Department of Energy & Climate Change

Development work for a longitudinal survey of energy use

Appendices

03 August 2015

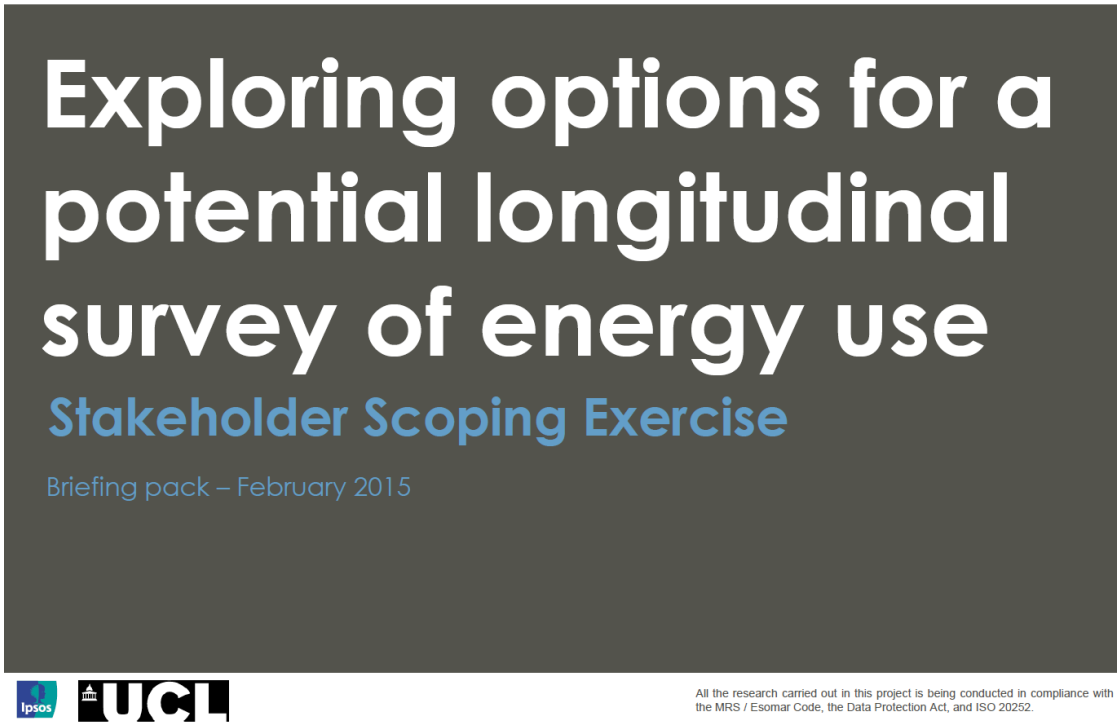
URN: 15D/407

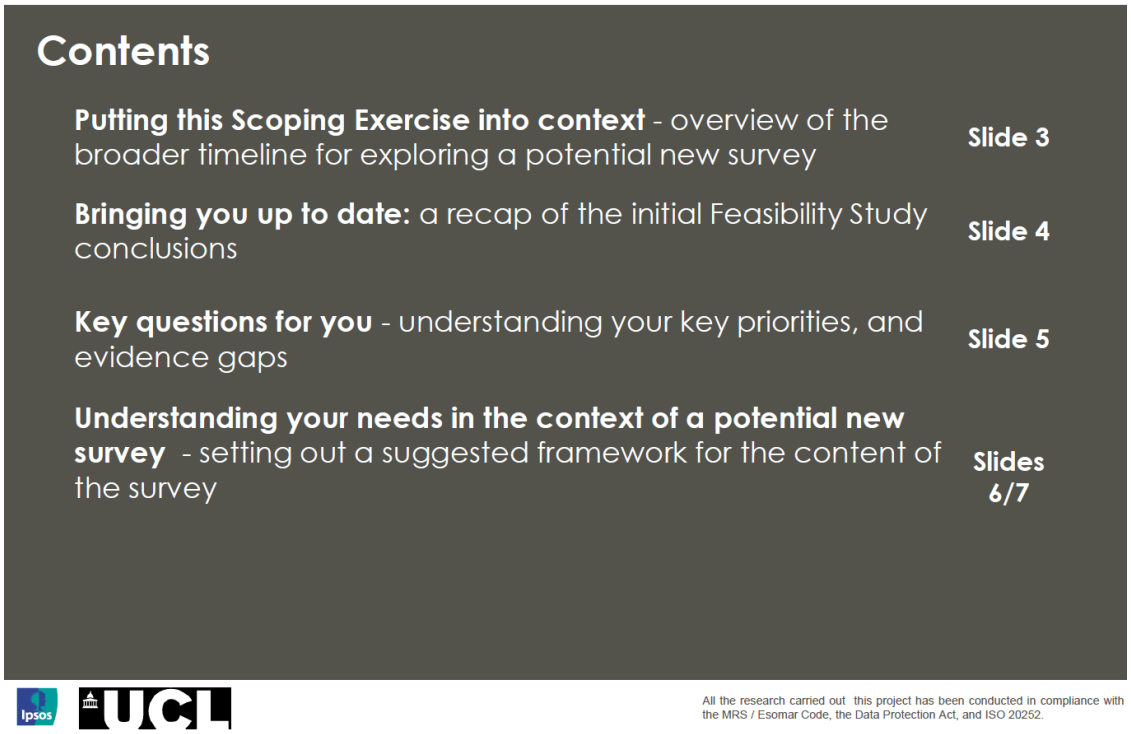
Any enquiries regarding this publication should be sent to us at: Fraser.Macleod@decc.gsi.gov.uk

Contents

Appendix 1: Stakeholder briefing pack

Screenshots from PowerPoint stakeholder briefing pack:





Putting this Scoping Exercise into context

Feasibility Study
Completed between January and June 2014.

- This study reviewed the feasibility of setting up a longitudinal survey of energy use.
- The study was supported by DECC and RCUK. The report recommended further stages of consultation and development work to refine the approach.
- The RCUK Centre for Energy Epidemiology at the UCL Energy Institute, UCL Department of Science, Technology, Engineering and Public Policy and NatCen Social Research undertook the study.

Development Work (including this Scoping Exercise)

Ongoing, from January to April 2015.

- DECC has now commissioned Ipsos MORI and UCL to continue scoping out the potential design of a future longitudinal survey of energy use.
- The aim of this development work is to:
  - Understand the potential need for such a survey;
  - Understand what it might be able to offer above and beyond other existing research channels;
  - Further develop a recommended design, including how it is administered and what information is collected

Engaging with stakeholders throughout the process

Further consultation likely
Continuing on from the development work.

Bringing you up to date: a recap of the initial Feasibility Study conclusions

It provided the following key reasons there could be value in a new longitudinal energy use survey

1. **There is limited data about energy demand and what drives it in homes.**
2. **Better evidence on what drives variation in energy demand would enable better targeting of policies to meet long term plans to decarbonise energy in homes by 2040.**
3. **There is agreement from major energy research and innovation institutions that such data is required.**

The Feasibility Study made suggestions for how the survey could be designed.

Design: survey carried out in the home, with some repeated annual visits (i.e. a longitudinal element).

Size of study: a large annual sample e.g.10,000 homes each wave.

Data collected: Mix of social data about people's attitudes and behaviours, and technical data about the building and internal space.

Data collection method:

- Social data collected by trained survey interviewers.
- Technical data collected by trained surveyors.
- Monitoring data collected from a subsample of homes via installed monitoring equipment.

The full Executive Summary report for the Feasibility Study can be found here.

http://www.ucl.ac.uk/steapp/docs/lukes-reports/exec

Key questions for you: understanding your key priorities and evidence gaps

To assist in developing and prioritising questionnaire content, please begin to think about the following questions:

1. **What is it you/your team/organisation is trying to achieve in relation to domestic energy use?**

   E.g. Policy objectives? Strategic priorities? Priority issues for the future? Is your focus on trying to measure things or to understand why things happen?

2. **What do you need to know in order to achieve this?**

   E.g. Information on people's attitudes or behaviours? Technical evidence? Are there specific groups of people, or types of home, that you particularly need information about? What do you need to measure/report? Are you interested in how things change and why?

3. **What do you see as the main evidence gaps from existing data sources?**

   E.g. What are your key evidence needs? What evidence gaps do you currently have, or foresee in the future?

4. **What would be the main benefits of a longitudinal survey of energy use to you/ your team/ organisation?**

   E.g. How could it help improve targeting of policy? Would it save you from commissioning other research or evaluations? How could the proposed survey improve research or evaluation plans in your area? Can you attempt to quantify some of these benefits?

UCL Ipsos

Understanding your needs in context: Overview of potential survey framework

Here we suggest the broad "elements" that might be included in the survey. We will seek to understand your evidence needs within each of these elements to help us develop and prioritise the survey content.

Survey objective

A longitudinal survey collecting sociotechnical data to understand domestic energy use.

Survey content

Four elements we suggest need to be understood through the survey

CONTEXT

What are households and their homes like?

A factual account of a household's resources, demographics and building.

PURPOSE

What are people's principles and needs? Why do they use their home as they do?

A focus on household attitudes, needs and values, that might underpin their daily activities.

ACTIONS

What do we do in our homes that uses energy? How and why are we doing these things?

Recording details of household behaviours that impact household energy use.

DESIRES

What do people want to change in their homes? What unmet needs do they have?

Exploring barriers to change and understanding potential mechanisms to enable this change.

Value of survey:

What will the outputs of the survey tell us?

THE PROFILE

of how households use energy, and how this varies in different contexts.

THE DRIVERS

of the way in which energy is used, and how this relates to people's capability, motivation and opportunity to act in a certain way.

THE OPPORTUNITIES

for assisting households and homes to use energy in a way that meets the range of needs they have.

UCL Ipsos

More detailed specification of potential survey content

CONTEXT

What are households and their homes like?

1. **What do people have in their home? -** An inventory and history of the systems and appliances a household has access to. *e.g. What resources do households have to - make their home warm? Heat water? Cool their home? Cook? Do laundry? How /when/why were these things installed?*
2. **What is their home like?-** The profile of the building. *e.g. How old is it? How is it laid out? What floor space does it have? What type of walls does it have?*
3. **What are the people like?-** About the people who live there. *e.g. Who lives in the home all of the time? Who sometimes live s there? What is their work status? What is their daily routine?*

PURPOSE

What are people's principles and needs? Why do they use their home as they do?

1. **What do people want from their home?** The "concept of a home" and their high level priorities for a home. *e.g. To raise a family? To entertain? To shelter? To benefit from re-sale value?*
2. **What general principles do they have?** People's attitudes to society, change, sustainability, technology , the environment.

ACTIONS

What do we do in our homes that uses energy? How and why are we doing these things?

1. **How do people go about doing things in their home?** The what, where, when and how of household chores and actions. *e.g. How do make their home warm? How do they control the temperature? How do they wash and dry their clothes? How does this vary at different times and why?*
2. **Why do they do these things the way they do?** Understanding why people decide to do the things they do. *e.g. What are the household dynamics – who makes decisions? What external information or advice have they received? What previous experiences have they had? What's "common sense"?*

DESIRES

What do people want to change in their homes? What unmet needs do they have?

1. **What do people want to change in their home?** What unmet needs do they have?
2. **Why haven't they done so already?** Understanding the barriers to change. *Financial reasons? Too old? Lack of knowledge? Suitability of home?*
3. **What would help them to do these things?** Understanding the enablers of change. *New information? New technology? Financial assistance?*

Appendix 2: Topic guide for stakeholder consultations

CAPITALS = Interviewer instructions
Italics = Section Title

Objective for section	Questions and prompts
Intro	
Introduction to the discussion – answering any initial questions and seeking permission to record. Understanding respondent's background and the context for the discussion.	Introduce self & Ipsos MORI as independent research company. *Checklist* - Seek permission to record discussion - request permission for interview notes (and respondent identity) to be shared with UCL as a partner organisation working collaboratively on this study - Have you had a chance to read the briefing document we sent through? (If not, offer to send it through by email in case they are able to open whilst on call, and give a brief overview of background and reason for call – consider re-scheduling interview if appropriate and without causing too many delays). - Do you have any immediate questions about the background or context for this study? IF POSSIBLE WE'LL KEEP MORE DETAILED QUESTIONS ON DESIGN UNTIL LATER ON IN OUR DISCUSSION AS TO START WITH WE'D LIKE TO HEAR MORE TOP-LEVEL THOUGHTS ON YOUR CURRENT PRIORITIES AND EVIDENCE NEEDS, BEFORE CONSIDERING HOW THESE NEEDS MIGHT BE MET THROUGH THE SURVEY. *Participant Introduction* - Please can you describe your current day-to-day role? ○ What does this role involve? What do you have responsibility for? - What other teams inside your organisation do you work closely with? - What other organisations do you have contact with? - Have you sought anyone else's views in preparing for this interview? (REASSURE THAT THIS IS OK.) If so, who (or what organisation)?
- **Key areas of interest related to domestic energy use**	
Exploring Q1 in the briefing pack.	*Current areas of interest* - What key areas / policies do you/your team have responsibility for in relation to domestic energy use? - What key issues or objectives related to domestic energy use are you working on at the moment?

Understanding high-level priorities now, and also likely priorities for the future
 	
(5 mins)
	Future priorities
	- Within this area, what do you expect you/your team will be focusing on most over the next couple of years?
	  o How about in 5 years time? In 10 years time?
	- What do you think will be the most important policy questions for your team in the future?
	  o Over the next 2 years? 5 years? 10 years?
	
	(IF RESPONDENT DOES NOT KNOW WHETHER THE TEAM WILL CONTINUE TO EXIST, ASK TO ASSUME IT WILL)

- **Evidence needs**	

Exploring Q3 in the briefing pack
 	
Explore key evidence needs and where gaps are currently, as well as gaps foreseen in future
 	
(10 mins)
	Evidence used to inform current decision-making
	- Which, if any, of the following types of evidence do you draw on to help inform policy development ?
	  o PROBE: primary research (collected by DECC, Government or others?), literature reviews, secondary data analysis (source?), technical data records (source?), administrative data (source?), expert advice?
	
	Identifying evidence gaps
	- To what extent is the evidence you currently draw on sufficient for informing policy development in your area? ? In what ways does it specifically meet the needs of informing policy in your area? In what ways, if at all, does the evidence available to you not meet the needs of informing policy?
	PROBE: type of information / format of information / source of information.
	
	- Where do you feel there are gaps in the evidence you have to draw on? What questions do you have that you can't answer currently, or feel you don't have enough detail about?
	  o Which specific issues does this relate to?
	  o Which specific groups of consumers does this relate to (PROMPT: could be groups based on location or on the characteristics of the household, dwelling or neighbourhood)?
	  o To what extent are these evidence gaps related to information you need now for current decision-making vs. evidence you need for future planning and to help address likely future policy issues?
	- What is the impact of having these evidence gaps? What is the impact now? What is the impact of this likely to be going forwards?
	
	IN THE NEXT TWO SECTIONS, EXPLORE FURTHER THE RESPONDENT'S MORE PRECISE INFORMATION NEEDS – REFERRING BACK TO EVIDENCE NEEDS AND EVIDENCE GAPS ALREADY DISCUSSED WHERE APPROPRIATE

Specific groups of interest	
Exploring Q2 from slide pack Understanding any specific evidence need priorities to help inform suitable survey design – particularly sample size to provide required level of geographical coverage, subgroup coverage etc.	*Groups of interest* - Are there any particular levels of geography you have most interest in? PROBE: any particular regions? Nations? GB or UK? Community scale? Urban vs. rural? - Any particular groups of consumers you have most interest in? - Any particular types of buildings and property you have most interest in? - Any particular types of circumstance/household situation/lifestage you have most interest in? IN RELATION TO EACH POINT ABOVE, ASK:

(10 mins)	○ What is it specifically about this group that makes it important to understand? Which particular issues are of relevance to this group? Is this likely to be a long-term policy interest? - Considering all the groups of interest we've just discussed, which would you say is your biggest priority to understand? What makes this the priority group?
Linking information needs to potential survey framework and design	
Understanding unique value that could be attained through potential new survey. Understanding level of need for cross-sectional vs. longitudinal data, and exploring frequency with which information is needed to inform decision-making. Drawing together information needs to understand whether, and how, they might fit in a questionnaire framework. (20 mins)	<u>Importance of tracking changes</u> - Are there any issues, or types of information, that you need to track over time? What? Why is it important for you to track this over time? ○ Is it most important for you to <u>track this over time with the same households</u>, or to <u>track this over time across the population as a whole</u> (i.e. at different intervals but with different households each time)? ○ What issues do you specifically need to track over time with the same households? Why is this important? ○ To what extent are you interested in understanding what impact a change of circumstance on a household has on other outcomes? Are there specific changes of interest to you? Or specific outcomes of interest? Are you interested in exploring the causality of any changes observed? ○ What issues do you specifically need to track over time, but at a general population level? When do you ideally need these snapshots of the population? What makes you say this? - Thinking about things that you need to track over time, what kinds of changes are you interested in looking at? ○ Are these social? Attitudinal or behavioural? Technical/technological? ○ PROBE to understand if these are longitudinal changes within the same households, or general population snapshots - On what timescale would you expect these changes to be occurring? On what timescale would you expect these changes to be observable? ○ Are these changes likely to be occurring in any specific types of circumstances? For any specific groups of consumers? For any specific types of building? ○ Is this information you think needs to be collected every year? Every 2 years? Less frequently than this? What makes you say this? To what extent would it be important for you that the survey explored the potential impact of new technology that aimed to change domestic energy use? Why do you say this? (if needed, give example of smart meters, smart heating controls etc.) Could you please turn to slide 4 of the briefing pack. I want to consider how appropriate or not the suggested design from the Feasibility Study would be for meeting the needs we've discussed. - Overall how important is it for you that robust national estimates are produced that describe the population at a certain point in time? Why do you say this? - Overall how important is it for you that the same households are visited over time to collect data that tracks changes and shows trends? Why do you say this? - What type of data is most useful for you - social data on people's attitudes and behaviours? technical data on the internal and external fabric of buildings? Or monitoring data that measures real-time energy use/temperature data etc.? To what extent is

	any one of these a priority over the other? Or is it a mix of these things? (GENERAL INTEREST TO BE COLLECTED HERE, BUT MORE DETAIL CONSIDERED IN FOLLOWING DISCUSSION) Finally, could you please turn to slides 6 & 7 of the briefing pack. I now want to bring together everything we've discussed by thinking how your policy needs, evidence requirements and the types of information you need, match up against these four areas. TALK THROUGH MEANING OF EACH ONE, ENSURING PARTICIPANT IS CLEAR. - Do any of these four areas stand out as being more important to you? Why is this more important for you? - Do you feel any of these four are less relevant to you? Why do you say this? TAKE EACH OF THE 4 QUESTIONNAIRE SECTIONS IN TURN TO EXPLORE RESPONDENTS SPECIFIC TOPICS OF INTEREST WITHIN EACH ONE. INTERVIEWER TO ALSO HAVE LONGER TOPIC LIST TO HAND TO USE FOR ADDITIONAL PROMPTS IF NEEDED *(this is not being shared with respondents, it is an internal document we've been building up from reviews of literature and existing surveys, and will continue to refine from analysis of the stakeholder interviews)* <u>CONTEXT</u>: - What do you need to know about the things that people have in their homes that you don't know already? - What do you need to know about domestic buildings that you don't know already? - What do you need to know about the people living in these homes that you don't know already? o How would you use this information? o How would this help improve decision-making? <u>PURPOSE</u>: - What, if anything, do you need to understand about people's underlying beliefs and principles? Is there anything specific in relation to this that you would find it useful to know given your current role? o How would you use this information? o How would this help improve your decision-making? <u>ACTIONS</u>: - What do you need to know specifically about what people do in their homes that uses energy? What parts of this do you feel you lack evidence on at the moment? o How would you use this information? o How would this help improve your decision-making? <u>DESIRES:</u> - What, if anything, do you need to understand about what people would ideally like to do in their homes? - Are there any specific concepts you need to know people's reactions towards? o How would you use this information? o How would this help improve your decision-making?

Conclusions - understanding the benefit of commissioning a future longitudinal survey of energy use	

Bringing interview to a close and confirming top priorities for future potential survey, and its possible applications and benefits/USPs for respondent. – Exploring Q4 in Slide Pack.
 	
(10mins)
	Thank you for talking through your current and future evidence needs and how these might be captured within a potential new survey of energy use in homes. To draw this to a close, please consider overall…
	
	- If this survey was to be commissioned, what would your top three priorities be for pieces of data it collected?
	- How can you see yourself applying this data given your current role?
	- What would be the main benefits of a longitudinal survey of energy use to you/your team/organisation?
	  o How could it help improve targeting of policy?
	  o Would it save you from commissioning other research or evaluations?
	  o How could the proposed survey improve research or evaluation plans in your area?
	  o Can you attempt to quantify some of these benefits?
	
	DISCUSS APPROPRIATE CONFIDENTIALITY LEVELS FOR DISSEMINATION OF FINDINGS TO DECC AND FURTHER AFIELD
	- How important is it to you that the things you have said over the course of this discussion are kept confidential?
	- Is there anything that you would like to be anonymised when we share our findings with DECC? Please we do not intend to share notes from individual interviews with DECC, it is helpful to know whether you would like to be anonymous when we report back on the views we've heard across the people we've We can discuss this again at the end of the conversation to consider if there is anything you have shared that you do not want to be attributed to you.
	  PROVIDE RE-ASSURANCE THAT ANY CONFIDENTIALITY AGREEMENTS MADE WILL BE ADHERED TO
	- Ask if any further members of the team would be interested in sharing their views via online engagement form.
	
	THANK AND CLOSE

Appendix 3: Written pro forma for wider stakeholder engagement phase

Development work into potential energy use survey
Have your say

Ipsos MORI and UCL are currently consulting a range of stakeholders on behalf of DECC to gather views about a potential future survey of domestic energy use. Please use this document to give your views on how this survey could be designed to be of value to you and your team/organisation. If you would like to work collaboratively in completing this document with other members of your team/organisation, please feel free to do so. Please see the briefing pack that accompanies this document for further detail.

Please complete this form and email it back to amy.wheeler@ipsos.com by Thursday 12th March. If you have any questions please contact either Antonia Dickman (020 7347 3157) or Amy Wheeler (020 7347 3105) at Ipsos MORI.

1. Introduction

Please list the role(s) of those who have contributed to this document i.e. their job title(s) / team(s):

1. Please type your response here.
2. Please type your response here.
3. Please type your response here.

2. Key areas of interest related to domestic energy use

Please briefly describe the current and future areas of interest you/your organisation/team has in relation to domestic energy use.

When responding to this section, you may like to think about:

- What domestic energy use issues / policy questions you are working on at the moment
- What you expect to be the key issues of interest over the next 5 to 10 years

Please type your response here.

3. Evidence gaps

Thinking about the evidence you draw on to inform your work, please detail any evidence gaps you currently have.

When responding to this section, you may like to think about:

- What sort of evidence are you missing – is this technical, attitudinal or behavioural information etc?
- The impact of not having this evidence

Please type your response here.

4. Groups of interest

Please list out below any groups within the population that are of particular interest to you/your organisation/team.

When responding to this section, you may like to think about:

- Particular levels of geography of interest (e.g. UK, GB, national, community, urban/ rural)
- Types of buildings or properties that are a priority for you to understand
- Groups of consumers that are a priority for you to understand

Please type your response here.

5. Cross-sectional vs. longitudinal survey

There are a range of ways in which this survey could be designed. A key decision is around the value of either cross-sectional or longitudinal data.

A cross-sectional survey offers a snapshot of the whole population at one moment in time by surveying a nationally representative sample. This design can provide a robust measure of the public's level of awareness, attitude or uptake of something at that time. How this changes over time for the population as a whole can be measured through repeat cross-sectional surveys with a fresh sample of representative households each time. However, it does not track trends across the same households.

A longitudinal survey tracks the same households so that changes in attitude or behaviour for that sample of households can be observed over time. This builds up a picture of how a change in circumstances can affect attitudes and behaviours. One disadvantage of a longitudinal survey is that, over time, the sample of households may not represent the national profile of the population as well as a cross-sectional survey.

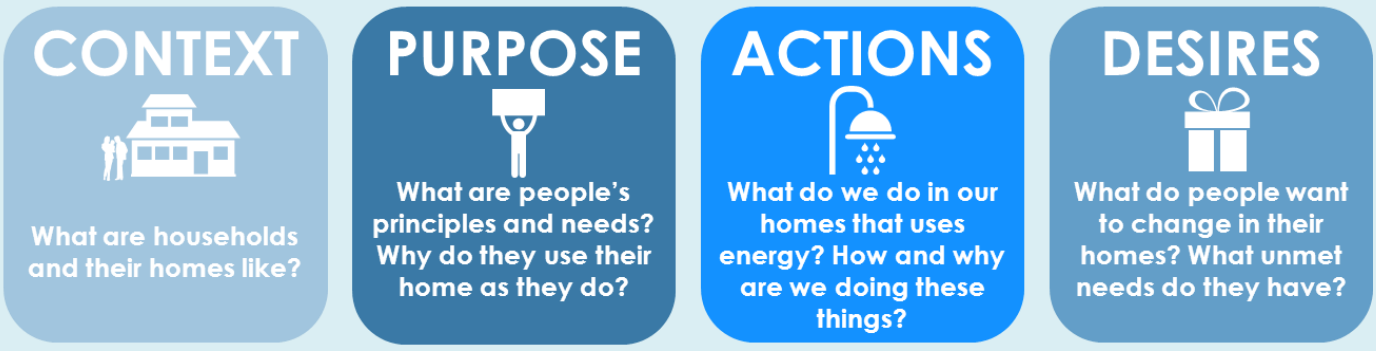
What would be most useful to you/your organisation/team?

Is it more important for you to track issues over time with the same households, or to track them over time across the population as a whole?

Please type your response here.

6. Subject matter of interest

Slides 6 & 7 in the briefing document present 4 potential key themes that the survey could include.



Thinking about these four areas, please answer the questions below.

1. **What things do you need to know that are related to "context"?**

Please type your response here.

2. **What things do you need to know that are related to "purpose"?**

Please type your response here.

3. **What things do you need to know that are related to "actions"?**

Please type your response here.

4. **What things do you need to know that are related to "desires"?**

Please type your response here.

5. **Which, if any, of the four areas are more important for you/your team/organisation?**

Please type your response here.

7. Final thoughts

Please imagine that such a survey has been commissioned and the data from the survey is now available for you/your organisation/team to use. With this is mind, please answer the final two questions.

1. **What would you prioritise as the first things to understand in the data?**

Please type your response here.

2. **What impact would having this data have on you/your team/organisation?** If possible, please quantify these benefits e.g. cost savings from removing the need to commission other research, or the monetary value of having this new information available.

Please type your response here

Thank you for your time

Appendix 4: Screenshot of topic tick-list for stakeholder completion

Ipsos MORI and UCL development work for a potential new survey of domestic energy use (conducted on behalf of DECC).

For more information please contact Antonia Dickman, Ipsos MORI (020 7347 3157) or Fraser Macleod, DECC (0300 068 8103)

Below is a list of question topics that could be included in a new survey about domestic energy use. Alongside each topic, **please indicate to what extent you feel it would be important for a new survey to collect information on this**. To do this, please **enter a 'Y' in one of the three columns for each topic**. Please add any comments in the final column.

Topic		Your Views - Please put a 'Y' in the relevant column			
General topic area	Specific issues of interest	This should be a priority area for this survey	Data on this issue would be interesting for us, but not an essential priority	This is not important for our uses	Comments (e.g. To tell us whether this is a topic you currently do not have any evidence about , or whether it's a topic you already have evidence about but would ideally have from one consistent source, whether it's data you need to link to existing datasets etc.)
Heating and keeping warm	Heating system(s) present in home, including types of fuel used				
	Heating controls present in home (e.g. room or radiator thermostats, timing controls) and when/how/why used to set room temperature and timing of heating				
	Instructions or guidance received on how to control the heating				
	Typical heating behaviours on different days, weeks, seasons (e.g. when/why certain rooms heated, what combination of heating sources used, how keep warm using clothing, closing doors)				
	Circumstances that lead to changes in normal heating behaviours				
	Respondent views on whether able to keep warm enough, and what, if anything, they would like to do differently				
Hot Water	Hot water systems present in home, including location and use of hot water tanks, water meter				
	Hot water controls present in home, and when/how/why used to set timing and temperature of water heating				
	Instructions or guidance received on how to control the hot water				
	Hot water appliances, washing facilities and typical hot water use behaviours (e.g. when/how/why hot water is used including behaviours around bathing, showering, laundry and cleaning)				
	Circumstances that lead to changes in normal water heating behaviours and use of hot water				
	Respondent views on whether able to get hot water and and when desired				
Keeping Cool	Cooling systems present in home, including air conditioning, fans, etc.				
	Cooling controls present in home and when/how/why used				
	Typical cooling behaviours on different days, weeks, seasons (e.g. how windows, doors and fans are used to either keep in or disperse heat)				
	Circumstances that lead to changes in normal cooling behaviours				
Other Energy Uses	Appliances present in home (e.g. white goods, cooking appliances, home office equipment) and when/how/why used by household				
	Lighting present in home and when/how/why used by household				
	Other major energy uses (e.g. charging electrical vehicle,				

Appendix 5: Exploring the potential for data linkage in the context of a potential future longitudinal survey of domestic energy use

Ben Anderson (b.anderson@soton.ac.uk, @dataknut), Faculty of Engineering and Environment (Energy & Climate Change Division), University of Southampton

Purpose

To highlight the potential value of data linkage in LUKES in order to:

- reduce costs of data collection;
- improve efficiency and quality of fieldwork process;
- improve quality of data collected including provision for dwelling history prior to fieldwork;
- validate administrative data sources against LUKES observed/surveyed data (and vice versa);
- enable additional policy relevant research/insights.

Background

The LUKES II Contract 1 feasibility study is developing concrete proposal for a large scale longitudinal survey-based study of dwellings in Great Britain. Current assumptions are as follows.

1. Dwellings will be the unit of longitudinal data capture. Thus individuals and/or households may move through the sample of dwellings; new individuals/households will be recruited to the study if they move into a dwelling in the sample.
2. Study area will include England, Scotland & Wales.
3. The sample will be nested as follows:
   a. Level 1: N ≈ 10,000 dwellings, annual face to face survey by field researcher with Household (Dwelling?) Response Person covering context, purpose, actions and desires;
   b. Level 2: N ≈ 2,750 dwellings as Level 1 but with additional dwelling survey by professional surveyor (similar to EHS?).
4. Level 1 will be conducted continuously to allow for monthly or quarterly samples to support seasonal analysis;
5. The 'context' and 'actions' topics in the annual questionnaire will include:
   a. reported annual or quarterly gas/electricity consumption & expenditure;
   b. reported recent & historical changes to the dwelling including extension, adaptation, re-insulation, additional glazing, heating/boiler replacement, addition of PV/turbine/solar thermal/heat pump etc.;
   c. reported health status of the household response person and other occupants with a specific focus on conditions known to be affected by poor housing/lack of heat.
6. Reported data is prone to response error.
7. Linkage could be pre or post fieldwork and at a number of levels.

The following sections outline the potential value of linking data from other sources to the sampled dwelling's local area, the dwelling itself and the individuals present at each annual survey either before (pre) or after (post) recruitment and fieldwork. In each case suggestions for data linkage are provided together with justifications.

Commentary on the requirements for explicit consent to data linkage are based on materials from the ESRC's 'Administrative Data Research Network (ADRN) Approved Researcher' training provided by Professor Mark Elliot of the University of Manchester and undertaken by the author. Additional resources are included in footnotes where appropriate and readers are encouraged to refer to two ADRN documents.

1. A researchers' guide to Section 33 of the Data Protection Act.[1]
2. Data protection laws and the exemptions for research.[2]

Other documents at http://adrn.ac.uk/protecting-privacy/legal may also be of use.

Pre-recruitment linkage

Linkage prior to recruitment would involve linking data to the issued address list from which the eventual sample is to be recruited. This would necessarily preclude consent for linkage by the occupant but could substantially improve response rates through the ability to pre-screen properties/occupiers, to assess and steer recruitment with respect to desired sample dimensions and also obtain telephone numbers and occupier names for personal contact.

Full customer records for electricity bill payers are available to DNOs and *may* be usable as a basis for linkage to provide additional contact details in order to personalize recruitment communications. Equivalent data for gas consumers is less useful due to lack of 100% gas coverage. In addition a range of commercial agencies claim to be able to provide validated names and telephone numbers from address lists if a random stratified sampling approach is to be used.

Linked data for those dwellings where an interview is secured could also be 'fed-forward' during the interview/survey process for validation in the field. Datasets that could provide useful pre-recruitment information at the dwelling/address level include:

- DECC NEED/HEED data on historical energy consumption, building type, form and age, EPC characteristics;
- Ofgem/FiT data on electricity generation, solar thermal and renewable heat installations;
- Census 2011 micro data on the household space including number of occupants, age & sex distributions, tenure, accommodation type and central heating characteristics
- DWP/HMRC data[3] on age & sex of current occupants;
- Continuous Recording of Social Housing Lettings and Sales (CORE)[4] and equivalent Scottish (SCORE)[5] on type of tenancy, household characteristics and economic status (but for social tenancies only).

Where the above data proves to be robust during initial recruitment and fieldwork there would be a strong case to replace questionnaire items by linked data in order to reduce LUKES questionnaire/dwelling survey duration in future recruitment waves with attendant cost and attrition reduction. It should be noted however that it may be preferable to perform this linkage and validation after recruitment which would enable consent to be obtained.

Post-recruitment linkage

This linkage assumes that the dwelling has been recruited to the sample and that appropriate consents (where needed) have been obtained.

---

[1] http://adrn.ac.uk/media/117642/section_33_DPA.pdf

[2] http://adrn.ac.uk/media/117515/data_protection_guide.pdf

[3] For example http://adrn.ac.uk/catalogue/cataloguepage?sn=888025 (Work & Pensions Longitudinal Study), http://adrn.ac.uk/catalogue/cataloguepage?sn=888026 (Child Benefit) & http://adrn.ac.uk/catalogue/cataloguepage?sn=888027 (Tax Credits) and previous footnote regarding consent.

[4] http://adrn.ac.uk/catalogue/cataloguepage?sn=888044

[5] http://adrn.ac.uk/catalogue/cataloguepage?sn=888045

Area Level Data Linkage

Area level data linkage involves attaching 'neighbourhood' aggregate data to each dwelling record in the sample. Such data will provide substantial additional 'contextual' information about the locality of the sampled dwelling.

Linkage of aggregated data local area is easily achieved using the latitude/longitude, postcode or census output geography unit (OA/LSOA) of the sampled dwelling and does not require consent from the household response person.

Potentially linkable area level data could include the following.

1. Index of Multiple Deprivation and *sub-domains* (available at LSOA level) that indicate area level relative deprivation across each country of the United Kingdom. *Income deprivation* may be an indicator of likelihood of fuel poverty and may usefully contextualize survey (dwelling level) fuel poverty indicators, *employment deprivation* may be an indicator of increased daytime energy demand whilst *health deprivation* can be linked to poor housing and fuel poverty. The sub-domains also include indicators of *poor housing conditions*, *lack of central heating* and *air quality* all of which would provide useful contextual information for the questionnaire. Additional potentially useful indicators would be the average road distance to a food shop which may give context to travel behaviour.
2. Census derived OA/LSOA level housing and other statistics to give local area profiles to provide contextual information for the questionnaire indicating how 'unusual' the sampled dwellings may be. This should include linkage over time to historical census data where feasible given known census boundary alterations (Martin, Dorling, and Mitchell 2002).
3. Local environmental conditions at latitude/longitude including altitude, daylight times, daily/hourly air quality, humidity, mean/max/min temperatures, insolation levels and wind speeds[6] as all of these play a substantial role in constraining behaviour such as laundry, heating, ventilation, cooling, outdoor/indoor leisure and modes of transport.
4. DECC sub-national domestic gas & electricity consumption data (LSOA level, potentially postcode level) and fuel poverty data to provide context to reported or linked (see below) consumption data indicating how 'unusual' the sampled dwellings may be.
5. Area level domestic water consumption data - Southern Water's Universal Metering Programme could provide postcode or LSOA level aggregate water consumption indicators to provide context to reported or linked (see below) consumption data. Other utilities may be able to provide coverage of other areas in England and Wales (there is no domestic water metering in Scotland) if metering is close to universal.
6. Area level health statistics derived from HES and Health & Social Care Information Centre (HSCIC) data (& similar for Scotland) indicating the prevalence of conditions known to be associated with poor housing such as excess winter deaths and respiratory diseases (Haines and Wilkinson 2014).
7. Area level statistics on uptake of:
    a. Electric Vehicles (via DVLA);
    b. Domestic electricity generation and renewable heat installations (via Ofgem).

Note that it would also be important to link area level data on a number of factors that may affect household behaviour but for which no complete datasets have yet been identified. These include:

- localised DNO or Local Authority energy demand reduction schemes or campaigns;
- localised NGO or 'community energy' schemes;
- presence of active local Transition or related groups.

[6] E.g. from http://wow.metoffice.gov.uk or http://www.metoffice.gov.uk/datapoint/about for the dwelling location.

Dwelling Level Data Linkage

Dwelling/address level linked data involves linking sampled dwellings to records of that dwelling held elsewhere.
With respect to the DPA 1998, this 'processing' is clearly in the legitimate interests [Schedule 2: 6(1)] of DECC (presumed data controller) and is also for research purposes [Section 33 applies so use other than for original purposes is permitted]. Provided the linked information does not constitute 'sensitive personal data' and the legitimate interests condition (above) is met, explicit consent from the dwelling occupier is not required. However the survey provides an opportunity to obtain such consent from the *current* occupier (only) and so should be pursued.

Potentially linkable dwelling/address level data could include the following.

1. DCC Smart Meter data.
    a. Over time it is assumed that half-hourly gas and electricity consumption data will be secured for all dwellings (Level 1 & 2) via the DCC.
2. DECC NEED data, specifically the following.
    a. Current unadjusted gas and electricity consumption data - to enable validation of and potential substitution for reported energy consumption item(s) in the LUKES questionnaire prior to natural smart meter installation.
    b. Historical unadjusted gas and electricity consumption data - to construct an '*energy history*' of the dwelling to underpin causal analysis of change over time from an early stage in the study and also allow exploration of anomalies/regression to mean effects.
    c. EPC derived data – to add EPC register data for a proportion of Level 1 dwellings to enable analysis of variation in energy consumption within EPC bands and associated characteristics. Noting that current EPC data can be prone to erroneous reporting or presumed existence of features such as floor insulation, linkage to subsequent LUKES Level 2 dwelling surveys could provide estimates of EPC 'error' which would be of wider value in adjusting EPC-based modelling or analysis.
3. Valuation Office/NEED data as appropriate.
    a. Council Tax Band to remove need to collect via LUKES questionnaire.
    b. Property age to validate and potentially substitute for questionnaire items.
    c. Property type to validate and potentially substitute for questionnaire items.
    d. Property floor area to remove need to collect via LUKES questionnaire.
4. EST/HEED or DECC/NEED data.
    a. Installation of energy efficiency measures (insulation, boiler, Green Deal etc) on an historical (see above) and ongoing basis to validate LUKES questionnaire and as a basis for the assessment of the impact of policy schemes.
5. Ofgem/FiT data, specifically the following.
    a. Historical and ongoing solar PV/Thermal or turbine installation including generation readings and FiT payments to validate and potentially substitute for item(s) in the LUKES questionnaire, top assess any consequential changes in energy demand behaviour (Hondo and Baba 2010) and to support more nuanced assessment of energy poverty.
6. ONS Census microdata (census records), specifically the following.
    a. Dwelling/'household space' data from 2011 and historical censuses on the socio-economic characteristics of the occupants and the dwelling including number of rooms, presence of amenities (central heating, hot water), number and age profile of occupants, employment, ethnic and health[7] status of occupants. This would provide a socio-economic history of the dwelling to set

[7] Ethnicity and health status may have considerable bearing on energy demand but they are also 'sensitive personal data' under the DPA1998. Consideration would be needed as to how best to link such data for 2011 (and earlier censuses) to the dwelling where the data applies to a previous occupier and consent cannot therefore be reasonably obtained.

alongside the NEED/HEED-derived energy history and provide the basis for longitudinal analysis early in the study period.

7. Continuous Recording of Social Housing Lettings and Sales (CORE) and equivalent Scottish (SCORE) data, specifically the following.
    a. Type of tenancy, household characteristics, economic status, ethnicity, primary reason for housing, source of referral, homelessness status, receipt of housing benefits, and previous tenure of occupant. Noting that this dataset does not cover the owner-occupier or private rental sectors, these records would be used to validate and potentially substitute for items in the LUKES questionnaire. They would also support analysis of housing affordability and fuel poverty and especially analysis of transitions in and out of fuel poverty and associated outcomes.
8. Local Authority data (where not contained in S/CORE), specifically the following.
    a. Tenure and nature of tenancy if council or social to validate and potentially substitute for items in the LUKES questionnaire.
    b. Responsibility for and payment method for energy bills if not the tenant to validate and potentially substitute for items in the LUKES questionnaire.
    c. Dwelling level energy consumption, occupancy and installation data where held[8] to validate and potentially substitute for items in the LUKES questionnaire.
9. HES and Health & Social Care Information Centre (HSCIC) data (& similar for Scotland)[9], specifically the following.
    a. Number and nature of historically and currently presented health conditions at each dwelling address per year to enable more detailed analysis of the relationships between health, housing and energy consumption using the historical data provided by NEED/HEED/Census and the future LUKES data.
10. DWP/HMRC data[10], specifically the following.
    a. Historical and current number and nature of benefit/pension/income support claimants at address at a given time point in each year. This could be used to validate and potentially substitute for questionnaire items on number and age of occupants and household composition. The data also includes benefit and disability status to support fuel poverty analysis. Historical data would also enable analysis of occupant effects on energy consumption in the historical NEED consumption data.
    b. To validate and potentially substitute for income and benefits payments questionnaire items and to support fuel poverty analysis. Historical data would also enable analysis of income effects on energy consumption in the historical NEED consumption data.
11. DoE National Pupil Database[11] and Scottish equivalent[12] data, specifically the following.
    a. Current and historical mode of normal travel to school (via schools census) for children resident in the LUKES dwelling to validate and potentially substitute for LUKES questionnaire items and to support analysis of CO2 and electricity demand effects of 'school run' switch to EVs.
    b. Pattern of early years provision (normal hours via early years census) taken up by children resident in the LUKES dwelling. When combined with parental employment situation this would act as a proxy indicator for occupancy patterns supporting analysis of variation in energy demand for heat and hot water.
12. DVLA/VOSA[13] vehicle data, specifically the following.

---

[8] As an example Portsmouth City Council holds gas and electricity consumption data together with occupancy levels and enhanced EPC style surveys for a wide range of its dwelling stock

[9] See previous footnote regarding consent for sensitive personal data although as defined here the data could be aggregated to the household level rather than identify individuals.

[10] See above – e.g. Tax Credit, Child Benefit datasets

[11] Noting potentially missing data from independent schools: http://adrn.ac.uk/catalogue/cataloguepage?sn=888022

[12] http://adrn.ac.uk/catalogue/cataloguepage?sn=888016

a. Number of licensed vehicles registered to dwelling address to validate and potentially substitute for questionnaire items.
b. Annual mileage to support analysis of EV substitution (VOSA MOT data for all vehicles aged 3+).
c. Fuel & actual or presumed emissions to validate and potentially substitute for questionnaire items and to support analysis of EV substitution.

13. Dwelling level water consumption data as a proxy for hot water demand although this is most relevant for dwellings such as flats with little potential for external use. Given the relatively low penetration of water metering in England and Wales (dependent on supply zone/supplier policy as mentioned above) and zero metering in Scotland any such linked data will only cover a proportion of LUKES dwellings. It may however provide coverage of compete regional sub-samples in England and so should be given some consideration.

Individual Level Data Linkage

Individual level data linkage involves linking data to specific occupants of the dwelling. Where this relates to sensitive personal information, explicit consent would be required.

1. HES and Health & Social Care Information Centre (HSCIC) data (& similar for Scotland), specifically the following.
   a. Individual level health conditions of young children and babies who may be resident in the LUKES study dwellings for extended periods of time during key stages of development. Such linkage may offer future researchers access to critical LUKES-derived data on early childhood environmental factors that may affect later life health conditions. However the primary aim would be to support analysis of housing, energy-use and environmental factors affecting early years health. This would provide further evidence of potential wider social benefits of energy demand reduction interventions (Ormandy and Ezratty 2012; Haines and Wilkinson 2014);
2. DoE National Pupil Database and Scottish equivalent data, specifically the following.
   a. Current and historical educational outcomes back to 2002 (via schools census) for children previously or currently resident in LUKES dwellings to enable similar analysis to health conditions but for educational development (Coley et al. 2013);
3. DWP/HMRC data.
   a. As above but at the individual level to enable validation of questionnaire items on work status, income and benefits status for each member of the household. As currently planned this will only be collected for the HRP/Index person. Work/study patterns for all occupants are critical .This information is crucial to understanding occupancy and thus variation in heat/hot water energy demand levels especially with respect to temporal demand for electricity;
4. Citizens Advice Bureau Client data.[14]
   a. There would be scope to probabilistically match this data to the name and address of LUKES dwelling residents in order to link to CAB enquires which have an energy component in the context of bill arrears, debt, poor housing and fuel poverty[15].

Summary

Overall there is scope to use linked data in two phases of the LUKES data collection process.

There is potential to use data that can be pre-linked to the issued sample address list to aid the initial recruitment process by personalising recruitment contacts and communications. This will necessarily

---

[13] As an example, see http://www.abdn.ac.uk/ctr/research/currentbr-research-projects/mot/ and reference http://data.gov.uk/dataset/anonymised_mot_test

[14] http://adrn.ac.uk/catalogue/cataloguepage?sn=888051

[15] CAB analysis suggests such enquiries are continuing to rise: http://docs.adrn.ac.uk/888051/mrdoc/pdf/888051_advice_trends_quarter_q3_2013.pdf (p30)

preclude consent for that linkage but this does not necessarily contravene the DPA1998 provided other relevant conditions are met. There is also scope to use such pre-linked data to actively manage the fieldwork process by targeting/excluding addresses with given under/over-represented characteristics. Suggestions for such pre-linkage are:

- NEED/HEED data;
- Ofgem/FiT data;
- Census 2011 microdata;
- DWP/HMRC data;
- S/CORE data.

There is then scope to link data after the recruitment process when any necessary consents can have been obtained. Such data could be as follows.

- Area level - no consent is required and provided appropriate geo-codes are available at the case level within the LUKES dataset such data can be linked at will for specific analyses.
- Dwelling level – consent may be required if 'sensitive' personal information is to be linked. This would require appropriate consent items to be included in the questionnaire and so would require substantial pre-recruitment work to determine exactly which to prioritise however the following would be candidates:
    - NEED/HEED data;
    - Ofgem/FiT data;
    - Census 2011 microdata;
    - DWP/HMRC data;
    - S/CORE data;
    - Dwelling level (aggregated) health episode data.
- Occupant level – as above consent may be required if 'sensitive' personal information is to be linked. This would require appropriate consent items to be included in the questionnaire. Suggested priority datasets are:
    - Individual level health episode data
    - Individual level DWP/HMRC data
    - Individual level educational outcome data

Where such pre or post-recruitment data provide to be a robust substitute for LUKES questionnaire items there would be a strong case for reducing the questionnaire in future rounds of fieldwork in order to reduce costs and attrition rates.

In addition linkage would enable several crucial LUKES 'requirements':

- construction of a dwelling energy and occupant history to accelerate longitudinal analysis (NEED/HEED, DWP/HMRC occupancy, census microdata);
- assessment of energy use, educational and health outcomes of policy interventions including green deal and variants but also changes to benefit & tax credit entitlements (NEED/HEED linked to DWP/HMRC & HSCIC);
- accelerated analysis of the factors affecting variation in energy demand within EPC/dwelling type categories for the whole Level 1 sample as input to NHM.

References

Coley, Rebekah Levine, Tama Leventhal, Alicia Doyle Lynch, and Melissa Kull. 2013. "Relations between Housing Characteristics and the Well-Being of Low-Income Children and Adolescents." Developmental Psychology 49 (9): 1775. http://psycnet.apa.org/journals/dev/49/9/1775/.

Haines, Andrew, and Paul Wilkinson. 2014. "Health in the 'Low-Carbon' Economy." In Global Environmental Change, edited by Bill Freedman, 657–64. Handbook of Global Environmental Pollution 1. Springer Netherlands. http://link.springer.com/referenceworkentry/10.1007/978-94-007-5784-4_106.

Hondo, Hiroki, and Kenshi Baba. 2010. "Socio-Psychological Impacts of the Introduction of Energy Technologies: Change in Environmental Behavior of Households with Photovoltaic Systems." Applied Energy 87 (1): 229–35. http://www.sciencedirect.com/science/article/pii/S0306261909002013.

Martin, David, Danny Dorling, and Richard Mitchell. 2002. "Linking Censuses Through Time." Area 34 (1): 82–91.

Ormandy, David, and Véronique Ezratty. 2012. "Health and Thermal Comfort: From WHO Guidance to Housing Strategies." Energy Policy 49: 116–21. http://www.sciencedirect.com/science/article/pii/S0301421511006926.

Appendix 6: Possible topics for a future domestic energy use survey

Items are suggested on the assumption that more technical data would be collected in a visit by a surveyor, so that interviews can focus on data best provided by a household member.

Certain topics could be addressed overall but ideally separately for each general domain of energy use (e.g. keeping warm, heating water and using hot water, keeping cool, food storage and preparation, lighting and use of electrical appliances, and power generation. For the consultation, I suggest putting each of these topics (marked *) in a matrix with the domains.

1. Basic drivers

Concept of home – high level "purposes" for a home (such as raising a family, shelter from the elements, work and education, financial security and personal identity) and attachment to home.

The needs that users are addressing through energy use (e.g. personal well-being, making or saving money, environmental protection and social needs). the relative priority of needs and whether each need is currently being met.*

Decision dynamics – how the household decides about energy use, e.g. decided by one person or by whoever wants to do something, by negotiation, on behalf of others in the home, or by argument).*

2. Heating and keeping warm

2.1. Facilities currently in place and that were present in previous home(s)

Means of heating present, used at all and used as main heating: type (e.g. central or district heating, individual heaters), heat source (e.g. standard or combi boiler, heat pump), heat distribution (e.g. radiators, under-floor, warm air) and fuel used.

Which rooms, conservatories, outbuildings and outdoor spaces have heating?

Heating controls and sensors present (plus their location, visibility and accessibility).

Any remote control by user or a service provider.

Any linkage of controls to feedback devices.

Chimneys present and in use.

Insulation (roof/loft, wall, floor, windows, doors).

2.2. Behaviour with the available technology

What the household does (and why) to keep warm (on a typical winter day and when what they usually do is not enough), e.g. use of heating, clothes and bedding; heat from other activities; closing windows, doors, curtains or blinds; hot shower or bath; hot food or drink; change location.

Typical winter clothing (clo).

Whether the household is able to keep warm enough; thermal comfort in different rooms and at different times.

When heating is used during the year, week and day, and why (or why not).

Which rooms are heated, when occupied and when not, and why (or why not).

How the household controls times and zones of heating, and room temperatures, and reasons for the strategies adopted.

Thermostat set points.

Ability/readiness to use heating controls: understanding, accessibility, ergonomics, aesthetics, issues with disability.

Written and verbal instructions for heating controls: available and used? If not, why not?

What circumstances lead the household to change its normal practice (e.g. cold weather, visitors, someone being ill)?

3. Cooling the home and keeping cool

3.1. Facilities currently in place and that were present in previous home(s)

Means of cooling the home or keeping cool (types present, used at all and used as main means): air conditioning, mechanical ventilation, dehumidifier, fan, all means of ventilation, shading at windows (internal or external), shading by trees.

Controls available on any mechanical systems (plus their location, visibility and accessibility).

Any remote control by user or a service provider.

Any linkage of controls to feedback devices.

3.2. Behaviour with the available technology

What the household does (and why) to avoid overheating in winter or to keep cool in summer (on a typical summer day and when what they usually do is not enough), e.g. adjustment of heating; use of mechanical systems, windows or other ventilation; curtains, blinds or shutters; cool clothes or bedding; shower or bath; cool spray or cloth; slow down (e.g. rest or sleep); cool food or drink; change location.

Typical summer clothing (clo).

Whether the household always keeps cool enough.

Use of windows in different types of room, daytime and night-time; reasons for opening and closing.

Air conditioning: when and where used and why (or why not); control of the system and ability/readiness to use controls (including rating of instructions for controls); satisfaction with system.

Mechanical ventilation: how used and why (not); understanding and control of the system and ability/readiness to use controls (including rating of instructions for controls); satisfaction with system; preference to opening windows.

What circumstances lead the household to change its normal practice for keeping cool (e.g. hot weather, visitors, someone being ill)?

Use of chemical 'air fresheners'.

4. Heating water and using hot water

4.1. Facilities currently in place and that were present in previous home(s)

Means of heating water present, used at all and used as main water heating: type, heat source, fuel.

Hot water controls present (plus their location, visibility and accessibility).

Is a hot water cylinder present and in use? In which room? With what insulation?

Are hot water pipes insulated?

Any remote control by user or a service provider.

Showers: number, type(s), over bath or separate.

Baths: number, type, indoor or outdoor (hot tub).

Other facilities relevant to hot water: washing machines; dishwashers; steam cleaners; heated pools/spas; drying facilities.

4.2. Behaviour with the available technology

Baths, showers and other whole-body washing: frequency (respondent and the household as a whole) in winter and in summer; time of day; flexibility of timing; depth of baths; duration of showers; bathing or showering away from home.

Choices about whole-body washing: reasons for washing (e.g. to get clean, wake up, get warm, relax or ease aches and pains) or a particular form of washing (e.g. speed, safety) and contexts (e.g. getting home or getting ready to go out).

Laundry: methods, patterns, timing and frequency; machine settings used; use of launderettes or dry cleaners (and reasons for all these).

How laundry is dried in summer and in winter.

Other uses of hot water (and, as appropriate, frequency, full or partial loads, machine settings): cleaning the home; washing dishes; washing vehicles or pets – at home or elsewhere.

Actions taken to reduce use of hot water (and why): installations, repairs, day-to-day actions and barriers to water conservation.

Is a water meter in use and, if so, why and since when?

When water is heated and why (or why not).

How the household controls the times and temperatures of water heating, and reasons for the strategies adopted.

Ability/readiness to use controls: understanding, accessibility, ergonomics, aesthetics, issues with disability.

Written and verbal instructions for hot water controls: available and used? If not, why not?

What circumstances lead the household to change its normal practice, e.g. heating water for longer/fewer hours than usual.

Are there problems with current means of getting hot water (e.g. not enough hot water, low pressure, long time to reach outlet)?

5. Other uses of energy

Lighting: types of luminaire; outdoor lighting with solar power, photocells or motion detection.

Using light to create a mood of cosiness; using daylight where possible; turning off lights when room not occupied and why (not).

Number of fridges and freezers; defrosting frequency.

Oven and hob fuel; cooker used as a heater (when cooking and when not); using microwave, toaster or smaller oven; using lids on pans.

Electric vehicles (type, charging schedule).

How many other appliances of each type; socket boards and adaptors to turn off multiple appliances; devices interconnected but not in the same room.

Replacement frequency for major appliances.

Turning off or to standby when not in use.

Non-negotiable uses of energy.

Other environmentally relevant behaviours, e.g. recycling, car use, flying.

6. Power generation

On-site or community-level power generation.

Automated systems to use power when excess available.

Concerns about how electricity is generated nationally and locally: fossil fuel, carbon capture and storage (CCS), nuclear, biofuels and renewable energy.

7. Installations (including non-energy renovations) by the household, landlord or freeholder*

Details of installation: what was installed, and when; whole home or a bit at a time; like-for-like replacement or change of technology?

"Trigger points" for the installation(s) – related to the technology (e.g. failure of the existing system), life events, changes in household or use of the home, or financial changes/opportunities.

Household or individual decision?

Reasons for the installation(s) – related to basic needs (as in Section 1) or specific attractions of the technology. Was energy considered?

How much done by household members and what other parties were involved in advising on, financing or carrying out the work.

Effects of installations (following any significant change), e.g. change in: heating pattern; comfort; window opening; satisfaction or energy bills.

Which, if any, alternative or additional services or facilities would be desired and why (not)?

Willingness to pay.

8. Energy contracts, payment and monitoring

Respondent's role in managing energy and bills.

For each fuel or source of heat: current and preferred method of payment, bill amounts and energy used.

Issues with bills (e.g. difficulty paying, being able to predict payments, sense of control over costs).

Details of any time-varying tariffs and household response to them (e.g. attempts to shift or reduce consumption, or issues with the tariff itself).

Mains gas and electricity from the same supplier?

When did household last review or switch tariff or supplier; why (not) interested in switching.

Details of any historic feedback routinely provided; household use and satisfaction with feedback.

Is there an electricity or gas smart meter? If yes, household experience of the installation and services provided, and any changes in behaviour. If no, interest in having a smart meter & why (not).

IHD (or other real-time feedback device) – separately for electricity and gas.

- Has one been offered or installed? Why (not)? By whom? Purchased or free? Any interest in acquiring? Which room (or carried around)?
- For overall consumption or appliance-specific?
- Does respondent/household use it? If so, for what purpose and how? If not, why not?
- Overall and for the device, individual features and instructions provided: ease of use and the usefulness of the information provided.

Arrangements for maintenance of systems.*

9. Demographics

9.1. Index person

Age, sex, education (highest qualification) and employment status.

Level of internet use and available devices, use of online games and social networks and interest in technology and gadgets.

First language, country of birth, ethnic group, ever lived in another country with a different climate?

Political orientation and religious belief.

Attitude to financial risk, savings, investment, personal discount rate.

Housing history, perception of current energy efficiency and scope for change.

9.2. Household

Individuals.

- Age, sex, employment status and relationship to respondent.
- Ever lived in another country with a different climate?

Household as a whole.

- Size (total and by age band), income (total & disposable) & benefits, socioeconomic group.
- Indirect demographic measure (e.g. MOSAIC, Acorn) to represent community factors.
- Disability/illness and relation to energy needs, ability to operate controls or care needs.
- Education: highest qualification of the household member with the highest level.

- Tenure (type, contract period, effect on work the household is allowed to do on the dwelling).
- How long in current home and how long are they planning to stay?
- At what times of day/year is there typically someone at home?

9.3. Dwelling

Characteristics: age, number of rooms (overall and by type), built form, height (storeys) above ground.

Location: urban/rural, on gas grid, internet/broadband connection?

Room use (e.g. often/occasionally occupied, used for guests/storage) and why (not) used.

Problems encountered (e.g. draughts, condensation, damp, mould), noise sources.

10. Interventions

Whether participating now or recently in any energy- or environment-related programmes, teaching or research, at the level of community, whole household, individual adults or children.

Who is participating – in the household and in general – and who is organising and funding?

Details of the programme and any interventions that were not thought of as being part of a programme, changes the household has made as a result, and reasons why anything was or was not done.

Any recommendation or advice the household has passed on to other people.

Preferred locus of action (e.g. EU, UK , DA, local, NGOs, building trades, energy companies) and trust.

Appendix 7: Draft questionnaire structure

Introduction

This appendix describes a recommended questionnaire structure for a new, longitudinal panel survey of domestic energy use. The linked Appendix 8 shows example outline questionnaires and explains the logic of the items included and possible order of questions. Together, these two appendices represent the culmination of stakeholder engagement work on key evidence needs from such a survey and a review of existing literature and research.

The tables on the following pages pull together recommended designs for a face-to-face CAPI interview at the first and subsequent waves, together with a supplementary self-completion questionnaire. It also makes reference to where information should be collected by a surveyor, rather than an interviewer, but does not set out a comprehensive survey schedule.

The questionnaire structure identifies topics but does not define the order in which questions should be asked. For example, some questions on the household might come at the start of the interview, to allow efficient routing of later questions. The structure does include notes on routing so that, if the order of questions is varied, it is clear which questions need to feed into which others. The structure also includes the following.

- Example questions within each section of the questionnaire, referenced in red text to the "question bank" provided to DECC (full question wording given in Appendix 8 for the Wave 1 question references)
- Estimated timings for each section of the questionnaire. The weight given to different sections of the questionnaire reflects the relative priorities for different areas of evidence, and the extent of questioning likely to be needed to gather this. The timings relate only to the Wave 1 household survey, and not any content suggested for self-completion or the surveyor visit.
- Suggested rotations of question sections to provide a core questionnaire of 60 minutes, but with content that might vary depending on the respondent, wave or cohort.

Key terms

W1, W2 etc.	Wave 1, Wave 2, etc.
All	The question should be asked to all participants
Check-up	The question should be shortened in order to monitor any changes over time. They may, for example, be asked on the basis of the response provided at a previous wave, such as, 'Last time you said that … is that still accurate?'.
Full repeat	The question should be asked in full, so that participants are not reminded of their previous response to the same or similar question, in order to track changes made without prompt.
Filtered	The question is only applicable for a subset of the sample, based on the outlined rule.
Rotated module	The group of questions should be asked to a subset of participants at each wave so that, after multiple waves, the information is held about all panel households.
New Q	A newly formulated question (i.e. a suitable one was not found in the question bank

Questionnaire structure

Section A. Introductory text & initial screening questions

Section	Topic covered	W1	W2 onwards[16]
	Description of survey, client and value of participation	All	Reminder version
	Screening for most appropriate household reference person. E.g. if based on role in household energy, use CRaB:Q109-Q110[17] or shorter item at SAVE:1.1b.	All	Check index person is still available

Section B. Heating and keeping warm

Rough timing for W1: 35 mins

Section	Topic covered	W1	W2 onwards
B1. Heating systems present and used	All heating systems present in home. CRaB:Q7-Q10, Q13-Q16 and surveyor observations	All	All (check-up)
	All heating systems used. CRaB:Q17	All	All (check-up)
	Main heating system used. CRaB:Q18	All	All (full repeat)
	Reason any heating systems present are not used. CaRB:B2c	All	All (full repeat)
B2. Means of keeping warm	What is done on a typical winter day? Does this keep them warm enough? When not warm enough, what do they do? What rooms do they have in their home?* CRaB:Q19-Q21	All	All (full repeat except check-up for *)
B3. Heating and use of different rooms	How habitable rooms used, e.g. how often occupied, for storage, for guests, for pets? Why some rooms not often in use, e.g. as no heating, not-decorated, in poor condition etc. How habitable rooms tend to be heated i.e. whether have heating or not, on most of time or not. CRaB:Q22-Q25	All	All (full repeat)
	Surveyor observations to collect information on property layout. Base on CaRB[self-completion]:Q28-31. Typical use of internal doors in winter: specific questions on shutting doors between living room(s) and other rooms, based on layout recorded by surveyor (e.g. extent to which rooms are open plan). New Q	All None	All (check-up) All
B4. Control of heating timing	Controls available for district heating.* CRaB:Q11 Which months heating is used. Is it on all the time in these months, or controlled? Why heating is on all the time *or* how timing is controlled? Which times of day heated? Reasons heating might be on when people not at home.	All	All (full repeat except check-up for *)
B5. Control of room temperatures	Controls available for district heating.* CRaB:Q12 How control temperature? Frequency of using heating controls? Why don't control temperature? CRaB:Q26-Q35 How thermostats are used. CaRB:C21-C22	All	All (full repeat except check-up for *)
	Current thermostat setting (respondent report plus interviewer check) CRaB:E3	Filtered (if use thermostat to set temperature)	Full repeat, filtered (if use thermostat to set temperature)

[16] Where there is a substantive change in the home or services, questions in W2 and later waves can revert to W1 format.

[17] Otherwise these questions would be in Section H under "Paying for energy".

Section	Topic covered	W1	W2 onwards
	What temperature does it tend to be set at on a typical winter day when people are at home, when they are not, and at night? Similar to RECS:D10b-D11c	Filtered (if thermostat)	Filtered (if thermostat) Full repeat
B6. Variations on usual practice	Circumstances under which heating patterns change. CRaB:Q36-Q46, CaRB:C31-C32	All	All (full repeat)
B7. Understanding of heating controls	Any instructions/guidance/advice received on how to control heating. New Q How helpful, or not, did you find this information? New Q	All	Filtered (if new controls installed since W1)
	What would your ideal source of information/advice be? New Q	All	All
	W1 surveyor observations: Heating controls present in home, including timers, programmers, boiler thermostat, individual room/radiator thermostats. Based on CRaB:C-F interviewer observations section. W2 questions if gaps in knowledge of controls present according to surveyor info.	All None	All (check-up) Filtered (if gaps in knowledge)
B8. Maintenance and servicing	Whether any part of heating system has received servicing or maintenance in the past year. Expanding on RECS:D-5a Why this was done. New Q	All	All (full repeat)
B9. Household dynamics around heating	Who decides control of heating temp, setting, timer, etc. CRaB:Q47, Q48	All	All (full repeat)
B10. Needs and desires	Desired changes to heating systems (things they want to have more control over. CRaB:Q49 Follow-up waves to revisit and check what has/hasn't been actioned and why. New Q	All None	All (full repeat) Check-up
	Perceptions of what affects ability to achieve what's desired with the heating. New Q	All	All
	Household's confidence about achieving what they want from heating systems in home. New Q	All	All (full repeat)
	Underlying needs that influence how the household. heats the home and keeps warm [Card sort exercise]. Based on CRaB:Q103-Q104[18]	All	All in W2 Full repeat (review whether needed in W3)

Section C. Cooling and keeping cool

Rough timing for W1: 6 mins

Section	Topic covered	W1	W2 onwards
C1. Means of keeping cool	Things done to avoid being too warm in winter. Things done on typical summer day to keep cool. Does it keep home cool enough? Any additional things done when the usual ways of keeping cool in summer are not enough. CRaB:Q51-Q54	All	All (full repeat)
	Ability to keep particular rooms cool, and reasons not cool enough. EFUS:Q79,Q80, potential more detailed questions.	None	All

[18] It would be beneficial to carry out further development work to refine these questions.

Section	Topic covered	W1	W2 onwards
C2. Cooling technology	How many months using air conditioning, how many hours in day, etc. CaRB:D39-D41 Temperature settings for main rooms used, and other rooms, during daytime, during sleeping hours. New Q Ideas in RECS:F9	Filtered (if air conditioning)[19]	Filtered (if air conditioning)
	Surveyor observations based on CRaB:Q55-Q56 Any instructions/guidance/advice received on how to control cooling. New Q	Filtered (if air conditioning)	Check-up Filtered (if changes from W1)
C3. Opening and closing windows	Reasons for window-opening, e.g. for cooling, ventilation, etc., and if keep windows closed but don't want to, why? CRaB:Q58-Q59	All	All (full repeat)
	Frequency and duration of window and external door opening. CaRB:D14-D28	None	All
C4. Problems and desires	Desired changes to cooling systems/installation of cooling system? CRaB:Q62	All	All (full repeat)
	Perceptions of what affects ability to keep home cool, i.e. affordability vs. availability vs. ability vs. specific needs. New Q	Filtered (if not cool enough in summer)	Filtered (if not cool enough in summer and changes from W1)

Section D. Heating water and using hot water use

Rough timing for W1: 10 mins

Section	Topic covered	W1	W2 onwards
D1. Uses of hot water	Main uses for hot water in the home, i.e. for bathing, showering, laundry, cleaning, etc. CRaB:Q63	All	All (check-up)
D2. Water heating systems	Source of domestic hot water (DHW), i.e. for hot taps in the home. CRaB:Q64	All	All (check-up)
	Main means used for heating DHW. CRaB:Q65	All	All (check-up)
D3. Control of hot water	Is hot water available all the time, or control when it's available? What is done to control availability of water, e.g. boost button, turn on/off manually? CRaB:Q72-Q76	All	All (full repeat)
	How, if at all, water temperature is controlled? CRaB:Q79-Q80	All	All (full repeat)
	Why and when normal hot water timing changes. CRaB:Q77-Q78	None	Filtered (if not DHW on demand)
D4. Understanding of DHW controls	Any instructions/guidance/advice received on how to control water heating e.g. instruction booklet, advice from family/friends, played with device, given demonstration of installer/heating engineer. New Q How helpful, or not, did you find this information? New Q (could draw on EDRP 6:Q53,Q55)	All	Filtered (if changes from W1)
	W1 surveyor observations - Hot water controls present in home. Based on CRaB:A,B,D interviewer observations section. W2 questions if gaps in knowledge of controls present according to surveyor info. Based on CaRB:C1.	All None	All (check-up) Filtered (if gaps in knowledge)

[19] Includes heat pump used for cooling.

Section	Topic covered	W1	W2 onwards
D5. Bathing and showering facilities and practices	Presence of showers/baths/hot tubs/swimming pools/sauna. CRaB:Q81 Type of shower. CRaB:Q82	All	All (check-up)
	Frequency of use of showers/baths, time of days. CRaB:Q83-Q92	All	All (full repeat)
	Details of showering and bathing. Reasons for bathing/showering. SPRG:30 How long in shower (mins). DW:S6 Continuous running of shower, running of water prior to getting in shower. New Q Depth of bathwater – potential specific question of interest. DW:S2, SPRG:34	None	All
	Frequency of taking showers/baths away from home. CRaB:Q93-Q96	All	All (full repeat)
	Use of hot tubs / swimming pools / saunas in each season. CaRB:F20	Filtered (if facility present)	Filtered (if facility present), full repeat
D6. Other uses of hot water	Presence of washing machine, dishwashers, tumbler drier. Based on EFUS:Q84 Frequency of doing laundry outside home & why. CRaB:Q97-Q98 How dry laundry, either at home or away. CRaB:Q99	All (self-completion)	All (check-up) All
	How many loads at different temperatures per week (dishwasher, washing machine, tumble drier). CaRB[self-completion]:Q9-17, SPRG:20,21,25 Detailed behaviour questions, e.g. full/half loads, main wash setting of machine. E.g. DW:L1,L6, SPRG:16-19,22-27	None (requires too detailed routing for W1 self-completion format)	Filtered (from responses to W1 self-completion)
D7. Problems and desires	Frequency of experiencing problems with DHW. CRaB:Q66-Q71	All	All (full repeat)
	Desired changes / What would you like to have more control over around hot water. CRaB:Q102	All	All (full repeat)

Section E. Other uses of energy

Rough timing for W1: 3 mins

Section	Topic covered	W1	W2 onwards
E1. Entertainment and ICT	Number and type of TVs. CaRB[self-completion]:Q1 Surveyor observations to record more detailed makes/models/ages as appropriate depending on type of appliance.	All (self-completion) All	All (check-up)
	TV watching behaviours, e.g. hours spent watching, listening, in the background, on but not watched or listened to, in use at same time as other devices	None	Rotated Module
	Number and types of other entertainment appliances, e.g. DVD players, games consoles. CaRB[self-completion]:Q3	All (self-completion and surveyor observations)	All (check-up)
	Usage behaviours around entertainment appliances, e.g. switching off at night. CaRB[self-completion]:Q2,Q4	None	Rotated Module
	Number and type of computers. Other equip – printers, modems, etc. CaRB[self-completion]:Q5 Q7	All (self-completion and surveyor observations)	All (check-up)
	Usage behaviours around computing equipment, e.g. switching off at night. CaRB[self-completion]:Q6,Q8	None	Rotated Module

E2. Fridges and freezers	Number and type of fridges and freezers. CaRB[self-completion]:Q18-Q27	All (self-completion and surveyor observations)	All (check-up)
	Defrosting behaviour.	None	Rotated Module
E3. Cooking & hot drinks	Number and type of cooking appliances, e.g. ovens, hobs, microwaves, electric coffee makers.	All (surveyor observations)	All (check-up and more detailed questions)
	Cooking behaviours, e.g. use of oven vs. microwave, re-heating etc. putting lids on pots when cooking. Eating away from home, purchasing take-aways. RECS:B1-B11, SPRG:38	None	All
E4. Lighting	Surveyor observations: Number and type of light bulbs - Internal - External (electric, battery, solar). Lighting controls – sensors, timers, switch. EFUS:Q112-Q27	All	All (check-up)
	Time of use - During summer on weekday - During summer on weekend - During winter on weekday - During winter on weekend. Lights typically left on overnight. External lights – typical time of use. Reasons lights used/left on, e.g. to enable reading, comfort, security. New Q	None	Rotated Module
E5. Other appliances and equipment	Recording number of other energy-using appliances/products: - patio heaters - electric lawn mowers - heavy work machinery - dialysis machines - other medical equipment - pottery kiln - electric blankets - hair styling products - electric armchairs/recliners SAVE:3.20-3.22	None	All (self-completion)
	General behaviour around use of other appliances (overnight, leaving on standby, etc.) EDRP4:Q79	None	Rotated Module
E6. Recent purchases	Whether any key appliances purchased in last year. New Q based on EDRP6:Q59 Factors considered when purchasing these appliances, e.g. whether looked at energy ratings. New Q based on EDRP6:Q59	All	All (full repeat)
E7. Transport	Use of energy at home for charging an electric vehicle or mobility scooter. New Q	All	All (full repeat)
	Understand basic travel patterns and behaviours. New Q – could be short section asking time-use questions for 'yesterday' (though limited to travel behaviour of index person/HRP).	None	All users of EVs, Rotated Module for others

Section F. Retrofit

Rough timing for W1: 0 mins

Section	Topic covered	W1	W2 onwards
F1. Work done	General home improvements made since property purchase (or in last 5 years), e.g. extensions, decoration, and motivation for making improvement. CRaB:SC3-SC4	All (self-completion)	All (check-up and more detailed questions for any work done in past year)
	Insulation and draughtproofing installed since property purchase (or in last 5 years), and motivation for making improvement. CRaB:SC5-SC6		
	Changes to heating & hot water controls, and other changes to heating or hot water system, and motivation for making improvement. CRaB:SC7-SC10		
	Micro-generation tech installed, and motivation for making improvement. CRaB:SC11 -SC12		
	Other changes made to home. CRaB-SC13-14		
	Any major projects? CRaB-SC15		
	For each home improvement/installation made. Triggers for retrofit, e.g. how it is funded, by grants/subsidies, family changes. E.g. developed version of GDHT:D3-D5 Perceived impact of making improvement. New Q	None	Filtered (if improvements made)
F2. Possibilities for the future	Any further home improvement measures planned/desired. CRaB-SC16 Follow-up on progress of any planned improvements. New Q	All (self-completion) None	All, filtered (if improvements planned at W1)
	Expected impact of these home improvement measures. New Q	Filtered (if improvements planned or desired)	Filtered (if improvements planned or desired)
	Any barriers to completing planned/desired home improvement measures. GDHT:C5	Filtered (if improvements planned or desired)	Filtered (if improvements planned or desired)
	Awareness of new technologies/home improvement options. Thoughts about these technologies. DECC PAT:Q7.1-3	None	All
F3. Sources of advice or services	Trusted sources for energy efficiency improvement work Drawing on examples such as CRaB:SC17 or GDHT: F1	All (self-completion)	All

Section G. Attitudes

Rough timing for W1: TBD

Section	Topic covered	W1	W2 onwards
	Concept of home, e.g. place for entertainment, socialising, relaxing, shelter, security. New Q learning from CRaB:Q127.	All	All (full repeat)
	In addition to the suggest question areas above, suggest an additional 2 minutes is kept for battery of attitudinal statements that will be defined by DECC/others, e.g. drawing on DECC PAT. This will help cover key “issues of the day” and help compare sample profile to general population, e.g. belief in climate change, support for renewables, attitudes to new technologies.	All	All

Section H. Household characteristics

Rough timing for W1: 7 mins

Section	Topic covered	W1	W2 onwards
H1. Index person	Education. CRaB:Q128-Q130 Age or date of birth. ONS:pg 6 HH Sex. ONS pg 6 HH (additional demographics to collect here may include social grade, ethnicity and religion (e.g. SPRG: 53, 54, 57-60). The demographic section will need to be rationalised in close consultation with policy teams to agree a limited set to collect here, given the time constraints. These may be demographics that could be collected via self-completion)	All	All (check-up)
H2. Household individuals	Age or date of birth. ONS:pg 6 HH Sex. CRaB:Q2 Relationship to respondent. CRaB:Q4	All	All (check-up)
H3. Household (as a whole)	Income. ONS:income (I) Education. CRaB:Q131 Disability affecting temperature requirement and/or control of heating. CRaB:Q132-Q133	All	All (check-up)
H4. Paying for energy	Paying for electricity and mains gas. SMEL:DM1/DM2 (additional questions to consider in CRaB "Paying for Energy" section , SPRG:4-5 and SAVE:3.3,3.5,3.1-3.12)	All	All (check-up)
	Amounts of non-metered fuels purchased. Draw on Wood Fuel Questionnaire and RECS:H7-H11b	All	All (full repeat)
H5. Participation in programmes and projects	Participation in energy-related programmes or research projects. New Q, drawing on RECS:D-5d	All	All (check-up)

Section I. Dwelling characteristics

Rough timing for W1: 2 mins

Section	Topic covered	W1	W2 onwards
I1. Built form	Property type, i.e. flat, bungalow, house, including whether purpose-built or converted, number of storeys. CRaB:O1 Floor level of entrance. CRaB:O5 Specific property details, e.g. Is the top storey directly under the roof? CRaB:O6	Interviewer observation	N/A
I2. Tenancy	Length of residency. CRaB:Q5, New Q if < a year Expected length of residency. CRaB:Q120 Type of tenancy, e.g. own, rent. CRaB:Q121 Landlord. CRaB:Q122	All	All (check-up)
I3. Age and condition of home	When built. CRaB:Q123	All	N/A
	Problems associated with home e.g. damp, condensation, mould. CRaB:Q124	All	All (full repeat)
	Windows in the home, e.g. single, double glazing and other insulation. CRaB:Q125-Q126 plus surveyor observations	All	Check-up

Appendix 8: Example Wave 1 household survey questionnaire

Introduction

This Appendix shows an example outline questionnaire for face-to-face CAPI interview in Wave 1, and a supplementary self-completion questionnaire. The linked Appendix 7 summarises the recommended questionnaire structure and section timings, together with suggested rotations of question sections to provide a core questionnaire of 60 minutes, but with content that might vary depending on the respondent, wave or cohort. Together, these two appendices represent the culmination of stakeholder engagement work on key evidence needs from such a survey and a review of existing literature and research.

The example questionnaires include explanations of the logic of the items included and possible order of questions. Overall the logic is based on creating a sociotechnical survey. So what people do (for example to keep warm) is primary and the technology with which they do it is only one aspect of their behaviour).

The order of questions is not fixed but question routing is included so that, if the order of questions is varied, it is clear which questions need to feed into which others. The structure also includes the following. Where example questions are adopted or adapted from past questionnaires, these are referenced in the form "Questionnaire:question number", e.g. "CaRB:C21", which can also be identified in the "question bank" in Appendix 5.20 Where there is a newly formulated question (i.e. a suitable one was not found in the question bank), this is denoted by "New Q".

The questions can only be examples at this stage because final decisions on priorities will follow after this project and the formulation of questions will depend on the question routing required and should be refined by piloting (including cognitive testing where appropriate).

[20] This survey question bank covers all the topics detailed in the questionnaire structure, as well as additional lower priority topics not covered here. It provides references to existing surveys where questions have already been developed to gather the required information.

Key terms and conventions

CAPI instructions (e.g. routing) are shown in { }

Instructions to the interviewer are in capitals or introduced by "INTERVIEWER:". Where the original question indicated that more than one response could be given, this is indicated by "CODE ALL THAT APPLY". Where the original question indicated that only one response could be given, this is indicated by "CODE ONE ONLY".

Codes of "Don't know" and "Declined to answer" are available as standard for all questions.

The layout of the following pages avoids any question being split over more than one page, hence there is often blank space at the bottom of a page.

Acknowledgements

We are grateful for access to questionnaires from the following past studies to draw upon for this project.

- CaRB and CaRB-SC (self-completion): Carbon Reduction in Buildings (NatCen and the University of Reading)
- CRaB: Consumer Response and Behaviour (UCL and NatCen for the Energy Technologies Institute)
- EDRP: Energy Demand Research Project (Ofgem, EDF Energy, E.On, Scottish Power and SSE)
- SAVE: © 2014-2015 SAVE Project Consortium [21]
- SPRG: Lancaster SPRG/ARCC water survey22

[21] Licensed under a Creative Commons, Attribution 4.0 International License. Anderson, B, Coleman, L (2014) SAVE Household Recruitment Survey (Draft 17), Scottish and Southern Energy Power Distribution's Low Carbon Networks Fund SAVE project, Southampton: University of Southampton.

[22] Released under the Creative Commons Attribution-ShareAlike (CC BY SA) licence. http://creativecommons.org/licenses/by-sa/4.0/. Browne, A, Anderson, B, Medd, W. (2011) Patterns of Water Survey Questionnaire, University of Lancaster: Lancaster UK. http://www.sprg.ac.uk/projects-fellowships/patterns-of-water

Section A. Introductory text and screening questions

Assume extended length introduction compared to average survey as will need to explain multiple waves, surveyor visit, desire to fit monitoring equipment, any incentives offered, etc. Written informed consent might also be obtained here or at the end of the interview.

Assume 2 standard pre-code screening questions. This would be to ascertain who, for example, is main energy decision-maker and/or who is at home the most. The form of question would depend on who it is decided would be the most appropriate household reference person for this survey (a discussion of this is presented in the final report).

CRaB:Q109
{Ask if more than one person in the household}
SHOWCARD
How would you describe your role in the household for paying for energy? You can choose more than one of the options on this card.
CODE ALL THAT APPLY

1. I look after the energy accounts (e.g. checking the bills and making sure everything is correct)
2. I pay the bills (e.g. write the cheque or set up the direct debit)
3. I try to keep the household's use of energy under control
4. I read the meter to provide the readings to the energy supplier(s)
5. I bring in some or all of the money that pays the bills
6. EXCLUSIVE (SPONTANEOUS): None of these

CRaB:Q110
{Ask if one person in household}
SHOWCARD
How would you describe what you do in relation to paying for energy? You can choose more than one of the options on this card.
CODE ALL THAT APPLY

1. I look after the energy accounts (e.g. checking the bills and making sure everything is correct)
2. I try to keep the use of energy under control
3. I read the meter to provide the readings to the energy supplier(s)
4. EXCLUSIVE (SPONTANEOUS): None of these

Section B. Heating and keeping warm

Introduction

Questions around heating and keeping warm form one of the key components to the questionnaire, hence this section comes early in the interview and is one of the most detailed. More detail would be collected in the surveyor visit but the questions are designed to cover key information about the heating systems and controls in case there is no surveyor visit and to guide the routing and phrasing of other questions. The section follows the following structure.

- Heating systems present and used: all the means of heating that are present and, if there is more than one, which ones are used and which is considered to be the main means of heating.
- What the household does to keep warm (using the heating or by other means), on a typical winter day and when additional means are needed, and whether they actually do keep warm.
- What rooms are present, how they are used and whether they are heated.
- How the household manages the timing of heating (through the year, week and day) and control of room temperatures, and reasons for strategies adopted. This includes what they normally do and the circumstances in which it changes.
- Household dynamics affecting decisions about how to heat the home and keep warm.
- The information and guidance that has been provided and how confident users are in their ability to manage heating and keeping warm.
- Maintenance and servicing routines.
- The basic needs that the household is seeking to meet when deciding how to heat the home and keep warm, what barriers they perceive and what changes they desire.

After Wave 1, additional items can be included, along the following lines.

- Using information on the heating system and the controls available (as recorded by a surveyor) in order to compare what a household thinks is present with what is actually present.
- Using room layouts (as recorded by a surveyor) to structure questions about opening and closing doors between rooms.
- Follow-up to revisit and check what has or has not been actioned in relation to desires expressed in Wave 1, and why.

B1. Heating systems present and used

CRaB:Q7
{Ask all}
SHOWCARD
I would now like to ask some questions about heating your home and keeping warm.
Looking at this card, please tell me which types of heating you have anywhere in your home, including any that you have but do not actually use.
CODE ALL THAT APPLY
INTERVIEWER: If respondent is not sure on any item, offer to go and check.

1. District or communal heating (heats more than one home)
2. Central heating – with radiators, panels or heated towel rails
3. Central heating – with warm air vents
4. Mechanical ventilation with heat recovery
5. Under-floor heating
6. Ceiling heating
7. Any other kind of central heating (PLEASE SAY WHAT)
8. Electric storage heaters
9. Electric panels, radiators or heated towel rails – fixed in the room but not part of central heating
10. Gas fire (fixed in the room)
11. Other fires, ranges or stoves (fixed in the room)
12. Something portable, e.g. heaters, radiators or heated towel rails
13. Something used for heating that does not have the main purpose of heating the home (e.g. a cooker, washing machine or tumble drier)
14. Anything else (PLEASE SAY WHAT)

CRaB:Q8
{Ask if CRaB:Q7 = 5}
SHOWCARD
How is the floor heated?

1. Central heating
2. District heating
3. Electricity

CRaB:Q9
{Ask if CRaB:Q7 = 6}
SHOWCARD
How is the ceiling heated?

1. Central heating
2. District heating
3. Electricity

CRaB:Q10
{Ask if CRaB:Q7=1 OR CRaB:Q8=2 or CRaB:Q9=2}
SHOWCARD
How does the heat come into your home for the district heating?

1. Hot water to radiators
2. Warm air
3. Under-floor heating elements
4. Other (PLEASE SAY WHAT)

CRaB:Q13
{Ask if CRaB:Q7=2, 3 or 7 OR CRaB:Q8=1 OR CRaB:Q9=1}
SHOWCARD
What fuel does the central heating use?
CODE ALL THAT APPLY

1. Mains gas
2. Bottled gas
3. Oil
4. Wood or wood pellets
5. Other solid fuel
6. Electricity
7. Other – PLEASE SAY WHICH

CRaB:Q14
SHOWCARD
What produces the heat?
CODE ALL THAT APPLY
INTERVIEWER: A range is a generic technology, which can include an Aga.

1. A boiler or air heater
2. A range or stove
3. A ground-source heat pump
4. A water-source heat pump
5. An air-source heat pump
6. Combined heat and power
7. Other (PLEASE SAY WHAT)

CRaB:Q15
{Ask if CRaB:Q7 = 11}
SHOWCARD
What fuel do the fixed heaters use?
CODE ALL THAT APPLY

1. Mains gas
2. Bottled gas
3. Oil
4. Wood or wood pellets
5. Other solid fuel
6. Electricity
7. Other (PLEASE SAY WHAT)

CRaB:Q16
{Ask if CRaB:Q7 = 12}
SHOWCARD
What fuel do the portable heaters use?
CODE ALL THAT APPLY

1. Mains gas
2. Bottled gas
3. Oil
4. Wood or wood pellets
5. Other solid fuel
6. Electricity
7. Other (PLEASE SAY WHAT)

CRaB:Q17
{Ask if more than one answer to CRaB:Q7}
SHOWCARD
Which of these types of heating do you {and your household}[23] use to heat your home at some point during a typical year?
INTERVIEWER: Respondent should state all that are ever used, using codes shown by CAPI from CRaB:Q7.

CRaB:Q18
{Ask if more than one answer at CRaB:Q17}
SHOWCARD
And what do you think of as your main way of heating the home?
CODE ONE ONLY
INTERVIEWER: Respondent should state all that are ever used, using codes shown by CAPI from CRaB:Q17.

CaRB:B2c
{Ask for each means of heating that is present (CRaB:Q7) but not used (CRaB:Q17)}
SHOWCARD
You said you do not use {insert heating system}. Why do you not use this?
INTERVIEWER: "Not in working order" means broken down all winter, not just temporarily.

1. Choose not to use it
2. Not in working order
3. It's too expensive
4. It's not effective
5. Other (specify)

B2. Means of keeping warm

CRaB:Q19
{Ask all}
SHOWCARD
Please think about a typical winter day (and night), with one or more people at home. Which of the things on this card would you {and your household} usually be doing to keep yourselves or your home warm?
CODE ALL THAT APPLY
INTERVIEWER: Ensure the respondent lists only those things done specifically to keep warm, not all things that are done.
INTERVIEWER: If asked, the respondent should think about winter in general, not the coldest day in winter.

1. Using the main heating
2. Using some other heating
3. Keeping windows and external doors closed
4. Shutting doors between rooms
5. Not heating all the rooms
6. Closing curtains or blinds
7. Wearing warm clothes (this includes footwear)
8. Using warm bedding (in bed)
9. Using blankets or duvets (other than when in bed)
10. Having warm food or drink to keep warm
11. Having a bath or shower to warm up
12. Using a hot water bottle
13. Using something else that's warm to hold
14. Using an electric blanket or bed-warmer
15. EXCLUSIVE: None of these things
16. Other – PLEASE SAY WHAT

CRaB:Q20
SHOWCARD
When you are doing that on a typical day in winter, does it always keep you {and everyone in your household} warm enough?
CODE ONE ONLY

1. Yes – always
2. Yes – sometimes
3. No – rarely
4. No – never
5. SPONTANEOUS: It varies between household members

[23] Throughout the questionnaire, there are standard variations of this kind, depending on whether there is more than one person in the household.

CRaB:Q21
SHOWCARD
Are there any things on this list that you {and your household} sometimes do if your usual way of keeping warm is not enough?
CODE ALL THAT APPLY

1. Have the main heating on for more time
2. Use more other heating
3. Turn up a thermostat
4. Close windows or external doors
5. Shut doors between rooms
6. Heat fewer rooms
7. Heat more rooms
8. Close curtains or blinds
9. Wear warmer clothes (this includes footwear)
10. Use warmer bedding (in bed)
11. Use blankets or duvets (other than when in bed)
12. Have warm food or drink to keep warm
13. Have a bath or shower to warm up
14. Use a hot water bottle
15. Use something else that's warm to hold
16. Use an electric blanket or bed-warmer
17. Exercise or do work that keeps you warm
18. Go somewhere warmer, away from the home (e.g. another home, a library or other building)
19. Other – PLEASE SAY WHAT
20. No – we are always warm enough
21. No – we are always doing all we can, even on a typical winter day

B3. Heating and use of different rooms

CRaB:Q22
SHOWCARD
Looking at this list, could you indicate how many of each of these kinds of room you have as part of your home? Think about the main way you use the room rather than what it might have been designed for.
RECORD NUMBER OF EACH TYPE OF ROOM
INTERVIEWER: E.g. a bedroom used as a study is to be coded as a study. Cellars and roof spaces – used other than for storage – should be recorded as whatever they are used as. Kitchen with breakfast bar

1. Kitchen diner
2. Open plan kitchen / living / dining area
3. Kitchen (not used as a dining/breakfast room)
4. Pantry / larder (cold area where food is stored)
5. Utility room (for white goods, e.g. washing machine)
6. *Living room[24]
7. *Dining room
8. *Combined living and bedroom (bed-sit)
9. *Bedrooms
10. *Study, studio or home office
11. *Playroom
12. *Conservatory
13. Bath/shower room with a toilet
14. Bath/shower room without a toilet
15. Separate toilet
16. *Gym / exercise / games room
17. Hallway (within the home)
18. Landing (within the home)
19. Porch, not open to the outside
20. Cellar (used only for storage)
21. Loft (unoccupied roof space)
22. Other storage room
23. *Heated outbuilding
24. Other – PLEASE SAY WHAT

[24] The stars denote those rooms for which usage is checked at the next question. These stars do not appear on showcards.

CRaB:Q23
(Rooms i … xx)
SHOWCARD
{Ask for each of the times each of the starred items at Q22 was identified}
{CAPI: present list of rooms}
Which of the following best describes how that room is used?
CODE ONE ONLY FOR EACH ROOM

1. Occupied by someone in the household at least some of the time, most days
2. Occupied by someone in the household less often
3. Rarely or never occupied by someone in the household
4. Used mainly for/by pets
5. Used mainly by someone who is away from home a lot of the time
6. Used mainly for guests
7. Used mainly for storage
8. Not used at all
9. Other – PLEASE SAY WHAT

CRaB:Q24
{Ask for each room if CRaB:Q23i…Q23xv = 3, 4, 6, 7, 8 or 9}
{CAPI: present list of rooms}
SHOWCARD
And why is this room not occupied more often?
Please pick your answers from this card.
CODE ALL THAT APPLY

1. We have enough space without using this room
2. We use it for something that does not happen most days
3. It doesn't have any heating
4. It tends to get too hot
5. It tends to get too cold
6. There is some other problem with the room (e.g. noise, draughts or damp)
7. We are redecorating, building or renovating
8. It used to be used by someone who no longer lives here
9. Other – PLEASE SAY WHAT

CRaB:Q25
{Ask for each of the times each of the starred items at Q22 was identified}
{CAPI: present list of rooms}
SHOWCARD
CODE ONE ONLY FOR EACH ROOM
For each of the rooms I mention, please tell me which option on this card applies.

1. (Room) has heating and we do tend to use the heating in winter
2. (Room) has heating but we do not tend to use the heating in winter
3. (Room) has no heating

B4. Control of heating timing

CRaB:Q11
{If district heating coded at CRaB:Q7}
SHOWCARD
What control do you have over **when** your home is heated by the district heating?

1. I can control the heating in my home **day-to-day** but not which months the heating is available
2. I can control **which months** the heating is available but not the day-to-day heating in my home*
3. I can control the heating **day-to-day and which months** the heating is available
4. None*

*Omit CRaB:Q28, Q30 and CaRB:C31-32 on timing of heating if district heating is the only form of heating.

CRaB:Q26
During a typical year, in which months do you {and your household} normally heat your home (for at least part of the month)?
CODE ALL THAT APPLY

1. Jan
2. Feb
3. Mar
4. Apr
5. May
6. Jun
7. Jul
8. Aug
9. Sep
10. Oct
11. Nov
12. Dec
13. EXCLUSIVE: Never have the heating on
14. EXCLUSIVE: All year

CRaB:Q27
{Ask if CRaB:Q26 ≠ 13}
SHOWCARD
In the months when you use your heating, is it on all the time? By "all the time", I mean all day and all night, even at times when there is no-one at home.
INTERVIEWER: If asked, this means that the home is heated the whole time, not that the heating system is on the whole time with the timer set to heat the home as needed.
CODE ONE ONLY

1. Yes – it's on all the time
2. No – it's not on all the time

CRaB:Q29
{Ask if CRaB:Q27=1}
SHOWCARD
You said that you keep your heating on all of the time, during the months that you use your heating. Why do you do this?
CODE ALL THAT APPLY

1. The home gets too cold otherwise
2. We believe it uses less energy than turning the heating on and off
3. We believe it costs less than turning the heating on and off
4. It is easier to do this
5. Like it to be warm when getting up in the morning or when coming home
6. I'm not sure if it's possible to set my heating to come on at different times
7. I don't know how to set my heating to come on at different times
8. I'm not able to access the controls to set my heating to come on at different times
9. To make sure the water pipes don't freeze
10. Other – PLEASE SAY WHAT

CRaB:Q28
{Ask if CRaB:Q27 = 2}
SHOWCARD
How do you or your household control what times of day your heating is on? Please tell me all of the things you ever do.
CODE ALL THAT APPLY

1. We control when the heating is on manually, by switching it on and off
2. We set the thermostat and let it control when the heating comes on and off
3. We use the thermostat to turn the heating on and off, whenever we need to
4. We control when the heating is on using a timer or programmer
5. EXCLUSIVE: Can't control when the heating is on
6. Other – PLEASE SAY WHAT

CRaB:Q31
{ASK IF CRaB:Q27 = 2}
SHOWCARD
At which times of the day do you normally heat your home during a typical weekday in winter?
CODE ALL THAT APPLY.
INTERVIEWER: If queried, please code an option if the heating was on for any part of that period.

1. Early morning
2. Late morning
3. Early afternoon
4. Late afternoon
5. Early evening
6. Late evening, until bedtime
7. During the night
8. EXCLUSIVE (SPONTANEOUS): It varies too much to say

CRaB:Q32
{Ask if CRaB:Q27 = 2}
SHOWCARD
At which times of the day do you normally heat your home during a typical day at the weekend in winter?
CODE ALL THAT APPLY
INTERVIEWER: If queried, please code an option if the heating was on for any part of that period.

1. Early morning
2. Late morning
3. Early afternoon
4. Late afternoon
5. Early evening
6. Late evening, until bedtime
7. During the night
8. EXCLUSIVE (SPONTANEOUS): It varies too much to say
9. EXCLUSIVE (SPONTANEOUS): It's the same as on weekdays

CRaB:Q30
{Ask if CRaB:Q27 = 2}
SHOWCARD
Do you ever leave your heating on when nobody is at home for part of a day, for any of these reasons?
CODE ALL THAT APPLY

1. EXCLUSIVE: No – the heating is always switched off if nobody is at home
2. Otherwise the home is too cold when I/we get home
3. I/we believe it uses less energy than turning the heating on and off
4. I/we believe it costs less than turning the heating on and off
5. It is easier to do this
6. I'm not sure if it's possible to set my heating to get the home warm again before someone comes home
7. I don't know how to set my heating to get the home warm again before someone comes home
8. I'm not able to access the controls to set my heating to come on before someone comes home
9. To make sure the water pipes don't freeze
10. Other – PLEASE SAY WHAT

B5. Control of room temperatures

CRaB:Q12
{If district heating coded at CRaB:Q7}
Do you have any control over how much heat you get in your home from the district heating (e.g. using a thermostat or control over the heat flow)?

1. Yes
2. No*

*Omit RECS:D-11 and CaRB:C21-22 on temperature control if district heating is the only form of heating.

CRaB:Q33
{Ask if CRaB:Q26 ≠ 13}
SHOWCARD
In the months when you use your heating, how, if at all, do you control the temperature of your home?
CODE ALL THAT APPLY.

1. EXCLUSIVE: We don't do anything to control the temperature
2. Manually turn the heating on and off
3. A single thermostat in one room
4. Thermostats on individual radiators
5. Other thermostats located in individual rooms
6. Change the temperature setting on the boiler itself
7. Adjust individual heat sources (e.g. using switches on heaters or manual valves on radiators)
8. Open/close windows or doors
9. Other – PLEASE SAY WHAT

CRaB:Q34
{Ask if CRaB:Q33 = 1}
SHOWCARD
You said that you don't do anything to control the temperature of your home. Why is that?
CODE ALL THAT APPLY

1. The heating is set at the right temperature / we don't want it hotter or colder
2. Changing the temperature would use more energy
3. Changing the temperature would be more expensive
4. I/we don't think there is a way to control the temperature
5. I/we don't know how to control the temperature
6. I/we are not able to access/use the heating controls

Other – PLEASE SAY WHAT

CRaB:Q35
{Ask if CRaB:Q33 = 2, 3, 4, 5, 6, 7, 8 or 9}
SHOWCARD
How often do you tend to do any of these things to control the temperature in a typical winter week?
CODE ONE ONLY

1. Less than once per week
2. At least once per week but not every day
3. Once or twice per day
4. More often

CRaB:Q34
{Ask if CRaB:Q33 = 1}
SHOWCARD
You said that you don't do anything to control the temperature of your home. Why is that?
CODE ALL THAT APPLY

7. The heating is set at the right temperature / we don't want it hotter or colder
8. Changing the temperature would use more energy
9. Changing the temperature would be more expensive
10. I/we don't think there is a way to control the temperature
11. I/we don't know how to control the temperature
12. I/we are not able to access/use the heating controls
13. Other – PLEASE SAY WHAT

CaRB:C21
{If CRaB:Q33 = 3 and/or 5}
There are many ways that people use their thermostats. When you turn up the room thermostat, which of these do you normally do?
CODE ALL THAT APPLY

1. Turn the thermostat up until it clicks
2. Turn the thermostat up high to warm up the room quickly
3. Turn the thermostat up to a specific number you choose
4. Turn the thermostat up without choosing a specific number
5. Some other method

New Q
And when you turn down the room thermostat, which of these do you normally do?
CODE ALL THAT APPLY

1. Turn the thermostat down until it clicks
2. Turn the thermostat down very low
3. Turn the thermostat down to a specific number you choose
4. Turn the thermostat down without choosing a specific number
5. Some other method

CRaB:E3
{If CRaB:Q33 = 3 and/or 5 or thermostat observed}
Current temperature setting (respondent's estimate and actual setting)[25].

1. Estimate (WRITE IN OR TICK BOX IF NO ESTIMATE)
2. Actual (WRITE IN OR TICK BOX IF NOT OBSERVED)

CRaB:E4
How is the temperature setting shown?

1. Degrees C (Celsius)
2. Degrees F (Fahrenheit)
3. Degrees (Unsure whether C or F)
4. Simple numbers
5. Unsure
6. Couldn't check

{If CaRB:C21 ≠ 3, skip to Section B6}

RECS:D-11a
During the winter, what is the thermostat usually set to when *someone is inside* your home *during the day?*

WRITE IN °C (degrees Celsius) OR °F (degrees Fahrenheit)

RECS:D-11b
During the winter, what is the thermostat usually set to when *no-one is inside* your home *during the day*?

WRITE IN °C (degrees Celsius) OR °F (degrees Fahrenheit)

RECS:D-11c
During the winter, what is the thermostat usually set to inside your home *at night*?

WRITE IN °C (degrees Celsius) OR °F (degrees Fahrenheit)

[25] Ask the respondent first, before looking at the thermostat. In the case of a digital thermostat, the number displayed could be the setting (set-point) or current temperature. Record the temperature as displayed.

B6. Variations on usual practice

CRaB:Q36 to CRaB:Q46
{Ask all}
SHOWCARD
We talked about how you normally use your heating. I'm also interested in why you might sometimes change what you do. Which of these, if any, would you tend to do …
CODE ALL THAT APPLY
[Q36] … when the weather is particularly cold?
[Q37] … if you have a visitor or guest who particularly needs to keep warm?
INTERVIEWER: This could include babies, elderly people or those who feel the cold.
[Q38] … if other people visit during the day?
INTERVIEWER: This and the item below refer to those without a particular need to keep warm.
[Q39] … if other guests stay overnight?
[Q40] … if someone at home is unwell?
[Q41] … if you just want to heat a particular room, not the whole home?
[Q42] … if the main way you heat the home is out of action?
[Q43] … if you are working from home?
[Q44] … during school holidays?
[Q45] … if the home is unoccupied overnight?
[Q46] … if the home is unoccupied for more than a day?

1. This does not happen
2. Heat for more hours
3. Heat for fewer hours
4. Turn up the temperature
5. Turn down the temperature
6. Turn the main heating on
7. Turn other heating on
8. Turn the main heating off
9. Turn other heating off
10. EXCLUSIVE: None of these
11. Other – PLEASE SAY WHAT

CaRB:C31
{Ask if CRaB:Q45 ≠ 1 and CRaB:Q46 ≠ 1}
If you go away overnight during the winter, leaving your home empty, what do you do with the heating?
CODE ALL THAT APPLY

1. Leave it running as usual
2. Leave it on and turn down the thermostat
3. Leave it running for a shorter period each day
4. Have fewer heaters or radiators on
5. Switch it off
6. Have not been away during the winter

CaRB:C32
{If CaRB:C31 = 2}
When you go away during the winter, what temperature is your thermostat turned down to?
CODE

1. Minimum
2. "Frost" (❄)
3. No particular number

OR WRITE IN °C (degrees Celsius) OR °F (degrees Fahrenheit)

B7. Understanding of heating controls

New Q
{If central heating, storage heaters or district heating}
Have you received any instructions, guidance or advice on how to control the heating, in any of these ways?
CODE ALL THAT APPLY

1. In a booklet or leaflet
2. Online
3. In person from an installer, plumber or heating engineer
4. In person from family or friends
5. Other
6. None of these ways

New Q
{For each source coded at previous question}
How helpful, or not, did you find this information?
[Assume 5-point scale question.]

B8. Maintenance and servicing

RECS:D-5a
SHOWCARD
In the last year, has any of this routine service or maintenance been performed on your heating in the past 12 months?

1. Service boiler
2. Flush system
3. Bleed radiators
4. Clean filters
5. Other
6. None of these things

New Q
{If any servicing or maintenance done}
Why was this done?
CODE ALL THAT APPLY

Done by landlord
Requirement by landlord, done by household
Done as part of boiler insurance
Done as part of a maintenance package
Other free service
Heard improves efficiency or saves energy
To avoid breakdown
To avoid health risk
Other

B9. Household dynamics around heating

CRaB:Q47
{Ask if more than one person in household}
SHOWCARD
People tend to vary in how warm they need their home to be. Please say which of these statements comes closest to your view about how you and your household decide about heating. This might include deciding when it is turned on and off, which rooms are heated and to what temperature, and so on.
CODE ONE ONLY

1. It's largely down to one person (e.g. who owns the home or has been here the longest or is home most of the time)
2. It's mainly to care for someone who needs to keep warm or cool, for example because of a health condition or age (being very young or elderly)
3. It depends on the needs of the person deciding at the time how to heat the home
4. Everyone has a say but one or more people's needs have a greater influence than others'
5. It varies – depending on whose needs are greatest at the time
6. It depends more-or-less equally on the needs of everyone who is at home at the time
7. Other – PLEASE SAY WHAT

CRaB:Q48
{Ask if more than one person in household and AND Q47 ≠ 6}
SHOWCARD
And which of the following statements comes closest to your view about who in your household has most influence on decisions about heating the home.
CODE ONE ONLY

1. I tend to have the most influence
2. Someone else tends to have the most influence
3. It varies – different people influence decisions about the heating at different times
4. Nobody – we all make decisions about it separately.
5. SPONTANEOUS: We decide together
6. Other – PLEASE SAY WHAT

B10. Needs and desires

CRaB:Q49
{Ask all}

SHOWCARD
Leaving aside how you currently make decisions about heating, are there aspects of your heating system or equipment that you would like to change? If you could design your own home or heating system, are there any of these aspects that you would like more control over? CODE ALL THAT APPLY

1. The times when the heating comes on and off
2. The temperature in each room
3. The rooms that are heated at any given time
4. Being able to heat rooms more quickly
5. Being able to deal with situations when I/we unexpectedly need to heat the home
6. Being able to control the heating system from any room in the home
7. Being able to control the heating system remotely, from outside the home
8. Knowing when someone else changes a heating control from how you set it
9. Other – PLEASE SAY WHAT
10. EXCLUSIVE: None of these
11. No, it would better to have more automation so that we wouldn't have to think about controlling the heating

New Q
Would you say that each of the following helps or hinders your ability to achieve what you want {as a household} with your heating? [Assume 8 ratings, e.g. affordability, effectiveness of the heating, level of insulation, the available heating controls, understanding the controls, having particular needs for warmth.]

New Q
How confident do you feel overall about achieving what you want {as a household} with your heating? [Single scale rating.]

CRaB:Q103
Intro
{Ask all}
You told me earlier some of the things you {and your household} do to heat the home and keep {yourself OR yourselves} warm – including {TEXTFILL: Specific examples selected at Q19}.

INTERVIEWER: Hand over set of sort cards and 'heating your home and keeping warm' sheet or labels.[26]

Different people and households take into account different kinds of need as they decide how to heat the home and keep warm. I would like you to tell me what is important to you {and your household}, using these cards. Each card has on it a factor that might influence how a {person OR household} decide{s} to heat the home and keep warm. Some of the factors will probably not seem relevant to you {or your household} in your current home, in which case you can just tell me that.

The cards show the basic factor or need that you could be thinking about – in the bold headings – and have some examples of how each factor could influence how you {and your household} decide how to heat the home and keep warm. These examples are included to explain some particular ways in which the factors might influence what you do. If you feel that the need could influence what you do, it doesn't matter if some or all of the examples are not relevant to you – just think about things that are relevant and focus on the basic need that you are trying to meet.

[26] Depending on the space available, the cards may be sorted onto a sheet of paper with three headings or under three labels placed on a table or other convenient surface.

Intro2
So, thinking about you {and your household}, please sort the cards into big factors, smaller factors and those that are not a factor in how you decide to heat home and keep warm.
Big factors would be those that are very important in influencing what you do.
Smaller factors would be less important but still influence what you do to some extent.
"Not a factor" means something that does not influence what you do or something that is not relevant to you or your current situation.
Place the cards under the headings on this larger card / by these labels.
INTERVIEWER: If necessary, guide the respondent to place the cards so that they are all visible, not on top of each other in a pile. Once the respondent has sorted all the cards, check that s/he is happy with the cards as sorted. Then record specific letters of cards in each pile and any not allocated.

CRaB:Q104
{Ask if 4 or more big factors coded at CRaB:Q103}
Which three of the things that you said are big factors in how you {and your household} decide{s} decide{s} to heat the home and keep yourselves warm would you say are the most important?

INTERVIEWER: Record letters of top three cards. Probe if fewer than 3.

Section C. Cooling and keeping cool

Introduction

Questions in this section ask the householder how they keep the home cool in the summer and avoid overheating in winter. This area of questioning is important for two main reasons:

- there is a natural interaction between heating and cooling, for example because opening windows increases heating energy use and some insulation can increase the risk of homes overheating;
- changes in housing design and social expectations, combined with climate warming, create a risk of greater demand for air conditioning in homes in future.

Because most homes do not currently have mechanical cooling, the questions for most respondents will be relatively brief in this section. As for heating, more detail would be collected in the surveyor visit but the questions are designed to cover key information in case there is no surveyor visit and to guide the routing and phrasing of other questions. The section follows the following structure.

- What the household does to avoid overheating in winter and to keep cool in summer (on a typical summer day and when additional means are needed), and whether they actually do keep cool.
- Where mechanical cooling is used, more information on the system and how it is used.
- Use of windows for cooling (and for other purposes).
- The barriers the household perceive and what changes they desire, in relation to cooling and keeping cool.

After Wave 1, additional items can be included on details, room by room, about ability to keep cool and about opening and closing of windows and doors.

C1. Means of keeping Cool

CRaB:Q51
{Ask all}
SHOWCARD
Please tell me which of these things, if any, you or your household sometimes do to avoid getting **too** warm **in winter**.
CODE ALL THAT APPLY
INTERVIEWER: Extract fans are usually located in 1-2 rooms e.g. bathroom and kitchen. Mechanical ventilation systems typically have elements located in all rooms of the home.

1. EXCLUSIVE: Nothing – it would not get too warm in winter
2. Turn the heating down/off
3. Open windows during the day to keep cool
4. Open windows at night to keep cool
5. Open external doors to keep cool
6. Open doors between rooms to keep cool
7. Open doors to shared indoor spaces such as landings or stairwells to keep cool
8. Use air conditioning that you always have at home
9. Hire an air conditioning unit
10. Use heat pump for cooling
11. Use extract fan(s) to keep cool
12. Use a mechanical ventilation system (that extracts air from some rooms and supplies it to other rooms) to keep cool
13. Use an electric fan to keep cool
14. Close blinds / curtains / shutters on the inside of windows or doors to keep cool
15. Close blinds / shutters on the outside of windows or doors to keep cool
16. Wear light clothes
17. Use light bedding
18. Have cold drinks to cool down
19. Have a bath or shower to cool off
20. Have a rest
21. Avoid using certain rooms in the home
22. Go outside
23. Go somewhere cooler, away from the home
24. Other – PLEASE SAY WHAT

CRaB:Q52
{Ask if CRaB:Q5 = 2-5 OR CRaB:Q6 = 1}
SHOWCARD
And please say which of these things, if any, you or your household sometimes do to avoid getting too warm on a **typical summer day** (not when there is a heatwave)?
CODE ALL THAT APPLY

1. EXCLUSIVE: Nothing – it would not get too warm
2. Turn the heating down/off
3. Open windows during the day to keep cool
4. Open windows at night to keep cool
5. Open external doors to keep cool
6. Open doors between rooms to keep cool
7. Open doors to shared indoor spaces such as landings or stairwells to keep cool
8. Use air conditioning that you always have at home
9. Hire an air conditioning unit
10. Use heat pump for cooling
11. Use extract fan(s) to keep cool
12. Use a mechanical ventilation system (that extracts air from some rooms and supplies it to other rooms) to keep cool
13. Use an electric fan to keep cool
14. Close blinds / curtains / shutters on the inside of windows or doors to keep cool
15. Close blinds / shutters on the outside of windows or doors to keep cool
16. Wear light clothes
17. Use light bedding
18. Have cold drinks to cool down
19. Have a bath or shower to cool off
20. Have a rest
21. Avoid using certain rooms in the home
22. Go outside
23. Go somewhere cooler, away from the home
24. Other – PLEASE SAY WHAT

CRaB:Q53
{Ask if CRaB:Q52 = 2-24}
SHOWCARD
When you are doing this on a typical summer day, does this always keep you {and everyone in your household} cool enough?
CODE ONE ONLY

1. Yes – always
2. Yes – sometimes
3. No – rarely
4. No – never
5. SPONTANEOUS: It varies between household members

CRaB:Q54
{Ask if CRaB:Q52 = 2-24}
SHOWCARD
Are there any things on this list that you {and your household} do when your usual ways of keeping cool in summer are not enough (for example, on really hot days)?
CODE ALL THAT APPLY

1. EXCLUSIVE: Nothing extra
2. Turn the heating down/off
3. Open windows during the day
4. Open windows at night
5. Open external doors
6. Open doors between rooms
7. Open doors to shared indoor spaces such as landings or stairwells
8. Use air conditioning that you always have at home
9. Hire an air conditioning unit
10. Use heat pump for cooling
11. Use extract fan(s)
12. Use a mechanical ventilation system (that extracts air from some rooms and supplies it to other rooms)
13. Use an electric fan
14. Close blinds / curtains / shutters on the inside of windows or doors
15. Close blinds / shutters on the outside of windows or doors
16. Wear lighter clothes
17. Use lighter bedding
18. Have cold drinks to cool down
19. Have a bath or shower to cool off
20. Avoid using certain rooms in the home
21. Go outside
22. Go somewhere cooler, away from the home
23. Other – PLEASE SAY WHAT
24. EXCLUSIVE: No – we are always cool enough
25. EXCLUSIVE: No – we are always doing all we can, even on a typical summer day

C2. Cooling technology

{This section used if the household uses air conditioning, including heat pumps used for cooling}

CaRB:D39
During a typical summer, for how many months would the air conditioning (cooling) be in use?

CaRB:D40
{If CaRB:D39>0}
During a typical month when the air conditioning (cooling) is in use, for how many days would it be in use?

CaRB:D41
During a typical day when the air conditioning (cooling) is in use, for how many hours would it be turned on?

RECS:F-9a1
Is the thermostat programmed to adjust the cooling temperature setting during sleeping hours?

1. Yes

2. No

New Q
What are the summer thermostat settings:

(a) During the day when somebody is at home?
(b) During the day when nobody is at home?
(c) At night?

New Q
Have you received any instructions, guidance or advice on how to control the cooling, in any of these ways?
CODE ALL THAT APPLY

1. In a booklet or leaflet
2. Online
3. In person from an installer, plumber or engineer
4. In person from family or friends
5. Other
6. None of these ways

C3. Opening and closing windows

CRaB:Q58
SHOWCARD
For which of these reasons do you sometimes open a window at home?
CODE ALL THAT APPLY

1. To keep cool
2. For fresh air
3. To let out smoke or smells
4. To avoid condensation
5. To let pets in or out
6. To talk to someone or hear what is happening outside
7. To sleep better
8. Habit/preference for no particular reason
9. Other – PLEASE SAY WHAT
10. EXCLUSIVE: None of these
11. EXCLUSIVE: I never open windows at home

CRaB:Q59
SHOWCARD
Are there ever times when you would like to open a window or door to keep cool, but you don't do it for one of these reasons?
CODE ALL THAT APPLY

1. EXCLUSIVE: No, this never happens
2. Yes – because of noise outside
3. Yes – for other reasons to do with conditions outdoors (e.g. smoke, odours, wind, rain)
4. Yes – because of concerns about security
5. Yes – because of concerns about safety (e.g. to prevent children falling out)
6. Yes – to keep pets in
7. Yes – to keep animals/insects/pests out
8. Yes – because it is difficult to open a window or keep it open the desired amount
9. Yes – window cannot be opened at all (e.g. sealed, locked or faulty)
10. Other – PLEASE SAY WHAT
11. EXCLUSIVE: None of these

C4. Needs and Desires

CRaB:Q62
{Ask all}
SHOWCARD
Leaving aside how you currently make decisions about cooling the home, are there aspects of how you are able to keep cool at home that you would like to change? If you could design your own home or cooling system, are there any of these aspects that you would like more control over?
CODE ALL THAT APPLY

1. Being able to make the home cooler than you currently can.
2. Avoiding overheating during heatwaves.
3. Being able to cool the home more quickly.
4. Being able to cool particular parts of the home
5. Being able to deal with situations when I/we unexpectedly need to cool the home
6. Being able to control the cooling from any room in the home
7. Being able to control the cooling remotely, from outside the home
8. Other – PLEASE SAY WHAT
9. EXCLUSIVE: None of these
10. No, it would better to have more automation so that we wouldn't have to think about controlling how we cool the home

New Q
Would you say that each of the following helps or hinders your ability to keep cool or avoid overheating? [Assume 8 ratings, e.g. affordability, problems with having windows open, size of

windows, effectiveness of other ventilation or air conditioning, level of insulation, availability of shading at windows, having particular needs to keep cool.]

Section D. Heating water and using hot water

Introduction

Hot water represents one of the largest and most diverse uses of energy in the home, involving multiple technologies and behaviours. It is also one that could become a greater use of energy that space heating, as heating technology and the insulation of homes improve. As for heating, more detail would be collected in the surveyor visit but the questions are designed to cover key information in case there is no surveyor visit and to guide the routing and phrasing of other questions. The section follows the following structure, covering both the domestic hot water (DHW) system and water heated in appliances.

- The uses of hot water in the home.
- Systems used to produce DHW and, if there is more than one, which is considered to be the main one.
- How, if at all, the water heating time and temperature are controlled.
- The information and guidance that has been provided around controlling DHW.
- Bathing and showering facilities and practices (at home and whether facilities away from home are used).
- Problems the household has encountered with DHW and what changes they desire.

Other major uses of hot water, such as by dishwashers, washing machines is covered in the self-completion questionnaire.

After Wave 1, additional items can be included, along the following lines.

- Circumstances under which DHW is heated for more or fewer hours.
- Using information on the DHW system and the controls available (as recorded by a surveyor) in order to compare what a household thinks is present with what is actually present.
- More details of showering, bathing and laundry practices.

D1. Uses of hot water

CRaB:Q63
{Ask all}
SHOWCARD
I now want to ask you about how you and your household use hot water in the home.
By hot water we mean any water that has been heated. This might include warm water or water used in a washing machine cool cycle.
Looking at this card, please tell me all of the ways in which you {or anyone else in your household} use hot water in your home.
CODE ALL THAT APPLY
INTERVIEWER: Code 6 applies whether the washing machine is hot or cold fill.
INTERVIEWER: Code 9 applies whether the dishwasher is hot or cold fill.

1. Have baths or bathe children
2. Have showers
3. Wash hands, face or feet
4. Brush teeth with hot water
5. Wash pets with hot water
6. Wash clothes etc. using a washing machine
7. Hand wash or soak clothes, etc.
8. Wash the dishes (by hand)
9. Wash the dishes (using a dishwasher)
10. Make hot drinks or cook food
11. Clean the home, using hot water
12. Wash a car/other vehicle using hot water
13. Other – PLEASE SAY WHAT
14. EXCLUSIVE (SPONTANEOUS): NONE OF THESE

D2. Water heating systems

CRaB:Q64
SHOWCARD
Which of the following do you use to heat the water that comes from the hot taps in your home?
CODE ALL THAT APPLY.

1. District heating (supplies more than one home)
2. Combi boiler- hot water on demand
3. Boiler with cylinder (hot water tank)
4. Immersion heater
5. Instant hot water tap (heats water at tap)
6. Solar thermal hot water
7. EXCLUSIVE: Not applicable – no centralised water heating (e.g. only kettle, or pans on hob)
8. Other – PLEASE SAY WHAT

New Q
{Ask if CRaB:Q64 = 2 or 3 AND means of water heating is different from means of space heating.}
SHOWCARD
What fuel does the water heating use?
CODE ALL THAT APPLY

1. Mains gas
2. Bottled gas
3. Oil
4. Wood or wood pellets
5. Other solid fuel
6. Electricity
7. Other (PLEASE SAY WHAT)

CRaB:Q65
{Ask if more than one way of heating water at CRaB:Q64}
SHOWCARD
And which is the **main** way that you heat water in your home – the water that comes from the hot taps?
CODE ONE ONLY

1. District heating (supplies more than one home)
2. Combi boiler: hot water on demand
3. Boiler with cylinder (hot water tank)
4. Immersion heater
5. Instant hot water tap (heats water at tap)
6. Solar thermal hot water
7. Other – PLEASE SAY WHAT

D3. Control of hot water

CRaB:Q72
{Ask if CRaB:Q65 ≠ 2 or 5 OR, IF CRaB:Q65 not answered, CRaB:Q64 ≠ 2 or 5}
SHOWCARD
Is hot water available all the time in your home or do you do any of these things to control when hot water is available?
CODE ALL THAT APPLY

1. EXCLUSIVE: Hot water is available all the time
2. Hot water is available at times when I/we set the controls for it
3. I/we sometimes use a boost button on the timer to get extra water heating
4. I/we turn the water heating on and off as needed
5. Other – PLEASE SAY WHAT

CRaB:Q73
{Ask if CRaB:Q72 = 2}
SHOWCARD
How often do you tend to change the timer settings for your hot water?
CODE ONE ONLY

1. Never
2. Less than once per week
3. At least once per week but not every day
4. Once or twice per day
5. More often

CRaB:Q74
{Ask if CRaB:Q72 = 3}
SHOWCARD
How often do you tend to use a boost button on the timer to get extra water heating?
CODE ONE ONLY

1. Less than once per week
2. At least once per week but not every day
3. Once or twice per day
4. More often

CRaB:Q75
{Ask if CRaB:Q72 = 4}
SHOWCARD
How often do you tend to turn the water heating on and off as needed?

1. Less than once per week
2. At least once per week but not every day
3. Once or twice per day
4. More often

CRaB:Q76
{Ask if CRaB:Q72 = 5}
SHOWCARD
How often do you tend to do something else to control when hot water is available?
CODE ONE ONLY

1. Less than once per week
2. At least once per week but not every day
3. Once or twice per day
4. More often

CRaB:Q79
SHOWCARD
How, if at all, do you or your household control the temperature of water from your hot taps?
CODE ALL THAT APPLY
PROBE UNLESS 1, 2, 3 OR 7 SELECTED
INTERVIEWER: If asked, this relates to the temperature of the hot water, not the use of mixer taps to mix hot and cold water.
INTERVIEWER: If unclear to respondent, emphasise that the question is about the temperature of the water, not the temperature of the room.
INTERVIEWER: If there is solar water heating, this question would apply to whatever the household uses for backup when there is insufficient sunshine.

1. EXCLUSIVE: We are not able to control the temperature of our mains hot water
2. EXCLUSIVE: We are able to control the temperature of our mains hot water but don't do this
3. EXCLUSIVE: The hot water was set up once and we just leave it like that
4. We change the temperature of our hot water on the boiler
5. We change the temperature of our hot water on the hot water cylinder/tank
6. We set the temperature on a point-of-use water heater (that heats water near the tap)
7. EXCLUSIVE: We get someone else to do it
8. Other – PLEASE SAY WHAT

CRaB:Q80
{Ask if CRaB:Q79 = 4 or 5}
SHOWCARD
How often do you change the temperature of your hot water?

1. Less than once per week
2. At least once per week but not every day
3. Once or twice per day
4. More often
5. (NOT EXCLUSIVE) When the season changes to colder weather (e.g. spring/summer)
6. (NOT EXCLUSIVE) When the season changes to warmer weather (e.g. autumn/winter)
7. Other – PLEASE SAY WHAT

D4. Understanding of DHW controls

New Q
Have you received any instructions, guidance or advice on how to control the hot water, in any of these ways?
CODE ALL THAT APPLY

1. In a booklet or leaflet
2. Online
3. In person from an installer, plumber or heating engineer
4. In person from family or friends
5. Other
6. None of these ways

New Q
{For each source coded at previous question}
How helpful, or not, did you find this information?
[Assume 5-point scale question.]

D5. Bathing and showering facilities and practices

CRaB:Q81
{Ask all}
SHOWCARD
I now want to ask about what you {and your household} do to wash or bathe.
Looking at this card, please tell me how many of each of the following do you have in your home?
RECORD NUMBER OF EACH

(i) A shower
(ii) A bath
(iii) A hot tub (outdoors or in an outbuilding)
(iv) A heated swimming pool
(v) A sauna

CRaB:Q82
{Ask if CRaB:Q8(i) > 0}
SHOWCARD
Which of these types of shower do you have in your home?
CODE ALL THAT APPLY.

1. An electric shower (heats cold water from the mains) in a shower cubicle
2. A power shower (pumps hot and cold water at a high pressure) in a shower cubicle
3. A mixer shower in a shower cubicle
4. An electric shower (heats cold water from the mains) over a bath
5. A power shower (pumps hot and cold water at a high pressure) over a bath
6. A mixer shower over a bath
7. Other – PLEASE SAY WHAT

CRaB:Q83
{Ask if one person in the household AND CRaB:Q63 = 2}
How many showers do you tend to have at home in an average week in winter?
WRITE IN NUMBER OR CODE BELOW

98. It varies too much to say

CRaB:Q84
{Ask if one person in the household AND CRaB:Q63 = 2}
And how many showers do you tend to have at home in an average week in summer?
WRITE IN NUMBER OR CODE BELOW

98. It varies too much to say
99. It's the same number as in the winter

CRaB:Q85
{Ask if more than one person in the household AND CRaB:Q63 = 2}
Thinking about yourself and everyone else in the household, all together how many showers does the household tend to have at home in an average week in winter?
PLEASE STATE NUMBER OR NUMBER OF SHOWERS PER PERSON OR CODE BELOW

98. It varies too much to say

CRaB:Q86
{Ask if more than one person in the household AND CRaB:Q63 = 2}
SHOWCARD
And all together how many showers does the household tend to have at home in an average week in summer?
PLEASE STATE NUMBER OR NUMBER OF SHOWERS PER PERSON OR CODE BELOW

98. It varies too much to say
99. It's the same number as in the winter

CRaB:Q87
{Ask if one person in the household AND CRaB:Q63 = 1}
How many baths do you tend to have at home in an average week in winter?
PLEASE STATE NUMBER OR NUMBER OF SHOWERS PER PERSON OR CODE BELOW

98. It varies too much to say

CRaB:Q88
{Ask if one person in the household AND CRaB:Q63 = 1}
And how many baths do you tend to have at home in an average week in summer?
PLEASE STATE NUMBER OR NUMBER OF BATHS PER PERSON OR CODE BELOW

98. It varies too much to say
99. It's the same number as in the winter

CRaB:Q89
{Ask if more than one person in the household AND CRaB:Q63 = 1}
Thinking about yourself and everyone else in the household, all together how many baths does the household tend to have at home in an average week in winter?
PLEASE STATE NUMBER OR NUMBER OF BATHS PER PERSON OR CODE BELOW

98. It varies too much to say

CRaB:Q90
{Ask if more than one person in the household AND CRaB:Q63 = 1}
And all together how many baths does the household tend to have at home in an average week in summer?
PLEASE STATE NUMBER OR NUMBER OF BATHS PER PERSON OR CODE BELOW

98. It varies too much to say
99. It's the same number as in the winter

CRaB:Q91
{Ask if CRaB:Q63 = 2}
SHOWCARD
Please pick the option that best describes when you {and the other people in your household} tend to have showers at home.

1. In the morning
2. In the evening
3. In both the morning and the evening
4. It varies between days
5. It varies between people
6. It varies according to activities that day
7. Other – PLEASE SAY WHAT

CRaB:Q92
{Ask if CRaB:Q63 = 1}
SHOWCARD
Please pick the option that best describes when you {and the other people in your household} tend to have baths at home.

1. In the morning
2. In the evening
3. In both the morning and the evening
4. It varies between days
5. It varies between people
6. It varies according to activities that day
7. Other – PLEASE SAY WHAT

CRaB:Q93
{Ask all}
SHOWCARD
Thinking about your own personal use of hot water in places away from your home, do you do any of the following (other than when you are away from home for a night or longer)?
CODE ALL THAT APPLY

1. Have baths elsewhere (e.g. at work, at a gym or at a friend or relative's home)
2. Have showers elsewhere (e.g. at work, at a gym or at a friend or relative's home)
3. Wash a car/other vehicle at a car wash
4. EXCLUSIVE: None of these

CRaB:Q94
{Ask if Q93 = 1 or 2)
SHOWCARD
Where do you have a bath or shower away from your home?
CODE ALL THAT APPLY

1. At a relative or friend's home
2. At work
3. At a gym or other sports facility
4. Other – PLEASE SAY WHERE

CRaB:Q95
{Ask if Q93 = 1}
SHOWCARD
Why do you sometimes have a bath away from your home?
CODE ALL THAT APPLY

1. There is no bath at home
2. The bath is better than at home
3. It's more convenient
4. To save money
5. To save time
6. To save energy
7. To get clean after activities
8. Other – PLEASE SAY WHAT

CRaB:Q96
{Ask if Q93 = 2}
SHOWCARD
Why do you sometimes have a shower away from your home?
CODE ALL THAT APPLY

1. There is no shower at home
2. The shower is better than at home
3. It's more convenient
4. To save money
5. To save time
6. To save energy
7. To get clean after activities
8. Other – PLEASE SAY WHAT

CaRB:F20
{Ask for each of hot tubs / swimming pools / sauna that the household has at CRaB:Q81}
In which seasons is the {hot tubs / swimming pool / sauna} used?
INTERVIEWER: Prompt if necessary for spring, summer, autumn, winter.
CODE ALL THAT APPLY

1. Spring
2. Summer
3. Autumn
4. Winter
5. All year (not prompted)

D6. Other uses of hot water

See self-completion questionnaire.

D7. Problems and desires

CRaB:Q66 to CRaB:Q71
{Ask all}
SHOWCARD
With the ways that you use to heat water, how often do the following circumstances occur …

… there is not enough hot water {for the whole household}?
… there is more hot water than you need?
… the water is not hot enough?
… the water is too hot?
… the hot water is at a low pressure (e.g. a sink or bath takes a long time to fill or water does not flow strongly enough from a shower)?
… water from the hot tap runs for a long time before it becomes hot?

1. Often or always
2. Sometimes
3. Rarely or never

CRaB:Q102
{Ask all}
SHOWCARD
Leaving aside how you currently make decisions about heating water, would you like to change any of the following aspects of your water heating system to give you {and your household} more control over them?
CODE ALL THAT APPLY

1. When the hot water comes on and off
2. The temperature the water is heated to
3. How quickly the water heats up
4. The amount of hot water that is available
5. Being able to deal with situations when I/we unexpectedly need hot water
6. Being able to control the heating of water from any room in the home
7. Being able to control the heating of water from outside the home
8. Knowing when someone else changes a hot water control from how you set it
9. Other – PLEASE SAY WHAT
10. EXCLUSIVE (SPONTANEOUS): None of these
11. No, it would better to have more automation so that we wouldn't have to think about heating the water

Section E. Other uses of energy

Introduction

Questions regarding other energy uses are mostly straightforward and factual, and are therefore covered by the self-completion questionnaire. Some questions on lighting and some appliances are best done by observation and will therefore be answered by the surveyor, for follow-up questions in later waves. In the Wave 1 interview, householders would be asked about any new key appliances and the rationale and considerations when purchasing. They will also be asked about any electric vehicles or mobility scooters, for follow-up in future waves.

E1. ICT

Covered by self-completion, surveyor and follow-up questions in later waves.

E2. Fridges and freezers

Covered by self-completion, surveyor and follow-up questions in later waves.

E3. Cooking & hot drinks

Covered by self-completion, surveyor and follow-up questions in later waves.

E4. Lighting

Covered by surveyor and follow-up questions in later waves.

E5. Other appliances

Covered by self-completion and follow-up questions in later waves.

E6. Recent purchases

New Q
Whether any key appliances have been purchased in last year (pre-coded question, yes or know for each of a list of appliances (those mentioned in other questions in Section E).

New Q
Factors considered when purchasing recent appliances, e.g. whether look at energy ratings, other ratings, cost, functionality, power, aesthetic features, recommendations, etc. (pre-coded question).

E7. Travel

SAVE:6.1
{Ask all}
Does your household have an electric vehicle? This does not include hybrid cars.
READ OUT AND CODE ONE ONLY

1. Yes
2. No

SAVE:6.2
{If SAVE:6.1=1}
When does your household tend to charge your electric vehicle?
READ OUT AND CODE ONE ONLY

1. Mostly overnight
2. Mostly during the day
3. Mostly in the evening from 4pm to 8pm
4. Mostly elsewhere (e.g. work)
5. Whenever it's needed

Section F. Retrofit

Questions about retrofit (energy-related and non-energy) cover behaviours that are (a) relatively infrequent and (b) easily covered mostly by tick-box responses. They are therefore part of the self-completion questionnaire.

Section G. Attitudes

Questions about attitudes are part of the self-completion questionnaire. This allows respondents to answer in a relatively private and considered fashion, with less influence by the interviewer.

Section H. Household Characteristics

Introduction

This section includes the household demographics of the index person, any others living in the household (including their relationships to one another), and the household as a whole. This section also includes questions on buying and paying for fuels, and participation in energy-related programmes and research. There would be some potential for households to record additional information on energy and fuel purchase between waves.

The questions recommended here have been put forward after an assessment of the ONS questions against other options, as shown in Annex 8.1 at the end of this document. An asterisk (*) marks where questions have been taken from the ONS Harmonised Questions.

H1. Index Person

CRaB:Q128*
{Ask all}
I would now like to ask you a few questions about your education.
Do you have any educational qualifications for which you received a certificate?

1. Yes
2. No

CRaB:Q129*
{Ask if Q128 = 2}
Do you have any professional, vocational or other work-related qualifications for which you received a certificate?

1. Yes
2. No

CRaB:Q130*
{Ask if Q128 = 1 OR Q129 = 1}
Was your highest qualification...?

1. at degree level or above
2. or another kind of qualification?

Age*
What is your date of birth?

<Insert DD/MM/YYYY>

IF YEAR OF BIRTH NOT GIVEN
What was your age last birthday?

<Insert Age>

INTERVIEWER: If respondents refuse to give their age, then give your best estimate.

Sex*
CODE FIRST THAT APPLIES

1. Male
2. Female

H2. Household individuals

{Ask each question for each household member}

Age*
What is {his/her} date of birth?

<Insert DD/MM/YYYY>

IF YEAR OF BIRTH NOT GIVEN
What was your age last birthday?

<Insert Age>

INTERVIEWER: If respondents refuse to give age, then give your best estimate.

Sex*
CODE FIRST THAT APPLIES

1. Male
2. Female

CRaB:Q4
And what is *his/her* relationship to you?

1. Partner/spouse/cohabitee
2. Son/daughter (inc. step/adopted)
3. Foster child
4. Grandson/daughter (inc. step/adopted)
5. Parent/parent-in-law
6. Grand-parent (inc. in-law)
7. Brother/sister (inc. in-law)
8. Other relative
9. Other non-relative

H3. Household as a whole

Income*
Thinking of the income of the household as a whole, which of the groups on this card represents the total income of the whole household before deductions for income tax, National Insurance etc.
SHOWCARD
Weekly / Monthly / Annual

A Up to £49 / Up to £216 / Up to £2,599
B £50 up to £99 / £217 up to £432 / £2,600 up to £5,199
C £100 up to £199 / £433 up to £866 / £5,200 up to £10,399
D £200 up to £299 / £867 up to £1,299 / £10,400 up to £15,599
E £300 up to £399 / £1,300 up to £1,732 / £15,600 up to £20,799
F £400 up to £499 / £1,733 up to £2,166 / £20,800 up to £25,999
G £500 up to £599 / £2,167 up to £2,599 / £26,000 up to £31,199
H £600 up to £699 / £2,600 up to £3,032 / £31,200 up to £36,399
I £700 up to £799 / £3,033 up to £3,466 / £36,400 up to £41,599
J £800 up to £899 / £3,467 up to £3,899 / £41,600 up to £46,799
K £900 up to £999 / £3,900 up to £4,332 / £46,800 up to £51,999
L £1000 or more / £4,333 or more / £52,000 or more

CRaB:Q131
{Ask if Q1 >1}
And what is the highest level of qualification held by anyone in this household?

1. At degree level or above
2. Another kind of qualification
3. None?

CRaB:Q132*
{Ask all}
SHOWCARD
Do you {or does anyone else in your household} have any physical or mental health conditions, injuries or illnesses that affect how warm or cool you like to keep the home or how much hot water you need?
CODE ALL THAT APPLY

1. Yes – I/we don't like to have the home too warm because of the condition, injury or illness
2. Yes – I/we don't like to have the home too cool because of the condition, injury or illness
3. Yes – we need extra hot water or hot water more of the time because of the condition, injury or illness
4. EXCLUSIVE: No

CRaB:Q133
{Ask all}
SHOWCARD
Do you {or anyone in your household} have any physical or mental health condition, injury or illness that affects how easy it is to control your heating or hot water system – for example, not being able to see the controls, get at the controls or adjust them easily?

1. Yes, and this means the controls cannot be used
2. Yes, and this limits how the controls can be used
3. Yes, but it has little effect on how the controls can be used
4. EXCLUSIVE: No

H4. Paying for energy

SMEL:DM1
How do you currently pay for the electricity you use in your home? Please read out the number that applies
SHOWCARD
CODE ONE ONLY

1. Direct debit
2. Quarterly payment on receipt of bill
3. Pre-payment (PPM, or card or key meter)
4. Payment card
5. Fuel direct
6. Included in rent
7. Paid to landlord
8. {If house share and cannot give one of the above categories} Paid to someone else in the household who then pays the supplier – not sure how
9. Other

SMEL:DM2
How do you currently pay for the mains gas you use in your home? Please read out the number that applies.
CODE ONE ONLY
SHOWCARD

1. Direct debit
2. Quarterly payment on receipt of bill
3. Pre-payment (PPM, or card or key meter)
4. Payment card
5. Fuel direct
6. Included in rent
7. Paid to landlord
8. {If house share and cannot give one of the above categories} Paid to someone else in the household who then pays the supplier – not sure how
9. Other
10. PROMPT IF NECESSARY: Home is not on the gas grid
11. PROMPT IF NECESSARY: Home is on the gas grid but gas is not used

{If non-metered fuel is used for space and/or water heating, ask the following questions on purchase of each fuel used}[27]

New Q
How much bottled gas did your household use in the past 12 months?
CODE IN AT LEAST ONE WAY

Gallons: ☐
Litres: ☐
Bottles: ☐ (each bottle being ☐ litres or ☐ gallons
Paid: £☐

RECS:H-8
SHOWCARD
About how many gallons of fuel oil did your household use in the past 12 months?

1. Less than 100 gallons
2. 100 to 499 gallons
3. 500 to 1,000 gallons
4. More than 1,000 gallons

OR
Paid: £☐

DECC WOOD:WD1
SHOWCARD
Which of these types of wood fuel do you use in your home, either on their own or with other fuels?
Please only tell us about wood fuel you use indoors, not about any wood fuel you may use outdoors.
IF NECESSARY CLARIFY: Please tell us about any wood fuel you use indoors for heating your home even if it is not the main fuel you use
INTERVIEWER: Some may use a different fuel alongside wood fuel (e.g. coal).
(MP CODES 1-6, allow ALLOW HIDDEN NULL)

1. Wood logs [IMAGE 1.p1499]
2. Wood pellets [IMAGE 2.p1500]
3. Wood briquettes / heat logs [IMAGE 3.p1501]
4. Waste wood, e.g. waste and off-cuts from industrial, manufacturing, DIY or renovation work [IMAGE 4.p1502]
5. Foraged, gathered or found branch wood from felled or fallen trees [IMAGE 5.p1503]
6. Wood chips [IMAGE 6.p1504]

[27] Some of these questions are derived from a survey in the USA – final options need to be checked to correspond with UK fuel types and purchase quantities.

DECC WOOD:WD10A-F
You say that you use {Repeat for each type of wood fuel coded 1-6 AT WD1 AND 1-7 AT WD7: A: wood logs / B: wood pellets / C: wood briquettes / D: found, gathered or foraged wood / E: waste wood / F: wood chips}. Thinking about the past full year, how much of this type of wood fuel did you purchase, receive or obtain?
Please tell me which of these units, if either, you can give me an answer in

1. Metric tonnes
2. Kilograms
3. Tons
4. Cwt
5. Cubic feet or yards
6. Cubic metres
7. Baskets or barrows
8. I didn't purchase, receive, or obtain any of this type of wood

DECC WOOD WD10K
And again, over the past full year, how much did you pay in total in that period for {[insert name of wood fuel from WD7A-F}? If you find this hard to answer please give your best estimate.

1. £□□□□□:□□p
2. DO NOT PROMPT: I did not pay anything

H5. Participation in programmes and projects

RECS:D-5d
SHOWCARD
Some people receive Government or energy supplier assistance in paying for heating equipment or insulation. Which of the following, if any, helped pay for some or all of the cost of your household's new main heating equipment or for maintaining your household's current heating equipment?

1. Did not receive any assistance
2. Manufacturer or retailer rebate
3. Utility or energy supplier rebate
4. Tax credit
5. Subsidised loan
6. Insulation assistance

New Q
Can you name the programme or programmes that you used?

Open question, interviewer prompt if respondent does not know, using full list of current and recent programmes (e.g. Green Deal, FiT).

New Q
And have you {or your household} taken part in any other research about energy or home improvement in the past five years?

If yes, record name and nature of project, and when it was.

Section I. The dwelling

Introduction

Questions about the dwelling are largely left to the surveyor, freeing up time in the interview for questions that only the household can answer, but the interview collects some basic data so that:

- other questions can be routed appropriately;
- there is sufficient description of the dwelling if the household drops out without a surveyor visit, to use the interview data cross-sectionally and to monitor differential attrition;
- the surveyor can prepare efficiently for a survey (e.g. how much time should be allocated).

On this basis, the following items are recommended for inclusion in the interview. See comments on ONS questions in Annex 8.1 for items marked *.

I1. Built form[28]

CRaB:O1*
Which of these best describes the dwelling?
INTERVIEWER:
Basements and occupied space directly under the roof (e.g. a loft conversion) are counted as a storey but a roof space used for storage is not counted.
Specific descriptions such as “Cottage” and “Town house” should not be coded as “Other”; please describe these dwellings using the available codes.
Link-detached means attached only by a garage. A dwelling is not counted as detached from the neighbouring home if it is attached in any other way (e.g. halls adjoining or attached at first floor level with a passageway between homes at ground floor level).

1. Flat: purpose-built
2. Flat: conversion
3. Maisonette (flat on two or more floors): purpose-built
4. Maisonette (flat on two or more floors): conversion
5. Bungalow: detached or link-detached
6. Bungalow: semi-detached / end terrace
7. Bungalow: mid-terrace
8. House with two storeys: detached or link-detached
9. House with two storeys: semi-detached / end terrace
10. House with two storeys: mid-terrace
11. House with three or more storeys: detached or link-detached
12. House with three or more storeys: semi-detached / end terrace
13. House with three or more storeys: mid-terrace
14. Cluster home
15. Other (Please specify)
99. Unable to obtain information

CRaB:O5
{If the home is a flat or maisonette (CRaB:O1=1-4)}
On which floor of the building is the entrance to this particular flat/maisonette?

[28] These items are intended to be interviewer observations, checking with the respondent if there is any uncertainty. O1-O6 recorded as questions A1-A6 in the question bank.

CRaB:O6[29]
{If the dwelling is a flat or maisonette (CRaB:O1 = 1-4).}
Does any floor of the flat or maisonette match any or the following descriptions?
CODE ALL THAT APPLY

1. Below ground level
2. At ground level
3. Above another flat/maisonette
4. Below another flat/maisonette
5. On the top of the building, under a pitched roof.
6. On the top of the building, under a flat roof.
7. Above a shop or office
8. In a commercial building in some other way
9. Part of some other kind of building

I2. Tenancy

CRaB:Q5*
{Ask all}
How long have you personally lived in your current home?
CODE ONE ONLY

1. Up to 12 months
2. Longer than 12 months but less than 2 years
3. Over 2 but less than 5 years
4. Between 5 and 10 years
5. Over 10 years

New Q*
{Ask if CRaB:Q5 = 1}
How many months is that?
OR
Which month did you move in here?

CRaB:Q120
{Ask all}
How much longer do you expect to stay in your current home?
CODE ONE ONLY

1. For less than a year
2. 1-5 years
3. 6-10 years
4. Longer

CRaB:Q121*
{Ask all}
Do you {or your household} own or rent this accommodation?

1. Own it outright
2. Buying it with the help of a mortgage or loan
3. Part own and part rent (shared ownership)
4. Rent it (includes all those who are on Housing Benefit or Local Housing Allowance)
5. Live here rent-free (including rent-free in employer's / relative's / friend's property)
6. Other – PLEASE SAY WHAT

CRaB:Q122*
{Ask if Q121 = 3 or 4}
Who is your landlord?
INTERVIEWER: Code first that applies.

1. The local authority/council
2. A housing association, Registered Social Landlord, charitable trust or Local Housing Company
3. Employer (individual person) of a household member
4. Employer (organisation) of a household member
5. Another organisation
6. Relative of any household member
7. Another individual private landlord
8. Letting agency

I3. Age and condition of the home

CRaB:Q123*
{Ask all}
When was this property built?
INTERVIEWER: Date of original build, not extension or conversion.

Before 1850	1965-1980
1850-1899	1981-1990
1900-1918	1991-1995
1919-1930	1996-2000
1931-1944	2001 or later
1945-1964	

CRaB:Q124
Do you ever experience any of these things in your home during the winter?
CODE ALL THAT APPLY

1. EXCLUSIVE: None of these
2. Cold draughts
3. Condensation
4. Any other damp
5. Mould on surfaces or furnishings in the home

[29] Codes 6-8 adapted from CaRB A04.

CRaB:Q125
What sort of windows do you have in your home?
CODE ALL THAT APPLY

1. Single glazing
2. Double glazing
3. Triple/quadruple glazing
4. Secondary glazing
5. Other – PLEASE say what

CRaB:Q126
Do you have any of the following types of insulation in your home?
CODE ALL THAT APPLY

1. Loft insulation
2. Other roof insulation
3. Cavity wall insulation
4. Insulation on the inside of the outside walls
5. Insulation on the outside of the outside walls
6. Insulation in the floor (in the floor itself – not a floor covering such as carpet or laminated flooring)
7. EXCLUSIVE: None of these

Self-completion questionnaire

Section F. Retrofit

Introduction

Questions on retrofit would need to start here but could be followed up by the surveyor to add more details about the work and exactly when it was done. The household should be able to report in broad terms what has been done while they have been resident, when and by whom (themselves, the landlord or freeholder). Most importantly, only the household can report the motivation for the retrofit. Alternatively, these questions could be asked in a self-completion questionnaire during the surveyor visit, so that the surveyor can – where necessary – guide the respondent as to the correct description of the work.

The period of five years is used as a compromise between a period that is short enough that householders are likely to remember but long enough to capture a large number of retrofits. After Wave 1, the questions instead can refer to "The past year, since the previous interview" and questions can be added about experience of the retrofit process (e.g. ease of gathering information, finding a contractor or DIY, and disruption caused).

The questions are composed here for self-completion but could easily be adapted for interview with showcards or showscreens. This is the content, not the layout of the questionnaire. Where responses are given in tick-boxes and/or columns, these are described in [square brackets]. Interviewers add codes to link the questionnaire to an interview respondent.

Completing the questionnaire

For the next sets of questions, please think about any work that you or your landlord or freeholder have done to this home in the last **five years** or are doing now. If you have lived here for less than five years, please answer about the time when you have been living here.

F1. Work done

Adding or refitting rooms

CRaB:SC3
Which of the following have you (or your landlord or freeholder) done in the last five years?
PLEASE TICK (✓) ALL THAT APPLY. [On each row, separate boxes for work by household, landlord and freeholder.]

(a) Painting and decorating
(b) Refitted the kitchen
(c) Refitted the bathroom / added a bathroom or toilet
(d) Refitted another room
(e) Replaced carpets or other floor covering
(f) Removed carpets & replaced with other floor covering
(g) Had carpets fitted to replace other floor covering
(h) Had a loft conversion
(i) Added a conservatory
(j) Built some other extension
(k) Did something else to add or refit a room
(l) None of these
(m) Don't know whether anything has been done

If no work of this kind has been done, or if you do not know whether anything has been done, please miss out Question 4 and go to Question 5.

CRaB:SC4
If any of the things listed at Question 3 have been done, please tick (✓) *up to three* boxes below to say the main reasons why they were done. [One box to tick for each item.]

(a) To improve the look of the home
(b) To improve the value of the home
(c) To improve energy efficiency / save money on energy bills
(d) To make the home more comfortable or healthy
(e) To create more space
(f) To make life at home easier or more practical
(g) To make the home more "environmentally friendly"
(h) Because of system breakdown or a need for repair
(i) Because of an offer of finance for the work
(j) The landlord or freeholder did it because someone in the household asked for it to be done
(k) The landlord or freeholder did it without being asked
(l) Another reason (please briefly state what the reason was)
(m) Don't know

Insulation and draughtproofing

CRaB:SC5
Which of the following have you (or your landlord or freeholder) done in the *last five years*?
PLEASE TICK (✓) *ALL THAT APPLY*. [On each row, separate boxes for work by household, landlord and freeholder.]

(a) Put in loft insulation / extra loft insulation
(b) Put in other roof insulation
(c) Put in cavity wall insulation
(d) Put in solid wall insulation – on the inside of the walls
(e) Put in solid wall insulation – on the outside of the walls
(f) Insulated the floor (within the floor, not just carpets or other floor coverings)
(g) Draughtproofed windows, doors, walls, floors or ceilings
(h) Replaced single glazed windows with double glazing
(i) Put in better double/multiple glazing
(j) Fitted secondary glazing
(k) None of these
(l) Don't know whether anything has been done

If no work of this kind has been done, or if you do not know whether anything has been done, please miss out Question 6 and go to Question 7.

Changing the controls for heating or hot water

CRaB:SC7
Which of the following have you (or your landlord or freeholder) done in the *last five years*?
PLEASE TICK (✓) *ALL THAT APPLY*. [On each row, separate boxes for work by household, landlord and freeholder.]

(a) Put new thermostatic radiator valves on one or more radiators
(b) Replaced/installed a central heating thermostat
(c) Replaced/installed a timer / programmer for the central heating and hot water
(d) Replaced/installed a timer / programmer for the central heating only
(e) Replaced/installed a timer / programmer for the hot water only
(f) Replaced/installed thermostat to hot water cylinder
(g) Some other change to the controls
(h) None of these
(i) Don't know whether anything has been done

If no work of this kind has been done, or if you do not know whether anything has been done, please miss out Question 8 and go to Question 9.

CRaB:SC8
If any of the things listed at Question 7 have been done, please tick (✓) *up to three* boxes below to say the main reasons why they were done. [One box to tick for each item.]

(a) To improve the look of the home
(b) To improve the value of the home
(c) To improve energy efficiency / save money on energy bills
(d) To make the home more comfortable or healthy
(e) To create more space
(f) To make life at home easier or more practical
(g) To make the home more "environmentally friendly"
(h) Because of system breakdown or a need for repair
(i) Because of an offer of finance for the work
(j) The landlord or freeholder did it because someone in the household asked for it to be done
(k) The landlord or freeholder did it without being asked
(l) Another reason (please briefly state what the reason was)
(m) Don't know

Other work on the heating or hot water system

CRaB:SC9
Which of the following have you (or your landlord or freeholder) done in the *last five years*?
PLEASE TICK (✓) *ALL THAT APPLY*. [On each row, separate boxes for work by household, landlord and freeholder.]

(a) Put in central heating
(b) Replaced a boiler
(c) Replaced warm air heating unit
(d) Serviced a boiler / air heating unit
(e) Put in a biomass / wood pellet boiler or stove
(f) Put in a heat pump
(g) Changed main fuel used for heating (e.g. from solid fuel to gas)
(h) Put in one or more extra radiators / storage heaters
(i) Replaced storage heaters
(j) Replaced hot water cylinder
(k) Added or improved insulation on hot water cylinder/tank
(l) Put in solar water heating
(m) None of these
(n) Don't know whether anything has been done

If no work of this kind has been done, or if you do not know whether anything has been done, please miss out Question 10 and go to Question 11.

CRaB:SC10
If any of the things listed at Question 9 have been done, please tick (✓) *up to three* boxes below to say the main reasons why they were done. [One box to tick for each item.]

(a) To improve the look of the home
(b) To improve the value of the home
(c) To improve energy efficiency / save money on energy bills
(d) To make the home more comfortable or healthy
(e) To create more space
(f) To make life at home easier or more practical
(g) To make the home more "environmentally friendly"
(h) Because of system breakdown or a need for repair
(i) Because of an offer of finance for the work
(j) The landlord or freeholder did it because someone in the household asked for it to be done
(k) The landlord or freeholder did it without being asked
(l) Another reason (please briefly state what the reason was)
(m) Don't know

Generating electricity

CRaB:SC11
Which of the following have you (or your landlord or freeholder) done in the *last five years*?
PLEASE TICK (✓) *ALL THAT APPLY*. [On each row, separate boxes for work by household, landlord and freeholder.]

(a) Put in solar photovoltaic (PV) panels
(b) Put in a wind turbine
(c) Did something else to generate our own electricity
(d) None of these
(e) Don't know whether anything has been done

If no work of this kind has been done, or if you do not know whether anything has been done, please miss out Question 12 and go to Question 13.

CRaB:SC12
If any of the things listed at Question 9 have been done, please tick (✓) *up to three* boxes below to say the main reasons why they were done. [One box to tick for each item.]

(a) To improve the look of the home
(b) To improve the value of the home
(c) To improve energy efficiency / save money on energy bills
(d) To make the home more comfortable or healthy
(e) To create more space
(f) To make life at home easier or more practical
(g) To make the home more "environmentally friendly"
(h) Because of system breakdown or a need for repair
(i) Because of an offer of finance for the work
(j) The landlord or freeholder did it because someone in the household asked for it to be done
(k) The landlord or freeholder did it without being asked
(l) Another reason (please briefly state what the reason was)
(m) Don't know

Anything else done to the home

CRaB:SC13

Is there anything else that you (or your landlord or freeholder) have done to your home in the last *five years* or are doing now? (If you have lived here for less than five years, please answer about the time when you have been living here.) [On each row, separate boxes for work by household, landlord and freeholder.]

(a) Yes (please briefly state what was done)
(b) No – nothing else
(c) Don't know whether anything else has been done

If no other work has been done, or if you do not know whether anything has been done, please miss out Question 14 and go to Question 15.

CRaB:SC14

For any of the things you have mentioned at Question 13, please tick (✓) up to three boxes below to say the main reasons why they were done. [One box to tick for each item.]

(a) To improve the look of the home
(b) To improve the value of the home
(c) To improve energy efficiency / save money on energy bills
(d) To make the home more comfortable or healthy
(e) To create more space
(f) To make life at home easier or more practical
(g) To make the home more "environmentally friendly"
(h) Because of system breakdown or a need for repair
(i) Because of an offer of finance for the work
(j) The landlord or freeholder did it because someone in the household asked for it to be done
(k) The landlord or freeholder did it without being asked
(l) Another reason (please briefly state what the reason was)
(m) Don't know

Major projects

CRaB:SC15

Please think again about all the work you've mentioned in the previous questions, that has been carried out on your home. Was any of it done as a major project with the whole home (or a large part of it) having refurbishment (for example, rebuilding, replacing the whole heating system or insulating all the outside walls)? [One box to tick for each item.] PLEASE TICK (✓) *ONE* BOX ONLY.

(a) Yes – taking less than a month to complete, once the work had started
(b) Yes – taking more than a month to complete, once the work had started
(c) No – nothing as part of a major project
(d) No work has been done to the home in the past 5 years
(e) Don't know

F2. Possibilities for the future

CRaB:SC16

You've told us what work has already been done, under the six main headings shown in the table below. Over the next five years, which of these would you most like to do (or do more of)?

Please tick one box in each column to say what would be your first, second and third choice, if you had the time and money to do it. [Three columns of boxes – 1st, 2nd and 3rd choice.]

(a) Adding or refitting rooms, e.g. bathrooms or kitchen
(b) Insulation and draughtproofing
(c) Changing the controls for heating or hot water
(d) Other work on the heating or hot water system
(e) Generating electricity
(f) Something else (please briefly state what it would be)
(g) Nothing else
(h) Don't know

New Q

{If any item selected at SC16}

What would be your main reasons for doing any of these things? Please tick (✓) *up to three* boxes below to say the main reasons. [One box to tick for each item.]

(a) To improve the look of the home
(b) To improve the value of the home
(c) To improve energy efficiency / save money on energy bills
(d) To make the home more comfortable or healthy
(e) To create more space
(f) To make life at home easier or more practical
(g) To make the home more "environmentally friendly"
(h) Because of system breakdown or a need for repair
(i) Because of an offer of finance for the work
(j) The landlord or freeholder did it because someone in the household asked for it to be done
(k) The landlord or freeholder did it without being asked
(l) Another reason (please briefly state what the reason was)
(m) Don't know

GDHT – C5

And which of these things prevent you from doing more at present to make your home more energy efficient?

1. Cost of improvements is too high
2. No guarantee that it will save me money
3. Don't know what to do
4. Don't know where to get information
5. Don't trust installers/suppliers to give me unbiased information
6. Confused/received conflicting information
7. Hassle/disruption of making improvements
8. May change character/appearance of my home
9. May lose space (e.g. room space, storage space in loft)
10. Structural considerations (e.g. shared walls, lease restrictions, planning permission needed, period features in home, live in conservation area)
11. No interest in energy efficiency/green issues
12. Lack of time
13. Other priorities at the moment (e.g. work, new baby)
14. Already doing enough
15. Landlord/freeholder won't allow
16. Won't stay here long enough
17. Other (specify)
18. None of these
19. Don't know

CRaB:SC17 / GDHT-F1

Who would you most trust to provide the following things? [Three columns of boxes: Advice on energy efficiency / Making changes to your home to improve its energy efficiency (e.g. insulate walls; install a new boiler) / Service or fix heating and hot water systems.]

Please tick one box in each column.

(a) The Government
(b) The Local Authority (Council)
(c) Energy charities
(d) Friends and family
(e) My housing association
(f) The Department of Energy and Climate Change (DECC)
(g) My landlord
(h) My energy supplier/another energy supplier
(i) A department store
(j) A supermarket
(k) A DIY store
(l) A Community Group
(m) A Charity
(n) Energy Saving Trust
(o) A tradesperson (e.g. plumber, gas fitter)
(p) A specialist installer of energy efficiency measures (e.g. cavity wall insulation, loft insulation, solar panel installation)
(q) Don't know

Section D. Heating water and use of hot water

D6. Other uses of hot water

New Q

How many of each of the following do you have at home?

1. Washing machine
2. Tumble drier
3. Combined washing machine and tumble drier
4. Dishwasher

CRaB:Q97

How often do you use a launderette or laundry services to do your washing?

Don't include drying the laundry – just the washing.

1. This is my main way of washing laundry
2. I do it often but it's not my main way of washing laundry
3. I don't often do this
4. I never do this

If you never use a launderette or laundry services to do your washing, go on to Q99.

CRaB:Q98
Why do you ever use a launderette to do you washing?
TICK ALL THE REASONS THAT APPLY TO YOU

1. I don't have a washing machine at home
2. There are other facilities I don't have at home (e.g. driers)
3. The washing machines are better than at home (e.g. bigger, faster, more effective)
4. It's more convenient
5. To save money
6. To save time
7. To save energy
8. The clothes require special cleaning (e.g. dry cleaning)
9. Other – PLEASE SAY WHAT

CRaB:Q99
In summer, how do you dry your laundry?
TICK ALL THE METHODS YOU USE

1. Outdoors
2. Using a tumble drier
3. Using a drying cycle on the washing machine
4. On radiators
5. In front of fires or heaters
6. Somewhere else around the home
7. At someone else's home
8. At a launderette
9. Other – PLEASE SAY WHAT

And in winter, how do you dry your laundry?
TICK ALL THE METHODS YOU USE

1. Outdoors
2. Using a tumble drier
3. Using a drying cycle on the washing machine
4. On radiators
5. In front of fires or heaters
6. Somewhere else around the home
7. At someone else's home
8. At a launderette
9. Other – PLEASE SAY WHAT

Section E. Other uses of energy

E1. Entertainment and ICT

CaRB-SC:Q1
Are any of the following television types in use in your home?
Please don't include TVs that are not used or plugged in. [Each type coded yes/no and the number of that type.]

1. Plasma televisions (slim, flat panel, and heavy)
2. LCD televisions (slim, flat panel)
3. 'Ordinary', traditional televisions
4. Other *(Please specify)*
5. None of the above

CaRB-SC:Q3
Are any of the following entertainment appliances in use in your home? [Each type coded yes/no and the number of that type.]
(Please tick the appliances you have, and write in how many are in use)

1. TV Set-top boxes
2. DVD or Blu-ray players/recorders
3. Video players/recorders
4. Games consoles
5. Media centre / home theatre
6. Hi-fi systems
7. Digital radios
8. Other *(Please specify)*
9. None of the above

CaRB-SC:Q5
Are any of the following types of computer used here, in your home? [Each type coded yes/no and the number of that type.]
Include any computers that are used at home, whether they are personal or work computers.

1. Desktop computer
2. Laptop
3. Notebook
4. Tablet
5. Other *(Please specify)*
6. None of the above

CaRB-SC:Q7
Are any of the following items of computer equipment in use in your home? [Each type coded yes/no and the number of that type.]

1. All-in-one printer-scanner-copier
2. Laser printer
3. Inkjet or bubble jet printer
4. Scanner (if separate from printer)
5. Copier (if separate from printer)
6. Individual modem
7. Wireless network router
8. Other *(Please specify)*
9. None of the above

E2. Fridges and freezers

Please use the following questions to tell us about up to 3 fridges and or freezers.

CaRB-SC:Q18
What type is the first fridge or freezer that is in use in your home?
If there is more than one, please tell us about the one that is used most often.
(Tick one box only)

1. Fridge *up to* kitchen worktop height
2. Fridge *taller* than kitchen worktop height – with one external door only
3. Upright freezer *up to* kitchen worktop height
4. Upright freezer *taller* than kitchen worktop height
5. Chest freezer
6. American or side-by-side style fridge-freezer
7. Fridge-freezer with two external doors
8. None

CaRB-SC:Q19
About how many years old is this fridge or freezer?
If you are not certain, give your best estimate.
(Please write in) Years old

CaRB-SC:Q21
What type is the *second* fridge or freezer in use in your home?
(Tick one box only)

1. There isn't one
2. Fridge *up to* kitchen worktop height
3. Fridge *taller* than kitchen worktop height – with one external door only
4. Upright freezer *up to* kitchen worktop height
5. Upright freezer *taller* than kitchen worktop height
6. Chest freezer
7. American or side-by-side style fridge-freezer
8. Fridge-freezer with two external doors

If you do not have a second fridge or freezer, that is the end of the questionnaire.

CaRB-SC:Q22
About how many years old is your *second* fridge or freezer?
If you are not certain, give your best estimate.

(Please write in) Years old

CaRB-SC:Q23
During a typical year, how many months is the *second* fridge or freezer turned on for? If you are not certain, give your best estimate.

(Please write in) Months

CaRB-SC:Q25
What type is the *third* fridge or freezer in use in your home?
(Tick one box only)

1. There isn't one
2. Fridge *up to* kitchen worktop height
3. Fridge *taller* than kitchen worktop height – with one external door only
4. Upright freezer *up to* kitchen worktop height
5. Upright freezer *taller* than kitchen worktop height
6. Chest freezer
7. American or side-by-side style fridge-freezer
8. Fridge-freezer with two external doors

If you do not have a third fridge or freezer, that is the end of the questionnaire.

CaRB-SC:Q26
About how many years old is your *third* fridge or freezer?
If you are not certain, give your best estimate.

(Please write in) Years old

CaRB-SC:Q27
During a typical year, how many months is the *third* fridge or freezer turned on for?
If you are not certain, give your best estimate.

(Please write in) Months

E3. Cooking & hot drinks

Covered by surveyor and follow-up questions in later waves.

E4. Lighting

Covered by surveyor and follow-up questions in later waves.

E5. Other appliances

Covered in later waves.

Annex 8.1 Review of ONS harmonised questions on household and dwelling characteristics

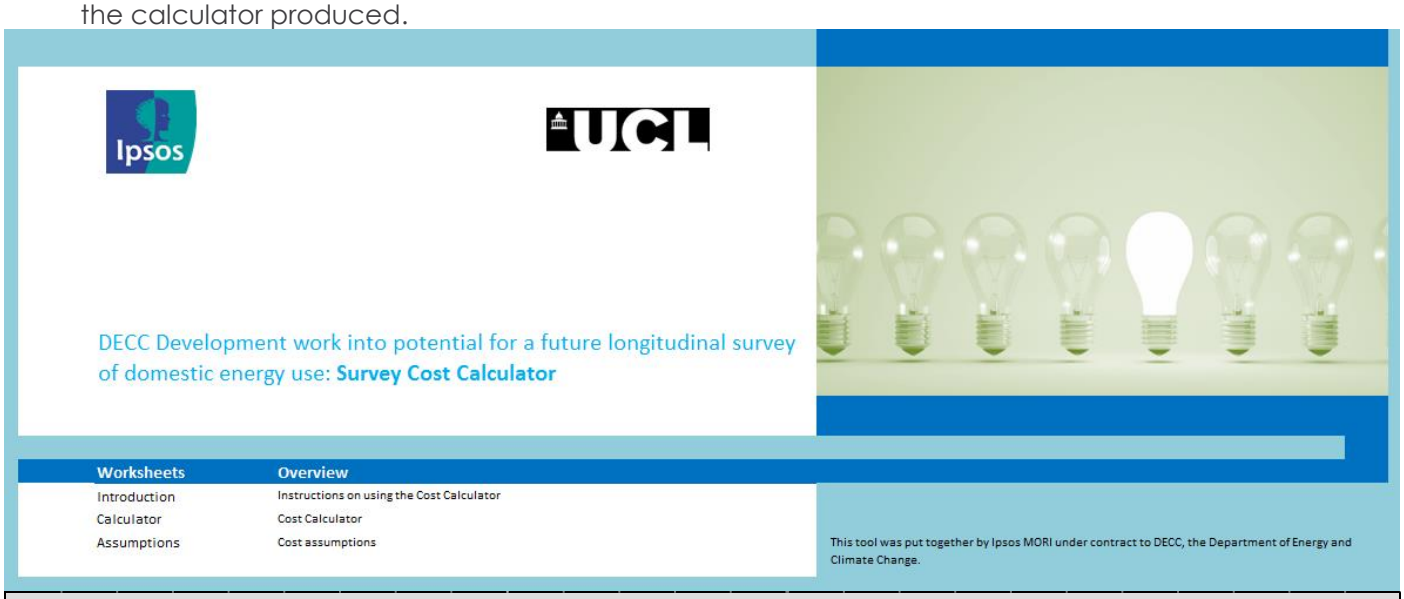
General	Specific	ONS reference	Comment
Index person	Education	Educational Attainment (p5 O)	ONS proposes response categories rather than questions but CRaB:Q128-Q130 appear to conform to the ONS recommendation.
	Age	Date of birth Age (p6 HH)	ONS favours asking for date of birth rather than age. CRaB:Q3 asks for age because it is quicker and simpler, especially for larger households, and provides sufficient detail for an energy survey. With date of birth sometimes being used as a security question for online or telephone services, people may also be less inclined to disclose theirs. However, for a longitudinal survey, d.o.b. is more useful because to allows age to be computed for each point of data collection.
	Sex	Sex (p6 HH)	ONS and CRaB approaches are effectively the same. May need to have a code for people who do not identify as either male or female.
Household individuals	Relationship to respondent	Relationships (p8 HH)	The ONS categories are far more detailed than CRaB:Q4 and probably more intrusive than necessary. ONS also asks relationship of each household member to each of the others whereas CRaB:Q4 asks only for relationship to the respondent. Some compromise between the two is probably needed, which gives sufficient information about the household without unnecessary detail, but allows matching to collapsed ONS codes. Note that the ONS guidance is out of date with current law where it says “A married partner must be of opposite sex”.
	Age	Date of birth Age (p6 HH)	See comment above on age of index person. The ONS questions appear to assume that each person will be directly questioned, whereas LUKES is more likely to acquire the information from the index person for all household members. Suggest adapting CRaB:Q3 to ask about d.o.b., with follow-up questions according to ONS but referring to “his” or “her” rather than “your”.
	Sex	Sex (p6 HH)	See comment above on sex of index person. The ONS question appears to assume that each person will be directly questioned, whereas LUKES is more likely to acquire the information from the index person for all household members. Suggest adapting CRaB:Q2 to ask about whole household.
Household (as a whole)	Income	Income (I)	ONS asks multiple questions and seeks more detail than the single question CRaB:Q134. The latter is probably sufficient for a basic categorisation but the ONS questions have the advantage of reminding respondents of all the possible sources of income and allowing the variable to be treated as something close to a ratio variable, and also allowing calculation of equivalised income. Deciding on the final question is likely to need some discussion with DECC and a review of what databases the income figures would allow LUKES to interact with. Actual income bands need to be kept up to date. CRaB:Q134 uses letter codes in random order, which is worth considering for LUKES.

Household (as a whole)	Disability	Affecting temperature	ONS (ID) questions are available to collect a lot of detail on illness and disability generally, but not specifically how it relates to energy, so CRaB:Q132 and Q133 are more useful for LUKES. CRaB:Q132 is adapted from ONS harmonisation questions to include household as well as respondent, and focus on the impact on energy.
		Affecting control	
	Education	Educational Attainment (p5 O)	ONS proposes response categories rather than questions but CRaB:Q131 appears to conform to the ONS recommendation.
	How long in current home	Period lived at this address (p7 A)	CRaB:Q5 adapts the ONS opening question. The respondent was always the reference person, so the routing instruction was not needed but the question was disambiguated by changing "you" to "you personally". The response categories are clarified but mainly the same except that ONS codes 3 and 4 are merged because that level of detail was not needed, but LUKES could reverse this. The ONS follow-up questions are not used in CRaB because the level of detail was not required but the ONS follow-up question about months (if <12) could be used. Alternatively, something along the lines of CRaB:Q6 could be used to establish which seasons the respondent has experienced in the current home.
Home	Tenure	Tenure (p9 O)	CRaB:Q121 conforms to the ONS opening question except that the research team decided not to mention squatters because (a) this is effectively asking whether the respondent is illegally occupying the home and (b) it is a small category and unlikely to be useful for analysis with a realistic total sample size. Respondents can use code 5 or 6. Of the ONS follow-up questions, only the type of landlord was considered to be sufficiently useful. CRaB:Q122 uses the ONS format except for the following variations. (a) Those who live rent-free were not asked this question because the breakdown would not be used in analysis but the ONS routing and soft check should probably be used. (b) ALMO is not listed an option (not sure why). (c) Northern Ireland is not mentioned because the survey was not carried out there. (d) RSL is written in full. (e) The option "employer (individual) of a household member" is clarified as "employer (individual person) of a household member" and moved earlier in the list to avoid miscoding between individual and organisation. (f) ONS's "relative/acquaintance of any current household member from before this tenancy started" seemed cumbersome and ambiguous. CRaB restricted it to relatives (hence always "from before this tenancy started"), effectively shifting the small and hard to define category of "acquaintance" to code 7. For analysis, we would almost certainly marge codes 6 and 7 anyway, so there should be no substantial variation from ONS – just easier to ask. (g) ONS does not let respondents say "letting agency" but CRaB added this category (code 8) to capture that information rather than assume code 7. Also, CRaB allows "Don't know" rather than assume code 7. Code 8 is used only if the respondent does not use one of the earlier codes, so the ONS code 7 can be recreated by merging codes 7, 8 and DK.

	Number of rooms overall	33. Rooms2	LUKES will need more detail, as in CRaB:Q22 to Q25. ONS codes rooms as they were intended to be used but this is of little use for LUKES, so use the alternative approach in CRaB:Q22.
	Number of rooms by type	34. Bedrooms 35. NrmS2a 36. KitOver 37. KitUnder 38. Living 40. Bathroom 42. Utility	
	Built form	Accommodation type of household (p5 A)	"Accommodation type of household" is a clumsy phrase – let's not use it. The ONS categories are not particularly useful for energy purposes. Use interviewer observations CRaB:O1, O5 and O6 instead.

Appendix 9: Survey Cost Calculator

The Survey Cost Calculator developed during this study is only available to DECC staff internally due to the data supplied being commercial in confidence. The following screenshots provide an illustration of the calculator produced.



Longitudinal survey of energy use – Survey Cost Calculator

Year 1		Year 2		Year 3		Year 4		Year 5	
Interview length	60	Interview length	60	Interview length	60	Interview length	60	Interview length	60
Number of interviews (minimum 1000)	10000	Number of interviews (minimum 1000)	11157	Number of interviews (minimum 1000)	12882	Number of interviews (minimum 1000)	14435	Number of interviews (minimum 1000)	10000
		% longitudinal	72 %	% longitudinal	75 %	% longitudinal	78 %	% longitudinal	68 %
Include Self Completion	☑	Include Self Completion	☐	Include Self Completion	☐	Include Self Completion	☐	Include Self Completion	☐
Incentive per achieved interview	£0	Incentive per achieved interview	£0	Incentive per achieved interview	£0	Incentive per achieved interview	£0	Incentive per achieved interview	£0
Cost	£xxxxxx	Cost	£xxxxxx	Cost	£xxxxxx	Cost	£xxxxxx	Cost	£xxxxxx
Number of surveyor visits	6500	Number of surveyor visits	1000	Number of surveyor visits	1000	Number of surveyor visits	1000	Number of surveyor visits	1000
Incentive per surveyor visit	£0	Incentive per surveyor visit	£0	Incentive per surveyor visit	£0	Incentive per surveyor visit	£0	Incentive per surveyor visit	£0
Cost	£xxxx	Cost	£xxxx	Cost	£xxxx	Cost	£xxxx	Cost	£xxxx
Cost of monitoring	£0	Cost of monitoring	£0	Cost of monitoring	£0	Cost of monitoring	£0	Cost of monitoring	£0
Total Cost	£xxxxx	Total Cost	£xxxxx	Total Cost	£xxxxx	Total Cost	£xxxxx	Total Cost	£xxxxx
Calculate								TOTAL COST FOR 5 YEARS	£xxxxx

Department of Energy & Climate Change
3 Whitehall Place
London SW1A 2AW
www.gov.uk/decc
URN: 15D/407