

**Whole life costs & the implications of the
performance gap:**

Post Occupancy Monitoring of two Passivhaus Schemes

Caroline Martin

**Ford Close – St Ive,
Cornwall (20 dwellings)**



WARM:
Low Energy
Building Practice



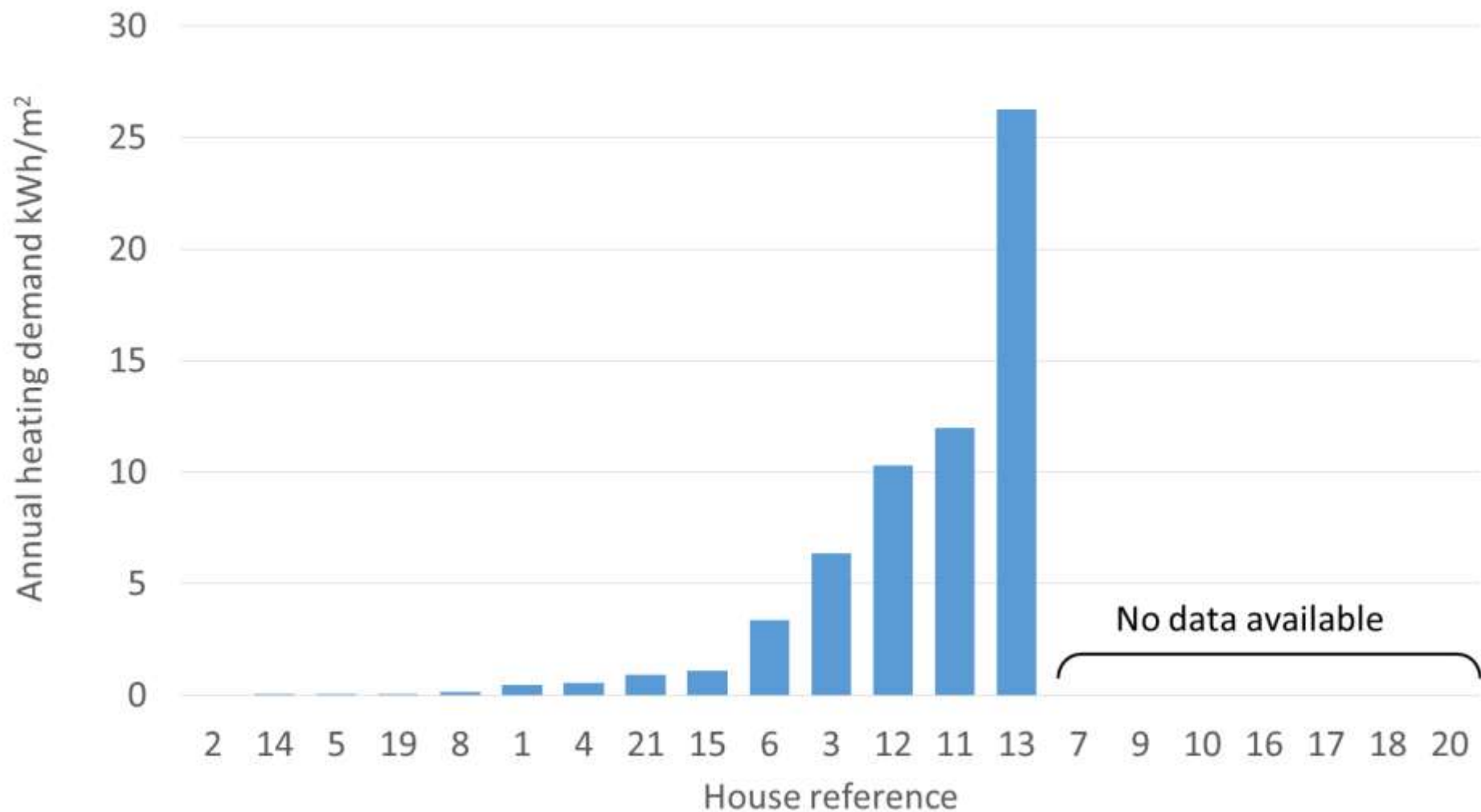
**Parsons Close – Long Sutton Somerset
(3 dwellings)**



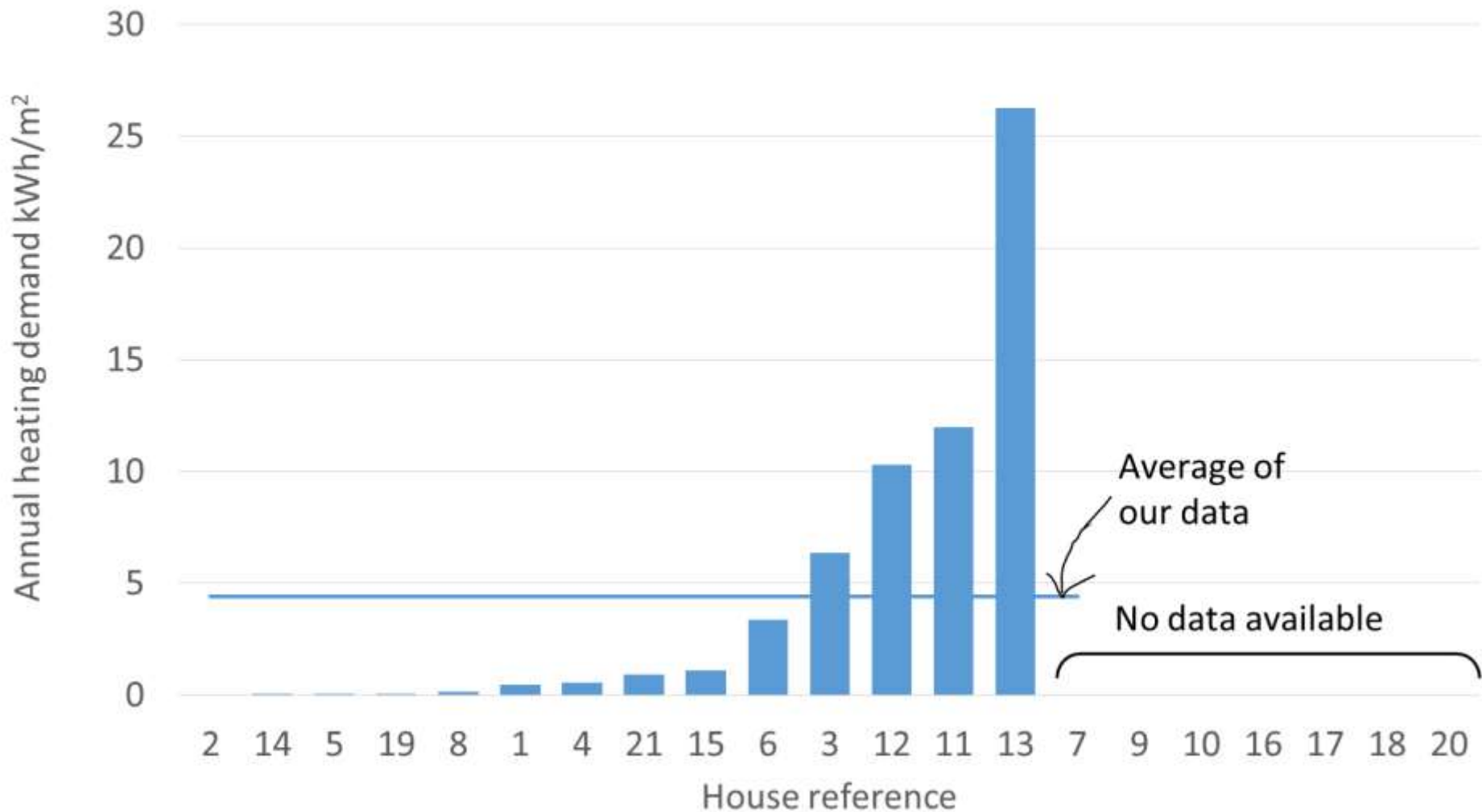
**CLOSING THE
PERFORMANCE
GAP: THE 2020
AMBITION**

From 2020, to be able to demonstrate that at least 90% of all new homes meet or perform better than the designed energy / carbon performance.

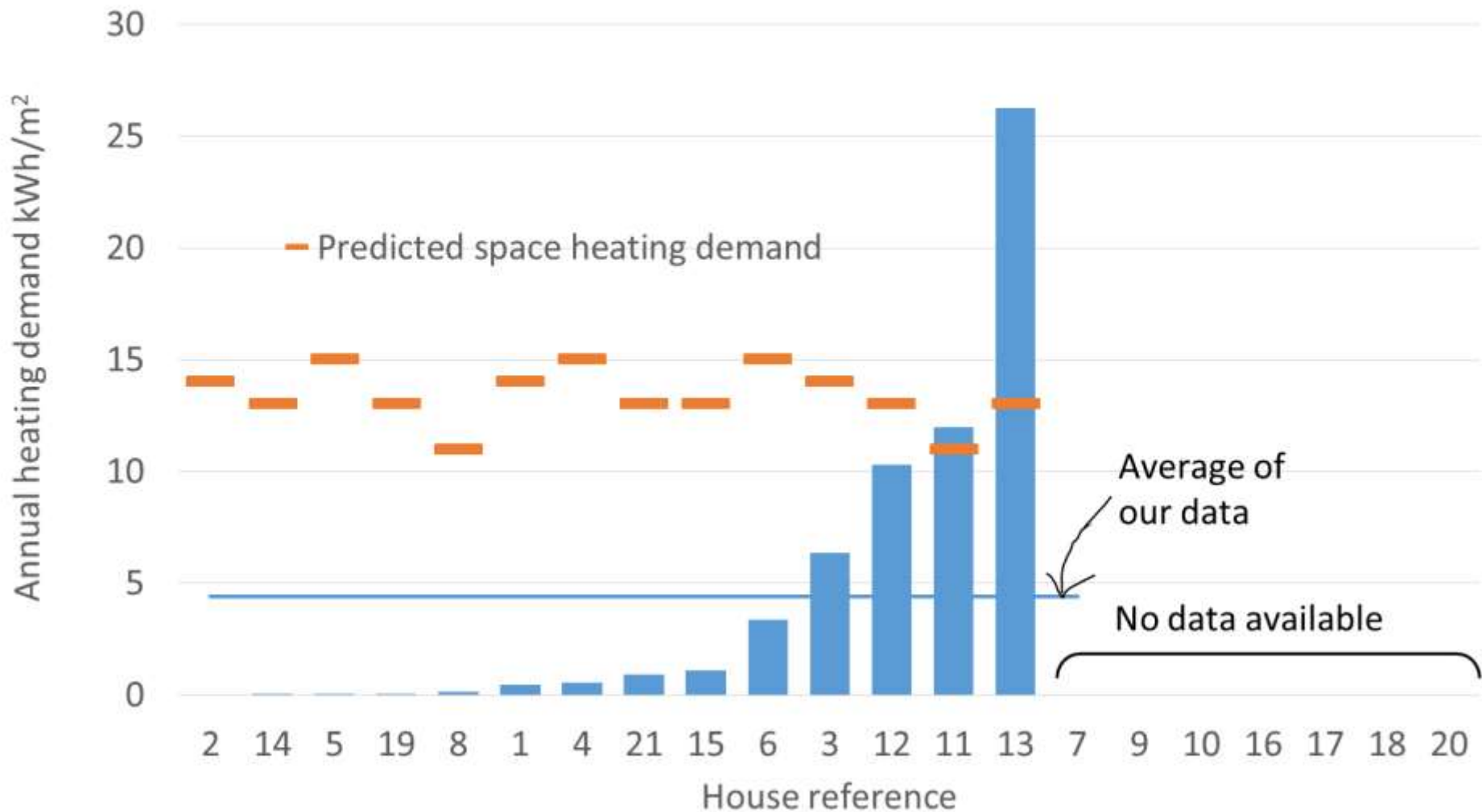
Measured Space Heating Demand (kWh/m²)



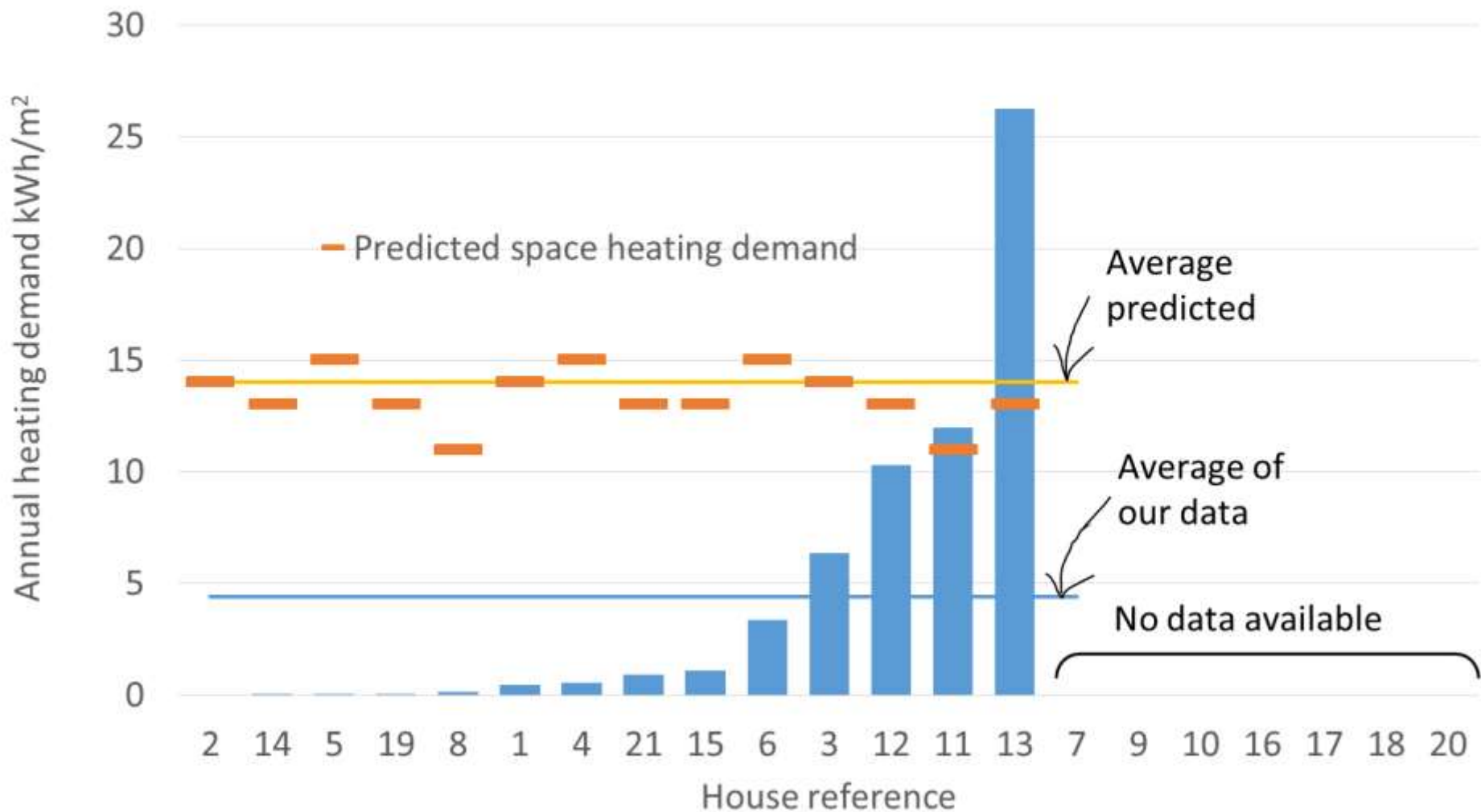
Measured Space Heating Demand (kWh/m²)



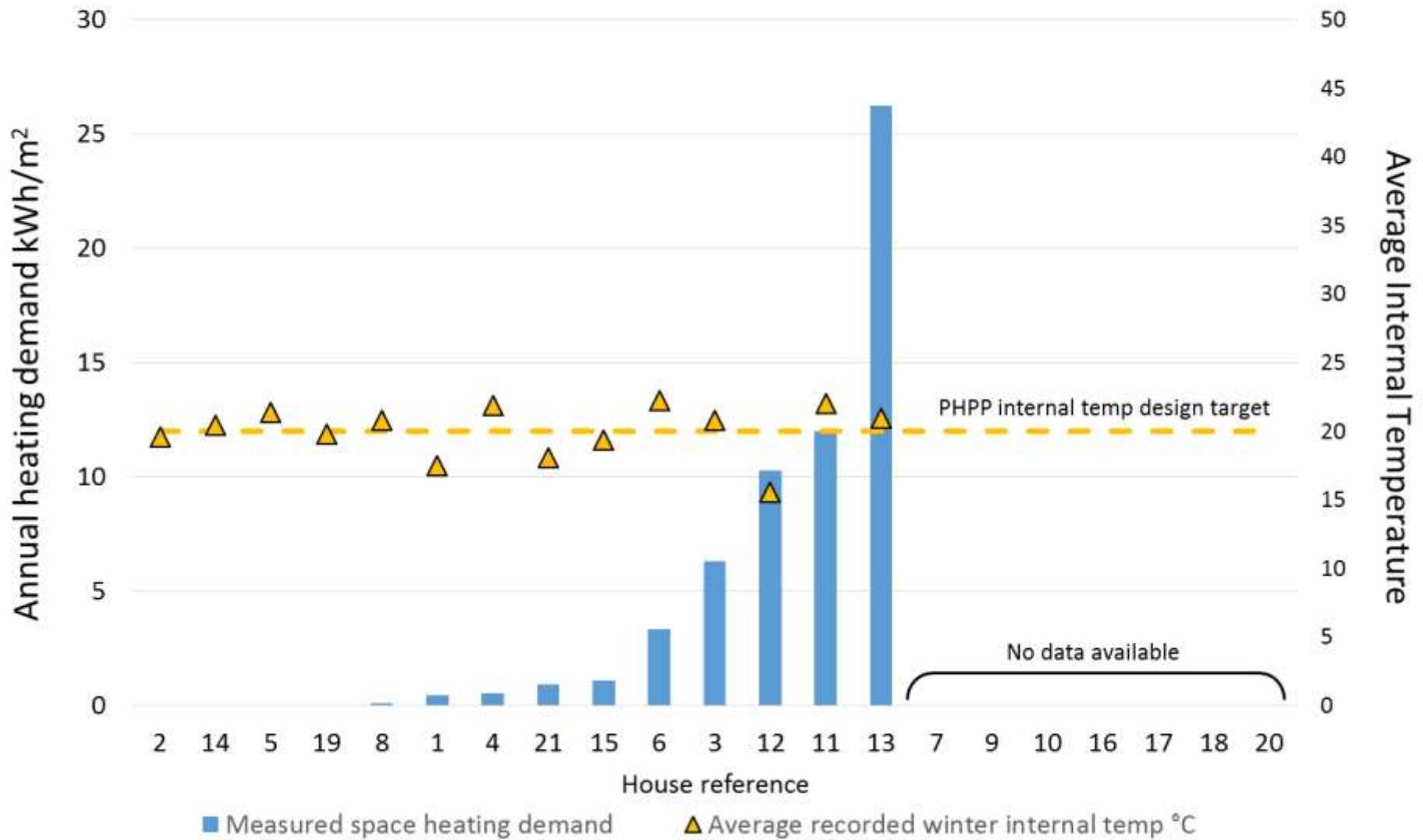
Measured Space Heating Demand (kWh/m²)



Measured Space Heating Demand (kWh/m²)



Measured Heating Demand (kWh/m²) and Average Winter Internal Temperature (October - March inclusive)

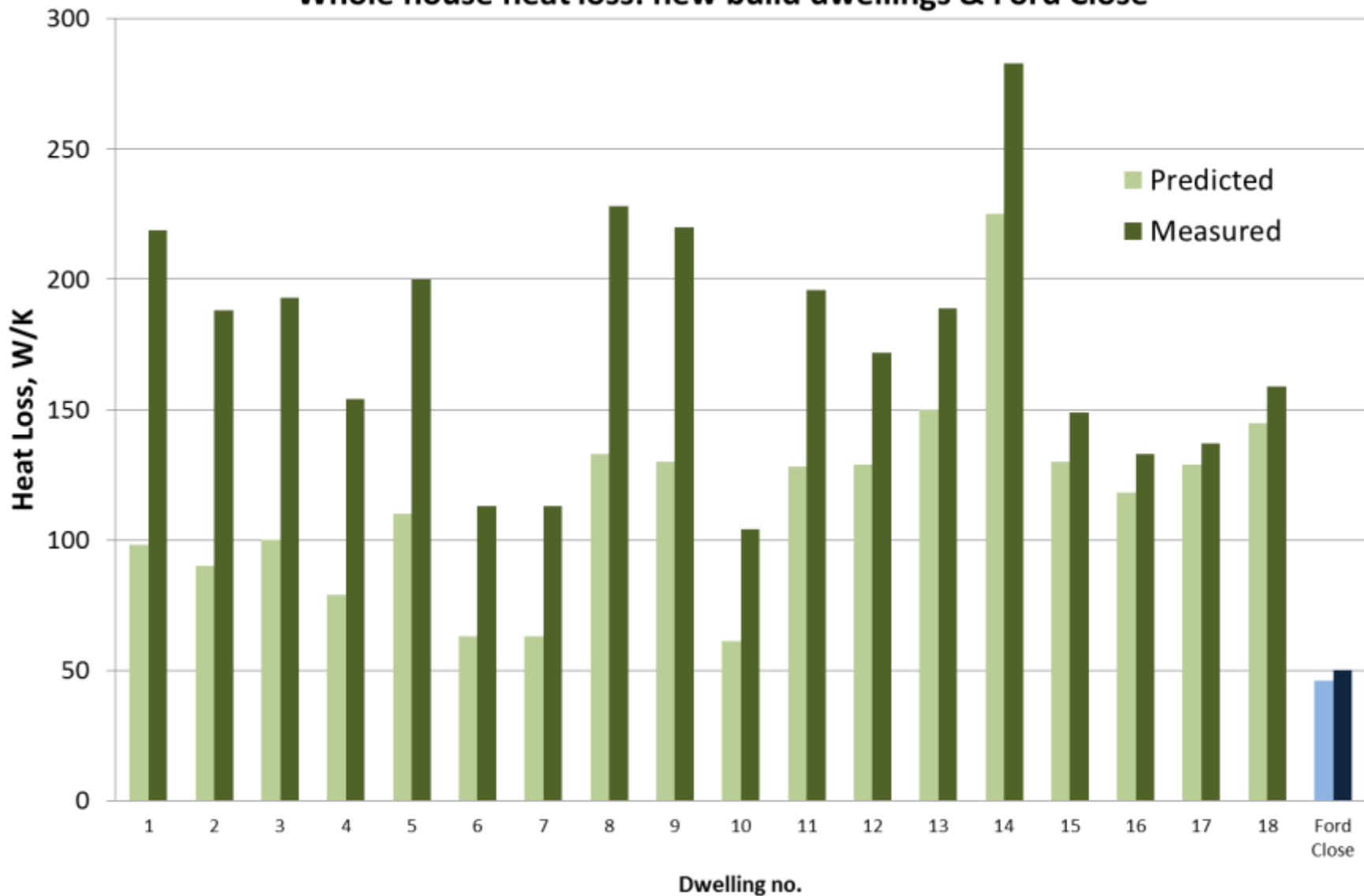


Possible reason for variations in space heating demand

- ~~1. Internal temperature~~
2. Internal heat gains

3. Open windows
4. Solar gain
- 5. Fabric performance**

Whole house heat loss: new build dwellings & Ford Close



Possible reason for variations in space heating demand

~~1. Internal
temperature~~

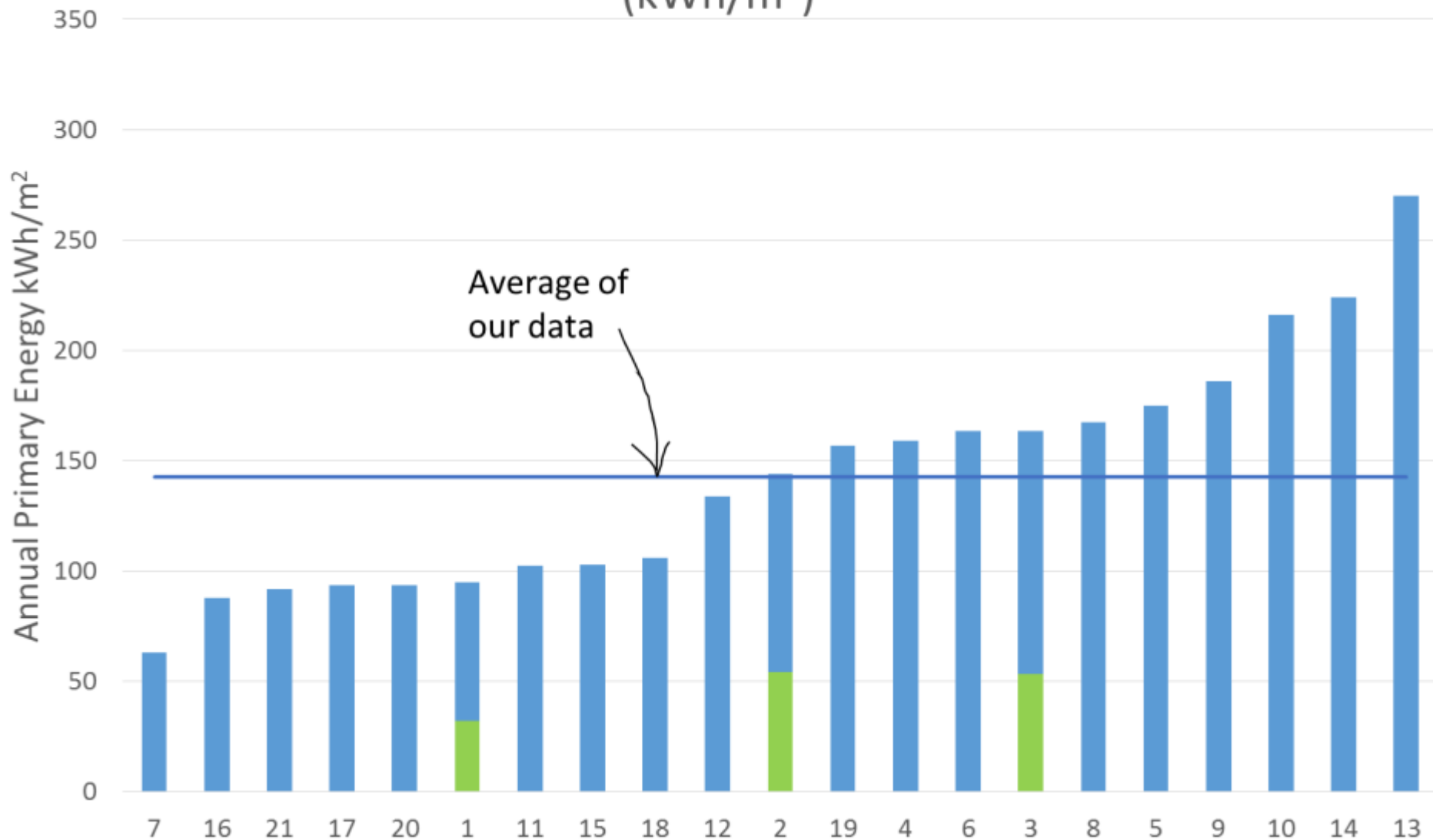
2. Internal heat
gains

3. Open windows

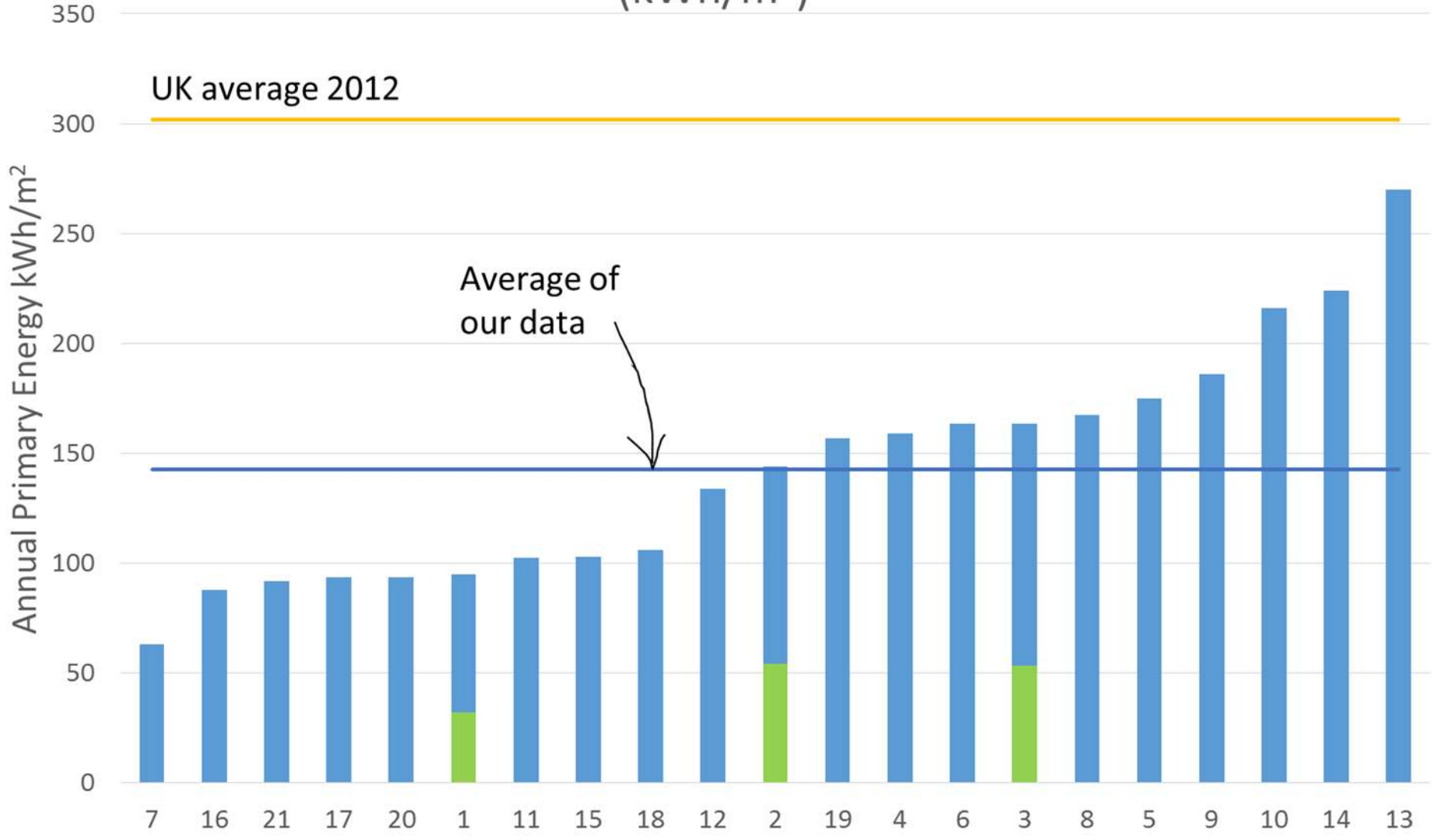
4. Solar gain

~~5. Fabric performance~~

Measured Primary Energy Consumption (kWh/m²)

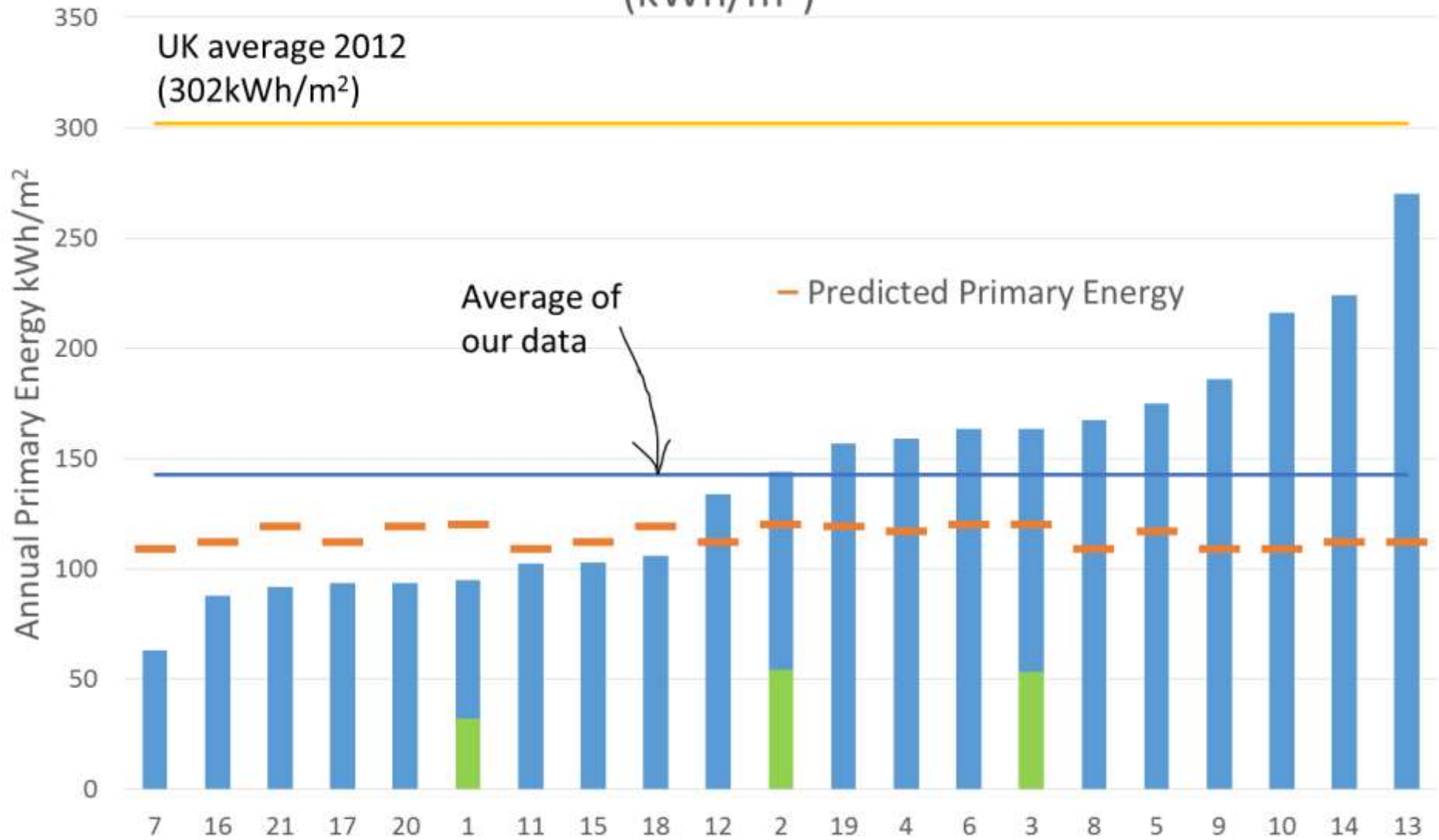


Measured Primary Energy Consumption (kWh/m²)



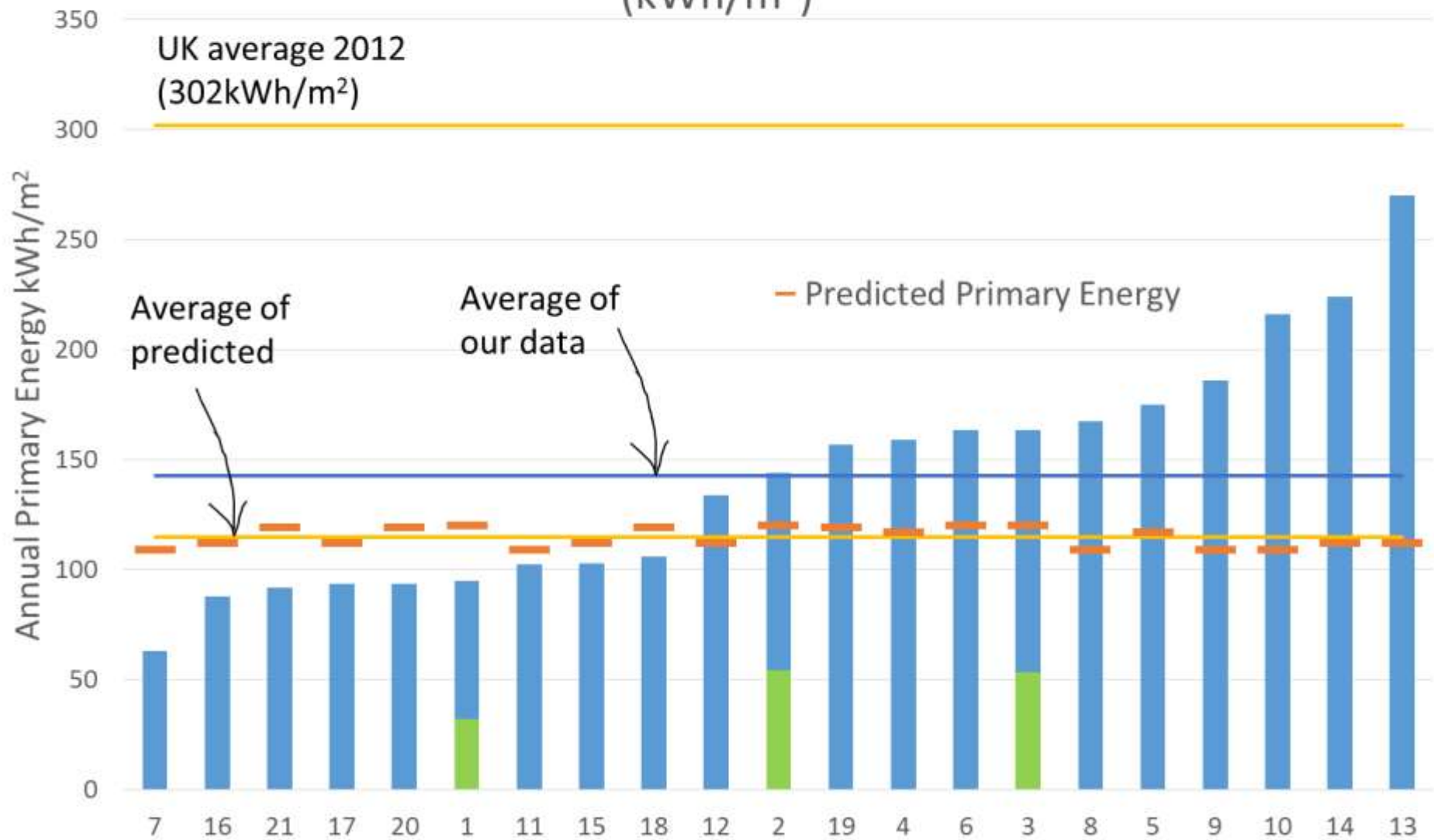
Measured Primary Energy Consumption (kWh/m²)

UK average 2012
(302kWh/m²)



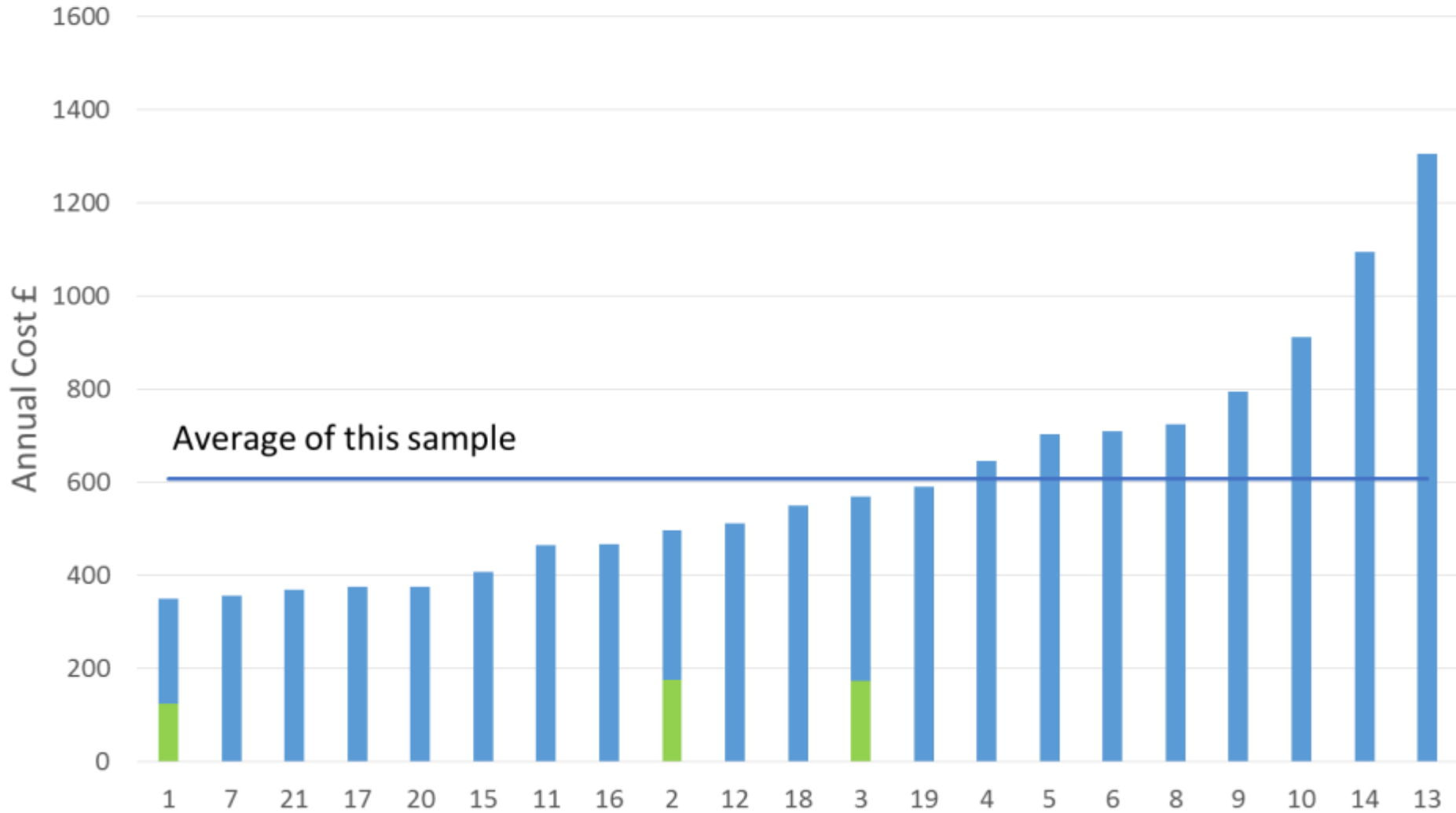
Measured Primary Energy Consumption (kWh/m²)

UK average 2012
(302kWh/m²)



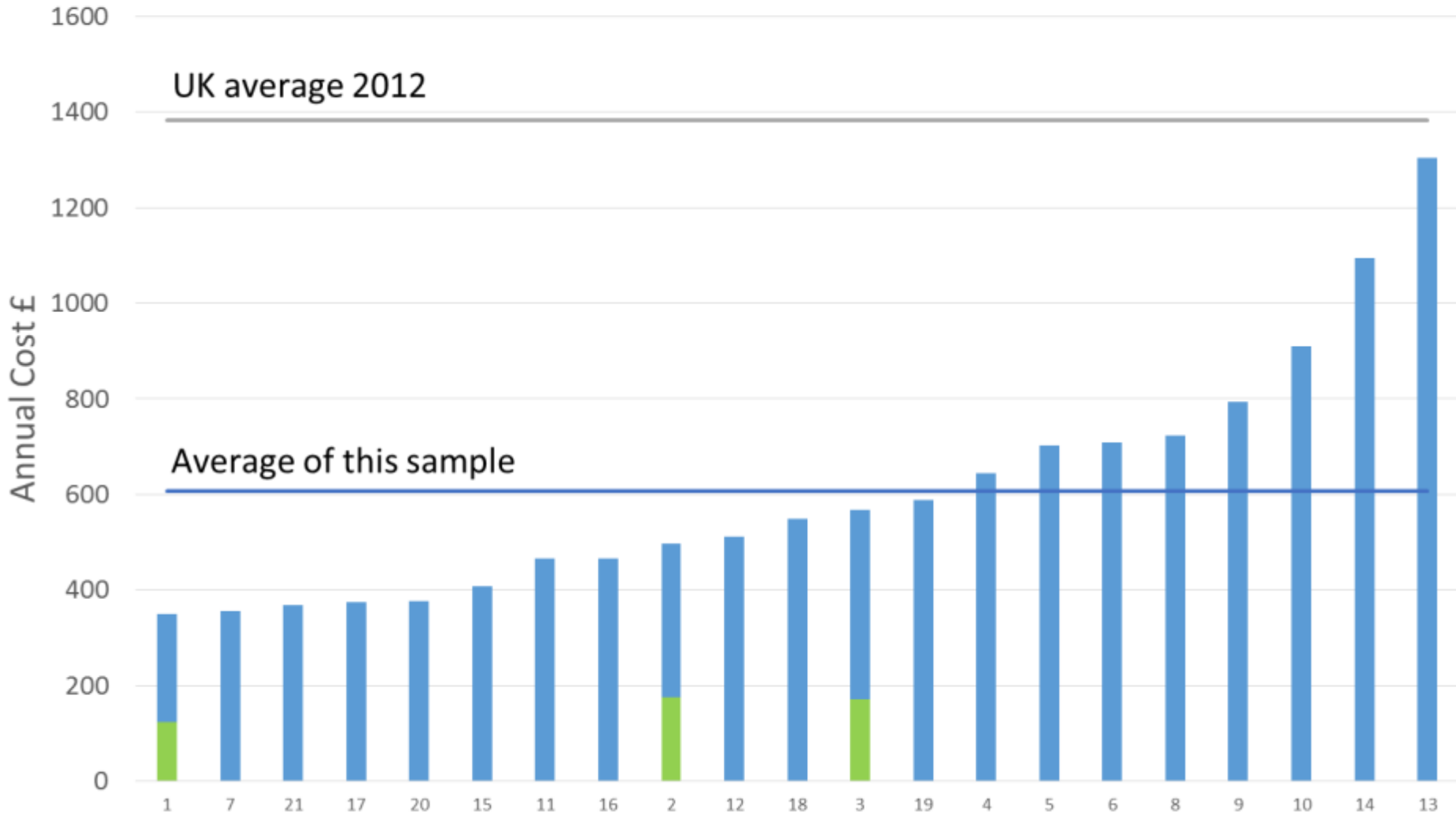
Annual Fuel Costs

■ Gas ■ Electricity



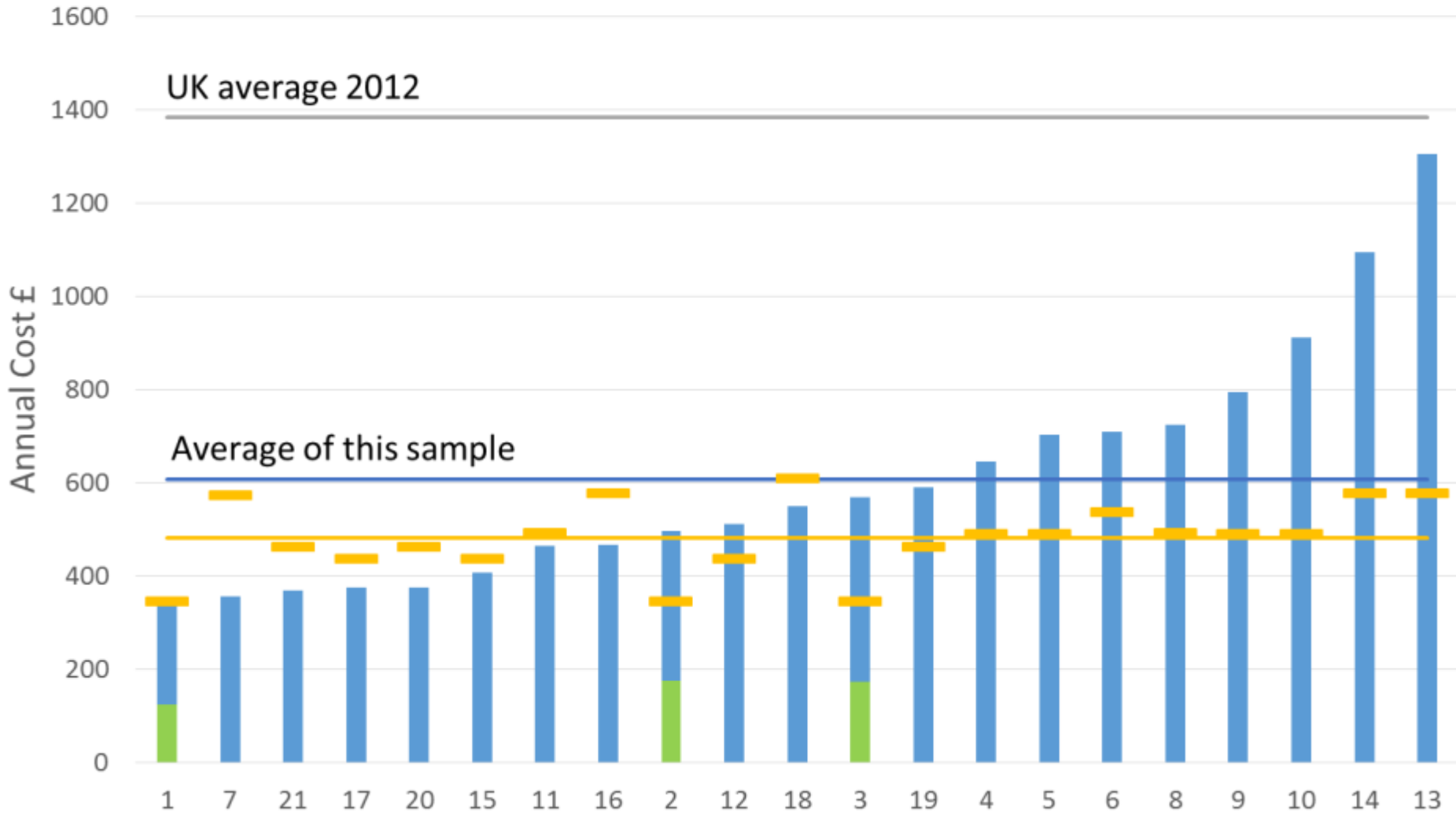
Annual Fuel Costs

■ Gas ■ Electricity



Annual Fuel Costs

■ Gas ■ Electricity — Predicted costs



Annual Heating Demand	Primary Energy Consumption	Annual Fuel Costs
kWh	kWh	£
67% lower than predicted	20% greater than predicted	21% greater than predicted
	53% lower than UK average	56% lower than UK average

Conclusions



- There is considerable variation within our sample
- Not all the buildings performed better than predicted
- Our sample is too small

What next?



- We need to understand occupant behaviour
- Real energy bills?
- Comfort?

Öwe need MORE data!