



# National Centre for Energy Systems Integration

## Modelling buildings within energy systems



— Our partners —



THE UNIVERSITY OF EDINBURGH

### — Modelling energy demand at scale —

For building modelling to be meaningful to energy systems research it needs to:

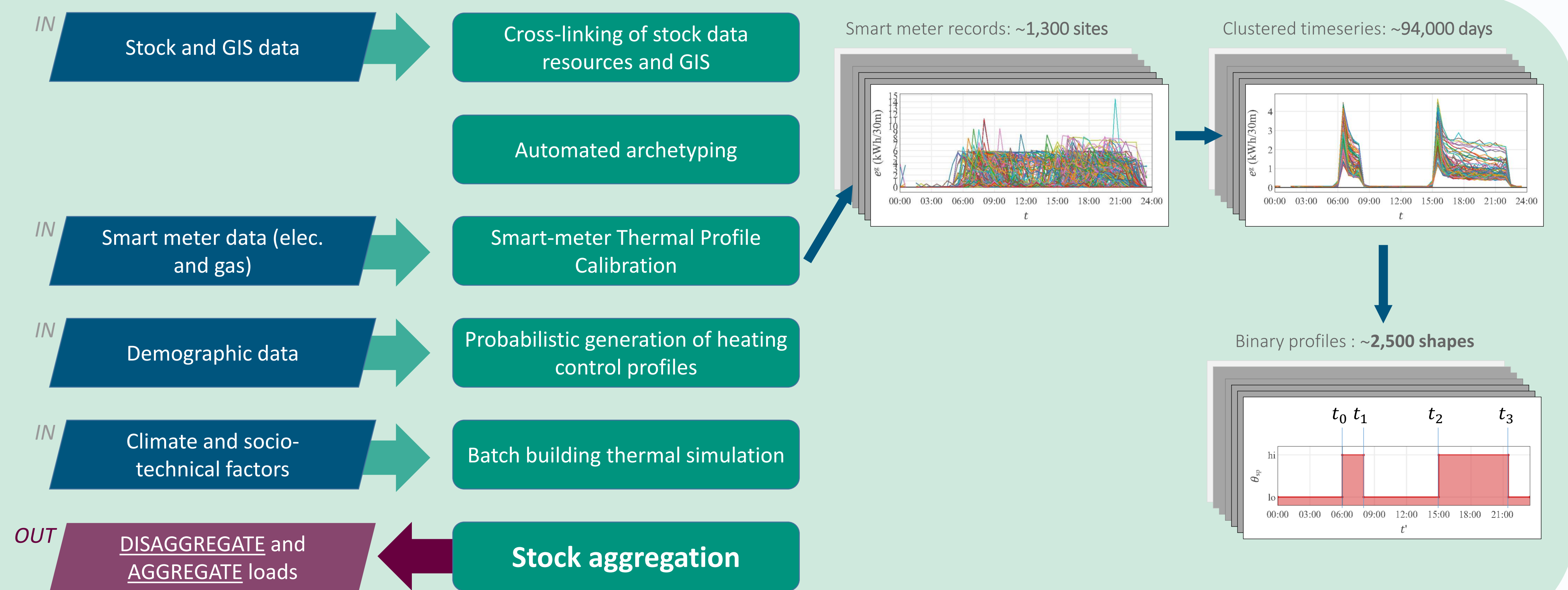
- operate at a suitable spatial scale for multiple buildings
- have an efficiency of calculation that makes model runs feasible at that scale
- be able to identify key inputs from available datasets
- generate a range of output metrics that are useful for urban-scale analysis

### — Constructing a tool for bottom-up demand modelling —

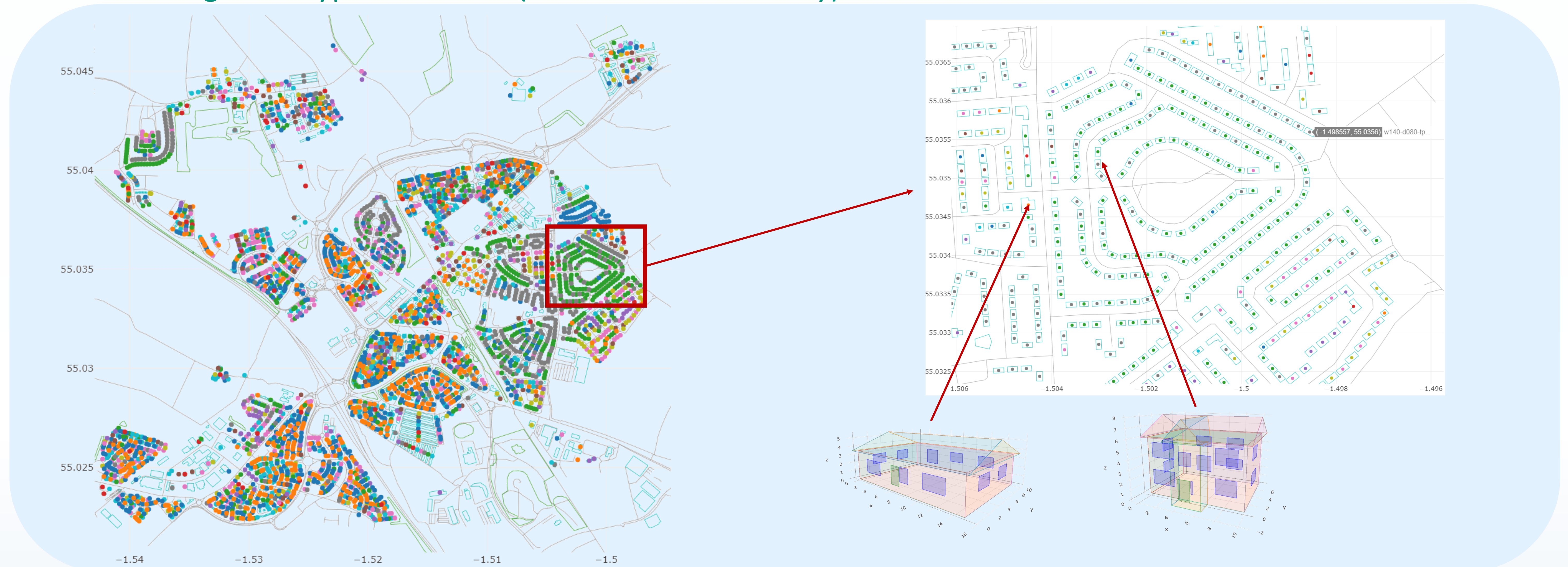
The tool can identify key inputs of:

- **Building geometry** (from GIS)
- **Activity schedules** (from smart meter data)
- **Building materials and HVAC systems** (from EPC reports)

This includes an auto-archetype process (ParaDwell) that converts the identified buildings into 3D physical models for use with dynamic simulation



### — Building archetype detection (Shiremoor case-study) —

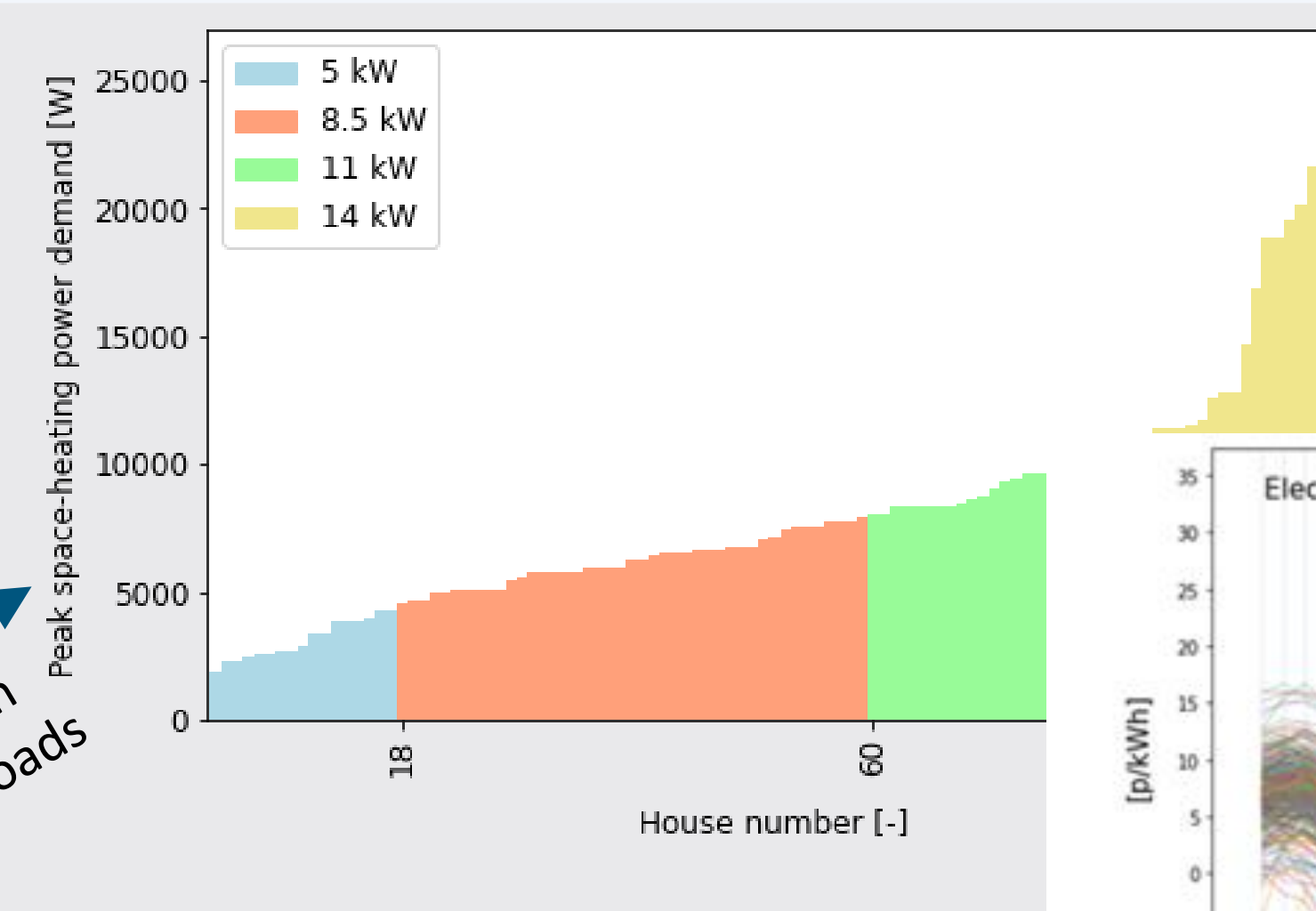


### — Technology deployment at scale (Orkney case-study) —

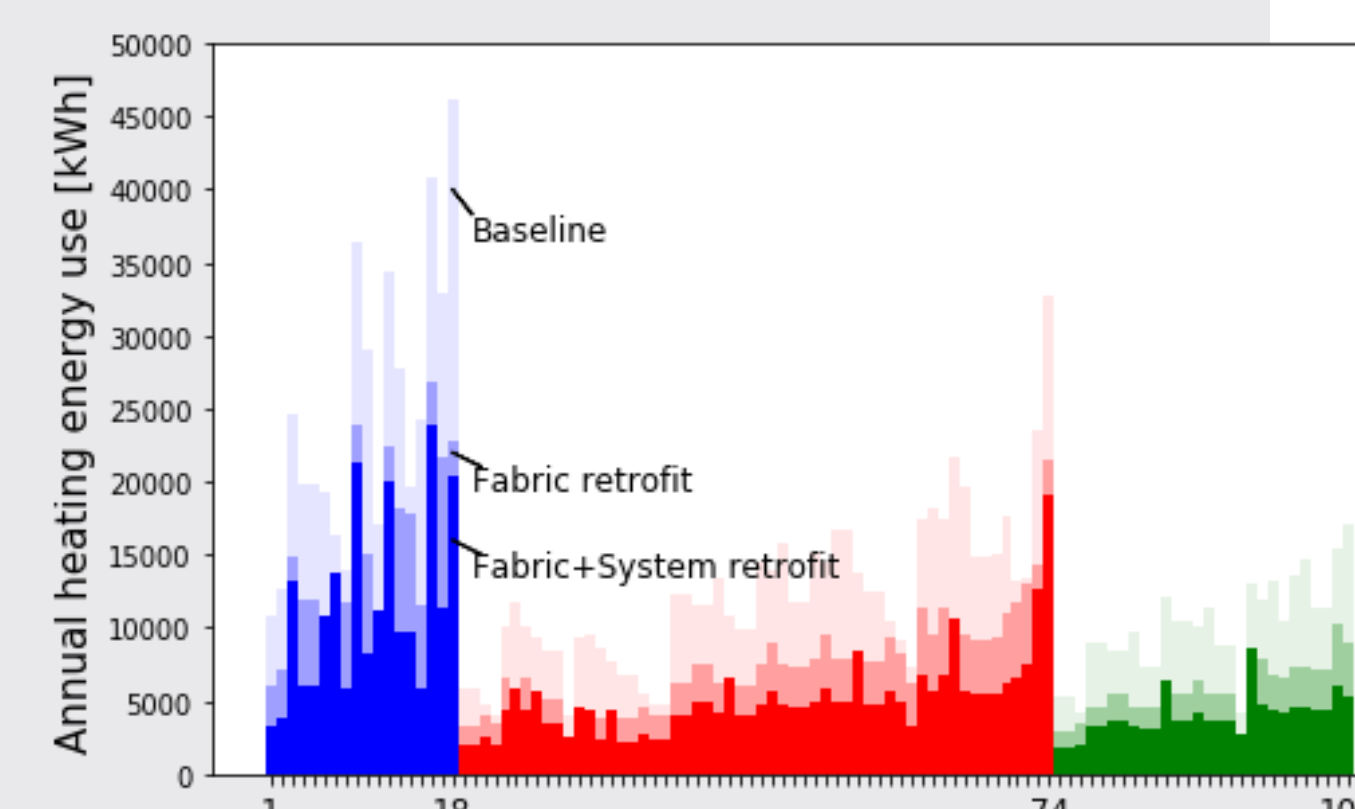
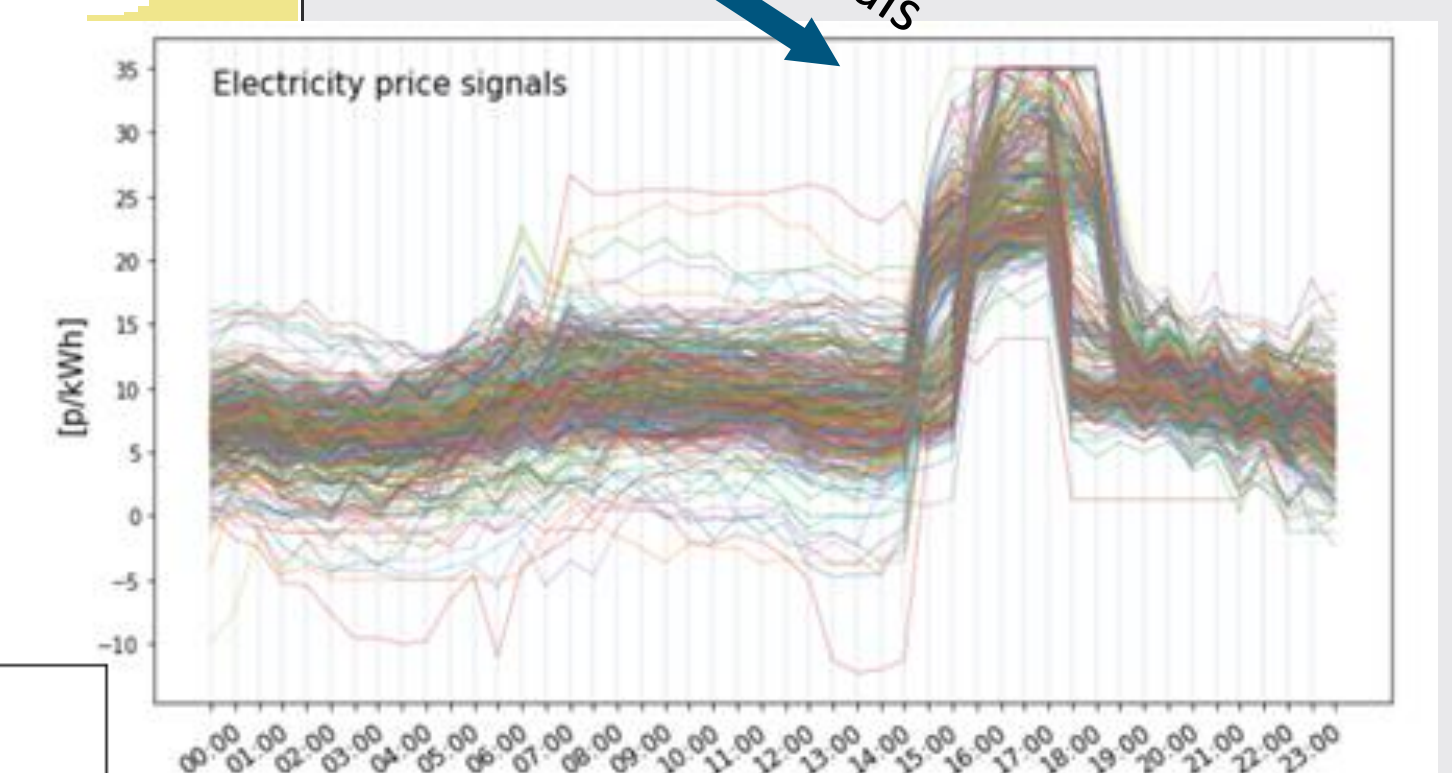
This model was applied to an Orkney case-study via the **ReFLEX** project to understand scenarios of heat pump deployment.

As well as showing aggregated impact of different demand-reduction and heating technology scenarios, it also shows the disaggregated effect by house type. This can potentially aid the design of deployment schemes across communities

ParaDwell application: housing stock characterisation



Rule-based control accounting for price signals



Impact of scenarios on both individual and aggregated buildings