UK Government

Qualitative research into the consumer value of in-use home energy performance metrics

Department for Energy Security and Net Zero (2026)

Authors

This independent research report was written by Quadrangle based on research conducted by Quadrangle on behalf of the Department for Energy Security and Net Zero in 2022 (then known as the Department for Business, Energy and Industrial Strategy).

Views expressed in this report are those of the researcher and not necessarily those of the UK government.

Contents

1. Project context and objectives

This report summarises the key findings from a piece of exploratory research conducted on behalf of DESNZ, among consumers who have recently installed insulation (and other retrofit measures such as under-floor heating or double glazing), and/ or heat pumps in their properties.

As part of this research, we also interviewed installers of insulation and heat pumps.

Advances in technology, and the introduction of smart meters in domestic properties, have meant householders and installers might begin to make use of actual data from the home on thermal efficiency and performance to inform decision-making when it comes to selecting, installing and validating the performance of, insulation/ retrofit measures and heat pumps.

This proposition is referred to as 'data on real home thermal performance' (or RP for short) throughout this report.

The project was designed to inform:

(i) DESNZ' understanding of consumer information needs and behaviour when it comes to purchasing and installing insulation and heat pumps;

(ii) the value that in-use performance data could offer to householders when undertaking these actions and in encouraging uptake, based on consumer and installer views of the concept.

Specifically, the research findings within this report are structured into the following sections:

- **What are consumers' information needs and behaviour in relation to insulation and heat pumps?**
  - Consumer motivations and the purchase process when buying insulation
  - Types of information and reassurance sought by consumers when buying insulation
  - Insulation installers' views on consumer information needs
  - Consumer motivations and the purchase process when buying heat pumps
  - Types of information and reassurance sought by consumers when buying heat pumps
  - Heat pump installers' views on consumer information needs
  - The key role played by insulation and heat pump installers according to consumers
- **What is the potential role for real data on home thermal performance (RP) pre- or post- installation of insulation and heat pumps?**
  - Consumer views on the concept of real data on home thermal performance (RP)
  - Installer views on the concept of real data on home thermal performance (RP)

2. Methodology and sampling

2.1 Overview

Given the exploratory research objectives, the technical nature of the proposition and the limited research on this topic to-date, a qualitative research strategy utilising phased focus groups and deliberative research techniques was selected for this research. This approach allowed for a detailed investigation of information needs and the value proposition. It was conducted with a set of householders who had recently installed insulation and/or heat pumps in their properties, as well as a set of installers of these measures.

Research was carried out by Quadrangle using two waves of online focus groups between 24 January and 24 March 2022. There were 10 cohorts in total with each taking part in two focus groups (20 focus groups in total). Each group lasted c.90 minutes; 3-7 participants attended each group. A total of 37 consumers took part in the research (33 in the second wave) and 16 installers (13 in the second wave).

The first wave explored consumer and installer experiences of installing insulation and heat pumps, with a specific focus on the types of information used to inform decision-making and the ideal information that might, in the future, support similar decision-making. The first wave of the research ultimately explored installation journeys to help identify opportunities for data on real home thermal performance to add value. However, the concept of RP was not shared in the first part of the research.

The second wave of the research involved reconvening the same participants and introducing the concept of RP. RP was brought to life using publicly available content from companies that have started developing similar propositions. We provide URL links later in the report to the content produced by Build Test Solutions[1] and Knauf Insulation Solutions[2].

2.2 Participant recruitment criteria and characteristics

2.2.1 Consumers

Participants for the consumer groups were selected using a purposive sampling strategy based on pre-defined criteria (see below). This ensured that the research would recruit participants that enabled achievement of the research objectives.

All participants were screened for suitability and recruited using free-find methods[3]. The primary selection criteria was that they had had either insulation or a heat pump installed within the last three years. This time period was chosen to ensure participants would be able to discuss their experiences pre- and post-installation in sufficient detail.

[1] Build Test Solutions website
[2] Knauf Insulation Solutions website
[3] Free-find methods involve recruiting participants from open or public sources as opposed to sampling from a specific sampling frame or population.

To take part in the research consumers had to meet the following criteria:

Table 1: Consumer recruitment criteria

Insulation	Heat pumps
Installed draught proofing or insulation within the last three years in their home	Installed an air-source or ground-source heat pump in their home within the last three years
Across the groups we recruited a mixed profile of participants in terms of: • Life-stage (e.g. age, working status) • Affluence • Regional distribution • Gender • Ethnicity • Mix of property types - e.g., a range of people living in terrace, detached, semi-detached housing and flats • Openness (in principle) to having a smart meter installed in their home OR already have a smart installed in their home (because this is an enabling technology for RP) • Participants also had to confirm they were not working in related industries	

Consumer participants were offered an incentive of £100 for each focus group they took part in (£200 maximum).

The achieved sample is detailed below:

Table 2: Achieved sample sizes (consumers)

Cohort	Description	No. of participants 1st wave 24 January to 3 February 2022	No. of participants 2nd wave 14 March to 22 March 2022
1	Heat pump consumers	5	5
2	Heat pump consumers	7	5
3	Draught proofing consumers	6	6
4	Draught proofing consumers	7	4
5	Loft / cavity wall insulation consumers	6	6
6	Loft / cavity wall insulation consumers	6	7
Totals		**37**	**33**

Comments on recruitment – consumers

A consequence of the research design is that almost all the consumer participants were homeowners, and few were tenants. This was not a screening criterion but was expected given tenants have less agency to make decisions about energy efficiency measures. Some findings are likely to be inapplicable to tenants.

During the focus groups it became clear that within the sample there was a variety of experiences, motivations and engagement which are important to understand when reading these findings. Participants in the insulation groups experienced one or more of the following:

- commissioning an installer to carry out (relatively) low value insulation in their property. Typical examples included carrying out single, discrete projects such as commissioning for cavity wall and/ or loft insulation
- commissioning builders to carry out broader household renovations which included energy efficiency improvements as a by-product or just one component of the overall project, such as loft conversions which including installing loft insulation
- a personal interest in ensuring their own property was as energy efficient as possible and engaged in a series of projects designed to achieve this. Whilst in the minority, these consumers stood out because they had an unusually high level of knowledge when it came to household thermal performance
- they had made the decision to install insulation after becoming aware that government grants were available to help with financing

In some cases, consumers admitted they had not felt the need to engage thoroughly with the decision to install insulation. There are a variety of reasons for this, and we return to this theme in various places in the report.

Heat pump consumers also tended to fall into distinct categories, including:

- being motivated to install a heat pump after becoming aware of government grants to help finance the installation
- choosing to install a heat pump from a desire to act in a more environmentally friendly manner
- choosing to install heat pumps because their property was not connected to the gas grid, and therefore they believed a heat pump would provide for a more cost-effective heating solution (vs. other sources, such as oil-fuelled heating)

The implications of this are also discussed in the research findings.

2.2.2 Installers

Installer participants were also recruited using a purposive sampling strategy. The insulation installers were recruited using free-find methods (e.g. from open source lists and directories of installers for each technology). Most of the heat pump installers were recruited using free-find methods and a small number were recruited from a list of organisations provided by the DESNZ team.

To take part in the research installers had to meet the following criteria:

- have more than two years' experience in one or more of the following fields: installing air-source heat pumps, ground-source heat pumps, cavity wall insulation, loft insulation, solid wall insulation
- installing in occupied properties
- installing heat pumps or insulation was the main focus of their occupation - e.g. they may have complementary skillsets, but insulation/ heat pumps had to be their primary focus

Installer participants were offered an incentive of £75 for each focus group they took part in (£150 maximum).

The achieved sample is detailed below:

Table 3: Achieved sample sizes (installers)

Cohort	Description	No. of participants 1st wave 2 March to 3 March 2022	No. of participants 2nd wave 23 March to 24 March 2022
1	Heat pump installers	4	3
2	Heat pump installers	3	3
3	Draught proofing installers	4	3
4	Loft / cavity wall insulation installers	5	4
Totals		**16**	**13**

Comments on recruitment – installers

Insulation installers tended to fall into one or more of the following:

- sole traders or partnerships specialising in insulation and serving a local customer base
- multi-skilled tradesmen who worked for private customers and building companies. For instance, they might have a complementary plastering or carpentry skillset
- building company owners and managers, typically involved in residential construction/ renovation projects. Insulation typically represented a small part of their profession and a small consideration in the context of the bigger projects they were typically employed to carry out
- specialist insulation experts who typically worked on high-value projects such as period property retrofit or deep retrofit

Heat pump installers tended to focus solely on installing heat pumps. They sometimes suggested they had a unique, specialist skillset and it made little sense (to them) to diversify into adjacent fields (such as insulation). Within the research we spoke to installers working for heat pump installation companies and also owners of heat pump installation companies (owners sometimes carried out consumer installation work in addition to running their business).

2.3 Technical note on interpreting this report

This purpose of this research was to inform DESNZ' understanding of consumer information needs in relation to installing insulation and heat pumps and the potential value of real data on home thermal performance in those customer journeys via qualitative research. It is designed to reveal the range of different attitudes, experiences and opinions and investigate the reasons for them, rather than provide findings on incidence of different attitudes or experiences.

Throughout this document, to describe consumer or installer attitudes, there is reference to where (e.g.) '**some** participants felt x…' or '**other** participants believed y…'.

NB: given this project is qualitative (rather than in quantitative) in nature, these types of terms are **not** intended to formally indicate levels of incidence for different attitudes or experiences. Instead, they are designed to **broadly** illustrate the type/ range of reactions we heard and the existence of different customer groupings therein.

It should also be noted that the sample has purposely selected to enable the discussions. For example, we expect that the consumer participants in this research are relatively early adopters of low carbon measures (particularly in the case of heat pumps) and relatively engaged with these decisions (though there was variation in engagement levels – see below). Their views and experiences may not reflect that of other consumers.

2.3.1 Key context when interpreting the findings

We spoke to a fairly diverse set of consumers in this research, ranging from those who were fairly disengaged and distant from the details of their installation (particularly where this was a simple/ low value project on the insulation side), through to (a small number) of much more engaged consumers who had been close to and interested in the detail.

There was correspondingly a broad set of needs and expectations in terms of the level of information and reassurances consumers had sought (or would seek) pre-installation – which ranged from needing very little beyond answers to basic questions, through to those interested in precise details (e.g. on specifics of material and performance, in the case of insulation).

The profile of consumer participants strongly influenced their views of real data on home thermal performance (RP). **The more engaged consumers were generally those most receptive to it in principle.**

Similarly, a good number of participating installers were working on simple insulation projects, and/or some were very focused on the actual installation and somewhat removed from discussions on helping consumers diagnose what they needed. Again, this is important context to bear in mind.

On a broader note, it should also be noted that most of the consumers we spoke with in the research were **satisfied** with their heat pump and/ or insulation. It is possible that we might have received a somewhat different reaction to RP if consumers had **not** been satisfied.

3. Summary of findings

The key findings from this research can be summarised as follows:

3.1 Overall reactions to the concept of 'Real Performance' (RP)

The foundational insight we observed was that consumers - including the more engaged - had not sought to 'properly' validate the impact of installing insulation or heat pumps, in the sense of seeking a quantified before and after measurement of the type that RP could provide. In short, this type of measurement was (unsurprisingly) not a known quantity and hence hadn't been considered; put another way, there was no unmet need for it.

This partly helps to explain why some consumers found it difficult to imagine that they would use RP in future.

Similarly, some of the reservations we heard about RP among installers can be explained by the fact that the concept is new and unfamiliar (alongside the considerations under 'context' discussed earlier).

Overall, consumers tended to like the idea of RP in principle, and - to a degree - saw it as a 'no brainer' in theoretical terms. They felt it ought to - in theory - lead to being able to make more informed and accurate decisions, and/or that it might enable installers to provide firmer guarantees on product performance. At the same time, there were also a number of reservations or 'unknowns' for them about the idea.[4]

In a similar vein, installers often felt that RP could be beneficial for their customers (at least in theory), and some felt it could ultimately help them in selling insulation/ heat pumps by providing validation of its (potential) performance. However, installers also had a number of burning questions or foresaw potential barriers, including among some a scepticism as to how reliable RP measurements would be, given (as they saw it) the complexities associated with 'proving' performance.[5]

[4] See section 4.2.1 for more on perceived positives and negatives of (and imagined scenarios for) RP
[5] See section 4.2.2 for more on installer perceptions of RP

3.2 Perceived key applications for RP

The table below summarises some of the key potential applications for RP that consumers and/or installers mentioned in the research[6]:

Table 4: Summary of RP applications identified by consumers and installers

RP application	Detail
Assisting with initial needs diagnosis	Some consumers suggested RP might help to initially diagnose what they need, pre-installation (in the case of insulation and retrofit, in a more tailored way than currently available options do, e.g. EPCs).
Validating performance	Some consumers suggested RP might be used to validate the performance of a (either insulation or heat pump) product after installation. NB: installers often thought longitudinal validation might not be realistic from a practical perspective because (they presumed) heat sensors would have to be left in place for a long period of time after installation.
Providing more robust product guarantees	Some consumers suggested RP might help installers provide more robust guarantees in their sales pitches and in their literature, because they could say with greater certainty what impact insulation and/or installing a heat pump might have on home thermal performance. However, some installers had doubts in this regard as they queried whether/ how the RP system could really be accurate. For them to feel confident about using RP, they would need to reassured about this and that the data was of a sufficient standard (and/or had sufficient accreditation).
Specifically, giving consistent recommendations on the size of heat pumps	Some consumers and installers felt there can be inconsistency between installers when recommending heat pumps to consumers, meaning a consumer can received quotes recommending larger or smaller pumps from different installers. The reason for the discrepancy usually lies in differences in judgement when conducting a site visit, differences in interpretation with regards to how the heat pump will be used by the occupants, and differences in the performance of heat pump brands. While some felt RP could in theory help in this regard, some also suggested that RP would have to achieve a very high standard of accuracy and/or receive a form of accreditation (including alignment with MCS) to give them the confidence to use the system to recommend a pump.

[6] Also see section 4.2.1 and section 4.2.2

RP application	Detail
As an alternative to Energy Performance Certificates (EPCs) or way to improve EPCs	Some consumers and installers felt that RP could improve or replace EPCs over time, leading to better assessments of people's homes and better advice in terms of the measures consumers may wish to implement. NB: some installers were sceptical as to whether the costs of using in-use performance data compared to EPC-style assessments would be low enough to make it a feasible offer to consumers within their offering.
Assessing multi-occupancy buildings	Some consumers and installers suggested RP may play a role in situations where several residents occupy the same building and disagreements are taking place about the cost of proposed works to improve the thermal performance of the building. They suggested that a third party might use RP and act as an auditor, making recommendations without a vested interested in the building.
Assessing large commercial and/ or public buildings	(More widely) Some installers suggested that government regulation or guidance might stipulate public buildings and large corporate buildings be subject to greater scrutiny in terms of achieving minimum thermal performance standards. In their minds RP might provide an evidence base to prove the building was meeting required standards.

3.2.1 Key future considerations

It was evident in the research that installers had typically played a vital role for consumers in helping them make decisions about insulation/ heat pumps

Accordingly, the findings of this research suggest that if RP is ultimately to be integrated into consumers' decision making and installation journeys, it appears critical that RP will need to be 'baked' into the service offered by installers (or other third parties, e.g. architects).

Whilst some consumers might keenly engage with and use this kind of data, this research suggests that many will be dependent on third parties to get the most out of it, and will need support to understand how it could help them.

In turn, this means that the scepticism we observed among some installers - notably around the perceived accuracy of this type of measurement - would need to be overcome. Installers typically suggested it was vital they had the opportunity to vouch for the quality of their own work, and so they would have to be reassured about the reliability and credibility of RP applications if they are to feel confident using them in their offerings.

Importantly, we observed that the information and reassurances sought by consumers pre-installation were usually outcome focused (e.g. 'how well will this insulation/ heat pump work'; 'what is the potential financial impact'), rather than focused on the details of the product(s) in question. This research suggests that - to make RP accessible - this type of data or information would need to be translated or packaged in a way that makes it intuitive and answers these questions.

The research however suggested several scenarios where there could be particular value for applications that involve direct engagement with consumers:

- in the pre-installation period when consumers are seeking to understand the performance of their home. RP could help them detect hidden problems and provide better information on how much they could improve their home's performance[7]
- where consumers are particularly engaged or have a strong desire for information to assist them in their pre-installation journeys (as opposed to more disengaged and/or wanting to hand over decision making control)
- more complex scenarios, including heat pump installations and more complex insulation projects, and/or where the consumer is particularly engaged by the subject matter or process (e.g. where they were on a 'quest' to achieve energy efficiency).

[7] Note that there was some scepticism about how far RP could provide accurate information on the impact of specific recommendations or specific components within the home.

4. Research findings

4.1 What are consumers' information needs and behaviours in relation to installing insulation and heat pumps?

4.1.1 Consumer motivations and the purchase process when buying insulation

Most participating consumers had commissioned relatively simple and low value insulation projects, and here the installation of insulation was very often a relatively quick (and fairly unconsidered) purchase decision for them. They were typically driven by simple needs and assumed insulation would provide a solution. They believed the benefits of installing insulation were clear and the right action for their situation.

Examples of typical installation motivations we heard here included:

- My home was too cold
- I wanted my home to be more comfortable
- My home was too draughty
- My heating bills were too high and insulation might save money
- General household maintenance - e.g., replacing or upgrading old insulation

Crucially, we found that these consumers tended to gather very little information personally before commissioning an installer, although some had spoken with friends/ family to understand what to expect. Very few consumers had conducted significant research of their own into types of insulation solutions or specifications of insulation materials.

In many cases these consumers could not describe the type of insulation material that had been installed or say with certainty that the installation had been done to a high standard. However, they felt their installations had been successful because they **felt** warmer in their home.

In short, these consumers were not deeply engaged with the details of their installation. When asked to explain why this might be the case, they tended to reference a variety of reasons including:

- an assumption that insulation would make the house warmer: e.g., they suggested the concept of insulation was well-established, and it simply had not occurred to them that it may not work
- the relative low cost of installing insulation (and some used grants to make it more cost-effective)

A small number of consumers had commissioned larger projects such as loft conversions and they were far more engaged in their overall project. However, their engagement with the insulation parts of the project was similarly low, because installing it was a relatively minor part of the broader project and their engagement with it. They tended to rely on the

recommendation of the installer, or in some cases the builder carrying out the work, or the architect overseeing the project. In these cases, they trusted that building regulations would ensure quality for the installation of the insulation.

As mentioned in section 2, a small number of consumer participants had commissioned insulation installation specifically designed to achieve energy efficiency (as distinct from the 'simpler' motivations mentioned above), with broader environmental considerations (and their contribution towards this) a key part of the mix. These consumers were much more engaged in the details of the insulation overall - e.g. in terms of knowing about and/or researching different solutions and technical details about insulation materials - and were keen for detailed information.

Quotes from consumers about why they wanted insulation:

"I wanted some insulation because the floor was so cold on my feet. I want my home to be cozy!"

"I had lived in a house that had underfloor heating previously and so I knew how nice it was, when we moved into our new place it was one of the first things we did."

"The insulation I had put in the flooring, I could feel the difference immediately and that was enough for me."

4.1.2 Types of information and reassurance sought by consumers when buying insulation

We wanted to understand the typical questions that consumers had before progressing with their insulation installation. Their questions were usually asked directly of the installer or put to trusted sources such as friends/ family that had installed insulation recently.

Amongst those who had commissioned simpler/ lower cost insulation projects – or indeed those where insulation was a small part of a broader overall project – people's pre-installation questions were typically outcome-focused and practical. Examples of typical questions included:

- How much does it cost?
- Will I feel the difference afterwards?
- What can I expect to happen during installation?
- Will I have to empty the loft?
- Roughly, how much **might** it save on my heating bills? (NB: Consumers did not expect installers to give them a firm answer on this)

Most consumers had sought 'high level' information and reassurance. Few had given any detailed thought to technical matters such as the specifics of insulation materials or thickness/ depth – partly because this would be handled by the installer or architect (and/or as it was seen as being standardised by regulations).

In short, consumers tended to think about insulation through the ways in which they experienced heat personally, in their home. They would frequently cite ‘comfort or warmth’ - or, more widely, cost of energy bills - as driving forces or outcomes they were hoping to influence.

However, being able to ‘formally’ validate the impact of installing insulation (i.e. through ‘properly’ measuring the before and after impact) was not something that had been considered, because:

- this was not a known possibility or norm for them, and/or
- it was assumed that the insulation would just work, and/or
- there was a feeling that the insulation ought to prove its overall worth through potential bill savings or feeling of additional warmth

Even among the more engaged consumers (e.g. those who were looking to achieve energy efficiency), this type of formal before-and-after validation was not top of mind (as, similarly, it was not a known possibility or norm for them). However, these consumers tended to have more technical queries about insulation, relating to details of thermal performance and/or nature of materials. For example, they mentioned U values within the context of making their decisions.

4.1.3 Insulation installers’ views on consumer information needs

Overall, feedback from insulation installers often mirrored the consumer feedback.

Unsurprisingly, the installers were typically more technical and detailed in the discussions than consumers when talking about insulation. For example, they discussed talking about the thickness of insulation in millimetres to their customers, discussed the role of building regulations in shaping and controlling their recommendations and service, and sometimes they discussed the performance of insulation in terms of U values.

Installers generally felt they had a clear sense of what consumers want to experience after an installation has taken place (and hence what drives satisfaction). Installers mentioned that consumers expect to **feel** a difference after installation - e.g., a warmer home, a less draughty home, etc. - and therefore hope to save money on energy bills. This is the way in which their customers ‘know’ the insulation has been successful. In some cases, this had led installers to deploy additional layers of insulation and/ or thicker insulation because they believe it is the surest way to ensure the customer will **feel** the impact of the insulation after the project finishes. Here, installers tended to make judgements based on a visual inspection of the home and by using assumptions about its thermal efficiency. For example, whilst regulations may specify or recommend a particular insulation thickness/ type, if on closer inspection the installer can see the house is very old and without double glazed windows, they therefore they feel insulation of a greater thickness/ spec is most likely required if the customer is to feel the difference and get the impact they desire.

In summary, installers suggested that:

- consumers typically tend not to ask them detailed questions about the specifics of the insulation used or the impact it will make, because most consumers already know they want insulation and are usually happy to leave the details to someone more expert/ knowledgeable than them
- similarly, given that consumers are familiar with the concept of insulation and see it as (in effect) proven - they tend not to need to be convinced of its efficacy
- accordingly, specific questions around 'what difference will this make?' rarely feature, at least not in the sense that their consumer customers expect a **quantifiable** answer such as pounds (£) or kilowatt hours (kWh) saved

The exceptions to this rule were where installers encountered a 'hobbyist' type of customer – e.g. the wealthier and/or more engaged, such as those who were involved with (expensive) period property projects or keenly interested in environmental impacts and energy efficiency. Installers mentioned this type of customer wanting to be much more involved with the details around insulation materials and performance, although they did not mention that these customers expected formally quantifiable (i.e. before and after) proof of the impact of insulation.

Quotes from insulation installers on installing measures for customers:

"I know people want to feel warmer afterwards. That is how they know if it (Insulation) has made a difference or not."

"The regulations will say put insulation of X thickness or use brand X in these places to cover the cold spots but when you see it, you can see that sometimes the insulation needs to be thicker, or you need a different type. You are far better off over-insulating in these cases because then the customer will always benefit."

4.1.4 Consumer motivations and the purchase process when buying heat pumps

The installation of a heat pump was typically a more considered purchase decision than it was for the installation of insulation (at least compared to those who'd had simpler/ lower value insulation installed).

Consumer participants typically knew they wanted a heat pump in advance. Some had had a degree of knowledge around heat pumps before commissioning an installer, but most became more confident after speaking with trusted sources such as friends, family or neighbours, and/or installers.

Examples of typical motivations for installing heat pumps included:

- My home is off the gas grid, I need a cost-effective alternative to oil/ LPG heating
- Oil prices are very expensive, I think I will make a cost-saving by transitioning to a heat pump
- I am modernising my home and a heat pump might future-proof it (NB: these consumers often engaged in large renovation projects that included retrofit, heat pumps and other home improvements/ alterations)
- I want to move away from a gas boiler for environmental reasons (or I want to play my part for the environment in general)
- Our children or grandchildren have encouraged us to be more environmentally friendly
- Government grants will pay a proportion of the cost

Quotes from consumers about why they installed a heat pump:

"We have grandchildren and having watched Greta Thunberg, we felt we had to do something for their future. Knowing we would get some of the investment back from a grant helped, but we thought someone must start to make a difference, even though it was expensive."

"We needed some heat! We are off the main sewerage, gas etc. We needed to choose something, we wanted to be green, we didn't want a ground source pump because we thought it might damage the soil and destroy the homes of insects, so we went with an air-source pump."

"A salesman came to the door and convinced us to have a heat pump. We wanted to do our bit for the environment and so we said yes."

4.1.5 Types of information and reassurance sought by consumers when buying heat pumps

Like insulation consumers, before the installation heat pump consumers tended to wonder how they would experience heat in their home and how they would engage with their new system. Typical questions/ queries included:

- Will the system actually work as/ when I need it to?
- Will my home will feel warm, or warmer?
- Will it save me money compared to my current system?
- How do I heat hot water/ will I be able to heat hot water as quickly as I can today?
- What is involved in terms of the installation and doing work on my home?
- Will it be noisy?
- What is the difference between an air source and a ground source heat pump?

Whilst heat pump customers tended to do more research than insulation customers, there was little awareness/ desire to seek out quantifiable data or information - in terms of 'properly' measuring or validating the likely 'before and after' performance - to inform their decision. In short, it was a case of this just not being a mental 'norm' for people (i.e. *"I don't know what I don't know"*). In this sense the consumer mindset was similar for heat pumps as it was for insulation.

Where research/ information gathering did take place, it typically took the form of seeking 'soft' reassurance to make sure their new heating system would perform to an acceptable (similar) standard as their current heating system. Consumers' research process typically involved consulting with other local people who had installed heat pumps and/or leaning on the expertise of installers, to ensure they understood how to use a heat pump to good effect and also ensure they understood the difference they could expect compared to their current system of heating.

In some cases, this prompted a small number of heat pump consumers to research some of the more practical aspects, such as 'would I benefit form an air, ground, or water-source heat pump?' and 'what are the pros and cons of each?' Others did some relatively quick research into the size of the heat pump they may require based on assumptions they made and using 'homes like mine' as a proxy. However, the process of researching a heat pump tended to merge quickly with the pre-installation process carried out by installers; specifically, the need to research heat pumps independently was obviated somewhat by the availability of installers early in the process and being able to ask them questions directly.

Overall, given the costs and extent of work involved with installing a heat pump, it might have been expected that the consumers we spoke to had done more of their own research to support their installation decisions, or sought to obtain a firmer indication as to what the performance of their heat pump would be post-installation. However, the fact that they typically had not appeared to be at least partly explained by the feeling that heat pumps represent new, relatively complex and technical territory – often also involving considerable intrusive building work. Accordingly, it was often felt that relying on installer expertise was critical (as was the experience of friends/ family/ neighbours with similar direct experience), with their own research playing a much more minor role.

4.1.6 Heat pump installers' views on consumer information needs

Heat pump installers suggested that recent, increased coverage of environmental issues (including energy supply issues) has led more customers to enquire about heat pumps. They suggested customers are tending to come to them with the desire to have a heat pump installed (regardless of how suitable their property is) and so the role of the installer is usually not one of convincing the customer to buy. Instead, their role is increasingly to ensure the consumer's home is right for a heat pump.

They suggested that at the moment, they are filtering customers through pre-qualification questioning and (where appropriate) conducting a site survey to ascertain if a home is suitable for a heat pump before proceeding to installation.

As part of that process, they mentioned engaging directly by answering consumer questions and educating them on what to expect from a heat pump. This process covers a variety of aspects, including:

- ascertaining if any additional work is necessary (e.g. improvements to the building fabric via insulation) to make a heat pump viable
- explaining the amount of intrusion and physical work needed to install a heat pump: e.g., taking up flooring, siting the pump in the ground or on the side of the home, etc.
- explaining the difference in home heat experience vs. a gas boiler (or other fuel type)
- assessing the thermal performance of the property: most often using their own judgement in conjunction with a heat loss calculation (often also consulting with the EPC), and sometimes via a thermal imaging survey

As discussed above for insulation installations (see section 4.1.3), heat pump installers generally appeared to be having few conversations with their consumer customers about data or information related to longitudinally validating heat pump performance. Instead, any such conversations/ information sharing tended to relate to the technical features of the pump/ system, such as what the right heat pump output (kW) rating is for the property. There were a variety of reasons for this, including:

- the focus of the installers' interactions appeared to be primarily about explaining what to expect (rather than touching on opportunities to validate performance). Where consumers express concern, installers can explain they will come back and fix any problems, which provides the necessary reassurance (and takes away the need, to an extent, to consider how consumers might validate performance)
- the pre-install journey is lengthy and involves multiple stages; quantifiable ongoing performance of the pump does not really feature within that conversation, or at least it takes on a more practical question (e.g., 'If I'm moving from oil to a heat pump, roughly how much might I save?')
- consumers appear to have quite low expectations in terms of quantifiable data/ information that might validate their decisions (which mirrors what we heard from consumers directly – see section 4.1.5)
- installers tend to rely heavily on MCS guidance (and technical pump performance data therein) to justify recommendations, in the same way as insulation experts tend to cite building regulations - this replaces or obviates somewhat the need to more formally evidence performance, whether that be heat pump performance, cost or the thermal efficiency of the home
- installers were often sceptical as to whether longitudinal heat pump performance in terms of comparative cost savings could realistically be measured. It created something of a disincentive to open this conversation with their customers
- most current customers were not moving to a heat pump with the expectation they would make significant savings on energy bills, so measuring performance in terms of savings becomes somewhat less relevant (NB: this finding is especially likely to reflect the fact that the participants are early adopters of heat pumps who did not get one for purposes of cost saving)

Quotes from heat pump installers on installing heat pumps for customers:

"You can ask all sorts of questions and we do, but until you start work on a job you can't really say what will be needed to install a heat pump. It is not a simple process we go through (ensuring a home is right for a heat pump): it is a project."

"You can't give people a Return on Investment (RoI). We're very up front about helping customers understand the potential RoI, but it's complex, the price of electricity will change over time, there are economic factors like inflation, [plus] many people combine a heat pump with solar and/ or battery storage."

4.1.7 The role played by insulation and heat pump installers – according to consumers

As discussed earlier, most of the consumers we spoke to in the research had relied strongly on installers to provide reassurance and help them navigate the pre-installation decision making process around insulation and heat pumps. In general, this appeared to be a relatively short process in the case of insulation and usually a somewhat longer process in the case of heat pumps.

In many cases - as mentioned previously - reassurance and advice from the installer tended to be (at least partially) a substitute for doing personal research/ information gathering. Most tended to admit that they did not have the knowledge to make informed decisions about these matters. Overall, many participants seemed to feel that they had no choice but to trust the installer and/or wanted to delegate key decisions to them.

Quotes from consumers about their reliance on installers:

"We had a good salesman, we trusted him, the information he gave us was sound – that made a difference when we installed our heat pump."

"I've had friends ask installers what difference it will make when they have cavity wall insulation done, and the installer can't tell, but you assume it will do some good, and so you go ahead with it because you trust the installer."

From what we heard from consumers; the installer appears to take on different roles in different scenarios. Broadly we heard these roles falling into three main categories:

Table 5: Consumer perspective on different roles of installers

Role of Installer	Scenario
Trusted expert	Single insulation project (relatively low value)
Executor – works as part of a team	Renovation project such as a loft conversion (high value but insulation is one small part of the bigger project)
Surveyor, Teacher, Trusted expert	Heat pump installation

As the consumer participants put it, in the case of insulation projects, installers typically informed them that insulation of a minimum type and thickness was required (which in turn was based on guidance from building regulations). In most cases consumers accepted the recommendation without question.

In the case of broader renovation projects such as loft conversions, typically consumers had commissioned a builder to oversee the project and that person would work with insulation installers (and architects), taking their advice directly on behalf of the end customer.

In the case of heat pumps, the installer typically took on a far greater role, usually conducting a site visit, undertaking a visual survey (sometimes this might also include a thermal imaging survey), checking other aspects of the property such as the electrics and position of radiators, and checking for existing retrofit that might impact thermal performance.

The installer tended to provide expert guidance in terms of the size of heat pump and the suitability of the property to have a heat pump. In most cases, their role extended to explaining the differences in terms of the in-home experience of a heat pump vs. a gas boiler (or other solution). Managing expectations of the installation process was also a key part of their remit.

In summary, the critical roles (as consumers see it) played by both installers of insulation and heat pumps highlight how - in future - each would have a vital part to play in helping consumers make sense of real data on home thermal performance and harnessing its benefits.

4.2. What is the potential role for real data on home thermal performance (RP) pre- or post- installation of insulation/ heat pumps?

4.2.1 Consumer views on the concept of real data on home thermal performance (RP)

As detailed above, prior to having either insulation or heat pumps installed, most participants had not sought quantifiable data or information to ‘formally’ validate the impact of installing insulation or heat pumps.

In short, this specific type of information was not known to exist and did not come to mind as something that could or should be available. For similar reasons, the same was true even amongst those more engaged consumers.

In the second wave of focus groups, consumer participants were introduced to the concept of RP for the first time to investigate whether and how this type of information could have added value for them. We did this as follows:

- sharing a video produced by Knauf Insulation to explain and bring the idea to life
- to help contextualise the RP concept, we explained how a current Energy Performance Certificate (EPC) is created to give an example of how thermal efficiency is commonly calculated, and particularly how it uses assumptions based on similarly constructed homes to model efficiency (as opposed to measuring it directly as proposed in the RP concept)

- we encouraged insulation consumers to imagine they were planning a new insulation project costing roughly £1,500, and to consider how RP might be applied in that scenario
- in the case of heat pump consumers, we simply asked them to reflect on their experience of installing a heat pump and consider how RP might have been useful

Overall, while some struggled to think of specific benefits, consumers were generally favourable towards the idea of RP. Reasons given as to why included the following:

- In general, it was seen as a case of 'why wouldn't this be useful' (i.e. a no-brainer), even though they hadn't previously conceived of it as data/information they would need
  - The more engaged consumers - e.g. those who'd had insulation installed as part of a 'quest' for energy efficiency - were most positive about the concept's potential
- Against a backdrop of rising energy prices, the concept was felt to be relevant/ timely
- Once they became aware that an EPC provides an estimate, some felt they might benefit (or might **have** benefitted) from a more precise measurement of their home's performance when carrying out their own projects
- A feeling it might help consumers (such as themselves) make more informed decisions and avoid the scenario where they pay for measures that are ineffective or not needed (e.g. where a generic or commonly recommended measure would be ineffective in their specific property)
- Feeling that the availability of RP might lead installers to offer (more specific) guarantees on products, given they could be more confident that an installation will achieve a quantifiable difference
- Specifically, some who had a heat pump installed could see how it might avoid problems related to installing heat pumps that are too small, or too large for the property
- Some who had received a thermal imaging survey of their house could instantly see how this system might work: e.g. they could imagine how a 3D visualisation of the home could be used to communicate this type of information to them in a simple manner

Some felt the overall presence of data such as this might lead to an overall lift in standards - e.g. as the net result would be installers being more easily held to account (which could help with consumer trust and confidence), or because assessors may be able to carry out more precise evaluations of properties, leading to better guidance given to consumers (via EPCs or otherwise). Some assumed that the eventual application for RP would be that it replaced the current EPC system over time.

In summary, therefore, there were many perceived potential benefits of RP, despite the fact we observed no significant pre-existing unmet need for this type of information.

At the same time, there was some feeling expressed that this type of information could be complex to understand and that to make it accessible it would need to be translated or packaged in a way that makes it intuitive, easy to use, and spells out the benefits of taking particular courses of action.

Some went further and pointed out that unless information was simplified and translated, quantitative measurements could, in fact, make it harder to decide what to do.

Consumer reactions to the idea of real data on home thermal performance (RP):

"Anything that allows you to monitor what you're spending and understand what value-for-money you are getting is good – with the increases in the price of gas and electric, it is all to the good."

"I just think it would be great to understand how your home is actually performing."

"I would like to know how efficient my home is in terms of retaining heat. At the moment I just go on how I feel and turn the thermostat up and down. If somebody could nail that down and make it more precise that would be good."

"We rebuilt the top floor of our house completely so it wouldn't have been very useful, but if we were just replacing the heating system I can see how this might have helped."

"It would help with ensuring you have the right size of heat pump in your property – it would help get rid of a lot of those headaches."

"It could show people where your house is leaking, what happens when you turn off your systems – I know from our experience of renovating our house how useful it is having an actual survey of heat loss."

Examples of specific use cases

Through the course of the discussions, consumers were encouraged to think of scenarios where they might apply RP, or ways in which RP might have helped them inform their own heat pump or insulation project.

During these discussions about RP, some – particularly those more engaged – articulated specific use cases as to how this type of information might be harnessed, **though this was often in reaction to prompts given by the moderator as part of the natural discussion flow**.

Examples of individual mentions are summarised below:

Table 6: Examples of specific use cases suggested by consumers

Use case	Example
Using RP to understand future savings	*"I would want to know how much money installing a piece of insulation would save me. I would want to compare before and after."*
Understanding the difference in terms of in-home experience	*"If you had wall insulation, put in your walls, you are likely to be X% warmer in your house or save X% on your bills."*

Use case	Example
Quantifying savings over time	*"I am a big believer in data, if you could quantify savings over time, I'd be happy to invest in RP."*
RP as a time saver	*"[Individual household assessments] are pointless unless it gets into the level of detail that this [RP] promises. It could tell me specifically what retrofit I need to have done for a property like mine – it would have saved me a lot of time that I spent manually investigating my own property."*
Understanding ways of reducing power consumption	*"If you do install X, it will lead to a reduction in your power usage of Y."*
Providing clear direction on what measures to install	*"RP would be good (in theory), in terms of telling you precisely what you need to install. For instance if you have a flat sandwiched between 2 others, you probably don't need wall insulation but ceiling insulation is probably a good idea."*
Understanding the lifetime efficiency of boilers or heat pumps	*"Could it tell you about the loss over time on an X KWH boiler or heat pump?"*
Providing reassurance	*"Could we use RP to be reassured a heat pump will work? e.g. would it tell us if we put a radiator of size X in plus some insulation, our heat pump should be performing at a particular level?"*
CO2 emissions	*"We might use RP to reassure ourselves our heat pump is actually more environmentally-friendly. I don't know how this data could help though, we would need some sort of simple reference point, like 'food miles' on food packets. I guess it would have to compare to a gas boiler?"*
Achieving a desired thermal performance value	*"You could have an online model where you are trying to achieve a certain [heat loss] value and plan out the impacts of installations. For example, installing double glazing changes the [heat loss] value to X, installing insulation changes it XY etc."*
Informing radiator sizing and power requirements	*"When I've bought radiators you can type in the room size and size/ position of windows and you get a recommended radiator and BTU. Could you use RP for this?"*
Choosing a future heating system	*"It would be useful to have a breakdown of installation costs + accurate running costs next to each option (oil, gas, electric, heat pump), so you could see the best option for your home."*

Use case	Example
Understanding temperature differences and identifying cold spots	*"My boss is a nerd and he has put thermometers all over his house and he can see his new conservatory outperforms the 100 year old brick in his main house. It might be useful for identifying cold spots."*

Presentation and accessibility of RP

Consumers naturally started to translate RP into concepts they understood. In the case of insulation, the 'currency' here was typically pounds saved and the payback period (i.e. the time taken to recoup the cost of the investment through savings in energy bills), and there was some expectation that RP would be packaged in such a way that this information would be obvious.

Some heat pump consumers naturally started to equate RP to Miles per Gallon (MPG) and could see how a similar expression could be put in place so that homeowners understood the thermal performance of their home in the same way as they understand the fuel-efficiency of their car. Crucially in some groups the moderator introduced the concept of MPG to aid comprehension, but in others participants naturally associated with RP a metric like MPG.

However, others naturally assumed this information would be quite technical (as mentioned above) and might require expertise to interpret it. In most cases, consumers suggested they were comfortable with the thought of sharing their data with installers or third parties, provided their permission was sought. Some also assumed the natural process here would be for the installer or third party to lead the process as to how and when RP featured during the customer journey.

Consumer quotes on how to make RP useful:

"Our car has an indicator to show MPG or charge left in the battery – it could be a great system, you could use it to maintain the home you have."

"Very useful to see if 'top of the range' insulation materials are actually worth their payback (compared to the standard materials) in terms of money saved on energy bills over time."

Perceived limitations of EPCs drove some of the appeal

As mentioned earlier, some consumers expressed a feeling that EPCs were generic in nature and had inherent limitations prior to the moderator explaining that EPC efficiency estimates were based on assumptions from similarly constructed homes (rather than from the individual home). Some said that the efficiency improvements recommended on their EPCs were too generic or not applicable to their home and some distrusted their accuracy in measuring efficiency. Here, this meant they could imagine RP providing more accurate and useful feedback and recommendations. Some others also came to a similar view after the moderator explained the methodology underpinning EPCs and how RP might work.

Quotes from consumers on their perspectives of RP and EPCs:

"RP would be useful in terms of telling people what they need, not what they could have done, which is the problem with EPCs."

"I don't trust EPC assessors, they don't really know, they take guesses, technically they would need to live in your house for a week to have any sense of how a home should be performing in terms of heat loss."

While RP was liked in principle a number of barriers emerged to engaging with it in reality

Whilst (as discussed above) consumers were able to think of a number of potential use cases for RP, they were also able to identify several barriers or potential issues that might prevent them from using it. These included the following:

Table 7: Barriers and issues with the use of RP identified by consumers

Barrier / issue	Detail
Perceived lack of genuine need	When pressed, some consumers felt they would be unlikely to engage with their own data, or certainly not unless the rationale for engaging with it was obvious and immediate, and it was simple to do (NB: the Miles Per Gallon analogy was thought to be useful in this context). They could see how in principle they might use RP for planning new projects but expressed scepticism that they would actually do this. Apps were suggested to make the data as accessible as possible in this regard.
Data privacy/ mining	Some were concerned at the thought of their home's thermal performance data being collected and about data aggregation/ accumulation by third parties (and the potential for misuse). Here consumers stressed they would not want third parties to try and 'sell them things' without their consent.
Potential complexity	There was an assumption among some that RP information could be complex to interpret – i.e. for it to have meaning one would probably have to share it with an installer or third party (and for them to 'guide you through').
Not necessary for small projects	Some felt there was not really a need for better data to plan for, or validate the impact of, low value projects (typically single insulation projects).
Assumed high cost	Some consumers assumed that RP would be more expensive than an EPC-style survey. Most assumed it would add cost and therefore might only be worthwhile if the project was of sufficiently high value.
Overall scepticism	A small number of consumers voiced overall scepticism when presented with RP. They doubted if the data would be genuinely accurate due to (for example) changing outside temperatures and the difficulty of considering the impact of things like leaving windows open. There was also an assumption that (if this were possible), a considerable amount of time would need to pass whilst data was collected, presenting a practical barrier to using data to plan future projects.

4.2.2 Installer views on the concept of real data on home thermal performance (RP)

The concept was introduced to installers using a publicly available, longer, more detailed video produced by Build Test Solutions (BTS).

Overall, installers often felt that RP could genuinely benefit consumers, and sometimes that the availability of RP could (in theory) help installers to make the case for insulation or heat pumps to consumers. There was some acknowledgement that RP ultimately could influence the service they provided to customers.

Some felt that RP could (in theory) provide an addition or alternative to existing ways of measuring thermal performance (e.g. thermal imaging surveys, EPCs or home surveys).

However, installers also had substantial questions and discussed several potential barriers or sticking points:

Wondering how RP could add value with simple insulation projects

Most insulation installers we spoke to were carrying out relatively low value insulation projects in domestic properties. They could see how RP might in principle provide more specific direction in terms of where to insulate and the thickness required, but some also felt this could be overly complex in comparison to their current methods - which broadly relied on direction from building regulations and/or architects, their own intuition when visiting a site and deploying additional insulation if in doubt.

There was also sometimes an assumption that RP may add more cost than it saved.

Overall scepticism as the workings of RP (insulation and heat pump installers)

Some installers expressed a technical scepticism after watching the BTS video. They suggested the RP system might not work as accurately as suggested due to the number of variables in play - e.g. changes in outside air temperature, changes in human behaviour such as leaving windows open, seasonal differences, etc. They also assumed it would take considerable time to gather the data (through sensors being left in the property) and that this might provide a practical obstacle to deploying RP on projects. (Note – the installers generally overestimated the time needed to do the measurements. In practice, currently available services can do this in 2-3 weeks during a heating season.)

Struggling to see how it could complement their business model (heat pump installers)

Heat pump installers explained their pre-installation process in detail and suggested that their site visit was a key element of their service delivery. They explained that ascertaining the thermal performance of a home was achieved during the site visit (sometimes the EPC was also consulted) but that it served a variety of other objectives such as working out where to put the pump and checking radiators and electrics. They acknowledged RP might be a useful addition and in particular could offer value as an alternative to an EPC, but it would not take away the need for a site visit: ultimately, they felt it had the potential to impact a relatively small percentage of their overall service delivery.

Some heat pump installers also wondered whether RP could - in effect - undermine projects for them: e.g. they felt it could potentially reveal a need to install insulation first, leading to delays in or de-prioritisation of the heat pump installation.

'Alignment' with regulations and guidelines (heat pump installers)

Some heat pump installers suggested they would need to be confident that any application of RP worked within or complemented the existing regulations (e.g. MCS guidelines), in the sense they felt that regulation and guidelines already provided both them (and the customer) with a defined framework for 'the right thing to do' when it comes to heat pumps. They suggested this 'alignment' was a pre-requisite for them feeling confident enough to use RP in recommendations to consumers with regards to the nature of the heat pump that should be installed.

Some others struggled to see a role for RP in the sense that they felt any heat pump performance data required (if the Consumer wanted/ needed this) was already contained within – and already standardised by – the MCS 'paperwork' (i.e. via terms and conditions/ disclaimers therein).

An assumption that a third party would be needed to gather and interpret data (insulation installers)

The insulation installers we spoke with were often building contractors and labourers skilled in other trades such as plastering or carpentry. Some quickly recognised that RP represented a departure from their current approach and assumed that a third party would be needed to interpret RP and convert the data into instructions they could carry out on the ground. Some struggled to identify 'who' that third party might be but assumed it was a distinct professional occupation that represented a full-time job for 'somebody'. (Note – as above, this may be an overestimation of the resource required to do the measurements.)

Quotes from insulation installers about implementing RP:

"This data capture system would have to be monitored by a professional for 3,6,12, months before and after? Then I suppose you could put a plan together to address cold spots. It needs an expert to do this. It can't be a builder doing insulation, they'd put the sensors in all the wrong places."

"I struggle to see this working for domestic properties. If I said to a client 'I can insulate your house but I'm going to gather data for 9 months first', I don't think they would like it."

"I'm just not sure we need this. It feels like the sort of thing that will end up being funded by grants from the government but we don't really need this because we can see the cold spots."

Quotes from heat pump installers about implementing RP:

"If there was a certified heat loss attached to every property that heat pump installers could use to say 'ok, I need a 12KW pump because this house has a heat loss of X', then yes it might be useful, it takes out a small proportion of the work. But I also need to talk to you about hot water, about pipe runs, space and your distribution system – it is one little piece of the jigsaw, I still need to go to your home."

"If you could show this was as good as your own heat loss calculation then it would replace that, it would save some cost but you would have to be confident in it because otherwise we could never install on that basis, we can't risk being taken to court."

"If you did an assessment and they had a certified, accurate underwritten energy demand for your property it might take away some of the wrangling and confusion that can come from recommending heat pumps of particular sizes. Some brands are better than others and deliver a better performance even if the KW is lower – that might help consumers if they [have] more than one quote."

"The only way you could possibly do this would be to put a sensor on every surface, the kitchen, the walls, every window, the roof. I just don't think it is going to give you the accurate data you need."

"A few sensors won't do it, you need thermal imaging to do this properly, you need to see where the heat is getting out."

Overall, whilst there were some open questions or challenges (as discussed above), installers felt RP might (in theory) offer the following benefits:

- reduce their cost to serve (at least marginally) by taking away some of the need to conduct their own heat loss calculations when fitting heat pumps (although not take away the need to conduct a site visit)
- help them produce quotes rapidly
- take away some of the confusion for consumers that can arise from installers recommending different sized pumps
- help them 'prove the case' for insulation or heat pumps by evidencing this through data

Additionally, some suggested that if they could be made to feel confident in the technology – and/or how RP dovetailed with the MCS 'framework' – then RP might take away the need for a heat loss survey in certain cases, which could reduce the investment for the end consumer.

Some installers felt RP had the potential to create an alternative and better system to EPC

As part of the discussion, installers sometimes talked about what they felt to be inherent limitations of EPCs (as some consumers also did – see section 4.2.1). Even where they expressed some scepticism with the idea of RP, they thought it might represent a better and alternative system to EPCs:

Quotes from installers on their perspectives on RP and EPCs:

"Yes this is slightly better than an EPC but I just can't see how any heat pump installer will be willing to service a customer based on someone else's information."

"This is supposed to be replacement for the EPC I assume?"

"This is a bit better than EPC, that is nice but I can't see how they can do this at the cost of an EPC, that costs under 50 quid."

This publication is available from: www.gov.uk/desnz

Any enquiries regarding this publication should be sent to us at: SMIP@energysecurity.gov.uk

If you need a version of this document in a more accessible format, please email alt.formats@energysecurity.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.