



# The Role of Behaviour Change in Scottish Climate Change Policy

Final Report

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# EXECUTIVE SUMMARY

## Introduction

The Scottish Government have recently set out their vision to achieving a low-carbon society through the publication of climate-related strategic plans. The Climate Change Plan<sup>1</sup>, and the Scottish Energy Strategy<sup>2</sup> set the route to achieve significant emissions reductions between now and 2050. Implementation of these policies will 'touch on the lives of everyone in Scotland', as changes to how people heat their homes, get around and use resources as part of their lifestyle will be necessitated. Given the scale and ambition of Scotland's targets, there will be significant demands on consumers to change certain behaviours which contribute to Scotland's emissions.

Changing behaviours at scale can be challenging due to the multiple factors which can contribute to how people act or influence the choices they make. To support policy-makers to understand and influence climate-related behaviours, the Scottish Government use the Individual, Social, Material (ISM) Tool which was developed specifically for this purpose.

A draft version of the Climate Change Plan received criticism for not fully integrating behaviour into policy and building on the insights available from the field of behavioural science<sup>3</sup>.

As yet, the individual expectations for behaviour change have not been mapped out to give a clear picture of how consumers will be impacted in operationalising Scotland's climate-related targets. This research is timely as it follows the publication of the policies and is able to inform the route and modes of delivering them.

## Research aims

This research project was commissioned to determine the role that consumer behaviour plays within the Climate Change Plan and the Scottish Energy Strategy, for the sectors within the CFU's remit - energy, postal and water. As such, it assessed the extent to which the ISM Tool had been applied to understand what consumer behaviour change is expected within the policies. The impacts that such behavioural expectations would have on consumers was explored, so that consumer interests can be a central consideration in realising the policy ambitions.

The research also aimed to review examples of integrating behaviour change into policy, to contextualise and inform the approach of the Scottish Government.

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<sup>1</sup> <http://www.gov.scot/Publications/2018/02/8867>

<sup>2</sup> <http://www.gov.scot/Publications/2017/01/3414/6>

<sup>3</sup> [http://www.parliament.scot/S5\\_Environment/Reports/ECCLRS052017R03.pdf](http://www.parliament.scot/S5_Environment/Reports/ECCLRS052017R03.pdf)

## Methodology

- A desk-based review of the Climate Change Plan and Scottish Energy Strategy was completed to assess what the behavioural implications would be for consumers.
- Following on from this, the expectations identified were assessed according to the likely impacts that they would have on Scottish consumers. Both positive impacts (co-benefits) and negative impacts (side-effects) were noted.
- A series of interviews were then completed with expert stakeholders to evaluate the policy expectations and assess their suitability and achievability given current behavioural trends.
- A series of ten case studies were developed. These detail a range of behaviour change interventions and research, to inform and provide a backdrop to the Scottish Government's approach.
- Following a synthesis of the findings from the research activities, conclusions and recommendations were made.

## Key findings

The following findings incorporate results from the policy review as well as points raised and insights from the stakeholder interviewees. The research found that:

- 41 behavioural expectations were identified across the policies, of which seven were explored in depth, as they fall directly within the CFU's remit. These changes in behaviours fell into two groups – one off, visible behaviours (adopt energy retrofits; install of low carbon heating systems; install of smart meters; adopting electric vehicles) and habitual changes to consumer consumption (adopt energy saving behaviours related to heat; energy saving behaviours related to water and electricity; purchase of energy efficient appliances).
- A number of the targets for achieving emissions reductions through changes to consumer behaviours are not explicit in the policy documents. It was noted that the 'one off' changes to behaviours were more detailed and better considered than the 'habitual' behaviour changes. Habitual behaviours are more complex to understand and influence.
- This was linked to an over-arching approach that explored how to make current consumption more efficient (e.g.: more efficient air travel) rather than looking to change social practices linked to consumption (e.g. taking trains instead of flying).
- Due to the missing or inadequate targets in some areas of the policies, it is difficult to get a clear picture on how consumers will be impacted. However, 4 areas which are likely to influence how certain policies will impact individual consumers differently were; those living in urban compared with rural areas, the socioeconomic status of consumers, their local authority area and consumers' tenure.

- The lack of clarity around some of the targets for behaviour change was noted as indicative of the uncertainty as to how the policy ambitions will be achieved. Interviewees expressed concerns about a lack of clear routes to delivery which could support widescale behaviour change, in particular regarding everyday behaviours (e.g. heating home, using electricity).
- At present, a gap appears to exist between consumer consumption, consumers' awareness of the need to change behaviours and the momentum needed to achieve Scotland's emission-reduction ambitions. In order to bridge this gap, tough decisions will be required by the Government, which may involve increased regulation as one of the means to influence behaviour at scale.
- In spite of some of the short-comings of the application of the ISM Tool or the extent behaviour change was considered in policy development, the Scottish Government has significant groundwork done on which to build. There is an awareness of the benefits of behaviourally-informed decision making within Scotland, and some recent innovative pilots have been run which will inform future policy and planning.

## Recommendations

- As the proposals and targets outlined in the plans will now need to be delivered, there is immediate need for the Government to put consumers' behaviour at the heart of policy. The ISM Tool is a proven means to achieve this and develop appropriate solutions that consider the numerous factors that influence any behaviour or choice. However, this must be embraced across Government so that policies are built around consumers and their behaviour, rather than behaviour being considered as an 'add-on'. Genuine commitment to supporting behaviour change is needed, which has not been fully observed to date.
- Further clarity will need to be provided to delivery organisations, local authorities and consumers themselves to understand the scale of behaviour change needed, as well as the most appropriate means to achieving this. In particular, as this relates to the consumption linked to consumer habits and lifestyles.
- In order to bridge current gaps in knowledge about what may motivate certain people to change their behaviours (particularly those who are not interested in climate change), there is a need for research. Better understanding of current trends, attitudes and motivations for change amongst consumers will be paramount to developing appropriate supports and interventions.

# 1. INTRODUCTION

## 1.1 The Role of Behaviour Change in Climate Policy

In recent years, there has been a growing recognition within academic and policy circles of the complexities of human behaviour. The traditional view of behaviour is that people act logically and rationally, weigh up options and make a deliberate choice to act in a way that offers most benefit to them, or society. Thus, behaviours should be influenced through either a carrot or a stick approach.

In reality of course, individuals often make choices which may appear irrational, as any choice is influenced by cultural, contextual and other types of factors. Everyday examples of this are smoking, poor recycling habits or driving rather than taking the bus to work. The extension of this complexity to any behaviour, is that to influence behaviour, a combination of relevant factors, or levers to change must be identified and targeted as part of an appropriate policy solution. Countless interventions, programmes and policies fail to achieve their aims, as they do not effectively target all relevant levers that contribute to a particular action, choice or pattern of behaviour. One example of this would be UK Government's Green Deal Initiative<sup>4</sup> which offered loans to encourage householders and businesses to install energy efficiency retrofits to their properties. The programme was terminated in 2015, after being live for only two and a half years, due to low uptake of retrofits. An analysis found that the programme over-emphasised the financial incentive as a catalyst for action and did not consider that this alone might not motivate people to act. Increased promotion of the benefits and emphasising the trustworthiness of those delivering the Green Deal were steps identified which could have led to greater uptake of retrofits<sup>5</sup>.

The increased understanding that behaviours are the product of numerous factors has major implications for policy related to climate change, which fundamentally relies on influencing behaviour at scale. Whether policy encourages purchases related to efficiency (loft insulation), prohibits a certain action (hose pipe bans) or encourages more sustainable habits (bottle deposit schemes), its success is reliant on influencing behaviours. Any such programme or intervention falls under the broad umbrella term of 'behaviour change'. Approaches which draw on behavioural science aim to support behaviour change by identifying and targeting the relevant levers to change.

There has been an international trend in policy-making of applying the scientific methods available to behavioural science to determine what works best for whom,

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<sup>4</sup> <https://www.gov.uk/green-deal-energy-saving-measures>

<sup>5</sup> Gillich, A., Sunikka-Blank, M., Ford, A., 2016, Lessons for the UK Green Deal from the US BBN, *Building Research and Information*

when and why<sup>6</sup>. With behavioural interventions, major successes can be achieved at relatively low cost to Government. This is why such approaches are growing in popularity worldwide<sup>7</sup>. As with any policy approach, not all interventions are successful, though such examples can be built on to inform future decision making<sup>8</sup>.

## 1.2 Climate Policy Within Scotland

Over the last number of years, Scotland has cemented and further developed its place as a leader in addressing the challenges of climate change through a series of ambitious plans and targets. The Climate Change (Scotland) Act 2009<sup>9</sup> has paved the way for subsequent strategy development that has set the bar and tone for Scotland's commitments. The Climate Change Plan (CCP)<sup>10</sup>, published in February 2018, sets out how the targeted emissions reductions will be achieved. As it was being developed, it explicitly acknowledged that *'in implementing this Plan, we will touch on the lives of everyone in Scotland'* and detailed how behaviour change would be needed across all domains of society, including travel, work, leisure and how people live within their homes<sup>11</sup>.

As was evident from the range of responses to the public consultation<sup>12</sup> of draft versions of the CCP, many working within the climate change policy sphere felt that this was not achieved to its fullest extent. While there was widespread support for ambitious changes to behaviour, the extent that Scottish consumers would need to adapt their behaviour was not felt to have the necessary clarity or route-map to being achieved.<sup>13</sup> Following scrutiny of the plan, The Environment, Climate Change and Land Reform (ECCLR) Parliamentary Committee recommended that the future draft not only incorporate a fuller consideration of behaviour but drew on behavioural science insights to best support change<sup>14</sup>.

The ECCLR committee recommended further application of the Scottish Government's available tool for achieving behaviour change through policy, the ISM

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6 <http://www.oecd.org/gov/regulatory-policy/behavioural-insights-and-public-policy-9789264270480-en.htm>

7 OECD (2017), Tackling Environmental Problems with the Help of Behavioural Insights, OECD Publishing, Paris

<sup>8</sup> See Case Study 5 – DECC Study

<sup>9</sup> <http://www.legislation.gov.uk/asp/2009/12/2009-08-05>

<sup>10</sup> <http://www.gov.scot/Publications/2018/02/8867>

<sup>11</sup> <http://www.gov.scot/Resource/0051/00513102.pdf>

<sup>12</sup> <http://www.gov.scot/Publications/2017/12/8859>

<sup>13</sup> <http://www.gov.scot/Publications/2017/12/8859/6>

<sup>14</sup> [http://www.parliament.scot/S5\\_Environment/Reports/ECCLRS052017R03.pdf](http://www.parliament.scot/S5_Environment/Reports/ECCLRS052017R03.pdf)

Tool<sup>15</sup>, within the final version of the CCP. This could ensure that a clear picture of the change required could be determined along with identification of the most appropriate mechanisms for achieving it.

### **1.3 About this Research Project**

The Consumers Future Unit of Citizen's Advice Scotland commissioned Changeworks and Hilliam Research and Analysis to assess the extent that recent Scottish climate policy has considered behaviour and utilised tools from behaviour science for supporting change. The research was timed to provide analysis and comment on two recent policy documents in particular. These were the final version of the Climate Change Plan (published February 2018), and Scotland's first Energy Strategy (published December 2017).

The primary research objective was to determine how the relevant strategy and associated policies would impact on consumers. In particular, the expectations of behaviour change which are expected of consumers across Scotland, and how such behaviour change may be achieved.

A supporting research objective was to analyse the integration of behaviour science within the Scottish climate policy. While best practice examples of interventions are context-dependant, this research aims to assess the approach of the Scottish Government against other examples, to inform recommendations going forward.

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<sup>15</sup> <http://www.gov.scot/Publications/2013/06/8511>

## 2. CONTEXT

### 2.1 The Climate Change Plan (CCP)

The Climate Change Plan<sup>16</sup> was finalised and published in late February 2018. This follows years of work within the Scottish Government since the establishment of the Climate Change (Scotland) Act 2009. Consumer views were sought and integrated into the iterations of the plan through public consultations, climate change conversations and holding an ISM workshop with members of the public<sup>17</sup>.

The CCP is an umbrella document which sets out Scotland's long-term vision and ambitions to achieving carbon reductions and transitioning to a low carbon society by 2050. It focuses on discrete sectors which contribute to Scotland's carbon footprint, such as Buildings, Electricity and Agriculture and utilises a multifactorial quantitative methodology (the Times Model<sup>18</sup>) to determine CO<sub>2</sub> emission targets for the specific sectors. Policies, plans and proposals within each sector are described within the document to give a picture of future practice.

### 2.2 Scottish Energy Strategy: The Future of Energy in Scotland

The Scottish Energy Strategy<sup>19</sup>, published in December 2017, falls under the CCP, focusing specifically on meeting the future energy needs of the Scottish population, balancing actions to support climate change mitigation in a way that can support Scotland's economy. This has gone through a draft publication and public consultation process, as with the CCP. The document describes six energy priorities<sup>20</sup> for a whole-system approach that considers both the use and the supply of energy for heat, power and transport. The high-level ambitions described within this document are caveated with a recognition that technological developments are likely to improve carbon efficiencies, though as yet such technologies are generally not mature enough.

### 2.3 The ISM Tool

The Individual Social Material (ISM) Tool<sup>21</sup> is a model used to identify and tease apart the multitude of factors which can influence behaviour completed by a person or group and anticipate likely responses to change. The ISM Tool was developed for the Scottish Government as a means to integrate best practice in behaviour change

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<sup>16</sup> <http://www.gov.scot/Publications/2018/02/8867>

<sup>17</sup> Changeworks delivered this workshop around *Engaging householders with their heating controls*

<sup>18</sup> <http://www.gov.scot/Resource/0050/00508928.pdf>

<sup>19</sup> <http://www.gov.scot/Publications/2017/01/3414/6>

<sup>20</sup> Consumer engagement and protection; Energy efficiency; System security and flexibility; Innovative local energy systems, Renewable and low carbon solutions; Oil and gas industry strengths

<sup>21</sup> <http://www.gov.scot/resource/0042/00423436.pdf>

into climate change policy. It was developed following an international review<sup>22</sup> of climate-behaviour interventions which found that effective behaviour change programmes targeted multiple levers to enable change. These levers may relate to the individual and the material world around them, as well as social factors such as the meanings attributed to certain actions, or the types of behaviours peoples' peers engage in. Considerations from the social level may not be immediately obvious, and are included less in interventions<sup>23</sup>, often at the expense of those interventions achieving their aims.

The Climate Hub within the Scottish Government have championed the use of the ISM Tool and aimed to incorporate it into the development of climate policy over recent years. The Tool represents the primary mechanism for incorporating considerations about behaviour and insights from the field of behavioural science into Scottish Climate Policy.

Between 2016 and 2018, Changeworks led a project which aimed to incorporate use of the ISM Tool into policy making teams within the Scottish Government through the delivery of workshops involving policy makers and/ or expert stakeholders from particular areas linked to climate change mitigation. The project was managed and evaluated from within the Scottish Government. As such, Changeworks is unable to comment on the extent to which behavioural considerations were integrated into policy. This research project involves an external analysis of the policy and the completion of the research activities outlined.

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<sup>22</sup> <http://www.gov.scot/Publications/2011/02/01104638/0>

<sup>23</sup> <http://www.gov.scot/resource/0042/00423436.pdf>

## 3. METHODOLOGY

### 3.1 Research Activities

To explore and evaluate the extent to which behaviour has been considered in policy-making in Scotland, a multi-modal research approach was taken. This comprised of the following activities:

- A review of the CCP and the Scottish Energy Strategy and familiarisation with supporting policy documents and associated grey literature to identify all the behavioural expectations for Scottish consumers in achieving Scotland's targets of emission reduction
- Exploring how these expectations could impact on consumers, across five dimensions which broadly mapped onto the CFU's consumer principles
- Mapping out the extent to which such behaviours would need to be adopted, and identifying the current 'state of affairs' for each behavioural expectation, under each of the 5 impact dimensions (Appendix 2)
- Completing interviews with expert stakeholders who work across Scotland, supporting the aims outlined within the policies. As the interviewees are involved in the delivery of proposals outlined in the policies, these interviews allowed for more in-depth exploration of the likely impacts on consumers, and identification of available support for consumers.
- Desk-based review of previous climate mitigation work that incorporates behavioural science and development of 10 case studies. These provide a backdrop for the Scottish policies, highlighting successes, challenges and costs to changing behaviours at scale.

The case studies selected are predominantly from the UK, though some from a European context have been selected to add diversity and depth. Case studies from the regulated industries of energy, water and post were deliberately chosen as they reflect CFU's remit. As would be expected, a range of behavioural models and change tools were used in the case studies selected, as the ISM Tool represents only one of a number of approaches to considering behaviour change. However, what is noticeable amongst the case studies which achieved successes, is that they targeted multiple factors that may be associated with changing a behaviour in a particular context.

Conclusions and recommendations have been drawn from these activities. These are intended to inform the CFU's agenda to promote consumer interests related to the regulated industries of energy, water and the postal sector. In addition, this research will provide a balanced assessment of the Scottish Government's commitment to achieving wide scale behaviour change to inform industry stakeholders and teams within the Scottish Government.

### 3.2 Note of Consideration

It should be noted that it was the intention of both the Consumer Futures Unit and the Research Team that this research would involve inputs from members of the Scottish Government, and in particular those linked to the Climate Hub, as well as climate-policy teams. This was to ensure that the Research Team was fully aware of, and

understood, all factors which had contributed to specific targets and decisions linked to the policies. Unfortunately, members of the Scottish Government were unable to participate in the research due to an upcoming internal review on associated topics. While this was not detrimental to the completion of the research, the Research Team wish to acknowledge that the research thus represents an external evaluation of Government policy. However, every effort has been made to accurately represent the policy content and consumers implications as comprehensively as possible.

## 4. FINDINGS

While efforts were made to represent the three regulated industries (energy, water and postal), it is acknowledged that the focus is predominantly on energy-related consumer impacts. Given the nature of the policies, this is to be expected. The water sector features where possible in case studies and examples given throughout the report. However, the policies reviewed included noticeably scant mention or detail about water use or plans to reduce this. The postal sector is absent, as interviewees were unable to comment on this and literature reviews did not point towards previous behaviour change work related to the postal sector. Meaningful evaluation of how behaviour change related to climate policy could affect consumers in relation to the postal market was further prevented by the challenges in assessing impacts of the policies, as discussed below.

### 4.1 Policy Review

The Climate Change Plan and Scottish Energy Strategy were examined in detail to determine what changes to behaviour would be demanded or expected of consumers to achieve the vision laid out for 2050. In-depth exploration of the two policy documents identified 41 different examples of behaviours which would be expected of some or all consumers. Some of the behavioural expectations were explicit (e.g. adopt retrofit solutions for domestic insulation), which may then necessitate implicit behaviours (adjust home heating behaviours post-retrofit). The initial longlist of behaviours comprises the first two columns of the table in Appendix 1. There was a high degree of overlap between the two documents regarding energy-related choices. To ensure meaningful outputs, some similar behaviours were clustered so 16 different behaviours or groups of behaviours remained.

This list of behaviours/ groups of behaviours (see Appendix 1) includes a number of behaviours which fall outwith of the CFU's remit. That is, they don't relate directly to the regulated industries of energy, water and post. Seven of the behaviours/ groups of behaviours are covered within the scope of the CFU and were thus explored in depth as they were of most interest for the purposes of this research. The seven behaviours/ groups of behaviour which were the primary focus of this research were as follows:

- 1) *Upgrading domestic heating*
- 2) *Completing energy retrofits*
- 3) *Install of smart meters*
- 4) *Switch to electric vehicles or ultra-low emission vehicles (EVs/ULEVs)*
- 5) *Adopt energy saving behaviours (heat)*
- 6) *Adopt energy saving behaviours (electric/ water)*
- 7) *Purchase energy efficient appliances*

In order to evaluate the extent that these expectations would impact on consumers, the targets set out in the CCP were also examined, such as the number of people within Scotland who would be expected to complete a certain change. The CCP is

heavily informed from analyses produced by the Times Model<sup>24</sup>, which set specific emission limits, or carbon envelopes for different sectors. Thus, the CCP is largely focused toward achieving quantitative emission reduction metrics. However, due to the visionary nature of the Scottish Government’s Energy Strategy in particular, some of the targets and future milestones in the policies are not specific enough to be able to comprehensively evaluate the impacts they will have on consumer’s behaviours. Where a clear picture is absent as to what the current state of affairs is compared to the targets, assessing the progress and ambitions of certain targets is also challenging.

All behaviour groups were evaluated in terms of the co-benefits (positive impacts) and side-effects (negative impacts) which they could have on consumers. The dimensions which potential impacts were assessed were Health, Wellbeing & Safety; Financial; Community & Social; Access; Choice, Fairness & Redress. These dimensions broadly encompass the seven principles of consumer protection which guide the CFU’s work as seen in Table 1 but were expanded to account for all likely impacts.

**Table 1: Dimensions to measure consumer impacts and related CFU principles**

<b>Dimensions which impact on consumers were assessed</b>	<b>CFU Consumer Principles covered within each dimension</b>
Health, Wellbeing, Safety	Safety
Financial	-
Community, Social	Representation
Access	Access, Information
Choice, Fairness, Redress	Choice, Fairness, Redress

Some general points from the review of the CCP and Energy Strategy are discussed below, followed by brief summaries of some of the key impacts noted and summaries of the seven behaviours explored in depth. These summaries are included to ‘bring to life’, the general themes discussed initially. The co-benefits and side-effects under each of the dimensions looked at are also included in Appendix 2.

## 4.2 Targets for Behaviour Change

The policies, plans and proposals include some high-level emission targets, but where behaviour change will be necessitated, the targets are often ill-defined or absent. One example was the 5 MTCO<sub>2</sub> reduction expected from the “the widespread adoption of electric vehicles”, mentioned several times within the CCP. However, it is

<sup>24</sup> <https://beta.gov.scot/publications/scottish-governments-climate-change-plan-third-report-proposals-policies-2018/pages/8/>

not made clear how many people or what proportion of the population are expected to switch to electric vehicles. The matrix included in Appendix 2 allows for gaps such as this in targets to be observed at a glance (i.e. blank cells in the matrix).

In some instances, where explicit targets were included, there was a lack of context or baseline figures indicating the current state of affairs (e.g. no mention of current rates of purchase/ use of energy efficient appliances). This prevented meaningful conclusions from being drawn as to the extent of the challenge that lies ahead and how this could impact on consumers in Scotland. These gaps are likely to be explained by one of two reasons – either supporting information and figures relating to current behavioural trends, rate of uptake of measures to date etc., were omitted from the policy documents, or these are not known. One resource of current consumption patterns is the Scottish Government’s Low Carbon Behaviours Framework<sup>25</sup>, but the information within this does not filter into many of the proposals and policies.

Due to the Research Team’s limited access to Scottish Government representatives as mentioned, it was not possible to build a picture of the reasoning behind certain figures and targets (or lack of detail). For example, the extent of domestic behaviours linked to heat, water and electricity that consumers will need to change, or how the uptake of EVs will be expected across different segmentations of the population. However, the research process suggested that major gaps exist in understanding current status and the extent of the effort and change required to meet interim and 2050 targets.

### 4.3 Scope of Policies

The scope of some of the policy ambitions also lack the detail needed to fully understand what they involve, and how these will affect consumers. Within the CCP, it is noted that emissions reductions can be achieved in the transport sector through societal shifts in work, social and leisure patterns. What this includes is not specified, though major shifts to current lifestyle practices would have significant implications (both positive and negative) for consumers. Similarly, the expectation to make a ‘switch to public transport’ relies on innumerable situational, cognitive and infrastructural factors for any person, rather than them doing it because ‘it is the right thing to do’.

Such examples suggest that it is assumed consumers will make choices and changes to their current lifestyles at scale, with little consideration of what this will actually involve them to do.

Simplifying such issues may be indicative of the traditional view of behaviour being rational, decision-based and deliberate, as mentioned above, as opposed to considering behaviour as being the outcome of numerous inter-related factors. Taking this chosen approach will of course influence how interventions are selected and delivered. This observation appears to be intrinsically linked to the broader

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<sup>25</sup> <http://www.gov.scot/Publications/2016/11/4735/0>

question of how central the analysis and consideration of specific behaviours actually are within the policies.

Further detail that breaks down what a particular expectation will involve for consumers should be provided by the Scottish Government in the coming years, though no plans are in place for this. Increased clarity could allow delivery organisations, local government and consumers themselves to understand what is being asked of consumers.

#### **4.4 Emphasis on Changes to ‘System’**

Where targets, base rates and routes to achieving the targets were noted, these tended to be in relation to the one-off visible changes to the physical ‘system’ that contribute to emissions. Energy efficient retrofits, transition to low carbon heating systems and transition to EVs or ULEVs all fall within this category. In contrast, the thinking around changes to consumer lifestyles and consumption habits which are personal (and less visible in terms of if they have been completed, or potential benefits) seems less developed. For example; changes to heat and electricity behaviours, or the behaviours relating to energy efficient appliances and equipment.

The once-off, ‘system changes’ are generally noted to be the ‘low hanging fruit’ for reducing emissions. The behaviours which are part of individuals’ consumption habits may be more complex and therefore more challenging to understand and influence. While these are mentioned throughout the CCP, there appears to be scant detail of how these changes to behaviour will be achieved. It is unclear, for example, which electric appliances should be purchased; should currently owned appliances be upgraded; questions about life-span and ratings, and so on. These lifestyle behaviours and consumption patterns warrant significant focus in the coming years to understand the behaviours as well as determining approaches to supporting change.

#### **4.5 Impacts on consumers**

Where evident, the likely impacts that the policy expectations could have on particular consumers were noted. These can be seen in the matrix in Appendix 2. However, given the lack of specific targets for some of the policy areas, or defined scope of certain proposals, many of these impacts are speculative. For implied behaviours (i.e.: they will be necessitated if some of the more explicit behaviours are completed), the analysis requires that assumptions are made from assumptions, so it becomes more challenging to confidently assess what the impacts will be on consumers.

Essentially, it is difficult to assess how the policies will affect those at the sharp end of the plan (consumers), when the policies appear to have been developed without explicit consideration of what behaviour changes will be expected of people and how these could be achieved. That being said, some recurring factors were noted to have the potential to affect some consumers more than, or differently to, other consumers in different situations. These are rural/ urban divide, local government, socio-economic status and tenure. These are described below. Other factors, such as number of dependants within a household, or a person’s physical and mental health are also likely to affect consumers, though the four which could be commented on

with relative certainty by the Research Team are discussed here. The text is relatively brief, as in-depth and meaningful analysis could not be completed due to the general tone of the policies.

#### **a. Rural/ Urban Divide**

This was noted to be the primary factor which could influence the extent and manner that some policy expectations would impact on consumers, (e.g. retrofits, heating systems). Difficulties in economies of scale for dispersed homes will greatly reduce the feasibility of domestic energy efficiency retrofits in comparison with densely located urban homes. Should a nationwide hydrogen network be the chosen path for decarbonising heating, it is unclear how those currently living off the gas grid would be affected. Geographical location is also an important consideration for the feasibility of certain technologies, such as district heating.

#### **b. Local Government**

Linked to the above point, the availability and delivery of climate-related support, programmes and regulations will likely vary depending on the local authority. This is not just due to the governance or priorities of a local authority (LA) but also resourcing, both financial and staff-based. As budgets for local governments continue to shrink, smaller LAs could be disadvantaged where required to commit staff to developing and delivering programmes which support this objective. A failure for centrally planned infrastructure for EVs could also disadvantage certain areas, as journeys may require multiple charging cards and numerous tariff zones.

#### **c. Socio-economic Status**

Using socio-economic status (SES) as a broad proxy for education and vulnerability to fuel poverty, there is concern that some policies may disproportionately disadvantage consumers from low SES backgrounds. The level of behaviour change required, even if not made explicit within policy, will require significant awareness, engagement, appropriate supports etc. As consumers on the lowest band of income are typically more likely to live in homes which are not energy efficient<sup>26</sup>, have less disposable income and less time to engage with climate-related issues, there is always the risk that they will be left behind and double-disadvantaged. Without the provision of sufficient additional support, the smart meter roll-out is not likely to benefit such vulnerable people, as it may with less vulnerable consumers.<sup>27</sup>

#### **d. Tenure**

Differences in tenure will also affect the impacts that Scotland's climate policy will have on consumers. Those living in social housing have been supported to the furthest extent through The Energy Efficiency Standard for Social Housing

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<sup>26</sup> <https://www.ons.gov.uk/ons/rel/social-trends-rd/social...41/housing-chapter.pdf>

<sup>27</sup> Darby S (2010) Smart metering: what potential for householder engagement? Building Research and Information 38(5), 442-457 59

(ESSH)<sup>28</sup> regulations. However, given the housing emissions targets, it may be more financially viable for local authorities to build some new housing stock than retrofit all current hard-to-treat stock<sup>29</sup>. This will require major upheaval to all those living within such areas. The private rental sector is likely to be further legislated for, to enforce the improvement of the energy efficiency of the private rental stock. In comparison, owner occupiers do not currently need to adhere to minimum efficiency standards.

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<sup>28</sup> <http://www.gov.scot/Publications/2017/12/2678/10>

<sup>29</sup> <http://www.engineering.ucl.ac.uk/engineering-exchange/files/2014/10/Report-Refurbishment-Demolition-Social-Housing.pdf>

## 5. Summary of Seven Behaviours Explored

Analysis of the seven behaviours which were explored in depth are summarised below. Targets, scope and pathways to change are mentioned, where identified. Some of the main impacts that adopting these changes could have on consumers are also discussed. These are separated according to the natural split between behaviours which the review highlighted i.e. the first 4 of these are 'One off behaviour changes' (changes consumers need to make to their energy 'system') and the remaining 3 are 'habitual behaviour changes' (changes consumers need to make to their everyday practice). Refer to Appendix 2 for an overview of these behaviours along with those outside of the remit of the CFU and this research.

### One off behaviour changes

#### 5.1 Upgrading domestic heating

This group of behaviours involves upgrading a domestic heating system to a more efficient one, as well as transitioning to a low-carbon system. This could involve installing low carbon heating systems, joining district heat networks or the transition to community renewable schemes.

Currently, 2% of Scotland's domestic heat is supplied by low-carbon technologies. By 2032, the target for this is 35%, indicating the scale of change needed in the coming years. The changes required will impact on consumers in different ways. For example; the ownership and trust issues a person joining a communal heating scheme may need to consider compared with the financial effects of investing in heat pumps. However, despite this, much has been put in place to support consumers making these changes.

The Energy Efficient Scotland<sup>30</sup> Programme (formally SEEP) incorporates plans for increased energy efficiency through the decarbonisation of household supply (including heat pumps, district heating). While the contents of this plan are outwith the scope of this research, this does highlight the plans in place to achieve efficiencies from fabric and physical 'system' improvements. Other programmes such as ECO funding and Home Energy Efficiency Programmes (HEEPS) will also support consumers to make what is largely a one-off change to their current situation (e.g. upgrade boiler, transition to district heating).

The impacts that these behavioural expectations will have on consumers are generally positive, with expected increases in affordable warmth expected. However, the financial costs of upgrading systems is an obvious side-effect which will influence consumer perceptions and acceptance of these expectations.

As the options available to consumers regarding low carbon heating systems is largely geography-determined (i.e. rural v urban, islands) this could affect different consumers in very different ways. District heating, by its nature could impact on the

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<sup>30</sup> <http://www.gov.scot/Resource/0053/00534980.pdf>

choice available to consumers living in an area where it is proposed. Consideration of the geographical diversity and spread of consumers is evident throughout the policies however and the Scottish Government's Community and Renewable Energy Scheme (CARES) funding is one example of the support in place for this.

## 5.2 Completing energy retrofits

This group of behaviours includes installing all measures which would increase the efficiency of one's home or property – from installs of insulation to building fabric upgrades such as external wall insulation.

The targets for this are wide-reaching including insulation of 60% of walls and 70% of lofts (200mm) where feasible by 2020. Relatively clear indication of the current state of affairs is also provided which indicates the scale of the changes required in the coming years. These changes will be achieved primarily with the Energy Efficient Scotland Programme which includes minimum standards for all domestic buildings to be achieved at different points between now and 2040.

Given the growing profile of the need for and value of energy retrofits, these expectations for consumer change may be somewhat intuitive to many consumers. As with upgrading heating systems, the co-benefits for consumers are clear and far-reaching. For example, improved efficiencies are likely to reduce fuel poverty and increase thermal comfort for many people. Financial savings over time are also probable. Physical and mental well-being improvements are likely outcomes of this, though this also opens the way for a rebound effect that sees more energy being consumed i.e. consumers will either overheat homes, open windows or spend savings on other energy consuming sources. Supports and policy which can help mitigate this may be needed.

The rural/ urban divide is likely to influence how some consumers will be impacted compared to others. Rural retrofits may be less financially feasible, which could disadvantage consumers in these areas. This could potentially place extra financial burden on rural local authorities compared with city councils, which may impact indirectly on consumers.

## 5.3 Install of Smart Meters

This one-off behaviour change expectation is interlinked with the smart meter roll-out, currently intended to be completed by 2020<sup>31</sup>.

The policies refer to Smart Energy GB, the organisation set up to deliver the roll-out but beyond this, little consideration appears to be given to smart meters. Uncertainties linked to costs, tariffs and incompatible properties which will impact on

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<sup>31</sup> <https://www.smartenergygb.org/en/smart-future/about-the-rollout>

consumers have already been identified within research completed by the CFU<sup>32</sup>. These have not, as yet been resolved, though little consideration of the impact smart meters will have on consumers is evident from the policies, perhaps this is because Smart Energy GB are responsible for most aspects of the roll-out.

Acceptance of a smart meter install is a once-off expectation of consumers which is unlikely to have dramatic side-effects or co-benefits for consumers in and of itself. However, it is as yet unclear how consumers on pre-payment meters will be impacted differently from bill-pay consumers.

Already, it has been highlighted that smart meters can present an additional barrier for consumers switching supplier, particularly those on pre-payment meters<sup>33</sup>. As those switching may require the install of a new smart meter, this could potentially impact negatively on those living in remote areas. The energy supplier who a customer is with will also influence how the roll-out will impact on them, in positive and/ or negative ways (through different tariffs, billing options etc.)

Smart meters will not achieve energy savings without associated behaviour change, a fact which is often over-looked and is just briefly acknowledged in the CCP. The CCP references that Home Energy Scotland will advise consumers on how to maximise the potential smart meter benefits. At present, however, Home Energy Scotland do not provide in depth advice about Smart meters

## **5.4 Switch to electric vehicles or ultra-low emission vehicles (EVs/ULEVs)**

The CCP makes numerous references to the ‘widespread’ adoption of electric vehicles, which will contribute to transport emission reductions. While it is not further specified what this scale involves, it appears that much of the foundations for this are already in existence and that progress is already being made. A multi-pronged approach by the Scottish Government to date has included significant charging infrastructure and the availability of interest-free loans for EVs through the Energy Saving Trust. In addition, conventional vehicles are being made less attractive, through changes to excise differentials and the planned phase-out of diesel cars by 2032.

Technological advances are greatly increasing the range of EVs/ ULEVs and as purchase costs continue to decrease, their uptake will increase, further ensuring market competitiveness for consumers.

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<sup>32</sup> [https://www.cas.org.uk/system/files/publications/smart\\_move\\_-\\_taking\\_stock\\_of\\_the\\_smart\\_meter\\_rollout\\_programme\\_in\\_scotland.pdf](https://www.cas.org.uk/system/files/publications/smart_move_-_taking_stock_of_the_smart_meter_rollout_programme_in_scotland.pdf)

<sup>33</sup> <https://wearecitizensadvice.org.uk/everyone-should-be-offered-a-smart-meter-by-2020-b3bb7cd2d600>

The research team deemed that a range of supports (as mentioned above) are in place to achieve the targets of this behaviour change expectation, in addition to domestic heating upgrades and energy retrofits. However, it should be recognised that this switch does not require a major shift in current behaviour patterns. Certainly, EVs need to be 'acceptable' to consumers, a trend which is increasing as range anxiety becomes debunked, and there is a necessary upfront cost of buying one. As people will likely upgrade a conventional vehicle after a few years anyway, this is not a new, unexpected cost. Similarly, the need to charge vehicles on a long journey is not dissimilar to the practice of stopping to fill the tank with petrol or diesel, especially with charging times reducing as new charging and battery technology is introduced.

One of the positive impacts of the widespread adoption of EVs and ULEVs will be a reduction in air pollution, particularly in urban areas, which can have major positive health implications. In terms of choice, fairness and representation, it may be that lower income households are at a disadvantage as there is currently a limited used-EV market and will continue to be so for a few years. As with conventional vehicles, rural and island communities may have limited choice of vehicles and suppliers.

## Habitual behaviour changes

### 5.5 Adopt energy saving behaviours (heat)

Unlike the explicit behaviours/ behaviour groups discussed so far, the behaviours related to heat are implicit, or will be necessitated as a result of other behaviours. This includes how consumers interact with heating systems and controls. For example, after receiving a retrofit which increases the insulation of one's home, a consumer will need to use the system most effectively to gain the expected benefits. Additionally, patterns of household use will need to change. For example, as time-of-use tariffs become more popular, householders may put on the washing machine as they go to bed. The development of such societal habits that conserve energy represents one of the major areas for emissions reductions but does not appear to have received the same attention within the policies as the explicit one-off choices.

Energy Efficient Scotland<sup>34</sup>, published in May 2018 is the Scottish Government's programme for achieving the changes through increased efficiency, including behaviour change. However, the demands on this approach are currently unclear, as there was little detail provided within the CCP or Energy Strategy regarding the level of change to home heating behaviours householders will need to make and what proportion of the population will need to make these changes. It is assumed that all consumers across Scotland will be affected by this expectation including those who may be vulnerable to fuel poverty and the 'able-to-pay' market. Among the latter are consumers who may not currently be doing all they can do to use energy efficiently, as the financial savings from doing this are an insufficient motivating factor.

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<sup>34</sup> <http://www.gov.scot/Resource/0053/00534980.pdf>

The impacts on consumers of adopting more efficient practices for heating their homes would generally be positive, in terms of comfort and financial savings. Those who could invest in more advanced technologies such as smart heating controls (Hive, Alexa etc.) may be able to achieve higher savings than less affluent consumers. However, such impacts will only be realised if there is sufficient consumer awareness, ability and motivation to adopt these changes. Currently the understanding or appetite for widespread changes to the way we use energy to heat our homes is too low to generate change.

## 5.6 Adopt energy saving behaviours (electric/ water)

The behaviours within this group are similar to the heat-related behaviours in that they are implicit, habitual behaviours which occur within people's homes and are less visible than bigger one-off changes to infrastructure. Water consumption fits neatly with electricity consumption for domestic users, especially when the energy required to get water from source to point of use is considered. However, the CCP makes almost no mention of domestic water use and includes no targets or plans to reduce water use.

The behaviours within this group are not specified within the CCP but are likely to range from turning off lights and appliances when not in use, to adopting new patterns of washing, cleaning and cooking to save energy through time-of-use tariffs.

Area-based schemes are one of the mechanisms for achieving change in this domain – though the continuation of the Climate Challenge Fund and SEEP Pathfinder pilots which incorporate domestic energy behaviours. Scottish Water also run area-based water efficiency schemes. However, the scale of the challenge ahead is not made clear from the policy documents.

While brief mention of the need to change patterns of heating, washing and cooking are included in the CCP, there is no clear picture of how this will be achieved or the consumers who will be expected to do this. Scottish Water and the Energy Saving Trust are likely to play a significant role, though how they will motivate different consumers across Scotland is not as yet laid out.

The impacts on consumers are thus largely unclear regarding their electricity and water use behaviours – questions remain about the extent that expected changes could impact on their lifestyle and habits. Will consumers who are part of an area-based scheme be at an advantage to those who are not? Can those who can afford to pay for higher energy usage continue to do so, or should they be made aware of their contribution to Scotland's overall emissions?

## 5.7 Purchase energy efficient equipment

Of the seven behavioural expectations which were explored in detail as part of this research, this was the one which received the least attention within the policy documents. Again, this is a habitual group of behaviours which are personal and less visible to others if or how they are completed.

There is little clarity provided on the need to consider the life-cycle of appliances, different rating scales, whether consumers should replace inefficient appliances or wait for a natural point to upgrade them (i.e.: when they stop working). Or, should appliances be repaired if they are inefficient? These questions, though they may appear trivial, could have implications for different consumers relating to awareness, regulation, inconvenience and financial costs and/ or savings. In this way this group serves as a useful case example of how different the consumers and their behaviours do not appear to have been the central consideration for some of the policies and proposals outlined in the Scottish Government's approach. As can be seen in Appendix 1, this is also the case for a number of the behaviours which are outside of the remit of the Consumer Futures Unit.

## 6. EXPERT ANALYSIS

To achieve the depth of evaluation necessary for this research to contribute meaningfully to the discussion of how Scottish climate change policy will impact on consumers, insights were sought from a range of expert stakeholders. These individuals work within climate-related fields and have insights into societal trends and current practices, enabling them to comment on the appropriateness, level of ambition and feasibility of some of the elements covered within the policies. Effort was made to include stakeholders from a range of disciplines, organisations and localities. In addition, to maximise the value and representativeness of inputs, stakeholders who work with different groups within society (rural householders, vulnerable consumers etc.) were invited to participate. The interviewees are noted in the box below. Many of the key themes identified overlap to an extent and have co-dependencies, though they have been separated to support readability and discussion. While interviewees' organisations are listed here, the views and ideas within this research project may not represent the views of these organisations.

**Table 2: Stakeholders who were interviewed as part of research**

Name	Role and Organisation
Michael Kellett	Sustainable Economy, City of Edinburgh Council
Dr. Kathryn Colley	Researcher, Social, Economic & Geographical Sciences Group, The James Hutton Institute
Donna Bogdanovic	Senior Housing Strategy Officer, Scottish Borders Council
Ellie Grebenik	Programme Manager – Scottish Transport, Energy Saving Trust
Dr. Dan Barlow	Programme Manager, ClimateXChange
Elaine Waterson	Strategy Manager – Scotland, Energy Saving Trust
Ross Armstrong	Managing Director, Warmworks

## 6.1 Policy Focus

An issue which many of the interviewees identified is that the Scottish climate policies focus on current practice rather than on future practice as the driver for change. That is, most of the emission reductions which the policies and proposals aim to achieve will come from consumers making amendments to their current behaviours and lifestyle choices. For example, achieving emissions reductions from the transport sector, through the widespread adoption of EVs or ULEVs. While such changes will begin to address current rates of emissions, they do not ask the tougher questions of consumers (and by extension the Scottish Government). That is, they do not force a genuine assessment of current social practices and patterns of consumption which are contributing to current emission rates.

The alternative approach to identifying possible efficiencies within current practice would be to establish a vision for the future, of what a low-carbon society would look like, then determine how to achieve it. Using the same example, this might involve assessing what travel journeys are being made, by whom, and tackling the increasing societal dependence of using privately owned vehicles for many of them. Some interviewees referred to the fact that EV infrastructure should not be solely focused on use for private vehicles as this does nothing to solve congestion issues. Rather infrastructure should have a large focus towards supporting electrified on-demand transport such as taxis, car club vehicles and car sharing.

Such an approach is likely to be more challenging to achieve than the current focus, of gradually improving the status quo. However, the benefits in terms of long term emission reductions are likely to be significantly greater<sup>35</sup>. This future-visioning would require a more holistic view of the practices, lifestyle choices and trends which contribute to current consumption. This point is linked with the observation from the policy review, that the policies focus on 'system' changes rather than tackling habits and social practices linked to consumption.

It could be argued that such an approach might seem too radical or could lack the political and public will to achieve it. This was acknowledged by many of the interviewees; that it can be easy to critique an issue from the outside without having the responsibility to make unenviably tough decisions. One interviewee highlighted that the current political system is at odds with achieving such an approach, as MSPs will understandably need to consider future elections, while the majority of the population are more concerned about their current bills rather than their role in combating climate change. In addition, it makes sense to future proof current infrastructure before expecting society-wide step change.

However, it was a notable consensus amongst interviewees that there is a disconnect between the climate policy ambitions which have been agreed and the level of programmes, strategic planning and momentum to achieve them, given current consumption and emission rates. This is particularly true for the behaviours

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<sup>35</sup> <http://www.demand.ac.uk/09/01/2018/bedazzled-by-energy-efficiency/>

related to personal consumption and lifestyle such as heating, transport and domestic electricity use, as outlined in the previous section. However, it was noted:

*“meanwhile the ice is melting, and we need to act quickly” – Dan Barlow*

## 6.2 Prioritisation of Climate Policies

The extent to which emission reduction targets (and associated consumer behaviour change) should be pursued was another theme which emerged from discussion with interviewees. With the completion of domestic retrofits, for example, one interviewee questioned the value of the target to ‘install energy efficiency retrofits in all homes by 2032, where technically feasible’. As retrofits could affect the resale value, the appearance and the character of a particular property, should the building’s efficiency be the sole metric of success, or at the very least be prioritised over other consideration? Technically feasible, it was also highlighted, may not mean being financially feasible, or even realistic in some instances.

An opinion at the other end of the spectrum to this was that emissions reductions should be pursued to their fullest extent, as it is a global issue, with implications for people and the environment worldwide. This interviewee highlighted that while householders may oppose legislation which mandated or regulated particular actions (which links to previous CFU research<sup>36</sup>), this did not take precedence over attempting to counter the impacts of flooding, famine and mass movement being observed globally.

The remit or prioritisation of any policy is linked to the Government’s orientation as to how much they are willing to intervene to influence societal practice, or how much they feel they are able to. However, one interviewee noted that there was cross-party, parliamentary, industry and public support for the ambitions set out by the Climate Change Act (Scotland) 2009, which now needs to be followed up with decisive actions.

## 6.3 Integration of ISM Thinking

Many of the interviewees were familiar with the ISM Tool, or at least the ideas linked to supporting behaviour change which underpin it. As stated, it is difficult to fully assess the extent ISM thinking was applied to policy development, though it appears from the documents that it was not the predominant approach for the majority of policies and procedures within.

The language used within the policy documents was highlighted by one interviewee. They acknowledged that while behaviour was not comprehensively considered, there was clearly an awareness of the ISM Tool and behaviours amongst many of the researchers and policy-makers involved in the policy development. One interviewee also highlighted the language within the documents which set out visions for “a low-carbon society” rather than a “low-carbon economy”, a term which is used by other

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<sup>36</sup>[https://www.cas.org.uk/system/files/publications/warming\\_scotland\\_up\\_to\\_energy\\_efficiency\\_-\\_cfu\\_insight\\_report\\_-\\_2017-10-10.pdf](https://www.cas.org.uk/system/files/publications/warming_scotland_up_to_energy_efficiency_-_cfu_insight_report_-_2017-10-10.pdf)

nations and was referred to in previous versions of CCP. This change of wording, it was felt, represents a shift in approach which considers the range of choices, habits and behaviours which contribute to Scotland's collective consumption rather than a purely quantitative analysis of carbon emissions. These factors were noted to be highly positive, though other comments relating to application of the ISM Tool and incorporation of behavioural science were more dispirited or critical, as discussed below.

## 6.4 Plans to achieve behaviour change

As consumer behaviours, and therefore consumers themselves do not appear to be the central focus of the policies, the routes to achieving change at scale are unclear. Some interviewees were disappointed that the plans and proposals outlined by the Government included no route-map as to how key behaviour changes would be achieved.

This perceived lack of direction, combined with inadequately defined targets was felt to present challenges for delivery. Many of the interviewees who worked for organisations tasked with delivering on these targets expressed a lack of steer in certain areas, which is already proving to be a major challenge.

Energy Efficient Scotland<sup>37</sup> (formally known as SEEP) the long-term strategy to realise emissions reductions through energy efficiency, was published in May 2018 shortly after the interviews were completed. Some interviewees were hopeful that it would better define the role of local Government in realising the programmes. However, there was slight apprehension as to whether it would fully incorporate behaviour change to the extent that this has been publicised to date. It was noted that there are many different industry perspectives as to what this route-map is and what it would include. As such, it may be too broad in design to achieve the specificity required to support societal behaviour change. The potential effectiveness of this plan in achieving real change was also noted to be dependent on many internal factors:

*“SEEP will set the framework... but the framework will need to be properly funded, properly targeted, properly accountable to be successful “ – Ross Armstrong*

## 6.5 Understanding of Drivers for Behaviour Change

There is still a knowledge gap for those involved in policy making as well as delivery about how to motivate certain behaviours for particular groups, and limited evidence of behavioural spill-over (where completing one sustainable action will lead to others being completed). One of the interviewees highlighted that findings from one behaviour change intervention may not be applicable to a similar intervention targeting a separate group. As any choice or decision is context-dependant, it was acknowledged that it is therefore extremely difficult for the Scottish Government to

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<sup>37</sup> <http://www.gov.scot/Resource/0053/00534980.pdf>

determine the best course of action for a particular behaviour, if they do not have clear data about current behaviours and evidence of successful interventions.

*“We need so much more research to understand what are the best ways of doing things, for different people. Without that evidence, we can only make best guesses” - Kathryn Colley.*

The point was made, however that while research to bridging this gap would be highly beneficial in the long run, it is understandable why resource is directed more to delivery of schemes and programmes which may not have as big an influence but will at least achieve some immediate and publicly visible impact.

Drivers and approaches will be needed for different consumers. One interviewee mentioned hearing of a lady who was hopeful of the prospect of global warming – as it may mean she could afford to heat her home. This anecdote highlights the complexity of influencing a behaviour, which will not be achieved by assuming people will reduce their emissions if asked to. Finding the right language, framing and messenger for different groups will be important in the coming years though this will of course come at a cost.

*“If we can get communities talking about [climate change and energy efficiency] more, talking about it as it relates to themselves and their immediate environment around them... because these things will be important to people” – Donna Bogdonovic*

## 6.6 Cultural Shift

All interviewees highlighted that the climate policy ambitions laid out in the CCP will require generating momentum of intention and action across society. This momentum, or cultural shift is not evident yet, nor do the mechanisms and programmes needed to achieve it appear to be.

Suggestions were made which could better allow consumers to make the link between the climate ambitions and their personal contribution to this through their actions or inaction. In particular, demonstrating the benefits of choices such as adopting retrofits through stories, case studies or community champions so that consumers could visualise what a retrofit would involve for them, and the ways that this could impact on their lives.

*“From chatting to various people who aren’t in the sustainable transport sector, there are still many misconceptions of EVs. This needs to change through consumer engagement, and the vehicles need to be normalised and visible to the public. People should feel like their next car will be a ULEV.” – Ellie Grebenik*

The widespread normalisation of emission-reducing behaviours could also be supported by re-framing decisions. For example, a sustainable action which could benefit an individual in other ways, such as increased convenience or saving time.

*“How to share and talk up the wider benefits that can come from these choices that an individual can make – by taking the train to London you also get four hours of quiet to do some work or relax.” – Dan Barlow*

Another point shared by interviewees was that as some of the expectations for consumers, such as the install of micro-renewables or transitioning to a low carbon heating supply, will require significant changes which may have a long-term pay off, the challenge is greater. The chicken-and-egg nature of driving renewables uptake, of needing to highlight the benefits, before achieving critical mass of uptake is a challenge for which there is no single and simple solution. Such thinking aligns with the ISM Tool which identifies multiple levers to enable change.

*“I think you need action on lots of fronts... lots of engagement work, lots of work around winning hearts and minds, getting people to understand why these things are important, and then you also need some kind of incentive to encourage them to take action. When all else fails, you may need to have to regulate” – Elaine Waterson*

## 6.7 Need for Immediate Decisive Action

It was widely acknowledged that in order to meet emissions reductions targets, there is a need for actions to achieving Scotland’s climate-related ambitions without delay. Even the short-term emission goals and Paris Agreement commitments may be unattainable without dramatic changes to current consumption.

Interviewees highlighted the need for some level of regulation and mandating to be used in conjunction with understanding of behaviours and the factors that influence them to “*motivate or even compel changes in behaviour*”. This was particularly favoured in relation to changes within the home. Social housing in Scotland has seen significant progress in recent years regarding fabric efficiency which has largely been achieved through regulation. Regulations within the owner-occupier and the private rental sector is likely to be beneficial, though politically unpopular.

Regulation was not the only suggestion to catalyse change. Choice architecture (making some options more attractive to encourage behaviour change) was suggested by many stakeholders. For example, introducing barriers to deter continued use of conventional vehicles

*“Maybe not in terms of cost, but in terms of where they can drive” – Ellie Grebenik*

Following from the previous points about drivers and cultural shift, one interviewee felt that key to this challenge is getting consumers on board before such changes are introduced. As was the case with the 2006 smoking ban, sufficient spadework in the years preceding, combined with a line being drawn in the sand and a change implemented can be successful. Consumers, it was noted, often adapt to change with more ease than they themselves or policy makers expected.

## 6.8 International Comparisons

Though some of the points noted above included an extent of criticism, it is worth highlighting that many of the interviewees drew attention to the encouraging efforts and successes of the Scottish Government relative to those of other governments. For example, Scotland was recently found to spend over four times as much per

capita on energy efficiency, compared to England<sup>38</sup>. Westminster's less visible and less ambitious efforts relating to energy efficiency were specifically highlighted by multiple interviewees. Despite the apparently low application of the ISM Tool being applied throughout policy, it was acknowledged that the Scottish Government has been genuine in some of its attempts to better place consumer behaviour at the heart of decisions. Examples of this were the development and championing of the ISM Tool for numerous years and a long-established Low Carbon Behaviours Team. The significant efforts of this team may be limited however, as individual policy teams determine to what extent their own policies genuinely consider consumer behaviour and levers to change.

The Scottish Government has also invested in innovative projects in order to develop understanding into the motivating factors for carbon reduction, for example through the Carbon Conversations Toolkit, a smart meter pilot and an energy efficiency behaviour change pilot (see Case Study 4). Though each of these examples must be assessed on their own merits, they provide increased understanding and learnings regarding consumer behaviours which can be applied to further projects.

Other innovations which overcome barriers include home visits from specialist renewable advisors and the provision of equity loans for renewables, delivered through Home Energy Scotland. Such programmes can overcome financial or access barriers which individuals or members of certain groups within society may experience. By contrast, one interviewee highlighted that within England and Wales, few comparative state-funded programmes exist, and much support that is available is funded through the Energy Company Obligation (ECO).

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<sup>38</sup> <https://www.e3g.org/news/media-room/home-insulation-crash-in-england>

## 7. CASE STUDIES

The following case studies comprise of policy, research programmes and interventions which have some of the learnings from behavioural science as their foundation. Behaviours can encompass a range of actions from habits, choices, lifestyle choices, social practices etc., and any particular behaviour is context dependant. Any number of situational, cultural, historical and social factors can contribute to any action at a particular time. As such, while the case studies can be used as a backdrop for other projects, direct comparisons are difficult and not always appropriate to make. Commentaries and research into behaviour continually emphasise the uniqueness of any intervention which aims to influence behaviour across groups so the successes or challenges of one example may not be transferable to another.

It is important to note that the research team has not undertaken a full review of the theories of change and approach to behaviour change used by those developing these case studies. As a result, it is not possible to fully ascertain if these examples sought to change all of the perceived influences on behaviours in these contexts or selected factors. In some cases, it is clear that the intervention focuses solely on one factor, in others multiple factors are addressed. The Scottish Government's ISM tool acknowledges that multiple factors influence any behaviour and to achieve long lasting change, multiple factors must be addressed by multiple stakeholders.

These case studies are indicative of the types of intervention that could be delivered to address different challenges. It is also important to note that the context for change is important – different interventions may work in different settings.

After presenting each case study some selected comments are made on the approach to change and findings from each study. Implications for change programmes and policy are also discussed.

### 7.1 One off behaviour changes (i.e. changes consumers need to make to their energy 'system')

The following case studies are examples of behaviour change interventions where consumers have been encouraged (primarily) to make one-off behaviour changes. These are similar to the first four of the seven behaviours identified in the CCP and Energy Strategy described in this report, i.e.

- Upgrading domestic heating
- Completing energy retrofits
- Install of smart meters
- Switch to electric vehicles or ultra-low emission vehicles (EVs/ ULEVs)

### **Case Study 1: The impact of domestic energy efficiency retrofit schemes on householder attitudes and behaviours (Kirklees Warm Zone scheme)**

**Date:** 2014 (scheme completed 2010)

**Organisation(s) responsible:** Kirklees Warm Zone run by Kirklees Council

**Type of research:** Attitudinal Research

#### **Detail of study**

The paper reports on the results of a survey of 500 householders in the Kirklees Warm Zone scheme. The scheme was a local authority led city scale domestic retrofit programme which installed free energy efficiency measures (loft and cavity wall insulation, energy efficient light bulbs) in over 50,000 homes between 2007 and 2010. The survey aimed to determine what roles different socio-economic and attitudinal factors play in levels of participation in, and the impacts of, the city scale energy retrofit scheme.

The 52-question survey was conducted in 2013 through face-to-face interviews in public places in Kirklees. A total of 505 survey responses were collected; 141(32%) who had fully participated in the scheme (received energy efficiency retrofits) and 364 who had not.

The Kirklees Warm Zone scheme was estimated to save 105,913MWh per year – with an assumption that half of the potential energy savings from installed insulation would be taken in comfort improvements rather than reductions in energy use.

The survey established that key design features of the scheme, socio-economic and attitudinal factors affected the take-up of energy efficient measures and impacted on behaviour and energy consumption following installation.

#### **Successes and failures**

A greater proportion of respondents who had fully participated in the scheme felt obliged to 'do their bit for the environment', 'save energy where possible' and 'enjoyed energy saving' compared to those who had not fully participated in the scheme.

Almost all of those who took part in the scheme (98 per cent) said they did so as the measures were free of charge; 82 per cent also stated that reducing environmental impact was a factor. The desire to reduce energy bills, to increase property values, to decrease damp and mould and to make the house warmer was given a higher priority by respondents classed as 'never worked and long term unemployed' than by other groups. The most common reason cited for not participating (40 per cent) was a desire to avoid disruption.

Almost a third (29 per cent) of participants used their heating less following the installation of insulation. There was also an increase in participants who began to monitor their energy use following the measures being installed. Participants were more positive about their ability to save energy in the future compared to non-participants.

#### **Costs**

The Kirklees Warm Zone cost nearly £30 million in total and was funded by a range of organisations. The research was enabled by the Ashden Trust – but the amount of financial support is unknown.

The Kirklees study highlights interventions broadly similar to those currently and previously used by the Scottish Government to support the installation (and best use of) technologies to insulate homes. Although primarily a project focusing on a change in the infrastructure of the buildings, the interventions and feedback highlight a range of different behaviour change levers and barriers that could be described across the I, S and M contexts. Selected levers include:

- Individual Levers:
  - Costs and Benefits: hassle and disruption; reducing energy bills; increased property values; warmth, comfort, reduction of damp
  - Values, Beliefs: reducing environmental impact
  - Emotions: enjoyment at being 'part of something'
- Social Levers:
  - Norms: being part of and participating in a bigger scheme; neighbours/ others in locality being part of the project
- Material Levers:
  - Objects / Infrastructure: New insulation, light bulbs both prompting behaviour and engagement and providing benefit.

This case study highlights the need for a holistic approach to behaviour change around retrofit programmes to ensure that the full benefits of a scheme can be realised. The impact of 'full engagement' with the scheme on realising impacts also highlights the need to consider the users of buildings and how they react when developing and delivering these programmes; bringing individuals and communities along with these building transformations can have a significant effect on long term behaviour.

#### **Case Study 2: SPARA (Smart Peripheral and Remote Airports) 2020**

**: 2018**

**Organisation(s) responsible:** HITRANS (Highlands and Islands Transport Partnership), in partnership with Highland Council, Energy Saving Trust and Highlands and Islands Airport Limited (HIAL).

Type of research: Exemplar/ trial

#### **Detail of study**

SPARA 2020 is a Northern Periphery and Arctic Programme area project, funded by ERDF, aimed at addressing the needs of smaller civilian airports in the region.

As part of SPARA 2020, lead partner HITRANS are developing low carbon fuel airport surface access demonstrator trials at airports in the Highlands and Islands. The aim is to decarbonise links from the airport to the local population centre(s).

This has involved the use of electric taxis at Inverness Airport. Inverness Taxis have been awarded a seven-year contract at Inverness Airport – they are committed to lowering their carbon emissions by moving to a fully electric fleet.

### **Successes and failures**

HITRANS are continuing to support the installation of rapid charging points at Inverness Airport and in Inverness City Centre.

Dynamo Taxis visited Inverness in January 2018 to offer local taxi drivers to the opportunity to test drive their wheelchair accessible electric taxis. A range of local taxi firms were contacted and invited to attend the test drive sessions.

Electric car clubs are also due to launch at HIAL airports, including Inverness in 2018.

**Costs:** Total SPARA 2020 project costs: €2.4million; HITRANS budget: €494,253.21.

The SPARA study again highlights the importance of delivering change interventions across multiple contexts (in line with the ISM approach). Although there are significant interventions in the material context, with electric vehicles, charging points and rules and regulation changes to encourage electric vehicle use (i.e. the taxi contract involving a commitment to reduce emissions), there are also interventions across other contexts. For example, wider institutions and groups (local taxi firms) are being encouraged to try out the electric taxi technologies to normalise them and car clubs for the public are also being launched to offer these benefits to individuals.

As a project at its initial stages it will be interesting to explore how successful this will be and how other ISM-related factors influence acceptance of these technologies. For example, there are significant negative meanings associated with air travel in terms of emissions and climate change, so how will this close association between the airport and a local low carbon travel option develop in terms of consumers in the area and how will the introduction and promotion within the City Centre influence wider practice.

### **Case Study 3: Drive Dundee Electric**

**Date:** Ongoing

**Organisation(s) responsible:** Dundee City Council

**Type of research:** Campaign

#### **Detail of study**

Drive Dundee Electric is multi-faceted approach to increase Electric Vehicle uptake in the city. The awareness raising campaign was launched in 2017 as part of wider electric vehicle work by the council. Additional activities include:

- installing EV charging infrastructure, including at council buildings and community hubs (with solar canopies), as well as working with neighbouring councils to install chargers outside Dundee
- supporting the uptake of EVs in the taxi industry (taxis are the biggest road users)
- providing free parking to drivers of electric vehicles

- providing free electricity for charging.

The campaign aimed to provide information and promote electric vehicles to many people through:

- public events
- promoting incentives (such as free parking for electric vehicles and free electricity to charge at public charging points)
- an online website highlighting the many benefits of electric vehicles and the work that Dundee City Council have already undertaken
- specific engagement with businesses, such as car garages, and schools
- work with car franchises to turn hubs into mini experience centres.

#### **Successes and failures**

While Dundee City Council have found that many residents are not yet ready to consider purchasing an electric vehicle, a significant proportion of the taxi fleet within the city is electric.

**Costs:** £55,000 for the campaign (£10,000 from Air quality grant programme and £45,000 from Transport Scotland).

Again, similar to the SPARA study, the Dundee Drive Electric project focuses on the introduction of electric taxi vehicles within a small area. There are multiple interventions across all ISM contexts and this example, led by the local Council, highlights significant interventions across the social and individual contexts to complement changes in infrastructure (material context). These include significant activity around promoting incentives for individuals to change to the use of use EVs (e.g. free parking and charging); promoting benefits; working to make the use of EV charging areas a positive/ destination experience (individual factors), and; tying in with local institutions, organisations and destinations to encourage this activity (levers in the social context).

The lack of uptake of consumers for electric vehicles highlights the fact there are always likely to be factors outwith the direct control of a localised intervention and that large changes to established consumer practices can take time to change, particularly in a case such as this whereby EVs are still unusual across the wider society. However, the lack of project success in terms of consumer purchasing of EVs does not necessarily mean that the project has not been successful; the material, social and individual factors that create a context for consumers to change to EVs has been developed within the area.

## **7.2 Habitual behaviour changes (i.e. changes consumers need to make to their everyday practice)**

The following case studies are examples of behaviour change interventions where consumers have been encouraged (primarily) to make habitual behaviour changes. These are similar or related to the final three of the seven behaviours identified in the CCP and Energy Strategy described in this report, i.e.

- Adopt energy saving behaviours (heat)
- Adopt energy saving behaviours (electric/ water)
- Purchase energy efficient appliances

#### **Case Study 4: Smart Meter Study**

**Date:** 2010

**Organisation(s) responsible:** Ofgem

**Type of research:** Intervention

#### **Detail of study**

The project was conducted by Ofgem between 2007 and 2011 to illustrate the potential of applying behavioural insights to encourage energy conservation by householders. The trials involved more than 61,000 households, delivered by four energy utility companies (EDF, E.ON, Scottish Power and SSE). A series of nine interventions were evaluated, individually and in combination:

- energy efficiency advice
- historic energy consumption information (e.g. comparing energy consumption with previous periods)
- benchmarking of household consumption in comparison to that of comparable households
- using targets to 'commit' households to reducing consumption
- smart electricity and gas meters
- real-time display (RTD) devices to show energy use
- RTD integrated with hot water and heating controls
- Financial incentives (including variable tariffs) to reduce consumption or to shift energy use away from periods of peak demand
- Use of digital media (online, TV) to deliver information.

#### **Successes and failures**

Separately testing the interventions allowed the researchers to determine their specific individual impact, however, coupling interventions was found to lead to larger impacts.

The deployment of smart meters in combination with RTD was found to be the most successful intervention. The inclusion of the RTD resulted in savings of two to four per cent higher than the smart meter alone. The smart meter savings of around three per cent may have occurred because they provide actual feedback on historic consumption, enabling the householder to learn. Smart meters also allow accurate billing, rather than energy companies relying on estimates. The inclusion of the RTD (providing an additional saving of two to four per cent) makes energy consumption more salient for consumers, frequent and accurate than smart meters alone.

Except for two interventions (use of RTD, and benchmarking against comparable households' consumption) the intervention combinations which did not include smart meters, did not result in significant energy savings.

**Costs:** The UK Government allocated £9.75 million to the trials which was match-funded by the energy suppliers which took part.

The Ofgem smart meter study focused on understanding how consumers could get the best out of their energy use, in particular in the context of the introduction of an object (the Smart Meter) that could provide feedback on their energy use. That there were nine interventions tested (across I, S and M contexts) highlights the diverse factors that can influence change. In addition to this, the finding that consumers were more likely to make savings because of multiple interventions again demonstrates that multiple levers are required to foster meaningful change.

#### **Case Study 5: Energy Saving Trust Behaviour Change Pilot**

**Date:** 2015

**Organisation(s) responsible:** Energy Saving Trust (EST), Changeworks, SCARF (the latter two organisations operating Home Energy Scotland advice centres under contract to EST)

**Type of research:** Intervention

#### **Detail of study**

This pilot study aimed to identify the techniques that would encourage people to make best use of their heating controls. The study then took these identified techniques and evaluated their impact to produce recommendations for future programmes on use of heating controls. The design of the pilot was informed by the existing behaviour change evidence base (literature review) and experiences of those 'at the coal face' (Home Energy Scotland advisors who participated in a workshop).

The pilot ran from October 2015 to June 2016 and engaged with households that had recently had insulation installed under home energy efficiency programmes- area-based schemes (HEEPS: ABS). This meant that variability in terms of house type, size and location were reduced. Two groups of households were identified; one in the South East advice centre area with gas heating, and one in the North East area with electric storage heaters. Each advice centre then split their households into:

- a low-cost intervention group (69 households)
- a high cost intervention group (71 households) – which received more intensive support, including a follow-up phone call, offer of home visits and smart thermostats (where central heating systems were suitable).

The advice was offered in the form of simple, reversible experiments – such as adjusting their room thermostat or hot water timer – up to three per household. In addition, households received newsletters and were invited to like the EST Facebook page where they could view more advice.

At least 96 separate heating system interactions (e.g. experiments) were carried out during the pilot (it is likely more were conducted but feedback was not provided). Advisors felt their autonomy in selecting experiments and the long-term contact with participants were key aspects of the support service they could provide to encourage behaviour

change. The fact that the advice was integrated with the HEEPS: ABS work was cited as important in the evaluation.

### **Successes and failures**

The pilot resulted in significant reported behaviour change, with 74 per cent of participants reported having changed at least one heating related behaviour. Of those that carried out at least one experiment, 95 per cent said they were continuing to adopt the changed behaviour. Levels of comfort and householders' control over their heating systems also increased.

A key challenge was being able to speak to householders in the first place, and to engage them to participate. However, a conversion rate of 50% was achieved (number of householders who agreed to participate, compared to those initially spoken to).

**Costs:** Resource intensive due to level of advisor support required.

This case study undertaken by the Energy Saving Trust in Scotland focused on addressing a range of different barriers to adopting energy saving practices after consumers had received an energy efficient retro-fit (similar to the example in case study one in Kirklees but focusing exclusively on the long-term behaviours rather than adopting the retro-fit).

It sought to address multiple elements from across the ISM contexts including: reducing fear or concern about adjusting heating controls through encouraging consumers to 'experiment', allowing consumers to choose an experiment that suited them, working with advisors to normalise participation through the language they use and the feedback provided. The project also sought to build a relationship with the consumers (within the limits of the budget) and included multiple contacts and 'call-backs' to check on progress and offer additional advice. The impact was limited due to resources and the constraints of being predominantly telephone based but demonstrates the type of approach that could be used to support consumers after retrofit programmes have taken place.

## **Case Study 6: Advice on how to use heating controls**

**Date:** 2014

Organisation(s) responsible: Department of Energy and Climate Change (DECC); Behavioural Insights Team, Newcastle City Council; Your Homes Newcastle (social housing); and Building and Commercial Enterprises (engineering firm for boiler checks).

**Type of research:** Intervention

### **Detail of study**

This was a Randomised Control Trial (RCT) aiming to test whether tailored advice from a ‘trusted messenger’ on how to use standard heating controls would result in reduced energy consumption. The trial tested whether face to face advice was more effective at achieving energy savings than an information leaflet, or no intervention at all.

Social housing tenants in Newcastle (1556 households) were randomly divided into three groups:

- one group (312 households) received bespoke advice from boiler engineers on efficient use of their boilers and heating controls;
- a second group (570 households) were given an information leaflet by the boiler engineer;
- the third group – a control group (674 households) received no additional information while the standard boiler check was conducted.

The study aimed to determine whether the advice provided resulted in a percentage change in individual household gas consumption, based on comparison of an end of trial meter reading compared to one taken at the start of the study. The study ran from October 2013 to May 2014.

### **Successes and failures**

No major successes were noted; none of the interventions had a significant effect on energy use. Analysis also considered the impact of different characteristics of the tenant groups (e.g. different property types/ sizes) but again there was no impact noted on gas use. It was noted however, that the advice given to tenants was effective at helping them to use their heating controls, but that this may have resulted in increased thermal comfort, rather than reduced energy consumption. Challenges in delivering face-to-face advice were also noted in some cases, with the boiler engineers having difficulty in delivering the intervention to its specification (e.g. tenants with English as a second language/ difficulty engaging with tenants at early morning appointments when they were distracted getting ready for work or taking care of children).

**Costs:** Wide-scale project, though costs not reported

This DECC energy advice case study focused on a single factor to explore the impact of the advice sources on energy consumption behaviours – specifically would information from a trusted advisor deliver changes in behaviours. It is interesting in

that this extensive trial could not identify any changes in consumption and potentially reinforces the need for a multi-intervention approach to deliver long term change.

### **Case Study 7: Perception of cost savings related to the use of energy-efficient major appliances**

**Date:** 2014

**Organisation(s) responsible:** DECC (now BEIS) and the Behavioural Insights Team

**Type of research:** Randomised controlled trial

#### **Detail of study**

This randomised controlled trial aimed to test whether the way energy efficiency is presented impacts on purchase of major appliances.

The total consumption of electricity consumed by domestic appliances grew around 1.7 per cent per year from 1970 to 2013. Households are estimated to own 41 electrical products on average. While the energy efficiency of new appliances continues to increase, many are still rated A or lower. DECC identified the lack of access to trusted and appropriate information as one of the four key barriers to energy efficiency; also, that energy labelling was an area where behavioural nudges could impact.

Total monetary lifetime running costs were introduced on the EU appliance energy labels (in addition to kWh per year energy consumption) of washing machines, washer dryers and tumble dryers in the trial which involved 38 John Lewis retail stores; evenly (randomly) split between a treatment and controls group.

#### **Successes and failures**

The study established that providing salient information to consumers can help to reduce energy demand. This could include small, low-cost changes to the information provided to consumers on the energy efficiency of appliances.

A total of 60 washing machines, 42 tumble dryers and 13 washer dryers were sold during the trial. The washer dryers sold in the 'treatment' stores in the trial consumed an average of 6.64kWh/year (0.7 per cent) less than the appliances sold in control stores. The effect was greater in non-town centre stores, compared to town centre stores; non-town centre purchases of washer dryers consumed an average of 15.26kWh/year (1.5 per cent) less in treatment stores compared to control stores.

There was however, no significant effect noted for the purchase of washing machines or tumble dryers. DECC hypothesised that this was due to the higher running costs of washer dryers (compared to the other two appliance types).

Extending the use of the new type labels to all washer dryers across John Lewis is estimated to cost around £1,000 (to design labels and train employees); anticipated net present value of social benefits would be around £47,000. Extrapolated to the whole of the UK, social net present value is estimated at £1.7 million in their lifetime.

**Costs:** Unknown

This trial focusing on appliance purchasing again focused on a single factor or behaviour change lever (providing salient information at the point of sale), rather than a multi-factor approach to change. Although there was some change identified to consumer practice, the lack of a major impact suggests that a wider approach to change, involving multiple levers and multiple stakeholders (in line with ISM) may be beneficial.

**Case Study 8: Water efficiency interventions in a non-domestic building – technical versus behaviour change**

**Date:** 2013

**Organisation(s) responsible:** BRE

**Type of research:** Intervention (technical and behavioural change)

**Detail of study**

The BRE research project analysed water use data over a period of 30 weeks, from hot and cold wash hand basin taps in toilets, and a kitchen tap, of an office building. Initially the baseline water consumption was identified before the intervention began.

In the technical intervention phase of the project, the tap flow rate was reduced from nine litres/minute, to six litres/minute and finally to four litres/minute. Water consumption data was logged each time a tap was used by building occupants (using flow meters and data logging equipment).

The trial then returned the flow rate to nine litres/minute and a behavioural change campaign was run to ‘challenge’ office users to reduce their water demand from the toilet wash hand basin taps, and a kitchen tap, by 25 per cent. This campaign ran over three weeks, during which time the water consumption for the male and female toilet wash hand basins was displayed graphically at the entrance to the toilets. Posters promoting water efficiency were also displayed throughout the office, and occupants were sent regular emails reporting on progress towards the 25 per cent target.

A focus group was undertaken with building occupants to establish if they had noticed a change in flow rate and to understand their response to the behaviour change campaign.

**Successes and failures**

The research identified a decrease in the water consumption from the male toilet wash hand basin taps, corresponding to the reduced flow rate in the taps (hot water taps: 14 per cent decrease / cold water taps: 26 per cent decrease). However, the water use increased in the female toilets per hand wash ‘event’ (hot water taps: 21 per cent increase / cold water taps: 32 per cent increase). A flow reduction from nine to four litres/minute should theoretically reduce water consumption by 56 per cent, assuming the same duration of tap use.

The behavioural change campaign was overall more successful than the water efficiency intervention, though the target of a 25 per cent reduction was not achieved. The male

wash hand basin taps (combined) saw a reduction in use of 19 per cent, the female wash hand basin taps (combined) saw a six percent reduction in use, and the kitchen tap use was reduced by 21 per cent. In the kitchen taps, water use consistently reduced over the three-week period, however, with the toilet wash hand basin taps water consumption reduced by approximately 20 per cent in the first week before increasing again in weeks two and three.

Most focus group participants said they did not notice a change in the flow rate of wash hand basin taps. All had been aware of the behaviour change campaign and had modified their behaviour as a result. Hypotheses for the difference in male and female water use included differences in the amount a tap might be turned on and potential differences in soap use.

**Costs:** unknown.

This BRE water trial highlights that a consumer-focused intervention *can* be more effective than a purely physical one and that as a result, consumer interactions and interventions to be considered and developed alongside infrastructure changes to foster behaviour change.

It is interesting that, when engaging with consumers within this trial, they were given regular, repeated and up to date feedback on how they were progressing with their behavioural challenge. They were also given a target (that was achievable) and information was provided through multiple routes and at the point of the behaviour taking place. Fundamentally, feedback was localised, meaningful, relevant and timely for the consumer.

**Case Study 9:** Real time feedback on hot water consumption in the shower

**Date:** 2013

**Organisation(s) responsible:** Swiss Federal Office of Energy (study developed by ETH Zurich and University of Lausanne researchers in collaboration with Amphiro AG and ewz).

**Type of research:** Intervention (randomised controlled trial)

**Detail of study**

The two-month study aimed to determine the impact of real time feedback on hot water consumption in the shower (e.g., the volume and temperature of water consumed). It also aimed to understand the factors and mechanisms that may facilitate effectiveness, including how feedback information affects self-assessment of consumption and conservation, the extent to which comparisons and 'competition' between household members can increase water saving effects and the influence of demographic factors.

The randomised controlled trial featured 697 households with one or two members. Three groups each received different feedback information: control group only receiving temperature information, treatment group 1 receiving temperature information plus real

time feedback on current shower (water and energy consumption), and treatment group 2 which received temperature information, real time feedback on current shower water and energy consumption and feedback on water consumption compared to the previous shower. Surveys were carried out before and after the trial to establish demographics, environmental attitudes and water pricing rates.

### **Successes and failures**

Exposure to real time information (as per treatment group 1) reduced water consumption in both one and two-person households (9.4 litres/ 10.4 litres per shower). Larger water savings were achieved in treatment group 2, where comparisons to the previous shower were made (10.4 litres in one-person households, 10.9 litres in two-person households). These savings amount to around 23 per cent compared to the control group.

Energy consumption (based on volume of water consumed and average temperature) also reduced by about five per cent compared to the control group.

These savings were achieved by changes in behaviour:

- Reduction of shower duration of between 45 and 55 seconds
- Reduction of flow-rate of about 0.3 litres per minute in one-person households (no significant results in two-person households)
- Reduction in average water temperature of between 0.4°C and 0.7°C (again only in one-person households)
- Pauses in water flow – showing real time information only led to pauses nine seconds longer in two-person households only.

Individuals with higher baseline consumption show a stronger behavioural response to intervention. Younger participants (20 – 29-year olds) used 72% more resources per shower than participants over 65, therefore this group is a key target for feedback campaigns.

**Costs:** Unknown

This case study focused on shower use echoes the previous case study in that it shows the potential impact of a change programme focusing on providing relevant, salient feedback to consumers. There is, similar to case studies 5 and 6, a narrow focus on a particular type of intervention (in this case information on consumption in various forms), rather than a more holistic approach involving more factors. However, this does demonstrate the potential success of this type of approach.

### **Case Study 10: What are the Barriers to the Use of Behaviour Change Techniques in the UK Water Sector?**

**Date:** 2016

**Organisation(s) responsible:** Hazel Lewis, MSc student in Water Science and Governance at King's College London

**Type of research:** Thesis – research

### **Detail of study**

The study aimed to determine the barriers to the use of behaviour change techniques in the UK water sector through a series of interview and surveys with a range of influential individuals in the sector. While Ofwat are keen for the customer to be the focus of water company business plans, the use of behaviour change techniques has been limited. The research therefore looked to assess how behaviour change techniques are currently used and understood.

The study involved:

- a literature review to establish the key behaviour change techniques and the use of these techniques in practice in the water sector
- semi-structured qualitative interviews with 17 participants from 14 companies
- a survey of 32 respondents to provide both qualitative and quantitative data.

### **Successes and failures**

The review found that while there is enthusiasm in the UK water sector for the use of behaviour change techniques; a lack of experience, misunderstanding and conflation of key elements are challenges to be addressed. There was some scepticism about the use of behaviour change techniques, with particular concerns around evaluation, and how (the cost of) programmes could be justified to stakeholders, funders and Ofwat. The water sector seems relatively uninformed about behaviour change techniques compared to other sectors (e.g. hygiene). Other key barriers include reluctance from internal teams and perceived cost.

Despite these challenges, all water companies believed that they should try to influence their customers' behaviour, and in some cases employee behaviour also. All interviewees believe that behaviour change is important and all survey respondents felt that customer behaviour impacts on water and wastewater management. Three-quarters of survey respondents said their organisation had already used behaviour change techniques. Many interviewees talked about how behaviour change considerations were essential going forward due to increasing pressures on water resources due to climate change and population growth.

**Costs:** N/A, as review

This final case study perhaps reflects the challenges that any policymaking organisation (and the Scottish Government in particular) faces when coming to terms with changing habitual behaviour to support climate change: i.e. the tension between believing that change is important but lacking the evidence that changes desired will occur, confidence on the correct approach or certainty around the extent of savings and the cost of delivering on these changes. In summary; can a 'strong business case' be made for a particular intervention or change? If not, is this something that we can confidently attempt to change.

### 7.3 Summary: Lessons from Case Studies

Although a very brief review of a select set of behaviour change interventions, it is possible to draw some conclusions from these examples. Firstly, they include some echoes of the Scottish Government International Review of Behaviour Change Interventions<sup>39</sup>. That is, there are examples here where (successful) change programmes have been based on multiple interventions across the I, S and M contexts, reinforcing the applicability of the ISM approach to change in relation to these types of behaviours. We cannot be clear if ISM or similar thinking was used in all of these cases, but it is possible to see how applying this approach to a behavioural challenge could help commissioners and designers to consider a wider range of interventions (i.e. levers across I, S and M) than may initially be considered.

Secondly, it is also noteworthy that focusing on the consumer and providing information, support or interventions that are relevant to them is also a factor in several case studies. Moving the focus of change and carbon reduction away from the carbon emitting 'system' and onto consumers will be an important step in developing policy to foster individual change in the future.

Thirdly, it is clear that there have been successes and failures in the case studies presented here. Fostering change is not just complicated, but complex – there are multiple factors acting on consumers and it a challenge to predict and account for all of them. If there was a single approach to change that could guarantee success this would have been identified. ISM provides a framework to assist in the identification of the factors that support and enable change, but (as evidenced by the final water case study) policymakers are not always sure of or guaranteed success when seeking to change behaviours, and this can act as a barrier.

The Scottish Government and associated partners should therefore accept this uncertainty and look upon change initiatives as an opportunity to learn about what changes (and does not alone change) behaviour, as opposed to seeking to guarantee success. This paper has shown that consumer focused behaviour change policymaking is at the start of its development; it is not firmly established within policy and policy teams as yet. The Government should therefore not only focus more firmly on behaviours but do this with a spirit of trial and experimentation. Expect to fail and succeed and share learning about what has worked and hasn't. This will promote a culture of learning both in terms of changing behaviours, but also in understanding the multiple elements that contribute to this.

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<sup>39</sup> <http://www.gov.scot/Publications/2011/02/01104638/0>

## 8. Conclusions

### 8.1 Behaviour in Policy

The activities completed to date as part of this research have allowed for a deeper understanding of the extent the Scottish Government have considered behaviour within their policy, through use of the ISM Tool. From our evaluation and analysis, it appears that behaviour has been considered to an extent and is clearly part of the awareness and language of policy-makers within the Government. However, in practice the potential opportunities afforded by the ISM Tool and the wider application of behavioural science insights appear less evident. Though the final version of the CCP frequently alludes to behaviour and behaviour change, this does not appear to be a primary driver for the content of the policies within, as the Times Model took precedence. In addition, targets and details on behaviour change have not been presented sufficiently throughout the document. The opportunities, for behavioural science to be harnessed within policy, which the ECCLR Committee recommended, do not appear to have been applied. Rather, the document suggests that behaviour change has not been fully thought through across sectors, as evidenced by viable plans to transition to a low carbon society.

The way forward, and the role different levels of Government, intermediary organisations and those responsible for delivery will play in achieving the ambitions also presents significant challenge. This is due to lack of defined targets in a number of areas, and a lack of clarity as to how some targets will actually be achieved. In particular, targets relating to everyday habits linked to consumption. Thus, until the actual steps to be taken are known, it is difficult to determine how they will affect consumers across Scotland. Linking back to the previous point, where behaviour change is not comprehensively considered, it can be difficult to determine how different people will respond to expectations that their behaviour somehow changes without knowing how.

As the case studies demonstrate, there is no hard-and-fast means of changing a behaviour, though tailoring one's approach to really consider the motivations and barriers to change can improve the likelihood of interventions succeeding. The ISM Tool is a key resource in achieving this. In addition, some interventions can be costly where others can provide significant impacts at relatively low expense.

### 8.2 Next Steps

While the publication of the policy documents represents somewhat of a missed opportunity by the Scottish Government to fully embrace behaviour change approaches, the work completed to date in developing strategy and policy does not end. Now, the challenges of delivering on them must be met if Scotland is to achieve interim and long-term targets across different sectors. Given the emissions reduction targets set out, alongside actual impacts of climate change which are being witnessed globally with increasing regularity, dramatic change will be required in the coming years and decades. The level of behaviour change required will warrant more than a business-as-usual approach by the Government and consumers living in Scotland. Positive elements noted over the course of the research to date indicate

that some of the foundations are in place on which an approach to this transition can be built.

In the first instance are the steps already taken to consider behavioural science and develop a culture to apply it to policy. The development of a bespoke approach to achieve this cross-sector, in the ISM Tool along with its application by certain policy teams is also encouraging. It may be also, that the step change required is unattainable and unfeasible by setting out transformational ambitions without the necessary public groundswell to achieve them. In this way, the 'low-hanging fruit' of domestic retrofits and switching to electric vehicles are necessary first steps in achieving societal change.

## **9. Recommendations**

### **9.1 Further Integration of Behaviour**

Given the availability and potential benefits which can be derived from use of the ISM Tool, it is a strong recommendation that it should be used in shaping the delivery of the climate-related policy. It can be a powerful resource to enable policies to be built around consumers, rather than hoping consumers can meet the expectations set of them which the policy sets out. It has the potential to point towards bespoke solutions for groups of the population for whom mainstream interventions and programmes may not account for (isolated rural consumers for example). As it provides an holistic means to deconstruct behaviours it could act as a useful bridge to achieving the cultural shift not yet present for certain climate-actions.

However, the ISM Tool does not achieve impact if applied tokenistically or as an add-on to policy, as may have been the case for some policy areas. If policies aim to achieve behaviour change, the consumers who engage in behaviours need to be considered at their very heart. Appropriate interventions which consider the relative barriers, motivations and opportunities to change must then be built around those consumers. As yet the Scottish Government have not matched their expressions of intent regarding behaviour with their practice, which needs to begin internally with how all teams integrate the ISM into practice. The Government is not guaranteed immediate success with behaviour change interventions. Change is complex and difficult to predict. However, embracing a culture of experimentation and trial in terms of behaviours, and seeking to learn more about what works and how to influence consumers to overcome concerns about commencing and commissioning change programmes is a vital step.

### **9.2 Additional Research**

The primary recommendation arising from the work completed as part of this Research project, is that there is a need for further research to be completed. The main ways that such research could be of benefit are explained briefly below:

## Assessing current trends

There appears to be gaps in understanding how widespread certain behaviours are currently amongst consumers. There does not seem to be evidence as to the extent people are aware of energy efficient appliances or engaged in actively saving water within their homes for example. It is possible that such information is required before the scale of a particular challenge or target of widespread behaviour change can be adequately understood.

## Social research with consumers

Attitudinal research to determine consumer 'readiness' to adopting certain changes could also be advantageous. A discrete example of this relates to domestic water consumption. Scottish Water are one of the primary electricity consumers within Scotland, due to the energy expended in the treatment and supply of water<sup>40</sup>. However, many householders do not make any link between water usage (or wastage) and carbon emissions. Though EST and Scottish Water have run a pilot to reduce water consumption through water-saving measures and in-home specialist advice from water advisors, it is unclear how this will be built on, given that the CCP does not discuss water use in any level of detail. Furthermore, as there is no personal incentive or disincentive to conserve water as metering is not the norm in Scotland (although it can be installed on request) and council tax is not linked to consumption, some consumers may struggle to prioritise this as an issue. In addition to climate change not being a significant priority across the population, this example also points toward another possible contributing factor – that consumption and emissions are not necessarily linked together in consumers' minds.

## Understanding consumer responses

As was highlighted over the course of the stakeholder interviews, there is still many unknowns regarding the preferences, motivators and barriers of some customers. One size fits all approaches to policy implementation may have limited success, though until targeted campaigns and programmes can be delivered which accommodate consumers who do not fall within the mainstream, it is difficult to know how current service delivery can be achieved. Previous CFU research<sup>41</sup> has highlighted that consumers minimise or misperceive the positive impacts that changes to their behaviour can have on climate change.

## Possible approaches to achieve Targets

Some of the targets outlined within the Scottish Government's vision are still largely undefined, such as the possible transition to hydrogen. Certainties about future events and technologies may not always be realistic to determine. However, further

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<sup>40</sup> <http://www.gov.scot/Publications/2018/02/8867>

<sup>41</sup> YouGov Consumer Futures Unit Omnibus research, 2017, details available from CFU

work which could develop possible options to achieving these aims could better allow for the impacts such proposals may have on consumers to be assessed.

### **Target Setting**

Completion of much research within the above areas could then allow for the development of meaningful targets regarding changes to consumption behaviours. For example, what proportion of homes need to adjust their hot water thermostats down, what will the related carbon savings be?

### **Further focus on sustainable habits**

In particular, there appear to be gaps in current knowledge and understanding across the behavioural areas relating to continued change over time, as opposed to one-off decisions. For example, the regulation and strategy for domestic retrofits as will be available through SEEP is at odds with the consideration of householder heating behaviours. Policy can obviously more easily support such physical improvements, while the 'softer' choices are better achieved through the work of intermediary organisations. That said, the relative absence of such habitual behaviours which form part of consumers' everyday lives within the policy documents suggests that thinking about how to achieve widespread cultural change is less developed. As stated previously, consumers may have to change significant aspects of their lifestyles in the coming years though there is insufficient visibility as yet regarding this. Major changes have been observed in recent years, such as the normalisation and widespread participation in domestic recycling in Scotland, though much yet remains to be done.

## **9.3 Continued Progress**

Much progress has been made, by the Scottish Government, local Government and consumers across Scotland in mitigating against the risks of climate change. This report is only reflective of a small portion of the effort completed to date. The successes and opportunities which the CCP and Scotland's stated ambitions present provide a robust platform for future delivery. Strategic decisions and political will in the future can best support consumers in playing their role in meeting Scotland's climate ambitions.

## 10. Appendices

### 9.1 Appendix 1: Behavioural Expectations Identified in Policies

Explicit Behavioural Expectations	Implicit Behavioural Expectations	Groups of behavioural expectations of consumers
<ul style="list-style-type: none"> <li>• Install of domestic low carbon or renewable heat sources (e.g. biomass, ASHP, GSHP)</li> <li>• Upgrade/ install new heating systems in homes</li> <li>• Join local heat networks</li> <li>• Adopt retrofit</li> <li>• Adopt smart meters</li> <li>• Install insulation in homes</li> <li>• Purchase and use of low emission cars and vans, EVs and ULEVs</li> <li>• Uptake of fuel efficient driving training and behaviours</li> <li>• Switch to public transport</li> <li>• Switch to active travel</li> <li>• Lift share and use of low carbon car clubs</li> <li>• Buy second-hand goods</li> <li>• Increase recycling (including food)</li> <li>• Repair items rather than replace them</li> <li>• Increase use of timber in construction</li> <li>• Landowners to plant woodlands</li> <li>• Land managers to restore peatland</li> <li>• Plant more trees and hedgerows (agriculture)</li> <li>• Include leguminous crops in rotation (agriculture)</li> </ul>	<ul style="list-style-type: none"> <li>• Adopt energy saving behaviours (heat)</li> <li>• Energy saving behaviours for heat, electricity, times of use,</li> <li>• Change patterns/ times of working</li> <li>• Purchase energy efficient equipment</li> <li>• Insulate homes</li> <li>• Associated changes of behaviour with retrofit</li> <li>• Adopt energy saving behaviours (heat)</li> <li>• Adopt energy saving behaviours (electricity)</li> <li>• Increased community engagement and ownership of renewable generation</li> <li>• Changing time of washing; cleaning; cooking for time of use tariffs</li> <li>• Change social/ leisure patterns</li> <li>• Travel patterns and behaviours</li> <li>• Adopt energy saving behaviours (electricity)</li> <li>• Consider circular economy in purchasing / using/ disposal</li> <li>• Undertake carbon auditing (agriculture)</li> <li>• Understand nutrient content and adopt management practices (agriculture)</li> <li>• Adopt nitrogen management and soil testing processes (agriculture)</li> <li>• Work with Quality Meats Scotland to improve emissions from livestock (agriculture)</li> <li>• Adoption of energy efficiency measures</li> <li>• Adoption of energy efficiency measures and Low or Zero Carbon technologies</li> <li>• Adoption of low carbon heating</li> <li>• Purchase and use of low carbon HGVs</li> </ul>	<ul style="list-style-type: none"> <li>• Upgrading domestic heating</li> <li>• Complete efficiency retrofits</li> <li>• Smart meters</li> <li>• Adopt energy saving behaviours (Heat)</li> <li>• Adopt energy saving behaviours (Electricity) (includes adjusting times of cleaning, cooking, washing to avail of cheaper energy costs out of peak hours)</li> <li>• Purchase energy efficient equipment</li> <li>• Switch from conventional vehicles to EVs/ULEVs</li> <li>• Switch to/ increase use of Public Transport</li> <li>• Switch to/ increase active travel</li> <li>• Drive efficiently</li> <li>• Car club use/ car share</li> <li>• Increase recycling (including food)</li> <li>• Consider a circular economy when purchasing, using and disposing of items</li> <li>• Repair/ replace goods</li> <li>• Change work/ social/ leisure patterns (adjust times to match available public transport times/ work from home/ condensed working hours)</li> <li>• Produce Less Food Waste (reduce the amount of food waste that is produced within the home through purchase, preparation and re-use)</li> </ul>

## 10.2 Appendix 2: Likely Impacts of behaviour change expectations on consumers

This matrix was developed as part of the desk-based policy review to determine the scale of the expectations on consumers and the likely impacts certain policies may have. It should be noted that the targets included are taken from the Draft version of the CCP published in 2017, so may not fully reflect the finalised versions. While the final document was reviewed upon its release in February 2018 and was used to inform the stakeholder interviews and completion of this report, this matrix had been previously completed and was not updated. However, the analysis completed applies largely to both documents due to their broad similarity, though some of the Times targets have been changed. The cells highlighted red in the fourth column highlight where the Research Team deemed insufficient supports noted within the policy documents. Blank cells indicate insufficient detail within the policy documents to comment on that particular factor.

Behaviour Description	Scale/ targets  Pages/ sections C=CCP S= Energy Strategy	Where is this now? Figures/ Subjective appraisal	What is in place to support these targets Green: sufficient support Red: insufficient support in place	Implied/ Explicit	One off/ Habitual Change	Impacts that such behaviour changes may have on consumers				
						Health, Wellbeing, Safety	Financial	Community, Social	Access	Choice, Fairness, Redress
<b>Upgrading domestic heating</b>  Upgrading to more efficient system, install of low carbon heat, join district heat networks, transition to community renewable schemes	80% homes have low carbon energy systems by 2032 (C50)/ EE targets may be stretched to 30% in line with European Commissions targets (S53)	Around 2% of homes heated by low carbon technologies and fuel and almost negligible zero carbon homes (C8.2.4)	SEEP  Numerous programmes in place-HEEPS, ECO	Explicit	One off	<ul style="list-style-type: none"> <li>• Positive effects on physical health</li> <li>• Positive effects on mental wellbeing</li> </ul>	<ul style="list-style-type: none"> <li>• Savings over time</li> <li>• Potential for community income</li> <li>• Cost of initial switch</li> </ul>	<ul style="list-style-type: none"> <li>• Community Energy can support community cohesion</li> </ul>	<ul style="list-style-type: none"> <li>• Some schemes suitable only in rural/ urban areas</li> <li>• Dependant on geography and environmental conditions/ resources in an area</li> </ul>	<ul style="list-style-type: none"> <li>• Characteristics of area limit choice of options</li> </ul>
<b>Complete efficiency retrofits</b>	All homes, where technically	2015 starting position of	SEEP as overarching vehicle of delivery	Explicit	One off	<ul style="list-style-type: none"> <li>• Positive effects on physical</li> </ul>	<ul style="list-style-type: none"> <li>• Savings over time</li> </ul>	Improved appearance	<ul style="list-style-type: none"> <li>• Costs may be higher to rural/</li> </ul>	<ul style="list-style-type: none"> <li>• Possibly less choice for rural consumers</li> </ul>

Simple (loft insulation) and more complex (EWI or HTT)	feasible to adopt retrofits by 2032 (C48) 60% of walls, 70% of lofts insulated to maximum level by 2020	57% of walls insulated, 64% of lofts having 200mm of insulation (C8.2.4) Growing awareness and understanding of need for insulation	- not finalised though plans in place. Current and future funding guaranteed through SEEP/ EESS H for social housing			health • Positive effects on mental wellbeing	• Cost of initial install/ upgrades	of local area (with EWI)	remote consumers • Hard to treat properties will be more expensive, if suitable for retrofit in first instance	(suppliers, materials, maintenance)
<b>Smart Meters</b>  Accept smart meter as part of nationwide roll-out	All homes to have smart meter installed by 2020	Currently mixed awareness, reactions and perceptions among populace. Roll-out generally not perceived to be successful	Smart Energy Great Britain established to support domestic and SMEs with advice, information and guidance	Explicit	One off	• Can provide certainty about bills	• Can save households money,		• Could further exclude the disengaged from benefitting from savings	• Intended to reduce billing errors • Can support better understanding of energy use  • Different suppliers will provide different tariffs/ service (linked to location) • Could present additional barrier to switching • Prepay customers may not have different tariffs made available
<b>Adopt Energy Saving Behaviours (Heat)</b>	Unspecified		SEEP to involve focus on behaviours, though yet to be determined	Implicit	Habitual	• Reducing financial burden linked with positive health outcomes	• Save money		• Advice equally available to all consumers? Range of media and geography • Range of technologies, systems in different homes will require appropriate	

									behaviours with different savings	
<b>Adopt Energy Saving Behaviours (Electricity)</b>		Area-based schemes		Implicit	Habitual	• as above				• Access to area-based schemes
<b>Purchase Energy Efficient Equipment</b>	Unspecified			Implicit	Habitual - multiple instances		• Bill savings over time  • Purchase costs may vary from non-energy efficient products - not definitive			• Availability/ choice of EE goods in rural areas
<b>Switch from conventional vehicles to EVs/ULEVs</b>	"widespread adoption of EVs" By 2032 petrol and diesel vehicles will be unavailable to buy  5MtCO <sub>2</sub> e reduction	Current annual transport emissions of 13MtCO <sub>2</sub> e Cost of EVs continuing to decrease towards parity with conventional vehicles	Plans to reduce excise duty differentials  Interest free loans from EST until 2020	Explicit	One off	• Reduction in air pollution	• Battery storage as possible income  • Purchase cost • Running and maintenance costs – comparison with petrol/ diesel?		• Potential income not likely to benefit vulnerable consumers  • Charging infrastructure in rural areas?	• Limited used market restricts access for lower income households • Choice of vehicles/suppliers in rural areas?
<b>Switch to/ Increase use of Public Transport</b>	No Quantifiable objectives - will rely on ad hoc specific actions	Plans to prioritise public transport over car travel though this is not specified in CCP	Continue Smarter Choices, Smarter Places funding	Explicit	Habitual		• May reduce travel expenses  • Costs of public transport	• Provides opportunities for interaction	• Schemes to support vulnerable people  • Public transport not available to all rural consumers • Will not cater for all journeys • Longer journeys more difficult to do	Costs relative to availability/ location etc - not fairly distributed

									• Disabled people may be disadvantaged further	
<b>Switch to/ Increase active travel</b>	10% of journeys by bike by 2020 (C71)  The types of journeys to be changed have not been specified so difficult to ascertain	1% of journeys currently completed by active travel	Cycling Action Plan / Active Travel, Support Smarter Choices Smarter Places programme	Explicit	Habitual	• Improve physical and mental wellbeing • Reduce cardiovascular risks, obesity etc.  • Road safety concerns	• Cheaper than driving/ public transport  • Purchase of equipment -bikes etc.	• Can increase cohesion - e.g. school runs	• Less suitable for disabled/elderly/ those with young children • Rural consumers at disadvantage	• No choice to use AT for many consumers/ journeys • Infrastructure available
<b>Drive Efficiently</b>	Unspecified	6000 have received FED training	FED training available	Explicit	Habitual	• Will contribute to reducing air pollution	• Save money on transport fuel			• Training available in rural areas as with urban?
<b>Car club use/ car share</b>	Unspecified	Car clubs in 25 locations in 16 Local Authority areas. There are approx. 10,000 members across Scotland, with access to 342 vehicles.	Smarter Choices Smarter Places  Scant detail	Explicit	Habitual		• Reduce travel costs • Reduce need to purchase car	Encourages interaction and cohesion	• More barriers for rural consumers • Barriers for vulnerable people	• Access to vehicles in non-built up areas
<b>Increase recycling (including food)</b>	Recycle 70% of all waste by 2025  Reduce food waste by 33% by 2025	44% currently recycled, 45% currently sent to landfill, 10% other diversion	Legislation to reduce waste councils send to landfill  Good Food Nation Bill to provide legislative vehicle to reduce food waste if necessary	Explicit	Habitual		• Current waste collection does not financially		• Urban centres likely to have better facilities and recycling services	• Different collection routes/ providers offer consumers different services

		from landfill (SEPA)					incentivise recycling			
<b>Circular Economy</b> Consider a circular economy when purchasing, using and disposing of items	Principles of circular economy to be well-established by 2035	Currently low but increasing awareness of circular economy concepts and benefits	Making Things Last – Circular Economy strategy includes Resource Efficient Scotland, and Circular Economy Investment Fund	Explicit	Habitual		• Save money	• Can enhance social connectivity	•Rural consumers have less opportunity to bring/ buy from second hand shops	• Greater choice in urban centres
<b>Repair/ replace goods</b>	Unspecified			Explicit	Habitual		• Save money	• Community cohesion through tool libraries etc.	•Rural consumers have less opportunity to bring/ buy from second hand shops	•Cost, access to skilled technicians etc
<b>Change work/ social/ leisure patterns</b>  Adjust times to match available public transport times/ work from home/ condensed working hours	Unspecified			Implicit	Habitual				•Communications and transport infrastructure may factor	• Not all employers offer flexible hours or patterns of working
<b>Change energy use patterns</b>  Adjust times of cleaning, cooking, washing to avail of cheaper energy costs out of peak hours	Unspecified			Implicit	Habitual					• Less feasible for those who are already time-poor

<p><b>Produce Less Food Waste</b></p> <p>Reduce the amount of food waste that is produced within the home through purchase, preparation and re-use</p>	<p>Reduce food waste by 33% by 2025</p>	<p>600,000 tonnes (ZWS 2016 report - figure from 2013?)</p>	<p>Zero Waste Scotland campaigns</p>	<p>Implicit</p>	<p>Habitual</p>				<ul style="list-style-type: none"> <li>• As above</li> </ul>	<ul style="list-style-type: none"> <li>• As above</li> </ul>
<p><b>Water Usage</b></p>	<p>Water use is only mentioned in relation to the energy expended in heating domestic water. There is no mention within the two policy documents of reducing domestic water consumption. If this will be considered by another plan or strategy, this is not mentioned. No consumer impacts could be identified as there are no expected changes to behaviour</p>			<p>Implicit</p>	<p>Habitual</p>					

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