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CATAPULT
Energy Systems

Public awareness and appeal of Smart Local Energy Systems

Portfolio report on smart local energy systems funded by the Prospering from the Energy Revolution programme

February 2023

Contents

Executive summary

This is one of three reports by ESC evaluating 13 smart local energy system (SLES) projects funded by Innovate UK's Prospering from the Energy Revolution (PfER) challenge. This report presents the findings on the user acceptance of SLES based upon two nationally representative surveys and a review of PfER projects' user engagement and experience. The other ESC reports are:

• Bills and Carbon Impact of SLES[1]
• Why SLES?[2]

The nationally representative surveys were conducted in January 2021 (n=3,019) and October 2022 (n=3,009) and explored public awareness and attitudes towards SLES. The appeal of a genericised SLES proposition and five specific service propositions were assessed: generating power, using power, home heating, transport services and charging services. The PfER demonstrator projects were evaluated based on set user experience metrics, with most delivering a good service across the board and some even achieving best-in-class service.

1 https://es.catapult.org.uk/report/bills-and-carbon-impact-of-smart-local-energy-systems
2 https://es.catapult.org.uk/report/why-smart-local-energy-systems

The key points and associated recommendations are:

1. The majority of the public believe that the UK is becoming too dependent on energy from other countries (74%) and is not investing fast enough in alternative energy sources (70%), both significantly increasing from the previous survey (54% and 56% respectively).

→ The public wants to see more action from the government on supporting greener, as well as more secure and affordable energy supplies. Supporting SLES could be a good opportunity, with most respondents believing that SLES could help to reduce their community's reliance on national energy networks.

2. Trust in many organisations and institutions has deteriorated significantly. For example, energy suppliers are now distrusted to provide impartial information by 38% of the public, representing a 20% increase from the previous survey.

→ The energy sector needs to focus on rebuilding trust to unlock energy innovation in future, as trust in the energy supplier continues to be linked to SLES appeal.

3. Knowledge of SLES has fallen from 19% to 3%, with few believing that there is much local or national activity to promote SLES. This is possibly due to news coverage about energy predominantly focusing on rising costs rather than designs of future systems, making it difficult for SLES to move to the forefront of people's minds.

→ Focus on proposing solutions for the immediate worries of households to attract public attention and garner local support for further SLES development.

4. Appeal in the general idea of SLES increased from 50% to 53%. More than half (53%) would get involved in a SLES within five years if it were on offer, but some felt it was too soon to get involved and preferred to see it working first.

→ Important to widely publicise trials and their outcomes both nationally and locally in lay language. There is an opportunity to hold events where previous participants describe the user experience to build trust.

5. Awareness and appeal in PfER project areas is greater than in the rest of the UK.

→ The PfER projects' active engagement and interaction with communities seemingly bolstered awareness and appeal levels. Trials appear to be good ambassadors for SLES and should be supported.

6. SLES propositions that featured power-related services were the most appealing, while transport-specific services were the least popular.

→ SLES trials should take note of what service offers are particularly resonating with the public to encourage uptake.

7. SLES benefits that particularly resonated with the public were providing low carbon decentralised energy and ensuring that the local community benefits, for instance through local job creation.

→ Align SLES messaging with the key benefits that are resonating with the public, emphasising the impact that SLES will have on consumers' bills as well as on their local community.

8. Delays in fixing issues for consumers or not resolving them completely can affect the overall satisfaction with SLES projects.

→ SLES projects should have a plan in place detailing how they will resolve problems as quickly and satisfactorily as possible to ensure their consumers remain satisfied.

Introduction

This report sets out the findings of Energy Systems Catapult's (ESC) assessment of user acceptance of SLES across the portfolio of PfER projects.

What defines a SLES?

A SLES describes an innovative way of delivering energy to system participants in a particular geographical area. They can be **smart by design**, using data to inform locally beneficial configurations of assets and networks to accelerate the Net Zero transition, or **smart by operation**, using automated asset operation and potentially automated trading of energy.

SLES are **local**, defined by a geographical boundary, potentially a local authority or even smaller area. This can provide better outcomes for the community in that area and can provide constructive alignment with local Net Zero plans, i.e. local area energy plans (LAEPs). SLES operate as a **system**; by operating local assets as a system with a more granular approach, there is potential for a more efficient energy system. SLES can take a **multi-vector**[3] **approach**, optimising the whole system locally. **Local users** form a crucial part of considering the system as a whole and can be better integrated at design stage using a SLES approach in contrast to national approaches.

What is ERIS Energy Outcomes Evaluation?
The PfER programme is supporting the development of SLES projects with the ESC's Energy Revolution Integration Service (ERIS), bringing learnings from across the programme together to provide recommendations for what is needed to accelerate the development of more local energy systems. ERIS has evaluated the energy outcomes of each project across the PfER programme.
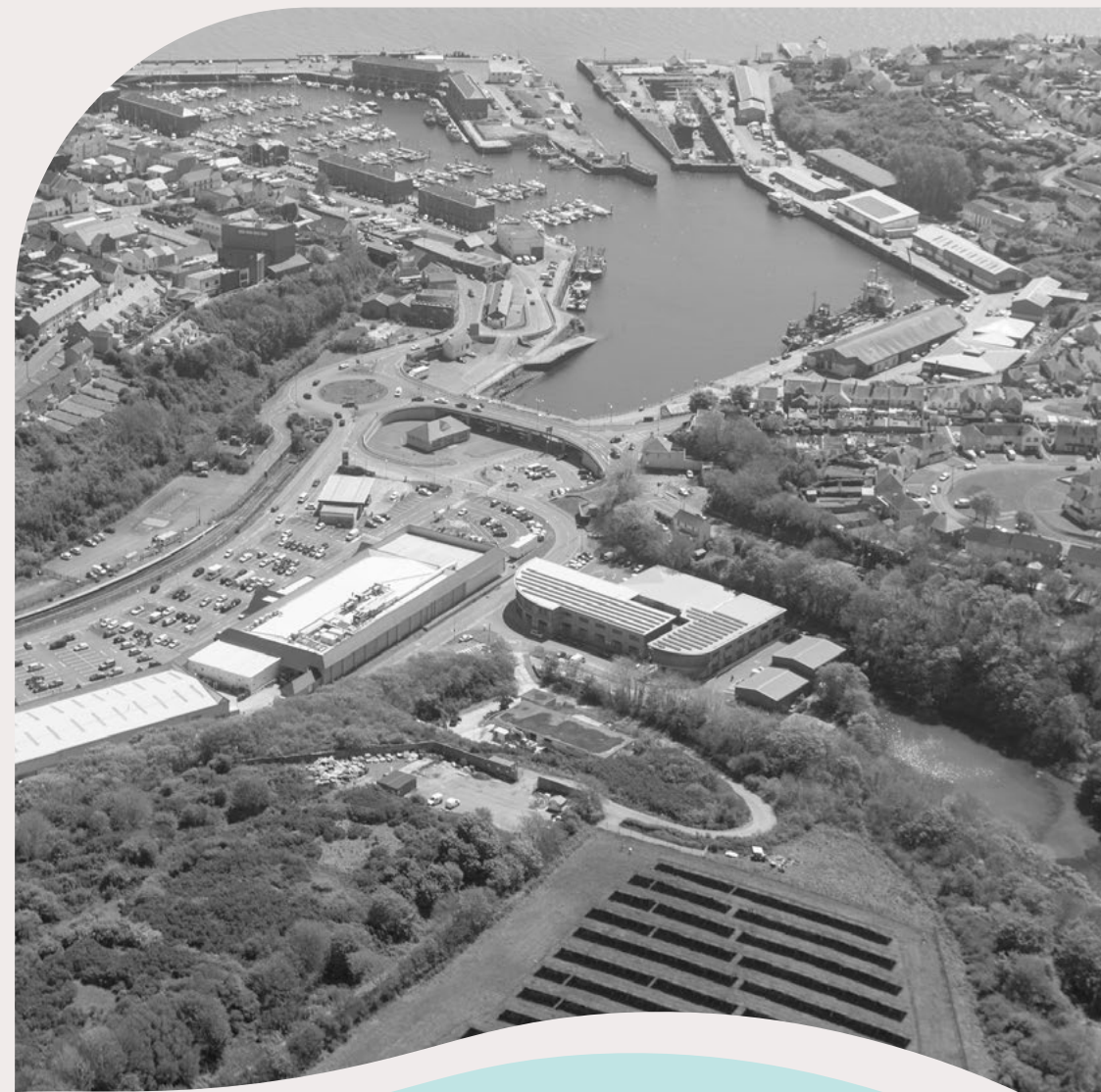

3   Multi-vector here means different carriers of energy to consumers (for example electricity from the grid, gas, hydrogen, heat network, electricity from private wire). A particular use (for example heating) might be supplied by any of these, singly or in combination.

PFER projects and evaluation criteria

Energy Outcomes Evaluation was conducted for 10 detailed design and three demonstrator projects funded by PfER challenge fund (Table 1)[5]

Table 1 PfER project list

Project type	Project name (acronym)
Detailed Design	• Girona **(Girona)** • Greater Manchester Local Energy Market (**GMLEM**) • Green Smart Community Integrated Energy Systems **(GreenSCIES)** • Liverpool Multi-vector Energy Exchange **(LEX)** • Milford Haven: Energy Kingdom **(MHEK)** • Peterborough Integrated Renewables Infrastructure **(PIRI)** • Rewire North West **(Rewire)** • Spearheading a Revolution in Energy Market Design **(REMeDY)** • West Midlands Regional Energy System Operator **(RESO)** • Zero Carbon Rugeley **(ZCR)**
Demonstrator	• Energy Superhub Oxford **(ESO)** • Local Energy Oxfordshire **(LEO)** • Responsive Flexibility Orkney **(ReFLEX)**

4 UKRI, Smart Local Energy Systems: The Energy Revolution Takes Shape (UKRI, January 2022), p. 32 <https://www.ukri.org/wp-content/uploads/2022/01/UKRI-250122-SmartLocalEnergySystemsEnergyRevolutionTakesShape.pdf>.

Each of the projects was assessed across a common set of evaluation criteria, agreed with UKRI (Table 2).

The scope of the detailed design projects was to produce a design with evidence to show that it could deliver the PfER objectives, whereas the demonstrator projects' scope was to realise a SLES. Despite these scope differences, energy outcomes were evaluated using a common method for all projects.

Table 2 Evaluation criteria

#	Evaluation Criteria
1	The impact of SLES designs on participants' bills due to number of units purchased or the cost per unit of energy
2	The impact of SLES designs on participants' bills as a result of network usage costs on a bill (forward and recovery)
3	The impact of SLES designs on greenhouse gas emissions
4	The participant acceptance of the SLES designs
5	The investability of the SLES designs
6	The scalability of the SLES designs
7	The replicability of the SLES designs
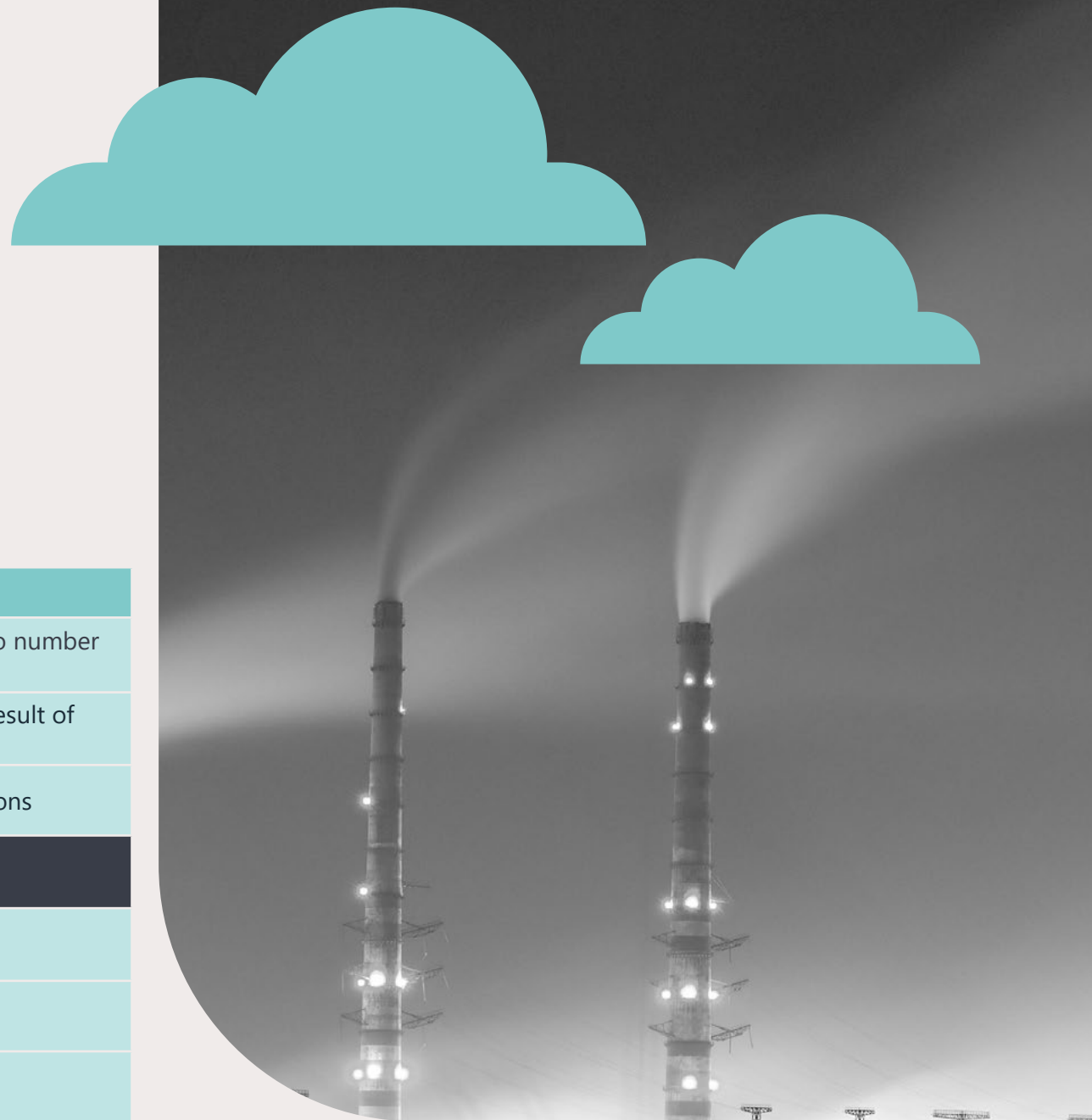
Methodology

Two nationally representative user acceptance surveys were conducted to explore public awareness and attitudes towards SLES in January 2021 (Wave 1, n= 3,019) and in October 2022 (Wave 2, n=3,009). The public's interactions with the energy system, their views on climate change and their trust in organisations were investigated. Respondents were then introduced to a generalised SLES concept as well as five genericised service propositions:

• Using power
• Generating power
• Home heating
• Transport services
• Charging services

The concept and propositions were based on the landscape of common SLES features within the PfER programme. Each was assessed for appeal, uniqueness, relevance, believability and likelihood to adopt. There is a specific focus on whether these results differed between respondents residing in PfER project areas, listed in Table 3, (Wave 1: n=439; Wave 2: n=473) or in the rest of the UK (Wave 1: n=2,654; Wave 2: n=2,577). The aim was to understand whether residents in PfER project areas held different views on SLES, considering they are more likely to have encountered SLES information.

PfER project areas

Oxfordshire, Orkney Islands, Causeway Coast and Glens, Greater Manchester, Merseyside, Warrington, Coventry, Staffordshire, Essex, Peterborough, Islington, Pembrokeshire.

Throughout the report, several survey results are referred to; unless otherwise stated, these are Wave 2 results of the nationally representative sample. The results are reported as being significant if they are statistically significant at a 95% confidence level. Many questions had a five-point scale, for instance asking to what extent they agreed or disagreed with different statements. They could choose one of the following options:

• Strongly agree
• Somewhat agree
• Neither agree nor disagree
• Somewhat disagree
• Strongly disagree

Often, findings are grouped when presented. Both 'somewhat agree' and 'strongly agree' are grouped and referred to as 'T2B' (top two boxes); 'somewhat disagree' and 'strongly disagree' are grouped and referred to as 'B2B' (bottom two boxes).

Shift in energy context and reduced trust

The energy context has changed drastically between the two waves of this research. Wholesale gas prices have significantly increased, which has led to 31 energy companies ceasing to trade and soaring energy costs for households,[5] leading to an estimated 6.7 million households in fuel poverty in April 2022, representing an increase of more than 50% in just six months.[6] This resulted in the UK government stepping in to cover a portion of households' bills in the winter of 2022/23 through the Energy Bills Support Scheme. Inflation has also soared in the UK, hitting a record high of 11.1% in October 2022, which further increased the cost of living.[7]

This shift in context is apparent between the two waves of the survey: 80% of respondents now think energy prices will rise steeply in the future, representing a statistically significant rise from Wave 1 (see Figure 1). There were also statistically significant increases in the proportion of respondents who believe that the UK is becoming too dependent on energy from other countries and is not investing fast enough in alternative energy sources, which are seen by respondents as avenues to reduce prices in future. The majority of respondents (82%) feel that the government and authorities have a responsibility to tackle climate change. In combination, a picture is painted of households' desire to see more action from the government, supporting greener as well as more secure and affordable energy supplies.
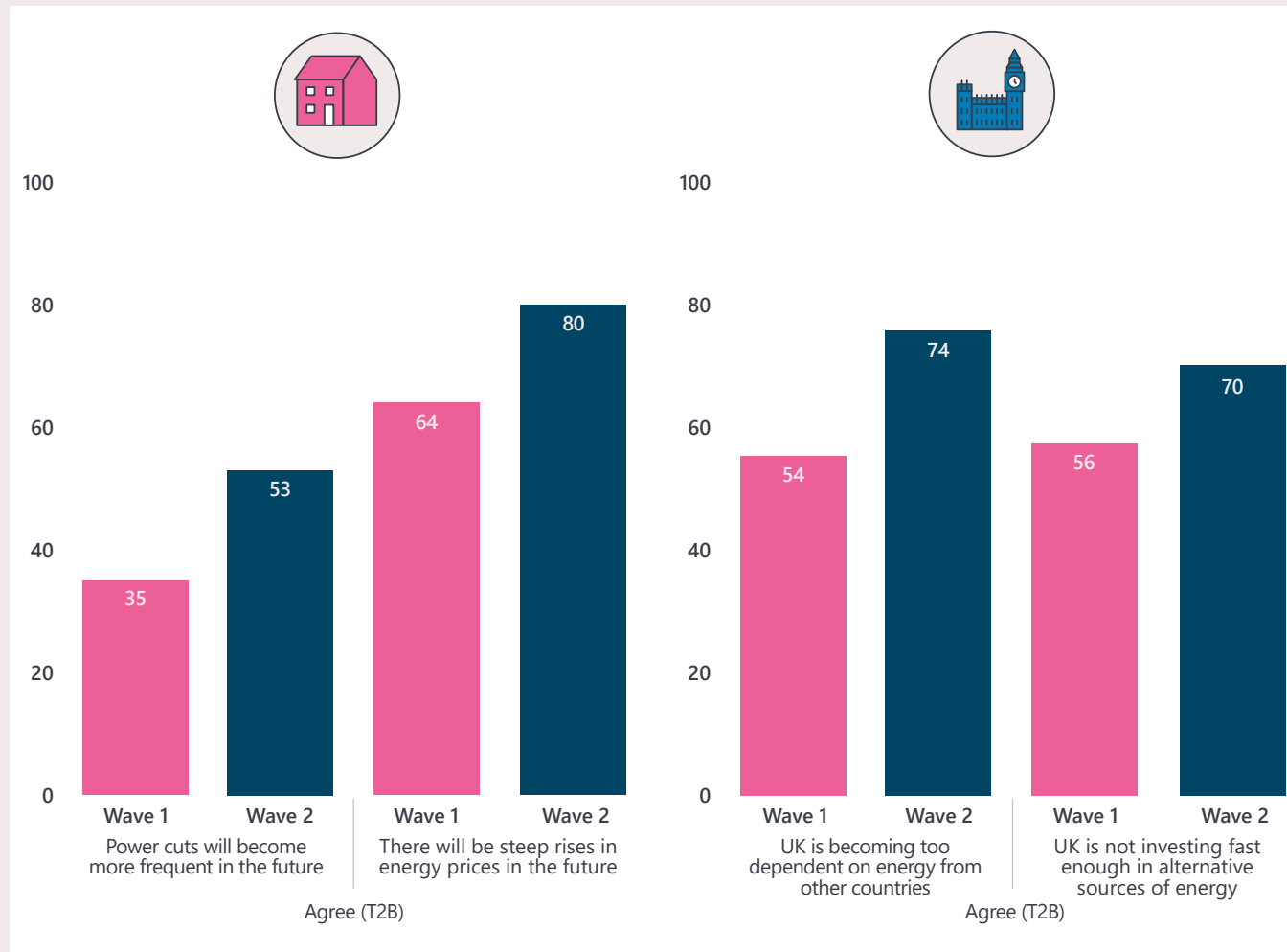

Figure 1 Views on energy sector. T2B = 'Tend to agree' and 'Strongly agree'.

5 Candiece Cyrus. 2022. 'Failed UK Energy Suppliers Update'. Forbes. 18 February. https://www.forbes.com/uk/advisor/energy/failed-uk-energy-suppliers-update/
6 National Energy Action. 2022. Fuel Poverty Statistics Explainer. https://www.nea.org.uk/energy-crisis/fuel-poverty-statistics-explainer/
7 Office for National Statistics (ONS). 2022. 'Consumer price inflation, UK: November 2022'. ONS Statistical bulletin. 14 December. https://www.ons.gov.uk/economy/inflationandpriceindices/bulletins/consumerpriceinflation/november2022

Trust in many energy information sources to provide impartial information has decreased in the second survey (see Figure 2). Only two organisations/ categories of organisation – price comparison websites and Citizens Advice – have increased or retained high trust levels, whereas trust in the following organisations/categories of organisation has reduced: Ofgem, landlords of private residential properties and trading standards, local authorities/ government/councils, politicians and ministers and government websites.

Only 34% trust energy suppliers to be fair in the way they deal with customers and citizens, a statistically significant drop from 50% in Wave 1.

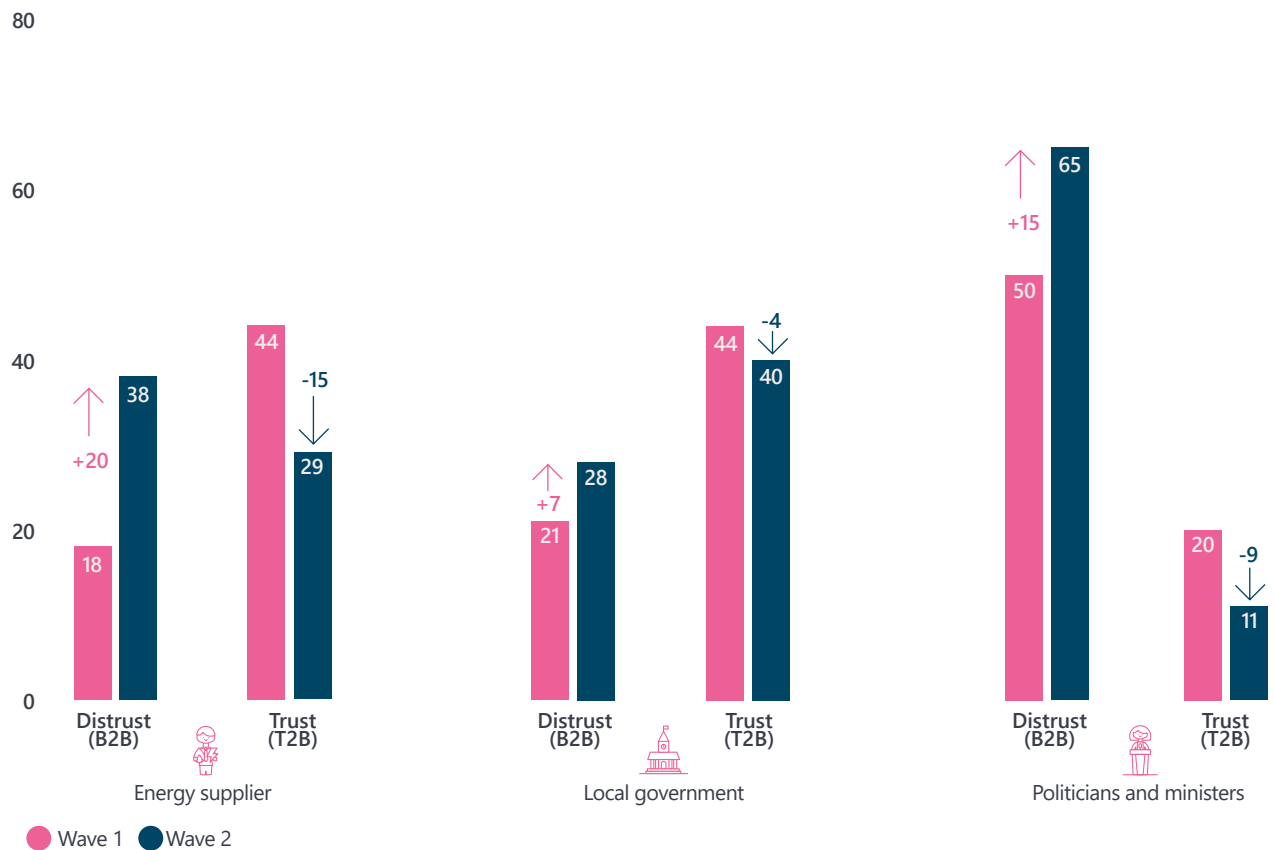**How much, if at all, do you trust the following to give you impartial information?**

Figure 2 Trust in organisations to give you impartial information. B2B = 'Strongly distrust' and 'Tend to distrust'. T2B = 'Strongly trust' and 'Tend to trust'.

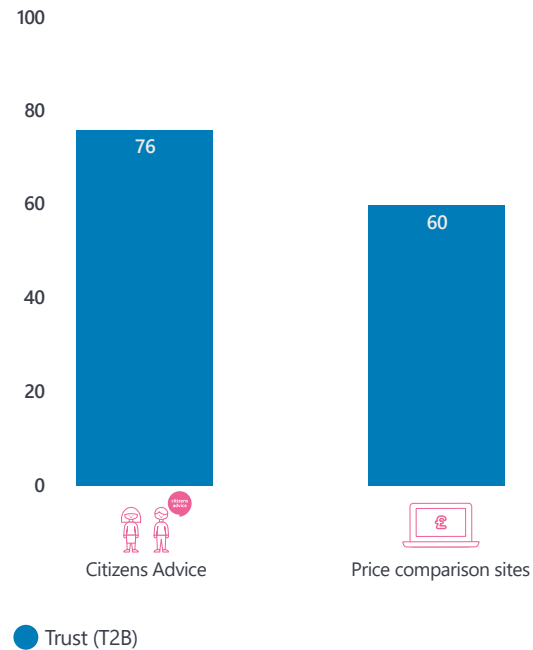**Trusted organisations to provide impartial information**

Figure 3 Two most trusted organisations to provide impartial information. Wave 2 results. T2B = 'Strongly trust' and 'Tend to trust'.

Lack of trust seems to have filtered down to the individual level. Significantly more people agree with the statement "Green products are just a way for the businesses to make more money" (46%) and fewer people (36%) are willing to pay more for products that are good for the environment now compared to the first survey (41%, 42% respectively). This could be due to the aforementioned distrust in organisations selling 'green products' or because people have less disposable income amid rising inflation. However, the younger demographic (18–34) was significantly more likely to not mind paying more (44%) compared to those aged 55+ (31%).

The shift in views on the energy market and the growing distrust in organisation and institutions have likely influenced consumer responses to the SLES concept and propositions evaluated in Wave 2 of the survey and are therefore important to consider when reading the remainder of this report.

Awareness of SLES has decreased and information is not filtering through

Awareness and knowledge of SLES significantly fell between the two waves of research (Figure 3). Awareness refers to anyone who has heard about SLES even if they know almost nothing about it, which reduced from 64% to 40%; respondents with at least a fair amount of awareness and knowledge about SLES has also fallen from 19% to 3%.

Residents in PfER project areas were more likely to have heard about SLES to some degree than those in non-project areas, although this was not statistically significant. Only 58% of respondents in PfER project areas had never heard of SLES, compared to 60% in non-project areas. Those aged 18–34 were also significantly more likely (6%) to know at least a fair amount about SLES than those aged 35–54 (3%).

Awareness of SLES might be low, as relevant information is not filtering through. Only 28% of respondents in PfER project areas agreed that there is relevant and useful information available on SLES. Moreover, many PfER project area residents did not think there is sufficient local (41%) or national (42%) government activity promoting SLES. There was no significant difference observed on this metric between PfER project areas and the rest of the UK, despite SLES becoming more prevalent in this period and the PfER demonstrators ramping up their activities.

The fall in SLES awareness and knowledge should be viewed in the wider energy context. Energy has more frequently featured in the news, but the debate has centred on rising costs and security of supply, rather than designs of future systems, making it difficult for SLES to cut through the noise. In contrast, technologies and projects that boast immediate impacts are more attention grabbing. This might explain the significant rise in the number of people becoming fully aware of smart meters (64%) and possessing one (48%), more than twice as many as in Wave 1. Households were also significantly more likely to be fully aware of ground-source and air-source heat pumps in the second survey (14% and 15% respectively), with demand for these soaring by 312% between 2020 and 2021 according to research by Rated People.[8] To help raise awareness of SLES, it might therefore be useful to focus on the more immediate impacts that SLES could have on households, such as helping them to feel in control of their energy usage.

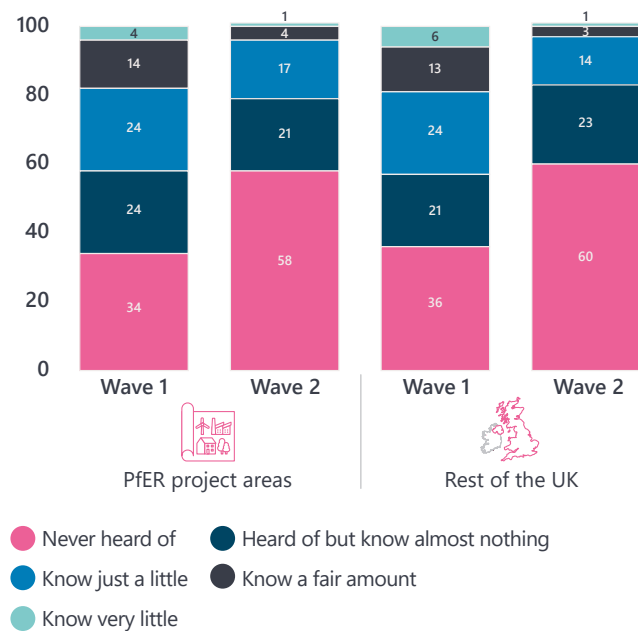**Before today, how well do you feel you know about smart local energy systems?**

Figure 4 Awareness and knowledge of smart local energy systems for both waves in PfER project areas and the rest of the UK.

General SLES appeal and likelihood to get involved in SLES has increased

A generalised description of a SLES was presented to respondents (p.37). Support for changing from a large-scale and distant energy system to a SLES significantly increased between surveys from 50% to 53%. Support was higher among PfER project area residents, although not significantly (Figure 5).

- Middle-class respondents (ABC1) (56%) and those aged 18–34 (58%) were significantly more likely to support a shift towards SLES than working-class respondents (C2DE) (49%) and those aged 55 or older (49%).

Respondents reporting to know at least a fair amount about SLES before the survey were significantly more likely to support a change to SLES (76%) compared to those who knew nothing/almost nothing about it (50%). It is thus important to further increase awareness levels of SLES among the public.

To what extent would you support or oppose, a change from a large-scale and distant energy system to a smart local energy system?

PfER project areas | Rest of the UK

Wave 1: Oppose (B2B) 7, Support (T2B) 54
Wave 2: Oppose (B2B) 8, Support (T2B) 58
Wave 1: Oppose (B2B) 8, Support (T2B) 50
Wave 2: Oppose (B2B) 8, Support (T2B) 52
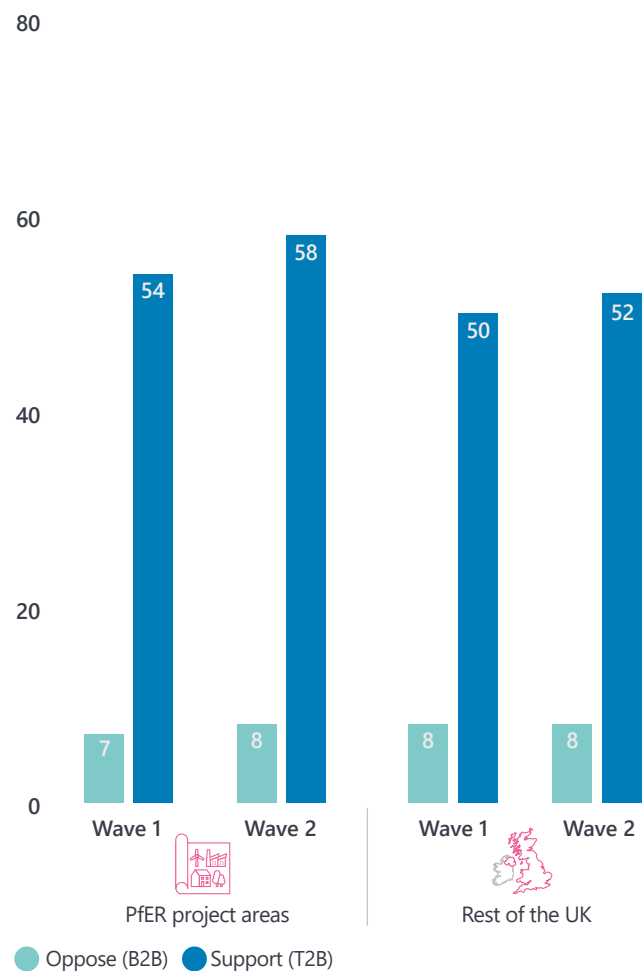
● Oppose (B2B)   ● Support (T2B)

Figure 5 Respondents' support to changing from a large-scale and distant energy system to a SLES in both PfER project areas and the rest of the UK for both surveys. B2B: 'Strongly Oppose', 'Tend to oppose'; T2B: 'Strongly Support, 'Tend to support'.

More than half of respondents (53%) reported wanting to get involved in a SLES within the next five years if one was on offer in their local area, representing a 5% increase from the first survey. Residents of PfER project areas were significantly more likely to report that they would get involved compared to those living in the rest of the UK (Figure 6).

53% found SLES an easy idea to understand. Those who found SLES easy to understand were significantly more likely to also support a shift towards SLES, compared to those who did not find SLES easy to understand, out of which only 26% supported this shift.

Therefore, it is important for SLES to be communicated in lay terms and it might be advisable to test promotional materials with select members of the public first to ensure they understand them before rolling these out more widely.

If a smart local energy system was on offer in your local area, how likely or unlikely are you to be involved (in any way) within the next 5 years?
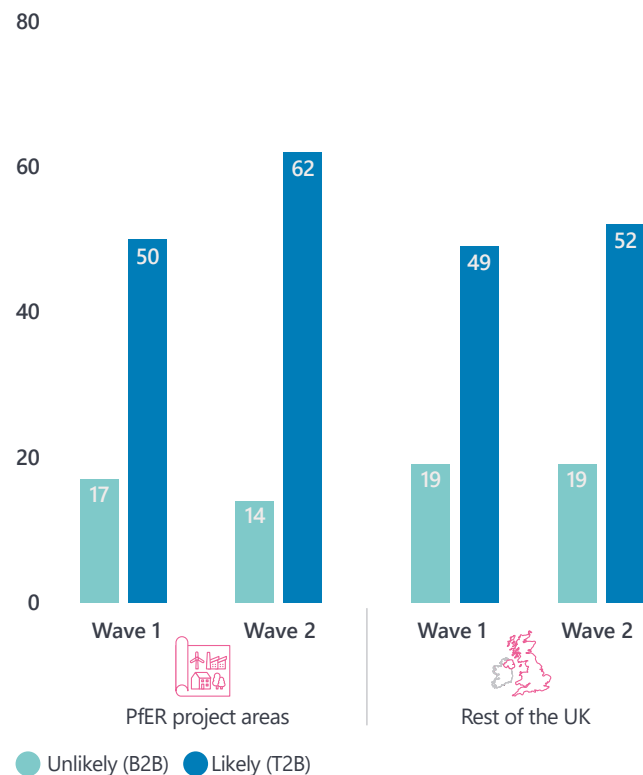

- Unlikely (B2B)
- Likely (T2B)

Figure 6 Respondents' likelihood of getting involved in a SLES within the next 5 years in both PfER project areas and the rest of the UK for both surveys. B2B: 'Very unlikely', 'Fairly unlikely; T2B: 'Fairly likely', 'Very likely'.

The development of positive attitudes towards SLES is an important component of driving overall acceptance; Table 4 highlights the 10 benefits that resonated the most for respondents. SLES projects could pivot towards addressing these benefits and advertising it to the community to garner support.

Residents in PfER project areas that specifically provided consumers with services, Local Energy Oxfordshire (LEO), Energy Superhub Oxford (ESO), ReFLEX and Project Girona, had higher user acceptance (63%) compared to areas without active demonstrators (53%). This may be due to the project's community engagement in these areas, which highlighted the key benefits of SLES.

Table 4 Top 10 SLES benefits Wave 2 respondents agree with and their net change from Wave 1. NB. Bold numbers highlight a 95% statistically significant change between the two surveys.

Key SLES benefits	Agreement (Wave 2)	Net change from Wave 1
Maximise the use of local renewable energy generation in my community	**70%**	+4%
Reduce my community's reliance on national energy networks	**67%**	+3%
Enable me to have more control of my energy bills	**66%**	+8%
Making heat more affordable for vulnerable customers	**66%**	+7%
Create opportunities for people in my community to participate in the energy system	**66%**	+4%
Create a healthy environment to live in for me and my family	**66%**	+4%
Reduce my energy bills	**65%**	+5%
Reduce my carbon emissions to help my local area meet climate targets	65%	+2%
Share the benefits with my local community	**64%**	+5%
Create local jobs within my community	**63%**	+4%

The key benefits emphasise the value placed on a low carbon decentralised energy system and on ensuring that the local community benefits through opportunities to participate or the creation of jobs. In the most recent survey, people's desire to have more control of their energy and heating bills, and to ensure these are affordable, has become more pertinent. This is reflective of the wider energy context, in which energy prices have soared.

The barriers for getting involved in a SLES were gathered by respondents in an open-text format and are listed in order of frequency in Table 5. The reasons for not wanting to take part are reflective of the current energy context, which is rife with uncertainty and growing distrust.

These findings are in line with the barriers highlighted by Project REMeDY and ZCR in their surveys and community interaction. REMeDY's findings from research with landlords and tenants showed that both worry about it being too soon to be involved and not wanting to take a perceived risk. ZCR engagement also identified lack of trust as a barrier to SLES support.

Table 5 Barriers to getting involved in a SLES in order of frequency gathered from open-text responses in Wave 2

Barriers to getting involved in a SLES
Need information/do not know enough about it/understand it
Could be expensive – set-up/installation/running costs/no savings
Too soon to be involved – would want to see it working
Do not know what will happen (in future)/uncertain this will happen
Lack of trust – in system/ provider/could become monopoly

Appeal of SLES propositions

Five SLES propositions were presented to respondents: generating power, using power, home heating, transport services and charging services.

Overall, appeal for all propositions significantly fell between the two surveys but propositions that relate to 'generating power' and 'using power' were the most appealing, while transport-related propositions were least appealing (Figure 7). Those aged 18–34 find each of the propositions significantly more appealing than those aged over 55, with the largest divergence occurring for the 'home heating' proposition.

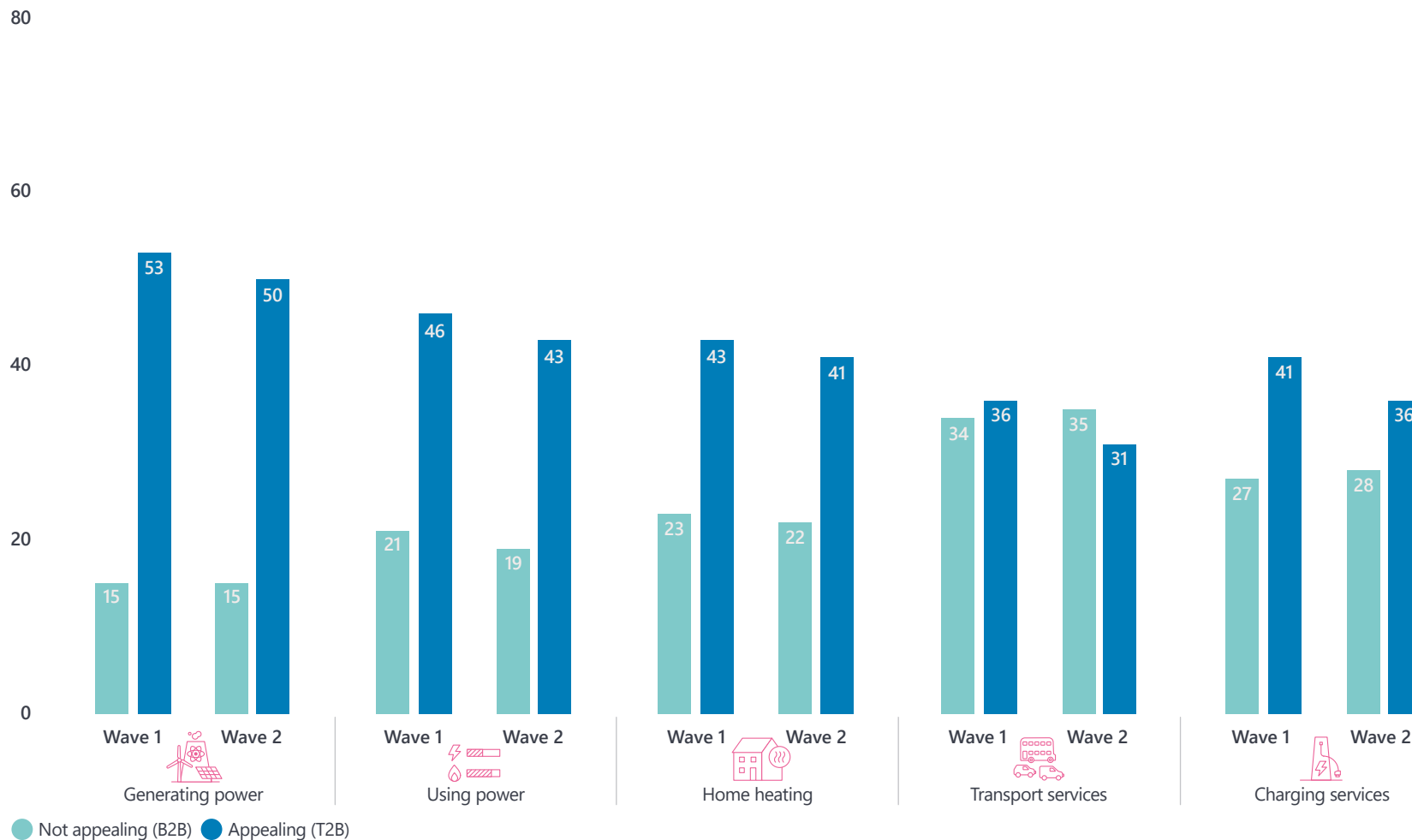**Personal appeal of SLES Propositions**

Figure 7 Personal appeal of SLES Propositions. B2B: 'Not at all appealing, 'Not very appealing'; T2B: 'Fairly appealing', 'Very appealing'.

Despite personal appeal in the propositions falling, more respondents would welcome the five propositions in their local area, although this was not signficant for the two transport propositions (Table 6). The public might be wary of being involved in a novel project themselves, potentially due to the uncertainty of the energy market and the growing distrust in organisations. However, respondents seemed keen to have their community trial it, which enables them to gather more information and feed back on these propositions.

For all five propositions, respondents in PfER project areas were more likely to find the range of services easy to understand and relevant, when compared to the rest of the UK.

Table 6 Agreement with SLES propositions in Wave 2. NB. Bold numbers highlight a 95% statistically significant change between the two surveys.

SLES propositions	This range of services is unique and different	This range of services is relevant to me	This range of services is easy to understand	The benefits described for this range of services are completely believable	I would welcome this in my local area
Generating power	60% (↑)	**58% (↑)**	**65% (↑)**	**56% (↑)**	**66% (↑)**
Using power	61% (↑)	**58% (↑)**	**63% (↑)**	**53% (↑)**	**59% (↑)**
Home heating	61% (↓)	**54% (↑)**	**56% (↑)**	**50% (↑)**	**57% (↑)**
Transport services	53% (↓)	38% (↑)	61% (↑)	48% (↓)	50% (↑)
Charging services	**53% (↓)**	36% (↓)	61% (↑)	52% (↑)	55% (↑)

Generating and using power

The 'generating power' proposition focuses on consumers generating their own energy from renewable sources, which could be sold and traded to others in their local areas (p.38). Out of the five propositions, 'generating power' enjoyed the highest personal appeal among respondents (Wave 2 – 50%). Moreover, two-thirds were happy to welcome a SLES that featured these services into their local area.

The 'using power' proposition gives consumers three options: to change when they use energy themselves, to let the system change it automatically or to store energy when it's widely available to reduce peaks in electricity demand (p.38). 'Using power' had the second highest appeal across all respondent groups interviewed. Both propositions were highly rated on all key measures, most of which saw significant increases from Wave 1. The public particularly found the range of services easier to understand and more relevant to them than most other propositions.

The most popular elements of the power-related propositions were being able to store energy when it is widely available and storing energy collected from renewables (Figure 8); 41% did not find it appealing to let the system change when you use energy automatically (e.g. having the supplier turn off your washing machine when it's best for the network).
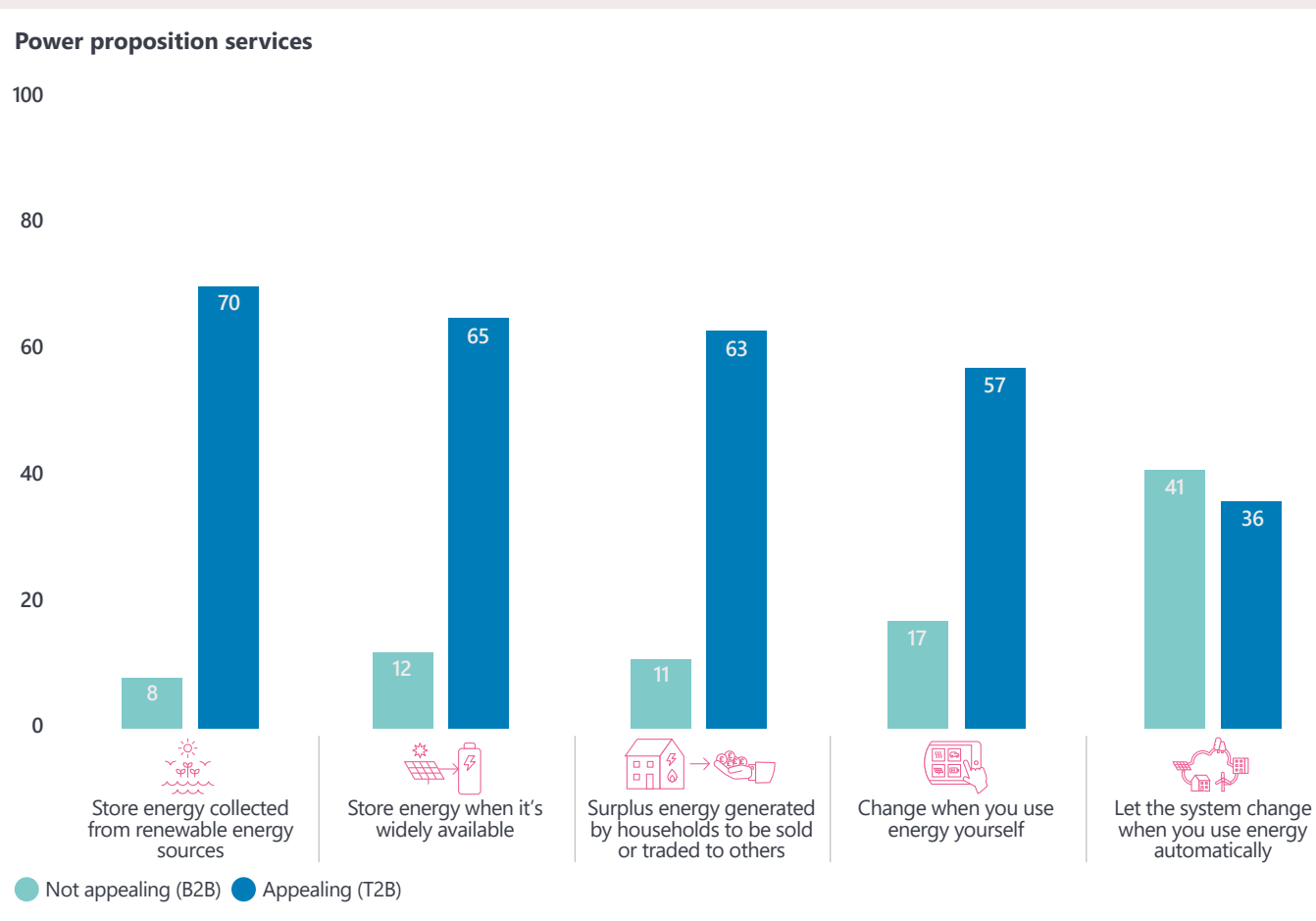
Power proposition services

	Not appealing (B2B)	Appealing (T2B)
Store energy collected from renewable energy sources	8	70
Store energy when it's widely available	12	65
Surplus energy generated by households to be sold or traded to others	11	63
Change when you use energy yourself	17	57
Let the system change when you use energy automatically	41	36

Figure 8 Views on specific power proposition services from Wave 2. B2B: 'Not at all appealing', 'Not very appealing'; T2B: 'Fairly appealing', 'Very appealing'.

Home heating

The 'home heating' proposition refers to novel low carbon technologies, including heat pumps, heat networks and hydrogen boilers, as well as innovative heating services such as agile tariffs, smart heating and heat services (p.39). This proposition was well received by respondents and perceived to offer unique benefits. Compared to the last wave, significantly more people now found it easy to understand. However, understanding remained lower than for other propositions: in Wave 2, 20% of those aged 55+ still struggled to understand it and only 31% of them found it appealing. This demonstrates the challenge for SLES of explaining novel technology and services to consumers so that they are understood and accepted.

The most appealing elements of the 'home heating' proposition were new technologies for heat and smart heating (Figure 9). However, heat services were not deemed particularly appealing, potentially as this idea can be difficult to understand.
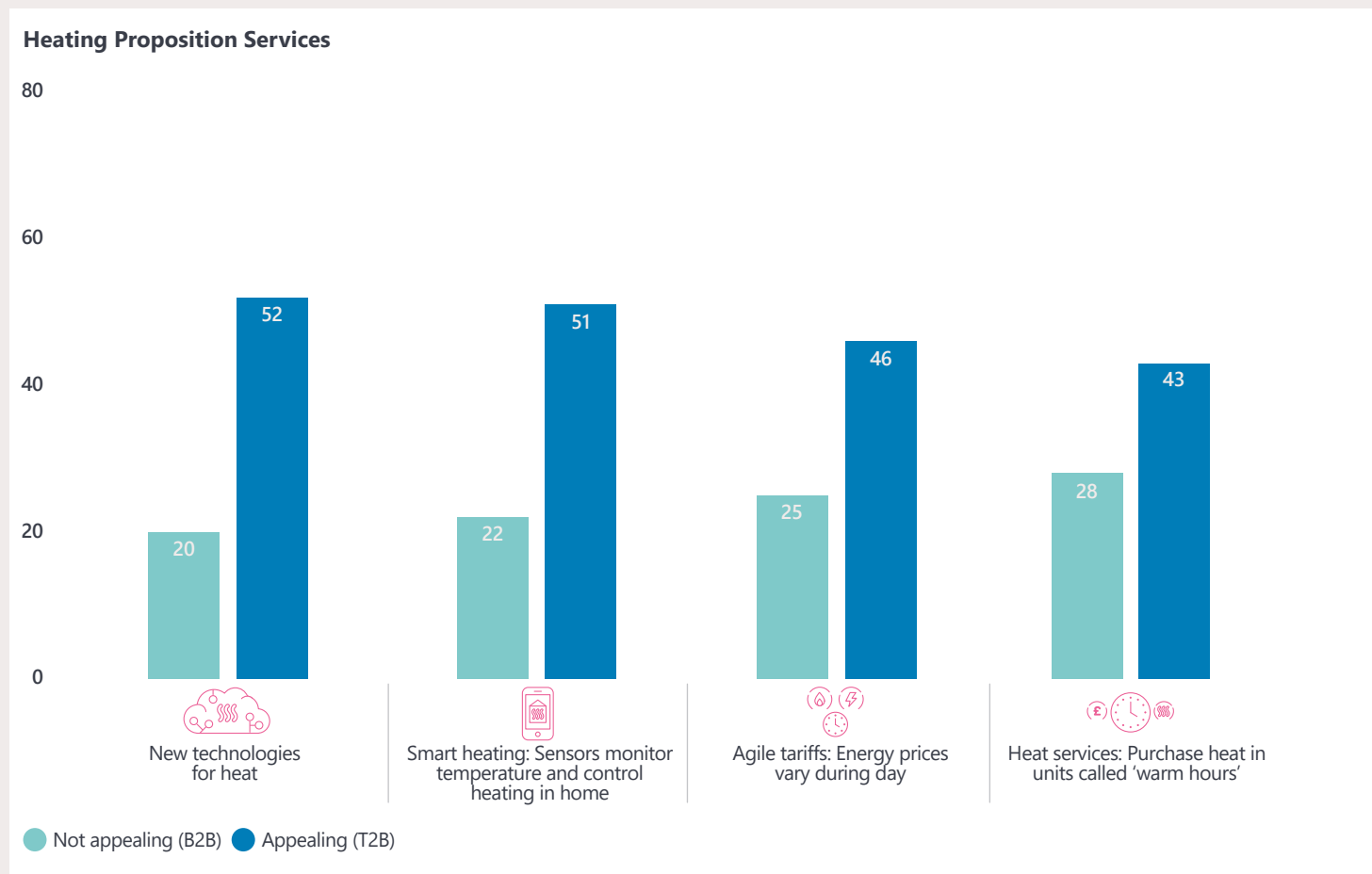
Heating Proposition Services

Legend: ● Not appealing (B2B)   ● Appealing (T2B)

Data:
- New technologies for heat: Not appealing 20, Appealing 52
- Smart heating: Sensors monitor temperature and control heating in home: Not appealing 22, Appealing 51
- Agile tariffs: Energy prices vary during day: Not appealing 25, Appealing 46
- Heat services: Purchase heat in units called 'warm hours': Not appealing 28, Appealing 43

Figure 9 Views on specific heating proposition services from Wave 2. B2B: 'Not at all appealing, 'Not very appealing'; T2B: 'Fairly appealing', 'Very appealing'.

Transport and charging services

The 'transport services' proposition referred to services that can make low carbon vehicles more accessible, such as vehicle leasing, full-service rental packages and car clubs (p.40). The 'charging services' proposition focused on increasing the number of charging stations for electric vehicles, as well as services for electric vehicle owners such as smart charging or vehicle to grid (V2G) (p.40). In both waves, 'transport services' and 'charging services' were the least appealing of the five SLES propositions assessed, with only 31% and 36% finding them appealing respectively.

For both, the services were only perceived as relevant to them by 36-38% of respondents (Table 6). This could be related to the small number of low carbon vehicles owned; respondents' perceived financial, practical and psychological barriers; or current high electricity prices. It may also be due to the life cycle of vehicles owned by respondents. Overall, car ownership also significantly reduced in this research, with 19% of respondents not owning a car in Wave 2 compared to 16% in Wave 1. The 'transport services' proposition also suffered from the greatest credibility issues compared to the other propositions, with only 48% of respondents agreeing that the benefits were believable. This corresponds to the finding that significantly more people think electric vehicles are not the future of the motor industry, increasing from 13% to 18% between waves. While both propositions were regarded as easy to understand, this did not counteract the effect of lower relevance on appeal.

The development of positive attitudes towards low carbon transport is thus an important component to influencing attitudes towards these propositions. The most appealing elements for the transport-related propositions were V2G and smart charging (Figure 10).

Nearly half of respondents did not find the idea of having charging stations for electric vehicles in their local area appealing. Most respondents who owned an electric vehicle did find the idea appealing (73%). However, support among non-electric vehicle owners (46%) and those without cars (36%) was much lower, probably as charging stations are less relevant for them. Low levels of support from the general public pose an issue for increasing electric vehicle ownership, as many households (particularly those without off-street parking) are unable to charge their cars at home and see the lack of charging stations as a barrier to adoption.
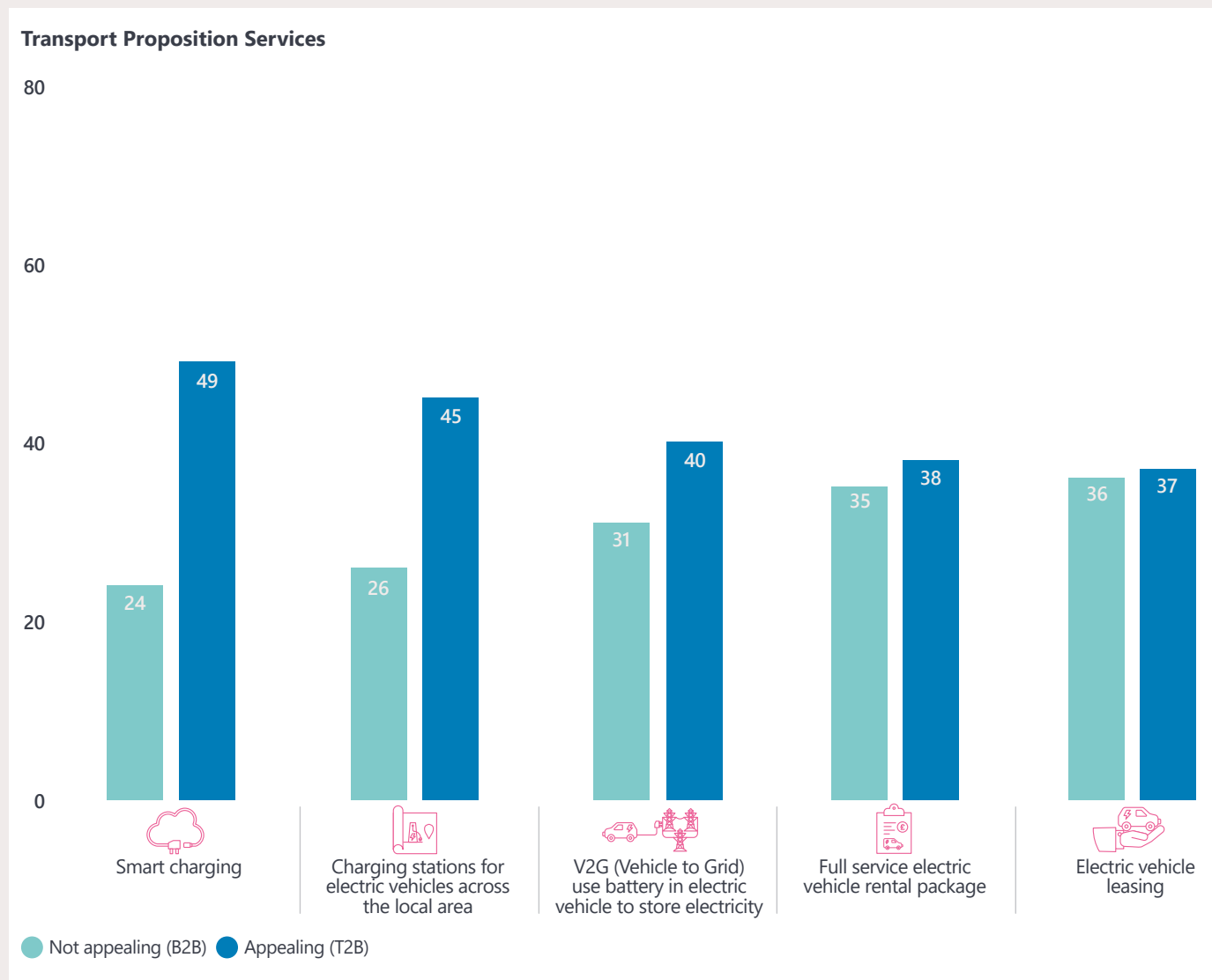
Transport Proposition Services

	Smart charging	Charging stations for electric vehicles across the local area	V2G (Vehicle to Grid) use battery in electric vehicle to store electricity	Full service electric vehicle rental package	Electric vehicle leasing
Not appealing (B2B)	24	26	31	35	36
Appealing (T2B)	49	45	40	38	37

● Not appealing (B2B)   ● Appealing (T2B)

Figure 10 Views on specific transport proposition services from Wave 2. B2B: 'Not at all appealing, 'Not very appealing'; T2B: 'Fairly appealing', 'Very appealing'.

Trust in SLES and current energy suppliers

SLES are compared to energy suppliers in this section, with the latter representing the traditional energy system in the eyes of the consumers.

The proportion of respondents satisfied with the service received from their energy supplier fell significantly from 75% to only 57% in Wave 2. This might be due to some (17%) finding it difficult to deal with their current energy supplier, representing an 11% increase from Wave 1. However, just over half of the public (52%) still believe that the energy supplier will treat them fairly in their dealings. Although 20% fewer respondents, compared to Wave 1, trust them to charge a fair price, despite suppliers not being fully in control of the prices set.

In comparison, despite the low levels of SLES knowledge, nearly half of respondents trusted SLES to treat them fairly in their dealings (49%) and to charge them a fair price for their energy (45%). Respondents in PfER project areas had an even more favourable view about SLES for both metrics (Figure 11). Significantly more respondents (53%) also trusted SLES to create local benefits for them and their community compared to the first survey (50%). This is despite the general trend towards lower trust in organisations and institutions among the public.

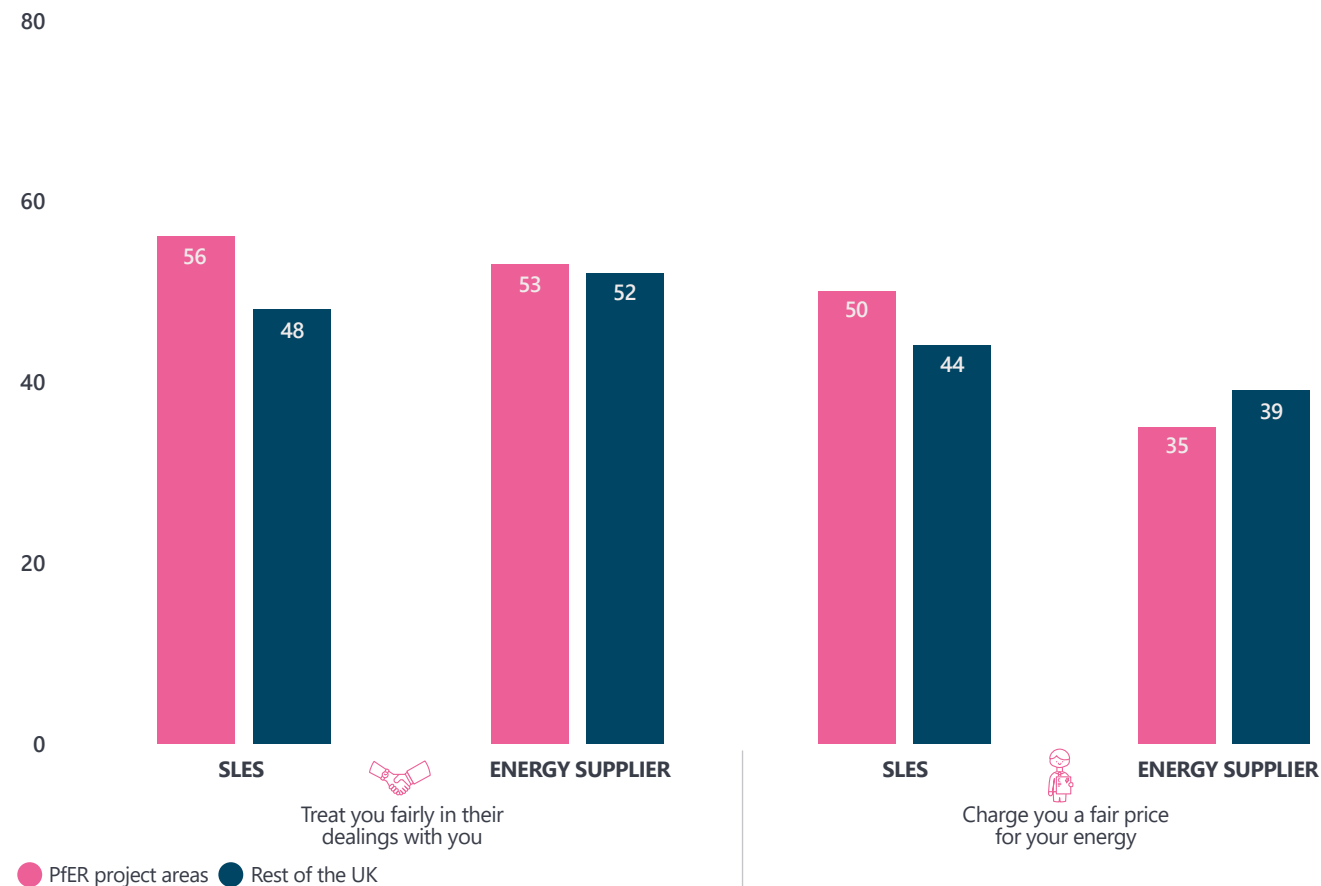**Trust in current energy supplier/ SLES to:**

Figure 11 Wave 2 results for those who either 'Tend to trust' or 'Strongly trust' their current energy supplier and SLES for both PfER project areas and the rest of the UK.

As households are becoming more discontented with the traditional energy system and their energy suppliers, SLES may have an opportunity to market themselves as an alternative, providing fairer prices and better service while benefiting the local community.

It was deemed important for a SLES to be managed by a local community group or their local authority to garner public support (Figure 12), despite respondents' growing distrust in local authorities to provide impartial information. They are seen as preferrable to private companies, particularly ones unfamiliar to them. However, private companies may be able to gain greater support by partnering with local community groups. PfER projects were made up of large coalitions that usually included local authorities, community groups and private companies. These findings mirror the results of **GMLEM's** citizens' jury, where participants highlighted a desire for local control and public ownership, as well as a lack of trust for commercial partners, particularly if they are not locally based.[9]
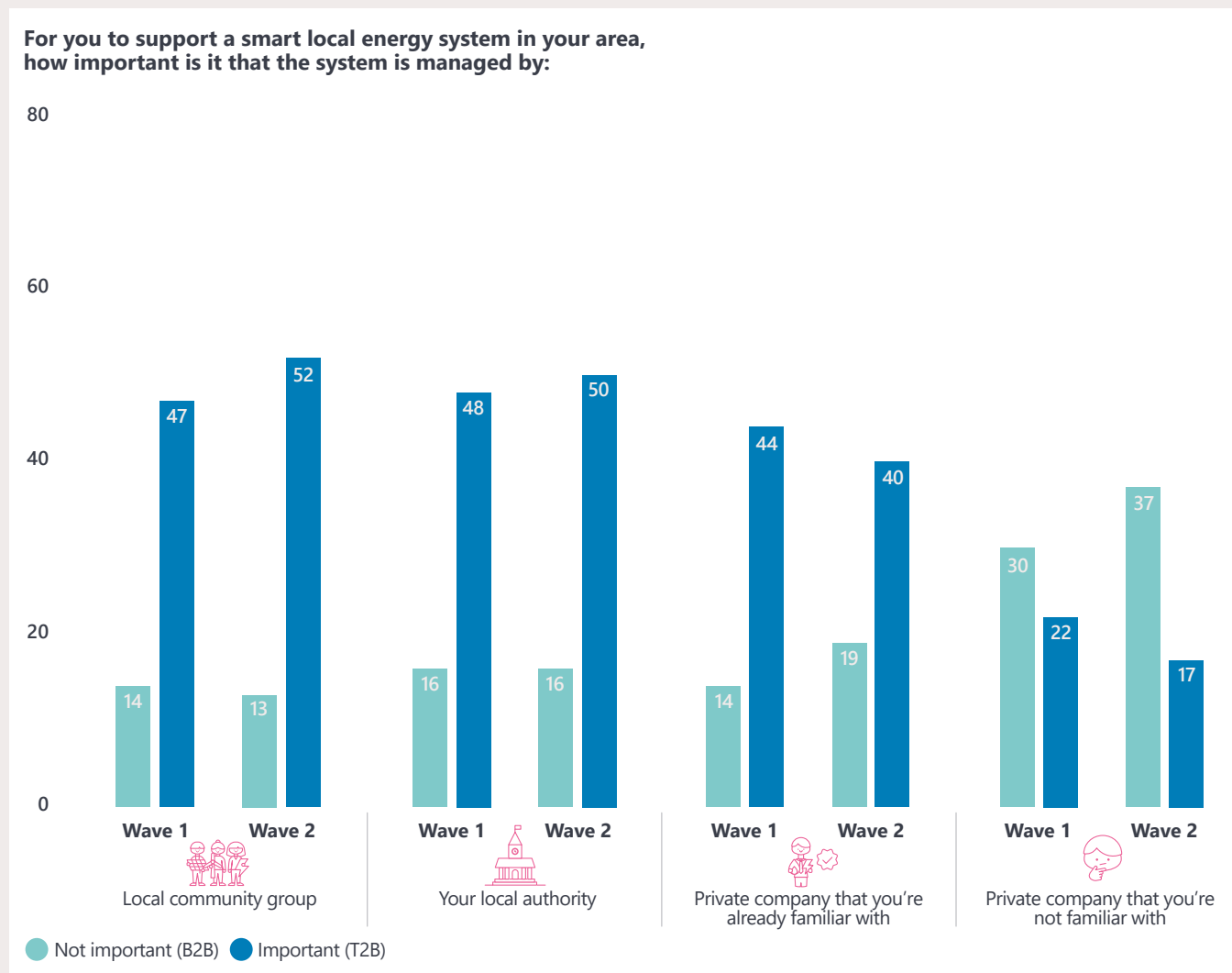
For you to support a smart local energy system in your area, how important is it that the system is managed by:

Figure 12 Importance of which organisation manages SLES. B2B: 'Not at all important' and 'Not very important'. T2B: 'Fairly important' and 'Very important'

9 GMLEM and Carbon Co-op. 2022. The Greater Manchester Local Energy Market Citizens' Jury Report.

User experience and engagement

In addition to understanding overall appeal of SLES, the PfER demonstrator projects provided an opportunity to investigate how SLES can deliver a best-in-class user experience. The PfER demonstrator projects examined included Project Local Energy Oxfordshire (LEO), Energy Superhub Oxford (ESO), Responsive Flexibility Orkney (ReFLEX) and Project Girona. Six user experience metrics were chosen to evaluate the demonstrators, representing the customer journey from first learning about a service to long-term day-to-day use: awareness, appeal, access, useability, resolution and satisfaction. Overall, the demonstrators delivered a good service across these metrics, with some even managing to achieve best-in-class service.

In the second survey, participants were asked whether they had taken part in one of the above PfER demonstrator projects, and those who had answered project-specific user experience questions (n=28). Trial activities include a small number of participants by nature, limiting the sample size for this survey. The findings below are therefore supplemented by secondary research about the projects, including their own research into user experiences.

Awareness

At the heart of SLES are the households and communities they aim to serve. An important part of raising awareness of a SLES is to engage with these communities, where the approach of PfER demonstration projects varied. Some projects focused on one-way engagement, such as social media, which can be useful to provide information (Table 7). Two-way engagement strategies, in which the community can voice their opinions and have input into the process, may build stronger buy-in among local residents. The frequency of engagement with the community can also play a role in the depth of awareness and appeal of a project.

The survey highlighted that the demonstration projects had varying levels of success in raising awareness, where the proportion of respondents who had at least heard of the project, even if they knew almost nothing about it, within the relevant PfER project area ranged from 6% to 77%.

Table 7 One-way and two-way engagement strategies

One-way engagement:
• Website describing trial and updates • Social media: Twitter, Facebook, LinkedIn • Newsletter • Local print and broadcast media • Community groups

Two-way engagement:
• Community events • Citizens' jury of local people • Research activities (e.g. focus groups, surveys, interviews)

⊢→ One-way engagement examples:

Project LEO realised that the language and concepts around flexibility and local energy markets are unfamiliar to most people, making engagement on this topic difficult. **Project LEO** therefore posted a 'plain English' guide on the subject on their website to raise awareness.[10]

Project LEO was also active on social media, including Twitter (391 followers), LinkedIn (237 followers) and Facebook (39 followers) and created a newsletter to raise awareness and to share updates and stories (statistics as of 20 January 2023). In addition, they set up a YouTube channel, which featured nine videos on their planned trial activities.

MHEK set up a virtual room online, where people could take a tour of the research, including information on the modelling and demonstrators delivered by project partners. This provided an engaging alternative to a regular website to highlight what a decarbonised SLES could look like in their local area.

←⊢→ Two-way engagement examples:

Zero Carbon Rugeley ran community events such as heritage walks around the Rugeley area, stands at jubilee celebrations where residents could give feedback, and special energy events held in local schools and community centres.

Milford Haven Energy Kingdom set up a public information hub and gave talks and demonstrations in schools and at community events, resulting in greater awareness and enthusiasm for hydrogen in the area.

Project ReFLEX attended an event where they enabled people to test drive an electric vehicle and had a car club display.

Project LEO conducted a survey in Rose Hill to provide residents with ideas on how they could aid their community transition to Net Zero as part of their Rose Hill Solar Saver Trial.

10 Local Energy Oxfordshire. 2022. Annual Synthesis Report – Year 3.

Several PfER projects, including ZCR, MHEK, REMeDY and ESO, conducted events in schools to empower and inspire children, which included climate assemblies and Net Zero workshops. Children might in turn share these lessons with other household members.

ESC's survey highlighted that overall appeal of SLES was highest among the youngest age groups (18–34) and reaching people early through such activities may be a good way to educate and get them involved.

GMLEM and their partners undertook various community engagement activities in Greater Manchester to understand their views on energy.

- **24** people took part in in-depth interviews exploring whether a domestic type of use tariff might be attractive to customers and might play a role in time shifting demand.

- **5,000** votes were received from Greater Manchester residents on which type of low carbon heating they would prefer for their homes in the near future in Energy Systems Catapult's zerocarbon.vote tool.

- **300** people were involved in public engagement on GMLEM plans and decision-making around the development of the local energy market business model, achieved by touring 14 sites with a bike-towed interactive engagement stand. The sites included housing association community events, supported living centres, shopping malls, charities, refugee resource centres and social enterprises devoted to sustainability.

- **10** people took part in in-depth interviews with electric vehicle drivers and heat pump users.

- **78** people participated in online surveys.

- **15** members of a Citizens' Jury,[11] carefully selected to represent the demographics of the city region, met over six days to help with decision-making, in particular how the GMLEM should be owned and governed.

11 GMLEM and Carbon Co-op. 2022. The Greater Manchester Local Energy Market Citizens' Jury Report.

It is important to factor in some time after every community engagement activity to reflect on whether the intended audience was reached and what worked well or could be improved in future. By publishing these leanings, future SLES projects may also be able to benefit from their experiences.

ZCR took a user-centric design approach and gathered feedback from the community to understand their concerns, which included the lack of local jobs, as well as their desires, such as having places to spend time and socialise in town. ZCR took specific learnings from their community engagement. They realised the importance of linking SLES design to other community sustainability initiatives to improve stakeholder perception and increase engagement. They also received extensive feedback on the accessibility of terms used, such as 'retrofit', and looked at simplifying their terminology.

In their report 'How can Smart Local Energy Systems projects and policies engage more effectively with the public?',[12] EnergyRev explored the different approaches to consumer engagement between PfER projects and their differing drivers. They identified variation in how the public was classified, from customers to partners, whether they were engaged directly or via an intermediary, such as a landlord of social tenants, and the modes of engagement used, from communication-centric press releases to consultative exhibits and participatory workshops.

The work found that projects which engaged people via existing community groups were able to access hard to reach parts of the community more efficiently. Those who approached people as co-creators of the SLES achieved greater engagement from those groups. Yet there was little sharing of learning between projects that would foster these successes across SLES projects.

The report makes three recommendations for future engagement:
1. Placing engagement more centrally in visions of what successful SLES implementation looks like to expand user perceptions beyond that of consumers requiring one-way marketing engagements

2. Providing structure and resources to enable social learning across funded projects

3. Taking engagement in SLES beyond the confines of projects to expand across different technologies and business models and bring into the mainstream.

Appeal

Appeal refers to the attractiveness of a product or service and how the perceived benefits influence the consumer's intent to engage with it. Most participants of PfER demonstrators agreed that their range of services was appealing (61%) and relevant to them (64%).

There were a few reasons survey respondents gave for not taking part in the demonstrators, despite being aware of them. The main one was preferring to wait until more people had participated, followed by being unsure about the technology or service. This resonates with the finding that respondents were increasingly likely to welcome the five SLES propositions in their local area, despite personal appeal for them declining. It highlights that respondents are interested in SLES and would like to see it in action but remain uncertain about becoming involved themselves.

ESO highlighted the value of having a tenant liaison manager, from the heat pump company Kensa, on site during drilling and internal works. When first approached, several tenants rejected the new system and planned not to let contractors in, partly due to Covid-19 and disruption concerns.

The tenant liaison manager talked to tenants and built trust, which resulted in the majority of those approached taking part in the trial and providing positive feedback on the installation process.[13]

Overall, appeal in the three PfER demonstrator areas was higher than in the rest of the UK, both for SLES in general and the five propositions. This could be due to the demonstrators' presence in the area raising awareness of SLES, which was linked with higher appeal.

ReFLEX saw high appeal levels, with more than 700 people expressing an interest for each of these services: electric vehicle leasing, smart chargers and buy-to-order second-hand electric vehicles, suggesting a good level of appeal for each. A further 317 expressed their interest in the car club.

Access

Access refers to the ability to sign up for, have installed and use a product or service, for a broad variety of user demographics and needs. Some PfER projects reduced access by setting trial eligibility criteria, including age restrictions, residency in a certain area or having a driving licence. A few services also required an upfront cost for the service or technology, which might have acted as a barrier to some, although many services were offered free of charge, thereby improving access.

Project Girona offered domestic customers free battery storage and solar panels and covered their installation costs, thereby removing any financial barriers to taking part in their SLES.

13 Energy Superhub Oxford. 2021. Energy Superhub Oxford Interim Report.

Requirements to participate in ReFLEX were dependent on the service but were relatively low. Despite this, only around 20% of those expressing an interest took up the smart charger and the electricity tariff, while 25% followed through with the electric vehicle lease. In contrast, a much higher proportion of those expressing interest (65%) participated in the car club. This highlights the importance of recording these metrics to be able to explore the reasons that certain services were accessed more often.

It is important to consider the accessibility requirements of the entire community to ensure that the SLES does not inadvertently exclude members of the public. For instance, if the SLES required people to sign up online then people without digital access would find it difficult to participate. To better understand these requirements, it is important to engage with the entire community, which usually requires multiple engagement routes.

Most PfER demonstrator project participants found the sign-up process easy (75%). However, 39% did not find it easy to install the technology. This might have been due to the professional installer struggling to install the technology (e.g. electric vehicle charger) or the respondent finding it onerous to support the install, for instance by having to clear space in their garage. To ensure SLES is accessible for all, it might therefore be helpful to reassure vulnerable and disabled households that they can receive support if needed.

GreenSCIES first held a series of six online workshops, which mostly attracted people who were already interested in energy issues and comfortable using the internet. To widen their engagement, they partnered with a local charity that is well connected in the local Somali community to hold a workshop for Somali and Arabic-speaking Islington residents. The workshop provided an overview of the GreenSCIES project and how it would affect them, as well as offering advice on energy costs.

For **ESO**, only three of the 60 tenants who expressed interest were unable to have the heat pump installed (due to technical issues with the property or vulnerable family members, e.g. a new baby), highlighting that barriers to access were low. ESO interviewed 15 tenants, who all provided positive feedback on the installation process.

Useability

Useability refers to the quality of users' practical interactions with a product or service they live with, on a day-to-day basis.

Most participants of PfER demonstrators agreed that it was easy to use the services and that they delivered the benefits they had expected. However, 39% of PfER project participants needed technical support with novel technologies, which might be expected considering that the technology is potentially unfamiliar. Being able to limit the need for this support by providing adequate upfront information or demonstrations, for instance, is therefore important. When technical support is needed, it is also crucial to make it easily accessible. These considerations could help to improve uptake and ensure participants have a good ongoing experience with any future SLES service.

A few **ESO** participants required technical support to set up their heat schedule and to override automated adjustments to their heat pump.[14] However, this survey found that the vast majority found it easy to use their services.

ESO's Oxford Superhub electric vehicle chargers received 6,860 visits between 23 June and 30 September 2022, suggesting high levels of awareness, which were likely bolstered by their presence on charging locator apps such as ZapMap. The high number of visits also suggests that the service was easy to use, although further research could examine whether there is any room for improvement.

14 Energy Superhub Oxford. 2021. Energy Superhub Oxford Interim Report.

Resolution

Resolution refers to how problems or complaints made by users about a product or service are responded to and addressed. The PfER demonstrators are trials and thus some problems are naturally bound to occur. A key finding from the survey was that respondents who felt that their issue was resolved quickly and satisfactorily seemed more satisfied with the project overall. It is therefore imperative for a SLES to have a plan in place detailing how to resolve the most likely issues in advance and to act to ensure problems are promptly and satisfactorily resolved. This is particularly important as word-of-mouth feedback about the specific project and potentially even SLES could turn negative if not managed well.

ReFLEX informs people on their website what they would do if an issue occurs, which provides clarity and may alleviate initial worries. For one of their services, they provide a bridging solution, such as a replacement car, for the entire time that the issues with the customer's vehicle are being fixed.

Satisfaction

Satisfaction refers to the overall way a user feels about a product or service, based on their end-to-end experience of a product or service. The user acceptance survey found that most PfER project participants (86%) would like to continue participating in the project, signalling their satisfaction with the trial and the benefits received.

ESO's research highlighted that heat pump users provided positive feedback about their experience. Many reported cost savings of over 50%, gaining increased control over heating and an increased ability to achieve comfort.[15] These magnitudes of savings are in line with the ESC evaluation of projected savings for users' bills in 2032.

15 Energy Superhub Oxford. 2021. Energy Superhub Oxford Interim Report.

Insights from PfER project engagement

Many PfER projects conducted research with their local communities. This section draws out a few of the key findings from their research and some lessons learnt from their engagement.

GMLEM findings[16]

- GMLEM conducted in-depth interviews, surveys and a citizens' jury to collect feedback on various local energy services.

- Citizens in Greater Manchester believed that the local energy market will support the region to reduce carbon emissions.

- People want to see the local energy market providing economic benefit to the region and call for an ownership and governance model that would ensure that happens.

- High levels of transparency and scrutiny were important to people because they lacked trust in the existing energy market.

- Many people expected an LEM tariff to be as simple as standard tariffs but cheaper.

Project REMeDY findings[17]

- Project REMeDY found that most participants in a user acceptance survey of SLES felt extremely concerned about issues related to environmental loss, climate change and the adverse impacts associated with it, pollution and waste. Moreover, over half of survey respondents were interested in adopting low carbon heating solutions with most respondents planning to drive a hybrid or electric car. However, it is important to note that the sample size of this survey (n=104) is relatively small.

- Project REMeDY also conducted research with social housing landlords and residents regarding the design of energy systems for social housing in Southend. They spoke with 10 low-income customers across the UK of different age groups and living scenarios and ascertained their reactions to the prototypes for a future smart energy experience with different scenarios. The findings highlight that SLES must be clear on their value proposition for customers and that people tend not to trust companies with an unchecked monopoly to act in their best interests. They also explored the needs of social housing landlords and discovered that they feel primarily responsible for creating the right conditions to protect low-income users and delay action to upgrade social housing energy systems. This highlights an opportunity to design services that meet user needs and build community trust based on these.

16 https://gmgreencity.com/wp-content/uploads/2022/09/GM-LEM-Summary-Report_Final_V3.pdf.
17 FG Remedy Phase 3 Final Recommendations

ZCR findings[18]

Zero Carbon Rugeley (ZCR) applied user-centred design and place-based engagement strategies to put engagement at the centre of the development of their SLES. This enabled the Rugeley community to help co-design and refine different aspects of the SLES. All of ZCR's design activities were informed by a community gatekeeper advisory group. This was an objective, community-led steering group made up of representatives from local interest groups and parish, town and district councils.

The project team maintained 'reflexivity' throughout their approach, recognising that engagement methods may be more or less effective and require alteration as the project progressed. They sought to learn how to develop the engagement approach to suit the Rugeley community and evaluated the engagement strategy during the mid-point of the project with a view to evolving as needed between design cycles.

ZCR have provided detailed findings about how to engage the public in their report 'User-Centric Design in Zero Carbon Rugeley'. They identify the following learnings from their engagements:

- Those leading the user-centred design approach should act as intermediaries between the community and the design team. Working with 'middle actors' who have pre-existing networks within the community can extend project engagement networks and provide invaluable feedback to enhance engagement approaches.

→ Forming an advisory group of these middle actors to meet regularly can maintain momentum for the project while providing ample opportunities for them to engage. ZCR felt that their bi-monthly meetings were perhaps not frequent enough.

→ A monthly newsletter may provide an alternative approach for regular engagement with this advisory group with lower logistical and financial burden.

- Engagement should be composed of multiple engagement opportunities (methods) of varying 'time intensity' (time requirements) to allow the public to engage as much or as little as they wish, for example single interviewers, multiple focus groups or rapid prototyping workshops.

- A dedicated engagement team is essential to build trust and meaningful relationships within the community. It enables sufficient time and effort to be put to these important activities and helps provide visibility.

- Social media can be a useful tool as part of a programme of engagement, offering an easy way for large numbers of people to provide comment. Multiple divergent views will be gathered and so ZCR have identified the following social media 'rules':

→ Not everyone will want to engage or respond positively to an idea. These boundaries must be respected with the aim of the engagement being to learn and understand where opposition lies, not resolve it.

→ Maintaining a consistent social media presence is important to build familiarity and learn about the types of people who engage regularly.

→ A dedicated social media manager is needed given the time-consuming nature of managing a multi-platform social media presence.

- Continual, sustained engagement is essential to maintaining interest and preventing one-way 'data harvesting'.

Conclusions

The energy context has changed drastically between the fielding of the two nationally representative surveys for this research. Several energy companies have gone bankrupt and energy prices soared, leading to many more struggling with the cost of living. This change in context is reflected in the results of the second survey, where significantly more respondents believed that the UK is becoming too dependent on energy from other countries (74%) and is not investing fast enough in alternative energy sources (70%). With the majority of respondents (82%) believing that the government and authorities have a responsibility to tackle climate change, SLES present a good opportunity for centrally driven action aligned to consumer sentiment about energy.

The significant change in context has also impacted consumer trust across the board. Only one in three trust their current energy supplier to treat them fairly. Trust in institutions and companies to provide impartial advice has also deteriorated since the first survey, including energy suppliers, local authorities and government websites. Despite this, local government is trusted by far more participants than politicians and ministers (40% and 11% respectively), reinforcing the potential for local solutions.

National awareness of SLES remains low as the PfER projects draw to a close, with only 3% of respondents knowing at least a fair amount about the general concept of SLES in 2022. This is a significant reduction from 19% in the first survey and reflects the challenge of building, and maintaining, awareness for a future-focused idea when many consumers are faced with immediate challenges such as the rising cost of living. Linking plans for the future directly to consumers' immediate needs may build awareness and momentum. Both awareness and appeal of SLES were higher in PfER project areas, highlighting that the project's engagement and interaction with communities is having an impact.

When presented with a short description of a SLES, slightly more than half of survey participants support changing to a SLES from a large-scale and distant energy system and most would get involved in a SLES if it were available. Survey participants were keen to reduce reliance on the national energy network and maximise use of locally generated energy as well as reducing energy bills. These benefits address the immediate concerns of many people and communicating them could build both awareness and appeal of SLES for the future. Opportunities to reduce carbon emissions and access community benefits were also welcomed.

Five specific SLES propositions were showcased to the public in the survey: generating power, using power, home heating, transport services and charging services. The power-related propositions were the most appealing, while transport-related propositions were the least appealing. While significantly more people were willing to welcome these propositions into their local area compared to the first survey, personal appeal for all propositions reduced, highlighting their uncertainty about getting involved before more widespread testing. In general, participants were also deterred from getting involved in a SLES by a lack of information about it and a concern that it could be expensive, in terms of installation or running costs. It is therefore important to widely publicise trials and their outcomes. Moreover, community events could be organised in which previous participants describe their experience to build trust.

Six user experience metrics were identified to evaluate the PfER demonstrators, representing the customer journey from first learning about a service to long-term day-to-day use: awareness, appeal, access, useability, resolution and satisfaction. Overall, the demonstrators delivered a good service across these metrics, with some even managing to achieve best-in-class service. The PfER projects conducted a lot of engagement with the local communities to raise awareness, including holding online or in-person workshops, engaging with schools or conducting research such as surveys or interviews. The demonstrator projects were able to deliver their services with low access barriers to consumers by reducing upfront costs and creating consumer-friendly sign-up processes that were easy to navigate. Most participants of PfER demonstrators also agreed that it was easy to use the services once installed and that they delivered the benefits they had expected. Resolution turned out to be a particularly important metric because delays in fixing issues for consumers or not resolving them completely can affect the overall satisfaction with SLES projects.

Based on this evaluation, lessons can be drawn to support the success of future SLES:

→ A range of citizen engagement activities should be used to build awareness and appeal of SLES projects, such as surveys, citizens' juries or workshops.

→ Support this with information from impartial organisations that are trusted by consumers, such as Citizens Advice.

→ Promoting SLES benefits that address consumers' immediate concerns, e.g. accessing low-cost decentralised energy, could increase the impact of these awareness-building activities.

→ Use simple, non-technical language to ensure understanding of the SLES concept. This is important as higher understanding is linked to greater appeal.

→ The public believes using a local community group to manage a SLES will garner more public support than an unfamiliar private company.

→ Adopt a user-centric approach, in which the accessibility needs of the community are assessed, to ensure everyone has a chance to participate in the SLES.

→ Services that are appealing to the public typically entail generating or using low carbon power locally.

→ It is important to resolve any problems with the service promptly (within hours or days) to ensure a good customer experience and long-term customer engagement. Identifying likely problem areas and planning solutions in advance will support future SLES in delivering the desired customer service.

→ Recording levels of engagement across target audiences and the outcome of each community engagement activity will enable SLES to identify any improvements for future engagements. This evidence would be valuable to help future programmes.

Appendix

SLES propositions shown to the public

Generalised SLES proposition

- Currently, the UK has a large, nationally centralised energy system, with both gas and electricity sold by a small number of well known energy suppliers.

- Smart local energy systems are where energy would mostly be generated and sold to you by people and businesses within your local area, with only a small amount coming from large central power stations that are a long way away.

- Smart Local Energy Systems can be designed in lots of different ways. They can use lots of different technologies and offer different services to help you do things like heat your home and travel around. There is no one standard approach, instead each system is tailored to the situation of a local area and the needs of the people and businesses there.

- Smart Local Energy Systems could:
  → Use smart technology to understand energy how people use energy in the local area
  → React to make sure energy is used in the best way for the people that live and work there
  → Be managed by a public body (e.g. your local council, social housing bodies), or by a private company

- Smart Local Energy Systems could have different benefits, which might include:
  → Give you more choice in how you buy and use energy, which could lower costs or give you a better experience
  → Improve air quality or the local environment
  → Encourage the local uptake of low carbon technologies (which have less carbon emissions than conventional fossil fuel burning technologies)
  → Improve the local community e.g. by helping vulnerable people access the heat they need, or by putting profits back in to the community
  → Encourage the use of electric vehicles for buses, taxis and council vehicles in the local area
  → Create jobs and build local skills in low carbon technologies

Generating power SLES proposition

- Some households generate their own energy from renewable sources. But they oftenmake more than they use or they generate it at a time when they do not need it (e.g. on a sunny day you may make lots of solar energy but not be at home to use it).

- In a Smart Local Energy System, any surplus energy made by those houses could be sold or traded to others in the local area saving money on their bills.

- The people buying the energy would save money too and have access to renewable, local energy instead of buying energy from far away power stations.

- The buying and selling of energy in this way would be managed by an organisation that's part of the local energy system. They could be run by the community for the community, be a local body, or a private company.

- The organisation could be set up to deliver value to the local community first. Benefits to the community could include:
  - $\rightarrow$ Encouraging more renewable energy generation in the area
  - $\rightarrow$ Reinvesting money saved through local generation in to the community
  - $\rightarrow$ Creating of a local energy community, working together
  - $\rightarrow$ Making heat more affordable for vulnerable customers

Using power SLES proposition

- Peaks in electricity demand happen when lots of people are using appliances (e.g. kettles, washing machines) at home at the same time. This means extra backup power stations have to switch on, which cost a lot of money and produce CO_2.

- At other times, electricity use is low and there is lots of renewable energy available. Ideally it would be better if electricity use was evened out throughout the day. This would reduce CO_2 emissions and the cost of your bill. It would also reduce the amount of investment needed in the network and backup power stations as electricity demands grow.

- One way to do this is through a new contract with your energy supplier. You can save money on your bill, or you could be rewarded, by moving when you use energy at home.

- With different types of contract you could:
  - $\rightarrow$ **Change when you use energy yourself** e.g. turning your washing machine on at a different (earlier or later) time
  - $\rightarrow$ **Let the system change it automatically** e.g. letting the supplier turn your washing machine on when its best for the network
  - $\rightarrow$ **Store energy when its widely available** e.g. Installing a battery at home to store electricity when its widely available, so you can use your washing machine whenever you want to without affecting the system

- You don't need to worry this might affect the performance of your appliances, as you can override the control at any time.

Home heating SLES proposition

Gas boilers emit large amounts of carbon, which contributes to climate change. Smart local energy systems could encourage more low carbon heating systems in your area, such as:

- **Heat pumps:** use electricity to move heat from the outside ground or air into your home. They're installed under gardens, inside a cupboard or mounted to outside walls. A minimal amount of piping connects them to your central heating system. Heat pumps provide steady heat throughout the day to keep your home comfortable, but can't always give the same instant 'bursts' of boosted heat that a boiler could.

- **Hydrogen boilers:** work like a gas boiler but burn hydrogen instead of natural gas. They release water instead of carbon. Your area would be switched to hydrogen gas with plenty of notice. During the switchover an engineer would make a simple switch, replacing your gas boiler with a hydrogen version. If you use gas to cook, you would also need to change your cooking appliance to hydrogen or electricity.

- **Heat networks:** create heat locally through renewable sources or capturing waste heat from local industry. It is piped to each home on the network and your gas boiler is replaced by comparably sized small heat exchanger. The energy service provider would maintain the network and your heat exchanger.

With these systems you could buy your energy in new ways, instead of buying kilowatt hours of energy on a flat tariff rate. Examples of this include:

- **Agile tariffs:** Where energy prices vary throughout the day depending on availability. Energy is cheap to use when demand is low and there is lots of renewable energy available (e.g. a windy night), but more expensive when demand is high (when everyone gets home from work). You'll be notified of the price in advance so you can decide what energy to use and when to use it.

- **Smart heating:** Sensors installed in your home monitor the temperature and control your heating. You can set up a heating schedule and your energy company uses the sensors to control the heating and deliver the comfort you want. The sensors can also learn what heat you like at home by tracking your use. This can be used to suggest ways to more efficiently heat your home, keeping you warm and saving you money.

- **Heat services:** A heat service lets you buy heat in units called 'warm hours'. One warm hour equals one hour of heat for your home. You decide how many warm hours you want, when to use them and what temperature you heat your home to. The energy company charges you a fixed monthly cost based on that schedule and is responsible for making sure your home is as warm as you want when you want. They can use the sensors from your smart heating to deliver the heating schedule for you.

Transport services SLES proposition

A smart local energy system could include a range of services that make low carbon vehicles more accessible.
These could include:

- **Vehicle leasing:** electric vehicles could be leased in the same way that petrol or diesel vehicles are. You form a long-term agreement with the lease company (usually for 2-3 years) and then pay a fixed cost per month for use of the car, up to a maximum mileage. The cost depends on the vehicle you choose, the contract length and the mileage. You would be responsible for tax, insurance and maintenance of the vehicle. A home charger would also be installed for your vehicle, if you have somewhere suitable to charge it e.g. a private driveway.

- **Full service rental package:** a monthly rolling full service package where you pay a single fee for a vehicle that includes all insurance, tax and maintenance of the vehicle and free charging at partner charge points in the local area. Access to charge points might be particularly useful if you don't have somewhere like a driveway to park and charge your car at night. You're not locked into a long-term contract and can cancel at any time to return the vehicle.

- **Car club:** A pool of electric vehicles could be available in the local area for short and medium term use. You could hire a car by the hour or the day for an all-inclusive fee, so you can access one when you need it without the ongoing costs for maintenance, insurance and tax. To use the car club you would either pay a monthly membership fee and a lower cost for each use, or pay no monthly fee but a slightly higher cost per hire.

Charging services SLES proposition

- With more electric vehicles available, Smart Local Energy Systems could install more **charging stations for electric vehicles** across the local area. You could pay per charge, much as you do when visiting a petrol station, or have free charging as part of a contract for a vehicle or a contract with your energy supplier. Payment is usually made over an app on your mobile device.

- The chargers could be built as hubs in places that people already visit (like town centres, shopping areas, parks or tourist attractions). They could also be built on the outskirts of towns, with park and ride access to popular destinations. They could also have shops and cafes built on site to use whilst you wait.

- These public charging sites could make it easier to charge your car if you're out and about, or if you don't have somewhere to park and charge an electric vehicle at home (like a private driveway).

- If you have an electric vehicle, you can use **smart charging** or **Vehicle to Grid (V2G)** to save money.

- **Smart charging** is where you plug your vehicle in overnight, but it doesn't need all that time to charge, so the system turns the charging on at a time when there is spare electricity and prices are lower.

- **V2G** uses the battery in an electric vehicle to store electricity when it is cheap because the local demand is low and easily met. You can then use the energy in your house or sell it back to the local network at higher price when demand is high.

- You don't need to worry that either option might leave you with an empty battery when you need your car. You specify when you're going to need your car and how much charge you need; the systems guarantees that you'll always have the right amount of charge at that time. If you need your car sooner, you can over ride them at any time.

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TO UNLEASH INNOVATION AND OPEN NEW MARKETS TO CAPTURE THE CLEAN GROWTH OPPORTUNITY.

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