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**Lowering your emissions through innovation in transport and energy infrastructure**

Energy Consumers Commission

Research into Consumer Engagement with Decarbonisation

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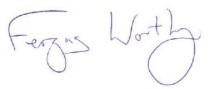
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Contents

[Abbreviations 4](#_Toc67301573)

[Executive Summary 5](#_Toc67301574)

[1 Introduction 10](#_Toc67301577)

[1.1 Cenex 10](#_Toc67301578)

[1.2 Project Context 10](#_Toc67301579)

[1.3 Research Objectives and Scope 11](#_Toc67301580)

[2 Policy Landscape 12](#_Toc67301581)

[2.1 Legislation and Policy 12](#_Toc67301582)

[2.2 Strategy and Advisory Reports 12](#_Toc67301583)

[3 Methodology 14](#_Toc67301584)

[3.1 Interviews 14](#_Toc67301585)

[3.2 Literature 14](#_Toc67301586)

[3.3 Synthesis Workshops 16](#_Toc67301587)

[4 Findings 17](#_Toc67301588)

[4.1 Concern about Climate Change 17](#_Toc67301589)

[4.2 Policy Ambition and Consumer Engagement 18](#_Toc67301590)

[4.3 Perceptions of Suitable Solutions 19](#_Toc67301594)

[4.4 Decarbonisation Perceived as Difficult and Expensive 20](#_Toc67301595)

[4.5 Behaviour Change is Key 21](#_Toc67301596)

[4.6 Trust Influences Consumer Attitudes 22](#_Toc67301598)

[4.7 Smart Meters 23](#_Toc67301600)

[4.8 Ensuring an Equitable Transition 24](#_Toc67301601)

[4.9 Engage at Community Level 25](#_Toc67301602)

[4.10 Local Supply Chain 26](#_Toc67301604)

[4.11 Consumer Segmentation 27](#_Toc67301605)

[4.12 Covid-19 27](#_Toc67301606)

[5 Recommendations 29](#_Toc67301607)

[5.1 Recommendations to Address Identified Themes 29](#_Toc67301608)

[5.2 Behaviour Change Insights 32](#_Toc67301621)

[5.3 Role of the ECC 32](#_Toc67301622)

[5.4 Research and Advocacy 33](#_Toc67301623)

[5.5 Decarbonisation through Regulation 34](#_Toc67301624)

# Abbreviations

|  |  |
| --- | --- |
| CAS | Citizen Advice Scotland |
| CCC | Committee on Climate Change |
| CSE | Centre for Sustainable Energy |
| CXC | ClimateXChange |
| DNO | Distribution Network Operator |
| ECC | Energy Consumers Commission |
| EPC | Energy Performance Certificate |
| EST | Energy Saving Trust |
| EV | Electric vehicle |
| GHG | Greenhouse gas |
| NTS2 | National Transport Strategy |
| SG | Scottish Government |
| SSEN | Southern Electricity Networks |
| TOU | Time of use tariff |
| TS | Transport Scotland |
| WPD | Western Power Distribution |

# Executive Summary

**Introduction and Research Background**

This project was delivered by Cenex, a not-for-profit research technology organisation and consultancy. This project was commissioned by Scottish Government (SG) on behalf of the Energy Consumers Commission (ECC). The ECC was established by SG to enhance the voice of consumers in Scotland within the energy market.

SG is required to meet the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 target of net zero greenhouse gas emissions (GHG) in Scotland by 2045. Scotland has led and continues to lead the UK in relation to targets for, and delivery of decarbonisation of heat, energy and transport. For Scotland to meet its ambitious GHG targets, significant changes will be needed to domestic heat, energy, and transport use. Consumers will have a key role to play in adopting new technologies and changing behaviour to support decarbonisation.

This report will help the ECC improve its understanding of consumers’ levels of knowledge of and attitudes towards decarbonisation technologies and associated behaviour change implications. The research objectives are summarised as follows:

* Review the current landscape of Scottish consumer engagement with decarbonisation technologies, specifically levels of knowledge and barriers to uptake.
* Consider how communities can engage with decarbonisation technologies.
* Explore how the adoption of decarbonisation technologies can be encouraged, accounting for differing consumer characteristics.

**Methodology**

Cenex addressed the research objectives through the following tasks:

**Stakeholder Interviews** with sustainability and climate change organisations and consultancies, organisations linked to housing associations, citizens advice and advocacy groups, academia, utility providers, regulators, industry bodies, and community groups.

**Literature review** of sources including academic research, policy papers, opinion pieces and industry and trade publications. Where available we focused on Scottish-specific literature, particularly where documents addressed characteristics which have higher rates in Scotland than in the rest of Great Britain, relating to consumers in rural and island areas and consumers experiencing fuel poverty.

**Synthesis Workshops** to compare learnings from the data collection exercise. The purpose of these sessions was to identify themes under which findings could be categorised; consider the implications for different consumers, particularly marginalised or vulnerable members of society; identify barriers to consumer engagement with decarbonisation and explore opportunities to overcome these barriers; and develop recommendations for the ECC for research and advocacy.

**Findings and Recommendations**

In the body of the report the findings from the interviews and literature review are presented first, with the recommendations in a subsequent section. For brevity here they are presented together.

*Concern about Climate Change*

**Findings**: Concern among consumers about climate change has never been higher, but the importance of the contribution of domestic energy to meeting net zero emissions targets has not been communicated effectively. Consumers are making low impact, frequent “social-norm” type changes to behaviour such as recycling household waste, but there is little evidence of more impactful changes such as adoption of heat pumps and EVs.

**Recommendation**: The increasing concern about climate change is encouraging and needs to be harnessed to create societal change to achieve Scotland’s net zero target. Work is needed to improve consumers’ knowledge and understanding of their role and the importance of measures taken at the household level. Consumer messaging by public and private sector bodies should better connect concern for climate change with measures individuals should take.

*Policy Ambition and Consumer Engagement*

**Findings:** Evidence consistently highlights a lag between policy ambition and consumer engagement with decarbonisation. This is compounded by a lack of understanding about the UK’s energy system and the scale of the decarbonisation challenge, and insufficient information and knowledge being provided about what actions to take, particularly on low carbon heating.

**Recommendation**: Stakeholders including SG, utility companies, Ofgem and others that interact with consumers should build on the good work already underway to increase consumer knowledge and understanding of low carbon technology. Messaging should avoid using technical jargon and instead should focus on communicating a vision of what life in a low carbon society will be like.

*Perceptions of Suitable Solutions*

**Findings:** There is a lack of adequate or desirable decarbonisation solutions, or a perceived lack of such solutions, and this can switch consumers off to those technologies and potentially to engagement with decarbonisation more broadly. When solutions are attractive, appropriate and brought to consumers’ attention at the right time they are likely to be more enthusiastically received. Appropriate tools and messaging are therefore needed to drive action on decarbonisation.

**Recommendation**: Promotion of decarbonisation technology has to be accompanied by appropriate messages for each audience and delivered when it is appropriate. Good examples exist including the Peebles and South Seeds community engagement projects.

*Decarbonisation Perceived as Difficult and Expensive*

**Findings**: Decarbonisation is often seen as difficult and expensive, due partly to the (perceived) lack of adequate solutions. Upfront cost of low carbon technology is frequently cited as the main factor negatively impacting consumers’ engagement with decarbonisation. A recent survey conducted by Savanta ComRes for the BBC found that consumers reported ‘price’ as the major barrier to buying an EV and installing low carbon heating[[1]](#footnote-1). However, it is not a driver for all consumers in all cases: there are several other important challenges to identify and overcome.

**Recommendation:** Where cost is cited as preventing change, it is important to investigate whether it is a perceived or actual barrier and tackle it appropriately. Consumers need to be provided with knowledge and skills to compare options on a lifecycle basis rather than just upfront cost. Other barriers must also be tackled including digital connectivity and literacy.

*Behaviour Change is Key*

**Findings:** Decarbonisation will involve a radical rethinking of heating and transport behaviours. Energy consumption behaviour is deeply ingrained in consumers and often linked to more emotive beliefs about safety, health, status and even personal liberty. Incentives have relied on rational decision-making behaviours in these sectors and have had mixed success.

**Recommendation:** ‘Social norms’ have a significant impact on consumers’ intention to change to new technologies. EVs are increasingly seen as socially normal, whereas other technologies such as heat pumps are at different stages, with social norms generally higher where a neighbourhood has high rates of uptake. This supports the case for working at a community level, rather than aiming at specific consumer types without spatial clustering.

*Trust Influences Consumer Attitudes*

**Findings:** Scotland leads the UK in adoption of low carbon technology. However, in some cases the technology was not fully developed and this has created some negative legacy issues which impact on levels of trust in the technology. Some consumers lack trust in decarbonisation technology installers and energy suppliers, which can negatively affect engagement.

**Recommendation**: Consumers need a trusted source of information, ideally delivered though face-to-face advice and supported by case studies. In a crowded space around decarbonisation, energy efficiency, and consumer rights, clarity is needed to prevent confusion. A local approach to engagement is crucial, involving home visits and physical locations in the community.

*Smart Meters*

**Findings:** Developments in flexibility and storage will be important future trends in heat and energy, arguably providing the greatest opportunities for innovation within the energy sector. These and other technologies linked to decarbonisation such as EVs are reliant on or work best in conjunction with smart meters, making their successful roll-out crucially important.

**Recommendation**: The low awareness of smart meters amongst consumers indicates that it has not been effectively communicated to them why they should be interested in smart meters and what benefits they can expect to see. It is important to address this as a good experience with smart meters can unlock consumer engagement with other decarbonisation technologies.

*Ensuring an Equitable Transition*

**Findings:** If the costs and benefits of decarbonisation are not shared equally there is a risk of a backlash against decarbonisation activity and progress stalling. This has occurred in other countries such as France where the ‘gilets jaunes’ protests about increased fuel costs and perceived risk of job losses have slowed progress on decarbonisation. More work is needed to identify the risks, quantify impacts, and design and implement mitigating interventions.

**Recommendation**: The ECC and other stakeholders in Scotland should monitor and tackle the risk of vulnerable groups being left behind in the transition to a low carbon society. Low income households, tenants, and remote and island communities are particularly at risk. The good work being done by the Just Transition Commission and other bodies in Scotland will be crucial in continuing to explore and mitigate these challenges. Encouragingly there is widespread visibility of this issue in Scotland where the agenda is more advanced than in the rest of the UK.

*Engage at Community Level*

**Findings:** Local action based around community organisations provides targeted support, can stimulate engagement by offering a range of measures for consumers, and is a conduit for vital participation in decarbonisation. There is evidence which supports the view that action at this level is critical to achieving significant change. However, there are also barriers to the continued success of this approach particularly in relation to funding and regulations.

**Recommendation**: Community engagement can be mediated by stakeholders including community groups and projects, utility providers and housing associations. The influence of community organisations should be drawn upon to engage local energy consumers, recruit participants and educate consumers on decarbonisation technologies and smart meters. A physical presence in the community will increase effectiveness, particularly with engaging hard to reach groups.

*Local Supply Chain*

**Findings:** The local supply chain is often the main source of information on decarbonisation technologies for consumers, but suppliers lack confidence and bandwidth to engage more widely with communities. More remote areas of Scotland do not have local access to supply chains which hampers choice, increases cost and makes procurement difficult.

**Recommendation**: Supply chain organisations are key providers of information about low carbon technologies and despite some legacy issues of mis-selling are generally viewed positively by consumers. This link to consumers could be leveraged to make the supply chain a key route to improving consumer engagement. One option could be to provide training and other interventions needed to make tradespeople the champions for low carbon solutions.

*Consumer Segmentation*

**Findings:** The categorisation and targeting of consumers according to their socio-economic status tends not to be popular with consumers, and focusing on a single category is not helpful in increasing consumer engagement with decarbonisation. Efforts are likely to continue to develop effective ways of targeting actions at specific groups, particularly in the context of a just transition.

**Recommendation**: Terms such as ‘fuel poor’ and ‘able to pay’ are not popular with consumers as they carry stigma or imply privilege and should be phased out from communications and messaging. Approaches to develop consumer archetypes in Scotland have not been widely adopted. Other models such as the capability lens developed by SSE, which is based around consumers’ ability to participate, may have more potential applications and industry buy-in.

*Covid-19*

**Findings:** Covid-19 has exposed risks to progress on decarbonisation, and presents opportunities for a green recovery. It has yet to make a fundamental impact on consumer engagement beyond the move to remote advice, with most impacts expected to materialise after the pandemic ends.

**Recommendation**: Covid-19 and associated restrictions have increased uptake of some of the behaviours that will be essential in reaching net zero emissions, such as active travel. With the right messaging there is an opportunity to ensure these benefits are maintained in the longer term. Equally there is a risk of a rebound effect as restrictions ease, such as an increase in road travel.

*Research and Advocacy*

This sub-section presents recommendations for a research and advocacy agenda which could be taken forward directly by the ECC or through collaboration with other stakeholders.

* Ensuring the benefits of decarbonisation are shared equally is a strong theme from this research. Research is needed to understand the scale of potential fuel poverty created by decarbonisation. While some work has been done by BEIS in this area further Scottish-specific investigation would be useful. The most advanced work in this area is the CES ‘Smart and Fair’ project, funded by SSEN and WPD. There is an opportunity to build on Phase I of the project either independently or by funding Phase II to secure Scottish insights.
* Understanding the potential for a services model of delivery could overcome some of the structural, behavioural and economic barriers to decarbonisation. However, there is little Scotland-specific insight. Dependant on the work being done by SG’s Energy Company Services, there may be an opportunity for the ECC to assist in gathering information.
* There is a significant evidence supporting the positive role of community level organisations in decarbonisation. A community-level project directory, with aggregated learnings and insights packaged for areas and groups considering activity, could help advance this agenda. Organisations like Community Energy Action are advocating for measures to enable community energy; the ECC could support a demonstration of a community-owned aggregation platform, using the products and systems for communicating with and controlling flexibility assets, to provide first-hand evidence of the community-led benefits of decarbonisation.
* As smarter energy networks become increasingly digital, consumers’ ability to engage via this channel will be essential. There is emerging evidence of changes to digital literacy as a result of Covid-19: more work is needed to understand what this will look like for all energy consumers, what gaps remain, and how they can be addressed.
* There is a knowledge gap around energy consumers’ understanding of how the energy system works and is funded in Scotland. It is important that this information is communicated particularly to vulnerable consumers and that knowledge is not a prerequisite for participation. Educational content could be developed for younger consumers who show high levels of concern for climate change but low levels of understanding of how decarbonisation will happen through the Scottish energy system.
* Further work may be needed to define and implement the consumer protection framework and regulation needed during the decarbonisation transition. The work of the ECC and Consumer Scotland in this area will be critical.
* Finally, we were advised by some stakeholders that further relevant reports are expected to be published later this year. Many reports have been delayed by Covid-19 and therefore there are likely to be several new reports available in Q1 and Q2 2021. We recommend updating this report, perhaps in summer 2021, once more documents have been released.

## *Role of the ECC*

The ECC has committed to push for increased consideration of consumers in the development of a decarbonised energy system and work towards ensuring the benefits of decarbonisation, financial and otherwise, are shared fairly with consumers. The ECC has an important role in setting the future agenda for Consumer Scotland and operates in an increasingly crowded energy and decarbonisation stakeholder environment in Scotland. It should therefore consider outreach activity to build understanding of its role, its aims, and how they fit into the future of energy consumer protection in Scotland. Potentially the ECC could use the release of this report (or a summary version) to relaunch themselves and use the report as a discussion aid around their remit and aims.

## *Decarbonisation through Regulation*

The scope of this report was limited to examining options for improving consumer engagement with decarbonisation. As such, it is beyond the scope of this work to consider in detail the need for additional regulation to help consumers switch to low carbon technologies. In brief, regulation will ultimately be needed to phase out carbon intensive technologies and achieve comprehensive uptake of low emission alternatives. There is certainly a case for using regulation to gradually phase out the most carbon-intensive technologies, with the phase out of inefficient lightbulbs being a good example.

Cenex believes that action to increase consumer engagement should be undertaken in parallel with a push for more regulation, as many consumers will voluntarily switch to low carbon technologies prior to regulation taking effect, assuming these alternatives are fit for purpose and other barriers identified in this report are overcome. This is particularly the case where regulation will take a long time to have an effect.

# Introduction

## Cenex

This project was delivered by Cenex, a not-for-profit research technology organisation and consultancy. Cenex was established in 2005 as the UK’s first Centre of Excellence for Low Carbon and Fuel Cell technologies. Today Cenex operates as an independent, not-for-profit consultancy specialising in the delivery of projects, supporting innovation and market development, focused on low carbon vehicles and associated energy infrastructure.

## Project Context

This project was commissioned by SG on behalf of the ECC. The ECC was established by SG to enhance the voice of consumers in Scotland within the energy market. The Commission was formed in July 2020 and comprises representatives with backgrounds in consumer advocacy and advice, academia and community engagement. This project is part of a programme of activity undertaken by the ECC through the 2020-21 financial year, in line with its draft work plan[[2]](#footnote-2). Outputs and themes from this activity will inform the development of advocacy and practical projects to be delivered in 2021-22.

SG is required to meet the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 target of net zero greenhouse gas emissions (GHG) in Scotland by 2045. SG must ensure that the transition to a net zero emission society is fair for all consumers, with costs and benefits shared fairly between all members of society. This means identifying and mitigating any regressive impacts on vulnerable or low income consumers. Policies which aim to reduce GHG emissions must also achieve the consumer outcomes defined in the SG’s Energy Consumer Action Plan and its draft Consumer Outcomes Framework.

Scotland has led and continues to lead the UK in relation to targets for, and delivery of zero emission mobility and energy efficiency programmes. The bold target to phase out the need for fossil fuel cars by 2032 is one such example as are the significant investment in the ChargePlace Scotland public chargepoint network and the rapid progress made on decarbonising grid electricity.

For Scotland to meet its ambitious GHG targets, significant changes will be needed to domestic heat, energy, and transport use. Consumers will have a key role to play in adopting new technologies and changing behaviour to support decarbonisation. Broadly there are three areas where change will be required to consumer behaviour and/or technology choice:

* Energy efficiency measures (for example insulation); more efficient behaviours in the home, supported by technology such as smart meters; and household or community energy generation.
* Increased uptake of low emission technologies such as heat pumps and heat networks.
* Increased uptake of zero tailpipe emission vehicles and greater use of shared mobility, public transport, and active travel.

Changes will be required not just in the home and on the driveway, but in the community as well. For example, district heating, community owned renewable energy generation and storage, and community owned electric vehicle (EV) chargepoints.

ECC activity including this research project must also consider challenges such as transport poverty, fuel poverty, inclusivity, and ensuring an equitable transition to a low carbon future. SG’s social equity ambitions are highlighted in Switched on Scotland and the Energy Consumers Action Plan. The ECC itself has aims to improve outcomes for consumers in Scotland, particularly those in vulnerable circumstances, and ensure adoption of principles of inclusivity and fairness in relation to decarbonisation.

It is essential that consumers are at the heart of efforts to decarbonise transport, heat and energy. The transition to a low carbon society will require significant changes to consumers’ use of, and engagement with, energy. The ECC observed in its brief for this project that “the success of whether we as a nation can transition to a decarbonised way of life may depend largely on consumers; their choices, experiences and responses”.

At present, levels of consumer understanding of and access to lower carbon technologies vary. For example, previous research for SG by Cenex found that the transition to EVs will disproportionately have neutral or negative impacts on marginalised groups such as those on low incomes or in rented properties. For domestic energy consumption and energy efficiency measures, tenure is likely to be a key barrier to uptake, together with factors such as wealth, digital connectivity, rurality, and education level. These issues must be explored and barriers to decarbonisation broken down. The benefits of improving consumer engagement and consumers’ knowledge (and therefore opportunities to decarbonise energy use) resulting from this will include direct and indirect benefits for consumers, such as improved agency/self-determination, cost savings, reduced fuel/energy poverty, and improved comfort; and ensuring Scotland can meet its ambitious climate change targets.

## Research Objectives and Scope

This report is primarily written to help the ECC improve its understanding of consumers’ levels of knowledge of and attitudes towards decarbonisation technologies and associated behaviour change implications. The specific research objectives are summarised as follows:

* Review the current landscape of Scottish consumer engagement with decarbonisation technologies, specifically levels of knowledge and barriers to uptake.
* Consider how communities can engage with decarbonisation technologies.
* Explore how the adoption of decarbonisation technologies can be encouraged, accounting for differing consumer characteristics.

Outputs may also be useful for other organisations, including:

* SG, to inform policy around decarbonisation and consumer engagement.
* Industry stakeholders such as Ofgem, utility companies, and transport, heat and energy supply chains, to better tailor message to influence consumers.
* Community groups and others that work with consumers at a local level.
* Academics and research organisations undertaking similar work in this space.

The scope of work includes research and stakeholders linked to Scottish consumers. Where there is a lack of Scottish-specific research, UK-wide data and examples are used. The research is limited to decarbonisation of domestic heat, energy, and transport, rather than other measures consumers may need to take to lower emissions, such as changing diet or flying less. Within those areas, technology options include domestic energy efficiency measures such as insulation, smart meters, domestic heating technologies, domestic renewable energy generation and storage, privately owned EVs, and shared mobility.

The report is structured as follows. Sections 2 and 3 briefly summarise the policy context and methodology for this work respectively. Section 4 presents the findings synthesised from a stakeholder engagement exercise and literature review, categorised into 12 thematic areas. Section 5 outlines recommendations mapped to these themes, discusses potential strategies from a behaviour change perspective, and makes recommendations for the ECC to develop its profile and for further research.

# Policy Landscape

This work was commissioned and delivered to help improve understanding of consumer engagement with decarbonisation. In Scotland and the rest of the UK there is a combination of legislation, policies, strategies and advisory reports that provide context for this project.

## Legislation and Policy

**Climate Change (Emissions Reduction Targets) (Scotland) Act 2019**

This act commits Scotland to a target of net zero GHG emissions by 2045. SG has set an interim target of a 75% cut by 2030 – arguably the most stringent national statutory emissions target. Transport is Scotland’s largest sectoral emitter, responsible for 37% of GHG emissions in 2017[[3]](#footnote-3). Road transport emissions must be cut significantly and urgently in order to achieve the 2030 and 2045 targets*.* Reductions in heat and energy related emissions are also required.

**Climate Change Plan: third report on proposals and policies 2018-2032 (RPP3)**

The latest climate change plan report includes SG’s pledge to phase out the need for conventional petrol and diesel cars and vans by 2032. This is likely to require widespread adoption of EVs, with some hydrogen fuel cell cars potentially also playing a role. The document also sets out an ambition for 35% of heat for domestic buildings will be supplied using low carbon technologies by 2032, to achieve a 23% reduction in emissions from Scotland’s residential buildings over the lifetime of the plan.

**Heat Policy Statement (2015)**

The decarbonisation of domestic heat is guided by the Heat Policy Statement, published in 2015, which set out three objectives: reducing the need for heat, supplying heat efficiently and at least cost to consumers, and using renewable and low carbon heat. These objectives aim to reduce residential heat demand by 15% by 2032.

**Scottish Government Draft Heat in Buildings Strategy (2021)**

The draft strategy sets out actions and proposals for transforming buildings and the systems that supply their heat in order to ensure that all buildings reach zero emissions by 2045. For consumers this means homes must achieve energy efficiency levels broadly equivalent to an Energy Performance Certificate (EPC) rating of Band C, as well as transition to being heated by heat pumps and heat networks, and potentially hydrogen in the longer term.

**Scottish Hydrogen Policy Statement (2020)**

This Hydrogen Policy Statement commits to make hydrogen a key element of Scotland’s decarbonisation plans. It states that for homes, decarbonisation will require a significant increase in the volume of green gases (biomethane and hydrogen) blended into the gas network and switching around 1 million homes currently using mains gas to zero carbon heating systems by 2030.

## Strategy and Advisory Reports

**Net Zero: The UK's Contribution to Stopping Global Warming (2019)**

The Committee on Climate Change’s Net Zero report, published in May 2019, recommended the new 2045 net zero emissions target. The report highlights the importance of a fair distribution of costs during the transition to a net zero society, observing that “some…households could suffer if appropriate policies are not put in place to mitigate the effects of what will be major structural changes, particularly in the transitional years”. The report calls for a review of costs and benefits and their distribution, and the appropriate policy levers to achieve an efficient and fair transition.

**Scottish Government Net Zero Nation: Draft public engagement strategy (2020)**

This document sets out a framework for engaging with consumers by way of three strategic objectives:

* Communicating climate change policy: People are aware of the action that the Scottish Government is taking to address climate change and how it relates to their lives.
* Enabling participation in policy design: people actively participate in shaping fair and inclusive policies that encourage adaptation to and mitigation of climate change.
* Encouraging action: taking action on climate change is normalised and encouraged in communities.

**National Transport Strategy (NTS 2) (2020)**

The National Transport Strategy for Scotland (NTS 2) was published in February 2020. It advocates a sustainable, inclusive, safe, and accessible transport system that protects the climate. The strategy acknowledges the need for EVs to support the phase out of new petrol and diesel cars by 2032. The strategy also states that reducing inequality, supporting economic growth, and improving health and wellbeing are priorities for SG. This balance of priorities emphasises the importance of ensuring that the transition to EVs does not disadvantage vulnerable or marginalised consumers.

**Transport Scotland National Transport Strategy - Delivery Plan (2020)**

The National Transport Strategy (NTS2) delivery Plan sets out a vision for the transport system for the next 20 years and outlines the four priorities: reducing inequalities; taking climate action; delivering inclusive economic growth; and improving health and wellbeing. Policy commitments made or reconfirmed in this document include continued support for EVs via a loan scheme extended to used EVs, a commitment to making the transport system accessible and affordable for all, £120m for bus decarbonisation over the next five years, the decarbonisation of rail by 2035, and progress on decarbonising ferry services.

**Energy Strategy (2017)**

Scotland’s Energy Strategy, published in December 2017, set out SG’s vision for delivery of secure, affordable clean energy for Scotland’s households. It includes consumer engagement and protection as one of six priorities underpinning a ‘2050 Vision’ for Scotland’s energy sector, and a commitment to protect consumers from excessive or avoidable costs and prevent new forms of social exclusion.

**Scottish Government Fuel Poverty Bill and Fuel Poverty Strategy (2018)**

The purpose of the Fuel Poverty Strategy is to help SG meet its commitment to tackle fuel poverty and ensuring everyone in Scotland lives in a warm home has access to affordable, low carbon energy. It also aims to increase consumer increased understanding of how to use energy in the home.

**Energy Consumers Action Plan: Putting Consumers at the Heart of Scotland’s Energy Transition (2019)**

This action plan[[4]](#footnote-4) establishes a framework to place consumer considerations at the heart of Scotland’s energy policy, including in relation to EVs. It recognises the need to tackle barriers to the widespread adoption of EVs by consumers, and that SG and partners need to tailor the support and advice they provide to the public. The framework contains four aims and associated outcomes:

* Listen and act, to develop fair and inclusive policy.
* Engage and empower, leading to active, energy-efficient consumers.
* Protect, via a market that promotes consumer fairness and trust.
* Innovate, so that good practice becomes common practice.

# Methodology

This section describes how we addressed the research objectives through stakeholder interviews, an in-depth literature review, and synthesis of information collated via these methods.

## Interviews

Initially we undertook a stakeholder mapping exercise to understand which organisations are most involved with consumers across the decarbonisation technology sectors of home energy, heating, and transport. We developed a longlist of 33 organisations across a broad range of categories: sustainability and climate change organisations and consultancies, organisations linked to housing associations, citizens advice and advocacy groups, academia, utility providers, regulators, industry bodies, and community groups. Specific organisations were identified via Cenex’s stakeholder network, suggestions from the ECC, and recommendations made by early interviewees.

The longlist was reduced to those organisations that would add most value to the research. 16 interviews were held to investigate relevant issues and explore new perspectives on the research area. Undertaking individual interviews allowed comparisons to be made between responses from different stakeholders, and between interview findings and the literature. In addition to addressing the research objectives the interviews were used to:

* Request access to reports containing data and evidence on consumer engagement.
* Explore formal and informal insight gained from trials or projects involving the roll-out of decarbonisation technologies in Scotland.
* Investigate segmentation of Scottish consumers to help guide targeting of recommendations for further research or advocacy projects.
* Understand the role of local community groups in relation to consumer engagement with decarbonisation in Scotland.

We are grateful to the organisations listed in the table below for participating in this research. The reference in the first column is used in the report where we attribute a point to a single source.

|  |  |  |  |
| --- | --- | --- | --- |
| **Ref.** | **Organisation** | **Ref.** | **Organisation** |
| **Int1** | Energy Saving Trust (EST) | **Int9** | Changeworks |
| **Int2** | Lochalsh & Skye Housing Association Energy Advice Service | **Int10** | EST Consumer Transport Programmes |
| **Int3** | Energy System Catapult | **Int11** | Dumfries & Galloway Community Transport Public Sector Partnership |
| **Int4** | Community Energy Scotland | **Int12** | CERG/Existing Homes Alliance Scotland |
| **Int5** | Citizens Advice Scotland | **Int13** | Energy Action Scotland |
| **Int6** | Scottish Federation of Housing Associations | **Int13** | Energy Agency SW Scotland |
| **Int7** | ClimateXChange | **Int15** | Ofgem |
| **Int8** | SSE Energy Networks | **Int16** | ALIEnergy |

*Table 1: Organisations interviewed*

## Literature

Next, we undertook a review of secondary sources on consumer knowledge and engagement with decarbonisation across home energy, heat, and transport. The review encompassed a wide range of sources including academic research, policy papers, opinion pieces and industry and trade publications. We identified a longlist of 53 sources and undertook an initial sift to remove those that were out of date, had been superseded, or were duplicated by other documents. Through this exercise we produced a list of 39 sources to be reviewed in detail, as shown in the table below. The reference in the first column is used in the report where we attribute a point to a single source.

Where available we focused on Scottish-specific literature, particularly where documents addressed characteristics which have higher rates in Scotland than in the rest of Great Britain, relating to consumers in rural and island areas and consumers experiencing fuel poverty. In many cases studies are UK-wide and do not reflect variation that may exist in Scotland.

|  |  |  |  |
| --- | --- | --- | --- |
| **Ref.** | **Author** | **Year** | **Title** |
| **Lit01** | Transport Scotland | 2020 | National Transport Strategy Delivery Plan 2020-22 (NTS2) |
| **Lit02** | Committee on Climate Change | 2020 | Reducing emissions in Scotland Progress Report to Parliament |
| **Lit03** | ECC | 2020 | Draft Workplan 2020-21 |
| **Lit04** | Scottish Government | 2020 | Update on Renewable Heat Target and Action 2020 |
| **Lit05** | Scottish Government | 2019 | Energy Consumer Action Plan: Putting Consumers at the Heart of Scotland’s Energy Transition |
| **Lit06** | Ofgem | 2020 | Decarbonisation Action Plan |
| **Lit07** | Just Transition Commission | 2020 | Interim report |
| **Lit08** | Scottish Government | 2020 | Hydrogen Policy Statement and Action Plan |
| **Lit09** | Scottish Government | 2020 | Update to the Climate Change Plan 2018-32 |
| **Lit10** | Scottish Government | 2019 | Fuel Poverty Strategy for Scotland |
| **Lit11** | Ofgem | 2020 | Consumer attitudes towards decarbonisation and net zero |
| **Lit12** | CXC | 2020 | Public awareness of and attitudes to low carbon heating technologies |
| **Lit13** | CXC | 2018 | Private household investment in home energy retrofit: reviewing the evidence and designing effective public policy |
| **Lit14** | CXC | 2019 | Domestic energy consumer archetypes |
| **Lit15** | CXC | 2020 | Assessing the impacts of the Climate Challenge Fund |
| **Lit16** | Existing Homes Alliance | 2019 | The right frame of mind: engagement for domestic energy efficiency in scotland |
| **Lit17** | SP Energy Networks | 2020 | Green Economy Fund interim report |
| **Lit18** | Energy Systems Catapult | 2020 | Understanding Net Zero: a consumer perspective |
| **Lit19** | Citizen's Advice Scotland | 2018 | Changing behaviour in a changing climate: consumers and Scottish climate change policy |
| **Lit20** | Scottish Government | 2020 | Net Zero Nation: Draft public engagement strategy |
| **Lit21** | Changeworks | 2020 | Energy Efficient Scotland Transition Programme Pilot Final Report Change Works in Peebles |
| **Lit22** | CXC | 2020 | Changes to the energy landscape and potential impacts on Scotland’s consumers |
| **Lit23** | Cenex | 2020 | Assessing the Impact of the Transition to Electric Vehicles on Consumers |
| **Lit24** | CSE | 2018 | Making “No-one left behind” meaningful in our future energy system |
| **Lit25** | Community Energy Scotland | 2020 | Next Steps in Community Energy (summary) |
| **Lit26** | Community Energy Scotland | 2019 | Flexible Power Communities Data observations |
| **Lit27** | Climate Emergency Response Group | 2019 | 12 immediate actions for Scotland’s response to the Climate Emergency |
| **Lit28** | IPSOS Mori Scotland | 2020 | Research into public attitudes to climate change policy and a green recovery |
| **Lit29** | National Statistics | 2020 | Scotland’s People Annual Report 2019 (Scottish household survey 2019) |
| **Lit30** | Citizen's Advice Scotland | 2020 | Engaging Hearts and Minds |
| **Lit31** | Citizen's Advice Scotland | 2020 | A-B-C? Easy as EPC |
| **Lit32** | Citizen's Advice Scotland | 2020 | Consumer Insights on the Future of the Gas and Electricity Distribution Networks in Scotland |
| **Lit33** | Citizen's Advice Scotland | 2018 | Leading by Example: a principled journey through regulation |
| **Lit34** | Scottish Government | 2021 | Heat in Buildings strategy consultation |
| **Lit35** | Community Energy Scotland | 2019 | Flexible Power Community Project Report |
| **Lit36** | University of Strathclyde | 2020 | Who pays for and gains from the electricity network upgrade for EVs? |
| **Lit37** | Ofgem | 2020 | Deep dive on Consumers Attitudes to Decarbonisation |
| **Lit38** | CSE for SSEN | 2020 | Smart and Fair - Exploring social justice in the future energy system |
| **Lit39** | BEIS | 2020 | The Future of Heat: Synthesis report |

*Table 2: Secondary sources reviewed*

## Synthesis Workshops

Rather than providing a simple descriptive account of the main points from each interview and source reviewed, Cenex facilitated two workshops to synthesise and compare learnings from the data collection exercise. The first of these was an internal project team session and the second involved representatives from the ECC and SG. The purpose of these sessions was to:

* Identify overarching themes under which findings could be categorised.
* Consider the implications for different consumers, particularly marginalised or vulnerable members of society.
* Identify the major barriers to consumer engagement with decarbonisation and explore opportunities to overcome these barriers.
* Develop recommendations for the ECC for future research and advocacy.

Much of the literature and some of the interviews focused on why engagement and decarbonisation has not happened more quickly. There is therefore a bias towards identification of issues and barriers rather than successful approaches and schemes. In reviewing this material Cenex has aimed to identify opportunities and highlight these through the Findings section and in the subsequent Recommendations part of the report.

The outputs of this work are presented in the following sections.

# Findings

This section presents integrated findings from the stakeholder interviews and literature review. Where a point can be attributed solely or primarily to a particular interview or source a reference is provided in brackets which relates to the tables in Section 3. In some cases the points made have been synthesised from more than one source and so a citation is not provided. Interviewees have had the opportunity to review interview notes and have approved the attributed use of their comments in this report.

## Concern about Climate Change

**Concern among consumers about climate change has never been higher, but the importance of the contribution of domestic energy to meeting net zero emissions targets has not been communicated effectively.**

Consumers are making low impact, frequent “social-norm” type changes to behaviour such as recycling household waste, but there is little evidence of more impactful changes such as adoption of heat pumps and EVs. Much of the research and insight into consumer attitudes and awareness has happened at the United Kingdom or Great Britain level. Little is known in detail about Scottish consumers and how their attitudes may differ, even though they face different circumstances to typical British energy consumers. There is emerging evidence of generational and socio-economic variation in levels of concern.

* Concern for climate change is at an all-time high but this is not converting into impactful consumer change in priority areas. The latest results from the Scottish Household Survey show that 68% of adults in Scotland now agree that climate change is an immediate and urgent problem, up from 46% in 2013 (lit20). In the latest IPSOS Mori survey of Scottish people, when asked specifically about climate change most respondents (79%) stated that it is an “immediate and urgent problem” and the level of concern has increased over time, including since the start of the Covid-19 pandemic (lit28).
* As a further indicator, after more than a decade of being driven by bill savings, the 2019/20 evaluation of the motivation of callers to Scotland Home Energy Service’s domestic renewable advice programme showed that reducing environmental impact has become the most frequently cited reason for calling for the first time (int1). Conversely motivation for action on transport tends to be saving money, health and lifestyle driven (int10).
* There is limited awareness of the link between reducing GHG emissions and individual energy consumption. Evidence suggests that many consumers already feel they are ‘doing their bit for the environment’ through measures such as recycling or reducing use of plastic bags. Ofgem’s Annual Survey found that 56% of consumers think they are doing enough already to tackle climate change (int16), while uptake of low carbon technology is low: only a tiny proportion (c. 5%) of UK households have low carbon heating (lit12).
* There is little Scotland-specific evidence on consumer attitudes to low carbon heat technology. Studies which have worked from UK-wide research argue that attitudes are expected to be broadly the same (lit11, 17, lit20), though further research to test this hypothesis would be valuable. Awareness of biomass boilers and ground source heat pumps is higher in Scotland, but this does not seem to be correlated with higher proportions of people having these technologies in their homes (lit12).
* Openness to considering different kinds of heating systems is significantly lower in Scotland than in the rest of GB: 26% said they would consider other kinds of heating systems (compared to 36% in GB), while 35% said they would be resistant to changing the type of heating system they have (compared to 21% in GB) (lit12). There is no evidence we are aware of that explains this disparity.
* It is likely that there will be differences in consumer attitudes towards climate change and uptake of low carbon technologies in Scotland compared to the rest of the UK because of the higher proportion of consumers in remote rural and island locations. In these areas many households are entirely off the gas grid, including all homes in Orkney and Shetland, 84% of dwellings in the Western Isles and 62% in the Highlands (lit22). Options for heating in these households include liquid fuels, liquid petroleum gas (LPG), electric storage heaters, and wood burning stoves. While these consumers may therefore be a good target market for heat pumps, questions around reliability in saline conditions and access to maintenance in remote areas must be addressed.
* The distribution of property types in Scotland is also important. Scottish consumers are more likely to live in tenements and less likely to live in semidetached homes, compared to the rest of Britain (lit12). Some tenement buildings have poor energy efficiency, and the shared nature of these properties means installing some technologies may be more challenging than in a typical house.
* Findings from the Scottish Household Survey show there is a growing disparity between different sectors of society with regards to climate change awareness and concern (lit20). Support for measures to tackle climate change tends to be higher among individuals who are younger, degree educated, and in the ABC1 social grades (lit28).

## Policy Ambition and Consumer Engagement

**While aspirations to place consumers at the heart of decarbonisation and climate change are mentioned regularly in policy and strategy documents, evidence consistently highlights a lag between policy ambition and consumer engagement with decarbonisation.**

This disconnect is compounded by a lack of understanding among consumers of the UK’s energy system and the scale of the decarbonisation challenge, and insufficient information and knowledge being provided about what actions to take, particularly on low carbon heating.

* Informed consumers are significantly more likely to become engaged in measures designed to support the energy transition (lit32). However, evidence from consumer surveys reveals a lack of awareness and understanding of the 2045/2050 net zero targets. Other studies have found that terms such as ‘decarbonisation’ or ‘low carbon technology’ are unfamiliar and perceived as ‘jargon’. Consequently, consumers filter them out or miss the implication of the term (lit11, lit37).
* Although 2045 is some way off, the pace of change will need to increase significantly in the 2020s in order to achieve the 2032 targets on heat and transport decarbonisation. Implementing the measures needed to hit these goals will make evident to many consumers the scale of ambition and change needed. For example, achieving the required emissions reductions in buildings will require over 1 million homes and an estimated 50,000 non-domestic buildings to convert to using zero or low emissions heating systems by 2030 (lit34).
* Much of the detail in policy and strategies focuses on the ‘system changes’ which are one-off and seen as low-hanging fruit. Changing behaviours linked to consumption habits are a longer term ambition and there is little information available on how policymakers expect to influence such changes (lit19).

### Heating

* The impact that heating homes and workplaces has on the climate is not well recognised. People have been encouraged to install modern, efficient gas systems to reduce emissions and as a result fewer than half of consumers identify gas central heating as contributing to harmful climate change emissions: fewer than half of consumers interviewed for BEIS’ “Future of Heat” research identified heating and cooling buildings as one of the top three contributors to GHG emissions. Other research correlates with this, showing that consumers identify transport and industry as high emitting sectors but generally do not believe switching to low carbon heating systems can significantly reduce their contribution to climate change (lit 18, lit 39, lit 58). In another study, fewer than 20% said they would consider switching to a zero-emissions heating system (lit34).
* Survey evidence suggests that consumers are unwilling to bear the cost of transitioning to low carbon heat. When asked about who meet the cost of (hypothetical) regulation requiring homeowners to replace their current gas or oil-fired boiler and radiators with a low carbon alternative, 43% of consumers responded that the Government should bear the bulk of the cost and 36% think that energy companies should be responsible. Only 8% of respondents feel that homeowners should incur costs, which contrasts with 82% who support the introduction of additional charges for the sale or provision of items that are harmful to the environment (lit28).
* While awareness of many technologies is similar across Britain, consumers in Scotland have relatively higher levels of awareness of some technologies, particularly biomass boilers (lit12). There is no clear evidence in the literature for this difference; it does not appear to be correlated with the technology mix in people’s homes.
* There is a need for a bespoke public engagement strategy for heat in buildings with a focus on raising the profile of energy efficiency and zero emissions heating options so that people are aware of the benefits and begin to see them as a positive choice, enabling people to actively participate in shaping the development of SG policy and incentives as well as local level heat and energy efficiency planning, and promoting the support available from Scottish and UK governments (lit34).

### Energy

* Since privatisation and subsequent changes to regulation of the energy markets, consumers’ engagement with the energy market is almost entirely via their energy suppliers. Energy markets are likely to become more flexible and therefore more complex as new technologies and tariffs are deployed. Lack of awareness and energy literacy among consumers is low, such as knowing who does what in the energy system. Consumers also struggle to understand how a smart, flexible and decentralised energy system will work, and few saw investment in innovation as a priority. This is likely to hamper progress and engagement (lit32).
* The gap between policy ambition and consumer awareness of energy markets is acknowledged in the Committee on Climate Change (CCC) *Reducing Emissions in Scotland* progress report. The CCC recommends considering the wider role of the education system in supporting the transition to a net-zero economy and preparing for the risks of climate change including the need for greater public awareness and understanding (lit2).

### Transport

* The focus on headline issues such as the banning of petrol and diesel vehicles risks misleading motorists that no further action is needed on transport decarbonisation. Ofgem’s upcoming Annual Survey found that that 83% of consumers who own an EV think they are already doing enough to tackle climate change (int16).

## Perceptions of Suitable Solutions

**There is a perceived lack of adequate or desirable decarbonisation solutions, and they are often poorly targeted to consumers even though they may not be appropriate or accessible due to their individual circumstances.**

The actual or perceived lack of suitable options can switch consumers off to those technologies and potentially to engagement with decarbonisation more broadly. The opposite of this also holds true: when solutions are attractive, appropriate and brought to consumers’ attention at the right time they are likely to be more enthusiastically received. Appropriate tools and messaging are therefore needed to drive consumer action on decarbonisation, and there is uncertainty and debate about the usefulness of the domestic EPC in this regard.

* Raising awareness of low carbon systems may not be enough to drive uptake; consumers also need confidence in the technology and to be provided with a sound understanding of how it works. Citizen’s Advice Scotland found that among consumers who were aware of heat pumps few understood what they were or how they worked, leading to uncertainty about their expected performance. Working with a ‘blank slate’ may even be easier than overcoming existing negative perceptions of low carbon heating. (lit12).
* Promotion of decarbonisation technology has to be accompanied by appropriate messages (without technical jargon) for each audience and delivered when it is appropriate. A good example is how the use of an e-bike hire scheme and ‘love your older home’ workshops were used by a scheme in Peebles to engage with people, before leading them to consider energy efficiency retrofit solutions for their homes (int9). Another good example of this approach is the South Seeds Flexible Communities project. Many respondents had been drawn into South Seeds by other activities such as the tool library and through that then engaged with the decarbonisation agenda. South Seeds also undertook active outreach to residents in the area through local groups to improve engagement (lit26).
* Energy efficiency measures have helped raise people out of fuel poverty and have been effectively targeted at groups that are most at risk such as those in social housing. Despite these successes, consumer awareness of EPCs remains low. The EPC system itself is thought to be not fit for purpose for guiding progress towards net zero emissions and can potentially put people off making changes to their homes based on environmental motivations. The main criticisms are that EPC ratings do not predict actual home energy performance, and they focus on cost rather than carbon emissions (int12, lit31).
* SG is already considering reforming the EPC scheme to include three indicators as a basis for future standards: energy efficiency, with recommendations of measures to reduce demand for heat and improve energy efficiency; heating emissions, with recommendations of the most appropriate of heating system to reduce emissions to zero; and cost of heating, with information for building owners and tenants about the impact of energy efficiency and heat demand measures on their energy bills (lit34).
* Other suggestions to make EPCs more useful include highlighting where homes are sub-standard in terms of energy efficiency and setting out clear property-level recommendations on the measures needed to reduce emissions to zero. Ideally this should be in the form of a longer-term plan for each home with clearly defined stages needed to decarbonise the property decarbonisation (lit16, lit 34, int 12, int 14).
* In the transport sector, 28% of Scottish households do not have access to a car[[5]](#footnote-5) so are turned off by messages around EVs. This is arguably not an issue as the messages are not aimed to influence these consumers. More encouragingly, evidence suggests that EVs are seen as desirable by a growing number of consumers (int 5, int10). Vehicle manufacturers have until recently not effectively marketed EVs, but this is likely to change rapidly to reflect the growing range of plug-in vehicles coming to market and increasingly stringent emissions targets for new models.

## Decarbonisation Perceived as Difficult and Expensive

**Decarbonisation is often seen by consumers as difficult and expensive, perhaps due in part to the lack of adequate and timely solutions.**

There is a perception among some stakeholders that early adopters are becoming the only adopters of decarbonisation technology, particularly in heat. Other potential consumers for these solutions are harder to identify, quantify and reach. Supply chains are understandably reluctant to risk trying to sell products and services to consumers outside of their usual target demographic when a market still exists within that group.

Upfront cost of low carbon technology is frequently, and with some justification, cited as the main factor negatively impacting consumers’ engagement with decarbonisation. A recent survey conducted by Savanta ComRes for the BBC found that consumers reported ‘price’ as the major barrier to buying an EV and installing low carbon heating[[6]](#footnote-6). However, cost is not a driver for all consumers in all cases: there are several other important challenges to identify and overcome.

* Reaching net zero emissions will require significant changes to infrastructure and systems in the supply and use of heat, energy and transport services. Consumers are concerned that reforming our current systems will have a significant economic cost for society and themselves as individuals. For example, when asked about switching to low carbon heating, few felt they could afford the investment and few felt it was their responsibility to pay for such changes, especially when they had little enthusiasm for making the switch (lit11).
* Research by Ofgem found that perceived cost is a significant barrier to change for many consumers. Householders assume that any changes they would have to make, such as switching to a ‘green’ electricity tariff or installing a new heating system, would be expensive for them personally (lit11). Consumers find it hard to ‘trade off’ upfront costs against long term savings. Cost is more likely to become a barrier to adoption when people have not been provided with the knowledge to compare technologies and assess their expected lifecycle cost performance (int16).
* Cost is not the only barrier to engagement with decarbonisation. Other important issues include (perceived) issues with the compatibility, reliability, aesthetics, noise, lack of available space and inconvenience of installation of alternatives (int3, lit11, lit 12).
* While the majority of consumers state that reducing their energy bills is a main motivator for action, there is little evidence that they are actively seeking the cheapest deal: in 2018 only 14% of Scottish energy consumers reported switching suppliers in the last 12 months. Levels of switching are lower in northern Scotland than more southern areas, with one report finding that in Northern Scotland, 59 per cent of customers are on their incumbent electricity supplier, compared to just 27 per cent for the UK as a whole (lit05, lit 22). Although no explanation is suggested in the literature, this is likely to be linked to lack of choice of suppliers or restrictive meters, tariffs or fuels.
* For low income groups cost is a factor, but not because they are unwilling to pay extra: rather it is because they are unable to pay anything. Loans for home improvements and new or even used EVs only aid those who have access to some capital or finance. Loans and grants that part-fund interventions will not significantly impact those at risk of missing out.
* Renewable heat and electricity technologies have struggled to reach outside a narrow demographic of off-gas, affluent consumers, due to a combination of technical, logistical, contractual and economic barriers. Suppliers of low carbon technologies have faced challenges in assessing demand in different property types and demographic groups, leading them to target sales and marketing efforts towards affluent, off-gas consumers (int1).
* Financial incentives can be helpful once a consumer has decided to install a particular technology, but not persuasive if the consumer lacks confidence or has dismissed the suitability of the technology. Energy Systems Catapult (ESC) tested this by offering free heat pumps, but only 9 consumers out of 17,000 contacted showed interest in the offer (int3).
* Another barrier is lack of digital literacy with studies reporting that one fifth of all adults in Scotland lack basic digital skills and for clients of Citizens Advice Bureau this goes up to a third (lit22). As companies increasingly switch to online channels as their primary means of engagement with consumers there is a risk of a divide in society between those who are and are not digitally literate.

## Behaviour Change is Key

**Decarbonisation will involve a radical rethinking of heating and transport behaviours. Interventions work best when consumers’ feelings are acknowledged.**

Energy consumption behaviour is deeply ingrained in consumers and often linked to more emotive beliefs about safety, health, status and even personal liberty. Incentives have relied on rational decision-making behaviours in these sectors and have had mixed success. Providing energy and mobility as services continue to garner interest but remain niche concepts.

* Issues around changing consumers’ behaviour are highlighted by examining efforts to deploy heat pumps. Consumers are traditionally used to heating their homes on a room by room basis, at certain times at the day, with other rooms left unheated for long periods. This works well with oil and gas central heating systems. Heat pumps by contrast are better suited to maintaining a lower ambient temperature across the whole house all the time, with only minor variations to temperature. When provided with a heat pump some consumers try to use them like a conventional heating system, leading to poor performance and high cost. Once they are equipped with the knowledge and skills to use them properly, people use the systems effectively and are pleased with performance (int2).
* Behaviour can be most effectively changed by understanding and tailoring messages effectively to individual consumer’s needs. For instance, on Skye, the advice service speaks to housing association tenants every three years, spending an hour in their homes, engaging via questions framed around preferences, feelings and emotions (int2). Other suggestions include focusing more on messages around comfort in winter than in summer, and for solid wall insulation highlight the expected improvements to the appearance of the property (int 12, 14).
* Another approach is evidenced by the ESC’s heat as a service project “Prescription for Heat”. The trial aims to improve consumer confidence to help them make changes, while putting the burden on suppliers to improve property performance and identify fuel poor households (Int 3).
* Tenancy has a significant bearing on engagement and motivations to engage with flexibility services. It is easier to recruit and engage with owner occupiers and these consumers are more confident in using an app for heating control, confident in switching energy supplier and more motivated to engage in flexibility for financial reward. Conversely social housing tenants are harder to recruit, more likely to need support in adapting to new heater control systems, and less motivated by access to an app or other smart home management software. (lit26).
* While EV adoption is starting to increase, charging behaviour still needs to be optimised. For example, preventing EV drivers from unnecessarily occupying a chargepoint bay to take advantage of free parking, or using rapid chargers for a full charge rather than a top-up to complete a journey. This is a particular issue in Scotland where many ChargePlace Scotland units still offer ‘free’ electricity and parking.

### Incentives

* Incentives have been heavily relied on to create behaviour change and in the transport sector grants, tax breaks and loans have grown increasingly successful in driving early adoption of EVs and more recently e-bikes (int10). However, low carbon heat incentives have struggled to gain momentum, arguably because incentives are for part of a system (such as heat pumps) rather than incentivising a low energy demand house (int3). Similarly, financial incentives for solid wall insulation sometimes expired before planning consent could be granted (int9).
* Some incentives for community transport are also sub-optimal. For example, SG sustainable bus funding is only available for vehicles over 23 seats, leaving a gap in the market for charities and community groups which commonly operate 12 to 18 seat minibuses. Fuel subsidies also use this threshold and means incentives worth tens of thousands of pounds are not available to community groups (int11).

## Trust Influences Consumer Attitudes

**Trust is a multi-faceted influencer of consumer attitudes to decarbonisation.**

Scotland has led the rest of the UK in adoption of low carbon technology. However, the downside of being an early adopter is that in some cases the technology is not fully developed and in Scotland this has created some negative legacy issues and word-of-mouth feedback which impact on levels of trust in the technology. Despite the efforts of many organisations working in this space, some consumers still lack trust in decarbonisation technology installers and energy suppliers, which can negatively affect engagement.

* Consumers need support to help them switch to low carbon technologies. Many consumers have concerns about wanting to do something but not knowing where to start and in one study specifically cited a lack of support with decision making as a critical factor (lit11).
* Consumers need to trust that technologies will benefit the environment: for example the perception still held by some that EVs are worse than diesel cars. Consumers need to be convinced trust that tariffs marketed as ‘green’ will in fact make the expected positive impact for the planet, for example by stimulating additional investment in renewable generation (lit 06).
* Early heat pump projects have led to a perception among some consumers that they are unable to provide sufficient heat. While newer technology does not suffer from these issues, the negative views persist (int2). Trial projects also often included the installation of proprietary technology which cannot be sustainably supported in the long term (int4).
* Consumer trust was damaged by negative experiences of mis-selling during the Green Deal which has created a wariness about government-backed schemes with innovative financial offers (int9, int15).
* As the heat and energy markets develop and become more complex there will be an increased risk of consumer harm through consumers making choices without being provided with sufficient knowledge (mis-bought), being offered services which are unsuitable (mis-sold), and not being offered services which are suitable and advantageous (missed out). Consumer protection measures are required to mitigate these risks and improve consumer confidence in the market (lit38).

### Building Trust

* A local approach to engagement is crucial. Successful advice services are often based around home visits (int2, int15, int14) or based at physical locations in the community, ensuring that engagement is inclusive, accessible, and representative (lit2, lit30, lit35). Similarly, studies have found that consumers are more than twice as likely to engage with a low carbon initiative through locally branded initiatives than if their distribution network operator (DNO) was the lead organisation. Consumers are generally wary of the energy industry and therefore traditional messaging on energy issues, which tends to focus on household energy costs, is ineffective in reaching many consumers (lit32).
* Consumers value recommendations from friends and family, who are perceived as trusted and similar to them; if they see or hear positive stories from friends and family they may become more open towards lower carbon technologies. (lit37).
* In addition to the local approach national bodies still have a role to play. SG plans to relaunch and expand its Green Homes Network so that people can learn from households, businesses and organisations who have already taken action to make their property warmer, greener and more efficient. Similarly there is a space for not-for-profit intermediaries which benefit from higher levels of trust from consumers because they are working towards non-economic objectives such as increasing uptake of low carbon technology and reducing emissions (lit 36).

## Smart Meters

**Smart meters are an enabler of decarbonisation.**

Developments in flexibility and storage will be important future trends in heat and energy, arguably providing the greatest opportunities for innovation within the energy sector (lit17). These and other technologies linked to decarbonisation such as EVs are reliant on or work best in conjunction with smart meters. Unfortunately the deployment of smart meters in Scotland is behind predicted timescales.

* Smart meters increase flexibility and consumer choice but create new risks of excluding customers. Many have not been made aware of, or interested in, participating in the smart meter roll-out, and this is a concern as smart meters are required for decarbonisation technology to work well (lit22).
* As well as supporting the functionality of technology, a good experience with smart meters can make consumers more open to adopting measures such as home energy storage, time of use tariffs (TOU), EVs and renewable energy generation (int5).
* Smart meters are particularly important in remote and rural areas of Scotland to support integration with local renewable energy generation. Generating enthusiasm for supporting local energy generation or other local sustainability activity can be helpful in overcoming scepticism about smart meters (int 2). However, smart meters may not be possible in some remote areas due to a lack of digital connectivity, so there are linkages with broader challenges facing island and other remote Scottish communities.
* There are emerging examples of energy suppliers in England using smart meters to connect and reward local consumers with local renewable generation (for example Octopus tariffs in Yorkshire (int5). We are not aware of any similar such schemes in Scotland.

## Ensuring an Equitable Transition

**There is evidence of stakeholder and public concern about a potential conflict between success on decarbonisation, and fair and equal access to the benefits by Scottish energy consumers.**

If the costs and benefits of decarbonisation are not shared equally – and perceived to be shared equally – there is a risk of a backlash against decarbonisation activity and progress stalling. This has occurred in other countries such as France where the ‘gilets jaunes’ protests about increased fuel costs and perceived risk of job losses have slowed progress on decarbonisation[[7]](#footnote-7). The importance of this issue is reflected in SG’s Heat in Building strategy which acknowledges the tension between decarbonising heat and fuel poverty targets (lit 49). More work is needed to properly identify the risks, quantify impacts, and design and implement mitigating interventions.

* There is significant concern among consumers that low income households are being left behind in the transition to a low carbon society, with 79% stating that those groups will not be able to afford technology which could deliver the energy cost reductions they need (lit32). A transition which leaves behind vulnerable consumers or creates societal injustice risks creating a backlash against the smart energy transition, stalling progress (lit37).
* Scotland produces more than 90% of its gross electricity consumption from renewable energy sources and is a net exporter of low carbon electricity to the rest of the UK (lit2). Despite what consumers may perceive to be an abundance of clean cheap energy, domestic electricity prices remain high and consumers with electric heating pay the highest bills (int5, int13). The transition to increasingly localised energy generation creates more opportunities for consumers to engage and benefit, but equally the nature of the local and fragmented renewable generation market means these benefits are not available to all (lit 22).
* Vulnerable groups may be limited in their ability to take part in decarbonisation, due to low access to capital to invest in technology that would save money in the long term (such as an EV or heat pump), limited understanding of technology capability, lack of digital skills, and a requirement to use energy at peak times. If costs to upgrade infrastructure are added to energy bills these same consumers will pay more for services they cannot access. Over time their bills will increase as they use legacy high carbon technology while other consumers switch to EVs, solar PV generation and other technology that allows them to consume less energy, use it at cheaper off-peak times, and benefit from flexible energy tariffs and (lit24, lit38). Specific risks that may emerge are:
  + TOUs may force social housing tenants to not heat their properties properly, risking pushing some into fuel poverty (int2, lit32). More generally with these tariffs it is unclear what the use case will be for significant off-peak energy used, aside from EV charging.
  + As the transition to EVs accelerates, late adopters – which will typically include lower income households – may see increasing fuel prices and a loss of spatial coverage of petrol and diesel supply due to reduced demand for mineral fuels, creating transport poverty (int3).
  + Regulation requiring social landlords to get properties up to EPC grade B by 2032 is creating costs which are likely to be passed on to tenants through increased rents (int6).
  + There is anecdotal evidence that private rental properties are being taken out of official markets and offered for long-term rents on platforms such as AirBNB in order to avoid EPC standards regulations affecting private sector landlords (int2).
  + Decarbonisation is likely to increase dependence on electricity (for example to power heat pumps and charge EVs), which increases risks and impacts for remote areas of Scotland which are at greater likelihood of power outages (int8, lit7).
* The ongoing ‘Smart and Fair’ project by the Centre for Sustainable Energy (CSE) is helping to tackle this issue by exploring how a ‘smart and fair’ outcome be achieved and what would it look like: what new requirements are being placed on consumers, in terms of the capabilities and attributes needed to ‘keep up’; how do requirements vary for different smart energy offers and services, which consumers are at risk of being left behind and how might such risks be mitigated, and where does responsibility lie for ensuring a ‘smart and fair’ outcome (lit37).

## Engage at Community Level

**Local action based around community anchor organisations provides targeted support, can stimulate engagement by offering a range of measures for consumers, and is a conduit for vital participation in decarbonisation.**

Community-level projects on decarbonisation are numerous and varied in their approaches and technologies employed. There is evidence which supports the view that action at this level is critical to achieving significant change. There is recognition of this in the latest SG policies, but there are also barriers to the continued success of this approach particularly in relation to funding and regulations.

* Local engagement in energy generation and decarbonisation is encouraged by an emphasis on local economic growth, self-sufficiency or civic pride. Consumers are more attracted by the idea of becoming part of a caring, connected community than by saving money or tackling climate change (int15, lit32). Community level organisations are frequently trusted sources of appropriate, locally relevant and targeted information and support, helping to overcome scepticism by focussing on solutions that work in their locality rather than generalised messages that aren’t appropriate (int14 and 15). Benefits are greatest when communities are involved early and are genuinely able to influence decision making (lit 30).
* Examples of community scale projects can include collective energy efficiency retrofits, bulk supply and installation of heat pumps, direct and on-site local renewable energy supplies, EV car clubs and charging points, and disseminating information and advice. There are important positive links to build on between community-led energy measures and the development of better and more sustainable local transport options which also help to circulate funds in the community. Community EV car clubs, local energy supply to charging stations and bulk purchase and installation of domestic chargers, as well as collective procurement electricity supplies, are all routes to deliver a step change in uptake. (lit25)
* Funding for decarbonisation tends to be targeted towards individuals or at a large scale, meaning community-level schemes can struggle to identify and secure support. Additionally the short-term nature of project funding can cause a loss of momentum to trial projects, or trap areas with proprietary equipment that is difficult and/or expensive to maintain (int4, int11).
* Small-scale community-level energy demand aggregation can work to deliver twin flexibility benefits in the form of maximising renewable utilisation and reducing prices, but is held back by lack of enabling energy market legislation. There is currently no enabling legislation around local supply of electricity, with legislative powers remaining at Westminster. It is too large scale to work on a community level, requiring 50,000 customers for a license. The small-scale flexibility market will not be realisable without platforms to aggregate flexibility into large, tradable volumes (lit26, int4).
* Community engagement can work in tandem with private sector involvement. For example, the Octopus local energy tariff raises awareness of local generation, engages local consumers in the benefits of decarbonisation, and generates civic pride (int5). Similarly the development of a local energy and decarbonisation plan, including baseline data on energy and attitudes to change, can help DNOs to model future demand and network investment (int8 and 15).
* Local housing association involvement helps to build credibility of schemes and has led to successful engagement and outcomes for social tenants (int2, int15, int6). Their involvement means that participants hear about changes from several local sources which further builds trust.
* Strong community engagement in the development and delivery of Local Heat and Energy Efficiency Strategies (LHEES) will be vital to achieving SG’s climate change commitments. SG has committed to implementing a public engagement strategy and action plan for heat decarbonisation to enable people to actively participate in shaping the decisions that affect them and will use LHEES to deliver ensure locally tailored solutions (lit34). However, the pace of change is slow and, until the LHEES are published in some areas, consumers will not have long-term certainty on how their properties will be heated.

### Examples

* The £20m Green Economy Fund launched in 2018 had objectives around decarbonisation and economic growth, as well as a specific objective to work with communities in rural and city areas affected by fuel poverty. Through this fund 35 projects have been supported in decarbonisation of heat and transport, renewables or education with many of the best examples community-focussed or led. Funding has been committed through to March 2021 (lit 24).
* Remote communities have been at the vanguard of complex trials of local generation and smarter networks, such as ReFLEX and TraDER projects in Orkney. Community energy action has proved essential in the integration of large scale renewable energy into the system (int4, lit25).
* Urban areas can also benefit from community level engagement on innovation such as the South Seeds Flexible Communities project. This approach appears to be successful at reaching consumers not engaged by large scale schemes. Community-based retrofitting of energy efficiency measures has also proven to work in areas with a range of different socio-economic profiles like Ayrshire, Kirkcaldy and Peebles. (lit35, Int9, int14).

## Local Supply Chain

**The local supply chain is often the main source of information on decarbonisation technologies for consumers, but suppliers lack confidence and bandwidth to engage more widely with communities.**

More remote areas of Scotland (rural and islands) do not have local access to supply chains which hampers choice, increases cost and makes procurement difficult. There is evidence of work underway to improve engagement and standards in this area.

* The heating trade is an important source of information about heating systems. One study found that around a third of Scottish consumers would ask members of the heating trade – such as gas fitters or plumbers – for advice about heating systems (lit12).
* Lack of local supply chains in remote areas means equipment typically costs more and maintenance is very expensive. For example, there is only one MCS certified installer on Skye, while other suppliers would need to travel from the central belt (int2). Similarly, many smaller car dealerships will not have the specialised staff or equipment required to work on EVs.
* This is a difficult challenge to address. It is challenging for the private sector to invest in greater density of after sales support when sales volumes are small, while sales volumes are small in part due to the lack of local support (int1). Another challenge that may be more prevalent in Scotland is that legal advice is required for installing low carbon heat solutions in multi-ownership properties such as tenements, which makes procurement more challenging and reduces choice and competition (lit17).
* An important learning from community-based micro-renewables projects is the need for early and direct engagement with suppliers to understand costs and any future cost uncertainty. For example, in the Glasgow community transport project, procurement of EV minibuses was very difficult due to a lack of suitable products on the market. Earlier pre-procurement engagement may have helped niche suppliers and converters work with the commissioning body to scope and meet requirements (int11, lit17).
* SG is already working to address this issue, for example by committing to promote PAS 2035/30 and MCS standards to ensure that installations are good quality and fit for purpose, and propose to integrate their Scottish installer skills matrix with these installer standards (lit34).

## Consumer Segmentation

**The categorisation and targeting of consumers according to their socio-economic status tends not to be popular with consumers, and focusing on a single category is not helpful in increasing consumer engagement with decarbonisation.**

Governments and organisations regularly categorise energy consumers according to factors such as their tenure, geography, socio-economic status and ability to pay for measures. Efforts are likely to continue to develop effective ways of targeting actions at specific groups, particularly in the context of a just transition.

* Descriptions such as ‘fuel poor’ and ‘able to pay’ are not popular with consumers as they carry stigma or imply privilege (int9, int15). While these terms may be suitable for research and analytical purposes, they should not be widely used in consumer-facing materials.
* SG commissioned research to develop a more sophisticated energy consumer archetype model. The research project took a long time to complete and there is limited evidence of its usefulness at this stage (int7). A prior report by Cenex examining the impact of the transition to EVs on different consumer types includes a critique of the archetype model.
* An alternative and potentially better model is the “capability lens” developed by CSE with funding from Scottish and Southern Electricity Networks (SSEN) and Western Power Distribution (WPD). This appears be a more accessible attempt which characterises consumers by the factors affecting their ability to participate in decarbonisation (lit 57).

## Covid-19

**Covid-19 has exposed risks to progress on decarbonisation, and presents opportunities for a green recovery.**

At this stage it is unclear what the longer term impacts will be of the pandemic and associated restrictions. It has yet to make a fundamental impact on consumer engagement beyond the move to remote advice, with most impacts expected to materialise after the pandemic ends.

* Many advice services have stopped entering homes to deliver advice and support. This may slow progress on decarbonisation with some consumers unlikely to seek out remote services.
* Public transport use is down 20-80%, depending on mode, compared to the same period last year. According to the Transport Scotland COVID-19 Public Attitudes Survey data from December 2020, almost half of consumers will avoid public transport and use their car more after the pandemic than they did before (lit1).
* Conversely there could be a positive active travel effect after the pandemic with 62% of consumers in one study stating they will walk and cycle more (lit1). There is an opportunity to engage consumers around decarbonisation through messaging around active travel.
* There is anecdotal evidence of improvements in digital literacy among previously less-literate groups due to a reduction in face to face support and an increase reliance on smartphones and online services. However, the literature review and interviews has not provided any evidence to support this view.
* There are concerns that attitudes towards car use might have changed during the pandemic, with cars being seen as a safe space or extension of the home (int10). While some stakeholders argue for community car clubs to be classified as critical transport infrastructure, service provision has suffered as the business model needs the volume to support it, and usage has dropped during the last year (int10). Unpublished research by Cenex for CoMoUK suggests that the car club market is recovering in Scotland after usage fell rapidly in spring and summer 2020.
* Covid-19 and its associated restrictions has increased a switch to some of the behaviours that will be essential in reaching net zero emissions. As well as an increase in active travel these include repairing clothes rather than buying new and reduced food waste (lit20).
* The pandemic has revealed the weaknesses of long global supply chains in a time of crisis, sharply exposed inequalities in our society and highlighted the importance of local infrastructure and community support networks (lit25).

# Recommendations

This section first provides a set of recommendations mapped to the 12 themes identified in the previous section. It then draws on behaviour change best practice to suggest how consumer engagement could be improved. Finally, we make recommendations for the ECC to continue raising its profile and for further research.

## Recommendations to Address Identified Themes

### Concern about Climate Change

**Concern among consumers about climate change has never been higher, but the importance of the contribution of domestic energy to meeting net zero emissions targets has not been communicated effectively.**

The increasing concern about climate change is encouraging and needs to be harnessed to create societal change to achieve Scotland’s net zero target. The disconnect between concern for climate change and consumers’ level of action may in part be driven by a perception that their capability to make major changes related to emissions from electricity consumption is low, as this is an issue relating to upstream energy generation. Work is needed to improve consumers’ knowledge and understanding of their role and the importance of measures taken at the household level. Consumer messaging by public and private sector bodies should better connect concern for climate change with measures individuals should take.

### Policy Ambition and Consumer Engagement

**While aspirations to place consumers at the heart of decarbonisation and climate change are mentioned regularly in policy and strategy documents, evidence consistently highlights a lag between policy ambition and consumer engagement with decarbonisation.**

Stakeholders including SG, utility companies, Ofgem and others that interact with consumers should build on the good work already underway to increase consumer knowledge and understanding of low carbon technology. Messaging should avoid using technical jargon and terms like ‘decarbonisation’ and ‘low carbon technology’ which are not positively received by many consumers. Instead, the focus should be on communicating a vision of what life in a low carbon society will be like and examples of how we will get there. Solutions need to be easy, accessible and well understood.

### Perceptions of Suitable Solutions

**There is a lack of adequate or desirable decarbonisation solutions, and they are often poorly targeted to consumers even though they may not be appropriate or accessible due to their individual circumstances.**

Promotion of decarbonisation technology has to be accompanied by appropriate messages for each audience and delivered when it is appropriate. Good examples exist as cited in Section 4 including the Peebles and South Seeds community engagement projects. These should be highlighted as examples of good practice and used as a platform for other schemes and projects.

Widespread criticism of EPCs in the literature and among interviewees could be addressed by developing a long term plan for decarbonisation of each property. When a house is for sale prospective buyers should be given details of what needs to be done and by when. It is important to consider how this will be delivered so that consumers can have confidence in the information. Responsibility for rental properties must lie with the property owner and not the tenant.

### Decarbonisation Perceived as Difficult and Expensive

**Decarbonisation is often seen by consumers as difficult and expensive, perhaps due in part to the lack of adequate and timely solutions.**

Cost is a barrier but not for all consumers and in all cases. Where cost is cited as preventing change, it is important to investigate whether it is a perceived or actual barrier and tackle it appropriately. Consumers need to be provided with knowledge and skills to compare technologies on a lifecycle cost performance basis rather than just upfront expenditure. Aside from cost other barriers must be tackled. As more services more mainly or wholly online, digital connectivity and literacy is likely to become critical and could risk creating a divide in access to new solutions and technologies. Lack of digital connectivity has significant impacts on the use of ‘smart’ technology in remote areas.

There has been a heavy reliance in many sectors on incentives and Scotland has done well to make these available particularly for EVs. Future incentives should be designed to address identified gaps in capabilities and attributes, such as grants or loans to make up for lack of access to capital, under-writing of technology performance to reduce perceived risk of participation, and protective tariffs for those unable to participate in TOU or other flexible market services.

### Behaviour Change is Key

**Decarbonisation will involve a radical rethinking of heating and transport behaviours. Interventions work best when consumers feelings are acknowledged.**

Behaviour change research shows that presentation of ‘social norms’ has a significant impact on consumers’ energy consumption and intention to change to new technologies and services. Within transport EVs are increasingly seen as socially normal, whereas for shared mobility social norms are not yet well developed. Other technologies such as solar PV and heat pumps are at different stages, with social norms generally higher where a neighbourhood or community has high rates of uptake of a specific solution. This supports the case for targeting interventions at a neighbourhood or community level, rather than aiming at specific consumer types without spatial clustering. These themes are discussed on more detail below.

### Trust Influences Consumer Attitudes

**Trust is a multi-faceted influencer of consumer attitudes to decarbonisation.**

Consumers need a trusted source of information, ideally delivered though face-to-face advice and supported by ‘real-life’ case studies. With an increasingly crowded space around energy efficiency, transport, heating, and consumer rights and representation, there is a need for clarity to prevent further confusion. A local approach to engagement is crucial, involving home visits and physical locations in the community. This helps generate highly valued recommendations from friends and family.

### Smart Meters

**Smart meters are an enabler of decarbonisation.**

The low awareness of smart meters amongst consumers indicates that it has not been effectively communicated to them why they should be interested in smart meters and what benefits they can expect to see. People will primarily be interested in the real application of these meters such as saving money and receiving positive feedback as they reduce energy consumption. This issue should be addressed by SG working with energy suppliers. It is important to address this as a good experience with smart meters can unlock consumer engagement with other decarbonisation technologies.

### Ensuring an Equitable Transition

**There is evidence of stakeholder and public concern about a potential conflict between success on decarbonisation, and fair and equal access to the benefits by Scottish energy consumers.**

The ECC and other stakeholders in Scotland should monitor and tackle the risk of vulnerable groups being left behind in the transition to a low carbon society. Low income households, tenants, and remote and island communities are particularly at risk. They may find themselves unable to adopt low carbon technology and services, using legacy technology which becomes expensive and obsolete, and paying higher energy bills to fund a transition from which they draw no benefits. Impacts will be felt not just on these consumers but on society in general. During periods of rapid innovation it is difficult for the market to also deliver fairness, and therefore regulation and other public sector interventions will be needed.

The good work being done by the Just Transition Commission and other bodies in Scotland will be crucial in continuing to explore and mitigate these challenges. Encouragingly there is widespread visibility and acceptance of this issue in Scotland where the equitable transition agenda is more advanced than in the rest of the UK.

### Engage at Community Level

**Locally-based action based around community anchor organisations provides targeted support, can stimulate engagement by offering a range of measures for consumers, and is a conduit for vital participation in decarbonisation.**

Community engagement is critical and is likely to be more effective than individual or household level engagement. This can be mediated by a wide range of stakeholders including specialist community groups and projects, utility providers and housing associations.

There was very little mention of Brexit in the interviews and literature but many community level activities particularly in the islands are part-funded by EU programmes like Horizon and Interreg which are likely to be harder to access in future.

The reach and influence of community organisations should be drawn upon to engage local energy consumers, recruit participants and educate consumers on decarbonisation technologies and smart meters. A physical presence in the community will increase effectiveness, particularly with engaging hard to reach groups such as those who are not digitally connected, or for whom English is not their first language.

### Local Supply Chain

**The local supply chain is often the main source of information on decarbonisation technologies for consumers but lack confidence and bandwidth to engage more widely with communities.**

Supply chain organisations are high profile providers of information about low carbon technologies and despite some legacy issues of mis-selling or poor performing products are generally viewed positively by consumers. This link to consumers, and the private sector investment in marketing and advertising could be leveraged to make the supply chain a key route to improving consumer engagement. One option could be to provide training, accreditation and other interventions needed to make tradespeople such as gas fitters, plumbers, car dealers and builders the experts and champions for low carbon solutions.

### Consumer Segmentation

**Consumer segmentation approaches tend not be popular with consumers, and the pre-dominant use of a single category is not helpful in targeting consumers for decarbonisation.**

Terms such as ‘fuel poor’ and ‘able to pay’ are not popular with consumers as they carry stigma or imply privilege and should be phased out from communications and messaging. More generally, approaches to develop consumer archetypes in Scotland have not been widely adopted. Other models such as the capability lens developed by SSE, which is based around reasons influencing consumers’ ability to participate, may have more potential applications and industry buy-in. Using capability to participate can help target appropriate interventions; for example, a tenant in the ABC1 socio-economic group is likely to be ‘able to pay’ but has little capability to install home efficiency measures.

### Covid-19

**Covid-19 has exposed risks to progress on decarbonisation and opportunities for a green recovery.**

Covid-19 and its associated restrictions have increased uptake of some of the behaviours that will be essential in reaching net zero emissions, such as active travel and reduced food waste. With the right messaging there is an opportunity to ensure these benefits are maintained in the longer term. Equally there is a risk of a rebound effect as restrictions ease, with an increase in road travel and aviation and purchase of consumer goods.

## Behaviour Change Insights

In order to develop interventions to promote the transition to low carbon behaviour and technology each behaviour and context should be considered separately. Generalisations across sectors and demographic groups should be avoided: the most effective interventions are those that are developed through mapping of the target behaviour and groups. This sub-section provides some guidance on how to develop and implement different interventions for some low carbon technologies and consumer groups.

‘Micro measures’[[8]](#footnote-8) are examples of engagement with low carbon technologies and solutions that impact habitual or everyday behaviours, such as energy saving techniques in the house, journey decision making, and heating energy conservation within existing systems. In these cases the greatest barriers to change are centred around motivation (particularly automatic/habitual) and normative behaviour. Research suggests that the use of normative framing increases the impact of energy conservation interventions, for example smart meters that compare your daily or weekly energy consumption with the average in the neighbourhood. Consumers will typically be more interested in data on energy usage and efficiency if it is placed in context. For example, providing information on what measures can be taken to reduce emissions and providing comparator figures will have greater impacts.

When considering the ‘macro’ changes that consumers can undertake, such as EV purchase or heat pump installation, it is important to understand consumers’ capability and agency to effect a change, particularly in the context of an equitable transition. Many of those at risk of being left behind have little control over their heating provision and electrical supply. Those in social and rented accommodation are usually not able to install a new heating system or renewable energy generation, and the option to buy an EV is irrelevant for those that cannot afford a car.

The other defining aspects of these macro changes is that the decision point happens at specific single instances, rather than as every day habitual behaviour in the case of the micro changes. Some elements influencing the decision will have built up over a period of time. For example, social norms and familiarity with new technology are influenced by increased exposure over an extended period. Interventions that provide opportunities to build familiarity with the technology and upskill the supply chain should be sought. This could include supporting community organisations with technology demonstrations and projects that implement low carbon technology in publicly accessible buildings.

In the supply chain the main barriers to engaging with low carbon technology are concerns around extra cost, technical standards and the burden of compliance. Motivations for engagement included willingness to innovate and problem solve. Many consumers will go to tradespeople for advice on low carbon technology, meaning there is an opportunity for this sector to be advocates for low carbon technology if given the tools and training. In addition, interventions should target major decision points such as home purchase, planning of building works, or change of tenancy.

## Role of the ECC

The ECC has committed to push for increased consideration of consumers in the development of a decarbonised energy system and work towards ensuring the benefits of decarbonisation, financial and otherwise, are shared fairly with consumers. It also aims to ensure that the costs of this approach are distributed fairly and in a way that protects the most financially vulnerable.

Among interviewees there was low awareness of the ECC and its role in the landscape of organisations involved in energy and decarbonisation. All interviewees were asked about their knowledge of the ECC membership and remit, with only a small minority able to talk unprompted. The ECC has an important role in setting the future agenda for Consumer Scotland and operates in an increasingly crowded energy and decarbonisation stakeholder environment in Scotland. It should therefore consider outreach activity to build understanding of its role, its aims, and how they fit into the future of energy consumer protection in Scotland. Potentially the ECC could use the release of this report (or a summary version) to relaunch themselves and use the report as a discussion aid around their remit and aims.

## Research and Advocacy

This sub-section builds on the enhanced understanding of the current levels of knowledge amongst consumers of decarbonisation technologies and barriers to uptake described above to make recommendations for a research and advocacy agenda. Some of this could be taken forward directly by the ECC while other will involve collaboration with other stakeholders.

1. Ensuring the benefits of decarbonisation are shared equally and reducing fuel poverty is a strong theme from this research. While the problem is acknowledged and the agenda is well developed in Scotland compared to the rest of the UK, there has not been in-depth work done to develop solutions. There are opportunities in several areas for the ECC to target its research and advocacy to tackle this issue. For example, research is needed to understand the scale of potential fuel poverty created by decarbonisation. While some work has been done by BEIS in this area further Scottish-specific investigation would be useful. Ideas are needed for how to target support to consumers with heat pumps and TOUs at times of high energy demand (e.g. cold weather periods) to avoid seasonal fuel poverty.

The most advanced work in this area is the CES ‘Smart and Fair’ project, funded by SSEN and WPD. There is an opportunity to build on Phase I of the project either independently or by funding Phase II to secure Scottish insights. The project is seeking to validate the tools and models it has developed, profile communities in terms of their likelihood to take part in smart energy offers and design and trial new interventions.

1. Understanding the potential for a services model of delivery has been a concept in energy decarbonisation for decades as it has the potential to overcome some of the structural, behavioural and economic barriers to decarbonisation. However, there is little Scotland-specific insight. Dependant on the work being done by SG’s Energy Company Services, there may be an opportunity for the ECC to assist in gathering information.
2. There is a significant evidence supporting the positive role of community level organisations in decarbonisation, from encouraging participation, providing advice and support through to aggregating demand for energy. However, funding and regulatory conditions inhibit their potential. Organisations like Community Energy Action are advocating for measures to enable community energy and ECC should consider further developing its position in this area.

A community-level project directory could help advance this agenda. There are numerous examples of projects conducted at community level which contain valuable insights but there is no good mechanism for sharing them with other current or planned projects. The ECC could support the creation of a database of these projects, with aggregated learnings and insights packaged for areas and groups considering activity. Discussions would be needed to identify the best organisations to be involved to build on existing knowledge bases (for example EST and CES). Support in this space will be critical to mitigate the risk of a loss of EU funding particularly on the islands.

The ECC could support a demonstration of a community-owned aggregation platform, using the products and systems for communicating with and controlling flexibility assets (e.g. storage heaters and EV batteries). This could provide first-hand evidence of many of the community-led benefits of decarbonisation and include several technologies discussed in this report.

1. As smarter energy networks become increasingly digital, consumers’ ability to engage via this channel will be essential. There is emerging evidence of changes to digital literacy as a result of Covid-19: more work is needed to understand what this will look like for all energy consumers, what gaps remain, and how they can be addressed.
2. There is a knowledge gap around energy consumers’ understanding of how the energy system works and is funded in Scotland. It is important that this information is communicated particularly to vulnerable consumers and that engagement with energy markets is available to all: knowledge should not be a prerequisite for participation. There are other consumer groups particularly in younger age brackets that show high levels of concern for climate change but low levels of understanding of how decarbonisation will happen through the Scottish energy system. Consideration should be given to the development of educational content aimed at these groups. Low carbon heating should be a priority due to the low level of understanding evidenced.
3. Further work may be needed to define and implement the consumer protection framework and regulation needed during the decarbonisation transition. Some work has been done by a SG Quality and Skills working group but the work of the ECC and Consumer Scotland in this area will be critical. Linked to this, consumers need to be given confidence that they will get the performance (such as comfort) they want at a predictable price. Uncertainty around technology performance and consumer outcomes and rights pose a risk to the decarbonisation challenge.
4. Finally, we were advised by some stakeholders that further relevant reports are expected to be published later this year. Many reports have been delayed by Covid-19 and therefore there are likely to be several new reports available in Q1 and Q2 2021. We recommend updating this report, perhaps in summer 2021, once more documents have been released.

## Decarbonisation through Regulation

The scope of this report was limited to examining options for improving consumer engagement with decarbonisation. As such, it is beyond the scope of this work to consider in detail the need for additional regulation to help consumers switch to low carbon technologies.

In brief, regulation will ultimately be needed to phase out carbon intensive technologies and achieve comprehensive uptake of low emission alternatives. There is certainly a case for using regulation to gradually phase out the most carbon-intensive technologies, with the phase out of inefficient lightbulbs being a good example.

Cenex believes that action to increase consumer engagement should be undertaken in parallel with a push for more regulation, as many consumers will voluntarily switch to low carbon technologies prior to regulation taking effect, assuming these alternatives are fit for purpose and other barriers identified in this report are overcome. This is particularly the case where regulation will take a long time to have an effect.

To illustrate with an example, SG will phase out the need for sales of new internal combustion engine vehicles in 2030. This clear policy signal will influence the choices of some consumers and, more importantly, will guide the market to increase the supply of zero emission tailpipe vehicles. In the 10 years between now and then, increased consumer engagement can help more people voluntarily switch to EVs, rather than waiting until the regulation takes effect. Similarly, while there are growing calls for EPCs to be reformed or replaced, this process may take several years to have an effect. In the meantime, more can be done to work with consumers to voluntarily adopt suitable low carbon heating and energy efficiency measures.



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1. <https://www.bbc.co.uk/news/uk-scotland-56500739> [↑](#footnote-ref-1)
2. <https://www.gov.scot/publications/energy-consumers-commission-2020-2021-workplan-consultation/> [↑](#footnote-ref-2)
3. <https://www.transport.gov.scot/media/47052/national-transport-strategy.pdf> [↑](#footnote-ref-3)
4. <https://www.gov.scot/publications/energy-consumer-action-plan-putting-consumers-heart-scotlands-energy-transition/> [↑](#footnote-ref-4)
5. [www.transport.gov.scot/media/47196/scottish-transport-statistics-2019.pdf](http://www.transport.gov.scot/media/47196/scottish-transport-statistics-2019.pdf) [↑](#footnote-ref-5)
6. <https://www.bbc.co.uk/news/uk-scotland-56500739> [↑](#footnote-ref-6)
7. The ‘gilet jaunes’ or ‘yellow vests’ protests started in response to a range of issues, at the forefront of which were tax increases of 7.6 cents per litre on diesel and 3.9 cents on petrol in 2018, with a further increase of 6.5 cents on diesel and 2.9 cents on petrol planned for 2019. These fuel taxes include a carbon-based element, hence the sharper increases for diesel. Protestors felt these increases unfairly impacted lower and middle impact consumers. As a result of the protest movement, in December 2018 the French government announced that the planned tax rises would not go ahead. [↑](#footnote-ref-7)
8. Avoiding the use of ‘small’ for its potential association with the size of impact or importance. [↑](#footnote-ref-8)