Making the social sciences matter for energy policy: epistemic shifts and methodological advances

Adam C.G. Cooper

Lecturer, Policy Research and Practice

UCL Science, Technology, Engineering and Public Policy (STEaPP)

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What I will cover

- Who am I and what is my angle?
- The problems of energy social sciences for policy

- Problem 1: interdisciplinarity
- Solution 1: integrated socio-technical research

- Problem 2: transdisciplinarity
- Solution 2: energy policy epistemology

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Policy Impact, EBPM and Science Advice

- Fair bit written about how to have impact
- Most advice treats **symptoms** not causes
  - Language
  - Timing
  - Networks
  - Access
- But then there is the ***real*** problem…

Oliver, K. 'A Systematic Review of Barriers to and Facilitators of the Use of Evidence by Policymakers'. *BMC Health Services Research* 14,1 (2014): 2. https://doi.org/10.1186/1472-6963-14-2.

The *real* problem…

- Academic ESSR is **largely irrelevant** in UK policy making
- Where it is relevant, it is **largely incomplete:**
  - 'Problematizing' rather than 'solutionising'
  - Wrong kind of time
  - Wrong intervention or population
  - Backward- not forward-looking
  - Ignores policy pragmatics
  - Ignores policy context
  - Wrong kind of data

PROVOCATION ALERT!!

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Wrong kind of data

- Energy is a **socio-technical** system
- Energy research is technical **and/or** social
- Policy needs **integrated** socio-technical data
- Where are the **methods** for collecting integrated socio-technical data?

- Problem 1: The problem of **inter**disciplinarity

Cooper, ACG. 'Building Physics into the Social: Enhancing the Policy Impact of Energy Studies and Energy Social Science Research'. *Energy Research & Social Science* 26 (2017): 80–86. https://doi.org/10.1016/j.erss.2017.01.013.

Love, J. & Cooper, ACG. 'From Social and Technical to Socio-Technical: Designing Integrated Research on Domestic Energy Use'. *Indoor and Built Environment* 24, 7 (2015): 986–98. https://doi.org/10.1177/1420326X15601722.

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Ignoring the policy context

- Assumption that 'good' research is same in policy and academia
- Failure to take account of the particular **knowledge demands** generated by policy context
- Epistemic conflict between academia and policy

- Problem 1: The problem of **inter**disciplinarity
- Problem 2: The problem of **trans**disciplinarity

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Cooper, ACG. 'Evaluating Energy Efficiency Policy: Understanding the "Energy Policy Epistemology" May Explain the Lack of Demand for Randomised Controlled Trials'. *Energy Efficiency* 11, no. 4 (2018): 997–1008. https://doi.org/10.1007/s12053-018-9618-8.

The problems of ESSP

- Problem 1: The problem of **inter**disciplinarity
- Problem 2: The problem of **trans**disciplinarity

The **inter**disciplinary problem

- Case study: **thermal comfort**

- How is data **currently** collected
  - Technical
  - Social and technical
- Particular **issues** with this approach
- An example solution: **contextual thermography**
- General lessons

Technical data capture: Co-heating test

Source: Samual Stamp, LoLo EPSRC CDT: http://www.lolo.ac.uk/w2up3/
Source: Oswald Consultancy: https://oswaldconsultancy.wordpress.com/2012/07/13/coheating-taming-the-test/

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Technical data capture: Thermal Imaging

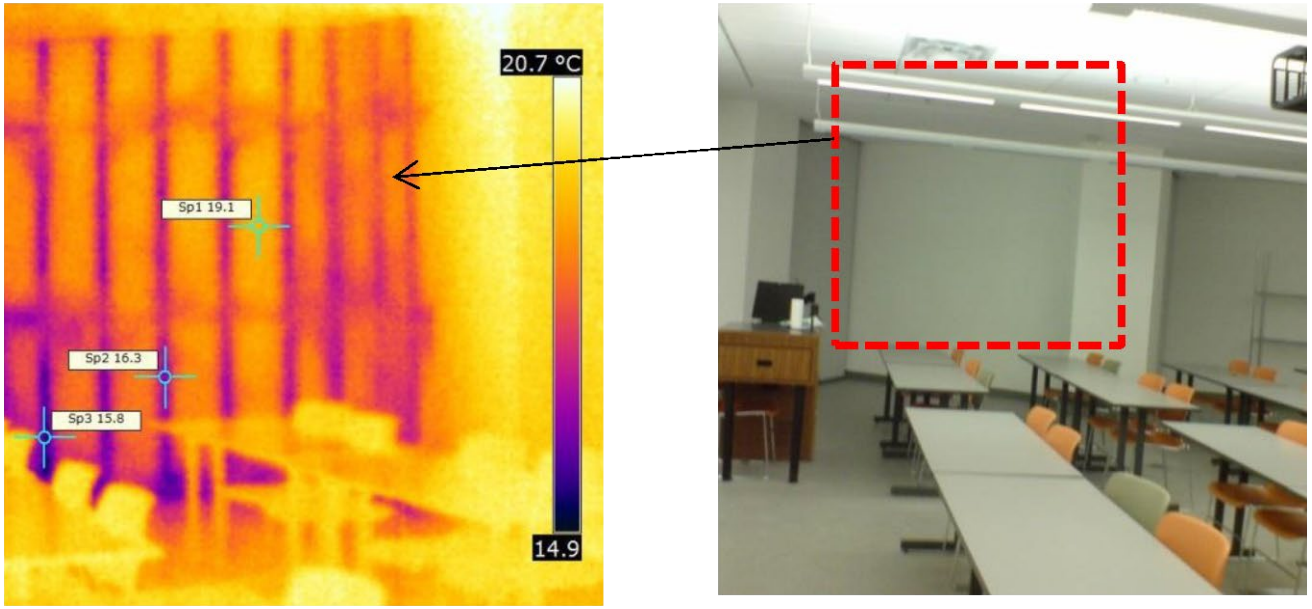


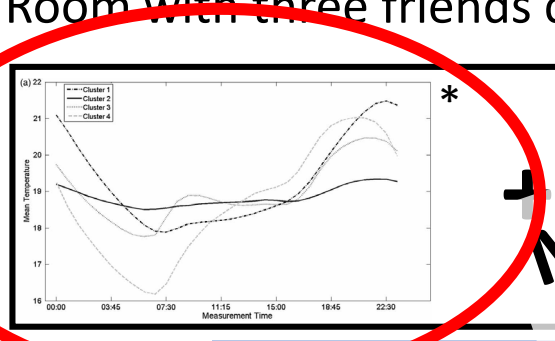
Fig. 6- (a) Thermograph showing thermal anomalies (thermal bridging), in purple cold steel studs temperature reading sp3 15.8 C (b) investigated wall, internally looking at a classroom

From: Taileb, Ali, and Hamoud Dekkiche. 'Infrared Imaging as a Means of Analyzing and Improving Energy Efficiency of Building Envelopes: The Case of a LEED Gold Building'. *Procedia Engineering* 118 (2015): 639–46. https://doi.org/10.1016/j.proeng.2015.08.497.

’Social’ and technical data capture: Thermal comfort

Strips out spatial dynamics, context and meaning

Living Room with three friends chatting on a Saturday afternoon becomes:



*

+

“Generally feels quite warm”

OR

-3 -2 -1 0 +1 [+2] +3

Multiple challenges to validity with self report

* **Source**: Huebner, GM., et al. (2014). The Shape of Warmth: Temperature Profiles in Living Rooms. *Building Research & Information*. https://doi.org/10.1080/09613218.2014.922339.

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Technical data capture misses these effects:

Social exclusion makes you cold

From: IJzerman, H, Gallucci M., et al . (2012) 'Cold-Blooded Loneliness: Social Exclusion Leads to Lower Skin Temperatures'. *Acta Psychologica* 140, no. 3 : 283–88. https://doi.org/10.1016/j.actpsy.2012.05.002.

ndition.

AND

Being warm leads to prosocial/trusting behaviour

From: Williams, Lawrence E., and John A. Bargh. 'Experiencing Physical Warmth Promotes Interpersonal Warmth'. *Science* 322, no. 5901 (24 October 2008): 606–7. https://doi.org/10.1126/science.1162548.

A **new method** to address this**: contextual thermography**

An interdisciplinary **socio-technical research method** to:

- Capture **physical parameters** on a human, social scale
- Enable interpretation of **context** and **behaviour**

All within the same **frame of reference.**

Combines **video ethnography** and **thermal imaging**

Differences vs video ethnography and thermography

Video ethnography

Capturing thermal spectrum data alongside video data

Analysis includes quant estimation of 'thermal landscape', estimations of clo etc

Thermography

Multiple frame capture (video)

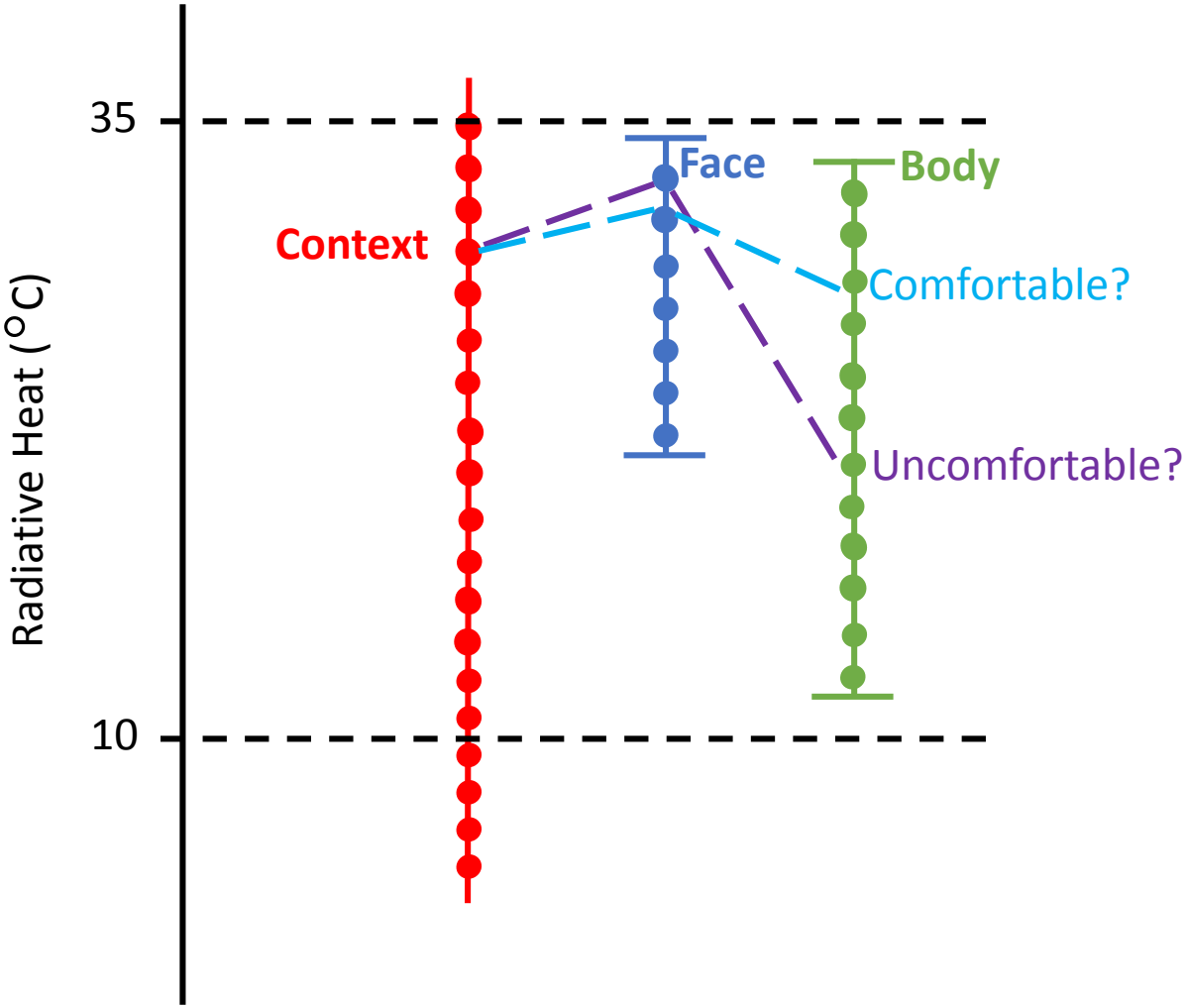
Capturing whole rooms, with people

Analysis includes interpreting arrangements and activities

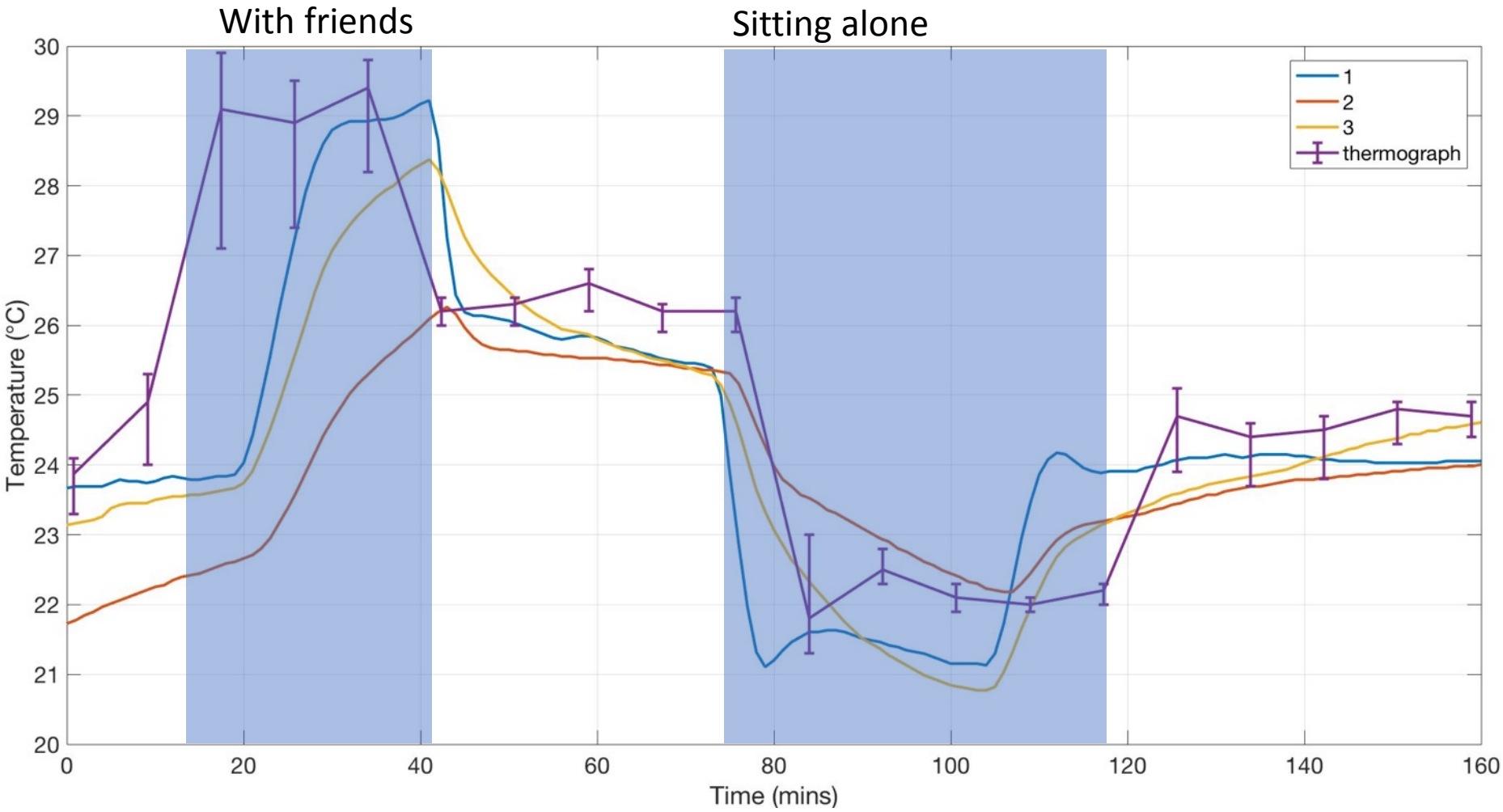
Demonstrating contextual thermography in UCL's climate chamber


33.8
CONTEXT
FACE
FACE
PERSON A
BODY
PERSON B
BODY
FLIR
18.5

Relative **temperatures to infer comfort**



Socio-technical analysis with contextual thermography: an example



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Emerging advantages of contextual thermography

- Observational assessment of thermal comfort
- Use of relative vs absolute temperature values
- Capture of dynamics of temperature and activity over time and space
- Capture of dynamics of social settings over time
- Automatic capture of a range of data which can be deployed at scale
- Ability to anonymously identify individuals to track over time (longitudinal)

Issues and limitations

Currently very little testing and pilot data: initial tests are promising

IR Cameras are not optimized for this use:

- Depth of field too shallow
- Field of view too narrow

Need to develop new algorithms to classify ‘thermal landscapes’

For large N deployment need auto recognition of individuals

The problems of ESSP

- Problem 1: The problem of **inter**disciplinarity
- Problem 2: The problem of **trans**disciplinarity

The **Trans**disciplinarity problem

- Issue of how academic research and policy interact
- Visible in logics of research quality and impact

Logic:

- **Problem**: evaluation not guiding policy effectively
- **Assumption**: RCTs = best to understand causality
- **Solution**: more evaluation should be RCT-like

Vine, E. et al 'Experimentation and the Evaluation of Energy Efficiency Programs'. *Energy Efficiency* 7, 4 (2014): 627–40. https://doi.org/10.1007/s12053-013-9244-4.

Frederiks, E. et al. 'Evaluating Energy Behavior Change Programs Using Randomized Controlled Trials: Best Practice Guidelines for Policymakers'. *Energy Research & Social Science* 22 (2016): 147–64. https://doi.org/10.1016/j.erss.2016.08.020.

Should evaluation use more RCT-style designs?

- Presupposes single epistemic perspective
- What if policy making has a different epistemic perspective?
- An ‘energy policy epistemology’ might justify a focus on other research designs as ‘best’

An ‘energy policy epistemology’

What drives a preference for other approaches?

This doesn’t rule out RCTs, but drops them down the merit order.

What might drive preferences away from RCTs?

This would rule them out as a design choice.

Cooper, A.C. G. ‘Evaluating Energy Efficiency Policy: Understanding the “Energy Policy Epistemology” May Explain the Lack of Demand for Randomised Controlled Trials’. *Energy Efficiency* 11, 4 (2018): 997–1008. https://doi.org/10.1007/s12053-018-9618-8.

An ‘energy policy epistemology’ I

What drives a preference for other approaches?

- **Accountability** – we’ve done what we said we’d do
- **Representation** – we understand how this affects the electorate
- **Useful subjectivity** – actors in the policy have agency and can detect issues

Contextual factor: limited resources (money, time and people) targets most efficient way of achieving each

An ‘energy policy epistemology’ II

What drives preference away from RCTs?

- **Limited agency** – FMDs not expected to control everything; this leads to:
- **Negotiated certainty** – policy causality may arise through *agreements* between actors

PUNT ALERT!

Combination counts **against** RCTs where:

- experimenter must have **total agency**; and
- causality is not negotiated but **discovered**

An ‘energy policy epistemology’ III

Other factors important for impact

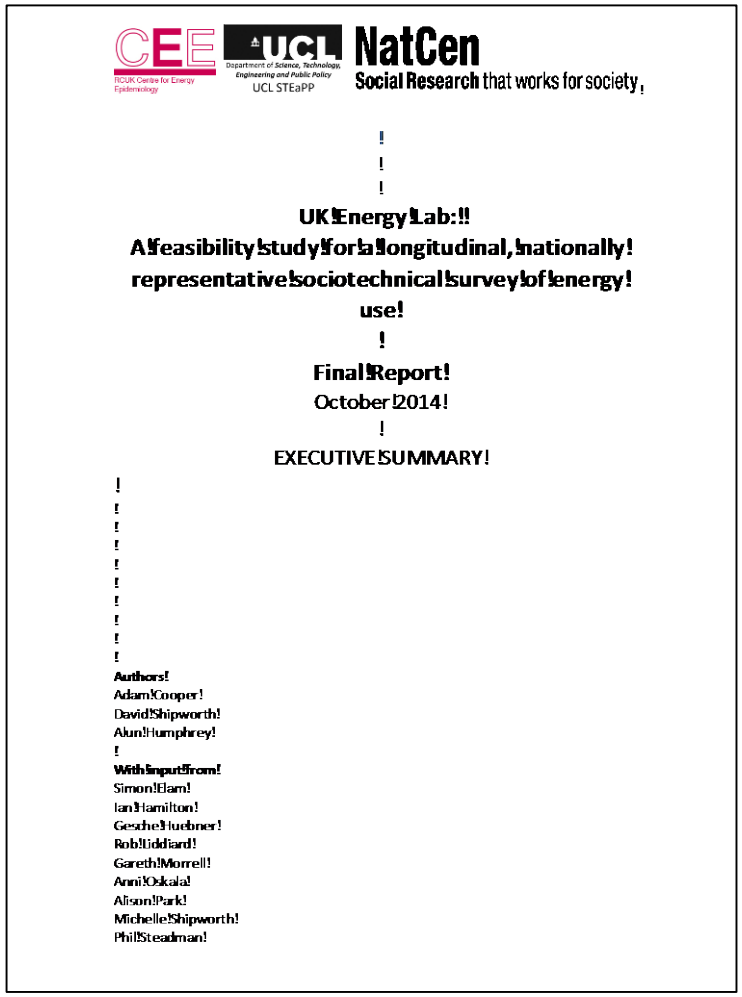
Research/data should have:

- **Timeliness** (cf. Kingdon’s ‘window of opportunity’)
- Capture **wider impacts** (co-benefits)
- Maximised **internal validity** inside EPE

Designs for the EPE

EPE feature	Ideal design approach
Accountability	**Systematic quantitative data** collection capturing policy delivery
Representation	**Large enough N** to derive valid population sub-group generalization
Useful subjectivity	Supports **qualitative** inquiry integrated into research
Limited agency & Negotiated certainty	Is mainly **observational** in approach, or design **not undermined** by changing policy
Timeliness	Data collection is **ongoing**
Wider benefits	Data collection **captures, or can be linked** to other sources of data on different topics
Internal validity	Approach takes advantage of natural variation in deliver (e.g. **natural experiments**)

LUKES: Longitudinal UK Energy Survey



CEE RCUK Centre for Energy Epidemiology · UCL Department of Science, Technology, Engineering and Public Policy, UCL STEaPP · NatCen Social Research that works for society

UK Energy Lab:
A feasibility study for a longitudinal, nationally representative sociotechnical survey of energy use

Final Report
October 2014

EXECUTIVE SUMMARY

Authors:
Adam Cooper
David Shipworth
Alun Humphrey

With input from:
Simon Elam
Ian Hamilton
Gesche Huebner
Rob Liddiard
Gareth Morrell
Anni Oskala
Alison Park
Michelle Shipworth
Phil Steadman

Building block 1: Smart Meter Research Portal

https://www.ucl.ac.uk/bartlett/energy/smart-meter-research-portal-smrp

See: http://www.ucl.ac.uk/steapp/research/projects/energy-lab

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Thanks for listening!

Fire away with questions, comments,
critiques or
general exclamations of awe…

Contact me for more information
adam.cooper@ucl.ac.uk
www.ucl.ac.uk/steapp

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