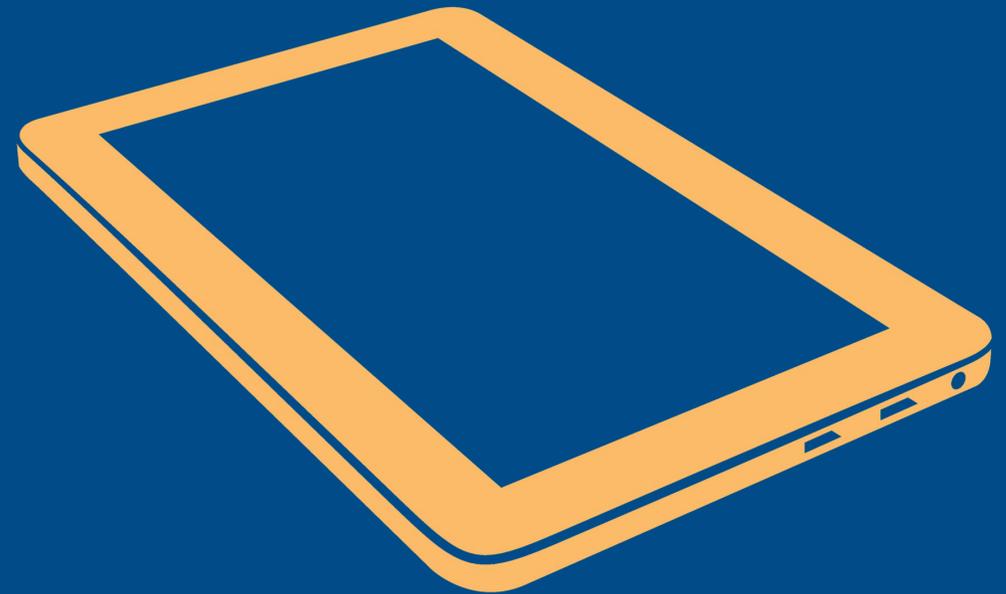


# Powering up or facing resistance?

How people understand the benefits of smart appliances



# Contents

- 3** **Key findings and recommendations**
- 6 Background
- 7 Research approach
- 8 The control and treatment content
- 9 What do people understand from the information?
- 12 What do different consumer groups understand?
- 14 Other research findings
- 15** **Why do we need change?**
- 16** **Achieving the recommendations: theory of change**
- 18 References and acknowledgements
- 19 Appendix

# Key findings and recommendations

**The government has set a goal to reach net zero carbon emissions by 2050. Digital technologies, like smart appliances, can help meet that goal. But as consumers are asked to buy these technologies, how can we help them make informed choices?**

## Short term

- 1 It is crucial that companies test and trial different ways to give people information about energy smart appliances and offers.**
- 2 Repeating and emphasising important messages, like those that help people make informed choices or relate to consumer rights, will improve people's understanding. But information alone won't be enough. Investing in good customer advice and support will be essential for dealing with queries and problems as this market develops.**

This paper sets out our recommendations for how we might better support people. It explains the research we've done to find out what consumers understand and if companies can improve how they present information.

Using visual aids can lead to a significant increase in consumer comprehension. But individual companies should test and trial the information they present to customers. Demand side technologies are reliant on a number of factors and there is no hard and fast rule about the behavioural effects different combinations of information could have on people.

In the short term, many offers will be entirely new to consumers. Emphasising important messages about consumer protection can improve how people understand it. However, it can also draw attention away from other messages. This means companies need to use different messages and consider repeating or mentioning them at multiple points in the customer journey. The research also shows some people may not understand different elements and will need other help. 62% of consumers would turn to energy companies to help them understand better. 67% would want contact information if there was a problem.

# Key findings and recommendations

## Medium term

**3 Monitoring this emerging market can help ensure its success. Government, consumer bodies and industry should monitor and understand experiences of energy smart appliances and services, taking action to tackle any systemic problems.**

Buying a smart appliance or bundled product and service comes with long term financial risk, with a variable pay off. This is especially the case for smart battery storage. For this product, the predictions consumers make about potential savings range from 0 - 100% of their energy bill. While people have varied circumstances, making such estimations can be difficult for industry experts, nevermind individuals.

**4 Regulations for energy smart appliances must include standards for communicating key information at the point of purchase**

How well people understand the information we tested varies greatly. The government is planning to regulate standards for smart appliances. This should include powers to stipulate how certain information is communicated. It's key the government has the right tools to protect consumers if needed.

**5 People will want to know how well smart appliances and services might work for them and how much money they may make or save. It needs to feel easy to assess and interpret their own data.**

Consumers being able to access their data opens up new ways to engage with complex tariffs. In a recent update by Ofgem, they suggest pausing the MiData programme to assess synergies with other programmes <sup>1</sup>. A natural next step would be to make sure either the MiData or Smart data review makes all the data needed to evaluate the benefits of smart appliances available too.

# Key findings and recommendations

## Long term

- 6 Government, Ofgem, industry and consumer groups will need to understand which consumer demographics are engaging with smart home flexibility and how best we can support people who would like to engage but feel they can't.**
- 7 Consumers will need access to independent advice and redress, specifically related to energy smart appliances and services to access this market.**

Using Ofgem's 6 consumer archetypes, our exploratory analysis suggests the consumers who lose out in today's market find it harder to understand the information we presented on smart battery storage. Furthermore, a similar percentage of consumers score below 25% on comprehension tests, regardless of which treatments they see. Not all consumers can or do engage with the energy market right now. There may be greater distributional risks if we don't overcome access barriers in the future.

A longer term goal should be to better protect consumers who use energy smart appliances and services. Our recent report<sup>2</sup> demonstrates the different types of consumer protection, which applies to companies depending on whether they are an energy supplier or a third party intermediary. Regardless of how consumers purchase their aggregation services, they should be able to access to independent advice and redress.

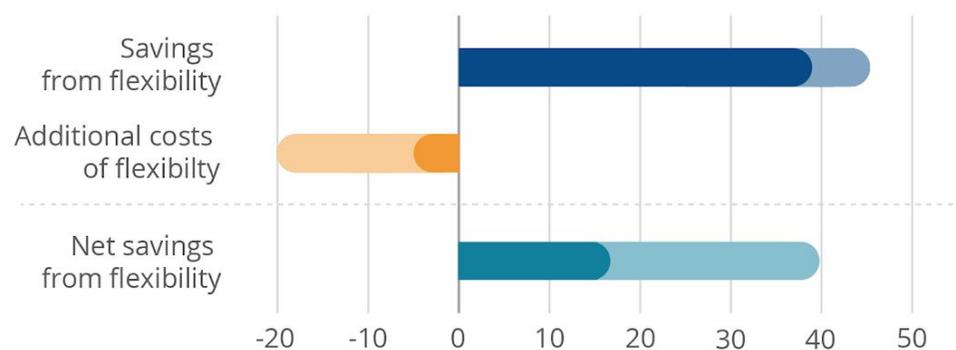
# Background

**We're facing a climate emergency that means our energy system, and how we use it, needs to change quickly.** We'll have to use more intermittent renewables to generate our electricity and more electricity to heat our homes and fuel our cars. This presents a challenge for how we best use our electricity system, in our homes and when balancing the grid.

**Digitalisation paves a way forward for greater efficiencies.** Smart appliances and services can help us use electricity more evenly and efficiently throughout the day, reducing peaks in use and unnecessary upgrades to our energy system. Smart technologies and services can also better meet the needs of consumers. For example, providing a service at least cost or more comfortable, automated temperatures.

**Avoiding upgrades to the energy system could save energy bill payers up to £17-40bn by 2040<sup>3</sup>.**

The faded areas show the range between low and high estimates



But this will only happen if we're able to change the way we use electricity, developing appropriate market incentives and structures. Citizens Advice supports government and industry activity in this area and we will continue to be involved in these conversations.

**Domestic and microbusiness consumers can contribute to national and local flexibility needs.** In fact, they already are, though at a small scale<sup>4</sup>. In the future, many more companies might seek to offer smart appliances and services to help take advantage of 'demand side response'. However, one major barrier to uptake will be understanding the value of these smart appliances<sup>5</sup>.

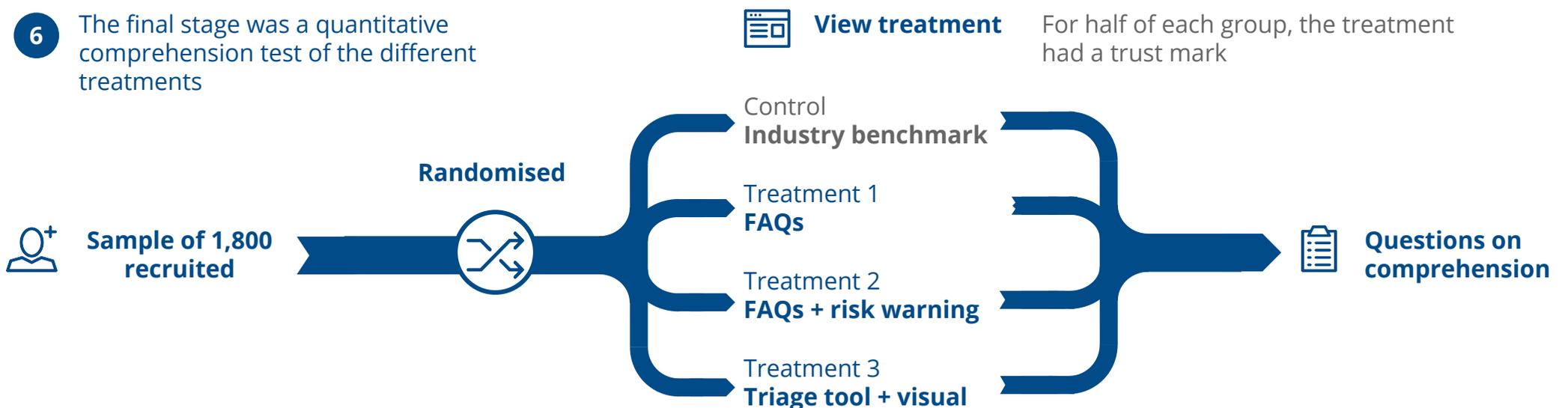
**Right now, the way manufacturers describe potential value is not consistent.** This can be made even worse because the value proposition, in and of itself, is hazy and often dependent on individual behaviour and homes. Presenting this better will not only make these products more appealing but - crucially - make it easier for people to buy the right product for their needs. Mis-selling is a real risk that can sour the early experiences of this market.

**We wanted to know how people understand information about smart appliances and what might help to improve this.** This research used smart battery storage as a test case for how the benefits of smart appliances could be communicated. We asked the Behavioural Insights Team to test what exactly people understood from one control content and three treatments. This short report summarises the main findings. The in depth research report from the Behavioural Insights Team is also available on our website.

# Research approach

- 1 We reviewed the literature on factors that can affect consumer comprehension.
- 2 Benchmark content was created based on the current market standard. This is the 'control'.
- 3 We held a workshop with key industry stakeholders to generate ideas of how to present information to consumers
- 4 Three treatments were drafted to test with consumers. These can be found in the appendix of this report.
- 5 We piloted our treatments with 6 consumers in vulnerable circumstances. We refined the treatments based on the results to ensure accessibility for this group.

- 6 The final stage was a quantitative comprehension test of the different treatments



# The control and treatment content

**We tested 4 types of content tested with consumers: one control and three treatments.**

The control is based on a review of the baseline across the market. The treatments are based on a workshop with industry stakeholders and on academic literature about people's behavioural biases. Copies of the content are in the appendix of the report.

## What did we want to say?

All the control and treatment contents have the same information. This included:

- an explanation of what you might need, in addition to the smart battery storage, to access the benefits
- possible financial and environmental benefits
- and trade-offs the consumer might make depending on how they use the device.

The research assumes certain requirements, such as having a smart meter installed to enable the functionality of the battery or that an aggregator may need to control some or all of the battery. This is to test comprehension not to suggest this is needed in all circumstances.



**The first treatment was in an FAQ format.** This helps structure information in smaller segments.



**The second treatment was in the same FAQ format with an additional 'risk warning box'.** This reminds consumers that buying smart battery storage is not worthwhile for every household and that assessing value may be complicated.



**The third treatment used a 'triage tool'.** This is the green tick box list on this treatment. This helps consumers easily identify whether they had the prerequisites for buying the product or getting the benefits. The treatment also included more visuals to support an explanation of the benefits and the tradeoffs

**Half of the participants in each group saw the content with a trustmark, whilst the other half saw it without one.** This was to test the effect of the trustmark on trust and comprehension.

## What do people understand from the information?

It's early days for the smart appliance market, with many consumers who take up the products likely to be early adopters. We know little about how the general population might understand them, including the offers associated. Learning more about this could help us better present that information and tell us what else we might need to do to support people. In this research, we financially incentivised consumers to correctly answer the comprehension questions.

The research finds, regardless of how information was presented, over half of the consumers we tested answered all our comprehension questions correctly.

### Overall understanding



Overall comprehension was best achieved through treatment 3, which has a significant impact on understanding. This treatment used a triage tool and visuals to demonstrate the benefits and trade offs between different use cases.

#### Key

The following colours are used in this and the next 2 pages to indicate which findings are statistically significant

No significant change ●

Increase Significant at 5% ●

Significant at 1% ●

Decrease Significant at 5% ●

Significant at 1% ●

# Understanding the benefits

## The financial benefits

All treatments significantly improved how financial benefits were communicated. Grouping information through FAQs or through visual format offers greater salience and clarity to consumers than the control.



## The environmental benefits

Treatments 1 and 3 also led to a significant increase in the understanding of the environmental benefit. Since treatments 1 and 2 only differ by the risk warning, it is likely this risk warning box drew attention away from the other information presented.



# Understanding of trade-offs

## The financial trade-off

Understanding of the financial trade-off did not increase for any treatments compared to the control. This may be because there was already a strong baseline understanding of these trade-offs if they used smart battery storage in different ways. For example, with a time of use tariff, storing solar energy or engaging with an aggregation service.

### Financial trade off



Comprehension decreased with treatment 1, although with weak significance. Again, it's likely the prominence of the risk warning box drew attention away from this element.

## The cost-benefit analysis

We asked participants to identify factors, which would help them do a 'cost benefit analysis' based on the information they had read. For example, the cost of the battery or how they intended to use it. Only treatment 2 significantly increased the comprehension of the cost benefit analysis, whilst treatment 1 decreased comprehension, as compared to the control.

### Cost-benefit analysis



The only difference between treatments 1 and 2 was the risk warning box. This suggests that a warning about how complicated it is to assess financial value increases the comprehension of the cost benefit analysis, overcoming the potential weakness of the FAQ format.

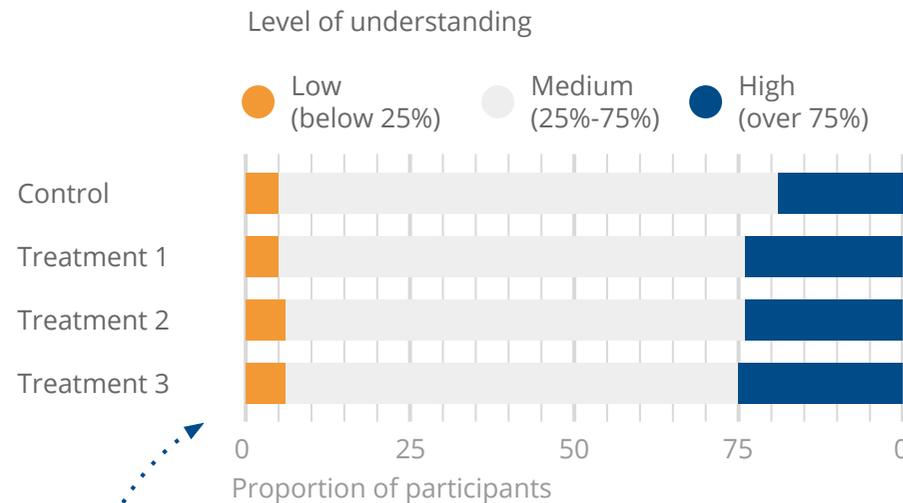
# What do different consumer groups understand

## The treatments do little to help those with the lowest understanding

Overall, changing the way information is presented does improve the way that people understand it. But when looking at understanding in different groups, people with a baseline understanding of the information are more likely to benefit from improvements to the way it is presented.

Those who already struggle to grasp the information don't benefit enough from the changes to presentation. They will need other support to properly engage with, understand and, most importantly, benefit from smart products or services.

## Numbers with low or high understanding after viewing the control and the treatments



Regardless of the treatment, a consistent 5-6% of individuals score below 25%. This is despite the fact participants were motivated to answer correctly, through the amount of money they earned

However, the treatments increase the number of individuals scoring above 75% in the comprehension test from 19% to 24-25%.

# What different consumer groups understand

## Least engaged consumer segments seem to benefit less from the treatments

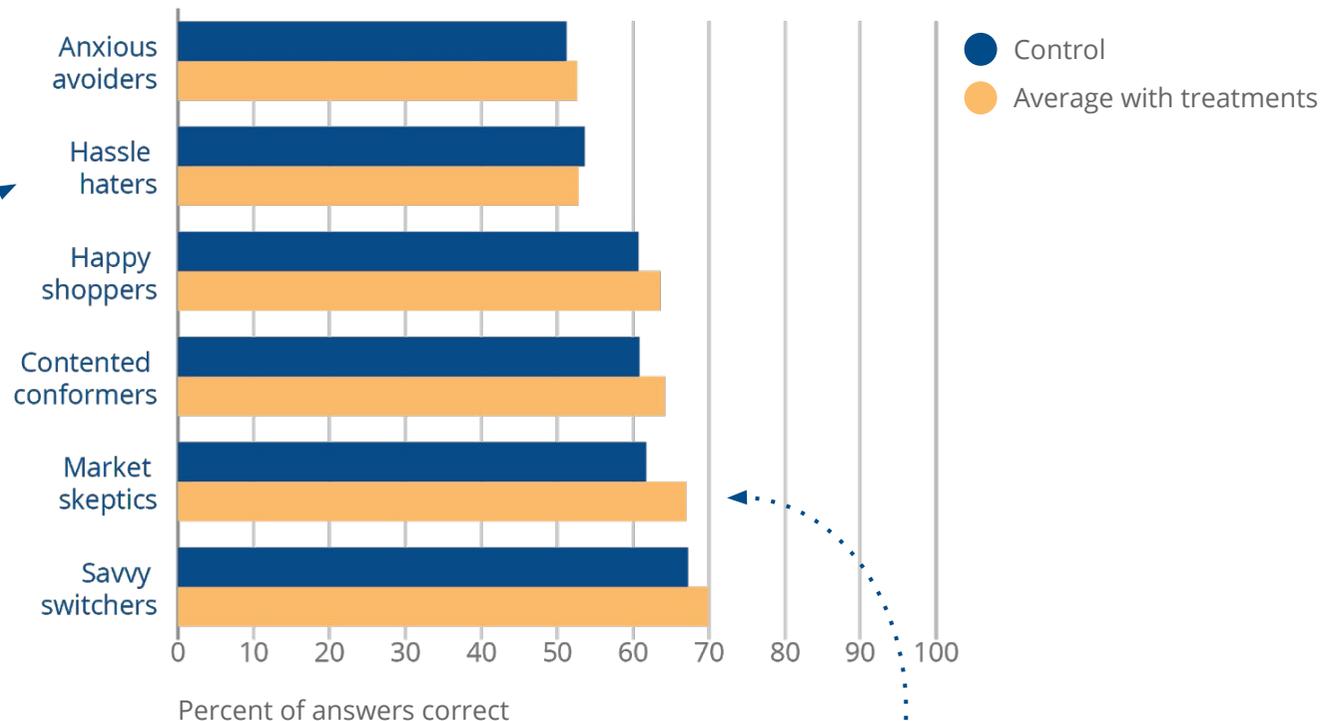
In 2017, Ofgem carried out research to identify different types of consumers in the energy market. They identified six consumer groups, who had differing attitudes and behaviours<sup>6</sup>.

We analysed the comprehension scores against which of Ofgem's groups consumers fell into. This is exploratory analysis and splitting the groups into these segments means that we no longer have a big enough sample size to conclude causal relationships. But the findings suggest many of the same consumer groups who lose out in today's market are helped the least by the treatments.

More research would be needed to confirm these results.

## Understanding levels by Ofgem consumer segment

Overall comprehension levels with and without the treatments



The anxious avoiders and hassle haters had the lowest comprehension with the control. Their understanding appears to have had little or no improvement with the treatments

Market sceptics appear to benefit the most from how information is presented. They had the only result that was big enough to be statistically significant, given the sample size.

# Other research findings

## Estimated saving

We asked consumers to assume they owned smart battery storage. Though individual circumstances are different, the average estimated saving on an energy bill made by consumers was 19.2% for the control. Overall, only treatment 2 saw a significant change, with respondents estimating savings at 16.5%. This, more cautious, estimate is in line with what we'd expect a 'risk warning box' to achieve.

## Trust

We wanted to know whether a trustmark would increase how trusted information was and what - if any - effect this had on comprehension. We asked consumers to self-report levels of trust from 1 to 7. Content with the trustmark and content without the trustmark scored 4.8 and 4.9 respectively, which is a weakly significant decrease in trust with the trustmark. This contrasts with other research findings, where 46% say they would like a trustmark to help them navigate the market.

## Engagement

Overall, just under half the people (48%) who participated in the research said they were interested in smart battery storage after reading about them. But only 17% were interested enough to click through for further information about them. There was no significant difference in engagement rates across the control and treatments.

## Sources and types of additional information

Consumers say they would turn to their energy supplier (67%) or an organisation like Money Saving Expert (44%) for more information. On consumer issues, 67% want a contact number if something went wrong and 64% want information on detailed functionality as well as warranties.

# Why do we need change?

Interest in smart appliances will vary depending on type and functionality. But for some products, potential growth could be substantial. One report<sup>7</sup>, suggests that 70% of smart charger installations will be outside people's homes by 2030.

Our research looked at smart battery storage, specifically, but many of the benefits outlined could easily apply to other demand side technologies. Right now, the government is developing technical standards for energy smart appliances, making sure these are right for consumers and industry. This is really important but we can't forget the consumer protection needed, not only for consumers but to help the industry grow well.

The findings suggest information won't always be taken in evenly or completely, with around 40% of consumers getting something wrong when we tested them. It isn't a big surprise that there's some difficulty, but the scale tells us we can't go forward without improving what, when and how we tell consumers about these technologies and services. This needs to be a priority because of their complexity, financial risk and the current lack of consistency, when framing the potential benefits or value.

Most markets have 'winners' and 'losers', depending on how people behave and whether they take advantage of the best offers. It makes sense for people to purposefully disengage, if that's what they want. But the research suggests that not everyone is equally empowered to engage. There's a minority of individuals (5-6%) scoring below 25% on our comprehension test, regardless of how the information is presented.

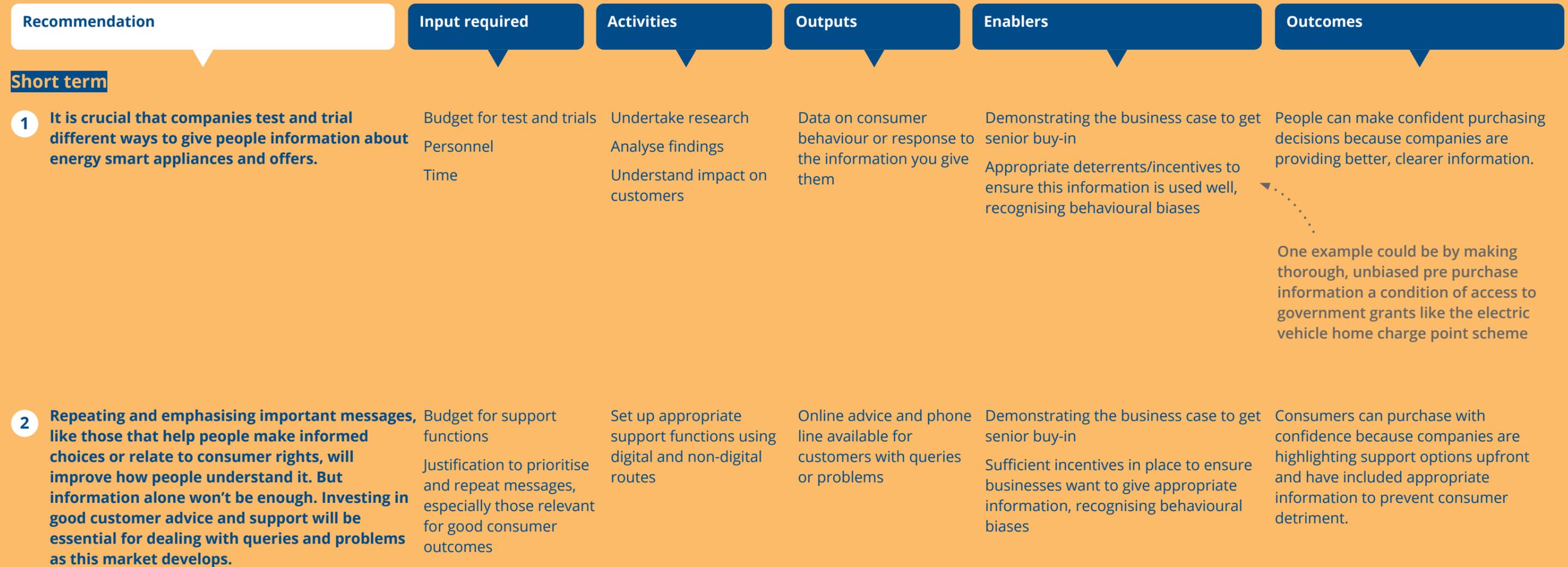
It's likely this may be one of several factors that could prevent people from participating in some new and flexible services enabled by smart appliances. We should consider who owns these devices, especially if this affects how affordable their energy bill is and where costs of maintaining the energy system fall.

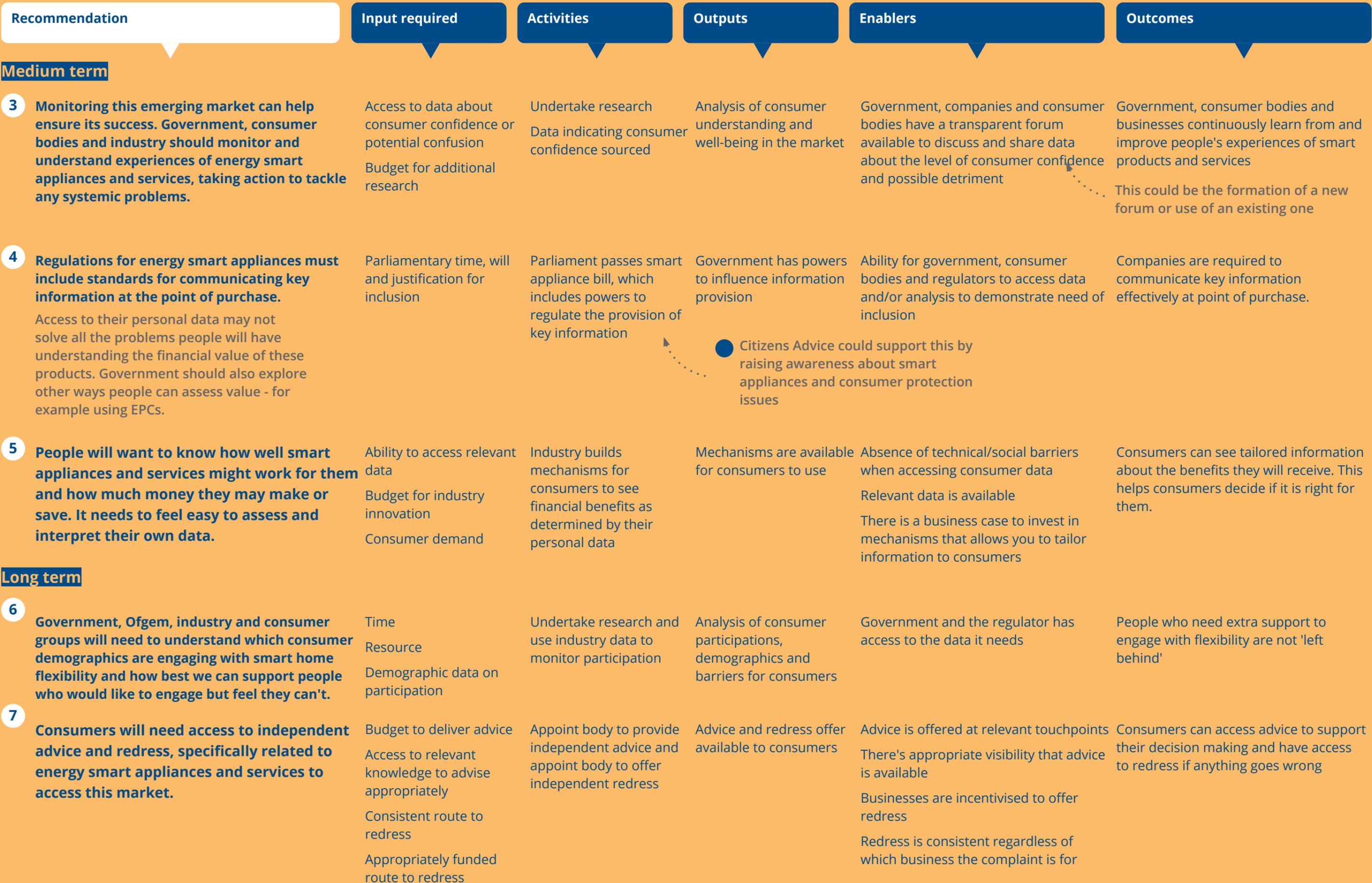
This research is foundational and exploratory. It's part of the early building blocks to better understand consumers and the smart appliance market. While organisations continue to research this area, it makes sense for the government to ready themselves with the appropriate tools and for interested organisations to monitor how this market develops. At the same, industry can and should take steps to minimise risk and support consumers whilst the market is unfamiliar.

# Achieving the recommendations

This theory of change has been developed to support our recommendations. It sets out a way forward for industry, government, regulators and consumer groups to identify what might be needed to support change and achieve these recommendations.

All the recommendations and their outputs ultimately support the same impact: **that more people are able to make a choice about buying technology and are fully informed about what the implications might be for them. As a result consumer detriment is reduced.**





Citizens Advice could support this by raising awareness about smart appliances and consumer protection issues

## References

1. Ofgem, 2020, **Midata in energy update**
2. Citizens Advice, 2020, **Stuck in the Middle**
3. Carbon Trust and Imperial College, 2016, **An analysis of electricity system flexibility for Great Britain, p5**
4. Piclo, 2019, **Flexibility and Visibility**
5. techUK, 2018, **State of the connected home, p11**
6. Ofgem, 2017, **Customer Engagement Survey 2017**
7. Delta EE, 2020, **UK EV chargepoint market set to increase by 29% annual growth despite covid-19 impact**

## Acknowledgements

We would like to thank the Behavioural Insights Team for completing this research on behalf of Citizens Advice. A full research report has been published alongside this report.

We'd also like to thank the many stakeholders who contributed to the development of 'treatment' content. This includes colleagues from the Renewable Energy Consumer Code, Energy Systems Catapult, the department for Business, Enterprise and Industrial Strategy and Flexi-Orb.

# Appendices

- 1 Control treatment
- 2 Treatment 1
- 3 Treatment 2
- 4 Treatment 3

# Battery X - green living with intelligent battery storage

**Battery X** is a smart battery storage system. **Battery X** can help you reduce your electricity bills by storing electricity from your supplier when it's cheaper during off-peak times or by storing energy from your solar panels. As well as saving on your bills, **Battery X** can help you make money by letting an energy company use your **Battery X** to store or release electricity when the electricity system needs it. **Battery X** can store up to 6 kWh of energy - that's enough to power your kitchen appliances and TV for one evening as well as a laptop all day.

Note, to use **Battery X**, you'll need to have a smart meter and somewhere cool and dry to store it.



**Battery X** is a modular system so you can upgrade to **Battery X premium** any time for more capacity and performance. **Battery X** is built according to industry-recognised safety standards and can be setup by a technician.

## Product details:

- ❖ Attach to solar to optimise your solar investment
- ❖ Use with time-of-use (TOU) tariff
- ❖ Modular system
- ❖ Access to grid balancing services

# Battery X - green living with intelligent battery storage

**Battery X** is a smart battery storage system. **Battery X** can help you reduce your electricity bills by storing electricity from your supplier when it's cheaper during off-peak times or by storing energy from your solar panels. As well as saving on your bills, **Battery X** can help you make money by letting an energy company use your **Battery X** to store or release electricity when the electricity system needs it. **Battery X** can store up to 6 kWh of energy - that's enough to power your kitchen appliances and TV for one evening as well as a laptop all day.

Note, to use **Battery X**, you'll need to have a smart meter and somewhere cool and dry to store it.



## How can **Battery X** help me reduce my electricity bill?

- ❖ First, you can store electricity directly from your energy supplier at times when it's cheaper, and then use it whenever you need it. Note, you'll need a 'time of use' tariff for this. A 'time of use' tariff is a tariff where the price varies at different times, e.g. it may be cheaper to use electricity at night and more expensive during the hours of the day when demand is high.
- ❖ Second, if you have solar panels you can store unused energy when it's being generated, and use it when you need it, for example when the sun isn't shining.

**How can **Battery X** help me generate an income?** To help the electricity system at busy times, you can sign up with an energy company who will pay you an income to lend part, or all of your **Battery X**'s storage capacity. Note, this may mean you cannot use this share of your battery for your own energy storage. This also means there is a financial trade-off between this income and the other benefits summarised above.

**How can **Battery X** make my energy consumption greener?** **Battery X** allows you to store electricity generated from your solar panels to use later. It can also help the entire system by storing renewable energy for the national grid at busy times or releasing electricity when it's needed. You can also set your **Battery X** to store electricity from the national grid when it is greenest.

# Battery X - green living with intelligent battery storage

**Battery X** is a smart battery storage system. **Battery X** can help you reduce your electricity bills by storing electricity from your supplier when it's cheaper during off-peak times or by storing energy from your solar panels. As well as saving on your bills, **Battery X** can help you make money by letting an energy company use your **Battery X** to store or release electricity when the electricity system needs it. **Battery X** can store up to 6 kWh of energy - that's enough to power your kitchen appliances and TV for one evening as well as a laptop all day.

Note, to use **Battery X**, you'll need to have a smart meter and somewhere cool and dry to store it.



## How can **Battery X** help me reduce my electricity bill?

- ❖ First, you can store electricity directly from your energy supplier at times when it's cheaper, and then use it whenever you need it. Note, you'll need a 'time of use' tariff for this. A 'time of use' tariff is a tariff where the price varies at different times, e.g. it may be cheaper to use electricity at night and more expensive during the hours of the day when demand is high.
- ❖ Second, if you have solar panels you can store unused energy when it's being generated, and use it when you need it, for example when the sun isn't shining.

**How can **Battery X** help me generate an income?** To help the electricity system at busy times, you can sign up with an energy company who will pay you an income to lend part, or all of your **Battery X**'s storage capacity. Note, this may mean you cannot use this share of your battery for your own energy storage. This also means there is a financial trade-off between this income and the other benefits summarised above.

**How can **Battery X** make my energy consumption greener?** **Battery X** allows you to store electricity generated from your solar panels to use later. It can also help the entire system by storing renewable energy for the national grid at busy times or releasing electricity when it's needed. You can also set your **Battery X** to store electricity from the national grid when it is greenest.

### **CAUTION**

*Smart storage batteries require an upfront investment that is not worthwhile for all households. The calculations surrounding this can be complex – involving your current solar generation, grid consumption, devices in your home, and your energy lifestyle.*

# Battery X - green living with intelligent battery storage

**Battery X** is a smart battery storage system. **Battery X** can help you reduce your electricity bills by storing electricity from your supplier when it's cheaper during off-peak times or by storing energy from your solar panels. As well as saving on your bills, **Battery X** can help you make money by letting an energy company use your **Battery X** to store or release electricity when the electricity system needs it. **Battery X** can store up to 6 kWh of energy - that's enough to power your kitchen appliances and TV for one evening as well as a laptop all day.



## Step-by-step guidance:

### 1. Is smart battery storage right for me?

Yes, if you:

- Have a smart meter, and
- Have a cool and dry place to install it

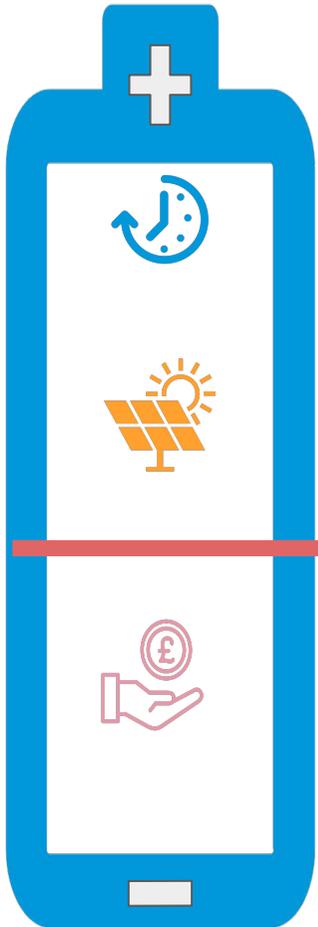
### 2. Have you considered how you want to use **Battery X**? Smart battery

storage is designed for a few different uses. In order to benefit from

having one, you would need to have at least one of the following:

- A time of use tariff to store cheap electricity from your supplier. A 'time of use' tariff is a tariff where the price varies at different times, e.g. it may be cheaper to use electricity at night and more expensive during the hours of the day when demand is high.
- Solar panels to store solar energy
- Sign up to lend part or all of your Battery X's capacity to an energy company

You can use and benefit from *your Battery X* in different ways: **And you can combine your benefits in three different ways:**



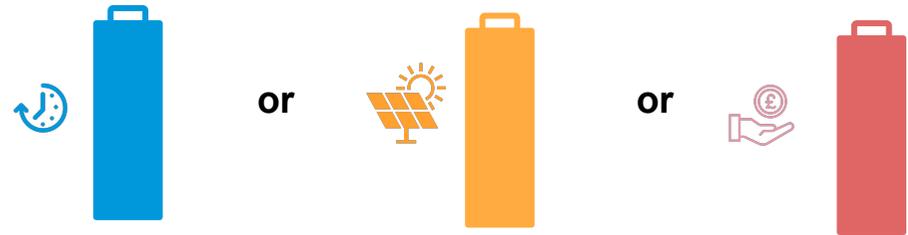
**Cheaper energy from your supplier.** Reduce your energy bill by storing electricity directly from your energy supplier at times when it's cheaper, and then using it whenever you need it.

**Solar energy.** If you have solar panels you can store unused energy when it's being generated, and use it when you need it, for example when the sun isn't shining.

**Capacity share lent to supplier in return for income.** To help the electricity system at busy times, you can sign up with an energy company who will pay you an income to lend part, or all of your **Battery X**'s storage capacity. Note, this may mean you cannot use this share of your battery for your own energy storage. This also means there is a financial trade-off between this income and the other benefits summarised above.

**Battery X** can help reduce CO2 emissions, as it enables the national grid to use renewable energy sources more efficiently, and it allows you to use more electricity generated from your solar panels.

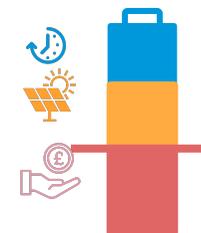
**A - single use:** Use your battery's full capacity for **one** of the three benefits.



**B - dual use:** Split your storage capacity between **two** benefits.



**C - combined:** Split your capacity between all three benefits.



# Good quality, independent advice. For everyone, for 80 years.

We give people the knowledge and confidence they need to find their way forward - whoever they are, and whatever their problem.

Our network of charities offers confidential advice online, over the phone, and in person, for free.

With the right evidence, we show companies and the government how they can make things better for people.



[citizensadvice.org.uk](https://citizensadvice.org.uk)

**Report lead: Rajni Nair**

Published June 2020

Citizens Advice is the operating name of The National Association of Citizens Advice Bureaux. Registered charity number 279057.