



Overview for DECC

## Theme 1: trends and patterns in energy demand

31<sup>st</sup> July 2013



These propositions underpin 5 research themes.

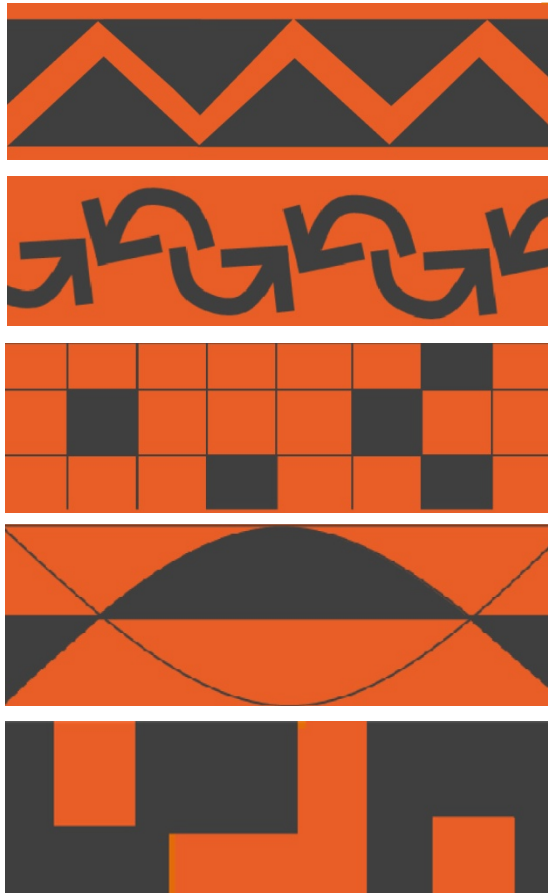
Is based on 3 linked propositions

1 Energy is used in the course of accomplishing social practices.

2 Social practices and energy demand are shaped by infrastructures and institutions.

3 These systems reproduce interpretations of need and entitlement, and of normal and acceptable ways of life.

- 1 How and why do end use practices vary
- 2 How and why do end use practices change over time
- 3 How do infrastructures of supply and demand shape end use practices
- 4 What are the implications for normality, need and entitlement
- 5 How is energy demand, constituted, transformed and steered?



Research within these themes allows us to:



Identify and explore new opportunities for **demand** management at different scales.



Achieve a step change in how energy **demand** is understood and managed.



Confront fundamental issues of **demand**: what is energy for?

# Theme 1: The starting point

- Energy 'demands' are emergent from co-evolving infrastructures and social practices
  - Temporally
  - Historically
- Wrong sorts of questions:
  - Who uses the most energy and when?
  - Which social groups do/don't adopt efficient technologies
- Right sorts of questions:
  - Which kinds of people carry similar social practices?
  - Which bundles of practices are currently energy intensive?

# What follows

- Structure and social distribution
  - Spatial, temporal, and social distribution of different practices : who does what, where and when?
- Time pressure and peak demand
  - Peak demand and flexibility : how strong/hard is the temporal structure? What can be changed by (what?) intervention?
  - Societal synchronisation?
- Change over macro & micro time
  - Birth, life and death of practices : how do practices evolve, change shape, expand, spread..?

## A taste of how we address these questions

- Asking new questions of existing data sets
- Combining existing data sets in new ways
- Moving between the domains of time use, energy and mobility research

## And of what we want to achieve

- Inspire and encourage understanding of energy demand as an outcome of practice
- Provide basic, foundational data on what people are doing that matters for energy use and mobility
- Identify relevant features of the timing of practices, their energy intensity and the directions in which they are changing

# Seasonality (electricity)

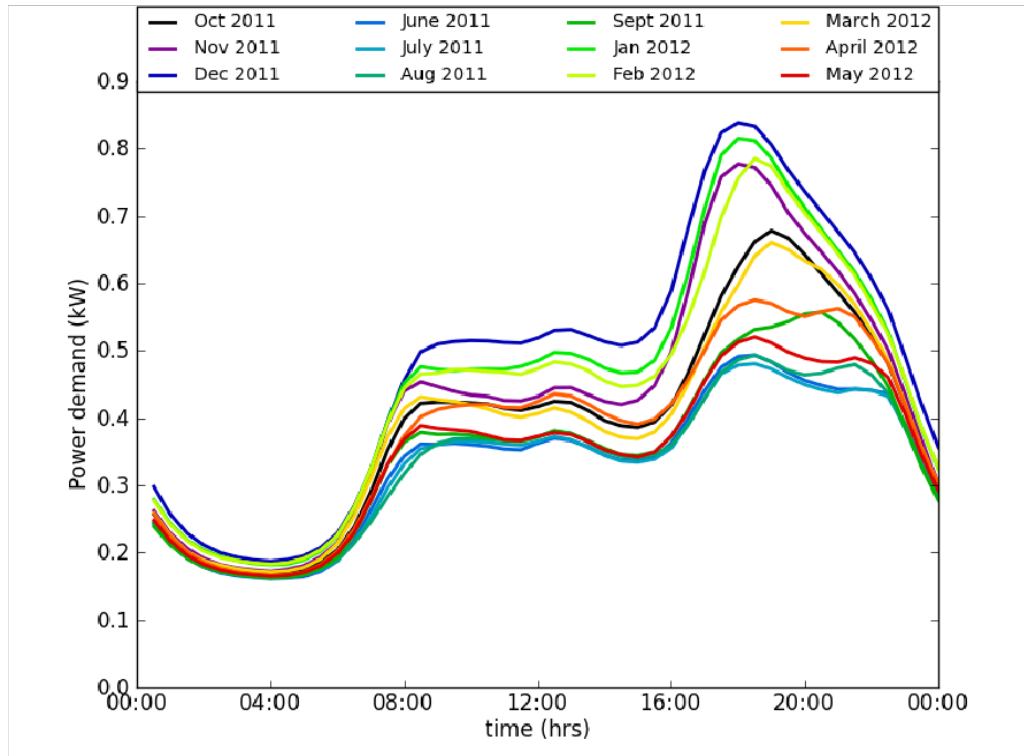


Figure 2: Monthly mean demand for TCLa customers over 1 year (June 2011 to May 2012 inclusive)

Source: CLNRL012 (2013) Initial Load Profiles from CLNR Intervention Trials, Customer Led Network Revolution Project

# Temporal Demand (electricity)

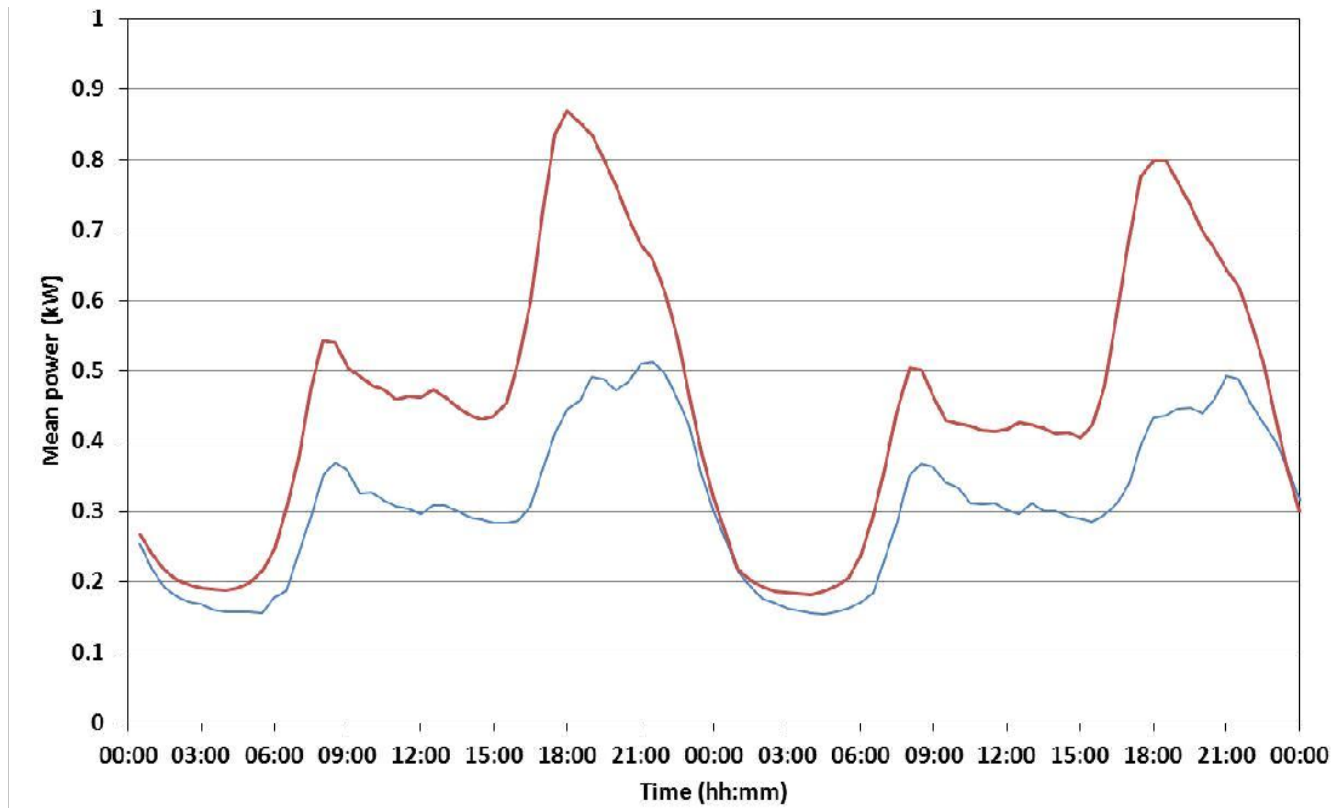
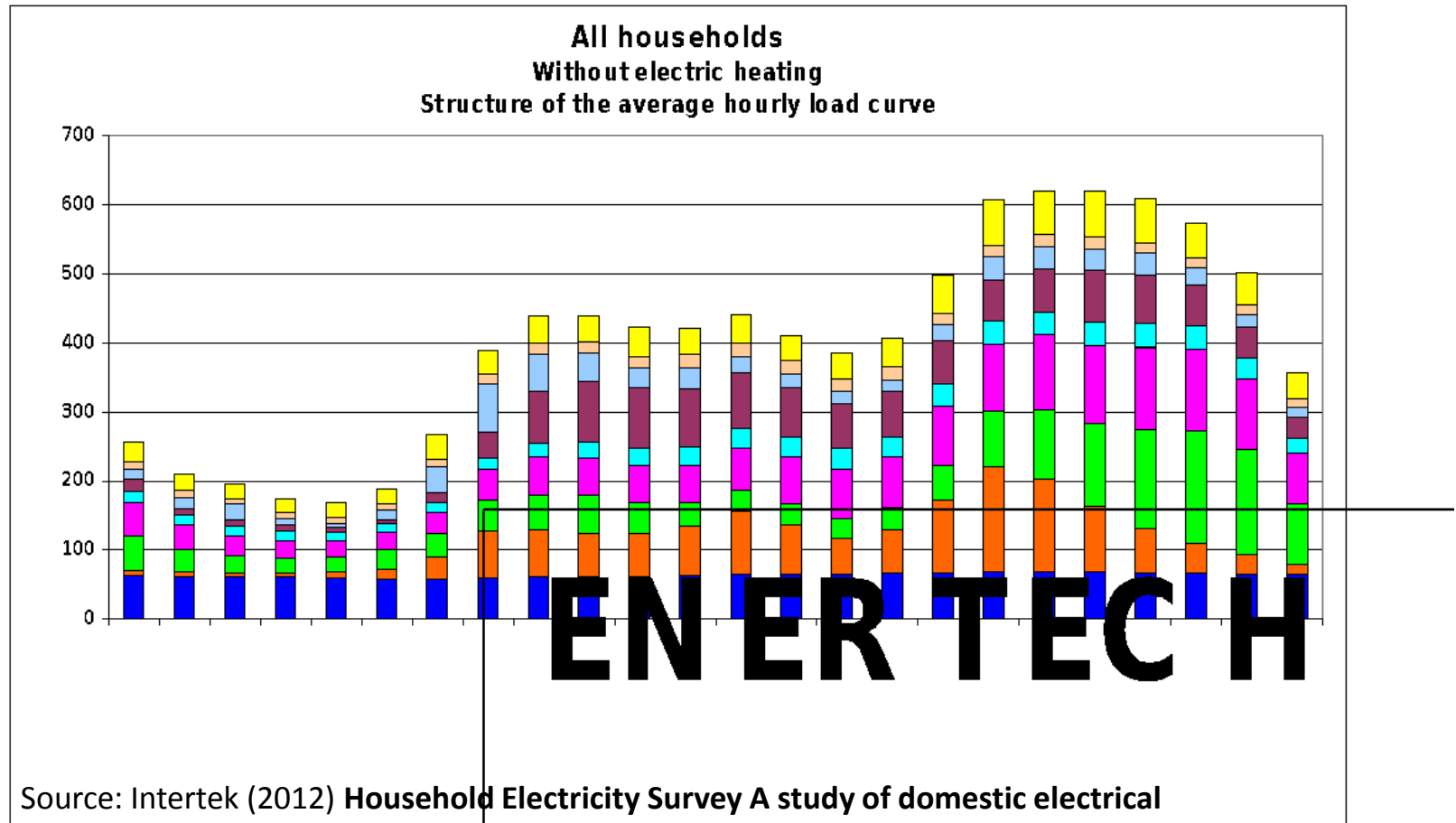


Figure 5: Test cell 1a mean half-hourly demand for two days in September 2012 and January 2013

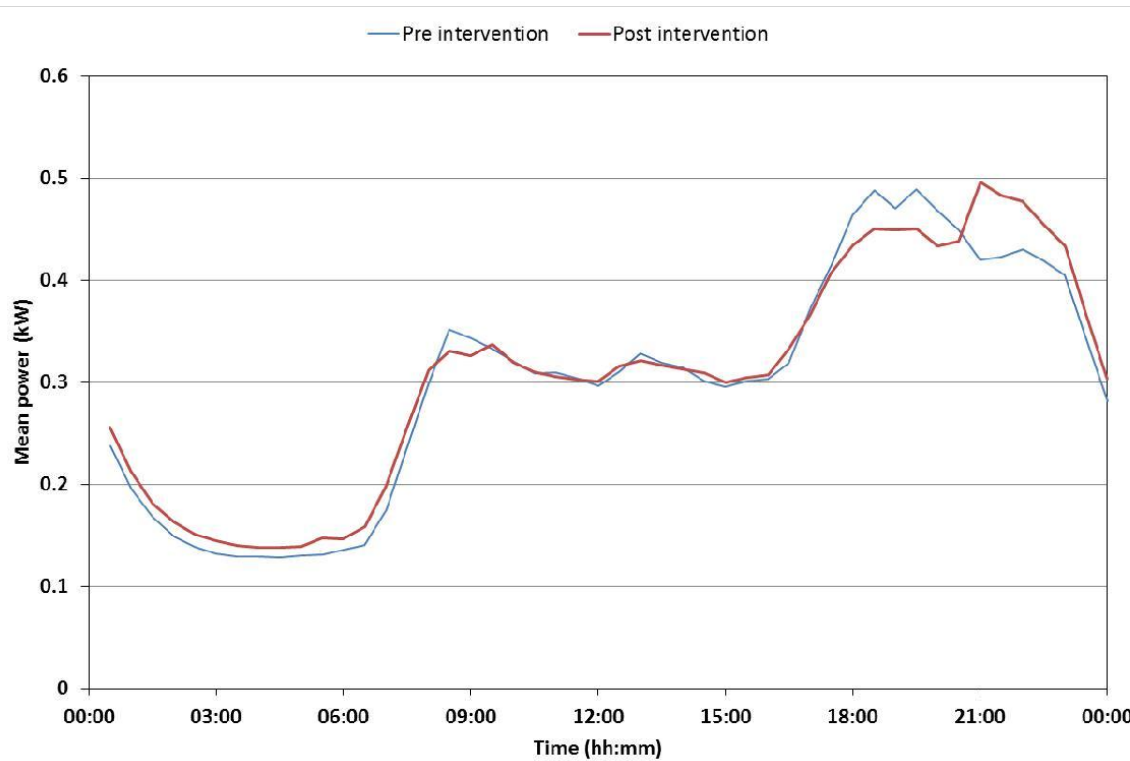
Source: CLNRL012 (2013) Initial Load Profiles from CLNR Intervention Trials, Customer Led Network Revolution Project

# Powering the nation...(electricity)





# 'Price' can't be the only lever

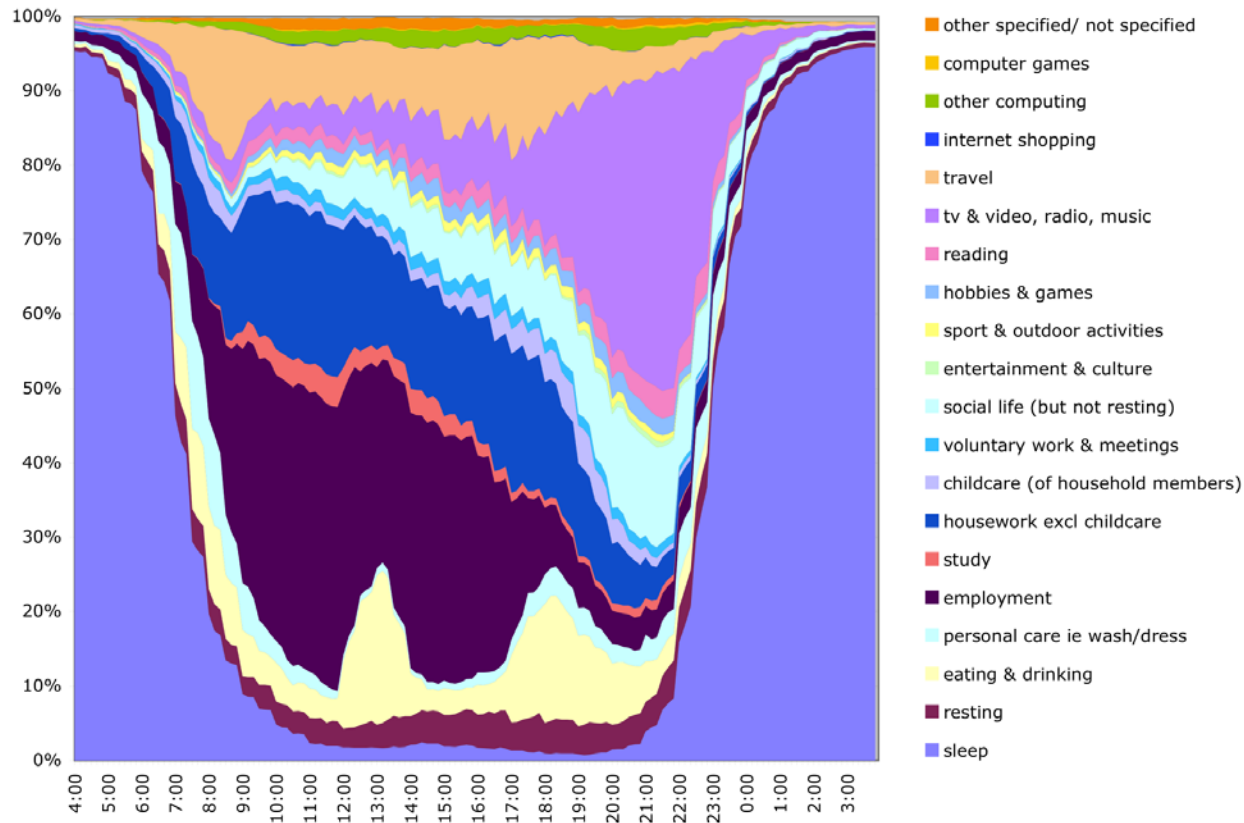


What  
about  
practices  
?

Source: CLNR-L015, (2013) Initial Time of Use Tariff Trial Analysis, British Gas  
Time of Use Tariff Trial – 18:00 – 21:00 , N = 112

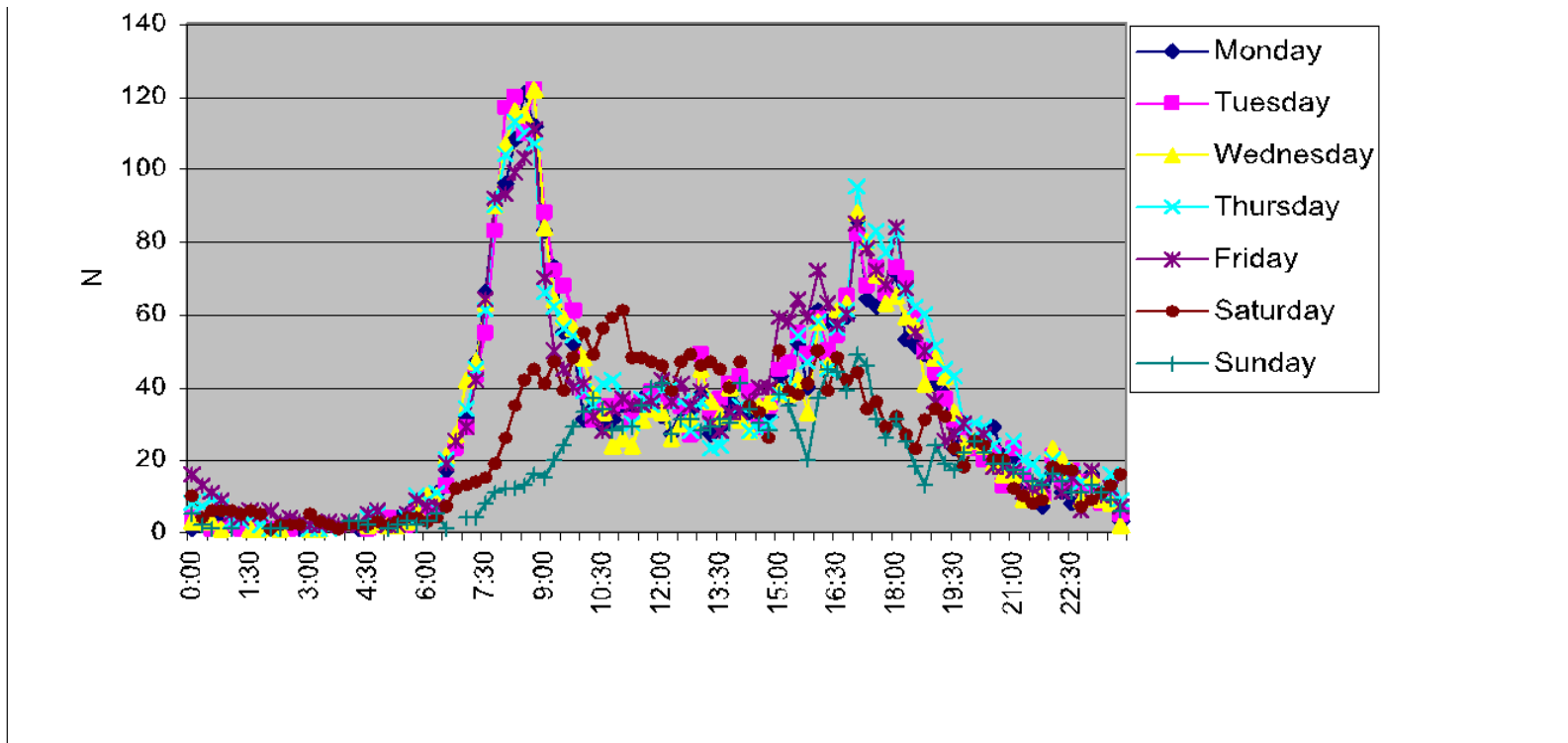
Price **doubles**, demand appears to shift...*slightly*

# So what constitutes demand?



Source: ONS 2005 Time Use Survey Data (UK, weekdays) % of persons reporting,  
Author's calculations

# Patterns of mobility

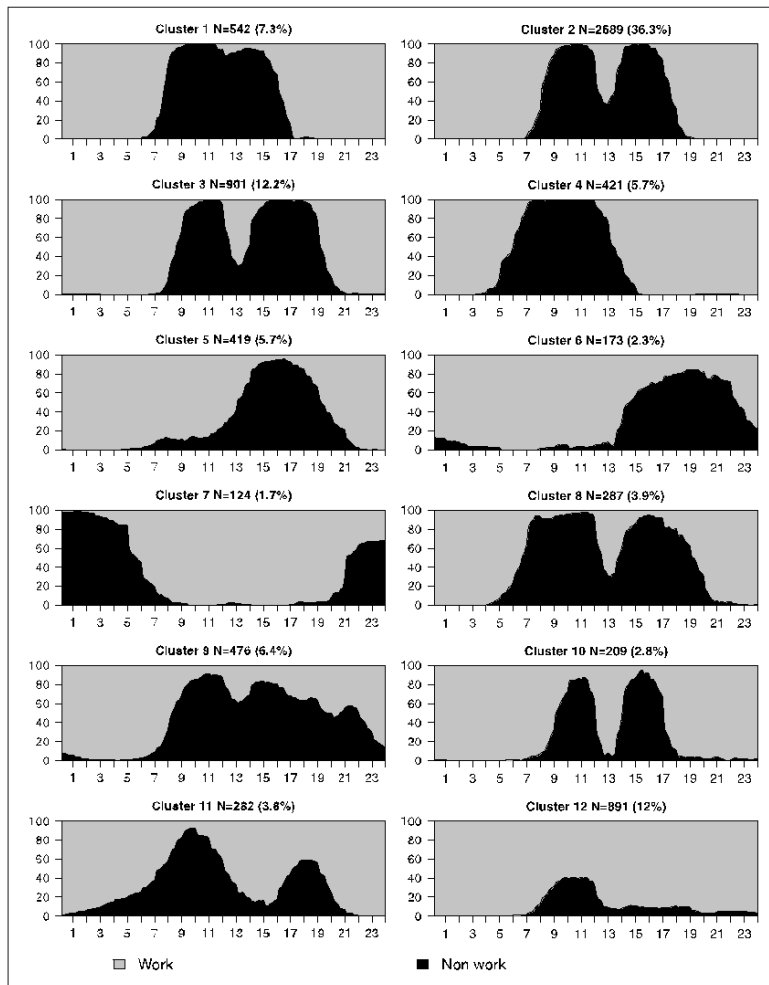


Source: Home OnLine 2000 Time Use Survey Data (UK) N of persons reporting (sample n = 1093), Author's calculations

# Clustering by practices?

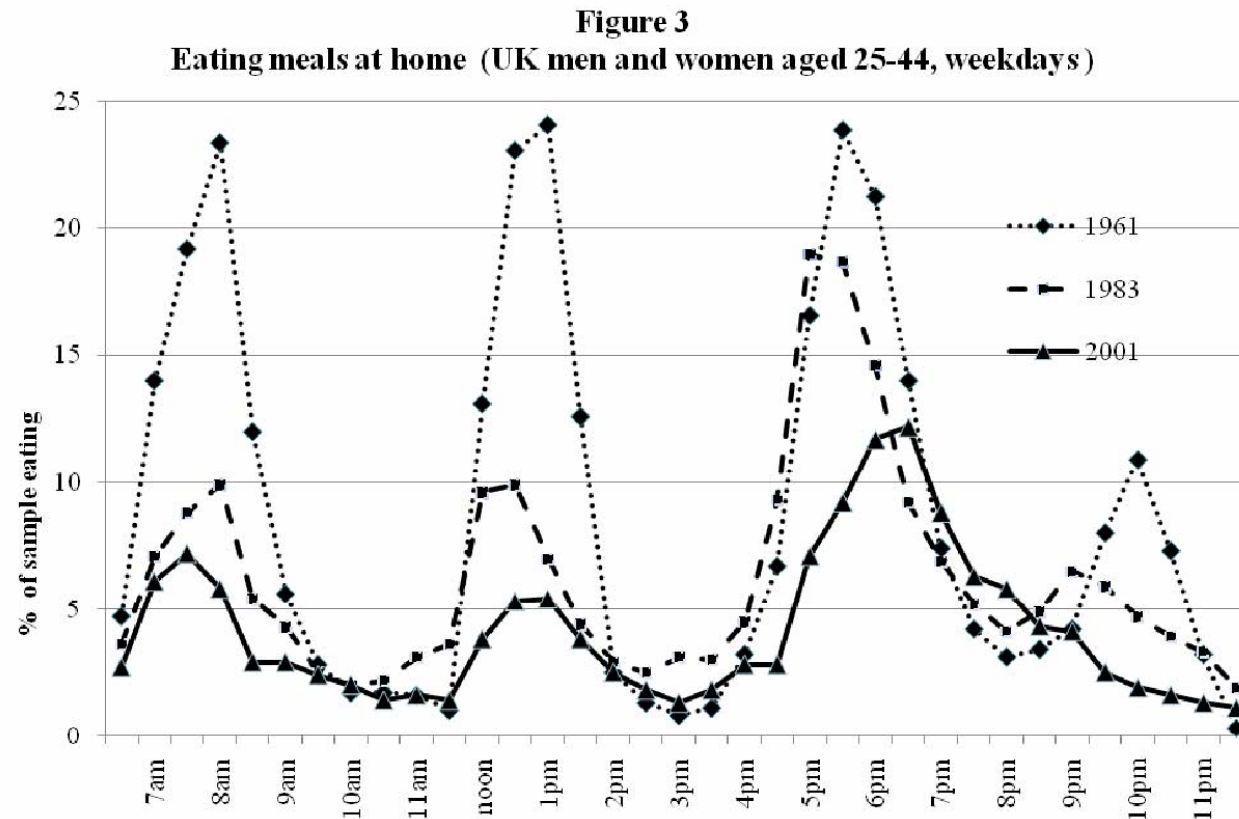
Source: Lesnard (2010) *Setting Cost in Optimal Matching to Uncover Contemporaneous Socio-Temporal Patterns, Sociological Methods & Research* 2010 38: 389 (Figure 3)

‘work’ profiles in France



**Figure 3.** Aggregate timetograms for the dynamic Hamming matching typology  
Note: Cluster ID numbers are different from Figure 2.

# Changing practices...(eating)

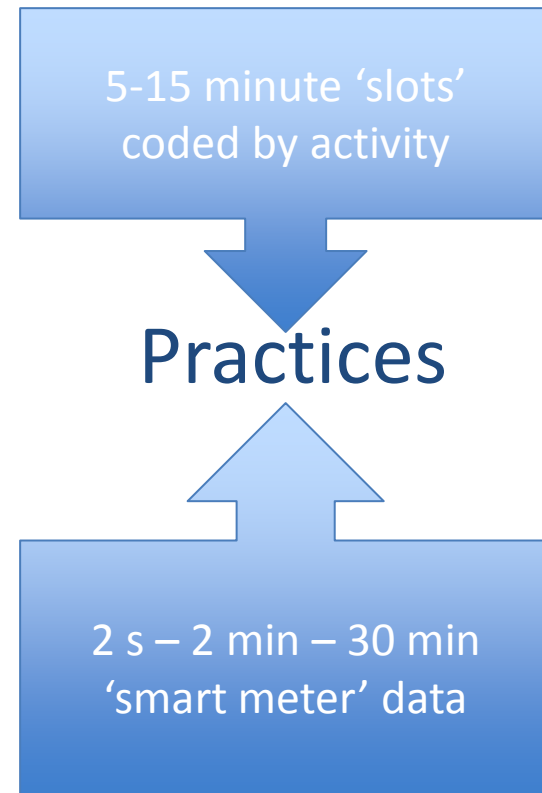


Source: Gershuny, J. (2011). Time-Use Surveys and the Measurement of National Well-Being. London, Office for National Statistics.

# Current practices

Review of data on practices in & over time as revealed by

**Time use data**



**Energy monitoring data**

# Data that would be useful...

- Linked time diary <-> real time energy use
  - For the last 30+ years
  - But it doesn't exist ☹
- ONS to renew commitment to 5 yearly HETUS
  - Harmonised European Time Use Study
- Smart Meter Data
  - Energy Demand Reduction Programme (EDRP) projects
  - LCNF projects
  - Elexon profiling sample
- Gas usage!

Jillian Anable [j.anable@abdn.ac.uk](mailto:j.anable@abdn.ac.uk)

Ben Anderson [b.anderson@soton.ac.uk](mailto:b.anderson@soton.ac.uk)

Mathieu Durand-Daubin [mathieu.durand-daubin@edf.fr](mailto:mathieu.durand-daubin@edf.fr)

Jacopo Torriti [j.torriti@reading.ac.uk](mailto:j.torriti@reading.ac.uk)

Elizabeth Shove [e.shove@lancaster.ac.uk](mailto:e.shove@lancaster.ac.uk)

Gordon Walker [g.p.walker@lancaster.ac.uk](mailto:g.p.walker@lancaster.ac.uk)

Greg Marsden [g.r.marsden@its.leeds.ac.uk](mailto:g.r.marsden@its.leeds.ac.uk)

Sylvie Douzou [sylvie.douzou@edf.fr](mailto:sylvie.douzou@edf.fr)

[www.demand.ac.uk](http://www.demand.ac.uk)