Communicating Market-wide Half-hourly Settlement (MHHS): Insights from consumer research and behavioural science

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Introducing Market-wide Half-hourly Settlement (MHHS) will place the right incentives on retailers to develop and offer new tariffs and products that encourage and enable more flexible use of energy. However, in order to deliver the associated consumer and environmental benefits of this, MHHS requires suppliers to be able to access their customers' smart meter data for settlement purposes.

In March – April 2021, we conducted research to understand the messaging approach needed to enable consumers to make an informed choice about sharing their half-hourly electricity consumption data. The outcomes of this research include a series of 'good practice' recommendations for suppliers.

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Executive Summary

The energy system is undergoing fundamental change, driven by technological innovation and by the need to decarbonise energy supplies at the lowest possible cost to consumers. To facilitate this, in April 2021 Ofgem decided to introduce Market-wide Half-hourly Settlement (MHHS) by October 2025 for domestic and microbusiness consumers.[1]

MHHS will place the right incentives on retailers to develop and offer new tariffs and products that encourage and enable more flexible use of energy. This will help decarbonise the sector cost effectively and so benefit all consumers and wider society. Yet, in order to deliver these substantial benefits, suppliers need access to their customers' smart meter data for settlement purposes.

Ofgem's proposed new data sharing framework sets out the 'granularity' of the electricity consumption data that suppliers may collect from their customers for settlement purposes in the future.[2] For "new" system domestic consumers, this means that providing half-hourly electricity consumption data will be the default, but that they will have the option to opt-out of such granularity if they choose to.[3] Ofgem believes that, with the appropriate safeguards in place, the substantial potential benefits above mean it is firmly in the interests of consumers to share their half-hourly consumption data with suppliers.

Nevertheless, empowering consumers to make an informed choice that respects their own preferences about sharing their electricity consumption data for settlement purposes remains of utmost importance. Supplier messaging about these changes will therefore be vital in empowering their customers to make fully informed decisions.

This report outlines the findings from research, undertaken from March-April 2021, designed to understand how best to communicate to domestic consumers the potential changes to their electricity consumption data sharing arrangements, the benefits of these changes, and what their options are if they do not wish to accept the changes.

To achieve this, we undertook a two-phased research approach. Phase one took the form of qualitative interviews with 35 domestic energy consumers. Phase two was a

[1] MHHS Decision, Full Business Case and Final Impact Assessment
[2] Statutory consultation on modifying Standard Condition 47 of the Electricity Supply Licence
[3] "New" system consumers are those who have their smart or advanced meters installed, or decide to change supplier or contract (excluding deemed contracts), after the new MHHS data sharing framework comes into force.

quantitative behavioural online experiment, which tested versions of potential communication messages with over 1,600 GB domestic energy consumers.

The findings, consistent with previous Ofgem research[4,5], indicate that most consumers are comfortable with accepting the proposed changes to data sharing for settlement purposes. They also reveal that the information provided, and the way the message is communicated, can influence understanding of the changes, their benefits, and the options available to consumers, as well as overall acceptance of the changes. Key findings include:

- Together, the role of 'formatting' of the communication, to make the information more easily digested, and including text to provide 'reassurance' increased consumers' acceptance of the changes, without having any detrimental impact on comprehension of key information.

- The addition of text to provide wider 'justification' of the changes reduced comprehension of key information and reduced acceptance of the changes.

- Communication length matters – increasing the length of the communication was associated with reduced engagement (ie reading the communication in full).

We undertook this research to help inform industry understanding of how best to communicate this important information to their customers. A list of the key considerations that were found to be effective in communicating to consumers through this research are presented below. As outlined in the 2021 MHHS decision document[6], Ofgem encourages suppliers to consider these 'good practice' recommendations when developing their own messaging.

[4] Ofgem Consumer First Panel, year 9, wave 3, half-hourly settlement | Ofgem
[5] Consumer views on sharing half-hourly settlement data | Ofgem
[6] MHHS Decision Document, pp.77-80.

'Good practice' recommendations for half-hourly settlement communications

Content

Action required (if any) – In the case of opt-out, make clear that no action is required from the consumer in the event that they are happy for the changes to take place, but to provide clear signposting for what to do if they do wish to take action.

Data protection – Factual information should be provided about how individuals' data will be protected.

Reassurance – Consider specific, and simple, reassurance around:

- The limited impact changes would have on smart meter use
- A reiteration of no effort required on consumer's behalf
- Additional reassurance around safety of data protection and limited use of data.

Formality - Sign off should be from a real person with a name and job title.

Language - Use of plain English. Keep the language as simple and understandable as possible. Avoid jargon, "big words" and overly technical language.

Style

Formatting - Use of formatting to make the message more attractive and clear to read, for example:

- Bold header title summarising the letter content
- Bold sub-header title information and 'chunking' to break content into relevant sub-sections.

Call-out boxes – Use of call-out boxes to bring important information to reader's attention.

Structure – Communicate using short, clear sentences and paragraphs.

Length – Not too long (suggestions from qualitative interviews were approximately equivalent to one side of A4 paper).

1. Introduction

Policy background

1.1. Settlement reconciles differences between a supplier's contractual purchases of electricity and the demand of its customers. Unlike traditional meters, smart meters can record the amount of energy consumed or exported within every half hour of the day. This provides an opportunity to make the settlement process more accurate and timely by using smart meter data for domestic and microbusiness consumers.

1.2. In July 2017, Ofgem launched an Electricity Reform Significant Code Review (SCR) to consider the case for introducing this Market-wide Half-hourly Settlement (MHHS). In April 2021, Ofgem decided that MHHS should be introduced by October 2025.[7]

1.3. Ofgem's Final Impact Assessment estimates that MHHS will bring net benefits for energy consumers in Great Britain (GB) of between £1.6bn and £4.5bn by 2045.[8] MHHS will send accurate signals to suppliers about the cost of serving their customers throughout each day. This will place incentives on suppliers to offer new tariffs and products that encourage more flexible use of energy and help consumers to lower their bills, for example time of use tariffs, automation, vehicle to grid solutions and battery storage. Making best use of existing infrastructure should reduce the need for future generation and network investment. This will help decarbonise the sector cost-effectively, which will benefit all consumers and wider society.

1.4. However, to deliver these substantial consumer and environmental outcomes, MHHS requires suppliers to access their customers' smart meter data for settlement purposes.

1.5. As set out in Ofgem's 2021 MHHS decision document[9] "new" system consumers will share half-hourly consumption data for settlement purposes by default.[10] "New" system domestic consumers will however have the option to opt-out of

[7] MHHS Decision Document
[8] MHHS Final Impact Assessment
[9] MHHS Decision Document
[10] "New" system consumers are those who have their smart or advanced meters installed, or decided to change supplier or contract (excluding deemed contracts), after the new MHHS data sharing framework comes into force.

sharing half-hourly data if they choose to do so. This was determined following extensive consultation on the access to data framework, including on the appropriate rules for data sharing arrangements (eg, opt-in, opt-out, or mandatory).[11]

1.6. Ofgem has consulted on modifications to Standard Condition 47 of the Electricity Supply licence to introduce the new data access requirements for MHHS.[12] The research findings presented in this report supplement the outcomes of the decision document in relation to this consultation.[13]

Previous consumer research on settlement and opt-out arrangements

1.7. Previous Ofgem research about half-hourly settlement found that most consumers who were explained the need for sharing data for settlement purposes would be happy to do so.[14,15] In tandem with this, most consumers were comfortable with an opt-out approach (ie where allowing data sharing for settlement purposes would be the 'default' position, but that they could request for this to not happen if they did not want it to).

1.8. For many consumers, an opt-out position was preferable to opt-in (where a consumer would need to proactively contact their supplier or someone else to permit the data sharing), on the basis that it required less effort from them. It was also preferable for many to mandating data sharing, because it enabled those who did not want to share their data a way to avoid this.

1.9. These previous consumer findings are supported by wider insights from behavioural science. Where a certain behaviour or decision is desirable, minimising the number of steps required for people to enact that behaviour or decision makes it more likely to happen. Making something the default setting (or opt-out), is an example of this, because it removes the need for an individual to take any action in order for the behaviour or decision to happen.

1.10. Many studies, across different domains (including in choices relating to energy decisions), have shown that setting a certain desired behaviour or decision as the

[11] Decision for access to half-hourly electricity data for settlement purposes
[12] Statutory consultation on modifying Standard Condition 47 of the Electricity Supply Licence
[13] Decision for modifying Standard Condition 47 of the Electricity Supply Licence
[14] Ofgem Consumer First Panel, year 9, wave 3, half-hourly settlement | Ofgem
[15] Consumer views on sharing half-hourly settlement data | Ofgem

'default' option can have a positive impact on the likelihood that it will happen.[16] Importantly, in contrast to mandating, a default (or opt-out) setting retains freedom of choice for consumers who do not wish to partake.

1.11. However, the previous Ofgem research also highlighted the need for clarity in explaining the nature of the opt-out process, what data was being shared, and why.

1.12. It will therefore be vital that consumers receive adequate messaging to enable them to make an informed choice about the granularity of data they wish to share, as well as what they need to do if they do not wish to share their data more granularly.

Purpose of this research

1.13. Communicating how and why consumer data may be processed presents challenges, not least because settlement as a process is not widely understood.[17]

1.14. In light of this, Ofgem consulted on whether there should be a central co-ordinated element to the communication of data sharing choices for settlement purposes to consumers, and, if so, who should carry it out. The decision, published as part of our 2021 MHHS decision document[18], was that Ofgem should provide messaging that suppliers can use to inform their customers about sharing their data.

1.15. This report outlines the methods and findings of a two-phased research project, undertaken by Ofgem's Consumer Insight and Behavioural Science team. Phase one took the form of qualitative interviews with 35 GB domestic energy consumers. Phase two was a quantitative behavioural online experiment, which tested versions of potential communication messages with over 1,600 GB domestic energy consumers.

[16] See, for example: Jachimowicz, J. M., Duncan, S., Weber, E. U., & Johnson, E. J. (2019). When and why defaults influence decisions: A meta-analysis of default effects. *Behavioural Public Policy*, *3*(2), 159-186.
[17] Ofgem Consumer First Panel, year 9, wave 3, half-hourly settlement | Ofgem
[18] MHHS Decision Document, pp.77-80.

1.16. The purpose of this research was to provide empirical evidence to inform what constitutes 'good practice' for energy supplier's communications to their own customers.

1.17. An effective messaging approach is one that meets two principal outcomes:

- It will adequately inform the consumer about proposed changes and the options they have around sharing data for settlement purposes, such that they will be able to make an informed choice around sharing half-hourly electricity consumption data.

- It will accurately communicate the rationale of half-hourly settlement, the data security of such sharing, and the benefits of sharing data for half-hourly settlement, both for the individual and for society as a whole, such that the consumer will be comfortable sharing their data for these purposes.

1.18. This means that it is not enough simply to maximise acceptance of the changes. A communications approach that increases acceptance of sharing half-hourly electricity consumption data while reducing consumers' comprehension of the changes and their options in relation to it would not be deemed to be effective.

1.19. Ofgem are not mandating the messages that suppliers must give to their customers. However, consultation responses indicated that some suppliers would value central co-ordination of the messaging. We therefore are using this research to highlight what 'good practice' messaging looks like in terms of achieving the two key objectives above. As outlined in the MHHS decision document[19], Ofgem encourages suppliers to consider these 'good practice' recommendations when developing their own messaging.

[19] MHHS Decision Document, pp.77-80.

2. Research Methods

Section summary

This section outlines the methods used in this two-phased research project. The first phase consisted of qualitative user interviews with 35 GB domestic energy consumers. The second phase was a quantitative behavioural experiment delivered online with over 1,600 GB domestic energy consumers.

Phase One - Qualitative User Research

2.1. In the first phase of the project, we undertook qualitative research with 35 GB domestic energy consumers. The purpose of this was to understand what information consumers needed to understand the basics of half-hourly settlement.

2.2. It was also designed to probe what additional type of information, wording and formatting might be more effective in enhancing comprehension and increasing recognition of the benefits of the proposed changes. These findings were used to inform the design of the template communications in the second phase of research.

2.3. Prior to the qualitative research, we engaged with representatives from energy suppliers via internal workshops, following a request for volunteers. These workshops helped in the creation of realistic communications that could be tested and refined through the qualitative research. This ensured that the communications we initially used represented realistic communications that suppliers may send to consumers about the changes, drawing on supplier's existing internal communications insights.

2.4. 35 interviews were conducted with GB domestic energy consumers over the course of three weeks in March 2021. Participants were independently recruited by an external market research agency. These customers came from a range of suppliers of all sizes and different social backgrounds from across GB. They already had a smart installed or were open to the potential of having one installed in the future. This was important, as these are the consumers who will be faced

with the decision around acceptance of changes to their data sharing as a result of MHHS.

2.5. Interviews were conducted in-house, by members of Ofgem's Consumer Insight and Behavioural Science team. The interviews were conducted in line with Market Research Society (MRS) and Government Social Research (GSR) ethics guidance. Three rounds of testing were conducted over the course of three weeks. After each round, we varied the communications tested following participant feedback.

2.6. Two different communications were tested in each round. To avoid order effects, the communications were rotated for each participant (ie, such that half saw version A first, B second, and half saw the reverse).

2.7. Each interview took approximately one hour. They were semi-structured, designed in a way to allow participants the freedom to talk to the things that mattered to them regarding the subject. This enabled a greater sense of what did or did not 'work' for individuals, in terms of comprehending the information, communicating the benefits of the changes, and providing reassurances against concerns.

Phase Two - Quantitative Online Experiment

2.8. The second phase was designed to evaluate consumers' likely behaviours and attitudes in response to receiving different possible communications *as if* they received them in real life.

2.9. To achieve this, an online behavioural experiment was designed for a broadly demographically representative sample of over 1,600 GB domestic energy consumers.

The advantages and disadvantages of online experiments

2.10. Often, the 'gold-standard' of trial design to test an intervention like this is via a real-world randomised-controlled trial (RCT). This would be achieved by randomly allocating different versions of communications to be sent to different homes and observing the real opt-out rates across each different version. However, there were a number of reasons why this was not an appropriate approach for this research:

- First, since half-hourly settlement is not currently a reality for most households, it was not feasible to send real communications to a representative mix of GB energy consumers.

- Second, we were particularly interested in what consumers understood and felt about the communication, in addition to identifying how they would respond to it. Such insights are difficult to capture when communications are physically sent to homes.

- Third, to maximise our insights, we needed participants to read and engage with the communications. In the real world, letters and emails often go unread.

2.11. Online (or laboratory) behavioural experiments, which allow for a hypothetical environment to be created, and ask participants to respond *as if* they received the communications in real life, are a good alternative in such circumstances. The case for using these types of experiments in a policy and regulatory setting has been well established.[20]

2.12. One advantage of these experiments is that the experimenter is able to control the environment that every participant experiences. This means it is possible to only change the one thing we want to measure (ie the different communications version), but keep everything else the same for everyone who takes part.

2.13. In these controlled experiments, participants are randomly assigned to see different versions of the communication. Provided that the socio-demographic profile of those who see different communications are the same, this randomisation ensures that any difference in reported behaviour observed between those who saw different communications must only be a result of the differences in the communications version they saw. This method provides greater confidence in understanding which communications work best for consumers.

2.14. However, there are limitations to the online or laboratory experiment approach. It is often easier to demonstrate an intention to make a decision in an experimental setting (eg by selecting a choice option in response to a question on the screen)

[20] See, for example, Lunn, P. D., & Choisdealbha, Á. N. (2018). The case for laboratory experiments in behavioural public policy. *Behavioural Public Policy*, *2*(1), 22-40.

than it is to action that decision in real life (eg by pro-actively contacting a supplier to request to opt-out of a forthcoming change). Because decisions are hypothetical, rather than real choices, absolute measures of decision-making must be treated with caution.

2.15. In the context of this research, this implies that a hypothetical absolute measure of opt-out rates may be higher than would be experienced in real life. Nevertheless, relative differences between different versions observed in this hypothetical environment still provide a strong indicator of the likely directional effect of different versions in the real world.

Experimental design

2.16. Utilising Ofgem's in-house expertise in behavioural science and experimental methodology, we used the findings from the qualitative research to design five different communication versions to be taken forward for online experimentation.

2.17. A controlled online behavioural experiment was designed, programmed, and set-up in-house by Ofgem's Consumer Insight and Behavioural Science team. It was hosted on Gorilla Experiment Builder, an online platform for running behavioural science experiments.[21] An initial 2,190 participants, broadly representative of GB domestic energy consumers, were recruited by an external market research agency to take part.

2.18. Once participants joined the experiment they were asked (1) if they had a smart meter in their homes and (2) whether they typically received communications via email or letter. These contextual questions determined certain exclusion criteria (see section 3.6), and also informed the exact text used in introducing the experiment, to make the experiment as realistic as possible for participants. Furthermore, it enabled us to understand whether engagement with different modes of communication influenced decision-making within the experiment itself.

[21] Anwyl-Irvine, A. L., Massonnié, J., Flitton, A., Kirkham, N., & Evershed, J. K. (2020). Gorilla in our midst: An online behavioral experiment builder. *Behavior research methods*, *52*(1), 388-407.

2.19. Participants were then randomly assigned to see one of five communications versions.[22] After participants had read the communications, they were asked a number of subjective attitudinal and objective comprehension questions in relation to what they had read. Primarily, we were interested in three key outcome measures, that we would compare responses to for each of the different communications versions:

1) How would participants respond to the communication (ie would they allow the changes, as they understood them, to happen or not)?
2) Do participants understand the content of the communication and what they would need to do to stop the changes from happening (ie opting-out)?
3) What do participants perceive the benefits of half-hourly settlement to be?

2.20. While (1) was designed to measure *what* consumers were likely to do, (2) and (3) were designed to inform what consumers' perceptions of the changes were as well as *why* they intended to behave that way.

2.21. We also collected basic socio-demographic information of participants, as well as their responses to a number of energy engagement questions, including:

- Age
- Gender
- Educational attainment
- Method of energy payment
- Attitudes towards data sharing with utility companies
- Usual level of engagement with utility communications.

Communications design

2.22. Five different versions of communications were created for testing in the online experiment. A Control version included basic informational text, as well as several important themes that emerged from the supplier workshop and qualitative research (see section 3.4), which provided the minimum necessary information required to communicate the changes and rights of customers.

[22] While the communication was described as a 'letter' or 'email' throughout the experiment, depending on the participants' usual communications preferences, the actual layout of the communication on the screen was the same for all participants.

2.23. We then tested four additional versions, which all contained the information and themes in the Control version as a minimum. Figure 1 reports the key differences between these. These communications are provided in Appendix 2.

2.24. In addition to utilising the findings from the qualitative research, the design of the four additional communication versions were informed by existing evidence from behavioural science, drawing on insights that could be readily implemented in standard communications from energy suppliers if shown to be effective.[23]

2.25. For example, when presented with lots of information, breaking that information into relevant '*chunks'* which each focus on one sub-section of information can make it easier to process. In the context of communications, this could be achieved by breaking content into short paragraphs with relevant headers identifying the content of that paragraph, which may make the collective information easier to process.

2.26. In addition, our attention is drawn to things that contrast or stand out. Making one section of information visually *salient* (eg by placing it in a standalone box, or making key information bold) can draw attention to that information. However, it is important to ensure that making one piece of information salient does not come at the detriment of other non-salient information.

2.27. Across the five communications versions, each one built on the previous by incorporating one thematic addition. This means it was possible to isolate and identify exactly what was driving differences in intended behaviour and attitudes across different communication versions.

[23] See, for example, https://www.bi.team/publications/east-four-simple-ways-to-apply-behavioural-insights/

Figure 1: Outline of different communication versions and their key differences

V0 (Control): Minimal information about:

- The proposed changes and actions required
- Presented as basic paragraph of text.

V1 (V0 + Formatting): Addition of formatting designed to enhance readability, including:

- Bold header title summarising the letter content
- Bold sub-header title and information 'chunking' to break content into relevant sub-sections.

V2 (V1 + Reassurance): Addition of text designed to reassure reader about:

- The limited impact changes would have on smart meter use
- A reiteration of no effort required on consumer's behalf
- Additional reassurance around safety of data protection and limited use of data.

V3 (V2 + Justification): Addition of text contextualising the changes in relation to:

- What a smart meter currently does
- Wider detail of the societal benefits to the energy system.

V4 (V3 + Benefits Salience): Increasing the visual salience of societal benefits, including:

- Placing them in a standalone box in the middle of the communication
- Outlining each individual benefit as a separate bullet point
- Bold titling of each benefit.

3. Results

Section summary

This section summarises the key findings of both phases of research:

- In both the qualitative research, and across all communication versions tested in the online experiment, most participants indicated a willingness to accept the proposed changes.
- However, in the online experiment there was evidence that the specific content of the different versions did influence the risk of opt-out.
- The addition of "formatting" and "reassurances" to the basic communication text together significantly reduced the risk of opt-out. Importantly, this did not come at the expense of reduced objective comprehension of key information.
- The addition of text providing "justification" of the changes reduced objective comprehension of key information and increased the risk of opt-out.
- Making the societal benefits of changes visually salient increased the perceived size of these benefits but was not associated with a reduction in the risk of opt-out.
- More generally, there is evidence to suggest that increasing the length of communication can have a negative impact on engagement with it.

Phase One: Qualitative interviews

3.1. Most participants during the qualitative research were content with the proposed changes and reported being unlikely to want to opt-out. Participants who were unhappy with the changes and suggested that they would pro-actively choose to opt-out tended to be opposed to sharing any data with energy suppliers and other providers in general.

3.2. Different participants held different views about how much information they would want to help them make a decision. Some only required minimal information to grasp the concept and be accepting of the change. For others having the option to find out more (for example via an external website) was viewed as helpful. Others said that communications that gave much more detail would be useful in their decision-making.

3.3. This highlighted the need to be mindful of the balance between too much information and reassuring consumers. The small sample sizes used in qualitative research do not permit estimations of which level of information would be most valuable for the wider population or for sub-groups of different consumer types. To quantify this in the online experiment, we systematically varied the level of reassurance and additional justification to understand if there was an optimal level of information that worked for the majority.

3.4. More broadly, throughout the qualitative research, a number of themes emerged that participants found particularly important to foster understanding and positive engagement with the communications. These became a feature of all versions of the communication versions in the online experiment:

- Keeping the language as simple and understandable as possible
- Using short, clear sentences and paragraphs
- Make clear what action/ steps are required if a participant wishes to opt-out
- Being signed off by a real person (as opposed to a generic position/ team name)
- Basic assurances that data would be kept safe.

Phase Two: Quantitative online experiment

3.5. The experiment took place in April 2021. 2,190 participants initially completed the experiment. All were aged over 18, were primary (or joint) energy decision makers, and were broadly demographically representative of the GB population. The experiment took approximately 10 minutes to complete and participants were incentivised with a small financial payment for their participation.

3.6. To remain consistent with the qualitative research, we removed participants who indicated that they did not currently have a smart meter and were "definitely not interested" in having one installed. 34.4% of those currently without a smart meter, or 17.1% of the total sample, answered as such. Appendix 3 reports the size of this disinterest across different socio-demographic groups. In general those who were more likely to be "definitely not interested" in having a smart meter installed were:

- Older (in particular, aged over 55)
- Did not like sharing their data with utility providers.

3.7. We also removed participants who took a disproportionately short (quickest 10% - 5.5. seconds or less) or long (slowest 1% - five minutes or more) time reading the communications, because such quick, or slow, response times are indicative of a failure to be engaged with the tasks in the experiment. The main findings are not sensitive to these specific cut-off points. After these exclusions, 1,615 participants remained for subsequent analysis.

3.8. Socio-demographic information of these participants can be found in Appendix 1. Given that a greater proportion of older consumers were removed because they indicated they were not interested in getting a smart meter, this final sample was no longer representative of the entire GB population. It did, however, provide a sample that was more reflective of the types of people who would be receiving these types of communications in the future.

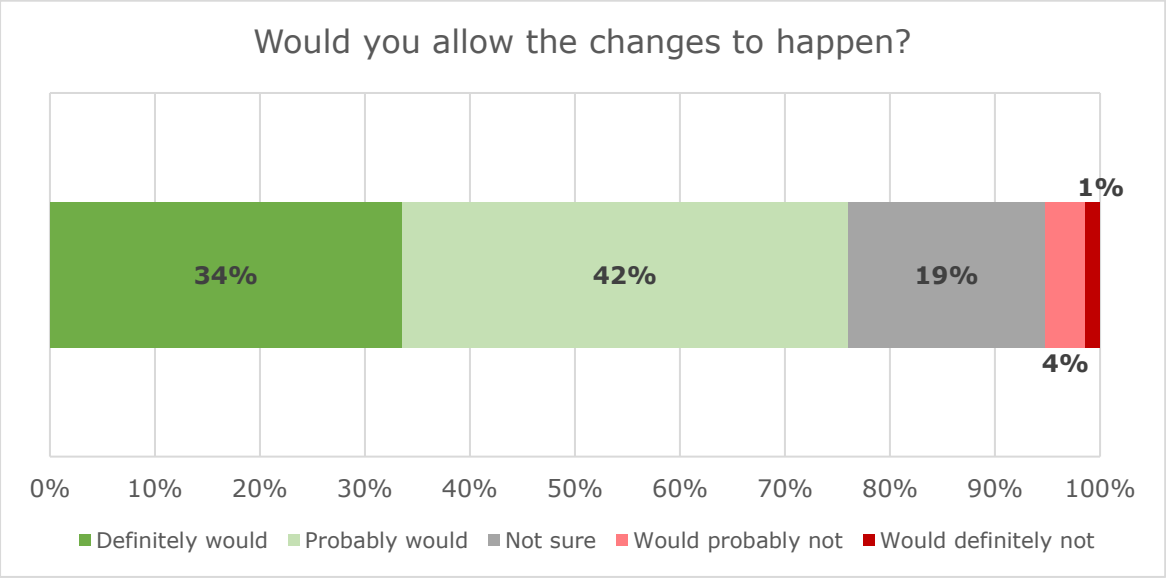
3.9. Randomisation checks confirm that socio-demographic characteristics were sufficiently randomised across the five different communication versions. This means that any differences between communication versions in subsequent analysis should not be a result of differences in the types of participants who received them.

Acceptance of changes

3.10. Our primary outcome measure was participant's self-reported acceptance of the proposed changes to their electricity consumption data sharing as a result of half-hourly settlement, as outlined in the communications. This was measured on a 5-point Likert scale from "I definitely would" to "I would definitely not" allow the changes to happen. Figure 2 outlines the distribution of responses across participants.

3.11. The majority indicated that they would accept these changes, as they understood them. 76% of participants said they would either definitely or probably allow the changes to happen. This suggests that the input from the qualitative research resulted in basic communications that was acceptable to the majority of participants. Only a very small proportion (5%) said they probably or definitely would not allow the changes to happen. 19% were not sure.

Figure 2. Distribution of responses of participants to main outcome measure



"If you [had a smart meter and] received this letter [email] in your home, how likely would you be to allow your electricity supplier to make the proposed changes to your smart meter readings?" (n= 1,615)

3.12. Given the low level of "Would probably not" or "Would definitely not" allow responses, we pooled these with those who responded "Not sure", to enable meaningful statistical comparisons between the five communication versions. We consider responses to these three options to indicate a potential "risk of opt-out".[24]

3.13. Figure 3 reports the predicted probabilities of being at risk of opt-out by communications version, estimated from a logistic regression model reported in Appendix 4. It estimates that among those who saw the Control communication (V0), a little over one in four (27%) were at risk of opt-out. Within the model, the only version that was statistically significantly lower was V2, where the predicted probabilities indicated 19% were at risk.[25,26] That is, participants who saw communications which included both "formatting" and "reassurance" in addition

[24] This is a conservative estimate of opt-out. In reality, it may be that not all those who were "Not sure" following an initial read of the communication would subsequently decide to opt-out.
[25] Statistical significance is a concept that broadly reflects the likelihood that any difference in outcome between different groups is not a result of chance.
[26] To account for the multiple comparisons being made against the Control version, all reported *p*-values for comparisons against the Control version have been calculated subject to a Bonferroni correction.

to the Control text, were 8%-points (or 31%) less likely to be at risk of opt-out than those who saw the Control version alone.

3.14. At scale, this effect could be economically significant. It implies that using V2 rather than the Control version as the communications sent to households could amount to up to 2 million fewer households across GB being at risk of opting-out of the proposed changes, simply as a result of changes to the communication sent to them.[27]

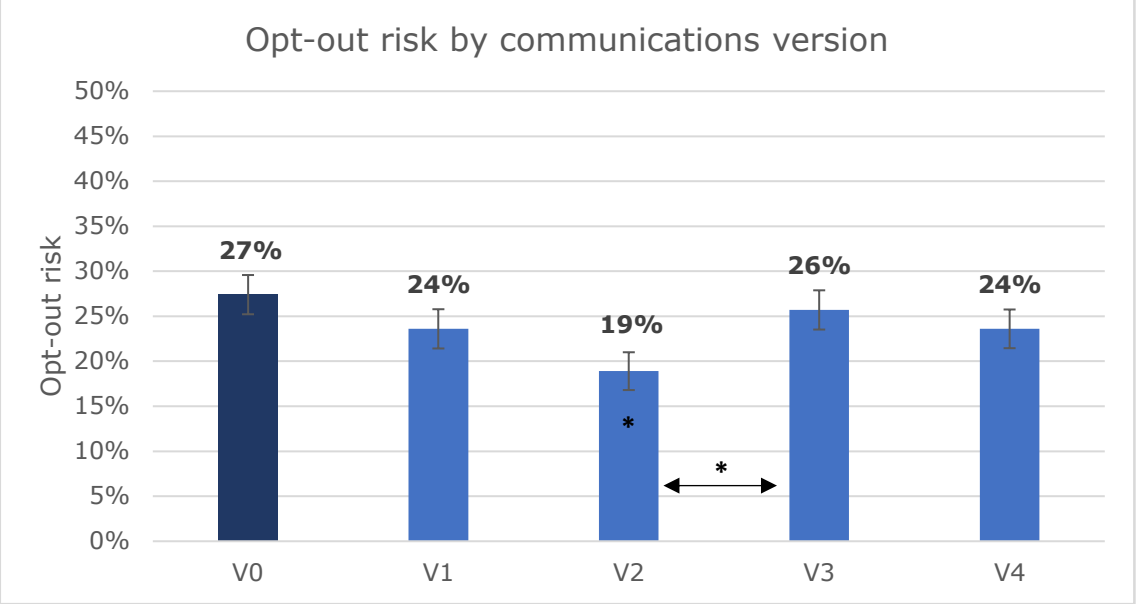
3.15. The models in Appendix 4 also find differences in risk of opt-out by different energy engagement metrics. In general, the risk of opt-out was lower for those who:

- Currently had a smart meter installed in their home
- Typically received energy communications via email (rather than letter)
- Had a prepayment meter
- Were happier with sharing their data with utility providers
- Typically opened and read communications from utility providers.[28]

3.16. Designing the communication versions such that each one differed in only one way from the previous version enabled pairwise comparisons between sequential pairs (eg V0 vs. V1, V1 vs. V2, etc.) to understand what changes worked in influencing decisions. The only statistically significant pairwise difference was the addition of "justification" in V3, compared to V2, which resulted in a 7%-point (or 36%) *increase* in the number at risk of opt-out. This suggests that participants were less accepting of the changes when provided additional text to further justify the changes and benefits within the context of what smart meters currently do.

[27] This is an upper estimate of the potential scale of impact. As mentioned at the outset, communications often go unread, and hypothetical experiments often result in an over-reporting of intended actions. Together, these facts could mean the absolute number of opt-outs when these communications are sent out to homes would be lower than reported here.
[28] We also found evidence that risk of opt-out was lower for certain socio-demographic types: those who were educated to degree level or above (compared to those educated below degree level), and those who were aged 18-34 (compared to those aged 55 or over).

Figure 3. Predicted probabilities of risk of opt-out by communications version, controlling for socio-demographics and general engagement with energy communications and products.



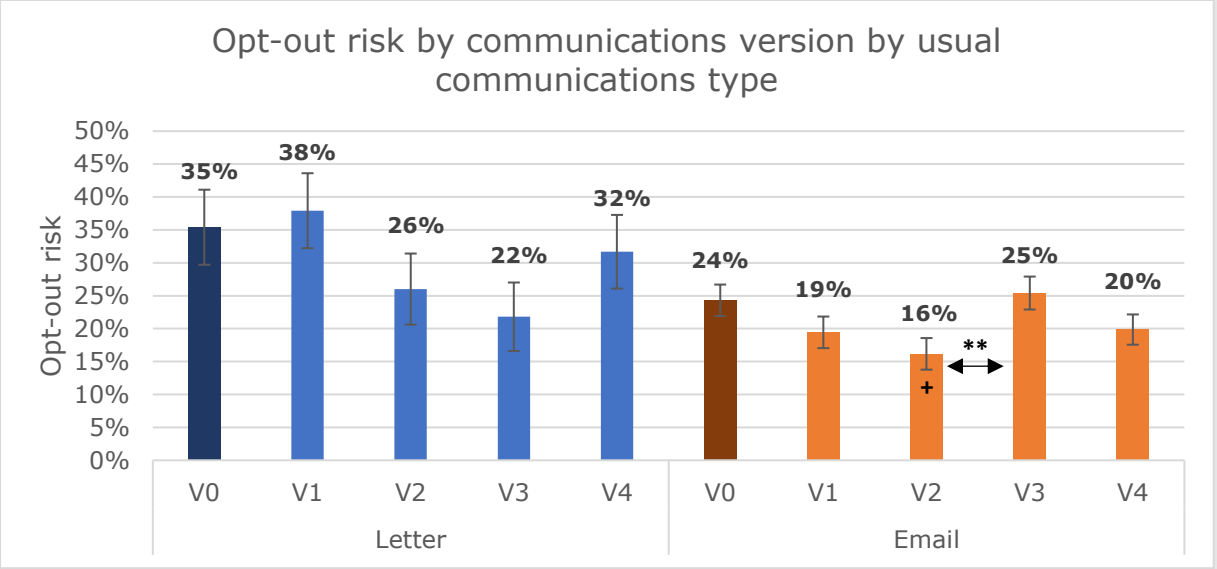
Error bars represent standard errors. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.[29]

3.17. We also explored whether these effects were being driven by specific sub-groups of consumers. Two potentially important sub-groups were identified: (1) those who did, or did not, currently have a smart meter installed in their home; and (2) those who received their typical energy communications via email or letter.

3.18. The above results were not notably different between those who did or did not currently have a smart meter in their home. However, the increased risk of opt-out from the addition of "justification" occurred in those who typically receive their energy communications via email, and not via letter, as shown in Figure 4.[30]

[29] These are conventional thresholds to indicate levels of statistical significance.
[30] These were estimated from a logistic regression model reported in Appendix 5.

Figure 4. Predicted probabilities of opt-out risk by communications version, controlling for socio-demographics and general engagement with energy communications and products, by usual communications type



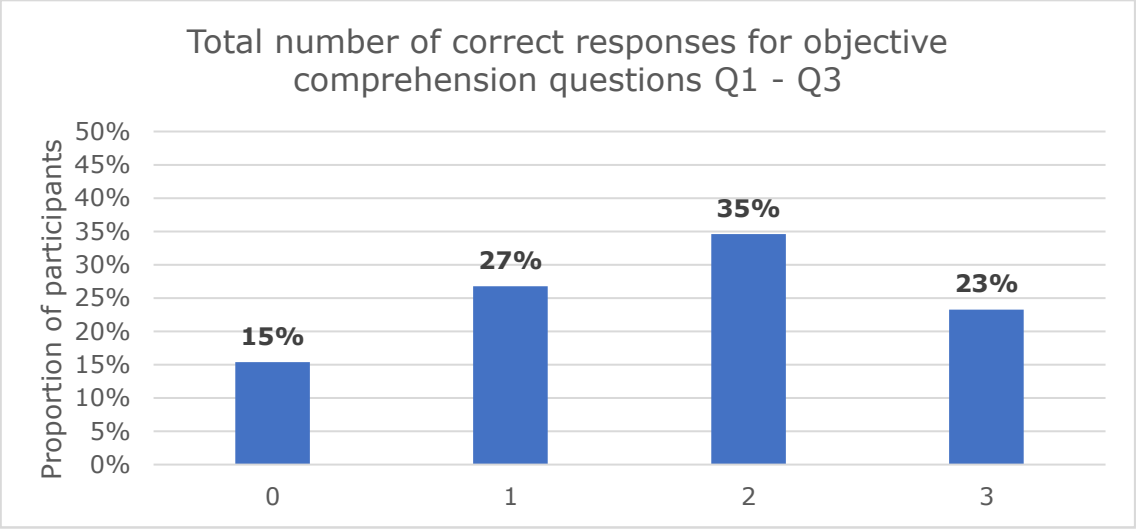
Objective comprehension of changes

3.19. As discussed at the outset, indiscriminately targeting a reduction in opt-out rates was never the aim of this research. A key criterion for effective communication of the changes was that participants understood the changes and what they needed to do if they wished to opt-out.

3.20. Participants were asked three multiple choice questions to assess their understanding of these.[31] Figure 5 highlights that 23% of participants answered all three questions correctly.[32]

[31] These questions are labelled Q1-Q3 throughout. They were also asked a further two questions (Q4-Q5) to assess their understanding of two other specific aspects of the communications. All five questions and responses are presented in Appendix 6.
[32] While this may appear low, participants were asked these having read the communications only once, and were not able to refer back to the communications. This method was designed to measure how easily participants found it to understand key information from an initial read of the communications. In reality, consumers would be able to consult their communications to clarify their understanding of its content.

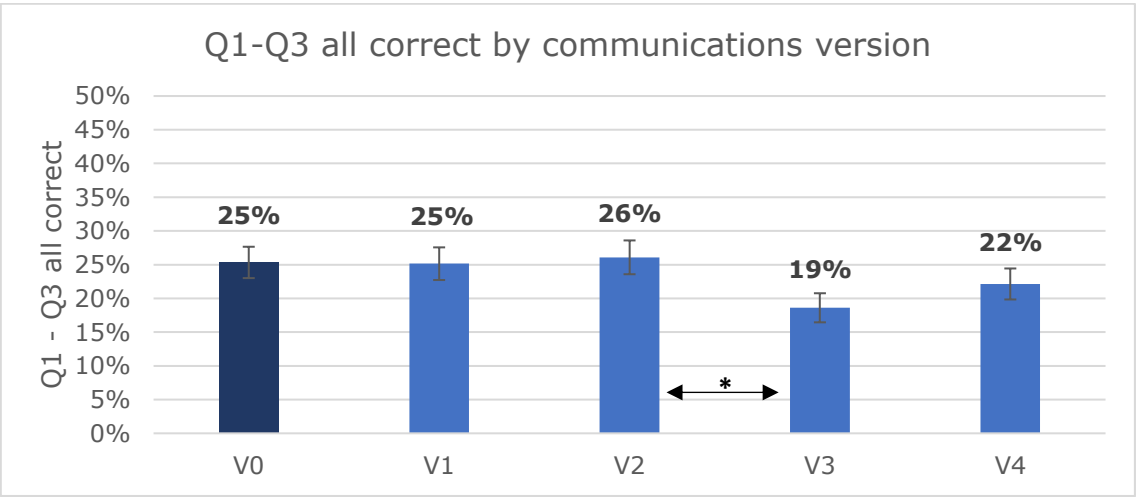
Figure 5. Total number of correct responses for objective comprehension questions Q1 – Q3



3.21. Figure 6 reports the predicted probabilities of correctly answering all three questions by communications version estimated from a logistic regression model reported in Appendix 7. Estimates from the model indicate that there was very little difference in the proportion between the Control version and V2.

3.22. Importantly, the similarity of comprehension between the Control version and V2 suggests that the reduced opt-out risk of V2 was not being driven by a lack of understanding of the changes. This suggests that it was a consequence of some genuine preference resulting from the communication content in V2.

Figure 6. Predicted probabilities to answer all Q1-Q3 correctly by communications version, controlling for socio-demographics and general engagement with energy communications and products



3.23. The only statistically significant pairwise comparison was the addition of "justification" in V3. The predicted probabilities approximate that this resulted in a 7%-point (or 29%) reduction in the proportion of those who answered the three questions correctly. It is possible that this reduction in comprehension is responsible for the increased opt-out risk in V3 compared to V2, although this relationship is only correlational.

3.24. Assessing the broader relationship between comprehension and attitudes to changes does indicate a link between the two. Across all participants, those who answered all three questions correctly were less likely to be at risk of opting-out (18%) than those who did not (26%).

3.25. This difference was mostly being driven by those who were not sure if they would accept the changes. 13% of those who answered all questions correctly were not sure, compared to 21% of those who did not answer all questions correctly. There was very little difference in the proportions who would not accept them. This suggests that comprehension may be effective in reassuring those who may be uncertain in their decision, but that there will remain a small proportion who remain fundamentally opposed to these changes, regardless of their level of understanding.

3.26. There were no socio-demographic effects, meaning that the information in the communications was no more or less accessible for different types of consumers. Those who typically open and read communications from their utility providers were more likely to answer correctly than those who did not, which may be related to their usual level of engagement with these communications.

3.27. Unlike the risk of opt-out, there were no differences in effects by smart meter ownership or usual communications type (letter or email).

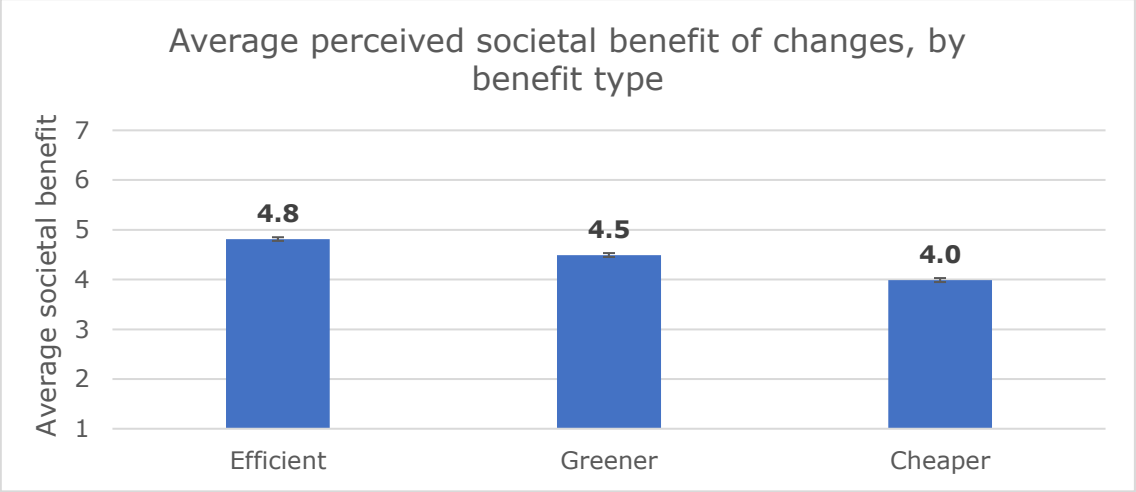
Perceptions of societal benefits

3.28. One potential driver of increased acceptance of the changes might have been the increased perceptions of societal benefits as a result of the changes, which differed in emphasis across the different communications versions. We asked participants to rate the extent to which the energy system would be made more

efficient, greener and cheaper as a result of the changes on a 7-point Likert scale from "Not at all" to "A lot".

3.29. Figure 7 reports average perceived societal benefit by benefit type across all communications. It reveals that the greatest perceived benefits to the energy system was of increased efficiency, then for increased environmental 'greenness' and least for reduced cost.

Figure 7. Average rating of perceptions of societal benefits as a result of the proposed changes, by benefit type



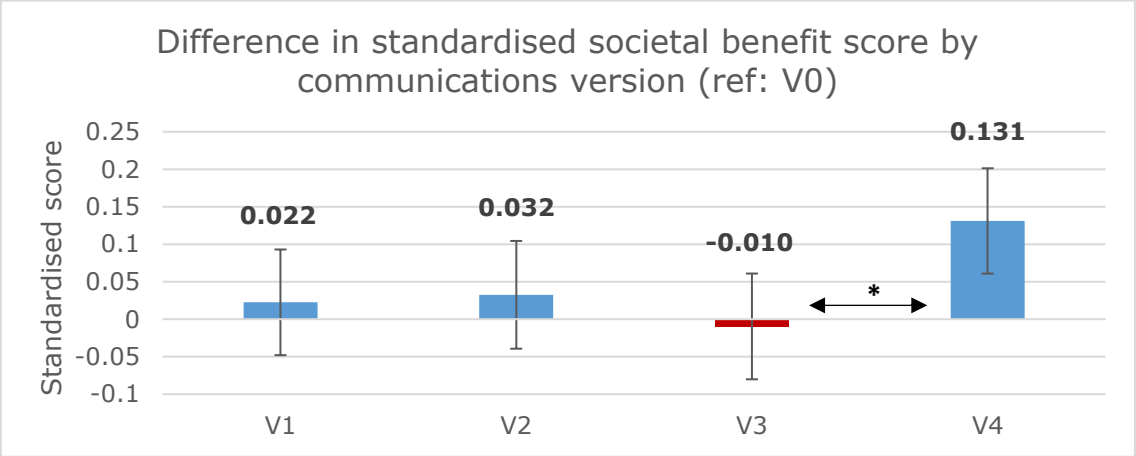
3.30. To compare perceptions of societal benefits across communications version we pooled the three scores to create a single, standardised, societal benefit score. Figure 8 reports the relative perceptions of societal benefits across the communications versions, using the Control version as the reference category, estimated from a linear regression model reported in Appendix 8. No alternative version led to a significant change in perceptions of societal benefits. In general, younger participants perceived societal benefits to be greater, as did those who were happier with sharing their data with utility providers.

3.31. The only statistically significant pairwise comparison was the addition of "benefits salience" in V4, compared to V3, where the benefits were emphasised by being placed in a standalone box within the communication. This finding is consistent with common behavioural science evidence on the importance of visual salience.

3.32. As with opt-out risk, this effect only held for participants who typically receive their communications by email, and not for those who receive them by letter. There was no difference by smart meter ownership.

3.33. As highlighted in section 2.26, there is a risk that making one piece of information salient can detract attention from other non-salient information. Positively, there was no evidence that making these benefits salient drew attention away from the key information about the changes (because participants who saw V4 did not score worse on the objective comprehension questions than those who saw V3). However, given that the increased salience of benefits did not result in a significant reduction in opt-out risk between V3 and V4, increased perception of benefits alone appears not a sufficient motivator for acceptance of the changes.

Figure 8. Differences in standardised societal benefit score by communications version, using V0 as the reference category, controlling for socio-demographics and general engagement with energy communications and products



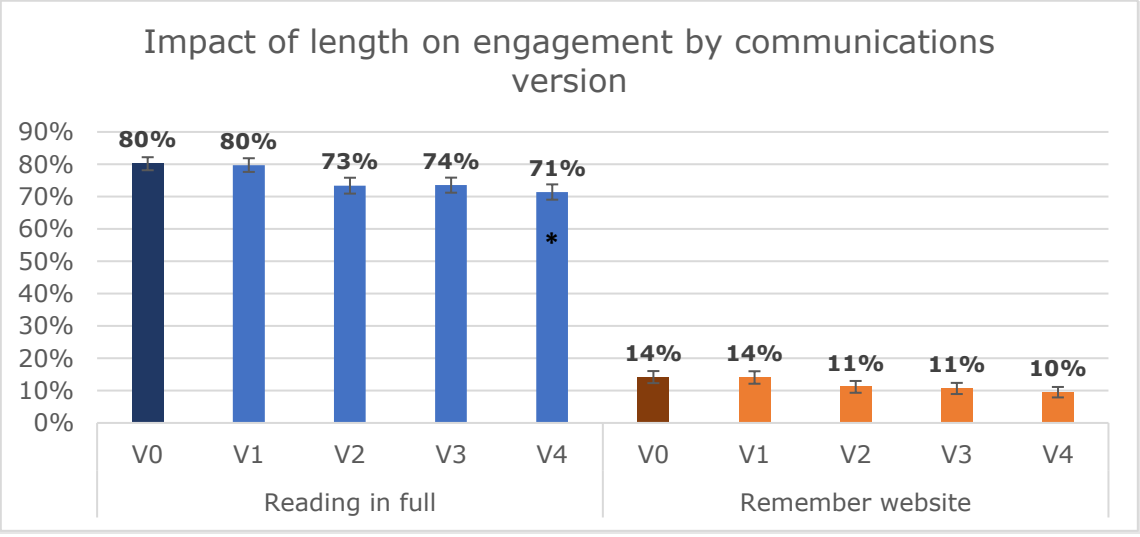
Effect of communications length

3.34. Across the five different communications versions, each from V0 – V4 increased in length. While this was not a key outcome variable, we were able to measure both subjective and objective engagement with the communications, and could compare this across the different length versions. Evidently, systematic variation in engagement according to communications length would be informative in considering what constitutes an effective communication.

3.35. First, we asked participants to tell us how carefully they read the communications. 76% self-reported as reading the communications in full. Next, as an objective comprehension question, we asked participants to recall the name of a website they could visit to find out more information about the changes, which appeared towards the end of the letter. This acted as a proxy for objective engagement with the letter. Recall was poor – only 12% of participants correctly recalled the website name.[33]

3.36. Figure 9 reports the predicted probabilities of subjective and objective engagement by communications version, estimated from logistic regression models reported in Appendices 9 and 10. Across both subjective and objective measures, engagement systematically and statistically significantly fell as the length of the communications increased. Estimates from the models indicate that every additional 50 words were associated with a 3%-point reduction in likelihood to read the communications in full and a 2%-point reduction in correctly remembering the name of the website.

Figure 9. Predicted probabilities of self-reporting of reading the communication in full (subjective engagement) and correctly remembering the name of the website (objective engagement) by communications version, controlling for socio-demographics and general engagement with energy communications and products



[33] Since this was multiple choice, simply choosing at random should have resulted in 25% of correct responses. Analysing the distribution of responses in Appendix 6, over half (53%) of participants chose the incorrect website "www.smartmeterchanges.com" instead.

4. Discussion and conclusions

Section Summary

This section summarises discusses what the findings of this research mean in terms of formulating an effective message for consumers around data sharing for settlement purposes.

Implications for half-hourly settlement communications

4.1. The intention of this research was to provide insights about the broad themes of messaging structure and content that participants indicated were important in effectively communicating the proposed changes, the benefits of allowing these changes, and the options available to them.

4.2. Across both the qualitative and quantitative research, a number of key themes emerged, which indicate 'good practice' recommendations in half-hourly settlement communications. These are presented in Figure 10.

4.3. We are not proposing that the templates used in this research represent the optimal communication for all consumers. Rather, this research has indicated that (1) most consumers are comfortable with the prospect of half-hourly settlement when provided basic information about it, and (2) there are themes that this research has highlighted as important factors to consider when developing communications to inform consumers about this, their options in relation to the changes, and the potential benefits of allowing it to happen.

Figure 10. 'Good practice' recommendations in half-hourly settlement communications

Content

Action required (if any) – In the case of opt-out, make clear that no action is required from the consumer in the event that they are happy for the changes to take place, but to provide clear signposting for what to do if they do wish to take action.

Data protection – Factual information should be provided about how individuals' data will be protected.

Reassurance – Consider specific, and simple, reassurance around:

- The limited impact changes would have on smart meter use
- A reiteration of no effort required on consumer's behalf
- Additional reassurance around safety of data protection and limited use of data.

Formality - Sign off should be from a real person with a name and job title.

Language - Use of plain English. Keep the language as simple and understandable as possible. Avoid jargon, "big words" and overly technical language.

Style

Formatting - Use of formatting to make the message more attractive and clear to read, for example:

- Bold header title summarising the letter content
- Bold sub-header title information and 'chunking' to break content into relevant sub-sections.

Call-out boxes – Use of call-out boxes to bring important information to reader's attention.

Structure – Communicate using short, clear sentences and paragraphs.

Length – Not too long (suggestions from qualitative interviews were approximately equivalent to one side of A4 paper)

Next steps

4.4. While most participants in our experiment indicated that they knew what action they would want to take following this initial communication, 19% indicated that they were not sure. Additionally, some in our qualitative research also suggested that they would want to be able to find out more information before making a decision.

4.5. This implies potential value in providing additional resource for consumers to find out more information prior to making a decision, if they wish. This could take the form of an additional centralised resource that interested consumers could access to learn more about half-hourly settlement.

4.6. This dual-layered approach to information provision allows for more information for those who require it, without compromising on the brevity and conciseness of the initial communication (that the research suggests is important in minimising confusion and disengagement amongst some consumers).

4.7. The trade-off, however, is that for those who do wish for further information, there is another step for them to take to reach it. This may act as a barrier to prevent consumers from seeking out that information. Making this information as easy to access as possible (eg by sign-posting clearly in the initial communication) would therefore be important. To this end, Ofgem intends to provide consumer information about MHHS on its website, to which suppliers can signpost their customers (although suppliers may also direct consumers to other relevant sources too).

4.8. While the findings of this research did not find any instances where the preferences of different sub-groups of consumers directly contradicted each other, what works best for one consumer may not be true for others. For example, our findings suggested that the increased risk of opt-out as a consequence of additional 'justification' in V3 was only true of those who prefer to receive communications via email – not via letter.

4.9. Where individual suppliers have additional insights into the needs of their consumer base, this reinforces the value for them to continue to engage with their consumers to understand what they need with regards to their half-hourly settlement decision-making.

4.10. Ofgem will monitor opt-out rates during the transition period to ensure that the data sharing framework remains appropriate. Once the new settlement arrangements come into force, Ofgem envisages routine monitoring of load shifting trends and opt-out rates (which may also include a review of suppliers' messaging to their customers about sharing their half-hourly data). Ofgem will also review the data access arrangements to ensure that they subsequently remain appropriate, as necessary.

Conclusions

4.11. This research has utilised insights from qualitative interviews in understanding consumer comprehension and attitudes towards half-hourly settlement when presented with alternative and realistic approaches to communicating these. It then applied controlled, online experimentation to enable a quantification of these.

4.12. In doing so, it has uncovered principles that generate a communications approach that was readily understood and accepted by most participants who engaged in this research. These participants were broadly reflective of those who are likely to receive such a communication in the near future.

4.13. Overall, this research has highlighted the potential value in taking a behaviourally-informed approach to regulatory and policy decision-making. Such an approach helps to ensure that decisions are made with empirical evidence underpinning them. This ultimately leads to a better understanding of the impact that different approaches will have on consumer engagement, attitudes, and comprehension towards changes that are relevant to them.

5. Appendices

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Appendix 1

Socio-demographic breakdown of participants in online experiment (n= 1,615)

Socio-demographic characteristic	Breakdown of participants
Age:	
18 – 24	9.0%
25 – 34	17.5%
35 – 44	16.9%
45 – 54	15.5%
55 – 64	18.3%
65+	22.8%
Prefer not to say (PNTS)	0.1%
Gender:	
Male	49.4%
Female	50.3%
Other/ PNTS	0.3%
Employment type:	
Employed FT/ PT	52.1%
Self-employed	6.6%
Retired	24.1%
Other/ PNTS	17.3%
Education:	
Below degree	52.1%
Degree and above	47.2%
PNTS	0.7%
Smart meter ownership:	
No	39.3%
Yes	57.2%
Unsure/ PNTS	3.5%
Usual communications type:	
Letter	18.4%
Email	75.4%
Other/ Unsure/ PNTS	6.3%

Appendix 2

Communication Version 0 (Control)

Hello <your name>,

We are writing to tell you that the way we can take your meter readings is changing. As of 1st May, we can start taking meter readings that include half-hourly information from your smart meter.

At the moment we take one meter reading per day, so we know the amount you've used but not when you used it during the day. By collecting half-hourly information instead, your smart meter can help to improve the electricity network to be more efficient, greener and cheaper to run.

We'll continue to keep your data safe and secure. You can find out how we use and protect your data in our Privacy Policy.

You can choose to opt out. If you'd rather stick to your meter readings only containing daily information, just let us know. Give us a call on 0800 456 6540 and one of our advisers will be happy to help.

If you need more information, you can find out more by visiting www.helpwithmeterreadings.com.

Thanks,

Jane Smith

Manager of Smart Meter Operations, Energy Supply Inc.

Communication Version 1 (V0 + Formatting)

The way we can take your meter readings is changing

Hello < your name>,

We are writing to tell you that as of 1st May, we can start taking meter readings that include half-hourly information from your smart meter.

Your smart meter could be used to help improve the electricity network

At the moment we take one meter reading per day, so we know the amount you've used but not when you used it during the day. By collecting half-hourly information instead, your smart meter can help to improve the electricity network to be more efficient, greener and cheaper to run.

We'll continue to keep your data safe and secure

You can find out how we use and protect your data in our Privacy Policy.

You can choose to opt out

If you'd rather stick to your meter readings only containing daily information, just let us know. Give us a call on 0800 456 6540 and one of our advisers will be happy to help.

Need more information?

You can find out more by visiting www.helpwithmeterreadings.com.

Thanks,

Jane Smith

Manager of Smart Meter Operations, Energy Supply Inc.

Communication Version 2 (V1 + Reassurances)

The way we can take your meter readings is changing

Hello <your name>,

We are writing to tell you that as of 1st May, we can start taking meter readings that include half-hourly information from your smart meter. Don't worry, there's nothing you need to do.

Your smart meter could be used to help improve the electricity network

At the moment we take one meter reading per day, so we know the amount you've used but not when you used it during the day. By collecting half-hourly information instead, your smart meter can help to improve the electricity network to be more efficient, greener and cheaper to run.

The good news is your smart meter can automatically take care of this change, so you won't need to do anything differently.

We'll continue to keep your data safe and secure

We'll always keep your information safe. And we won't use it for any other purposes without your permission. You can find out how we use and protect your data in our Privacy Policy.

You can choose to opt out

If you'd rather stick to your meter readings only containing daily information, just let us know. Give us a call on 0800 456 6540 and one of our advisers will be happy to help.

Need more information?

You can find out more by visiting www.helpwithmeterreadings.com.

Thanks,

Jane Smith

Manager of Smart Meter Operations, Energy Supply Inc.

Communication Version 3 (V2 + Justification)

The way we can take your meter readings is changing

Hello <your name>,

We are writing to tell you that as of 1st May, we can start taking meter readings that include half-hourly information from your smart meter. Don't worry, there's nothing you need to do.

What your smart meter currently does

Smart meters, like the one in your home, can automatically record and share how much electricity you use. These readings help us to bill you accurately.

At the moment we take one meter reading per day, so we know the amount you've used but not when you used it during the day.

Your smart meter could be used to help improve the electricity network

By collecting half-hourly information instead, your smart meter can help to improve the electricity network to be more efficient, greener and cheaper to run. That means we can reduce the need to burn unnecessary fossil fuels and could lower the cost of energy across Great Britain, which may result in lower energy bills for customers.

The good news is your smart meter can automatically take care of this change, so you won't need to do anything differently.

We'll continue to keep your data safe and secure

We'll always keep your information safe. And we won't use it for any other purposes without your permission. You can find out how we use and protect your data in our Privacy Policy.

You can choose to opt out

If you'd rather stick to your meter readings only containing daily information, just let us know. Give us a call on 0800 456 6540 and one of our advisers will be happy to help.

Need more information?

You can find out more by visiting www.helpwithmeterreadings.com.

Thanks,

Jane Smith

Manager of Smart Meter Operations, Energy Supply Inc.

Communication Version 4 (V3 + Benefits Salience)

The way we can take your meter readings is changing

Energy Supply Inc.

Hello <your name>,

We are writing to tell you that as of 1st May, we can start taking meter readings that include half-hourly information from your smart meter. Don't worry, there's nothing you need to do.

What your smart meter currently does

Smart meters, like the one in your home, can automatically record and share how much electricity you use. These readings help us to bill you accurately.

At the moment we take one meter reading per day, so we know the amount you've used but not when you used it during the day.

Your smart meter could be used to help improve the electricity network

By collecting half-hourly information instead, your smart meter can help the network be:

- **More efficient**, by accurately knowing when you use electricity throughout the day.
- **Greener**, by reducing the amount of unnecessary fossil fuels being burned.
- **Cheaper to run**, which could lower the cost of energy across Great Britain, and may result in lower energy bills for customers.

The good news is your smart meter can automatically take care of this change, so you won't need to do anything differently.

We'll continue to keep your data safe and secure

We'll always keep your information safe. And we won't use it for any other purposes without your permission. You can find out how we use and protect your data in our Privacy Policy.

You can choose to opt out

If you'd rather stick to your meter readings only containing daily information, just let us know. Give us a call on 0800 456 6540 and one of our advisers will be happy to help.

Need more information?

You can find out more by visiting www.helpwithmeterreadings.com.

Thanks,

Jane Smith

Manager of Smart Meter Operations, Energy Supply Inc.

Appendix 3

Differences in demographic composition of those who were at risk of not resulting in HHS (including both those who are "Definitely not interested" in getting a smart meter *and* those who indicated they were at risk of opting-out after reading the communications)

		"Definitely not interested" in SM	Statistical test for differences	Opt-out risk	Statistical test for differences	Total risk of no HHS	Statistical test for differences
Total	All	17.1%	-	24.0%	-	37.0%	-
Gender	Male	16.8%	$\chi^2(1) = 0.112$	22.7%	$\chi^2(1) = 1.386$	35.7%	$\chi^2(1) = 1.315$
	Female	17.4%	*p*-value = 0.738	25.2%	*p*-value = 0.239	38.2%	*p*-value = 0.252
Age	18-34	3.6%	$\chi^2(2) = 102.270$	22.7%	$\chi^2(2) = 0.535$	25.5%	$\chi^2(2) = 41.516$
	35-54	14.8%	*p*-value **< 0.001**	24.7%	*p*-value = 0.765	35.8%	*p*-value **< 0.001**
	55+	25.4%		24.3%		43.5%	
Education	Below Degree	17.5%	$\chi^2(1) = 0.116$	26.4%	$\chi^2(1) = 6.824$	39.3%	$\chi^2(1) = 5.291$
	Degree or Above	16.9%	*p*-value = 0.734	20.8%	*p*-value = **0.009**	34.2%	*p*-value = **0.021**
Prepayment Meter	No	17.2%	$\chi^2(1) = 0.055$	23.7%	$\chi^2(1) = 1.997$	36.8%	$\chi^2(1) = 1.624$
	Yes	16.4%	*p*-value = 0.814	18.0%	*p*-value = 0.158	31.5%	*p*-value = 0.202
Usual Comms Type	Letter	18.6%	$\chi^2(1) = 0.477$	31.0%	$\chi^2(1) = 12.599$	43.8%	$\chi^2(1) = 10.425$
	Email	17.1%	*p*-value = 0.490	21.3%	*p*-value **< 0.001**	34.7%	*p*-value **= 0.001**
Data Sharing Acceptance	Always Happy	8.8%	$\chi^2(2) = 159.145$	7.0%	$\chi^2(2) = 165.746$	15.2%	$\chi^2(2) = 290.767$
	Sometimes Happy	11.3%	*p*-value **< 0.001**	18.6%	*p*-value **< 0.001**	27.8%	*p*-value **< 0.001**
	Don't Like	35.4%		47.9%		66.3%	
Usual Comms Read	Always	17.6%	$\chi^2(2) = 4.568$	19.7%	$\chi^2(2) = 37.969$	33.8%	$\chi^2(2) = 27.268$
	Sometimes	15.7%	*p*-value = 0.102	32.5%	*p*-value **< 0.001**	43.1%	*p*-value **< 0.001**
	Rarely	30.3%		56.5%		69.7%	

Appendix 4

Logistic regression estimating likelihood to be at risk of opting-out (ie "Not sure", "Probably would not" or "Definitely would not" allow changes to happen), by communications version read, socio-demographics and energy/ privacy attitudes

Opt-out Risk	Model 1	Model 2	Model 3
Comms Version (Baseline: V0)			
V1	-0.2402	-0.2352	-0.2439
	(0.183)	(0.185)	(0.199)
V2	-0.4763^{+}	-0.4743^{+}	-0.5792*
	(0.194)	(0.196)	(0.212)
V3	-0.0326	-0.0441	-0.1057
	(0.178)	(0.181)	(0.193)
V4	-0.1767	-0.2030	-0.2376
	(0.181)	(0.183)	(0.197)
Smart Meter Owner (Baseline: No)			
Yes	-0.6343***	-0.6157***	-0.6484***
	(0.122)	(0.124)	(0.133)
Usual Comms Type (Baseline: Letter)			
Email	-0.4737**	-0.5497***	-0.5450**
	(0.146)	(0.154)	(0.165)
Gender (Baseline: Male)			
Female	---	0.1129	0.0728
	---	(0.122)	(0.131)
Age Category (Baseline: 18-34)			
35-54	---	0.2530	0.1798
	---	(0.166)	(0.179)
55+	---	0.2760^{+}	0.3431^{+}
	---	(0.164)	(0.181)
Education (Baseline: Below Degree)			
Degree or Above	---	-0.3242**	-0.3438*
	---	(0.124)	(0.133)
Prepayment Meter (Baseline: No)			
Yes	---	-0.4965^{+}	-0.4701^{+}
	---	(0.258)	(0.277)
Data Sharing Acceptance (Baseline: Always)			
Sometimes	---	---	1.0115***
	---	---	(0.258)
Don't Like Sharing	---	---	2.3660***
	---	---	(0.271)
Usual Comms Read (Baseline: Always)			
Sometimes	---	---	0.4843**
	---	---	(0.158)
Rarely	---	---	1.1114*
	---	---	(0.468)
Constant	-0.3356^{+}	-0.3790	-1.7212***
	(0.179)	(0.234)	(0.341)
Observations	1,615	1,614	1,614

Standard errors in parentheses; *** p<0.001, ** p<0.01, * p<0.05, $^{+}$ p< 0.1

Additional Pairwise Tests	***p*-value**
Formatting: V0 vs. V1	0.219
Reassurances: V1 vs. V2	0.128
Justification: V2 vs. V3	**0.027**
Benefits Salience: V3 vs. V4	0.510
Age 35-54 vs. 55+	0.292
DSA Sometimes vs. Don't Like	**< 0.001**
UCR Sometimes vs. Rarely	0.188

Appendix 5

Logistic regression estimating likelihood to be at risk of opting-out by communications version read, socio-demographics and energy/ privacy attitudes, with interactions between communications version and usual communications type

Opt-out Risk	Model 1 All	Model 2 Letter	Model 3 Email
Comms Version (Baseline: V0)			
V1	0.0782	0.1317	-0.3369
	(0.412)	(0.423)	(0.239)
V2	-0.5280	-0.5391	-0.5981^{+}
	(0.442)	(0.470)	(0.259)
V3	-0.7925	-0.8149	0.0708
	(0.461)	(0.477)	(0.224)
V4	-0.2526	-0.2044	-0.3061
	(0.429)	(0.440)	(0.233)
Smart Meter Owner (Baseline: No)			
Yes	-0.6432***	-1.1653***	-0.4753**
	(0.134)	(0.307)	(0.157)
Usual Comms Type (Baseline: Letter)			
Email	-0.6054^{+}	---	---
	(0.335)	---	---
Comms Version * Usual Comms Type			
V1 * Email	-0.3861	---	---
	(0.476)	---	---
V2 * Email	-0.1038	---	---
	(0.512)	---	---
V3 * Email	0.8661	---	---
	(0.512)	---	---
V4 * Email	-0.0559	---	---
	(0.488)	---	---
Gender (Baseline: Male)			
Female	0.0684	0.0559	0.1125
	(0.132)	(0.286)	(0.157)
Age Category (Baseline: 18-34)			
35-54	0.2160	0.1685	0.1381
	(0.181)	(0.353)	(0.229)
55+	0.3559^{+}	0.2792	0.2774
	(0.183)	(0.357)	(0.230)
Education (Baseline: Below Degree)			
Degree or Above	-0.3626**	-0.3950	-0.3918*
	(0.135)	(0.301)	(0.159)
Prepayment Meter (Baseline: No)			
Yes	-0.4925^{+}	-0.0035	-1.3978*
	(0.279)	(0.411)	(0.546)
Data Sharing Acceptance (Baseline: Always)			
Sometimes	1.0205***	0.8423	1.0456***
	(0.258)	(0.541)	(0.299)
Don't Like Sharing	2.3645***	2.2374***	2.3658***
	(0.271)	(0.590)	(0.314)
Usual Comms Read (Baseline: Always)			
Sometimes	0.4884**	0.4593	0.5418**
	(0.159)	(0.337)	(0.190)
Rarely	1.1839*	---	0.3016
	(0.475)	---	(0.603)
Constant	-1.6838***	-1.2530^{+}	-2.3150***
	(0.415)	(0.664)	(0.387)
Observations	1,614	296	1,217

Additional Pairwise Tests	**Letter *p*-value**	**Email *p*-value**
Formatting: V0 vs. V1	0.756	0.158
Reassurances: V1 vs. V2	0.142	0.339
Justification: V2 vs. V3	0.577	**0.010**
Benefits Salience: V3 vs. V4	0.204	0.107
Age 35-54 vs. 55+	0.777	0.437
DSA Sometimes vs. Don't Like	**< 0.001**	**< 0.001**
UCR Sometimes vs. Rarely	0.173	0.694

Appendix 6

List of objective comprehension questions (correct answers underlined)

Q1. What would you need to do if you wanted to stop the proposed changes to your smart meter readings from happening?

1. Phone your supplier and ask them to stop the changes from happening [38.9%]
2. Nothing – the changes won't happen unless you ask for them to do so [20.4%]
3. Visit a website to choose to stop the changes from happening [30.7%]
4. You can't stop these changes from happening [10.0%]

Q2. What would happen if you do not respond?

1. The proposed changes will happen automatically on 1st May [61.5%]
2. Nothing will change if you do not respond [19.1%]
3. Your energy supplier will contact you again if you do not respond by 1st May [14.3%]
4. Your smart meter will stop taking any readings from 1st May [5.1%]

Q3. Which of the following statements best reflects the proposed changes to smart meter readings?

1. Smart meter readings currently contain daily information, but will contain half-hourly information from 1st May [65.5%]
2. Smart meter readings currently contain half-hourly information, but will contain daily information from 1st May [13.9%]
3. Smart meter readings currently contain weekly information, but will contain daily information from 1st May [10.2%]
4. Smart meter readings currently contain daily information, but will contain weekly information from 1st May [10.5%]

Q4. What impact could the proposed changes to smart meter readings have on the cost of electricity bills?

1. Electricity bills may start to fall at some point in the future because of these changes [58.5%]
2. Electricity bills will definitely start to fall on 1st May because of these changes [11.5%]
3. Electricity bills will definitely start to fall because of these changes, but it may take some time before it happens [14.4%]
4. Electricity bills will definitely not fall because of these changes, and may actually rise [15.7%]

Q5. What was the address of the website you could visit if you were interested in finding out more information about the proposed changes to smart meter readings?

1. www.helpwithmeterreadings.com [12.0%]
2. www.smartmeterchanges.com [52.9%]
3. www.meterreadingsupport.com [8.3%]
4. www.myenergysupply.com [26.9%]

Appendix 7

Logistic regression estimating likelihood to get all of Q1-Q3 correct by communications version read, socio-demographics and energy/ privacy attitudes

OC All Correct	Model 1	Model 2	Model 3
Comms Version (Baseline: V0)			
V1	-0.0288	-0.0305	-0.0102
	(0.179)	(0.180)	(0.182)
V2	0.0599	0.0463	0.0406
	(0.181)	(0.181)	(0.184)
V3	-0.3843	-0.3935	-0.4032
	(0.190)	(0.191)	(0.192)
V4	-0.1854	-0.1868	-0.1807
	(0.183)	(0.184)	(0.185)
Smart Meter Owner (Baseline: No)			
Yes	-0.0731	-0.0584	-0.0895
	(0.122)	(0.123)	(0.124)
Usual Comms Type (Baseline: Letter)			
Email	0.0963	0.0207	0.0432
	(0.156)	(0.163)	(0.165)
Gender (Baseline: Male)			
Female	---	0.1637	0.1402
	---	(0.120)	(0.122)
Age Category (Baseline: 18-34)			
35-54	---	0.0332	-0.0169
	---	(0.165)	(0.168)
55+	---	0.2504	0.0957
	---	(0.160)	(0.164)
Education (Baseline: Below Degree)			
Degree or Above	---	0.0417	0.0185
	---	(0.121)	(0.123)
Prepayment Meter (Baseline: No)			
Yes	---	-0.1775	-0.1817
	---	(0.245)	(0.247)
Data Sharing Acceptance (Baseline: Always)			
Sometimes	---	---	0.2683
	---	---	(0.172)
Don't Like Sharing	---	---	0.4142*
	---	---	(0.204)
Usual Comms Read (Baseline: Always)			
Sometimes	---	---	-0.7701***
	---	---	(0.179)
Rarely	---	---	-0.7338
	---	---	(0.579)
Constant	-1.1251***	-1.2746***	-1.2770***
	(0.190)	(0.240)	(0.280)
Observations	1,615	1,603	1,603

Additional Pairwise Tests	***p*-value**
Formatting: V0 vs. V1	0.956
Reassurances: V1 vs. V2	0.787
Justification: V2 vs. V3	**0.024**
Benefits Salience: V3 vs. V4	0.264
Age 35-54 vs. 55+	0.434
DSA Sometimes vs. Don't Like	0.339
UCR Sometimes vs. Rarely	0.951

Appendix 8

Ordinary least squares regression estimating perceptions of societal benefits by communications version read, socio-demographics and energy/ privacy attitudes

Societal Benefits (Standardised)	Model 1	Model 2	Model 3
Comms Version (Baseline: V0)			
V1	0.0406	0.0473	0.0225
	(0.077)	(0.076)	(0.070)
V2	0.0469	0.0406	0.0325
	(0.079)	(0.077)	(0.072)
V3	-0.0500	-0.0343	-0.0096
	(0.078)	(0.076)	(0.071)
V4	0.1194	0.1370	0.1310
	(0.077)	(0.076)	(0.070)
Smart Meter Owner (Baseline: No)			
Yes	-0.0035	-0.0077	-0.0265
	(0.052)	(0.051)	(0.047)
Usual Comms Type (Baseline: Letter)			
Email	0.0432	0.1294^{+}	0.0916
	(0.065)	(0.066)	(0.061)
Gender (Baseline: Male)			
Female	---	0.0414	0.0740
	---	(0.049)	(0.046)
Age Category (Baseline: 18-34)			
35-54	---	-0.1270^{+}	-0.0735
	---	(0.066)	(0.062)
55+	---	-0.4496***	-0.4252***
	---	(0.065)	(0.062)
Education (Baseline: Below Degree)			
Degree or Above	---	0.0637	0.0697
	---	(0.050)	(0.047)
Prepayment Meter (Baseline: No)			
Yes	---	0.1110	0.0840
	---	(0.095)	(0.089)
Data Sharing Acceptance (Baseline: Always)			
Sometimes	---	---	-0.4361***
	---	---	(0.063)
Don't Like Sharing	---	---	-1.1400***
	---	---	(0.076)
Usual Comms Read (Baseline: Always)			
Sometimes	---	---	-0.0750
	---	---	(0.060)
Rarely	---	---	-0.3141
	---	---	(0.197)
Constant	-0.0509	0.0589	0.5818***
	(0.080)	(0.098)	(0.105)
Observations	1,615	1,615	1,615
R-squared	0.005	0.055	0.190

Additional Pairwise Tests	***p*-value**
Formatting: V0 vs. V1	0.750
Reassurances: V1 vs. V2	0.891
Justification: V2 vs. V3	0.564
Benefits Salience: V3 vs. V4	**0.050**
Age 35-54 vs. 55+	**< 0.001**
DSA Sometimes vs. Don’t Like	**< 0.001**
UCR Sometimes vs. Rarely	0.234

Appendix 9

Logistic regression estimating likelihood to self-report reading the communications in full by length of communications version read, socio-demographics and energy/ privacy attitudes

Comms read in full	Model 1	Model 2	Model 3	Model 4
Comms Version (Baseline: V0)				
V1	0.0142	-0.0194	-0.0289	---
	(0.195)	(0.198)	(0.205)	---
V2	-0.3213	-0.3704	-0.4295	---
	(0.190)	(0.192)	(0.201)	---
V3	-0.3610	-0.4030	-0.4204	---
	(0.186)	(0.189)	(0.196)	---
V4	-0.4786*	-0.5034*	-0.5399*	---
	(0.184)	(0.186)	(0.193)	---
Word Count	---	---	---	-0.0039*
	---	---	---	(0.001)
Smart Meter Owner (Baseline: No)				
Yes	0.1493	0.1407	0.0856	0.0843
	(0.122)	(0.124)	(0.129)	(0.129)
Usual Comms Type (Baseline: Letter)				
Email	0.1815	0.0317	0.0348	0.0386
	(0.151)	(0.158)	(0.164)	(0.164)
Gender (Baseline: Male)				
Female	---	-0.0609	-0.0701	-0.0705
	---	(0.121)	(0.127)	(0.126)
Age Category (Baseline: 18-34)				
35-54	---	0.0793	0.0577	0.0590
	---	(0.155)	(0.164)	(0.163)
55+	---	0.3727*	0.1398	0.1470
	---	(0.159)	(0.169)	(0.169)
Education (Baseline: Below Degree)				
Degree or Above	---	-0.0750	-0.1028	-0.0967
	---	(0.123)	(0.128)	(0.127)
Prepayment Meter (Baseline: No)				
Yes	---	-0.1627	-0.2149	-0.2136
	---	(0.224)	(0.232)	(0.232)
Data Sharing Acceptance (Baseline: Always)				
Sometimes	---	---	-0.1565	-0.1479
	---	---	(0.190)	(0.190)
Don't Like Sharing	---	---	-0.5562*	-0.5514*
	---	---	(0.215)	(0.215)
Usual Comms Read (Baseline: Always)				
Sometimes	---	---	-1.0409***	-1.0308***
	---	---	(0.146)	(0.146)
Rarely	---	---	-1.5411**	-1.5335**
	---	---	(0.461)	(0.459)
Constant	1.2416***	1.3320***	2.0344***	2.6583***
	(0.192)	(0.242)	(0.302)	(0.390)
Observations	1,615	1,614	1,614	1,614

Appendix 10

Logistic regression estimating likelihood to correctly answer recall name of website by length of communications version read, socio-demographics and energy/ privacy attitudes

Correct recall of website name	Model 1	Model 2	Model 3	Model 4
Comms Version (Baseline: V0)				
V1	-0.0347	-0.0451	-0.0106	---
	(0.222)	(0.223)	(0.225)	---
V2	-0.3044	-0.2990	-0.2777	---
	(0.240)	(0.241)	(0.243)	---
V3	-0.3529	-0.3448	-0.3289	---
	(0.237)	(0.239)	(0.240)	---
V4	-0.4711	-0.4787	-0.4579	---
	(0.243)	(0.244)	(0.245)	---
Word Count	---	---	---	-0.0033*
	---	---	---	(0.001)
Smart Meter Owner (Baseline: No)				
Yes	-0.0596	-0.0624	-0.0627	-0.0645
	(0.158)	(0.160)	(0.160)	(0.160)
Usual Comms Type (Baseline: Letter)				
Email	0.1356	0.1811	0.1486	0.1502
	(0.205)	(0.213)	(0.214)	(0.214)
Gender (Baseline: Male)				
Female	---	-0.0423	-0.0390	-0.0395
	---	(0.157)	(0.158)	(0.158)
Age Category (Baseline: 18-34)				
35-54	---	-0.2515	-0.2193	-0.2182
	---	(0.203)	(0.206)	(0.206)
55+	---	-0.4146*	-0.3577+	-0.3537+
	---	(0.203)	(0.209)	(0.209)
Education (Baseline: Below Degree)				
Degree or Above	---	-0.0923	-0.0895	-0.0862
	---	(0.159)	(0.160)	(0.160)
Prepayment Meter (Baseline: No)				
Yes	---	-0.5369	-0.5343	-0.5343
	---	(0.350)	(0.350)	(0.350)
Data Sharing Acceptance (Baseline: Always)				
Sometimes	---	---	0.0002	0.0033
	---	---	(0.218)	(0.218)
Don't Like Sharing	---	---	-0.0153	-0.0120
	---	---	(0.264)	(0.263)
Usual Comms Read (Baseline: Always)				
Sometimes	---	---	0.0854	0.0888
	---	---	(0.201)	(0.201)
Rarely	---	---	1.3670**	1.3665**
	---	---	(0.500)	(0.499)
Constant	-1.8274***	-1.5085***	-1.5680***	-1.0348*
	(0.244)	(0.301)	(0.352)	(0.455)
Observations	1,615	1,614	1,614	1,614