



Science for Environment Policy

FUTURE BRIEF:

Green Behaviour

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1.0 Introduction and background

Green Behaviour

It is recognised that the sum of our individual or household behaviours has a substantial impact on the environment. However, it is difficult for citizens to relate personal consumption and behaviour to large-scale problems such as climate change, pollution, biodiversity loss and natural resource depletion. Even if we express environmental concern and awareness, this most often does not translate into behaviour (Kollmuss & Agyeman, 2002).



Box 1: The impact of individual and household behaviours

- In 2002, the EU-25 contained 7% of the world's population and its consumption generated 17% of the world's ecological footprint. (European Commission, 2008) .
- Households are one of the largest final energy users in the EU, accounting for 26.2% of total energy consumption in 2001 (Eurostat, 2005). In 2002, households contributed 10% of CO₂ emissions in the EU-15 (EEA, 2004a).²
- Modes of transport have become more energy-efficient in the EU, but this is outweighed by growth in transport demand, resulting in a net increase of about 20% in GHG emissions over the past decade (EEA, 2004b).

Pro-environmental or green behaviour is behaviour that minimises harm to the environment as much as possible, or even benefits it (Steg & Vlek, 2009). Examples include minimising energy use, and reducing waste. More simply, it has been described as 'doing good and avoiding bad' (Cushman-Roisin, 2012).

This Future Brief from Science for Environment Policy outlines the current scientific theory, thinking and research in the field of green behaviour. Alongside this, it explores the opportunities and challenges in developing policy to support and encourage green behaviour and suggest avenues for future research.

1.1 Role of Policy

Policy has a role in supporting and encouraging green behaviour (Lehner *et al.*, 2011), but gauging the level and form of intervention is complex since behaviour is influenced by many factors (Jackson, 2005). Green

behaviour is the shared responsibility of individual citizens, public authorities and industry (Sonigo *et al.*, 2012) and policy can provide a framework within which business and citizens can operate with less detriment to the environment (EEA, 2005).

Green behaviour is inherent in several EU policy initiatives, such as the 2008 EU Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan, which is due for review this year. Under the existing action plan, several EU policies have been revised, such as the Eco-design Directive and the EU Eco-label. Green behaviour will also be linked to the Resource Efficiency flagship initiative as part of the Europe 2020 strategy.

1.2 Types of policy tools

Sonigo *et al.* (2012) have identified four main categories of policy tool that can be used to encourage green

behaviour:

- **Regulatory** – this includes mandatory tools that ban or limit certain products or behaviour, and requirements, such as mandatory labelling.
- **Economic** – market-based instruments that influence purchasing decisions through taxes, incentives, subsidies, penalties or grants for green enterprises.
- **Information** – such as product labels and information on energy bills.
- **Behavioural** – tools or nudges aimed at influencing consumer behaviour by leading individuals to make choices that are better for the environment.

There is increasing policy interest in behavioural tools or nudges which are perceived as less paternalistic, so increasing public acceptance and lessening the administrative and regulatory burden (Thaler & Sustein, 2008). Successful examples are comparative information on energy bills, pledges to perform certain behaviours and defaults for pro-environmental alternatives, such as paperless billing, (Oullier & Saunero, 2011). However, other forms of policy tool are influential and may be more appropriate in certain contexts. As such, it is important that initiatives are evidence-based to ensure they encourage the desired behaviour and minimise unintended or rebound effects (Maxwell *et al.*, 2011).

2.0 Theoretical underpinning to green behaviour promotion

2.1 Neoclassical economic theory

Microeconomics is the study of decision-making processes of individuals and organisations and, for most of the 20th century, was underpinned by neoclassical economic theory. This has three broad assumptions: individuals have rational preferences, they maximise outcomes and they act independently on the basis of full information. This view also implies behaviour is the result of conscious deliberative thought and that education would result in more pro-environmental behaviour (Kollman & Agyeman, 2002).

2.2 Bounded rationality

During the latter half of the 20th century, evidence emerged to suggest that human behaviour is often irrational. To address this, economics integrated insights from psychology with economic theory, resulting in a new sub-discipline called 'behavioural economics', which explains why decisions may not be rational. Simon (1955) introduced the notion of 'bounded rationality', which proposes that rational decision-making is often limited by availability or time, or in some cases, too much choice which leads to procrastination (Schwartz, 2004). This 'paradox of choice' can be heightened by the complexity of green behaviour, for example, it is difficult for consumers to decide whether non-organic, locally-produced food is more sustainable than organic food that has been transported long distances (Söderholm, 2010).

2.3 Mental shortcuts and heuristics

Our limits to rationality can be described by judgement heuristics or 'mental shortcuts'. Some common examples are described in Box 2.

2.4 Cognitive Dissonance

'Cognitive dissonance' is the discomfort caused by inconsistency or conflict between two or more attitudes, beliefs or actions. For example, we may have an attachment to the freedom of driving, alongside a concern for the environment. People are motivated to reduce this discomfort by altering existing attitudes and beliefs, or by adding new ones to create a consistent belief system. For example, someone may reassess the freedom they gain from driving because of congestion and parking problems. Behaviour change can work on cognitive dissonance by asking people to voice their beliefs and set them against their behaviour.

2.5 Norms

Norms are important influences on decision-making. **Social norms** have been called the 'grammar of society' (Bicchieri, 2006) and are collectively agreed rules about how to behave. On the other hand, **personal norms** are our own expectations of how we should behave based on our internal values (Schwartz, 1968) and independent of others' views (Bicchieri, 2006). A person who follows personal norms will be more resistant to social influence than a person who follows social norms (Bicchieri, 2010).

Box 2: Limits to rationality

Some common examples of 'judgement heuristics', which can be thought of as mental shortcuts that limit our rationality, include:

- **Anchoring.** The tendency to rely too heavily, or 'anchor', on one trait or piece of information. This can lead to branded or well-known products being chosen over newer, environmentally-friendly products.
- **Loss aversion.** The tendency for people to be more reluctant to give something up than they are to be content with gain. For example, a 5% tax on environmentally-harmful products will have more impact on behaviour than an incentive of the same value to buy an environmentally-beneficial product. It can also produce a reluctance to give up old products, such as inefficient cars and washing-machines (Mudgal *et al.*, 2011).
- The **status quo bias.** This suggests we prefer familiar situations. This is one of the reasons that the 'default option' is a powerful policy tool. For example, defaults on computers to double-sided printing and by utility companies to receiving paperless bills have proved effective (Oullier & Saunero, 2011).

Emotions can also limit rational decision-making (Savage *et al.*, 2011). We often build emotional relationships with behaviours and objects. For example, our emotional attachment to possessing the most up-to-date mobile phone can mean we ignore replacement costs as it is more important to own the newest model.

Market norms (Heyman & Ariely, 2004) influence behaviour through the assessment of costs and benefits. Introducing market norms into a context usually governed by social or personal norms can cause a ‘**crowding out effect**’ and actually de-incentivise a desired behaviour. For example, financially rewarding recycling can de-incentivise the behaviour because the initial motivation is based on civic duty and not individual gain (Söderholm, 2010).

2.6 Sociological theories

Sociological theories focus on the structure surrounding the individual, rather than the individual themselves. They suggest that people are locked in to patterns of behaviour by their physical, economic or social conditions. For example, the availability of recycling facilities, the quality of public transport, house prices and economic conditions all affect behaviour.

Although the responsibility of the individual must not be diminished, it is important to recognise the influence of situational factors (Hines *et al.*, 1986, Steg & Vlek, 2009) and policy has a role in ensuring the appropriate infrastructure allows behavioural change.

At a more conceptual level, Welzer (2011) proposes that our external economic infrastructure shapes our mental infrastructure and society’s preoccupation with economic growth is reflected in our need for constant individual advancement, which does not promote green behaviour.

2.7 Transition theories

Whilst behavioural theories tend to focus on a single point in time, transition theories are focused on the process of change (Prochaska & DiClemente, 1982). This highlights periods of transition, such as starting university, changing job, or retiring, where behaviours come under scrutiny.

Policy initiatives to promote green behaviour could tap into the more predictable ‘moments of change’, such as moving house or having a child (Schäfer *et al.*, 2012). These theories may inform the potential of using more collective moments of change that represent a ‘window of opportunity’ for policymakers. For example, in the UK public resentment against four-wheel drive vehicles (‘4x4s’) in urban areas enabled the introduction of taxes for these larger vehicles.

2.8 Multi-dimensional models

Considering all the relevant theories, the promotion of green behaviour will require a multi-dimensional view (Jackson, 2005). Kollmuss

& Agyeman (2002) have identified the factors important in green behaviour as falling under three headings: demographics, external factors and internal factors (see Fig. 1).

External factors include infrastructure, economic, social and cultural factors. Internal factors include motivation, environmental knowledge, values, attitudes, environmental awareness and perception of control.

2.9 Social practice models

Shove (2010) argues that merely placing driving factors, such as value systems and infrastructure, into basic causal models does not do justice to the complexity of sustainable behaviour. She suggests a more dynamic approach that considers citizens as part of the infrastructure and instrumental in creating values, rather than simply being subject to them. Her ‘Three Elements model’ outlines the importance of:

- **Materials**, which consist of the physical objects that permit or facilitate green behaviour to be performed, such as recycling boxes or energy monitors.
- **Meanings**, which are images or interpretations associated with behaviours that affect their performance. For example, cycling in some parts of Europe is considered to be a sports activity rather than a convenient mode of commuting, which influences the groups that take up cycling.
- **Procedures**, which are the skills or competencies that permit or encourage the behaviour, such as knowledge about reducing energy use. This also includes legislative frameworks and policy initiatives, such as EU energy labelling or building standards.

Although the academic debate between the more individualistic behavioural economics models and social practice models (Shove,

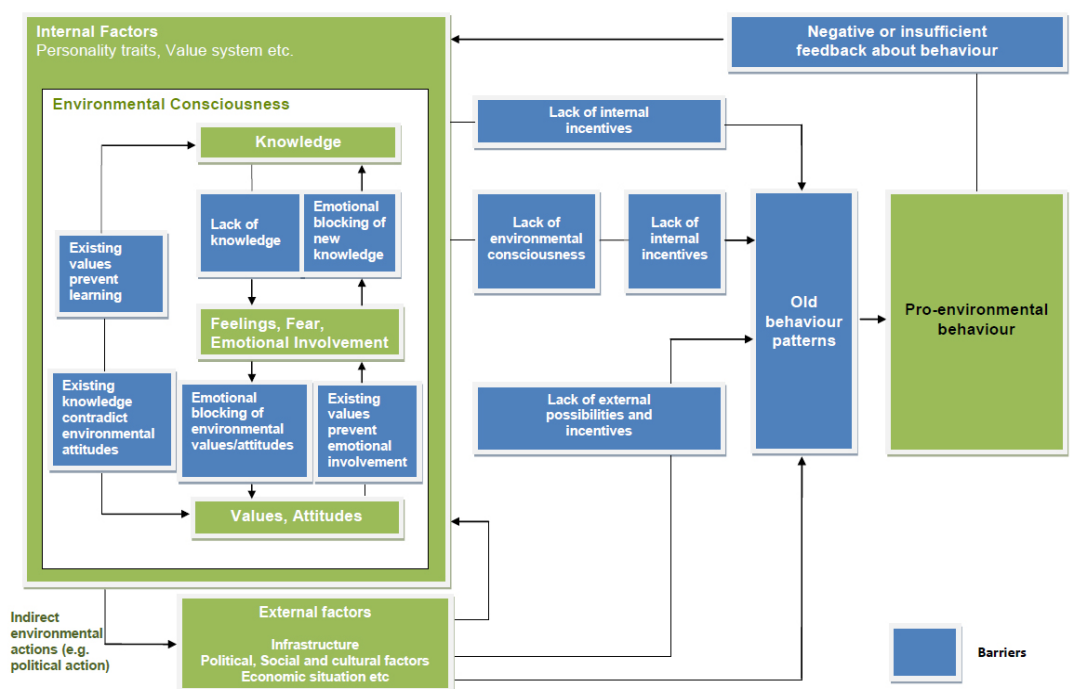


Figure 1: Model of pro-environmental behaviour (Adapted from Kollmuss & Agyeman, 2002)

2010; Whitmarsh *et al.*, 2011; Shove, 2011) is ongoing, one approach does not have to be taken at the expense of the other.

Instead, acknowledging the contribution from various disciplines (Wilson & Chatterton, 2011) can help green behaviour initiatives to work at multi levels with appropriate techniques, whether they are financial incentives, regulation or encouraging community transition.

3.0 Practical frameworks to inform policy

In order to apply theories within a policy context it is helpful to incorporate them into a pragmatic framework (Chatterton, 2011; Dolan *et al.*, 2010). A number of these frameworks have been developed, mostly on a national level and within certain policy sectors such as transport or energy.

3.1 Defra's UK Sustainable Development Strategy

This outlined the 4 'E's model of behaviour change to assist the UK government to develop strategies that enable more sustainable living in homes and communities (Defra, 2005) (see Fig. 2).

Later, in its framework for pro-environmental behaviours, Defra (2008) suggested that different combinations of these tools should be applied to different population segments that vary according to environmental awareness and commitment, such as 'deep greens' versus those who are honestly unengaged in green behaviour.

3.2 The Four 'A's

This approach is rooted in social marketing and identifies the Four A's which focus on the necessary conditions to improve green consumption and behaviour:

- **Accessibility** – green products and services must be available, which may also include phasing out of products that are harmful to the environment.
- **Affordability** – sustainable consumption must be affordable for everyone, especially low-income households.
- **Attractiveness** – sustainable consumption needs to be seen as pleasant with clear personal benefits, such as improved health and better quality of life.
- **Awareness** – sustainable consumption requires a level of environmental knowledge, for example, gained through information pamphlets and education schemes.

An approach similar to the Four 'A's has been adopted by the international company Unilever (2011) in its five levers of behaviour change, which propose that the desired behaviour must be made understood, easy, rewarding, desirable and habitual.

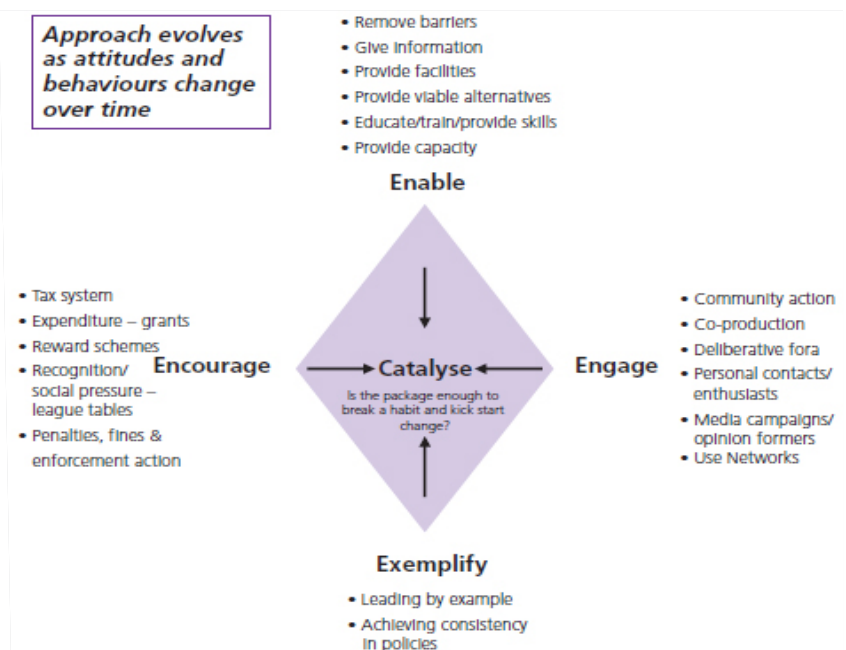


Figure 2: Changing behaviour through policymaking (Defra, 2005)

3.3 Nudge and think

John *et al.* (2009) differentiate between nudge and think strategies. Nudge philosophy assumes citizens use mental shortcuts and proposes policymakers should customise messages to these biases.

In comparison, think strategies hold that citizens should have a more meaningful influence on political decisions through participative means, such as citizens' assemblies and online forums. In the case of think strategies, the policymaker's role is to create institutional spaces that support citizen participation.

John *et al.* (2009) suggest that policy can benefit from both nudge and think. For example, think strategies could help identify and legitimise nudge strategies and nudging may encourage participation in think strategies.

3.4 Four dimensions of behaviour change

Chatterton (2011) proposes a framework that recognises the need for 'multiple models' and aims to help policymakers select models that work best in different contexts. Based on work conducted in the UK to reduce household energy use, it encourages policymakers to identify the desired behaviour along four dimensions:

- The **actors** of the relevant behaviour – these range from self-determined individuals to communities or populations.
- The **scopes** – these range from isolated behaviours, such as car-free days, to lifestyles, such as complete self-sufficiency.
- The **durabilities** – these range from one-off behaviours, such as loft insulation, to enduring behaviours, such as routinely switching off lights.
- The **domains** of relevant behaviour – this refers to the target for change and ranges from the psychological (the way people think or make decisions) to the infrastructural (energy, transport and economic systems). It also refers to the scale at which the change occurs in terms of social, national, or global levels.

Once this is done, the appropriate model can be applied. For example, rational economics would work best with more individual, isolated, one-off behaviours, whilst a social practices approach would be best for community level behaviour that aims to endure.

Chatterton (2011) suggests the framework provides a starting point for policymakers to think about behaviours and consider which models may be applicable in a given situation.

4.0 Research and evaluation of interventions

Research on green behaviour uses both correlational and experimental methods (Osbaldiston & Schott, 2012). Correlational methods use surveys to collect data, asking participants about psychological processes, such as social norms, values and identity. Experimental methods examine interventions by manipulating factors that are thought to encourage green behaviour.

4.1 OECD review and survey

The OECD has reviewed evidence on the effects of policy instruments on household behaviour (OECD, 2008) and on the basis of this conducted a survey of household consumption patterns and behaviour (OECD, 2011). Its survey of 10,000 households in ten OECD countries indicated that certain interventions were better suited to certain behaviour changes. Price-based incentives are more appropriate for encouraging energy and water saving, as well as reducing waste. For example, households charged for water consume 20% less than houses that are not charged.

The review and survey also identified a number of important infrastructural factors. For example, there are split incentives for landlords and tenants to insulate houses: landlords do not benefit from insulation as they do not pay energy bills, and tenants are not motivated to invest in a house they do not own.

The survey also recognised variation in the impacts of certain policies on different groups. For example, it appears that information campaigns to modify transport choices would be most effective if targeted at groups with higher car use, such as men, the middle aged and those with higher income. In addition, policies to encourage green behaviour may have negative distributional effects, particularly with respect to water charges, which are more likely to adversely affect low-income households.

4.2 Swedish SHARP programme

The SHARP programme in Sweden on environmental household behaviour (Söderholm, 2010) also found divisions of responsibility in consumer segments, noticeably along the lines of gender. Results indicated that men tend to make more decisions about home energy systems and personal transport, whilst women are more instrumental in green behaviours concerning food, such as buying organic products.

Söderholm's (2010) research highlights the role of other policy

contexts (e.g. housing, monetary and transportation policies) that directly or indirectly influence daily household behaviour. For example, the building of new roads and car parks indirectly promotes car travel despite government's attempts to reduce car use. Conflicting messages can impede green behaviour initiatives.

4.3 Reviews of case studies

Southerton *et al.* (2011) reviewed 30 case studies of green behaviour change initiatives and examined six of the most successful in depth. They noted that the majority of schemes focused on the individual context (50% of European cases), mainly via informational and marketing campaigns and sometimes incentives. This is similar to Shove's (2003) observations that policy tends to focus on financial or informational measures. Shove argues that this is due to the dominance of economics in policymaking and the need to make complex issues more manageable so that policy can address them practically.

Osbaldiston & Schott (2012) conducted an international analysis of experimental research that measures green behaviour in real-world settings. Their analysis indicated the most effective treatments use cognitive dissonance, goal setting, prompts or reminders and 'social modelling', which involves passing information via demonstration or discussion with others. In comparison, feedback and instructions had less impact.

Some treatments seem more effective for certain behaviours. For example, social modelling and commitment are effective for promoting home energy conservation, whilst techniques that increase convenience appear better for recycling. Osbaldiston & Schott (2012) called for more integrated sets of tools that complement each other and target multiple contexts. For example, a water-saving initiative in Canada involved face-to-face information campaigns alongside technology to monitor water and pledges from consumers for reductions in water consumption. This resulted in a 17% reduction in peak water use.

The project 'Policies to encourage sustainable consumption' (Sonigo *et al.*, 2012) reviewed 15 case studies. It suggested that, when designing tools that affect prices, there should be a consideration of possible rebound effects on environmental benefits. For example, the French government introduced its 'bonus-malus' system, which involves subsidising the purchase of environmentally-friendly cars whilst funding these subsidies with a tax on high emission cars. In 2009, it was estimated that the system had averted 3 million tons of CO₂, but there had also been some rebound effects, with people driving more efficient cars greater distances.

4.4 More systematic monitoring

Numerous sources have recommended more systematic monitoring of behaviour initiatives (Osbaldiston & Schott, 2012; Southerton *et al.*, 2011). There is a need to identify which components are most important for particular outcomes. Noteworthy attempts in this direction already exist, in particular, the UK Government's Behavioural Insights Team trial initiatives to inform a household energy efficiency programme (see Box 3).

Trials can help identify possible rebound effects and methods

to counteract them. For example, the American energy company OPower conducted a trial of 1000 households, providing them with comparative data on energy consumption and that of their local neighbourhood. This green nudge reduced energy use in households with high consumption, but increased energy use in low consumption households as they appeared to feel justified to use more. However, this rebound effect was rectified by using expressions of social approval (a smiling face) or disapproval (a frowning face), for decreases and increases in energy use respectively.

Mudgal *et al.* (2011) call for more interdisciplinary research programmes, rather than programmes that focus on just one area, such as transport or energy, and for more retailer-academic collaboration, as exemplified in some work of the UK Behavioural Insights Team.

Cross-cultural research could provide insights into why certain behaviours are easier to encourage in certain contexts, whilst Shove (2010) suggests more holistic investigation into how to align appropriate infrastructure with the influence of norms and environmental awareness.

5.0 Policy Implications

5.1 Bundles of tools

There is strong evidence-based support for the use of a mixture or 'bundles' of tools to encourage green behaviour (Sonigo *et al.*, 2012; OECD, 2011). Combinations of push and pull strategies may be useful, and this could also include choice-editing, i.e. the removal of unsustainable choices (Defra, 2008).

Box 3: Green behaviour trials in the UK

The UK Government's Behavioural Insights Team are conducting trials to research the impacts of incentives designed to encourage green behaviour. These are:

1. A trial to test the impacts of incentives to encourage uptake of energy efficiency products. This compares individual incentives, such as vouchers for home products, with collective incentives, such as a 25% discount when five households purchase energy efficiency products together.
2. A trial to test the impact of removing barriers to change by offering a free loft-clearing service to enable insulation. Preliminary results indicate that this service has increased uptake by about 2.89%, whereas financial incentives have not increased uptake (Haynes, 2012).
3. A trial to examine how behavioural feedback can help consumers save energy through comparisons to others' energy use. Preliminary results indicate this has produced between 1 and 2% reduction in energy use, mainly based on social comparison (Haynes, 2012).

However, alongside this there is a need for awareness of how tools interact, as there may be possible rebound effects. Thus, more efficient vehicles may lead to an increase in driving distances or better insulation could lead to an increase in home energy use. There may be also adverse distributional effects, for example, when low-income households suffer from water charges.

5.2 Supply and demand, and new business models

Policy needs to work with the supply side of industry and business, as well as consumers, to improve the environmental performance of products, stimulate the demand for better products and technologies, and help consumers make better choices.

With current business models there are several 'lock-ins', whereby consumers do not choose environmentally better products, so companies do not invest in product design to reduce negative environmental impacts. Innovative new business models need to break these vicious circles between supply and demand. For example, clothes stores can be encouraged to set up 'second-hand' outlets to re-sell their own products, which have been bought back from customers. This would encourage recycling of clothes and brand loyalty, but also the design of more durable clothing.

Different groups in the population have different approaches and stakes in sustainability. Existing research has indicated a potential in targeting initiatives for certain segments of the consumer population, which can be defined socio-demographically by income and gender (OECD, 2011; Söderholm, 2010), or by commitment to environmental issues (Defra, 2011). More research is needed to inform effective targeting of green behaviour initiatives.

5.3 Role of values

When implementing behavioural tools it is important to recognise the influence of values (most prominently 'we-centred' vs. 'I-centred' values) and cultural change (Lehner *et al.*, 2011; Crompton, 2010; Welzer, 2011). Further encouragement of we-centred values is necessary, but also a cultural revaluing of certain behaviours. For example, a greater value could be placed on working from home rather than commuting to work.

De Groot & Steg (2009) suggest that if policy intends to work on egoistic or I-centred values then it should always be linked to altruistic (we-centred) and biospheric (environment-centred) values to produce stable pro-environmental behaviour. This will depend on the reversibility of behaviour. For example, loft insulation is difficult to reverse so, in this case, appealing to I-centred values with financial incentives could be productive. However, transport choice is easier to reverse so, in this case, interventions may need to appeal to altruistic and biospheric values to produce stable behaviour change.

In some cases it may prove successful to appeal to values indirectly. For example, durable goods are appealing because consumers associate them with quality, and not because it means the products last longer. In this instance, it may be better to appeal to the value of quality to encourage consumers to buy longer-lasting goods.

5.4 Greater variation in types of intervention

Until recently, the focus in behavioural change initiatives has been on

fiscal incentives and information campaigns (Jackson, 2005; Shove, 2003; Southerton *et al.*, 2011). Little focus has been on facilitating conditions and encouraging community and business initiatives. Some potentially effective solutions on this level are deliberative and inclusionary procedures ('DIPs'), which include citizens' juries and round tables (Kollmuss & Agyeman, 2002), or the social modelling interventions identified by Osbaldiston & Schott (2012) (see Section 4.3). These are also acknowledged by John *et al.* (2009) to promote deliberative thinking and more stable behaviour conversion.

This again emphasises the need to understand how values interact. For example, is it possible to convert short-term behavioural nudges into long-term deeper value change? Shove (2003) suggests that by focusing on individual behaviour, policymakers cannot influence longer-term transformations of technology, culture and practice. Southerton *et al.* (2011) question whether it is best to focus on incremental changes that are less disruptive, or to overhaul existing practices, which may produce greater reductions in environmental damage but require longer timescales.

Indeed, it could be argued that certain initiatives may encourage I-centred values, for example, financial incentives may collude with consumerist and materialistic values. However, if implemented correctly, financial incentives and nudges could have a 'deeper' influence by working at several levels. For example, lowering taxes on the labour to repair electrical products could promote greater levels of repair, as well as encourage the design and value of more repairable goods.

In addition, with the advent of smart technology, it may be possible to take the individual out of habitual loop and automate decision processes, for example, master switches can be introduced which automatically turn off all lights and put appliances on standby when a person leaves their house (Haynes, 2012). However, this has social and ethical implications in terms of personal choice.

5.5 Collaboration vs. Intervention

It is valuable to use a bottom-up and collaborative approach to behavioural change initiatives, as has been done by the Middelgrunden Wind Cooperative in Copenhagen, whose wind farm has produced an estimated annual reduction in CO₂ emissions of 81,000 tons. However, there may be a need for policy interventions to break down 'locked-in' behaviour or kick-start green behaviour. This may be financial through taxes, penalties and grants, for example, in the Middelgrunden Wind Cooperative, the Danish government provided financial incentives through tax breaks on dividends and by setting a guaranteed price for the renewable electricity produced.

Other policy interventions could involve product standards and building standards or mandates on guarantee lengths and lifetimes to increase durability of products. They could also involve the use of media standards and marketing standards (Jackson, 2005) by ensuring products are not misrepresented as environmental through clever phrasing and imagery.

5.6 Policy framing

The framing of policy is important (Crompton, 2010; Mudgal *et al.*, 2011). Despite a reluctance to be interventionist, policy is never neutral but shapes our thinking (Jackson, 2005). For example, targets

on greenhouse gas reductions can communicate the seriousness of the environmental issue and Jänicke (2011, 2012) has shown that countries with low environmental targets often do not reach them, whereas those with higher achievable targets tend to surpass them.

To be successful, policy needs an appropriate context and consistency (Jackson, 2005). It should minimise conflicts with other initiatives, for example, the UK's car-scrapping scheme, which offers motorists a discount on new vehicles if they trade in their old vehicle (intended to revitalise the motor industry), could appear to be in conflict with the promotion of durable products. Sustainable consumption needs to be more mainstreamed into other policies and also into politics. This includes consistency with the behaviour of government, which can lead by example with environmental behaviour in its own offices and through green procurement.

Sustainable consumption needs to be reframed so it is *not* viewed as a sacrifice or reverse route from previous lifestyle progress, but as a progressive route in itself (Sonigo *et al.*, 2012). Social marketing has a role to play in improving the image of green behaviour, as well as in the recognition of consumer segments.

5.7 Striking a balance

Promoting green behaviour is a complex task. It involves tapping into habitual and deliberative processes at individual, household and social levels, and working within the triangle of government, business and consumer. In addition, it can be prone to unintended or rebound effects. As such, it will require multifaceted and adaptable initiatives with a sound evidence base in economic, psychological and social sciences. This does not require an integration of these disciplines, but an appropriate application of their different models (Wilson & Chatterton, 2011). Policymakers will need to strike a balance between including the increasing range of scientific and theoretical insights whilst maintaining a practical approach that is transparent to stakeholders.

Implementing green behaviour initiatives will also require policy to walk a strategic line between encouraging and enforcing, which will involve working closely with a range of actors and an awareness of moments of change to strike the right balance. Evaluation and feedback will be needed to ensure adaptation throughout the development of initiatives. Complex tasks may require complex solutions and produce complex results, but this should not deter the development of innovative methods and evaluations.

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This Future Brief is edited by the Science Communication Unit, the University of the West of England (UWE), Bristol.
Email: sfep.editorial@uwe.ac.uk

Image credits: Page 2: @istockphoto.com/Mark Weiss Photography. Page 4: Fig 1: Model of pro-environmental behaviour. Adapted from Kollmuss, A. & Agyeman, J. (2002) Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research* 8:3, 239-260. Page 5: Fig 2: Changing behaviour through policy making/Defra (2005) Securing the Future: delivering UK Sustainable Development Strategy. Downloadable from <http://www.defra.gov.uk/publications/files/pb10589-securing-the-future-050307> Open Government Licence: pdf <http://www.nationalarchives.gov.uk/doc/open-government-licence/>

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