Boosting Energy IQ

UK energy efficiency policy for the workplace

Guy Newey
Edited by Simon Less

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Published by
Policy Exchange, Clutha House, 10 Storey's Gate, London SW1P 3AY
www.policyexchange.org.uk

ISBN: 978-1-907689-06-2

Printed by Heron, Dawson and Sawyer
Designed by SoapBox, www.soapboxcommunications.co.uk

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Acknowledgements

Policy Exchange would like to thank British Gas and Microsoft for the support which enabled us to undertake this project. We would also like to thank those who gave their opinions and expertise at various points throughout, including review comments from Dr Joanne Wade. In particular, we would like to thank the interviewees who provided invaluable insights into how energy efficiency decisions are made.

Executive Summary

"Energy efficiency has traditionally been the Cinderella at the energy policy ball."

Chris Huhne (2010)

"Insulation is sexy stuff. Here's what's sexy about it: saving money."

Barack Obama (2009)

Improving the energy efficiency of the UK's workplaces presents a tantalising opportunity to cut carbon emissions. It can also save money. Reducing energy use through conservation and improved efficiency often offers significantly cheaper carbon savings compared to alternatives such as increased renewable energy generation. However, UK policy has so far failed to unlock the full potential of energy efficiency in the workplace. This report examines why the non-domestic, non-energy intensive sectors (around 12% of UK emissions) appear to have neglected cost-saving energy efficiency opportunities. It explores how policy can improve the awareness and understanding of energy – the 'Energy IQ' – of the UK's commercial and public sector.

The report's recommendations aim to simplify the overlapping and sometimes confusing set of policies that affect decisions on energy efficiency. It suggests a framework that overcomes barriers to energy efficiency, reduces market distortions, increases transparency, and avoids imposing unnecessary burdens on organisations.

The report's principal findings are:

- The CRC Energy Efficiency Scheme, while having an impact, has become overly and unnecessarily complex, burdensome and unfair;
- Policy layering, including changes to the CRC in the Comprehensive Spending Review, means that effective carbon prices vary hugely and distortingly both across different sectors of the economy and between electricity and heating (in 2020 they will range from £10 to more than £100/tonne CO_2). As a result, the policy mix fails to harness the market's ability to identify the cheapest possible carbon reductions.

Following from this, the report's principal recommendations are:

- Scrap the CRC Energy Efficiency Scheme (CRC)
- Instead, deploy mandatory carbon reporting to a wide group of companies
- Flatten carbon taxation so that it is more consistent across different sectors

The findings in this report are based on in-depth interviews with 22 energy management professionals from 16 organisations, as well as a literature review and policy analysis. The interviews gleaned what helps and what hinders energy efficiency investments 'on the ground', and what influence the policy mix has on investment decisions.

What is blocking a greater take-up of energy efficiency?

The interviews showed that energy efficiency opportunities offer genuine cost, energy and carbon savings. They backed up substantial evidence showing that once organisations begin to focus on energy use, they often identify both immediate savings and investments that pay back quickly. The interviews showed that the price of energy was often crucial in pushing organisations to reduce energy use, as it made a 'narrow' cost-benefit assessment of a new investment more attractive. However, price alone was not always sufficient. Several other major obstacles also got in the way:

- The wider costs of energy management – measuring and monitoring energy use and identifying savings – can be significant. Partly as a result, many organisations hold very poor data on how much energy they use.
- Tapping the reputational benefits of being 'green' is not yet a strong driver (although there are tentative signs of a growing reputational market).
- Many senior managers in non-energy intensive firms have little understanding of energy consumption. As a result, they often neglect cost-saving opportunities.
- Misaligned incentives present a major obstacle to both understanding energy consumption and making energy efficiency investments. These can be between landlord and tenant, or more complex splits.
- There is evidence of apparently irrational behaviour in organisations' decisions on energy use, such as focusing on 'sexy' solar panels rather than mundane, but more cost-effective, energy efficiency improvements.

When these barriers are overcome, often when senior managers improve their understanding of energy (their 'Energy IQ') and focus on energy management, the interviews showed it can lead to significant energy and carbon reductions, as well as potential reputational benefits.

Current UK Policy on Energy Efficiency

The interviews and wider analysis explored how well current UK policy helps ease the barriers of pricing, reputation and information.

(i) Fragmented and divergent pattern of carbon pricing

The UK and the EU have created an overlapping jumble of climate-related policies, some of which are an expensive way of cutting emissions. The overall effect for non-domestic energy consumers is (a) to obscure current and future overall carbon prices, and (b) to distort the market's ability to identify the most efficient and cheapest carbon reductions.

The cumulative effect of the various policies is a pattern of carbon prices faced by energy consumers that varies hugely between (a) different sectors of the non-domestic economy (b) different types of organisations and (c) different fuels. This was exacerbated by the 2010 Comprehensive Spending Review's changes to the CRC, converting it into what is effectively a tax. This fiscally expedient move injected yet another partial carbon price into the economy. This is an unsatisfactory way to decide environmental policy.

Figure ES1: Effective carbon prices 2013 – current policy

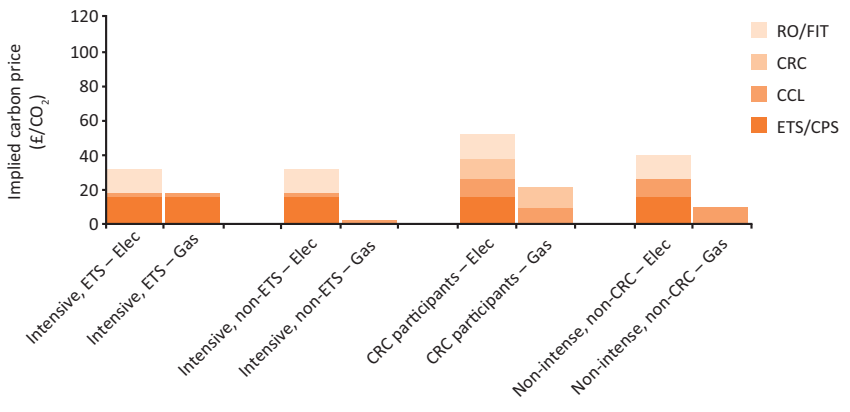


Figure ES2: Effective carbon prices 2020 – current policy

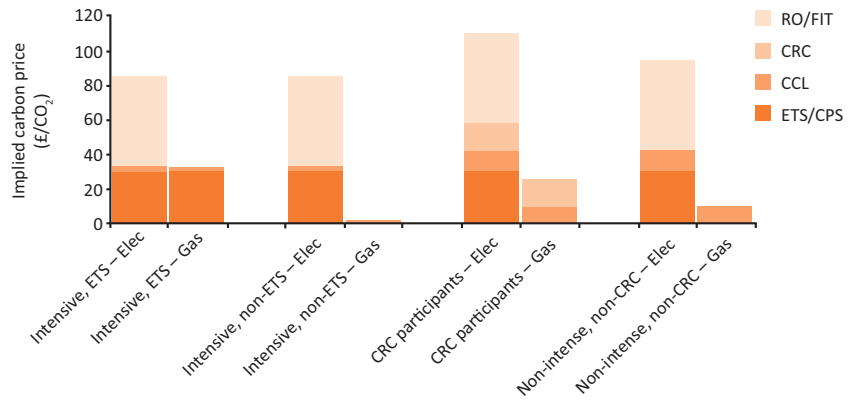
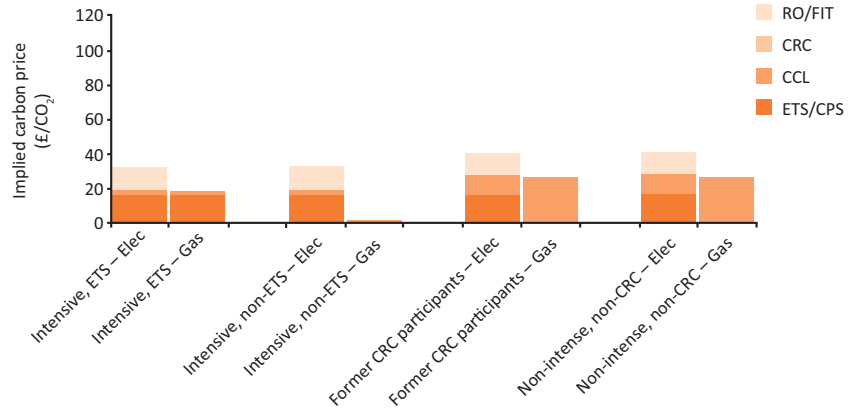


Figure ES3: Effective carbon prices 2013 – Policy Exchange proposal



Figures ES1 and ES2 collate the effective carbon prices faced by businesses and public sector energy consumers created by the layering of policies (including the Emissions Trading Scheme, Carbon Price Support, Climate Change Levy, Climate Change Agreements, Renewables Obligation, Feed-in-Tariffs and CRC) in 2013 and 2020. The charts highlight three major weaknesses with the current framework:

1. The wide range of effective carbon prices created by current climate policy. Such a confused pattern distorts efforts to cut energy demand. It has the perverse effect of making cuts in electricity use more attractive, even if cuts in gas use would be cheaper without any carbon pricing. This makes overall carbon reductions more expensive.
2. Current plans will make these discrepancies even more marked by 2020, when the effective carbon price on electricity for CRC participants will be more than £100/tonne CO_2. However, for gas-fired heating it will only be £26/tonne CO_2. Smaller, non-CRC, organisations will only be taxed at around £10/tonne CO_2 in 2020 for gas use.
3. The high cost of the Renewables Obligation (RO). By 2020, the RO will make up more than half of the cost of climate policies for businesses and public sector consumers (Policy Exchange's 2020 *Hindsight* calls for an overhaul of renewables policy).

While there may be valid reasons for some discrepancies in carbon pricing, for example to protect energy intensive firms, it is far from clear that such a wide range of distortions can be justified. The current policy mix creates a disincentive for firms to switch from gas to electricity use (such as in heating), even though this may lead to cheaper carbon reductions.

This report recommends flattening these distortions by scrapping the CRC and adjusting the Climate Change Levy (CCL) gas level to be more closely aligned with the carbon price of the Carbon Price Support. Although deciding the precise level of an adjusted CCL to ensure Treasury revenues are maintained is not possible here, we have provided an illustrative example of how the current jumbled carbon prices could be improved (see ES3). While some distortions remain (mostly as a result of the RO), our framework provides a much clearer price signal. And while the changes may increase the cost of energy, in particular gas, for some organisations, they will flatten the current unnecessary distortions, ensure government revenues are maintained and lead to cheaper overall carbon reductions.

(ii) A weak 'reputational market'

Harnessing organisations' desire for a 'green' reputation could complement a clearer pricing signal. Traditionally, the reputational benefits of reducing carbon emissions may have been undervalued, partly because it is difficult to prove actions are not simply 'greenwash'. The introduction of carbon and energy reporting and a league table under the CRC has begun to change this, by engaging senior managers in reducing energy use.

However, because of its considerable administrative burdens (see below), the CRC is confined only to companies using 6,000MWh of electricity per year,

narrowing the potential benefits of a 'reputational market' and improving organisations' information on energy use. In addition, the potential of comparisons may be undermined by how the league table has been designed, including whether it is useful and fair to compare different sectors with different energy intensities in a single table.

Moreover, existing voluntary standards have failed to drive enough carbon reporting. While 62% of FTSE all-share companies provide some emissions data, only 22% do so in line with government guidance. Useful and powerful comparisons are therefore difficult.

(iii) Administrative burdens

The interviews supported analysis that the CRC is a very complex, burdensome (and unpopular) scheme. Reporting rules (in particular trying to bring together separate organisations in a single entity), complicated guidelines over which emissions should be reported, and overlap with different policies have frustrated energy managers. In addition many participants lack the skills for permit auctions and a cap-and-trade scheme. The burdens of the scheme, reinforced by the switch to a tax, create an unfair competitive disadvantage for participants compared to non-CRC firms. Frustration was compounded by the constant tinkering with the policy's rules over the past few years.

The government has recently proposed another set of changes, including simplifying reporting rules and scrapping the cap-and-trade element of the scheme. These are to be welcomed and were highlighted in our pre-publication discussions with government. However, the scheme remains unfair to participants in comparison to non-CRC competitors. It has become simply a revenue-raising tool with a league table. Moreover, one of the league table's main purposes – to decide how recycling payments would be distributed – has become redundant.

The CRC's initial purpose – to make energy and carbon management a greater management priority – could be achieved much more simply and, crucially, more widely by the recommendations below.

Boosting the UK's Energy IQ

The following set of recommendations aims to improve the current mixture of policies by providing a simpler framework for incentivising and unlocking key barriers to energy efficiency. It aims to join up the different initiatives being pursued by five different government departments into a more coherent whole and provide greater certainty for businesses. The proposals are discussed in more detail in Chapter 8.

Policy recommendation 1: Scrap the CRC, in favour of much simpler and broader arrangements for (a) pricing carbon and (b) mandating carbon reporting.

While the CRC has driven action on energy efficiency, it is overly-complex, burdensome and unfair. While recent proposed changes are welcome, the scheme's aims – to make senior managers more aware of carbon and energy issues – could be achieved more efficiently by other measures, and could be more widely applied if not part of the CRC.

Policy recommendation 2: Simplify carbon pricing across the non-domestic sector. Flatten the carbon price distortions between different types of customer and different fuels, through abolition of the CRC and adjustment to CCL rates. A clear, more consistent carbon price would incentivise organisations and the market to identify the cheapest energy efficiency measures and emissions reductions. This report recommends scrapping the CRC 'tax' and adjusting CCL rates to flatten out the distortions between the different carbon prices for electricity and gas. Further adjustments to the CCL rates could then be made to ensure the Treasury's revenues remain stable following the loss of CRC revenue. The effect of this tentative proposal is shown in Figure ES3 and discussed in more detail in Chapter 8.

Policy recommendation 3: Ensure greater certainty about future carbon prices by placing the gas-based carbon prices on the same trajectory as electricity Carbon Price Support. Provide greater certainty through future contracts on carbon price. The Carbon Price Support introduced as part of the Electricity Market Reform gave a clear carbon price trajectory until 2020. This is likely to enhance the potential for a clear pricing signal to encourage a greater take-up of energy efficiency, but would be much more powerful a signal if the policy was backed by contracts and extended until 2030. A matching trajectory should be provided for gas, possibly using the CCL (and should help offset any rebound effects). Any additional revenue provided by the change to the CCL rate should be offset by reductions in other taxes, as the government committed to in the Coalition Agreement.

Policy recommendation 4: Introduce mandatory reporting for up to 24,000 large firms, as well as public sector organisations. Rather than centrally design a league table, the government should enable private and civil society organisations to use the data to produce comparisons, and accredit the most effective ones. Mandatory carbon reporting will ensure organisations accurately measure energy consumption, make energy and carbon use a greater management priority, and nurture a more powerful reputational market. It will achieve many of the aims of the CRC, while reducing its unnecessary complexity, allowing more organisations to participate.

Including up to 24,000 firms will present additional costs for businesses who do not currently report emissions. However, the evidence suggests these costs will be, on average, offset by reductions in energy use once energy management is a greater priority. This improved Energy IQ will likely ease some misaligned incentives, as energy use will be a more important part of negotiations over new buildings and energy contracts. Mandatory reporting remains cheaper than other carbon policies, such as support for the mass roll-out of renewable energy (see Figures ES1, ES2), which places a significant extra cost on electricity prices for businesses and the public sector.

While the league table has impact, it is flawed in design and may punish the reputation of firms that expand UK operations. The main reason for a single table, to allocate recycling payments, has been removed. Instead, the government should encourage more sophisticated and useful comparisons of organisations' carbon use to emerge from the private sector and civil society, based on appropriate intensity measures and metrics. Government could accredit the most useful comparisons, boosting their credibility.

Policy recommendation 5: Allow organisations to report purchased green energy at zero net emissions.
Allowing firms who purchase 'green' energy from suppliers to report this at zero net emissions could harness the potential of the market to drive investment in renewable energy. If this demand-side drive is significant, it may mean that future policy support for renewable energy can be reduced, cutting energy prices.

Policy recommendation 6: Reduce the scope of Climate Change Agreements.
Evidence suggests that CCAs have been a very weak driver of action on energy efficiency and have sometimes merely allowed businesses to avoid paying a tax while achieving business as usual improvements. Government should abolish those CCAs where there is no clear evidence that such a move would lead to the offshoring of sectors.

1 Introduction

One of the easiest and cheapest ways to reduce greenhouse gas emissions is simply to use less energy for the same economic output. However, policymakers have struggled to unlock the potential of energy efficiency in the UK. This is particularly the case outside the energy-intensive sectors.

A wide, overlapping range of government policy affects decisions by private firms and public sector organisations to act on energy efficiency. This includes energy taxation, product standards and building regulations. Since 2006, the government has been developing the CRC Energy Efficiency Scheme (CRC). The CRC targets large, non-energy intensive businesses and public sector bodies. It has gone through several overhauls in the past five years and is facing another review, even as firms and public sector bodies work to comply with the existing structure. The CRC has received considerable criticism for its complexity, uncertainty and its recent changes into what is effectively a tax.

Just before the publication of this report, the government proposed a series of changes to the scheme. DECC will formally consult on these from the start of 2012. While these changes are supported by the findings in this report (which Policy Exchange discussed with government officials leading up to publication), we do not believe they address the unfairness and carbon price distortions of the CRC scheme. Moreover, the full details of the proposals are yet to be made clear, creating continued uncertainty. Above all, it is still not clear that the initial aims of the CRC – raising awareness of energy use among senior managers – could not be achieved much more simply through other measures.

Many of the policy measures that affect energy efficiency are currently under review or changing. The cross-cutting nature of environmental policy means several of these reviews are taking place in different departments (DECC, Defra, DCLG, BIS, the Treasury). It is important that energy efficiency policy for the non-energy intensive sector is considered as a whole, and avoids confusing, contradictory and costly overlaps. With this in mind, this research aims to answer the following key questions:

- What is the potential for further cost-effective energy and carbon savings among large- and medium-sized, non-energy intensive firms, as well as in the public sector?
- Assuming there are significant benefits to organisations from greater energy efficiency, why has this 'low hanging fruit' not been seized? What barriers to energy efficiency exist?
- How well does existing policy address these barriers? Does it do so at the lowest economic cost?
- How could policy be improved to unlock further, cheaper carbon reductions?

This report focuses on large- and medium-sized organisations, where much of the potential for carbon savings exists. The research is based on a literature review of barriers to energy efficiency and independent assessments of existing policy. The author interviewed 22 energy managers, sustainability managers and energy consultants from 16 different organisations across a broad range of non-energy intensive sectors. The in-depth interviews tested the practical experience of how businesses and the public sector cut emissions, the impact of policy and what has prevented further action. Finally, the report suggests a revised policy framework to help businesses and the public sector seize energy efficiency opportunities at lowest costs.

2
Climate Change and Energy Efficiency

Climate change threatens to disrupt economic progress and cause severe damage to many of the world's ecosystems on which we depend.[1] Reducing greenhouse gas emissions from human activity, which are expected to cause future increases in global temperature, should be an international and domestic priority. The UK has set challenging carbon reduction targets. The 2008 Climate Change Act committed the UK to cut emissions by 80% by 2050 against a 1990 baseline. Achieving this, without unnecessarily damaging economic progress, is a huge challenge.

In addition, UK activity comes against the background of European targets on energy efficiency. In 2008, EU member states agreed to a goal of reducing energy consumption by 20% by 2020 compared to business as usual projections. However, unlike carbon reduction and renewable energy targets, this is not binding. Progress has been poor: it is currently expected the EU will achieve only an 11% reduction by 2020.[2]

Emissions

Since 1990, the UK has reduced its emissions by 27%.[3] In 2009, emissions were 566.3 $MtC0_2e$ (million tonnes of CO_2 equivalent).[4] Much of this reduction has been the result of switching from coal to gas as a source of electricity generation, a reduction in heavy industry, and in the last two years, a sharp recession. In addition, much of the UK's emissions have been offshored (Policy Exchange analysis shows that, on a consumption basis, UK emissions have actually increased by 30% since 1990).[5]

Emissions from the commercial, public and industry sectors account for around a third of the UK's greenhouse gas (GHG) emissions.[6] Of these, the public sector accounts for 3% of UK emissions and the commercial sector 9%. Analysis by the Committee on Climate Change says that public sector emissions have fallen by about 30% on 1990 levels, mainly due to changes in the energy mix. However, emissions from the sector have been broadly flat since 2002. Commercial sector emissions have been flat since 1990. In effect, the sharp drop in the carbon-intensity of electricity generation has been offset by greater consumption. The 2007 Energy White Paper found that without policy intervention, emissions from the commercial sector would rise by 17% between 2007 and 2025.[7] While large parts of the UK's economy are decarbonising, the commercial and public sectors are not. Reducing overall carbon emissions will be very difficult or impossible if these sectors do not play their part.

1 Intergovernmental Panel on Climate Change (2007) *Climate Change 2007 Synthesis Report*

2 Euractiv.com (2011) *Energy Efficiency: The EU's new action plan.*

3 DECC (2010) *2009 Final UK greenhouse gas emissions: data tables*

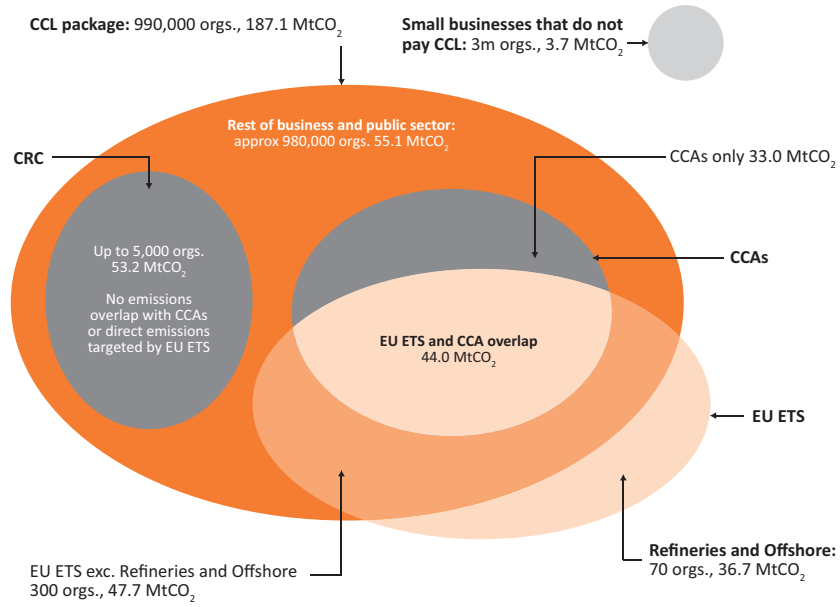
4 Ibid.

5 Brinkley, A (2010) *Carbon Omissions* Policy Exchange.

6 Committee on Climate Change (2010) *The CRC Energy Efficiency Scheme – advice to Government on the second phase* p7

7 BIS (2007) *Meeting the Energy Challenge: A white paper on energy*

Figure 2.1: Map of emissions in the private and public sector



DECC (2010) Final Impact Assessment on the order to Implement the CRC Energy Efficiency Scheme

Figure 2.1 shows which sectors of the non-domestic economy are responsible for the UK's emissions.

Potential for carbon and energy savings

Countless studies have identified significant opportunities for energy saving in both the private and public sector. These could deliver net financial savings for organisations. They also offer potentially cheap ways to decarbonise the economy. The IEA found unexploited energy efficiency could reduce global CO_2 emissions compared to business as usual by between 31% and 53% by 2020.[8] Sorrell et al's comprehensive review of the literature on energy efficiency found that investments in energy efficiency are generally paid back quickly through reduced energy bills.[9] In the UK, several studies have also highlighted the potential abatement:

- The Carbon Trust found there was 8.4MtCO_2 of 'cost-effective'[10] carbon abatement potential in the large, non-energy intensive sector (based on 13,200 firms).[11] If all these measures were taken up it could lead to an 18% cut in emissions from the sector by 2020. In the public sector, there was 2.9MtCO_2 of potential cost-effective reductions, leading to a potential 15% reduction in emissions from the sector.
- The Committee on Climate Change's 2010 report into the CRC saw even greater potential. It found there was potential abatement of 14.7MtCO_2 for large, non-energy intensive organisations within the CRC (around 5,000 organisations) by 2017, compared to a 2008 baseline.[12] The organisation's modelling said annual reductions of between 1.6% and 3.6% were possible in the sector, mostly through reduced use of electricity.

However, many organisations continue to ignore substantial savings in this area, even if they appear cost-effective.[13] There are a variety of reasons for this:

8 International Energy Agency (2006) *Energy Technology Perspectives* p.39

9 Sorrell, S, O'Malley, E, Schleich, J, Scott, S (2004) *The Economics of Energy Efficiency: Barriers to Cost Effective Investment*

10 Carbon Trust (2005) *UK Climate Change Programme: Potential Evolution for business and public sector.* The Carbon Trust said 'cost-effective' means a positive Net Present Value at 15% discount rate. This report generally uses the term 'cost-effective' to mean the investment has a positive net present value. If there is a more specific definition, we will highlight it.

11 Carbon Trust (2005) p14

12 Committee on Climate Change (2010) p.17. The vast majority of identified savings were at 'negative costs', or a positive net present value.

13 Stern, N (2007) *The Economics of Climate Change*. p.429.

- Potential abatement figures should be treated with caution. Sorrell et al found that bottom-up engineering models tended to exaggerate the potential for abating energy consumption. However, he stressed that, even with such a discount, the opportunities for savings were still considerable.[14]
- The 'rebound effect' (see Box 2.1) means that without well-designed and coherent overall policy (including, for example, an effective carbon pricing framework), it is likely a significant proportion of efficiency improvements will be offset by increased energy use.
- Various research has shown that other barriers to action are at least as important as investment costs in the non-energy intensive sector.
  - Energy costs represent a small proportion of these organisations' total expenditure, typically around 1-3%.[15]
  - Barriers such as **poor information, the cost of management time, misaligned incentives** (such as when the billpayer is not responsible for energy consumption) and **irrational behaviour** all work against greater action.

The existence of these barriers suggests the need to consider a range of possible government interventions. This is discussed in the next chapter. Potential interventions to overcome these barriers are discussed in Chapter 4.

Box 2.1: Rebound effect

The rebound effect occurs when the cost savings realised by improvements in energy efficiency are used to increase other energy-consuming activities. As a result, the overall level of energy saving is reduced. If the subsequent increase in energy use is even greater than that saved by the efficiency, it is called backfire.

This is not a new phenomenon. William Stanley Jevons found in 1865 that the invention of a more efficient coal-fired steam engine by James Watt had led to a vast overall increase in the use of coal across the economy.[16] Bottom-up engineering models that highlight the potential of energy efficiency tend to ignore or discount the rebound effect. Many models focus on a particular technology rather than how technological improvements interact with a firm's wider activities or the wider economy. How strong is the rebound effect and does it undermine the effectiveness of improved energy efficiencies in the sectors covered by this report?

Sorrell's review of the literature found that economy-wide rebound effects will be at least 10% and often higher.[17] But such effects will differ widely between different sectors of the economy. Direct rebound effects, where the effects are limited to a particular individual or factory, are likely to be smaller when energy is a small proportion of costs (such as in the sectors this paper considers). Sorrell stressed that, even accounting for the rebound effect, "many energy efficiency opportunities are highly cost-effective."[18] The Breakthrough Institute's review of the literature also concluded that rebound effects are "real and significant".[19] It argued that rebounds could erode more than half of the global efforts to use energy efficiency improvements to reduce carbon emissions, including household energy efficiency which is not the focus of this report.

Sorrell added that rebound effects may be mitigated by increasing carbon and energy pricing, so that the cost of energy remains constant even if improvements in efficiency are being made, and so retain pressure for continuing improvement. Policymakers should be mindful of the rebound effect when designing an overall coherent policy framework.

14 Sorrell et al (2005)

15 Carbon Trust (2005)

16 Jevons, W (1865) *The Coal Question*

17 Sorrel, S (2007) *The Rebound Effect: an assessment of the evidence for economy-wide energy savings from improved energy efficiency*, UKERC Review of evidence for the rebound effect, UK Energy Research Centre

18 Ibid. p.ix

19 Jenkins, J, Nordhaus, T, Shellenberger, M (2011) *Energy Emergence: Rebound & Bakcfire as Emergent Phenomena*. Breakthrough Institute. p.4

3

Barriers to and Drivers for Greater Action on Energy Efficiency

Summary

- The low take-up of cost-beneficial energy efficiency measures suggests that price is not the only factor affecting decisions on energy efficiency.
- Wider factors, such as the costs of measuring energy use and energy management staff, and comparing new products add significantly to the cost of energy efficiency.
- A lack of information about an organisation's energy use and new technologies are major barriers to greater action.
- Misaligned incentives limit organisations' ability to act on energy efficiency.
- There is evidence of irrational organisational behaviour in decisions over energy efficiency. There is a wide range of behavioural phenomena that may undermine action on energy efficiency.

If, as many studies suggest, there is such significant potential for cost-saving energy efficiency measures in the public and private sector, why has this 'low hanging fruit' not been plucked more enthusiastically? Every organisation has different reasons for neglecting or acting on energy efficiency opportunities. However, available evidence suggests some overarching categories of barriers and drivers. In its 2005 study, the Carbon Trust identified the major barriers to and drivers for improved energy efficiency in businesses and the public sector (see Table 3.1).

Table 3.1: Barriers to and drivers for energy efficiency uptake[20]

Barrier	Driver	Classical economic
Investment costs	Estimated value of energy savings	↕
Expanded cost-benefit	Intangible benefits e.g. corporate social responsibility, customer pressure	
Split incentives	Savings from third party energy management	
Ignorance, inertia, lack of interest (behavioural barriers)	Awareness and motivation	Behavioural

20 Adapted from Carbon Trust (2005)

These categories include traditional economic factors such as the investment costs (and estimated savings) of installing more efficient equipment, but also wider behavioural and organisational barriers. These factors are broadly consistent with those identified in other studies and provide a useful framework for discussion. The main factors are considered below.

1. Investment costs

When an organisation is considering any investment, it will ask two questions. Firstly, does the investment offer a financial benefit? A conventional economic approach will weigh the costs and benefits of the investment, and ascertain over what period it is likely to be paid back (if at all). Secondly, if there are constraints on the amount of capital available to an organisation, how does the investment compare to other opportunities? A rational organisation will rank the investments based on which provide the greatest net present benefit compared to the costs. It will then choose the highest ranked projects to invest in.

> "Without a thorough understanding of energy consumption, an organisation's ability to make informed, rational decisions about a particular energy efficiency investment is severely hampered"

Often energy efficiency investment decisions will be made on a narrow cost-benefit analysis, which assesses the costs of a particular new technology, for example a programme to switch a building's lighting to energy efficient bulbs. Managers then compare the cost with the potential savings through reduced energy bills. The investment is then ranked against other opportunities, such as investments to increase production. If the price of energy increases, through wholesale prices or increased taxation, it will increase the potential savings from reducing consumption. Energy efficiency projects should therefore become more attractive. Equally, if the cost of a particular technology drops, it will also increase the attractiveness of investing in it.

However, the literature is clear that significant opportunities for cost-beneficial investments in energy efficiency remain untapped in both the commercial and the public sector. Studies show that these investments often compare favourably with other business opportunities.[21] Stern argues "it is difficult to explain the low take up of energy efficiency as purely a rational response to investment under uncertainty".[22] He, and others, argue that other barriers, such as a wider set of costs, market failures and irrational decision-making are also undermining investments in energy efficiency.

2. Expanded cost-benefit

Narrow cost-benefit analysis considers the return on a specific investment or piece of new equipment. However, it may not include wider costs associated with an energy efficiency investment decision.

Cost of information

The literature pinpoints a lack of knowledge about energy consumption as a major barrier to energy efficiency improvements in non-energy intensive sectors. Stern says that while "there are information difficulties in many or most markets,

21 Carbon Trust (2005) and Green Monday (2011) *The £25bn investment opportunity – through the lens of a MAC curve*

22 Stern, N (2007) p.429

they may be particularly powerful in relation to energy efficiency measures".[23] Joskow and Marron found that many studies underestimate the full cost of action to improve energy efficiency, including the cost of establishing baseline energy consumption.[24] Quantifying such costs can be difficult and will differ between organisations. Hein and Blok found that they may represent 3-8% of total investment costs.[25] In an empirical study of 48 different public and private institutions, Sorrell et al argued that 'hidden' costs associated with gathering information and energy management presented the most significant barrier to action on energy efficiency.[26] Overcoming this lack of information presents two major costs:

1. *Cost of energy management*. Setting up and managing effective energy monitoring systems are a cost to a business. This may include costs of finding and hiring energy management staff, commissioning consultants, installing meters and building management systems, as well as the cost of senior management time for decision-making. All of these steps have real impacts on an organisation's ability to improve energy management. Without a thorough understanding of energy consumption, an organisation's ability to make informed, rational decisions about a particular energy efficiency investment is severely hampered.[27] While many large firms and public sector organisations will have dedicated energy managers, their role may be simply to maintain energy supplies (pay bills, ensure equipment is working) rather than actively manage energy consumption. This shortage of skills can be compounded if energy management is a shared responsibility, rather than the sole responsibility of one employee. As a result, it can be neglected.

2. *Cost of gathering information on energy efficiency opportunities.* Even if an organisation's energy use is well understood, seeking adequate information about opportunities, technologies and risks also has a cost. Comparing products, time taken negotiating with contractors, legal advice and the opportunity cost of management time all increase costs. In addition, there is often a perception that any new energy efficient equipment may not perform as well as the traditional alternatives. This technology risk could include worries about increased noise, lower reliability or quality. This lack of information about, and thus confidence in, new technology may result in its potential benefits being unnecessarily discounted.[28]

Production interruption

Installing new equipment can interrupt an organisation's operations, resulting in reduced production or revenue. This means energy efficiency may only be considered as part of a wider refurbishment. Sorrell et al found concerns about production interruptions were not a major factor in decisions over energy efficiency.

Intangible or hidden benefits

As well as the wider costs discussed above, the literature identifies wider benefits from energy efficiency investment beyond the potential financial savings from reduced consumption. Again, these factors may sit outside narrow cost-benefit analyses. One key driver is reputational benefits of being perceived as 'green'. Some customers and investors place a value on pro-environmental actions.

23 Ibid. p.430

24 Joskow, P and Marron, D (1992) *What does a negawatt really cost? Evidence from utility Evidence from utility conservation programs* The Energy Journal 13 pp41-74

25 Hein, L and Blok, K (1994) Transaction costs of energy efficiency improvement' Proceedings. European Council for an Energy-Efficient Economy.

26 Sorrell et al (2005)

27 Stern, N (2007)

28 Sorrell et al (2005)

Reducing carbon emissions is therefore one area where organisations may gain a potential reputational – and thus competitive – advantage. This may be particularly important for consumer-facing organisations, such as supermarkets and hotel chains (there is also evidence that large organisations are driving this reputational concern down their supply chain (see Chapter 6)). In effect, a new market in 'green reputation' is developing. However, 'greenness' can be hard for customers and investors to test thoroughly. It risks being faked, or 'greenwashed', damaging the development of this reputational market.

Other intangible benefits include:

- Engaging staff in energy reductions, both through changing behaviour and identifying energy saving opportunities. This may improve morale and boost loyalty.
- The technology or practices an organisation implements could lead to further business opportunities. In effect, the process could be a part of an innovation strategy.

3. Misaligned/split incentives

Differing incentives for those who consume energy in an organisation and those who pay for that consumption can block action on energy efficiency. When this happens, the full benefits or costs of energy efficiencies are misaligned between the parties who are responsible for decisions about how an organisation uses energy. This barrier is well established in the literature.[29] Such misaligned incentives can be *internal* or *external* to an organisation. Within an organisation, it may be that equipment purchasers are not judged on the energy efficiency of the products they buy, or are unaware of the cost to the organisation of their buying decisions. Or it may be that a large organisation with several sites does not correctly transfer the responsibility (including the financial cost) for energy use to the workers who consume the energy. As a result, it is more likely that energy is wasted. Such *internal* misaligned incentives are likely to be a manifestation of a lack of organisational focus on energy efficiency rather than a cause of it.

A misaligned, or 'split', incentive may also fall between an organisation and an external body. The most common example of this is the landlord-tenant split. If the energy billing rests with the landlord, the tenant lacks a financial incentive to change the behaviour of people who consume energy or the efficiency of plug-in technologies. Conversely, if billing rests with the tenant, the landlord may be less likely to invest in technologies to save energy, such as new boilers. This split is further complicated if there are separate landlords, tenants and facilities management firms, who are each partly, but not wholly, responsible for energy management. Analysis of non-energy intensive organisations found that the landlord-tenant split was a major obstacle to reductions in energy use.[30]

4. Behavioural barriers and drivers

In addition to the more traditional economic barriers, the literature has established behavioural factors that can also undermine the case for energy efficiency. A traditional economic (and policy) approach has focused on the idea of an organisation or an individual acting rationally. In this argument, the actor

29 See Sorrell et al (2005), Stern, N (2007) Carbon Trust (2050), Committee on Climate Change (2010)

30 Defra (2006) *Options for the Implementation of a New Mandatory UK Emissions Trading Scheme*. NERA Economics Consulating & Enviros p.44

will make an effort to change a particular behaviour if they consider such a move is in their (or the firm's) best interests. However, in recent years behavioural economics has established that some decisions do not appear to be in the individual's or firm's rational self-interest. Often, they act in a seemingly irrational way. In particular, behavioural economics argues that the context in which a decision is taken, including what people perceive as 'normal behaviour', is a crucial factor in decision-making. Such behavioural factors may play a considerable role in relation to energy efficiency decisions.[31] Behavioural barriers overlap and reinforce the other barriers discussed above.

Behavioural economics

The literature on behavioural economics is very broad, and includes work by social psychologists and anthropologists. The joint Institute for Government and Cabinet Office document, *MINDSPACE: Influencing behaviour through public policy*, has brought together the strands of behavioural understanding into a coherent model.[32] It identifies nine factors in decision-making that contradict a purely rational view of individual action. A full discussion of each effect is beyond the scope of this report. However, MINDSPACE provides a useful framework to discuss how irrational behaviour affects energy efficiency decisions. It is worth stressing that behavioural economics is not an alternative to the concept of a rational-thinking actor. Behavioural researchers maintain that price and information remain the dominant factors in behaviour.[33] However, behavioural economics provides a fuller explanation of human behaviour and can enhance, rather than replace, conventional policy instruments. Box 3.1 discusses the nature of behavioural effects in more detail, as they relate to action on energy efficiency.

Box 3.1: How behavioural effects may relate to energy efficiency

1. **Messenger.** The likelihood of us acting on information depends on who has delivered that information. If we see the individual as trustworthy and reliable, we are more likely to act, even if the information is the same as that delivered by someone else we trust less. This suggests the importance of senior level leadership in driving action on energy efficiency in an organisation (if such figures are seen as a reliable authority). It also underlines the need for trustworthy sources of information on a particular technology.
2. **Incentives**. While incentives have long been recognised as a driver of behaviour, the strength of an individual's response is qualified by some irrational factors:

    - *We prefer smaller, more immediate payoffs to larger, more distant ones.* This could limit an organisation's ability to make investments in technology or processes, even if the long-term returns are greater than an alternative, but shorter-term investment costs.
    - *We allocate money to different mental budgets, and are reluctant to move money between them.* If an organisation is inflexible in budgeting, this rigid allocation bias could prevent sensible investments in energy efficiency. If energy is dismissed as a minor expenditure item, organisations may be over-reluctant to make even high return investments.

31 See Stern, N (2007) and Sorrel et al (2005)

32 Dolan, P, Hallsworth, M, Halpern, D, King, D, Vlaev, I (2010) *MINDSPACE: Influencing behaviour through public policy.* Institute of Government & Cabinet Office

33 Stern, P (1992) *What Psychology Knows About Energy Conservation*. American Psychologist.

3. **Norms.** Our behaviour tends to be moderated by what others do. If we think a course of behaviour is 'normal', we are more likely to take part in it. The market can reinforce this. Action on energy efficiency by one firm may lead to action by its competitors if the rival has gained a competitive advantage. Equally, a lack of action by a sector may reinforce a mindset that carbon reduction is someone else's problem.
4. **Defaults.** When faced with complex or uncertain decisions people prefer decisions with certain, familiar outcomes.[34] This is the case even if it is not the most cost-effective or 'rational' option. As a result, organisations may over-discount the potential of an unfamiliar, efficient piece of technology, preferring a familiar, though inefficient alternative. Defaults also influence habitual energy behaviours, such as always turning on the heating. Equally, ingrained habits may exist at an organisational level. Senior managers' expertise will often relate to production or sales, rather than energy. The organisational default may be to unthinkingly pay energy bills rather than manage use. Research shows an irrational bias towards the default, or no-action, option. However, structuring choices to favour a more 'rational' outcome (without ruling out the alternatives) can change outcomes without limiting choices. This is a 'nudge'.[35]
5. **Salience.** People are more likely to react to new, accessible and simple messages. Making it as easy as possible for people to understand the implications of their energy choices, be it the technology they purchase or the behaviour they adopt, makes it more likely that they will make a particular choice.
6. **Commitment.** People unnecessarily delay making long-term decisions even though such decisions might be in their interests. To counter this, research indicates that if you make a public promise to act in a certain way, you are more likely to achieve that promise (even though the incentives are unchanged). Securing public declarations of carbon reductions are therefore likely to have an effect on the behaviour of an organisation, even if the underlying rationale for action is unchanged.
7. **Ego.** Research has found that people act in ways that make them feel better about themselves. This has important resonances with environmental actions. If we feel that such a move is a 'good' thing, then we are more likely to do it (and vice-versa). Our social context helps drive what we consider 'good'. In addition, psychologists argue that when behaviour and self-belief are in conflict it is discomforting (cognitive dissonance). In this situation beliefs tend to get changed rather than behaviours. So, by taking part in pro-environmental actions, you are more likely to develop pro-environmental beliefs. "This challenges the common belief that we should first seek to change attitudes in order to change behaviour".[36]

MINDSPACE also identifies **priming**, where acts are influenced by sub-conscious clues, and **affect**, where emotional associations shape our actions, as drivers of apparently irrational behaviour. These appear less relevant to decisions on energy efficiency.

34 Kahneman, D, and Tverskey, A (1992) *Advances in prospect theory: cumulative representation of uncertainty.* Journal of Risk and Uncertainty 5 (4) pp297-323.

35 Thaler, R and Sunstein, C (2008) *Nudge: Improving decisions about health, wealth and happiness*

36 Dolan et al (2010) p.28

Overall, which barriers to the greater uptake of energy efficiency are the most important? Of course, for each organisation the barriers will vary in importance. In addition, the literature argues that the barriers reinforce each other. As a result, energy efficiency opportunities are undervalued compared to other investments of the same magnitude.[37] The literature argues that it is difficult to disentangle the barriers. It calls for a sophisticated, multi-faceted approach. In effect, any policy mixture needs to address all the barriers, squeezing organisations towards energy efficiency. This leads to the question of what instruments can policymakers employ as part of a coherent overall policy approach to increasing the uptake of energy efficiency?

37 Sorrell et al (2005)

4

Policy Instruments to Overcome Barriers to Energy Efficiency

This section considers a range of policy instruments to overcome the barriers identified in Chapter 3.

Pricing

If firms and public sector bodies were simply acting rationally (and there were no other market failures), appropriate pricing of carbon ought to be a sufficient tool for driving action on energy efficiency. When faced with higher prices, organisations choose whether to pay the increased price or take measures to improve energy efficiency, depending on whether they consider the cost of abatement is greater or less than potential savings. Stern, many other economists and Policy Exchange[38] argue that such market-based approaches are the most efficient way of ensuring carbon reductions.

Research shows there already appears to be a large potential pool of energy efficiency investments that would provide a net benefit to organisations, even without a higher carbon price. However, there is every reason to incentivise energy efficiency beyond that level if such a move delivers emission reductions more cheaply than alternatives currently being favoured, such as offshore wind generation. Work on carbon abatement curves suggest there is an additional large pool of energy efficiency investments that offer such alternatives.[39] The main pricing instruments are outlined in Box 4.1.

Box 4.1: Options for pricing policy instruments

Taxation. Taxation that increases the price of energy (or more appropriately carbon) incentivises a reduction in consumption. Taxation can provide a visible and potentially stable carbon price. Organisations have a number to plug into investment appraisals. Establishing the appropriate price depends on estimating the social and environmental cost of carbon, as well as relevant carbon reduction objectives. However, the outcomes from increased taxation are uncertain, as it is not clear precisely how many savings a given level of tax would lead to. If hitting a precise quantity of emissions reductions is not critical, then taxation enables the government to define the costs it is willing for the economy to bear to achieve reductions. Carbon tax rates can also be adjusted, though a degree of long-term certainty can help organisations plan investments. The

38 Less, S (2010) *Re-Monopolising Power: 10 Principles for electricity market reform* Policy Exchange

39 Carbon Trust (2008) *Building the Future, Today*

Green Fiscal Commission said that the evidence was "overwhelming" that environmental taxes are an effective way of reducing environmental impacts.[40]

Carbon permitting (cap and trade). The government can also price carbon by limiting the amount of carbon consumed by a particular sector. One option is to sell a limited, and reducing, quantity of carbon permits, which can then be traded. This allows the market to determine the price for achieving emissions reductions. Capping emissions also provides greater certainty that precise environmental outcomes will be achieved. Additionally, businesses pay a carbon price no higher than is needed to achieve those aims. However, the future price is consequently subject to a greater degree of uncertainty. In practice, permitting schemes have been complex to administer and to take part in, and decisions about where to set the cap open to rent-seeking.

Subsidies. Reducing the cost of investments in energy efficiency technologies makes them more attractive. Subsidies could work by cutting taxation on approved products, subsidising their retail price, or offering low-cost loans for energy efficiency projects, reducing the cost of capital. The cost of these measures is borne by another party, often energy consumers or general taxpayers. As with taxation, it can be difficult to set the optimal level of subsidy. More importantly, subsidies require the government to decide the relative desirability of particular technologies. It will generally be much more efficient to allow organisations, energy managers and the market to find the best approaches, subject to a neutral carbon price. Stern argues that it is preferable for governments to tax externalities rather than subsidise desired outcomes.[41]

Pricing instruments not only target the narrow investment cost barriers of energy investment, but also other barriers discussed in Chapter 3. They may help overcome the wider costs associated with energy efficiency investments, as the potential return from gathering accurate information and discovering where money could be saved increases. Pricing policies may also engender a social norm that reducing energy use is the 'normal' or 'right' thing to do.

The literature argues that price is not the only important tool in decisions on energy efficiency. It may not be the most efficient tool where behavioural barriers and market failures are important. So when might other interventions be more effective?

Potential justifications for interventions beyond pricing

Government can use various kinds of regulation to address market failures or irrational behaviours, if this can be justified as necessary. What justifications are there for regulatory interventions in relation to organisations' energy efficiency?

1. *Co-ordination of information.* As considered in Chapter 3, firms can find it difficult and costly to find out which new products are the most energy efficient, reliable, etc. It could be efficient to pool this effort. There is a theoretical role for government in enabling or undertaking this co-ordination. This may include accrediting energy efficiency products or service providers (e.g.

40 Green Fiscal Commission (2010) *The Case for Green Fiscal Reform*. p.19

41 Stern, N (2007)

through labelling), providing a trusted source of advice, or, most drastically, banning the most inefficient products from the market. Such measures may be justified if the cost of government action was less than the total cost to organisations in the market of finding out the information themselves. However, companies and public sector procurement officers regularly make purchase decisions in the face of uncertainty. Energy consumption purchases are no different. Markets are generally adept at finding ways to effectively fulfil the needs of customers, in this case energy buyers. Government should, therefore, be careful to ensure that, on a case by case basis, particular interventions of these kinds are necessary and desirable.

2. *Irrationality.* Government regulation may be justified if there was sufficient evidence that organisations were acting irrationally. It seems likely that, partly as the result of norms and defaults, energy management in non energy-intensive organisations has been neglected. Policymakers should be cautious about deciding which behaviour is irrational. The interviews section of this report, Chapters 6 and 7, considers this in more detail.
3. *Co-ordination to enable development of a 'reputational market'.* Chapter 3 discussed the development of a new market in 'green reputation' as a potential driver of energy efficiency. In order for such a market to flourish, customers and investors need better information and need to be able to trust or verify organisations' claims and properly compare them against competitors. If this is not straightforward, the reputational advantages of cutting carbon may be unfairly undervalued. Government could have a role in helping ensure green claims are credible and comparable. One approach could be to set common standards of reporting and require firms to publically report carbon use. This would allow the private sector or civil society to identify useful and innovative ways of comparing energy use between organisations, using different intensity measures (such as carbon per unit of turnover).
4. *Misaligned incentives.* Split incentives may, in theory, be dealt with through negotiation between relevant parties. However, if the costs of undertaking negotiations individually are too high compared to the expected benefits, regulation may be required.

Potential options for regulatory interventions

Mandatory carbon or energy reporting

The aim of this intervention would be to ensure organisations invested in understanding their own energy use, as well as informing customers, investors and competitors about their carbon consumption on a verified and comparable basis.

The government is consulting on whether to require organisations to publicly report energy and/or carbon data. Stern found that providing accurate and timely information encourages investment in energy efficiency and organisations to adopt energy-saving behaviours.[42] Defra's proposals are discussed in more detail in Chapters 5 and 7.

While such an intervention would increase costs for organisations, it may be justified:

42 Stern, N (2007) p.439

- By making organisations measure emissions, it removes choice about whether to incur the costs of understanding energy use. This may make it more likely that energy efficiency measures will be taken up. On its own, this does not justify intervention.
- Some irrationality in organisations' decision-making (see justification 2, above, and Chapter 6) blunts the effect of pricing tools and improves the case for requiring firms to measure their energy use. In particular, this intervention may encourage senior level engagement.
- It strengthens the development of a reputational market (as discussed in justification 3 above). By providing credible, comparable and publicly-available data, organisations can more easily demonstrate that they are more carbon-efficient than competitors. This information could be used to compare performance, for example, in league tables.
- It allows investors to better understand how exposed an organisation is to future rises in carbon prices. Defra identified this as a key driver for voluntary GHG reporting.[43]

Minimum product standards

Establishing minimum standards for energy consumption removes energy inefficient products from the market. Such standards can apply to any products, from white goods to buildings. The aim of this regulation would be to reduce the search costs for more energy efficient solutions (as discussed in justification 1 above).

Such measures may be justified as a simple way of improving the energy efficiency of a particular good. In addition, tightening standards can incentivise innovation. In Japan, the Top Runner programme sets mandated standards based on the most efficient products, including domestic appliances, heaters and vehicles. In effect, the wider industry is forced to keep up with the market leaders. Such an approach can create a 'virtuous cycle of improvement'.[44]

> "Customers and investors need better information and need to be able to trust or verify organisations' claims and properly compare them against competitors. If this is not straightforward, the reputational advantages of cutting carbon may be unfairly undervalued"

However, there are risks that this approach substantially increases costs. It also requires decisions about appropriate regulatory requirements on, and rate of innovation in, individual technologies, on which policymakers may not have full information. Policymakers should be cautious about banning specific products, rather than allowing markets to respond to appropriate incentives, without careful analysis.

Labelling

An alternative to outright banning of products is provision of improved information on the energy consumption of a product or service. One common approach is through mandating that a product's energy efficiency is clearly displayed to buyers in a consistent format. This helps ensure energy consumption is part of the decision on whether to buy a piece of technology. It may also change the default bias, increasing the chances that efficient measures are taken up. By not banning a product it avoids limiting trade and the associated opportunity costs.

43 Defra (2010) *The contribution that reporting of greenhouse gas emissions makes to the UK meeting its climate change objectives*

44 Pielke, R (2011) *Let there be more efficiency light.* New York Times

Government-approved lists of particular pieces of technology may achieve a similar effect (which may be reinforced by tax relief on the products).

Advice

Low-cost advice on energy efficiency is another way for government intervention to reduce the search costs for information, reducing uncertainty about which products are the most energy efficient and reliable.[45] Sharing best practice can also create a social norm around energy efficiency improvements. However, a government-backed approach could risk undermining private sector provision of such energy advice.

Ringfenced loans

The aim of ringfenced loans would be to overcome any 'irrational' organisational barriers to funding energy efficiency investments. The literature suggests that some organisations fail to act on energy efficiency because managers irrationally consider it a low priority.[46] As a result, it is less likely to attract capital even if it is more attractive than other investment options. One policy option is to provide loans that are only available for energy efficiency projects. This counters the irrational default that energy efficiency is a low priority. It also helps organisations that struggle to access private sources of capital, a particular problem for small firms.[47] In addition, if the loans are subsidised, it may make energy efficiency projects cheaper. Again, government should be cautious about providing finance for a specific market, and must only act if it has sufficient evidence that the existing market is failing.

Negotiation of targets for energy performance

Government can negotiate specific energy efficiency targets with a particular sector. There could then be penalties if firms failed to meet such targets. Such an approach forces organisations to measure consumption and requires public commitments about energy reductions. Behavioural research suggests that this makes it more likely to be achieved. In addition, any fine for missing targets imposes an additional price risk. However, such an approach has risks, as it is hard for government to understand a sector or a firm's potential for energy abatement better than the sector itself. This asymmetry disadvantages government in negotiation and may lead to weak targets.

Central government and public sector leadership

Stern argues that the public sector has a crucial role in improvements in energy efficiency.[48] Firstly, there is significant potential for savings within the sector. Secondly, as a major consumer of energy, the sector can drive the market in energy efficiency products and technologies. Thirdly, it can help create a strong social norm where energy efficiency is seen as a national priority and the 'right' thing to do. This may help overcome a lack of interest among some industries, particularly non-consumer-facing ones, in energy consumption.

Summary of policy options

Table 4.1 summarises the options for policymakers trying to address a lack of action on energy efficiency. As discussed, many policy options address several different barriers.

45 Stern, N (2007)

46 Carbon Trust (2005)

47 Stern, N (2007)

48 Stern, N (2007) p.449

Table 4.1: Summary of policy options[49]

Policy Instrument		Which barriers does policy tackle?			
		Narrow cost-benefit	*Wider cost-benefit*	*Misaligned incentives*	*Behavioural*
Price	Taxation	✓	(✓)		
	Subsidy	✓	(✓)		
	Cap and trade	✓	(✓)		
Information/ Regulation	Voluntary/mandatory reporting		✓		✓
	Product/building standards		(✓)	✓	✓
	Labelling		✓		✓
	Advice		✓		✓
Organisational/ Behavioural	Ringfenced loans	✓	(✓)		✓
	Negotiated targets	(✓)	(✓)		✓
Other	Public sector leadership	(✓)		(✓)	✓

Key

✓ Primary barrier the particular policy tackles

(✓) Secondary barrier the particular policy tackles

Chapter 5 considers how the UK's existing policy framework uses these instruments.

49 Adapted from Carbon Trust (2005), Sorrell et al (2005), Stern (2007), Dolan et al (2010)

5
UK Policy on Workplace Energy Efficiency

Key findings

- The overlapping of energy policies has created a wide variety of effective carbon prices between different sectors of the UK economy and different fuels.
- By 2013, in one sector of the economy (electricity used by CRC participants) carbon will be effectively taxed at £52/tonne, while in another (gas used by non-CRC firms) it is only £10/tonne. By 2020 the differences will be even more marked. CRC participants will be paying an effective carbon tax of close to £110/tonne CO_2 for electricity, while non-CRC, non-domestic users will still pay just £10/tonne for gas.
- The Climate Change Levy was initially a strong tool for reducing energy consumption. However, its effect has diminished.
- Climate Change Agreements are a weak driver of energy efficiency improvements.
- The Carbon Price Support mechanism has increased certainty over future carbon prices. However, it remains vulnerable to annual Budget changes, undermining its potential to drive energy efficiency investments.
- The CRC Energy Efficiency Scheme has raised awareness of energy consumption and the opportunities for energy efficiency considerably. However:
  - It is an extremely complex and burdensome scheme.
  - Changing the CRC from a revenue-neutral scheme into what is effectively a tax has created an unfair financial disadvantage for participants.
  - The league table has created a genuine reputational risk. However, there are risks that its design may undermine its effectiveness.
- The Green Deal may help overcome irrational barriers to energy efficiency where companies ignore potential opportunities. Its accreditation scheme may also help reduce search costs for energy efficiency technologies and services.

Over the past 15 years, the UK has developed a range of policies relevant to promoting energy efficiency. Some were aimed at energy efficiency specifically, while others will affect the likely uptake of energy efficiency measures and technologies. This chapter examines the effectiveness of these polices and assesses them against the barriers identified in Chapter 3. It will also consider some policies that have been proposed, but not yet introduced, including the Green Deal. This chapter assumes a general level of understanding about how the policies work. For a detailed explanation of the policies and how they have been designed refer to Annex 1. It also

focuses on the most relevant policy areas that influence organisations, as identified from the interviews in Chapters 6 and 7. Other, less relevant policies (DECs, EPCs, Carbon Trust, Salix Finance) are also discussed in Annex 1.

Table 5.1 categorises UK policy according to the taxonomy of instruments discussed in the previous chapter. It also shows where the policy is currently under review, in the process of being launched or revised or the government has announced a future consultation.

Table 5.1: Summary of existing UK energy efficiency policy

Policy Instrument		UK policy (date introduced)	Under review?[50]
Price	*Taxation*	Climate Change Levy (2001)	
		Carbon Price Support (from 2013)	
		Carbon Reduction Commitment (fr. 2012)	✓
	Subsidy	Enhanced Capital Allowances	✓
	Cap and trade	Emissions Trading Scheme (2005)	
		Carbon Reduction Commitment (fr. 2014)	✓
Information/Regulation	*Mandatory reporting*	Mandatory carbon reporting (fr. 2012?)	✓
		Emissions Trading Scheme	
		Climate Change Agreements	✓
		Carbon Reduction Commitment (inc. league table)	✓
	Product/building standards	Buildings Standards	✓
		– including Zero Carbon standards (2019)	✓
		Product standards	
	Labelling	Product labelling	
		Green Deal (2012)	✓
		Display Energy Certificates	✓
		Energy Performance Certificates	✓
	Advice	Carbon Trust	
Organisational/Behavioural	*Ringfenced loans*	Green Deal	✓
		Salix Finance (for public sector)	
		Green Investment Bank	✓
		Carbon Trust (for SMEs)	
	Negotiated targets	Climate Change Agreements (2001)	✓
Other	*Public sector leadership*	10:10 commitment	
		Salix Finance	
		Carbon Reduction Commitment	✓

1. Assessment of pricing instruments

The Climate Change Levy (CCL)

1. **The CCL led to significant initial improvements in energy efficiency.** This was observable in both energy intensive and less energy intensive industries.[51] Initial estimates said the levy would decrease annual emissions by 7.3MtCO_2 by 2010 against business as usual projections. In fact, the NAO predicted it would likely decrease emissions by 12.8MtCO_2 by 2010.[52] Some evidence suggests this step-change was driven by an 'announcement effect'.[53] By unveiling a policy that focused specifically on energy efficiency, the government raised the profile of the issue.

50 DECC (2011) *Carbon Action Plan Summary*

51 NAO (2007)

52 Ibid.

53 Cambridge Econometrics (2005) *Modelling the Initial Effects of the Climate Change Levy.*

2. **However, the CCL's impact has diminished.** In 2007, the NAO found "it is no longer seen as a major driver of new energy efficiencies".[54] The Carbon Trust found it was doing little to change behaviour in the commercial sector.[55] When it was introduced, its effect was to increase energy bills for a typical UK business by around 15%.[56] However, while wholesale energy prices rose sharply over the past ten years the levy has remained at around the same level. Therefore, the CCL now represents a smaller fraction of energy bills. After years of relative stability, the 2011 Budget said the CCL would increase with inflation, at least until 2012/13.[57] The levy is now set at 0.485p/kWh for electricity and 0.169p/kWh for gas (up from 0.43p/kWh and 0.15p/kWh in 2001).

Climate Change Agreements (CCA)

1. **Evidence on CCAs is mixed.** Some research has found CCAs led to greater energy efficiencies than if the sectors had simply paid the full levy. This was attributed to an 'awareness effect'.[58] By forcing firms to measure emissions and negotiate targets, CCA firms overcame barriers such as a lack of reliable information and management attention. As a result, low cost energy savings were identified.

   However, this is disputed. The NAO argued that, while there were genuine improvements as a result of the policy, many of the agreements were feeble. Work for Cambridge Econometrics found that "the energy (and therefore carbon) saving and energy-efficiency targets would have been met without the CCAs".[59]
2. Martin et al made further compelling criticism of CCAs.[60] Their research compared actual energy-use data from manufacturing firms inside and outside the CCA. Firstly, it found the business as usual scenario used by the government was weaker than other models. The 4.8% expected improvement in energy efficiency between 2000 and 2010 modelled for the CCA is significantly more conservative than other estimates (the then-Department for Trade and Industry predicted an 11.5% improvement). Secondly, the research found that firms inside CCAs increased both energy intensity and energy expenditure in comparison with firms who had to pay the full CCL. This growth was particularly marked in electricity use, which rose by 29% in comparison with firms who paid the full levy. Finally, firms paying the tax suffered no significant impact on employment, gross output or productivity:

   > *"Had the CCL been implemented at full rate for all businesses, further cuts in energy use of substantial magnitude could have been achieved without jeopardising economic performance."*[61]

   The authors called for the replacement of CCAs with a 'moderate' energy tax.
3. The sectoral structure of CCAs – where entire sectors sign up to agreements, rather than individual firms – means firms who perform well are effectively subsidising those firms that perform badly. The NAO argued as a result "some firms have benefited from the tax discount despite failing to meet their targets."[62]

EU Emissions Trading Scheme (ETS)

A full appraisal of the ETS is beyond the scope of this report. However, the scheme does provide lessons about cap and trade schemes (such as the proposed CRC):

54 NAO (2007) p.19

55 Carbon Trust (2005)

56 National Audit Office (2007) *The Climate Change Levy and Climate Change Agreements.*

57 HM Treasury (2011) 2011 Budget.

58 Ekins and Etheridge (2006), p. 2079 from NAO

59 Cambridge Econometrics (2005) *Modelling the Initial Effects of the Climate Change Levy* p.7

60 Martin R, de Preux, L and Wagner, U (2009) *The Impacts of the Climate Change Levy on Business: Evidence from Microdata*

61 Ibid p.1

62 NAO (2007) p.5

1. The ETS, at least in theory, provides certainty over the volume of CO_2 reductions across the installations covered by the scheme.
2. The price of carbon rises no higher than needed to achieve the carbon cap. It has been argued that a lax cap has depressed the price of allowances. However, low prices may alternatively indicate that the scheme has successfully achieved its carbon reductions more cheaply than expected. However, because the carbon price is decided by the market, there is a lack of certainty over the trajectory. This creates a risk for investors.
3. At present, the ETS runs until 2020, after which there is uncertainty about the shape of the scheme. That decisions about the scheme and cap are made at a political level, and by negotiation between member states, further compounds this uncertainty.[63]
4. Because it provides an upstream carbon price that feeds through to electricity bills, the ETS price is a factor in decisions on energy efficiency for electricity users across the EU economy, even for firms (and households) outside the scheme. In theory, this consistency helps maximise the chance of identifying the cheapest carbon reduction measures. Following early fluctuations, the current traded price of carbon has settled at around €15/tonne CO_2 (around £13/tonne). This is the equivalent to 0.65p/kWh levy on electricity use, higher than the current CCL. However, the effect of this may be undermined to a degree because the ETS is less visible to consumers as it is folded into the wholesale electricity price and is not itemised on bills.
5. There is a risk that energy-intensive industries will move abroad. However, the ETS, by virtue of being EU-wide, eliminates the risks of offshoring between EU countries (in contrast to purely domestic carbon and renewable energy policies).
6. Administrative weakness. Trading in the spot price was suspended in recent months after the national registries of emissions permits were successfully hacked.[64]

Carbon Price Support (CPS)

The Carbon Price Support mechanism was introduced in the 2011 Budget. It provides a minimum price for carbon used in UK electricity generation from 2013, net of the ETS price.

1. **Increased certainty.** By setting out a clear trajectory, the CPS aims to increase certainty for investors in low carbon generation compared to the ETS alone. It should also provide greater certainty to those weighing energy efficiency investments by providing an explicit minimum carbon price a number of years ahead. However, the CPS consultation recognised limitations in the current mechanism. Firstly, the price is only assured until 2020.[65] Moreover, if the rate has to be reconfirmed as part of the annual budget process, it may not provide as much certainty for investors as might have been achievable. The consultation offered several options to overcome this problem, including an escalator over the life of a parliament. However, as the ending of the fuel duty escalator in the 2011 Budget showed, such an approach is controversial and is still vulnerable to political whim. Further options to increase certainty are considered in Chapter 8.

63 Helm, D (2010) *The Case for Carbon Taxes.* Policy Exchange, London

64 Wall Street Journal, *EU Carbon Market Suffers Further Setback,* January 28th 2011

65 The CPS consultation raised a long-term price of £70/tonne CO_2 by 2030, but the Budget did not include this.

2. **Limited to electricity.** Coming as part of reforms to the electricity market, the CPS will only apply to fuels used in the generation of electricity, not, for example, gas-fired heat or industrial processes. This reinforces the problem of multiple, varying carbon prices across the economy. This distorts decisions and may lead to less efficient carbon reductions, for example acting as a disincentive to switch from gas to electrical heating.

CRC Energy Efficiency Scheme

The CRC Energy Efficiency Scheme (formerly the Carbon Reduction Commitment) is the government's flagship scheme to encourage greater energy efficiency in large, non-energy intensive organisations.

1. **Increased awareness of energy efficiency.** Even before the purchase of allowances, there is evidence that the policy has had an effect. Around 500 firms have achieved the Carbon Trust Standard, which rewards action on energy efficiency, since it was introduced in 2008 because it is linked to the CRC.
2. **Complexity.** Both business and independent observers have criticised the current scheme for its overly-complicated approach. The Committee on Climate Change described it as a 'very complex scheme' and called for a simplification or a fundamental redesign.[66] It said that government should consider scrapping the cap and trade element of the scheme and whether to drop the purchase of allowances entirely. The main criticisms have focused around the reporting rules (see Box 5.1), overlap with other existing schemes and the design of the trading scheme.[67] Many eligible organisations, both private and public, have little if any experience of trading allowances.[68]

Box 5.1: Organisational reporting rules

The scheme's reporting rules have attracted criticism, particularly from organisations with diverse operations. The rules are designed to capture as many emissions as possible. For firms with various independent operations, one nominated company is responsible for reporting emissions of 'sister' firms, even though they may not be responsible for its business operations. This means extracting data from an organisation which is, in effect, entirely separate. This is a particular problem for franchises, which may have little operational control over franchisees. Multinational firms with separate operations may also suffer. This approach is different from that used in the Greenhouse Gas Protocol, organised by Defra and reporting under CCAs and the ETS.

3. **Pricing.** The 2010 Spending Review significantly changed the financial implications of the scheme. The carrot of recycling payments enhanced the reputational benefit of coming top of the league table. That has been replaced with the stick of a £12/tonne CO_2 price.[69] The change has, in some ways, strengthened the incentives to improve energy efficiency. Previously, in the initial phase of the scheme, the plan was for organisations at the

66 Committee on Climate Change (2010) *The CRC Energy Efficiency Scheme advice to Government on the second phase.* p.5

67 DECC (2011) *Simplification of the CRC Energy Efficiency Scheme.*

68 Committee on Climate Change (2010)

69 HM Treasury (2010) *Spending Review 2010*

bottom of the table to receive a maximum 30% penalty payment (while those at the top got a 30% bonus). The worst performers would have been repaid their £12/tonne for each permit purchased, minus only £3.60/tonne penalty – much less severe than the new arrangements. In addition, the changes provide greater certainty over the future carbon price, at least until the capped phase begins.

However, the effect is to inject yet another, different carbon price into part of the economy. As a result, organisations in the CRC will pay three levels of taxation on electricity consumption: through the ETS; through the CCL; and now through the CRC (as well as contributing to policies such as the Renewable Obligation). This is not the same for other sectors of the economy, nor in relation to other (non-electricity) sources of carbon emissions, such as gas-fired heat. Table 5.2 highlights these differences. Singling out CRC organisations for a high tax rate does not appear to have anything to do with the primary aim of the CRC which was "to increase organisational awareness and attract senior manager's attention to carbon and energy issues."[70] In addition, by removing the recycling payment, the government has undermined one of the primary reasons for a single league table – to decide how the repayments would be distributed.

4. **Threshold for inclusion.** The threshold for inclusion has risen from 3,000MWh of annual electricity consumption when the CRC was first considered to 6,000MWh. The argument for increasing the threshold was to "help further ensure that the organisations covered will benefit from the scheme through reduced energy bills".[71] This contradicted earlier, government-commissioned research that found organisations consuming 3,000MWh/year would clearly benefit from a scheme.[72] Concerns about the growing complexity and administrative burdens of the CRC scheme, as it developed, may have influenced the decision on whether it could apply to smaller energy consumers.

   Firms above the eligibility threshold are sensitive to where the threshold is set, particularly if their competitors are below the threshold. This creates a competitive advantage for those outside the scheme, reinforced by the switch to the scheme being a more or less straight tax. The threshold rules also create a perverse incentive to not install metering, as participation is based on the amount of metered electricity.

5. **League table.** The league table aims to develop a reputational market for carbon reductions by comparing organisations' carbon use. The reputational risk is greater because it is a government-backed table which will carry greater weight. However, there are concerns about the league table's design. By using multiple metrics, government risks undermining the strength of comparisons. It also seems hard to try to compare organisations in widely differing sectors, perhaps diminishing the usefulness of the single proposed league table.

6. **Uncertainty.** The CRC's complexity was compounded by the regular revisions to the scheme since it was first announced. The complications of franchise rules, the changes in the threshold and the league table rules, and the sudden switch to a straight tax has infuriated business.[73] Even

70 DECC (2010) *Final Impact Assessment on the order to implement the CRC Energy Efficiency Scheme.* p.12

71 Defra (2007) *Consultation on Implementation Proposals for the Carbon Reduction Commitment.* p.viii

72 NERA/Enviros (2006) Energy *Efficiency and Trading Part II: Options for the Implementation of a New Mandatory Emissions Trading Scheme*

73 CBI (2011) *Back to the Answer: Making the CRC work*

though the scheme has already started, the CRC will undergo yet another consultation later in the year. Frequent change risks alienating those who have already made investments, as well as causing confusion for those trying to plan investments. This issue arose in the interviews, discussed in Chapters 6 and 7.

Summary of pricing policy

The layering of climate policy has created different effective carbon prices across different fuels and different parts of the economy. Table 5.2 compares the various prices, from 2013. Table 5.3 shows carbon prices in 2020, using the existing policy trajectory. It includes the effective cost of the Renewables Obligation (RO) and Feed-in-Tariffs (FITs) (see Annex 1). While the RO and FITs do not target energy efficiency, they do add to electricity costs, so therefore affect energy efficiency decisions.

74 Based on data from DECC Annual Energy Statement supporting papers; CPS consultation; 2011 Budget; CRC Impact Assessment; author calculations. Note on calculations: The effective carbon price is based on the approximate grid average carbon intensity in 2013 (0.5kgCO_2/kWh). Natural gas used a conversion rate of 0.185 (kgCO_2/kWh). The RO/FITs figures are extrapolated from estimates for the impact of the policy on bills for 2010 and 2015.

Table 5.2: Cost of UK climate policies on energy prices in 2013[74]

	Electricity			*Gas*		
Category of energy user (non-domestic unless stated)	**Policy**	**Extra cost on prices (p/kWh)**	**Effective carbon price (£/tCO_2)**	**Policy**	**Extra cost on prices (p/kWh)**	**Effective carbon price (£/tCO_2)**
Energy intensive	ETS/CPS	0.8	16.0	ETS	0.30	16.0
in ETS* (CCA, exempt CRC)	CCL#	0.1	2.0	CCL#	0.04	1.9
	RO/FIT	0.7	14.0			
Total		**1.6**	**32.0**		**0.34**	**17.9**
Energy intensive non-ETS	ETS/CPS	0.8	16.0			
(CCA, exempt CRC)	CCL#	0.1	2.0	CCL#	0.04	1.9
	RO/FIT	0.7	14.0			
Total		**1.6**	**32.0**		**0.04**	**1.9**
Non-energy intensive,	ETS/CPS	0.8	16.0			
large (CRC participants)	CCL	0.5	10.2	CCL	0.18	9.6
	CRC	0.6	12.0	CRC	0.22	12
	RO/FIT	0.7	14.0			
Total		**2.6**	**52.2**		**0.40**	**21.6**
Non-energy intensive	ETS/CPS	0.8	16.0			
(non-CRC)	CCL	0.5	10.2	CCL	0.18	9.6
	RO/FIT	0.7	14.0			
Total		**2.0**	**40.2**		**0.18**	**9.6**
Domestic	ETS/CPS	0.8	16.0			
	RO/FITs	0.7	14.0			
	CERT/SO+	0.4	8.0	CERT/SO	0.1	5.4
Total		**1.9**	**38.0**		**0.1**	**5.4**

* Excludes electricity generators

CCL less 80% discount.

+ CERT is the Carbon Emissions Reductions Target, an obligation on suppliers to install energy efficiency measures in the UK housing stock. It is due to be reformed in 2012, under a new Supplier Obligation (SO). Details of the scheme are still to be announced.

Table 5.3 Cost of UK climate policies on energy prices in 2020[75]

	Electricity			*Gas*		
Category of energy user (non-domestic unless stated)	**Policy**	**Extra cost on prices (p/kWh)**	**Effective carbon price (£/tCO$_2$)**	**Policy**	**Extra cost on prices (p/kWh)**	**Effective carbon price (£/tCO$_2$)**
Energy intensive	ETS/CPS	1.3	30.0	ETS	0.56	30.0
in ETS (CCA, exempt CRC)	CCL	0.1	2.4	CCL	0.04	1.9
	RO/FIT	2.2	51.8			
Total		**3.6**	**84.2**		**0.60**	**31.9**
Energy intensive non-ETS	ETS/CPS	1.3	30.0			
(CCA, exempt CRC)	CCL	0.1	2.4	CCL	0.04	1.9
	RO/FIT	2.2	51.8			
Total		**3.6**	**84.2**		**0.04**	**1.9**
Non-energy intensive,	ETS/CPS	1.3	30.0			
large (CRC participants)	CCL	0.5	12.0	CCL	0.18	9.6
	CRC	0.7	16.0	CRC	0.30	16.0
	RO/FIT	2.2	51.8			
Total		**4.7**	**109.8**		**0.48**	**25.6**
Non-energy intensive	ETS/CPS	1.3	30.0			
(non-CRC)	CCL	0.5	12.0	CCL	0.18	9.6
	RO/FIT	2.2	51.8			
Total		**4.0**	**93.8**		**0.18**	**9.6**
Domestic	ETS/CPS	1.3	30.0			
	RO/FITs	2.3	54.1			
	SO	0.5	11.8	SO	0.10	5.4
Total		**4.1**	**95.9**		**0.10**	**5.4**

These tables and figures highlight three major weaknesses with the current policy framework:

1. The wide range of effective carbon prices created by current climate policy. The tables demonstrate the inconsistency of carbon pricing between gas for heating or industrial processes and electricity. The effect of this distortion is to make the overall cost of carbon reductions more expensive. It means measures will be taken to cut electricity use, even though cutting gas use or other carbon reduction efforts may be cheaper.
2. How the current policy trajectory will make these discrepancies even more pronounced by 2020. Under the trajectory of existing policies, by 2020 carbon will effectively be priced at more than £100/tonne for electricity used by parts of the non-domestic sector, while some non-domestic gas use will only face an effective carbon price of £10/tonne.
3. The high cost of the Renewables Obligation in comparison to other policies. By 2020, the RO will make up more than half of the cost of climate policies for businesses and the public sector.

75 Note on calculations: Effective carbon price calculated using estimated emissions intensity from electricity generation in 2020 of 0.425gCO2/kWh (CPS consultation). The increased CRC figure is based on the expected cost of allowances under a trading scheme (CRC Impact Assessment).

Figure 5.1: Effective carbon prices 2013 – current policy

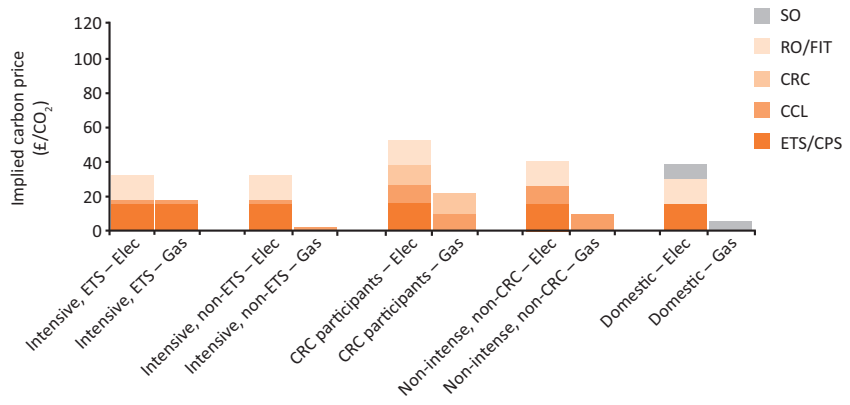
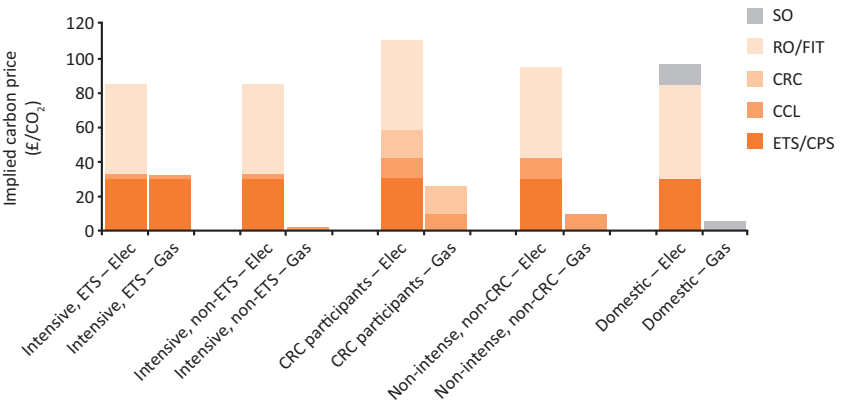


Figure 5.2: Effective carbon prices 2020 – current trajectory



While some differences in energy prices may be desirable in some circumstances, for example to protect energy-intensive industries, it is not clear that there is much coherence or justification for most of the observed pattern of carbon prices. Rather, policies have been introduced to achieve multiple aims (decarbonisation of the electricity sector through increased renewable energy; the decision not to fund the Renewable Heat Incentive from bills, but from general taxation) without enough consideration for how it feeds through to energy prices.

A tonne of carbon emitted from gas-fired heating has the same effect as one emitted by electricity generation. Although electricity represents a greater and growing proportion of energy consumption in the commercial sector, this differs between organisations. In addition, some technologies for reducing heat consumption offer cheaper carbon reductions than, for example, some expensive renewable generation technologies.

Such a complex pattern of carbon prices also seems unlikely to be stable, and so will contribute to ongoing regulatory uncertainty. It is unlikely to lead to the most cost-effective carbon reductions being identified and exploited. If policymakers want the most efficient (and cheapest) carbon reductions, they should provide a clear, consistent price across the economy, unless there are clear reasons for not doing so.

2. Assessment of information/regulation instruments

Mandatory reporting

The 2008 Climate Change Act included provisions to introduce mandatory carbon reporting by 2012. Defra is currently consulting on whether and how mandatory reporting could be introduced.[76] A government-commissioned review of the evidence on reporting and measuring carbon emissions found that policies that encourage firms to measure emissions accurately "will enable GHG emissions reductions".[77] Defra is looking at four options as part of its consultation:

- a continuation of a voluntary system of reporting
- requiring all listed firms to report (1,100 firms)
- requiring all CRC companies to report (4,050)
- requiring all large companies, as defined by the Companies Act to report (c. 24,000)

Box 5.2: A rough guide to carbon reporting

While financial reporting standards have developed over decades, reporting carbon emissions is relatively immature. The leading UK standard is the voluntary Greenhouse Gas Protocol, produced by Defra. Emissions fall broadly into three categories:

Scope 1: Direct emissions. Activities that release emissions straight into the atmosphere. These include combustion in furnaces and transport emissions from vehicles or ships controlled by an organisation.

Scope 2: Indirect emissions linked to an organisation's use of energy. These include emissions generated from electricity and heat consumption. The emissions do not occur onsite, but the firm's activity is responsible for creating them.

Scope 3: Other indirect emissions. These are emissions related to a firm's activities taking place at sources it does not control, but which are not classified under Scope 2. This includes emissions related to materials purchased, waste disposal or travel from vehicles that are not owned or controlled by the organisation.

While there are complications in each scope, the third category presents a much greater level of complexity than the first two. Defra's guidance acknowledges this, recommending firms focus on the first two scopes when first reporting.

There are a number of questions for policymakers to consider when deciding whether and how to introduce reporting:

76 Defra (2011) *Impact Assessment of options for company GHG reporting*

77 Defra (2010) *The contribution that reporting of greenhouse gas emissions makes to the UK meeting its climate change* objectives. p.46

1. **Should reporting be mandatory?** Proponents of voluntary standards argue it gives organisations time to develop expertise. However, it also gives the chance to avoid action, failing to address the barriers outlined earlier. It also reduces the breadth of comparisons which can be made between organisations by customers and investors. Some business groups have argued for its introduction.[78] They argue mandatory reporting creates a level playing field, allows meaningful comparisons between different organisations, and rewards early movers on energy conservation. In addition, it provides investors with reliable and useful climate-risk information. In surveys for the CRC consultation, there was support for making any requirement mandatory.[79]

   The Carbon Disclosure Project argues that mandatory reporting of some emissions is desirable and practicable. While 62% of FTSE all-share companies report some quantified emissions data, only 22% do so in line with government guidance, undermining the potential for comparisons.[80]
2. **How many firms should be required to report?** The introduction of mandatory reporting should only take place once it is demonstrated that the potential benefits from reporting outweigh the potential costs for participants, or that these costs are still lower than alternative carbon-reduction measures.

   The Defra consultation said "organisations which measure and report emissions information have stated that they have found benefits from doing so."[81] However, there remains considerable uncertainty both in the costs and the benefits of introducing mandatory reporting. For the most aggressive option (24,000 firms), estimates of the net present value of the scheme range from a benefit of £549 million to a cost of £6 billion. The assumptions behind this estimate will be tested in the interviews section and discussed in Chapter 8.

Green Deal

The Green Deal is a proposed scheme to help finance energy efficiency improvements in domestic and commercial properties. Investments will be paid for initially by the Green Deal provider, and then paid back by the householder or firm. Crucially, the policy allows the loan to be paid back through energy bills. The loan is tied to the property on which the improvements take place, not the occupier. Policy Exchange proposed a similar scheme in its paper, *Warm Homes*.[82] The proposals are now going through consultation. It is hoped the first Green Deals will be offered from autumn 2012.[83]

1. **Price.** The government hopes the Green Deal will provide competitively-priced loans. By linking repayments to energy bills, which have lower risk of default than a conventional unsecured loan, it is hoped that cost of a Green Deal loan will be lower than a normal bank loan.[84] Furthermore, by stretching the repayment period of the loan, it aims to match the payback rate to the rate at which the benefit is accrued. If a new boiler pays back over ten years, repayments should match. Currently, conventional investments may require faster paybacks. The scheme's success in reducing price will depend on the interest rates at which Green Deal providers offer their loans. The government is trying to encourage as wide a range of suppliers as possible, including retailers as well as energy firms, to participate in an effort to create strong price competition. There is no government guarantee to the loans.

78 CBI (2009) *All Together Now: a common business approach for greenhouse gas emission reporting;* Aldersgate Group (2007) *Carbon Costs*

79 Defra (2007) *Measures to reduce carbon emissions in large non-energy intensive organisations: Review of Consultation Responses*

80 Defra (2011) *Impact Assessment of options for company GHG reporting*

81 Ibid. p.12

82 Caldecott, B & Sweetman, T (2009) *Warm Homes.* Policy Exchange, London.

83 DECC (2010) The Green Deal: A summary of the Government's proposals

84 The government expects domestic Green Deal loans to be more competitive than a typical 11% annual interest rate on an unsecured loan. It does not provide a similar estimate for the non-domestic sector. DECC (2010)

2. **Information.** The Green Deal aims to remove some of the costs to businesses (and householders) of researching energy efficiency projects. The government will list technologies that are eligible for financing through the scheme. These technologies will be subject to the so-called 'golden rule', where estimated long-term savings from energy bills should exceed the cost of the work (including the cost of the technology, labour and financing). In addition, Green Deal installations will be carried out by government-accredited advisors. This includes initial assessors who advise on the options for improvements, Green Deal providers and the contractors who make the improvements. This is to guard against rogue operators.
3. **Standards.** In the commercial sector, the government is considering requiring landlords to meet a minimum energy efficiency standard before they lease a property. As commercial properties change hands relatively regularly, it is hoped this would lead to significant uptake of energy efficiency measures. This measure aims to cut through misaligned incentives, such as the landlord-tenant split.

   Mandated standards risk significantly raising the cost of leasing a property, and disrupting the smooth functioning of the leasing market with potentially detrimental economic impact. The Green Deal aims to mitigate this by keeping the cost of energy efficiency investments low. The question for policymakers is how stringent the minimum standards are. This will likely be a contentious area of consultation.
4. **Irrationality.** Above all, the scheme aims to raise the profile of energy efficiency investment. Government hopes that because the Green Deal is ringfenced, it will help overcome the irrational behaviour in some firms, where the value of such schemes is unfairly neglected. It aims to empower energy managers and energy management companies to highlight the opportunities, and attract the attention of senior managers.

6

Findings From Interviews With Energy Management Professionals About Barriers to Energy Efficiency

Key findings

- There are significant opportunities for greater energy efficiency in the private and public sector.
- Price is a major driver of action on energy efficiency.
- A clear carbon price with a future trajectory would make it more likely for energy efficiency projects to go ahead. There is some support for the price to be broader and cover gas, as well as electricity.
- Concern about an organisation's 'green' reputation can be key in energy efficiency investment. There is evidence that this is driving action down the supply chain.
- Organisations were concerned about how they compared with competitors or similar public sector organisations, not organisations in other sectors.
- Data on energy consumption remains generally poor in both the public and private sector. When data is improved it can drive energy efficiency investment.
- A lack of information on relevant technologies undermines energy efficiency investment. The market for energy efficiency technologies and services remains immature.
- Split incentives are a major barrier to energy efficiency improvements.
- There is significant evidence of irrational behaviour, sometimes because of a lack of knowledge about energy. Senior managers often neglect potential savings from energy efficiency. Highly visible actions like installing solar panels are chosen over 'unsexy' but much better value energy efficiency projects.

Methodology

This section examines the results of interviews with 22 people working in energy management from 16 different organisations. This includes internal energy managers, sustainability managers, energy services companies, organisations providing finance to fund efficiency projects and one firm selling energy management technology. Interviewees worked for both public and private sector organisations. The interviewees captured a broad range of firms and public sector

bodies, in particular sectors covered by the CRC. In addition, several interviews were conducted with external energy management firms, who have experience with dozens of clients. Each interview lasted between 30 and 90 minutes. Some were conducted face-to-face, while others were by telephone. All the comments have been anonymised.

The aim of the interviews was, firstly, to test the various barriers to and drivers of energy efficiency identified in the literature, and understand which may be most important. This included establishing evidence for irrational decision-making. Secondly, the interviews tried to understand how policy influenced decisions on energy efficiency 'on the ground', to try and unpick which elements of a particular policy are helpful and which are not. By choosing energy management experts and conducting in-depth interviews, it provided a clear insight into how decisions were made.

The interviews were open and structured around three broad questions:

- What actions has your organisation taken on energy efficiency?
- What are the barriers to and drivers of energy efficiency within your organisation?
- How do different policies encourage or hinder action on energy efficiency?

Detailed findings

1. Energy efficiency opportunities are genuine

> *"You could go into any building and if cost was not a factor, you could save 30 or 40%. The opportunities are there, it is economics that drive how much is going to get done."*
>
> Energy consultant 2

All of the interviewees said that significant opportunities to save energy existed in their organisations and in the organisations they dealt with. Many said they had already made major and quantifiable savings in energy use and carbon. One telecoms firm said it had reduced emissions by 57% since 1997, even as energy use had grown, saving £20 million a year. One major retailer said it had achieved annual reductions of around 6% for several years. The retailer's incremental improvement – driven by senior management commitment – was typical of firms who had made energy management a priority:

> *"This is not rocket science. Sometimes in government they expect there to be a magic answer. It is about doing some boring stuff, but doing it in a considered way."*

There were many mundane, but often ingenious, methods of improving energy efficiency. One firm said that simply cleaning the roof of a vehicle service operation meant that lighting did not have to be used as often. One energy manager from a property management firm said that it had made considerable savings by installing 12,000 valve jackets. Another energy manager from an IT firm said it had identified annual energy savings of £670,000 on an investment of £1.9 million (less than three-year payback). On one site the firm was able to save 50% in a year in energy costs.

The public sector also saw potential for savings. One public sector energy manager said that absolute savings of 30% could be made in almost any building, including new builds. This was because the building management system (BMS) was often badly set up, and people had not always matched its settings to how a building was actually used. One common way of saving energy – raised by several interviewees – was challenging the idea that buildings needed to operate at the same level 24 hours a day.

> *"The classic example is the public building. People always say it is a 24-hour building. When you ask what the building is used for, you find out just one room is 24 hours."*
>
> Energy consultant 4

This was also the case in the many private sector buildings. One energy consultant argued that, in most buildings, simply adjusting the building management system and the lighting would lead to significant savings, at very little cost. This evidence, although anecdotal, supports the potential for energy savings across the commercial and public sectors identified in the literature.

2. Price is a major driver of action on energy efficiency

> *"The (main driver) now is the same thing now as it was 25 years ago. It is the bottom line."*
>
> Energy services company

> *"Cost-saving – that is the number one driver … I think if saving CO_2 did not save any money there would be no agenda for it in the public sector. It would be very fluffy."*
>
> NHS Trust

> *"We will save money, but it is also green. Not the other way round."*
>
> Restaurant franchise

The role that price played in driving action on energy efficiency was complex. Firstly, price was identified as a key driver for some organisations. Several interviewees said it was more important than concerns about carbon or corporate social responsibility. Some interviewees identified increasing energy prices over the past ten years as a spur to action. Unsurprisingly, sectors where energy was a larger proportion of costs (water, manufacturing) appeared to have the most aggressive energy management strategies. For medium-sized firms price remained the key factor.

"One energy consultant argued that, in most buildings, simply adjusting the building management system and the lighting would lead to significant savings, at very little cost"

Even if other factors, such as concerns about reputation, were the primary drivers of action, price was still central in deciding which projects went ahead. Decisions were based on how quickly the projects would pay back.

The definition of an acceptable payback differs between organisations, but the interviewees gave some general guidelines. One energy services company, with considerable experience running energy efficiency projects, said a general rule

was that small and medium sized firms insisted on paybacks of fewer than two years. One manufacturer said that schemes which paid back in more than 18 months would not get approved. Most larger firms were prepared to accept paybacks of up to three years, but only a few went beyond that. One restaurant chain energy manager said he was competing for capital against new stores in China. As a result, his paybacks needed to be as quick as possible.

Many energy managers pointed out that demand for tight paybacks was exacerbated by the recession. Firms engaging energy services companies were demanding no initial cost and guaranteed savings over a short period. This tight schedule was preventing expansion of the ESCO model (see Box 6.1), which needed longer paybacks if it was to finance new technologies upfront. Some public sector organisations were prepared to work on paybacks of up to five years. One university energy manager said his organisation had supported projects with a seven-year payback. But such longer public sector timeframes were contradicted by one consultant who said that the sector demanded quicker paybacks.

Box 6.1: The ESCO model

An ESCO, or Energy Service Company, both installs energy efficient technologies and arranges financing to pay for them. The model has been described as "like a bank but with engineers."[85] The ESCO will go into a firm and assess energy efficiency opportunities. It will then install the agreed measures. Contracts vary, but there is often no upfront cost to the client. Crucially, savings are guaranteed. Loan repayments are directly linked to savings from reduced energy consumption. If the savings do not happen, the ESCO does not get paid. As a result, the risk is transferred from the client to the ESCO. This requires accurate measurement to provide proof of savings. The model is different from both a simple energy supply contract and an energy management contract, where services are paid at a flat rate.

ESCOs were first established in the US in the late 1970s, as a response to the Oil Crises. They developed later in the UK, but have increased significantly in recent years and seen several new entrants to the market, both smaller firms and offshoots of utility, construction and facilities management companies. A lack of awareness about the ESCO model and the Energy Performance Contracting model it uses are seen as a key barrier to greater expansion of the industry.

3. Energy managers want a clear future carbon price

"I want there to be a minimum floor linked to inflation. Ideally on an escalator … I asked the Environment Agency what the CRC price is going to be in 2020. They had no idea."

NHS Trust

"A carbon price is essential."

Retailer

"If you have a price up to 2020, it would be incredible. It would drive new build, it would drive short term investment or assets."

Energy consultant 3

85 http://www.theescoblog.com/2009/08/what-is-esco_06.html

> *"Lots of businesses want to be clear on what the costs of carbon will be. Most businesses are very happy to plan for a plan. What businesses do not like is uncertainty or surprises. £12/tonne is not going to be around for very long. But it is all guesswork, therefore it makes planning difficult."*
>
> Water company

Several interviewees said that uncertainty over future energy prices and, in particular, future carbon prices complicated the calculation of potential payback. This made it more difficult to convince senior managers of the opportunities. Several interviewees said that a visible carbon price with a clear trajectory could help them argue more effectively for investment (some added that changes to the CRC had provided useful certainty, see below).

One energy consultant said that a clear price up to 2020 would drive down payback periods and force behaviour to change. He added that renewable support schemes (such as FITs) could probably be abolished, as action on renewables would probably take place anyway. A long-term price would allow firms to *"deploy the MAC (marginal abatement cost) curves"*. In effect, organisations would be allowed to make their own decisions on how to reduce carbon in the cheapest ways. Other interviewees stressed that current prices were not yet high enough to encourage non-energy intensive firms into greater action (the interviews took place before the budget announcement on the CPS price up to 2020):

> *"Carbon is not expensive enough to drive behaviour. If you look at most energy technologies, if you really want a step change you are looking at something quite expensive, you are looking at four or five year payback."*
>
> Energy consultant 1

Several interviewees said that if there was a clearer carbon tax it should be as wide as possible. One truck manufacturer said:

> *"We have already got the CCL, relatively speaking the CRC is about the same. What is the point of having two systems? We would prefer a common approach across all fuels. It should be the same on gas and transport. Government cannot pick a winner."*

One manufacturer stressed a wider carbon tax presented a risk to UK firms if it was not introduced across Europe.

4. Concern about reputation can drive energy efficiency investment

> *"Another big driver is customers. [Climate change] is not top of their agenda, but we do get strong feedback that they expect a company like ours to do everything it can to reduce emissions and be more cost-effective."*
>
> Retailer

> *"[Our action on carbon] is mainly driven by the sense that the company needs to demonstrate it is committed to not impacting on the environment."*
>
> Telecoms

Concern about reputation was identified as a major driver for reducing energy use, particularly for firms who are consumer-facing. The corporate social responsibility (CSR) agenda has become a priority for many large firms, of which carbon consumption is a key element. In addition, while many aims within CSR can be vague, carbon is measurable and reportable. Some firms have set aggressive energy management and carbon reduction targets, and will be held to account by senior managers.

Reputational concern was driven by both customers and investors. As a result, going 'green' could be a competitive advantage. One major retailer said that while customers may not raise the issue of carbon consumption directly, its customer surveys had showed that they expected big businesses to lead on environmental action. As a result, it considered it important to become a market-leader (and to act ahead of regulation).

In the public sector, however, the reputational driver was less clear. One energy consultant, who had worked with local government, suggested that reputation was a much weaker driver than financial worries, as voters had little concern for carbon consumption (however, it is likely that they will be concerned if money is being wasted). One energy manager for a central government department argued that the Prime Minister's pledge to lead the 'greenest government ever' had created an imperative to act on energy consumption. The fact that each department's progress against this target is publically available through the government's online portal, data.gov, underlined this driver (see Box 6.2). Firms who sold energy measurement technologies recognised this as an opportunity to sell services to central government.

Box 6.2: Central government's 10% energy reduction pledge

Soon after becoming Prime Minister, David Cameron pledged that all central government departments would reduce their total emissions by 10% in the first 12 months of the Coalition government. As part of this commitment, central government departments have to publish online real-time energy data for their headquarters. Such an approach has several effects. Firstly, it demonstrates senior level leadership that carbon (and therefore energy consumption) is a government priority. Secondly, by making a clear and verifiable commitment, behavioural economists argue it is more likely that the reductions will be achieved. Thirdly, by publishing the data online and in real-time it means that departments have to measure emissions. This makes it more likely that energy use is managed (as energy consumption is the cheapest and easiest way of reducing emissions). Finally, it helps create a wider social norm that energy efficiency should be a greater UK priority.

All the data on departmental emissions is collected at data.gov, including all the measures taken to reduce emissions in different departments. A league table of performers has also been published.[86] Over the first nine months of data, the government was exactly on target to meet its 10% commitment. The best performing department was the Department for Culture, Media and Sport which was 7.6% ahead of its target, while BIS was the worst performer (3.7% behind target).

When considering reputation, most firms said they were concerned about how they compared with competitors or similar public sector organisations, but not how they compared with organisations in other sectors, who have very different consumption patterns. One NHS Trust energy manager said: "*We are not bothered about*

86 Data available from http://data.gov.uk/departmental-performance-co2-emissions-reduction-date

how we compare to Tesco, but how we do against other NHS Trusts is important." This has important implications for any league table, where comparisons of like with like are the most powerful driver.

While it is often perceived that reputational drivers are not as strong for firms who do not sell directly to consumers, there was some evidence that reputational concerns were forcing action down the supply chain. Consumer-facing firms are demanding that suppliers produce goods as energy- and carbon-efficiently as possible. One manufacturing firm, which supplies car makers, said that demonstrating environmental standards through certification was now a prerequisite for supplying many firms. In addition, the financial driver of keeping prices low also meant that energy expenses were closely controlled. This demonstrates the complex interaction of reputation and financial market forces. Some firms believe that a green reputation will provide a competitive advantage in the market. The decision to 'green' a business will be reinforced if it also saves the firm money. Equally, if an organisation was considering a move to reduce energy bills, it would be more likely to go ahead if the decision enhanced its green credentials. The interviews showed that the balance of these two drivers varied between organisations. However, they often worked together. One energy manager at a trucking firm demonstrated how the two factors affected its decision to take direct control of energy management:

> *"Our firm trades on its brand, therefore we decided to bring energy management in-house and put more focus on it … If I can also manage to build a financial case for it [that is more likely to happen]."*

One property firm said:

> *"While there was some positive PR out of reducing carbon, it is also just good for business. We wanted to have the best buildings, the best locations but also be the best for sustainability. It was the commercial reality that really mattered."*

5. Data on energy consumption remains very poor

> *"Still an awful lot of organisations do not have any idea of what their energy consumption is. Without that you cannot begin."*
>
> Energy services company

> *"A lack of information was a huge problem (in taking action on energy efficiency). You are only as good as your data."*
>
> IT firm

> *"You have to start if off with data. We had energy management before, but not proper energy management."*
>
> Energy consultant 1

Although several firms had monitored energy use across their estate for more than 15 years, several energy managers said they had only recently begun to get to grips with their energy use. Some organisations with huge and varied estates remain

unable to measure all of their consumption accurately and in real-time. This is particularly the case in the public sector. Energy consultants said this lack of data was common across different sectors, and that many organisations had no clear idea of their energy use. One major barrier to collecting data has been poorly performing building management systems. Often, these systems do not provide reliable and trustworthy data, meaning that energy managers are forced to rely on manual meter readings, estimated bills or physical checks. One director of a firm providing technology for energy data management conceded the sector remained immature.

So, while poor data is a major barrier most interviewees stressed that good data was fundamental to making any efficiency improvements and emission reductions. One water firm's experience was typical. When it began the process of measuring its energy baseline, it discovered sites that were no longer in use but still consuming energy. The process allowed them to deactivate some sites. It also found that bills were overestimated, and that it was overpaying for its energy: "*We cleansed our portfolio. That meant we could get different terms on our energy supply.*"

Interviewees were unanimous in their belief that establishing good data leads to major savings. Almost every interviewee stressed the importance of information as a starting point for tackling energy efficiency. Many added that, without it, it was impossible to manage energy consumption. One property management firm, who manages a large government estate, found that until it began installing more meters in 2004, it had little idea how well its buildings were performing:

> "*Previously there was very little coherent data … Now automatic meter reading is our backbone. Now we cover 90% of electricity. We do need data. It does drive improvement.*"
>
> Property management firm

Some energy managers said that without solid data, it was hard to convince senior management about the potential of energy efficiency. In particular, installing automatic meters that provided real-time data on energy consumption rather than relying on reading conventional meters provided a huge boost for improved energy management:

> "*Metering has driven huge behaviour change. You have to start it off with data. We had energy management before, but not proper energy management.*"
>
> Energy consultant 1

While some energy managers recognised that improved data alone did not mean action on energy efficiency was inevitable, many insisted it was the start of the process of identifying savings. One interviewee, who sold measurement technologies, compared better data to road signs: "*A sign on the road is not the same as someone taking their foot off the gas pedal, but it works.*"

Sub-metering, where particular operations within an organisation are given real-time feedback on their own energy use, also helped to avoid rebound effects. One water company had found that engineers had changed behaviour when a meter showed the energy benefits of slightly adjusting a process. The energy manager said that monetising the change, by describing the savings, also made it more likely that the change would be embedded: "*You need to move from carbon accounting to carbon management. The real power is predicting what you are going to be using.*"

The interaction between price and information was also an important factor. Once a lack of understanding about energy use had been overcome and reduction was a senior management priority, the focus shifted to the price of energy and where the cheapest savings could be made.

6. There is a lack of information to assess energy efficiency opportunities

> *"Energy managers get fed up of being sold a lot of widgets. They are not all technical people. They are nervous about whether it will definitely save X amount. To me that is a big barrier."*
>
> Energy consultant 1

Concern about new technology was cited by several interviewees as a major barrier to investing in energy efficiency. Some interviewees had suffered bad and expensive experiences installing new 'energy efficient' technology that did not work as planned, and even created problems in other business activities. One energy manager from a restaurant franchise who invested in some poorly-designed equipment said that the year of the investment, 2004, was now used as shorthand whenever he proposed new technology: "*How can we be sure this is not another 2004?*" This technological caution was reinforced by bad experience with building management systems. A major IT firm found that despite the building management system telling them the lights outside a particular property were turned off every night, complaints from employees and a test found this was not true. The effect of poorly performing technology is to reinforce a nervousness or risk-averse culture from senior managers, many of whom have little understanding of energy problems.

Box 6.3: ICT sector and energy efficiency

Growth in the Information Communication Technology (ICT) sector is increasing demand for energy consumption. However, developments in information technology also offer significant potential for reducing emissions in other sectors of the economy.

The use of ICT is responsible for around 2-5% of the UK's total emissions, and around 10% of the demand for electricity. This demand is growing rapidly, as firms and public sector organisations use more computers, servers, printers and telephones. As a result, improving the efficiency of ICT equipment will play a major part in controlling UK emissions, particularly in the non-energy intensive sector. There is significant potential for carbon reductions using ICT, both in measuring and managing energy use and more efficient or low carbon technologies. Examples range from teleworking software to systems that automatically turn off equipment when people leave the office. The Climate Group estimated improvements in energy efficiency driven by ICT could reduce predicted global emissions by 15% in 2020.[87]

One major source of emissions is data centres, a single facility to house ICT equipment and store data. These are major users of energy representing around 2-3% of the UK's total electricity use alone. However, such facilities offer significant potential for efficiency improvements compared to underused servers based in offices. They are also becoming more efficient. While traditional data centres still draw up to 90% of their maximum power even when they are inactive, 'sharing' servers between different users (while protecting

87 Climate Group (2008) Smart 2020: Enabling the low carbon economy in the information age

data) can lead to much greater efficiencies.[88] Such virtualisation or 'cloud computing' shows the potential of the ICT sector to drive carbon reductions. This is particularly the case in small firms, where servers are underutilised.

However, Intellect UK, the ICT industry's body, argued that the UK's current policy framework undermines the potential to expand more efficient data centres. Intellect UK said that the CRC acts as a disincentive to increasing the UK's data centres. This is because data centre firms will take on energy use from customers and will be held reputationally responsible for apparently higher emissions through the league table, when in fact the growth of their data centres is reducing the economy's net emissions. This was compounded by the switch to a tax. In addition, even if the data centre firm generated its energy from renewable technology, they would still have to pay the full CRC rate (if that generation were also claiming Renewable Obligation Certificates or FITs).[89] One data centre operator said the CRC meant it was unlikely to locate any data centres in the UK. As a result, Intellect UK has called for data centres to be incorporated into CCAs (and therefore exempt from the CRC).[90]

The interviews suggested various policy improvements that might lead to energy efficiency being a greater part of ICT purchase decisions. Some argued for an expansion of the A-G energy efficiency classification system to ICT equipment. Another option suggested was including a wider range of ICT equipment on the Enhanced Capital Allowances (ECA) system, which provides tax relief for certain environmental technologies including measurement and building management systems. Other interviewees argued that it was up to individual firms to do appropriate due diligence. One restaurant chain energy manager said that she did not trust technologies on the ECA list. One manufacturing firm said that it had decided against installing one ECA-listed technology after consulting with other businesses. "*[Being on a list] would not convince me ... Technically, we decide ourselves what to do*."

7. There is a shortage of skills in energy management

> *"I see two types of people in energy management. You have the old school who liked tinkering with boilers and the people who are more interested in sustainability, who are more forward-facing."*
>
> NHS Trust

> *"There is a huge problem of shortage of skills in both the public and private sector."*
>
> Energy consultant 3

Several interviewees suggested that a lack of skills in energy management remained a significant barrier to improvements. The role of a traditional energy manager has shifted from simply ensuring major energy-consuming equipment kept running to someone who is more concerned about energy management and reducing carbon. However, people who combine these two sets of skills are rare. This problem is reinforced by split incentives (see below) where contracts are too rigid and do not include drivers for energy conservation. In addition, contracting out energy services to a facilities manager who does not have modern energy management skills may mean that such a person is reluctant to accept advice from an energy services specialist. However, one interviewee said that skills were no longer a major barrier in the public sector.

88 Parliamentary Office of Science and Technology (2008) *ICT and CO_2 Emissions*

89 This is different from reporting under the Greenhouse Gas Protocol. See Box 7.1

90 Intellect (2011) Intellect Response to DECC: A consultation on the simplification of the CRC

8. Split incentives are a major barrier to energy efficiency improvements

> *"Trying to get information from landlords is very difficult. They didn't want to tell us [about energy use]. They assume it is because you are looking to switch or save money."*
>
> IT firm

Split incentives were identified by several organisations as a major obstacle to improvements in energy efficiency, in particular in the public sector. As identified in the literature, divisions in responsibility between those who use energy and those who are responsible for making improvements to a building can prevent action.

This was confirmed by interviewees, who often found it difficult to get information from landlords about energy consumption, thus undermining efforts to try to manage consumption. One sustainability manager from a major IT firm said that even trying to discuss energy consumption meant that the landlord became suspicious that the client was simply trying to reduce the rent.

In some public sector organisations, the split was reinforced by rigid agreements between parties, in particular Private Finance Initiative (PFI) contracts. These contracts have been increasingly common over the past 15 years as a way to fund public sector developments. However, the contracts can often be very prescriptive. Some last for more than 25 years and specify particular aspects of how energy is managed. This can prevent changes in technology and practices. One energy service company manager put it succinctly: "*PFIs stop you dead in your tracks*". In one example, a facilities manager would not let an energy services provider alter the temperature in the boiler, as they claimed it would affect the performance of the boiler: "*They will say 'If that reduces the life of our boilers and you will have to pay for all the boilers'*" (Energy consultant 1).

As this example shows, often the split is not just two-way but three-way. A particular organisation may have outsourced the management of its buildings to a facilities management firm, but may also be keen to get advice from a specialist energy management firm. Interviewees said this creates suspicion from the facilities firm, who suspect they may be being undermined. "*Energy managers have egos and do not like to let go*" (Energy consultant 1). Again, this reinforces other financial and behavioural barriers.

> *"It just gets to be hard and sometimes the economics are not compelling and it is not the most significant decision (for a company). That is why there is not enough happening now."*
>
> Energy consultant 2

However, one interviewee showed that the split incentives barrier can be overcome if there is trust between the facilities managers and the tenants. One property management firm, operating a major part of the government estate under a PFI contract, said they had been able to build a relationship with internal energy managers: "*We do not let the contract get in the way of a good idea. It takes trust.*"

9. There is significant evidence of irrational behaviour in energy management

Leadership

> *"Senior levels don't quite get what sustainability is about. It would be helpful to have a chief executive fully engaged and leading from the front. Most companies are not like that. Making widgets is what they understand, not sustainability."*
>
> NHS Trust

> *"Energy is not your core business. Energy procurement – that is a distressed purchase for the business. It very rarely has management attention."*
>
> Energy consultant 3

> *"A keen CEO is important, without doubt."*
>
> Energy consultant 1

If an organisation's leaders do not identify energy efficiency as a priority, action can be severely hampered, according to the interviewees. This matches the importance of the messenger in behavioural economics. If the boss is not engaged, it is much less likely that staff will be. Many interviewees said that a general low level of awareness about energy and carbon among senior managers, often reinforced by inaccurate data, fed an over-cautious approach to investment. One NHS manager said that, even when presented with well-tested technologies, such as voltage optimisation, finance directors would be reluctant to sign off: "*There is a cautionary approach to investing in an engineering solution: 'We are a hospital, we do not know about voltage optimisation'.*" Often, a lack of leadership was fatal to action: "*If a minister does not like the temperature, that is it*" (Energy consultant 4).

> "Many interviewees said that a general low level of awareness about energy and carbon among senior managers, often reinforced by inaccurate data, fed an over-cautious approach to investment"

Engaging senior managers was haphazard. Some energy managers said that senior managers may have realised the importance of conserving energy after a conversation at the golf course or simply by noticing how steeply petrol prices have increased. Regulation, in particular the CRC, had also helped attract management attention. An awareness of climate change has helped this process:

> *"Traditionally an energy management system or application was of no interest to senior management, now CO_2 has made it an issue for the chief executive."*
>
> Technology provider

However, the mundane nature of many energy efficiency projects meant they might struggle to gain senior level attention, according to one energy consultant.

> *"Getting the attention at a senior level is still a barrier... There is nothing particularly sexy about efficiency."*

Correctly framing potential savings is a crucial behavioural element in gaining the interest of senior managers. One energy services firm was struggling to convince

a major food retailer of the potential of energy efficiency investment. However, once they began describing the positive impact on the bottom line in terms of profits, rather than savings, the potential client began to take more notice. When it was framed as an annual profit of £750,000 (the same as that from all the firm's northern operations), it received a better reaction.

Moreover, once senior managers made energy a priority it tends to filter through an organisation. In one multinational electronics firm, a long-standing culture of resource efficiency had developed. This culture led to lights being turned off in every unused room, as well as efficiency embedded in product design. One major retailer has targets on energy use throughout the organisation, after the chief executive identified carbon as a priority. One former water company energy manager said managers were so keen on efficiency they would send photos of examples of wasted energy around the firm. Once managers began to understand energy consumption, they become more confident when faced with energy efficiency investments:

> *"Customers have to be brought through an educational process... That means they are more trusting when they are being pitched business, they know what they are being pitched... They have increased their energy IQ."*
>
> Energy consultant 2

While large pockets of ignorance remain, there were signs that energy management was becoming a much greater priority. One energy services manager said: "*Five years ago, who would have understood the term carbon footprinting? Now it has almost become common vernacular.*" The manager put this down to the increasing and uncertain price of energy, something which financial directors loathed.

Default options

Behavioural economists argue that people tend to take the default option when faced with complex and uncertain decisions. This phenomenon was evident in the interviews:

Organisational structure affects how likely an organisation is to act on energy efficiency. In particular, if energy efficiency is not a priority for finance departments, it can be unfairly discounted. Finance departments are well-placed to help measure and manage carbon consumption, as they deal with energy data through bills. One energy manager at a truck firm said convincing his finance department of the need to engage "*had been a challenge... Financial needs to wake up and smell the coffee.*" Often a culture of just paying a bill automatically has to be overcome.

> *"Finance teams will question you on a £100 receipt, but will happily pay a £1,500 energy bill. There is a policy around expenses, but there is no policy around energy."*
>
> Energy services company

Other organisational irrationality undermined energy efficiency. Rigid public sector budgetary processes often meant that energy efficiency projects do not go ahead. One central government department's energy manager said that money would appear towards the end of the fiscal year, without enough time to plan a rigorous energy efficiency projects. Rigid borrowing rules have also prevented Salix Finance, a public-funded private firm set up to lend money for energy efficiency projects in

the public sector, from lending to central government departments (see Annex 1). In another other example, a finance company was unable to proceed with a loan to a public sector body because the organisation's rules stipulated that any loan must be stretched over ten years. The payback of the project was too short. Salix Finance has eased this irrational behavioural barrier considerably in some parts of the public sector, according to an NHS Trust energy manager.

The absence of a particular budget for energy efficiency was also identified by interviewees in the private sector. If money was saved through projects, it was not recycled to make further savings. If energy management or sustainability is represented on the board, that makes it more likely that investments get made, according to one manufacturer.

One public sector energy manager said that procurement decisions only took place once a piece of technology had broken down, rather than actively managing whether replacement offered earlier cost savings.

On a more local level, energy managers said that changing the energy consuming habits of staff is difficult. This problem is particularly acute in the public sector, where employees can be reluctant to engage in energy reduction activity if it changed working conditions (Energy consultant 4). The challenge of overcoming habits is made even greater by misaligned incentives. One energy services company manager said facilities managers tended to simply react to what the tenant wanted: "*The FM will override and override. Until you ask the question about how the building is used, you don't get anywhere.*"

Even if behaviour can be changed, maintaining improvements is difficult. One example given was encouraging people to switch off computer monitors when they went home. This worked for a short time, but needed to be reinforced by changing the default settings on the IT equipment. Senior leadership and commitment from finance were crucial in engendering a sense of shared responsibility: "*You need three people involved – sustainability, facilities management and you also need to get the buy-in from finance*" (IT firm). Once these interests are aligned, a lot can be achieved.

Commitments

Organisations who have successfully tackled energy efficiency have integrated targets for consumption throughout their organisation. One major retailer said that setting a company-wide target had led to store-level monitoring and targeting, and had encouraged managers throughout the firm to tackle energy use. The positive experience of some central government departments (see Box 6.2) demonstrates how making clear and public commitments helps achieve energy reduction measures.

Box 6.4 Potential of information and transparency: Windsor and Maidenhead

In 2008, Windsor and Maidenhead Council was looking to cut its energy bills. It realised that improved information combined with public pressure may have a role in changing behaviour. It installed energy monitors, provided by TR Control Solutions, in the town hall to provide real-time and accurate data. Crucially, it made the data available online, so that

residents could see how energy was being used in the main council building (and complain if they thought that energy was being wasted). The project was an immediate success, with an overnight 15% drop in energy consumption and has since been expanded to other buildings in the borough. Liam Maxwell, the council member in charge of the policy, said members of the public had even called up to query a sudden spike in energy use.[91] However, what was more important than the volume of calls was that officials were aware that the public could phone up and complain. As a result, the scheme drove officials to make sure energy was not being wasted in their department.

Ego

> *"The incentives have driven people to focus on lovely, sexy solar panels or wind turbines rather than switching things off. That is because it is not interesting. [Renewable energy] has been a distraction [from energy efficiency]."*
>
> Energy consultant 1

> *"You can see photos of the chief executive standing next to PV panels in the annual report. A new boiler? An air-cooled chiller? It is not going to happen. But they get a return far more quickly that through your PV investment."*
>
> Energy services company

Behavioural economists argue that people are more likely to take actions that make them feel better about themselves, even if it is not the most rational option. Many of the interviewees said that one barrier to greater action on energy efficiency was that it was not as exciting or as accessible for senior managers as alternatives. A lack of awareness about opportunities in energy efficiency means that managers make poor decisions. While some firms were reluctant to invest in energy efficiency projects with paybacks of more than 18 months, they were prepared to invest in renewable energy with paybacks stretching beyond seven years. Often, this was because the manager wanted to show that something was being done, rather than focusing on what should be done first.

One energy services consultant said it had been inundated with requests about solar panels (partly driven by the very rational attraction of generous Feed-in-Tariffs). He said a focus on renewables prevented more action on efficiency, as it tied up the time of the energy manager. This provides a warning for policymakers: "*It is worth remembering you are talking to the same audience with your messages.*" Another energy service company manager said the need to be seen to doing something 'green' led to confused choices. "*People tend to get big into recycling then jump to renewables. They do not pick some of the low-hanging fruit.*" Others stressed that it can be the unglamorous changes that make the biggest difference: "*IT is a drop in the ocean compared to plant and lighting. The stuff behind the scenes is what matters*" (Energy consultant 4).

This highlights some of the problems of energy efficiency projects – they are mundane, often invisible and poorly understood. As a result, when trying to demonstrate corporate social responsibility credentials they can be hard to show off. Finding a way for firms to celebrate their success in improving energy efficiency in a public way is a tricky challenge.

91 Author interview

7

Findings From Interviews With Energy Management Professionals About Policy

Policy findings

- The CCL and ETS are not seen as drivers of action on energy efficiency. Senior managers are often not aware of them, along with other price signals created by carbon policies.
- CRC Energy Efficiency Scheme:
  - The CRC has driven action on energy efficiency. Its reporting element has forced organisations to measure emissions, often leading to savings.
  - The league table has created a reputational risk that is leading to greater attention among senior managers, empowering energy and sustainability managers.
  - However, there are doubts about the fairness and usefulness of comparing different sectors in a single table. Interviewees said it has created a disincentive to invest in the UK.
  - The multiple requirements of the policy are seen as overly-complex and burdensome.
  - The switch to an effective tax has created triple taxation on electricity for CRC participants. This is seen as unfair and creates a direct financial disadvantage for those firms inside the CRC against competitors outside the scheme. It has also created another carbon price in the economy, underlining how different fuels and sectors are not treated in the same way.
- Regulation to improve available information, particularly through mandatory reporting, has the potential to drive action on energy efficiency.
- Regular changes to individual policy and the policy landscape have frustrated organisations. Greater stability would help drive improvements.

The following chapter outlines interviewees' views on particular UK policies. Although most policies discussed in Chapter 3 were discussed, most attention was paid to the Carbon Reduction Commitment. As a result, it is discussed in the greatest detail here.

CCL/CCAs/ETS

> *"No one really sees it [the CCL]. Our finance director asked about it, but he had confused it with the CRC."*
>
> IT firm

> *"The CCL is hidden in the bill. Anything that is hidden in the bill is not going to drive behaviour."*
>
> Energy consultant 1

The CCL was considered a weak driver of change by most of those interviewed. It was very rare that the levy was mentioned as a driver of improvements without prompting. For many, the CCL is a line in the energy bill and is simply paid and not acted upon. However, the water company's energy manager said the CCL *was* a factor in action on energy efficiency (this may be because energy costs are a greater proportion of overall expenditure in the water sector than elsewhere).

The focus of the research was not on energy-intensive industries. As a result, only one organisation interviewed, a car industry manufacturer, was part of a Climate Change Agreement. The energy manager said the firm had moved inside the CCA regime simply to avoid paying the CCL. It said that the targets it had negotiated under the CCA were actually weaker than its own internal targets: "*To be quite honest, to achieve the CCA, the target is quite easy*." This supports research that found CCAs were weak and had failed to drive efficiency improvements beyond business as usual. Some firms outside CCAs said they were keen to become part of CCAs, following the changes to the CRC. This determination to avoid the CCL and CRC does imply that carbon taxation has impact.

The ETS, if mentioned at all, was also not considered a specific driver of action on energy efficiency by itself. Again, it was considered just part of the cost of energy and not a separate driver (it is not itemised in energy bills).

CRC Energy Efficiency Scheme

> *"We have always supported the broad aims. But I have always had a feeling that it was more bureaucratic and complex than it needed to be."*
>
> Retailer

> *"Some of the objectives of the CRC are good. It gives senior level visibility of how much energy a company is consuming. However, it is cumbersome, inefficient and complicated."*
>
> Telecoms firm

The following summarises the key findings about the CRC.

1. **Raised profile of energy efficiency.** The introduction of the CRC has pushed energy efficiency and carbon consumption up the corporate agenda, according to interviewees. The policy led to greater engagement with the Carbon Trust and energy consultants. Many said that boards and senior managers are now more engaged in energy decisions. The interviewees put this down to both the CRC

submission having to be signed off at board level and the reputational risks presented by the league table. One IT sustainability manager said:

"Everyone complains about CRC but it was a good thing for us. I have got carte blanche to do what I can to reduce carbon."

One restaurant franchise said they appointed an energy manager, partly because of the introduction of the CRC (although also partly because energy prices were rising). The CRC has created significant opportunities for energy services companies.

2. **Carbon pricing has helped to reduce payback periods.** The need to purchase allowances has priced carbon more clearly, providing greater certainty. This has made some projects more cost effective and reduced payback times, making it more likely that improvements take place. As one technology firm said: "*CRC was welcome because it prices energy efficiency. Finance now look at it as a risk.*" One NHS Trust energy manager said the clear price made it easier to pitch energy efficiency projects.

"I am really pleased it is a tax. It did seem bloody complicated with the recycling. If you have a clear price signal and can say what that is going to be going forward, then you can invest. You can make a ten-year energy case. I can now factor in a minimum price."

One telecoms energy manager added: "*Let's not be dishonest, the CRC does provide an incentive for energy efficiency and does make it more likely to happen.*" However, he insisted that removing the recycling payment had weakened the drive for activity within his organisation. Several interviewees said that making the scheme into a straight tax had simply reduced the budget to spend on energy efficiency projects.

3. **Making firms report emissions had a considerable effect.** Several interviewees said that the CRC's reporting requirements forced their organisations to measure energy consumption and emissions accurately, some for the first time. It has also created a driver towards improved metering and understanding of energy consumption. However that effect is complicated by how the threshold for inclusion in the CRC was decided (it is based on the quantity of metered electricity, providing a disincentive for metering). One energy services provider said that the introduction of the CRC meant that 2010 was a record year for the purchase of smart meters.

4. **The removal of the recycling payment distorted energy taxation**

"Why should we pay three times for our carbon when our competitors are [not]?"

Restaurant franchise

"While we see the point of putting a price on carbon, [the system means] others do not have to pay, while we pay CCL, ETS and the new CRC."

Retailer

Several energy managers said that the removal of the recycling payment created an unfair tax system. Some said they could not understand why

carbon was not treated in the same way across the economy (including transport). Concerns were raised about why electricity used by CRC participants faced three taxes (CCL, ETS, CRC), while those outside the CRC faced only two, and heat outside the CRC only had to pay the CCL. One retailer said the decision to stop recycling payments had reinforced this unfairness. Those just above the CRC threshold were particularly angry if competitors were outside the scheme. One restaurant franchise said it would face additional annual costs of £700 per store compared to rivals outside the CRC. One energy consultant, whose firm was too small to be included, said he had previously lobbied his board to be part of the CRC for its potential reputational advantages, as some competitors were participants. He expressed understandable relief that his board had not been convinced.

5. The CRC was overly complex and created an unnecessary administrative burden

"I understand the principles for what the policy is trying to achieve. I am absolutely bemused by the way the government has gone about it. I have never come across anything as complicated and complex to understand."

Electronics retailer and manufacturer

"It is just a pain. The CRC was a great idea. It really drives behaviour. Gets them [businesses] worried about the information, about what they need to do... But the complexity is mind-boggling."

Energy consultant 1

The biggest complaint from interviewees about the CRC was the level of complexity. DECC has recognised this in its latest review of the policy, which considers a wide range of options for simplification. Specific complaints include the organisational rules for multi-nationals which require foreign firms with several operations in the UK to appoint a responsible party, who then has to collect energy and emissions data from other firms. Many firms in this situation said this was a major burden: "*It forces disparate businesses to work together and creates inherent conflict*" (Electronics firm).

Many organisations said that because of these organisational rules and the detail of reporting required by the CRC, too much time was spent finding data, and not enough time was left over to manage energy consumption (restaurant chain). This was particularly the case for organisations already required to report elsewhere, particularly in the public sector. Some argued that reporting for the CRC should follow lines for financial reporting (truck manufacturer).

There was some evidence that complexity around the reporting threshold had created anomalies. Basing qualification on readings from half-hourly settled meters meant that some firms could 'manage themselves out of the CRC' (truck manufacturer, restaurant chain), if they simply chose not to install meters. The literature and interviews argue that getting better energy data is a crucial first step in managing energy consumption. Another complexity raised

by interviewees was the future trading of allowances. One energy consultant was candid enough to concede that the complexity of trading would open opportunities for his firm. Another energy consultant also admitted the potential for increased consultancy provided a boon, but was still very critical of the scheme:

"It has been a disaster from day one…The initial idea was absolutely right about targeting big energy users, but not energy intensive organisations. Doing it through reputation [was right] with senior managers having to sign on the dotted line. However, through the various rounds of consultation and a lot of commentary, they came back with a policy that kind of allowed for all the commentary. This made it overly complex without really thinking about the end user."

Energy services company

6. Tinkering with the policy undermined action on energy efficiency

"Tell us what the CRC is going to be, tell us quickly and stick to your guns."

Water company

"The changes have caused a lot of upset. People have invested a lot in AMRs or the Carbon Trust standard. The lack of recycling has disenfranchised a lot of people."

Energy consultant 1

Frustration with the CRC was further stoked by the changes introduced in the Comprehensive Spending Review. For many interviewees the effect was to disempower the people who were likely to make the changes – energy managers: "*The problem for most of them is egg on the face*" (Energy consultant 5). The sudden shift to a tax from the recycling mechanism also created a level of anger and cynicism about government policymaking. More than one energy consultant agreed that the decision to revisit the scheme had led to a hiatus in firms acting on energy efficiency:

"We know they are going to change it again. People are dragging their feet because they do not know what to do."

Energy consultant 1

Several added that the uncertainty created by the change, on the back of regular tweaks to the policy (and reinforced by tweaks to other policies, such as the renewable Feed-in-Tariff) was the most significant frustration and meant firms would shy away from long-term investment on environmental action. Above all, energy managers craved stability and certainty in policymaking. Even supporters of the scheme said the changes had undermined its ability to encourage action on energy efficiency:

"It is a quite wonderful piece of legislation they put together, but they did not let it last long enough to see if it works."

Energy consultant 1

7. The league table showed reputation could be a driver of action, but there were concerns about fairness and whether it provided useful comparisons

"That is where CRC, as was, is a very clever instrument – it has to be signed off at board level. This is why I so hope they keep the league table."

Energy consultant 3

"For me to get traction within the organisation, it was quite a powerful thing. We are worried about our brand. We really do not want to be bottom of the table."

IT firm

"Companies are generally more worried about where they sit on the league table than how much it was going to cost them."

Energy services company

"I think league tables are good. It moves you from accounting to management. If you have a league table, you have got to have a strategy."

Water company

The league table led to action on energy efficiency for many of the firms, according to the interviews. One energy consultant said it helped bring together the reputational, regulatory and price drivers for energy efficiency. He warned that without the high-level sign-off and the league table, organisations might just pay their tax and not worry about carbon. The league table was "*that glue in between all three of the drivers. It made [the CRC] a potent instrument.*"

However, while the league table was a driver, many energy managers felt that it provided unfair comparisons. Others said they were so concerned about the flaws in the league table, that even if they came top they would be cautious about taking any PR advantage from it. One multinational electronics firm, which has both factories and retail outlets in the UK, said rivals who did not have UK factories would get an unfair advantage:

"If you want to come top of the league table you come there by reducing your UK operations in a carbon efficient way... It actually becomes a disincentive for businesses to operate in the UK compared to EU countries."

Most interviewees said the only useful comparison from the league table would be between similar organisations. One restaurant chain said that combining all the data together in one league table undermined its ability to make meaningful comparisons. Others questioned how useful the metrics were in comparing performance, in particular the early action metric.

Mandatory reporting

"I firmly believe that mandatory reporting would be the most cost effective way of reducing CO_2 and energy reductions. What gets measures gets managed. It gets organisations to the starting point."

Energy services company

There was significant support for making organisations measure energy and carbon consumption and report it. One energy consultant said he believed that mandatory reporting would have the same effect as the CRC by making firms concentrate on energy efficiency. Others said a carbon tax would not be as effective without mandatory reporting. Making the CEO sign off on figures had a significant effect. Only one interviewee, a manufacturer who already reported through CCAs, said the information should not be public saying that it would be "*just another stick to whack us with.*" However, he agreed measuring was crucial and already reported the firm's emissions through a CCA.

Box 7.1: Green Tariffs

One complex issue raised in the interviews was green tariffs. Energy suppliers sell green tariffs to organisations and households for energy generated from renewable sources. These tariffs are usually higher than normal energy prices. Under Defra's Greenhouse Gas Reporting Protocol, organisations can only report emissions under green tariffs at zero emissions if the generator did not receive payment through a policy such as the RO or FITs. In effect, the renewable electricity must be *additional* to generation supported by RO and FITs. The government argues such instruments already provide adequate support for renewable generation and wants to avoid double-counting (as such measures already reduce the overall carbon intensity of energy generation). This has infuriated companies that use green tariffs. One interviewee said that green tariffs, if used properly, would create a premium price for green energy, which would drive greater investment in renewables without expensive policy support:

> *"At the moment there is no point us spending all the money buying green energy. The way it is set up, you are not allowing the market to have an influence... It is an economic engine that is not being utilised... Suddenly, the board asked 'Why the hell are we purchasing green energy?'"*
>
> *Telecoms*

Some concerns were raised about reporting. Firstly, several interviewees stressed that mandatory reporting should not conflict with reporting requirements already in place. A number of interviewees said the process must match financial reporting timetables – a move they said would help embed emissions reporting within finance departments – and structures, rather than the complex organisational rules under the CRC. Most firms argued that full reporting of Scope 3 emissions (see Box 5.2) was not practicable at the moment, but may be in the future. Some interviewees argued that reporting should include business-related transport emissions. One central government energy manager raised concerns about how to account for emissions from contractors. One telecoms energy manager said the rules for reporting green-tariff energy created a disincentive to purchase renewable energy (see Box 7.1). However, none of the interviewees said these complications would be impossible to overcome. The energy manager from the water firm said third party verification was vital to avoid greenwash.

Others pointed out that if reporting was mandatory, unofficial league tables, possibly from NGOs, would spring up straight away. One energy consultant said

mandatory reporting from a wider range of firms approach would encourage the SME market to look at carbon consumption and reporting.

Building Standards

Building Standards were seen by interviewees as a driver of improvements, both in new build and refurbishments. There was little concern about tightening standards, and most firms simply just comply. None said they should be loosened, and several interviewees said they should be tightened over time.

Display Energy Certificates and Energy Performance Certificates (see Annex 1)

Display Energy Certificates (DECs) were generally welcomed by those who had to provide them, mainly in the public sector. One former university energy manager felt that they were a useful tool for raising awareness. One property management firm, who was initially sceptical about their benefits, now believes they had proved useful:

> *"They are a really straightforward way of letting people understand the performance of the building. At my board level, they can understand a letter. I think that little bit of clunkiness is turning out to be quite a bit of an advantage."*

The manager added the question of whether to spend more money to push the building rating higher was now an active part of discussions about building upgrades. Others were more sceptical of their benefits, with some complaining that preparing DECs took up too much time and got in the way of managing energy. One interviewee conceded that he had not yet installed DECs, despite a legal obligation to do so.

Energy Performance Certificates were seen as a weak factor in decisions on new buildings. Some interviewees said they were just seen as an income generator for those who performed them, and were not yet factored into decisions about property.

Product Labelling

The question of whether the Green Deal's list of approved technologies could reassure risk-averse finance directors was also raised. Again, the evidence was mixed with some energy managers looking for greater assurance about a technology's performance, while others insisted that it was up to companies to make informed energy decisions.

This doubt about government standards was also raised in relation to Enhanced Capital Allowances. One interviewee from a restaurant franchise said the products on the list were not tested in a real environment, but only in a lab. They added that getting the tax benefit was complicated, as the allowances sometimes referred to technologies purchased between a particular set of dates.

Green Deal, Salix Finance and revenue recycling

For the larger firms interviewed, access to capital was not raised as a major issue. They did not see themselves as benefiting from the Green Deal (except as a potential provider). As we have seen, access to capital was a major barrier for some firms, but the general level of awareness about the Green Deal was low.

Several energy managers, both in the public and private sector, argued that revenue raised from any carbon tax, including the CRC, should be recycled back to finance energy efficiency projects. This would have the effect of ring-fencing capital to energy efficiency projects. One professional services manager argued that such a loan facility, tied to energy efficiency, could be the precursor of a Green Investment Bank. Salix Finance loans were shown to help overcome organisational irrationality within the public sector.

8
Conclusions and Policy Recommendations

This report has sought to understand why firms and public sector bodies act or fail to act on energy efficiency, and how policy helps and hinders those decisions. The literature and the interviews indicated that a narrow cost-benefit analysis of a new piece of technology or process is only one element in the decision-making process. The wider costs of understanding energy consumption and comparing technologies also needed to be taken into account. In addition, there was some evidence of irrational behaviour when energy efficiency opportunities are being considered.

The research identifies a number of areas in need of attention, in particular:

- Simplification of the overlapping policies and reduction in unnecessary burdens.
- Greater clarity and consistency in the carbon price, and its future trajectory.
- Development of the immature reputational market, so organisations can gain the maximum benefit for reducing carbon consumption.

The proposed policy changes outlined in this chapter aim to unlock energy savings across the non-domestic sector, and to realise the cheaper carbon reductions energy efficiency promises.

A key aim is to enable and incentivise organisations to become more aware at a senior level of the importance of managing energy, overcoming misaligned incentives and behavioural effects that have often prevented action on energy efficiency, without having to resort to draconian regulation. The interviews underlined that managing energy use is a process. One interviewee described the process of senior managers "building their energy IQ" before action to cut energy and carbon can take place.

Of course, improving energy efficiency is just one way of reducing carbon emissions. The proposed framework aims to encourage firms to identify the cheapest carbon reductions, not simply use less energy. While these reductions will likely be through energy efficiency, at least in the short-term, boosting management's Energy IQ will allow more rational, long-term carbon-cutting decisions to be made.

A clear, consistent and stable policy framework based on effective prices and information should help make energy a more important factor on a range of decisions, including renting and buying new buildings, negotiating contracts

with facilities managers and energy services companies, and purchasing new equipment and technologies. As a result, split incentives should be eased.

Policy recommendation 1: Scrap the CRC, in favour of simpler and broader arrangements for (a) pricing carbon and (b) mandating carbon reporting.

Reasons for recommendation:

- The CRC is too complex and burdensome. As a result, it has prevented its helpful interventions from applying to a wider group of organisations.
- The CRC is unfair to firms whose competitors fall outside the scheme. This was made worse by the removal of the recycling mechanism and switch to what is in effect a tax.
- The scheme exacerbates the already complex pattern of carbon prices affecting different organisations and different parts of the economy.
- The policy has caused frustration among energy managers because of uncertainty and tinkering. This has delayed action on energy efficiency.
- Its aims, including the Treasury's revenue-raising needs, can be achieved more simply through mandatory carbon reporting and a more coherent carbon pricing framework.

The interviewees condemned the CRC as unnecessarily complicated, burdensome and unfair. While some elements of the CRC – its steps towards a green 'reputational market' through mandatory reporting and a league table – have helped drive action on energy efficiency, its complexity undermined the policy's potential benefits. In particular, the organisational eligibility rules, the guidelines for which emissions to include, overlaps with other policies and the administration needed to partake in a carbon permitting and trading scheme had caused considerable frustration.

This complexity – highlighted by the Committee on Climate Change – meant the positive aspects of the CRC cannot be applied to a greater number of organisations, even though there would likely be benefits from many of them being required to report emissions.

Frequent government tinkering has compounded complaints of complexity. The policy has been in development for more than five years, and has seen many minor changes, including the threshold, the format of the league table and reporting rules. Removing the recycling element changed the scheme again. Yet another consultation begins in January. The interviews showed that this delayed action on energy efficiency.

Moreover, the switch to a tax created yet another separate carbon price in the economy. Firms within the CRC face this additional cost but those outside, including some competitors, do not. For a firm on the threshold, which consumes 6,000MWh of electricity a year (around £500,000) this is an extra cost of £36,000 compared to a firm just below the threshold, or a 7% increase in the cost of electricity.[92]

As a result, the scheme, as it is currently stands, should be scrapped in favour of much simpler and broader arrangements for (a) pricing carbon and (b) mandating carbon reporting and encouraging effective public comparisons between organisations.

92 Based on 0.5kgCO2/kWh grid average.

Policy recommendation 2: Simplify carbon pricing across the non-domestic sector. Flatten the carbon price distortions between different types of customer and different fuels, through abolition of the CRC and adjustment to CCL rates.

Reasons for recommendation:

- The overlaying of UK energy policy has created multiple, widely-diverging carbon prices across the economy. There are inconsistencies both between different types of consumer and different types of energy. This creates distortions and risks preventing the economy's cheapest, most efficient carbon reductions being realised.
- By 2020, these differences will become even more marked. While one sector of the economy (CRC) will pay an effective carbon tax rate of more than £110/tonne CO_2 on electricity use, gas use outside the CRC will only pay a rate of £10/tonne.
- Carbon prices are currently opaque, undermining their potential to identify savings.

> *"The only change in economic circumstances that has been shown to reduce energy consumption is an increase in energy prices."*
>
> Green Fiscal Commission[93]

There is clear evidence from the CCL, rising energy prices and interviews that pricing is a necessary (though not always sufficient) driver of action on energy efficiency. However currently carbon pricing across the industrial and commercial sector is:

- highly and irrationally variable between different categories of firm, and different categories of energy use;
- opaque, hidden beneath overlapping policies.

The very wide range of carbon prices distorts demand reduction efforts (the variations were highlighted in Tables 5.2 and 5.3). It means some measures will be taken to reduce electricity use, even though cutting gas use or other carbon reduction efforts may be cheaper. The effect is to make the overall cost of carbon reductions more expensive.

The principle for aligning gas and electricity carbon prices already exists, as the CCL rates are set to provide a similar carbon price. However, this has been undermined by adjustment in other policy areas. For example the Carbon Price Support announced in the 2011 Budget will apply only to electricity.

This therefore leaves the main discrepancies between carbon prices in the non-energy intensive sector as:

- CRC organisations vs non-CRC organisations; and
- gas vs electricity emissions.

93 Green Fiscal Commission (2010) p.12

Our goal is to see these differences reduced and removed. We recognise the Treasury's need to maintain its expected revenues, in particular following the Comprehensive Spending Review announcement about the CRC. For the CRC, this is expected to be £640 million in 2012-13, rising to £1 billion by 2014-15.[94]

There are a number of possible options for adjusting existing policies to deliver a more consistent carbon price across emission sources and organisations, including abolishing the CRC carbon 'tax', applying the upstream CPS tax instrument across both gas and electricity (though this would also affect domestic customers)[95] or using adjustments to the (downstream) CCL rates to narrow discrepancies.

Our preferred package, although only illustrative, is explained in Box 8.1.

Box 8.1: One policy option to achieve more consistent carbon pricing

1. Remove the £12/tonne price for CRC participants.
2. Increase the CCL rate on non-electricity use in the non-domestic sector to equalise it with total carbon price on electricity (CPS plus CCL).
3. Adjust all CCL rates so that overall Treasury revenues matched those expected previously, including the CRC.

   Detailed modelling of the effect on Treasury revenues is beyond the scope of this report and this proposal is suggested purely to show what a flatter, fairer carbon pricing system might look like. The proposal would increase the price of gas to £26.2/tonne CO_2 (0.48p/kWh, up from 0.18p/kWh now). Assuming gas use represents around one third of workplace emissions[96] (around 37MtCO_2, not including ETS emissions), this increase would raise around £615 million (37MtCO_2 multiplied by the £16.6/tonneCO_2 increase in the gas CCL rate). This compares to the £640 million expected to be raised through the CRC in 2013. For guidance, the CRC currently covers 52MtCO_2 of emissions. This suggests our proposal could broadly offset the loss of revenue by scrapping the CRC. Any further shortfall could be achieved by measures such as reducing the number of sectors with CCAs (see Policy recommendation 6), reducing the percentage rate of CCL exemption or further adjusting CCL rates on both electricity and gas.
4. Continue to increase the CCL on non-electricity to match proposed increases in the Carbon Price Support until 2020. Such an approach may, over time and depending on actual future CPS and CCL rates, increase overall carbon tax revenues somewhat more than the government's current plans. Increasing carbon taxes over time could be offset by reductions in other taxes such as employee National Insurance Contributions (as was done when the CCL was introduced) or income tax. The Coalition Agreement commits the government to increasing the proportion of tax revenue from environmental taxes.[97]

94 HM Treasury (2010) *Spending Review 2010*

95 Helm, D (2010) *The Case for Carbon Taxes*

96 Defra (2011) p.42

97 HM Government (2010) *The Coalition: our programme for government*

Figure 8.1: Effective carbon prices 2013 – current policy

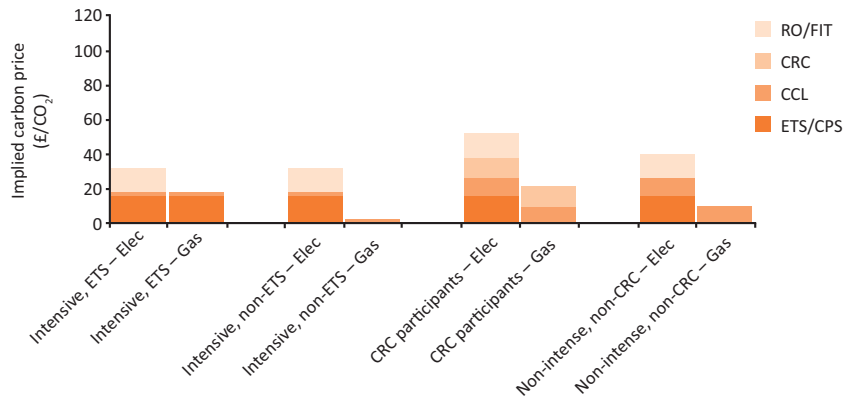
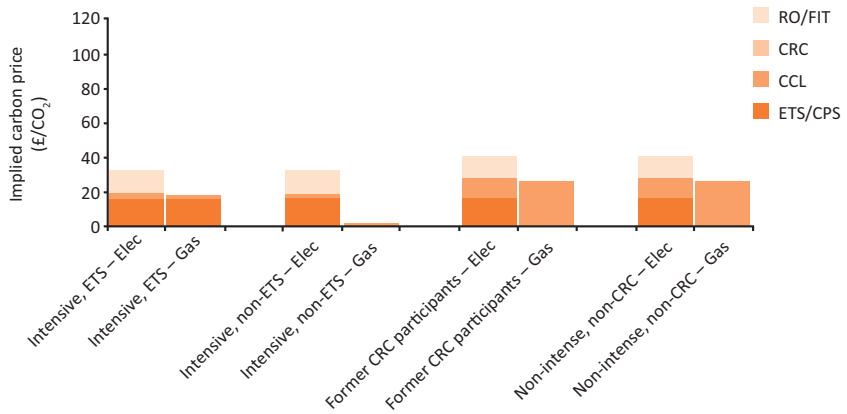


Figure 8.2: Effective carbon prices 2013 – Policy Exchange proposal



Figures 8.1 and 8.2 compare the current implied carbon prices for 2013 based on current policy with this report's proposal for flattening out the carbon price in the non-domestic sector. While some discrepancies in the effective carbon price will remain, our proposals show a much more consistent carbon price, in particular across the non-intensive sector (where the distortions of the CRC have been removed) and between different fuels.

Characteristics of this package include:

- aligning the carbon price between gas and electricity, better incentivising businesses and public sector bodies to reduce emissions in the cheapest ways;
- instead of hitting electricity use by large companies hardest (as in current CRC plans), the carbon tax is raised across a wider range of companies and fuels, leading to less competitive unfairness and distortion;
- Treasury revenues would be neither reduced nor increased in 2013;

- simplification, and lower administrative burdens, as a result of removal a whole scheme (the CRC), and simply adjusting the rates of a pre-existing tax (the CCL);
- raising organisations awareness again of the CCL; and
- no impact on domestic customers.

While such an approach would likely increase the price of non-electricity energy use for firms currently outside the CRC, it would provide a much fairer and more consistent approach for reducing emissions. It would also remove the projected distortions where a switch from gas to electrical heating is disincentivised by inconsistent prices, even if such a move would be cheaper without the additional costs of carbon policy.

Increasing visibility of carbon price

The inconsistency discussed above is made worse by a lack of visibility about the carbon price. In order for any carbon price to have the greatest possible impact on energy efficiency, the interviews and literature suggest it has to be as visible as possible, so that it is part of senior management decision-making. The CCL is detailed in bills for non-domestic customers, but the cost of other carbon policies is not included. In Green Bills,[98] Policy Exchange argued that business and consumer bills should specify the cost of carbon policies.

Policy recommendation 3: Ensure greater certainty about future carbon prices by placing the gas-based carbon prices on the same trajectory as electricity Carbon Price Support. Provide greater certainty through future contracts on carbon price.

Reasons for recommendation:

- The current framework fails to give a clear, certain long-term price signal, which could provide greater certainty for energy efficiency (and other low carbon) investment.
- The interviews and literature show that a carbon price with a clear future trajectory could help convince senior managers of the need for investments in energy efficiency.
- The government has established a rising trajectory for carbon in electricity generation through the Carbon Floor Price. It is appropriate to match the carbon price for gas to this trajectory to allow the market to choose the cheapest emissions cuts.
- A rising carbon price has been shown as the best way to counter the rebound effect and ensure energy efficiency improvements continue.

Uncertainty over the future price of carbon through the ETS risks undermining decisions on low carbon investments. The interviews found that this uncertainty, combined with a lack of visibility over other carbon taxation levels was, in some cases, preventing greater energy efficiency investment. Many energy managers and consultants argued that a clear, long-term carbon price would increase the chances of senior managers agreeing to projects. Crucially, a rising carbon price is also the best way to counter the rebound effect,[99] ensuring energy efficiency improvements continue.

98 Less, S (2010) *Green Bills.* Policy Exchange

99 Sorrell, S (2007)

While the 2011 Budget set out a future price for carbon until 2020, the removal of the fuel duty escalator in the same document highlighted that long-term tax trajectories are vulnerable to political circumstance.

There are various options to increase certainty over the carbon price for both electricity and gas, including: legislating over the period of a parliament; and allowing an outside body, such as the Committee on Climate Change, to either advise or set the level of carbon tax. Obviously, the latter option would provide greater certainty to investors (and the model of the Bank of England setting interest rates is already established). However, such a move is likely to meet considerable opposition from the Treasury who would be reluctant to lose control of taxation.

Our preferred option is for government to ensure greater certainty by providing contractual guarantees.[100] In effect, the Treasury would provide insurance for firms that made investments based on the Treasury's future carbon price trajectory. They would only pay out on these contracts if they, the Treasury, then abandoned its promised carbon price. The effect would be to greatly increase certainty for not only investors in low carbon technology, but also for people considering energy efficiency investments based on future carbon prices. Greater long-term certainty could also be provided by extending such measures to 2030, as was suggested in the Treasury CPS consultation.

Policy recommendation 4: Introduce mandatory reporting for up to 24,000 large firms, as well as public sector organisations. Rather than centrally design a league table, the government should enable private and civil society organisations to use the data to produce comparisons, and accredit the most effective ones.

Reasons for recommendation:

- A lack of reliable information about energy use prevents cost-beneficial action on energy efficiency. When organisations measure emissions, it can lead to significant and cheap savings.
- Mandatory reporting will make it more likely that senior managers will pay attention to energy use. This increased awareness, or 'Energy IQ', means that energy efficiency investments are more likely to be considered on an equal basis with other investments.
- Evidence indicates that a much wider group of organisations than those within the CRC would benefit from carbon reporting.
- The 'reputational market' for green and energy efficiency claims is held back by a lack of transparency, creating difficulties in verification and comparison of green claims. Mandating organisations to report emissions would provide reliable, comparable data.
- This data could be used in comparisons and league tables produced by the private sector or by civil society. The government could then approve the one it considers most useful, boosting its reputational driver.

Making firms and public sector organisations publically report their emissions and/or energy consumption will have several effects. Firstly, it ensures that energy consumption is measured accurately. There is considerable evidence that accurate understanding of energy use can to lead to better management of it. Secondly,

100 Less, S. (2010) *Remonopolising Power.* Policy Exchange; Climate Change Capital (2011) *The UK Carbon Price Floor: How to enhance its credibility with investors.*

ensuring it is published means that senior managers will have to understand the figures and make decisions based on the risks of higher carbon prices. Thirdly, the improved transparency will allow investors, customers, green campaigners, academics and the general public to make comparisons and hold organisations to account.

There remains considerable uncertainty as to precisely what mandatory emissions savings reporting would deliver. Defra's current consultation on mandatory reporting recognises this, stressing there were "extremely large uncertainties" about the benefits of mandatory reporting. As a result, it says the net present value for one of its consultation options – mandating large firms (around 24,000 companies) to report emissions – could range from a benefit of £549 million to a loss of £6 billion.[101] These figures imply policymakers should be extremely cautious about where they set the threshold for inclusion in mandatory reporting. However, the consultation has made conservative assumptions – as it concedes – to arrive at its figures. In particular:

- The upper limit of the costs is, in part, based on the cost of complying with the CRC. However, mandatory reporting will not include the significant costs of auctions and trading that are part of the CRC.
  - Analysis considering alternatives to the CRC found that a mandatory reporting scheme (with a 3,000MWh threshold) would cost between 30-50% less than a carbon permitting scheme.[102]
- The benefits in the consultation were calculated on a maximum, one-off carbon reduction of 2% in non-transport energy use (the lower estimate of cost-benefit assumed no change in carbon emissions). However, the interviews suggested that once firms pay more attention to energy management, it is likely to lead to ongoing investment in energy efficiency. This leads to greater carbon savings, and therefore greater benefits.
  - The best performing firms have been able to achieve ongoing annual reductions of 3% over more than ten years, according to the interviews, partly as a result of improved measurement. The interviews showed there was considerable potential for reductions in energy consumption.
  - More than 250 organisations who have achieved the Carbon Trust Standard, partly by better-measuring carbon, have cut emissions by, on average, more than 6%.[103]
  - The government itself is on course to reduce its emissions by 10% in just one year from its central estate.
  - The Committee on Climate Change says large commercial and public sector bodies could make cost-effective reductions in emissions of between 1.6-3.6% annually.[104]
- The Carbon Trust found there were "overwhelming opportunities" for cost-effective abatement from the non-energy intensive sector (even with the extra cost of its proposed cap and trade scheme). It argued that any firm with a half-hourly meter would benefit from an increased focus on energy efficiency under its (more-complex proposals). This equates to 13,000 private sector firms.[105]
- Earlier Defra analysis found mandatory reporting by itself would provide a net present value of between £310 million and £1.9 billion, although it was limited to fewer organisations than those under the current consultation.

101 Defra (2011) *Impact Assessment of options for company GHG Reporting*

102 Defra (2007) *Comparison of Policies to reduce Carbon Emissions in the large non-energy-intensive sector.*

103 Carbon Trust (2010) *Carbon Trust annual review 2009/10*

104 Committee on Climate Change (2010) *The CRC Energy Efficiency Scheme – advice to Government on the second phase*

105 Carbon Trust (2005)

The increased regulatory burden of mandatory reporting should also be seen in the context of this report's recommendation to remove the administrative complexities of the CRC. By replacing such a scheme with mandatory reporting, this means that a larger number of organisations would see a net benefit from inclusion. By scrapping the CRC, any new reporting requirements may also satisfy the Coalition's "one in, one out" rule for new regulation.

Crucially, any increased regulation must be seen within the context of current carbon policies, such as support for the mass roll-out of renewable energy. As we have seen, the Renewable Obligation is a very expensive scheme and places a significant extra cost on the price of electricity for businesses. Mandatory reporting, alongside other changes suggested here, offer a much simpler and cost-effective way of reducing emissions.

This report supports one of the proposals in Defra's consultation, that all large firms (around 24,000) are required to report emissions annually.

League Table

The interviews showed that the proposed CRC league table may have had led to action on energy efficiency, and had pushed energy use up the corporate hierarchy. However, there were major concerns about the way the league table had been set up, including the choice of metrics used to produce the table. Some organisations said the table created a disincentive to invest in the UK, as expansion would lead to a lower spot on the table.

Moreover, organisations were concerned about how they performed against other firms or public sector bodies in the same sector, rather than in an overall league table. Focusing on a single league table may hide important comparisons within sectors, and different, but valid, ways of comparing organisations' performance. Importantly, one of the main reasons for a single league table – to decide how recycling payments would be allocated – has been removed by the changes in the Comprehensive Spending Review.

An alternative is for government to simply require organisations to report comparable emissions through mandatory reporting and enable civil society – academics, NGOs, think tanks, journalists, bloggers, carbon data firms – to create their own comparisons and tables from the data. These could be more nuanced, sector-specific, use different metrics and innovate. There are a number of examples of comparison mechanisms in other fields and some of the most impressive often have no government involvement whatsoever. There could be competition to produce the most credible league table. The government could then give its backing to its favoured approach, or accredit a range of ways of comparing organisations. This report supports such an approach.

Policy recommendation 5: Allow organisations to report purchased 'green energy' at zero net emissions.

Reasons for recommendation:

- Such a move will create a greater demand-side driver for renewable energy generation.
- If it unlocks significant additional market demand, it may allow a reduction in the generosity of future government-mandated subsidies for renewable energy.

In order to maximise the reputational advantage of mandatory reporting, some interviewees said they wanted to be able to report very low or zero total emissions. In addition to cutting reducing energy use, an organisation can also reduce its reported emissions either by generating its own renewable energy or by buying 'green energy' from its supplier, through green tariffs (see Box 7.1). The current GHG Protocol treats these options differently. Firstly, energy generated onsite from renewable power is counted at zero emissions. Any renewable energy generated onsite that is sold back to the grid is reduced from its gross figure, to provide a net figure.[106] The treatment of 'green tariffs' is different. An organisation can only offset the energy they purchase through green tariffs from gross emissions if it can prove the renewable energy was generated in addition to support policies, such as the RO or FITs.

Some energy managers argued that these rules create a disincentive to purchase green energy. In effect, it undermines the potential of the market's demand-side to drive investment in renewable energy. If the reputational benefits of reporting low emissions data are significant, it would create a greater demand for both onsite renewable energy and green tariffs, increase the price of such energy and incentivise further investment in renewable generation.[107]

Others argue that such an approach risks 'double-counting', as the carbon reductions from subsidised renewable generation are already reflected in a (lower) electricity grid average. However, this argument is unconvincing. If the market demonstrates sufficient demand for green energy, then there is less need for government intervention to mandate it. In that event, the levels of subsidies needed for renewables could be cut.[108] The inability to report energy from renewable energy as zero emissions meant that one data centre operator said it was unlikely to locate centres within the UK. Reporting rules should allow the zero-reporting of green tariffs, and review the impact after a period.

Policy recommendation 6: Reduce the scope of Climate Change Agreements

Reasons for recommendation:

- CCAs are a weak driver of action on energy efficiency. Evidence suggests they simply match business as usual improvements.
- By providing a large discount on the CCL, the agreements contribute to the discrepancies between carbon prices across the non-domestic sector. This may prevent the market from identifying the cheapest, most efficient ways to reduce emissions.

CCAs were established to protect the most energy-intensive businesses from increased costs under the CCL. This was to prevent these sectors moving abroad. However, the literature, as well as some evidence from the interviews, shows that CCAs have been a weak instrument in improving energy efficiency. The targets have only matched business as usual improvements in energy efficiency. One interviewee said the CCA targets were less rigorous than his firm's internal targets. One comparison of energy use data for manufacturing firms inside and outside CCAs found removing the CCA discount would have led to substantial energy savings without jeopardising economic performance.

106 This approach is different for the CRC, where onsite renewable energy is treated as grid average.

107 Regulators would have to ensure the total of low carbon energy sold through such tariffs was no greater than the total low carbon generation across the UK.

108 Any changes should not affect current RO commitments, but future changes to the subsidy system.

While this report has focused on non-energy-intensive industries, there appears to be significant opportunity for reducing the CCL rebate on CCAs or phasing it out, at least in some of the 54 sectors the agreements cover. The government should only retain protection for sectors where there is clear evidence that the absence of a CCA would lead to offshoring of industry.

A new direction is needed following the Budget, which extended the use of CCAs until 2023 and expanded the CCL discount (which had been reduced to 65% in the 2009 Budget). The government is set to consult on a simplified CCA scheme in the next few months. It should take the opportunity to conduct a full review of which sectors should retain the tax benefit of the CCAs.

Annex: Summary of Existing UK Policies Relating to Energy Efficiency

Climate Change Levy and Climate Change Agreements

The two policies were introduced in the 2001 Budget. The Climate Change Levy is a tax on all non-domestic energy consumption. The policy aims "to encourage energy efficiency in business, agriculture and the public sector, and to reduce emissions from these sectors".[109] Revenues were offset against National Insurance Contributions, so the policy was revenue neutral. Energy intensive firms were rebated up to 80% if they signed up to a Climate Change Agreements.

The levy aimed to make energy efficiency investments more attractive by increasing the price of energy (and therefore the potential savings). It provided an incentive for organisations to reduce energy consumption, including by investing in energy efficiency measures. In addition – as with any policy – by announcing a focus on energy efficiency the government raised awareness of the opportunities.

Climate Change Agreements were introduced alongside the Climate Change Levy to protect energy-intensive industries disproportionately affected by increased taxation on energy. These were agreements between the then Department for Trade and Industry (now Department for Business, Innovation and Skills) and industry sectors. The sectors covered included chemicals, minerals, metals, textiles, horticulture and packaging. It was extended in 2006 to more sectors. The agreements specify an improvement in energy efficiency for each sector as a whole, in exchange for a rebate of up to 80% on the CCL. The negotiations aimed to ensure that the firms closed 60% of the gap between a 'business as usual' scenario and 'taking all cost-effective measures'.[110]

While shielding eligible firms from the impact of the CCL (therefore limiting the price effect), the policy attempted to tackle some of the wider costs to improved energy efficiency. In particular, it aimed to overcome the absence of reliable information within an organisation about energy consumption and focus senior level attention on efficiency options. The 2011 budget extended CCAs to 2023 and increased the discount for some sectors. A consultation on simplifying CCAs is expected next year.

EU Emissions Trading Scheme (ETS)

The ETS is a cap-and-trade scheme that aims to reduce carbon emissions across Europe. It was set up in 2005 as the major policy instrument to help the EU to meet its carbon reduction obligations under the Kyoto Protocol. Under the

109 HM Treasury (2000) *Regulatory Impact Assessment – Climate Change Levy.* p.2

110 AEAT (2001) Climate change agreements – sectoral energy efficiency targets. Technical report, AEA Technology, Didcot.

scheme, generators and major energy consuming industries were given permits to emit carbon. The quantity of permits is capped. This cap has been tightened since the scheme's introduction, and a proportion of the permits are now auctioned. Currently, the scheme covers around 43% of UK emissions, mainly from the power sector but also other major emitters. The ETS is a pricing tool that allows the market to price the cost of carbon reductions. Following early fluctuations, the current traded price of carbon has settled at around €15 a tonne (around £13 a tonne of carbon). This is the equivalent to 0.65p/kWh levy on electricity use, higher than the current CCL.

Carbon Price Support

To try and overcome the limitations of the ETS (and as part of a wider reform of the electricity market), in the 2011 Budget, the Chancellor of the Exchequer George Osborne announced a minimum price for carbon emitted by electricity generation through to 2020:

> *"Investment in green energy will never be certain unless we bring some stability to the price of carbon. Today we become the first country in the world to introduce a carbon price floor for the power sector... This will provide the incentive for billions of pounds of new investment in our dilapidated energy infrastructure."*

The CPS provides a minimum carbon price. It would use an upstream carbon tax to supplement the ETS price if the price of permits is lower that the target price in a given period. In other words, the tax will be net of the ETS price. The CPS taxes fuels used in electricity generation depending on their carbon content, like the ETS. Electricity generated by coal will be taxed at a higher level than that from gas-fired generation, while nuclear and renewable energy will not pay the levy. The CPS carbon price target will start at £16/tonne CO_2 in April 2013 and increase to £30/tonne CO_2 in 2020. Although the CPS is technically an adjustment to the Climate Change Levy, the existing CCL rate on non-domestic energy use will remain in place.

CRC Energy Efficiency Scheme (CRC)

The CRC Energy Efficiency Scheme, formerly the Carbon Reduction Commitment, grew out of the then-Chancellor Gordon Brown's 2004 Pre-Budget Report. Brown said that rising oil prices and concerns about carbon emissions demanded greater action on energy efficiency.

A year later, the Carbon Trust published *UK Climate Change Programme: potential evolution for business and public sector*. The report argued that there was significant potential for reductions in carbon emissions from the non energy-intensive sector, but that the current package of measures (in particular the CCL) was "not providing significant incentive for change across the less energy intensive segments".[111] The report argued that inadequate information about energy consumption, including a lack of metering, meant that organisations found it hard to assess opportunities for reducing energy waste. "It is hard to manage what you cannot measure".[112] The Carbon Trust proposed the following scheme:

111 Carbon Trust (2005) p.4

112 Ibid.

- A cap-and-trade scheme for large non-energy intensive companies (around 13,000) and the public sector, outside the ETS and CCAs. It would cover around 73.4MtCO_2 of UK emissions (65% from private sector).
- Permits to emit carbon would be auctioned and traded between firms in the sector. Purchased allowances would lead to a CCL discount.
- Emissions from both direct energy and electricity consumption would be covered. Emissions from transport may be included at a later date.
- Organisations would publically report emissions.

Over the next five years, the proposal was refined by a series of consultations. As the scheme currently stands, it has the following elements:

1. Reporting

Eligible organisations (those using 6,000MWh of metered electricity – about £500,000 a year) registered with the Environment Agency in 2010. The public sector, including central government departments, also had to comply. Around 2,700 organisations registered. In July 2011, eligible organisations will report the previous year's emissions, approved by a senior director. Emissions covered by the ETS or CCAs will not be included (unless they receive benefit under support schemes such as the Renewable Obligation). Transport emissions will be excluded.

2. League table

The government will use the data to publish a league table (the first is due in October 2011). As currently proposed, the table will be based on three different metrics:

- Early action metric. 50% of this will be based on the percentage of an organisation's electricity and gas supplies covered by automatic meters. This aims to encourage firms to increase metering. The other 50% will be based on the proportion of emissions certified under the Carbon Trust Standard (a standard for energy efficiency measures). This aims to avoid punishing those who had already taken significant action on energy efficiency.
- Absolute metric. This will measure the percentage change in an organisation's emissions compared to an average of the previous five years.
- Growth metric. This will reflect the percentage change in carbon emissions per unit of turnover, compared to the previous five-year average. This aims to counter the disincentive to growth of the absolute metric (If a firm expands rapidly it is likely its emissions will also increase. If the league table only relies on the absolute metric, it risks creating unfair reputational damage to a firm that has expanded rapidly).

The relative importance of the metrics will change as the scheme develops. The first league table will be based entirely on the early action metric. By 2013, the early action metric will represent just 20%, the absolute metric 60% and the growth metric 20%.

3. Carbon permitting/cap and trade

In the first phase, (originally due to start in April 2011, but now delayed until April 2012) firms and public sector bodies will purchase permits to emit carbon, at a set

price of £12 a tonne. The first capped phase was due to begin in April 2013 with the auction of permits. Revenue from the sale of permits was expected to be recycled back to participants, based on performance in the league table. This made it a revenue neutral scheme for the Treasury, apart from a small administrative cost. The recycling aimed to create a carrot for organisations to come towards the top of the table, on top of the reputational driver. By 2013, the organisation at the top of the table would receive the cost of the purchased allowances plus a 30% premium.

The recycling payment was eliminated in the October 2010 Comprehensive Spending Review. Money raised from the permit sale will now be retained by the Treasury. The Review also delayed parts of the scheme. The first round of permits will not be sold until April 2012 (the capped phase will now begin in 2014). The business sector condemned the switch away from recycling, dubbing it "an environmental stealth tax".[113] Greg Barker, the Climate Change Minister, admitted that it was simply a revenue-raising move.[114]

Renewable Obligation and Feed-in-Tariffs

The Renewable Obligation (RO) is the main government scheme to support the development of renewable electricity generation. Introduced in 2002, it obliges suppliers to source an increasing amount of electricity from renewable sources. They can either do this by setting up their own projects or buying Renewable Obligation Certificates from other renewable generators. The scheme has been criticised for trying to achieve too many policy goals: rapid expansion of renewable deployment; some support for early stage innovation; and promotion of green jobs.[115] It has also been criticised for favouring particular technologies and for being hugely and unnecessarily expensive.[116] The policy is relevant to this report because it places an additional cost – another levy on electricity – around 0.7p/kWh on 2013, rising to 2.1p/kWh by 2020.

The Feed-in-Tariff (FIT) is a subsidy paid to support small-scale renewable energy generation, also paid for through another levy on energy prices (though much smaller than the RO). Policy Exchange's report, Greener, Cheaper, called for the government to abandon the scheme as it was too expensive for the benefits likely to be secured

Building regulations

Increasing efficiency in the non-energy intensive sector often means improving the quality of buildings. As the Carbon Trust report, Building the Future, Today, argued the UK needs "better buildings, used better".[117] It found there was a lack of demand for energy efficient buildings. This may be because of a lack of available information on a building's efficiency or misaligned incentives between landlords, tenants and other parties.

One option for cutting through this is simply to mandate minimum efficiency standards. Currently, this is done through building regulations. Section L2 of the Building Code deals with energy efficiency. L2A deals with regulations for new buildings, while L2B deals with major renovations (around 15% of existing building will undergo a major renovation before 2020[118]). In addition, the previous administration said that by 2019, all new non-domestic buildings should be 'zero

113 Financial Times (2010) *Carbon 'stealth tax' spat mars business welcome.* October 20th, 2010

114 DECC CRC Consultation event, March 3rd, 2011

115 Helm, D (2009) *Credible Energy Policy*. Policy Exchange. London; Gross, R (2010) *Is there a route to a UK Feed in Tariff for renewable energy*. ICEPT Discussion Paper.

116 For a fuller discussion of the RO see Moore, S (2011) *2020 Hindsight: Does the renewable energy target help the UK decarbonise?* Policy Exchange

117 Carbon Trust (2008) p. 4

118 Ibid.

carbon'. However, there was considerable confusion about what 'zero carbon' meant. The Coalition government appeared to step back from this commitment in the 2011 Budget. The main advantage of regulating in this area is simplicity. Government provides minimum standards which have to be met and therefore drives improvements. This eliminates uncertainty for builders. However, it does impose additional costs on businesses, and government should ensure that the standards are likely to provide a clear cost-benefit and that the market is not delivering improvements by itself. The Carbon Trust argued that all commercial buildings should be mandated to achieve an F-rating by 2020 (on an A-G scale). The government is expected to launch a consultation on building regulations for the commercial sector in December.

Information on energy performance of buildings

As we have seen, a lack of data on energy use is a major barrier to action on energy efficiency. In an effort to address this, the government – driven by the EU's Energy Performance of Buildings Directive – introduced mandatory Energy Performance Certificates (EPC) and Display Energy Certificates (DECs) in 2008.

EPCs assess a particular building's potential for energy efficiency, and benchmark it against other buildings on a scale of A to G. When any building is sold or leased it must include an EPC. DECs use actual consumption data which reflects both the energy efficiency potential of a building but also how energy is used within that building. It is compulsory for all large public buildings to display these prominently, and they have become a common feature in universities, central government departments and even the Houses of Parliament. DECs also rate performance on a scale from A to G. The Carbon Trust found that if the average DEC rating for commercial buildings shifted from an E to a C by 2020, it could cut carbon emissions in the sector by 35% by 2020. To meet the 2050 reduction targets the UK's average needs to improve to an A.[119]

The DCLG has begun consultation to extend DECs to all large commercial buildings by the end of 2012. Its impact assessment put the net present value of such a move as £316 million, based on the increased take-up of energy efficiency measures. However, it expressed considerable uncertainty as to what levels of take-up of energy efficiency the introduction of DECs would create.[120] The DCLG is also consulting about improvements to EPCs.

Product standards/labelling

The UK (via EU legislation) has enjoyed considerable improvements in efficiency through its labelling system. This has categorised energy consuming products, such as fridges, on an A-G scale. Without banning inefficient products, labelling is estimated to have delivered a huge increase in the market for energy efficiency fridges. In 2003, sales of A-rated fridges represented around 45% of the market, up from fewer than 5% in 1990.[121] Similar schemes, such as the Energy Star system in the United States, have also delivered significant improvements. The EU drives legislation on product labelling so there is limited potential for the UK to act alone, although it does provide tax relief to some products through the Enhanced Capital Allowances scheme (see below).

119 Carbon Trust (2008)

120 Department for Communities and Local Government (2010) *Proposal for extending Display Energy Certificates (DEC) to commercial buildings*

121 Stern (2006) p.439

4. Organisational/Behavioural and other policy

Carbon Trust

The Carbon Trust was set up in 2001 with two aims: to help organisations cut their carbon emissions; and to provide support for early stage low carbon technologies. It is a not-for-profit, private company. It aims to overcome several barriers to the greater take-up of energy efficiency. Firstly, it provides low-cost or free advice to firms on cutting emissions, including a best practice programme. It also manages the Enhanced Capital Allowances scheme. This lists approved energy efficient technologies, including boilers, lighting and automatic meter reading technology. Such purchases receive 100% tax relief and the policy aims to reduce the search costs for energy efficiency technologies. The Carbon Trust has also established the Carbon Trust Standard, which accredits organisations that have taken measures to reduce energy use. This aims to bring greater credibility to projects, and therefore enhance the reputational benefit of energy efficiency schemes. This is underscored by its inclusion in the CRC early action metric.

The Carbon Trust also provides interest-free loans to businesses to take energy efficiency measures. The loan scheme has run since 2003 and is targeted at small and medium sized firms (fewer than 250 employees or turnover of up to £42.5 million). Loans can range from £3,000 to £100,000. Since 2003, the scheme has lent £150 million, which it estimates will save £350 million in energy bills and 4.4MtCO_2 over the lifetime of the projects.[122] It was given an additional £79 million in 2009 as part of the government stimulus package. However, the government has decided the Carbon Trust will no longer receive central funding from 2012.[123] To counter this fall in funding, the Carbon Trust announced a £550 million deal in partnership with the financing arm of engineering group Siemens.

Salix Finance

Salix Finance provides interest-free loans to the public sector for energy efficiency projects. Set up by the Carbon Trust in 2004, it is a not-for-profit, private company. It has several aims. Firstly, by offering cheap loans it makes efficiency projects more attractive. Secondly, it aims to cut through irrational, over-rigid public sector borrowing rules. Thirdly, it demonstrates public sector leadership. Finally, it saves money.

Salix loans are offered under two models: firstly, through pots of match-funded money to public sector bodies; secondly, a project-by-project loan fund. The first fund is closed to new entrants, as it was felt that money could be used more efficiently through the second approach.[124] Salix has loaned around £110 million, supporting 6,000 projects with around 500 public sector bodies. Projects range from new controllers on hot water urns to boiler replacements. The largest project cost £2.5 million (the average is £20,000). Loans are offered only if the improvements pay back over a maximum of five years (although they are paid back to Salix in four).

Salix relies on grants from government to fund its lending. It was awarded £50 million in the 2009 budget, but has no guaranteed annual funding. It received £4.5 million from central government in 2010 and £2.75 million from the Welsh authorities. There is little independent assessment of Salix's performance. Its chief executive Alistair Keir said it expected a 100% repayment on its lending from the

122 Carbon Trust (2010) *Carbon Trust annual review 2009/10*

123 DECC (2011) *Review of DECC's Delivery Landscape*

124 Author interview with Alistair Keir, chief executive, 22nd February, 2011

project-by-project loans. The repaid money is returned to the Treasury. It estimates its lending will help save £660 million in public sector energy bills and 4 million tonnes of carbon. Salix has been unable to lend to central government departments because of accounting rules against external loans.

Improving the energy efficiency of the UK's workplaces presents a tantalising opportunity to cut carbon emissions. Reducing energy use through conservation and improved efficiency often offers significantly cheaper carbon savings compared to alternatives such as increased renewable energy generation. However, policymakers have struggled to unlock the potential of energy efficiency in the UK.

This report examines why parts of the non-domestic, non-energy intensive sectors appear to have neglected cost-saving energy efficiency opportunities. It explores how UK climate policy can improve the awareness and understanding of energy – the 'Energy IQ' – of the commercial and public sector.

Based on interviews with 22 energy experts and analysis of current policy, *Boosting Energy IQ* finds the UK's overlapping climate policies are unnecessarily complex. Moreover, they have created multiple carbon prices across the non-domestic sector. This risks making overall carbon reductions more expensive. The report argues for a simpler policy framework that will help ensure that managing energy use is a greater priority for organisations. The report calls for the scrapping of the unfair and over-complicated CRC Energy Efficiency Scheme. It should be replaced with mandatory reporting for 24,000 organisations and a fairer, clearer carbon price with a more certain future trajectory.

£10.00
ISBN: 978-1-907689-06-2

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