

A photograph of two women standing on a balcony. The woman on the left is wearing a blue denim jacket over a striped shirt and glasses. The woman on the right is wearing a red and black patterned top and is holding a green and yellow patterned mug. They are both smiling and looking at each other. The balcony has a brick wall and a metal railing. There are glowing blue energy lines and circles overlaid on the image, suggesting a connection to energy or technology.

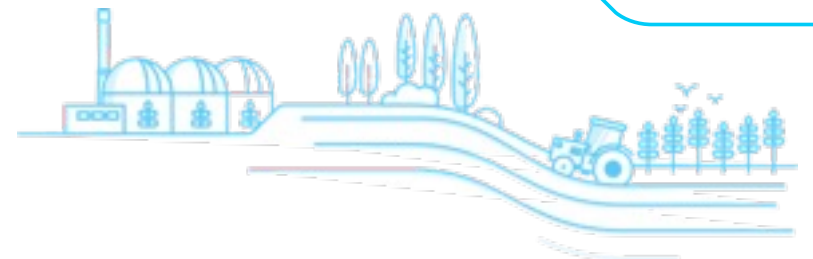
Household engagement with the Demand Flexibility Service 2022/23

Social research report by the Centre for Sustainable Energy for ESO

July 2023

Contents

| | |
|----------------------------------|-----------|
| Executive summary | 03 |
| Introduction | 07 |
| Awareness and Motivations | 17 |
| Who participated | 26 |
| Household Experiences | 36 |
| Benefits and Challenges | 49 |
| Recommendations | 69 |



Executive Summary

Introduction

The Demand Flexibility Service (DFS) is the largest demand response scheme to have taken place on Britain's electricity network to date. The service ran from November 2022 to March 2023, with 20 test events and two live events in this time. 1.6 million households and businesses participated, delivering in total 3,300MWh of electricity reduction.

This report provides an evaluation of household engagement with the Demand Flexibility Service. The evaluation was designed to understand:

- Awareness and motivations for participating in the DFS
- Who was able to participate
- How households responded
- The main benefits and challenges households experienced
- Longer term outcomes

The evaluation was run by the Centre for Sustainable Energy using a smart energy capabilities lens¹ to consider the range of factors that may have shaped household engagement with the DFS. Data about household experiences of the DFS and household smart energy capabilities were collected from four sources:

- 134 diaries completed by active DFS participants in the final month of the Winter 22/23 service.
- 1,700 responses to an opinion poll from a representative sample of the GB population.
- 23,717 responses to an online evaluation survey shared by 7 of the 21 domestic DFS providers with their customers in April 2023.
- 10 semi-structured interviews carried out with diary respondents and evaluation survey respondents who had reported specific experiences. These were carried out in June 2023.

Where relevant, these evaluation data have been compared to national statistics and datasets. Information has also been included from the high-level evaluations published by domestic DFS providers who did not share the evaluation survey with their DFS customers.

The evaluation represents a partial picture of household experiences because not all domestic DFS providers opted to share the survey link with their customers. In addition, smart meter data was not available for this first phase of the evaluation. The analysis of smart meter data will follow in the second phase of the research and will evaluate how household engagement relates to the amount of demand reduced

Important lessons can be drawn from the households who took part in this engagement evaluation. These should be used in future flexibility service design by procuring organisations like ESO as well as by flexibility service providers to consider how to improve household engagement with domestic flexibility services.



Executive Summary

Main findings

Awareness:

38% of the opinion poll respondents had heard of the DFS, and of these 51% were participating. This suggests some wider awareness in the population of the DFS outside participating households. However, evaluation survey respondents did not actively seek out the offer. Most (85%) heard about the DFS through their provider. To increase competition between DFS providers and improve household offers through the market, wider awareness will be needed, including awareness of the option to participate with a provider that is not the households' electricity supplier. Improved advice is needed alongside increased awareness of flexibility services to help households gauge the appropriateness of taking up an offer and any benefits they are likely to achieve.

Motivations:

Financial benefit (savings or rewards) was the main motivation driving uptake of the DFS (selected by 76% of survey respondents). Households were also motivated by the challenge of responding (41%) but wider system gains featured. Balancing the grid or 'keeping the lights on' was selected by 37% of survey respondents. The evaluation found that motivations differed between groups. There was some evidence that those motivated by the potential to reduce their energy costs experienced frustration when they did not achieve significant savings. In addition, several households called for more understanding of the system impacts achieved through the DFS. The evaluation therefore indicates an opportunity for wider communications about the role that flexibility services can play in decarbonising the energy system and improving energy security.

Who participated:

A wide range of households took part in the evaluation survey, including those who have been flagged in research as potentially facing participation barriers; 30% of respondents had a health condition or long term illness, 18% of respondents were tenants and 30% lived in households with 3 or more people. This indicates that the DFS achieved low barriers to participation. However, some demographic groups were underrepresented, including younger age groups, lower income households, renters and city residents. Participation should be monitored to understand any emerging inequalities, in terms of differential access to offers and outcomes achieved through participation.

Experiences:

Households reported that they found it easy to know how to participate (82%), but many households participated in 3 or fewer events (41%). This figure includes 680 (3%) households who experienced technical faults and communication issues with participating.

The evaluation identified five main approaches used by households to shift or reduce their demand during events:

- Plan usage around an event
- Reduce usage during an event
- Turn off all power
- Move usage to the 1-4 hours directly before an event
- Use domestic battery

The evaluation also identified two main constraints:

- Unable to shift due to low usage
- Unable to shift due to limited flexibility

Planning usage around the event was the selected as the primary strategy by 41% of households, while reducing demand without shifting was selected as the primary strategy by 37%. When taking households' primary and secondary strategies together, both options were selected by 57% of participants. The prevalence of demand destruction might indicate the increased need for participants to make savings in light of the cost of living crisis. It may also reflect a limited understanding of demand shifting. The proportion of households who targetted the period directly before the event (the in-day adjustment window) was low. Only 8% of survey respondents selected this as their first ranked approach. These households tended to have low carbon technologies such as PV and EVs.

The main considerations influencing household decisions to opt in to turn down events shows that critical peak shifting is challenging. The time of the event was the main consideration for 49% of survey respondents, and the amount of notice given was selected by 35% of respondents. Only 20% of respondents felt they could react with 2 hours' notice, but this figure rises to 61% with 6 hours' notice.



Executive Summary

Benefits:

For evaluation survey respondents, the most commonly selected benefit was the sense of satisfaction from managing the challenge (42%). The rewards earned was selected 39% of the time. Being part of a national collective effort was selected 38% of the time.

Qualitative analysis showed households enjoyed a general 'feel-good' factor around doing their bit or contributing to something (especially carbon reduction) on a national scale. Learning more about energy in their home, including smart meter displays, low carbon technologies and high-usage appliances was another benefit discussed. A key element of this learning process involved teaching family or friends more about energy. 'Fun' was another benefit flagged, with comments including the benefits of switching off from electronic devices for a while and feeling better connected with themselves or others around them.

Challenges:

Incentives in general were low, and this was the most selected challenge by the respondents (38%). However, low rewards are tied to low numbers of events participated in, and do not appear to be a determining factor in satisfaction or willingness to sign up again.

A bigger challenge identified by the analysis is that households who are struggling financially, or who have long term health impacts did not find it as easy or rewarding to participate. Any future DFS offer must require providers to give effective guidance to help households gauge which loads they can shift, how much effort this will require and what type of benefits they will generate.

Fairness is another significant challenge that has been raised by respondents and through the analysis. Households that have higher and more flexible demand will gain higher rewards, while those with lower demand may make significant efforts during the event window but receive very little reward. This was seen as unfair and led to some households to call for rewards to be based on effort rather than demand reduction. In addition, news of households turning up their demand prior to events to maximise their rewards also risked negative public perception. Interestingly, qualitative research with households who took this approach to shifting showed awareness of this not being 'in the spirit of DFS', indicating the need

and opportunity for public debate about the benefits and challenges of incentivising demand shifting.

In spite of challenges experienced by specific groups, quantitative evidence from survey respondents suggest overall sentiment about the DFS was positive. 62% of respondents were satisfied with their experience and 83% would participate again.



Executive Summary

Longer term outcomes:

The DFS achieved low barriers to participation and succeeded in enrolling 1.6 million households and businesses. Of those households who participated in the evaluation survey, the main benefit achieved was being able to respond to the challenge, most would participate in something similar again, and some households described how they would improve their shifting strategy in future by, for example, increasing motivation amongst household members or investing in smart technologies. All of these factors suggest that the DFS has widened awareness of flexibility, provided a wide range of households with experience of demand shifting and led to an increase in smart energy capabilities for some households.

This positive outcome needs to be tempered by evidence from the evaluation that some households may have chosen a 'low effort, low reward' approach, not opting into many events and not expecting to earn rewards. While other households opted in with the hope of reducing their energy bills but had negative experiences perceiving their effort not equal to the reward. This was particularly the case for households who were struggling financially. Managing these different experiences will be key to increasing effective participation. Ensuring that households are enrolled onto flexibility services that match their expectations and capabilities is central to sustaining interest longer term in domestic demand response.

The evaluation has produced a dataset that will support further research into the household capabilities needed to engage with and benefit from providing flexibility. 78% of households opted to make their evaluation survey data available for further research. An anonymised dataset will be made available for stakeholders and researchers.

Summary of recommendations for future DFS

- Improve advice for households
- Communicate widely the purpose and outcomes of DFS
- Create transparency on rewards and baseline methodology
- Improve communications with participating households
- Build in safety mechanisms to protect vulnerable households
- Mandate a common evaluation

Summary of wider recommendations

- Diversify the type of flexibility services offered
- Build households' smart energy capabilities
- Build industry and consumer confidence in domestic flexibility with a more open approach to data
- Widen public debate about flexibility and fair ways to achieve it



Introduction



Introduction

Aims and scope

This report provides an overview of household engagement with the Winter 2022-2023 Demand Flexibility Service.

The report draws on data collected through an independent evaluation run by the Centre for Sustainable Energy (CSE) for ESO. The evaluation aimed to understand who was able to take part in the Demand Flexibility Service (DFS), why they opted in, their experiences of participating, and whether they would take part in something similar again.

Aims

This report aims to

1. Provide practical insights for ESO and DFS providers in the design of future DFS offers, to improve households' experiences and outcomes.
2. Flag any inequalities between groups that should be investigated further.
3. Discuss longer term outcomes for future household engagement in flexibility services.

Scope:

The evaluation only covers households' experiences. The following are out of scope:

- Industrial and commercial consumers and small or medium enterprises who took part in DFS events.
- Analysis of the volume of demand reduction delivered by households. This will be produced when smart meter data is available for analysis.
- Comparison of offers across different DFS providers, many of which will carry out their own market analysis of the effectiveness of different offers.



Context

Overview of the Winter 22/23 Demand Flexibility Service

The DFS was designed to incentivise households and businesses to reduce or shift their electricity use from peak times. The service ran from November 2022 – March 2023, with 20 test events and two live events in this time.

ESO guaranteed DFS providers a minimum price of flexibility of £3/kWh and provided a standardised baselining methodology to determine kWhs shifted. DFS providers used the method to determine each household's kWh savings relative to a household's specific baseline for that day. An 'in-day adjustment window (IDA) was used to adjust average demand. DFS Providers determined their own incentive schemes for customers some using points, cash back or prize draws. In total, 31 providers signed up (14 domestic only, 10 non-domestic only, and seven both domestic and non-domestic). Providers were able to sign up at any point in the 5 month period, which meant their customers were offered different numbers of events.

The DFS is the largest demand response scheme to have taken place in the UK to date. 1.6 million households and businesses participated, delivering in total 3,300MWh of electricity reduction at key times (roughly the amount of electricity that 9.9 million households would use at peak times across a single hour)¹. The scheme and this evaluation provide key insights on the UK's progression towards a smarter, more flexible energy system and how households can be part of that transition. For the purposes of this research, only the participation of consumers through domestic providers has been included in the evaluation.

| Winter 22/23 DFS Domestic Providers | Incentive mechanism** |
|--|---|
| British Gas | Money off bills |
| CarbonLaces* | Not available |
| Chameleon Technology (UK) as ivie | Points and a prize draw |
| E.ON Next | Money off bills |
| EDF * | Money off bills |
| Equiwatt* | Points |
| ev.energy | Points and a prize draw |
| Hildebrand Technology Limited | Cash, gift cards and donations |
| Hugo Energy App (via SMS) | Cash back |
| Labrador (via Perse Technology)* | Money off bills |
| Loop.homes (via SMS) | Gift card |
| myenergi (via Orange Power) | Unknown |
| Octopus Energy* | Points for cash, prizes and donations |
| OVO Energy | Cash back |
| Power Rewards App (via Orange Power) | Cash back |
| Shell Energy Retail (Via SMS) | Prize draw |
| SMS (aggregator) | Delivered via partners (Hugo Energy App, Loop.homes, Shell Energy Retail, SolarEdge Technologies) |
| SolarEdge Technologies (via SMS) | Gift card |
| Uswitch Limited (Via Hildebrand) | Cash back |
| Utilita | Money back |
| VpowerU* | Reward scheme |



¹ National Grid ESO, [Demand Flexibility Service delivers electricity to power 10 million households.](#)

* Indicates a DFS provider offering services to both domestic and non-domestic customers.

** Information on incentive mechanisms has been collated from websites and published information. It has not been verified with DFS providers who may have changed their incentives, or offered different incentives to different customers.

Context

Energy demand in Winter 2022-23

The outcomes achieved through the DFS need to be interpreted within the context of an unprecedented winter for energy use which combined gas shortages, soaring household energy bills, a domestic cost of living crisis, and some significant cold spells.

With bills at the highest they have been for decades and the introduction of the Government Energy Price Guarantee and the Energy Price Cap, public discussion around the cost of energy was extensive. War in Ukraine and the disruption to European gas supply prompted reports of the risk of blackouts on the coldest days.

Households were more aware of energy issues and were changing their behaviour in response. DESNZ statistics show that despite the UK experiencing similar temperatures, gas consumption fell 11% at the end of 2022 compared to the same period in 2021, concluding that the reduction in domestic demand “seems likely to be driven by changes in consumer behaviour resulting from higher prices”¹. Ofgem’s Consumer Impacts of Market Conditions survey, run in November / December 2022, reports that 87% of consumers were taking actions to reduce their energy costs².

The concept of ‘reducing demand on the grid’ was frequently covered in the press and social media, providing a context in which demand management could be viewed as a national effort. Press coverage of the DFS reported that households could earn up to £100. This will have affected household engagement with the DFS. Some may have felt it was important to take part, while others, particularly those struggling financially may have felt pressure to opt in and do everything possible to reduce their bills. Analysis carried out for the Committee on Fuel Poverty at the time illustrated the extreme measures that desperate households were taking³. This backdrop of extreme privation, which saw public ‘warm spaces’ being offered to households who could not afford to heat their homes, raises questions about the fairness of rewarding households who did not have to limit their consumption. Struggling households, with low electricity use who contribute very little to peak demand did not stand to gain from the DFS in the same way as well-off households with higher demand.

Household ability to participate in flexibility markets

Active participation by households in the energy market is a key requirement for the low carbon transition but remains challenging to achieve. Ofgem statistics on switching activity have shown that engaged consumers are biased towards mid-aged, higher income groups. Disengaged consumers are more likely to pay by pre-payment meter or be in financial difficulty³. UK government statistics on smart meter uptake show that 51%⁴ of all domestic meters are smart meters. Therefore 49% of UK households do not have a smart meter and were not eligible to participate in the DFS. These data indicate that some households find it harder than others to actively engage with the energy market or benefit from their engagement.

When considering the ability for households to actively shift their demand in response to market signals, there are additional factors that may affect households’ ability to engage and benefit from their participation. CSE’s Smart Energy Capabilities Framework sets out five domains that influence participation. These are routine household energy usage, dwelling characteristics, digital skills and confidence, financial status, as well as social and personal factors⁵. In addition, academic research has provided insight into barriers such as trust, perceptions of risk and household routines⁶. The way that structural inequalities affect household engagement and ability to create value through demand shifting have also been studied⁷.

The Demand Flexibility Service in principle had very low barriers to participation. The only technical requirement for households to participate was having a functional smart meter with half-hourly data consent. The DFS was a non-punitive offer meaning that households could sign up without risking any negative financial consequences. Households could opt in to events knowing that even if they could not shift, their energy bill would not be negatively affected. In addition, households could also choose to participate via an approved provider such as an energy app, rather than be tied to their existing electricity supplier, widening access further.

¹Department for Energy and Net Zero, Energy Trends UK: October to December 2022

²Ofgem, Household Consumer Impacts of Market Conditions Survey Wave 3 Report: Research conducted in November - December 2022.

³Understanding the challenges faced by fuel poor households, Final Report for the Committee on Fuel Poverty, May 2023 available at <https://www.gov.uk/government/publications/understanding-the-challenges-faced-by-fuel-poor-households>

³Ofgem, Consumer Survey 2020

⁴Department for Energy and Net Zero, Smart Meter Statistics in Great Britain: Quarterly Report to end March 2023

⁵Smart and Fair phase 1 report, September 2020 Smart & fair - Centre for Sustainable Energy (cse.org.uk)

⁶Parrish, B et al. (2020) A systematic review of motivations, enablers and barriers for consumer engagement with residential demand response. Energy Policy, 138.

⁷Powells, G. and Fell, M.J (2019) Flexibility capital and flexibility justice in smart energy systems. Energy Research and Social Science, 54: 56–59.



Evaluation Design



Evaluation design

Evaluation questions

The evaluation was designed to answer the following four main questions:

1. How did households hear about the Demand Flexibility Service?
2. Who was able to participate in the Demand Flexibility Service?
3. How did households respond?
4. What were the main benefits and challenges households experienced?

The research was designed to provide insights for future DFS offers. Data was collected to understand:

- Awareness of the service
- Motivation to participate
- Ease of engaging
- Approaches taken to shift demand
- Benefits and challenges
- Likelihood of long-term change and future uptake

The evaluation used CSE's smart energy capabilities lens¹ as the framework to explore the range of factors that may affect different households' experiences of participating. These range of factors have been used in the evaluation to analyse potential inequalities emerging between groups who found it easy and beneficial to participate, and groups who did not.

A dataset created through the evaluation will be anonymised and published for use in other research.

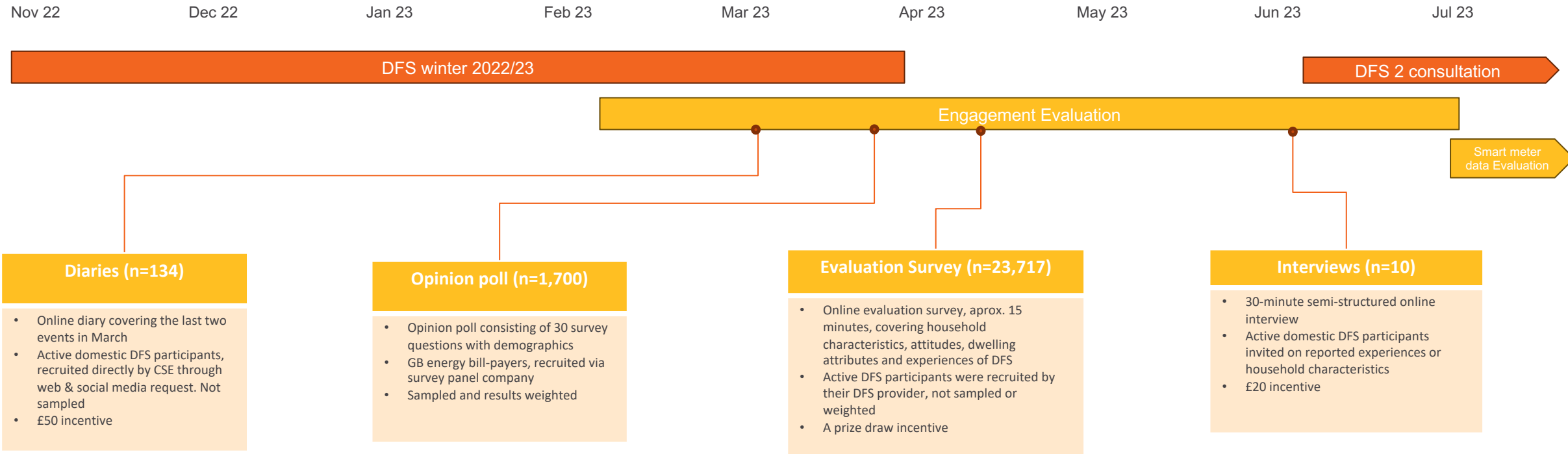
Data collected for this evaluation based on CSE's capability lens

| CSE's capability lens | Social research data collected for the evaluation |
|-----------------------------|---|
| Energy tech & usage | <ul style="list-style-type: none">• Installed LCT tech & use of monitoring / smart control• Heating type• Meter type |
| Dwelling & location | <ul style="list-style-type: none">• Dwelling type & tenure• Region |
| Digital skills & confidence | <ul style="list-style-type: none">• Use of smart appliances or controls• Trust in energy suppliers |
| Financial | <ul style="list-style-type: none">• Employment status• Socio-economic grade of highest wage earner• Tenure• Perception of coping financially |
| Social & personal | <ul style="list-style-type: none">• Attitudes of the person filling the diary (financial risk, interest in new technologies, climate concern)• Health status• Demographics (gender, age, ethnicity) |



Methods summary

Evaluation timeline



Methods summary

Data collection

The data for the evaluation was collected through four tools; diaries, an opinion poll, an online evaluation survey and semi-structured interviews.

Diary

The diaries were made up of four parts; Part A covered households characteristics and demographics, Parts B&C asked participants to qualitatively describe why they opted into specific events and what they did. Part D captured participant attitudes and reflections on the DFS. The diaries were timed to run for the last two DFS events on 15 March and 23 March 2023. The qualitative data captured in the diaries was analysed and used to create multiple choice questions for the online evaluation survey and the opinion poll.

Households were invited to participate through a post on CSE's social media and CSE's newsletter and were offered a £25 incentive at the start and £25 on completion. 134 households completed all four sections.

Opinion Poll

The opinion poll was run in March and was designed to capture awareness levels of the DFS in a representative sample the GB population. Similar questions on household characteristics and demographics were also included to allow some comparison of participants across the different research strands. The sample was designed to be representative of the GB population in terms of age, gender, region, and socio-economic group. Quotas were set on combined age band and gender (e.g. male aged 35-54), region and socio-economic grade. Responses were weighted by raking following DeBell and Krosnick¹.

Evaluation Survey

The evaluation survey was run in April covering household awareness, motivations and experiences of the DFS as well as demographics, household characteristics and attitudes to generate variables related to CSE's capabilities framework. The survey had 44 questions and the median time taken to complete was just under 15 minutes. Households were offered entry into a prize draw as an incentive. Responses that

were completed in less than 5 minutes were removed from the final dataset (38 responses were removed in total).

The evaluation survey included some open text questions that allowed respondents to leave comments. These comments have been analysed. The comments showed that 680 (3%) households responding to the survey had not been able to participate in the DFS as they had wanted. The main reason was communication issues around not receiving event invitations or notifications (536 households). 40 households had a technical fault with their meter. In addition, 55 households reported that they had not opted in to the DFS indicating either confusion on their part or a mistake by the provider in sending out the survey link. DFS providers are assumed to have sent the survey link only to households who had opted into the DFS, therefore these responses have been kept in the evaluation survey data as valid responses. They contribute to the number of 'don't knows' received and the number of households who received £0 rewards or participated in 0-3 events.

In addition to the evaluation questions, households were asked if they wanted their responses to be shared with different parties:

- 95% (22,545) wanted their survey results to be shared with their DFS provider
- 78% (18,530 households) wanted their survey results to be anonymised and archived for future research
- 37% (8,722 households) were interested in knowing how to add their smart meter data to the evaluation and link it to their survey responses

Interviews

The interviews were run in June, to allow for more detailed exploration of key issues that emerged from the evaluation survey. Interviewees were invited based on reported experiences or household characteristics including:

- People with a health condition in household which impacts day-to-day life 'a lot'
- Those who adapted their shifting strategy based on the 'In Day Adjustment' (IDA)
- Households in shared ownership/rented properties
- Households with pre-payment meters



¹ DeBell, Matthew and Jon A. Krosnick. 2009. "Computing Weights for American National Election Study Survey Data." Stanford University.

Methods summary

Providers

Customers of 11 domestic DFS providers took part in the evaluation research.

Participation was unevenly distributed across the research tools and providers. The majority of households responding to the evaluation survey were E.on Next customers (69%) while the majority of households responding to the diary were Octopus Energy customer (84%).

Comparing the different provider offers was out of scope for the evaluation. Although different incentive mechanisms and customer communications will have shaped household engagement, we expect providers to carry out their own assessments on the terms offered to households. This evaluation is designed to look at household engagement with flexibility more broadly and households' experiences of participating in the DFS. The evaluation does not compare experiences and outcomes for one provider's customers to another provider's customers.

Customers and providers participating in the evaluation

| Winter 22/23 DFS Domestic Providers | Evaluation survey | Diary | Interview |
|--------------------------------------|----------------------|-------------------|------------------|
| British Gas | - | 5 (4%) | - |
| CarbonLaces | - | - | - |
| Chameleon Technology (UK) as ivie | - | - | - |
| E.ON Next | 16,415 (69%) | 2 (1%) | - |
| EDF | 5,332 (23%) | 4 (3%) | - |
| Equiwatt | 97 (0%) | 1 (1%) | - |
| ev.energy | - | - | - |
| Hildebrand Technology Limited | - | 1 (1%) | - |
| Hugo Energy App (via SMS) | 722 (3%) | 3 (2%) | - |
| Labrador (via Perse Technology) | - | - | - |
| Loop.homes (via SMS) | 309 (1%) | 4 (3%) | 1 (10%) |
| myenergi (via Orange Power) | - | - | - |
| Octopus Energy | - | 112 (84%) | 5 (50%) |
| OVO Energy | * | 1 (1%) | - |
| Power Rewards App (via Orange Power) | - | - | - |
| Shell Energy Retail (Via SMS) | 125 (1%) | 1 (1%) | - |
| SMS (aggregator) | - | - | - |
| SolarEdge Technologies (via SMS) | - | - | - |
| Uswitch Limited (Via Hildebrand) | - | - | - |
| Utilita | 517 (2%) | - | 4 (40%) |
| VpowerU | - | - | - |
| Total | 23,717 (100%) | 134 (100%) | 10 (100%) |

* Ovo energy combined the DFS with other flexibility services and their customers were not included in the evaluation survey



Methods summary

Caveats and limitations

Not all DFS providers participated

20 DFS¹ providers offering the service to domestic customers were invited to take part in the evaluation survey, however only seven were able to participate. Customers from other providers responded to CSE's invitation to participate in the qualitative research (the diaries and interviews) and were present in the sample recruited for the opinion poll. This means that overall customers from 11 providers have participated in parts of the evaluation. The largest dataset, the evaluation survey, does not include customers of the providers who delivered the largest amount of demand reductions and received the highest proportion of the incentives.

Several DFS Providers have undertaken their own evaluation work or published blogs and news stories about their schemes. Relevant findings have been included in this report where possible.

| Providers' own reports and publications | |
|---|--|
| British Gas | 2023 PeakSave Trial, Customer analytics & Insight |
| Octopus Energy – Centre for Net Zero | Insights from the UK's largest consumer energy flexibility trial |
| SMS | Demand Flexibility Service Project Insights |
| Equiwatt, EDF, E.On Next, Shell Energy, Utilita | High-level findings published online. |

No smart meter data was available for this part of the evaluation

The evaluation is not able to consider how participation relates to the volume of demand reduction provided by households surveyed. This analysis will be carried out in a future phase, and the insights from this research will be used to inform the planned smart meter data analysis.

Evaluation participants were recruited via their provider and not sampled

This evaluation was run in collaboration with DFS providers, but independent to them. The evaluation team did not have access to commercially sensitive data such as which consumer segments DFS providers had invited to participate in the DFS, nor what proportion opted in. It has therefore not been possible to recruit a representative sample of households who opted in, nor target households who chose not to participate. A comparison of diary respondents and survey respondents show significant differences between these samples in terms of demographics and technologies installed, suggesting that this evaluation provides a partial picture of the households who engaged.

Participating DFS providers were asked to mail out the survey links to all households that had taken part in the DFS. Comments by survey respondents in open text boxes suggest 55 households were not aware they had opted in to the DFS, but these responses have been kept in the survey.

Evaluation participants are self-selecting

These evaluation results need to be interpreted with the understanding that the responses are from a self-selecting sample of households who took part in DFS. These households are likely to face fewer barriers to participate in demand response activities than a random sample of the UK population. Their experiences cannot be interpreted as representative of all participating household experiences, but important insights can be drawn, particularly for considering future iterations of the DFS.



¹ There were 21 domestic DFS providers. Ovo was not invited to take part in the DFS evaluation survey because they bundled the DFS with other flexibility offers for their customers.

Awareness and Motivations



Awareness and Motivations

Introduction

In this section we look at how domestic customers heard about the offer, and why they decided to join the DFS.



Awareness and motivations

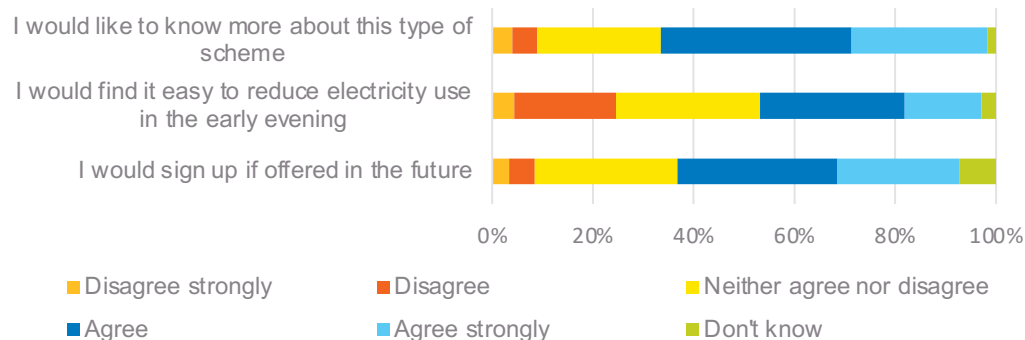
Awareness

The opinion poll undertaken in April provides a picture of awareness amongst a nationally representative sample of the general population. This revealed that 38% of people had heard of one or more DFS offers, 62% had not heard of any.

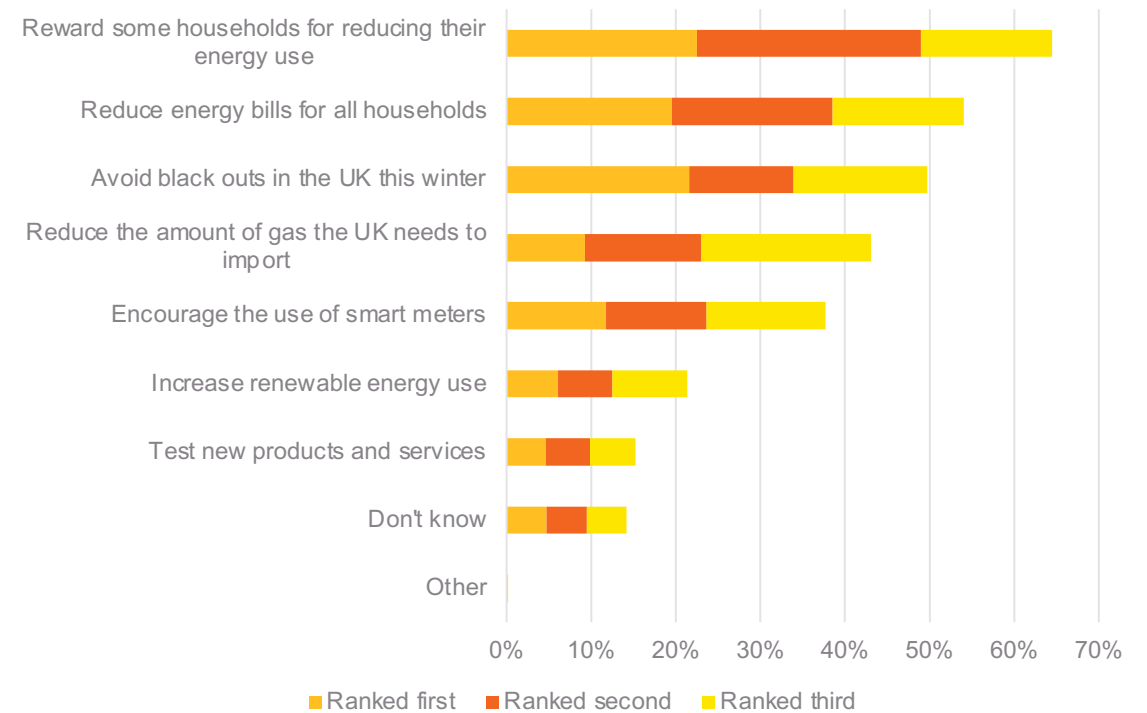
Of those that had heard of the DFS, most (65%) understood the service to be about rewarding households who reduced their energy use, and 50% selected to “avoid black outs”. The largest proportion of respondents who had heard of DFS schemes had signed up to a scheme (44%). The majority of those who heard of an offer, but did not sign up were not invited to join (38%).

Opinion poll respondents who had not been invited to participate expressed interest in learning more about DFS. This indicates interest in engaging with flexibility services in addition to the households that signed up. Of those who had not heard of the DFS 65% would like to know more and 44% thought they would find it easy to shift their demand from the early evening.

How much do you agree with the following statements (n= 1,315, weighted)



From your understanding, which of the following statements best describes these energy schemes? These schemes aim to... (n= 646, weighted)



Awareness and motivations

Signing up

Almost all survey respondents were directly invited to participate in the DFS by their Provider.

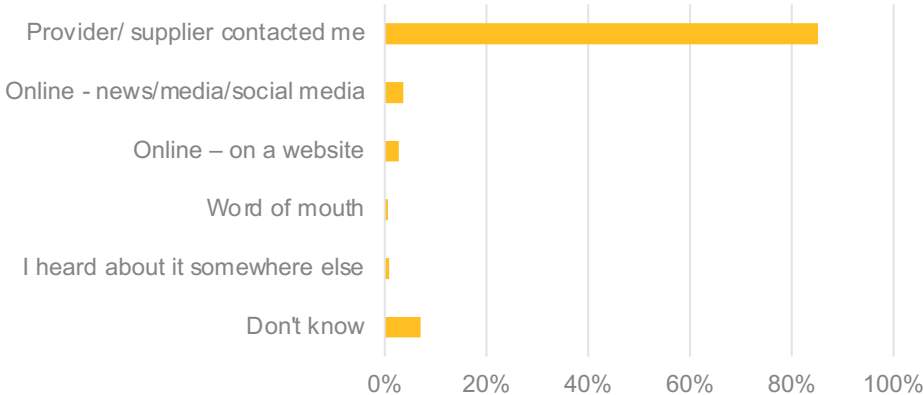
The majority of respondents (85%) heard about their DFS offer through their DFS provider.

6% heard about it online, either on a website or through news or social media. Just under 1% reported that they heard about it somewhere else and were able to specify where. The most common response here was non-online media (for example, newspaper, TV or radio).

These data suggest that providers drive recruitment for the DFS and households were not actively seeking out opportunities to participate. This is understandable for the first time this service was offered. However, future iterations of the DFS could consider how to widen awareness of different providers' offers and encourage more active up take. But as statistics on switching activity in the retail market have shown, certain demographics are more active and able to secure better deals when these are available. The opinion poll responses have shown that there is wider interest beyond those households who had heard of the DFS. The balance between encouraging consumers to be more active and allowing households to access offers through their existing provider needs to be struck.

From a policy and regulation perspective it is helpful to know which consumers are being invited by their existing providers, who may be able to shop around between providers, and who declines or remains unaware.

How did you find out about the [provider's named offer]?



Awareness and motivations

Motivations

Participants signed up to the DFS for multiple reasons, and these clearly differed for different groups of research participants.

For those responding to the evaluation survey (23,717 people), reducing energy bills was the most cited reason for signing up (76% of people selected this option). Earning rewards was also a popular response (40%), suggesting that financial benefits were a key driver for signing up for the DFS. Responses around being interested in the challenge (41%), reducing bills for all by balancing the grid (37%) or avoiding black outs (37%) were also common. This group were less motivated by reducing carbon emissions (24%), reducing gas imports (22%), and learning about energy (9%) were all less of a motivation for signing up. Survey respondents were also able to detail any of their motivations that weren't included in the response options. Common themes here were: the war in Ukraine, curiosity and fun.

For those participants that took part in the diary (134 people), the picture is different. Being interested in the innovation of the scheme was the most cited reason (74% of people selected this), followed by helping National Grid to 'keep the lights on' (65%). Around 60% of people said they were motivated by reducing their energy bills, reducing carbon emissions, and reducing gas imports. Other motivations for survey respondents included that it was fun, and to contribute to community spirit.

Of the 329 (weighted number) opinion poll respondents that were signed up to a DFS scheme, reducing their energy bill (62%) and earning rewards (48%), were the most commonly selected motivations.

Interviews identified that respondents considered help with their bills, a collective effort to balance the grid, preventing blackouts and environmental concerns as key motivations. Similar to the survey respondents, rewards were mentioned frequently by interviewees, but key motivations varied. One respondent considered preventing blackouts (remembered through lived experience in the 1970s) was the most important to them.

Early results from a qualitative academic study carried out with DFS participants indicate that different motivations affected household experiences and outcomes. This study also defines a group of tech-oriented households who participated with primarily financial motivations¹.

Though the picture is mixed, it is evident that financial benefits (savings or rewards), balancing the grid or 'keeping the lights on', and taking part in an interesting or innovative challenge were all drivers.

These findings broadly align with providers' own findings. For the British Gas PeakSave scheme², the main reported reasons for participating were to make savings or to support the National Grid. For Octopus customers the top three reasons for households participating in Saving Sessions were to reduce our dependence on fossil fuels, to benefit from financial rewards, and to keep the grid stable³.

The prominence of expected financial benefits as a reason for signing up reflects the cost-of-living crisis and the high energy bills that households were facing. It may also reflect the way the scheme was communicated in wider media, as it was reported that a typical household could save "up to £100" by taking part⁴.



"I'd say the main reason for taking part for me was probably to see how much I could save, or I guess earn [...] then I guess secondary was to help the grid, to do my part and I guess third from that was sort of helping from a carbon point of view"

- Interview respondent



¹Mihilache, A & Hampton, S. (pre-print) People-Centric Electricity Demand Flexibility Programmes: Learning from Great Britain's 2022-2023 Demand Flexibility Service

²British Gas (2023) PeakSave Trial, Customer analytics & Insights

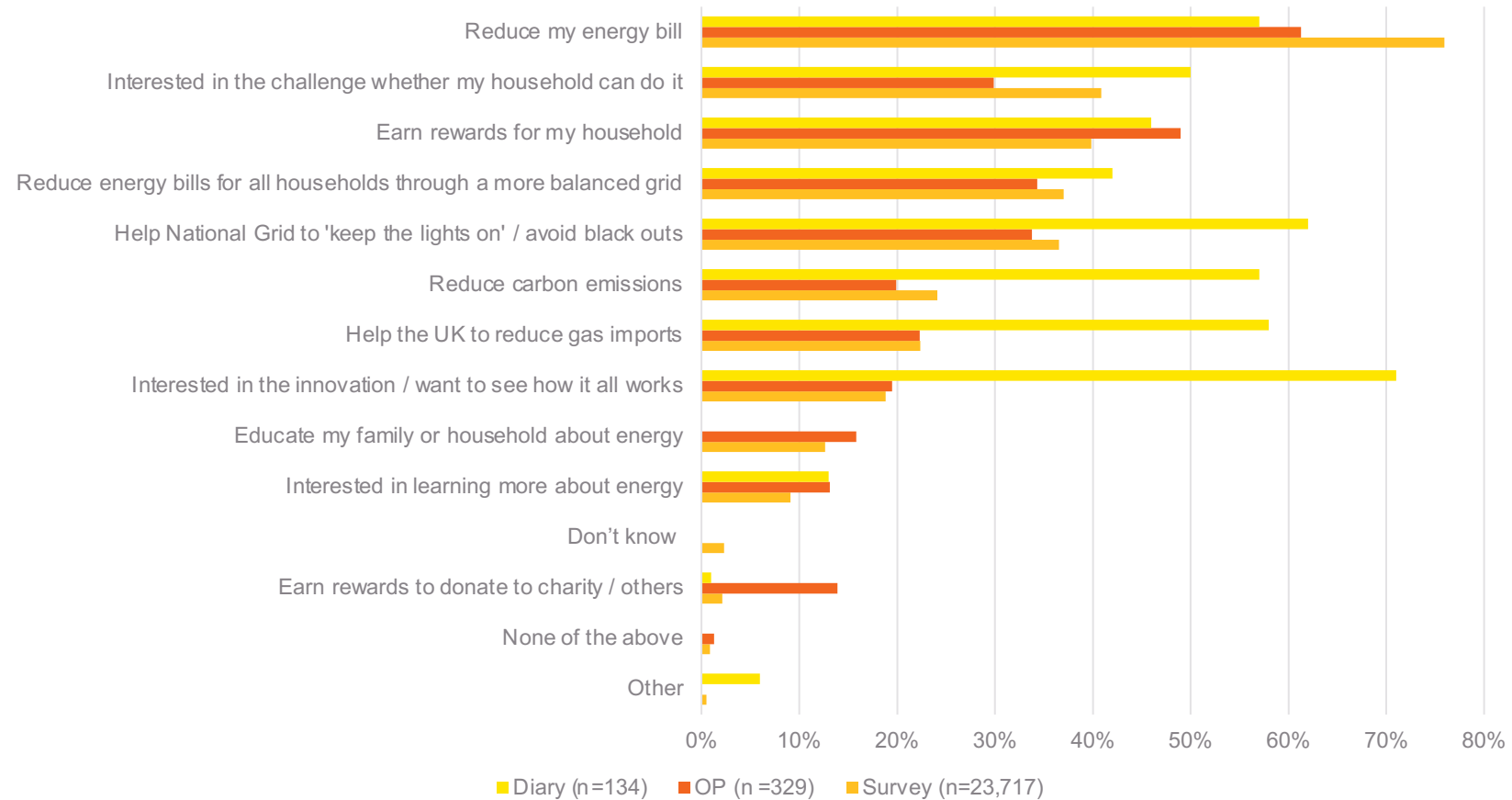
³Octopus (2023) Centre for Net Zero Insights from the UK's largest consumer energy flexibility trial

⁴National Grid, ESO, [The ESO's Demand Flexibility Service](#)

Awareness and motivations

Motivations

Why did you decide to sign up?



Awareness and motivations

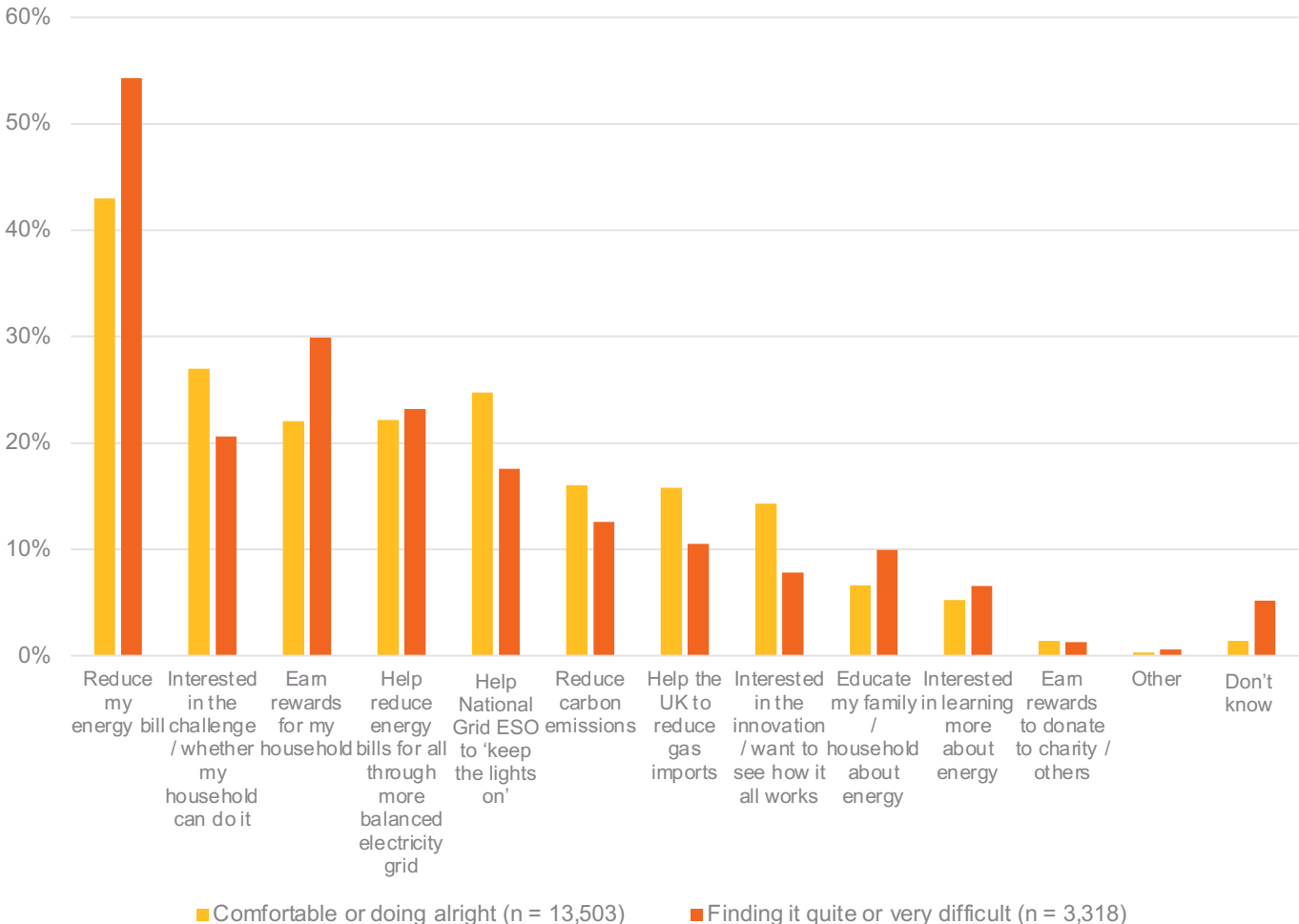
Motivations

Reasons for participating varied between those households that reported being 'comfortable or doing alright' (13,503 households) and those 'finding it quite or very difficult' (3,318 households).

Reducing my energy bill was the most common reason given by both groups, but this was selected by 65% of those finding it difficult, compared to 43% of those who are comfortable. Earning rewards was also more important for those finding it difficult (30%) compared to those who are comfortable (22%).

There were also differences in being motivated by the challenge. 27% of those who are comfortable selected this motivation, compared to 21% of those finding it difficult. And similarly, interest in innovation was more of a motivation for those that are comfortable.

Motivations for signing up against financial comfort



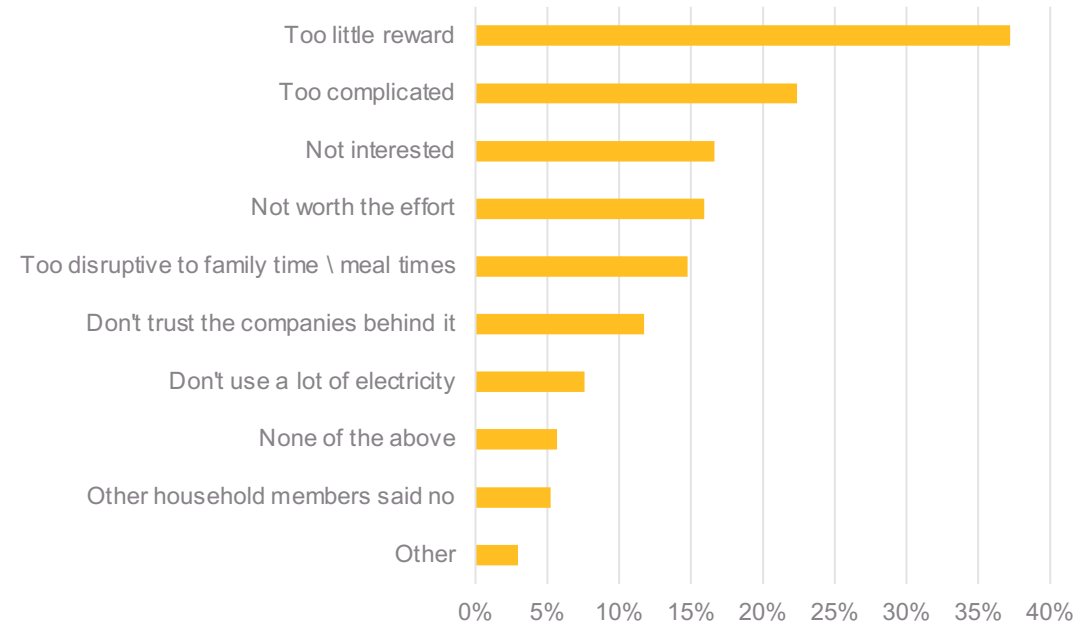
Awareness and motivations

Reasons for saying no

Opinion poll respondents who were invited to sign up, but chose not to (3%, 56 people (weighted)), were asked about their motivations. The largest proportion stated that their reason for not signing up was that there was too little reward offered (37%). The least common reason was that other household members said no (5%).

Data published by other DFS providers do not provide insights on reasons why households did not opt in.

Why did you decide not to opt in with these schemes? (n = 56, weighted)



Awareness and motivations

Conclusions

Awareness

38% of a nationally representative sample of the GB population had heard of one or more DFS offers.

Signing up

Most respondents heard about the DFS via their own provider. As this was the first time the DFS had been run, it is expected that providers would drive household recruitment. However wider awareness could lead to more competition between providers and more transparency about the different terms being offered. Households could be encouraged to take a more active role in selecting who they sign up with in future iterations of the DFS, but this risks introducing the inequalities seen in the retail market where less engaged customers fail to access the best deals.

Motivations

Though the picture is mixed, it is evident that financial benefits (savings or rewards) was the main driver. Helping the National Grid and taking part in an interesting or innovative challenge were also important drivers.

Reasons for participating varied between those households that

reported being 'comfortable or doing alright' and those 'finding it quite or very difficult'. Financial rewards were more important to those finding it difficult. Being interested in innovation and motivated by the challenge were more important for those who are financially comfortable.

Reasons for saying no

We do not have a full picture of the number of households that were invited to participate in the DFS or the numbers that said no.

The opinion poll provides some limited insight into why some households did not participate in the DFS; low rewards and perceived complexity of the offer were the two most frequently selected responses within this small group of 56 responses.



Who participated?



Who participated

Introduction

In this section we provide an overview of the data describing who participated in the survey and discuss how successful the DFS was in overcoming some of the known barriers to participation in flexibility services.

We compare evaluation survey data against relevant datasets including ONS¹ data and Ofgem data on consumer participation in energy markets.



¹This section uses ONS 2021 census data supplemented by 2011 Census where 2021 data is not available.

Who participated?

Demographics

A broad spectrum of households participated in the DFS.

Age and gender

Respondents under 45 years old were underrepresented compared to the GB population. The most pronounced underrepresentation was in the groups 18-19, and 20-24 years old. The most overrepresented age groups were 55-64 and 65-74 years old. These groups formed 49.9% of the responses, but 28.6% of the GB population.

Women made up the majority of participants under 45, while men made up the majority of older participants. Overall, there were more women respondents, with 54.9% of respondents identifying as female, compared to 51.7% of the GB population.

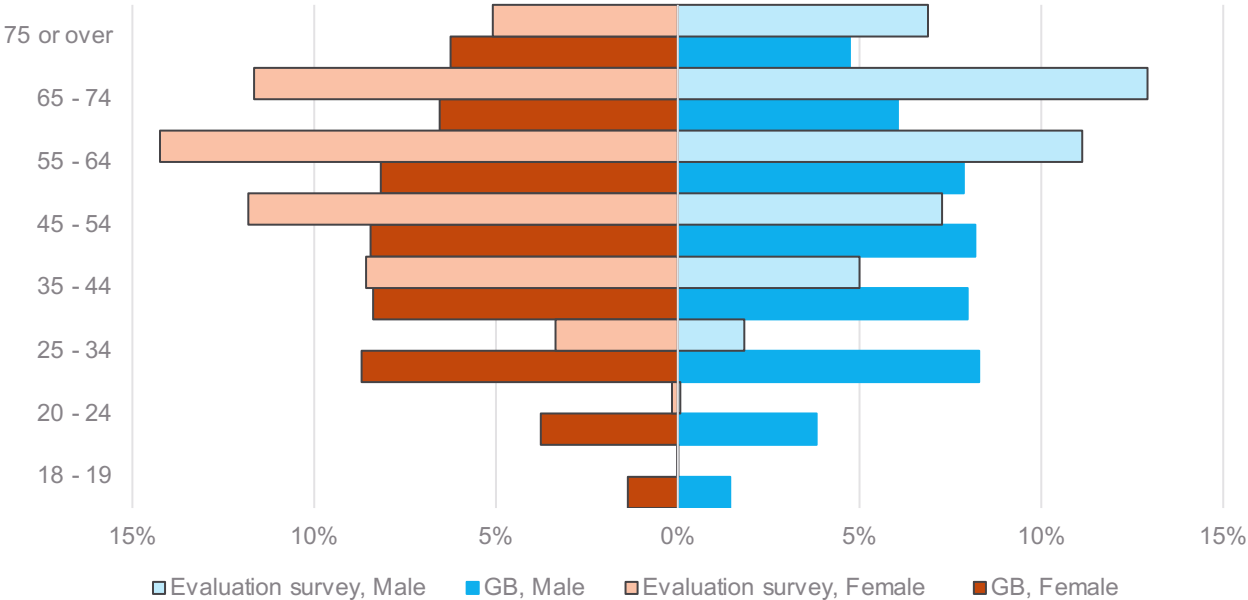
Ethnicity

The White ethnic group was overrepresented in respondents compared to the GB population, with 95.7% of respondents reporting this group, compared to 82.7% of the GB population (13% difference). All other groups were underrepresented. The most severely underrepresented group was Asian or Asian British, with only 2.4% of respondents compared to 8.7% of the GB population (6.3% difference).

Health

30% of respondents have a physical or mental health condition or illness lasting or expected to last 12 months or more, compared to 24% of the population of England and Wales as reported in the 2021 Census (health data is reported differently for the Census in Scotland).

Which of the following age bands are you in?



Who participated?

Location

Survey respondents were predominantly urban, but London was underrepresented.

Region

Respondents are overrepresented in almost all regions of England, with the exceptions of London, the South East, and the West Midlands.

London was significantly underrepresented with only 5.0% of respondents located in the region, compared to 13.5% of GB population (8.6% difference). Scotland was also underrepresented, with 6.9% of respondents located there, compared to 8.4% of GB population (1.5% difference).

Yorkshire and the Humber was the most overrepresented group, with 11.9% of respondents located here compared to 8.4% of the GB population (3.5% difference).

20% of respondents were from rural locations and 64% from urban locations, with 16% of respondents not classifiable. In comparison, 17% of Scotland and 17.1% England's population is rural*.

Location of respondents derived from postcode n = 19,936



*Up to date statistics for Wales are not currently available

Who participated?

Tenure and dwelling type

Most respondents owned their own home and lived in a detached or semi-detached house.

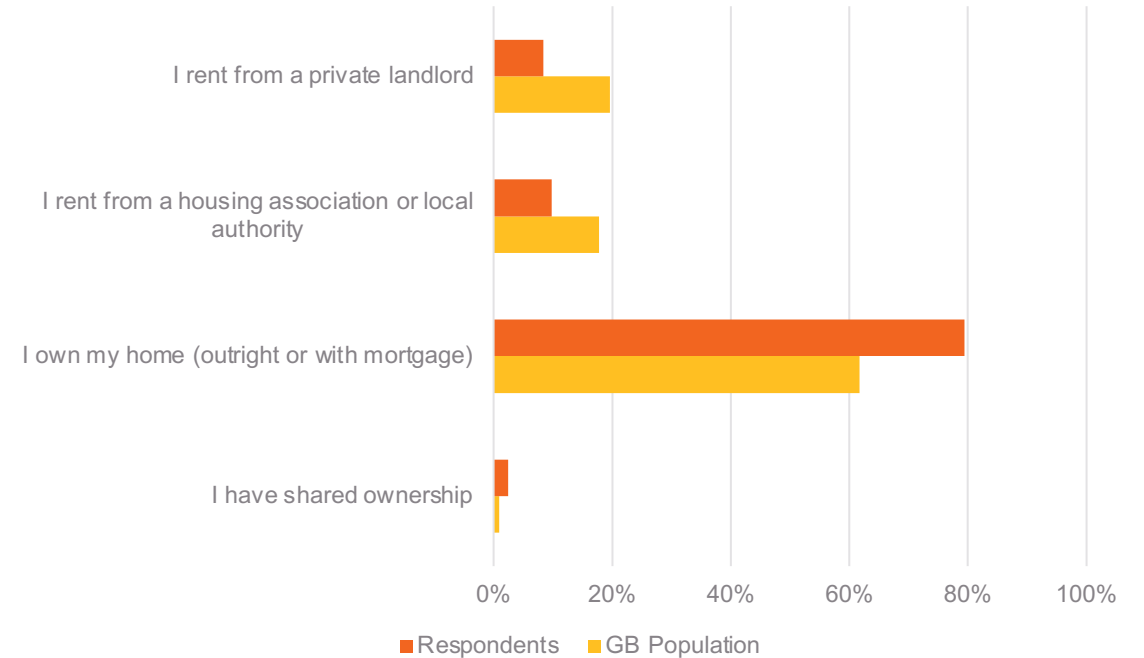
There is a higher proportion of homeowners in the survey respondents compared to the GB population. 79% of respondents own their home compared to 62% of GB population (18% difference).

Renters are underrepresented with private landlord renters underrepresented by 11% and social (housing association or local authority) renters underrepresented by 8%.

Respondents are overrepresented in detached households (by 7%) and semi-detached households (by 2%) compared to the GB population.

Terraced houses, flats within converted or shared houses and purpose-built flats are all under-represented. With purpose-built flats being underrepresented by 10%.

Which of these best describes your home? (n = 23,585)



Who participated?

Socio-economic group

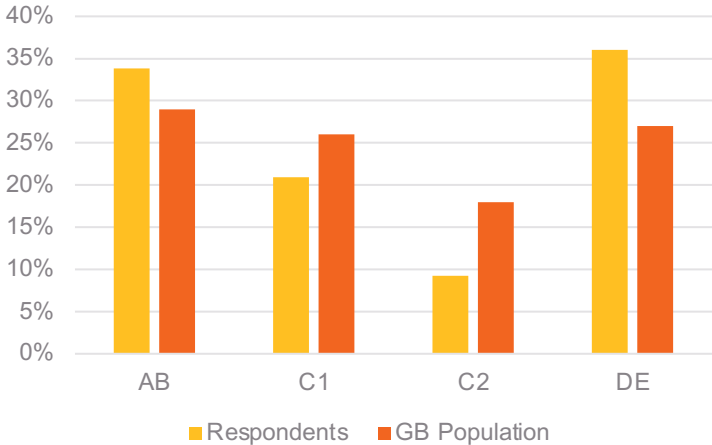
Retired households made up a significant proportion of the respondents, as did households with a main income earner from a professional or managerial position.

Both ends of the socio-economic scale were overrepresented in the survey:

- 34% of respondents representing group AB compared to 29% of the GB population (5% difference).
- 36% of respondents fell into group DE, compared to 27% of the GB population (9% difference).

5,025 (23%) of respondents were retired, but of these, most (60%) were 'living comfortably' or 'doing alright'. 4% of respondents were unemployed, this aligns with ONS data on unemployment for the UK, which is reported to be 3.8%.

How would you describe the occupation of the main income earner in your household? If they are retired please select what they used to.



| Occupational group of the Chief Income Earner | % |
|---|-----|
| Higher managerial / professional / administrative | 10% |
| Intermediate managerial / professional / administrative | 23% |
| Supervisory or clerical / junior managerial / professional / administrative | 21% |
| Skilled manual worker | 9% |
| Semi or unskilled manual work | 7% |
| Retired / living on state pension | 23% |
| Student | 0% |
| Carer of other household member | 1% |
| Casual worker – not in permanent employment | 1% |
| Homemaker | 0% |
| Unemployed or not working due to long-term sickness | 4% |



Who participated?

Household energy use

Over half of respondents used smart appliances of some form. A higher proportion of respondents had solar panels at home, compared to the GB population.

Though the majority of respondents (84.2%) do not have any low carbon technologies installed at home, a higher proportion of respondents had solar panels at home (9.8%) compared to the GB population (4.2%)¹.

4.2% of respondents have a plug-in electric vehicle. There are estimated to be around 1.3 million plug-in cars² in the UK, which equates to around 4.5% of households. 4.6% of respondents have an electric vehicle charger.

57% of respondents reported having appliances with timers or smart controls at home. Around one quarter of respondents has a timer function on their washing machine or tumble dryer and around one quarter of respondents have smart heating controls.

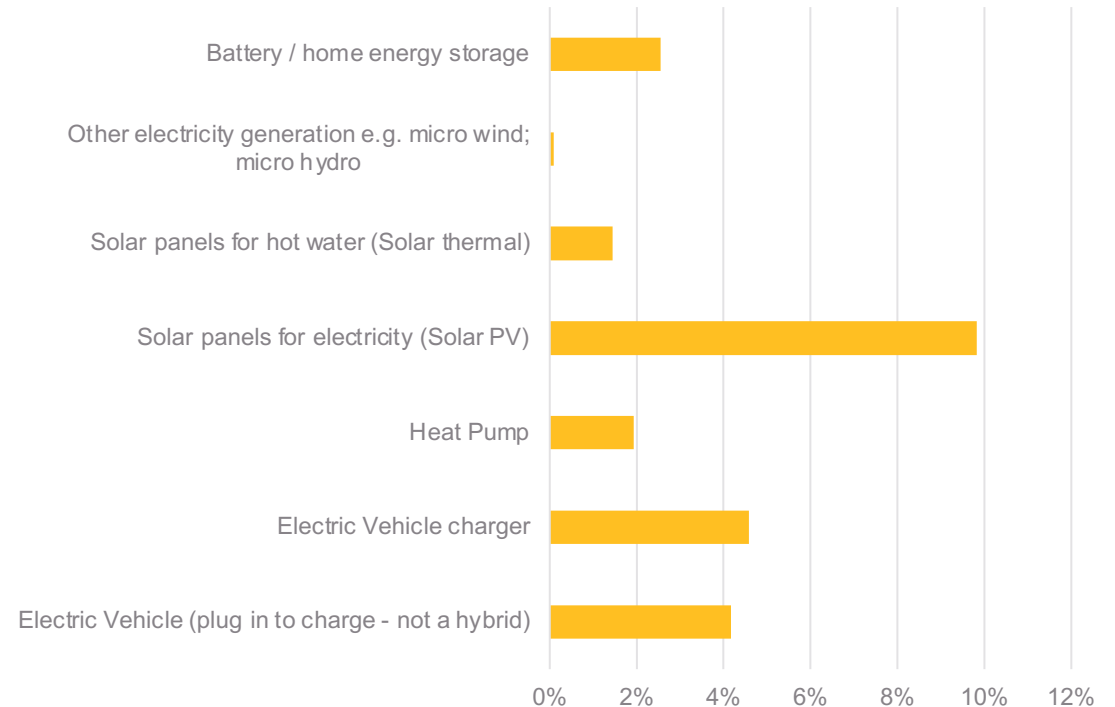
Medical equipment

Nearly 700 respondents selected that they have medical devices that run on electricity (and would therefore be classified by Ofgem as being in a vulnerable situation).

Smart prepayment meters

A small number of households (563) reported they use a smart prepayment meter.

Do you currently have any of the following, often called 'low carbon technologies' installed at home for you to use? Please select all that apply. Please only select those technologies you can use at home, not any attached to your building which you are not able to directly use.



¹Solar photovoltaics deployment 2023, UK Government: 1,140,586 GB domestic installations

²EV market stats 2023, ZapMap (data supplier to UK Gov.): 1,280,000 plug-in cars

³This question is taken from the survey used by the Smart Energy Research Laboratory, available via serl.ac.uk.



Who participated?

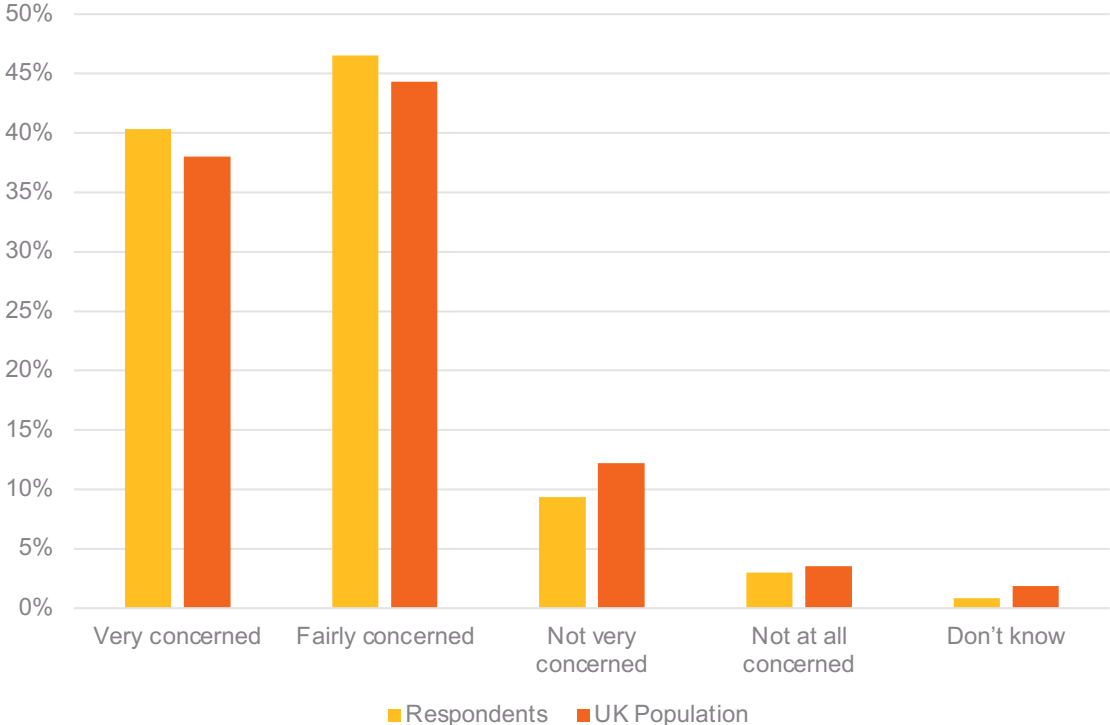
Attitudes

Trust, attitudes and values affect consumer willingness to engage in the energy market and take up new products and services.

The evaluation survey used a question from the DESNZ Public Attitudes Tracker survey¹ to gauge respondents' level of concern about climate change. Evaluation survey respondents were slightly more concerned about climate change. The total concerned (very or fairly) is 87% of the sample compared to 82% in the Public Attitudes Tracker (5% difference).

In addition, over a third of respondents self-reported taking an active interest in energy issues, and almost half took an active interest in new technologies.

How concerned, if at all, are you about climate change, sometimes referred to as 'global warming'



¹DESNZ Public Attitudes Tracker: Net Zero and Climate Change Spring 2023, UK



Who participated?

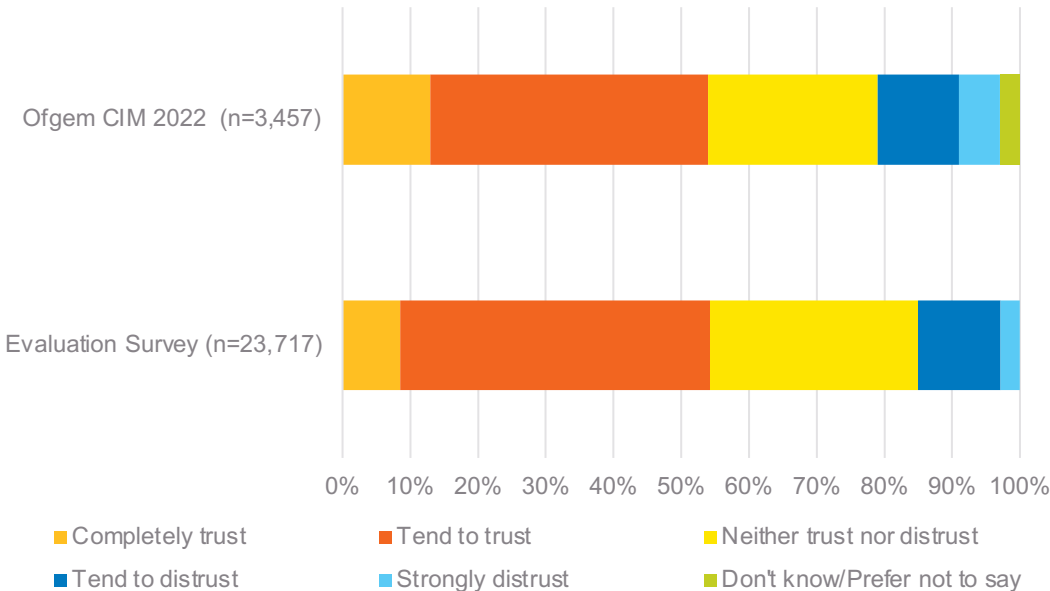
Trust

Respondents reported similar levels of trust in energy suppliers to treat them fairly, when compared to Ofgem consumer research¹, but lower levels of trust in being charged a fair price.

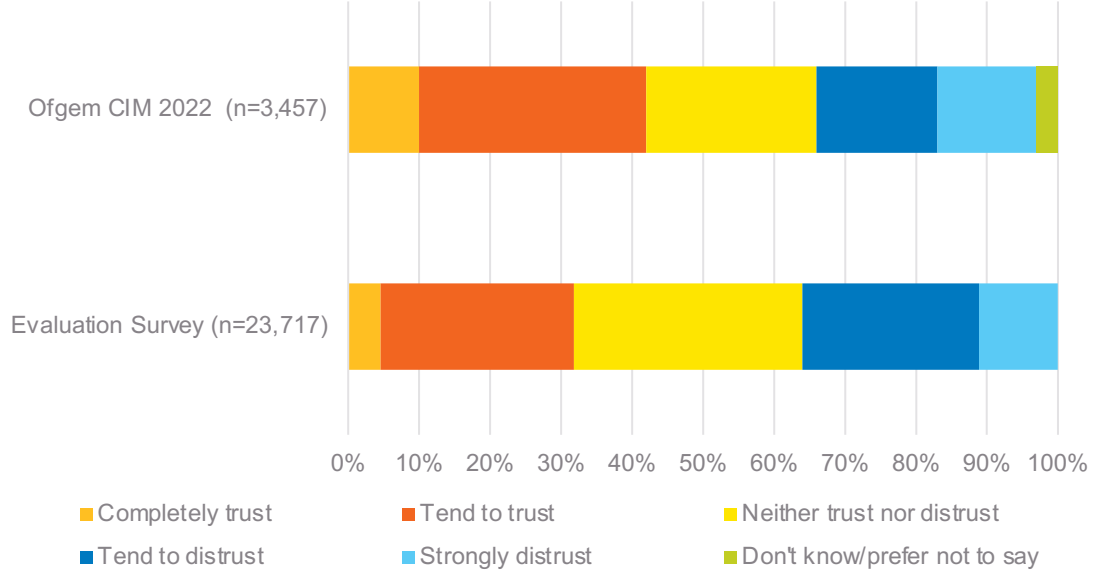
54% of evaluation survey respondents trust their energy supplier to treat them fairly and 15% distrust, this is broadly the same as Ofgem consumer research findings.

However, only 32% of evaluation survey respondents trust their supplier to charge them a fair price, significantly lower than Ofgem survey respondents (42% said they trusted their supplier). 36% of evaluation survey respondents distrust their supplier to charge them a fair price, compared to 31% of Ofgem survey respondents.

To what extent do you trust or distrust your energy supplier(s) to treat you fairly in their dealings with you



To what extent do you trust or distrust your energy supplier(s) to charge you a fair price for your gas and electricity



¹Ofgem, Household Consumer Impacts of Market Conditions Survey Wave 3 Report: Research conducted in November - December 2022

Who participated

Conclusions

Key learnings from this section

Our findings suggest that the DFS succeeded in recruiting a diverse set of households. Though, as we have seen, this evaluation provides a partial picture of the households who took part. The participants were self-selecting and may have faced fewer difficulties or concerns about participating. The small number of opinion poll survey respondents who were invited to participate but did not opt in, show that some households found the offer too complicated.

Underrepresented demographics

Some groups were significantly underrepresented in the survey respondents. This includes younger people, renters, people in London and Scotland. White British respondents were overrepresented and other groups underrepresented, particularly Asian or Asian British. Females are slightly overrepresented. The age profile of male respondents is older than for female respondents.

Socio-economic groups

Survey participants were predominantly better off, with a high representation of older retirees and professionals. Most do own their own homes, more households than average had solar PV. This is in line with existing research on barriers and enablers for participating in flexibility services. Homeowning, prosumer households, and those with more flexible daily routines are likely to find it easier to shift their demand and achieve value from participating.

Values and attitudes

Survey respondents were slightly more concerned about climate change than the general population, and slightly less trusting of their energy supplier.



Experiences



Experiences

Introduction

This section explores how DFS participants attempted to reduce their usage for turn down events during the Winter 22/23 DFS.

It covers considerations when opting into events, how well participants understood what to do, and the impact of the notification period on participation.

There is some in-depth analysis of the seven main shifting approaches used by participants during turn down events, as well as a deep dive on two potentially adverse approaches: making use of the In-Day Adjustment to maximise incentives and coming off supply.

The section finishes by exploring how participation changed over time and any ways that participants would change their approach next time.

Experiences

Considerations when opting-in to events

Peak time shifting is challenging – the main consideration was the time of event.

Evaluation survey respondents were able to select up to five responses for their key considerations when deciding whether to opt-in to a turn down event.

Nearly half of respondents selected the time of the event (49%). A third of respondents said they always opted in.

Respondents were also able to specify other considerations when opting in. Common themes here included:

- Care responsibilities (either for young people or people with health conditions)
- Personal health
- Whether a notification was actually received from a provider about the turn down event

Some respondents also gave some general reasons for not participating, including feeling like it was a waste of time or otherwise not worth participating.

Demand for 'opt-in all' option

Reflecting the popularity of the always opt-in regardless consideration (34%), there were comments from participants in diaries, surveys and interviews asking for an option to opt-in to all turn down events in future.

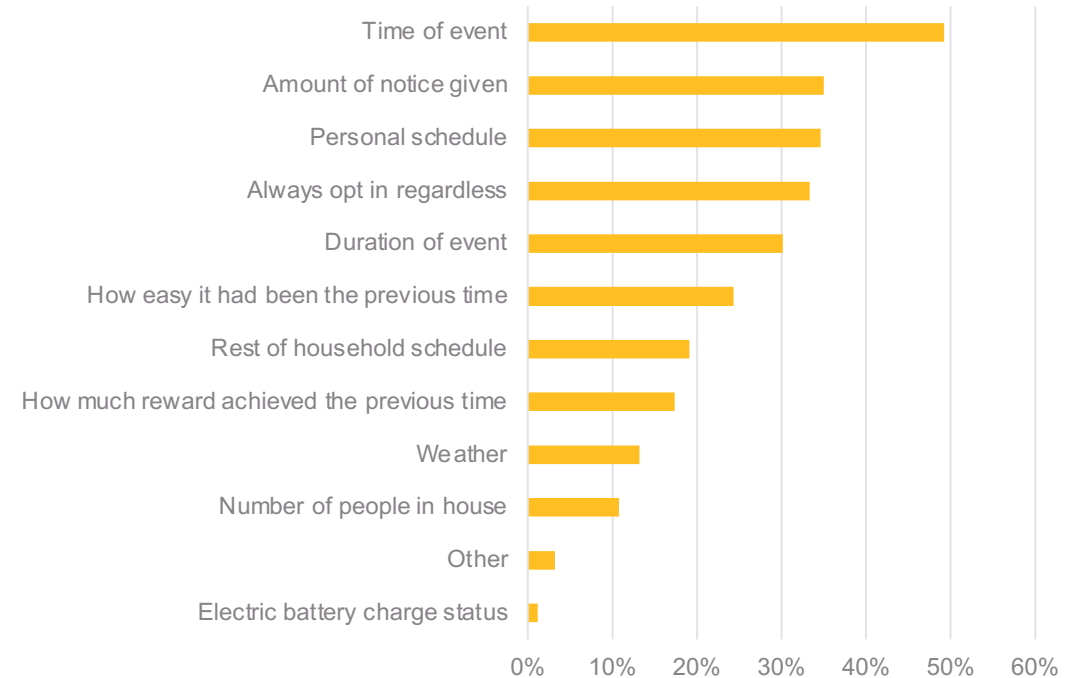


“The only thing that was a little annoying was that every time you had to click to sign up again rather than it just being a one off to agree to all the sessions”

-Interview respondent



What were your key considerations when deciding whether to opt-in to a turn down event?



Experiences

Understanding

Most understood what to do during events – but more guidance needed on how

82% of survey respondents reported they found it either easy or very easy to understand what to do during turn down events. Only 3% reported finding it difficult or very difficult.

Nonetheless, comments from the survey suggest that, although most respondents understood they needed to reduce their usage, some could have used more specific guidance on how best to achieve this.



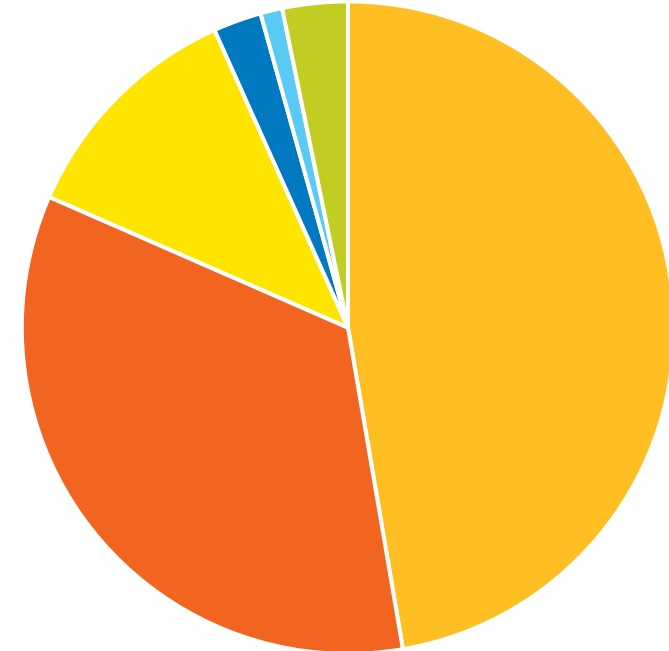
“Provide more tips on what to do during those events to reduce energy consumption”

- Survey respondent

Some evidence of limited understanding of DFS amongst participants

There was evidence to suggest that some DFS participants had a limited understanding about the DFS itself. Comments made by some interviewees and survey respondents suggested that some participants understood the DFS as a general energy-saving scheme rather than specifically aimed at demand shifting during critical peaks. Comments requesting longer notification periods or different times of events, suggest these households may find a different type of flexibility service or time of use tariff easier to fit into household schedules.

Thinking about your experience overall, how easy was it to understand what to do during events to earn rewards?



■ Very easy ■ Easy ■ Neither easy nor difficult ■ Difficult ■ Very difficult ■ Don't know

Experiences

Notification periods

Most respondents struggle with a notification period of less than 2 hours, but 61% felt they could respond with a 6-hour notification period.

Evaluation survey respondents were asked: “Based on your experience of taking part, how much notice do you need to take part in an event?”

Only 20% agreed they would be able to take part with less than 2 hours’ notice. With more than 6 hours notice, at least 61% felt they would take part. Octopus findings were similar – just 20% of evaluation participants said they could respond with 1-4 hours notice¹.

Household size and LCT made no impact on perceived notice needed

Interestingly, neither household size nor low carbon technology in the home made a meaningful impact on perceived ability to take part at any notice level.

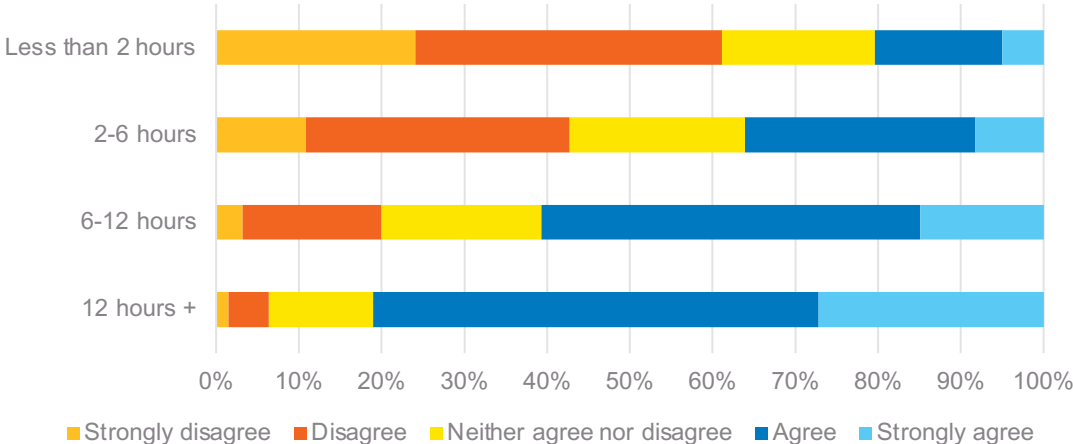
Number of events participated in

The highest proportion of respondents participated in 3 or fewer events

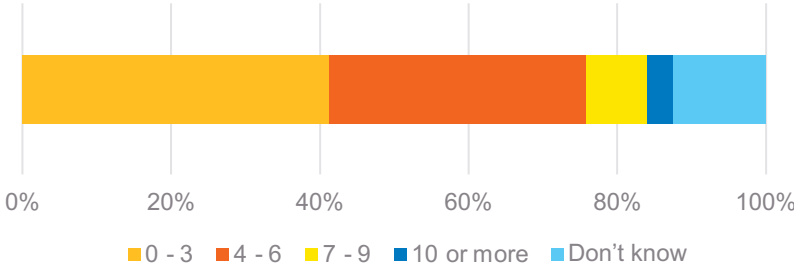
Very few survey respondents (4%) took part in all or close to all the turn down events that ran in 2022-23.

The highest proportion (41%) took part in 3 or fewer events, and 12% didn’t know how many events they had taken part in. This suggests that while households understood what to do during events, they experienced challenges in actually taking part. 680 households described technical difficulties in open text responses. 536 households experienced communication issues to do with not receiving event notifications, while 40 had smart metering issues.

Based on your experience of taking part, how much notice do you need to take part in an event?



How many turn down events did you participate in?



¹Octopus (2023) Centre for Net Zero Insights from the UK’s largest consumer energy flexibility trial

Experiences

Change in participation over time

No change over time for most

Most survey respondents reported that there was no change over time when it comes to how easy, rewarding and interesting the scheme was (73%, 64% and 71% respectively).

Out of easy, rewarding and interesting, respondents were more likely to report a negative change over time for rewarding (17% of respondents). It is unclear whether respondents mean rewarding financially or in another way. Nonetheless, some survey respondents commented that the rewards they received decreased over time.

One interviewee felt that participating felt like more of a routine as time went on. This did not have an impact on their participation: they continued to participate in most events, and reported they would be likely to take part again. Nonetheless, they also reported targeting the IDA more over time: including charging their electric car in the period before an event. This may have influenced their perception of routine: they focused less on the novelty and more on optimising their performance and rewards over time.

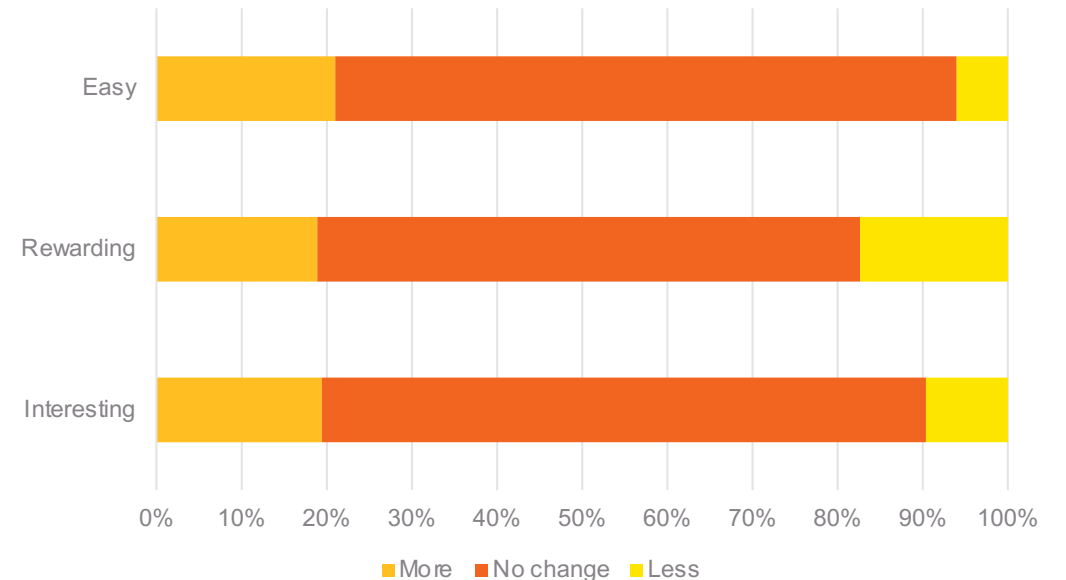
The aggregator SMS, which provided schemes for four different DFS providers, reported a significant reduction in opt-ins during January and February, suggesting this may be a result of the frequent occurrence of events during that time.



“The first few sessions were definitely more of a game, and it was fun, as the time went on, it went to more routine (because obviously there was like two a month), the novelty wore off and it was like oh there is another session tonight, but we will keep doing it...”

- Survey respondent

Did you find that how you participate has changed over time? Has it become more or less:



Experiences

Shifting approaches

Seven key approaches to shifting usage

Qualitative data from diaries about household responses were analysed to understand different approaches.

This analysis identified five distinct approaches to shifting.

- One response was to carry out straightforward demand shifting; plan household activities around the event window and move demand to other times of the day or week.
- The second response was to reduce demand during the event, without planning to shift it to another time.
- The third response was a more extreme version of this, turning off all power in the house.

There were also two more technical approaches.

- Some diary respondents described using their home battery to avoid importing power during the event.
- Others spoke about increasing their demand during the period immediately before the event window to take advantage of the in-day adjustment and earn higher rewards.

In addition, there were two main reasons households could not shift in response to notifications:

- They had little demand to shift.
- They had little flexibility to change their activities.

These approaches were turned into a set of seven 'shifting strategies' that could be used as response options for the evaluation survey to allow respondents to quickly describe their approach to shifting.

| Shifting approach | Description used in the Evaluation Survey |
|---------------------------------|---|
| Plan usage around event | We planned our electricity usage around the event and moved activities like cooking, laundry or charging to other times of day or week. |
| Reduce usage during event | We turned off appliances that we could and cut down our energy use. |
| Turn off all power | We turned off all power, and went out or went to bed during events. |
| Move usage directly before | We tried to move all our electricity into the 1-4 hours before the event, then turned things off during the event. |
| Use battery | We used our battery during the event. |
| Couldn't shift (low user) | We could not respond as we do not use a lot of electricity in general. |
| Couldn't shift (no flexibility) | We could not respond as we could not change how we used electricity during those times. |



Experiences

Common approaches

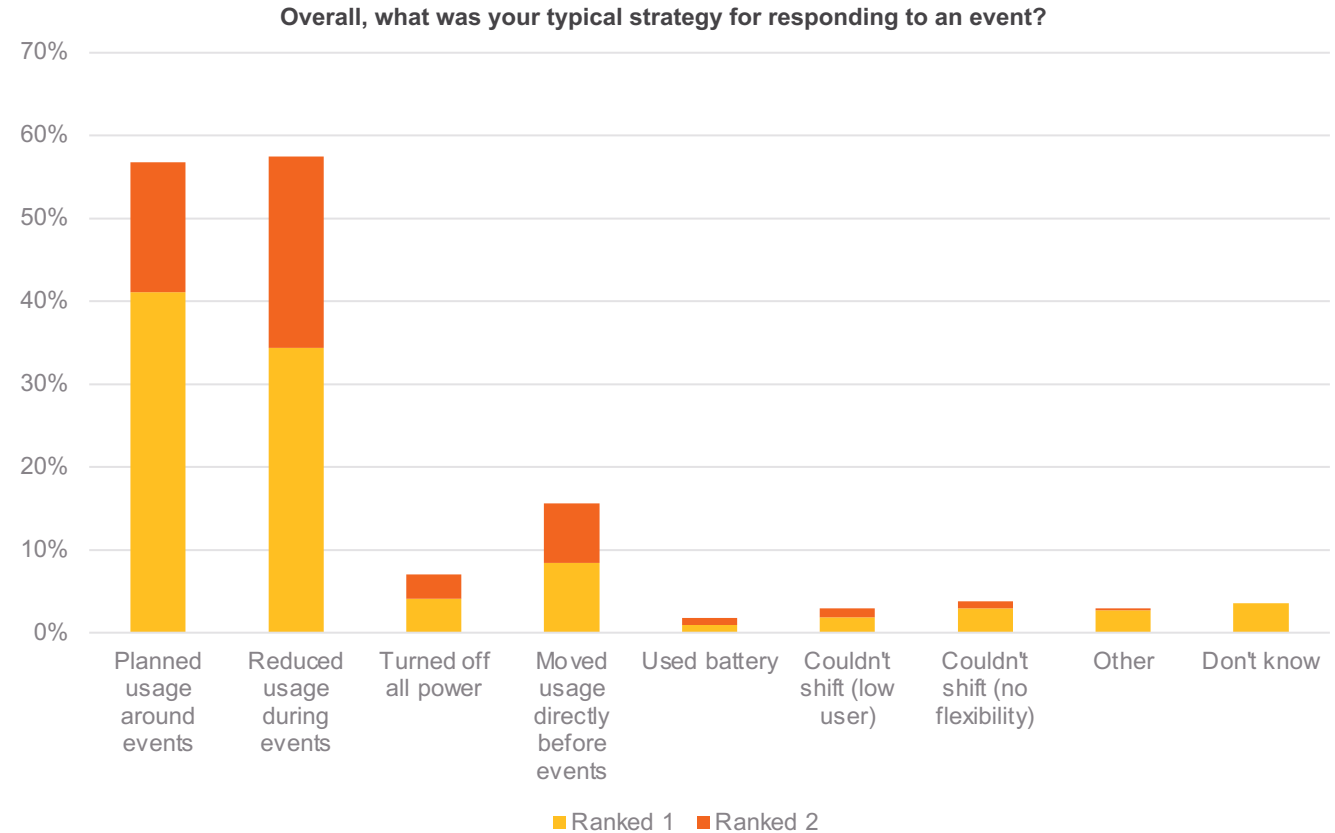
Demand destruction was almost as typical as demand shifting. Targetting the baseline through the IDA window was not prevalent.

Respondents were asked to rank up to two options that described their typical response to shifting. 'We planned our electricity usage around the event and moved activities like cooking, laundry or charging to other times of day or week' was ranked first by 41% of respondents and second by 16% of respondents, while 'We turned off appliances that we could and cut down our energy use' was selected first by 34% and second by 23%.

Only 16% of respondents reported moving their usage directly before events as their first or second strategy. It is not clear how many of these respondents used this strategy because they were aware of the IDA and the possibility of increasing their rewards, or for other reasons.

3% of respondents selected 'Other' and were able to specify their strategy. The most common strategies suggested here were restricting electricity usage to one room and not shifting due to perceived lack of point.

Smart meter data is needed to compare household perceptions with metered responses.



Experiences

Approaches – insights

Low carbon technology impacted approach adopted

Shifting strategies (ranked first) were compared by some capabilities included in the CSE Capabilities Lens. Low carbon technology had the most impact on approach adopted. Respondents with a battery were more likely to report both turning off all power during events and using a battery.

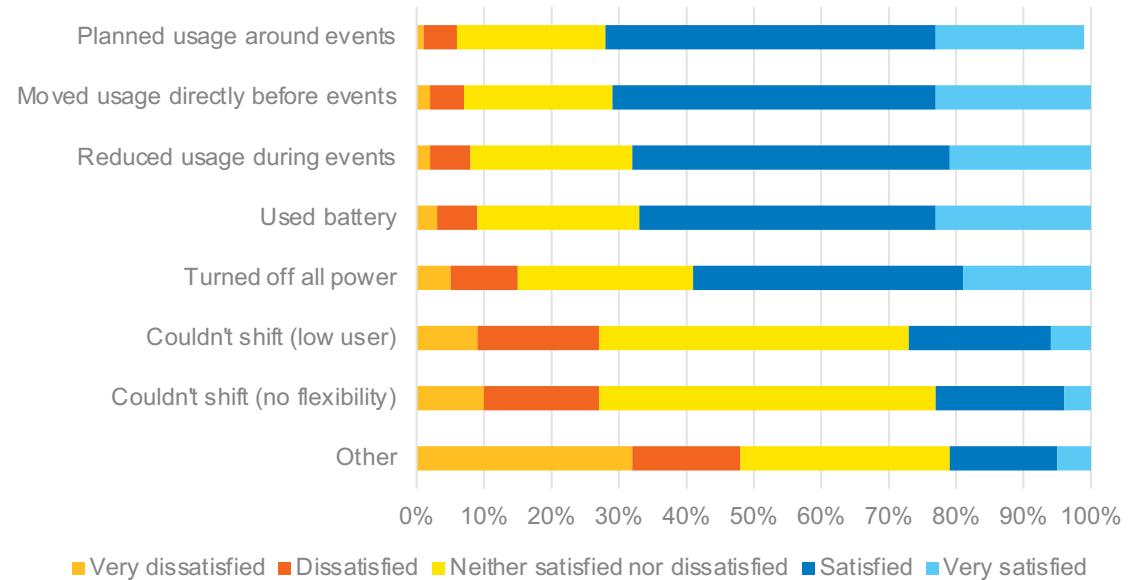
Respondents with a heat pump, electric vehicle and electric vehicle charger were more likely to report shifting usage directly before events.

Dwelling type, heating fuel and smart technology or appliances had little impact on strategy.

Those who couldn't respond were less satisfied

Adopted shifting approach impacted overall reported satisfaction with the DFS. Those who reported not being able to shift were the least likely to report being satisfied or very satisfied. Of the other five approaches, those who reported planning usage around the event were the least likely to report being satisfied or very satisfied (59%).

Shifting approaches (ranked first) against satisfaction with DFS (n=22,875*, percentages shown are of the respondents who used that approach.)



Experiences

Deep Dive 1: Adverse approaches

Exploring two shifting approaches in more detail

While the majority of respondents reported that they understood what to do to earn rewards, the different strategies deployed show differences in capacity to shift (not enough load or flexibility in use) as well as difference in interpretation on the 'right' response (demand destruction, demand shifting or targetting the baseline).

In this sub-section we provide insight on households who targeted the IDA to maximise their benefits and households who self-rationed: turned all their power off during events. We cover what and why households took these actions, (and for IDA, how they became aware of the strategy), what they felt about this behaviour and whether would they continue to participate in this way in future.



Adverse approaches: IDA

Press and social media reported on households targetting the in-day adjustment window to maximise financial incentives. These reports referenced participants 'gaming' the system in a way that could generate negative public perception. ESO did not see a system level impact from participants targetting the IDA. Nonetheless, for future engagement it is important to understand the impacts on public perception and future participation. It is also helpful to understand how information about what the DFS is and what it aims to achieve circulates and affects participation.

Low overall awareness

Awareness of the IDA amongst survey respondents was low: only 16% reported that they attempted to shift all of their electricity usage into the 1-4 hours before an event. Furthermore, it is not clear how many of these respondents adopted this strategy because of explicit knowledge of the IDA or for other reasons – for example, assuming this was the best approach to take, or this approach happening to fit with their schedule. It is also unclear precisely how many participants who were aware of the IDA just shifted their normal loads into the 1-4 hour period, or artificially inflated their normal load (which could be considered 'gaming' the system). There is evidence of both of these approaches being taken by participants: future analysis of smart meter data will unlock more detailed findings on this.

There was only a handful of comments from survey participants referencing the IDA in other parts of the survey. A higher proportion of diary respondents left comments relating to the IDA. This likely reflects the comparative level of energy knowledge across the two groups: 90% of diary respondents reported having a professional level of understanding of energy, or actively kept up to date with the sector, compared to 37% of survey respondents. This being said, for both the diary and survey, there is a possibility that some respondents did not leave comments about the IDA due to a perception that this was the 'wrong' way to respond or could be construed negatively as gaming the system.

Some of the diary respondents who left comments referencing the IDA were invited to take part in interviews. Comments from both diary respondents and interviewees suggest that most participants who consciously made use of the IDA found out about the strategy through online forums: for example on the websites of providers or Money Saving Expert.

Experiences

Adverse approaches: IDA

Maximising savings

Most positive comments about the IDA (all from diary respondents) referred to using the calculation to maximise savings, with respondents reporting carrying out energy intensive activities in the hours before a turn down event. Some of these activities were part of a household's typical demand, other activities were not part of normal usage. For example, three different respondents reported that they had used electric heaters to heat their home before the event, instead of their normal gas heating. Respondents commented that the IDA helped them to make participating more worthwhile, and that they might not have participated without it.

Concerns about gaming

Some respondents were concerned about the IDA being abused or 'gamed' by some DFS participants. Respondents felt it was unfair that some participants were able to profit more through being aware of the IDA, or through having specific energy-using technologies like electric vehicles. Some respondents felt this was against the purpose of the DFS. Others were concerned this had led to inaccurate reporting of results. Nevertheless, two respondents who felt unhappy about IDA gaming also reported making use of the IDA themselves to increase their rewards.

Other issues

Six survey respondents reported that their provider had stopped using the IDA to calculate baselines midway through the DFS. This reduced the amount of rewards they received.



“If it hadn't been for knowing the in-day adjustment period I wouldn't have actually gained that much because I'm a very low user’

- Interview respondent



“I did read about people just putting everything on in the afternoon which felt a bit cheeky...”

- Interview respondent



“It should be clear when a user is gaming the system and a supplier could warn a user that this is not in the spirit of the service, although not against the rules. Ultimately it is up to NG ESO to set the criteria.”

- Diary respondent

Participant suggestions for improvement

Some respondents shared ideas about improving how an IDA is applied to the DFS in future. One suggested selecting randomised periods for calculating the IDA, to reduce capacity for gaming. Another suggested warning users who are clearly gaming the IDA, or removing the IDA altogether.

'Spirit' of DFS

Comments about the 'spirit' of DFS indicate an opportunity (or risk) around communicating the need for public participation and collective effort in the DFS, and demand shifting more generally. The analysis on awareness and understanding shows that the public recognise that DFS is about reducing household costs, but also that the DFS is designed to deliver broader system impact. Wider discussion of the purpose and outcomes of the DFS will shape household understanding of how to respond.

Gaming and demand turn-up

There is evidence that a limited number of participants effectively 'gamed' the system by artificially inflating their demand in the IDA window 1-4 hours before an event. That there are domestic users who are able and willing to increase their demand in this way indicates an opportunity for future demand turn-up schemes.

Experiences

Adverse approaches: turning off all power

Who turned off?

7% of survey respondents reported turning off all their power during turn down events as either a primary or secondary strategy. Analysis shows that some groups were more likely to adopt this approach than others. Respondents who turned off all power were:

- More likely to live on their own (38%) than those who didn't turn off (25%)
- More likely to rent (social or private) (26%) than those who didn't turn off (17%) and less likely to own (72% against 80%)
- Slightly less likely to be retired and living on a state pension (14%) than those who didn't turn off (22%).
- Slightly more likely to report they were finding it very difficult financially (10%) than those who didn't turn off (5%), and slightly less likely to report they were doing alright (36% rather than 42%).

Turn off is not uniform

Not all respondents interpreted 'turned off all power' in the same way. Comments received in the survey from those who turned off suggest some respondents who reported they turned off all power actually kept powering some appliances, like the fridge or burglar alarm, and evidently were not coming off supply.

Little impact on quantitative outcomes

Respondents who turned off all power were slightly more likely to receive rewards worth £1-£5 than those who didn't (51% against 46%) and slightly less likely to receive nothing (9% against 12%). Nonetheless, there was almost no differences between those who turned off all power and those who didn't in terms of satisfaction with their rewards and the DFS overall and their likelihood of participating again.

That turning off all power had such a minimal impact on overall perceptions of the DFS is a surprising finding. One might expect that adopting a more radical approach to demand reduction would lead to more dissatisfaction with experience of the DFS. This finding could be explained in a number of ways. The slight improvement in rewards received by those who turned off their power (at lower reward levels), might explain why overall satisfaction levels were relatively even between those who turned off and those who didn't: on average, an increase in reward helped to mitigate a greater amount of effort.



"Turn everything off at the main switchboard. The silence is just wonderful."

- Diary respondent

Qualitative evidence of enjoying turn off

Qualitative evidence from interviews, diaries and surveys also suggests that some respondents found turning everything off an easier or more relaxing way to participate. One interviewee also reported turning everything off made it easier for her to ensure other household members weren't using electricity secretly.

Challenges

Despite the similarity between those who turned off all power and those who didn't in terms of overall DFS outcomes, findings give some insight into some challenges faced by those who disconnected.

41 respondents who reported turning off all power also had electrical medical equipment at home. Although it is not clear that all of these respondents turned off their medical equipment as well, this is a potential red flag. Some evidence indicated some potential health concerns around respondents with electric heating staying in a cold house. Some respondents also raised some specific issues around turning appliances back on after reconnecting their power. Other respondents were frustrated that their effort in turning all power off had led to small rewards. Some respondents who didn't turn off expressed negative feelings about the prospect.



"I heard people turning off everything and I thought that was a little bit too far"

- Interview respondent



"Personally I wouldn't waste my time as it hardly made any difference, I committed so much into completely switching everything off for an hour for a measly £1.30"

- Survey respondent



Experiences

Conclusions

Key learnings from this section

Timing and notice

Participants reported that the timing of events was their most important consideration when opting into events. Maximising notice periods will help to make participants feel more able to participate in future: with 6 hours' notice or more, at least 61% of respondents felt able to participate.

Seven core shifting approaches

Evidence from participants suggests that there were seven different core approaches to shifting demand during turn down events.

Demand destruction almost as common as demand shifting

The two most common approaches involved both demand shifting (planning usage around the event) and simple demand destruction (reducing usage during event). The prevalence of demand destruction might indicate the increased need for participants to make savings in light of the cost-of-living crisis. It may also reflect a limited understanding of demand shifting.

LCT impacted approach taken

When compared against a range of smart energy capabilities, low carbon technology had the biggest impact on shifting approach.

IDA: low awareness, mixed reception

Relatively few participants were aware of the in-day adjustment – although awareness was higher amongst diary respondents. Participants who used the IDA to alter their baseline as part of their shifting approach (both through shifting their normal demand or artificially inflating their demand) reported this motivated them to participate and earn larger rewards. Some participants (both who used the IDA themselves and those who just heard about it) felt that 'gaming' baselines was unfair or against the 'spirit' of the DFS.

IDA: learnings for next time

Evidence about the IDA suggested several possible routes for future action around the calculation. Some respondents suggested ways of adapting how the calculation is made. It may also be worth considering specific communication around the 'spirit' of the DFS to gain public buy-in. Evidence of some users being able to significantly increase their demand may support future demand turn-up schemes.

Those living on their own and with financial difficulties more likely to turn off all power

Sole residents were 13% more likely to use turning off all power as a shifting approach, whilst those finding it financially very difficult were 5% more likely.

No unified turn off experience

Respondents had different motivations for turning off: for some it was about maximising rewards, for others it was the easiest option, others simply thought this was what was being asked of them.

Those who turned off also had different outcomes. Some reflected positively about the process, saying it allowed them more control or more time to relax. Other comments suggested that respondents were frustrated that their effort had led to little reward.

Some turn off should be discouraged

Evidence suggested that some clients turned off power needlessly or dangerously. For example, some respondents reported turning off their heating despite having gas boilers. Other potentially vulnerable participants reported turning everything off, potentially putting themselves at risk. Discouraging these actions should be a priority for future communication around the scheme.

Little change in participation over time

There was limited evidence of participation changing over the course of the scheme. Less than 20% of survey respondents felt that participation got less rewarding, easy or interesting over time.



Benefits and challenges



Benefits and challenges

Introduction

This section explores some of the overarching impacts of being involved with the DFS for participants.

It starts by exploring reported benefits, including a deep dive on how participants felt about the rewards they received. It also covers challenges, including a deep dive on how diverse households experienced the DFS.

Finally, it presents some overarching findings about overall satisfaction with the DFS, likelihood of taking part again, and some suggestions for improving the process next time.

Benefits and challenges

Benefits – quantitative insights

Sense of satisfaction outweighs rewards

Respondents were able to select up to 5 benefits they experienced from participating in the DFS.

The most common response was the sense of satisfaction from managing the challenge (42%). The rewards earned was selected 39% of the time. Being part of a national collective effort was selected 38% of the time. 4% of respondents felt there was little or no benefit to their participation. This option was not included as one of the multi-select options in the survey, but was coded from the open text responses. This may have led to 'little or no benefit' being under-reported.

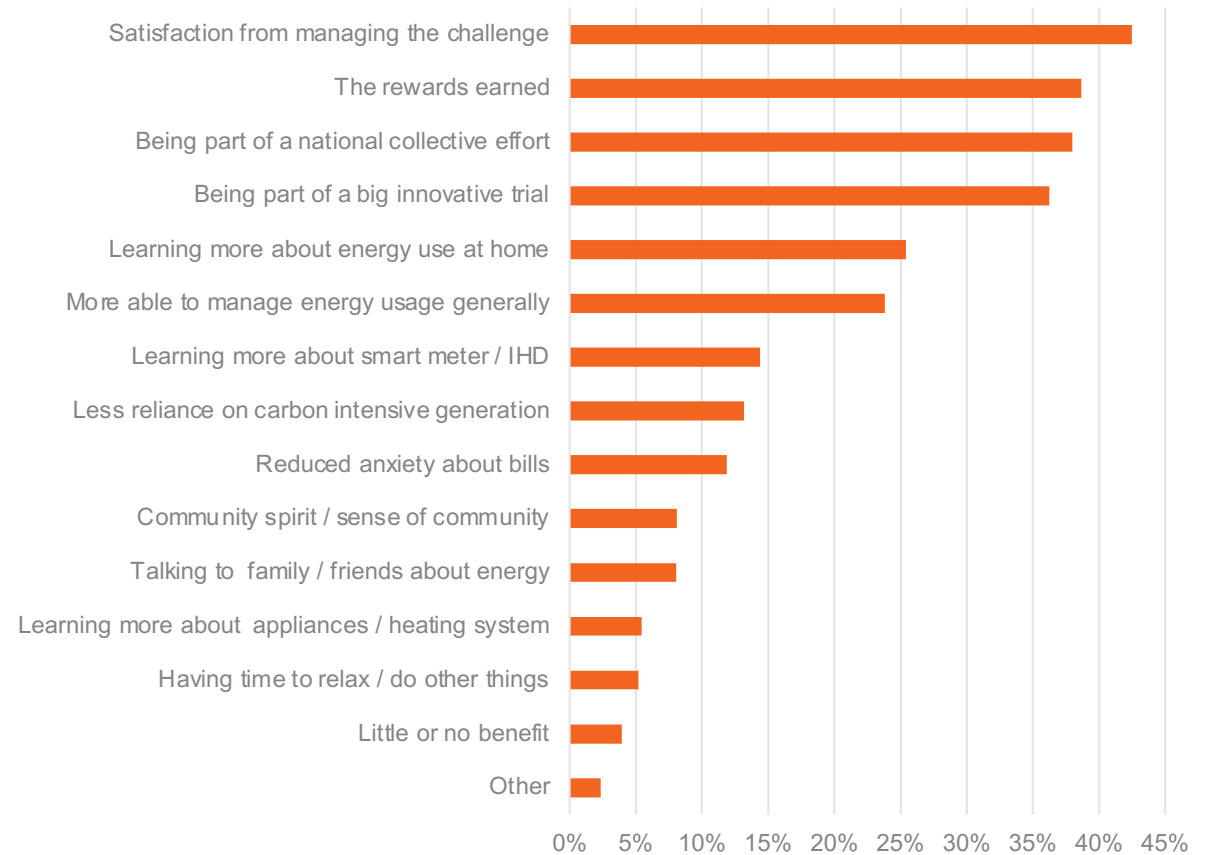
The survey response options were based on qualitative analysis of the information provided by diary respondents about the benefits they received. These options may not have covered all benefits that participants experienced. The 'other' answer allowed respondents to specify their own benefits. Some common responses here were helping to reduce blackouts and spending time with family.



“This has been a fun but effective way of educating the family about our electricity usage, and is having a lasting impact on our habits - much more likely now to turn off appliances we're not using”

- Survey respondent

What have been the main benefits of participating in the Demand Flexibility Service?



Benefits and challenges

Benefits – qualitative insights

Qualitative findings from the survey, diary and interviews provide some context to quantitative results around benefits.

‘Feel-good factor’

Although given the chance to comment, a relatively small amount of comments were received from survey participants about the benefits they experienced. Most of these related to a general ‘feel-good’ factor around doing their bit, or contributing to something (especially carbon reduction) on a national scale. This was a common theme in comments from diary respondents as well, although these commenters tended to focus more on specifics of the DFS – for example, using more electricity when the grid is greener. These findings support the evidence already presented around the need for clearer communication of the cumulative impact of DFS.



“Have always tried to respond to a challenge and in my old age am still up for it. Does give me satisfaction looking after our wonderful world.”

- Survey respondent

Learning

Both survey and diary respondents also reflected on learning more about energy in their home, especially around smart meter displays, low carbon technologies and high-usage appliances. A key element of this learning process involved teaching family or friends more about energy. In this regard DFS participation was a novel way of helping (especially young) family members understand some abstract ideas about energy in a practical way. Respondents felt this could have lasting impacts on general household energy efficiency. Stressing these benefits could be a powerful way of helping to market the DFS to, for example, young families in future.



“Learning how to use the heat pump properly!”

- Interview respondent

Fun

Another key theme of qualitative feedback about benefits was the enjoyment of the process itself. Both survey and diary respondents described the process of taking part as ‘fun’, especially with children, around the competitive element of trying to save as much as possible. Other respondents commented on the benefits of switching off from electronic devices for a while. In both cases, respondents reported feeling better connected with themselves or others around them. Two different interviewees positively compared the experience to lockdown in terms of bringing the family and community together. This comparison raises a question on the extent this benefit for participating will be replicated in future, if it depends on a sense of novelty, or an external crisis that benefits from collective action.



“I felt I actually connected better with my son because we made it into a bit of an adventure. He’s four so he loved reading books with torches and it led to lots of questions about energy and electricity.”

- Diary respondent

Benefits and challenges

Deep Dive 2: Rewards

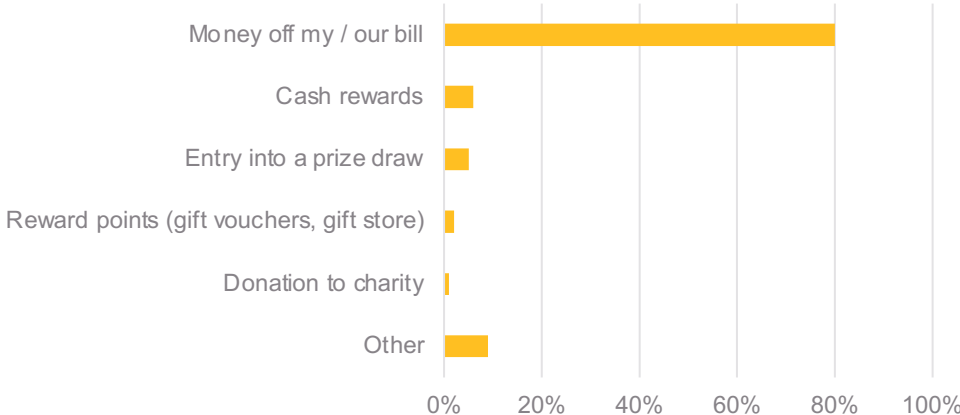
Although the financial incentive provided the mechanism to drive participation in DFS, and was the main motivation to take part, it was not the main benefit that households achieved through their participation. The data suggests a number of issues around the amount of reward achieved which we explore in detail here.

Reward type

Money off bill most common

Providers offered a range of incentives, but the majority (80%) of survey respondents received money off their bill as the incentive for flexing their demand. The options reflect the subset of offers from the providers included in the evaluation survey. Respondents were able to select more than one response. The dominance of 'money off bill' reflects the high proportion in the survey sample of customers of providers that offered that type of reward.

What rewards did you receive for participating?



Benefits and challenges



“We maybe went a bit over the top....”

- Interview respondent

Reward value

Most respondents received low rewards...

Survey respondents self-reported receiving very low rewards. Over half (51%) of respondents selected that they had received rewards of £1-5 in value. 13% reported that they received nothing. Only 4% received above £25 in rewards.

These figures need to be interpreted against the fact that the provider who delivered the largest volume of demand reduction and therefore received the highest proportion of the incentive carried out their own evaluation and their customer data is not included in the table below. However, Octopus' evaluation of Saving Sessions broadly aligns with this, reporting that households earned on average 90p per hour of participation¹. Similarly, EDF reported an average reward of £1.35 per event².

Roughly what was the value of the reward you received for taking part? (n = 21,419)

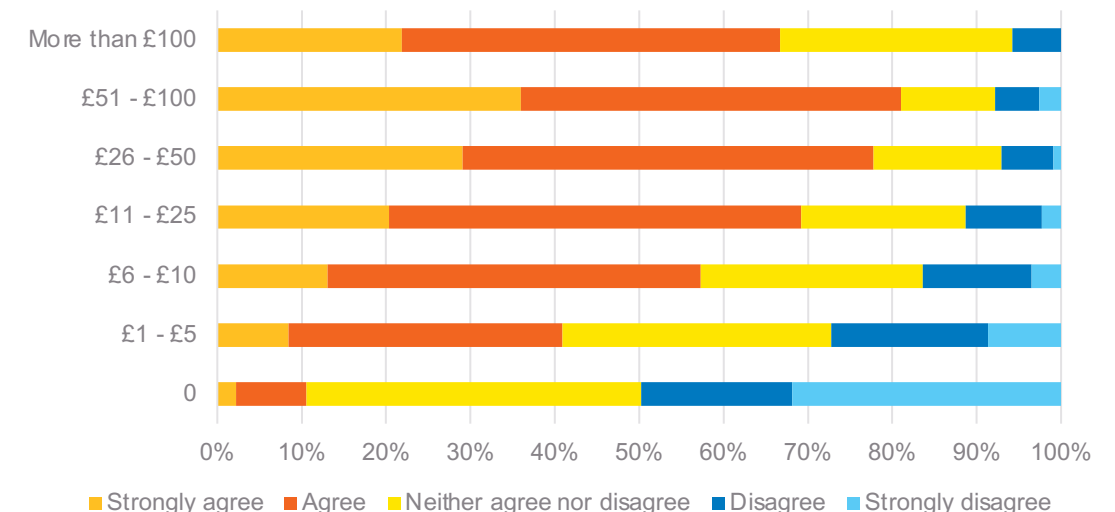


...but few were dissatisfied with rewards received.

Despite the low level of rewards, 44% agreed or strongly agreed that the rewards they received were satisfactory and only 24% disagreed or strongly disagreed. Overall satisfaction with rewards rises as rewards get larger. Satisfaction increases from 41% in the £1-£5 category to 82% in the £51-£100 category. There was a small reduction in overall satisfaction for those that received rewards of more than £100. This may indicate erroneous survey responses selected (very few households selected more than £100) or that some made so much effort that even a large reward wasn't satisfactory. This was reflected in comments made by an interviewee (quotation above).

Only 50% of participants expressed dissatisfaction with having received no financial reward at all. This could indicate low effort and therefore low expectation. Other research has found that non-punitive mechanisms may encourage households to opt in regardless of intent to engage actively with shifting demand³. Households may opt in when there is no risk of financial penalty, but may not make additional effort to actively earn rewards.

Reward value against reward satisfaction (Please indicate your agreement with the following statement: 'Overall, I am satisfied with the rewards I have received for taking part') (n = 21,419)



¹Octopus (2023) Centre for Net Zero Insights from the UK's largest consumer energy flexibility trial
²EDF, Beat the Peak: A New Demand Flexibility Service

³Johnson, C. (2020) Is demand side response a woman's work? Domestic labour and electricity shifting in low income homes in the United Kingdom, ERSS (68)

Benefits and challenges

Reward value

More events = more reward

Unsurprisingly, participating in higher numbers of events leads to larger rewards received.

Of those respondents who reported they earned nothing, almost 80% had only taken part in 0-3 events. Of those respondents who earned £26-£50, over half had taken part in more than seven events.

These findings suggest that participation levels can partly explain why many respondents reported earning relatively small levels of reward. This may also explain why households had fairly low levels of dissatisfaction with the rewards they received. If they had not actively engaged, they may have had very low expectations of any reward.

Potential misunderstanding within 'more than £100' reward level

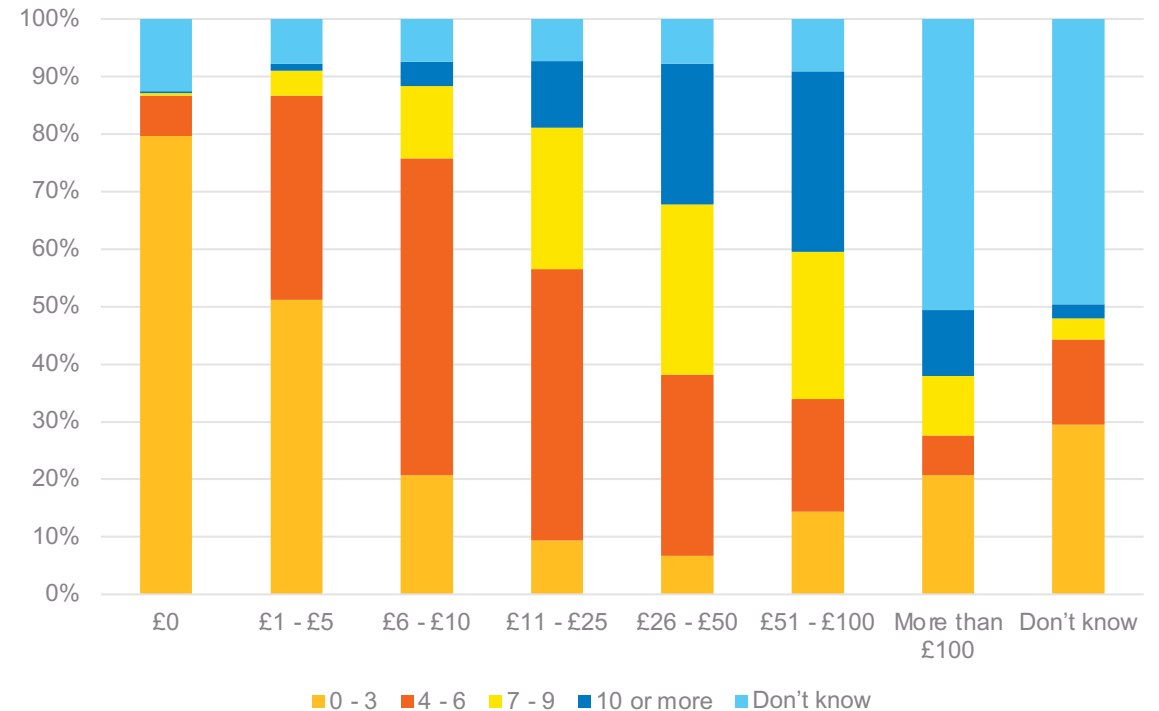
Furthermore, this comparison highlights that almost half of those who reported earning more than £100 didn't know how many sessions they participated in. This may reflect that some respondents who selected they earned this much did so by mistake. This may explain other anomalous results within this group. These anomalies are also likely to be exacerbated by the comparatively very small sample size (87 respondents).

That being said, significant energy reductions and high rewards were clearly possible – E.On Next reported that their top saver earned over £260¹ over 12 events, and Equiwatt reported that one user managed to shift 7.2 kWh of electricity in just one event².

¹E.On Next, [What is the Demand Flexibility Service](#)

²Equiwatt, [From Coal to Clean Energy: A look back on the Impact of National Grid's Demand Flexibility Service](#)

Reward value against number of events participated in



Benefits and challenges

Rewards – further insights

Low value

Analysis of the open text comments written by survey respondents showed that just over half of the 3,047 total comments about rewards were negative. The issue raised most frequently was a perceived imbalance between effort and reward. Many commenters felt they had done a lot to shift their usage – or endured some hardship, like sitting in the cold and dark – and the reward received didn't reflect this, it wasn't 'worth it'. This linked to another common issue: not having enough usage to benefit. Others reported their reward levels changing over time, usually getting worse, which was confusing.

Different rewards

Respondents also raised some issues with reward types. Some were unhappy with being only entered into a prize draw. Others wanted more consideration for low users, such as rewards for participation, or rewards based on proportion reduced, not amount.

“Because my electricity usage is generally low I was told I didn't reduce enough, even though I did all I could! The reward should be according to how much reduced rather than...by a set amount.”

- Survey respondent



“They [rewards] were alright but if I wasn't motivated in another way, I wouldn't have found them that inspiring”

- Interview respondent

Positive perceptions of rewards linked to cost-of-living crisis or motivation

Amongst survey respondents who left more positive comments regarding rewards, a minority reported the rewards in themselves were satisfactory. Most felt that, though reward levels weren't high, this was less of an issue for them, either because any reward was valuable in the current economic climate, or because rewards weren't their primary motivation. Interviewees reported the same.

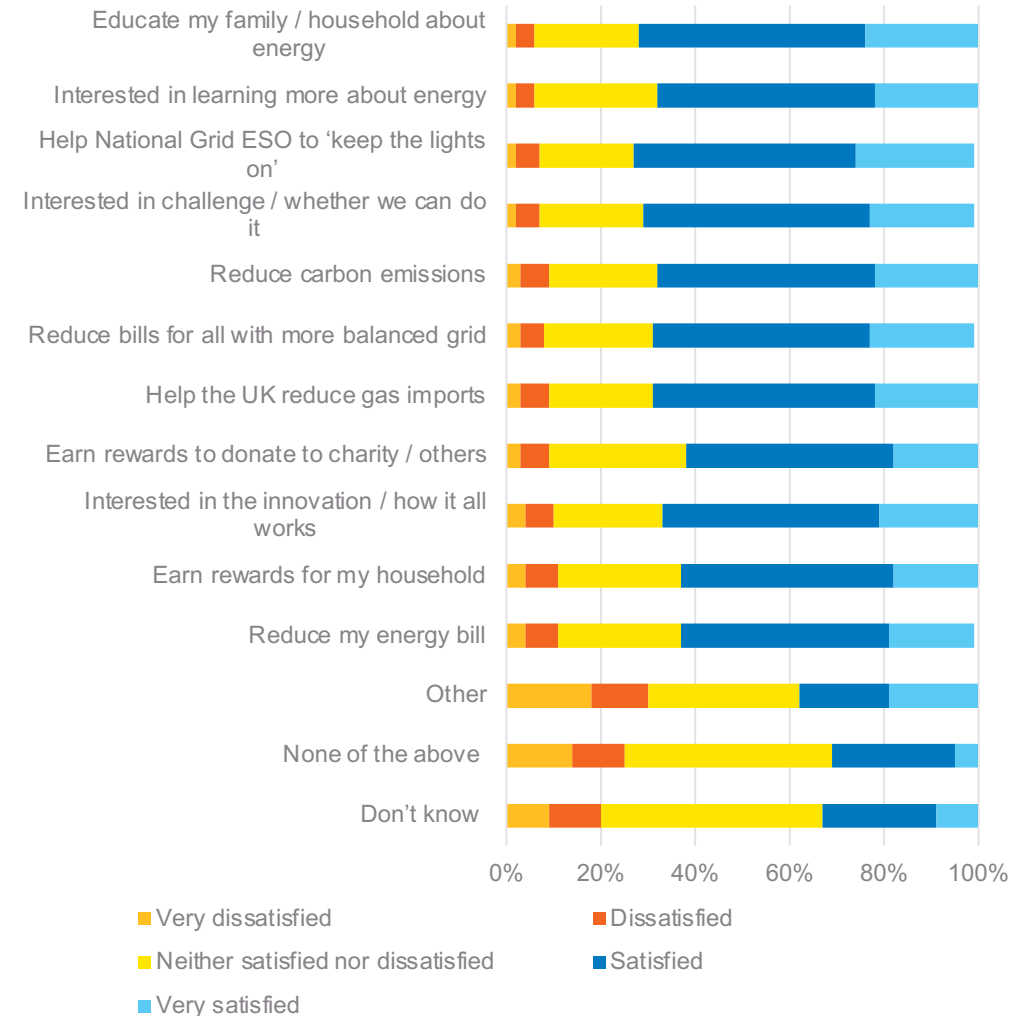
This point is borne out when satisfaction levels with rewards is compared with motivations for participation. Although differences are not large, respondents who reported that reducing their energy bill was a key motivation were more likely to be dissatisfied (11%) with their reward level than those who selected any other motivation.



“Using the same strategy was confusing because I just turned everything off, so I don't know how the rewards fluctuated.”

- Interview respondent

Motivations against satisfaction with rewards



Benefits and challenges

Challenges – quantitative insights

Rewards are a key issue

Respondents were able to select up to 5 challenges they experienced whilst participating in the DFS.

The most common answer is the rewards being insufficient (38%). The next three challenges relate to the practicalities of demand shifting: changing routines (31%), remembering events are happening (27%) and understanding what actions to take (21%). The fifth challenge relates to not seeing the wider system impacts (18%).

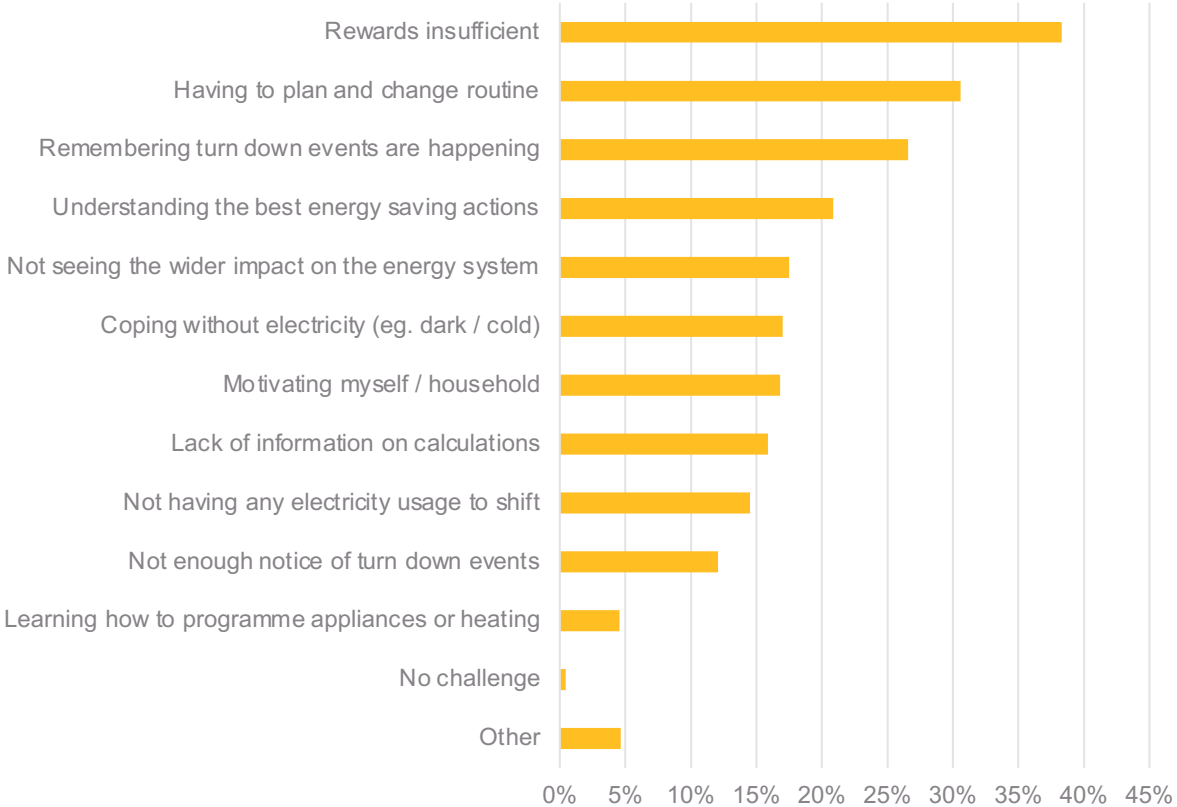
The 'other' answer allowed respondents to specify which other challenges they experienced. Comments here took two key themes: the DFS process and personal challenges. With the DFS process, respondents said they struggled with lack of information about events and their impact and issues with their provider (mainly with smart meters and missing notifications). In terms of personal challenges, common themes were juggling caring responsibilities and managing health conditions.



“Whilst I've selected 'lack of information on how reductions/savings are calculated', it's more how complicated the savings calculation was. Simplifying this will help more people immediately grasp that by doing x that has effect y. To date, there's been very little information published on how the scheme/individual activity window altered national/regional/local electricity demand.”

- Survey respondent

What have been the main challenges of participating in the Demand Flexibility Service?



Benefits and challenges

Challenges – qualitative insights

Qualitative findings from the survey, diary and interviews provide some context to quantitative results around challenges.

Rewards

Survey respondents were able to leave a comment giving more detail about any challenges that they experienced. Many comments related to rewards. Similar to those discussed in the rewards section, most of these comments focused on a perceived imbalance between effort and reward, and difficulties for lower users to earn rewards.

Notice and information

The quality and quantity of information provided was another key theme in responses. Many respondents felt short notice periods restricted their ability to shift. Others wanted more detail on how to shift effectively, quicker results, more detail about how results were calculated and the cumulative impact of the DFS. This was a theme shared with diary respondents as well. One interviewee suggested that participants should have been celebrated more, like NHS staff in Clap for Carers during Covid.

“It took quite a while - 4 or 5 days - to get result back on the app”

- Interview respondent



“It sort of came and went and nobody seemed to say anything, and it wasn't generating the same sort of traffic' [as Clap for Carers]”

- Interview respondent

Powerless struggles

Other survey respondents gave more detail on the impacts of coping without electricity. Struggling in the cold and dark – especially on colder days – was a key challenge here, especially for vulnerable groups.



“Created more anxiety and more stress, making it harder to manage Type 1 diabetes.”

- Interview respondent

Some respondents with gas boilers also reported switching their heating off. This might suggest they did not know they had to just reduce their electricity usage.

Several respondents felt that the process of coping without electricity had a negative impact on their mental health. They felt that being more conscious of their energy usage made them more anxious or stressed about their bills, especially if they didn't receive much reward through the DFS.

These challenges should be addressed by improved information in future. Households must be advised that gas is not part of the DFS. They should also be provided with clear advice on how to work out the most impactful and appropriate ways to reduce their electricity use during event windows.

Household dynamics

Intra-household dynamics was another prevalent challenge theme raised by both survey and diary respondents. Some respondents reported other household members being less interested or forgetting about participating. More common, however, was the needs of other household members restricting the extent of shifting. This was especially true for families with children around mealtimes.



“Trying to feed hungry children who were just home from playing sports without using the oven was not possible.”

- Survey respondent

Technical or participation issues

680 survey respondents used the open box to report issues with participating in the DFS, either through a lack of invitation to events (536 households) or issues with their smart meter (40 households). Technical issues are likely to be under-reported as households with technical faults or participation issues may have chosen not to complete the survey or may have been disengaged by their providers, and not invited to participate in the evaluation survey. More understanding of technical issues with participation is needed.



Benefits and challenges

Deep Dive 3: Including diverse households

This deep dive focuses on the experiences and outcomes for households who may face greater challenges in participating in flexibility markets, including renters, households with long term health conditions, households that use smart pre-payment meters (PPM) and those that are struggling financially.

The DFS was designed with low barriers to participation. The evaluation results show that a very broad range of households were able to opt in and take part in demand shifting events. However, participation may not be as easy or rewarding for all households. In this section we look at the experiences of diverse households to see if there are key differences or insights that can be drawn. We focus on four groups who may face particular challenges in being flexible with their energy use or who are at risk of being left behind in the smart energy transition.



Households who rent

Only marginal differences based on tenure

Tenants may find it harder to participate in flexibility services than homeowners because they have more constraints on the types of appliances or technologies they can install and use at home. Analysis suggests only marginal differences in DFS experiences based on tenure.

Owner occupiers were overrepresented in the evaluation survey, making up 79% of the sample. However, the survey did capture insights from 2,302 social renters, 1,978 private renters, and 699 households with shared ownership or other forms of tenure. Here we compare households who own their homes (n=18,738) (either outright or with a mortgage) to renters and households with other types of tenure (n=4,979).

Knowing what to do

80% of renters found it “easy” or “very easy” to know what to do to earn rewards in comparison to 82% of owner occupiers (2% difference).

Fewer events

48% of homeowners reported opting in to 4 or more events, while 41% of tenants opted into this many (a 7% difference). 17% of tenants were not sure how many events they had participated in, while only 11% of owner occupiers were not sure.

Lower rewards

48% of renters received £1-£5 in comparison to 45% of owner occupiers, (a 3% difference) and 17% reported receiving £6-£10 in comparison to owner occupiers (a 3% difference).

Less satisfied

Although overall satisfaction levels were high, renters were slightly less satisfied with their experiences and less likely to want to take part again. 60% were satisfied or very satisfied with participating in comparison to 63% of owner occupiers, while 81% were likely or very likely to take part again in comparison to 84% of owner occupiers (a 3% difference).

Benefits and Challenges

Households with long term health conditions

Slightly worse experiences and outcomes for households with health conditions

Comparing experiences of households with long term health conditions that impact their life 'a little' or 'a lot' (n=5,467) to experiences of households who were not impacted by their health condition or did not have one (n=17,106) suggests their experience was slightly worse¹.

Knowing what to do

A lower proportion found it easy to know how to respond. 78% of households found it "easy" or "very easy" to know what to do to earn rewards in comparison to 83% of households who do not experience health impacts (4% difference).

Fewer events

43% of households with long term conditions that impact their life reported that they participated in 4 or more events, in comparison to 48% of households who are not impacted by health impacts (a 5% difference).

Lower rewards

£1-£5 was the most typical reward received for both groups, but households with health impacts were more likely report lower rewards than higher rewards. 14%

reported no reward, in comparison to 12% (a 2% difference) and 12% of impacted households reported that they did not know what rewards they'd received in comparison to 10% (a 2% difference).

Lower satisfaction or intent to participate again

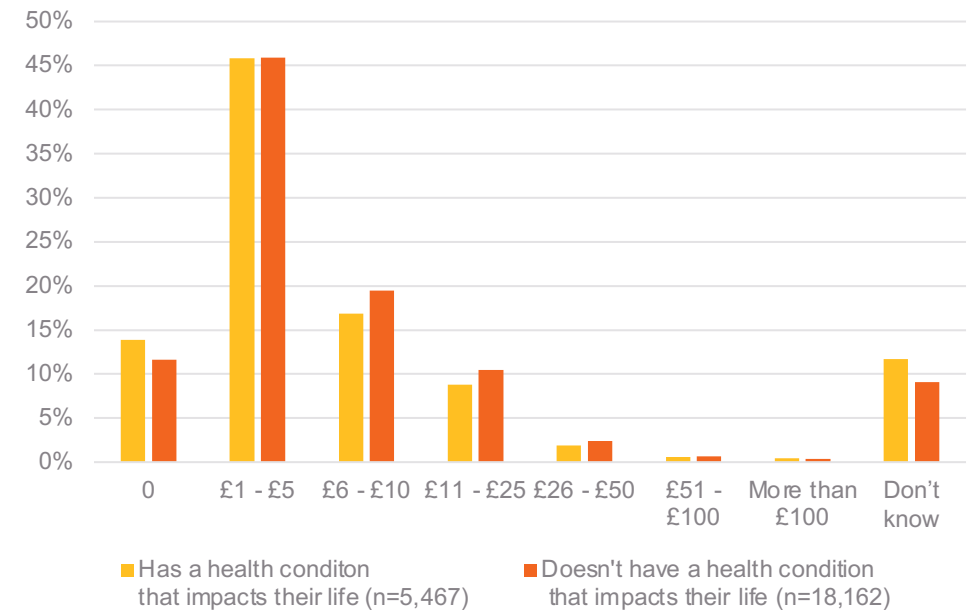
58% of households with long term conditions that impact their life reported satisfaction with participating in comparison to 63% of households who do not have a condition or are not impacted (5% difference). 80% of households with long term conditions that impact their life reported they were likely or very likely to take part again in comparison to 85% of those without a health condition (a 5% difference).



"Pennies in the height of winter when physically disabled is an insult!"

- Survey respondent

Roughly what was the total value of the rewards you achieved by taking part?



¹ Households reporting 'I don't know' or 'Prefer not to say' when asked about their health status have not been included in this analysis



Benefits and Challenges

Households with long term health conditions

Although this data indicates that households with health conditions or illnesses overall found it less easy or satisfying to participate, 4,376 (80%) of these households were either likely or extremely likely to participate again. This suggests it is important for service providers to think about how to improve these households' experiences, limiting any risks, while also ensuring that opportunities are offered to those households able and willing to participate.

Households provided some insights into specific factors that affect their ability to flex their demand or participate:

Care routines

The timing of events was a key issue. Respondents reported having specific needs in the household that needed to be met at specific times – for example, eating, using medical equipment or receiving a visit from a carer. Some respondents raised that their decision to opt-in to an event was dependent on how their health was on that particular day, or what the weather was like.

Practical issues

Other respondents reported practical issues with shifting as a result of a health condition in the household, explaining that it could be difficult to physically turn things off.

These issues help to explain why respondents with a health condition were more likely to report they didn't understand what to do during turn down events, and less satisfied overall with their experience.



"I'm disabled and I found turning off the lights was potentially dangerous"

- Survey respondent



"We are both disabled and sometimes it wasn't easy to turn things off"

- Survey respondent

Notably, some evidence from respondents with health conditions suggested that participating could have put them at risk. 41 respondents with electrical medical equipment reported turning off all power. It is not clear that all of these respondents turned off their medical equipment too, but this is a potential concern. Several respondents also reported turning off their heating and or lighting despite their medical needs. This also tied closely to some comments around fairness. Some respondents with health conditions felt it was unfair they had to compromise their health to participate. For some respondents, this also exacerbated perceptions that rewards were too low.

Insights

There is a need for improved or tailored advice that clearly explains how flexing electricity demand might conflict with care or health needs and allows households to gauge whether it is an appropriate service to opt in to. Targetted safety messages should be a priority for future communication around the DFS. Participants with health conditions should not feel like they should compromise their health through taking part in the scheme. Sharing best practice for participants with health conditions could also be a valuable output. For example, one interviewee gave details of how they had used smart plugs to help them shift their load without having to move to reach plugs for appliances. Some respondents also wanted different or more flexible times for disabled households.

"I can just go onto my phone and switch something off, especially if it's a downstairs one and I'm not sure if it's been left on or not..."

- Interview respondent



"Consider people with disabilities have to eat at tea times. Maybe offer different times to participate to customers who are disabled or who have disabled people living in their home."

- Survey respondent

Benefits and Challenges

Financial wellbeing

Households who were struggling financially found it less easy to know what to do to shift their demand and had lower satisfaction levels. These differences may reflect that struggling households were already reducing their electricity costs as much as possible.

Knowing what to do

85% of those who were comfortable or doing alright said they found it easy or very easy to understand, in comparison to 74% of those finding it difficult (a 9% difference).

Number of events

There were marginal differences in the number of events, with 42% of households who were struggling reporting they took part in 3 or fewer events in comparison to 41% of households who felt they were comfortable or doing alright.

Lower rewards

Generally, those that were finding it difficult were slightly more likely to report the lowest categories of reward and less likely to report the higher categories of reward. For the category of £6-£10, 21% of those who were comfortable or doing alright gave this amount, in comparison to 15% of households who were finding it difficult.

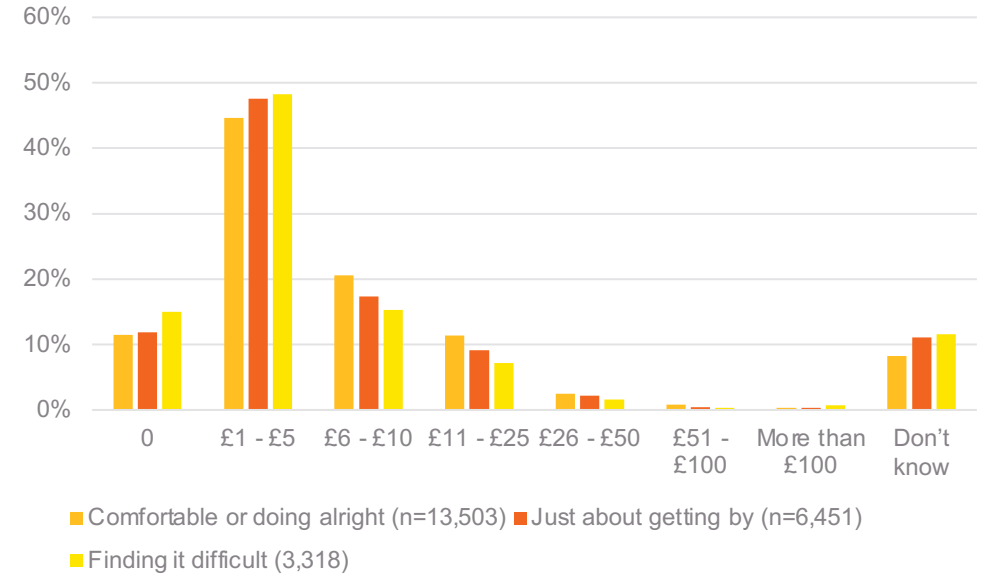
Satisfaction levels

These were higher for groups who were financially better off. 68% of those who are comfortable or doing alright reported being satisfied or very satisfied with their provider's scheme, but only 46% of households who were struggling reported satisfaction, a difference of 22%.

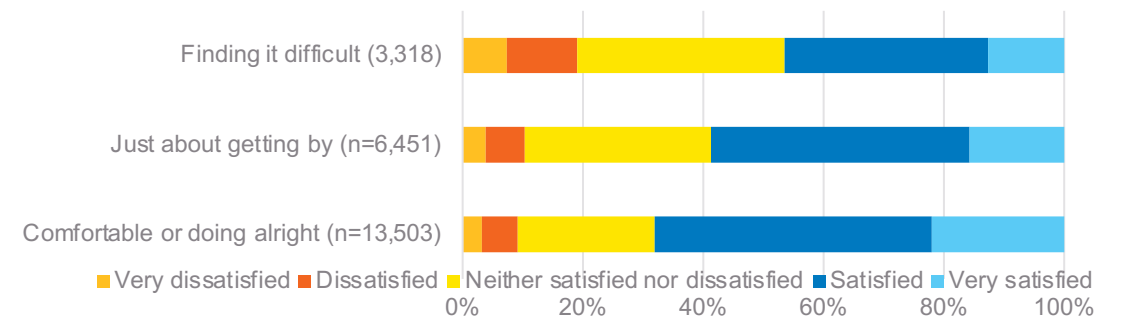
Taking part again

Lower satisfaction levels correlate to lower willingness to participate again. 74% of struggling households reported they were likely or very likely to take part again, in comparison to 86% of those who considered themselves comfortable or doing alright.

Financial comfort against value of rewards received (n=23,272)



Financial comfort against overall DFS satisfaction (n=23,272)



Benefits and Challenges

Prepayment Meter users

Prepayment meter (PPM) users are often excluded from the best value or most innovative tariffs on the market, however this group were able to participate in the DFS. 563 households with PPMs responded to the survey and self-reported that they found it easy to participate. Comparing results between PPM households (563) and households who used other payment methods (23,009) others shows that PPM households had a slightly better experience than typical.

Knowing what to do

84% of PPM households found it “easy” or “very easy” to know what to do to earn rewards, while 82% of non-PPM households did (a difference of 2%). This could indicate that PPM households are already very aware of household energy costs and are used to managing these closely.

Higher rewards

PPM households reported higher rewards on average. 52% received £1-£5 and 21% reported £6-£10, in comparison 46% of non PPM households reported rewards of £1-£5 and 19% reported rewards of £6-£10. They were also less likely to report ‘I don’t know’. 7% of PPM households gave this answer, in comparison to 10% of non PPM households (3% difference). PPM households included in interviews also reported they were happy with how rewards were transferred directly onto their meters. They reported this was quick and meant rewards were felt directly.

Satisfaction levels

PPM households were comparatively less ambivalent about their experiences. Proportionally, more reported they were satisfied or very satisfied with their experience (64% of all PPM households, in comparison to 62% of non PPM households). However 15% reported they were dissatisfied or very dissatisfied in comparing to 11% of non PPM households.

PPM households may be less keen to participate again. 79% reported they were likely or highly to

participate again, in comparison 83% of non PPM households gave this answer (a 4% difference). These results need to be interpreted with care. The PPM sample is much smaller and 90% of PPM households were with one provider. This provider joined the DFS in February 2023, near its end, and their customers’ experiences are likely to be different from those households who had been recruited in November. In addition, the provider may have offered different amounts of incentives to their participating households, or provided different levels of support.



“It went onto the meter, which for me that was great, which was money we didn’t have on the meter and we saved up.”

- Interview respondent

Benefits and Challenges

Smaller vs larger households

Both smaller and larger households experienced distinct challenges

Smaller and large households tend to have certain smart energy capabilities that impact their experience of demand shifting. Large households may have more electricity demand, but face challenges in co-ordinating household responses or have fixed routines related to caring for young or elderly household members. Smaller households may find it easier to coordinate a response, and have more flexibility in their domestic routine, but may have less to shift. These differences were reflected in the DFS findings.

Smaller households earned less

Survey respondents in smaller households (two or fewer residents) on average earned less reward through their participation in DFS than those in larger households (three or more residents). Smaller households were more likely to earn nothing or £1-£5. Those in larger households were more likely to earn £6 or over. This point is supported by qualitative evidence. Survey, diary and interview respondents all highlighted that it was harder to earn rewards in smaller households with lower usage. Some thought this was unfair. Many suggested having some specific incentives for lower users in smaller households, like participation rewards.

Larger households reported finding shifting difficult

Qualitative evidence from respondents in larger households suggested they found shifting their demand difficult. This was often an issue of scheduling, especially with feeding young children. Some respondents suggested it heightened stress and, in some cases, caused conflict within the household. This was mentioned in the diary responses with one respondent explaining they had 'some fraught-ish disagreements with my partner about the point of the events'. One interviewee also reported having a larger household impacted her choice of shifting strategy: turning all power off meant she could have more control over who used electricity. Although household size had minimal quantitative impact on the reported notice needed to react to events, several respondents made comments about larger households needing more notice.



“Appreciate that for young families there is less flexibility and more notice is needed.”

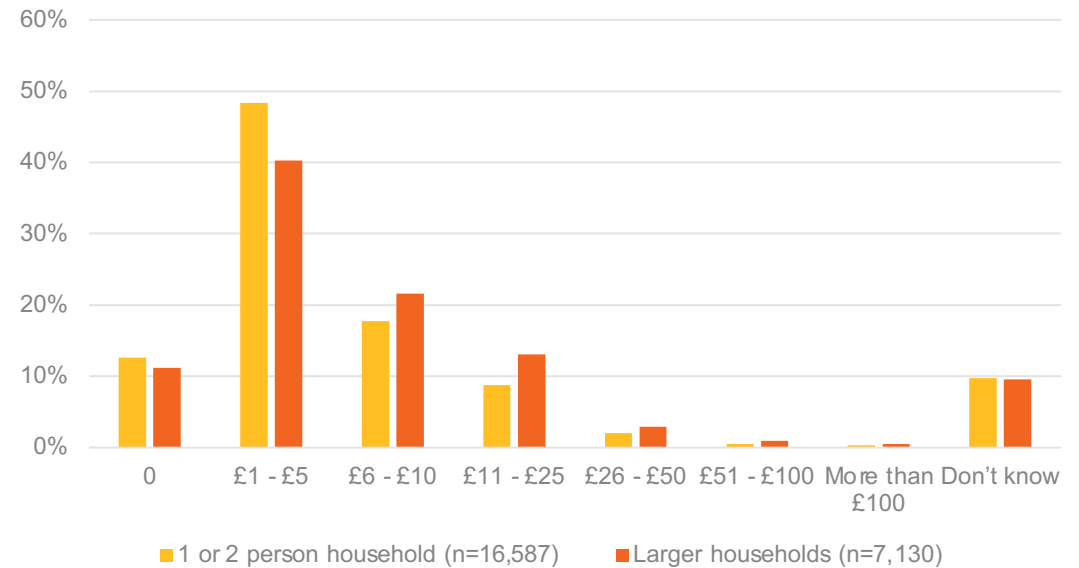
- Survey respondent



“I think it is worth it for those that have a big house because they use a lot but not for people like me in a small flat...”

- Interview respondent

Household size against reward value



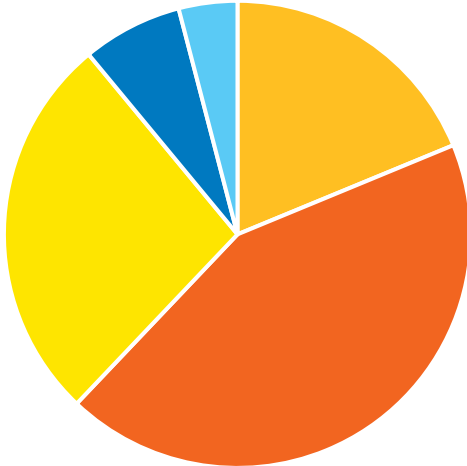
Benefits and challenges

Overall satisfaction

Overall satisfaction high, some ambivalent

Almost two thirds of survey respondents (62%) reported that they were either satisfied or very satisfied with their experience of the DFS. Notably, more than a quarter (27%) reported neither satisfaction nor dissatisfaction.

Thinking about your experience overall, how satisfied are you with your experience of the Demand Flexibility Service this winter?



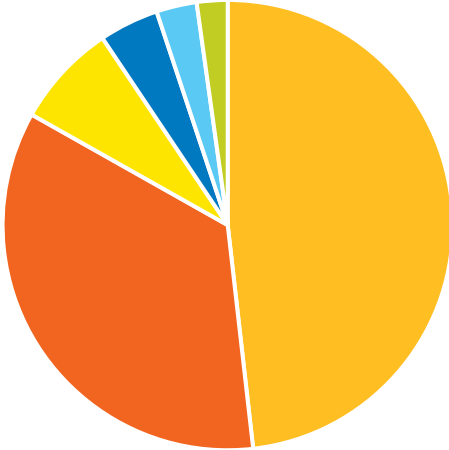
Very satisfied Satisfied Neither satisfied nor dissatisfied Dissatisfied Very dissatisfied

Likelihood of taking part again

More than three quarters likely to take part again

Almost all survey respondents (83%) reported that they would be likely to take part in the DFS again. Similarly, most participants in Octopus' evaluation of Saving Sessions reported that were very interested in participating in future events (92%)¹.

Thinking about your experience overall, how likely are you to take part in the Demand Flexibility Service again?



Extremely likely Likely Neither likely nor unlikely
Unlikely Extremely unlikely Don't know



¹Octopus (2023) Centre for Net Zero Insights from the UK's largest consumer energy flexibility trial

Benefits and challenges

What would you do differently next time?

Survey respondents were asked to comment in response to the question: 'Is there anything you'd do differently if you participated in the Demand Flexibility Service next time?' 3,595 respondents gave responses to this question.

Roughly 1,500 responses given to the question related to changes that could be made by ESO or DFS providers. These responses were analysed separately and are reported on the next page .

Out of the remaining responses, the most common theme was around adapting or changing shifting strategy. Many respondents felt they would adapt the times they used appliances. Some suggested they would try to shift more of their usage into the IDA period. Some also mentioned more radical strategies, like turning appliances/their fuse box off completely. Some respondents also mentioned making use of smart products to help facilitate their shifting, including in-home displays, batteries and smart devices.

Another key theme in responses was preparation. Some respondents felt they could find better ways of organising their schedules or ensuring buy-in from other members of their household. This reflects the novelty of demand shifting for many respondents.

A minority of respondents reported they wouldn't make any changes, either because they already did all they could, or they didn't know what changes they could make.

This evidence suggests that some respondents are actively reflecting on and improving their approach to demand shifting. It also raises a possible communications issue if future DFS offers use different baselining methodologies and the IDA is altered or removed. Any changes will need to be clearly communicated to households to reduce the risk of some shifting their demand in a way that would have generated rewards under DFS Winter 22/23, but that do not generate rewards in new DFS offers. In general, better advice on demand shifting will help solidify household learning and should improve household experiences and outcomes in future schemes.



“Plan things better and buy more smart plugs.”

- Survey respondent



“I'd go round and make sure things were switched off an hour or so beforehand... rather than just a bulk blackout.”

- Interview respondent

Benefits and challenges

What should providers or NGESO do differently next time?

Survey respondents were asked to comment in response to the question: 'Is there anything that you'd like your provider or National Grid ESO to do differently with the Demand Flexibility Service next time?' 7,643 respondents gave responses to this question, as well as the roughly 1,500 responses given to the question about what respondents would do differently.

Fairer rewards

The most common theme in responses was rewards. Many respondents felt that there was an imbalance between the amount of effort they put in and the level of reward they received. This was especially an issue for low electricity users. Perceptions of unfairness were also exacerbated by the wider energy context: some respondents left comments about their high energy bills, or profits made by energy companies. One respondent suggested that company profits should be shared with customers. A few respondents also referenced fairness between participants as important, especially in relation to those who made use of the IDA, and high or 'wasteful' users, in comparison to those that did not use much energy.



“Channel some of those massive profits my way in bigger rewards.”

- Diary respondent

Better notice and information

Information provision was another key theme. Notice was a common issue raised by commenters: they wanted earlier notice, and through different media, like text messages. They also wanted clearer communication around the calculation of results, tips for reducing demand, and information about the cumulative impact of their participation. This is supported by British Gas' evaluation of the PeakSave



Have a tariff that acknowledges my daily contribution to peak lopping.”

- Survey respondent

scheme, which reported that optimising communication around rewards and making it easy to see how much people had saved, was one way to make the scheme better¹. Similarly, a key recommendation of the Octopus Saving Sessions evaluation is that household savings or benefits received should be reported “unambiguously”².

Enthusiasm for participation

The demand for more information ties into a third core theme of responses: a general enthusiasm for participation. On the whole, commenters made suggestions to help improve the quality and quantity of their contributions to the DFS in future (rather than, for instance, to limit its impact on their daily lives). Many respondents requested more events to maximise savings, or different time slots. Some suggested an opt-in all feature. Others wanted more 'smart' offers to help them to shift their demand, including smart technology like smart plugs or time-of-use tariffs to help them benefit from demand shifting in the long-term. Even the concerns raised around financial reward were generally phrased in terms of wanting more reward, not less onerous ways of participating. These findings suggest there is acceptance amongst respondents for the concept of demand shifting, albeit achieved in a more refined way. Some commenters revealed a limited understanding of the rationale of the DFS – for example, suggesting off-peak time slots, but in doing so, indicate an opportunity for wider and more diverse types of flexibility tariffs and services. Enthusiasm for shifting demand needs to be channelled towards the most appropriate flexibility products and services for the household.

“Give more notice and include text notifications.”

- Diary respondent



“It would be good to make more of a fuss about it and it would be good to hear that it did have a positive impact”

- Interview respondent

¹British Gas (2023) PeakSave Trial, Customer analytics & Insights

²Octopus (2023) Centre for Net Zero Insights from the UK's largest consumer energy flexibility trial

Benefits and challenges

Conclusions

Key takeaways

Rewards low but no major impact on satisfaction

Evidence on rewards is complex. Respondents were most likely to select rewards as a motivation for participating, but most respondents received a small amount of reward (less than £5) and respondents were most likely to report rewards as a challenge. Nonetheless, satisfaction levels, both overall and with the amount of reward received, were relatively high.

This could be explained in several ways. Firstly, low reward value reflects low participation rate: more than 50% of those who received a reward value between £1 and £5 participated in 3 or fewer events. Secondly, satisfaction in spite of low reward may also reflect the appreciation of some participants for making any saving in challenging economic conditions: this point was borne out in comments made about rewards. Thirdly, given the low barriers to access for the DFS, it is possible that some respondents opted in without intending to actively shift their demand. In these cases, low rewards may not have negatively impacted overall satisfaction. Finally, there is evidence that many respondents also enjoyed other benefits aside from rewards.

Non-financial benefits were important for some

In the absence of significant financial rewards, some participants experienced other benefits. Some respondents enjoyed a 'feel-good factor' for taking part and contributing to wider system benefits. Others (especially those in families), found events fun. Learning more about energy was also a commonly reported benefit: both in terms of teaching other household members and taking general learnings about energy around the home.

Diverse sign-up ≠ equal experiences

Diverse households had different experiences of the DFS. Analysis focused upon several different characteristics that typically impact a household's ability to take advantage of flexibility markets. Among these groups, it was found that households with health conditions and financial stress were less able to participate in and benefit from the DFS. Smaller and larger households also experienced distinct challenges in participating. This evidence suggests that, although a variety of groups were able to participate in the DFS, it should not be assumed that benefits were equally distributed. Going forward, it cannot be assumed that high levels of participation will lead to higher volumes of flexibility.

Overall sentiment positive

In spite of challenges experienced by specific groups, quantitative evidence from survey respondents suggest overall sentiment about the DFS was positive. 62% of respondents were satisfied with their experience and 83% would participate again.

Enthusiasm for more flexibility participation

Reflecting the quantitative results about overall positive sentiment about the DFS, a notable trend in qualitative results was a desire for more participation in demand shifting opportunities. Respondents generally gave suggestions to help improve the quantity and quality of their participation in DFS, rather than to curtail its impact on their lives. Some respondents also expressed an interest in other smart products or services to aid their participation in DFS or bring year-round benefits. These findings suggest there is a public acceptance

for the concept of demand shifting, albeit achieved in a more refined way. Other flexibility services may be more appropriate, for example households requesting for longer notice periods or events at different times may find a static time of use tariff more suitable. Households who can significantly increase their demand in the IDA window could be better suited to a turn up a service.

The fairness of the incentive questioned

Increased rewards were the most common suggestion for improving the DFS in future. Key reasons given for wanting more next time were: perceived imbalance between effort and reward, struggles for low users to earn rewards, and fairness in relation to energy company profits and 'wasteful' energy users. These reasons all point to a need to discuss the fairness of the incentive mechanism and the distributional impacts of reducing system costs by domestic demand shifting.

Communication is key

Information was a common theme amongst suggestions for improving the DFS next time: respondents wanted more advice for shifting usage, and more information about results and impact of their participation. More broadly, other findings suggests that some tailored communication for specific diverse households may help to improve outcomes. For example, evidence from households with health conditions suggest that they could benefit from some safety information around not turning off essential heating, lighting or medical equipment, or some best practice tips for using smart products like smart plugs to aid shifting with limited mobility.



Recommendations



Recommendations

Future iterations of DFS

Improve advice for households

In general, better advice is needed to help households consider what they can shift and the benefits they are likely to see. This evaluation has shown a number of uncertainties around the extent that households understand how to shift, including households opting in with little expectation of being able to shift or making large efforts to shift with little load available to them. Flexibility service providers should provide appropriate estimates of effort and reward at the point of recruiting households. The HOMEflex Code of Conduct outlines some considerations and recommendations for this.

Public statements on the levels of reward that can be achieved should be accompanied by clear examples of how. These statements need to include the assumptions made about routine electricity use, method for shifting and the number of events participated in.

The evaluation has shown that a broad range of households opted in, but experiences varied. It could help to provide some illustrative descriptions of how different households flex their demand and what types of benefits they receive. Some useful good practice examples have been generated through this evaluation that could be shared.

Communicate widely the purpose and outcomes of DFS

The evaluation has shown households are motivated by and interested in the system benefits they contribute to through their participation in DFS. Respondents requested more communications on the purpose and outcomes of DFS. This should help to build public understanding and acceptance of the DFS in particular and demand flexibility more generally. It will also contribute to the emerging social norms around what is the 'correct' response to calls for flexibility. Comments on the use of the IDA show that social norms are being created, and social media forums are providing detailed information on the 'best' way to respond which contain implicit value judgements. There is also a risk of unfairness if this information is not accessible for all DFS participants. There is a need for stakeholders to actively engage and provide reliable information for all households.

Create transparency on rewards and baseline methodology

Greater transparency about the rewards and the baseline methodology should be encouraged wherever possible. This will help customers compare offers of different providers and may help to allay some concerns raised around the fairness of rewards received.

Improve communications with participating households

Respondents requested more and varied communications from their providers, including text message notifications. In addition, the evaluation revealed that some households were uncertain if they had opted into the DFS or struggled to opt into events due to technical faults and notification issues. Future DFS iterations should prioritise improved communications and monitor the level of technical issues that affect participation in the scheme and in events.

Build in safety mechanisms to protect vulnerable households

A concerning finding of the evaluation is that vulnerable households may have been jeopardising their safety by coming off supply in order to earn rewards. The extent of this issue is not clear, but future iterations of DFS should protect against this. PSR flags could be used to provide tailored advice covering the loads that households should and should not switch off, the challenges households may face in shifting their demand and the benefits they are likely to achieve through participating.

Mandate a common evaluation

A common evaluation run across all DFS providers will increase understanding of household capacity to shift demand and build confidence in procuring flexibility from domestic customers.

95% of respondents wanted their evaluation data to be shared with their DFS provider, suggesting that they are happy for data to be shared. A common evaluation will support a much-needed evidence base to more effectively evaluate future DFS services.



Recommendations

Supporting longer term change

Lessons learnt through the DFS also apply to other flexibility services and these recommendations focus on how the DFS can contribute to longer term change in the energy system.

Diversify the type of flexibility services offered

The evaluation has shown there is interest in demand shifting. However household suggestions for events at different times or longer notification periods suggest that other types of flexibility services could be more appropriate than the critical peak rebate offered via the DFS. The interest in the DFS should be directed to other types of flexibility products and services when more appropriate and beneficial to households. Evidence from participants who targetted the IDA to maximise their rewards also suggests that there are some domestic users who are willing and able to increase their demand on request. This suggests there may be a market for future demand turn-up initiatives. Insights from the DFS could be used in designing a range of smart products and services that support wider access.

Build households' smart energy capabilities by matching them to suitable offers

The DFS evaluation data indicates that factors such as tenure, health conditions, financial well-being and meter type do affect household engagement with flexibility services. This indicates a need and opportunity for taking a smart energy capabilities-based approach that supports households signing up for offers that are suited to them. The benefits achieved through the DFS include a satisfaction at managing demand and contributing to the greater good, while the challenges include a frustration with having made efforts that are not rewarded.

There is evidence that some households have increased their understanding of energy use at home and have changed some habits. Participants have described the changes they will make to respond more effectively to future iterations of the DFS. However, the evaluation only provides a snapshot of attitudes at a particular point, more research is needed to track how sustained these changes are over time and whether capabilities can be developed through simply participating in a flexibility service.

Build industry and consumer confidence in domestic flexibility with a more open approach to data

Understanding which households participate and how they respond is needed to build confidence in domestic demand side response (DSR) and protect against any market-based exclusions. The evidence base created through the DFS should help to build industry confidence in procuring flexibility from domestic customers.

The DFS evaluation will result in a dataset of the survey results of the 18,530 households who opted to make their anonymised results available for future research. This data includes socio-economic variables, household characteristics and attitudes, as well as experiences of demand shifting. This dataset can be used by stakeholders to, for example, understand the socio-technical potential for domestic DSR and improve representation of household demand flexibility in modelling energy system change. The expectation is a subset of this dataset will include household smart meter data from some of the 8,722 households who were interested in this option.

Importantly, the high number of households opting in demonstrates consumer interest in their data being used by industry. Social research carried out for the HOMEflex code of conduct also found that consumers expect energy suppliers and third-party aggregators to use their data to improve their outcomes¹. While the Public Interest Advisory Group on smart meter energy data recently reported their recommendations that “de-personalised smart meter data should be treated as system data for the purpose of the Data Best Practice Guidance and application of the “presumed open” principle”². A more open approach to data could improve confidence from both consumers and industry.

Widen public debate about flexibility and fair ways to achieve it

The DFS has raised awareness about demand shifting but has also prompted questions about the fairness of rewarding those with high consumption or encouraging participation from those with low consumption. This indicates an opportunity for stakeholders to support wider debate about why flexibility is required for the low carbon transition and to improve energy security. This debate should include an open discussion long-term reliability of using gamification to encourage shifting as well as the fairness of using incentives instead of penalties to manage peak load.

¹HOMEflex Qualitative Research Report, 2023 available at CSE.org.uk

²PIAG Follow-up Project – Final Report, February 2023, available at sustainabilityfirst.org.uk





Continuing the conversation

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<https://www.nationalgrideso.com/industry-information/balancing-services/demand-flexibility-service-dfs>

