Department of Energy & Climate Change

Smart Metering Early Learning Project:

Consumer survey and qualitative research - Main report appendices

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Appendix 1: Glossary of key terms used in this report

Smart meter: These were defined to respondents in the survey as: "*Smart meters are the next generation of gas and electricity meters. Smart meters are able to communicate directly with energy suppliers by sending and receiving information about the amount of energy being used. Smart meters are installed by a professional engineer from your company".* In most cases these respondents will have received a 'smart-type' meter, as described in section 1.3.

In-home display (IHD): These were defined to respondents in the survey as: *"An in-home energy display is a portable device that displays current and past energy usage and how much it is costing or will cost. You may also know these as Real Time Display."* A range of IHDs can be purchased and used independently of a smart meter but customers are also offered – free of charge – an IHD to accompany their smart meter.

Clip-on in-home display: Some respondents may have owned an IHD prior to having a smart meter installed. During the survey it was explained to respondents that *"In contrast to the display that came with the smart meter this would have been fitted by someone in the household as opposed to an engineer from the energy company, although you may have been sent it by your energy supplier. The display would have been fitted by clipping a receiver onto the wires which feed into the electricity meter. This would have then transmitted data to the display"*

Smart meter customers: customers listed by suppliers as having an electricity or electricity and gas smart meter.

Legacy meter customers: customers listed by suppliers as having a conventional electricity meter/ conventional electricity and gas meters.

Proactive requesters: smart meter customers who contacted their supplier first and requested to have a smart meter installed in their property, or who changed supplier in order to sign-up to a package that included having a smart meter installed.

Active responders: smart meter customers who received information about smart meters and contacted their supplier to request that they have a smart meter installed.

Passive agreement: smart meter customers who agreed to have a smart meter installed after being contacted by their supplier and asked if they would like to have one.

Meter replacement: smart meter customers who were contacted by their supplier and told that their meter needed replacing. In some cases these customers may have been told their meter was being replaced with a smart meter, but this was not always recalled to be the case.

Social Grade: A social grade of A refers a household where the Chief Income Earner is a higher managerial professional, a social grade of B refers to an intermediate managerial professional, a social grade of C1 refers to a supervisory/clerical or junior managerial position, a social grade of C2 to skilled manual workers, a social grade of D to semi or unskilled manual labour, and a social grade of E to those not working or retired with a state pension. In households where the Chief Income Earner is retired on a private pension, the social grade is classified according to their previous employment role.

Household income: as part of the survey all customers were asked for their household's total annual income before tax and any other deductions. They were asked to include all forms of income, including that from interest on savings.

Long term health condition: as part of the survey all customers were asked if they or someone in their household had a long-term illness, disability or infirmity. Long-term was

defined to customers as being anything that had troubled or in some way affected that person or other members of the household over a period of time.

Vulnerable customers: customers may be considered vulnerable if they have; sight, hearing or speech impairments; are disabled; have limited literacy or numeracy; have a first language other than English; have limited or no experience of digital technology; aged 65 and over; live with a mental health condition or another long-term health condition; or live in a low income household. The survey recorded these details for all customers. Where the term ‘vulnerable’ is used in this report further detail is provided about the specific group of respondents being referred to.

Appendix 2: Qualitative interviews – quotas and completed interviews

The following appendix provides: an overview of the number of interviews completed; the quotas that were set for recruitment; and the final number of completed interviews.

The tables below show quota completes by two separate measures:

- Achievements against the sample data;
- Achievements as recorded in the screener questionnaire and uncovered through the interviews.

Variation between the two types of data was due to, either, changes to respondent behaviour over time, or to our improved understanding of their behaviour from the interviews conducted.

Completed Interviews

The table below shows the number of completed interviews by type of interview. In total 79 interviews were completed - 36 household interviews and 43 individual interviews.

Completed interviews	Target	Achieved
Individual interviews	As many required	**43**
Household interview	20	**36 (total, with and without children)**
Household interview with children (under 16)	As many as possible	**4**
Households with 17 year olds	As many as possible	**2**
Diary	As many as possible	**29**

Completed interviews where IHD was ever plugged in

Completed interviews (with targets) where the IHD was ever plugged in (74 interviews) is shown below broken down between energy company, social grade and age.

Energy supplier	Social Grade	IHD status	Age - grouped						Totals	
			18-34		35-64		65+			
			Target	Completed	Target	Completed	Target	Completed	Target	Completed
Company A	A/B/C1	IHD - plugged in	2	3	5	6	5	3	12	**12**
		IHD - plugged in initially, but now unplugged	3	1	3	7	2	2	8	**10**
	Total		**5**	**4**	**8**	**13**	**7**	**5**	**20**	**22**
	C2/D/E	IHD - plugged in	2	1	5	3	6	3	13	**7**
		IHD - plugged in initially, but now unplugged	1	1	3	4	2	3	6	**8**
	Total		**3**	**2**	**8**	**7**	**8**	**6**	**19**	**15**

Company B	A/B/C1	IHD - plugged in	2	3	5	4	5	6	12	**13**
		IHD - plugged in initially, but now unplugged	3	2	3	2	2	4	8	**8**
	Total		**5**	**5**	**8**	**6**	**7**	**10**	**20**	**21**
	C2/D/E	IHD - plugged in	2	2	5	6	5	2	12	**10**
		IHD - plugged in initially, but now unplugged	1	2	3	1	2	3	6	**6**
	Total		**3**	**4**	**8**	**7**	**7**	**5**	**18**	**16**
Totals			**16**	**15**	**32**	**33**	**29**	**26**	**77**	**74**

Quota targets

The table below shows the target number of interviews for each quota set, as well as the criteria monitored during the recruitment process.

	Target number of interviews	Final Completes	
		Based on screening/ interview data	Based on original survey data
Priority quotas (outwith matrix)			
IHD Never plugged in	**5**	4	5
Low income	**15**	Not gathered during qualitative interviewing process	20
Elderly (respondent or other in household 75+)	**8**		9
Health condition	**20**		24
Not present at installation / new occupant	**8**		8
Presence of children in household	**16**		20
Monitoring criteria			
No-one looks at IHD	**8**	Not gathered during qualitative interviewing process	6
Low education	**25**		33
Low tech	**10**		6
Single person household (excluding elderly)	**5**		6
Criteria of interest			
Busy lifestyle	**Monitored**	25	Not collected
Resistant to external advice	**Monitored**	19	Not collected
Environmental interest - high	**Monitored**	27	26
Environmental interest - low	**Monitored**	5	5
Gadget-lovers	**Monitored**	18	21

Appendix 3: Sampling, Weighting and Analysis Technical Information

Statistical Reliability

Accuracy of reported survey percentages

The confidence intervals, or margins of error, that apply to the percentage results in the main research report are given in the table below. This table shows the possible variation that might be anticipated because a sample, rather than the entire population, was interviewed. These confidence intervals allow us to be sure that results for different groups are statistically different.

As indicated, confidence intervals vary with the size of the sample and the size of the percentage results. The confidence interval is widest at a finding of 50% and narrows the nearer we get to absolutes of 0 or 100%. This table shows the confidence interval at the 95% level, which means that with repeated sampling, 95% of the time the result will lie within the margin of error given by the confidence interval.

Figure 1: Confidence intervals for survey

Size of sample on which survey result is based	Percentage point difference required for significance at or near these percentage levels		
	10% or 90%	**30% or 70%**	**50%**
1,080 interviews (smart meter customers who look at IHD personally and still have IHD plugged in and in use)	±2%	±3%	±3%
1,494 interviews (smart meter customers who personally look at IHD)	±2%	±2%	±3%
1,700 interviews (smart meter customers who were at home for their smart meter installation)	±1%	±2%	±2%
1,767 interviews (smart meter customers with an IHD that has ever been plugged in)	±1%	±2%	±2%
2,037 interviews (all smart meter customers)	±1%	±2%	±2%

Comparing survey results across subgroups of respondents

Tolerances are also involved in the comparison of results from different parts of the sample. A difference, in other words, must be of at least a certain size to be considered statistically significant. The following table is a guide to the sampling tolerances applicable to comparisons.

Figure 2: Interpreting subgroup findings

Size of sample on which survey result is based	Percentage point difference required for significance at or near these percentage levels		
	10% or 90%	**30% or 70%**	**50%**
154 vs. 269 (proactively requested a smart meter vs. those contacted by their supplier to say their meter needed replacing)	±6%	±9%	±10%
586 vs. 403 (Social grade A or B vs. social grade D or E)	±4%	±6%	±6%
1,353 vs. 514 (Any qualifications vs. no formal qualifications)	±3%	±5%	±5%
1,200 vs. 317 (IHD still plugged in vs. never plugged in)	±4%	±6%	±6%

Appendix 4: Description of smart meter population profile compared to national profile

This section provides key details of the demographic profile of the early roll-out smart meter population. The smart meter population statistics are taken from the weighted survey percentages. These reflect the profile of the original population data used to sample the survey respondents.

The source and nature of the national comparison data varies. All sources and comparisons are clearly labelled.

These tables should be interpreted with caution and only be considered an indicative view of the differences between the smart meter population and the national population profiles. This is because there are a number of reasons why the smart meter and national population figures may not be directly comparable:

- **Answer codes (e.g. income brackets, or benefits received) have been grouped together to aid comparison.** Due to differences in question wording and answer codes, this process is not always straightforward and can mean that sometimes the definition of a grouping varies between the tables and the report, resulting in different compositions and base sizes.
- **The countries included in the national data do not always directly align**. For instance, the smart meter population are all from Great Britain, but some national data is only available for England or for the UK as a whole (i.e. Great Britain and Northern Ireland).
- **The dates of data collection vary**. The smart meter fieldwork was conducted between 4th October 2013 and 1st February 2014. However, the national comparative data either precedes or proceeds this point in time – some data for the national comparisons dates from 2009.

It should be noted that:

- Differences in results presented in these tables are only statistically significant if discussed in the report
- Direct comparisons can also only be made if the results are discussed in the main report

As such, any differences in the results that are not discussed in the main report can neither be considered comparable nor statistically significant.

Table 1: Social Grade

Social Grade	Smart meter survey population	United Kingdom
A	**5%**	**4%**
B	**22%**	**22%**
C1	**31%**	**27%**
C2	**21%**	**22%**
D	**14%**	**16%**
E	**7%**	**9%**
Refused	**1%**	**N/A**

Smart Meter Survey Population Base: 2,037

National Comparison Source: National Readership Survey (2012-2013), Social Grade Definitions (http://www.nrs.co.uk/lifestyle-data/).

Table 2: Household connection to mains gas

Mains Gas connection	Smart meter survey population	United Kingdom
Connected to mains gas	**95%**	**85%**
Not connected to mains gas	**5%**	**15%**

Smart Meter Survey Population Base: 2,037

National Comparison Source: Office of Fair Trading (2011) Off-grid energy: an OFT market survey, London.

Table 3: Household property type

Property type	Smart meter survey population	Great Britain
House or bungalow	**94%**	**77%**
Flat, maisonette or apartment	**6%**	**22%**
Other	***%**	***%**

Smart Meter Survey Population Base: 2,037

National Comparison Source: ONS (2011 Census), Accommodation type – Households, local authorities in the United Kingdom, Table QS402UK. Based on all households.

Table 4: Household Income

Household's total income, before tax and any other deductions.	Smart meter survey population	Great Britain
Up to £15,999	**20%**	**24%**
£16,000 - £24,999	**17%**	**13%**
£25,000 - £34,999	**11%**	**10%**

£35,000 - £49,999	**13%**	**12%**
£50,000+	**12%**	**8%**
Don't know / Refused	**27%**	**33%**
Smart Meter Survey Population Base: 2,037 **National Comparison Source:** DECC (2014) Public Attitudes Tracker – Wave 9 dataset.		

Table 5: Central heating system

Central heating system[1]	Smart meter survey population	Great Britain
Gas	**91%**	**80%**
Oil	**2%**	**4%**
Solid fuel (e.g. coal, wood)	**1%**	**1%**
	Remaining proportion made of fixed room heaters, portable heaters and other types (both electric, gas and solid fuel).	Remaining proportion made of electric central heating, no central heating and other types.
Smart Meter Survey Population Base: 2,037 **National Comparison Source:** ONS (2011 Census), Central heating, local authorities in England and Wales, Table QS415EW. All household spaces with at least one usual resident. Scotland's Census 2011 - National Records of Scotland, Table QS415SC - Central heating.		

Table 6: Smart meter installation period

Period smart meter installed	Smart meter survey population	
April – December 2011	**21%**	**Comparison not possible.**
January – June 2012	**29%**	
July – December 2012	**42%**	
January – February 2013	**7%**	
Smart Meter Survey Population Base: 2,037		

Table 7: Household size

Household size	Smart meter survey population	Great Britain
1	**23%**	**31%**
2	**46%**	**34%**
3	**14%**	**16%**
4	**11%**	**13%**

[1] The survey data is based on the main way customers heat their home, whereas the census data is based on asking people about whether they have central heating and what type it is. As such, the data presented in this table should be approached with more care than others in this appendix.

5 or more	**6%**	**7%**
Mean	**2.3 people**	**2.3 people**

Smart Meter Survey Population Base: 2,037

National Comparison Source: ONS (2011 Census), Households with at least one usual resident, household size and average household size, local authorities in the United Kingdom, Table H01UK. All usual residents in households; all households with at least one usual resident.

Table 8: Long-term health condition

Presence of long-term health condition in household	Smart meter survey population	England
Yes	**30%**	**30%**
No	**69%**	**70%**
Don't know / Refused	***%**	**N/A**

Smart Meter Survey Population Base: 2,037

National Comparison Source: DCLG (2012), English Household Survey, Full Report (2011-12), London.

Table 9: Method of electricity bill payment

Method of payment	Smart meter survey population	Great Britain
Direct debit	**77%**	**56%**
Credit (quarterly payment on receipt of bill)	**17%**	**29%**
Other (including pre-payment)	**5%**	**16%**
Don't know	***%**	**N/A**

Smart Meter Survey Population Base: 2,037

National Comparison Source: DECC (2013) Table 2.4.2 Regional variation of payment method for standard electricity, December 2013, London.

Table 10: Method of gas bill payment

Method of payment	Smart meter survey population	Great Britain
Direct debit	**78%**	**57%**
Quarterly on demand	**16%**	**29%**
Other	**5%**	**15%**
Don't know	***%**	**N/A**

Smart Meter Survey Population Base: 1,930

National Comparison Source: DECC (2013) Table 2.2.2 Regional variation of payment method for gas payments, December 2013, London.

Table 11: Property age

Property age	Smart meter survey population	England (housing stock estimates)
pre 1919	**14%**	**20%**
1919-44	**21%**	**17%**
1945-64	**24%**	**20%**
1965-80	**21%**	**21%**
1981-90	**7%**	**9%**
post 1990	**7%**	**14%**
Don't know	**6%**	**N/A**

Smart Meter Survey Population Base: 2,037

National Comparison Source: DCLG (2013), English Household Survey, Headline Report 2012-2013, London.

Table 12: Length of residence

Length of residence	Smart meter survey population	England
Under 5 years	**15%**	**33%**
5 to 9 years	**16%**	**18%**
10 to 19 years	**23%**	**21%**
20 to 29 years	**19%**	**12%**
30 years and above	**27%**	**16%**
Don't know / Refused	***%**	**N/A**
Mean	**21.5**	**13.9**

Smart Meter Survey Population Base: 2,037

National Comparison Source: DCLG (2013), English Household Survey, Headline Report 2012-2013, London.

Table 13: Household benefits received

Benefits received	Smart meter survey population	UK
None of these	**60%**	**40%**
Job seekers allowance	**1%**	**4%**
Income support	**2%**	**3%**
Working tax credit	**4%**	**6%**
Child tax credit	**7%**	**11%**
Pension credit	**6%**	**5%**
Housing benefit	**6%**	**13%**
Council tax benefit	**10%**	**16%**

Disability living allowance	**9%**	**14%**[2]
Universal credit	***%**	**-**
Child Benefit	**-**	**22%**
State pension	**-**	**25%**
Other state benefits	**13%**	**8%**
Don't know	**1%**	**-**
Prefer not to say	**4%**	**-**
Smart Meter Population Base: 2,037 **National Comparison Source:** UK - Family Resources Survey 2012 to 2013 (Department for Work and Pensions, 2014) *Income and state support receipt: data tables*, London.		

Table 14: Managing energy bills

Which one of these best describes how well you and your household are keeping up with your energy bills at the moment?	Smart meter survey population	Great Britain
I/we manage very well	**27%**	**21%**
I/we manage quite well	**35%**	**33%**
I/we get by alright	**30%**	**34%**
I/we have some difficulties	**6%**	**9%**
I/we have severe difficulties	**1%**	**2%**
Don't know	**1%**	**1%**
Prefer not to answer	***%**	***%**
Smart Meter Survey Population Base: 2,037 **National Comparison Source:** DECC (2014) Green Deal Household Tracker Survey – Wave 4, Topline data.		

[2] This figure combines "Disability living allowance (carer component" and "Disability living allowance (mobility component)"

Table 15: General attitudes

Attitudinal statement		Smart meter survey population	Great Britain
a) The environment is a low priority compared with other things in my life *(please note comparisons for this statement are from 2009).*	Agree strongly	**10%**	**6%**
	Tend to agree	**25%**	**22%**
	Neither agree nor disagree	**22%**	**25%**
	Tend to disagree	**22%**	**32%**
	Disagree strongly	**13%**	**14%**
	Don't know	**1%**	**1%**
b) I'm the type of person who likes to have the newest gadgets in my home	Agree strongly	**7%**	**10%**
	Tend to agree	**15%**	**23%**
	Neither agree nor disagree	**15%**	**22%**
	Tend to disagree	**32%**	**26%**
	Disagree strongly	**31%**	**18%**
	Don't know	***%**	**Code not provided**
c) It's not worth me doing things to help the environment if others don't do the same	Agree strongly	**7%**	**6%**
	Tend to agree	**15%**	**14%**
	Neither agree nor disagree	**15%**	**15%**
	Tend to disagree	**32%**	**33%**
	Disagree strongly	**30%**	**31%**
	Don't know	**1%**	**Code not provided**
d) I'm always looking out for new ideas to improve my home	Agree strongly	**15%**	**17%**
	Tend to agree	**39%**	**36%**
	Neither agree nor disagree	**18%**	**22%**
	Tend to disagree	**19%**	**18%**
	Disagree strongly	**8%**	**7%**
	Don't know	***%**	**Code not provided**

Smart Meter Population Base: 2,037

National Comparison Source:

a); Defra Public Attitudes and Behaviours towards the Environment – Tracker Survey , Sept 2009.

b-d): DECC (2014) Green Deal Household Tracker Survey – Wave 4, Topline data.

Appendix 5: Summary of differences in the experiences of smart meter customers

This section summarises the key differences in the experience of the customer journey between different subgroups of the smart meter customers involved in this research.

5.1 How customers were contacted about having a smart meter installed

Customers who proactively requested their smart meter were more likely than other groups of customer to be satisfied overall and to be engaged with their IHD. This was especially true in comparison with customers who received a smart meter as they were told their meter needed replacing.

Proactive requesters or those who actively responded to an offer for a smart meter were more likely to be satisfied with their smart meter and IHD (84% and 79% respectively) than those who were told that their meter needed replacing (64%). Proactive requesters were also more likely to speak highly of their smart meter and IHD (71% compared to 57% of active responders, 50% of passive receivers and 38% of those told their meter needed replacing).

Proactive requesters and active responders were more likely to still have their IHD plugged in (70% for both compared to 59% of those who passively agreed to have a meter installed). Proactive requesters were also more likely than other groups to have used a number of functions on their IHD; for example those who proactively requested a smart meter were more likely to have used their IHD for information on past *and* current spending on electricity at least once a week compared to those who passively or actively responded to their energy company about smart meters (past - 48% compared to 32% for both; current – 59% compared to 39% for both). These customers were also more likely to say that they wanted more information on how to use their IHD to manage their energy use (35% stated this compared to 25% of those who passive agreed and 21% those told that they needed a meter replacement).

During the in-depth interviews it was apparent that the smart meter installation was viewed as more of an ‘event’ in households where the smart meter had been proactively requested. These customers spoke of having “looked forward to getting it”. By contrast, in some of the households where the supplier had written to let them know that their meter needed replacing it was apparent that the smart meter installation had been a very minor occurrence for them. These contrasting attitudes confirm the story told by the survey data that proactive requesters are likely to be more engaged with their smart meter and IHD, probably as a result of their higher initial level of interest.

However, despite the story told by the survey data, the way in which customers were initially approached, or themselves requested, a smart meter was not found to be an important driver of subsequent behaviour. While it is related to overall levels of satisfaction with the installation it is a minor driver of this model, and is not significantly related at all to any of the other behaviours explored (e.g. feeling in control, using the IHD to understand and manage energy use, buying more energy efficient products etc.).

5.2 Prior knowledge of SM

Those who knew a fair amount or a great deal about smart meters before getting one installed were more satisfied with their smart meter and IHD and knew more about their IHD.

Those who knew a fair amount or a great deal about smart meters before getting one installed, were both more satisfied with their smart meter and IHD (84% vs. 68%) and higher advocates

(62% vs. 41%), than those who had never heard of them before. They were no more likely to be satisfied or dissatisfied with the installation process overall, but were more satisfied with the explanations provided by the booklets and the installers.

With IHDs, those who knew at least a fair amount about smart meters before having one installed were more likely to have their IHD plugged in (75% vs. 53%), less likely to have never plugged it in (6% vs. 16%) and less likely to have unplugged it because they did not know how to use it (19% vs. 7%). They were also more likely to know how to switch between cost and usage displays and current and past information; as well as agreeing they found their IHD easy to use (84% vs. 61%) and have had use a variety of different screens (95% had used at least one different type of information screen vs. 79% of those who had never heard of smart meters). Those who knew at least a fair amount about smart meters before having one installed were more likely to discuss IHD information with other household members (37% compared to 22% among those who had never heard of smart meters).

These smart meter customers were also more likely to have thought at least a fair amount about the amount of electricity they used in the last couple of years (84% vs. 69% who had never heard of) and think the amount of electricity they have used has increased (34% vs. 26%). They also thought their IHD had shown them that they used more energy than they expected (51% vs. 40%). However, these customers were also more likely to have tried to reduce the amount of energy they use at home (90% vs. 84%), to know what uses the most electricity in their home (90% vs. 78%) and to feel in control of how much electricity they used (84% vs. 78%).

The KDA found that the amount known about smart meters in advance of being contacted to have one installed is related to subsequently exhibiting positive behavioural outcomes, albeit a less important factor than some other parts of the customer experience.

5.3 Length of time since smart meter installation

Customers who had their smart meter installed in the initial months of the early roll-out, around April 2011, were more likely than those who received their smart meter more recently to be satisfied overall. Those who had their smart meter for longer were also more likely to report changes in their level of engagement with energy use and to report changes in their energy-related behaviours. This conclusion has been reached from analysis of the survey data, although substantial differences in customers' experiences depending on the date of their installation were not observed during the in-depth interviews.

Customers who had their smart meter installed for a longer period of time were both more likely to be satisfied and less likely to be dissatisfied with their smart meter, as well as less likely to be critical of it, than those who had had it for a shorter space of time. For instance, 3% of those whose smart meter had been installed for between 19 and 24 months said that they were dissatisfied with their smart meter compared to 6% of those who have had their smart meter installed for less than 12 months.

The main difference between customers who had received their smart meter in the initial months of the early roll-out and those who had theirs installed more recently, was in their self-reported changes to their energy usage and levels of engagement. Those customers who had their smart meter installed more than two years before the survey were more likely to state that their gas and electricity usage had decreased over this time period than those who had their smart meter installed within the last 12 months (26% compared to 17%). Those who have had their smart meter for longer were also more likely than those with a more recent installation to say they were thinking at least a fair amount about their electricity usage (83% of those who have had a smart

meter for over two years compared to 73% of those who have had a smart meter for less than 12 months).

Those who have had a smart meter for longer were also more likely to say they were performing certain inefficient behaviours less often than they used to, such as leaving lights on when leaving the room, filling the kettle more than they needed to, and leaving the heating on when out of the house. For instance, 14% of those who had had a smart meter for two years or more before the survey stated that they were leaving their lights on less often than a few years ago in contrast to 9% of those who had had the smart meter for 13 to 24 months.

Those who had received their smart meter longer ago were also more likely to have looked for information on tariffs, or changed tariffs, than those who received their smart meter more recently. For example 45% of those who had had a smart meter for more than two years stated that they had found out more information on tariffs in the last couple of years compared 31% of those who had had the smart meter for less than 12 months.

The profile of customers receiving their smart meter in different periods of the early roll-out has been analysed. This shows there was a fairly even spread of different types of customer across the full period. For example, those of different social grades and ages were similarly likely to have received their installation at any point over the early roll-out. Similarly, proactive requesters, active responders, passive agree-ers and meter replacement customers were all just as likely to have had a smart meter installed at any point over the early roll-out. There did not appear to be any major differences in the pattern of responses to more detailed questions about installation experiences across different time periods either. Although there may have been other differences in the profile or experience of customers not captured by the survey, this suggests that the differences observed here are related to how long the smart meter has been installed in a home rather than any other demographic factor.

However, despite the story told by the survey data, the length of time that the smart meter had been installed was not found to be a driver of subsequent behavioural outcomes which were explored through the KDA.

5.4 Whether respondents were present for the smart meter installation visit

A small but significant proportion of smart meter customers surveyed had not been present when their smart meter was installed, either because they had moved into that property after the meter was installed, or because someone else in the household had been present for the installation visit. Customers not present at the time of installation were less likely to speak highly of their smart meter and less likely to know how to use a variety of features on their IHD.

Customers who were present for the installation were more likely to speak highly of their smart meter and IHD (49% compared to 41% of all smart meter customers).

Those not present were less familiar and knowledgeable of the IHD functions; though interestingly, were more likely to still have it plugged in and in use (71% vs. 60% present). Customers not present were less able to switch between IHD displays (50% compared to 62% of all smart meter customers with an IHD that had ever been plugged in) or access information on current and past energy use. However, they were also more likely to consider that their IHD had shown them they were using more energy than expected (55% vs. 44%). A few of the in-depth interviews were conducted with respondents who had not been present for the smart meter installation. They discussed the ways in which any information given during the visit had been passed on to them second hand. In some cases, this revealed some of the challenges of subsequently engaging with the IHD which supports the survey data described above.

“My husband was present for the installation. He said they turned up, fitted it, gave him a 30 second demonstration, then left him with a book … I asked him how it worked, and he wasn't all that clear. I don't know what happened to the booklet he was given. I had thought it would make a difference, but I haven't really got around to working it out.”

Individual, Low income, 18-34, IHD plugged in

5.5 Length of engagement with IHD

There are some notable differences when comparing between those smart meter customers who still had their IHD plugged in, and those who unplugged it after either a few months or after only a few days or weeks. Customers who still had their IHD plugged in tended to be more engaged with it, were more satisfied overall and were more likely to speak highly of their smart meter. By contrast, customers who unplugged their IHD within a few days or weeks tended to be less engaged, and were less likely to feel their IHD was easy to use and less likely to say that they knew how to operate their IHD.

Smart meter customers who still had their IHD plugged in were both more likely to say that they were satisfied with their smart meter and IHD and that they would speak highly of them. For example 83% of those who still had their IHD plugged in expressed satisfaction compared to 72% of smart meter customers overall. In contrast, those who unplugged their IHD after a few days or weeks were more likely to be critical of their smart meter (9% compared to 3% of those who still had it plugged in).

Customers who unplugged their IHD after a few days or weeks were more likely to disagree that their IHD was easy to use (20%) compared to those who still had their IHD plugged in (7%). This group was also less likely to say that they knew how to operate different functions of their IHD compared to those who had it plugged in for a few months, or who still had it plugged in. For instance, 43% of those who unplugged their IHD after a few days or weeks said that they knew how to switch between the energy usage and spending displays on their IHD compared to 67% of those who unplugged after a few months and 68% of those who still had it plugged in.

The survey results suggested that those customers who left their IHD plugged in were more likely to see unexpected patterns in their energy use. Those who said their IHD was still plugged in, or who had the IHD plugged in for at least a few months, were more likely to say that the IHD showed them that they were using more energy than expected (48% and 50% respectively, compared to 30% of those who had it plugged in for a few days or weeks). Those who still had their IHD plugged in were also more likely to say that their IHD showed them that they were using less energy than expected: 21% said this compared to 12% and 13% of those who had it plugged in for a few days or weeks and a few months respectively.

Those who still had their IHD plugged in were also more likely to have experienced a particular issue with their IHD: for example, 12% had experienced a delay in how quickly the IHD responded to turning an electrical device off compared to 4% of those who had had it plugged in for a few months and 7% of those who had had it plugged in for a few days or weeks. However, only a very small proportion of customers felt they had been inconvenienced by any of the issues they were prompted to think about during the survey.

The in-depth interviews found that although some respondents had used their smart meter initially before unplugging it and still felt they had gained something from doing this, those who continued to use it reported being more engaged. The survey data showing those who still had an IHD plugged in were more satisfied suggests that some were able to continue to get use from their IHD in the longer term, and that this correlated with satisfaction and advocacy. An example of this being reported during the in-depth interviews is provided below:

"I taught myself to check it regularly, and because of the location I do check it regularly. I more or less learned what it does, so I can see what is on or what has just gone off. I learned it pretty much immediately after getting it, within a couple of days. It was just a matter of looking at it after that."

Individual, Middle income, 35-64, Single person HH, IHD plugged in

5.6 Respondent age

Looking at customers by age, there are some clear differences when considering elements of the smart meter installation experience and use of the IHD. The most consistent difference is when comparing customers aged 65 or over to smart meter customers overall, or to other age groups. Whilst expressing similar levels of overall satisfaction with their smart meter and the installation process, customers aged over 65 tended to be less satisfied with specific elements of the installation process such as the explanations provided on the IHD. They were also less likely than other groups to have ever plugged their IHD in. Of those that had, those aged 65 and over were more likely than other groups to say that they had stopped using it because they did not understand it.

Younger smart meter customers were more likely to say that they knew at least something about smart meters before contact with their supplier about installing one compared to other age groups. For instance, 18% of 18 to 34 year olds said they knew at least a fair amount about smart meters prior to any form of contact with their supplier compared to 10% of those aged 65 or over.

Overall levels of satisfaction with the smart meter and IHD were similar across age groups: 74% of smart meter customers aged 65 or over were satisfied with their smart meter compared to 72% of smart meter customers overall . It was a similar case for overall levels of satisfaction with the smart meter installation process: 91% of those aged 65 or over were satisfied compared to 89% of smart meter customers overall who lived in the property where the installation took place. Satisfaction levels were also broadly similar when considering the pre-installation experience of arranging the visit. However, those aged 65 or over were less likely to express satisfaction with a number of specific aspects of the installation process. For example, they were less likely to be satisfied with the booklet explaining how the IHD worked (66% compared to 72% of all those who received a booklet).

Considering IHD usage, those smart meter customers aged 65 or over were more likely to have never plugged their IHD in and were more likely to say that they had stopped using their IHD because they did not understand how to use it (19% compared to 8% of those aged 18 to 64), and less likely to say that they knew how to operate the functions on their IHD. For example, 56% of those aged 65 or over said they knew how to switch between the money and energy usage displays compared to 71% of those aged 18 to 34. Of those who had ever plugged in their IHD, customers aged 65 or over were less likely than other age groups to state that they were using more energy than they expected (34% of those aged 65 or over said at least one aspect of the IHD showed that they were using more energy than expected compared to 51% of those aged 18 to 64). These differences are also apparent when comparing single person to multiple occupancy households; 37% of single person households said that at least one aspect of the IHD showed that they were using more energy than expected compared to 55% of households with three or more people (the section below provides further detail of differences by household size).

Lower levels of engagement with the IHD shown through the survey data, may be explained by the lower levels of familiarity and confidence in technology observed during the in-depth interviews with some older respondents.

Once you're older you don't go in for these gadgets."

Individual, Low income, 65 and over, IHD plugged in

For a few older smart meter customers interviewed the IHD also made them feel concerned – either because they were afraid of touching it in case it affected the settings or stopped functioning, or because they did not like to be reminded of their energy use or felt unable to make any changes to the amount they used.

The KDA showed that satisfaction with the explanations of the smart meter and IHD given by the installer were more important drivers of subsequently finding the IHD easy to use and interacting with the information shown in the case of older customers compared with younger customers, or customers overall. It will be important for these explanations to be pitched at the right level for the specific customer as during the in-depth interviews some older customers described the information they were given as "going over my head".

The lower levels of engagement with the IHD among older smart meter customers is also likely to be related to their greater likelihood of either living alone or in smaller households and with no children. During the in-depth interviews, respondents living in these types of household, including those who were older, felt the IHD was less useful for them as they already felt in control of how much energy they used. The section below describes the results according to household size in more detail.

5.7 Household size

Smart meter customers living in multi-person households were more likely to speak highly of their smart meter than those living in single-person households. They were also more likely to find the IHD easy to use and to feel confident using it to access different types of information. Although these differences may mirror the findings about respondent age (72% of those in single smart meter households were aged 65 or over) or presence of children aged under 15, it may also indicate the potential importance of other household members in motivating IHD use and contributing to knowledge of its use. Respondents from multi-person households were also more likely to have been shown through their IHD that they were using more energy than they expected, and to have taken up more energy efficient behaviours and to believe some of these actions had been encouraged by having the smart meter and IHD installed.

Those in multi-person households were more likely to know about smart meters before being contacted by their energy supplier and would speak more highly of their smart meter and IHD overall (49%), than those in single-person households (39%). No particular differences existed by overall satisfaction with the installation process, but those in multi-person households were more satisfied with the explanations provided by both the booklets and the installers explaining how the smart meter and IHD work. Among customers whose IHD was unplugged, those in households of three or more people were more likely to have unplugged it as they considered it took up space or was in the way (13% vs. 4% in single person households) – whereas single person households were more likely to have unplugged it as they did not understand it (19% vs. 9% in three person or more households). Those in multi-person households were more likely to know how to use certain features on their IHD, agree that their IHD is easy to use and use its features more often. Moreover, those in households with three or more people would have liked further information on how to use their IHD to manage their energy use, than single person households.

Those in households of three or more people felt their IHD showed them they were using more energy than they expected (55% vs. 37% one or two person households). Respondents from multi-person households were more likely to have taken up more positive energy behaviours over

the last couple of years; washing clothing at 30 C and keeping unused rooms cool. This was mirrored in multi-person households being more likely to have agreed that their smart meter or IHD has encouraged them to try to reduce their energy use at home, believe it is important to save as much energy as possible and to know what uses the most electricity in their home.

In-depth interview respondents who lived in multi-person households highlighted how useful the IHD was to show them when the most energy was being used in the home and felt this was sometimes the first step to then considering whether any changes could be made. Some multi-person households were using the IHD to encourage others, especially children, to use less energy. For example, a family that could tell when their teenage son was using a computer or games consoles in his bedroom. By contrast, many of the in-depth interview respondents living in single person households felt they knew what energy was being used when and for what purpose. Some of these respondents felt that as long as they were being relatively careful with their energy usage, they did not need to engage with the information shown on the IHD in any detail.

5.8 Children under 16

Smart meter customers living in households with children aged 15 or younger, were more likely to have their IHD plugged in and to have been encouraged through it to carry out more energy efficient behaviours.

Smart meter customers living in households with children aged 15 or younger, were no more or less likely than customers overall to be satisfied with their smart meter or IHD – but were more likely to be advocates (55% would speak highly vs. 47% overall). Moreover, they were no more likely to be satisfied with the installation process or any particular aspects of it.

In terms of IHD use, those in households with children were more likely to still have their IHD plugged in (67% vs. 61% overall) and to discuss information displayed on their IHD with other household members. They were also more likely to have said that their IHD had shown them they were using more energy than expected. Potentially as a result of this, those with children in their household were more likely to agree they had tried to reduce the amount of energy they use at home (50% vs. 38% overall) and believe it is important to save as much as possible (38% vs. 31% overall) as a result of their smart meter and/or IHD. Moreover, they were also more likely to agree that they would like to receive more information on how to use their IHD to manage how much energy they use.

5.9 Social grade and income

Smart meter customers from social grade A or B tended to be more engaged with their IHD and to be more satisfied with their smart meter and IHD than those from social grade D or E. Fewer differences were seen by household income, but followed a similar pattern.

Smart meter customers from social grade A or B were more likely to say that they knew at least something about smart meters before they had any contact with their supplier about having one installed (19% of those in social grade A or B said they knew at least a fair amount about smart meters compared to 10% of those in social grade D or E).

Smart meter customers in the higher social grades were also more likely to speak highly of their smart meter (52% of those in social grade A or B spoke highly compared to 37% of those in social grade D or E). No differences existed by overall satisfaction with the installation process, but those in social grade A or B were more satisfied with particular aspects; information about what would occur during the visit, ease of making an appointment and the ability of the installer to answer questions. For example, 82% of those in social grade A or B were at least fairly satisfied

with the ability of the installer to answer questions compared to 72% of those in social grade D or E.

In terms of IHD usage, those in social grade D or E were more likely to have never plugged in their IHD. They were also more likely to disagree that their IHD was easy to use compared to those in social grade A or B, and to say that they stopped using their IHD because they did not understand how to use it (22% compared to 5% of those in social grade A or B) or that they had used it when it was first installed to find out how much all their appliances used, and then didn't need to look at it anymore (30% compared to 18% of those in social grade D or E).Overall, more customers in the higher social grades agreed they found their IHD easy to use, than those in the lower social grades (76% vs. 63%). Moreover, those from social grade D or E were also less knowledgeable and confident about using aspects of their IHD; for instance, fewer knew how to access information on their IHD about past energy use (47% vs. 65% of those in social grade A or B).

Those in social grades A and B were more likely to say their IHD had shown them that they were using more energy than they expected (51% vs. 37% of those in social grades D or E). These customers were also more likely to have agreed that their smart meter or IHD has encouraged them to take up more positive attitudes and behaviours, such as being more likely to have tried to reduce the amount of energy they use at home (44% of ABs who had tried to reduce their usage vs. 31% DEs who had tried); feeling in control of their electricity use (34% of ABs who felt in control vs. 22% of DEs who felt in control), gas use (30% of ABs who felt in control vs. 21% of DEs who felt in control) and in control of their energy bills (29% of ABs who felt in control vs. 19% of DEs who felt in control); and to know what uses the most electricity in their home (37% of ABs who said they knew vs. 28% of DEs who said they knew).

There were fewer differences seen by gross household income.[3] Aligning with the social grade findings, those smart meter customers with a total household income of under £16,000 were more likely to say they had never heard of smart meters before being in contact with their energy supplier (46% vs. 37% overall). Similar differences existed with IHD usage. For example those with a total household income of under £16,000 were less likely to agree they found their IHD easy to use (64% vs. 71% overall). However, no consistent differences by income were seen in relation to satisfaction with the installation process or advocacy of smart meters.

It was observed during the in-depth interviews that higher income and higher social grade respondents were more likely than others to be interacting with the IHD as a type of game which they enjoyed playing around with to learn more about how energy was used around the home. While some of these customers also used it to help them understand steps they could take to reduce this energy usage, they were not financially pressured into having to find ways to cut back. By contrast, lower income and lower social grade customers were more likely to feel anxious about the information shown to them on the IHD, and in some cases felt it would not be useful to them as they were already using as little energy as they felt was possible.

"*I was looking at it I assumed it was going up every time you put something on, you got the red and amber and whatever, and I'm thinking even though this is plugged in I don't know how to use it but I'm burning electricity so I just turned it off"*

Individual, Low income, 35-64, IHD now unplugged (C2DE)

[3] It is important to note that 27% of smart meter customers refused, or stated don't know to the income question on the survey.

5.10 Health conditions

Smart meter customers in households where someone lived with a long term health condition tended to be less aware and more critical of smart meters, as well as finding it more difficult to use the IHD.

Though no more likely to be dissatisfied with their smart meter and IHD, households with someone living with a long term health condition were less likely to be advocates of their smart meter than those living in households where this did not apply (42% vs. 50% would speak highly). They were no more satisfied with the installation process overall, but were less satisfied than households without any long term health conditions in regards to the information they received in advance of the installation (63% vs. 72% agreed) and the explanations provided by both the booklets and installer on the smart meter and IHD.

Smart meter customers living in households where someone lived with a long term health condition had greater difficulties using the IHD. These households were more likely to have never plugged in their IHD (16% vs. 8%) and to have stopped using it as they did not understand how to use it (22% vs. 8%). They were also less likely to know how to use particular aspects of their IHD and find it easy to use (74% vs. 64% without). These findings are very similar to those for respondents aged 65 and over most likely due to the high level of overlap between these groups.

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