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Promoting pro-environmental behaviour: existing evidence and policy implications

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ABSTRACT

This paper describes a recent study in the UK aimed at identifying how policy makers might more effectively encourage pro-environmental behaviours amongst their target audiences. The study included analysis and synthesis of theories and models of behaviour change, a range of current policy programmes and instruments and 'real world' practices of individuals, households, groups and organisations.

The paper highlights some important considerations for future policy within the UK and, more widely, for other countries aiming to introduce comprehensive and multi-level policy programmes to encourage pro-environmental behaviours. To this end, it emphasises the complex and non-linear nature of environmental behaviours and, thus, the importance of adopting multi-levelled and multi-instrument integrated policies across whole systems of delivery.

1. Introduction

As in many advanced industrial countries, policy makers in the UK are beginning to reach a consensus about the need to develop policies that can have an active, significant and lasting impact on the behaviours of both consumers and producers, in order to meet the extreme environmental challenges of the 21st century (Department for Environment, Food and Rural Affairs (Defra), 2006). There is also widespread acceptance of the need for strong political and institutional leadership to promote and guide this policy process, as evidenced by the UK Government's Environmental Leadership agenda (Defra, 2004). What is far less clear is what the most appropriate processes, mechanisms and policy instruments to achieve these changes in behaviour might be or, indeed, the extent to which policy makers are actually able to intervene to bring about lasting changes in people's behaviours.

Defra's 5-year strategy *Delivering the Essentials of Life* (2004) sets out an ambitious agenda for environmental leadership and sustainable development. In large part, embedding the core principles of this agenda relies on making it easier and more efficient for producers and consumers to behave more sustainably. This is a sizeable task, as changing people's environmental behaviours will require complex and innovative policies and practical interventions across a wide range of different sectors and at every level of society (i.e. individual, household, community, organisational, institutional and across whole systems). In order to understand the scope and breadth of this challenge more precisely, Defra commissioned a review and synthesis of the existing evidence base pertinent to encouraging pro-environmental behaviours. The study reviewed the evidence relating to both producer and consumer behaviours and at the individual, organizational and 'whole systems' level (see Darnton et al., 2006 for full technical reports of the study).

This paper presents the findings of the policy review and evaluation that was undertaken as part of this wider study. It sets these findings in the context of the theoretical literature on pro-environmental behaviour change. The paper briefly outlines the background to environmental policy making in

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the UK, before describing the scope and methodology of our study. It draws out a set of common themes arising from the review and provides recommendations for future policy making on the basis of these.

2. Background

In the UK, policies with an explicit aim to influence environmental behaviour began to emerge in the early nineties with the publication of the first UK Sustainable Development Strategy (Her Majesty's Government, 1994). Publication of two further strategies in 1999 and 2004, as well as international developments such as the Johannesburg Summit of 2002 and the implementation of the Kyoto Protocol have served to emphasise the growing need for national governments to develop and implement policy interventions that are capable of reducing the impact of a wide range of behaviours which have a negative impact on the environment.

Until recently, three distinct approaches have dominated in the UK, namely:

(i) The provision of environmental information,
(ii) The incremental introduction of environmental regulations, and
(iii) The use of environmental taxes and charges.

There has been considerable criticism of the effectiveness and viability of all three.

(i) Provision of environmental information

Although information campaigns provide a relatively cheap method for communicating government policy intention to the public, several commentators have noted that they often have a negligible effect on people's actual behaviour (Jackson, 2005; Darnton, 2005). This problem has been articulated by Demos and The Green Alliance:

> ''Information does not necessarily lead to increased awareness, and increased awareness does not necessarily lead to action. Information provision, whether through advertisements, leaflets or labelling, must be backed up by other approaches.'' (Demos/Green Alliance, 2003: 46).

(ii) Environmental regulation

Due to its intrusive nature and the costs of implementation and enforcement, direct regulation is relatively rare. Restrictions or bans are most often applied in response to health and safety concerns or when tangibly maintaining or increasing the quality of a product or service. Rather than direct regulation, UK policy makers have tended to prefer to encourage self-regulatory activities, for example, by the use of codes of conduct, minimum standards or voluntary agreements that individuals or organisations can sign up to. This means they can be more flexible in targeting both the scale and type of externality. Even with voluntary regulation schemes, monitoring standards and administering licenses can take considerable resources to establish and there can be high levels of non-compliance and malpractice, particularly where target audiences consider quotas and standards to be unjust or poorly distributed (Howes, 2005).

(iii) Use of environmental levies and charges

A number of disadvantages have also been noted with the fiscal approach, such as the potential for negative distributional impacts on lower income groups and reduced competitiveness for small- and medium-sized enterprises (Revell and Blackburn, 2004). It can also be argued that this top–down and largely mechanistic approach does little to build the necessary consensus amongst policy makers and their target audience of the need for change. As the UK Fuel Protests in 2000 demonstrated, unless the reasons for increased taxation are clearly explained and the negative distributional impacts ameliorated, there can be widespread public resistance with the backlash presenting serious consequences for future policy making (Defra, 2006).

Our study suggests that although UK policy makers largely recognise and accept the limitations of their past attempts to influence environmental behaviours, they still fall short of developing sophisticated and effective policy interventions to achieve their desired environmental policy outcomes.

3. Methodology

The overall aim of the project was to use secondary research methods to establish how Government departments (and Defra in particular) can best encourage pro-environmental behaviours amongst different audience groups. The three objectives for the overall project were to:

(1) Analyse models and theories of environmental behaviour change amongst different target groups of consumers, and amongst other related groups including producers;
(2) Identify and analyse policy interventions and other initiatives designed to encourage pro-environmental behaviours amongst different target groups; and
(3) Present practical recommendations for future work by Defra aimed at influencing specific pro-environmental behaviours.

This paper particularly focuses on the second objective – the policy review – but importantly sets the findings in the context of the theoretical literature on behaviour change (reviewed under the first objective).

3.1. *Evaluation criteria*

It was felt that a rigorous and consistent set of evaluation criteria would be needed to ensure that our analysis was both robust and traceable by others. From a review of the relevant literature, we determined that the seven criteria identified by Ledbury et al. in a 2006 report for the Home Office provided a good starting point (Ledbury et al., 2006). These are as follows:

(1) Likely effectiveness against objective,
(2) Cost,
(3) Unintended consequences,
(4) Impact on international competitiveness,
(5) Additionality/deadweight,
(6) Distribution,
(7) Uncertainty.

We took these seven core criteria and, as far as the available data allowed, used them as the basis of our evaluations.

4. Review of theories and models

The policy analysis phase of our research was preceded by a synthesis review of the theoretical literature on pro-environmental behaviour change (Darnton, 2006). This large and diverse body of literature has been reviewed by UK-based researchers on several occasions in recent years, most notably by Jackson (2005). Our review differed from previous studies by going beyond models of environment-related behaviours undertaken by individuals to include process models and theories of change applying at higher levels of scale: amongst groups and organisations, across operating systems (e.g. supply chains) and ultimately society as a whole. By taking this approach, the literature review revealed remarkable consistencies applying across theories operating at these different levels of scale. Some of the key points arising from the review which had most bearing on the subsequent policy analysis are discussed here.

The rationale for exploring change at multiple levels is already present in theories and models, that solely address individual social behaviours. Socio-psychological models of individual behaviour reveal environment-related behaviours to be complex and non-linear, shaped by multiple antecedent factors applying in different sequences and with different weighting to determine the end behaviour. Even a model as self-sufficient as the Theory of Planned Behaviour (Ajzen, 1991) includes the determinant factor of normative beliefs. Norms are one well-evidenced way in which social contexts frame individual behavioural outcomes.

Jackson (*op cit*) identifies other such contextual limiting factors under the heading of 'external conditions'; for example, lack of access to recycling facilities or public transport will limit the potential of even the strongest-willed individual for engaging in these pro-environmental behaviours. 'Lock-in' is a further term used by Jackson (and more fundamentally in Shove, 2003) to describe the way in which individuals' behavioural options are circumscribed by the physical (or social) contexts in which they function (for instance, if I wish to use a supermarket, I will most likely need a car to shop there). All this individual level evidence points to the importance of factors beyond an individual determining which behavioural options they will pursue.

This dynamic is usefully demonstrated in a single model by Gatersleben and Vlek (1998) whose Needs–Opportunities–Abilities (NOA) model brings together contributory factors operating at individual, collective and societal levels. Taken together, the external forces of needs and opportunities motivate consumption, while opportunities and abilities (bracketed as 'behavioural control') limit consumption. However, the model is influenced by a still higher level of factors beyond the individual's domain: the top tier of the model shows societal 'drivers' setting the context for individuals' courses of action (see Fig. 1).

It is important to note the circularity in this top–down model: a large arrow indicates feedback from the outcome (which interestingly in this case is 'wellbeing' rather than the target behaviour itself) to the higher tiers of NOA, and to the societal drivers. In this way, individual lives contribute to the establishing of societal norms, and build the context for individual change. The clear implication of this model is that the social context needs to be right if the required behaviour change is to result: policy makers may need to aim for societal change in addition to targeting individuals with change interventions.

Theoretical evidence of this kind is also found in the work of Stern, who helpfully expresses consistent theoretical views in the context of advice to policy makers. Indeed Gardner and Stern's 'Principles for Intervening to Change Environmentally Destructive Behavior' (Gardner and Stern, 1996) require that effective policies ''*Address conditions beyond the individual that constrain pro-environmental choice*''. Only once such external limits are removed is there the possibility of behavioural

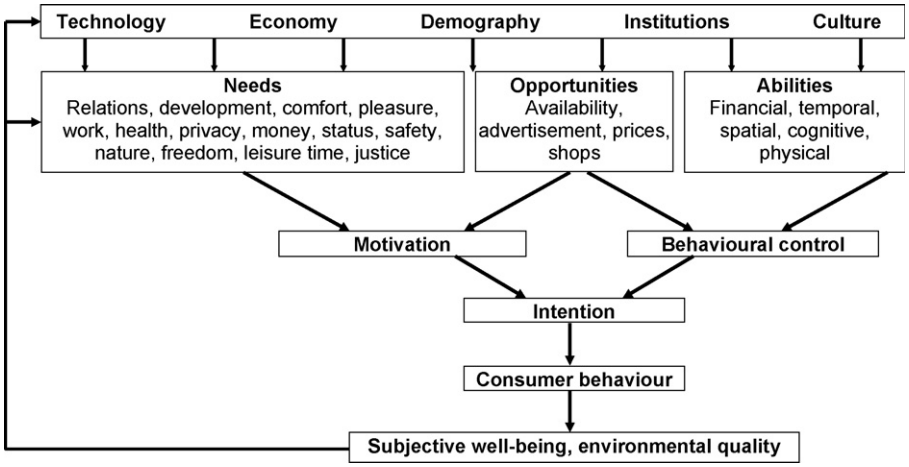

Fig. 1 – 'The needs–opportunity–ability model of consumer behaviour', reproduced from Gatersleben and Vlek (1998), with kind permission from Birgitta Gatersleben.

change occurring. Importantly the approach is not presented as a choice between addressing internal or external barriers but as both: a combination of measures in a balanced package (what social marketers would call "an intervention mix"—see French and Blair Stevens, 2005). Stern (2000) gives the example of an energy efficiency grant scheme: once the amount of money offered has been optimally determined, altering the amount will have much less effect on uptake than, say, addressing the promotional material which publicises the grant. He sums up: "*...little happens until the right combination of intervention types is found*".

Stern's guidance for policy makers thus already incorporates interventions at a higher level of scale (or 'upstream' interventions). A further vital principle for effective policy design identified by Gardner and Stern (*op cit*) is encapsulated as "*Understand the situation from the actor's perspective*". Not only is this a call for evidence-based approaches, but the formulation clearly positions the individual as not merely a passive target, but as an active partner in the process of change (it is, after all, the individual's own behaviour which is to be changed). This recommendation to adopt participative approaches borrows heavily from the literature on change theory, in which cycles of action and reflection are seen as the vital methods for bringing about change amongst participating individuals.

In the looped learning models of Argyris and Schon (1996) (see Fig. 2), material change or innovation happens outside the loop, as a by-product of the learning (and change) undergone by the individual or participants themselves. Learning theory of this kind reveals change not merely to be non-linear (as the socio-psychological models of behaviour demonstrate) but to be looped, or spiralling, in an ongoing process of learning and feedback, through which individuals are changed as they adopt new starting points with each new cycle of enquiry.

The imperative to empower audiences and include them in the process of change is strong; in itself this sort of sharing of power represents a departure from prevalent 'command and control' models of policy making (e.g. see Chapman, 2004). A common strand in the literature is again apparent in work on organisational change which focuses on the role of change champions (see for example the work of Torbert, cited in Ballard and Ballard, 2005). By identifying individuals at different points on the spectrum of change, and empowering them to become 'change agents', it is argued that organisations can most effectively bring about transformational change across their whole culture. Networked approaches of this kind may be more effective in driving change than targeting the behaviour of all individuals directly.

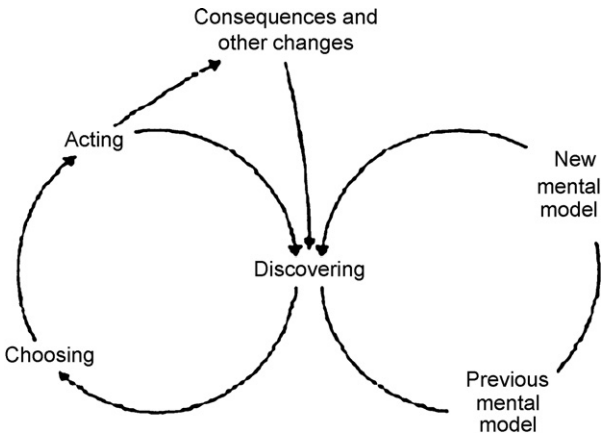

Fig. 2 – 'Argyris and Schon's Double Loop Learning', reproduced from Ballard (2005b), with kind permission from David Ballard.

The literature review came full circle by presenting models of systemic change which call for holistic approaches in order to bring about lasting changes at the level of individuals. A perfect example is provided by Hampshire County Council's Waste Minimisation Strategy (Hampshire County Council et al., 2005) under the 'More from Less' initiative, which included an Integrated Process Chain Delivery model (see Fig. 3). All sectors of society are required to participate in a total community engagement approach. It is notable that the ultimate outcome of the process, beyond even driving community action, is to "*create societal change...*". On one level, this is an ambitious target; on another it describes how local-level behaviour change can be approached from a whole society (systems) perspective.

Using such evidence, the review argued that behaviour change interventions must account for – and ultimately address – society as a whole in order to achieve normative behaviour change. This is a valuable basic principle arising from the review of theories and models that policy makers should bear in mind when designing behaviour change policies, whether in the UK or elsewhere.

5. Policy selection

Our aim with the policy review was to test the extent to which these key messages from theories and models of behaviour change were being recognised by policies working at either the level of individual, organisational or whole systems change. To this end, 14 policy interventions were selected by a Steering Group within Defra, from a longer list proposed by the researchers. Some policy interventions had reached completion, others were just beginning. It was vital to the research that the policies considered were within a sufficient timeframe to have delivered outcomes, but not too back dated for the evidence base to be lost. This suggested that an implementation timescale of approximately 10 years, from circa 1993/4 to circa 2003/4, would be appropriate.

The selected policies targeted a range of audiences and behaviours at different levels of activity, from farming and business practice to consumer behaviour and voluntary action. The review was predominantly desk-based, using available evidence from two key sources: (i) published and internal evaluation reports and (ii) the views of policy officers involved in the delivery of these programmes. Informal telephone and face to face interviews with key policy officers augmented the written evidence, allowing the review to encapsulate any on-going changes and evolutions in policy design over time. A common framework was used to structure the evaluation of each policy (see Table 1).

The 14 policies reviewed were as follows:

(1) Biowise, 1999–2005: a major UK Government Programme funded by the Department of Trade and Industry, which

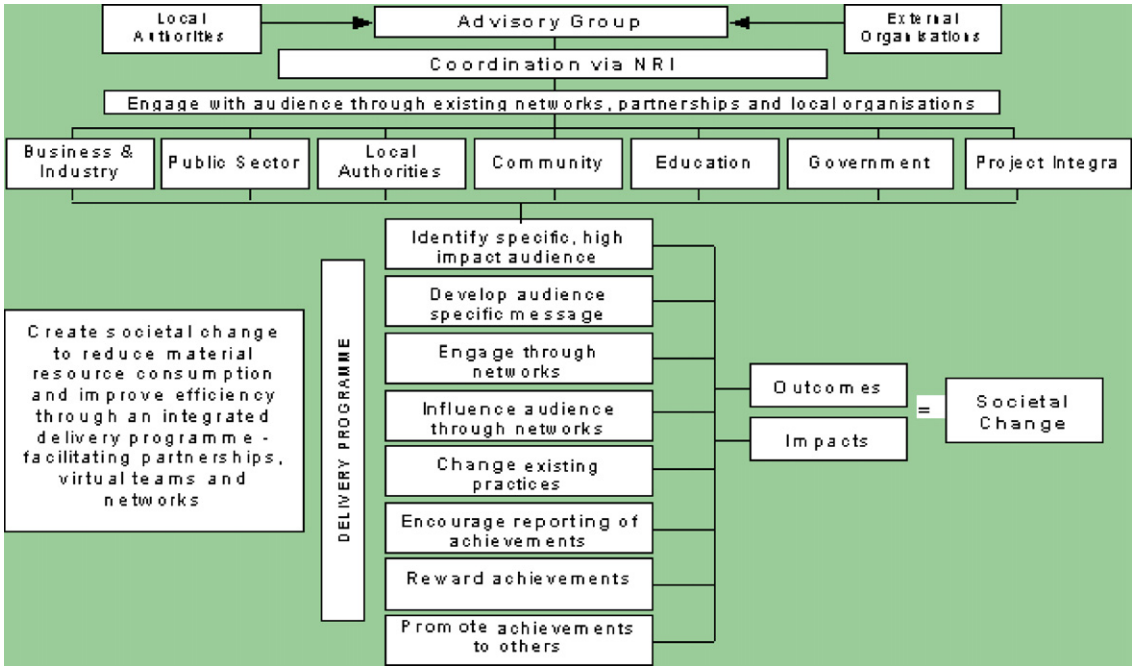

Fig. 3 – 'The integrated process chain delivery model', reproduced from Hampshire County Council et al. (2005), with kind permission from Campbell Williams.

aimed to improve the competitiveness of UK industry through the use of biotechnology and to support the development of the UK biotechnology supplier industry.

(2) Common Agricultural Programme (CAP) Single Payment Set-Aside Scheme, 1992–present: used as a production control measure to curb levels of supply, farmers are paid to meet agri-environmental measures, receiving payments for setting land aside from production. They are also encouraged to use their land in alternative ways to conventional cereal production.

(3) Common Fisheries Policy – Total Allowable Catches Scheme, 1983 – present: aims to reverse the decline of fish stocks and create a more sustainable fishing industry. Member States share fishing opportunities in the form of quotas amongst their fishermen, fixing the maximum quantities of fish that can be caught from a specific stock over a given period of time.

(4) Energy Efficiency Advice Centres (EEACs), 1993—present: EEACs aim to offer a respected and widely utilised network of advice provision to encourage households to understand, and then take action to reduce, the negative environmental impact of their energy use.

(5) England Rural Development Programme (ERDP)–Rural Enterprise Scheme, 2001—present: encourages diversification of the rural economy by issuing a Capital Grant to farmers to fund one-off projects and diversify their income and farming practice.

(6) Environmental Action Fund (EAF), 1992–present: helps voluntary and community sector groups to further the Government's sustainable development objectives, issuing grants from £25,000 to £250,000 per year.

(7) Framework for Sustainable Development in the Government Estate, 2001–present: sets out policy tools for operation to exemplify good housekeeping in Government. The aim is to help departments identify resource savings with a structure of targets, while allowing flexibility to implement these targets.

(8) Public Sector Food Procurement Initiative, 2003–present: set up to help deliver the aims and objectives of the Sustainable Farming and Food Strategy of 2002, the initiative targets the demand-side of the food market (by encouraging public sector bodies to procure food in a manner that promotes sustainable development) and the supply-side (encouraging more small and local farmers, producers and suppliers to compete to supply these bodies with food).

(9) The Green Claims Code, 1998–present: aims to achieve a common consensus around ground rules on labelling and products that make green claims. The code addresses the problem of careless advertising, strengthening the legislative case against products that make dubious claims about their pro-environmental credentials.

(10) The Market Transformation Programme (MTP), 1996–present: supports policies and delivery programs which encourage competition and innovation in the environmental performance of traded goods and services. It aims to support the development and implementation of UK Government policy on sustainable products, with the strategic focus of improving the availability, take-up and use of products that are more energy-efficient and less environmentally damaging over their lifetime.

(11) UK Emissions Trading Scheme, 2002–present: began with companies and organisations bidding for annual cumulative emissions reductions targets in return for a share of a £215 million budget. Its aims were to reduce emissions

Table 1 – Evaluation template using example of UK Emissions Trading Scheme

Aims	The scheme had three principal aims: to secure cost-effective reductions in greenhouse gas (GHG) emissions; to give UK companies early experience of emissions trading and a competitive advantage before the proposed launch of the European Union Emissions Trading Scheme (EU ETS) in 2005; and to encourage the establishment of emissions trading centres in London
Delivery mechanism	The underlying principle behind emissions trading is to ensure that reductions of emissions occur where the cost of the reduction is lowest, lowering the overall costs of combating climate change. The Government sets the overall cap for the scheme. This allows the Government to regulate the overall amount of emissions and the participants to determine how and where the emissions reductions are achieved. With a trading scheme the Government decides the environmental outcome, displacing uncertainty onto the cost of compliance Under the UK Emissions Trading Scheme (UKETS), participating companies are allocated allowances, each allowance representing a tonne of carbon dioxide (CO_2) equivalent. Companies can emit in excess of their allocation of allowances by purchasing allowances from the market, allowing for variation in a company's production of CO_2. A company that emits less than its allocation can sell its surplus allowances, creating a financial incentive for cutting emissions (Defra website, 2005) The UK ETS provides a framework for companies to become more energy-efficient. Companies like BP can also use participation in the scheme as a reputational marketing tool. The auction mechanism provides an incentive for companies to bid-in substantive reductions, meaning Government does not have to micro-manage the process of allocation. Finally, the voluntary aspect of the scheme allowed companies to adapt to such a scheme before the imposition of a mandatory scheme
Background	The UK Emissions Trading Scheme (ETS) was designed to help the UK government meet and exceed its commitments under the 1997 Kyoto Protocol. Lord Marshall's, 1998 report *Economic Instruments and the Business Use of Energy* outlined how best to use new economic instruments to improve the industrial and commercial use of energy and help reduce emissions of greenhouse gases. Several options were recommended, including a UKETS (Her Majesty's Treasury, 1998). Following the report Defra received £215 million from the Treasury to fund the scheme from 2002–2006; the scheme began in April 2002. It was the first emissions trading scheme in the world and was acknowledged by the National Audit Office (NAO) as a 'pioneering initiative'. In the first year of the scheme, 33 companies–'direct participants'–volunteered to be involved and each had to bid for annual cumulative emissions reductions targets set against a 1998-2000 baseline, in return for a share of the £215 million (bidders were limited to receiving no more than 20% of the total budget). The scheme was not mandatory (NAO, 2004)
Who leads and who delivers	A UK registry oversees the running of the scheme, but once the allocations are in place it is down to the participants in the scheme to deliver reductions in their GHG emissions
Target audience	The target audiences were private companies and public sector organisations. Participants in the scheme ranged from large multinational corporations such as Shell and BP to local authorities and museums. When the scheme was launched in 2002 almost every organisation in the UK (apart from power stations) was eligible to join
Timescale of change targeted	The targeted change was long-term, preparing industry for future trading schemes and looking to change the way companies regarded their energy consumption. The Government's decision to introduce a trading scheme rather than regulation was in anticipation of a future trend towards emissions trading. Launching a voluntary pilot UKETS enabled 'learning by doing' for participants and Government, and established the city of London as a centre for carbon trading before European and international trading schemes were launched
Outcomes	Over the first 3 years (2002, 2003 and 2004), the scheme delivered emissions reductions totalling 5.9 million tonnes of CO_2 equivalent (Defra website, 2005), demonstrating far more potential than participants had realised for reducing emissions. Targets were arguably too low in the first year with companies naturally risk-averse
(Cost) Effectiveness	The scheme allows companies a competitive advantage in that they have a chance to experience and learn about emissions trading before it becomes mandatory or applied at the European level. Many participants in the scheme make a profit and are incentivized to become more energy-efficient. While £215 million is a considerable amount of Government funding, the benefits to Government and business in terms of learning by doing and first mover advantage deserve to be fully acknowledged
Links to change theory	There is a strong incentive for companies both to profit from the scheme and to avoid costs. These drivers are identical to those shown to determine supply chain behaviours in models of environmental purchasing. Participation in the scheme was voluntary, meaning the scheme was reliant on an existing will from industry to learn about such a scheme and to become more energy efficient
Lessons arising	The 'learning by doing' objective the scheme has been a considerable success: far more emissions savings were achieved than had been projected and the City of London is now regarded as an international centre for emissions trading (NAO, 2004) The scheme created an understanding about emissions reductions amongst participating companies, in a way that a tax might not have done, because of the level of decision making devolved to participating organisations. As discussed, the scheme provided both an opportunity to make money and a risk of generating costs (NAO, 2004) However, because some companies met their targets relatively easily, generating a surplus in emissions reductions allowances, the allowance price collapsed, tempering the incentive aspect of the scheme. After evaluation in 2004, tighter targets have been agreed with the top six performers whose targets were not seen as value-for-money. After the evaluation process companies feared regulatory action and were keen to comply with the new demands of the voluntary system. The large surplus of allowances and the low allowance prices have been regarded as evidence that there is insufficient demand for allowances, principally because targets were not set stringently enough, though other trading schemes have also witnessed similar over-achievement in early years (NERA, 2004: 19)

Table 1 (*Continued*)

	In some cases, participants' levels of emissions in the years leading up to the scheme had become lower than their baselines, meaning their targets had already been achieved before the scheme started. These participants could then sell allowances and receive money for continuing their operations at the same level, rather than receiving payment for cutting their emissions (NAO, 2004: 3)
What could be done differently?	There have been criticisms about the voluntary aspect of the scheme. Firstly, there is an intrinsic bias towards companies who had planned to reduce their GHG emissions in any case (in this example the scheme rewards them without requiring them to change their behaviours). For example, British Airways, knowing that they were scaling back domestic flights and thus reducing domestic emissions regardless of the policy, made a bid and received a share of the £215 million and the opportunity to sell surplus allowances. Secondly, companies are naturally risk-averse, leading to the setting of modest limits. Thirdly, abatement is cheap for non-CO_2 emitting companies, who can bid-in knowing that technological additions will bring down their emissions, generating windfall profits and dampening the drive for CO_2 emissions reductions. The National Audit Office, in its 2004 evaluation of the UK ETS, concluded that in "a mandatory trading scheme, these issues would either not occur or, in the case of target-setting, would not give rise to an incentive payment" (NAO, 2004: 4)
Legacy	The UK ETS legacy has been to help companies prepare for mandatory emissions trading. Specifying appropriate technology or providing pro-environmental infrastructure might have been cheaper in the short-term, but would not have provided the platform for learning that was central to the scheme and to achieving long-term organisational change (NAO, 2004). The EU ETS is mandatory, there is no bidding process for allowances and non-CO_2 emitting companies are excluded; this suggests lessons have been learnt from the UK scheme. The scheme has raised the profile of the UK on the international stage and has given both Government and UK companies first-mover advantage in this area. 13 different countries have now adopted the UK's licensed registry scheme. In a recent study, the Carbon Trust recommended that Government develop a new mandatory auction-based scheme, targeting 14,000 companies (Carbon Trust, 2005)

levels while allowing businesses and organisations to adapt to a trading scheme.

(12) UK Headline Sustainable Development Indicators, 1996–present: intended to act as a mechanism for improving accountability in Government performance on sustainability. The key delivery mechanism is effective communication and dissemination of the indicators in order to hold Government to account, to raise awareness of the issues involved in sustainable development, and to provide a benchmark for achieving change.

(13) Warm Front, 2000–present: provides infrastructure and advice to help combat fuel poverty. The Scheme provides grants for insulation and heating to homes in the owner-occupier and private-rented sector for people at risk of fuel poverty, as well as advice on how to lower fuel bills.

(14) Waste Minimisation and Recycling Fund, 2002–present: aims to provide an increase in recycling facilities, leading to a long-term increase in levels of household recycling. Local Authorities are invited to bid for a capital grant to fund a project proposal.

It should be noted that the selected policies were not intended as an exhaustive list of all of the UK Government's policy efforts to affect environmental behaviours, rather they were chosen to reflect a range of different policy instruments as they are applied to different sectors, settings and target groups. The review could, therefore, only offer a partial view of the present policy position. Nevertheless, we feel that some useful messages for future policy making emerged from the analysis.

6. Discussion of findings

Table 2 offers a simplified summary of our findings against each of these seven performance criteria (a tick indicates that the policy performed favourably against each criterion–where a criterion is negative, a tick means the policy did not have that drawback). The table is intended as an overview of outcomes only, in practice each policy was subjected to a full qualitative evaluation based on the available published information and interviews with representatives from the key delivery agencies responsible for each programme (see Table 1 for an example of this). A number of key issues for future policy making emerged from this process.

6.1. *Issues with the evaluation of 'success'*

Those policies seen as most successful against their own stated objectives, such as the CAP Set-Aside Scheme, were often less successful when evaluated more objectively against environmental outcome and efficiency measures. This is because many of the policies were set-up with very limited and modest objectives. For example, the UK Energy Emissions Trading Scheme never aimed to revolutionise the energy market, but simply to provide support to companies wishing to enter into voluntary trading of emissions. It was designed to allow companies to adapt their practices and thereby create a model of good practice; in this respect it was successful. However, looking at the bigger picture, the policy did not have a significant environmental impact in terms of total emissions reductions amongst energy producers. The overall 'success' of the policy in terms of encouraging pro-environmental behaviours is, therefore, questionable.

6.2. *Data deficiencies*

A major issue for the research was the paucity of relevant information for evaluating the actual performance of policy interventions in direct relation to their intended behaviour *outcomes*. It is our contention that monitoring and evaluating policies on the basis of their *outputs* (as many government evaluations currently do) often gives a misleading reading of their benefits to policy makers. For example, in the first phase of the Environmental Action Fund, the fund was assessed on the number of projects it had funded (i.e. its outputs). The impact of these initiatives was not monitored; this problem is often experienced with policies which rely on the voluntary sector to deliver, which often cannot manage a heavy data collection burden (Department of Environment, Transport and the Regions (DETR), 2001). The Warm Front

Table 2 – Summary of policies against criteria

Policy	Likely effectiveness against objective	Cost	Unintended consequences	Impact on international competitiveness	Additionality/ deadweight	Distribution	Uncertainty
Biowise		✓	✓	✓	✓	✓	
CAP Single Payment Set-Aside Scheme	✓	✓			✓	✓	✓
Common Fisheries Policy–Total Allowable Catches	✓	✓			✓		✓
Energy Efficiency Advice Centres	✓	✓	✓	✓	✓	✓	
England Rural Development Programme (ERDP)–Rural Enterprise Scheme	✓	✓	✓	✓	✓	✓	
Environmental Action Fund	✓	✓	✓	✓		✓	
Framework for Sustainable Development in the Government Estate		✓	✓	✓	✓	✓	
Public Sector Food Procurement Initiative		✓	✓	✓	✓	✓	✓
The Green Claims Code	✓	✓	✓	✓		✓	
The Market Transformation Programme		✓	✓	✓	✓	✓	
UK Emissions Trading Scheme	✓	✓	✓		✓		✓
UK Headline SD Indicators	✓	✓	✓	✓		✓	
Warm Front		✓	✓	✓	✓		✓
Waste Minimisation and Recycling Fund		✓	✓	✓	✓	✓	✓

Scheme, which provides energy-saving advice and infrastructure to homes at risk of fuel poverty, had also only recently moved from an evaluation based on counting the number of households helped, to a target-based approach with energy targets set for each participating household measuring the energy saved (National Audit Office (NAO), 2003).

6.3. *Assessing cost effectiveness*

Clearly, value-for-money and cost effectiveness is an important consideration in the adoption of any policy. Our review found that the cost of implementation differed considerably from policy to policy and the use of funds was often criticised in the evaluation reports of funding agencies. For example, our study identified that, until 2001, the cost and process of administering the Environmental Action Fund were adversely disproportionate to the size of the Fund itself and the amounts awarded (Defra, 2006; DETR, 2001). Cost-effectiveness was also not calculated in terms of the environmental achievements of the projects that were funded, but rather on the number of projects that had benefited from the Fund. The Warm Front Scheme was also assessed in this way: the cost-effectiveness of the policy initially depended on the number of homes that had benefited from the scheme, not the net energy savings that had been made. This was changed after evaluation (NAO, 2003).

6.4. *Considering the perverse or unintended consequences of policies*

In evaluating the benefits of a policy intervention, it is also important to consider whether it has had any perverse or unintended outcomes that might have undermined its success or the success of other initiatives. For example, the CAP Set-Aside Scheme had a negative impact on the objectives of the Rural Enterprise Scheme, with the former policy entrenching a culture of dependency amongst farmers that the latter policy was trying to overcome. The 2001 review of the Environmental Action Fund also noted how other, larger funds (e.g. the Landfill Tax Credit, the New Opportunities Fund, the Single Regeneration Budget and the European Social Fund) increasingly impinged on its remit (DETR, 2001).

One further perverse side effect is that the target audience could adapt to the new policy too effectively. The UK Emissions Trading Scheme is one example of this, with some businesses behaving very shrewdly to benefit from the Scheme in a way that was not intended. For example, British Airways bought a large amount of permits knowing they were due to downsize their number of short haul flights (after competition from the low cost airlines), guaranteeing a financial return for a decrease in emissions that would have happened anyway. Fortunately, policy makers had anticipated this effect and were able to re-price the cost of permits. The cost of abatement was also cheap for non-CO_2 emitting polluters, the Scheme giving these businesses the opportunity to bid-in knowing they could install appropriate technology to limit their emissions. A mandatory scheme would make such practices more difficult (NAO, 2004).

6.5. *Identifying net gains*

Ledbury et al. (2006) advise that the impacts associated with a policy intervention should be additional to the do-minimum scenario. In other words, when attempting to improve the environmental impact of certain behaviours, policy makers should assess whether these behaviours would have changed irrespective of the intervention. When policies are poorly monitored or monitoring is based on measuring outputs instead of outcomes, it is difficult to ascertain whether a specific policy is producing any real net gain. For example, the diversification of farming practices observed in the Rural Enterprise Scheme could well have occurred as a result of changes in market demand within the food sector, or as a result of high level agricultural reform at the EU level, making it hard to ascertain whether the grants awarded by the Rural Enterprise Scheme had secured a net gain.

6.6. *Evaluating the equity of policies*

Environmental justice is now a key element of the UK's Sustainable Development Strategy (Her Majesty's Government, 2005). The Strategy advises policy makers to ensure policies, at best, reduce inequalities of outcome and at the very least avoid disproportionate negative financial and environmental outcomes for the most vulnerable in society. Our evaluations demonstrated that policy makers had rarely considered the equity effects of policies and, what is more, the data were generally unavailable to undertake such evaluations. The Warm Front programme represents an interesting case: it was specifically designed to reduce the inequities that arise from domestic energy supply in poorer households and so it could be anticipated that its impact on reducing social inequalities would be of the utmost importance. In fact, the NAO estimated that around a third of fuel poor households were not eligible for the Scheme, while two thirds of eligible households were not fuel poor (NAO, 2003). These negative equity impacts should be more tightly monitored in the future.

7. Lessons arising from the theoretical and policy reviews

The lack of appropriate data with which to evaluate the impact of policies on pro-environmental behaviours represents a significant finding in itself. Notwithstanding this fact, based on the limited evidence that was available to us and synthesis these with our review of theories and models, we have identified seven useful lessons for improved policy making to encourage pro-environmental behaviours. These are discussed in the sections below.

7.1. *Policies need to pull in one direction and convey a consistent message if they are to have any legitimacy amongst the target audience*

The process of changing individual and organisational behaviour is already a complex one, without being further confused by conflicting messages from policy makers. A consistent message across departments is vital to the success of both specific policy interventions and broader Governmental strategies, particularly where compliance from the target audience is central to a policy's success.

The England Rural Development Programme's Rural Enterprise Scheme (RES) represents a case where a consistent message was not given to the target audience of farmers. After a competitive tendering process, farmers were given a one-off capital grant to set up a rural enterprise, such as a tourist attraction or craft activity, in order to increase income and encourage economic development in rural areas (Defra, 2003). However, the RES operates alongside other more traditional incentive schemes, such as the Common Agricultural Policy (CAP) Single Payment Set-Aside Scheme, which pays farmers for setting aside a percentage of their land. While one policy looks to erode the culture of subsidy dependency, the other entrenches it, actually discouraging off-farm enterprises that could create other sources of income (Defra, 2005).

7.2. *Target audiences are more likely to adapt their practices in line with a policy when they have been involved in its formulation (upstream engagement)*

The review identified both good and bad practice examples in this respect. For example, during the formulation of the Green Claims Code a participatory approach was adopted. The Code's formulation stage was an iterative process involving a range of stakeholders. The Confederation of British Industry and various retail bodies endorsed the code, with the National Consumer Council and environmental groups following suit, giving the policy a legitimacy and industry-wide support that helped dispel any resentment that new regulation might have caused. One policy officer interviewed as part of our review felt that, had the Code been mandatory from its inception, the level of stakeholder compliance would probably have been lower. Conversely, a participatory approach was not adopted during the formulation of the Common Fisheries Policy Total Allowable Catches policy, which was set up with the intention of preserving fish stocks. The top–down approach that was adopted created a considerable amount of resentment amongst the target audience, seriously undermining levels of compliance (PM Strategy Unit, 2004).

7.3. *It is important to ensure that the relevant skills, resources and capacities are available for organisations to take on the additional duties that come with a new policy initiative or scheme*

For example, capacity and skills were not considered in the development of the Framework for Sustainable Development in the Government Estate which, in the words of one policy officer interviewed, lacked the 'teeth' to seriously improve the environmental performance of each Government department. The policy had neither a substantial incentivising instrument, nor an appropriate punitive element to improve each department's performance. Though there were successes, each department lacked the resources to significantly improve their environmental performance.

7.4. *Policies are more effective when responsibility for delivery is devolved to locally accountable bodies working on the ground to change behaviours*

Government seems to have recognized the value of devolving power closer to the point of delivery, as shown in their review of the Environmental Action Fund. The EAF funded voluntary schemes run by local organisations with a good working knowledge of the local area and the specific problems that needed to be addressed. Similarly, the Waste Minimisation and Recycling Programme provided grants to local authorities to help them implement schemes specific to the local area. The grant allowed the Local Authorities to formulate policies tailored to their constituency and by so doing reach their recycling targets from central government.

7.5. *Policies are most effective when they simultaneously tackle several aspects of behaviour at multiple levels (whole systems approaches)*

The positive benefits of taking a 'whole-system' approach can be seen in the Market Transformation Programme (MTP). The MTP involves both industry and end-users to support the development of UK policy on sustainable products, using tools like information dissemination, mandatory labelling and energy efficiency requirements. The programme has led to considerable energy savings, but also serves to highlight the need for effective linkages with other policies and programmes such as fiscal and regulatory changes (Chesshire, 2000).

7.6. *Effective policies must be context specific, while recognising the 'bigger picture'*

Policies often focus too much on short-term outputs, meaning the long-term 'big picture' goals of the policy, or the policy package, are lost. For example, it is difficult to assess the outcomes of the CAP Set-Aside scheme in the wider context of global poverty, exactly because it is part of a wider package of reforms. While the scheme has decreased aggregate production in cereals this does not necessarily mean increased access to markets for farmers from the developing world (Defra, 2006). Judged against its self-defined goals the scheme has achieved its objectives, but the bigger picture has been lost.

7.7. *There is a value in government having 'first-mover' advantage and leading by example*

The UK Emissions Trading Scheme began in 2002 as a voluntary measure, allowing businesses and organisations the opportunity to involve themselves in a trading scheme and adapt their practices in order to reduce their emissions and become effective traders before the implementation of a mandatory European Union (EU) wide trading scheme in 2005. The UK was the first country in the world to begin trading in emissions, and this brought a number of benefits; first, by demonstrating leadership Government won the respect of the target audience. Second, the target audience had an advantage over other businesses based outside the UK, having acclimatised to the disciplines of a trading scheme. Finally, at the elite level Government was able to maintain a strong position in negotiations at the formulation stage of the mandatory EU scheme (Defra, 2006; NAO, 2004).

8. Conclusions

Based on our study of theory and current policies in the UK, this paper argues that both policy makers and practitioners need to adopt a more holistic 'systems' approach in their future endeavours to encourage pro-environmental behaviour. While this finding is made in specific relation to policies and programmes in the UK, it is also likely to apply in other countries where pro-environmental behaviour change is necessary as part of a climate impact reduction strategy.

Both theory and practice suggest that changing public behaviours is a complex matter, requiring innovative policies and practical solutions across a range of different sectors and at every level of society. The literature review and the policy analysis were consistent in finding that a holistic approach should be taken when designing policy, with policy makers standing back to see the big picture, and involving 'actors' at all stages of the process. More joined-up working within, and between, departments is one part of this, to ensure that policy signals are all pointing in the same direction, enabling behaviour change to follow likewise. A further vital consideration for encouraging behaviour change, which was present in both the literature review and in the policy analysis, is that devolving power to ground-level agencies and organisations of individuals is the most effective way to encourage change, treating audiences not as passive targets but as active partners in the process of change.

The most important message in this respect is that unsustainable environmental behaviours need to be combated at all levels and simultaneously, i.e. with individual (household level) behaviours being addressed at the same time as business behaviours and whole systems change. To be effective in bringing about system-wide change, policies need to be situated in the wider context of their global impacts, for example, on climate change, rather than simply focus on changes in behaviours. This means assessing policies and practices in terms of their actual environmental impact and addressing behaviours both upstream and downstream to reduce these impacts.

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