Modelling Energy Practices

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Overview

- Surrey's work focuses on household energy demand, which accounts for approximately 1/3 of energy used in the UK (DECC2013).
- We aim to:
  - Develop better models of energy demand
  - Utilize social practice theory to explore household energy use
  - Utilize secondary data and collect new empirical data to both feed into the new models of energy demand and independently explore social practices

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Understanding energy demand

- For 40 years behavioural and economic approaches to human behaviour have been used to try and understand energy consumption.
- Most research to date focuses on individual unsustainable behaviours rather unsustainable lifestyles.
- A major problem with this approach is that it is questionable whether it is even possible to adopt more sustainable ways of living within the constraints of present infrastructure and social conventions

Application of behavioural and economic approaches

- Originally used to fill the presumed information deficit amongst the population and educate them to hold more environmentally rational beliefs and values:
  - ‘Helping the Earth Begins at Home’ (Hinchliffe, 1996)
- Has been applied to pro-environmental behaviour change:
  - ‘I will if you will’ (Sustainable Consumption Round Table, 2006)
  - ‘Changing behaviour though policy making’ (DEFRA, 2005)

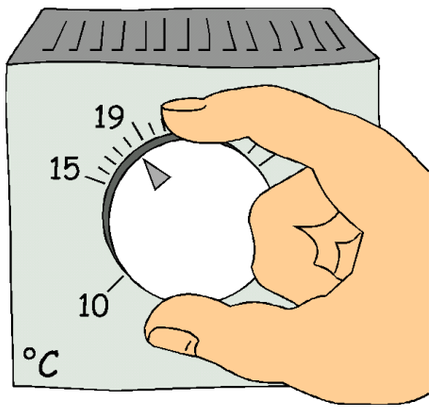
Social Practice Theory - An Alternative Approach

- Social practice theory puts the spotlight on how, at given points in time, broader collectives establish and achieve everyday objectives, rather than how individual traits drive behaviour

'Social practices ordered across space and time constitute the basic domain of study of the social sciences' (Giddens 1984: 2).

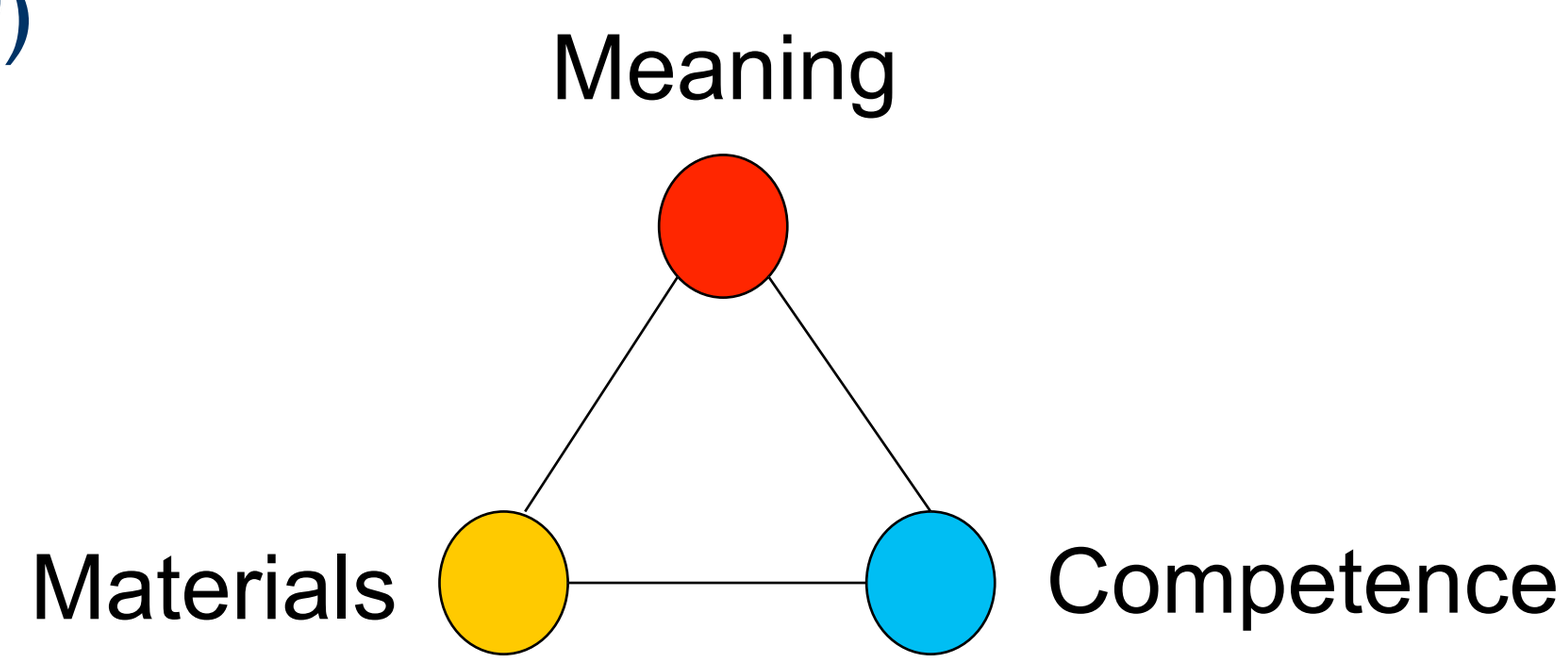
A different way of thinking about everyday activities

- Actions such as leaving the lights on, showering every day and turning the heating up are not seen as individual behaviours but as embedded within and occurring as part of social practices, such as:
  - Worries and concerns about security
  - Conventions about cleanliness
  - Conventions about appropriate dress in different settings



Practices are made up of elements

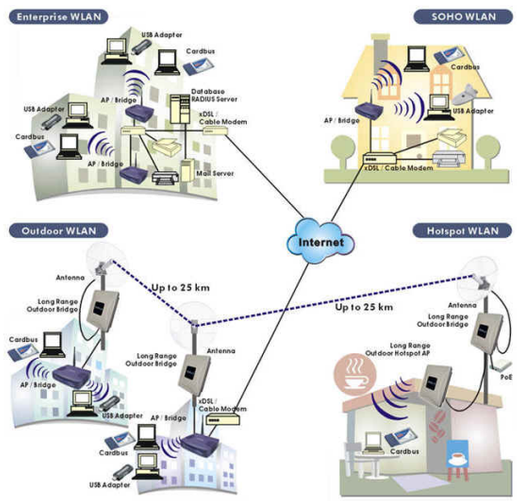
- A practice 'consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities 'things' and their use, a background knowledge in the form of understanding, 'know-how', states of 'emotion and motivational' knowledge' (Reckwitz 2002:249)



The 4 Cs Framework

- Shove (2003) suggests most energy intensive domestic practices can be analysed in connection with at least one of three domains of da

  - Comfort
  - Cleanliness
  - Convenience



- Gram-Hassen (2010) suggests a 4th ‘C’:
  - Connectedness

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Advantages of the Social Practice Approach

- Allows, researchers and policy makers to explore (un)sustainable behaviour within the wider context in which they occur.
- Moves the focus away from attempting to change a series of individual behaviours, to looking at ways to reconfigure daily lives in more sustainable ways.

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Modelling Social Practices

- Elements to be modelled and understood
  - Life-cycle and dynamics between practices depending on the practice elements
  - Behaviour of different cohorts with respect to energy practices
  - Context/environments that encourage or discourage practices

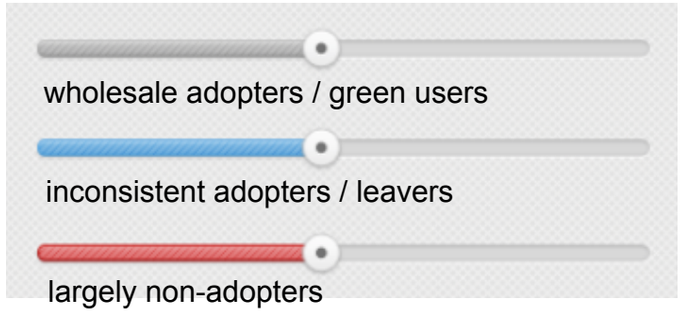
Advantages of using an Agent-based Model

- Dynamics
  - model emergence of macro-phenomena
  - model influence of structure on agent behaviours (immergence)
  - model different interacting dynamics
  - model environment and agent interactions
- Actors
  - model heterogeneous agents
  - model incomplete information
- Networks
  - model social networks
- Data
  - integrate different kinds of data
- Possibility of computational experimentation

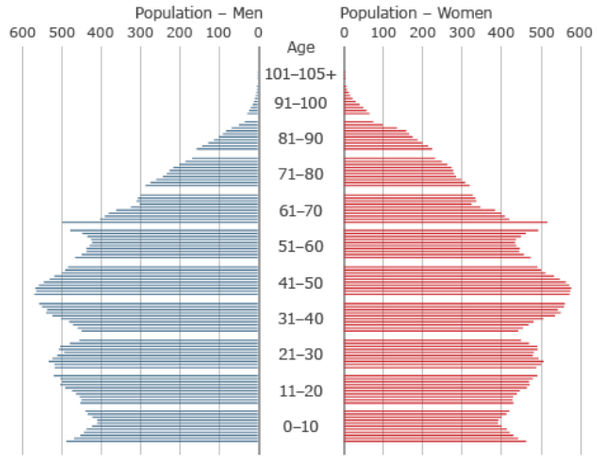
Input

Please specify your target cohort or select one from the set of pre-defined cohorts below!

population types

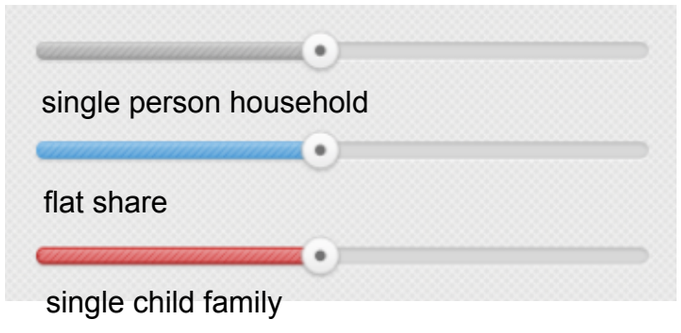


population agent distribution



housing situation

household composition sliders



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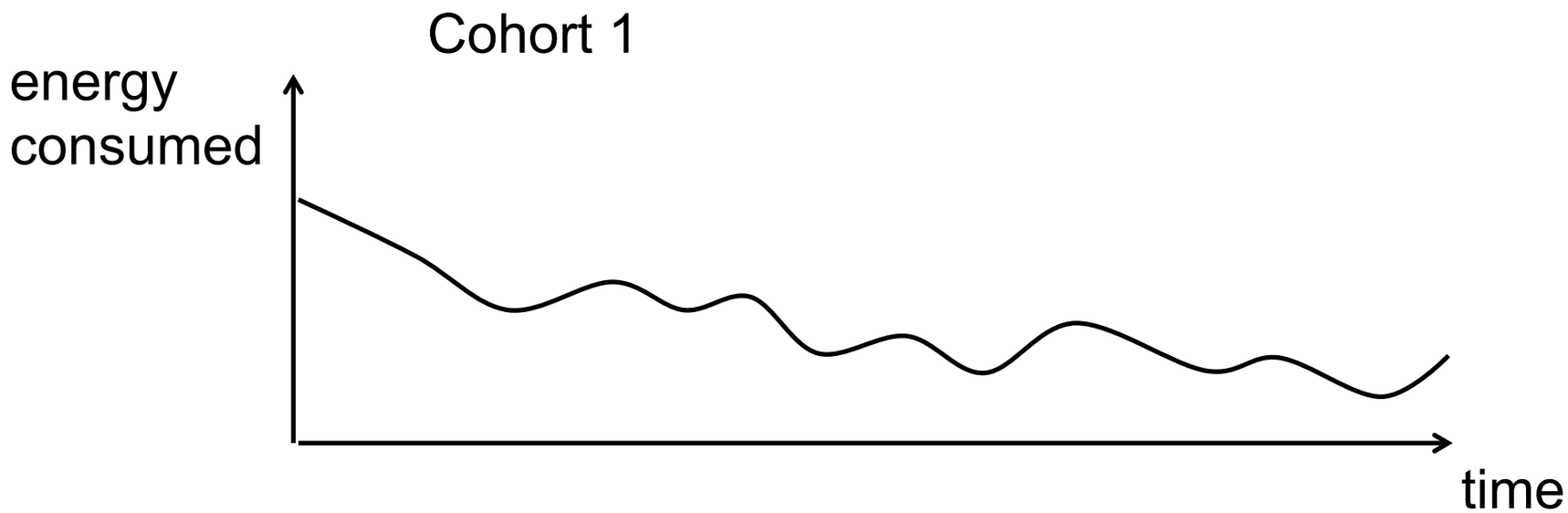
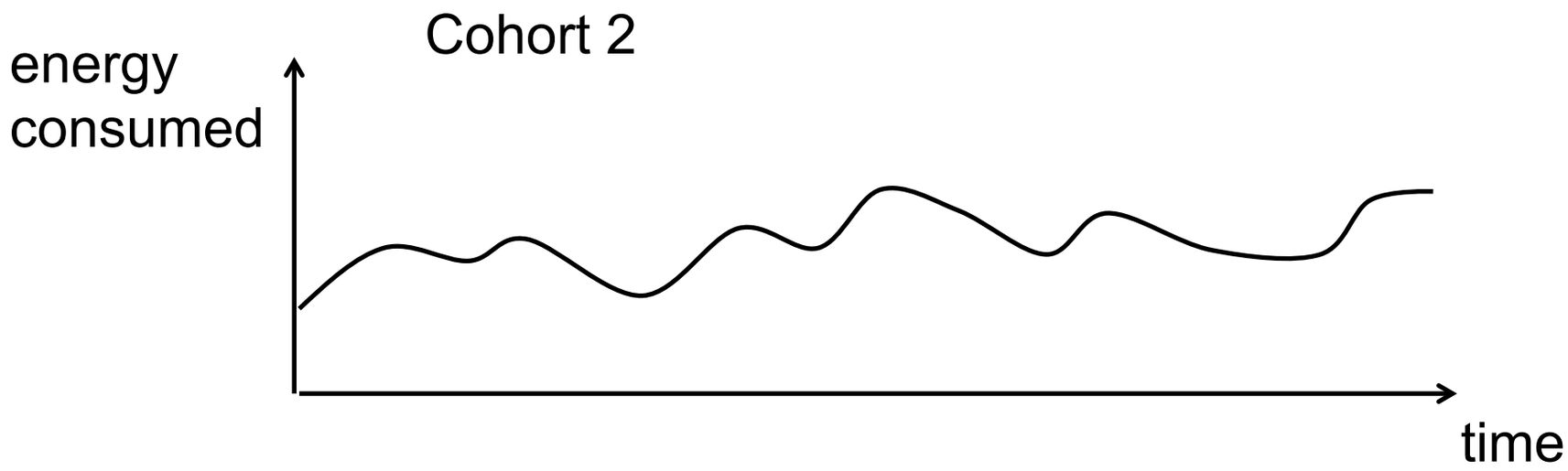
Output





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Input 2

- Please select changes in the base setting and observe what happens to the energy consumption
  - Possible change options:
    - More innovation
    - Public incentives / communication campaigns
    - Other policy interventions
    - Etc.

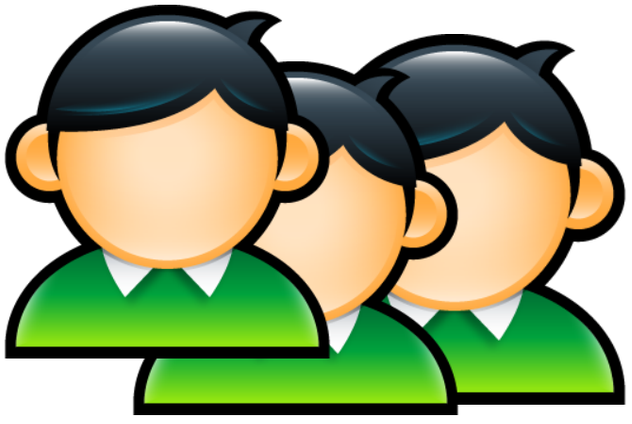
Which ones would be of interest to you?

Linking In- & Output

Social Practices

Industry

Materials



Households Members

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Introduction to pilot research

- Aim:
  - to identify energy intensive domestic practices through an in-depth exploration of the ways in which people use energy in their homes.
- Key objectives:
  - Examine daily routines and the role energy plays in them
  - Identify particularly energy intensive practices
  - Explore how energy practices change and the reasons behind these changes
  - Explore what the participants conceptualise as normal energy use
- Methods
  - Twenty walking interviews with people living in a variety of types of households

Early results

- Key finding
  - The life stage of household members and their access to technology are key determinants of household energy practices

Quote from a man in his 60's with grown up children:

"I have two computers now where I used to have one, you know, the internet/eBay and all that stuff, but I'm working less, so I spend less time on the computer"

Quote from a mother with young children:

"…it [energy use] changes with having children of course. So things like using the washing machine and being in the house more. Because I gave up work… before that and we weren't in the house, you know, we were only there first thing the morning and late in the evening, now the heating is on all day … [Also] as the children get older they seem to acquire more and more devices"

Early results

- Key finding
  - Heating practices often co-evolve with practices related to connectivity and availability of IT equipment.

Quote from a women in her 30s who has recently had a second baby:

"Having a good broadband connection at home means my husband can work from home more which gives us a lot of flexibility and that would have been impossible a few years ago…. It does mean we have to heat the whole house though rather than just the room I'm in during the day"

Quote from a man in his 40s who occasionally works from home:

"The problem with working at home is they are still heating my office and as I'm sat still all day at the computer I get quite cold and have to turn the heating up"

Early results

- Key finding
  - Energy efficiency is a central criterion when choosing a large 'time saving' domestic appliance but does not feature in the criteria when choosing a 'time using' device such as a TV.

Quote from woman in her 40s who has recently refurbished her kitchen:

"Value for money and energy efficiency were our priorities, we had a good look at all the which reviews"

Quote from the same women regarding the purchase of a new TV:

"The most important factors were functionality and size, my husband wanted the best one we could afford and would fit in the space, energy efficiency was not a factor"

Reflection and Next steps – taking the project forward

- Reflection
  - Review on literature of energy practices and household energy demand
  - Literature review on innovation, new domestic technologies and technology learning in energy models (in co-operation with UCL)
  - Pilot Study
  - Modelling Considerations
  - Workshop organization and result dissemination
- Next steps
  - Identification of energy-intensive practices
  - Empirical study focussing on identified practices
  - Integration of data into model
  - Online survey on the adoption of green domestic technologies and practices