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INTERNATIONAL REVIEW OF
BEHAVIOUR CHANGE INITIATIVES:
CLIMATE CHANGE BEHAVIOURS
RESEARCH PROGRAMME

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EXECUTIVE SUMMARY

Background and aims

This report, commissioned as part of the Scottish Government's <http://www.scotland.gov.uk/Topics/Research/by-topic/environment/social-research/Behaviour-Change-Research/Behaviour-Change-Strategy>, reviews a range of behaviour change initiatives that have attempted to reduce the carbon intensity of consumption practices. It aims to enhance understandings of the different combinations of mechanisms for behavioural change, and to explore the potential transferability of initiatives to other regional, specifically Scottish, contexts.

Framework

The report develops an analytical framework, based on recent contributions to the academic literature, for extracting lessons from a range of different behaviour change initiatives. This framework takes the view that the mechanisms employed in behaviour change initiatives tend to address at least one context in which behaviour might be changed:

- The **individual**, which refers to initiatives that focus on influencing the attitudes of individual consumers so as to change their behaviours and choices;
- The **social**, which refers to the social norms, cultural conventions and shared understandings of consumer practices;
- The **material**, which refers to the objects, technologies and infrastructures that both enable and constrain ways of behaving.

These three contexts represent a good starting point for isolating behaviour change mechanisms and better understanding the rationale that underpins them. A simple conceptual framework of this type allows for wider lessons to be drawn beyond the viability of any single scheme

Research approach

The first stage of the research involved the identification and review of a wide range of publicly available reports, including an extensive search of web-based resources. Thirty cases were identified from these sources to provide a 'long list'. These were selected to provide a range of examples covering alternative mechanisms for behaviour change, regional locations, scales, sectors addressed, and the way in which the initiative was provisioned. After analysing some of the general features of the 'long list', six of the initiatives, which appeared to offer potential for greater insights, were selected for further research. These are the behaviour change case studies presented in this report.

Key Findings

While the **thirty cases** identified in this study cannot be taken as fully representative of the range of initiatives for fostering sustainable behaviour, they do suggest something about the patterning of initiatives. The cases focused disproportionately on the individual context for behaviour change, especially informational campaigns that sought to change consumer attitudes in the hope that this would result in behavioural change. This focus is to the exclusion of the social contexts in which individual decisions, attitudes and choices are often understood and framed. The material context was most obviously attended to in areas of public service provision, where infrastructures of energy, water and travel clearly affect patterns of behaviour.

The **six detailed case studies** each provided a number of insights about the potential effectiveness of different behaviour change mechanisms and the potential for transferability to different settings:

Durham Water. This initiative from Ontario, Canada, experimented with several mechanisms to reduce household water consumption. The key lesson was that an informational campaign on its own had very limited impact. But the scheme proved more successful when information was provided face-to-face and was reinforced with technology to monitor water use and pledges to a long term commitment to reduce water consumption. Durham Water provides evidence of the benefits of combining mechanisms to simultaneously target individual, social and material contexts.

TravelSmart. This initiative from Australia developed personalised travel advice for individuals, providing information about the availability of non-car travel options tailored to their specific travel needs. Similar schemes deployed elsewhere specifically target people moving into the area, taking the opportunity to promote non-car forms of mobility before travel habits have become entrenched.

RECO. The Residential Energy Conservation Ordinance, from Berkeley, California, is a city law that requires residential buildings to meet certain energy and water efficiency requirements when they are sold or significantly renovated. As such, it guarantees an upgrading of the housing stock to a minimum threshold by regulating and normalising environmental performance criteria into the pre-existing range of building standards required for house sales. Associated schemes in the USA have used financial mechanisms (e.g. the Energy Star Mortgage) to further incentivise homeowners to upgrade their houses to reach higher environmental performance standards.

Barclays Cycle Hire. This initiative provided a bicycle hire scheme and was launched in London in July 2010 with the objective of encouraging cycling for short journeys in and through the centre of the city. A major infrastructural change to London's transport systems, the scheme currently provides access to 5,000 bicycles that can be picked up and dropped off at 340 docking

stations. Implementation of the scheme clearly benefitted from the experience of a similar scheme in Paris, learning lessons from what had worked well and the nature of challenges that needed to be addressed. Major infrastructure schemes of this type are expensive, but can be attractive to commercial sponsors (in this case Barclays Bank) seeking reputational benefits.

FoodNYC. This initiative, which at present is only at the planning stage, represents a wide-ranging and coordinated effort to transform the food production and consumption systems of New York City. The programme of proposed mechanisms targets individual, social and material contexts of behaviour and goes further still by setting out major changes to the way that food is produced and sold in the city. As such, it is notable for its systemic approach to major behavioural change and its inclusion of legislative measures and proposals for new public institutions to oversee implementation.

Middelgrunden Wind Cooperative. This initiative in Copenhagen resulted in the world's first co-operatively owned offshore wind farm. It is a large scale facility for producing renewable energy owned by 8552 members. The Danish Government provided significant financial incentives to encourage participation in the scheme, through tax breaks on dividends and by setting a guaranteed price for the electricity produced. According to the Cooperative, opening up the scheme to local involvement was particularly important for ensuring local public acceptability.

Conclusions and key lessons

There are three specific lessons regarding behaviour change initiatives and four general conclusions that arise from the research that forms the basis of this report. The three specific lessons are:

1. *Targeting multiple contexts, moments of lifestyle transition and institutional or infrastructural pressure points*

Behaviour change initiatives will be more effective if they go beyond targeting the individual context (especially through informational campaigns) to include mechanisms which intervene in the social and material contexts. Targeting moments of transition (moving home, having children, and so on) and pressure points in infrastructural systems represent opportunities for sustained behavioural change.

2. *Developing frameworks for coordinated initiatives across systems*

There appears to be significant, and as yet untapped, potential to employ a set of mechanisms, within a coordinated framework, based on a coherent vision of the required changes in a specific sector or domain or consumption. This provides an opportunity for otherwise individual, 'single action' schemes to complement one other towards a common goal – and to reduce the possibility that they might pull in opposite directions.

3. *Utilising 'less visible' mechanisms and non pro-environmental messages to effect change*

There are opportunities to change the provision of goods and services without necessarily altering specific behaviours (e.g. renewable energy). Using non pro-environmental issues related to health and fitness, diet or even concerns about time pressure (e.g. to encourage home working) can also be used to mobilize pro-environmental behaviours.

Beyond these three specific lessons for stimulating behaviour change, there are four more general conclusions that have emerged from this international case study review:

1. *The need for robust evaluation measures*

At present, the evidence base regarding behaviour change initiatives is very poor. There is a need for systematic monitoring and reporting of behaviour change initiatives so that robust measures of costs and outcomes can be reliably identified. There is also a need for methodological development to accurately conduct such evaluations given the complexity of behaviour change initiatives.

2. *Challenges for transfer and replication*

Simple imitation of an apparently successful initiative is unlikely to be effective. Attempts to transfer initiatives need to be sensitive to local factors: natural endowments, social norms, existing material infrastructure, and institutional arrangements. Seeking advice from those involved in previous initiatives from other locations will facilitate learning opportunities and provide access to the tacit knowledge developed through the implementation process.

3. *Organisational leadership of initiatives*

The financial resources required for behaviour change initiatives can be provided by governments, firms or through community groups. But, there are a range of institutional innovations that can be employed to incentivise up-front investment or to spread the financial costs over longer periods of time. Who leads an initiative (government, firm or community) is likely to influence how the initiative is perceived and has potential to affect outcomes.

4. *Radical vs. Incremental Change*

Most initiatives reviewed in this report tended to target rather modest improvements towards low carbon lifestyles. There remains a significant question about whether initiatives with this scale of ambition can deliver the GHG reduction targets set by governments. It is useful to consider the potential for wider-reaching system level changes, which radically transform what and the way we consume, to achieve much more significant GHG savings.

1. INTRODUCTION

1.1 This report was commissioned by the Scottish Government to explore the initiatives that are currently underway outside of the United Kingdom and aiming to foster individual, household and community level behaviour change towards lower carbon lifestyles. The report draws on initiatives and interventions that have addressed different areas of environmentally significant behaviour (energy, transport, waste etcetera) and considers the mechanisms that have been used to facilitate change. The report discusses the different behavioural contexts in which interventions can be - and have been - focused and it aims to contribute to better understandings of the different combinations of mechanisms for behavioural change. It also addresses the potential for learning from different initiatives and combinations of mechanisms for application in other regional, specifically Scottish, contexts.

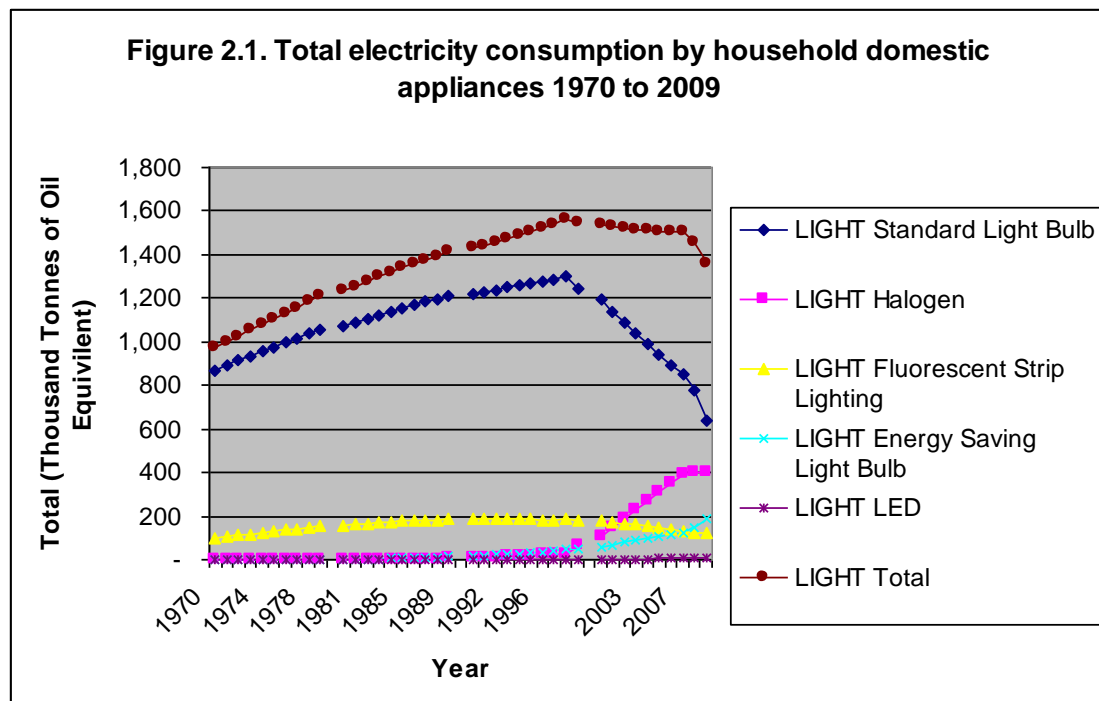
1.2 It is well established that the challenges of mitigating (and adapting to) climate change and finding a path towards a more sustainable future require different ways of living and consuming to take hold in developed nations. Against this backdrop, notions of 'behaviour change' have become something of a 'holy grail' (Jackson, 2005) such that the challenge is now understood as one of fostering more environmentally friendly behaviours at the level of households and individuals.

1.3 Changing consumer behaviour related to the purchase of specific items is difficult enough, but to attempt to reconfigure entire lifestyles which involve multiple and related practices, goods and services and to do so across diverse social groups is a major challenge. While many mechanisms for shifting behaviours have been identified, the evidence to date suggests mixed success. Policy makers are equipped with a range of behaviour change mechanisms, but the difficulty faced is understanding which mechanisms should be used in relation to what aspects of consumption and directed at which social groups.

1.4 This report tackles this conundrum by reviewing a range of policy initiatives and interventions that have been undertaken (largely but not exclusively) outside of the United Kingdom. Its objective is not simply to identify successful initiatives, but to explore and better understand the potential transferability of interventions to other contexts – most notably across different regions, sectors (travel, food...), scales (regional, local...), and forms of provision (e.g. through the state, market or community). Following a brief overview of approaches to behaviour change, the report takes thirty international policy initiatives to illustrate mechanisms for behaviour change, before selecting six cases for more detailed exploration.

2. MECHANISMS FOR BEHAVIOUR CHANGE

2.1 Evaluating policy initiatives in terms of success or failure is problematic. What constitutes success is dependent on the criteria and scope of the evaluation: what appears successful along one criterion can seem less persuasive along others. For example, campaigns for selling light bulbs based on price incentives and marketing have been successful in terms of sales (Munasinghe et al., 2009), and total energy consumption from standard light bulbs began to drop in 2007 (see Figure 2.1). However, the energy savings made from straight substitutions between standard and energy-saving light bulbs is partly offset by the increasing energy consumption from halogen light bulbs (see the disparity between the red and dark blue lines in the Figure). In this case, purchase behaviour is changed (success) but environmental impact is not significantly reduced (failure). While it could reasonably be argued that energy consumption through lighting would have risen at a greater rate were it not for sales of lower energy bulbs, the more important question is why do people appear to consume more light? Answers might be found in accounts of emerging social tastes for ambient low-lighting that has resulted in there being many more light bulbs per room in European countries than was the case in the past (Wilhite and Lutzenhiser, 1999). In other words, behaviour change mechanisms need to be combined so as to address the use of goods and services as well as shifting consumption patterns toward more sustainable substitute products.



Source: Department of Energy and Climate Change (2010) 'Energy Consumption in the UK'.

2.2 It is useful to summarize some of the key behaviour change mechanisms available to policy makers in order to identify what combinations are most effective. Such mechanisms tend to address at least one context in which behaviour might be changed:

- The individual, which refers to initiatives that focus on influencing the attitudes of individual consumers so as to change their behaviours and choices;
- The social, which refers to the social norms, cultural conventions and shared understandings of consumer practices;
- The material, which refers to the objects, technologies and infrastructures that both enable and constrain ways of behaving.

2.3 These three contexts represent a good starting point for isolating behaviour change mechanisms and better understanding the rationale that underpins them.

The individual context

2.4 The individual context broadly covers initiatives that primarily seek to change the attitudes and choices of consumers in ways that encourage more sustainable behaviours. Most prominent are economic incentives. Increasing the monetary cost of environmentally damaging activities or offering financial incentives to undertake less environmentally damaging behaviours (such as air travel and home insulation) is a common, if politically problematic, mechanism. Other than the difficulties of interfering with market mechanisms, two further problems can be identified. Incentives do not necessarily foster long term changes in behaviour. For example, a study conducted as part of the Danish Environmental Research programme gave free one-month bus passes to 400 car-driving commuters. Following a significant increase in the number of journeys made by bus rather than car, the number of bus journeys declined and people largely reverted back to driving their cars after the trial period (Thogerson & Moller 2008). Second, monetary penalties or disincentives can work to legitimate the behaviour being discouraged. For example, when parents at a kibbutz school were fined for turning up late to collect their children the number of late pick-ups rose, because parents felt that they were paying for the right to be late (Gneezy and Rustichini 2000).

2.5 Offering and actively promoting environmentally friendly alternatives to unsustainable practices is another mechanism that addresses individual consumer choices. This can involve ‘nudging’ choices by making low-carbon goods and services easier to find and adopt. For example, when Tesco moved their organic products from a specialist area and integrated them with all the other produce, it became easier for consumers to choose organic, and sales of organic produce rose by 35% (Munasinghe et al. 2009). Another form of nudging is default opt-ins for discretionary charges to finance carbon off-setting schemes (such as customers having to opt out of a discretionary

charge associated with a product, say an airline ticket, for funding carbon off-setting programmes).

2.6 Informing the consumer, thus not trying to overtly manipulate (through price incentives and nudging) but to change attitudes through education is a third mechanism. In addition to product labelling (see Box 2.1), marketing campaigns are often used to raise awareness of environmentally problematic activities. Such approaches can be expensive in relation to their effectiveness. For example, during the 1980s Californian utility companies spent \$200 million to advertise residential energy efficiency measures but household energy use changed only marginally. In one case, the Pacific Gas and Electricity Company spent more money advertising the benefits of home insulation in California than it would have cost to install the insulation directly into the homes of every person it was trying to reach (McKenzie-Mohr 2000).

Box 2.1. The Casino Carbon Index (case study 28, Appendix 1)

A French labelling scheme advising consumers of the carbon footprint associated with the purchase of over 200 products. In the first two years of the scheme over 20 metric tonnes of CO₂ equivalent are calculated to have been saved as a result of customers substituting higher for lower carbon products. This represents some success but it is important to recognise that this is the level of annual CO₂ emissions associated with the energy use in two homes in the United States. It should be noted however that the impacts of carbon labelling would not be expected to show significant returns before all products are fully and consistently labelled.

The general challenge for carbon labelling is to ensure that the information contained within labels is meaningful, easy to understand, standardised across products, and that consumers are motivated to want to take action. So while this could be transferred to the Scottish context; it is not immediately clear that labelling is an effective way of reducing individual carbon footprints.

2.7 Information campaigns are most effective when targeted at particular groups. Segmentation models (such as those developed by DEFRA) make it possible to direct marketing campaigns at groups according to their attitudes and current behaviours. Targeted marketing also opens the opportunity to develop campaigns attached to values that are not necessarily pro-environmental but which, nevertheless, still foster more sustainable behaviours (see Box 2.2).

Box 2.2. Save the Crabs – Then Eat ‘Em (case study 19, Appendix 1)

A campaign in Virginia and the Greater Washington DC area persuaded homeowners to fertilise their lawns differently and so reduce the nutrient pollution flowing into the nearby Chesapeake Bay. The information campaign did not position this as an environmental issue, rather it stressed such actions were necessary to ensure that seafood yields, important for the local economy and therefore local communities and households, did not diminish.

It cost \$550,000 to initiate and 46% of those exposed to the campaign planned to change their behaviour accordingly compared to 40% of those not exposed. While reported as a success, this campaign only achieved a marginal increase of intentions to change behaviour and appears to be quite expensive. More interesting is the potential to use other more localised and directly relevant issues to mobilise more sustainable behaviours.

The social context

2.8 Many cultural conventions and social norms underpin consumer behaviour. For example, studies consistently reveal shared understandings of a proper meal being that which constitutes meat, vegetables and a carbohydrate (Mitchell, 1999). Changing cultural conventions is difficult because they are entrenched in ways of life and also vary across social groups. Studies also show that social groups favour different variations of the ‘proper meal’ according to gender, age, household composition and socio-economic status (Bennett et al, 2009). Addressing the social contexts of consumer behaviour involves attempting to shift the cultural conventions and social norms that underpin different activities. This is both difficult and problematic because it requires shifting the foci of initiatives away from individual consumer decisions and toward shaping and intervening in the shared behaviours of social groups.

2.9 Social institutions, such as the workplace and schools, represent social contexts through which people learn, come to understand and habituate certain consumption behaviours, and can be targeted for behaviour change. This can involve initiatives that seek to better coordinate the temporal rhythms of everyday activities, such as hours of working, and encouraging employee car sharing. Households or families are another social institution through which behaviours can be changed, particularly by focusing on moments of transition. A scheme operated by the Centre Area Transportation Authority (CATA) in Pennsylvania (case study 16) is a good example. It targeted households who had recently moved to the neighbourhood, offering free bus passes for a trial period, and information about bus stops and services. Importantly, rather than simply seek to shift individual attitudes this scheme focused on moments of life-course transition (in this case moving home; others could include marriage, becoming a parent, leaving the parental home,

and so on) in order to reframe the social context in which habitual practices are located. While CATA did not directly evaluate the success of the scheme, they did report a sustained and significant increase in passenger numbers. Using social institutions to re-set social norms can also lead to wholesale shifts in cultural conventions (see Box 2.3). As the Cool Biz example demonstrates, governments have a direct opportunity to re-frame the social context of behaviour through attention to the building stock and practices of its institutions.

Box 2.3. Cool Biz (case study 22, Appendix 1)

A campaign initiated by the Japanese Ministry of Environment aimed at reducing energy use in buildings by setting air conditioners at no lower than 28°C throughout the summer months. To make this more comfortable for workers a new dress code was implemented. This involved removing ties and blazers and wearing clothing made from 'breathable' fibres. Not only was the regulation of air conditioning achieved but the social norms surrounding workplace clothing attire changed. The Ministry estimated a 1.14 million ton reduction of CO₂ emissions (equivalent to the annual emissions associated with the average energy use of 85,000 US homes), although sales of neckties declined by 36%! While the ministry's figures need to be interpreted with caution, this intervention highlights the potential for governments to shift behaviours through attention to the buildings and practices of its institutions. It is also reasonable to expect that interventions such as this are relatively inexpensive and could perhaps even save money thanks to lower energy bills.

2.10 A second mechanism for addressing the social contexts of behaviour change is cultural tastes, which by definition are shared (otherwise it would be impossible to distinguish good from bad or identify personal tastes – see Gronow 1997). Here the focus is less on influencing the decision making of the individual but generating shared cultural understandings of what is fashionable and appropriate. In Europe and the US, for example, celebrity chefs have made a significant difference to the eating aspirations of large sectors of the population. But celebrity endorsement is not the only way of influencing cultural tastes. Often, early adopters of new styles can set the trend. Think of the gastronomes who, in the 1970s, championed eating lamb and duck when it is pink rather than cooked through, creating a demand for a way of cooking that has since become the mark of good taste in restaurants (Warde 2009). The 'New Nordic Diet' (case study 2) is attempting to use such mechanisms to change eating tastes in Denmark, using a celebrity chef and media exposure, not to mention the production of recipe books and cookery lessons, to shift the cultural understandings of what constitutes 'good Danish food'. While this (expensive – circa £10 million) campaign is in its early stages, concerns about trying to 'dictate' tastes and reactions against the diet as 'not being for people like me' demonstrate the difficulties of trying to 'design good taste' (see Bere and Brug, 2009, for more details).

2.11 Community-based initiatives often seek to change consumer behaviour by influencing social norms (see Box 2.4). Such schemes tend to focus on the importance of social networks for circulating information and expectations regarding appropriate behaviours. They seek to support individual efforts to live more sustainably just as they might operate to 'police' tastes and so govern both what it is that 'we' like to consume as well as what 'we' understand to be bad or appropriate conduct.

Box 2.4. Backyard Composting (case study 20, Appendix 1)

In 2000, Nova Scotia province in Canada introduced an initiative to encourage composting by persuading households who already engaged in this activity to put a sign on their bin to make it more visible to their neighbours. They were also asked to speak to their neighbours and friends about composting and dispel common fears that it was unpleasant. Seven months after the trial began 80% of those surveyed who had not previously composted had taken up the activity.

This is an example of a very cheap and simple initiative that uses social norms to trigger behaviour change, and with impressive results. Such schemes have much potential to be applied in different locations due to their sensitivity to local issues and cultures, and the Scottish Government's

The material context

2.12 The material context refers to the technologies, infrastructures and material design of the goods that almost all forms of consumption involve or rely upon. Infrastructures and technologies permit particular forms of consumption, whether that is travel, cooking, bathing or surfing the internet, but also lock people into behaviours that can be very difficult to change. The freezer, for example, has developed alongside an entire frozen-food infrastructure that includes the changing design and use of houses and kitchens, the development of the out-of-town supermarket, and subsequent decline of local food stores, which renders household food provisioning without a freezer increasingly difficult (Shove and Southerton, 2000). Shifting infrastructural arrangements are, however, often essential to facilitate individual decision making and shift social norms toward more sustainable behaviours. Recycling in the UK increased significantly once the appropriate waste infrastructure was in place through the provision of recycling bins/boxes and curb-side collection facilities. Such interventions in material infrastructures not only create the conditions for new habits to emerge but have the potential to lock people into sustained environmentally friendly behaviours (see box 2.5).

2.13 The way that objects are designed and combined can shape the way that they are. Classic examples are traffic calming measures such as sleeping policemen which force drivers to slow down or oversized hotel keyfobs which

encourage guests to hand keys in at reception when leaving the hotel, reducing the number of lost keys in the process (Latour, 1991). Attention to design of goods and services is therefore a mechanism that can nudge behaviours in particular directions (see Box 2.6).

Box 2.5. BRT and CicloRuta (case study 9, Appendix 1)

The city of Bogotá, Colombia has made substantial investments in a Bus Rapid Transit (BRT) system and an extensive cycle network. The BRT system involves: dedicated bus lanes with feeder routes into the main system; dedicated terminals that allow for quick and easy boarding and ticketing; frequent and high capacity buses and; an organisation structure that allows for flexible and reliable scheduling. Consequently, bus travel becomes a quick and reliable alternative to car travel and, as a result, it is estimated that over 287,000 tons of CO₂ are saved annually – equivalent to the annual emissions associated with the energy use of 22,158 homes in the USA. However, it is not a cheap intervention with the cost of the first phase of implementation having cost \$297 million (although it is estimated that \$25 million will be made in carbon credits by 2012). The BRT has gone hand-in-hand with the expansion of Bogotá's cycle network which has worked to make cycling safer and easier and in turn, the percentage of residents using bicycles doubled between 2000 and 2007 with an estimated annual saving of 6,500 tons of CO₂. Again, this is not a cheap intervention with an initial investment cost of \$50.25 million but taken together, BRT and CicloRuta highlight the potential for interventions in material infrastructures to facilitate less environmentally damaging travel behaviours.

Box 2.6. Traffic Signal Timing (case study 25, Appendix 1)

In Portland, Oregon the timings of traffic signals were changed in order to reduce the petrol used by motorists when idling or accelerating. This relatively straightforward intervention is reported to save 15,460 tons of CO₂ emissions each year (equivalent to the emissions associated with the annual energy use of 1,194 US households). This intervention is particularly interesting insofar as behaviour is changed through the re-scripting of the practice of driving and carbon emissions reduced without individuals having to make the choice to do so or necessarily be aware that they are changing their behaviour. It cost \$533,000 to initiate for which the returns were significant given: 1) the CO₂ reductions that it is reported to be responsible for and; 2) figures that estimate annual financial savings for motorists of over \$4,000,000.

3. THIRTY BEHAVIOUR CHANGE INITIATIVES

3.1 The thirty case studies identified as part of this international review (see Appendix 1) employed at least one of the mechanisms for behaviour change identified above. The case studies were selected based on regional location, scale, sector addressed, and the way in which the initiative was provisioned. Potential case studies were identified from a number of publicly available publications, including an extensive search of web-based resources. They were reduced to thirty according to the amount of data regarding the impact of the initiative and the presence of commentaries other than those provided by the initiative's sponsor. It should be noted that the volume and consistency of the data for evaluation that is currently available is very poor; often vague and generic and with very little empirical rigour presented. As such, the thirty case studies should not be read as a representative sample of behaviour change initiatives nor as having been subject to comprehensive evaluations. Rather, the cases identified represent a broad and indicative overview of behaviour change initiatives from which insights into the potential transferability of mechanisms for change can be explored. Table 3.1 shows a summary of the case studies.

Table 3.1. Thirty case studies summarised by region, scale, sector, mode provision, and three contexts of consumer behaviour.

	Total number of cases	Individual context	Social context	Material context
Total cases per context	30	27	11	20
Region:				
North America	13	12	4	11
Europe	11	10	4	5
Inter-regional	3	3	2	2
Other	3	2	1	2
Scale:				
Regional	21	18	7	16
National	8	8	3	4
International	1	1	1	0
Sector:				
Food	4	4	4	3
Energy &/or buildings	9	8	3	5
Transport	6	4	0	3
Waste/recycling	5	5	1	4
Water	3	3	1	3
Green lifestyles	3	3	2	2
Mode of provision:				
State	16	14	3	11
Market-State	6	6	3	5
State-Civil society/community	3	3	1	1
Civil society/community	5	4	4	3

3.2 Of the thirty cases, twenty-seven employed mechanisms associated with targeting the individual context of behaviour change, compared with twenty that tackled material contexts and only eleven that addressed social contexts. While a crude measure, this does perhaps indicate the continued

dominance of understandings that behaviour is a causal consequence of individual attitudes and that it is perceived to be politically easier to tackle individual consumer decisions as opposed to cultural conventions and social norms.

3.4 Almost half of the cases identified (13) are located in North America, eleven in Europe, one each in Australia, Japan and Latin America, while three were inter-regional (i.e. multiple countries). While the individual context was dominant in all cases, North American initiatives were far more sensitive to the material context (12 initiatives) than were European (5 of 10 case studies).

3.5 Initiatives in the food sector and oriented toward 'greener lifestyles' appeared to pay comparatively greater attention to social contexts than those in other sectors. The material context, unsurprisingly, featured more prominently in the energy and/or buildings, transport, water and waste/recycling sectors. This implies a general prioritisation of material contexts when it comes to sectors where public service infrastructures are highly visible as opposed to those that focus on practices that are overtly cultural (food and lifestyle).

3.6 Behaviour change initiatives can be instigated and delivered (provisioned) in a variety of ways. Principally this can be through the state, the market and civil-society/community or any combination of the three. Most initiatives were provisioned through the state (16), six came through state-market partnerships, three through state-civil society/community collaboration, and five from civil society/community. Notably, comparatively few State initiatives focused on mechanisms addressing social contexts. Without more systematic data it is difficult to know if this is representative of differences between state, market and civil-society/community provisioned behaviour change initiatives (for a more detailed analysis of business initiatives see Munasinghe et al, 2009).

3.7 The thirty case studies were selected based on the available information for assessing initiatives, and with particular attention to their transferability to government policy in Scotland. It is by no means a systematic and representative sampling of behaviour change initiatives across the globe. As such, the conclusions of a crude 'survey' of the thirty cases identified cannot be taken as a representation of the range of initiatives for fostering sustainable behaviour. It does, however, suggest something about the patterning of initiatives. There is a disproportionate focus on the individual context for behaviour change to the exclusion of the social contexts in which individual decisions, attitudes and choices are often understood and framed. The material context is most obviously attended to in areas of public service provision, where infrastructures of energy, water and travel clearly affect patterns of behaviour. While the initiatives provisioned through the State (in its various guises) may well be disproportionately represented in our sample (particularly given the tendency for information and comment about such schemes to be more readily available), it does appear that such cases pay surprisingly little attention to changing the social contexts of behaviour.

4. SIX CASE STUDIES FOR CHANGING BEHAVIOUR

4.1 To better understand how the many and very different mechanisms for behaviour change policy might be better calibrated and targeted, it is necessary to take a more detailed look at some of the cases. The six cases below were selected on the basis of three criteria:

1. Their apparent success
2. The mix of mechanisms drawn from the individual, social and material contexts of behaviour
3. Their representation of, and potential application across, different regions, scales, sectors, and modes of provision.

The six case studies are summarised in Table 4.1 overleaf and discussed in more detail below.

Table 4.1. The six case studies summarized

	Objective	Cost	Impact	Potential
Durham Water	10% reduction in domestic water use	\$80,000 to implement but financial savings of \$945,000	17% reduction in peak water use over time	Highlights the importance of tackling the individual, social and material contexts of behaviour
TravelSmart	Encourage individuals to reduce private car use	£460,000 but estimated payback period of 30 years	Up to 18% reduction in private car journeys claimed	Highlights the importance of tailored information and foregrounding habits.
RECO	Reduce household energy use	Responsibility lies with homeowners – up to \$3,400 but estimated annual financial savings of \$450 per household	13% reduction in domestic energy use. City wide annual reduction of over 5,000 tons of CO2 (equivalent to the annual emissions associated with 386 USA homes)	Highlights the potential of legislative imperatives and interventions in the material context of behaviour.
Barclays Cycle Hire	To encourage the use of bicycles for short journeys	£140million over the first 6 years but with an investment of £25million from Barclays and reported potential to make money	Results unknown but early indications suggest a high level of uptake.	Highlights the potential for commercial sponsorship and interventions in transportation infrastructures.
Food NYC	To set out a blueprint for a sustainable food system.	Not known	Not yet evaluated	Highlights the potential for government to set agendas and provide a co-ordinating framework for multiple interventions in a particular area of behaviour.
Middelgrunden	To provide renewable energy for domestic consumption	€44.9 million (50% co-operatively owned)	81,000 tons of CO2 saved annually across 40,000 homes equivalent to the annual emissions associated with the energy use 6,254 homes	Highlights the potential for communities to respond to climate change issues and the ways in which interventions in social contexts can help legitimate environmental initiatives.

Durham Water

4.1 This example (no. 15 in the appendix) is drawn from the Durham region in Ontario where a social marketing campaign was employed to bring about a 10% reduction in residential water use (see McKenzie-Mohr 2000). The motivation for this initiative lay in a growing recognition that the already high levels of domestic water consumption (especially lawn watering) would increase further with anticipated population growth. It was hoped that a campaign to reduce water use would remove the need to invest in an expensive new water-processing plant.

4.2 Four different test groups were chosen to pilot this intervention. One control group received no intervention; the second received an information brochure; the third had access to 'master gardener' volunteers who could provide landscape assessments for homeowners; and the fourth was selected for a community-based social marketing approach. Of interest here are the differences between the group which received a straightforward information pack (group 2) and that targeted with the community based intervention (group 4).

4.3 The intervention for group 2 rested entirely on a 'passive' informational campaign aimed to raise awareness of the problem in the hope that this alone would spark the desired behavioural change. By contrast, the community based social marketing campaign targeting group 4 deployed a greater variety of approaches that aimed to affect behaviour through multiple mechanisms. The first component of this campaign involved a visit by a student who explained the initiative in detail, a significantly more proactive way to impart information compared to a brochure through the letterbox. In addition, each consumer was provided with a sign to be hung on the outside water tap reminding them to water their gardens only every other day, and not at all if had rained in the previous week. Third, residents were asked to sign a pledge that they would water their lawns only on odd or even days and restrict their watering to one inch per week, a measure designed to translate increased awareness into persistent behavioural change. Finally, residents were given a gauge to measure when the lawn had received sufficient watering.

4.4 The results were revealing. The group that was given informational brochures actually increased the amount of water they used when watering their lawns, the frequency at which they watered and the amount of time that they spent watering their lawn. The group that was targeted with multiple approaches (group 4) decreased their watering by 54% and a demonstrated 66% drop in the number of times that a member of this group watered for more than an hour at a time. Overall, the initiative resulted in 30% reductions in peak water use at first but this figure levelled off at around 17% over time (<http://www.toolsofchange.com/English/CaseStudies/default.asp?ID=156>). It cost the regional municipality of Durham's works department \$80,000 to deliver but the reductions in peak water consumption saved them \$945,000 by not having to invest in a new water processing plant (McKenzie-Mohr 2000). This example illustrates that information by itself is not enough and may

actually be counterproductive. Moreover, when an initiative mobilises multiple approaches targeting the different contexts in which consumer practice take place the results can be dramatic.

4.5 While water shortages are unlikely to be a priority for behavioural change in Scotland, the generic lessons learned from this case are instructive in showing how interventions in the individual (personal contact with the student), social (community pledges) and material (gauges, and to a lesser extent signs to intervene at moments when using the material infrastructure) contexts of practice can yield success in terms of changing behaviour. The dramatic difference in outcome between the 'information only' and the 'multiple mechanisms' approaches, illustrate the significance of addressing different contexts of consumer behaviour simultaneously. It also raises ideas regarding how to shape behaviours related to specific practices such as gardening. For example, the more nuanced approach to group 4 allowed scope for variations in the information provided (and its application) according to the varieties of garden uses, whether aesthetic, for purposes of growing vegetables or as a playground. Additional attention to points of influence, such as garden centres and garden care service providers, offer further potential for more coordinated and targeted mechanisms of changing behaviour. Gardening is just one example of ways of thinking broadly about points of intervention and nuanced campaigns for addressing other areas of domestic consumption.

TravelSmart

4.6 This example (no.12 in the appendix) is a community based programme in Western Australia that encourages individuals to find alternatives to private car use. It was initiated by Western Australian Department of Transport and was premised on the idea that individuals do not have adequate information about different modes of transport and so the intervention is to rectify this deficit and incentivise individuals to make more sustainable choices, assuming of course suitable alternatives exists. The emphasis is on information and encouragement rather than telling individuals what journeys they should change, what mode of transport they should use or otherwise constraining their mobility.

4.7 It is a form of personalised transportation planning that makes use of individualised marketing techniques that aim to change overall travel behaviour. Individualised marketing techniques start from the assumption that generalised marketing of public transport is ineffective in reducing private car use and that there is a need to offer tailored bespoke information. They involve contact with individuals who are infrequent users of public transport but have already reported an interest in adopting more environmentally friendly forms of travel. The forms of encouragement and information involving a mixture of:

- The provision of travel maps and public transport timetables with specific guidance on the routes that are relevant to the journeys that an individual takes
- The provision of travel maps and public transport timetables that are of direct relevance to individual's needs
- Information on walking and cycling routes in the area that are relevant to the journeys that an individual takes

4.8 The intervention involved direct contact with 15,300 households in South Perth and it is suggested that it brought about a 14% reduction in car journeys and a 17% reduction in the distance travelled by car. Follow up surveys have suggested that these changes have been sustained over time (Cairns *et al*, 2004). TravelSmart's own statistics (2009) go even further to suggest that car use by participants reduced by 18%.

4.9 The total cost of implementing this intervention in Perth was estimated at equivalent to £460,000: £260,000 for household visits, £160,000 for marketing information and £40,000 on monitoring. Kerr and James (1999) suggest that the costs of implementing TravelSmart might be recouped by public transportation operators over a 30 year period on the assumption that individuals will be spending more on bus, train and tram fares.

4.10 This appears – at first glance at least – to be a successful case study that illustrates the importance of offering tailored interventions in the individual context of behaviour. There are, however, reasons to treat the apparent success of this scheme with some caution. Firstly, while the intervention is to be praised for its potential to close the 'value-action' gap amongst individuals who have already expressed an interest in reducing their car use; the results are based on a self-selecting sample of individuals who are sufficiently motivated in the first place and have the time to seek out information. As such, they say nothing about the travel habits of those who are not yet willing or able to engage in the programme. Crucially, interventions based on tailored information appear quite expensive and, as noted, TravelSmart's potential for financial return is ambiguous at best. It follows that, if success cannot be guaranteed in terms of environmental impacts, the initial investments in such a programme may be hard to justify.

4.11 These schemes are readily transferable to other locations. Scotland's £15million Smarter Choices, Smarter Places (SCSP) initiative is already developing a range of interventions to reduce private car use in favour of more sustainable modes of transport. Unlike TravelSmart, SCSP is looking beyond informational campaigns to also address material infrastructures (for example, by looking to improve the quality and availability of cycling and walking routes) and broader system of incentives and disincentives (such as travel passes and cycle schemes). To this, it is important to add that there might be a longer term role for public planners when it comes to making decisions about where to locate the destinations (schools, work places, supermarkets) that individuals are travelling to in the first place. In this regard, there are promising

moves underway in Scotland, most notably Kick Start Kirkwall's plans to research 'CarCultures' in island communities. TravelSmart, as a package of tailored information, may be a useful addition to help facilitate the travel behaviours transformations sought by SCSP, and some SCSP initiatives have already experimented with such ideas (see for example <http://www.gobarrhead.co.uk/>). If that information, together with incentives, can be intelligently targeted at groups who are likely to be experiencing moments of transition to their travelling habits (such as moments like moving house or changing job) as was the case with CATA scheme discussed in section 2 (see example 16 in Appendix 1), then the potential for shifting the behaviours of the 'less motivated' are likely to significantly increase.

RECO

4.12 This example (no.21) is drawn from Berkeley, California. RECO (Residential Energy Conservation Ordinance) is a city law that requires residential buildings to meet certain energy and water efficiency requirements (see Table 4.2 overleaf) when they are sold or renovated (where costs of the renovation exceed \$50,000). The state of California has a variety of mandatory energy codes and targets but these only apply to renovations and so through RECO, the city of Berkeley is voluntarily mandating that these standards are applied to the sale of properties as well. The distinctive features of this initiative are to target intervention at particular moments of change (e.g. moving home or home renovations) and the use of legislation for environmental performance upgrades. It is the responsibility of the buyer to comply with the measures set out by RECO and they are given one year from the point of purchase/transfer/renovation to meet the requirements. A third party, non-profit organisation is contacted by the homeowner once they have made the necessary changes in order to inspect the property and ensure that the required standards have been met. While the emphasis is on the owner taking responsibility for meeting RECO upgrade standards, the amount of money that they are required to spend is capped at 0.75% of the final property sales price. The city of Berkeley makes use of funding from the State of California to lessen the financial burden on homeowners. Additionally, they have established contracts through non-profit organisations in order to make loft insulation (typically the most expensive measure to be undertaken as part of RECO's requirements) more affordable.

4.13 There is evidence to suggest that RECO has been successful insofar as the Berkeley region exhibits the lowest level of household energy consumption in California, which itself is the state with the lowest levels in the United States. It is estimated that these measures have reduced residential energy consumption by over 13%, although it is not clear whether such reduction can be attributed to RECO exclusively. As a result, the city of Berkeley is said to have reduced its overall annual CO₂ emissions by over 5,000 tonnes (source: http://www.c40cities.org/bestpractices/buildings/berkeley_standards.jsp) which is equivalent to the CO₂ emissions from the energy use of 386 US homes for one year.

Table 4.2. Summary of RECO measures

Item	Requirement
Toilets	1.6 gal./flush toilet, or flow reduction devices
Showerheads	3.0 gal./min. flow rate
Water heaters	Insulate
Hot and cold water piping	Insulate first two feet from water heater
Hot water piping in pumped, recirculating heating systems	Insulate all piping
Exterior door weather-stripping	Permanently affixed weather-stripping, and door sweeps or door shoes
Furnace duct work	Seal duct joints and add insulation wrap
Fireplace chimneys	Install dampers, doors, or closures
Ceiling insulation	Insulate
Common area lighting (multi-unit buildings only)	Replace incandescent with compact fluorescent lamps (CFL) of at least 25 lumens per watt
Faucets	2.75 gal./min. flow rate for kitchen and bathrooms

4.14 The RECO initiative has the effect of reducing the amount of water and energy that individuals consume in the home. In this case, the focus is not on changing domestic consumption practices themselves, but rather on changing the environmental performance of buildings to conserve energy and water, whatever the nature of consumption behaviour in the household. Furthermore, it is not an intervention that relies on consumers making appropriate personal choices, instead placing a legislative imperative to compliance.

4.15 It is instructive to place the RECO scheme in the context of other similar initiatives which seek to intervene in household technologies as ownership is transferred. One example is the provision of Energy Star Mortgages in the United States (no. 3 in the appendix). The Energy Star programme was created by the US Environment Protection Agency in order to provide a standard for energy efficient products, with the Energy Star awarded to those homes that comply. These homes must be at least 15% more energy efficient than those built to the 2004 International Residential Code (IRC) and they tend to include additional energy-saving features that typically makes them up to 30% more efficient than standard homes. Currently, the Energy Star Programme is being extended to pilot a scheme for energy efficient mortgages. These mortgages are intended to cover the cost of additional energy efficiency investments in new and existing homes. The repayment structure is designed to ensure that an energy efficient mortgage costs no more than a standard one. For example, it allows mortgagees to repay the investments over the length of the loan while benefiting from financial savings immediately. Another interesting initiative is the Home Star Energy Retrofit Act (no.4 in the appendix), a recent legislative intervention that provides financial incentives to undertake energy efficiency measures in existing homes. These approaches differ from RECO by providing a framework for financing investments in greener household technologies. In particular, the schemes remove the up front burden of paying for energy efficiency measures and

provide strong financial incentives in the form of reduced utility bills and a house of increased value.

4.16 RECO demonstrates how interventions in the material infrastructure of buildings at moments of transition (i.e. moving house) can cause reductions on household energy use without directly changing the ways in which people behave and live their lives. The 'Home Buyer' reports introduced by the Scottish Government in December 2008 operate along similar principles, although this differs from RECO-style schemes in that it is information-only with no obligation for homeowners to act. The success of RECO is a result of legislation to enforce energy efficiency standards in residential housing that led to a gradual upgrading of environmental performance over time as properties are bought and sold. There is the risk that such legislation might lead householders to delay moving home because of the requirement to make home renovations; however, in certain circumstances the Berkeley system enables responsibility for compliance to be transferred to the buyer for a limited period which would help to address this issue. On these grounds, an extension of Scottish 'Home Buyers' reports through which the efficacy of home improvements are marketed could potentially set the legitimacy and appetite for legislation such as that found in RECO, particularly as the measures required save households money.

4.17 RECO-type schemes have been operating for several decades in the USA – gradually amended to increase effectiveness over time. Introducing such an approach in Scotland would require careful planning and consideration of a range of issues, including in respect of any potential impacts on the wider housing market. Public acceptance of such an approach would be likely to be enhanced if RECO-type measures were considered alongside financial frameworks offered by programmes such as Energy Star Mortgages, or other forms of targeted financial support.

Barclays Cycle Hire

4.18 The Barclays Cycle Hire scheme (no.6) was launched in July 2010. It is modelled on the hugely successful Vélib scheme in Paris. London's plans for a bicycle hire scheme were made possible through a £25million investment by Barclays bank. As such, this example is also interesting as it draws attention to the potential of commercial sponsorship in facilitating behaviour change, with presumed reputational benefits for the sponsor in being publicly associated with an initiative to reduce environmental problems.

4.19 London's bicycle sharing scheme was launched with the objective of encouraging cycling for short journeys in and through the centre of the city. In order to make use of this scheme, users register with Transport for London (TfL) and are issued with a key that gives them access to 5,000 bicycles that can be picked up and dropped off at 340 docking stations that have been set up throughout a 17 square mile area of central London. Members pay an access fee of £3 and then they pay for the amount of time that they use the bicycle, the first 30 minutes of any journey being free. TfL is responsible for maintaining the bikes and the day-to-day running of the scheme. Although it is

still a fledgling initiative, early indications suggest that it is a success with healthy membership and ever increasing number of journeys being undertaken on these bicycles – the millionth bike journey was announced on 27th October 2010 and at present, there are over 90,000 members. Impressive as these figures are, they must be treated with caution insofar as 1) they say nothing about modal shifts in transport so it is not yet known whether these journeys are substituting trips that would otherwise be taken by car, bus, tube and so: 2) the savings in CO2 emissions are not yet known. The system looks poised to expand, both in terms of adding more bikes and ensuring that docking terminals are available at 300 meter intervals. This is expensive, current estimates suggest that the scheme will cost £140million over six years. However, the initial investment from Barclays of £25million lowers the demands on TfL and, according to the London Cycling Campaign, the various fees that users pay mean that this investment in transport is likely to generate a profit for TfL, especially compared to tube and bus journeys where they actually make a loss.

4.20 Schemes of this type significantly change the transport infrastructure of a city, especially when coupled with dedicated cycle lanes and designed to complement existing public transport networks. In urban areas of high density living and workplaces, the availability of short duration cycle hire opens up an opportunity to use bicycles for many who would not otherwise be able to (for example, because of lack of space to store a bicycle in the home or workplace).

4.21 Success of the scheme rests on a design that clearly targets particular types of bicycle use and places a heavy emphasis on usability. The Barclays scheme has intentionally targeted short duration hire to maintain maximum overall use. To this end, the fee is structured in a way to discourage cycles being taken home insofar as it favours shorter journeys (first 30 minutes are free, an hour costs just £1, it jumps to £4 for an hour and half and increases disproportionately thereafter). In addition, the bicycles are not fitted with a lock which further enrolls people into short journeys and encourages swift return to docking stations.

4.22 These schemes are symbolic of a strong commitment by metropolitan governments to tackle environmental problems. The bicycles have potential to become iconic features of the London street (like black cabs), although in this respect, the Barclays branding has already drawn criticism, leading to a spate of vandalism. The high visibility of this new infrastructure doubtless has some potential to progressively make cycling the norm, especially if safe, cheap and easy. As such, cycling might become further normalised as a way of travelling in London. There is potential too for the scheme to enhance the popularity of cycling more generally as users transfer newly formed habits for short duration rides into a more dedicated interest in cycling beyond the scheme itself. Of course, at present the analysis is purely speculative and only once the scheme has been officially evaluated will there be a clearer indication of the modal shift in transport, CO2 reductions and wider impacts of the initiative.

4.23 This example is useful as it highlights the possibilities afforded by interventions in material infrastructures. Of course, such interventions require significant up front investment, but this example also suggests 1) that they are expected to pay for themselves in the longer term and 2) the potential for commercial sponsorship (e.g. RBS following the example of Barclays) to reduce the initial burden somewhat.

4.24 Demand for such schemes appears considerable; in fact, in London demand for bicycles exceeds availability. This is especially the case for after-train commuter hubs, which currently cannot be accommodated in the scheme, due to insufficient space for docking stations and the concentration of demand at peak commuter times (many bicycles would remain unused in off-peak periods). The extent of this demand in London and Paris does suggest a potential for transferability to Scottish cities – Glasgow has some 200km of cycle lanes, so infrastructure is already in place. The transferability of such a scheme has already been demonstrated and indeed, the London scheme itself is modelled after Paris' Vélib bicycle scheme¹. Furthermore, the potential to combine bicycle hire schemes with the existing SCSP and TravelSmart style initiatives present opportunities to reconfigure what are taken as 'normal' and everyday modes of urban travel.

Food NYC

4.25 This example (no.7 in the appendix) is drawn from New York City where, in early 2010, a report was launched setting out a blueprint for a sustainable food system. The food proposal grew out of New York City's Food & Climate Summit that was held in late 2009 to discuss the role that urban communities and sustainable food systems can play in mitigating climate change. This summit was hosted by Manhattan Borough President Scott Stringer and organised with the belief that the Copenhagen Summit would fail to provide solutions to the food and climate problem. The report that followed the Summit is wide ranging and incredibly ambitious. As it has only just been launched, no evaluations have been conducted to assess the success and impact of the report. It is included in this report on the basis that Food NYC represents an original idea that takes seriously the need for combining different mechanisms of behaviour change, addressing the linkages across the production and consumption of particular sectors (in this case food), and facilitating change in multiple modes of provision. These are identified as critical to behaviour change by the Scottish Government's 'Ten Key Messages About Behaviour Change' (2010) and DEFRA's 'Securing the Future' report (2005). Unlike the many other behaviour initiatives identified in this report, Food NYC presents a framework for coordinated action across the range of ways in which food is provisioned and consumed.

4.26 Food NYC's framework recommendations (provided in summary in the box 4.1 below) are wide ranging. They call for action by local government to radically restructure the production, processing, distribution and retail of food

¹ see http://www.c40cities.org/bestpractices/transport/paris_cycling.jsp for further information on Vélib.

in New York City, with a major emphasis on the region becoming significantly more self-sufficient.

Box 4.1. Summary Recommendations:

“[FoodNYC: A Blueprint for a Sustainable Food System](http://www.mbpo.org/release_details.asp?id=1496)”,
(source: http://www.mbpo.org/release_details.asp?id=1496)

URBAN AGRICULTURE – Establish food-producing spaces in New York City for personal, community, or commercial use by the year 2030, through various legislative and land-use actions. The City should facilitate the development of rooftop gardens, in addition to creating an NYC Urban Agriculture Program, which would provide access, resources, and information to promote community gardening.

REGIONAL FOOD PRODUCTION – Promote and support regional agriculture by connecting upstate and Long Island farms with downstate consumers, and by mapping the food produced and sourced from the region within approximately 200 miles of New York City.

FOOD PROCESSING AND DISTRIBUTION – Increase the sale and consumption of regional foods by expanding distribution and processing capacity. In particular, the Administration, in conjunction with the City’s Economic Development Corporation (EDC), should redevelop the Hunts Point Produce Market, to both modernize this food delivery hub and ensure that the 8,500 jobs the facility maintains remain in NYC.

NEW MARKETS – Increase the number and type of retail food outlets that deviate from the traditional grocery store model by dedicating city-owned spaces for use as “alternative” food markets. By increasing the number and long term viability of farmers markets, the City can give residents both the option and the access to healthy food.

PROCUREMENT OF REGIONALLY PRODUCED FOOD – Incorporate preferences for locally-sourced food into the city’s procurement regulations. Specifically, the City Council should pass legislation that would require 20% of all food purchased by city agencies to come from local producers.

EDUCATION – Educate New York City’s children to become a new generation of healthy and environmentally aware eaters. Moreover, students should have access to some type of agricultural production, be it a community garden or urban farm.

FOOD WASTE – Launch twin composting initiatives: (a) support for large-scale composting through creation of a municipal facility; and (b) support for small-scale composting through education, decentralized composting bins, and more pick-up locations.

PLASTIC WATER BOTTLES – Ban the sale of bottled water in all city facilities and on municipal property, and increase the use of water fountains and canteens. Plastic water bottles waste an enormous amount of energy to produce and only a small portion are recycled.

FOOD ECONOMY – Actively develop the local economy’s food sector to create more jobs while elevating labour standards, environmental protections and public health. Moreover, the creation of kitchen incubators in every borough will create entrepreneurial opportunities for many New Yorkers with a talent for food production.

OFFICE OF FOOD AND MARKETS – Create an Office of Food and Markets to coordinate and lead systemic reform of the city’s food and agricultural policies and programs. In addition, the Mayor should look at amending PlaNYC to include a comprehensive overhaul of the City’s food system, like the one outlined in this report.

4.27 The ambitious plan requires legislative measures (such as the protection of New York's farmland and new procurement requirements for city agencies) and infrastructural investments (for example in regional systems of food production and distribution). Many of the interventions are designed to reconfigure the supply side of food provisioning systems, in anticipation of and to stimulate consumer mobilisation around food and climate issues. The principal informational component of the programme targets the next generation of NYC residents through educational programmes in Schools and elsewhere. To implement this initiative, the report calls for a new Office of Food and Markets, thereby locating responsibility for its success in a dedicated administrative body that relates to health, diet and sustainability.

4.28 The striking features of the NYC Food Programme lie in its breadth and ambition and the commitment and investment required by local government. It is designed to precipitate a major overhaul in the City's food provisioning system, which would lead to a highly visible change to the urban landscape. Rather than relying on a single measure, this is a multi-mechanism proposal aimed at changing infrastructure and governance of the food system, which in turn, aims to deliver significant and persistent changes to food consumption habits. Significantly, this model is designed to target provision first, in the hope that this will shift consumer behaviour.

4.29 The potential of this scheme lies in: 1) the connections that it makes between the consumption and the production, distribution and retail of food; 2) creating a framework for co-ordinating initiatives; and 3) the use of different behavioural mechanisms to address a range of inter-connected behaviours. More generally, it hints at the potential of government to set an agenda and provide the framework (legislative and financial) through which to undertake a range of initiatives in public, private and voluntary sectors. Similarly, it highlights the possibility of government co-ordinating multiple initiatives to help facilitate moves towards more sustainable food behaviours and a more sustainable food system. Of course, the radical, ambitious and multidimensional character of the plan means that it will most likely be the subject of significant political negotiation. Indeed, the fact that it covers so many aspects of the local food provisioning system may be a cause for delay in anything being taken forward. In addition, while costs are not detailed in the report, we can expect that significant financial investment would be required and significant administrative work in the development of new regulations and local government agencies, although there is scope for a proportion of such costs to be borne by the private sector.

4.30 The distinctiveness of Food NYC raises the intriguing question of whether a substantial social and cultural change can be affected by this type of coordinated programme at the system level. Either way, there are things that the Scottish Government could do, which are beyond rather unappealing attempts to persuade consumers to change their diet, to start setting the agenda for moving towards a sustainable food system. For example, creating 'green standards' for catering firms and restaurants, to include requirements such as specified quantities of food for buffets so as to reduce waste, the use of local and seasonal goods, tap water, poultry rather than other meats. While

not a novel idea in its own right, if that standard was tied to public sector procurement such that catering and expenses for meals taken at restaurants were restricted to those firms with the 'green standard' then significant shifts toward more sustainable food consumption could be expected. As evidence suggests, the use of government institutions to enact change can shift cultural norms toward more sustainable behaviours (such as in the Cool Biz example), and given that we know that domestic eating is heavily influenced by the format and conventions of meals taken when eating out (Warde and Martens, 1999), it is likely that such a scheme will have knock-on effects beyond the public sector.

4.31 When broken down into its constituent parts, many of the plan's recommendations are quite familiar and have been deployed elsewhere – for example, ONNI Community Gardens (no. 5), Fork It Over (no. 1) and the New Nordic Diet (no. 2). Similarly, these echo things that are already going on in Scotland, for example the Fife Diet or FareShare. However, the significant potential is in the capacity for coordination across the sector and utilising the knock-on effects of changing one behaviour on other parts of the system.

Middelgrunden Wind Cooperative

4.32 As a country that has historically had relatively high levels of CO₂ emissions per capita; Denmark's environmental policy has become increasingly focused on renewable energy, with a particular emphasis on wind power (Krohn, 2002). This is similarly the case in Scotland where the Scottish Government has set a target of 50% of gross electricity consumption from renewable sources by 2020, with an interim target of 31% by 2011. In Denmark, public resistance to wind farms has proved a major barrier to the development of wind power (CEEQ, 2003). This example (no.18) is drawn from Copenhagen where Middelgrunden, the world's first co-operatively owned offshore wind farm, is located and it suggests how intervention in social contexts can help secure public acceptance of measures that reduce household CO₂ emissions.

4.33 The Middelgrunden Offshore Wind Farm was established in 2000 and consists of 20 turbines with a combined capacity of 40MW. It provides renewable energy to more than 40,000 homes in the Copenhagen area, saving 81,000 tons of carbon dioxide annually (equivalent to the emissions associated with the energy use of 6,254 US homes). Government grants were provided to carry out the necessary preparatory research into environmental impacts, design and public acceptability.

4.34 The total investment cost was €44.9 million (Bolinger, 2001) with ownership split equally between local utility company and a co-operative of 8,552 members. Members of the co-operative are mostly from the Greater Copenhagen region and possess a total of 40,500 shares between them, each share costing EUR570. The scheme has a business model which forecasts an annual rate of return of 12.5% per year and a pay back time of 8 years. The scheme is further incentivised by the Danish Government, which

has instituted an arrangement whereby income to shareholders up to a value of EUR400 is exempt from tax. The Government also sets the price for wind power electricity for the first 10 years to guarantee a return.

4.35 The cooperative ownership model for this scheme has a number of benefits in addition to the production of renewable energy itself. The model is one of local and inclusive ownership - it used to be that only people from Copenhagen could buy shares but now anybody from Denmark can, although people from outside the city are only allowed to invest under particular circumstances. The Cooperative claims that this model significantly helps in generating local acceptance of wind farms, which have been resisted in other circumstances, and that 70% of the Danish population are in favour of wind power (CEEQ, 2003), although it is not specified as to whether this relates only to wind power.

4.36 Projects of this nature also raise the profile of renewable energy projects more generally. The Middelgrunden project has received considerable media exposure and their website has proven very popular. But the significance of the project for the shareholders themselves arises from the opportunity to demonstrate a strong commitment to supporting something that can make a substantial contribution to the reduction of greenhouse gas emissions from energy production.

4.37 Middelgrunden demonstrates the role that can be played by communities and co-operatives in responding to climate change. As such, it highlights the potential for alternative approaches for the funding of capital intensive technology solutions. From a behaviour change perspective, it highlights: 1) how interventions in material infrastructures can reduce the environmental impacts of household behaviour even if that behaviour does not change, and 2) a mechanism for gaining public acceptance of these interventions. This example implies a correlation between cooperatively owned and financed changes in the material infrastructure and the capacity for shifts in the social acceptability of sustainability measures.

4.38 A scheme of this type is certainly possible for Scotland, which has an appropriate climate and plenty of offshore locations. Indeed, the Scottish government has supported over 400 community renewables projects across Scotland through the Scottish Community and Householders Renewables Initiative (SCHRI) and its successor the Communities and Renewable Energy Scheme (CARES). Through these schemes, communities receive advice and financial support to carry out the preparatory stages (feasibility, planning) in their renewable energy initiatives. While there are clear similarities, the Middelgrunden project differs from the Scottish initiatives in two key respects. First, Middelgrunden is a wind energy project of significant scale, whereas Scottish equivalents tend to focus on smaller decentralised and local initiatives. Large scale wind energy initiatives in Scotland appear to rely exclusively on private investment. Second, the Danish Government provides additional financial incentives to individuals participating in renewable energy cooperatives, principally in the form of tax concessions on earnings up to a specified level. The Danish Government also guarantees a set price for

renewable energy, which significantly reduces the financial risks for those investing in such schemes.

4.39 A mixed portfolio of larger and smaller scale renewable energy initiatives (such as Middelgrunden and CARES) might have mutual benefits with respect to increasing the acceptability, sharing ownership (costs and revenue) and drawing attention to positive actions in the battle against climate change. Perhaps more importantly, it is hard to imagine the Scottish Government meeting its ambitious 2020 targets without major investment in emblematic schemes of the likes of Middelgrunden.

5. CONCLUSIONS

5.1 This report developed a framework for categorising alternative mechanisms according to whether they targeted the individual, social or material contexts that influence different practices of consumption. A simple conceptual framework of this type allows for wider lessons to be drawn beyond the viability of any single scheme. Overall, a large number of schemes had focused on the individual context, principally via informational and marketing campaigns, occasionally supported by price incentives. Some were successful, others less so.

5.2 Three specific lessons and four general conclusions emerge from this review of international behaviour change initiatives. The three specific lessons are:

Targeting multiple contexts, moments of lifestyle transition and institutional or infrastructural pressure points

As the Durham Water initiative (amongst others) demonstrated, information and marketing campaigns appear to have a greater impact when mobilised in tandem with mechanisms focused on shifting the social and material contexts of behaviour. Other examples in the report highlighted the potential of targeting moments of lifestyle transition, especially moving home but which could also include becoming a parent, changing job or getting divorced, as ways of achieving sustained changes to behaviour. Other transitions might be found within the re-organization of a workplace or public institutions and infrastructures where opportunities are presented to shift habitual behaviours.

Developing frameworks for coordinated initiatives across systems

There is significant potential for coherent frameworks (beyond tightly defined action plans) that present portfolios of coordinated initiatives within or across related sectors, and focus on incremental and radical programmes of behaviour change that combine small and large scale initiatives. Such frameworks are necessary to address the relationships between the resources (such as financing initiatives), infrastructures, institutions and consumer behaviour (e.g. RECO and Middelgrunden), and to recognise that shifts in one part of a system can have positive (as well as negative) knock-on effects in other parts. Changes in food consumption behaviour (as proposed in FoodNYC), perhaps toward lower meat diets, will require corresponding transitions in the production and distribution of food as well as changing cultural conventions around what constitutes a good meal and consumer understandings of a more sustainable diet.

Utilising 'less visible' mechanisms and non pro-environmental messages to effect change

There is considerable scope for utilizing 'less visible' mechanisms to support pro-environmental behaviours change. This can take the form of changing the provision of goods and services without necessarily altering specific behaviours (as with the Middelgrunden example). The benefit here is creating positive images of more sustainable behaviours which might help people identify with 'green' lifestyle change. Enrolling consumers in such a way would help increase public acceptance of other behaviour change institutions. Using non pro-environmental issues related to health and fitness, diet or even concerns about time pressure (e.g. to encourage home working) can also be used to mobilize pro-environmental behaviours.

5.3 Beyond these three specific lessons for stimulating behaviour change, there are four more general conclusions that have emerged from this review of behaviour change initiatives. The first relates to the problem of evaluation. Information on costs and outcomes of any initiative was consistently generic and unspecified across all of the case studies. There is a real need for systematic monitoring and reporting of behaviour change initiatives so that robust measures of costs and outcomes can be reliably identified. Such measures need to take full account of:

- Ascertaining direct causality between an intervention and its associated outcomes. This raises issues about controlling for other contextual factors that may have been equally important in the outcome associated with the initiative.
- Identifying which components of an intervention were most important for achieving particular outcomes, which of those components are sector or region specific and which are transferable to other sectors and regions.
- Evaluating the unanticipated consequences ('rebound effects') of an initiative.
- Accounting for timescales and thresholds of success. Compare SmartTravel where effectiveness would be expected to be over the course of months with carbon labelling or home improvement schemes that may take many years.

5.4 The second broad conclusion from this report relates to the capacity for replication and transferability of one initiative to another region (such as Scotland) or sector. Exact replication appears unlikely. Region specific factors – natural endowments, social norms, existing material infrastructure, and institutional arrangements – will significantly shape how any initiative works, the resources required for its implementation and the extent to which it is successful. In some cases, these local contexts may make transfer impossible or unlikely. For example, the successful CoolBiz scheme in Japan could in principle be deployed in Scotland (with the obvious modification that thermostats are turned down and warmer clothing encouraged). But social and cultural differences between Japan and Scotland might suggest that this

would be much more difficult to achieve. Despite such challenges, transfer of initiatives can offer the opportunity to learn from the original effort, as was the case with the Barclays cycle scheme. It is clear from that scheme that lessons were learned from the Paris (Velib) experience and furthermore, the Barclays scheme was implemented with the specificities of London in the foreground – making it more a case of adaptation than simple transfer.

5.5 The third conclusion draws attention to the agencies and organisations responsible for the implementation and resourcing of initiatives. There are several important issues relating to the provision of pro-environmental behaviour initiatives, according to whether the principal actor is the state, a commercial firm or community group. First is the issue of financial resource, especially when significant up-front investment is necessary. This is linked to the possibility of creating new institutional arrangements to spread the financial burden over time (loans, mortgages, shares). Second, there can be sensitivities amongst the public related to which types of organisation are involved in a scheme. This can have implications for how consumers react to initiatives. Government schemes, especially when they involve regulation can be perceived as authoritarian. Community initiatives can create buy in through the initiative itself. Company led initiatives can be viewed with suspicion, as attempts at 'green-washing'. Third, the type of organisation involved and the scale of resource that can be mobilised will obviously influence the scale at which an initiative is implemented. Local and National governments have set jurisdictions. Community initiatives tend to emerge at the local level, but might be replicated and diffused more widely (e.g. Transitions towns²). Companies vary significantly in their geographical reach, with the potential for a given initiative to have a global reach

5.6 The relative merits of interventions aiming to effect radical or incremental behavioural change are a final consideration. Most if not all of the interventions reviewed aimed to bring about incremental changes leaving the main logic of the practice being targeted largely undisturbed. For example, the SmartTravel initiative focused on shifting modes of travel (incremental) rather than seeking more radically to remove the need for the journey in the first place. But given the scale of the challenge, as set out by the Scottish Government, will incremental interventions ever deliver enough? Initiatives that are less disruptive to the social and cultural logics of existing behaviours may provide a less turbulent path and lead to stepwise progress. Initiatives that aim to overhaul existing practices might promise great reductions in environmental damage, but may require much longer timescales to come about.

² The term 'Transition Town' (example 10 in the appendix) is shorthand for initiatives (that could apply to a city, a village and so on) through which communities seek to reduce their reliance on peak oil and reduce their carbon emissions. These initiatives tend to involve a range of measures centred on raising awareness and engaging groups of people throughout the community. Transition Towns are linked together to form a network or social movement that provides advice on how communities can become more sustainable.

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Appendix

	Region	Scale	Sector	Mode of Provision	Ind.	Soc.	Mat.	Outcome and Link to further information
1. Fork it Over	Portland, Oregon	Regional	Food	State	✓	✓	✓	9,000 tonnes of surplus food diverted from landfill annually/ See: http://www.metro-region.org/index.cfm/go/by.web/id/9887
Scheme in which surplus food is donated and diverted from landfill								
2.New Nordic Diet	Scandinavia	International	Food	State-Community/ Civil Society Partnership	✓	✓	⊕	Scheme in process, results not yet known. See: http://scandinavianfood.about.com/b/2010/01/04/the-new-nordic-diet.htm
Movement that promotes Scandinavian food as healthy, tasty and sustainable								
3.Energy Star Mortgages	USA	National	Energy and Buildings	State-market	✓	⊕	✓	Scheme in process, results not yet known. See: http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.pt_lender_mortgage
Pilot scheme for affordable, energy efficient mortgages								
4.Home Star Energy Retrofit Act	USA	National	Energy and Buildings	State and Commercial	✓	⊕	✓	Act recently passed, results not yet known.
Legislation that provides incentives for energy efficient retrofits								

5.ONNI Community Gardens	Vancouver	Regional	Food	Market	✓	✓	✓	Some indication that sustainable forms of food consumption have become a mark of good taste as a result of gentrification. See: Quastel (2009)
Regeneration project facilitating new forms of consumption								
6. Barclays Cycle Scheme	London	Regional	Transport	State-market partnership	✓	⊕	✓	1 million cycle journeys undertaken within the first ten weeks of operation. See: http://www.tfl.gov.uk/roadusers/cycling/14808.aspx
Bicycle rental scheme to promote cycling for short journeys in the centre of London								
7. Food NYC	New York	Regional	Food	State-civil society/comm unity	✓	✓	✓	Results not yet known. See: http://www.suite101.com/content/manhattan-new-sustainable-food-plan-a204747
Report outlining a blueprint for a sustainable food system								
8. Eco Top Ten	Germany	National	Energy	Civil society/comm unity	✓	⊕	✗	It is claimed that the label is ‘useful’ and ‘reliable’. See: http://www.energychange.info/casestudies/164-case-study-7-ecotopten-initiative
Communication scheme that labels and promotes sustainable products								
9. BRT and CicloRuta	Bogotá, Columbia	Regional	Transport	State	⊕	⊕	✓	BRT saves 287,000 tons of CO2 annually; CicloRuta saves 6,500. See: http://www.gobrt.org/Transmilenio.html http://www.bogota-dc.com/trans/ciclo.html
Rapid bus transit system and extensive cycle network								

10. Transition Town	Multiple	Regional variants of international movement	Lifestyle	Community/Civil Society	✓	✓	✓	Results cannot be calculated but it is generally held that the TT fosters sustainable lifestyles at the community level. See: http://www.transitiontowns.org/
Range of activities to encourage reductions in environmental impacts								
11. Get in the Loop	Washington State	Regional	Waste/Recycling	State	✓	✗	✓	Increased overall sales of products with recycled content by 1/3. See: http://www.toolsofchange.com/en/case-studies/detail/8
Campaign that encourages purchase of recycled products								
12. TravelSmart	Western Australia	Regional variant of international activity	Transport	State	✓	⊕	⊕	Claimed to be as much as an 18% reduction in car journeys. See: http://www.travelsmart.gov.au/about.html
Tailored information scheme to reduce the number of journeys undertaken by car.								
13. Austin Water Efficiency	Austin, Texas	Regional	Water	State	✓	⊕	✓	Annual CO2 reductions of 8,230 tons. See: http://www.c40cities.org/bestpractices/water/austin_conservation.jsp
Water conservation program								
14. Buy Nothing Day	Multiple	Regional variant of international activity	Waste/recycling	Civil Society/Community	✓	✗	✗	No real impact on patterns of consumption. See: https://www.adbusters.org/campaigns/bnd
Activist campaign against 'consumerism' involving boycotts and a range of activities/events								

15. Water Efficient Durham	Durham, Ontario	Regional	Water	State-market	✓	✓	✓	17% reduction in peak water use. See: http://www.toolsofchange.com/en/case-studies/detail/156/
Social marketing intervention to reduce residential water use								
16. CATA Free Bus Passes	Pennsylvania	Regional	Transport	State	✓	⊕	⊕	Scheme not evaluated but a sustained increase in numbers of bus passengers is claimed. See: Munasinghe <i>et al</i> (2009)
Scheme to promote bus travel by giving new residents free bus passes for a trial period.								
17. MIGROS	Switzerland	National	Waste and Recycling	Market	✓	✓	✓	CO2 eq. reductions of 7,000 tons. See: Munasinghe <i>et al</i> (2009)
Co-operative recycling initiative involving information, education and infrastructural interventions								
18. Middelgrunden	Copenhagen, Denmark	Regional	Energy	Civil society/comm unity	⊕	✓	✓	Annual CO2 reductions of 81,000 tons. See: http://www.middelgrunden.dk/middelgrunden/?q=en
Co-operatively owned offshore wind farm								

19. Save the Crabs – Then Eat ‘Em	Virginia, Greater DC	Regional	Water	State-Civil Society/com munity	✓	⊕	⊕	46% of those targeted by marketing campaign reported willingness to adopt behaviour change, compared with 40% of those not targeted. See: http://www.toolsofchange.com/en/case-studies/detail/90/
Environmental campaign framed as an initiative to ensure availability of seafood								
20. Backyard Composting	King and Annapolis county, Nova Scotia	Regional	Waste and recycling	State	✓	⊕	✓	80% of those surveyed who had not previously composted had taken up the activity as a result of the intervention. See: McKenzie-Mohr 2000
Successful composting scheme diverting organic waste from landfill								
21. RECO	Berkeley, California	Regional	Buildings	State	✓	⊕	✓	Estimated annual CO2 reductions of over 5,000 tons. See: http://www.c40cities.org/docs/casestudies/buildings/berkeley_standards.pdf
City mandate requiring buildings to meet certain standards when sold, transferred or renovated								
22. CoolBiz	Japan	National	Energy and Buildings	State	✓	✓	✓	Estimated CO2 reductions of 1.14 million tons. See: http://search.japantimes.co.jp/member/member.html?nn20050430f1.htm
Campaign to reduce energy use in buildings by setting air conditioning no lower than 28°C throughout the summer months								

23. ESP Berlin	Berlin	Regional	Buildings	State	✓	✗	✓	Annual CO2 reductions of 60,484 tons. See: http://www.c40cities.org/bestpractices/buildings/berlin_efficiency.jsp
Energy efficiency retrofit program								
24. Fuel Economy Labelling	Portugal	National	Transport	State	✓	✗	✗	Results unknown. See: http://www.iea.org/textbase/pm/?mode=weo&id=2437&action=detail
Labelling scheme indicating CO2 emissions of vehicles								
25. Traffic Signal Timing	Portland, Oregon	Regional	Transport	State	✗	✗	✓	Annual CO2 reductions of 15,460 tons. See: http://www.c40cities.org/bestpractices/transport/portland_traffic.jsp
Successful initiative that optimise traffic signals to reduce motorists' fuel consumption								
26. LETS	Multiple	Regional variant of international activity	Lifestyle	Civil society/comm unity	✓	✓	✓	Results not quantified but are thought to have implications for 'sustainable consumption'. See: Seyfang (2001)
Community currency and exchange systems								
27. Waste Plan 2008	Copenhagen Denmark	Regional	Waste and Recycling	State	✓	⊕	✓	Annual CO2 reductions of 40,000 tons. See: http://www.c40cities.org/bestpractices/waste/copenhagen_landfill.jsp
Successful and <i>flexible</i> waste minimisation plan								

28. Casino Carbon Index	France	National	Lifestyle	Market	✓	✗	✗	In the first two years of the scheme over 20 tonnes of CO2 equivalent have been saved on labelled products. See: http://www.groupe-casino.fr/en/The-Casino-Carbon-Index-a-green.html
Supermarket's carbon labelling scheme								
29. Energy Expert	Finland	National	Energy	State	✓	✓	✗	Reports 10% decrease in electricity consumption. See: http://www.energychange.info/casestudies/167-case-study-10-energy-expert-programme
Trains ordinary people to act as 'energy experts' for the buildings in which they live								
30. Initiative EnergieEffizienz	Germany	National	Energy	State	✓	⊕	✗	Results unknown. See: http://www.dena.de/en/topics/electricity/projects/projekt/the-initiative-energieeffizienz
Provides information on efficient use of energy								

✓ = Yes; ✗ = No; ⊕ = Possibly/to some extent

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