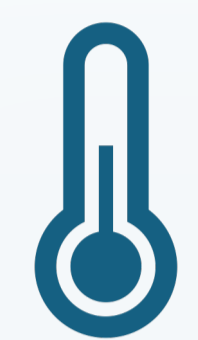


Are Today's Net Zero Retrofits Ready for Tomorrow's Climate?

Real Data, Virtual Solutions: Building Energy Simulation for Climate-Resilient Net Zero Pathways

Laurence Peinturier, David Wallom | Oxford e-Research Centre, University of Oxford



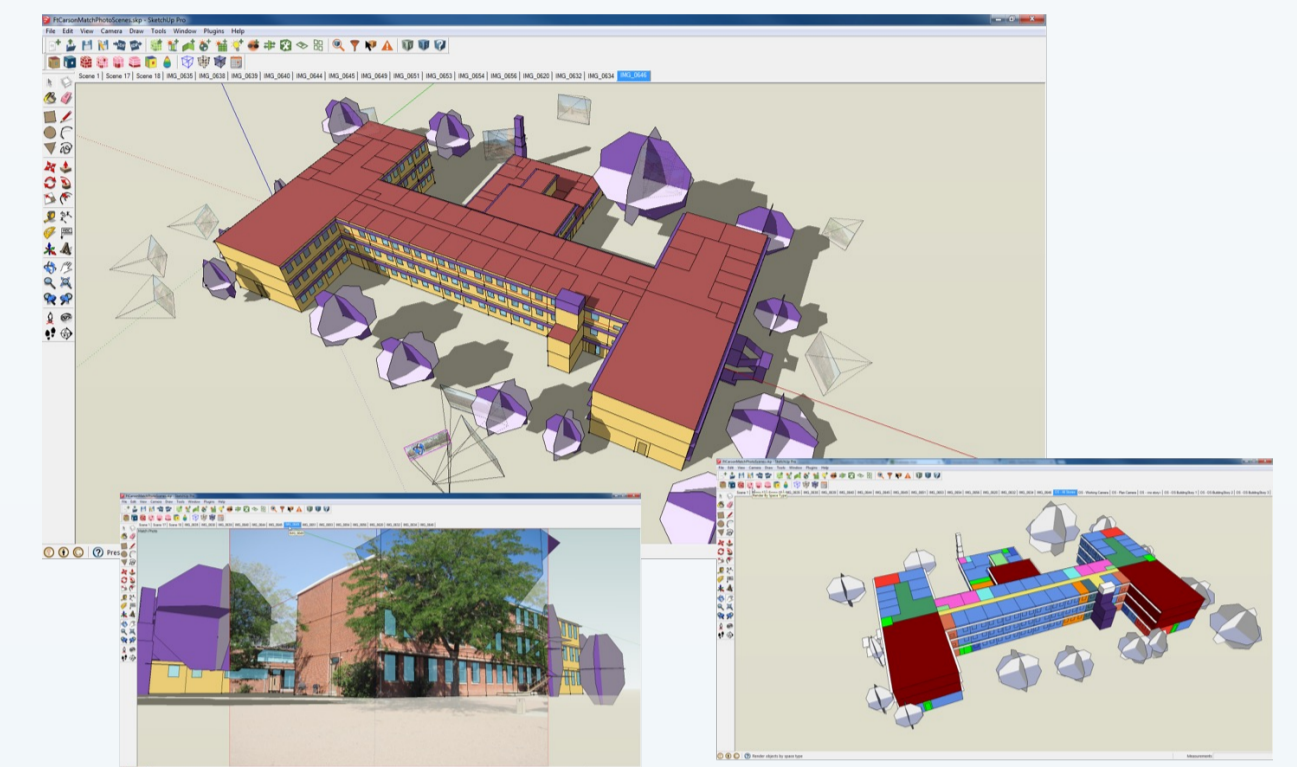
Challenge

- Building operations account for **30%** of global energy demand
- Buildings must achieve **net-zero targets** while remaining comfortable under **future climate conditions**



Building Energy Simulation

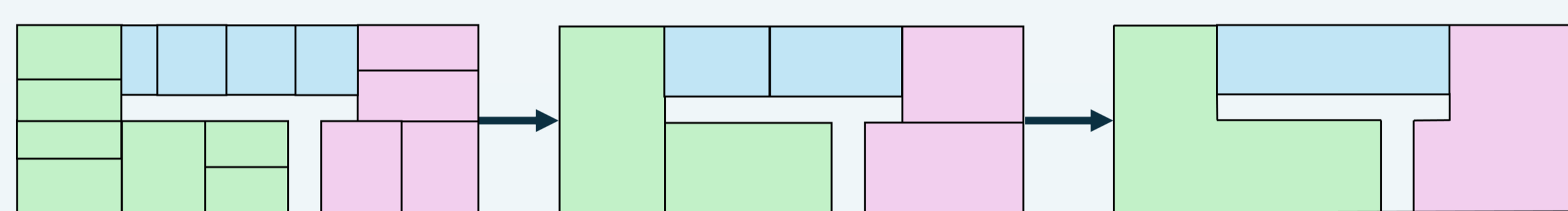
- Virtual testing of retrofit measures
- Proofing for future climate resilience



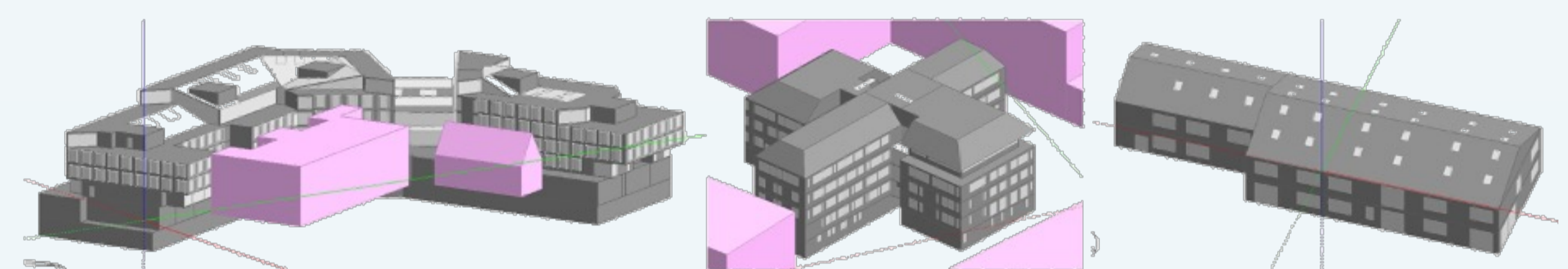
BUT BES is complex and time-consuming!



Step 1: Simplifying BES While Maintaining Accuracy



3 levels of modelling detail (LOD)

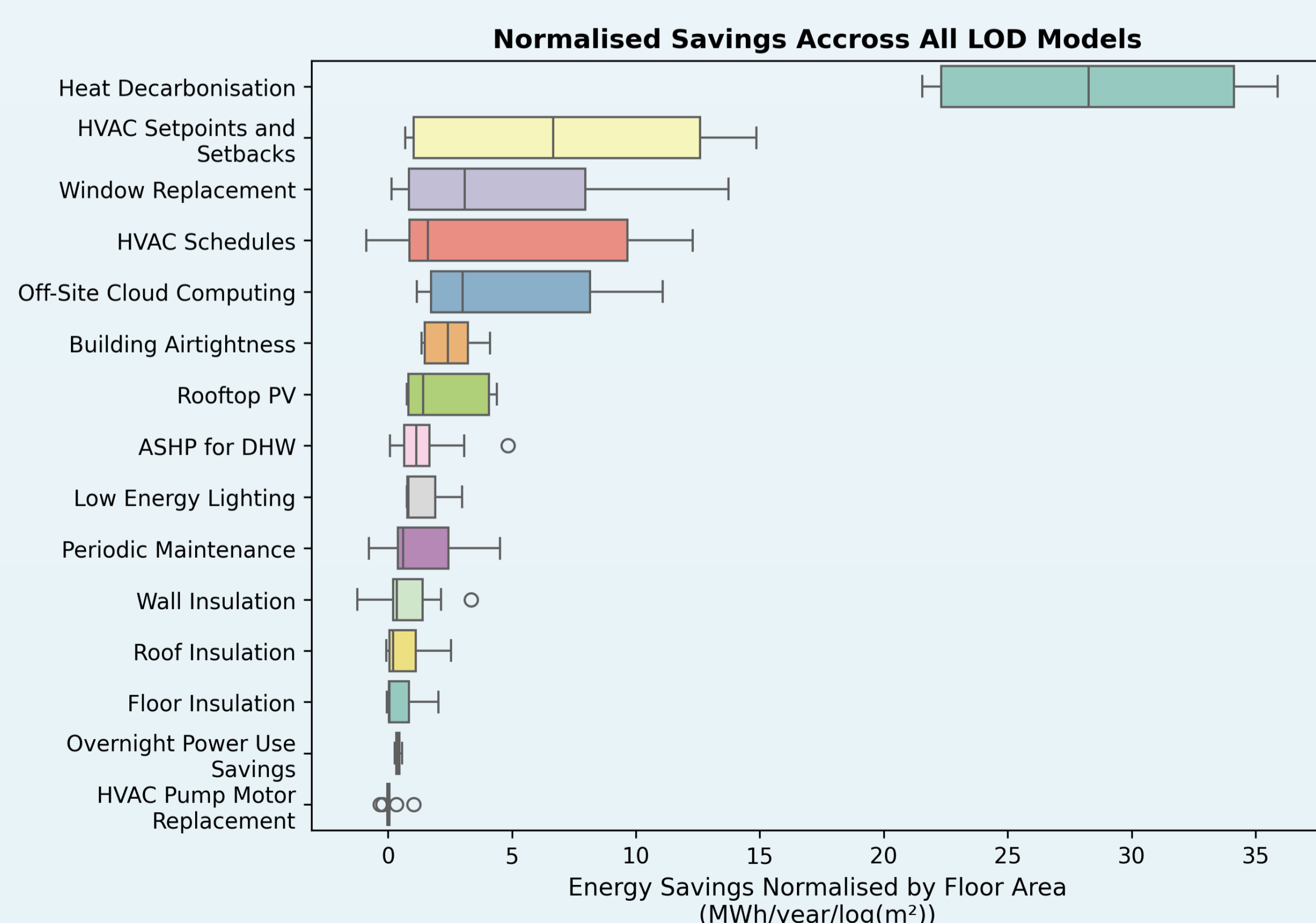
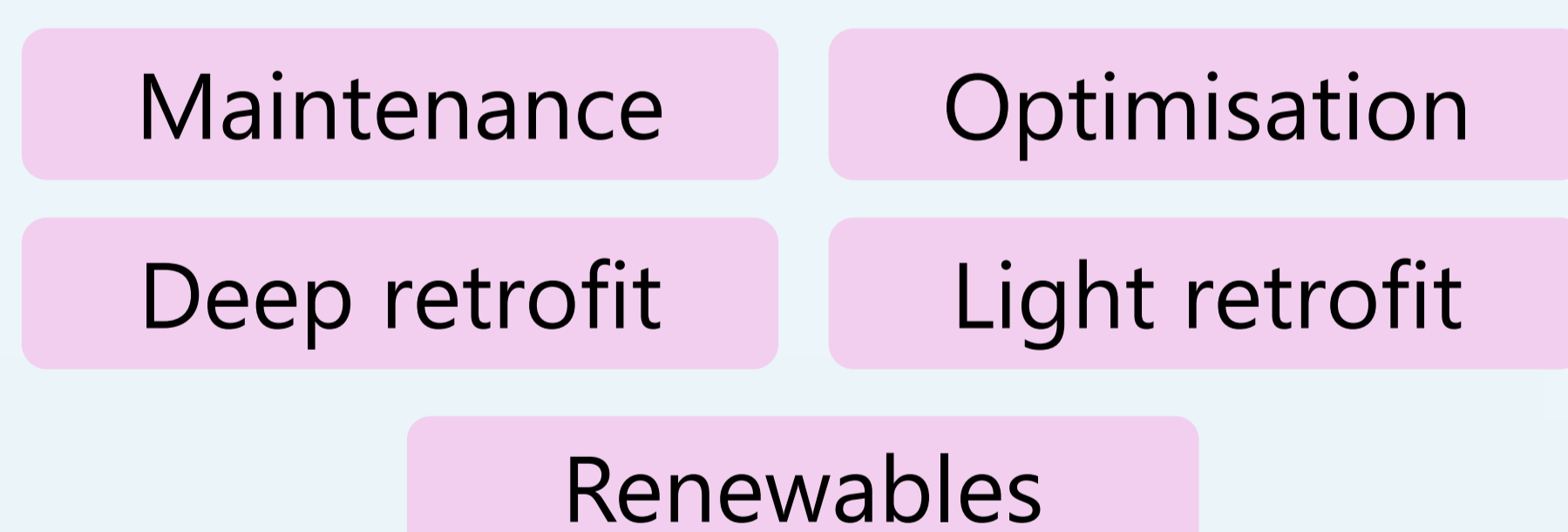


3 case study buildings – University of Oxford



Step 2: Using BES for Retrofit Testing

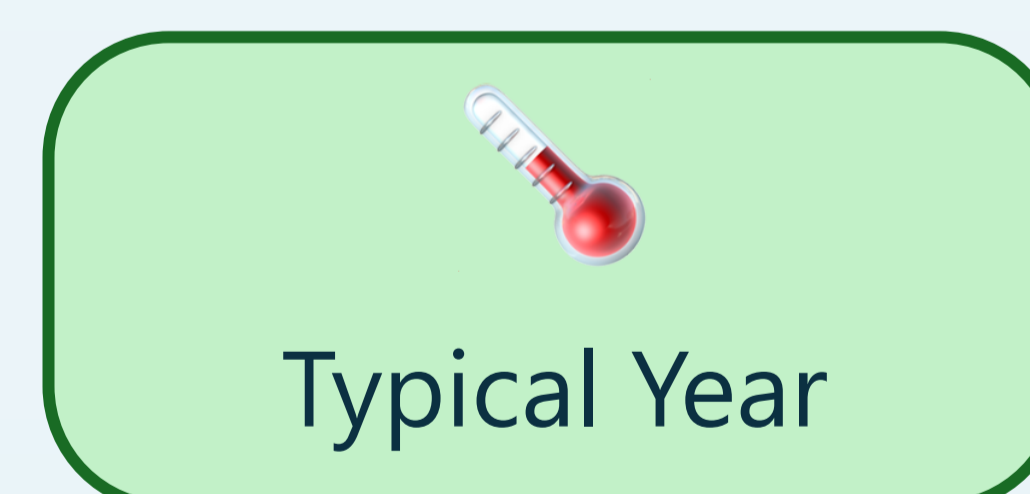
5 retrofit categories



- **Renewables** and **deep retrofits** work well with simplified models
- **Control-based** measures require detailed modelling

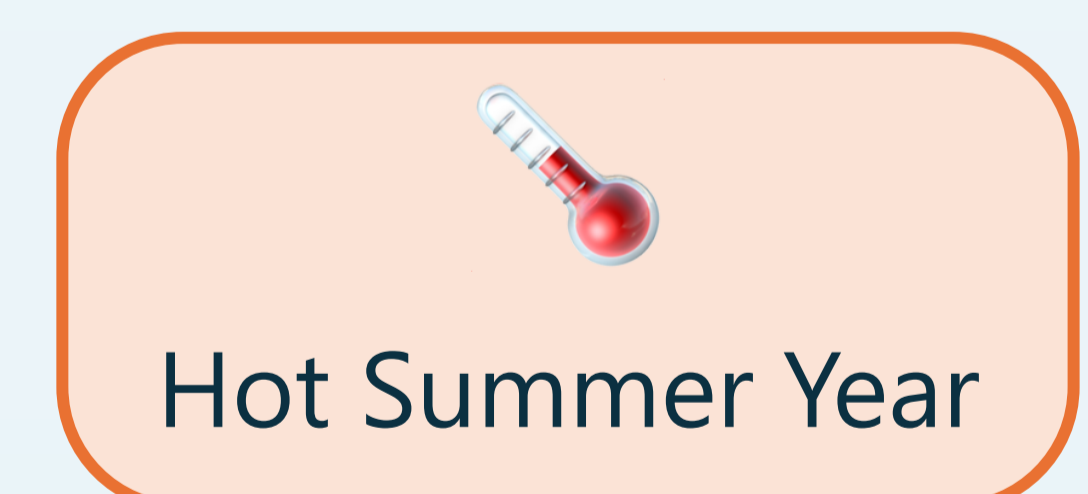


Step 3: Using BES for Future Climate Proofing



Typical Year

VS



Hot Summer Year



No Retrofit

VS



Net-Zero Retrofit

VS



Adaption/Mitigation

- Net-zero retrofits worsen summer comfort by up to **40%** under future climate
- **Building age ≠ climate resilience** - adaptation strategies are needed

