ICT for Energy Balanced Living

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Solar power generation world record set in Germany

Plants produced 22 gigawatts at midday hours on Friday and Saturday, meeting half country's electricity needs on second day

We will all be ENERGY FARMERS soon ...?

By September 2012 there were over 360,000 domestic microgeneration installations in the UK, with a constant pace of over 1,200 installations added per week.

As of March 2012, domestic PV systems registered under the Feed-in Tariffs reached 800 megawatt, which is about 0.1% of UK domestic electric consumption.

[Feed-in Tariff statistics - Department of Energy and Climate Change: 2012. http://www.decc.gov.uk/en/content/cms/statistics/energy_stats/source/fits/fits.aspx]

Energy is becoming more COMPLEX for consumers
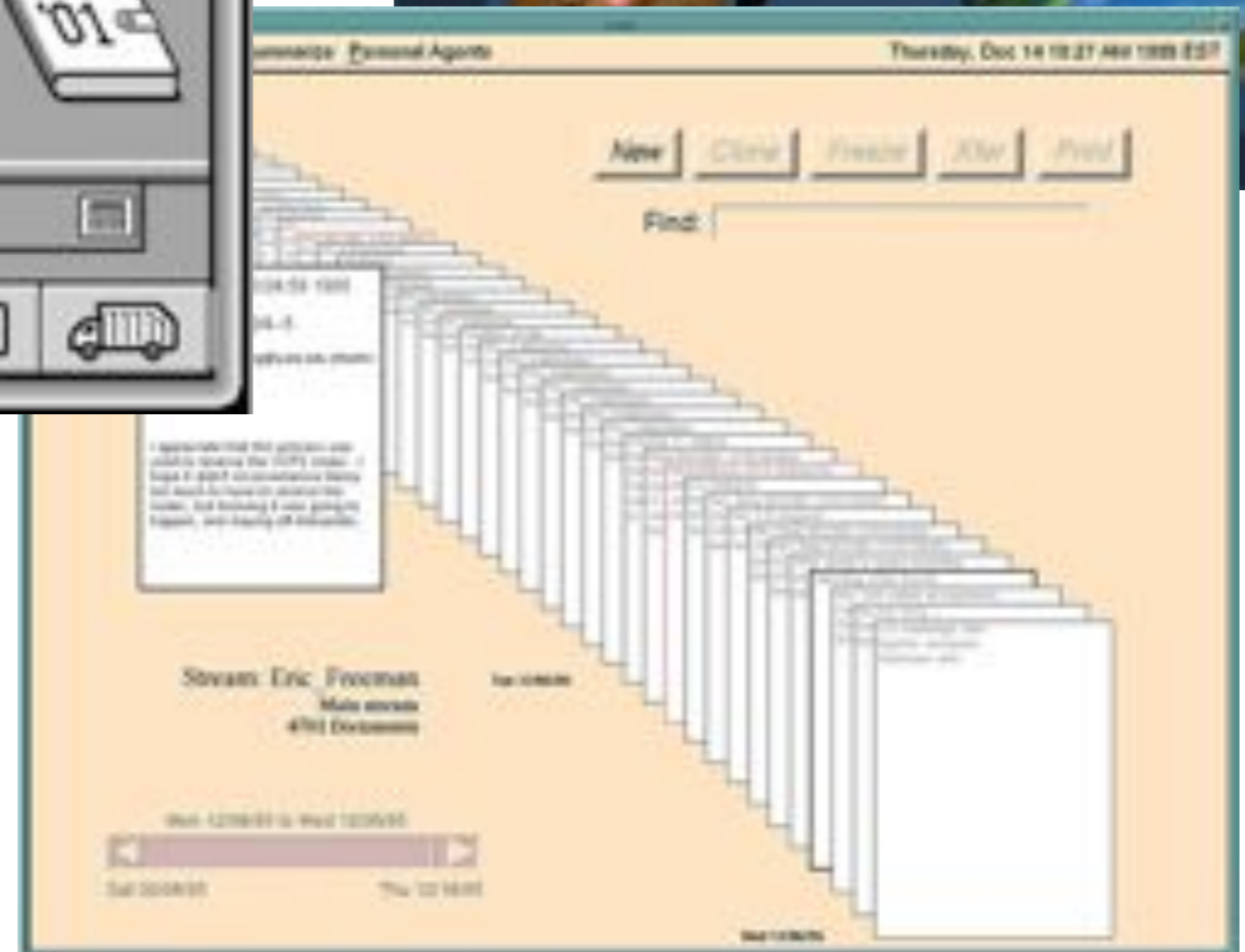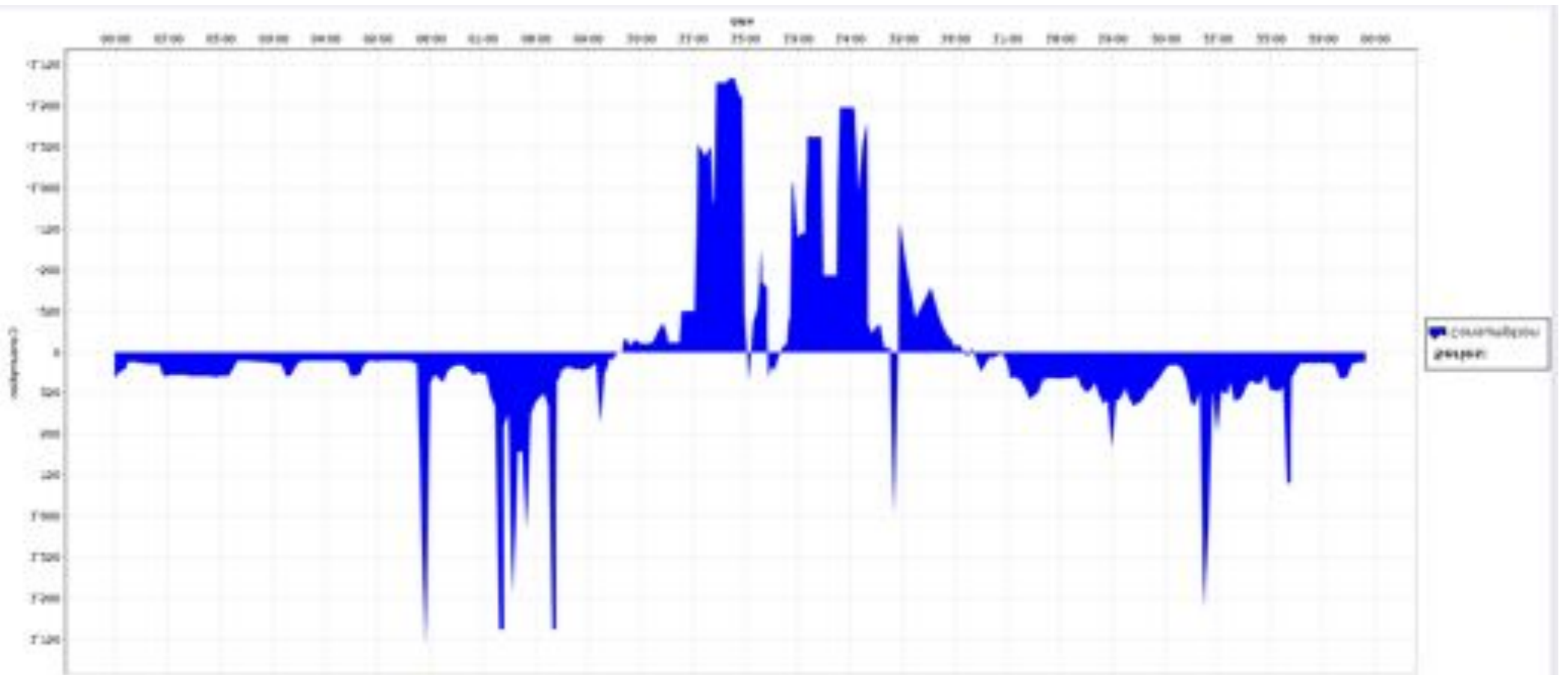
Computer Science is about dealing with complexity

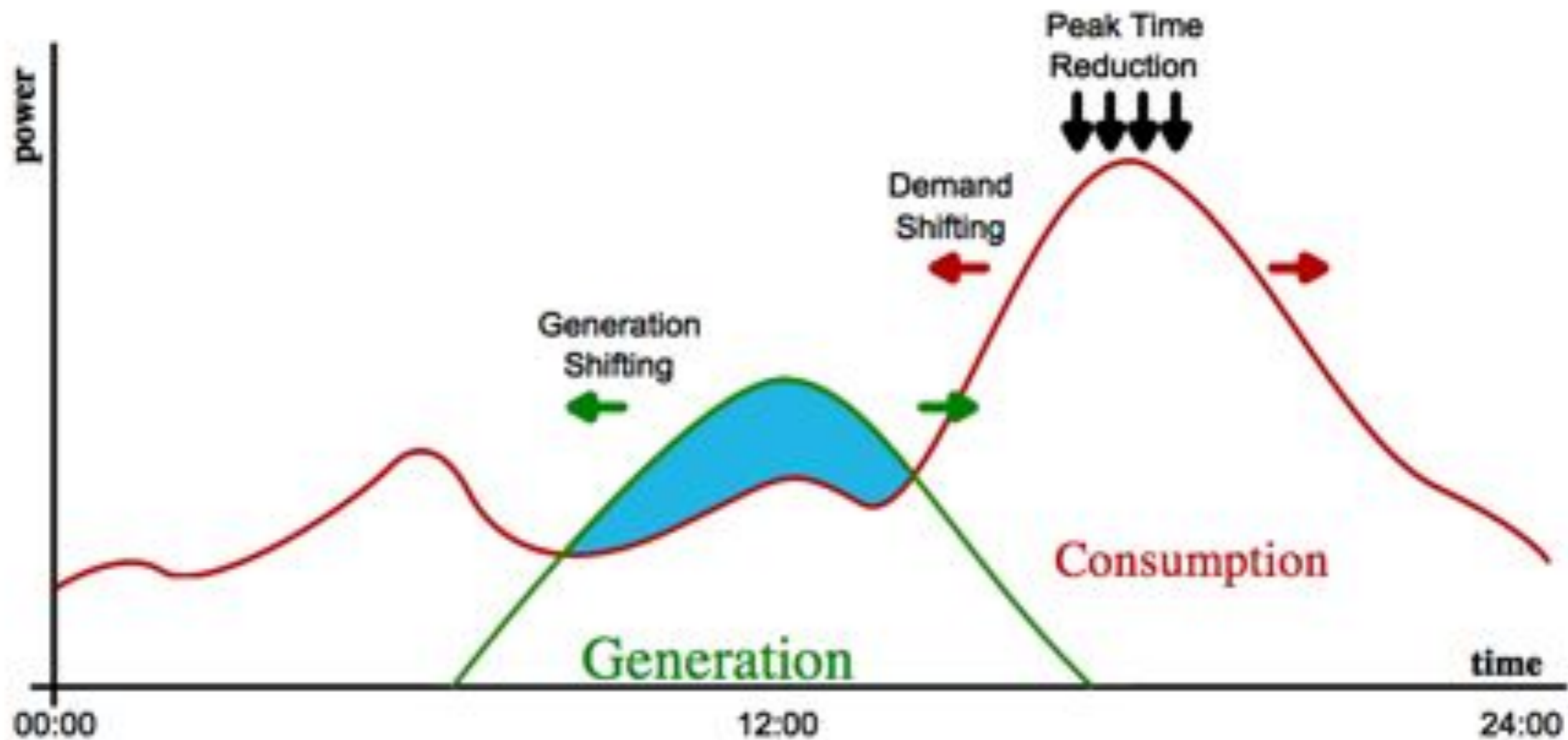**Currently we are just exposing complexity**

What is the role of ICT in helping people deal with ENERGY COMPLEXITY?

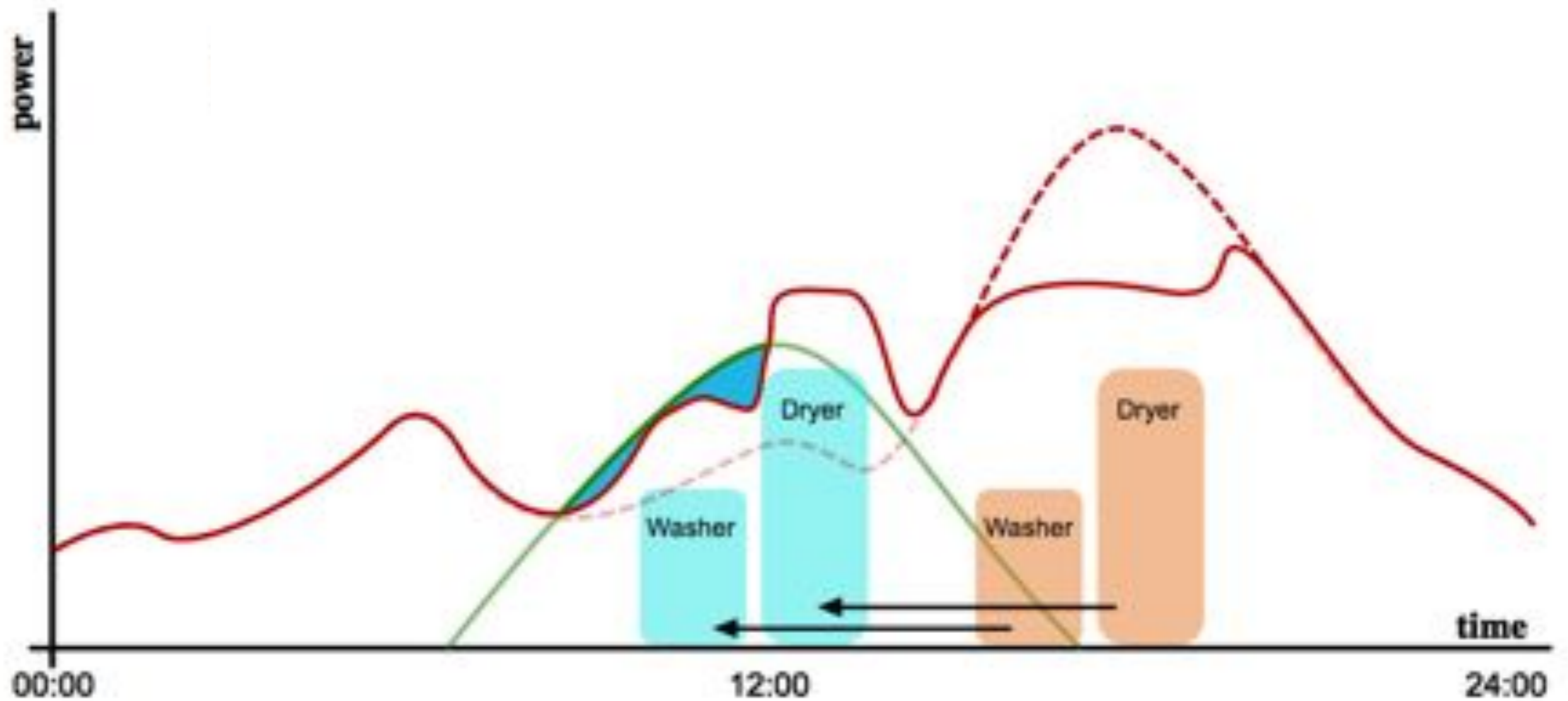What is the role of ICT in enabling people to live an ENERGY-BALANCED LIVE?
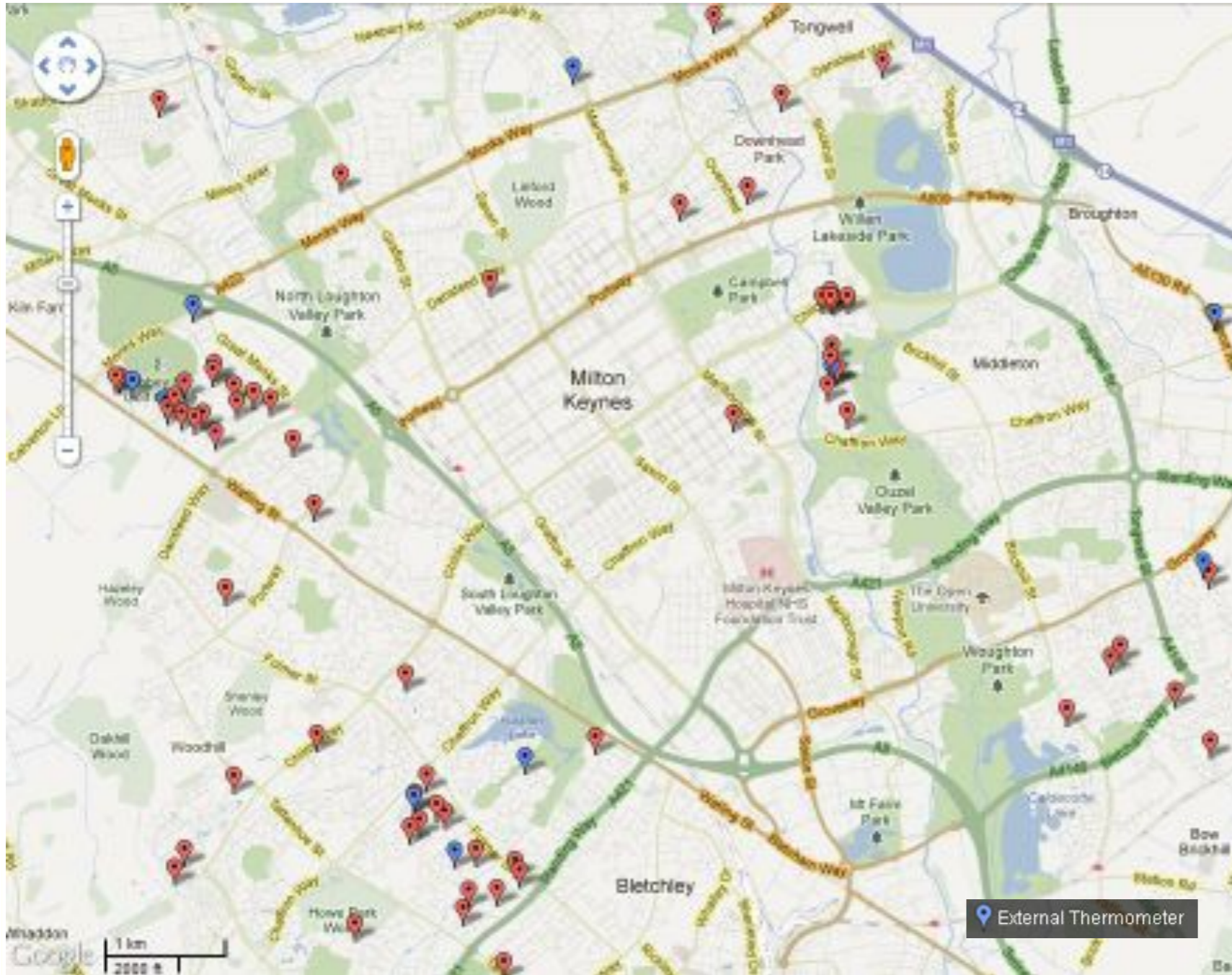
Consumption vs Generation (2013-01-15)
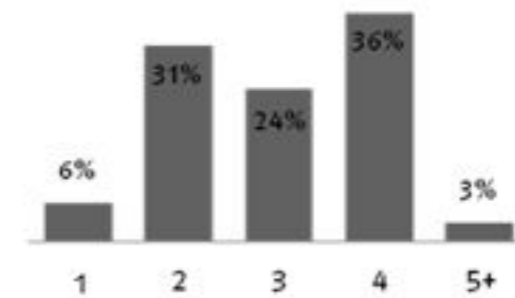
Is DEMAND-SHIFTING a viable option?

Is DEMAND-SHIFTING a viable option?

Map of participant distribution

Participant Demographics

- 63% Married/Cohabiting+ Kids+/Parents
- 5% Married/Cohabiting +Kids out of home
- 2% Other
- 2% Living alone
- 7% Single+Kids+/Parents
- 22% Married/Cohabiting

People in Household

- 6% (1)
- 31% (2)
- 24% (3)
- 36% (4)
- 3% (5+)

No of bedrooms

- 0% (1)
- 8% (2)
- 30% (3)
- 48% (4)
- 13% (5+)

Monthly Energy Cost

- £51-100: 45%
- £0-50: 8%
- Don't Know: 8%
- £151+: 11%
- £101-150: 30%
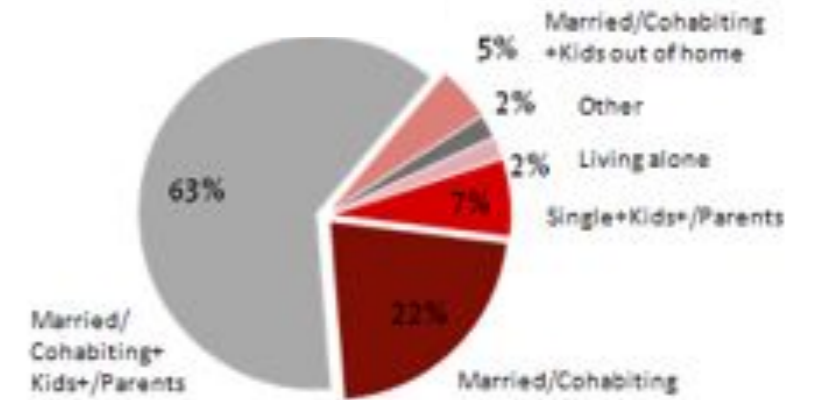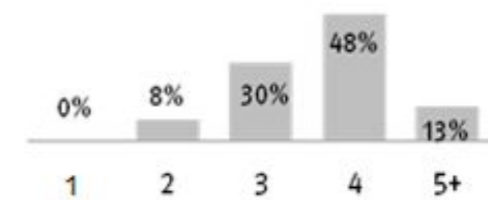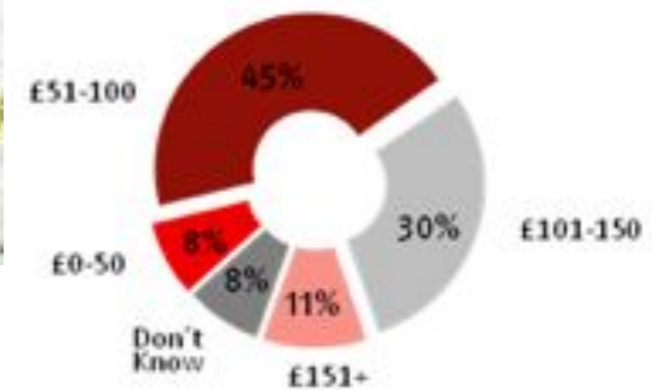
FOCUS GROUPS with 75 Households

"We now switch on (appliances) when the sun is out – so that's happened with the introduction of solar panels…"

"the sun was out, so the washing machine was on. It would be nice if I could do the ironing – but I don't know how much …"

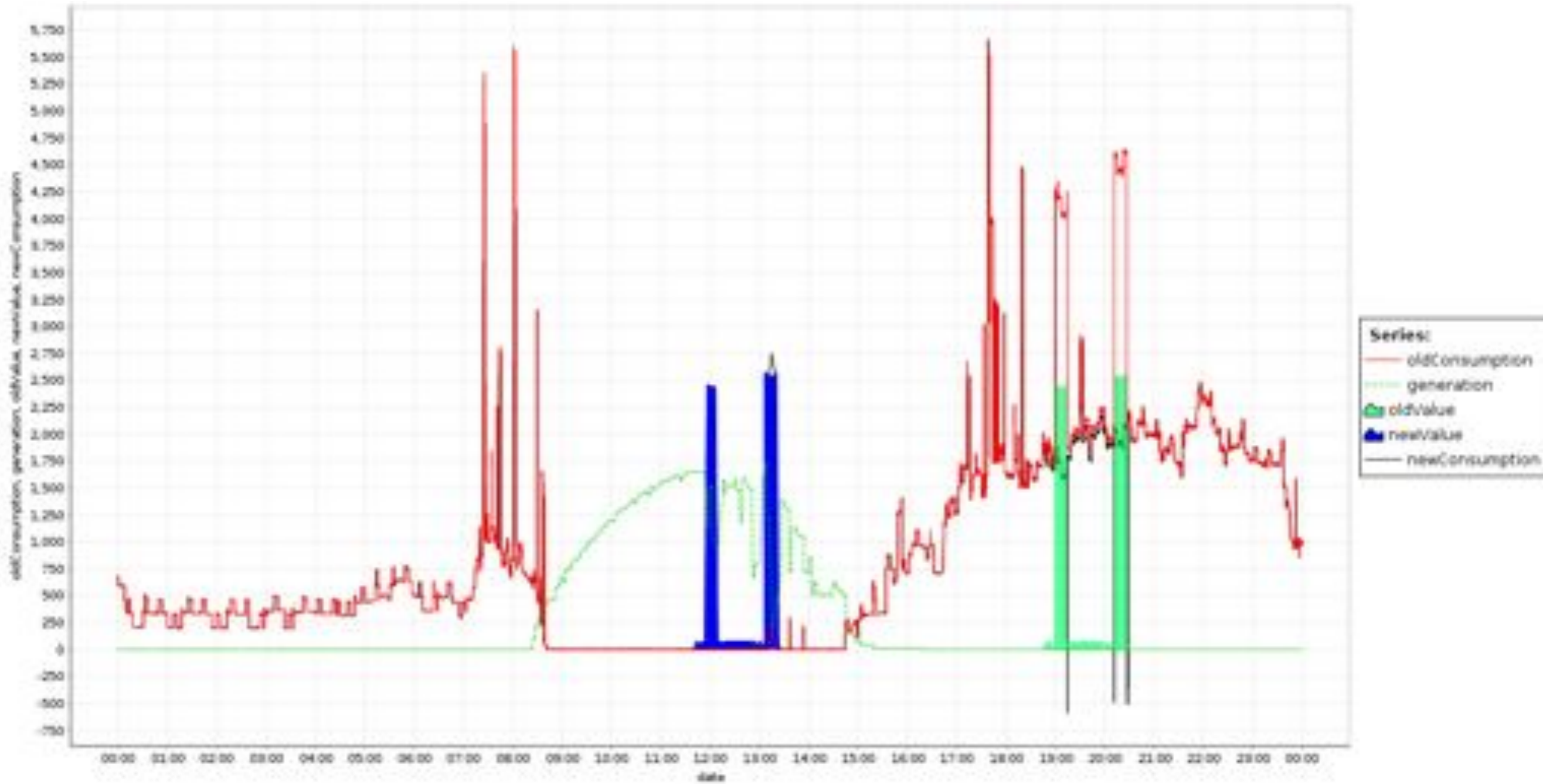**There is evidence that people do DEMAND SHIFTING**

People BELIEVE they understand their own energy generation, but is their understanding correct?

Do they understand the precision required to do effective demand shifting?

Strategy 1: send all local generation to the grid

- Export all the local generation
- Import all the consumption

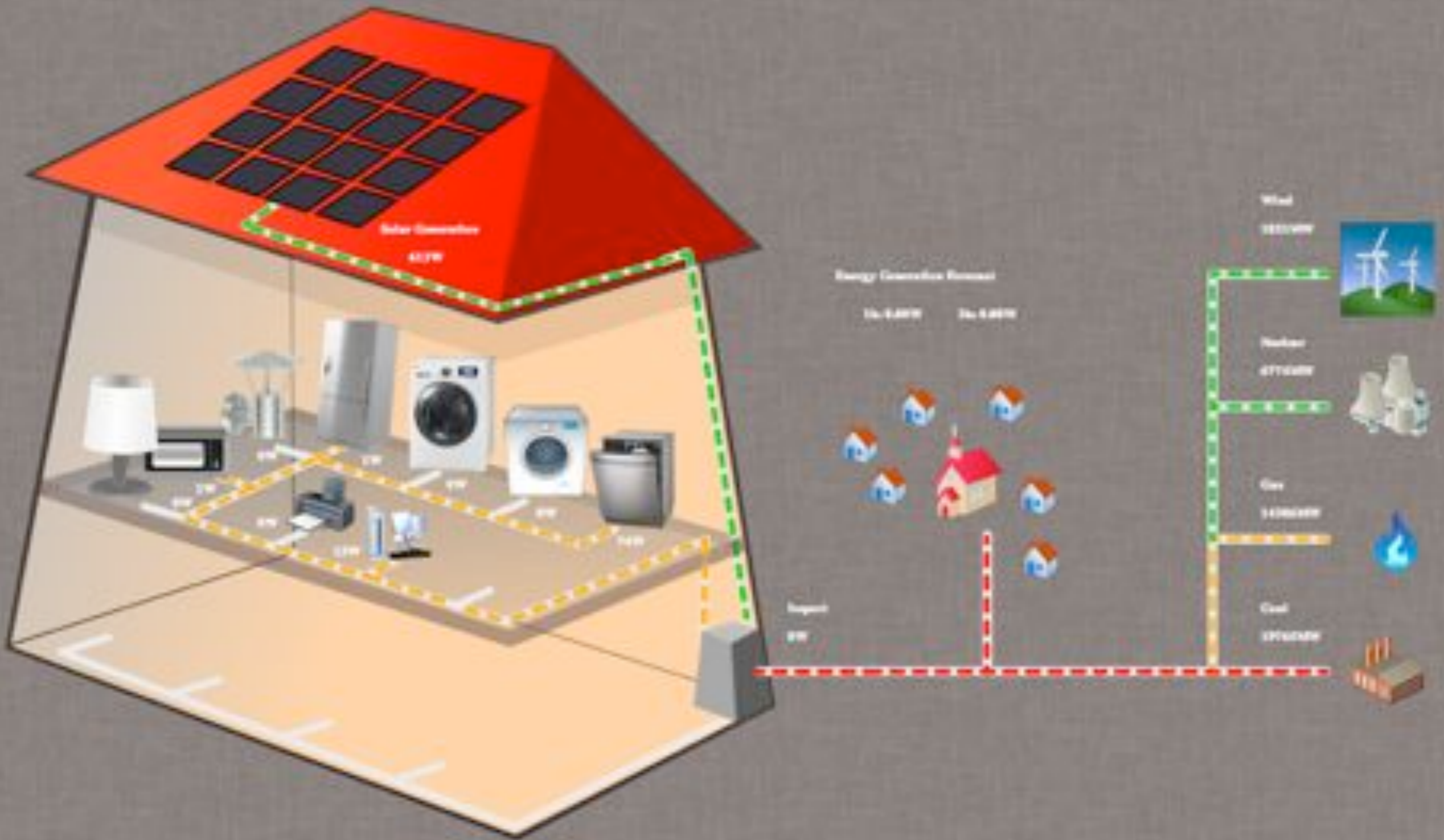## Strategy 2: use local generation locally, export excess

- Use the local generation to power the consumption
- When Generation > Consumption then Export
- When Generation < Consumption then Import

Do they understand the how import/export works?

Generation — 0.16 £/kWh | 0.0 £/kWh

Export — 0.046 £/kWh | 0.27 £/kWh

Grid Carbon footprint — 550 gCO2/kWh | 90 gCO2/kWh

Do they understand import/export tariffs?

The current FEEDBACK-based approach is not enough

Recommendation User Interface for DEMAND-SHIFTING

"Now is not a good time for using me."

"In 3 hours there will be enough local energy to run me."

"Would you like me to start in 3 hours?"

"You could save £100/year if you follow my advice (or 80kg CO_2)."

"80% of your neighbours follow my advice, why don't you?"

Recommendation User Interface for DEMAND-SHIFTING

How well can we predict local demand and generation?

What are the social constraints for demand shifting?

How does the message effect people's willingness to shift demand?

What are the overall savings that can be realized?

Recommendation User Interface for DEMAND-SHIFTING