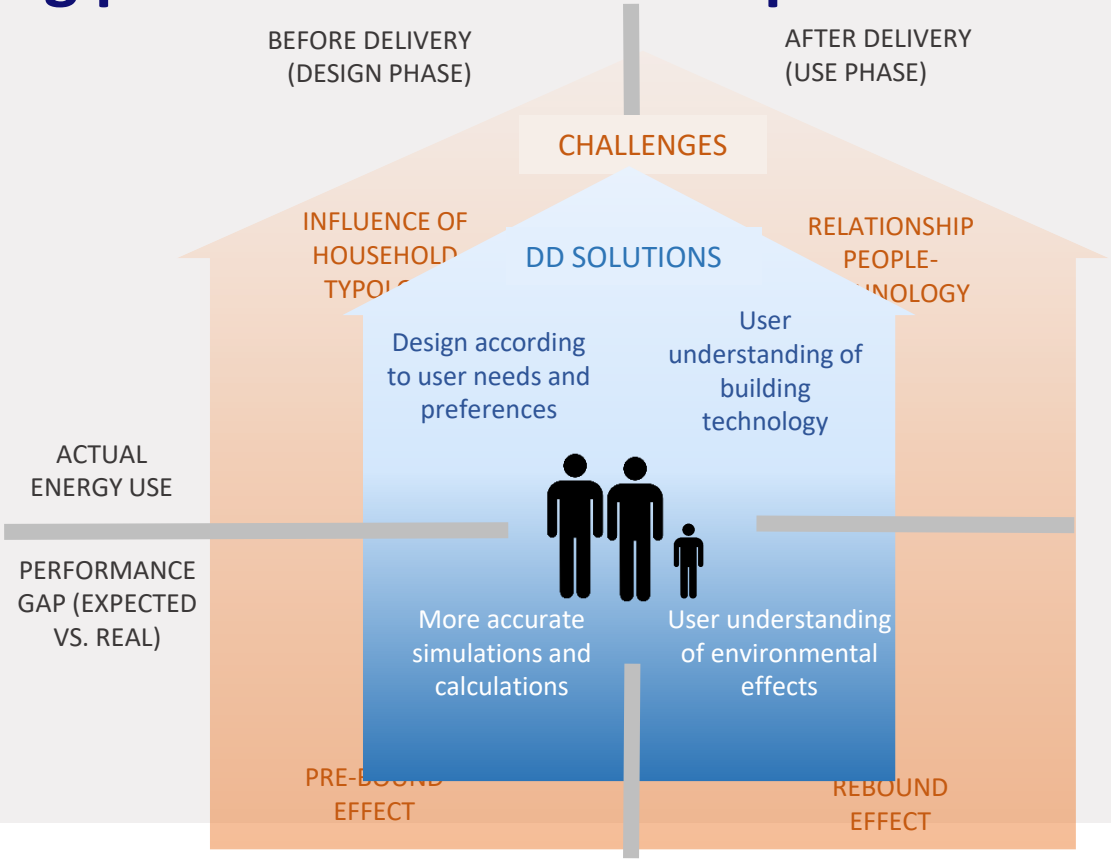
Dr. Olivia Guerra-Santin

Chair of Smart Architectural Technologies, Department of the Built Environment

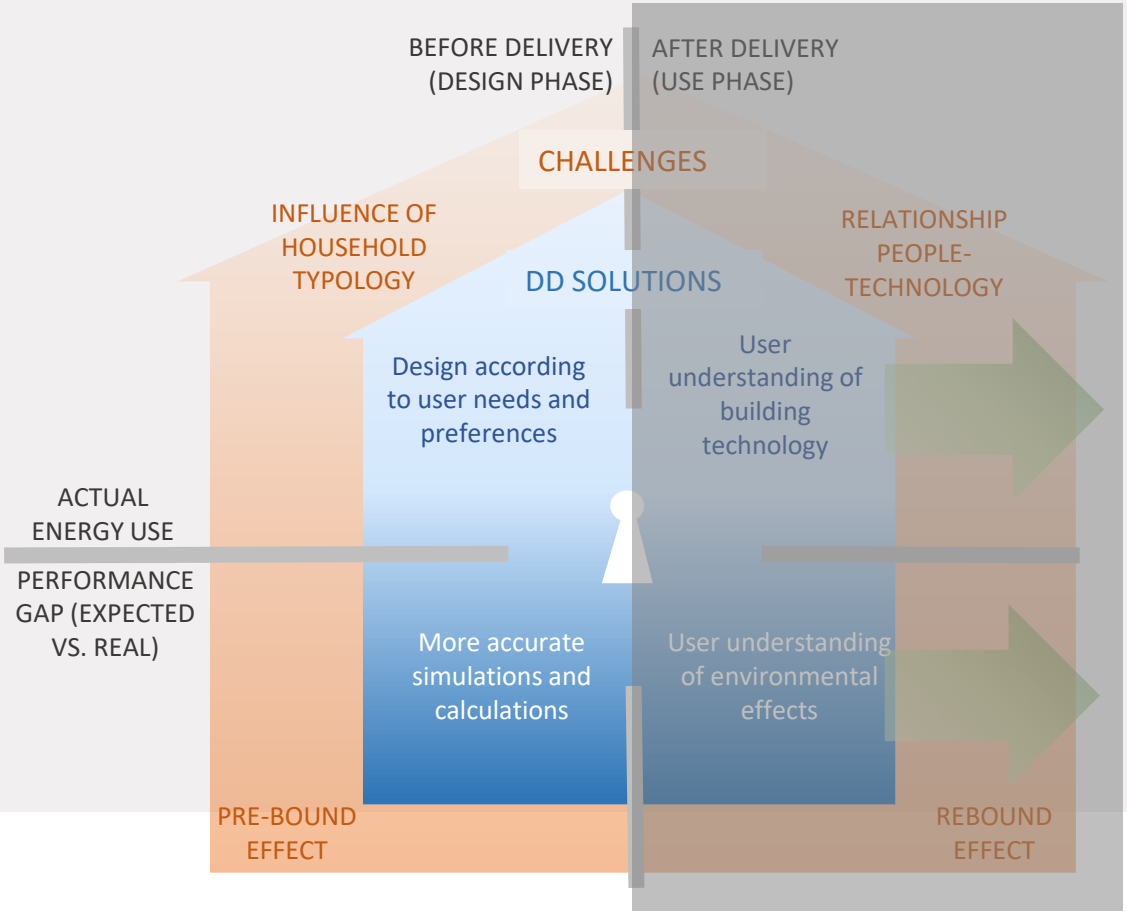
Building performance and occupants



Building performance and occupants

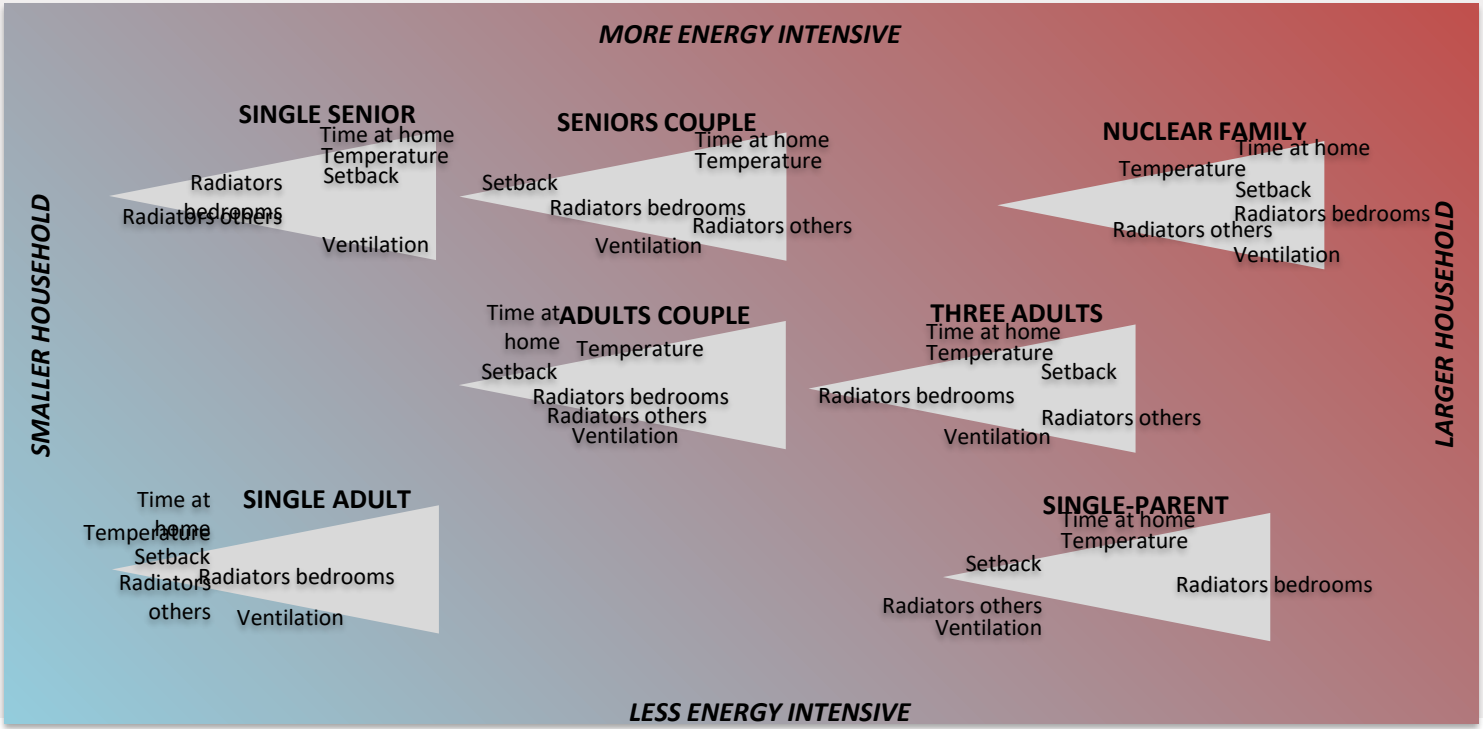


Building performance and occupants



Occupants profiles: actual needs and preferences

Statistically determined household profiles



Development of Dutch occupancy and heating profiles for building simulation. Guerra-Santin & Silvester. BRI 45(4), 2017

https://doi.org/10.1080/09613218.2016.1160563

Occupants profiles: actual needs and preferences

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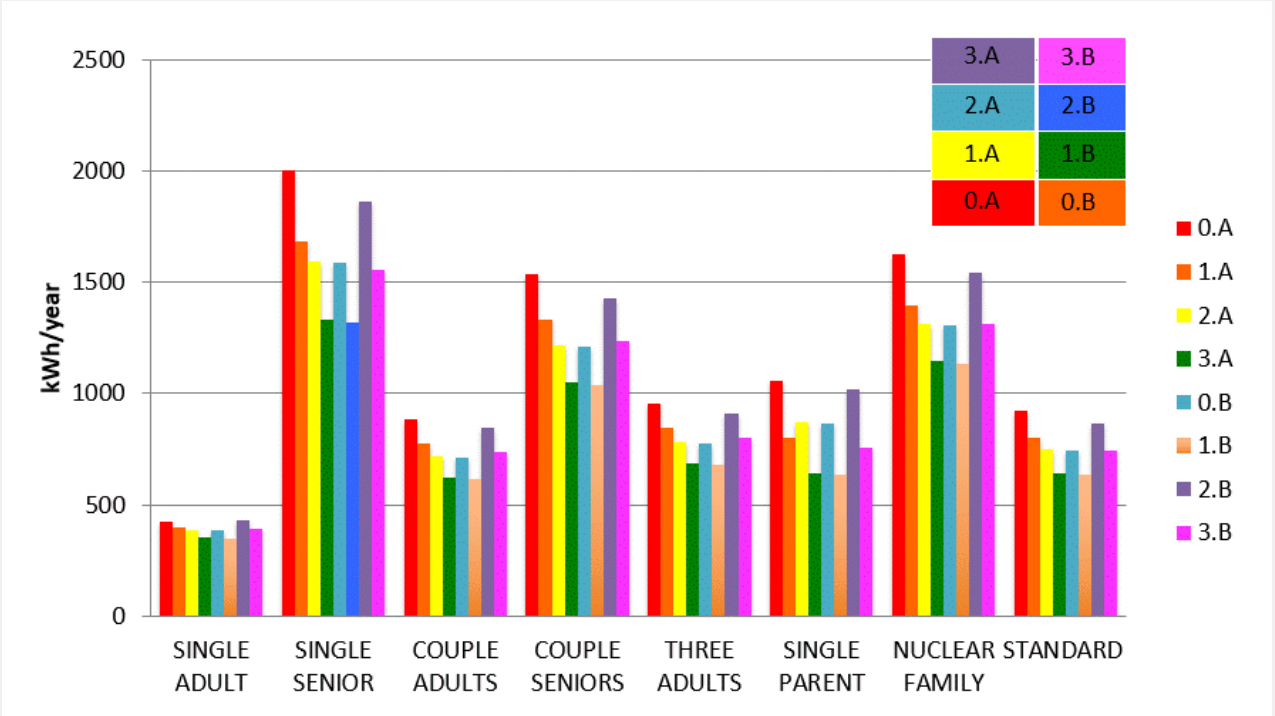
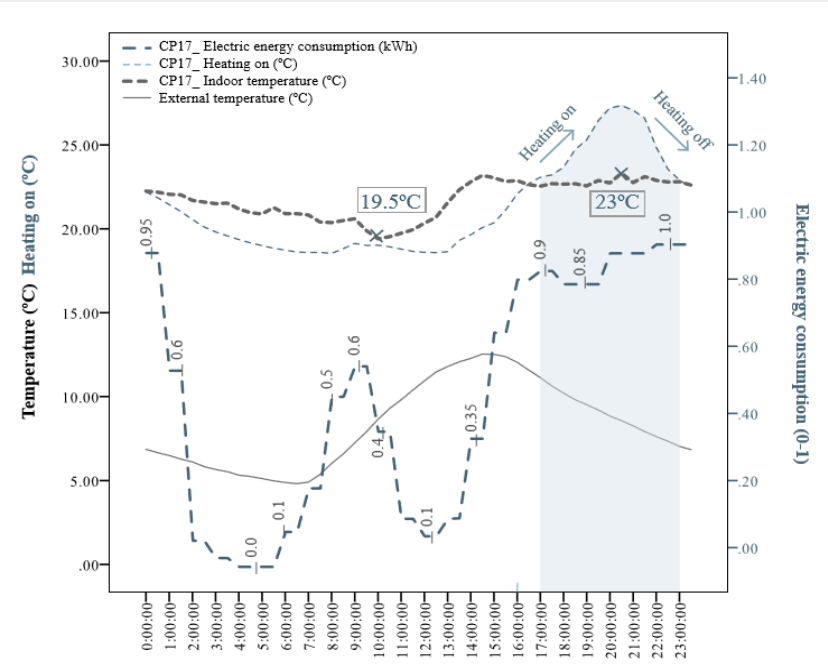


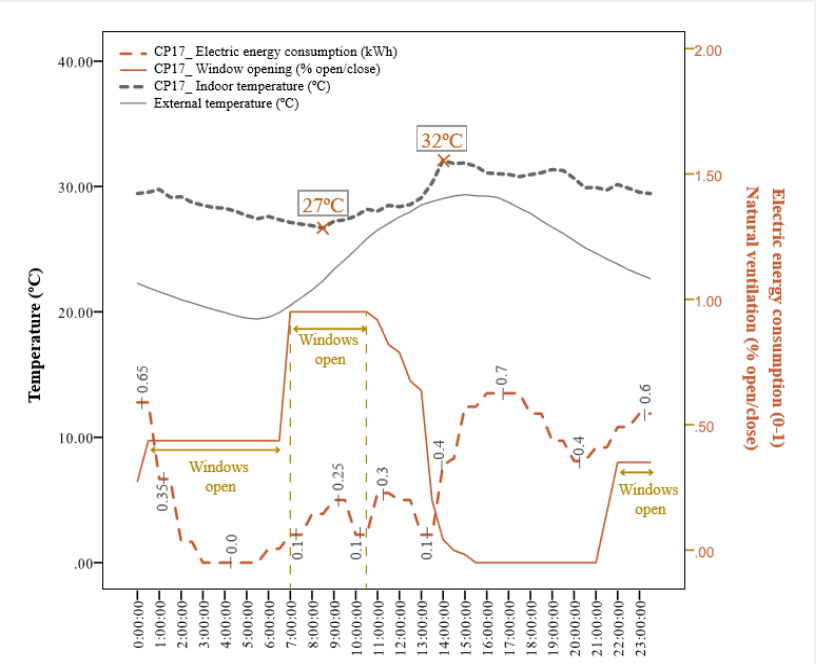
2ndSkin renovation solution

Considering user profiles and occupants' behaviour on a zero energy renovation strategy for multi-family housing in the Netherlands. Guerra-Santin et al. Energy Efficiency 11(7) 1847-1870.
https://link.springer.com/article/10.1007/s12053-018-9626-8

Occupants profiles: actual needs and preferences

Building monitoring





Understanding the performance gap in energy retrofitting: Measured input data for adjusting building simulation models.
Cuerda et al. ENB 209, 2020
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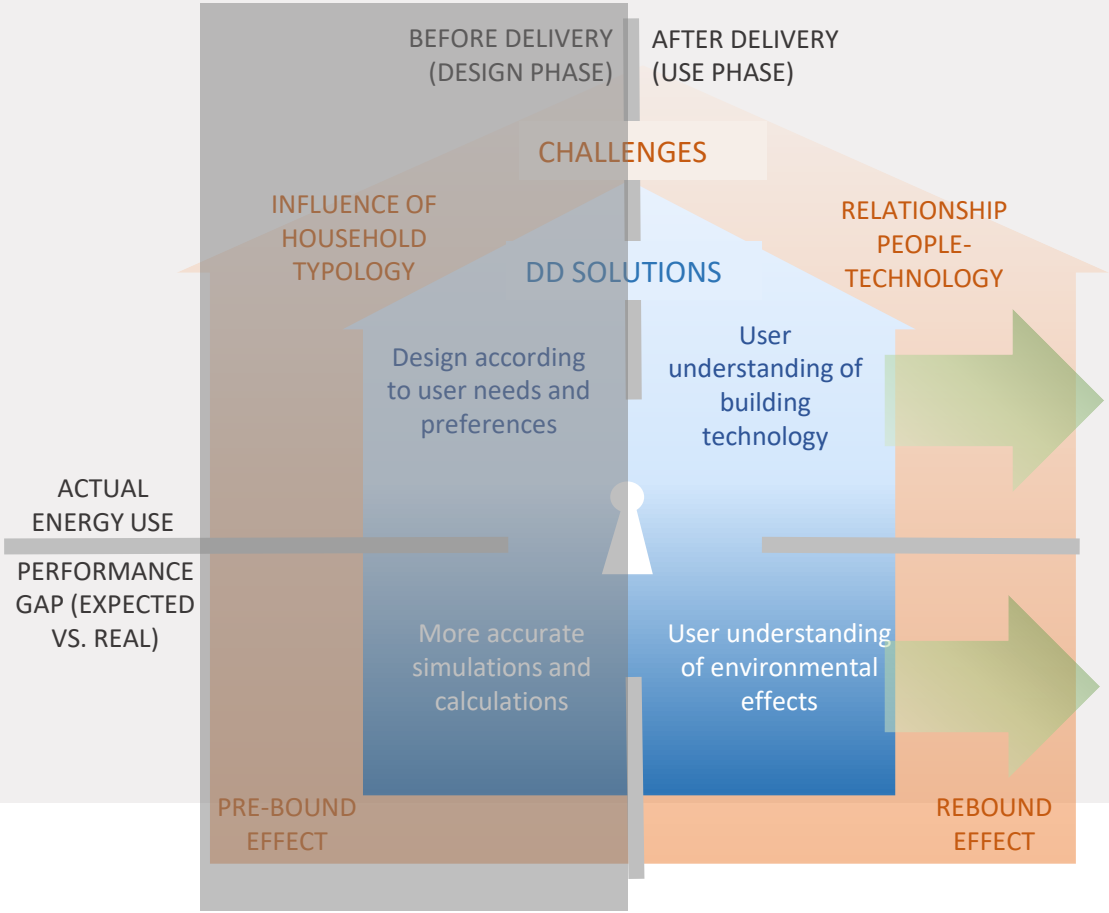
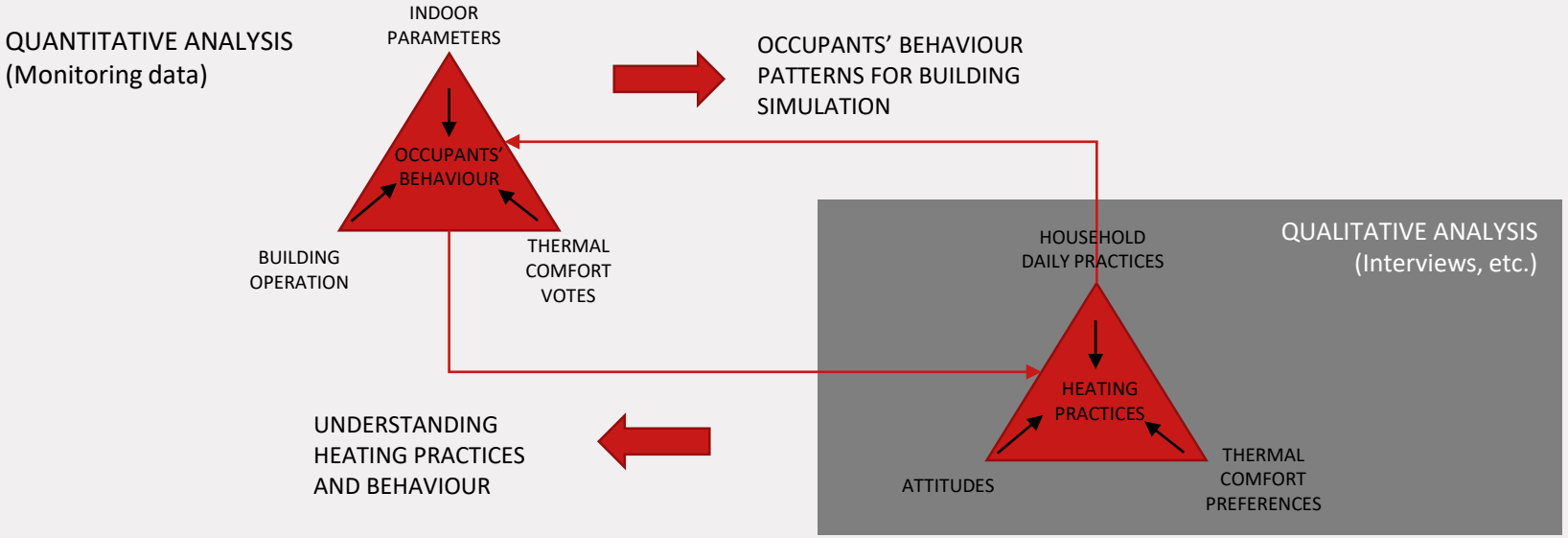
Building performance and occupants



Occupants profiles: actual needs and preferences

Mixed methods incl. data mining complemented by walkthroughs, interviews, etc.



Actual needs and preferences | Occupancy practices | Drivers for behaviour

Mixed methods approach to determine occupants' behaviour – Analysis of two case studies, Guerra-Santin et al. ENB 130 546-566, 2016.
https://doi.org/10.1016/j.enbuild.2016.08.084

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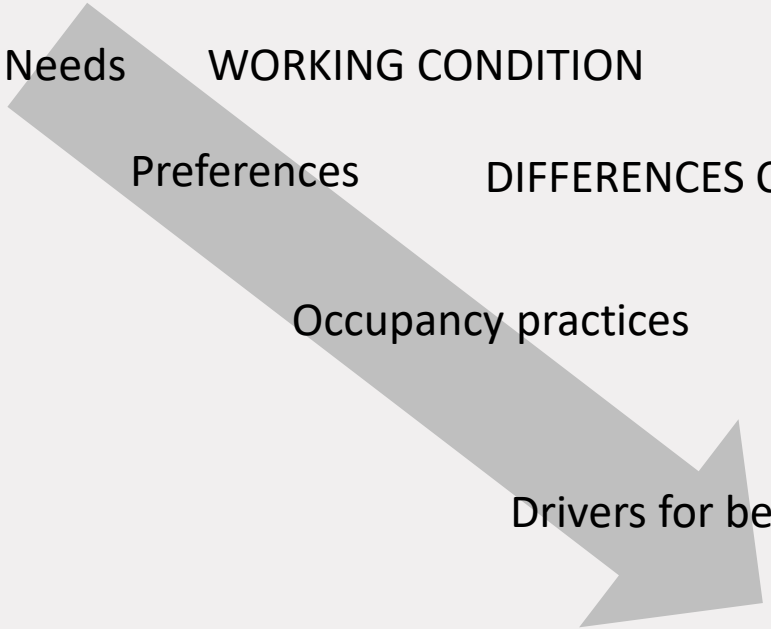

Needs WORKING CONDITION

Preferences DIFFERENCES COMFORT/ FAMILY MEMBERS

Occupancy practices SHOWER, DRINK TO KEEP WARM
ADJUSTMENT CLOTHING

Drivers for behaviour ENVIRONMENT
REDUCING ENERGY COSTS
COMFORT
CONVENIENCE