Rethinking energy consumption feedback in everyday life

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UK smart meter roll out

- 30 million homes, 2015-20, £12billion (€14/$19/PZL60).
- Consumption reduction rationale: information>knowledge>behaviour


Smart Metering Implementation Programme

Department of Energy & Climate Change

The roll-out of smart meters will play an important part in Britain's transition to a low-carbon economy and help us meet some of the long-term challenges we face in ensuring an affordable, secure and sustainable energy supply.

Consumers will have near real time information on their energy consumption to help them manage their energy use, save money and reduce emissions. Smart meters will also provide consumers with more accurate information and bring an end to estimated billing.

What is a Smart Meter?

Smart meters are the next generation of gas and electricity meters and they can offer a range of intelligent functions. Domestic customers will be offered an In-Home Display (IHD) linked to their smart meter, enabling them to see what energy they are using and how much it is costing.

What will Smart Meters do?

Smart meters will communicate directly with energy suppliers, allowing suppliers to give consumers accurate bills; they will remove the need for manual meter readings and bring an end to estimated billing helping consumers to budget better.

The In-Home Display will put consumers in control and help them to avoid wasting energy and money.

How will Smart Meters work?

Most of the smart meters that are being installed today use mobile phone-type signals to send meter readings to energy suppliers, and other wireless technologies to send information to the In-Home Display.

The interests of consumers lie at the heart of the Smart Metering Programme. Smart Meters enable the following benefits:

Near real time information on energy use - expressed in pounds and pence. Consumers will be able to manage their energy use, save money and reduce emissions.

More flexibility - more tailored tariffs to suit individual customers.

Easier switching - it will be smoother and faster to switch suppliers to get the best deals.

New products and services - to help better manage energy. In future suppliers will be able to offer different prices at different times of day. Smart appliances could be set to switch on when energy is cheaper.

Supported by theory

- Neo-classical economics, social psychology and behavioural sciences
- Social science
  - Invisibility and immateriality of energy (Shove 2003; Pierce and Paulos 2010; Hargreaves et al 2010; 2013)
  - Feedback ‘feeds forward’ and shapes future practice (Shove et al 2012)

Energy consumption reductions vary widely

- Meta-reviews (electricity)
  - 5-15% (Darby 2006), 9.2% (Ehrhardt-Martinez et al 2010), 3-19% (Stromback et al 2011)
- 20%+ for electricity, when used for space/ water heating (Mountain 2007)
- 3% for electricity and gas (Ofgem 2011)
- DECC impact assessment 2.8% (electricity) and 2% (gas)

Qualitative research

- Feedback supports:
  - visibility
  - salience
  - literacy
  - appraisal
  - change

Burchell et al (2014); Grønhøj and Thøgersen 2011; Hargreaves et al 2010; 2013; Strengers 2011; 2013; Rettie et al 2013; van Dam 2010

Critiques

- The assumptions of the smart meter approach represent a technological vision or smart ontology (Strengers 2013) that neglects
  - the broader social context (see Shove 2010 on behaviour change more broadly)
  - everyday practice (see Strengers 2013 on smart technologies)
  - conditions of everyday life (see Wilson et al. 2013 on retrofits)

Everyday domestic life

- Messiness and habit
- Busyness and other priorities
- Everyday practice (meanings, skills, materials, norms)

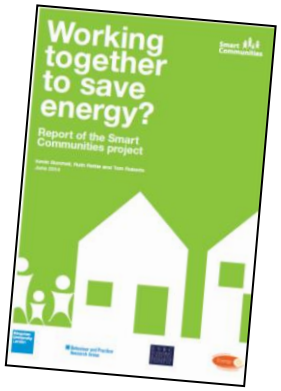
Feedback and everyday life

- Engagement with feedback is often limited
- Energy and energy units are meaningless
- Difficult to relate feedback to practice
- Conflicts with home as place of comfort and care
- Engagement often limited to one household member (male? ‘resource man’ Strengers)
- Negotiation and conflict with others
- Disillusionment and boredom
- Long term engagement is problematic
- Feedback may reinforce practice that is understood as ‘normal’ or ‘non-negotiable’

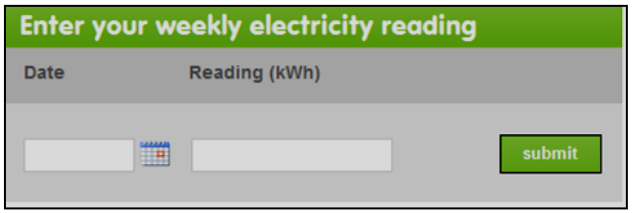
Strengers' conclusions

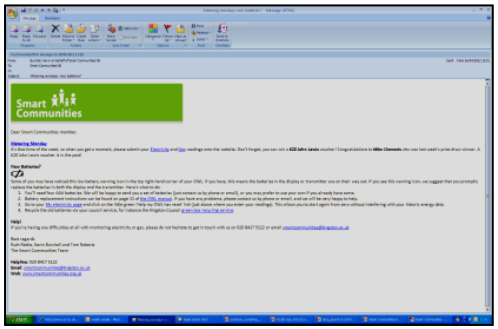
- We need to ask, 'how energy feedback can become more meaningful to everyday practice?' (p160)
- 'Reimaging a Smart UTOPIA grounded in the mundane realities of everyday life…is one alternative that disrupts this dominant feedback agenda' (p167).

Smart Communities

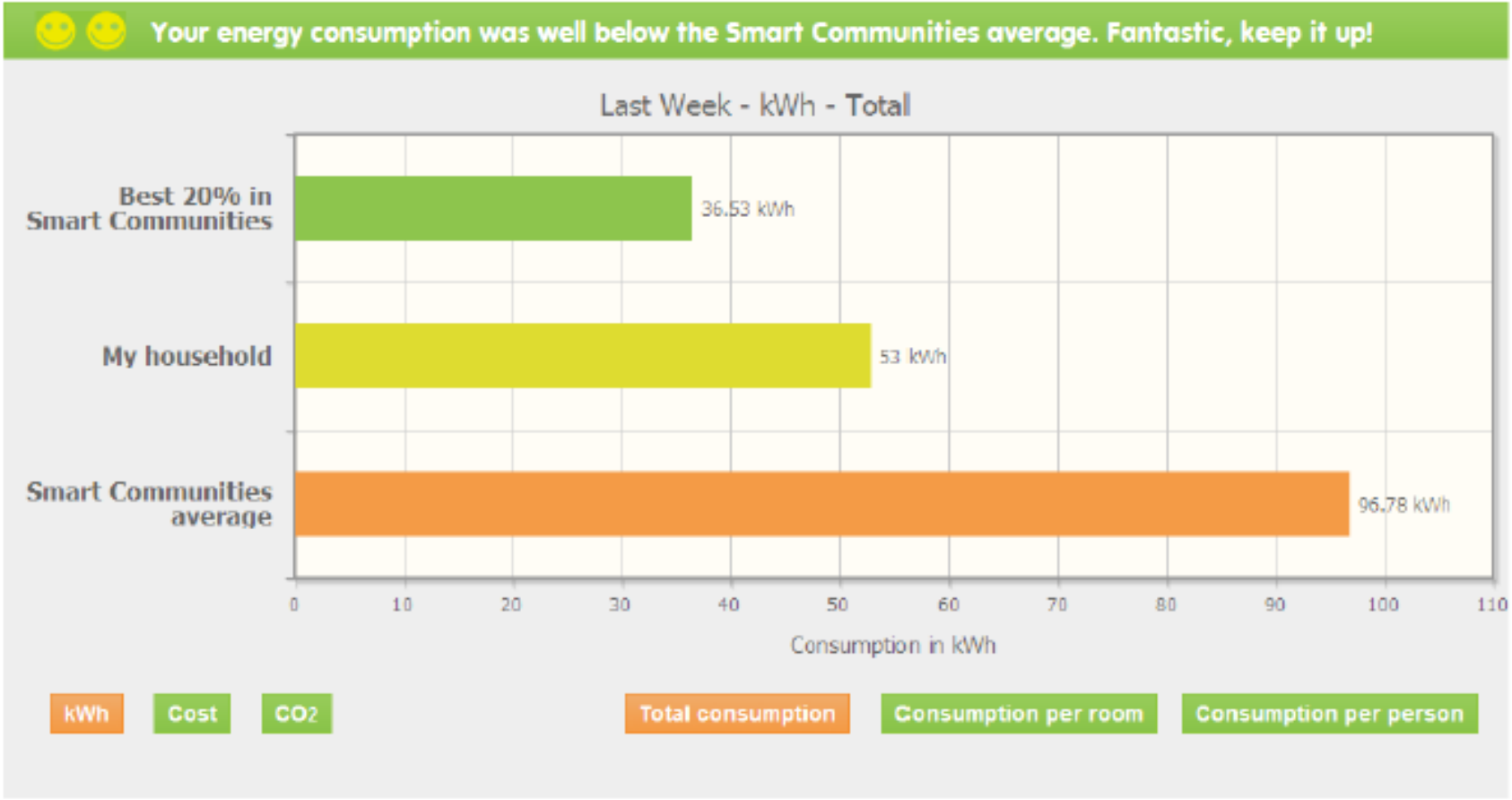


- Two-year *action research* project, funded by RCUK Energy Programme
- Energy monitoring and feedback within context of community action
- Very basic Owl IHD (real time feedback)
- Electricity and gas readings manually entered into website by participants
- Weekly consumption feedback
- Feedback has a comparative element
- Weekly emails encourage readings and use of the IHD + tips and info
- Interviews and survey.
- Report launch next week in London





Smart Communities



Findings

- Long-term engagement; after up to two years
  - 40% using monitor once a day or more
  - 72% once a week or more
- Very high levels of literacy about domestic energy consumption
- More involvement by women(recruitment through school, tone of communications?)
- Project members claimed more behavioural changes than non-members
- Evidence of household consensus as well as conflict
- Gas monitoring/feedback can be highly productive - offsets disillusionment?

Rethinking energy consumption feedback

Making feedback meaningful

- Comparison contextualises
- Feedback oriented around ‘practices’ could make energy much more salient.

Doug: I think the real glory is seeing the graphs and seeing the relationship between our home and the community on average.

Faith: On the website, seeing that some people are using dramatically less energy you think, mm, okay, so what are they doing, do they live in a similar house, the type of property must make a big difference, and ours is an old boiler, and all these things. Our use per room is quite low, which is good. Mainly because we don’t heat the rooms we’re not in! And also per person we’re not using too much.

Making feedback social

- Communication is powerful
- Action is powerful
- An important sense of ‘being part of something’

Jacqui: I agreed to do it, so I would feel that I have to fulfil that really. As soon as we came from holiday, we said oh, we must do our readings! [laughs]

Faith: People as individuals often feel they can't make much of a difference and them putting the lights on or running the drier, well what difference does that make? But obviously if you feel that as a part of Kingston you're all doing something and also, obviously, the incentive now with the high-energy costs to save money.

Jess: It's like you might say Friday night's bath night. Monday, 4 o'clock, take your readings. It's a routine now.

Making feedback normative

- Practices are normative but – typically – current feedback is not.
- Normative feedback – possibly evoking 'waste' – might disrupt practice.

'I grew up in the seventies with a piddly shower. I can't see us having a quick sponge down. I think maybe the older generation might but I think younger people more or less have showers every day.'

Thank you.

Research Councils UK Energy For a Low Carbon Future

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