



The UK's opportunity for demand response has almost doubled

DEMAND RESPONSE

Time-varying tariffs and other programmes encourage households to shift electricity use away from peak times. This can reduce pressure on the electricity grid.

AVAILABILITY

People can only respond if they are home and awake for long enough. **Availability** means the opportunity to respond.

METHODOLOGY

TIME-USE DATA

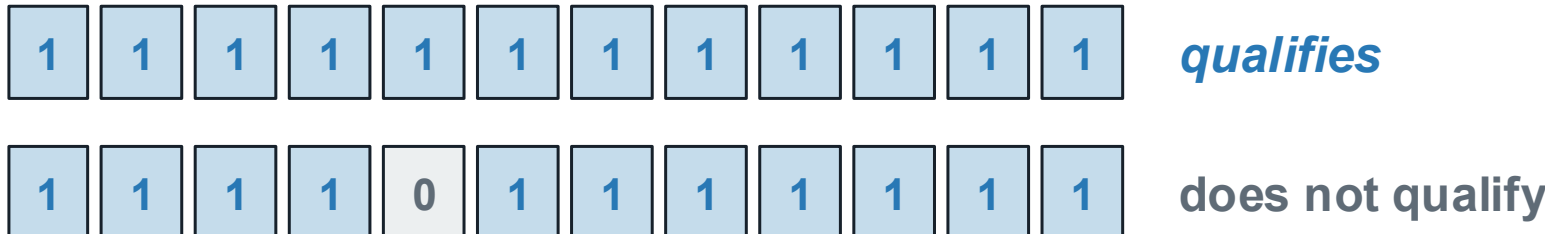
Four national Time Use Survey datasets recorded people's activities and locations from 2000 to 2025.

1 CLASSIFY THE DAY

Every diary day was divided into 10-minute periods.

1 = home and awake
0 = unavailable for that period

2 TEST EVERY TWO-HOUR PERIOD



A period qualified only when all 12 observations (2 hours) equalled 1.

3 AVERAGE THE PERIODS

$$\text{Availability} = \frac{\text{qualifying two-hour periods}}{\text{all eligible two-hour periods}} = \text{opportunity to respond}$$

SMART-METER DATA

Two datasets measured household electricity use.

ELECTRICITY DURING THE PEAK

Peak use
Total electricity used during the peak

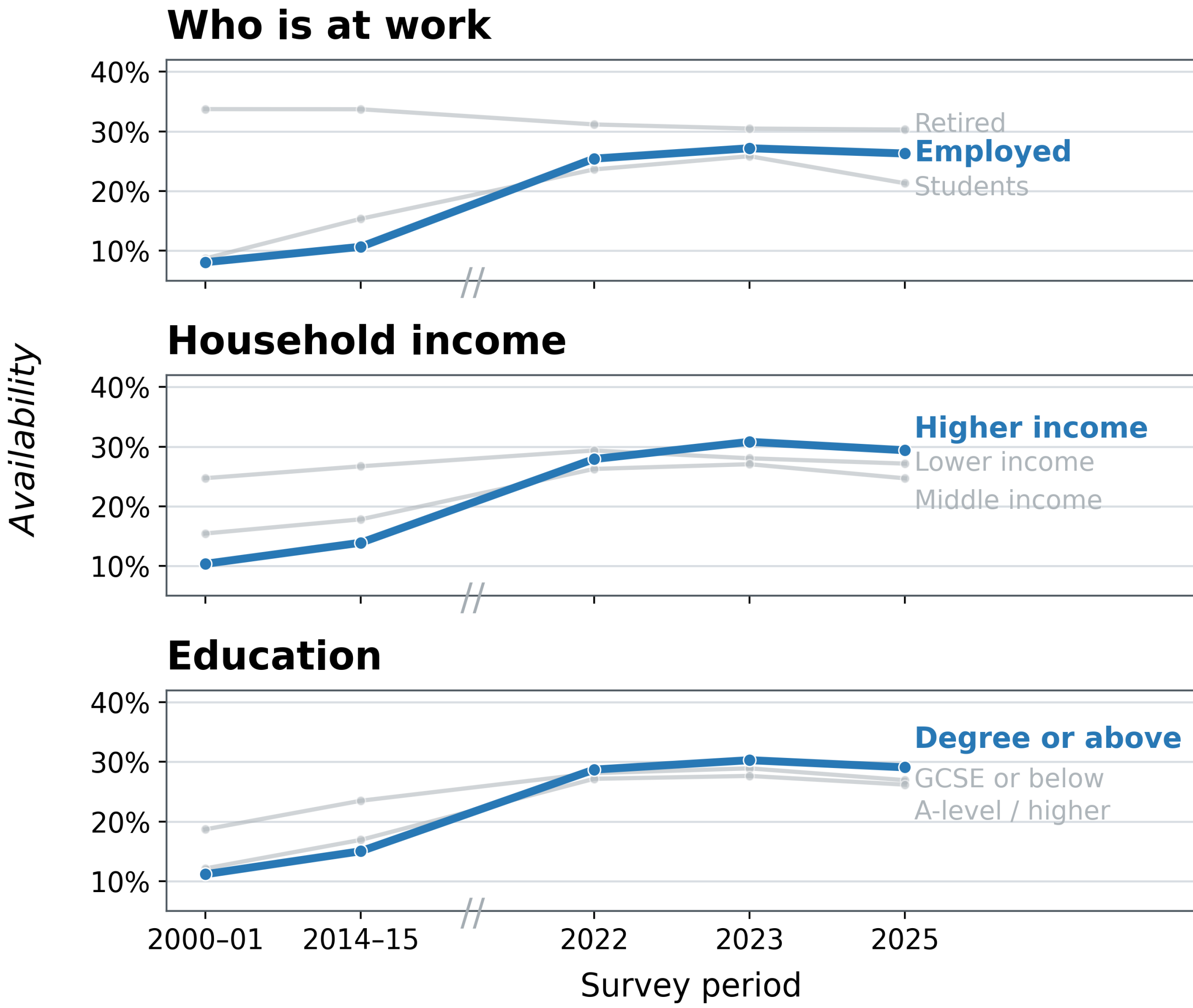
Peak share
Peak use ÷ total daily use (%)

RESULTS

OVERALL AVAILABILITY ALMOST DOUBLED SINCE 2000

16% → 30%

Groups linked to home working gained the most availability



LARGEST GAINS

- Higher income +23 points
- Degree qualified +20 points
- Employed +19 points

These groups could benefit most from home working.

LITTLE OR NO CHANGE

- Retired adults +2 points
- Lower-income women ≈0

These groups were less likely to benefit from the expansion of home working.

IMPLICATIONS

FORECAST REALISTIC OPPORTUNITY

- Many national forecasts overlook whether people are home for long enough to respond.
- Use the current range for normal planning and the pandemic as a stress-test case.

TARGET WHERE RESPONSE MATTERS

- Availability shows who has time to respond; peak use shows where shifting could provide the greatest value.
- Occupation and required work location can identify who is able to participate.

TURN OPPORTUNITY INTO ACTION

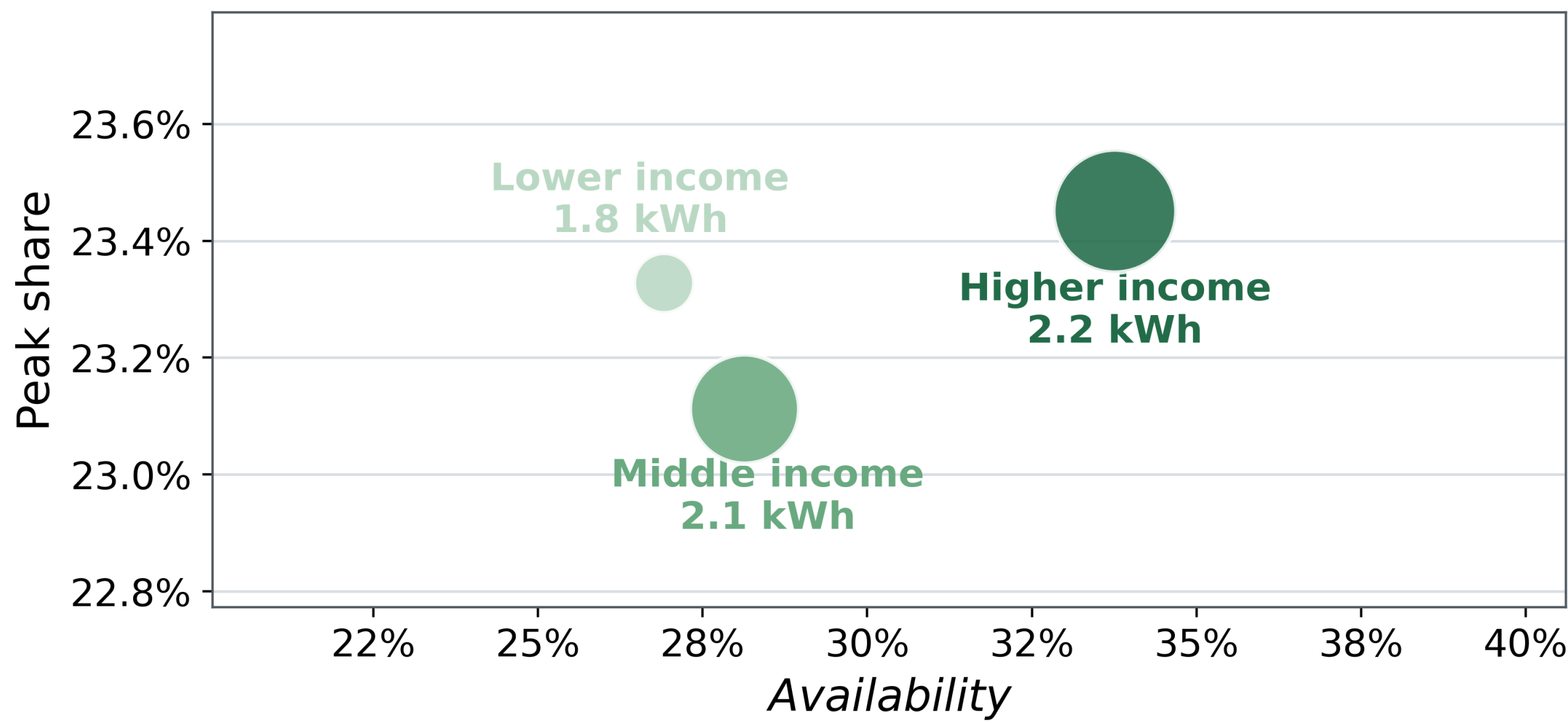
- Higher-income groups combined high availability with high peak use, but may be less motivated by savings alone.
- Combine payments with app-based challenges and feedback, as in Octopus Savings Sessions.

PROTECT PEOPLE WHO CANNOT SHIFT

- Vulnerability depends on income, availability and essential peak use.
- During severe energy crises, households unable to shift may need protected tariff options.

Availability matters for both system value and fairness.

Higher-income groups have greater availability and greater peak use



Higher-income adults gained the most availability.

More advantaged households used the most electricity during the peak.

Together, these groups are the clearest target for demand response.

Availability identifies opportunity. It does not show whether people will act.

Considering **availability** alongside **peak use** shows who has time to act, where demand response can provide the greatest value, and who could face tariffs they cannot avoid.

