

Behaviour Change and Energy Use



CabinetOffice

Behavioural Insights Team



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Ministerial Foreword



Oliver Letwin
Minister of State,
Cabinet Office



Gregory Barker
Minister of State,
Department of Energy
and Climate Change



Andrew Stunell OBE
Parliamentary
Under-Secretary of
State, Department for
Communities and Local
Government

This paper draws on evidence from behavioural economics and psychology to outline a new approach to enabling people, at home and at work, to reduce their energy consumption and reduce their bills in the process.

These insights are not alternatives to existing policy. They complement the Government's objective to reduce carbon emissions across all sectors, and show how we can support these efforts in relatively low-cost ways.

Behaviourally based changes that reduce emissions have major advantages. First, the benefits can be very fast, unlike major infrastructure changes that can take years, or even decades – a 1% gain today is worth more than a 1% gain tomorrow. Second, they can be highly cost-effective. Third, they can provide savings and other benefits directly to citizens.

This paper demonstrates how government is working with the commercial sector and with local authorities to test the application of behavioural insights to public policy in order to see how we can encourage the uptake of energy efficiency products by thinking about how people respond to the incentives that they are given – either as individuals or communities.

Other insights tell us that we can reduce carbon emissions by informing people about what other people living in similar households are doing to manage their own emissions, or how much money they may be wasting by being relatively energy inefficient.

But this paper is not just about encouraging people in domestic settings to do all the hard work. It also shows what the Government has already done to reduce the emissions of central government departments.

We have managed to reduce emissions by over 10% in just one year, including by applying insights from behavioural economics to departmental policy on how to heat and light our buildings. We have set a new target of 25% by 2015. In the long term, these changes will save the public sector millions of pounds a year.

Government's own endeavours are part of a wider national movement around saving energy and reducing carbon emissions. We want other organisations to join us in these efforts to cut emissions and bills, so we are launching a green Responsibility Deal to help companies to reduce their emissions further.

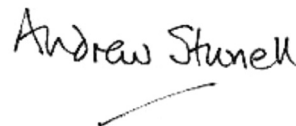
The behavioural insights at the heart of this paper are, we believe, just the start of a new approach to thinking about and understanding the way in which we might conduct public policy in the future. Applying behavioural insights in this way will ultimately become an additional, important way of achieving our policy objectives.



Oliver Letwin, Minister of State, Cabinet Office



Gregory Barker, Minister of State,
Department of Energy and Climate Change



Andrew Stunell OBE,
Parliamentary Under-Secretary of State,
Department for Communities and
Local Government

Executive summary

This paper shows how government can make it easier for people to use energy more efficiently. It sets out a range of trials to test different ways of applying behavioural insights to overcome barriers to being more energy efficient. This research will help to ensure that government policy on energy efficiency will be as effective as possible in motivating behavioural change.

Chapter 1 sets out how we can encourage people to green their homes and be more energy efficient. It puts in place four large-scale field trials to test the efficacy of different ways of encouraging the uptake of energy efficiency products. These trials have been developed in partnership with local authorities and businesses, and include:

- a trial to test the impact of offering upfront incentives to encourage the uptake of energy efficiency products (for example a month's council tax holiday); and
- trials that test the impact of offering community rewards and discounts for people who agree to collectively purchase energy efficiency products (for example 25% discount for five households).

Chapter 2 focuses on how we can use information more effectively to encourage people to be more energy efficient. In particular, it explores how we can draw upon the fact that people are influenced by what those around them are doing (social norms), and are more likely to be influenced by information which is novel, accessible and of relevance to the individual in question. Two main areas are explored. These are:

- a trial which examines how behavioural feedback, including comparisons of how much energy you are using compared with a similar person, can help consumers to save energy. Similar trials in the US have shown consistently positive results; and
- reforming the front page of Energy Performance Certificates (EPCs), which provide information for those buying or renting a home. From 2012, these will be made much clearer, and will provide an estimate of the costs of heating a home.

Chapter 3 demonstrates how the Government has already done a great deal to achieve energy efficiency savings of its own. The Government set itself a target to reduce emissions from departments by 10% in just one year. The application of behavioural insights has helped the Government to surpass this objective, for example through changes to the default settings of heating and lighting systems. Building on this progress, we will seek to reduce emissions by 25% by 2015. This chapter also recognises the work done by UK businesses, non-governmental organisations and other organisations, and sets out a new Responsibility Deal, whose aim is to encourage organisations to make public commitments to reduce energy use.

Taken together, these trials and reforms show how the Government is drawing on new evidence to encourage positive behaviours in ways that do not require a new legislative initiative or spending programme. We will evaluate their impact, and ensure that lessons learnt inform future policy.

Introduction

This paper shows how government can make it easier for people to use energy more efficiently. It is not a traditional government document. It does not consider what new laws or regulations might be needed, and it does not announce a new spending programme.

Rather, this document focuses on the ways in which individuals respond to everyday situations and can be encouraged to waste less energy by being more energy efficient. It does so by drawing upon a range of insights from behavioural economics and psychology, all of which are grounded in a growing body of academic evidence.

This evidence shows that the behaviours of individuals can deviate greatly from a standard rational choice model,¹ in which people objectively weigh up the costs and benefits of investing time and money into 'greening' their homes and being more energy efficient. Research indicates that social, cognitive and behavioural factors are important in explaining why many people have not – yet – introduced changes that could help them to enjoy cosier homes and lower energy bills. For example:

- Although many people are concerned about the environment (a stated preference), this does not always translate into taking practical steps to reduce domestic energy consumption (revealed preferences).²

- Although many energy efficiency measures have been proven to be highly cost-effective (for example insulating a loft or putting in place cavity wall insulation), and therefore a 'rational' thing to do, many people are yet to introduce them.

This paper seeks to address many of these discrepancies through a more nuanced understanding of how people behave in their everyday lives. Three of the most significant insights relate to (i) our tendency to 'discount the future'; (ii) the power of social norms; and (iii) the use of defaults:

I. Discounting the future. One of the barriers to making energy efficiency improvements relates to the fact that the benefits are accrued over a long period of time, whereas the costs associated with them are immediate and sometimes large. We know that people often have a tendency to 'discount the future' – in other words, they may prefer a smaller reward today over a larger reward in the future. So, many of the new approaches outlined in this paper will seek to reward individuals for taking concerted action now which will help them to achieve energy savings in the longer term.

2. Social norms. Behavioural insights tell us that people are heavily influenced by what others around them are doing. This paper explores how social norms can encourage the adoption of green behaviours. We are introducing new trials and policy changes that will show how we can encourage people to reduce their energy use by providing them with comparative energy consumption information. And we will be offering rewards to communities and groups, as well as to individuals, to test whether we can encourage the diffusion of norms through existing social networks.

3. Defaults. One important lesson from behavioural economics is that individuals tend to go with the flow of pre-set options, or defaults, often regardless of whether the pre-set options maximise our individual or collective wellbeing. Some of the most successful interventions that supported the achievement of the Government's 10% reduction in departments' carbon emissions focused on changing these defaults – such as when heating and cooling systems were turned on and off through the identification of 'optimal core hours windows'.

Encouraging the uptake of some of the most effective energy efficiency measures therefore demands an understanding of how people behave and use energy in their homes and businesses, and why they do not act already, in order to identify and both overcome the barriers and facilitate the prompts to becoming more energy efficient. This is what this paper seeks to do, learning lessons that we have also been applying within government, which are helping to waste less energy and money.

How this paper is organised

This paper is based around three broad chapters.

Chapter 1 explores how to encourage people to be green and energy efficient in their homes. Four field trials based on behavioural insights will test whether different interventions increase the likelihood of people installing green products in their homes. This will be aligned with key government programmes, such as the Green Deal – a new initiative which will enable individuals to undertake energy efficiency measures in their homes with no up front cost. The Renewable Heat Incentive (RHI) scheme seeks to encourage people to be green in their homes by installing renewable heating systems. To ensure that the structure of the incentive scheme motivates uptake, we will consider what impact being part of the RHI scheme and installing a renewable heating system has on an individual's wider behaviour around energy use.

Chapter 2 considers the ways in which information and how it is presented can help people to reduce their energy consumption. We will introduce changes to the front page of Energy Performance Certificates (EPCs) so that they convey information more effectively to home buyers and owners. From April 2012, the EPC will also act as a prompt for take-up of the Green Deal. We will also explore ways of encouraging individuals to reduce their energy consumption, principally through new measures which will give people detailed feedback on how they use energy in their home, and how their energy use compares with similar households. US trials of 'comparative consumption' have consistently demonstrated that social norms and personalised behavioural feedback can help householders to reduce their energy consumption. Drawing on these insights, and research conducted by the Department of Energy and Climate Change (DECC), we will be putting similar measures in place in the UK.

Chapter 3 shows how government has managed to achieve its target of reducing energy use in departments by more than 10% in just one year. This work has been driven forward by civil servants across government, who have drawn upon behavioural insights to help achieve these reductions, saving energy and money in the process. Building on the 10% target, we will seek to have reduced the emissions from the government estate by 25% by 2015. DECC will also develop a new approach to encouraging businesses to commit to taking action, in particular through the introduction of a new Responsibility Deal.

This is the full list of trials set out in Chapters 1 and 2 which we will be running:

- 1. A trial to test the effectiveness of offering upfront incentives to encourage the uptake of energy efficiency products including a month's holiday from council tax payments and the offer of a voucher for goods and services. Commercial partner: Homebase.**
- 2. A trial to test the impact of offering green products at a discount for collective purchasing and the effect of removing the hassle factor of loft clearance. Commercial partner: B&Q.**
- 3. A trial to test the impact of offering community rewards for the take-up of the Green Deal. Commercial partner: E.ON.**
- 4. A trial of how behavioural feedback, including consumption comparisons, can help consumers with smart meters to save energy. Commercial partners: First Utility and Opower.**
- 5. A trial to test the impact of framing cost savings of making energy efficiency improvements over one, three and five years, using Homebase's home energy audit as a template.**

1. Helping people to green their homes and be more energy efficient

Greening your home, through the installation of energy efficiency measures, can help to save energy and money. But making the kind of improvements that have these effects is not always simple – they usually require some planning, time and a degree of hassle.

Drawing on insights from behavioural economics and psychology, this chapter focuses on what we might be able to do to further encourage the uptake of energy efficiency measures.

This chapter shows how we might be able to motivate people to act through restructuring existing incentives and using collective rewards.

There are two areas that we focus on:

A Most attention is devoted to how uptake of the Green Deal – the Government programme to help homeowners to introduce energy efficiency measures in their homes – might be encouraged in the future. Four large-scale trials are outlined, including offering upfront rewards to individuals and groups and reducing the ‘hassle factor’ of loft insulation.

B The Government is introducing a Renewable Heat Incentive (RHI), and this section sets out how we will be taking forward the RHI for households. This will begin in October 2012. The interim period will allow us to test insights from behavioural economics to maximise uptake of the RHI.

A Encouraging uptake of the Green Deal

The Green Deal, which is planned to launch in October 2012, is the Government's flagship policy to help people introduce energy efficiency measures in their homes at no upfront cost.

At its heart is an innovative financing mechanism that allows private companies, charities and local authorities to cover the upfront costs of installing energy efficiency measures. Individuals will then pay back the costs of these measures through the savings made on their energy bills. The repayments should never be more than the amount saved, so consumers should see no increase in their bills. It is not a personal loan: the charge remains with the billing at the property, rather than with the individual.

The Green Deal is itself a great example of how the Government is applying behavioural economics to reduce carbon emissions. We know that people can heavily discount future rewards, which is one of the reasons why people are not always willing to pay now for energy efficiency measures which will only save them money in the future.³

The Green Deal removes this barrier by offering consumers the chance to introduce changes at no upfront cost to themselves.

The Behavioural Insights Team and DECC have been working together to explore ways in which we can encourage further uptake of the Green Deal through the application of behavioural insights. This chapter sets out the details of four trials to be conducted over the next year to determine which interventions are the most effective. Each of these trials is supported by local authorities and the commercial sector, two groups which will have a crucial role to play in helping to deliver the Green Deal.

Partnering with future Green Deal providers from the commercial sector has enabled the Behavioural Insights Team to run these extensive real-world trials. The results of the trials will be ready in time for the national launch of the Green Deal in late 2012, and will help to inform market players in developing their Green Deal offer, and government with regard to future policy.

Incentivising people through immediate rewards (rather than long-term paybacks)

Immediate upfront costs and long-term benefits characterise a number of environmentally friendly actions, including installing energy efficiency measures in the home. By deferring the costs of installation, the Green Deal is designed to make the uptake of these measures more appealing to individuals.

In this way, the Government has high ambitions for the Green Deal, and believes that it allows for the development of a healthy market in energy efficiency improvements, delivering real benefits to households and businesses across the country. However, we also recognise that these households may need additional prompts and encouragement in order to overcome their natural inertia. The human tendency to heavily discount future energy savings, coupled with a natural predisposition to focus on the short term, and an aversion to the hassle of installing energy efficiency measures, could limit people's readiness to take action – even when the cost barrier is removed. One way to increase the appeal of improvements to people's property where the financial benefits accrue in the longer term is to include an additional upfront incentive as part of the offer.⁴

The Behavioural Insights Team and DECC are considering how to ensure that as many people as possible take up the Green Deal when it is launched nationally in 2012. We will run a trial of a range of upfront incentives alongside the standard offer of home energy efficiency improvements.

In partnership with Homebase supported by Carillion, we will team up with a local authority to conduct a trial to test two different types of immediate rewards to consumers for installing loft and/or cavity wall insulation.

1. Entitlement to a one-month council tax holiday. We anticipate that the offer to offset a month's council tax will be highly appealing to householders. This offer will be time limited, which we hope will tap into people's aversion to anticipated regret:⁵ people will not wish to miss out on a good offer that others are taking advantage of.

2. Vouchers for products or services from the Home Retail Group. The trial will test the effectiveness of an upfront reward in the form of a voucher redeemable on products or services available from the Home Retail Group (Homebase and Argos).

The aim of these trials is to determine how effective different types of upfront rewards will be in motivating households to take up energy efficiency measures similar to those offered under the Green Deal. The effectiveness of different incentives will be of particular interest to future providers of the Green Deal. The findings will be independently evaluated in time to inform the Green Deal in autumn 2012, and will help to inform wider government policies and initiatives around encouraging people to install energy efficiency measures in their homes.

In addition, the consumer organisation Which? is planning to conduct an analysis of a range of incentives that could be used in conjunction with the Green Deal, including the type of incentives mentioned above. These findings will provide valuable additional evidence on consumer attitudes to different incentives to green their homes.

Collective purchasing and social norms: encouraging energy efficiency through social networks

Several decades of psychological research have documented the power of social influence – the tendency for people to adopt the opinions, judgements and behaviour of others.⁶

Recent work indicates that the likelihood that we are happy or healthy, depends in part on how those in our social network – our friends, family and colleagues – fare on these dimensions.⁷

Social processes are also critical to the widespread, sustained adoption of pro-environmental behaviours.⁸ For example, people are more likely to install a programmable thermostat if one of their family or peers have done so.⁹

Social norms, signalling and the diffusion of behaviours through social networks effectively act as social vehicles to encourage the adoption of green (or ungreen) behaviours.¹⁰ Recent research suggests that engaging individuals as members of a community, rather than only as consumers of energy, is an important strategy for changing energy-related behaviours.¹¹

The Behavioural Insights Team and DECC have considered how social networks might be harnessed to support the uptake of domestic energy efficiency measures. In partnership with B&Q and two local authorities – Kingston and Merton – we will run a trial to test the impact of offering energy efficiency products and services at varying levels of discount depending on how many people opt in to the offer. This not only creates a financial incentive, but also creates a signal that others are taking up the offer. Indeed, the incentive partly acts to encourage those who are thinking of taking up the offer to actively encourage their neighbours to do the same – making their own decision to insulate their homes transparent to others.

The nature of the reward here is important: by making the size of the financial incentive contingent on engaging with your neighbours and reaching a minimum number of people to qualify for the offer, we hope to tap into the power of social networks to increase the number of people taking steps to make their homes more energy efficient.

In this trial, homeowners in Merton will be offered a discount on B&Q energy-efficient products such as loft and cavity wall insulation. People will be incentivised to encourage others in their local community to take up the offer with them – discounts for each household range from 10% for two households, to 15% for three households and 25% for five households.

Merton Council will highlight this through community engagement, also raising awareness about the discounted energy-efficient products by marketing the deal in their own local publications. Evidence suggests that collaboration between two trusted organisations – a local authority and a home improvement retailer – and community marketing should improve uptake.¹²

The trial will be conducted between September and December 2011. To determine the effectiveness of this intervention, Kingston Council will act as a control where householders will be offered standard, non-discounted green products. The trial has been designed in conjunction with academic experts and the results will be independently evaluated. The findings will provide critical insights for future providers of the Green Deal when it comes to national roll-out in late 2012, and will also inform the Government's understanding of how to stimulate consumer demand for energy-efficient products.

Helping to reduce the 'hassle factor'

One of the main barriers faced by UK householders in making energy-efficient structural changes to their home, such as loft insulation, is the 'hassle factor' – the disruption caused by installation of energy-efficient products in the home can be far from straightforward. For example, research indicates¹³ that one major practical and psychological barrier to loft insulation is the requirement to clear out a cluttered loft. Therefore, the Behavioural Insights Team and DECC will test the impact of helping to remove the hassle factor on behavioural change.

This trial will investigate specifically whether minimising the hassle associated with loft clearance will encourage the uptake of loft insulation. B&Q and the London Borough of Sutton are currently discussing the terms of a trial which will test the effectiveness of offering a subsidised loft-clearing service in conjunction with loft insulation. Added to this offer will be the opportunity for residents to donate their unwanted loft contents to a local good cause.

The effectiveness of reducing this barrier to installing loft insulation will be tested relative to uptake of a standard loft insulation offer in a control region under Kingston Council. Running between September and December 2011, the trial will be independently evaluated in time to inform the roll-out of the Green Deal in 2012.

Incentivising people through community rewards

Alongside the above-mentioned trials, which relate to rewards received by individuals and small groups, the Behavioural Insights Team has considered the potential of offering rewards at a community level to incentivise uptake of energy efficiency measures. By offering incentives to be enjoyed by whole communities, it may be possible to capitalise on social processes – for example, individuals may actively encourage others within their local area to introduce energy efficiency measures. A common interest in a community-level reward may supplement the motivation of individual households to save energy and money. In addition, were such community-level offers to prove popular, the social normative influences may also come into play to increase uptake of measures to make homes more energy efficient.

The Behavioural Insights Team and DECC is partnering with E.ON to run a trial to test the impact of offering collective rewards – versus a standard offer of green products and services – on people's uptake of investment in energy efficiency products.

Depending on results from initial focus groups, these community rewards could range from microgeneration technology for community buildings, to training for community volunteers and additional support for vulnerable groups.

The results of this research, which will be conducted and evaluated in time for the roll-out of the Green Deal in autumn 2012, will inform future Green Deal providers about the effectiveness of offering collective rewards as an incentive to install green products and services.

Key moments to prompt action

A key insight from behavioural science is the tendency of individuals to go with the flow of pre-set options, or defaults. For example, the number of people who register as organ donors,¹⁴ or take out pension plans,¹⁵ appears to be strongly influenced by defaults. There is also evidence that defaults are important for decisions about green products and services.¹⁶

This insight is important for government: many public policies do not require people to actively take a decision and indicate a preference, even when it may be in an individual's interest to do so. Energy efficiency measures fall into this category.

One option which government could use would be to automatically enrol individuals to signing up to the Green Deal, leaving the citizen the option to opt out. To do so would, however, be disproportionate to the nature of the problem and unpopular, and is therefore not under consideration. A more proportionate response would be to encourage individuals who may not otherwise have considered taking up energy efficiency measures through prompts. 'Prompted choices' of this kind are a milder cousin of formal defaults, and are currently being piloted in the context of organ donor enrolment.¹⁷

Prompted choices are low-cost ways of encouraging action. DECC will consider how best to use prompted choices to encourage the uptake of the Green Deal whenever it engages directly with citizens.

DECC will also work with other departments in areas that are relevant to energy efficiency to consider further areas in which prompted choices might be successful. As a starting point, the Department for Work and Pensions and DECC will work together to identify how we could use the Winter Fuel Payment system to encourage the uptake of energy efficiency measures.

Winter Fuel Payments and ‘mental accounting’

Research from behavioural economics and psychology shows that we often think of money as sitting in different ‘mental accounts’ (such as savings or expenses), which affects how much we spend on particular goods or services.¹⁸ For example, we might be unwilling to shift money from a savings account to pay off a credit card debt, even if the interest paid on the credit card is higher than that received through the savings account.

‘Mental accounting’ has potentially significant policy implications in relation to how particular payments are labelled. For example, recent research¹⁹ indicates that households receiving the Winter Fuel Payment are almost 14 times as likely to spend the money on fuel than would have been the case had their incomes been increased in other ways. Increasing the income of a pensioner by £100, without labelling it, increased their spending on fuel by £3, while labelling the increase a ‘Winter Fuel Payment’ led to £41 of the £100 being spent on fuel.

Getting the messenger right at salient moments

In our everyday lives, we are constantly bombarded with information and stimuli and cope with the quantity of information by unconsciously filtering out much of it.²⁰ We are significantly more likely to register stimuli that are novel, accessible and simple (see also the redesign of the front page of the EPC set out in Chapter 2 of this report).

There are also salient trigger points in our lives, such as moving house, when we know that we are more amenable to fitting energy-efficient products in our homes and adopting new environmentally friendly habits.²¹

Focusing on when individuals move house also makes practical sense: the loft is more likely to be free of clutter, and the disruption due to installation of energy-efficient products is less burdensome if other refurbishment is already under way. It is also a time when capital finance is being arranged.

The Behavioural Insights Team, DECC and the Department for Communities and Local Government (DCLG) have analysed ways in which to capitalise on these key trigger points; it is important not only to influence consumers at key moments, but also to ensure that the message is delivered by a trusted messenger. Two partners have been identified.

The Royal Institution of Chartered Surveyors (RICS) offers a number of routes that can be used to cascade down Green Deal measures to the built environment profession to encourage take-up. In addition to working with DECC on deepening the evidence base in this area through further research, RICS will:

- make a clearer link between the energy efficiency of a property and its value by demonstrating that an inefficient property could be worth less, helping to incentivise uptake of energy efficiency measures. This process will be facilitated by the changes being made to EPCs, set out below. RICS is already committed to releasing a new Valuation Information Paper (VIP) on sustainability and residential property valuation in summer 2011. This will serve to increase the level of awareness and advice for RICS members on the potential impact of energy efficiency measures on residential property valuation; and
- issue a revised Guidance Note, which will recommend specific best practice procedures for incorporating and communicating energy efficiency impacts within the valuation process of a property.

DECC will also work with London and Country, a whole of market, fee-free mortgage broker to:

- use its customer base of over 100,000 home-buyers to conduct research into the attitudes of home-buyers regarding energy efficiency and the incentives that would encourage people to consider taking out a Green Deal when buying or selling their property;
- set up a network of local energy efficiency 'champions' ahead of the Green Deal launch. These people would commit to promoting the benefits of energy efficiency improvements within their community. London and Country would help to facilitate ongoing communication between these champions and DECC, with DECC then able to monitor the impact that this approach has on encouraging people to take action; and

- help to facilitate arrangements between London and Country and potential Green Deal providers so that they are able to consider arrangements for providing referrals for those customers that are interested in further information about the Green Deal once packages are available in late 2012.

In its forthcoming consumer research, Which? is planning to explore what energy-saving information, advice and support home buyers and sellers would find most useful. Which? has agreed to share key findings with the Government to support the existing evidence base. Which? has also launched a Which? Mortgage Advisers service – which will be publicly available to non-Which subscribers – and which presents a potential opportunity to test the impact on behaviour of providing energy-saving advice and information to users of this service.

B Increasing the uptake of renewable energy generation

Today, about half of the UK's greenhouse gas emissions come from the energy used for heating, with only 1% of heat coming from renewable sources.

The Government has set a goal of increasing this proportion to reach 12% by 2020. This level of ambition means transforming the way Britain heats its homes and workplaces, replacing old gas and oil boilers with modern renewable alternatives such as air or ground-source heat pumps, solar thermal panels or biomass boilers.

To kickstart the market for these technologies, the Government is introducing a Renewable Heat Incentive (RHI). This will provide financial support for anyone choosing to install renewable heat technologies in place of fossil fuel alternatives, and will be worth £860 million over the next four years.

The scheme will commence from summer 2011 for businesses, the public sector and charities. The RHI for households will begin in autumn 2012 and, in the interim period, a Renewable Heat Premium Payment will be put in place to help cover the cost of air or ground-source heat pumps, biomass boilers or solar thermal panels. One of the key objectives of the Renewable Heat Premium Payment scheme is to understand how people use renewable heat equipment once it is installed and how people respond to incentives. This interim period will allow the Government to consider how to apply behavioural insights to the full household scheme in order to maximise uptake.

The structure and level of the household Renewable Heat Incentive

Achieving a true transformation in British home heating means offering support packages that encourage maximum uptake while protecting against oversubsidy for any individual. So, government must find a way of constructing packages that best fit people's circumstances and priorities.

This is difficult because individuals' priorities may not always look 'rational' at first. For example, people may prefer lower, short-term rewards on offer today, rather than higher rewards guaranteed tomorrow. Between now and the introduction of support for households in October 2012, we will consider how behavioural insights should influence the design of the policy. As we do this, we need to question:

- segmentation: how householders diverge in their intentions and capacity;
- discount rates: how much people devalue payments made in the future instead of today;
- non-monetised barriers: how different householders account for various risks and hassles when weighing up the costs of changing heating;
- private utility: what value householders place on 'being green' that mean they might act anyway; and
- inertia: the attractiveness of 'doing nothing', and whether some additional incentive or support will be needed to trigger uptake.

These insights will be used to determine the structure and size of the RHI on offer to households. We welcome thoughts or evidence from industry, academia and other interested parties on these questions, which can be submitted to the RHI team by email at rhi@decc.gsi.gov.uk. We will set out a proposal for supporting householders through the RHI at the end of the year, so welcome any contributions in summer 2011 in advance of this.

Understanding how consumers behave upon receipt of the incentive

Once new equipment has been installed, we then need to understand what happens next – which can also make use of behavioural insights. For example, people may make lots of use of their new renewable heat device by keeping their house warmer, which could use more energy overall. Or there might be opportunities for government and industry to improve the usability and efficiency of technologies by providing better information or advice, or by improving their design or installation. We will use the interim Premium Payment scheme to ask individuals for some ‘real-life’ feedback on the technologies, covering areas such as:

- how people use heat pumps. We know that some users do not make the most efficient use of heat pumps’ design, setting them like boilers as either fully on or off;
- how best to run a biomass boiler. Questions include the ease of storage and delivery of biomass fuel, particularly at times of peak demand; and
- the practical use of – and potential for – solar thermal hot water heating in conjunction with other renewable space heating systems.

Understanding how people respond to the incentives on offer, and how they use the equipment once it is installed, will then help the Government to improve the scheme once it is operational.

Linking the incentive scheme to the Green Deal

As well as improving our understanding of user behaviour, rolling out the RHI to households in 2012 will align the incentive scheme with the Green Deal. This will ensure, for example, that useful links are made between insulation and renewable heat generation, particularly to ensure that properties are insulated to a suitable level before they benefit from RHI. This will also allow advice and home audits to be carried out in a joined-up way covering all aspects of home heating and ventilation.

2. Helping people to reduce energy consumption through better information

Providing people with information does not necessarily encourage them to change their behaviour. This is true for many types of behaviour, including those related to energy consumption.²² However, not all ways of conveying information to influence behaviour are equally effective. Drawing on insights from behavioural economics and psychology, this chapter focuses on how we can convey information to consumers in ways that enable them to save energy and money.

There are two areas which we focus on:

A The first focus is upon providing people with feedback on their energy use, including how their energy consumption compares with similar households – drawing on research which suggests that how we feel we compare with others can strongly influence our behaviour.

B The second area relates to EPCs, and specifically how we can make the information contained within them clearer and more salient for those considering buying or renting a home.

A Comparative energy consumption

Many of the behaviours considered in this report are 'one-off', such as making structural changes to your home to make it energy efficient. In contrast, everyday energy-consuming behaviours (such as use of heating and lights) are largely habitual.²³ Such habits are often reliant on automatic processes which may be particularly resistant to change.²⁴ For example, while information campaigns to reduce energy use may result in increased consumer knowledge, this does not always translate into real energy savings.²⁵

Infrequent energy bills and energy reports mean that, in the majority of UK homes, domestic consumers have little way of knowing which of their everyday behaviours contributes most to their energy bills, or what the simplest changes are to make in order to bring their bills down.

The roll-out of smart meters will be a significant step towards addressing this problem: consumers will be able to engage with an in-home display which will provide real-time feedback on the effect of their behaviour on energy consumption and will support other forms of feedback and advice. However, completion of the smart meter roll-out is not due until 2019.²⁶

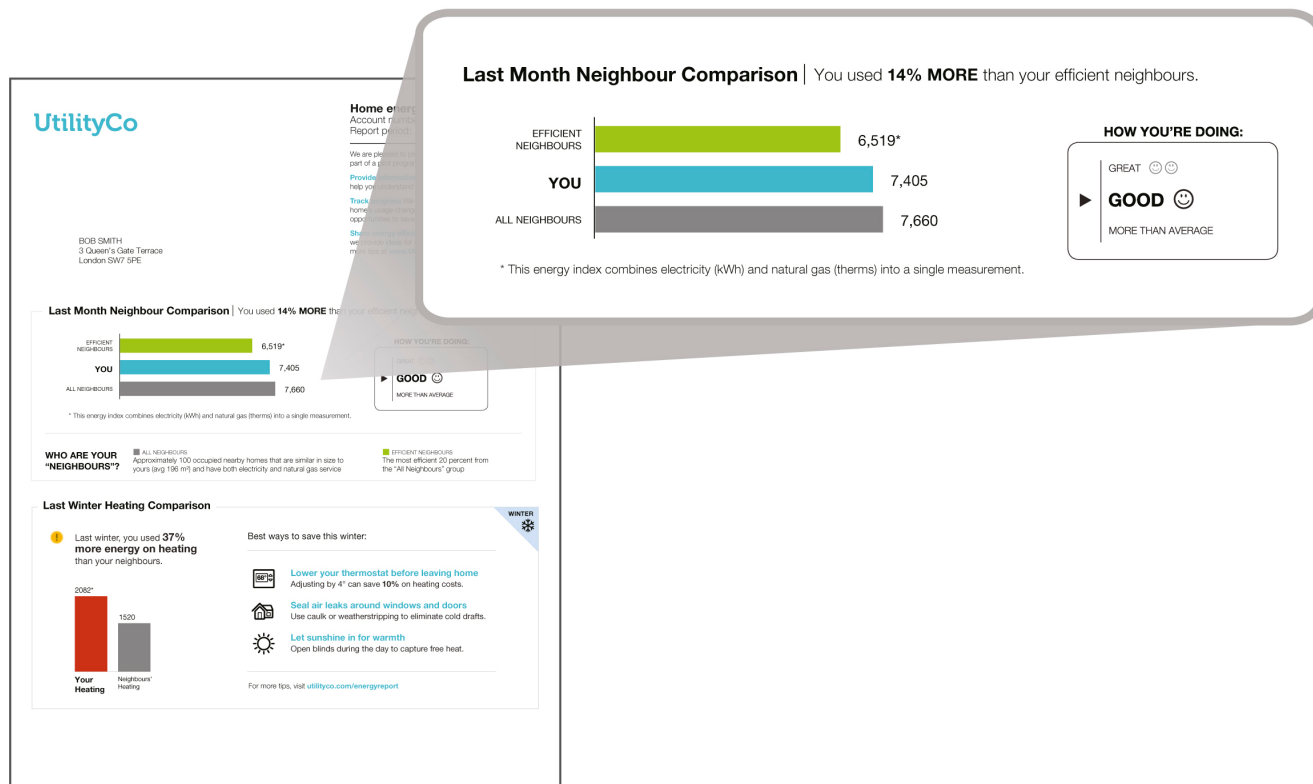
And even when householders have access to in-home displays to illustrate their energy use, significant scope will remain to enable people to reduce their energy consumption – by providing tailored tips on the most effective ways to waste less energy, by motivating people to take action, and by making it easier through automation.²⁷

Motivating change through comparative consumption

How we feel we compare with others has long been known to be a key determinant of our feelings and actions.²⁸ In the context of domestic energy use, providing consumers with feedback on how their energy use compares with similar households in their neighbourhood has been shown to reduce energy consumption in higher-than-average users.

For example, the US company Opower provides consumers with a Home Energy Reporting Program, which includes comparative consumption information (see overleaf) showing how your energy use compares with similar neighbours. This neighbourhood comparison is accompanied by personalised feedback on how the household uses energy and tailored suggestions on how to waste less energy and save money. This feedback is based on monthly and, increasingly, sub-monthly meter data, which enables Opower to provide consumers with more fine-grained information. The reports are provided to consumers on an opt-out basis, to ensure high participation rates. At least nine independent evaluations have demonstrated consistent average energy savings in the order of 2–3%.²⁹

Opower's monthly Home Energy Report



The consumption comparison provided in the Opower Home Energy Report contains two key features. First, the 'descriptive norm' indicates where consumers fall relative to the average and their most efficient peers. Second, the 'injunctive norm' (provided in the 'How you're doing' box, in this case a smiley face – 😊) provides a social appraisal of the household's relative performance. Injunctive norms appear to be critical in mitigating a 'boomerang effect'³⁰ (whereby social norms can cause relatively low energy consumption households to increase energy use) and encouraging energy-efficient users to continue to outperform the average.

DECC has been working with the Behavioural Insights Team, which is partnering with Opower and First Utility to examine the potential for comparative consumption and other types of information to help UK consumers with smart meters to save energy. Households with smart meters will be able to receive highly personalised behavioural feedback, which is deliverable through a range of new technology platforms, such as a web portal, email, mobile applications and social media. An independently evaluated randomised controlled trial will be conducted in 2012 to investigate the energy savings made possible for First Utility customers by providing them with both smart meters and behavioural feedback, including consumption comparisons. Baseline data collection and the repeated provision of feedback necessary to influence energy-saving behaviour mean that results will be publicly available in 2013, in time to inform the wider smart meter roll-out.

The Behavioural Insights Team and DECC are also working with British Gas and AlertMe to investigate the effectiveness of different channels in providing personalised information to smart meter consumers about their energy use. Personalised hints and tips on how to save energy will be provided to customers through various channels. The advice will be based on analysis of current patterns of energy use and consumers will also be able to compare their consumption with households of a similar type. The research will involve a selection of British Gas customers who have received smart meters in advance of the wider roll-out. The learnings will be published and will help to ensure that future government policy reflects the most effective means of communicating to smart meter customers how they might waste less energy.

DECC research³¹ indicates an appetite for consumption comparison information across all UK consumer groups, and recommends that, even in the absence of smart meters, consumers could benefit from additional advice on how to reduce their energy bills. DECC and the Behavioural Insights Team are seeking a voluntary agreement with energy suppliers to provide customers with comparative consumption information on their energy bills, as well as information on their supplier's lowest tariff. We believe that this information is an important tool to help consumers manage their energy consumption. A voluntary mechanism is our preferred approach but, if an agreement cannot be reached by the end of the summer, we will look to legislate to require companies to give this information to consumers by October 2012 at the latest. Prior to its implementation, we will continue to work and consult on the most effective way to implement this policy. The way in which these messages are framed will draw upon research DECC has conducted, together with a growing

body of international evidence. We will also evaluate the impact of these changes in the early stages of their implementation to ensure that the information is as helpful as possible for consumers.

B Reforming Energy Performance Certificates

EPCs give information about how those buying or renting a property can make their homes more energy efficient. All homes for sale or for rent require an EPC, which currently contains:

- information on a home's energy use and carbon dioxide emissions; and
- a recommendation report with suggestions to reduce energy use and carbon dioxide emissions (see example below).

EPCs therefore represent important vehicles through which information about a home's energy performance is conveyed to those individuals who may be best placed to take action.

However, research conducted by Consumer Focus into people's attitudes towards EPCs³² demonstrates that they are not having the effect which we would like them to have. It shows that:

- 18% of people report the EPC had any impact on their decisions to buy a property; and
- 17% of people report acting on the recommendations in the EPC.

The fact that 18% of people claim that EPCs influence their house-buying decisions is clearly positive. However, we know that individuals may overstate the degree to which they engage in positive behaviours such as carrying out environmentally friendly activities,³³ so it is possible that these figures overstate the true extent to which people are acting upon the information contained within EPCs. Either way, there is clearly scope to build on the existing levels of use by making EPCs more salient, so that their impact is greater.

In order to address this issue, DCLG, DECC and the Behavioural Insights Team have worked together to improve the design of EPCs. These changes, outlined below, are part of a broader review being undertaken by DCLG and DECC.

Applying behavioural insights to Energy Performance Certificates

Using insights from behavioural economics, we have redesigned the front page of the EPC. This will be rolled out from April 2012, in time for the national launch of the Green Deal later that year.

As part of the wider refresh of the EPC, the front page should now capture more people's attention, be a clearer signpost to the Green Deal and precipitate greater action towards making energy efficiency improvements.

The most substantial change to be introduced will be to ensure that the information most likely to motivate action appears in the most salient position on the first page of the report. In the current version of the EPC (see EPC before April 2012), the most prominent position is given to two graphs, which provide the home with an energy efficiency rating and a carbon dioxide rating.

Consumers found these two graphs, displayed side by side, relatively difficult to interpret. In the new version, they will be replaced with a simple, clear message, focusing on the costs of heating a home and how much can be saved by introducing energy efficiency measures (see EPC after April 2012). Drawing greater attention to the costs as well as the environmental consequences will make the implications of energy inefficiency clearer to those considering purchasing or renting a home.³⁴

These estimated costs have been calculated over a three-year period, in order to illustrate the potential savings in the longer term. One outstanding question is whether the length of time over which these savings are calculated will impact the effectiveness with which the message motivates people to act. For example, a longer time period (for example five years) would make the savings appear larger, but savings predicted over a shorter time period may be seen as more credible to homeowners.


The Behavioural Insights Team will work with Homebase, using their new home energy efficiency audits, to test the impact of how the costs associated with inefficient homes are presented. For example, the effect of framing the costs as potential savings to be made or losses to be avoided on the likelihood that energy efficiency measures are adopted will be explored. This research will also investigate whether the length of time over which the savings are calculated (one, three, or five years) impacts upon behaviour.

We know that people are more likely to change their behaviour when presented with small, simple tasks over which they feel they have control and are achievable in the short term. In addition to information about the relative costs of heating a home, the revised front page of the EPC will also include a list of the top three recommendations on home energy efficiency improvements, ranging from cheap measures, for example buying a hot water cylinder jacket for £25, to more substantial investments, such as installing a boiler from around £1,500. A number of these measures, such as those listed in the example we give here, will pay back in less than three years and so even in the relatively short payback period shown on the EPC, the savings will exceed the cost. Many of the most effective measures, such as installing a new condensing boiler or solid wall insulation, will have significantly longer payback periods, although where eligible for the Green Deal they will be available at no upfront cost to the consumer.

Finally, in order to ensure that there is a close link between EPCs and the Green Deal, we will use the EPC to signpost consumers to those energy efficiency improvements which qualify for Green Deal support. This will act as an additional prompt for people to take advantage of the Green Deal.

Overleaf we show examples of the old and new EPC.

Front page of the EPC before April 2012


Energy Performance Certificate


17 Any Street,
Any Town,
County,
YY3 5XX

Dwelling type: Detached house
Date of assessment: 02 February 2007
Date of certificate: [dd mmmm yyyy]
Reference number: 0000-0000-0000-0000-0000
Total floor area: 166 m²


This home's performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.

Energy Efficiency Rating

	Current	Potential
<i>Very energy efficient - lower running costs</i>		
(92-100) A		
(81-91) B		
(69-80) C		73
(55-68) D		
(39-54) E	37	
(21-38) F		
(1-20) G		
<i>Not energy efficient - higher running costs</i>		
England & Wales	EU Directive 2002/91/EC	

The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills will be.

Environmental Impact (CO₂) Rating

	Current	Potential
<i>Very environmentally friendly - lower CO₂ emissions</i>		
(92-100) A		
(81-91) B		
(69-80) C		69
(55-68) D		
(39-54) E		
(21-38) F	31	
(1-20) G		
<i>Not environmentally friendly - higher CO₂ emissions</i>		
England & Wales	EU Directive 2002/91/EC	


The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Estimated energy use, carbon dioxide (CO₂) emissions and fuel costs of this home

	Current	Potential
Energy Use	453 kWh/m ² per year	178 kWh/m ² per year
Carbon dioxide emissions	13 tonnes per year	4.9 tonnes per year
Lighting	£81 per year	£65 per year
Heating	£1173 per year	£457 per year
Hot water	£219 per year	£104 per year

Based on standardised assumptions about occupancy, heating patterns and geographical location, the above table provides an indication of how much it will cost to provide lighting, heating and hot water to this home. The fuel costs only take into account the cost of fuel and not any associated service, maintenance or safety inspection. This certificate has been provided for comparative purposes only and enables one home to be compared with another. Always check the date the certificate was issued, because fuel prices can increase over time and energy saving recommendations will evolve.

To see how this home can achieve its potential rating please see the recommended measures.



Remember to look for the energy saving recommended logo when buying energy-efficient products. It's a quick and easy way to identify the most energy-efficient products on the market.

For advice on how to take action and to find out about offers available to help make your home more energy efficient, call 0800 512 012 or visit www.energysavingtrust.org.uk/myhome

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Page 1 of 6

We will be removing this second graph from the front page of the EPC, as it had the potential to confuse consumers

We have simplified these messages, which many people found complex or simply ignored

Front page of the EPC after April 2012

Energy Performance Certificate

17 Any Street **Dwelling type:** Detached house **Reference number:** 0182-2077-9473-0601-9571
 District **Date of assessment:** 03 October 2012 **Type of assessment:** RdSAP, existing dwelling
 Any Town **Date of certificate:** 22 October 2012 **Total floor area:** 165 m²
 Y3 5XX

Use this document to:

- Compare current ratings of properties to see which properties are more energy efficient
- Find out how you can save energy and money by installing basic measures

Estimated energy bills for 3 years	£5,436
Over 3 years you could save	£2,715

Estimated fuel costs of this home

	Current costs	Potential costs	Potential future savings
Lighting	£243 over 3 years	£243 over 3 years	<div style="background-color: #4caf50; color: white; padding: 10px; width: 50px; margin: 0 auto;"> You could save £2,715 over 3 years </div>
Heating	£4,476 over 3 years	£2,166 over 3 years	
Hot water	£717 over 3 years	£312 over 3 years	
Totals	£5,436	£2,721	

These figures are estimates and are based on the standard energy bills that are the same for all homes. Energy bills include the costs of heating the home, heating water, and lighting and exclude costs of running appliances like TVs and cookers.

Energy Efficiency Rating

Very energy efficient - lower running costs	Current	Potential	<p>This graph shows the current energy efficiency of your home.</p> <p>The higher the rating the lower your bills are likely to be.</p> <p>The potential rating shows the effect of undertaking the recommendations on page XX.</p>
[92 plus] A			
(81-91) B			
(69-80) C		72	
(55-68) D			
(39-54) E	45		
(21-38) F			
Not energy efficient - higher running costs			

Top actions you can take to save money and make your home more efficient

Recommended measures	Typical cost	Typical savings over 3 years	Available with Green Deal
1 Add additional 80mm jacket to hot water cylinder	£25	£36	
2 Increase loft insulation to 270mm	£100 – £300	£219	✔
3 Install cavity wall insulation	£500	£840	✔

A green tick means this measure can be paid for by the Green Deal.

This home has not yet benefited from a Green Deal to make it warmer and cheaper to run. To find out more about how you can take up a Green Deal visit www.direct.gov.uk/greendeal

The savings of having an energy-efficient home will be made clearer

The new EPCs will highlight a small number of things which can be done to achieve savings – many of which will be eligible for the Green Deal and will incur no upfront cost

The implication of these changes to Energy Performance Certificates

Ultimately, we believe that the changes we will introduce to EPCs should start to change people's behaviours in two distinct ways:

- It should start to impact upon individuals' initial decisions whether or not to purchase or rent a property, and at what price, which should feed through to house and rental prices. An inefficient home will cost the homeowner or tenant more to heat, and the new EPCs will make this very clear. We know that this is already the case in the Netherlands, where homes with a green label sell at a premium of 3.6% relative to otherwise comparable homes.³⁵
- It should start to impact upon homeowners' propensity to put in place energy efficiency measures, in the knowledge that this will result in cost savings for them, and will arm them with information about how this can be done in a cost-effective way.

3. Government and businesses leading by example

Over the past year, the Government has taken a lead, not just in helping to create the environment in which others can reduce their carbon emissions, but in putting in place new measures which allow government departments to do the same.

This chapter is about what government departments have done to reduce their carbon emissions, and how we will be doing even more in the future. It is also about how we can work with other organisations to support their efforts to reduce their own emissions.

There are two areas that this chapter focuses on:

A **After a year of concerted action, we have delivered a step change in the drive to tackle the Government's own environmental impact and reduce our carbon emissions by 10% in 12 months. Government has significantly exceeded the 10% target. Never before has central government achieved this level of reduction in such a short space of time. We are now setting a new target of 25% by 2015.**

B **The excellent work done by many businesses, non-governmental organisations, public sector organisations and campaign groups in encouraging voluntary action on climate change. We now invite others to follow these leads and join us in making a public commitment to reducing their impact on the environment, as part of a new Responsibility Deal.**

A Reducing departments' emissions by 10% over one year and by 25% by 2015

To demonstrate the Government's commitment to reducing its own carbon emissions, the Prime Minister committed central government to cutting emissions from its office estate by 10% between 14 May 2010 and 13 May 2011. This is an ambitious and challenging target on government energy efficiency, covering 300,000 civil servants in 3,000 buildings.

Over this period, the Cabinet Office and DECC have led a programme of work which has introduced a wide range of changes to the way in which government departments manage their facilities and encourage changes of behaviour.

Many of these changes have involved very practical changes to building management – for example eliminating unnecessary or redundant external or internal lighting. Several of the changes have also drawn on behaviour change techniques, the most potent of which fall into two broad categories – changing defaults for lighting and heating, and encouraging behavioural change through social norms and competition.

Changing defaults in government department buildings

The behaviour change literature shows that individuals tend to 'go with the flow' of a pre-set option, whether we explicitly recognise it or not. The classic example of this is pensions – individuals are significantly more likely to enrol on a pension scheme if they are automatically put onto a scheme (with the option of opting out) when they begin their job.

The point is that defaults of this kind exert influence as individuals regularly accept whatever the default might be, even if that default has potentially significant consequences. Policy makers have a role to play here in thinking about whether the default option does not necessarily maximise the wellbeing of citizens – for example if the pension default results in some people having smaller pension pots than they would have had if the default were different.

Changing defaults in government departments was shown to be one of the most effective ways of reducing emissions in them. Examples of this included:

- changing the defaults around when heating and cooling systems were turned on and off through the identification of 'optimal core hours windows';
- aligning operating temperatures with best practice for the public sector, so that buildings are never over-heated or over-cooled (space should not be heated above 19°C or cooled below 24°C); and
- ensuring that buildings were shut down effectively during relatively quiet periods. Some departments did this between Christmas Day and the New Year bank holiday, which included minimising unnecessary lighting and heating.

Using social norms to encourage behaviour change

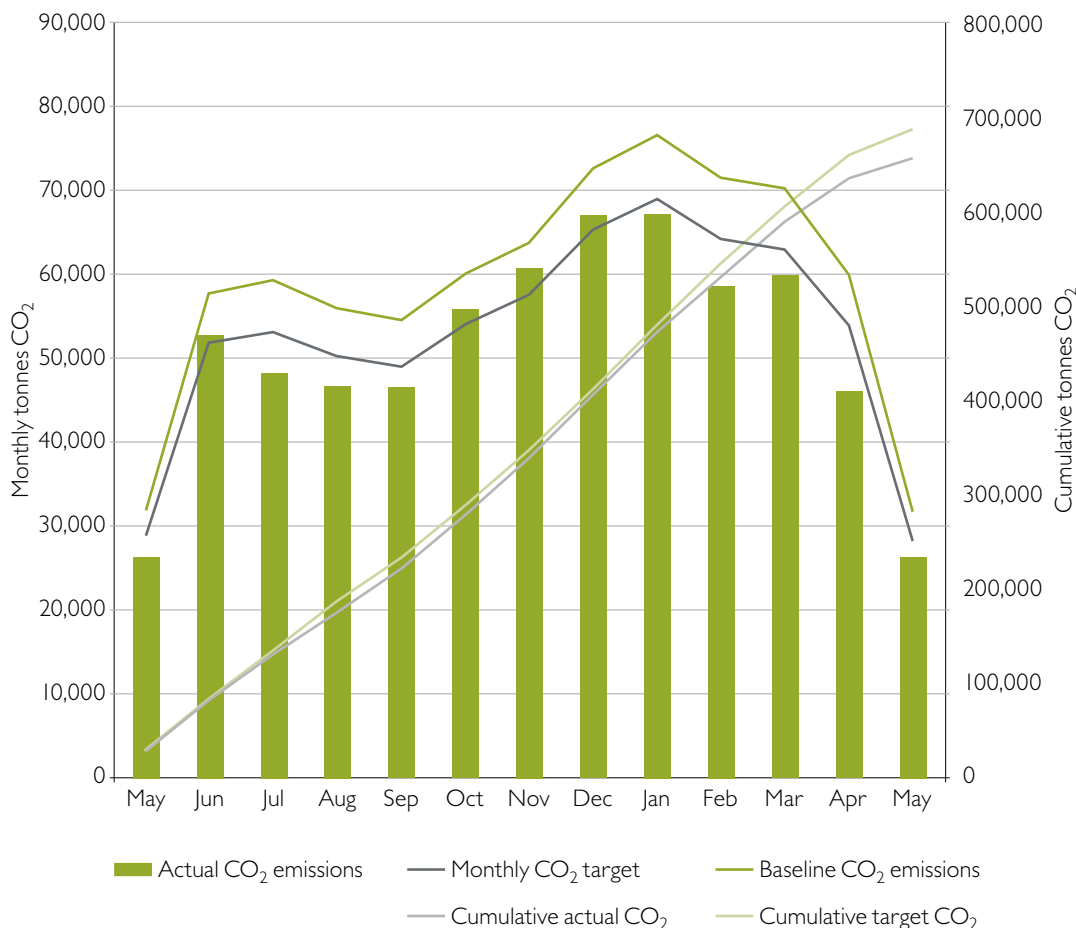
As explained above, social norms can be powerful motivators of behaviour change. The Cabinet Office and DECC drew upon this knowledge to encourage departments to take action.

Examples of ways in which social norms have been used to change behaviour include the following:

- Publishing monthly performance league tables showing progress towards the pan-government target. These were discussed by the Cabinet Secretary, Sir Gus O'Donnell, at his meetings with Permanent Secretaries. This introduced a competitive element to departmental performance and a strong incentive for departments to avoid the reputational loss of being seen to perform poorly on the Prime Minister's commitment.
- Real-time displays were installed in 19 Whitehall HQ buildings, feeding online reports of energy use. Again, this has helped to ensure that awareness of the programme has been maintained, while also giving departments much richer data about their ongoing performance.
- A competition was held in October 2010 to see which HQ building could save the most energy, relative to the previous month. Details of how the winning department achieved savings were circulated to departments to help to reinforce this behaviour as a social norm.

Achieving the 10% reduction in carbon emissions and next steps

After a year of concerted action, we have delivered a step change in the drive to tackle the Government's own environmental impact and reduce our carbon emissions by 10% in 12 months. Government has significantly exceeded the 10% target.



Government has risen to the 10% challenge; the next step will be ensure that the lessons learned in doing so are applied as widely as possible in moving forward. A new set of Greening Government Commitments was published in spring 2011, setting the framework for action on greenhouse gases, waste, water and sustainable procurement.

In addition, we are setting a new, even more challenging target to ensure that the the Government keeps bearing down on its own emissions. Building on the 10% target, we will seek to have reduced the emissions from the Government's estate by 25% by 2015.

B Working with others to achieve change

The Government has led the way on showing that it is possible to reduce emissions rapidly and cost effectively. We also recognise the excellent work done by many businesses, non-governmental organisations, public sector organisations and campaign groups in encouraging ambitious voluntary action on climate change. We now invite others to follow these leads and join us in making a public commitment to reducing their impact on the environment, as part of a new green Responsibility Deal.

This is part of a broader approach by the Government to establish new partnerships with businesses to achieve social objectives.³⁶ We will build on the approach of the Public Health Responsibility Deal; as in health, voluntary approaches complement rather than replace current government schemes.

This new Responsibility Deal invites businesses and other organisations to make public commitments to reduce energy use and emissions by a specific amount by a specific date in the future, with the long-term aim of becoming carbon neutral. Adopting the Government's 10% target is one route which Responsibility Deal partners may wish to take, but we recognise that different levels will be right for different organisations. Free support for business is available via the non-profit group 10:10 (1010uk.org).

Voluntary action must be led from the ground up, but the Government will help by putting in place a simple and trusted online mechanism for organisations to make transparent pledges on the environment against which they can be measured by customers, business partners and the public.

Some organisations will be able to go further than others, and we welcome those wishing to make broader commitments relating to other sustainability areas (such as recycling or water usage), to support staff and customers to take action or pledges to introduce more environmentally friendly products and services. The Government's Green Economy Council will make a set of pledges later in the year.

The Responsibility Deal will formally launch in the autumn, but we welcome all organisations that are willing to commit to reducing their emissions and impact on the environment.

Conclusion

This report illustrates some of the ways in which behavioural insights can be used to help reduce emissions and save people money. It also illustrates a key point that in many areas, although the behavioural insights literature gives us powerful clues about what blocks behaviour and what might work to make it easier and more appealing for people to change their consumption, we need to approach the issue with a degree of humility and pragmatic experimentation.

Ultimately much of the innovation going forward will flow from businesses, communities and the expression of consumer preference. So the other half of the story, and the Green Deal, is ensuring that the incentives on businesses – from energy companies to lenders – drive innovation towards energy efficiency and conservation for consumers.

References

1. Wilson, C. and Dowlatabadi, H. (2007). Models of decision making and residential energy use. *Annual Review of Environment and Resources*, 32: 169–203;
Jackson, T. (2005). *Motivating Sustainable Consumption: A review of evidence on consumer behaviour and behavioural change*. London: Policy Studies Institute.
2. Kollmuss, A. and Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behaviour? *Environmental Education Research*, 8(3): 239–60.
3. Loewenstein, G. and Thaler, R. (1989). Anomalies: intertemporal choice. *Journal of Economic Perspectives*, 3(4): 181–93.
4. Transue, M. and Felder, F.A. (2010). Comparison of energy efficiency incentive programs: rebates and white certificates. *Utilities Policy*, 18(2): 103–111.
5. Zeelenberg, M., Van Dijk, W.W., Manstead, A.S.R. and van der Pligt, J. (2000). On bad decisions and disconfirmed expectancies: the psychology of regret and disappointment. *Cognition and Emotion*, 14(4): 521–41.
6. Bond, R. and Smith, P.B. (1996). Culture and conformity: a meta-analysis of studies using Asch's (1952b, 1956) line judgment task. *Psychological Bulletin*, 119(1): 111–37;
Latané, B. (1981). The psychology of social impact. *American Psychologist*, 36(4): 343–56;
Zaki, J., Schirmer, J. and Mitchell, J.P. (2011). Social influence modulates the neural computation of value. *Psychological Science*, in press.
7. Christakis, N. and Fowler, J. (2009). *Connected: The surprising power of our social networks and how they shape our lives*. New York: Little, Brown & Co.
8. Moloney, S., Horne, R.E. and Fien, J. (2010). Transitioning to low carbon communities – from behaviour change to systemic change: lessons from Australia. *Energy Policy*, 38: 7614–23.
9. Darley, J.M., & Beniger, J.R. (1981). Diffusion of energy-conserving innovations. *Journal of Social Issues*, 37, 2, 150-171.
10. Fell, D., Austin, A., Kivinen, E. and Wilkins, C. (2009). *The diffusion of environmental behaviours: the role of influential individuals in social networks. Report 2: The evidence. A report to the Department for Environment, Food and Rural Affairs*. London: Brook Lyndhurst/Defra.
11. Heiskanen, E., Johnson, M., Robinson, S. et al. (2010). Low-carbon communities as a context for individual behaviour change. *Energy Policy*, 38: 7586–95.
12. Stern, P.C., Aronson, E., Darley, J.M. et al. (1986). The effectiveness of incentives for residential energy conservation. *Evaluation Review*, 10(2): 147–76.
13. Caird, S., Roy, R. and Herring, H. (2008). Improving the energy performance of UK households: results from surveys of consumer adoption and use of low- and zero carbon technologies. *Energy Efficiency*, 1(2): 149–66.
14. Johnson, E.J. and Goldstein, D.G. (2004). Defaults and donation decisions. *Transplantation*, 78: 1713–16.
15. Choi, J.J., Laibson, D., Madrian, B.C. and Metrick, A. (2004). For better or worse: default effects and 401(k) savings behavior, in Wise, D. (ed.) *Perspectives in the Economics of Aging*. Chicago: University of Chicago Press.
16. Pichert, D. and Katsikopoulos, K.V. (2008). Green defaults: information presentation and pro-environmental behaviour. *Journal of Environmental Psychology*, 28: 63–73.

17. Cabinet Office Behavioural Insights Team (2010). *Applying behavioural insight to health*. London: Cabinet Office.
18. Thaler, R. (1985) Mental accounting and consumer choice. *Marketing Science*, 4(3): 199–214.
19. Beatty, T., Blow, L., Crossley, T. and O'Dea, C. (2011). *Cash by Any Other Name? Evidence on Labelling from the UK Winter Fuel Payment*. London: Institute for Fiscal Studies.
20. Driver, J. (2010). A selective review of selective attention research from the past century. *British Journal of Psychology*, 92: 53–78.
21. Bamberg, S. (2006). Is residential relocation a good opportunity to change people's travel behavior? Results from a theory-driven intervention study. *Environment and Behavior*, 38(6): 820–40.
22. Constanzo, M., Archer, D., Aronson, E. and Pettigrew, T. (1986). Energy conservation behavior: the difficult path from information to action. *American Psychologist*, 41: 521–8.
23. Barr, S. (2005). The household energy gap: examining the divide between habitual and purchase-related conservation behaviours. *Energy Policy*, 33: 1425–44.
24. Steg, L. and Vlek, C. (2009). Encouraging pro-environmental behaviour: an integrative review and research agenda. *Journal of Environmental Psychology*, 29: 309–17; Maréchal, K. (2010). Not irrational but habitual: the importance of 'behavioural lock-in' in energy consumption. *Ecological Economics*, 69: 1104–14.
25. Abrahamse, W., Steg, L., Vlek, C. and Rothengatter, T. (2005). A review of intervention studies aimed at household energy conservation. *Journal of Environmental Psychology*, 25: 273–91.
26. DECC (2011). *Smart metering implementation programme: Response to Prospectus consultation*. London: DECC.
27. Erhardt-Martinez, K., Donnelly, K.A. and Laitner, J.A. (2010). *Advanced Metering Initiatives and Residential Feedback Programs: A meta-review for household energy-saving opportunities*. Report no. EI05. Washington, DC: American Council for an Energy-Efficient Economy.
28. Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7: 117–40.
29. Allcott, H. (2011). Social norms and energy conservation. *Journal of Public Economics*, in press; Ayers, I., Raseman, S. and Shih, A. (2009). *Evidence from two large field experiments that peer comparison feedback can reduce residential energy usage*. NBER Working Paper Series, Working Paper 15386; Cooney, K. (2011). *Evaluation Report: Opower SMUD Pilot, Year 2*. Navigant Consulting.
30. Schultz, P.W., Nolan, J.M., Cialdini, R.B. et al. (2007). The constructive, destructive, and reconstructive power of social norms. *Psychological Science*, 18: 429–34.
31. DECC (2011). *Research on Consumption Benchmarks on Energy Bills: A research study conducted by Ipsos MORI for the Department of Energy and Climate Change*. London: DECC.
32. Lainé, L. (2011). *Room for improvement: The impact of EPCs on consumer decision-making*. London: Consumer Focus.
33. Richman, W.L., Kiesler, S., Wiesband, S. and Drasgow, F. (1999). A meta-analytic study of computer-administered questionnaires, traditional questionnaires, and interviews. *Journal of Applied Psychology*, 84: 754–75.

34. Schultz, P.W. and Zelezny, L. (2003). Reframing environmental messages to be congruent with American values. *Research in Human Ecology*, 10: 126–36.
35. Brounen, D. and Kok, N. (2011). On the economics of energy labels in the housing market. *Journal of Environmental Economics and Management*, in press.
36. Department for Business, Innovation and Skills/Cabinet Office Behavioural Insights Team (2011). *Better Choices: Better Deals. Consumers Powering Growth*. London: BIS/Cabinet Office Behavioural Insights Team.



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