CLIMATE CHANGE BEHAVIOURS RESEARCH PROGRAMME UPDATE: FEBRUARY 2011

Purpose of this report

The Climate Change Behaviours Research Programme 2010-12 (CCBRP) is an initiative by the Scottish Government that seeks to better understand how behaviours across a number of key areas can be influenced so as to reduce carbon emissions at individual, household and community level.

The purpose of this update is to describe ongoing work within the programme to a broad audience – policy makers in different sectors and community groups working on sustainability projects, amongst others – in an accessible way. The CCBRP has been running for a year, some outputs have already been published separately, and there is more to come.

After a brief **introduction to the programme**, the update sets out some of the background to the **Key Behaviour Areas** – ten areas of high household emissions, where action by government or others could be taken to encourage or enable behavioural change, and includes information sheets on each area, drawing out some of the key evidence. The report then reflects on **emerging themes** to date, not as a formal evidence review, but rather as a way of highlighting key points for further discussion and analysis. The report concludes by setting out **next steps** for the CCBRP, including reference to behavioural or intervention models the programme is making use of, with a number of **annexes** giving additional information in some areas.

Climate Change Behaviours Research Programme

How we live as individuals, families and communities is key to meeting the targets set out in the Climate Change (Scotland) Act to reduce greenhouse gas (GHG) emissions from 1990 levels by 42% by 2020 and 80% by 2050. How government develops policy, the signals it sends, and what business, industry, the public sector and the third sector do and how, are also crucial to providing a basis for a more sustainable Scotland. However, our understanding of how to bring about significant shifts in lifestyles is limited, particularly in terms of unlocking habits, despite a significant body of underpinning theory in behavioural psychology, sociology and economics.

As a response to this – i.e. in order to support more sustainable lifestyles - the Scottish Government has initiated the ‘Climate Change Behaviours Research Programme’ (CCBRP), which is being led by environment researchers in government. This evolving programme features a range of projects, both in-house and commissioned, across five themes:

- Identifying Key Behaviours
- Assessing Behaviour Change Interventions
- Understanding Behaviour Change in the Workplace
- Delivering Effective Communication and Engagement
- Managing Knowledge Transfer and Exchange

The overall aim of the CCBRP is to inform policy development and, as a result, improve outcomes from interventions that seek to influence or change behaviours. Specifically, the Programme seeks to better understand: the areas that are central to reduced emissions, as they relate to what people do and how they live; the societal contexts and structures within which change can be encouraged and enabled; the abatement potential of particular changes individually and collectively; and the most effective mechanisms for stimulating, facilitating and supporting change at individual and household level.

Behaviour is in itself complex, and the behavioural science that seeks to understand it is a multifaceted and challenging body of knowledge. 'Behaviour change', even as a basic concept, can incorporate a wide number of reference points. It can take in key one-off decisions (e.g. installing insulation or not; buying a lower carbon vehicle or not). It can include regular habitual behaviours (e.g. driving to work; food purchasing decisions) as well as occasional ones (e.g. flying for business or leisure). Importantly, it can encompass the broader contexts which affect how people live – the social norms, the infrastructure, the technology and the design of particular objects that both constrain and enable particular behaviours. Managing this complexity, so that insights can be effectively applied, is an overarching objective of the CCBRP.

Outputs from the CCBRP to date

The CCBRP is continuing over the next year and will feed into ongoing policy development and delivery. A number of outputs have already been made publicly available. The first of these was *Ten Key Messages about Behaviour Change*,[1] which emerged from a national behaviours conference organised by the Scottish Government in July 2010. The messages effectively set an initial framework for the CCBRP on 'what works' in terms of interventions going forward. The *Public Engagement Strategy*,[2] published in December 2010, included a brief summary of the key behaviour areas, described in more detail here. Finally, an *International Review of Behaviour Change Initiatives*,[3] conducted by the University of Manchester for the CCBRP, was published in February 2011; this featured thirty case studies, six in detail, where innovative practice has been developed to influence sustainability behaviours.

More information on future projects is provided in the last section of this update review. Outline details of the current programme can be found in **Annex A** of this report.

The next section of the update report sets out ten key behaviour areas, which have already featured in the Public Engagement Strategy and provide a key focus for the CCBRP.

Key Behaviour Areas

A central aim of the CCBRP has been to understand the areas where carbon emissions are high at individual and household levels. The first output of this work has been a set of ten Key Behaviour Areas (KBAs), which provides a focus for policy-making on the behaviour areas that are important in relation to climate change. The KBAs are set out overleaf.

Method and Principles

Evidence review was used to develop the KBAs. Although a wide range of analysis and research was drawn on to develop the key behaviours, the following were particularly influential:

- A report on Scotland's household-level greenhouse gas (GHG) footprint between 1992 and 2006[4],
- Available Scottish and UK survey data, for example the Scottish Household Survey and Scottish House Condition Survey;[5]
- Modelling undertaken by Scottish and UK Government energy and transport analysts;
- A range of analysis undertaken by the Energy Saving Trust in Scotland on carbon impacts and costs of a range of household energy and transport measures.

The following texts, each of which delivers its own set of key behaviours, were useful as a sense check of the approach and final selection of the behaviours.

- Institute for Applied Ecology (2010) *$C0_2$ Reduction Potential for Consumers*[6].
- David McKay (2009) *Sustainability without the Hot Air*[7].
- DEFRA (2008) *Framework for Pro-Environmental Behaviours*[8].
- Gardner and Stern (2008) T*he Most Effective Actions US Consumers can Take to Tackle Climate Change*[9].

Because it is possible to frame a behaviours set in many ways, depending on the assumptions made, a set of principles was developed to underpin the set. These included that the KBAs should be clear and straightforward; that each behaviour should offer significant potential for carbon reductions (i.e. from current baselines); that there should be some consideration of how willing and able

Table 1 - Key Behaviour Areas Set

Category	Key Behaviour Areas
Home Energy	**1. Installing a more efficient energy system or generating your own.** (Replacing inefficient boilers with condensing boiler and/or microgeneration (e.g. solar water heating, biomass boiler, heat pump))
	2. Keeping the heat in. (Insulation, draught proofing, double glazing)
	3. Better heating management (Turning down heating thermostat to between 18°C-21°C, reducing the hours heating is on, and turning down hot water thermostat [to a max of 60 degrees]).
	4. Saving electricity (Buying energy efficient appliances, lightbulbs, TVs and other products, when these need to be replaced. Washing clothes at low temperatures.)
Transport	**5. Becoming less reliant on the car.** (Walking, cycling, using public transport and/or car sharing instead of driving)
	6. Driving more efficiently (Using a low carbon vehicle [fuel efficient, hybrid, alternative fuel or electric] and following eco-driving principles)
	7. Using alternatives to flying where practical (e.g. train or teleconferencing for business)
Food	**8. Avoiding food waste**
	9. Eating a healthy diet high in fruit and vegetables, locally in season where we live
Consumption	**10. Reducing and Reusing** (This could involve reusing and repairing products to give them a second use and only replacing when necessary. Avoiding unnecessary packaging.)

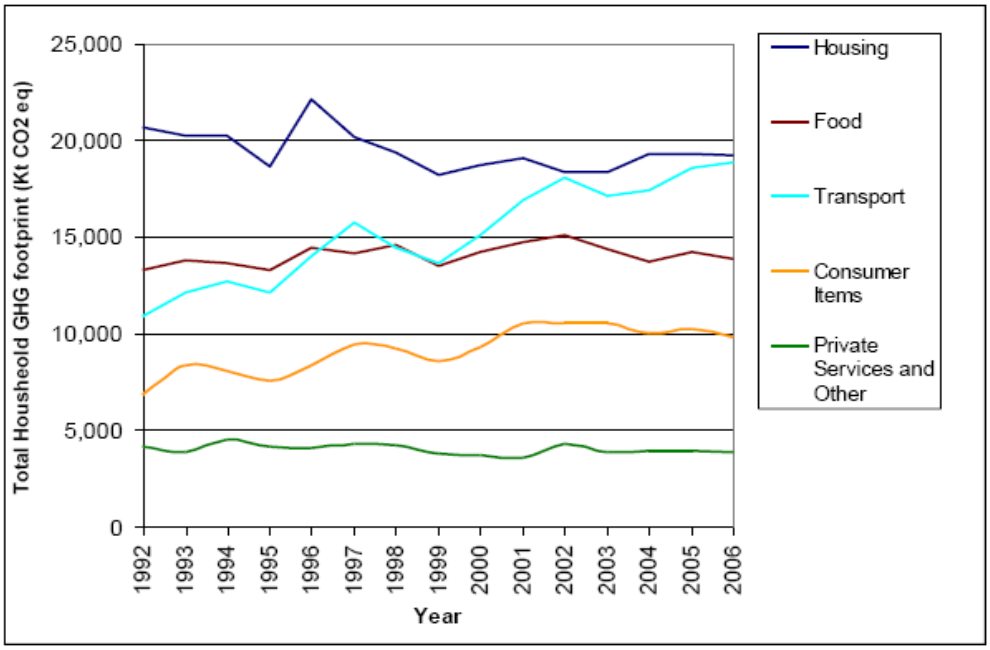
people are to make changes; that the KBAs should include some appreciation of direct and indirect emissions;[10] that the KBAs should not exist in a vacuum or simply make a passive 'ask' of people; finally, that the KBAs must be part of a

wider coherent, strategic and joined up engagement and policy approach that can act to develop the structures that enable behavioural change.

The Behaviours Selected

The KBA themes - homes (household energy), transport, food and consumption – broadly reflect four areas most associated with household emissions as reflected in the Greenhouse Gas Footprint by Scottish Households produced for the Scottish Government (see Figure 1 below). This indicates the rapid rise in transport-related emissions (by 73% over the period) and suggests that overall emissions increased by 17.5% over this period.[11]

Figure 1 - Greenhouse Gas Footprint of Scottish Households by theme, 1992-2006[12]



Summary sheets on each behaviour area are provided below. In addition, a slide pack is being prepared for publication on the CCBRP webpage, which will give more detail on the evidence underpinning each of the behaviour areas.

Using the KBAs

The KBAs will be used to inform our analysis of what Government and others can do to remove barriers, improve our own performance, and otherwise engage on, enable, encourage, and exemplify change. Although the evidence base does suggest it is important to be clear publicly about which areas contribute most to individual and household carbon footprints, as is set out in the following section on Emerging Themes,[13] how that clarity is expressed is likely to be important: it

may be that leading by example on certain issues is a more effective way of communicating.[14]

An important point, here, is that there is no intention to use the KBAs simply as a 'to do list' for the people of Scotland. Simply informing people about the need to take action will not in itself bring about change; rather, actions are strongly influenced by the contexts in which they take place.[15] So, behaviour change may become more likely when infrastructure is provided - for cycling, for example; or when incentives and practical support are offered to have homes insulated; or when public services like hospitals are sited in easy access of public transport; or when consumers are given tailored feedback and personalised advice on how to save energy. At the same time, it is difficult to change ingrained habits where, for example, roads are poorly laid out with little space for cyclists; where the nearest shop selling food is a supermarket miles away; and where decisions about insulation and boilers are made by the landlord. These factors may be influenced by individuals in some cases, but largely these are areas/issues/decisions in the hands of others: government, local authorities, other public bodies, businesses and industry. With this in mind, it would be unreasonable for government to ask individuals and households to take primary responsibility for developing sustainable lifestyles.

Examples of Actions to Address the KBAs

Examples of Scottish Government action in relation to all aspects of the KBAs are provided in **Annex B**. Some of these are joint interventions with the private sector / public bodies. Similarly, community groups are key in influencing behaviours. In the box below, a case study from rural Perthshire shows how one community group is seeking to reduce emissions locally in a range of innovative ways.

Case Study: Comrie Development Trust. Since 2008, grant funding from the Climate Challenge Fund and other funding sources has supported a range of behaviour change work by the Comrie Development Trust (CDT). CDT has tackled each of the behaviour areas in a variety of innovative ways. Here are some examples of its work.

The systems that heat our homes. CDT currently has a Renewable Feasibility Study in progress looking at hydro-electric production, which would generate income to be reinvested in community projects.

Keeping the heat in. The Street by Street Project has enabled 87 households to have insulation installed since April 2009, while a Thermal Imaging Scheme helped 46 households identify where they were losing heat from their homes and take remedial action.

Managing Home Heating. CDT has employed part-time Energy Awareness Advisors (EAAs), and provided them with City & Guilds energy awareness training. The EAAs have given guidance on reading meters, understanding fuel bills and setting heating and hot water thermostats via home visits, thus reducing bills and emissions.

Saving Electricity. A "current cost monitor lending library" allows local people to borrow a current cost monitor for 2 weeks to monitor home energy use and make savings on bills. In addition, 21 households have participated in an Energy Competition, which led to household electricity consumption dropping by more than 50%, saving over 4 tonnes of CO2.

Becoming less reliant on the car. CDT has set up a bespoke "Comrie Liftshare" system within the national Tactrans Liftshare website, following community consultation. It also promotes local walking routes and cycle paths. A Green Travel Plan feasibility study has identified sustainable transport barriers and enablers for the community.

Driving more efficiently CDT has promoted fuel efficient / hybrid cars at events, with demonstration cars, displays and information.

Using alternatives to flying where practical With community help, a baseline carbon footprint for Comrie has been developed, allowing local carbon reductions targets to be set. Alternatives to air travel have been stressed during this process but this is one of the more challenging behaviours to address.

Avoiding food waste CDT has a range of activity to reduce and deal with food waste. A "rocket" has been set up for use by a local catering and events company. Eight community composting bays have been built with the help of a large local private organisation. Practical and interactive "cooking with leftovers" sessions have been held to encourage less food waste. A feasibility study is looking into the potential for an Anaerobic Digestion facility on community-owned land to compost food waste.

Eating a healthy diet 30 allotments have been established on community owned land on the outskirts of Comrie. A newly formed Allotments Association has helped over 30 families to grow fruit and vegetables on site.

Reducing and Reusing The Comrie Youth Theatre developed a play on reuse themes called "Who says it's rubbish?" – the process of working on the script and performing the play has engaged young people and successfully raised awareness. In developing the community footprint, local people have been encouraged to make pledges about consuming in a more sustainable way – e.g. joining the local library, keeping their mobile rather than always upgrading to a newer model, downloading music rather than buying a CD, sharing tools rather than buying them, and reducing the number of clothes items bought in a year.

Key Behaviour Area Information Sheets

The information sheets that follow are intended to act as accessible top-line summaries on each KBA from across the evidence base. Key evidence on why this behaviour area is important, current uptake, and intentions, external factors and (where appropriate) habits is outlined below. The evidence areas are mostly substantial – particularly diet, home energy and transport – and summary sheets can never capture the full richness or complexity of the data: therefore, those interested in particular areas are encouraged to seek more information about the various studies cited. References and, where available, hyperlinks are provided at the end of this report; and more detailed reviews will follow later in the year. Note that the data from the first two rows – on why it's important and uptake – are drawn from Scottish data wherever possible. The data on the remaining rows – on intention, external factors (i.e. the areas where the individual has limited or no control), and habit – are drawn more widely, often relying on UK evidence.

The systems that heat our homes. *Upgrading to A-rated condensing boilers and/or microgeneration*	
Why is it important?	• Space and water heating account for over three quarters of energy use in the home.[16] • Upgrading to an A-rated condensing boiler from a G rated system (all boilers at least 15 years old) with a full set of heating controls is estimated to bring typical savings of 1,100kg CO2 and £235 per year.[17]
Evidence on current uptake?	• The primary source of heating for 84% of properties in Scotland is a boiler.[18] • Condensing/condensing combi boilers account for 13% of all gas boilers in Scotland.[19] Only limited data on boiler age are currently available. • 1% of Scottish households use energy from renewable sources.[20] • A large proportion of people have not given upgrading boilers or installing microgeneration any thought.[21]
Evidence on intentions	• The success of the recent boiler scrappage scheme indicates a willingness to act, particularly where attractive incentives are in place. • However, there is limited incentive to think about boiler replacement when the current system is thought to be working satisfactorily.[22] • Lack of awareness about potential cost-savings from a new system and the different kinds of systems available is a barrier.[23] • People knowing about and trusting installers is important, particularly for renewable systems. • A desire to help the environment and tackle climate change did appear a positive influence on intentions.[24]
Evidence on external factors	• Upfront costs are a key barrier in relation to both installing a new boiler and microgeneration. (But saving money appears to be a key motivator.)[25] • The ability to install condensing boilers, community heating and/or microgeneration also depends on tenure, property type and geographical location. • Skilled local installers may not be available.

Keeping the heat in. *e.g. insulation, draught proofing, double glazing*	
Why is it important?	• Insulation is recognised as one of the most cost-effective solutions to improving energy conservation in the home and is often cited as a key route through which to reduce housing-related carbon emissions.[26] • High savings (carbon and financial) can be achieved through installing wall and loft insulation, as well as double glazing. External wall insulation could save households £385 per year; internal wall £365; full loft insulation £145; and double glazing £145.[27] • There is limited evidence on the effectiveness of carpets and shutters, over floorboards and curtains, as ways of energy savings.
Evidence on current uptake?	• Nine in ten (90%) households in Scotland have double glazing.[28] • Over half (56%) of all dwellings in Scotland have less than 200 mm of loft insulation.[29] • A quarter (26%) of dwellings in Scotland have either cavity or solid wall insulation. Of the 74% of dwellings remaining, 23% have solid walls with no insulation, and 40% have cavity walls with no insulation.[30] • Insulation schemes generally achieve an uptake rate of less than 30%.[31]
Evidence on intentions	• Saving money is a key influence on intentions.[32] • People are generally open to the idea of installing loft insulation and double glazing, however, there is less enthusiasm re cavity and solid wall insulation.[33] • Households would be more willing to improve their home's energy efficiency if a financial incentive was offered, with a council tax rebate in exchange for conducting energy efficiency works being the most popular option.[34] • Factors in unwillingness to act often relates to: hassle factor (e.g. having to clear a loft, general disruption), lack of understanding (of benefits), financial costs.[35] • A desire to achieve thermal comfort can be a key motivator of households to insulate.[36]
Evidence on external factors	• An inability to act often relates to: upfront cost, suitability of technology for property type and property tenure, poor information provision. • When households do sign up to insulation schemes, minimizing the period before installation is key to avoiding drop out.[37] Regular contact if the waiting period is not short will be important. • Feedback (e.g. – thermal imaging of home to reveal how much energy is lost) can encourage the adoption of insulation measures.[38]

Better heating management. *Turning down heating / hot water thermostats and reducing the hours heating is on*	
Why is it important?	• Turning down the thermostat is a highly effective energy-saving measure – with the potential to save up to 10% of heating costs for each degree.[39]
Evidence on current uptake?	• Six in ten (61%) people in Scotland say they have already turned down their thermostat by one degree or more.[40] • One study found that in the UK nearly a third (28%) had their thermostats set at between 20° – 24°, 6% above 25° and 20% didn't know.[41] • Most Scots (72%) believe it is important to turn the heating off when they go out for a few hours.[42] • Less than half (46%) of Scottish households monitor their home energy use fairly or very closely.[43]
Evidence on intentions	• There appears to be an overwhelmingly positive attitude to the importance of conserving energy at home.[44] • Lack of awareness of the amount of energy heating systems use and how this energy use has an impact on the environment is a key barrier in terms of changing behaviour.[45] • Willingness to undertake better heating management may still be high amongst those who do not believe it helps mitigate climate change, because of other motivations, e.g. saving money.[46] • Most Scots (74%) agreed that "I hate the idea that I'm wasting energy".[47] • Six in ten (61%) households in Scotland have a central heating system with both a time clock and thermostat.[48]
Evidence on external factors	• This is a low/no-cost behaviour area. However, it does rely to a large extent on the heating and hot water controls installed in the property. • High fuel prices are an important motivating factor.[49] • Internal home temperatures relate to strong cultural notions of comfort, which may hinder attempts to improve home heating management.[50] • Of those who use them, the vast majority find time clocks and thermostats easy to use and control.[51] • Feedback, both direct and indirect, can provide an impetus for reducing energy use, and persistent feedback appears to promote persistent reductions in energy use.[52] Almost nine in ten (86%) claimed that smart metering would encourage them to turn down their thermostats by 1°.[53] • Only 2% of Scottish households have an energy use monitoring device.[54]
Evidence on Habits	• Some households (38%) do not regularly adjust the temperature of their home, with some (14%) not changing it even if it became too warm. In other words, heating management isn't an established habit for all.[55] • Aims to reduce periods when the heating is on can be negatively influenced by the use of timers (e.g. timers not altered in accordance with weather conditions or changes in routine).

Saving electricity. *Buying energy efficient appliances, lightbulbs, TVs and other products, when these need to be replaced, and using them as efficiently as possible (e.g. turning off lights, not leaving things on standby)*	
Why is it important?	• Appliances and lighting are responsible for 13% and 2% of energy use in Scottish homes respectively.[56] • Increased total UK electricity consumption by household domestic appliances and lighting between 1970 and 2009 has been driven largely by increasing ownership of electrical products.[57]
Evidence on current uptake?	• Less than half (46%) of Scottish households monitor their home energy use fairly or very closely.[58] • Survey findings appear to show a high level of uptake of some electricity saving behaviours (e.g. turning things off rather than leaving them on standby and turning off lights). Uptake is lower, however, in terms of considering information on the green credentials of products before buying.[59]
Evidence on intentions	• Willingness to save electricity may be influenced to a great extent by cost. Indeed, of those who said they had used less electricity and gas in the past year, the main reason given for doing so was cost.[60] • Most Scots (74%) agreed with the statement "I hate the idea that I'm wasting energy".[61] • Only one quarter (24%) of people in Scotland identified using less electricity as one of the key actions that would most help reduce climate change.[62] • There is some evidence to suggest that switching off lights and appliances is becoming a social norm, primarily motivated by environmental concerns and rising energy costs.[63]
Evidence on external factors	• Most electricity-saving behaviours are considered easy to undertake, for example switching off lights, washing clothes at 30°, switching appliances off standby. • Some barriers still exist though, for example lack of awareness and information on the energy efficiency of products, lack of understanding of utility bills and the design of some appliances can make switching them off standby difficult. • Emerging social tastes for ambient low-lighting has led to more light-bulbs per room in European countries than in the past, which may reduce benefits from moving to more energy efficient bulbs.[64]
Evidence on Habits	• Some evidence suggests lighting behaviours are highly routine.[65]

Becoming less reliant on the car. Walking, cycling, using public transport and/or car sharing instead of driving	
Why is it important?	• Within the Scottish transport sector, road transport accounts for the largest proportion of energy consumed (70%).[66] • At a UK-level, energy consumption from domestic transport is around double the consumption of industry and services transport combined.[67]
Evidence on current uptake?	• On average, Scots travelled 5,247 miles per person per year by car (driver or passenger) in the two-year period 2007/2008.[68] • In 2008, about two-thirds of commuters said that they travelled to work by car or van (60% as a driver; 6% as a passenger), 13 per cent walked, 12 per cent went by bus, 4 per cent took a train and 2 per cent cycled. Those driving to work has risen 5 percentage points whilst those receiving a lift has fallen 6 percentage points since 1998.[69] • Over half (54%) of car journeys in Scotland are under five kilometres.[70] • Around 1% of all journeys by Scottish residents are made by bicycle.[71] • 15% claim to car share, most organised informally, with around one in ten of these arrangements (11%) organised via an employer.[72]
Evidence on intentions	• Pro-environmental values appear to play a minor role in driving habits.[73] • More than half (53%) of Scots feel that they should be able to use their car as much as they want.[74] • The *Smarter Choices, Smarter Places* baseline suggests substantial willingness and potential for change, with 19% of motorists being both willing and able to reduce their driving and 20% able but not willing.[75] • Convenience is an overriding consideration in transport mode choice.[76] • Cost is a complex factor is relation to transport. The car is often perceived as the cheapest mode, compared to public transport.[77] • Barriers to bus use are wide ranging; largely concerned with safety and comfort, other passengers' behaviour, perceived cost, convenience.[78] • Perceptions of personal safety appears a key consideration for cycling.[79] Distance to work and weather are other key deterrents.[80] • Evidence on willingness to car share is mixed.[81]
Evidence on external factors	• Mode of transport is influenced by the purpose of a journey (e.g. commuting, shopping, and leisure). • Infrastructure for alternatives to driving is an important factor in transport mode choice (e.g. frequency of public transport services, availability of routes, and directness of services). • Six in ten (59%) people in Scotland who own a car say it would be difficult to reduce their car use.[82] • Four in ten (42%) car commuters say they could have used public transport.[83]
Evidence on Habits	• There is evidence to support habit as a relatively strong factor in modal choice.[84]

Driving more efficiently. Using a lower carbon vehicle *(fuel efficient, alternative fuel, hybrid or electric)*; following 'eco-driving' principles.	
Why is it important?	• Vehicle emissions may be reduced by up to 24% when car owners switch to the most fuel-efficient model in class. For comparison, this saving is more than the annual impact of upgrading an F-rated boiler to an A-rated condensing boiler.[85] • Over the longer term, vehicle technologies which enable a 90% reduction in per kilometre emissions, most likely based on battery-electric propulsion systems, are feasible.[86]
Evidence on current uptake?	• Petrol and diesel cars account for over 99% of cars licensed in the UK. • By the end of 2009 there were 114,000 hybrid, electric or gas/LPG powered cars (an increase of 96,000 from numbers in 2000).[87] • The proportion of new cars in the lowest three tax bands (Bands A to C, emitting 120 g/km or less) increased from 11% of all new cars in 2008 to 20% in 2009.[88] • A majority of Scots (73%) claim to be following eco-driving principles.[89]
Evidence on intentions	• CO2 emissions are a low priority in car purchasing decisions, but good fuel economy is a key influence.[90] • Cost is a primary factor influencing car purchasing.[91] • Owning an eco-friendly car is not seen as normative behaviour.[92] • There is limited evidence on eco-driving intentions. • However, it would seem that a desire to save money is a key influence on intentions re eco-driving.[93]
Evidence on external factors	• Factors that inhibit ability to take up this action include: lack of information (e.g. three-quarters of people do not know how much CO_2 their car emits[94]); concerns about higher up-front and maintenance costs and availability of options and infrastructure (e.g. electric vehicles reliance upon battery capacity and infrastructure to support charging). • Feedback on fuel consumption and reduction of speed limits can help facilitate the use of 'eco-driving' principles.
Evidence on Habits	• Habit plays a limited role in relation to car purchasing as this is a one-off purchasing decision (on average, people replace cars every 7 years[95]). • Habit may impact negatively on intentions to drive more efficiently – e.g. many people are used to driving at the speed limit on motorways and may see this as a norm.[96]

Using alternatives to flying where practical. *For example, taking the train or teleconferencing for business*	
Why is it important?	• One way travel from Edinburgh to London by plane emits three times more CO_2 per traveller than the equivalent journey by train.[97] • If each person in a household of average size took one fewer return flight to London each year, the carbon saving equates roughly to the annual impact of upgrading an E-rated boiler to an A-rated condensing boiler[98]. • A return flight to Cape Town is estimated to require nearly as much energy as driving an average car 50 kilometres every day for a year.[99]
Evidence on current uptake?	• Between 1999 and 2009, the number of air terminal passengers increased by 41 per cent for Scotland, and 30 per cent for the UK. Over the past ten years, the number of air terminal passengers per head of population has been higher for Scotland than for the UK (4.3 vs. 3.6).[100] • Just under half (47%) of Scots took at least one flight for leisure purposes in 2009, and around one in ten (9%) took at least one flight for business purposes. Business travel shows quite different patterns with the highest percentage (41%) being for those who took 7 or more trips. [101] • Half (50%) of terminal passengers in Scotland are taking flights to/from other parts of the UK.[102]
Evidence on intentions	• Evidence of a high level of resistance to the idea of flying less (e.g. a third (32%) of Scots say that they do not want to take fewer flights[103]).[104] • Between 2006 and 2010, an increasing number of people agreed that people should be able to travel by plane as much as they want, 'even if this harms the environment' (up from 17% to 29%).[105] • The most common reason given by Scots for choosing to fly within the UK is because it was viewed as 'quicker'.[106] • There is some openness to travel by rail where this is a practical alternative, provided it costs less.[107] • Environmental concern does not appear to play a significant role in the decision to fly or not, with most people believing that everyday pro-environmental behaviours (e.g. recycling) offset the environmental impact of flying once a year for a holiday.[108] The 'environment' as a reason for flying less has increased from 1% (2008) to 6% (2010) in a DfT survey.[109] • There is evidence to suggests that holidays are perceived as 'a necessity' that justifies a lack of attention to environmental impacts.[110]
Evidence on external factors	• Factors that inhibit this action include: time, cost; geographical remoteness; perception that no practical alternative exists.[111] • There are increasing options for business travellers to use teleconferencing and other IT solutions to minimise work related travel.
Evidence on Habits	• Flying for holidays and business travel are viewed as norms, and have become key aspects of annual leisure or work routines.[112]

Avoiding food waste	
Why is it important?	• Emissions associated with household food waste in Scotland are estimated to be the equivalent of 1.7 million tonnes of CO_2 each year which, if avoided would be equivalent to removing one in every four cars from Scottish roads.[113]
Evidence on current uptake?	• Scottish households produce 566,000 tonnes of food waste every year, over two-thirds of which could be avoided.[114] • A fifth (20%) of Scottish households say they recycle/compost all of their food waste, and almost a third (31%) say they recycle/compost at least some of their food waste.[115] • Almost four in ten (38%) households in Scotland agree that they throw out food on a regular basis because it has gone out of date.[116]
Evidence on intentions	• Reducing food waste appears to be an immediately appealing behaviour - reduce waste; save money and minimise environmental impact.[117] • Three quarters (74%) of Scots say they hate the idea of wasting food.[118] • Most people do not think they waste food, which is not what on-the-ground research has found. Households tend to underestimate the amount of food they waste. Households that say they waste no food produce *more* avoidable food waste than the average household.[119] • There is evidence for a culture of celebrating/rewarding through food, which leads to over purchasing.[120] • People think that food packaging is a greater problem than food waste.[121] • There appears to be a lack of connection in the public mind between food waste and damage to the environment.[122]
Evidence on external factors	• Lack of awareness and understanding (e.g. misperceptions around the meaning of guidance dates, people not thinking that they waste enough to make it an issue of concern) appears to be a key barrier to change.[123] • Food costs can contribute to avoiding food waste; but there are few economic levers which incentivise avoiding food waste. [124] • Retailer offers (e.g. buy-one-get-one-free) can lead to overpurchasing and hence an increased level of food waste.[125] • Current lack of service provision and infrastructure to facilitate different waste disposal options (e.g. kerbside collection of food waste, composting options for those without access to a garden). Plans to separate collection of food waste are being developed via the Zero Waste Plan.[126] • Shopping for large amounts of food (e.g. at supermarkets) can lead to people forgetting that they've bought items, which then go out of date.[127]
Evidence on Habits	• Food purchasing and meal preparation are often routine[128], which may have knock-on effects on food waste. • Increasingly unpredictable eating patterns make food planning more difficult and may increase food waste.[129]

Eating a healthy diet, high in fruit and vegetables in season where we live	
Why is it important?	• It is estimated that food makes up approximately 25% of Scottish households' greenhouse gas footprint.[130] • It is estimated that a standard healthy diet could reduce the footprint of the average Scottish diet by 15%.[131] • Further work is required to ensure our understanding of the complexities surrounding the carbon impacts of different foods across their whole life cycles is fully understood.
Evidence on current uptake?	• Evidence on uptake of local and seasonal food is limited. • On average in 2008, Scottish women consumed 3.4 portions of fruit and vegetable per day and men consumed 3.1 portions. A fifth of men (20%) and a quarter of women (24%) consumed the recommended amount of five or more portions per day. (No significant change since 2003.)[132] • Over a third (35%) in the UK claim that they are trying to eat more healthily.[133]
Evidence on intentions	• People value the idea of supporting local producers and retailers and their local economies.[134] • There is a strong notion of what constitutes a 'proper meal' (e.g. meat and two vegetables).[135] • Decisions to buy local are driven by perceptions of taste and cost.[136] • There is a wide range of influences on which food people buy, and it is difficult to untangle the effects. However, health and economics factors (including income) would appear to be key. Environmental influences appear less important.[137]
Evidence on external factors	• Producers and retailers are key drivers of food behaviours.[138] • There is a reluctance to change diet and reduce meat and dairy consumption.[139] • Cost can be a barrier to eating seasonal or local produce.[140] • There is a lack of awareness of seasonal food and 'low-impact' diets.[141] • A barrier to buying seasonal and local food is the availability and access to outlets where they are on sale.[142] • Reward / celebration through food is a culturally strong factor; reward foods tend not to be healthy, *per se*.[143] • While NHS Scotland recommends 5 portions of fruit and vegetables,[144] in other countries the recommended level is higher. E.g. Denmark = 6; Canada = 5 to 10; France = 10; Australia = 5 veg, 2 fruit.
Evidence on Habits	• Food purchasing (e.g. where you shop, what you buy, route through supermarket) and meal preparation (e.g. set range of meals) are often routine. This can be a barrier to eating more seasonal products.[145]

Reducing and Reusing	
Why is it important?	• There is a large amount of uncertainty over the potential impact of the behaviours that make up this action. The theoretical potential is high, with, according to some research, two-thirds of all household emissions embedded in the goods and services that we buy.[146]
Evidence on current uptake?	• General participation in reduce behaviours appears to be low, largely focused on donating goods to charity.[147] • Repairing items also appears to be an area of limited interest. In one study, 38% never had any broken products repaired. [148] • Most people already claim to be reusing many household items such as shopping bags, plastic containers, paper and envelopes and donating to charity shops.[149] • Many products that are thrown away still have a use. One study suggests that nearly a third of appliances disposed of were still functional, including nearly 60% of computers and mobile phones and almost one-half of cookers and hi-fi systems.[150]
Evidence on intentions	• Research suggests a relatively low interest in buying second-hand goods, even lower interest in sustainable wood and mixed opinions concerning sustainable clothes, with perhaps more interest in social aspects [e.g. sweat shops] than environmental ones.[151] • There is a common perception that “green” goods represent poor value for money, being of a lower specification but for a higher cost[152]. • Aspects of modern lifestyles hinder attempts to get people to reduce and reuse (e.g. consumer society, shopping as a form of leisure, fashion as a societal norm). • Waste prevention is often equated with recycling so people do not think about purchasing behaviours when considering reducing waste.
Evidence on external factors	• There is a lack of awareness of which products are sustainable and how product manufacture, retailing and disposal are related to sustainability.[153] • Consumer awareness and understanding are hampered by the lack of visibility of many reuse and reduce behaviours, especially in comparison to recycling so there is less feedback to reinforce behaviour change.[154] • There is a lack of understanding of what ‘reuse’ means in practice and a tendency to equate waste reduction with recycling so that other behaviours are not considered.[155] • There is a lack of knowledge and skills to enable repair of items and poor understanding of which items are suitable for reuse.[156] • It is perceived that repairs can be costly and repair services not widely available, while cheap new goods are seen as readily available.[157]
Evidence on Habits	• Reuse of shopping bags is now habitual.[158] • There is tendency to keep hold of items rather than reuse them, leading to them becoming obsolete.[159]

Summary of emerging themes

This section reflects on recurring themes from the national conference on behaviour change, the Scottish Environmental Attitudes and Behaviours Survey (SEABS), the International Review, and informal feedback from Climate Challenge Fund projects. This is not a formal evidence review, p*er se* - more formal reviews will be published during the course of the CCBRP – it is rather to raise issues for further discussion and analysis. Home energy projects have been a particular focus of recent review work, so receive most attention here.

Information and attitudes

Information is important but is not enough on its own to change behaviours

There remains work to be done to improve public understandings of climate change. SEABS suggests that around one in three people in Scotland is sceptical about climate change and/or the need to take action. Similarly, there is a significant minority with limited understanding and knowledge of climate change: while nearly half said they either knew a great deal or a fair amount about climate change, two–fifths said they did not know very much, and one in ten said that they had heard about climate change but knew nothing about it.[160]

In particular, as noted in the KBAs section, there would appear to be a need to engage with people about which behaviours are key in tackling climate change. Around one in three did not believe that what they did in their everyday lives contributed to climate change. Further, when asked which actions could do most to help tackle climate change, the most popular choice was recycling.[161] Recycling is obviously important, and offers the potential for reduced emissions if reuse of items leads to less extraction and processing of raw materials when developing new products. However, there is a challenge for engagement efforts if households believe they are doing their bit for climate change simply by recycling. This is an area where the Public Engagement Strategy has a clear role to play.

However, information is unlikely to be enough on its own to change behaviour, particularly in some of the more challenging areas around sustainable lives.[162] Indeed, in some circumstances, information-only approaches can be counterproductive. For example, the International Review has contrasted two approaches to water saving in Ontario, Canada. In areas where a multi-strand programme offered targeted face to face engagement with a strong emphasis on developing social norms, water usage reduced by more than 50%; while in areas where an information-only campaign was running water usage actually increased.[163] This case echoes other examples from the evidence base where information-only approaches have exacerbated a particular problem rather than resolved it.[164] Information-giving appears most effective when included as part of a package of measures.

Similarly, focusing on attitudes to climate change has only limited capacity to deliver sustainable lifestyles.

SEABS has suggested that even the most environmentally aware do not necessarily behave in 'green' ways, particularly for some of the more challenging behaviours like personal transport. The most environmentally engaged in the survey - the 'deep greens' - were no less likely to drive to work than other groups; they were no less likely to fly for leisure; and they were actually more likely to have taken flights for business than other groups. The survey did find a relationship between environmental attitudes and some behaviours – the 'deep greens' were more likely to have taken eco-purchasing decisions and energy saving measures in the home, for example – but not for all. There is, SEABS suggests, a 'value-action gap' between the environmental attitudes people hold and what they actually do in relation to the more 'challenging' climate change behaviours, like driving and flying less often.[165] Narrowing this gap is a challenge, and perhaps focusing on attitudes – and specifically on climate change as a motivator – will have limited success in shifting some behaviours in itself, a view supported by informal feedback from some Climate Challenge Fund projects, and by some behavioural theory (e.g. the Triandis model discussed below).

It is important, then, when developing interventions on key behaviours, to develop a clear sense of influential motivators for change in each area – which may include environment/climate change attitudes for home energy and reduce/reuse behaviour areas - and to address these through multi-strand approaches. Such interventions will also need to be clear about what the target behaviour is (which may require breaking down the key behaviour area into component parts) and what the key determinants of that behaviour are. These issues are discussed in more detail in the next section.

However, addressing the behaviour areas one-by-one will not necessarily deliver significant shifts in lifestyles to help meet shorter-term emissions targets; there would appear, from initial findings from the Review of the Climate Challenge Fund, to be few 'spill-over effects' between different behaviour areas - for example, projects working on food growing have had limited success in interesting project participants in other areas of the sustainability agenda, like changing transport habits.[166] This suggests that sustainability-related behaviour change will be a long and piece-meal process *unless* attitudes and values can be more successfully engaged to shift behaviours. This is a real question for behaviour theory that requires pragmatic answers. There is new thinking emerging about communicating values effectively to influence behaviours - for example, from Tom Crompton at WWF on strengthening helpful 'intrinsic' values, and the New Home Front Campaign which is drawing sustainability lessons from societal responses during World War II - as well as new ways of conceptualising habits from practice theory (discussed below). The potential from all these is worth exploring.[167]

Targeted information appears to be a more effective approach than generalised campaigns and can be further improved by combining feedback with another strategy, such as making a public commitment.

Targeted information campaigns tend to be more effective than mass information campaigns albeit in the short term.[168] Research consistently reports that tailored information and feedback interventions (e.g. where information about an individual's energy consumption levels is provided) are considerably more effectual than general information campaigns.[169] To maximise impact, information needs to be personalised, continuous and visually appealing (see EST recommendations on visual display[170]).

The most powerful combination appears to be feedback partnered with a goal (e.g. energy saving target, particularly a challenging one) or commitment, and an incentive. The Green Streets project, for example, which combined all three, reported an average 25 per cent energy saving, and estimates that extrapolating the outcomes to all UK households would result in a reduction of 35 million tonnes of carbon dioxide (MtCO2) per annum, equivalent to a third of UK 2020 emissions reduction target.[171]

The Individual and the wider context

Interventions with a nuanced understanding of target audiences are more likely to be effective.

To be effective, many interventions need to be tailored to an individual's lifestyle and household characteristics. A fairly concrete example of this is the home energy audit, where studies have shown reductions ranging from 2 per cent to 21 per cent compared to baseline levels and control groups.[172] Some of these effects have been observed over a number of years. Similarly, the International Review has described the potential of tailored travel planning, provided in home, with incentives, particularly for those households experiencing 'moments of change' (moving house, joining two households together or changing job, for example): a Pennsylvania scheme offering free bus passes to new arrivals has claimed long-term take up of public transport. Travel planning is also being explored via the Scottish Government's *Smarter Choices, Smarter Places* programme.

More generally, a robust segmentation model (or models) may prove useful in helping develop an understanding of the motivations and barriers faced by particular individuals, although any such model would need to be narrowly focused on the behaviour area in question and able to be tested and refined. Segmentation options are being explored at present.

However, in addition to seeking to influence the individual or household, there is a need to focus more broadly on the contexts that actively shape people's behaviours.

The International Review argued that behaviour change initiatives tend to be most effective when they go beyond targeting individuals and actively seek to engage via social and material levels. Supporting positive social norms appears to be key, alongside improvements in infrastructure and developments in technology that can give useful information or feedback (for example, real time bus passenger information at bus-stops or via phone apps, water monitors, smart meters). In other words, a broader emphasis on the *contexts* in which people make behavioural choices is needed, rather than a narrow focus on individuals *per se*. One example cited in the International Review which addresses all three contexts – the individual, the social, and the material - is the Barclays Cycle Hire scheme in London, which is encouraging cycling for short journeys in the city centre. The scheme targets the individual level with an attractive and flexible fares regime that means a bike is free for a hire period under 30 minutes. The high visibility branding and even the 'Boris Bike' nickname bring it into the social sphere of collective understandings and meanings. And the 340 docking stations and 5000 bikes, represent a very usable and highly visible infrastructure.

Communities are key to fostering change

Evidence suggests the importance of the social context within which behaviour takes place and the powerful influence of an individual's social circle in promoting cooperative behaviour and improved performance.[173] This approach is growing in popularity with policy makers, with both England and Scotland undertaking programmes targeting local community-led projects, such as the Environmental Action Fund in England and Climate Challenge Fund in Scotland. The review of the latter (scheduled for publication in June 2011) should shed light on critical success factors, and particularly the degree to which achieving a collective sense of agency matters.[174] However, community-led interventions can be resource intensive for participants and highly dependent on the determination of individual enthusiasts and highly motivated participants, so rolling out initiatives that have worked well on a local scale may be problematic.

Individuals respond positively to financial incentives in particular circumstances, but these need careful handling

One important insight from behavioural economics is that, while financial incentives can be important, they need to be handled with caution, in part because people are more focused on avoiding losses than on taking action to make financial gains. This might explain the evidence base finding that insulation programmes, even with attractive incentives, can struggle to achieve high take up rates. The behavioural economics thinking about our attachment to the 'default' position – i.e. we tend to be reluctant (or rather, find it difficult) to take

action to change our current situation – suggests that schemes should be wary of emphasising incentives at the expense of other elements. This is explored in more detail in the next section, about initiative mapping, and ensuring a package approach to a particular behaviour.

Finding out what works

Policy needs good data to develop effective interventions

Policy makers need to be able to understand the drivers and barriers to change, which means having the right data. For example, there is a lack of knowledge about how people use energy in the home.[175] There is a lack of robust and available household energy consumption data and how it varies with building and household occupant characteristics and appliance use.[176] There is little understanding of how to address the rebound effect – research shows that consumers of energy efficient appliances and measures sometimes increase their energy demand rather than reduce it.[177]

High quality planning and evaluation of programmes is vital to determining what works and how.

One of the key findings from the International Review is that, despite significant public investment in behaviour change initiatives, the evidence base on what works in relation to climate change behaviours is poor – often, it would appear that key programmes are not comprehensively evaluated or that the evidence that is collected is not always well understood. Given that the durability of the change is a critical success factor, due consideration should also be given to how change can be sustained and outcomes tracked over time. This will not only help establish an intervention's effect but could also highlight when further action is needed to sustain the improvement. For example, insulation has an important contribution to make to saving household energy, but uptake from insulation schemes described in the literature tends to be fairly low, even where attractive incentives are in place: the reasons for this are not well understood because of a lack of good quality evaluation data.

Changing behaviour can lead to important reductions in carbon emissions but there is a question about how much 'behavioural change' can achieve by itself.

The International Review suggests that the behaviour change interventions it reviewed were delivering 'incremental' rather than 'radical' reductions in emissions and that there remained a significant question about whether these kinds of behaviour change initiatives could deliver carbon reduction targets.[178] Certainly, research suggests that people seem to 'hit a wall' at about 20 per cent when it comes to cutting individual carbon emissions.[179] It would therefore be informative to consider the potential for wider-reaching system level changes to

achieve more significant GHG savings. This is an area the CCBRP wishes to explore in coming months.

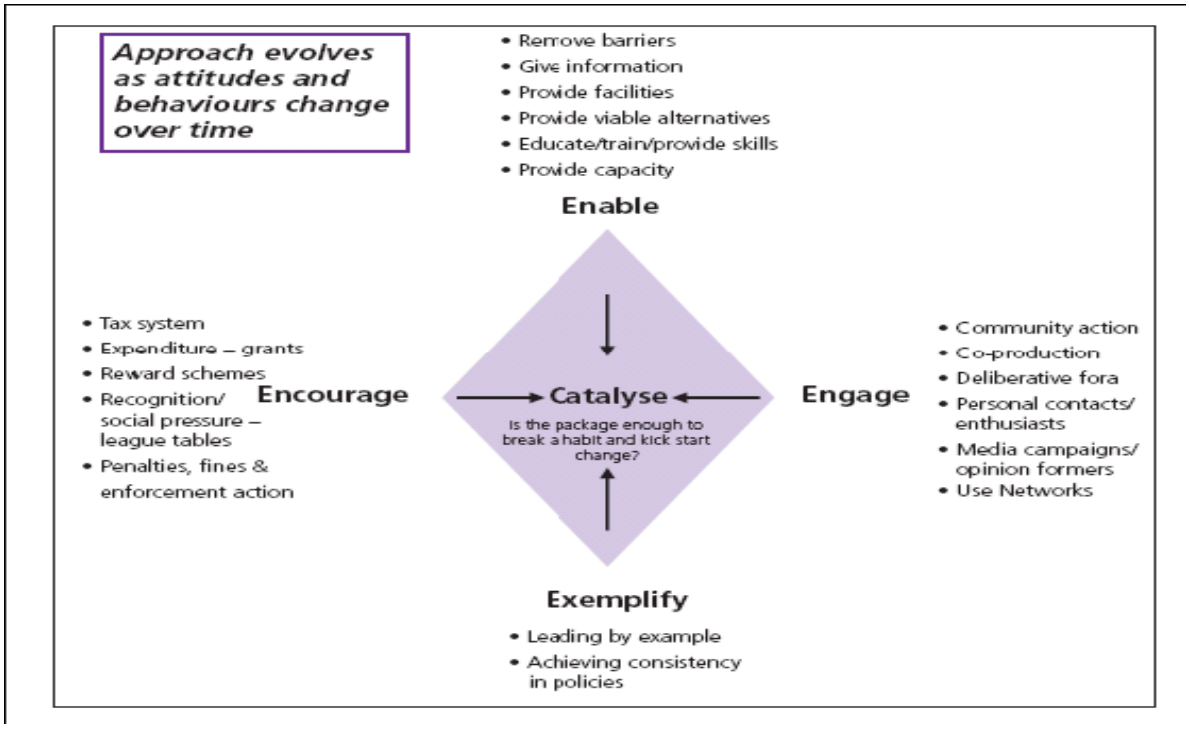
Next steps for the CCBRP

The CCBRP has a number of workstrands ongoing, with others still to start. This section offers a summary of key pieces of work that will feed into a final report.

Initiative Mapping using the 4Es Model

The CCBRP is examining the extent to which Scottish Government interventions are in place to provide support for the KBAs, and what the elements of this support might be. A 'mapping' of each behaviour area is being prepared, using Defra's '4Es' model – the four Es being **E**nable, **E**ncourage, **E**xemplify and **E**ngage - as illustrated in Figure 2. The mapping process will help determine where the weight of intervention is being placed in relation to each KBA and, therefore, where gaps and opportunities for a more dynamic package exist. So for example, mapping the components of insulation initiatives may reveal an overemphasis on financial incentives to **E**ncourage change, and a lack of ongoing **E**ngagement to ensure that households remain within the programme once they have signed up: lack of regular 'hand-holding' of householders by insulation schemes appears to be a key factor in drop-out. Maps will be made available as illustrations of more formal evidence review work.

Figure 2 - Defra's '4Es' model

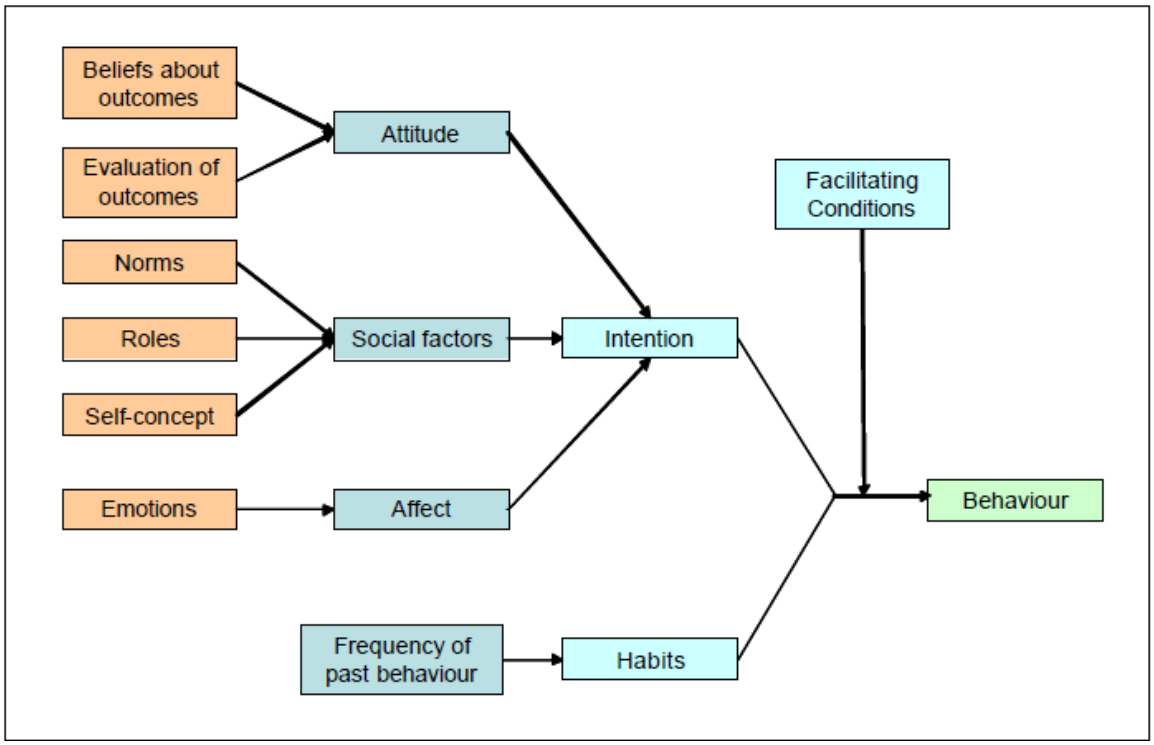


Review of Behavioural Determinants using Triandis's Theory of Interpersonal Behaviour

Understanding the factors that 'determine' behaviours is crucial to effective behaviour change interventions, and is key to the ongoing work of the CCBRP.

Triandis's Theory of Interpersonal Behaviour (TIB) is being used by the CCBRP as a framework to identify key influences on the KBAs – for example, it could be used to map out the factors which determine whether people drive to work. Figure 3, below, provides an overview of the structure underlying the TIB model. One of its attractions as a framework is that it shifts the emphasis away from attitudes, the focus of many behavioural models, and instead focuses on habit - a key issue in relation to sustainable/greener behaviour areas like commuting, food buying, and using energy.[180] The TIB indicates that while an individual's attitudes may contribute to an *intention* to act, attitudes may not in themselves determine behaviour. In some cases, habit may be the only influencing factor - simply the fact that an individual is *used to* driving to work may be the key determining factor as to whether s/he keeps on commuting in this way. An individual's attitudes may have little influence. As noted above, SEABS suggested that those who were the most pro-environmental in attitudes terms in the sample were no less likely to drive to work than other groups. In short, we might feel bad about driving to work – or other habitual behaviours - but we still do it.

Figure 3 - Triandis' Theory of Interpersonal Behaviour[181]



The TIB model also usefully highlights the importance of 'facilitating [or external] conditions' – those influences outside a person's immediate control, like price, or the infrastructure that can help or hinder particular behaviours. So, an individual may have strong pro-environment attitudes, but if the transport infrastructure is not sufficient to enable that person to take the bus or cycle to work, s/he will probably drive.

The TIB is being used within the CCBRP to structure our reviews of the evidence base around the KBAs and to inform our thinking about the factors that any initiative should address.

Review of the Climate Challenge Fund

The Climate Challenge Fund (CCF) has funded over 250 communities since 2008 to deliver carbon emissions reductions. A review of twenty case study projects from within the CCF will report in June 2011. The review has two main aims: to assess project impacts on local people and the communities in which they live, and to report on carbon savings; and to learn lessons about the critical success factors of particular projects. The review is exploring what makes projects successful (or unsuccessful) in taking forward a variety of approaches, in order to support community initiatives more effectively in the future.

Workplace Behaviours Study

The CCBRP's main commission for 2011 is an investigation into successful initiatives in workplaces to reduce emissions. The project will consider a number of case studies where employers from various sectors have, through innovative policy and practice, managed to shift employee attitudes and behaviours. The research will also be examining if and how workplaces can act as catalysts for behavioural change outside work. The project will produce best practice guidance for employers as a key output.

Long term data collection strategy

The Public Engagement Strategy sets out as its *Action 1* a data collection strategy for developing a better understanding of the key behaviour areas. Existing data collection (for example from the Scottish Household / House Conditions Surveys) will be complemented by new questions, possibly via a small trends survey or omnibus survey which will collect data only in areas where no existing sources are available. The survey will be repeated every two years, enabling us to track progress to 2020. Policy, research and communications teams will be able to use that data to make decisions on future government engagement, and we will make it available for others to use.

In addition, the possibility of developing a greener segmentation model or models, to reflect the key behavioural areas, is being explored. This would help

target social marketing activity, as well as identifying suitable areas for future pilot projects to test out particular behaviour change hypotheses.

Sustainable Behaviours Research Groups and Practice Theory

The Scottish Government is supporting two academic research groups, in collaboration with the Economic and Social Research Council (ESRC) and DEFRA, that are conducting research into sustainable lifestyles. The two research groups have hubs at Surrey University (The Sustainable Lifestyles Research Group; SLRG) and Manchester University (The Sustainable Practices Research Group; SPRG), with Edinburgh University involved in both groups. The groups are funded from 2010 to 2013. More information of the substantial body of work currently underway and/or being developed can be found in **Annex C**.

One area of theory that SPRG is bringing to government thinking is concerned with 'practices' as a way of conceptualising habit. Practice theory, which has emerged mostly from sociology, shifts the focus away from the individual, traditionally the focus of behavioural psychology and behaviour change interventions. Instead, practice theory emphasises the rules and conventions, meanings and objects that structure 'routines', ways of doing things; these routines are produced and continually reproduced within society. Three elements appear to be consistently key to each practice and combine in a holistic and collaborative way:

- Procedures (e.g. the skills that drive participation in each practice; the rules of the game)
- Materials (e.g. the infrastructure, or particular tools, or other items that each practice requires) and
- Meanings (e.g. the particular concepts or images that have developed to describe aspects of each practice).[182]

The nuances of practice theory can be difficult to grasp, but it is nevertheless an area worth exploring further, not least because traditional approaches to behaviour change have not always been effective in some areas of habit change. One example cited in the *International Review* could be seen as a practices intervention. The Cool Biz initiative, developed by the Japanese Ministry of the Environment, sought to reduce energy use by restricting air conditioning, and at the same time changed the rules of dress at work by implementing a new dress code, which meant for example that men were no longer required to wear jackets and ties in hot weather, and reinforced this new message by high profile leaders – including the prime minister – being interviewed on TV without a tie/jacket. These new rules, the new understandings of 'appropriate' wear for work, the developing social norms, and the clear rationale for change could all be seen to be a practices-style intervention.

The CCBRP team will be looking to explore with SPRG the potential of practice theory as a route to new thinking about behaviour in coming months.

Environment Research
February 2011

Annex A:

CCBRP Work Programme

#	PROJECT DETAIL
Strand 1 - Key Behaviours Understanding the key behaviours essential to mitigate climate change by:	
1.	**Developing a key behaviours set**. **Complete**
2.	**Developing evidence briefings** for each key area of the behaviours set, drawing out the determinants of each. Ongoing. **2011**.
3	Developing a **long term data collection strategy** for climate change attitudes and behaviours in Scotland. **2011**
Strand 2 – Behaviour change interventions Developing understandings of how behaviour change works in practice	
4.	Undertaking a **mapping of 'behaviour change' initiatives** currently ongoing in Scottish Government and wider partners. **Ongoing. 2011.**
5.	Undertaking an **international review** of policy-led activity across different countries to pull out useful case studies. **Complete.**
6.	**Testing out particular policy interventions**, including behavioural economics issues via qualitative research.. **Start Autumn 2011**
7.	Possible commission on climate change and the concept of 'fairness' in policy development, taking in issues around **socially exclusion**. **Starts Summer 2011**
8.	Drawing **detailed learning from the Climate Challenge Fund** and developing plans for a quasi-experimental approach for any future pilots / commissioning of a future, similar fund. **June 2011**.
Strand 3 – Workplace Developing understandings of the role of the workplace in influencing attitudes and enabling behavioural change	
9.	Undertaking a scoping review of existing evidence, with a focus on the effectiveness of various workplace initiatives. **Starts Spring 2011**.

Strand 4 - Communications and Engagement Analytical work to underpin successful marketing and associated work on communications and engagement. Social Marketing lead strand.	
10	Undertake **initial qualitative research** to build a narrative that will inform Greener/Climate Change communications developments. Completed.
11.	Undertaking **a segmentation, building on SEABS,** in order to identify and size optimum target audiences, priorities, and value impact. TBC.
12	Conduct social marketing **insight gathering and proposition testing** across a range of target audiences; undertake creative testing (qualitative and ethnographic) and direct marketing testing (quantitative), including message 'source'. TBC.
13	**Evaluation research** – analysis of media, pr, dm, advertising and marketing activity to determine impact by segment, ROI and to inform future activity.
Strand 5 - Knowledge transfer and exchange Developing our collective understandings of individual and household behaviour change (providing background to our approach for all questions)	
14.	**Hosting a "What Works in Behaviour Change" Event** for SG and key public bodies and stakeholders – drawing pragmatic learning from successful policy initiatives (and community-led interventions) in place in Scotland and internationally. **Completed**.
15.	Developing a **seminar series on Greener Behaviours** to improve knowledge exchange with universities / third sector / NDPBs. **Ongoing**.
16.	Developing **SEABS and behaviour change mini-summaries** for policy use. **Completed**.
17	Developing a **Behaviour Change Online Library** for internal (policy and analysis) use. **Ongoing**.
18.	Development of a **knowledge exchange strategy for the CCBRP**

Annex B – Example Initiatives to Address the Key Behaviour Areas

1) Improving the systems that heat homes *- e.g. boiler replacement; installing micro-renewables*

Policy package and description
The **Energy Assistance Package** (EAP) is a four stage package of advice and upgrades for the least energy efficient/most fuel poor homes, accessing funding from CERT. Can provide replacement boilers and central heating systems. EAP and HIS (below) together will be supported by £48m funding in 2011-12.
Through its Energy Saving Scotland Advice Centres (ESSACs), managed by the Energy Savings Trust (EST), the SG recently funded a **Boiler Scrappage Scheme**, enabling early replacement of inefficient G-rated boilers, a £2m **Energy Saving Scotland Home Loan Pilot**, giving interest free loans for energy efficiency works, and a Home Renewables Grant scheme, which provided grants for installation of renewable technologies.
£2m **Pathfinder Domestic Loan Scheme** funded by the SG, launched in October 2009, is for householders who want to invest in energy efficiency and micro-generation. The loan scheme works, in part, in conjunction with the Home Insulation Scheme (HIS).
Loans to landlords: Private landlords can access Energy Saving Scotland Small Business loans to install energy efficiency measures e.g. more efficient heating systems. A boiler scrappage scheme is also running for landlords.

2) *Keeping the Heat in -* *e.g. Insulation, draught proofing, double glazing.*

Policy package and description
The **Energy Assistance Package** (EAP) is a four stage package of advice and upgrades for the least energy efficient/most fuel poor homes, accessing funding from CERT. Can provide standard insulation measures, draught proofing and solid wall insulation. EAP and HIS (below) together will be supported by £48m funding in 2011-12. Assistance has also been provided to Local Authorities and Registered Social Landlords over 2009-10 and 2011-12 to install cavity wall, loft insulation and lagging of pipes.
The **Home Insulation Scheme** (HIS) is a Scottish area-based scheme promoting and installing insulation and other energy saving measures, accessing funding from CERT. Area-based home insulation schemes are offering energy efficiency advice, free or discounted energy efficiency measures and interest-free loans for more expensive measures in hard-to-treat properties to around 500,000 households across Scotland in 2010-11. This will be extended to a further 200,000 houses in 2011-12.
Landlords' Energy Saving Allowance (LESA). Allows landlords to claim a tax allowance of up to £1,500 per property for energy efficiency measures fitted.

3). Managing home heating. e.g. *Turning down heating (to between 18-21 degrees) and hot water thermostats (to 60 degrees) and making sure heating is only on when it needs to be.*

Policy package and description
The **Energy Assistance Package** (EAP) is a four stage package of advice and upgrades for the least energy efficient/most fuel poor homes, accessing funding from CERT. Can provide thermostats and heating controls. EAP and HIS (below) together will be supported by £48m funding in 2011-12.
The **Energy Saving Trust,** part-funded by SG, provides advice on ways to save energy and on water efficiency (both on the use and heating of water).
Smart Metering and Better Billing. "Smart" meters are to be installed in every home by 2020 to encourage better household energy management, monitors real-time gas and electricity usage (funded by energy companies).

4) Saving Electricity - *e.g. behaviours / purchasing decisions around appliances, lights, gadgets*

Policy package and description
The **Energy Saving Trust** provides advice on ways to save energy, including switching off lights and appliances and purchasing energy efficient goods and water efficiency.
Smart Metering and Better Billing. "Smart" meters are to be installed in every home by 2020 to encourage better household energy management, monitors real-time gas and electricity usage (funded by energy companies).

5). Becoming less reliant on the car

Policy package and description
The **Cycling Action Plan for Scotland** published in June 2010 sets the framework for a tenfold increase in the proportion of road journeys made by bicycle and shows clearly where investment has been placed. Support for Sustainable and Active Travel increases from £21.2m to £25.1m in 2011-12. Investment in cycling has been increasing year on year for the last three years and by nearly 50% in the last year (2010-11).
The Scottish Government's Smarter Choices, Smarter Places programme is funding sustainable travel projects in seven communities across Scotland, demonstrating ways of increasing active travel and public transport use. In five of the communities fifty travel advisers from within the local communities have visited over 40,000 households in 2009 and 2010, chatting with local residents, asking them about their travel patterns and providing information about the opportunities that exist as alternatives to the car.
The Government also delivers advice to organisations on travel planning to encourage increased levels of active travel through the Energy Saving Trust and www.chooseanotherway.com . Sustrans provides travel planning for schools, while Cycling Scotland delivers the Cycle Friendly Employer Award. The SG supports the Energy Saving Trust to provide sustainable travel information through visiting workplaces and engaging with the public and private sectors and consumers. As well as written and verbal advice, they have a driving simulator to demonstrate eco-driving principles in a practical way.

6) Driving more efficiently

Policy package and description
£4.3m has been committed to support the procurement of low carbon vehicles and their supportive infrastructure in 2010-11. The **Public Sector Low Carbon Vehicle (LCV) Procurement Scheme** will provide funding support to Community Planning Partnerships to assist the uptake of a range of low carbon vehicle technologies in the public sector fleet.
Eco-driving advice and information from the Energy Saving Trust helps car drivers to significantly reduce fuel consumption.
Edinburgh, Glasgow and the Central Belt is one of five areas across the UK that has bid successfully for funding to roll out a **network of electric vehicle recharging points**. The area will receive a grant of £1.45 million as part of the 'Plugged In Places' scheme to install 375 public, domestic and workplace electric vehicle charging points.

7. Using alternatives to flying where practical

Policy package and description
The SG have signed up to the **WWF one in five challenge**, whereby participants commit to cut 20% of their business flights within five years. SG employees flex half a million miles less in 2008-09 than the previous year.
SEPA, a Scottish Government agency, intends to maintain a **50% reduction in internal flights**, achieved during 2008/2009 relative to a 2006/2007 baseline

8. Avoiding Food Waste.

Policy package and description
Scotland's Zero Waste Plan, launched in June 2010, set out the Scottish Government's intention to introduce progressive bans on the sorts of material that can be landfilled, including food waste.
Zero Waste Scotland supports the **Love Food Hate Waste** campaign, which is encouraging people in Scotland to waste less food and save money, with advice on food shop planning, meal planning, and using left-overs.
The **Climate Challenge Fund** is funding Bothwell Community Garden to establish a sustainable community garden with the aim of reducing carbon emissions and preventing local vegetable waste going to landfill. - £196,354.

9. Eating a healthy diet, high in fruit &vegetables locally in season where we live

Policy package and description
Our **National Food and Drink Policy** supports the sustainable consumption and production of food and drink and has a number of initiatives which support this behaviour area. Amongst many, these include support for the Scottish Association of Farmers Markets to develop more farmers markets, Eco Schools and the Royal Highland Educational Trust to work with children to revalue our relationship with food, and in public awareness with the award-winning Eat More Fish PR campaign, and the Taste: the Best Reason to Eat Food in Season marketing campaign.
The Scottish Government plans to invest £679,000 over three years to extend the Scottish Grocers' Federation (SGF) **Healthyliving Programme**, matched by a £650,000 investment from retailers. The Scottish Grocers Federation (SGF) Healthyliving Programme improves the supply and provision of fresh produce and healthier food choices in local convenience stores, particularly in low income areas. The programme currently has 878 members.
The Climate Challenge Fund is funding **The Fife Diet**, to build a mass network of people sourcing their food locally, working closely with local farmers, aiming to shorten the supply chain, reduce food miles, innovate around distribution and re-localise production, and exploring sites for collective growing as well as co-operative purchasing on a larger scale - £144,060.
The Scottish Government and the Food Standards Agency fund the operation of the **Scottish Cooking Bus**. The bus is an articulated lorry that opens out to provide a fully equipped state-of-the-art classroom/kitchen for 16 students. To date, 6820 pupils have been taught in 163 schools, alongside 1124 teachers and 969 community members trained.

10. Reducing and Reusing.

Policy package and description
Zero Waste Plan A waste prevention programme will be developed for all waste to ensure that prevention and reuse of resources is at the centre of all waste policy in Scotland
Zero Waste Scotland is developing support for **Reuse Centres** – e.g. of used furniture – to improve the quality and reputation of these centres. ZWS will also launch a Zero Waste Zones scheme that will engage communities in action to reduce waste and litter and reuse or recycle unwanted goods.

Annex C - Sustainable Behaviours Research Groups

The paper provides a short synopsis of the workpackages falling under the Sustainable Lifestyles Research Group (SLRG) and the Sustainable Practices Research Group (SPRG).

Sustainable Lifestyles Research Group

The SLRG will be coordinated through the University of Surrey under the direction of Prof Tim Jackson. Key partners include the University of Bath, the University of Sussex, Brunel University and the Institute for Fiscal Studies. A variety of other academic and non-academic institutions will also participate formally and informally in the activities of the group. These include the University of Cardiff, Queens University Belfast, the University of Vienna, Peterborough City Council, the Royal Society for the encouragement of Arts, Manufactures and Commerce (RSA), and the London Sustainability Exchange.

Aims and objectives

Specific aims of the group include the following:

- to develop an integrated, inter-disciplinary understanding of the relationship between human behaviour, social practices, technological systems and sustainability;
- to build a sound conceptual basis for understanding and influencing change processes aimed at sustainable living;
- to synthesise relevant findings from existing and ongoing research on behaviour, practices, lifestyle and social change in a form accessible to policy-makers;
- to develop primary research studies aimed at elucidating key social, psychological, and structural dimensions of lifestyle change;
- to engage in and evaluate action-research initiatives aimed at sustainability – at community, organisation and household levels;
- to undertake or commission targeted research to inform specific policy campaigns or strategies;
- to expand UK research capacity on sustainable living, providing a unique opportunity for the transfer of knowledge and experience between academic and non-academic communities;
- to promote the UK as an international centre of excellence in research and policy for sustainable living.

Sustainable Lifestyles Research Group Work Programme

Project 1: Foundations for Sustainable Living

This project will convene and synthesise the understandings that emerge from the empirical projects(listed below) and be led by Prof Jackson with input from across the research group. Practically the Foundations Project will proceed through a series of 'thinkpieces' contributed by members of the group and contribute towards its Working Paper Series.

Project 2: Habit and Habit Discontinuities

This project looks at how habits are (temporarily) broken for example when people change job or move house. It is proposed that interventions provide more value for money when delivered in association with life course transitions. The project will be developed in partnership with the Peterborough Environment City Trust.

Project 3: Dynamic mapping of community resilience

This project will develop a framework for assessing how 'stable', 'durable', 'resilient' or 'robust' sustainable behaviours are in the face of potential shocks or stresses by looking across separate community-based sites of inquiry.

Project 4: Price Responsiveness of Demand in Energy and Transport

This project will explore the influence of price on people's decision-making in relation to three specific energy-related behaviours: household energy consumption, private motoring and flying.

Project 5: Mapping Rebound Effects from Sustainable Behaviour

The aim of this project is to estimate the 'rebound effects' associated with a variety of behavioural changes and to explore their policy implications. The project will use the Surrey Environmental Mapping framework (SELMA), developed under Research Group On Lifestyles, Values and Environment (RESOLVE[1]) to explore rebound in relation to different categories of behaviour.

Project 6: Sustainable Behaviour and Economic Stability

This project will take the form of a PhD project developed in conjunction with the Sustainable Development Commission and develop a macroeconomic simulation model exploring how changes in consumption affect economic stability. Household economic behaviour can impact on economic stability in several ways i.e. reduced consumption affects economic output.

Project 7: Longitudinal Qualitative Household Study

Building on a pilot study currently taking place in RESOLVE, this study will track changes in households, during what is expected to be a period of intense cultural change – particularly

[1] precursor to SLRG

in the context of climate change, financial insecurity and concerns over food, water and energy security. It is intended that the geographical spread of r respondents will allow for a comparison of different cultural contexts and governance regimes within the individual nations of the UK.

Project 8: The Environmental 7-Up Project

The project aims to develop a ‘flagship’ project to track changes in environmental attitudes and values over the lives of children now at school and draw inspiration from the long running Granada Series. It should be noted that this undertaking lies beyond the resources of the current bid, but its value could be enormous. The intention is to devote some limited resources to develop a detailed plan for the study and to seek external funding for it.

Project 9: Greener Living – grassroots initiatives for change

The project will study processes of group formation and activism in different towns and analyse the salient features embodied in different grassroots groups. The project aims to reflect on the reproduction of such groups as geographically, economically and politically dispersed.

Project 10: Sustainable Living in Remote Rural Scotland

The project looks to examine the challenge of sustainable lifestyles in remote rural areas. Different areas have different levels of connectivity, cohesion, participation, and an appreciation of their dependence on 'ecosystem services'. This PhD project will explore these countervailing forces in remote rural sites.

Project 11: Directions of Policy Dialogue

This project will explore how evidence about sustainable behaviour is provided to policy officials, and examines the policy ‘pull’ and how evidence is defined, sought, weighed, evaluated and used by policy officials. Case studies will be conducted in different regions and interviews will be conducted with both policy officials and stakeholders involved in policy processes.

Sustainable Practices Research Group Work Programme

The SPRG has a sophisticated and clear strategy for engagement and dissemination which is designed to ensure that its research will have maximum impact on policy debates and will engage throughout with its key non-academic stakeholders, including governments (local, regional, national and European), departments of state, and industrial organisations. The research partnership is organised on a hub - spoke model, with the hub at Manchester and partners at the Universities of Cardiff, Edinburgh, Essex, Lancaster, Leeds, Queens University Belfast/Newcastle, and Salford.

Aims and objectives

Specific aims of the Centre include the following:

- To develop fresh understandings of how social practices change and how they might become more sustainable
- To encourage theoretical reflection about the difficulties of change in behaviour and to analyse alternative theories (lay and scholarly) about the motors of social action
- To diffuse an alternative understanding of how to approach behaviour change in relation to mitigating the impact of climate change
- To make public officials and policy makers aware of the levers for change which are identified and emphasized by the practice-theoretical approach to routine behaviour
- To influence the making of government policy at all levels and organizational practices of corporations with regard to encouragement of sustainable behaviours.

SPRG Work Programme

WP1 (Eating): Changing eating habits: an international comparison.

This project will compare a sample of people whose recent and longer term experiences have offered the potential for radical change of diet in four cities in two countries (UK and France). Those examined will be people who have purposely attempted to alter their diets radically, those who have altered diets as a result of informal pressure to act differently; and those exposed to structural situations which facilitate change (e.g. migration or marriage).

WP2 (Sheltering): Zero-carbon habitation: an international comparison

This project will (i) examine the assumptions and expectations about behaviours and practices embedded within building concepts and the designs that are being developed to fulfill zero-carbon criteria. (ii) Ask how practices shift when zero-carbon homes are inhabited, and how might these change over time; asking to what extent are identical homes inhabited in different ways and with what are the implications for their sustainability in action. (iii) Ask what can we learn about different national contexts of zero-carbon living; examining how debates and practices compare and contrast between the UK and Germany.

WP3 (Sheltering): Keeping Cool

This project will investigate how expectations and practices of keeping cool or being comfortably warm are evolving. The project will ask how this is being shaped and realised through the promotion of technologies and lifestyles, the development of new infrastructures, and the reformulation of habits and routines in the UK. The project will examine (i) the variety of spaces that people occupy (private and public, home, workplace, retail, leisure, transport); (ii) how technologies and infrastructures of cooling (passive and energy consuming) are being promoted and applied; (iii) the expectations and desires that people have in relation to

thermal comfort. The project consists of a series of strategic linked studies in homes, workplaces and hotels, to reveal the changing 'geometry' of infrastructure, expectation and demand.

WP4 (Water): A micro-level understanding of the drivers of water consumption in the UK

The aim of this project is to examine the role of 'the meter' as an intervention that shapes patterns of domestic water consumption. The project builds on existing studies of domestic water consumption that have helped to identify how water use is split between different activities and where the big areas of change lie. A number of questions will be asked: From which end-uses does the average saving from metering come? Exactly how does metered water consumption change, in relation to which practices does it decrease (or increase), and which are unaffected? Is there social variability and diversity with respect to this question? And how does this relate either to the level of existing consumption or to rising 'background' trends in demand?

WP5 (Water): Bottled water consumption and markets: an international comparison

The research project will explore the rapid shifts in the consumption of bottled water in the UK and Europe over the past two decades. The project will analyse the market in four European countries (the UK, France, Italy and Germany). The project will examine patterns of consumption, and European and national standards for regulation of water. Further, different strategies of marketing bottled water, and correlations with other trends will be investigated. Further, two city regions in Mexico and India will serve as the counterpoint to the institutionalisation of European bottled water.

Theoretical and conceptual integration

It is intended that those involved in WPs 1-5 will make a substantial input into WP6, in addition to being involved in engagement and dissemination activities. The five WPs are in a position to contribute knowledge of different domains of activity.

WP6 Theoretical development and integration

WP6 will review and analyse secondary literature on historical examples of behaviour change, including, re-cycling, smoking, prohibition and others that are directly associated with the empirical domains. This will include garden watering, nutrition guidelines, car usage in cities and house insulation. It is intended that this will draw lessons from previous successful (and unsuccessful) attempts to achieve behaviour change in different countries.

Second, the workpackage will seek to develop and communicate a framework for comparing the range of policy interventions that operate at macro, meso, and micro levels regarding policy interventions and regional variation. The package will examine what policies work best for which practice and whether lessons can be learned across them.

Third, the workpackage aims to collectively construct an overall theoretical and conceptual position and combine insights from across the social scientific disciplines. The package will involve analysis of multilevel processes that shape consumer behaviour within the workpackages identified above and analyse how practices emerge, stabilize, change. This analysis will identify cross-cutting conceptual themes.

WP7 Engagement, Interaction and influence

The engagement strategy is intended to establish new ways of thinking about sustainability and behaviour in political, policy and public debate. Rather than taking existing definitions and agendas as 'given'; the workpackage will treat these as subjects of enquiry, analysis and action. Therefore the workpackage will be a combination of action research (Part A) and dissemination (Part B).

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