SusLabNWE: Integrating Qualitative and Quantitative Data to Understand People's Everyday Energy Behaviour

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London
‘Behaviour change’
Partners in Washington to build on BIT work

Over the past week or two there has been lots of coverage of a new team in the White House that will look to apply lessons from behavioural science to public policy. The US team will be headed by Maya Shankar, who met members of BIT in Washington to discuss how we will exchange ideas and share research – a process first started by our Director, Dr David Halpern, and Prof Cass Sunstein while Cass was at the White House.

On Friday, TIME Magazine ran an ....read more

Date posted: August 9, 2013 | Author: Behavioural Insights Team | No Comments -
Categories: Uncategorized

Growth Vouchers

We’ve been working with the Department for Business, Innovation and Skills (BIS) on the £30 million business support programme which was announced at Budget. The announcement in the budget stipulated that the programme would be run as a randomised controlled trial (RCT), the first time that we know of where the government has explicitly required a programme to be conducted as an RCT in order for it to go ahead.

Growth Vouchers are a different approach to Government business support. The ....read more

Date posted: August 8, 2013 | Author: Behavioural Insights Team | No Comments -
Categories: Uncategorized

Policy school

...
‘Energy use behaviour change’
Department of Energy & Climate Change

Smart meters: a guide

Smart Meters put consumers in control of their energy use, allowing them to adopt energy efficiency measures that can help save money on their energy bills and offset price increases.

The new meters

Smart meters are the next generation of gas and electricity meters and they can offer a range of intelligent functions.

For example they can tell you how much energy you are using through a display in your home. They can also communicate directly with your energy supplier meaning that no one will need to come and read your meter in future.

Benefits of smart meters
Design and behaviour change
All design affects behaviour
Operating instructions

Siemens REV24RF...
RCR10/868

1. Day radio clock temperature controller for the light temperature at the right time. A factory setting will provide optimal living comfort. You can easily adjust the controller to your needs with the automatic heat source selection and program selection.

REV24RF... (controller with radio clock) is a wireless device that you can mount on the wall or place freely.

Its wireless frequency 606 MHz is largely immune to external disturbances. The signal level meets regulations and is kept as low as possible. The devices are approved for all EU member states, Iceland, Norway, and Liechtenstein.

Note the following tips:
- A wall should not be located in a position that might influence the controller's reception (e.g., within a valley and other parts of the installation).
- The distance between controller and receiver must not exceed 20 m or 50 feet.
- Do not place electronic devices or electrical devices too close.

Special symbols displayed:
- A rolling triangle symbol / symbol displayed?
- The controller needs re-setting.

Is symbol displayed?
- This symbol tells you that you must:
  - Insert 2 new alkaline batteries type LR6 (AA). Remove the controller from the wall, replace the fuse, and reset the device.

Caution:
- Time and date are set to 12:00.
- All other settings are saved.
- Dispose of the batteries as per regulations.

Is symbol displayed?
- The radio clock symbol only appears if you receive signals from an external receiver.
- Date and time on the controller are set by a receiver.
- The symbol flashes if the signal is lost.

Commission receiver RCR11:
- The factory setting is '00'.
- Press the overdose button if the calibration is incorrect.
- The reading turns off a set of the last received value.
- The LED 'LR6' is slowly changing color when the receiver is connected to the controller. LED 'LR6' flashes to indicate signal quality.
- Max 15 receivers.

Commission the controller:
- The controller requires a factory setting.
- Proceed as follows for initial commissioning:
  - Remove the controller from the wall, and insert 2 batteries.
  - Connect the controller to the controller in the mounting.

Tips to save energy:
- Heat your rooms to max 21°C.
- Use ELIS to switch to energy saving mode.
- Air out your rooms briefly, but y
Operating Instructions

REV24RF - 7-day radio room temperature controller for the right temperature at the right time. All factory settings already provide optimal living comfort. You can easily adjust the controller to your needs with the user-friendly clear-text display and program selection slider.

REV24RF (controller with radio transmitter) is a wireless device that you can mount on the wall or place freely on a table in the room. Its radio frequency 868 MHz is largely immune to external disturbances. The signal level meets regulations and is kept as low as possible. The devices are approved for all EU member states, Ireland, Norway, and Switzerland.

Note the following for placing the devices:
- Make sure no other influencing factors influence the controller’s temperature sensor (no solar radiation and other heat or cold source influences).
- The distance between controller and receiver may not exceed 20 m or 2 floors.
- Do not place near metallic items or electrical devices, etc.

Display

- Day of week
- Radio clock
- Date
- Setting: 1-5, 6-7, 1-7
- Time display
- Holiday mode
- Automatic mode
- Parity mode active
- Exception day mode
- Continuous comfort mode
- "C" or "F"
- Continuous energy saving mode
- Heating On
- Cooling Off
- Protection mode
- Temperature display
- info button
- Increase values, set time or make a selection
- Change between Comfort and energy saving temperature (active until next switching time) and Party function
- Decrease values, set time or make a selection
- Program selection slider

Special symbols displayed
- The controller display can show the following special symbols:
  - Is symbol ¬ displayed? The alarm indicates an error
  - Press the info button and check the alarm message (e.g., radio clock, radio connection to receiver, etc.)
  - Contact a specialist as needed
  - Is symbol  or  displayed? The controller is in "heating mode"  or "cooling mode"

Is symbol ◊ displayed?
- The symbol tells you that you have the following symbols:
  - Insert new alkaline batteries if the signal is too weak
  - Remove the controller from the wall or table if it overheats
  - Time and date are correct

Commission receiver RCR11
- The factory setting of the receiver is on 15 m in telegrams.
- The relay turns off a receipt of the last message.

Commission the controller
- The controller contains a factory-setting.
- Proceed as follows for initial commissioning:
  - Remove the controller from the wall or table if it overheats.
  - After startup, a welcome message is displayed. Press  or  to accept your selection.
  - Set the operating mode to "RCR11" or "LCR11".
  - Fold the operating instructions and return them to the manufacturer.

Tips to save energy without turning off the heating:
- Heat your rooms to max 21°C.
- Use  to switch to energy-saving mode.
- Air out your rooms briefly, but...
Requisite Variety

Design with Intent toolkit

Design with intent: 101 patterns for influencing behaviour through design by Dan Lockton with David Harrison & Neville A. Stanton. ISBN 978-0-9565421-0-5 (print) & 978-0-9565421-1-3 (PDF)

Requisite Variety’s Design with intent toolkit is a collection of design patterns, or ‘gambits’, for influencing user behaviour through design.

Download the toolkit (free) or buy printed packs

It’s applicable across product, service, interaction and architectural design, aimed at socially and environmentally beneficial behaviour change. The patterns are drawn from a range of disciplines, and are phrased as questions or provocations to enable the toolkit’s use as both a brainstorming tool and a guide for exploring the field of design for behaviour change. More about the toolkit >

The toolkit’s in use by industry, public sector and educational organisations worldwide, and Requisite Variety also offers workshops and consultancy using it, as well as exploring other aspects of design for behaviour change, and the interface between people and technology. More about Requisite Variety >

Explore the eight ‘lenses’ of the toolkit

Architectural Lens Errorproofing Lens Interaction Lens Ludic Lens
Requisite Variety

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designwithintent.co.uk
Sustainable Design with Intent: A Toolkit for Designers and Engineers

Updated October 19, 2012

In this webinar recording, Dawn Danby reviews a range of sustainable product development strategies, focusing on ways designers can guide users to more sustainable behavior. Explaining this work and how it can inform better sustainable design.

by Adam Mente, Autodesk Sustainability Education Program Manager

Designing with Intent

"Design is the first signal of human intention." This is a powerful statement from William McDonough, co-author of the book Cradle to Cradle®. But what does it mean in practice and how can a designer’s intention lead to a more sustainable world by improving the environmental impacts of user behavior?
Use as a warning tag.
What’s missing?
NO!

x 1000 RPM

0 2 5 8 8 2

km/h
UNLEADED FUEL ONLY
MPH
140
Breaking This Seal Constitutes Acceptance of The End User License Agreement
The dominant ‘behaviour change’ approach to energy assumes that ‘demand’ is largely homogeneous, and can be addressed mainly through pricing changes.
Quantitative energy data gives us *what?* But not *why?*
People are not setting out to ‘use energy’ – they’re meeting everyday needs for family comfort, cleaning, food, entertainment and so on.
So we need to understand the contexts of people’s everyday routines, and their interactions with energy, in a much more nuanced way to be able to design interventions that can help them reduce their energy use.
## Electricity Summary

<table>
<thead>
<tr>
<th></th>
<th>Last Reading</th>
<th>This Reading</th>
<th>Electricity units used</th>
<th>Cost Split</th>
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<td><strong>Charges for Tariff - Standard Electricity / Quarterly Receipt of Bill</strong></td>
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<td><strong>Day</strong></td>
<td>30/04/2013</td>
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<td></td>
<td>10697</td>
<td>10714</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Estimated</td>
<td>Estimated</td>
<td></td>
<td></td>
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<tr>
<td><strong>Night</strong></td>
<td>30/04/2013</td>
<td>30/04/2013</td>
<td>3 kWh</td>
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<tr>
<td></td>
<td>30423</td>
<td>30427</td>
<td></td>
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<tr>
<td></td>
<td>Estimated</td>
<td>Estimated</td>
<td></td>
<td></td>
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<tr>
<td><strong>Day PC</strong></td>
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<td>Actual</td>
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<td><strong>Night PC</strong></td>
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<td>08/07/2013</td>
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<td><strong>Standing Charge</strong></td>
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<td>69 days at 13.800p per day</td>
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<td>02</td>
<td>016</td>
<td>100</td>
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</tbody>
</table>

* Price change
Please note - there's been a price change during this bill period. We've split your cost into:

- **Cost of electricity used this period**: £9.52
- **VAT at 5% on £217.17**: £10.86
- **Total electricity charges for this period**: £228.03
“1 in 5 people don’t know what kWh (kilowatt hour) stands for—some thought it was a make of Japanese car, a type of heavy goods vehicle or even a boy band.”

(E.ON survey)
Aim is to integrate quantitative data from monitoring
Aim is to integrate quantitative data from monitoring with qualitative data from engagement with householders…
...to understand the everyday contexts of energy use
...to understand the everyday contexts of energy use, and opportunities for new products and services
May – July: In-depth interviews with nine households
### Lead users

<table>
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<th>Housing type</th>
<th>Social</th>
<th>Private</th>
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<tr>
<td><strong>No monitor</strong></td>
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</table>
Lead users

Housing type

Social | Private

Monitor

Energy use

No monitor
Lead users

Housing type
Social  Private

Monitor

Energy use

No monitor
Lead users

<table>
<thead>
<tr>
<th></th>
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<th>Private</th>
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<tr>
<td>Energy use</td>
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</tr>
<tr>
<td>No monitor</td>
<td></td>
<td><img src="red-circle" alt="No Monitor" /></td>
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</table>

Diagram showing the relationship between housing type and energy use for lead users.
Electricity, gas, temperature & humidity data

**Energy Consumption**
2013-6-1 - 2013-6-3

- Electric - Main Total 29.566kwh
- Gas - Main Total 142.7979kwh

**Condition Report**
2013-6-1 - 2013-6-3

- Temperature - Lounge
- Humidity - Lounge

**Compare Conditions**
- Sensor 1
- Update graph

**Compare Dates**
- Condition Sensor: Temperature - Lounge
- Select start and end dates: June 2013
- Update graph

- Choose 2 dates: June 2013
# Timelines

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<th>12 midnight</th>
<th>1 am</th>
<th>2 am</th>
<th>3 am</th>
<th>4 am</th>
<th>5 am</th>
<th>6 am</th>
<th>7 am</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>8:30</td>
<td>9:30 Second</td>
<td>Breakfast</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Tea &amp; toast.</td>
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</table>
**Energy on Show**

Painting in the street or smirky face signs your house can make public displays of each energy use.

Do you feel about this kind of energy display?

- Really like
- Really dislike
- A lot
- Not at all

Can you explain why?

- Copy should be shown up.
- I think it would affect how you use energy.
- Already aware of energy use.

Digital Aquarium

One fish in the aquarium represents your home energy use. Reduce your energy use to see your fish grow and swim. The other fish represent your neighbours, making the whole community's energy use visible.

How do you feel about this kind of energy display?

- Really dislike
- Really like
- A lot
- Not at all

Can you explain why?

- Saving the planet.

Do you think it would affect how you use energy?

- Not at all
- A lot

Can you explain how and why?

- Saving the planet.

Intelligent thermostat

This 'intelligent' thermostat learns your daily routines (when you're in, and when you're out), and then automatically programmes itself. You can also 'teach' it so it makes better predictions. It's claimed to lower your heating bills by up to 20%.

How do you feel about this product?

- Really dislike
- Really like
- A lot
- Not at all

Can you explain why?

- To use, cool. How needs to earn.
- I would want to be convin.

Do you think this would change how you use energy at home?

- Not at all
- A lot

Can you explain why?

- Problem of remembering to do it.

Home energy display

Some housing associations are providing households with home energy displays. These usually show the amount of electricity or gas the house is using, and the costs, both in 'real time' and the total so far for each day. Some break it down by appliance too.

How do you feel about this idea?

- Really dislike
- Really like
- A lot
- Not at all

Can you explain why?

- Environmental benefits.

Do you think this would change how you use energy at home?

- Not at all
- A lot

Can you explain why?

- Already aware of energy use.

Pre-pay meters

With key- or coin-meters you pay for your energy before you use it. It means you have to plan ahead, but also allows you to accurately budget for your energy costs.

How do you feel about this kind of energy system?

- Really dislike
- Really like
- A lot
- Not at all

Can you explain why?

- Would make sure it’s always topped up. Don't want to risk running out.
3. Everyday Activity

Even quite routine everyday activities can have a lot more complexity to them than we normally think about.

Have a look at the simple statement below:

I vacuumed my bedroom

and then look at the story in a bit more detail:

I decided to vacuum my bedroom because I noticed lots of cat hair on the floor when the sunlight came streaming in this morning.

I opened the cupboard and checked that the Hoover bag wasn't full, wheeled the Hoover out of the cupboard and into the hallway, then bumped it up the stairs. One of the wheels gets stuck sometimes.

I bent down to unreele the cable, pulling the plug out and plugging it into the socket on the landing, then switched the socket on. I stood up, turned the handle to open my bedroom door, and pushed the Hoover into the room.

...and so on!

The words highlighted in yellow are all 'things' that you could point to, or even label in real life. Simple activities involve lots of different steps with things around the house.

We'd like you to break down a daily routine for us: making tea. Make a cup of tea, like normal, break it down like a story, and label some of the steps that make it up around the house.

Things involved in the process of tea:
- Teapot
- Kettle
- Sugar
- Milk
- Tea
- Cup

If you have trouble thinking of things, you can use your tea as a guide.

Steps involved in making tea:
1. Lift kettle from base.
2. Press button for lid to flip up.
3. Turn cold tap on & fill with particular amount of water (there's a measure on side that indicates ml/cups) - although, with calcium in it, it gets hard to see level.
4. Turn off tap.
5. Put kettle back on base. Fill out from wall (to stop vapour).
6. Take teabag from tea chest (or cupboard). Press on button. Take teabag from tea chest (or cupboard), pour water straight into mug. Add 2 teaspoons of sugar, half milk, from the fridge; add a blob of milk. Stir with a teaspoon, take teabag out. Yummy!
1. Words and Meanings

The thesaurus suggests some of the following as other words for energy.

Which of these words would you associate with energy? Please circle them.
What does energy look like?

Use this space to draw or write something that represents how you think about energy. There are no right or wrong answers.

Flow: Energy is life. Everything you do, everything you see, needs it. Energy is everywhere.

7. What does energy look like?

Use this space to draw or write something that represents how you think about energy. There are no right or wrong answers.
What does energy look like?

Use this space to draw or write something that represents how you think about energy. There are no right or wrong answers.

A cloud materialising into drops (droplets) moving into cables

Like a pool table – balls disappearing...

...but not really disappearing

Like a dance floor in a club – people shaking

Loop – nothing is lost!

Energy can’t be used up!
7. What does energy look like?

Use this space to draw or write something that represents how you think about energy. There are no right or wrong answers.

A Thunderbolt.
Dan Lockton (left) and Flora Bowden (right) interview a resident in East London about attitudes and routines in using domestic energy.
September:
50 ‘What does energy look like?’ drawings

EXPANSIVE
SPONTANEOUS
PROGRESSIVE
Energy is light, an idea, excitement, positivity.
September:
Co-creation workshop with householders and designers
Introductions
- Name
- Why you’re here
- Favourite food, place or film.
Key Findings from Interviews, Logbooks and Co-creation

- The invisibility and intangibility of energy makes it difficult for people to understand what they are using, and how to change the ways they use it.

- Communicating home energy use through different senses (e.g. audio) could offer new ways for householders to relate to their energy use and appliances.

- New ways of communicating the load on the grid, e.g. better or worse times to use energy, would also be valuable information.

- Devices or apps that tell people about their home energy use when they are out could also address security worries, such as leaving the gas on.
October:

Week-long workshop with 20 RCA students, from 12 courses
November: Home Energy Hackday with 35 designers, developers, energy utilities, energy-related start-ups
Calling all entrepreneurs, designers, artists, students!

Internet of Things London Meetup

#iotlondon

Internet of Things Meetup 26

Xively
4th Floor, 13-21 Curtain Road, EC2A 3LT, London (map)

Join us for drinks and networking as we listen to 3 speakers who are making the internet of things a reality. Interested in speaking? Get in touch on twitter at @...

Internet of Things Meetup 27 (The Christmas edition)

What's new
Briefs:

**In/visibility of energy**: Householders have told us that not being able to 'see' the energy they use (and what's actually using it) limits their ability to change how they use it. This doesn't just mean visualisation via numbers and graphs - what could be new ways of communicating energy? Following on from this, are there opportunities for more **ambient (e.g. audio) interfaces for energy use**?

**Thermal comfort**: Heating uses the largest proportion of energy in homes, but can we look at this question not directly through temperature, but instead from the perspective of householders' **comfort and their sense of control** over the home environment?
localised heating

personalised settings

Smart thermostats in each room

Heart above bedrooms (4 per)


Heat allowance per person per room?

Control over individual room temps

Match comfort to schedules and patterns of occupancy

where is the house most warmest

match comfort to schedules of people or occupancy

heat usage per person per room

visual monitor

headphones?
JANUARY

YOUR LOG PREDICTION:

LAST JANUARY

THIS MONTH'S WEATHER

SEASONAL AVERAGE

32 logs

+ 32 logs

− 32 logs

8 PER WEEK
Next steps:

- Prototyping new energy visualisation / ambient interfaces
- Prototyping new thermal comfort / control interface
- Trials of devices with householders, both at home and in the SusLab living labs across Europe
- Iterative development
- ???
- **PROFIT** Energy savings
Invitation: Home Energy Hackday, Saturday 9 November

SusLab Home Energy Hackday, Dana Centre, Science Museum, London SW7 5HD
Saturday 9 November, 8.30am – 8.30pm

Sign up at Eventbrite

Are you interested in energy, design, prototyping or user research? As part of the European SusLab project, we’re running a one-day hackday event to explore new ways of making home energy use more tangible, visible, or understandable, and we’d love you to take part. We’re looking for makers, however you define: hackers, coders, designers, artists, systems people, to come together and push this area forward.

There’s loads of work going on about reducing energy use, feedback, behaviour change and smart metering, but a lot of it misses a fairly basic insight: people don’t understand energy very well, and it’s difficult to change what you’re doing if the feedback doesn’t mean much to you.