EXPLANATORY MEMORANDUM TO

THE CRC ENERGY EFFICIENCY SCHEME ORDER 2010

2010 No. 0000

1. This explanatory memorandum has been prepared by The Department of Energy and Climate Change and is laid before Parliament by Command of Her Majesty.

2. Purpose of the instrument

2.1 This Order makes provision for the creation of a new energy efficiency scheme called the CRC Energy Efficiency Scheme (CRC). The scheme has been designed to reduce carbon emissions through improving energy efficiency in public and private sector organisations that are consumers of large amounts of electricity and further public sector organisations that are mandated to participate. The scheme will be necessary for the UK to meet its domestic and international greenhouse gas emission reduction targets (and future such targets).

3. Matters of special interest to the Joint Committee on Statutory Instruments

None

4. Legislative Context

4.1 CRC is being introduced under powers provided by the Climate Change Act 2008 (Part 3 and Schedules 2-4). The Order is being made in conjunction with regulations made by the HMT under section 21 of the Finance Act 2008.

4.2 The main climate change policy instruments affecting large private and public sector organisations are the Climate Change Levy (CCL), Climate Change Agreements (CCA) and the EU Emissions Trading System (EU ETS). CCL is a tax on energy use. CCA are voluntary instruments allowing certain sectors a reduction on their CCL where agreed emission reduction targets are met. The EU ETS is a site-based trading scheme designed to drive emission reductions from upstream energy intensive facilities. CRC has been designed to avoid overlap with these instruments.

5. Territorial Extent and Application

5.1 This instrument applies to all of the United Kingdom.

5.2 The definition of the extent of the United Kingdom in regard to this instrument is set out in section 89 of the Climate Change Act 2008.

6. European Convention on Human Rights

The Secretary of State of Energy and Climate Change has made the following statement regarding Human Rights:

In my view the provisions of the CRC Energy Efficiency Scheme Order are compatible with the Convention rights.

7. Policy background

What is being done and why

7.1 In 2005, Government published its Energy Efficiency and Innovation Review which, drawing on analysis by the Carbon Trust, identified cost effective energy efficiency opportunities for large private and public sector organisations that existing policies were not delivering. The analysis suggested that insufficient financial drivers, uncertain reputational benefits of demonstrating leadership, split incentives between landlords and tenants and organisational inertia have prevented cost effective energy efficiency measures from being adopted. By placing large private and public sector organisations in a regulatory scheme that will limit the total number of carbon emissions participants can emit, the CRC will ensure that the available cost effective emissions savings are taken up in the target sector.

7.2 Emissions from the CRC's target sector are estimated to be c. 53.2MtCO_2 per annum; approximately 10% of the UK's total CO_2 emissions. Our policy aim is for the CRC to deliver emissions reductions of at least 4MtCO_2 pa by 2020 and net financial benefits to participants of approximately £1 billion per annum by 2020. The carbon reductions will help deliver on the UK's carbon budgets as set out in the UK Low Carbon Transition Plan. The emissions reductions in future years will be driven by the cap, which will be set by Government after considering advice from the Committee on Climate Change.

7.3 The Environment Agency, the Scottish Environment Protection Agency and the Northern Ireland Chief Inspector will administer the scheme. Organisations that qualify for the scheme will need to register to be a participant as described in Part 2 of the Order. Under Part 4 participants will need to produce a "footprint report" once a phase detailing their emissions covered by the EU ETS, CCA and CRC footprint supplies (defined in section 2 of Schedule 5). The footprint report is due by the last working day of July after the end of each "footprint year". After the introductory phase footprint years will be five years apart. Under Part 5 participants will need to produce annual reports, which cover a subset of energy supplies covered by the footprint report. This subset will include core electricity and gas supplies (defined in Schedule 2) as well as any residual supplies (defined in section 2 of Schedule 5) required to ensure that at least 90% of the participant's emissions are covered by either CRC, CCA or EU ETS. Annual reports are due by the last working day of July after each annual reporting year. Part 6 of the Order requires participants to surrender allowances equal to the emissions resulting from the energy supplies that they are required to report on in the annual report.

7.4 Regulations made under section 21 of the Finance Act 2008 will provide the administrator the powers to sell these allowances to CRC participants. The administrator will publish a league table setting out how well each participant is improving its energy efficiency relative to the other participants (Part 10), based on information provided in the annual reports. To ensure compliance participants will be audited by the administrator each year using a risk based approach. Organisations failing to meet their obligations under the scheme are liable to receive civil penalties and in limited cases, criminal penalties.

7.5 Until 2013 there will be an unlimited number of allowances that participants can buy. However after the first phase a limited number of allowances will be sold at auction thereby limiting the amount of carbon the target sector can emit. The Government will take into account the advice of the Committee on Climate Change in determining the number of allowances to be sold.

Consolidation

7.6 CRC has been designed to avoid overlap with existing policy instruments, in particular EU ETS, and CCAs, and renewable energy financial incentives.

8. Consultation outcome

8.1 In November 2006, the UK Government and Devolved Administrations consulted on options to drive energy efficiency in the target sector primarily focused on:

1. The CRC Energy Efficiency Scheme (then called the Energy Performance Commitment) – a mandatory energy efficiency trading scheme targeting carbon emissions from large business and public sector organisations.

2. A system of voluntary benchmarking and reporting of energy use covering large business and public sector organisations.

8.2 Responses demonstrated strong support for a mandatory approach, with the majority of respondents considering that a voluntary measure would not deliver the required target reductions. Analysis commissioned by Government in 2006 established that a mandatory emissions trading scheme, such as CRC would deliver net benefits to the target sector. Further analysis commissioned by Government in 2007, looked at various policy options for emissions reductions and concluded that an emissions trading scheme covering the target sector performed favourably compared with alternatives such as expanded Climate Change Agreements, stronger building regulations or mandatory reporting and benchmarking. It was therefore announced in the 2007 Energy White Paper that Government would proceed with implementation of a mandatory emissions trading scheme.

8.3 In June 2007 Government consulted on the implementation options for CRC including areas such as price of allowances, definition of organisations, auction design, emissions coverage and relationship to CCAs and EU ETS. With a couple of exceptions, responses showed strong agreement with the proposals described in the consultation. The main exception was the grouping of maintained schools with their Local Authority. The Government Response was published in March 2008. The Government chose not to change its policy on maintained schools in order to demonstrate public sector leadership and because cost effective carbon reduction opportunities have been identified through analysis of schools' estates.

8.4 In March 2009 the Government published a third consultation document primarily focusing on the CRC Draft Order (as it was then drafted) but also including some technical policy details. Responses showed that overall there was a consensus that the Draft Order would meet the policy intent without unforeseen consequences. However there were some specific concerns about the cash flow implications for participants in the first year and some questions concerning the performance league table and other technical aspects of the scheme. In October 2009 the Government published the Government Response which addressed the issues raised by allowing participants greater organisational flexibility in how they may participate in the scheme; has made the first year reporting only; and has amended technical details of the scheme.

9. Guidance

9.1 A CRC 'user-guide' has been published on the DECC website to accompany the Order. This document sets out in plain terms the obligations that participating organisations will need to meet. The document is written as a practical tool for those within participating organisations who will be responsible for ensuring compliance with the scheme.
(http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/crc/compliance/compliance.aspx)

9.2 The Environment Agency has published detailed guidance on their website describing the obligations that organisations need to undertake to register and will be publishing further guidance and case studies over the coming year. They also operate a helpdesk for participants.
(http://www.environment-agency.gov.uk/business/topics/pollution/111597.aspx)

10. Impact

10.1 The impact on CRC participants is a net benefit of £1,133million (present value, based on 10% commercial discount rate) over the next 23 years. Monetising the carbon savings and air quality benefits raises the net benefits to £3,800million (based on 3.5% discount rate).

10.2 An Impact Assessment is attached as an annex to this memorandum and can also be obtained from the website of the Department of Energy and Climate Change:
(http://www.decc.gov.uk/en/content/cms/consultations/crc/crc.aspx)

11. Regulating small business

11.1 The legislation does not apply to small business.

12. Monitoring & review

12.1 The scheme will start in April 2010. An introduction phase will run for the first three years of the scheme during which time all aspects of the scheme will be monitored. The scheme will be fully reviewed after the introductory phase.

13. Contact

Jane Dennett-Thorpe at The Department of Energy and Climate Change (Tel: 0300 068 5304 or email: jane.dennett-thorpe@decc.gsi.gov.uk) can answer any queries regarding the instrument.

Summary: Intervention & Options

Department /Agency:	Title:	
DECC	Impact Assessment of the CRC Energy Efficiency Scheme	
Stage:	**Version:** Final	**Date: October 2009**
Related Publications: Consultation on the Draft Order to Implement the Carbon Reduction Commitment: Government Response and Policy Decisions – October 2009		

Available to view or download at: http://www.decc.gov.uk/en/content/cms/consultations/crc/crc.aspx

Contact for enquiries: Head of Branch, CRC Team **Telephone: 0300 068 5304**

What is the problem under consideration? Why is government intervention necessary?

Barriers and market failures mean that cost-effective abatement measures are not being taken up in this sector, in which energy costs represent a relatively small proportion of total costs. In addition, the carbon price for those parts of the sector not covered by EU ETS is relatively low (CCL)* and does not reflect the marginal cost of meeting our emissions reduction targets. Without Government intervention meeting our targets would be more costly, as the cost-effective abatement identified by analysis would not be realised. This policy will overcome this issue through the combination of a cap and trade system allied to a reporting mechanism that will raise the profile of the prevailing carbon price.

What are the policy objectives and the intended effects?

The CRC's objectives are to encourage carbon savings within large organisations, primarily by driving uptake of cost-effective end use energy efficiency measures and fuel switching – in order to help the UK meet its medium and longer-term greenhouse gas emisssion reduction targets. In addition, the CRC should encourage UK leadership in respect of the EU's voluntary commitment to a 20% improvement in energy efficiency by 2020 (within the "EU 20/20/20 package"). By incentivising cost-effective action in the EU ETS sector, the CRC is also designed to create the policy conditions for more stringent upstream EU ETS caps in the future. Government will take into account the views of the Committee on Climate Change in setting the CRC caps, acknowledging that greater emission reductions could be realised through more ambitious caps.

What policy options have been considered? Please justify any preferred option.

Government consulted in November 2006 on policy options to secure 1.2 MtC / year cost-effectively from the large business and public sector organisations. The two primary measures that were given detailed consideration within the consultation were the CRC - a mandatory 'cap and trade' scheme and a system of voluntary benchmarking and reporting of energy use. Stakeholders were generally clear in their response for a need for a mandatory policy approach. Government has also published substantial analysis appraising a wide range of different potential policy options to target the sector (and this analysis is referenced within Annex 1). Government then announced in the Energy White Paper in May 2007 its decision to implement the CRC.

When will the policy be reviewed to establish the actual costs and benefits and the achievement of the desired effects?

Initial assessment autumn 2011, after the first compliance year in the Introductory Phase, and then at end of the Introductory Phase, in Autumn 2013. Government is developing its evidence base on energy consumption in sectors covered by the CRC, which will support future evaluation.

*Climate Change Levy

Ministerial Sign-off For Impact Assessments:

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs and benefits.

Signed by the responsible Minister:

Date:

Summary: Analysis & Evidence

Policy Option: -	Description: CRC Energy Efficiency Scheme

COSTS

ANNUAL COSTS		Description and scale of **key monetised costs** by 'main affected groups'
One-off (Transition)	**Yrs**	The main costs are emissions control costs (around 50%) and admin costs (50%).
£ 0	-	
Average Annual Cost (excluding one-off)		
£ 34m	15	**Total Cost** (PV) **£ 500m**

Other **key non-monetised costs** by 'main affected groups' -

BENEFITS

ANNUAL BENEFITS		Description and scale of **key monetised benefits** by 'main affected groups'
One-off	**Yrs**	Main benefits are energy savings (around 50%), benefits to society of carbon reductions (around 40%) and air quality benefits (around 10%).
£ 0	-	
Average Annual Benefit (excluding one-off)		
£ 290m	23	**Total Benefit** (PV) **£ 4,300m**

Other **key non-monetised benefits** by 'main affected groups'

The scheme could create the conditions for tighter future EU ETS caps.

Key Assumptions/Sensitivities/Risks The Net Benefit Range is driven by using a range of assumptions for carbon valuation and air quality benefits in line with Government appraisal guidance. The impacts are also driven by assumptions on the speed at which participants make the savings under the assumed allowance price. The impact of the league table on incentives and revenue recycling is also uncertain as this type of mechanism has not been implemented before.

Price Base Year 2009	Time Period Years 23	**Net Benefit Range** (NPV) **£ 2,500m – 5,340m**	**NET BENEFIT** (NPV Best estimate) **£ 3,800m**

What is the geographic coverage of the policy/option?	UK
On what date will the policy be implemented?	April 2010
Which organisation(s) will enforce the policy?	The Environment Agency, Scottish Environment Protection Agency & Northern Ireland Department of the Environment.
What is the total annual cost of enforcement for these organisations?	£6m*
Does enforcement comply with Hampton principles?	Yes
Will implementation go beyond minimum EU requirements?	Yes
What is the value of the proposed offsetting measure per year?	£ 0

What is the value of changes in greenhouse gas emissions?	£1 billion (non-traded) £0.8 billion (value of EUA savings)
Will the proposal have a significant impact on competition?	No

* Based on 4,000 participants

Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large
	-	-	-	**9000**
Are any of these organisations exempt?	Most	Most	Some	Some

Explanatory note: The CRC targets the UK energy use emissions of the highest parent organisation and its group members. The scheme focuses on organisations using at least 6,000 MWh/year of half hourly metered electricity. Most SMEs will be exempt at this threshold, although some will participate by virtue of their inclusion as group members. The scheme focuses on organisations for whom the private energy efficiency benefits should outweigh the administrative costs.

Impact on Admin Burdens Baseline (2005 Prices) (Increase - Decrease)

Increase of £ 2.2m Decrease of £ - **Net Impact** **£ 2.2m**

Key: **Annual costs and benefits: Constant Prices** **(Net) Present**

Updated IA: CRC Energy Efficiency Scheme

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1. Purpose and Intended Effects of the Measures

1.1 Objective

This IA examines the costs and benefits of a particular scenario for the CRC Energy Efficiency Scheme (CRC) – a new mandatory energy saving scheme. The Government will come forward with plans in 2012 for the final level of emissions savings from the scheme and will re-assess the costs and benefits nearer the time.

The 2006 Energy Review set out the Government's aims to reduce carbon emissions from large business and public sector organisations – targeting energy use not covered by Climate Change Agreements (CCAs) or directly by the EU Emissions Trading System (EU ETS). In line with this emphasis, subsidiaries with more than 25% of their energy use emissions in CCAs will be exempt from the CRC.

In total, this target group covers emissions corresponding to about 53.2 million tonnes of carbon dioxide ($MtCO_2$) per year, and analysis of the modelled scenario suggests that currently available energy efficiency measures (not covered by other schemes such as the Energy Performance of Buildings Directive (EPBD)) could cost-effectively save at least 1.3$MtCO_2$ (0.4MtC) per year by 2015, rising to 3.2$MtCO_2$ (0.9MtC) per year by 2020. Government wants to cut emissions from the target group by incentivising investment in energy efficient technologies and systems, and by encouraging the business and the public sectors to improve their energy management and reduce their energy consumption. However, estimates of the likely level of abatement at given prices are subject to a high degree of uncertainty. The final level of carbon savings from the CRC ("the cap") will be determined in 2012 after taking into account advice from the Committee on Climate Change.

Government believes that existing policies, including the Climate Change Levy, the Building Regulations and work by the Carbon Trust, will continue to contribute to effective emissions reductions, but that there is further potential in these sectors.

The **UK CRC Energy Efficiency Scheme** (CRC) will apply mandatory emissions trading to energy use emissions from these sectors, thereby contributing to several energy policy goals, including meeting energy and climate change objectives fairly at home and abroad and ensuring that the UK economy benefits from the business and employment opportunities of a low-carbon future. The concept of a 'cap and trade' emissions trading scheme means that emissions abatement should occur where it is cost effective, with those for whom it would be more costly buying additional allowances instead. Starting in 2010, the CRC will save at least 1.3$MtCO_2$ (0.4MtC) per year by 2015, rising to 3.2$MtCO_2$ (0.9 MtC) per year by 2020. The reductions within the CRC sector will be greater owing to the synergy with other measures, such as the EPBD and decarbonisation of electricity supply within the sector.

1.2 Background

In the Pre-Budget Report 2004, the Chancellor announced that Defra and HM Treasury would jointly sponsor a review into innovation in energy efficiency. A summary of the principal

conclusions of the review was published alongside the Pre-Budget Report in December 2005. At the same time, within the context of the Climate Change Programme Review and feeding into the Energy Efficiency Innovation Review, the Carbon Trust carried out some in-depth research looking at the potential evolution of the Climate Change Programme for the business and public sector – culminating in a detailed report to Government, also published in December 2005[1].

The Carbon Trust concluded that there is significant scope for cost-effective energy efficiency and emissions reductions in large business and public sector organisations. The Carbon Trust appraised a wide range of policy options both qualitatively and quantitatively to address this market segment, and recommended a new mandatory cap and trade UK Consumption-based Emissions Trading Scheme (UK CETS) as a frontrunner option for this target sector.

The original option, as suggested by the Carbon Trust, was subjected by Government to a thorough process of review and additional analysis. This included taking a step back and looking again at a broader range of options to address emissions from large organisations as well as commissioning more detailed analysis on a possible emissions trading scheme, including a major study by NERA and Enviros[2]. Overall, this led to some significant refinements to the proposed new trading scheme.[3]

The 2006 Energy Review announced that Government proposed to consult on the introduction of a new measure to target energy use emissions from large organisations which lie outside the EU ETS and Climate Change Agreements (CCAs). Analysis (by NERA/Enviros) of the costs and benefits of a cap and trade scheme were also published. A consultation document was published in November 2006 which invited views from stakeholders regarding options to secure the uptake of 1.2MtC/year carbon savings by 2020 from the sector – in particular highlighting the mandatory CRC (then named the Energy Performance Commitment (EPC)) and voluntary reporting and benchmarking. Alongside this consultation, the original partial RIA was also published, drawing together all the relevant evidence on the costs, benefits and overall regulatory burden of the CRC proposal, alongside the option of a voluntary reporting and benchmarking scheme.

Following the publication of the original partial RIA and November 2006 consultation document, Defra commissioned additional work into aspects of how the CRC would work. This included research by ERM/MDI into the CRC auction and market design; work by Hedra into defining a solution for the identification of the relevant organisations for the CRC and analysis by NERA into potential alternative options for securing carbon reductions in the target sector.

In May 2007, Government announced in its Energy White Paper its decision to implement the CRC. In June 2007 Defra published a second consultation document – on the policy design of the CRC – inviting views on how the UK Government and Devolved Administrations should

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[1] Carbon Trust (2005) The UK Climate Change programme: Potential evolution for business and the public sector. Report Ref: CTC518. Available online at:: http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=CTC518&metaNoCache=1

[2] Available online at: http://www.decc.gov.uk/media/viewfile.ashx?filepath=what we do/a low carbon uk/crc/policy/nera-enviros-report-060428.pdf&filetype=4

[3] The original proposal was based on targeting all organisations with mandatory half hourly metering, without exemptions for small energy users.[0]

implement the CRC, along with an updated partial RIA. Defra published a Government response to this policy design consultation[4] in March 2008 and commissioned Ecofys/Burges Salmon to perform further analysis on organisational structures within the CRC[5]. The CRC became a DECC policy when the new Department of Energy and Climate Change (DECC) was formed in October 2008. DECC published the UK Low Carbon Transition Plan in July 2009, which set out a national strategy for climate and energy. The plan details how the UK will meet its 2020 emissions reduction target of 34%. The CRC will be a vital policy tool which will help to drive forward these emissions reductions within large businesses and public sector organisations. DECC launched its third consultation[6] on the CRC's draft order in March 2009 to which the Government's response was published in October 2009.

1.3 Rationale for Government intervention

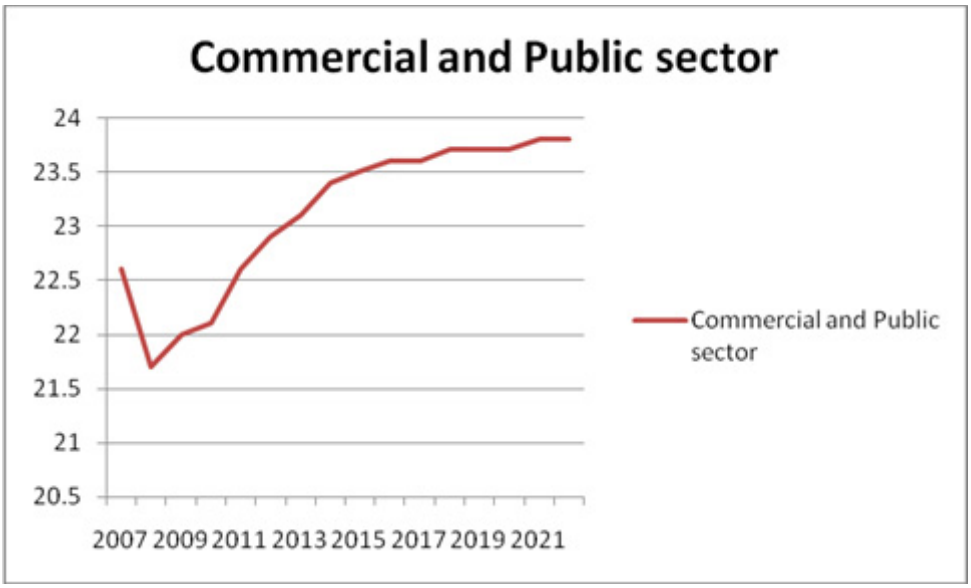
The Carbon Trust notes that within the UK, the commercial sector, the public sector and manufacturing industry produced 198MtCO_2 (54MtC) emissions in 2002. Within this, large businesses were responsible for approximately 25% of emissions, with the public sector producing another 10%. The Government's most recent long term Energy Projections indicate that, without further measures as stated in the 2007 Energy White Paper, there is likely to be a steady rise in carbon emissions from the service sector. In the commercial sector alone, emissions are forecast to rise by 17% between 2007 and 2025 **in the absence of Energy White Paper policies**.

[4] Available online at: http://www.decc.gov.uk/media/viewfile.ashx?filepath=what we do/a low carbon uk/crc/policy/crc-implement-govresponse-0803.pdf&filetype=4

[5] Available online at: http://www.decc.gov.uk/media/viewfile.ashx?filepath=what we do/a low carbon uk/crc/policy/organisational-structure.pdf&filetype=4

[6] Available online at: http://www.decc.gov.uk/en/content/cms/consultations/crc/crc.aspx

Figure 1.3.1: Emissions projections in the commercial and public sector (services), without Energy White Paper policies MtC02e[7].



Source: Updated Energy Projection 32 (DECC).

There is a large body of evidence suggesting strong potential for reducing carbon emissions cost-effectively through increased energy efficiency in large organisations, including ENUSIM/BRE databases and cost curve models, as well as evidence at firm level from Carbon Trust work, CCAs and the voluntary UK ETS[8]. The Carbon Trust, as part of the Energy Efficiency Innovation Review, carried out an analysis of the barriers and drivers for the uptake of energy efficiency measures[9], concluding that they fall into four main categories as exemplified in Figure 1.3.2.

These barriers and drivers do not apply evenly across all sectors. The Carbon Trust analysis concluded that in large businesses and public sector organisations, market misalignment preventing the benefits of an investment accruing to the organisation concerned, and organisational behaviour and motivation were the two key barriers to activity. In some sectors (e.g. manufacturing) more than others, financial cost/benefit issues are more of a barrier to energy efficiency investment.

[7] Projections are based on no Energy White Paper policies, no carbon price, central case fossil fuel prices, central case growth scenarios

[8] For an academic review of the literature on barriers and case studies of different sectors See Sorrel at al. *The Economics of Energy Efficiency*, Edward Elgar, Cheltenham, UK and Northampton, MA, USA, 2004.

[9] See the Carbon Trust discussion of barriers and market failures (section 1.2, page 15 -18 in their report, or the Energy Efficiency Innovation Report for a discussion, available online at: http://www.hm-treasury.gov.uk/d/pbr05_energy_675.pdf

Figure 1.3.2. Carbon Trust Analysis of barriers and market failures

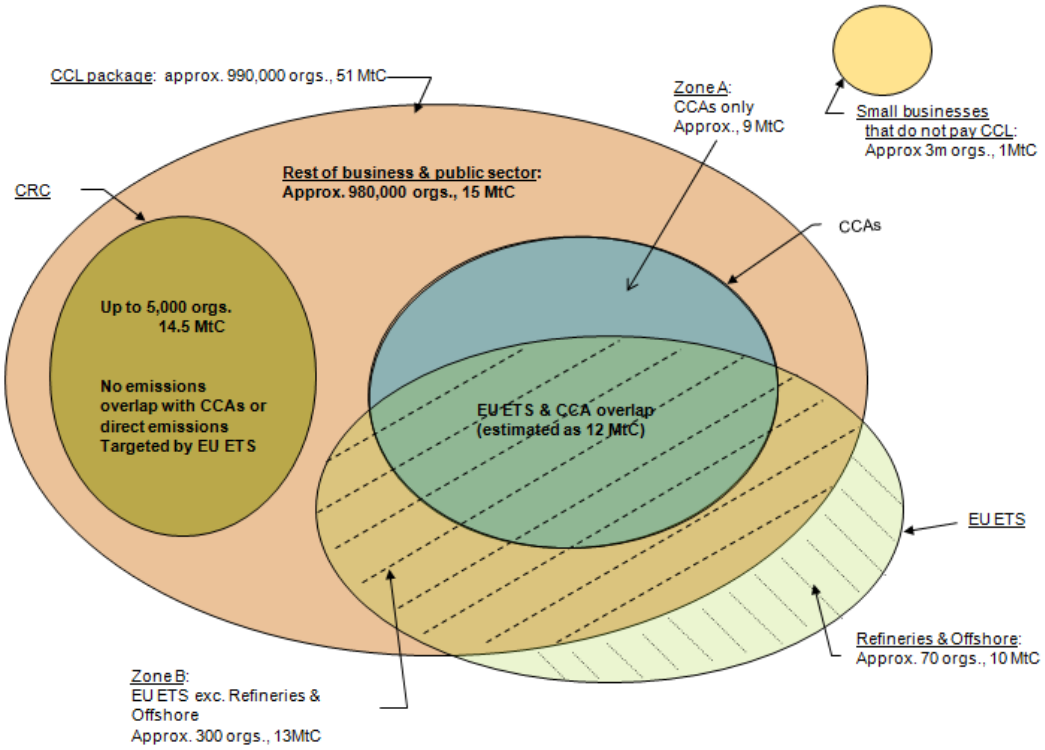
	Issue	Barriers	Drivers
Classical economic			
	Financial cost/benefit	Investment costs	Value of energy savings
	Expanded cost/benefit	Hidden costs	Co-benefits and intangible benefits e.g. Corporate and Social Responsibility, customer pressure
	Market misalignment	Split incentives and other system failures	Systemic efficiency;
	Behaviour and motivation	Ignorance, inertia and lack of interest	Awareness and motivation
System and behavioural			

1.4 Fit with current Government policies

The main policy measure currently placed upon large business and public sector organisations is the Climate Change Levy (CCL), which is a tax on energy use. The current policy framework provides useful price signals, but does not address the two main barriers of market misalignment and organisational behaviour and therefore does not sufficiently encourage this sector to engage in cost-effective energy efficiency measures that reduce their emissions. By placing large organisations in a quantity based environment, the CRC should encourage them to set targets, in the context of the overall scheme cap and through a requirement to monitor, report and account for their carbon allowances accordingly. In particular, the recycling of the CRC auction revenue linked to organisation position in the CRC Performance League Table will link financial and reputational drivers, and so raise the profile of energy efficiency and carbon saving at senior management level.

There is a **key policy gap** that the new CRC would target. Currently, the large business and public sector organisations that make up the target sector have limited reason to engage in energy efficiency. A small handful took part in the voluntary pilot UK ETS, which ended in December 2006.

Figure 1.4.1. Schematic map of emissions for business and the public sector



1.5 Keeping policy instruments under review

In terms of Better Regulation, Government recognises that it is important to keep the mix of policy instruments – including the CRC – under regular review, to assess the cost-effectiveness of schemes in light of experience, and to ensure that the overall policy framework is delivering emissions reductions efficiently and in a balanced way across the economy. We will therefore keep the CRC under review, to ensure that it is functioning effectively. As stated in the Energy White Paper, Government will use the experience we gain from the first phase of the CRC to determine whether, over time, it would be cost effective and proportionate to extend the scheme to organisations with lower energy consumption.

2. Risk Assessment

2.1 Impact of not targeting large business and public sector organisations

Following the conclusion of the voluntary UK ETS in December 2006, doing nothing would leave the EU ETS, CCAs and the CCL as the remaining policy tools, of which only the CCL effectively targets large business and public sector organisations. As energy costs do not generally form a significant proportion of operating costs in these organisations, the additional costs incurred as a result of the CCL tend to be absorbed, as opposed to providing an incentive for investments in energy efficiency. In other words, price signals alone are not sufficient to incentivise the uptake of energy efficiency measures and reductions in carbon emissions.

Annex 1 provides details of the policy measures currently targeting the sector, and those policy developments in the pipeline that will also impact the sector. Importantly, published analysis (by both NERA and Carbon Trust) indicates that a targeted instrument is needed for the large organisations in order to secure the uptake of the identified cost-effective energy efficiency opportunity.

Taking no further action to reduce emissions from large business and public sector organisations is likely to result in a steady rise in carbon emissions from these sectors post-2010 and would therefore place the Government's objective of putting the UK on a path to cut greenhouse gas emissions by at least 34% (relative to 1990 levels) by 2022 at risk. Alternatively, failing to target emissions from this sector while still meeting the Government targets would require placing a greater emission reduction burden on other organisations, which would imply unnecessarily higher costs for society as a whole.

3. Description of Policy

3.1 CRC Energy Efficiency Scheme

3.1.1 Design of the CRC mechanism

The CRC Energy Efficiency Scheme (CRC) is a new energy saving and emissions reduction scheme for the UK. The scheme starts in April 2010. The CRC will encourage energy efficiency improvements. It will reduce carbon dioxide emissions by introducing a cap and trade mechanism combined with a performance league table for large organisations in both the public and the private sectors. The scheme will begin with a three year introductory phase, during which allowances will be sold during an annual month long sale at a fixed-price of £12/tCO_2 and the number of allowances for sale will not be capped by Government. This will allow participants to become accustomed to predicting their emissions and trading their allowances. During this time Government will collect accurate data to inform the process by which a cap is set on the number of allowances available in subsequent phases. As highlighted in the 2006 Energy Review, the CRC scheme will be broadly revenue neutral to the exchequer. Revenue raised by the auction will be recycled back to participants in proportion to their 2010/11 emissions, adjusted by a bonus or penalty based on their rank in the CRC Performance League Table.

Under a cap-and-trade system, participants have substantial flexibility to decide how they will comply – by reducing their own emissions or by purchasing more allowances that give them the right to emit. Allowances will be tradable between participants, which makes it possible for emissions reductions to take place where they are most cost-effective. Emissions reductions can be achieved by energy efficiency measures and switching to lower carbon fuels – for example for space heating.

The aim of the CRC is both to increase organisational awareness and attract senior manager's attention to carbon and energy issues, therefore acting as a key driver of behavioural change among participant organisations. The direct financial levers introduced by the CRC (through the additional element of carbon pricing and the risks and rewards implied by the revenue recycling mechanism) will play a key role in attracting sustained management attention. Nonetheless, these will be accompanied by several other drivers including the provision of better information on energy use and emissions across participant organisations (through the monitoring and reporting requirements), the general push to raising energy management and emissions up the corporate agenda (through the target setting process that the scheme encourages and also through the proposed league table and the carbon price); and reputational drivers (again, through the proposed league table). In essence, these additional levers introduced by the CRC (which are ultimately indirect financial levers) are expected to be at least as important as the direct financial drivers.

The regulatory impact of the CRC will be minimised by exempting small energy users and by making the CRC significantly "lighter touch" administratively than the EU ETS. For comparison, analysis carried out by the Environment Agency shows Group A EU ETS installations (so called "small emitters") pay total annual costs (with fees) of £4.79/tCO_2 covered per year, whilst larger Group B EU ETS installations pay £0.05/tCO_2 covered per year. Initial analysis indicated that, with benchmarking, the CRC administrative burden would be £0.38/tCO_2 covered per year at a 10,000 MWh/year threshold, and £0.60/tCO_2 covered given a 3,000 MWh/year threshold. Given Government's decision to opt for a 6,000 MWh/year threshold, the CRC administrative burden is

estimated at £0.43/tCO_2 covered per year. It should be emphasised that this assessment is conservative (i.e. higher end of cost range), as Government has decided against including benchmarks within the CRC. Estimates of administrative burdens without benchmarking are set out at page XX of the published NERA/Enviros analysis[10]. The CRC also includes a *de minimis* threshold so that supplies accounting for fewer than 10% of emissions would not need to be included, to minimise monitoring and reporting burdens. More information on the *de minimis* threshold is available in the March 2009 consultation document[11] and in Government's Response to the consultation exercise, published alongside this Assessment. EU state aid approval has been achieved for the revenue recycling mechanism, on the grounds that this would be offset by the CRC auction revenue, and – moreover – the recycling mechanism is necessary to drive uptake of the available energy efficiency opportunity. Importantly, the revenue recycling mechanism is tied to a participant's rank in the CRC Performance League Table, thus *linking* corporate financial and reputational drivers. Given that total energy costs are generally just 1-2% of total operating costs in the target sector, linking corporate financial and reputational drivers is critical in sustaining senior management motivation on energy efficiency – underscoring that the league table deserves central attention (on both reputational and financial grounds).

3.1.2 Allocation of allowances and revenue recycling within the CRC

Allowances will be auctioned in the capped phase. This approach is appropriate for the CRC for several reasons. The large number of participants suggests that concentration of market power would not be an issue, and greenhouse gas emissions allowances are highly suited to auctions. To ease participants into the scheme, the first three years will be an introductory phase featuring a simple fixed price sale of allowances at £12 per tonne of CO_2. Government consulted stakeholders on the most suitable form of auction during the June 2007 consultation and a significant proportion of respondents opted for the simple sealed bid, uniform price auction design.

Revenue raised through the sale/auction will be recycled to participants by means of a direct payment, and the scheme will be broadly revenue neutral to the Exchequer. The auction revenue will be recycled to participants in proportion to their 2010/11 emissions, with a bonus or penalty depending on their position in the CRC league table. The preferred approaches to formulating the league table were detailed in the June 2007 consultation. The CRC will therefore include three metrics; an absolute metric covering participants' absolute emissions reductions (relative to their annual mean average over the preceding five years), an early action metric which measures the extent of voluntary automatic metering and accreditation under the Carbon Trust Standard or equivalent and a growth metric, which will provide recognition to those participants that were able to grow at the same time as reducing their emissions intensity, as well as accounting for the effects of organisational decline. The second of these metrics has been included as an administratively simple means of recognising action taken before the start of the scheme – and encouraging action before the start of the scheme.

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[10] Available online at: http://www.decc.gov.uk/media/viewfile.ashx?filepath=what we do/a low carbon uk/crc/policy/nera-enviros-report-060428.pdf&filetype=4

[11] Available online at: http://www.decc.gov.uk/en/content/cms/consultations/crc/crc.aspx

The metrics will be weighted as follows:

	Early action metric	Growth metric	Absolute metric
Introductory phase year 1	100%	0%	0%
Introductory phase year 2	40%	15%	45%
Introductory phase year 3	20%	20%	60%
Capped phases	0%	25%	75%

Details of how each of the metrics will be calculated were set out in the March 2009 CRC consultation document.

A safety valve mechanism, in the form of a "buy only" link with the EU ETS, will be implemented to place a ceiling on the CRC allowance price. The Energy White Paper 2007 also proposed setting a minimum price for the CRC Safety Valve buy-out – to ensure that the emphasis on emissions reductions and energy efficiency within the target sector is preserved and that participants view the Safety Valve as an option of last resort. Government will not sell allowances to participants for less than the introductory phase fixed price of £12/tCO_2. By ensuring that Safety Valve allowances can only be bought at the higher of £12/tCO_2 or the prevailing EU ETS price, participants will be incentivised to take part in the sales/auctions – which, in turn, ensures that there will be auction revenue to recycle to CRC participants. For every new Safety Valve issued by the scheme administrator, the administrator will cancel an EU ETS allowance, to preserve the environmental integrity of the cap. In the unlikely scenario that any "surplus revenue" is raised from the Safety Valve (which could only be the case if the Safety Valve minimum floor price exceeded the cost of purchasing an EUA at the prevailing EU ETS price), that "surplus revenue" would be added to the total amount for recycling to CRC participants, where this is possible within Government spending rules.

Provisions for banking of allowances will be introduced to help smooth out fluctuations in allowance prices, to encourage early action, and to allow participants flexibility in distributing energy savings efforts over time. Banking of allowances will be allowed in the three year introductory phase and the capped phases but it will not be possible to carry over allowances from the introductory phase into the capped phase (as this would undermine the cap). Therefore, from the start of the fixed quantity phases (2013) an organisation could choose to purchase extra allowances for use in any future years. Equally, if an organisation ends up with a surplus of allowances at the end of a compliance period, it could choose to retain allowances for future use rather than selling them on the secondary market.

3.1.3 Coverage of the CRC

Organisations with settled half hourly electricity meters will form the preliminary set from which the CRC coverage will be determined. Because the metering requirement is already in place, the set of eligible organisations will be well-defined and there will be limited opportunity to avoid participation in the scheme. After considering a number of qualification thresholds, Government

decided that organisations that possess at least one half hourly meter settled on the half hourly market and have a total half hourly metered energy use of at least 6,000 MWh a year would qualify for participation in the CRC.

This threshold has been increased from the 3,000 MWh proposed in the first consultation exercise in order to help further ensure that the organisations covered will benefit from the scheme through reduced energy bills. However, it is not expected that the 6,000 MWh threshold will result in a substantially lower number of organisations being involved – we expect between 4,000 and 5,000 will be covered.

Table 3.1.3 below shows the approximate number of organisations covered by the CRC subdivided by sub-sector under the 6,000 MWh threshold criteria. As demonstrated in the table, the CRC will target organisations in the commercial and public sectors. This threshold will also cover some light manufacturing sectors that are not party to CCAs. Government wishes to limit the CRC overlap with other policies which would subject organisations to multiple reporting requirements. Therefore, the CRC will only cover energy use emissions outside CCAs and the EU ETS. In addition, subsidiary organisations with more than 25% of their energy use emissions covered by a CCA will be completely exempt from the scheme. A small percentage of CRC organisations will have some of their direct emissions in the EU ETS. These direct EU ETS emissions will *not* be covered by the CRC – the CRC will cover the remaining electricity use and energy use emissions outside the CCAs and EU ETS.

The reader will notice that in Table 3.1.3 below there is a difference in the number of organisations expected to be included in the CRC between the aggregate and subsectoral analyses. In addition, there is some uncertainty over the number of organisations that may be excluded as a result of the exemption for those organisations with more than 25% of emissions covered by a CCA. This may be up to 20% of organisations[12]. Government expects the actual number of organisations included would be closer to the aggregate (higher) figure.[13] A key message that emerges from this uncertainty is the value that will be gained in conducting an introductory phase to the CRC, in order to develop greater understanding of the effect of the CRC on the sector.

[12] A sensitivity case for this scenario is presented in Annex 4, in which the effect of such exemptions on the NPV of the scheme is illustrated. As shown, the NPV would decline if allowance purchases had to be made from the safety valve as a result of the exemption.

[13] There are greater uncertainties in the data when it is disaggregated to sub-sectoral level.

Table 3.1.3: Number of organisations covered by the CRC by subsector for a 6,000 MWh threshold

Aggregate without sector differentiation	**4,810**
Aluminium	10
Automotive trade	53
Bricks	
Cement/Lime	
Ceramics	
Chemicals	69
Construction	7
Education	74
Elec Engineering	31
Energy processing	-
Estate & business	308
Food & drink	20
Glass	1
Health & social	58
Hotels and Restaurants	23
Mech Engineering	1,066
Paper & board	67
Plastics	259
Printing	-
Public sector	168
Retail	109
Steel	45
Textiles	-
Transport, storage & comms	33
Vehicle Engineering	24
Water & waste	23
Wholesaling	35
Total of differentiated sectors	**2,485**

Source: NERA estimates

3.1.4 Obligations on participants

The CRC scheme has been designed to be administratively light-touch. To illustrate this, a participating organisation would be expected to go through the following practical steps each year:

1. Forecast emissions for the compliance year, taking into account their energy efficiency / carbon abatement strategies;

2. During the auctioning period of each year, purchase allowances from the Government auction (fixed price sale in the introductory phase) according to the organisation's abatement strategy[14];

3. Monitor, assess and manage emissions throughout the emissions year ;

4. If so desired / necessary, buy or sell allowances on the secondary market, or through the 'buy-only' safety valve;

5. Report emissions and surrender sufficient allowances to cover the organisation's emissions (note that action of surrendering sufficient allowances will be a legal requirement); and

6. Receive recycling payment proportional to the organisation's annual average emissions in 2010/11, with a bonus / penalty based on its position in the published performance league table.

The reporting of emissions will be done via the online Registry[15] primarily through annual summary energy reports from metered energy where possible. This will be supported by self-reading or energy bills where necessary, and will be self-certified. The information provided to the administrator along with any raw data used to calculate the figures provided must be stored in an 'evidence pack', similar to that in CCAs, to demonstrate their reported energy use across the CRC organisation. The reporting mechanism will be backed by a risk-based audit regime targeting around 20% of the CRC organisations each year.

Importantly, the scheme will place organisations in an emissions capped environment, encouraging them to set targets for themselves to reduce energy use emissions. Moreover, the scheme will seek to tap into company Corporate Social Responsibility (CSR) motivations by making disclosure of performance mandatory. Information to be made public will include rankings of the CRC organisations in terms of their energy performance and whether the organisation has included a quantitative carbon target (looking ahead at least five years) in its annual reporting.

The Admin Burdens assessment for the Summary Sheet has been calculated using a methodology consistent with the BRE Standard Cost Model[16]. The Admin Burdens assessment does not cover public sector participants in line with BRE guidance. However, the calculation of administration costs associated with the policy for the Net Present Value has been calculated by NERA/Enviros. Further details are contained within their report.

[14] Note that it will not be a legal requirement to take part in the auction - participants could choose to only buy allowances on the secondary market, or through the safety valve.

[15] The CRC will be administered online via a purpose-built website known as the CRC registry. Participants will register, report, buy and sell allowances and communicate with the administrator via this online system.

[16] http://www.berr.gov.uk/files/file44503.pdf

3.1.5 Identification of participants

In November 2006 consultants (Hedra) were commissioned by Defra to undertake a piece of work to be used in developing the methodology for identifying scheme participants[17]. Hedra analysed a number of methods of establishing a list of the potential CRC organisations, though several did not allow for correct identification of included and excluded organisations. In light of Hedra's analysis, it was decided to introduce an obligation on energy suppliers to provide Government with a list of all half hourly meters settled on the half hourly market, specifying the annual consumption of each meter, identification number, billing and contact details. Because organisations are likely to have several energy suppliers (e.g. for different fuels), there is currently no single source of information matching the half hourly meters and the organisation that consumes energy from individual meters across all suppliers. Government therefore intends to identify the CRC organisations by asking the administrator to contact all the organisations with settled half hourly meters. The organisations themselves would then need to collate half hourly electricity information for their whole organisation and submit a return during the registration period. The main steps of this process are the following:

Step 1 – Obligation on Suppliers

Energy suppliers are required to supply the administrator with a list of all half hourly meters settled on the half hourly market that they supply together with identification numbers, the billing organisation name, address and annual consumption figures for each meter. Subsequently, the administrator provides the billing organisation with a qualification pack, including a list of all the meters connected with that address and instructions on collating the data for the whole organisation. Detailed guidance will also be provided.

Step 2 – Obligation on bill payers of half hourly metered electricity

Counter parties of half hourly metered electricity would be required to collate information related to all half hourly meters (not only the half hourly meters settled on the half hourly market), identify their highest parent organisation, and pass on information regarding their total half hourly metered electricity consumption to the parent organisation (or organisation acting on behalf of the group participant, called the 'primary member', if different). The group will be responsible for ensuring all their subsidiaries' half hourly metered electricity use is reported in the return to the administrator.

In each case the group would need to specify:

(i) the name of the highest parent organisation plus relevant contact details

(ii) any principal subsidiaries and their contact details, and inform the administrator of any 'designated changes' which occurred between the qualification day and day when they complete the registration.

(iii) details of any 'primary member', if different from the highest parent, that will act on behalf of the group

[17] Available online at: http://www.decc.gov.uk/media/viewfile.ashx?filepath=what we do/a low carbon uk/crc/policy/hedra-report.pdf&filetype=4

(iv) the type of business activity it undertakes;

(v) a list of all the half hourly meters settled on the half hourly market that fall under its responsibility;

(vi) the total organisation wide electricity use through half hourly meters – including from half hourly meters settled on the half hourly market, voluntary AMR half hourly meters, half hourly light meters and pseudo half hourly meters; and

(vii) name and address of appropriate contacts, one of which must be at Senior Officer level, and must be senior enough to act on behalf of the group in matters relating to compliance. The other two or more contacts (Primary and Secondary contacts) must be individuals whom the administrator can contact on behalf of the participant. These individuals will be periodically contacted with information relating to any actions that the participant may need to undertake.

In the case where the organisation qualifies to claim a CCA exemption, it will be required to provide information to support its claim.

Step 3 – Obligation on Government

Government, through the administrator, will be required to collate the information received from suppliers and organisations and will have the ability to audit / follow-up organisations who have not responded to Government and hence have not met their CRC obligations.

Administration cost on the non-CRC organisations

Government recognises there will be a small administration effort from organisations that do not qualify for the CRC – since they will still have to provide Government with the name of their organisation and a list of their half hourly meters. However, this effort would only be required once every phase (where Government proposes an introductory phase of three years, followed by capped phases of seven years in length). Moreover, analysis indicates that it should only take a short time to complete this step as details of an organisation's half hourly settled meters will be sent to each billing address by the administrator. Hedra estimates that this process would take no more than three hours for those organisations that clearly do not qualify for the CRC. This task has been included within the administrative burden costs in this updated IA. Energy suppliers will also bear relatively small costs in terms of providing information about the CRC to their customers via the Environment Agency. This has been included in the overall costs.

4. Cost-Benefit Analysis

Cost-benefit estimates in this Impact Assessment are essentially the same as those produced in the Partial Impact Assessment published in March 2009. The policy changes announced in the Government Response have not been modelled due to insufficient data on coverage and abatement potential. However, because some changes increase coverage and others reduce coverage we expect the net impact on abatement to be marginal. Cost-benefit estimates have been up-dated using the latest guidance including the most recently published traded and non-traded carbon price estimates. Changes to these prices are the main cause of differences to those produced in March 2009. In the modelled scenario the abatement estimated to be achieved, without EUA purchases, under an allowance price of £16/tCO_2 in 2020 is 3.2MtCO_2. However, estimates of the likely level of abatement at given prices are subject to a high degree of uncertainty. The final level of carbon savings that can be achieved from the CRC will be determined when a cap is set on the number of allowances available for participants to purchase. The cap will be set in 2012 and advice will be sought from the Committee on Climate Change to determine the level of this cap[18].

4.1 Identification of benefits and approach to derive benefit estimates

The benefits of the policy option to be implemented are expected to include:

- environmental benefits in terms of **reduced emissions of CO_2**;
- **monetary benefits to the participant organisations** (savings on energy bills from investment in energy efficiency); and
- ancillary benefits in terms of **improvements in local air quality**.

The benefits of alternative CRC options in terms of savings of energy bills and the physical impact of the scheme on carbon savings have been quantified by NERA/Enviros (and adjusted by Defra analysts for policy overlaps), and are summarised below. The benefits are presented in terms of the physical quantities of carbon saved, as well as in terms of the value of the benefits of reduced emissions, calculated using the new Government carbon values for use in policy appraisal[19] for non-traded sector emissions and traded sector emissions (EU ETS allowance price forecasts)[20]. Impacts on local air quality have been estimated for inclusion in this IA. These also follow Government guidance.

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[18] The CO2 savings result from a scenario modelled by NERA / ENVIROS, updated to take account of the latest guidance on carbon values for use in public policy appraisal. Previous estimates of carbon savings varied depending on the assumptions made about the likelihood of take-up of the safety-valve mechanism to purchase EU Allowances.

[19] Updated carbon values can be found at:
http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/valuation/valuation.aspx

[20] Please see Government-wide Interdepartmental Analyst Group Guidelines on Greenhouse Gas Policy Appraisal and Evaluation: http://www.decc.gov.uk/en/content/cms/statistics/analysts_group/analysts_group.aspx. Traded sector emissions refer to those within the EU ETS, non-traded covers the remaining emissions outside the EU ETS.

The NERA/Enviros analysis on the impacts of the CRC on carbon savings and energy bills is based on two databases of technological and behavioural measures: BRE's abatement cost curves for non-domestic sector buildings and the ENUSIM model for industrial sectors activities as modified by Enviros for the Energy Efficiency Innovation Review (2005). It assumes that over time (and in response to the introduction of the scheme) the existing cost effective potential for emission reductions will be taken up by participant organisations. The expectation that the CRC could deliver additional abatement of 3.2MtCO_2 (0.9MtC)[21] per year by 2020 reflects an assumption of a CRC allowance price of £16 per tCO_2. In practice, under the cap and trade phase of the CRC, Government would set a cap and the market would generate the CRC allowance price, so an allowance price of £16 per tCO_2 is subject to uncertainty. In any case the modelling assumes that the CRC organisations would take up abatement opportunities at all prices up to a maximum of £16 per tCO_2 (marginal abatement cost). More details are provided in the NERA/Enviros report.

For the purpose of their cost-benefit analysis, NERA/Enviros apply a discounted cash flow model, which therefore accounts for the fact that benefits will occur over a number of years. In particular, the assumed time horizon for the CRC is 15 years, while the energy and carbon savings are still counted (but assumed to tail off) for up to eight years after the end of the scheme. As the main focus of the NERA/Enviros report was to assess the impact of the proposed scheme on participant organisations, a 10% private discount rate was adopted as the default discount rate. However, NERA/Enviros also looked at the implications of using a 3.5% social discount rate[22]. Energy savings presented at the 3.5% discount rate reflect the social benefits of energy savings net of taxes (as these merely reflect transfers between Government and firms and therefore is not an additional benefit from the perspective of society on the whole), the ETS allowance price (as this is valued elsewhere in the IA) and also the cost of transmission and distribution.

4.2 Estimation of benefits for different policy options

Option 0: Do nothing

There would be no additional benefits under this option. This is simply the counterfactual against which the benefits of other options are measured.

Option 1: The CRC with 6,000 MWh qualification criterion

In a scheme with a qualification threshold of 6,000 MWh of electricity from half hourly meters, the CRC would cover around 53.2MtCO_2 (14.5MtC), leading to around 1.3MtCO_2 (0.4MtC) carbon savings per year by 2015, and around 3.2MtCO_2 (0.9MtC) per year by 2020. The present value of benefits in terms of savings on energy bills would be around £1,779 million for a 10% private discount rate, or around £2,132 million for a 3.5% social discount rate.

[21] In the Partial IA published in June 2007, a figure of 1.1MtC (1.0MtC additional) of savings in 2020 was cited. This reflected a start date for the scheme of 2009. The CRC is now due to start in 2010, hence the carbon savings trajectory has been pushed back a year. Figures of 1.1MtC (1.0MtC additional abatement) now apply for the year 2021.

[22] All costs and benefits presented in this IA are discounted back to the first year of introduction of the policy (2010). The price base year is 2005.

As mentioned in Annex 1, there are policy overlaps, but also policy 'synergies'. The Energy Performance of Buildings Directive (EPBD) will produce an additional 0.7MtCO_2 (0.2 MtC) per year from the sector by 2020: 0.4MtCO_2 (0.1MtC) overlapping with the CRC and 0.4MtCO_2 (0.1MtC) as a result of an improvement in the climate for energy efficiency investments where there is a landlord-tenant relationship. Hence, the 6,000 MWh option retains Government's commitment (from the Energy Review) to save 4.4MtCO_2 (1.2 MtC) per year from the large, business and public sector organisations.

In terms of policy overlaps, Government expects a combined overlap of 0.4 MtCO_2 (0.1 MtC) carbon saving per year by 2020 from the interaction of the CRC options with EPBD and Business 'Smart' Metering. This is referred to above (i.e. is attributed to EPBD). It is not attributed to the CRC in this IA.

It should be emphasized that Government has publicly committed to the Committee on Climate Change advising Government on the CRC caps (the first capped CRC phase begins in 2013). Once Government has received the Committee's advice, it will update the analysis on costs and benefits – and decide on a cap in light of this analysis.

Recent Policy Developments

1. The removal of the double sale/recycling payments in April 2011 and October 2011 introduced to reduce impact onto cash flow for participants.

    - April 2010-2011 has now become a reporting year only and participants will only be able to purchase allowances to cover 2011/12 emissions emissions in April 2011. In October 2011, participants will receive a single recycling payment. Although this change has cash-flow benefits for firms it does not impact on the cost-benefit estimates provided in the summary page as these are on a societal rather than commercial basis.

2. Changes in the treatment of large subsidiaries.

    - Subsidiaries which are large enough to participate in their own right may now opt to do so, unless the residual parent group falls below the 6000MWh threshold. This policy change may potentially increase the number of participants but will not impact on coverage and therefore cost-benefit estimates.

3. Changes in the definition of transport in the transport exclusion.

    - Transport will now be defined in terms of energy used to power vehicles, navigation vessels, aircrafts and trains (including related network services). This policy change could increase the emissions coverage in some sectors. The extent to which this is likely has not been determined but is not expected to be substantial for the CRC as a whole.

4. Changes in the exemption threshold.

    - Supplies for transport and domestic purposes are not included in the CRC. The deduction will be applied from HHM before determining qualification. This effectively

changes the transport exemption threshold from that originally proposed, and may potentially decrease the number of participants in the scheme. The size of this decrease has not been determined, but is expected to be very small.

5. The exclusion of domestic emissions.

    - All domestic accommodation will now be outside the scope of the CRC irrespective of counterparty arrangements, unless provided for work, educational, recreational, religious or medical purposes. This amendment will ensure that rented/social accommodation will be outside the scope of the CRC. This policy change is likely to decrease emissions coverage and reduce the number of participants from housing-related sectors, although the potential magnitude of this decrease has not been quantified.

6. The development of the early action metric to include Carbon Trust Standard equivalents and to amend the early action metrics weightings.

    - The early action metric will be weighted 100% in 2010/11, 40% in 2011/12 and 20% in 2012/13. This amendment could incentivise additional action. This potential has not been included in the cost-benefit analysis.

Table 4.2: Summary of benefits

Options	PV savings on energy bills at 10% DR (£ million)	PV savings on energy bills at 3.5% DR (£ million)	Carbon saved by 2015 ($MtCO_2$ p.a.)	Carbon saved by 2020 ($MtCO_2$ p.a.)	PV of monetised carbon saved[23] at 3.5% DR (£ million)	PV of monetised air quality benefits at 3.5% DR (£ million)
Option 0: do nothing	-	-	-	-	-	
Option 1: The CRC with 6,000 MWh qualification criterion	1,779	2,132	1.3	3.2	1,840 [1,315 – 2,761]	371 [84 – 802]

Sources: NERA/Enviros. Value of carbon savings calculated by DECC on the basis of NERA/Enviros estimates of physical amount of carbon saved. Carbon savings figures rounded to the nearest 0.1 $MtCO_2$. The air quality valuation benefits are calculated by Defra analysts on the basis of estimates of physical energy savings.

Notes: Ranges in square brackets refer to uncertainty ranges around carbon values and air quality benefits valuation.

[23] This is the sum of the value of abatement in the traded and non-traded sectors.

5. Costs

5.1 Identification of costs and approach to derive cost estimates

5.1.1 Costs of the CRC proposal

The costs of participating in the CRC fall into two categories:

- the **cost of emissions control or abatement measures**; and
- the administrative **costs of participating in the scheme**, including transaction costs and management costs;

Emissions control costs

NERA/Enviros estimates of the emission control costs for the various options are based on BRE's abatement cost curves for the non-domestic sector and the ENUSIM model for industrial sectors as modified by Enviros (see the NERA/Enviros report for more detail).

The estimates presented here reflect the default scenario assumed, i.e. one where an administrative regime with some element of external verification is in place and standard energy prices are assumed[24].

As mentioned in Section 4.1, when presenting estimates of benefits, NERA/Enviros apply a discounted cash flow model, which therefore accounts for the fact that benefits will occur over a number of years. In particular, costs are assumed to accrue over a 15-year time horizon for the policy. Once again, it is useful to observe that as the main focus of the NERA/Enviros report was to assess the impact of the proposed scheme on participant organisations, a 10% private discount rate was adopted as the default discount rate. However, NERA/Enviros also looked at the implications of using a 3.5% social discount rate, the results of which are also presented here.

Administrative costs

Direct costs incurred by each participating organisation can be divided into a number of different activities. Each of these entails a certain amount of effort that will depend on the particular policy implementation as well as the size of the organisation (including the number of covered sites and the total energy bill). The primary activities include:

1. Understanding scheme rules
2. Initial collection and analysis of energy data
3. Developing a compliance strategy
4. Understanding and participating in auction
5. Trading activities

[24] The 'high' price case assumes 2.59 p / kWh for gas and 10.13 p / kWh for electricity.

6. Submitting data to coordinator

7. Verifying data (external costs)

NERA/Enviros estimated the amount of direct administrative effort required for organisations of different sizes to participate in the proposed scheme. These vary, based on the number of sites covered by the scheme and the level of energy consumption at these sites. Table 5.1.1 below summarises the estimated person-days required for the major categories of administrative costs that would be associated with the scheme. The cost estimates reflect the activities that would be required by the cap and trade scheme. However, with the exception of the activities relating to understanding and participating in the auction, these are likely to be very similar to the activities required by the introductory phase. Therefore, the cost estimates should provide a good indication of the administration costs that the CRC organisations would face in the introductory phase.

There are useful parallels to both the EU ETS and CCAs although the proposed CRC scheme is intended to be simpler and less burdensome. Administrative activities and costs are well understood for the EU ETS and CCA programmes and the experience from these programmes can be used as a basis for estimating costs for the proposed CRC.

It is important to recognise that the costs include fixed costs per company plus variable costs linked to the number of sites in the company. For this reason the cost per site for a company with only one site will be very high compared to a company with, say, 100 sites. The overall NERA/Enviros estimates of administrative costs are presented below in Table 5.1.1. The approach used to derive these estimates is described in more detail in Annex 2.

Table 5.1.1: Average management commitment (in person days) due to scheme participation

Number of sites operated by organisation	1	2	3	4	5	6-10	11-50	50+
Understanding the rules	3	3	3	3	4	4	4	4
Initial collection and analysis of energy data	3	3	4	4	4	4	7	13
Developing a compliance strategy	1	1	1	1	1	1	3	5
Understand and take part in Auction	2	2	2	3	3	4	5	6
Trading activities	2	2	2	2	2	3	4	5
Submitting data to coordinator	1	1	1	2	2	3	4	5
Verifying data (external costs)	3	4	5	6	7	10	14	19
Total person-days	**14**	**15**	**18**	**20**	**22**	**27**	**40**	**57**
Management costs of participation	**£7,000**	**£7,500**	**£9,000**	**£10,000**	**£11,000**	**£13,500**	**£20,000**	**£28,500**

Source: NERA/Enviros estimates.
Note: The Cost estimates assume a daily cost of £500 / person-day input. The discrepancies in the totals are explained by roundings in the person days.

In addition to the direct administrative costs, some form of co-ordination cost will need to be paid by participants. Scheme co-ordination costs will be the costs to the regulator to run the scheme and undertake any audits. The costs of administration and regulation will be recovered via a charging scheme, as set out in the CRC Charging Scheme provided by the Environment Agency. Work undertaken by the Environment Agency suggests that such costs are estimated at about £6 million p.a. Under the proposed charging scheme, organisations will incur an

additional annual cost of £1290 p.a. per organisation, in addition to a one-off registration fee of £950. Overall estimates of scheme co-ordination costs are likely to be in the region of 1% of auction revenue, based on an allowance price of £12/tCO_2.

Government has taken on board the responses to the November 2006 public consultation[25] which indicated that administrative costs had been underestimated in the original partial RIA. However, the administrative costs presented in the original partial RIA, published alongside the consultation in November 2006, also included costs associated with sectoral benchmarking. Government no longer proposes to include sectoral benchmarking as part of the CRC scheme, so reducing the administrative burden[26]. Taking this into account, Government believes that the original administration burden presented in the partial RIA now represents a fair reflection of the person-days required, and hence the administrative costs, that organisations included in the CRC will face. The quantification of costs in the default case now also includes the cost of identifying the potential CRC organisations – both from the perspective of Government and from the firm's perspective – as identified in the Hedra report (included in 'admin costs' in Table 5.2 below). A sensitivity case – involving a more conservative administrative cost scenario – is also presented here (see Annex 4). However, it should be noted that Government believes that the default case will be the likely outcome.

Cost to participants of purchasing allowances to cover residual emissions

In terms of the costs of residual emissions, the CRC proposal is to recycle revenues that accrue as a result of Government allowance sales. The amount that is available to be recycled is equal to the amount that firms pay to Government for allowances during a Government sale to cover their residual emissions; the total net cost of residual emissions within the overall scheme is zero. In addition, some of the expenditure by firms on allowances may not be collected by the Government at auction – both because of trading (which may result in net costs or revenues to individual firms relative to what they spend initially at auction) and because of the fact that the CRC features a buy-only link to the EU ETS. The league table which underpins allocation of recycled revenues is designed to provide a reputational driver for firms to improve energy efficiency, reduce emissions and cut costs. In addition firms that reduce emissions will have reduced allowance expenditure and potentially benefit from recycled revenues. The marginal incentive to reduce emissions, the effective carbon price, will be at least equal to the cost of allowances.

As set out above the Government has announced that the first year will be a reporting only year and firms will not be required to purchase allowances to cover their first year emissions. This reduces the cash flow impact on firms in 2011 as allowance expenditure is effectively halved in that year. This change provides a financial benefit to firms, relative to previous proposals. This is not included in the summary cost-benefit estimates as these figures represent societal rather than commercial estimates.

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[25] Available online at: http://www.decc.gov.uk/media/viewfile.ashx?filepath=what%20we%20do/a%20low%20carbon%20uk/crc/policy/epc-consultresponse.pdf&filetype=4

[26] Benchmarking comprised up to one-fifth to one-quarter of the original administrative burden.

5.2 Estimation of costs for different policy options

Option 0: Do nothing

There would be no additional costs under this option. This is simply the counterfactual against which the costs of other options are measured.

Option 1: The CRC with 6,000 MWh qualification criterion

With a qualification threshold of 6,000 MWh of electricity from half hourly meters, the present value of emission control costs would be £177 million using a 10% private discount rate, or around £271 million using a 3.5% social discount rate. The present value of administrative costs would be £186 million using a 10% private discount rate, or around £263 million using a 3.5% social discount rate. The present value of the opportunity cost of allowances would be £297 million using a 10% discount rate. In addition, there would be a cost of EU ETS allowance purchases of £77 million (at a 10% discount rate).

Table 5.2: Summary of costs – Default Case

Options	PV emission control costs at 10% DR (£ million)	PV emission control costs at 3.5% DR (£ million)	PV admin costs at 10% DR (£ million)	PV admin costs at 3.5% DR (£ million)
Option 0: do nothing	-	-	-	-
Option 1: The CRC with 6,000 MWh qualification criterion	177	271	186	263

Source: NERA/Enviros estimates (adjusted by DECC to reflect additional costs identified by Hedra).

The costs presented in the table above represent costs to businesses, some of which are resource costs (the pollution control / abatement costs, the administration costs, and any additional EUA purchases made through the safety-valve mechanism). These costs are aggregated and reproduced on the Summary Sheet at the front of this IA. Other costs to businesses (the CRC allowance purchases) are not resource costs, they are transfers – ultimately to other CRC participants.

The CRC will have distributional impacts with consumers being affected by the degree of cost pass-through of allowance costs to prices of goods and services; different businesses and public sector organisations having different scopes for cost-effective abatement and hence different returns from the revenue recycling mechanism; and Government being affected by the flows of auction revenue and revenue recycling. Analysis of these impacts will need to be considered as the scheme develops.

Table 5.2.1 contains the figures for a more conservative administrative costs scenario, revised by NERA/Enviros to provide an alternative, more pessimistic picture of the progression of admin costs in relation to site numbers.[27]

Table 5.2.1 Summary of administrative costs – 'More conservative' Case

Options	PV admin costs at 10% DR (£ million)	PV admin costs at 3.5% DR (£ million)
Option 0: do nothing	-	-
Option 1: The CRC with 6,000 MWh qualification criterion	287	407

Source: NERA/Enviros estimates. Figures estimated by DECC analysts by scaling default case admin costs by the same factor as applies to the 3,000 MWh threshold figures in NERA analysis.

[27] For more information on the pessimistic admin costs scenario, please see Annex 4.

6. Comparing Costs and Benefits[28]

6.1 Methodological approach

The cost-benefit analysis of the CRC options carried out by NERA/Enviros is based upon detailed cost-benefit modeling of opportunities for carbon abatement. As explained in Sections 4 and 5, the NERA/Enviros analysis on the impacts of the CRC takes, as its starting point, two databases of technological and behavioural measures: BRE's abatement cost curves for the non-domestic sector and the ENUSIM model for industrial sectors as modified by Enviros for the Energy Efficiency Innovation Review (2005).

These typically show a positive private return from abating carbon emissions through investments in energy efficiency. Naturally, this analysis raises the question of why firms do not introduce these measures without intervention. As noted above, there may be information failures or other (for example, financial) constraints on the ability of businesses to take advantage of these measures. However, it is also possible that the analysis does not consider some of the "hidden costs" of investment in energy efficiency (e.g. the opportunity cost of scarce management time). These effects are extremely difficult to quantify but suggest that the estimates of net benefits might be interpreted as upper bounds.

One of the features of the NERA/Enviros analysis is that it allows an examination of the distributional impacts of different policy options on most of the 27 different subsectors that would be affected by the CRC. Provided below is a general comment on subsectoral impacts alongside highlights of the cost-benefit analysis for different policy options. More detail on subsectoral impacts is included in Annex 3.

It should be noted that the cost-benefit analysis presented here (taken from the NERA/Enviros report) assumes that a 10% discount rate does not seek to monetise the environmental benefits from the policy, as we are considering the policy from an organisations' perspective. When social costs and benefits are also taken into account – using the 3.5% social discount rate recommended by the Treasury Green Book – the case for action is strengthened, as measures to reduce energy consumption typically require upfront investment to produce benefits in the form of savings on energy bills for a number of years. Similarly, monetising the value of carbon savings and air quality benefits using the Government guidance leads to higher NPVs.

As stated in Section 5, in addition to costs identified by NERA/Enviros, Government has also included the costs associated with the identification of organisations and the opportunity cost of allowance purchases, as well as the cost of purchasing safety-valve allowances.

[28] For details of derivation of cost figures please refer to Annex 2. For details on sub-sectoral breakdowns please refer to Annex 3. For details on sensitivity analysis on costs/benefits see Annex 4.

6.2 Net cost–benefit results and distributional impacts for different policy options

Option 0: Do nothing

There would be no additional costs or benefits under this option. This is just the comparator against which the costs and benefits of the other options are measured.

Option 1: The CRC with 6,000 MWh qualification criterion

Under this option the scheme would have a £1133 million private NPV (based on a 10% commercial discount rate). Using a social discount rate of 3.5%, as recommended by HM Treasury's Green Book guidance, the private NPV is £1,616 million. When the carbon savings and air quality benefits are also valued in monetary terms the overall NPV becomes £3,800 million (within a range of £2,300 million to £5,340 million).

Table 6.2: Summary of costs and benefits (central case)

Options	NPV excluding external costs and benefits at 10% DR (£ million)	NPV excluding external costs and benefits at 3.5% DR (£ million)	NPV with monetised carbon and air quality benefits at 3.5% DR (£ million)	Number of NPV negative subsectors at 10% DR	Carbon saved by 2015 ($MtCO_2$ p.a.)	Carbon saved by 2020 ($MtCO_2$ p.a.)
Option 0: do nothing		-	-	-	-	-
Option 1: The CRC with 6,000 MWh qualification criterion	1133	1616	3,800 [2,300 – 5,340]	0 out of 27	1.3	3.2

Source: NERA/Enviros estimates. Value of carbon savings calculated by Defra on the basis of NERA/Enviros estimates of physical amount of carbon saved. Carbon savings figures rounded to the nearest 0.1 $MtCO_2$. Ranges in square brackets refer to uncertainty ranges around carbon value estimates and air quality benefits valuation, i.e. from low estimates of both air quality benefits and the price of carbon, to high estimates of both of these values.

6.3 Sensitivity of cost-benefit results to alternative assumptions

6.3.1 Sensitivity analysis in the NERA/Enviros report

The modelling results that support the cost-benefit analyses presented in this IA rest on a series of key input assumptions.

As part of their study, NERA/Enviros carried out sensitivity tests to identify the most critical of these assumptions. Overall, their analysis points to energy prices as being a key sensitivity factor, which is easy to understand as the private benefits from the scheme are essentially expected to accrue as savings on energy bills. A low energy price scenario (with prices one-third lower than the default) would significantly reduce (by nearly two-thirds) the NPVs of all of the options considered above. Conversely, higher prices lead to higher benefits from the scheme.

Another sensitive assumption (which would affect both the NPV and the rate with which carbon savings could be achieved cost-effectively) is the rate of uptake of abatement measures. The default scenario assumes a “middle” rate of uptake, but choosing a high or a low rate would respectively change NPVs by plus 45% or minus 43% and carbon savings by plus or minus 23%. In terms of the relative comparison of an alternative option, the higher rate of uptake would tend to support lower inclusion thresholds, while a lower rate of uptake would tend to support higher thresholds. The results are less sensitive to other assumptions, such as the administrative regime and landlord-tenant split.

More details on sensitivity analysis carried out as part of the NERA/Enviros study is included here at Annex 4.

6.3.2 More conservative admin costs scenario

Following the publication of the original NERA/Enviros report, the numbers for organisations with more than 50 half hourly electricity metered sites have been revised by NERA/Enviros in order to provide an alternative, more pessimistic picture of the progression of admin costs in relation to site numbers.

These revised estimates assumed higher administrative costs and included additional person-days for energy audit input and “other hidden costs” (see Annex 4 for details). In the commercial case (10% discount rate) the PV of admin costs for Option 1 (6,000 MWh threshold) is increased from £186 million to £287 million, and the NPV is consequently reduced from £1133 million to £955 million. With a 3.5% discount rate, admin costs increase from £263m to £407m, and the NPV is consequently reduced from £3,800m to £3,656m.

7. Small Firms Impact Test

The CRC's focus is on large business and public sector organisations. The proposed exemption for small energy users would exempt genuinely small organisations, for whom administrative costs would outweigh energy efficiency benefits.

It is important to note that entities such as schools, franchisees, and small subsidiaries of a corporate group are not targeted separately as individual CRC participants. Rather, the CRC obligations, risks and opportunities are placed on the group as the CRC participant, so that it can deploy its energy management expertise across the different group members. For example, CRC local authorities will include state-funded school energy use within their portfolios, CRC franchisors will be responsible for their franchisee energy use, and the CRC corporate group highest parent will be responsible for the energy use of its subsidiaries.

We estimate that, at current energy prices, organisations with annual electricity bills below around £0.75 million are unlikely to meet the scheme's 6,000MWh qualification threshold.

Provided small energy users are exempted in this way, the analysis by NERA/Enviros shows that the remaining organisations with a relatively small number of sites left in the CRC (generally belonging to light industrial sectors), including those that can be classified as SMEs on the basis of their number of employees, are in fact likely to benefit from the scheme. This is because, even though base load admin costs cannot be spread across a large number of sites, they nonetheless have relatively high baseline levels of energy consumption, and hence opportunities for efficiency savings on energy bills.

Increasing the energy consumption exclusion criterion from 3,000 MWh to 6,000 MWh has removed some of the smaller emitters from the scheme, further reducing the already unlikely risk of any negative impact on smaller organisations.

Additional information from small business stakeholders on the likely costs and benefits was invited as part of the public consultation on the CRC proposal. Please refer to the Enviros analysis of consultation document responses for details.

8. Competition Assessment

The CRC is expected to affect large, business and public sector organisations in the following 27 subsectors:

- Aluminium
- Automotive trade
- Bricks
- Cement/Lime
- Ceramics
- Chemicals
- Construction
- Education
- Electrical engineering
- Energy processing
- Estate & business
- Food & drink
- Glass
- Health & social
- Hotels and restaurants
- Mechanical engineering
- Paper & board
- Plastics
- Printing
- Public sector
- Retail
- Steel
- Textiles
- Transport, storage & communications
- Vehicle engineering
- Water and waste
- Wholesaling

Each of these subsectors has its own market structure and competition dynamics. However, the analysis carried out by NERA/Enviros indicates that the risk of competitive distortions between UK companies and risk of disadvantages relative to competitors in other countries is very low. This is because energy costs are a small proportion (generally just 1-2%) of total operating costs in the target sector and because the scheme will help promote efficiency gains that will be to the advantage of scheme participants. The European Commission has granted State Aid approval to the revenue recycling mechanism and therefore has accepted the UK Government submission that the CRC will not impact on competition.

The proposed allocation method based on an auctioning approach would avoid the complexities that have arisen from free allocation in some other trading schemes, such as the risk of introducing competitive distortions and barriers to entry through the free allocations of emission allowances to incumbent organisations. As recognised in the ERM/MDI report on market design and auctioning, market power would not be an issue in the CRC auction as there are a large number of participants, none of whom emits greater than 5% of total sector emissions. Further, even in the case that an organisation has some market power, auction theory suggests that

their optimal strategy is to artificially deflate their demand in order to reduce the price paid on all permits. The aggregate impact of this strategy is to also reduce the price paid for allowances by all participants. In addition to this a limit will be placed on the percentage of allowances that one organisation can buy to stop any risk of one organisation being able to control the market. This limit has currently been set 10% of the auction. Given the above reasons, it is unlikely that a single organisation would be willing or able to follow a strategy of purchasing enough allowances in order to exert some control over the secondary market. . Should they attempt to do so, this would be a particularly risky strategy as this would require them to inflate their demand for allowances which would raise the equilibrium allowance price. Given, the presence of the safety valve it is a risky gamble to pursue a strategy that requires the (already-inflated) allowance prices to be exceeded both on the secondary market and by the safety valve price. Overall, therefore, the proposed CRC would not appear to raise significant concerns about potential adverse effects on competition.

Climate Change Policy Cost-Effectiveness Indicator

All Impact Assessments that estimate changes in CO_2 emissions in excess of either (i) 0.1MtCO_2e average per year for appraisal of less than 20 years, or (ii) 2.0MtCO_2e over the lifetime of appraisal of more than 20 years, are required by PSA Delivery Agreement 27, Indicator 6 to undergo a Climate Change Policy Cost-Effectiveness analysis. This Impact Assessment falls into both of the above categories. In summary, analysis indicates that 100% of the carbon savings projected as a result of the CRC are cost-effective – i.e. occur at carbon prices below the shadow price of carbon. A list of the abatement measures included in the analysis is given at Appendix A (page 126) of the NERA / Enviros analysis[29].

Cost effectiveness analysis provides an estimate of the net social cost per tonne of GHG reduction in the ETS sectors and/or an estimate of the net social cost per tonne of GHG reduction in the non-ETS sectors. Where a policy delivers emissions reductions in both the traded and non-traded sectors both figures should be calculated, where:

$$\textbf{Cost-effectiveness} = \frac{\textbf{PV costs – PV benefits}}{\textbf{tonnes of } CO_2\textbf{e saved in either (but not both) the ETS or non ETS sectors}}$$

The existence of the EU ETS and the newly proposed centrally set cap require that UK GHG emissions reductions in the ETS sectors are distinguished from UK GHG emissions reductions in the non-ETS sectors. A tonne of CO_2e abated in the ETS sectors is treated as a distinct unit from a tonne of CO_2e abated in the non-ETS sectors.

Reductions in UK emissions in the ETS sectors deliver an economic benefit to the UK but, from a static perspective, do not reduce global GHG emissions and are therefore valued at the 'market price of carbon'. (Note that, from a 'dynamic' perspective, downstream instruments

[29] Available online at: http://www.decc.gov.uk/media/viewfile.ashx?filepath=what we do/a low carbon uk/crc/policy/nera-enviros-report-060428.pdf&filetype=4

targeting electricity use help to create the political conditions for more stringent upstream caps on the EU ETS – which would in due course need to be accounted for as additional carbon savings).

Reductions in the non-ETS sector help the UK reach its binding target for emissions in the non-traded sector and should be valued using the Shadow Price of Carbon (SPC).

The resulting cost-effectiveness figures for the non-ETS sectors should be compared to the weighted average discounted Shadow Price of Carbon (WAD SPC) to assess the cost-effectiveness for the climate change policy cost-effectiveness indicator. Further details on the WAD SPC can be found at:

http://www.decc.gov.uk/en/content/cms/statistics/analysts_group/cc_indicator/cc_indicator.aspx

The resulting cost-effectiveness figures in the ETS sectors should be compared to the weighted average discounted market price of carbon (WAD EUA).

Sign convention: a policy that reduces non-ETS emissions with a cost effectiveness of -£10/ tCO_2e produces net benefits of £10 per tonne of CO_2e saved in the non-traded sector.

The calculations indicate that the CRC reduces ETS emissions with a cost effectiveness of -£29.7 against a weighted average discounted EUA price of £27.6. This means that it produces a net benefit of £29.7per tonne of CO_2 saved, and is thus cost effective. For the non ETS sector, the calculations indicate that the CRC reduces ETS emissions with a cost effectiveness of -£40.0 against a weighted average discounted SPC of 21.9. This means that it produces a net benefit of £40 per tonne of CO_2 saved and is thus cost effective.

9. Summary and Recommendation

This final IA provides an assessment of the costs and benefits of alternative options to reduce CO_2 emissions from the large, business and public sector organisations in line with the aim of around 4.4 $MtCO_2$ (1.2 MtC) of savings per year by 2020.

The option assessed by this IA to target emissions consists of the CRC Energy Efficiency Scheme (CRC) - a new proposed mandatory cap-and-trade scheme.

Several variants of the CRC, reflecting alternative qualification criteria, have previously been assessed. Government has decided that the inclusion threshold should be set at 6,000 MWh. The positive net present value indicates that when costs and benefits are taken into account, the scheme is beneficial to participant organisations. Including societal benefits, the net benefits of the scheme rise substantially.

As stated in the Energy White Paper, Government will use the experience we gain from the first phase of the CRC to determine whether, over time, it would be cost effective and proportionate to extend the scheme to organisations with lower energy consumption.

In terms of Better Regulation, Government recognises that it is important to keep the mix of policy instruments – including the CRC – under regular review, to assess the cost-effectiveness of schemes in light of experience, and to ensure that the overall policy framework is delivering emissions reductions efficiently and in a balanced way across the economy.

Specific Impact Tests: Checklist

Use the table below to demonstrate how broadly you have considered the potential impacts of your policy options.

Ensure that the results of any tests that impact on the cost-benefit analysis are contained within the main evidence base; other results may be annexed.

Type of testing undertaken	*Results in Evidence Base?*	*Results annexed?*
Competition Assessment	Yes	No
Small Firms Impact Test	Yes	No
Legal Aid[1]	No	No
Sustainable Development[2]	No	No
Carbon Assessment	Yes	No
Other Environment	Yes	No
Health Impact Assessment[3]	No	No
Race Equality[4]	No	Yes
Disability Equality[4]	No	Yes
Gender Equality[4]	No	Yes
Human Rights[5]	No	No
Rural Proofing[4]	No	No

Notes:

1. The UK Government has submitted an EU State Aid application and has received State Aids approval.

2. The original Partial RIA contained a Sustainable Development Impact Assessment. The CRC is considered to make a positive contribution to sustainable development given the key environmental benefits (carbon savings), economic benefits (financial benefits of energy efficiency, plus energy security benefits in terms of reduced reliance on energy supply), and social benefits (local air quality)

3. The Impact Assessment quantifies the local air quality benefits of the CRC, as the only significant health impact of the scheme

4. The CRC is considered as having no significant impact on these criteria

5. The relationship between the CRC Order and the requirements of the European Convention on Human Rights (ECHR) were reviewed along with the CRC's proposed enforcement regime during the 2009 consultation period. The Department for Business, Innovation and Skills (BIS), the Ministry of Justice (MoJ) and the Home Office have signed off the proposed enforcement regime as a whole, no specific issues were raised with regard to the ECHR.

In addition the CRC is considered to meet the seven principles for Better Regulation with regards to climate change, as set out by The Better Regulation Commission (BRC) in its report "Regulating to Mitigate Climate Change: a response to the Stern review"30. Details can be found in the March 2009 consultation on the draft Order to implement the CRC.

[30] "Regulating to Mitigate Climate Change: a response to the Stern review" BRE. Available online at: http://www.brc.gov.uk/upload/assets/www.brc.gov.uk/climate_change.pdf

Annexes

Annex 1: Other Policies to Reduce Carbon Emissions in Large Business and Public Sector organisations

Various policies are currently in place to encourage reductions in carbon emissions from the large business and public sector organisations. These are detailed in the 2006 Climate Change Programme and the 2006 Energy Review and DECC's 2009 UK Low Carbon Transition Plan[31]. Key existing policies include:

- **The Climate Change Levy (CCL).** The CCL plays an important role in internalising the external costs of CO_2 emissions and delivering emissions reductions from the business and public sectors.

- **Carbon Trust activities.** The Carbon Trust, an independent company funded by Government, is an important contributor to emissions reductions, including reductions from the large business and public sector organisations. The Trust's activities include advisory services, funding for energy efficiency measures, and investment and development of new low-carbon technologies.

- **Building Regulations.** The Building Regulations contain provisions which, over time, will help make buildings more energy efficient through targeting new buildings and major refurbishments. This will contribute to emissions reductions in the large organisations, where a large part of carbon emissions are associated with buildings use.[32]

Other policy instruments are directed primarily at energy intensive organisations. Only a small percentage of those organisations expected to qualify for the CRC currently have some of their emissions in these instruments. In order to minimise administrative overlap, the CRC will cover emissions outside of Climate Change Agreements (CCAs) and outside the direct emissions already covered by the EU Emissions Trading System (EU ETS). In addition, subsidiary organisations with more than 25% of their energy use emissions covered by a CCA will be completely exempt from the scheme.

The key policy instruments aimed primarily at the energy intensive industry that will nonetheless impact on the CRC sector to a limited extent are as follows:

- **Climate Change Agreements (CCAs).** CCAs are voluntary agreements, typically negotiated by established representative sector associations, focusing on energy intensive firms. CCAs cover around 5000 UK companies and have been very successful in delivering energy efficiency improvements within the energy-intensive sector – where

[31] Available online at: http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx

[32] Building regulations are devolved to the Administrations, a review of the energy standards for Scotland was recently completed and the new measures came in to being on 1 May 2007.

the 80% CCL discount (obtained by those organisations that meet their CCA targets) is comparatively significant.

- **EU Emissions Trading System (EU ETS).** Overall, around 370 UK organisations currently have some of their emissions in the EU ETS. Government estimates that around 5% of the 5,000 large organisations within the target sector will have part of their direct energy use emissions covered by the EU ETS (for example, as a consequence of having a boiler exceeding the 20 MW capacity threshold, or due to a large company owning an oil refinery). In addition, electricity generation is covered by the EU ETS and this is reflected in electricity prices. In this respect, there is therefore an overlap – though not one imposing double administrative requirements – between the inclusion of electricity generators in the EU ETS and all downstream energy efficiency policy in the Climate Change Programme (e.g. CCAs and the Energy Efficiency Commitment in respect of households). As with all downstream policy impacting on the efficiency of electricity use, the EU ETS cap needs to be adjusted to reflect projected improvements in such energy efficiency.

Other policy developments that will impact on large organisations

Any new policy instrument targeting the sector would overlap with some key policy developments impacting on large organisations. These key policy developments are as follows:

- **Energy Performance of Buildings Directive (EPBD):** Any potential policy targeting large organisations would have some overlapping elements with EPBD. Primarily, we expect overlaps to be in relation to Article 7.3 of EPBD[33]. There is an estimated emissions reduction overlap of 0.4$MtCO_2$ (and the impacts of this have been attributed to EPBD in the Impact Assessment, i.e. they have been excluded from the CRC analysis). However, it should also be noted that Government expects EPBD to provide an additional contribution of 0.4 $MtCO_2$ (0.1 MtC) of emission reductions per annum by 2020 from the large business and public sector organisations. This is expected to originate from an improvement in the situation regarding landlord-tenant relationships and energy efficiency improvements which will be brought by EPBD.

[33] This refers to the requirement of "public display of energy performance certificates for buildings over 1000m^2 that are occupied by public authorities and by institutions providing public services that are frequented by the public e.g. government offices, hospitals, schools, museums, libraries. The Government is committed to potentially widening the DEC requirement to other public and private sector buildings where cost effective to do so."

- **Business 'Smart' Metering:** As announced in the Energy White Paper package, Government consulted on the rollout of smart metering to business energy users in July 2008. Government's response to this consultation was published in May 2009[34]. Business 'smart' metering will target non half hourly metered electricity meters as well as non-daily read gas meters. There is likely to be a small amount of overlap in terms of carbon savings, however, much of this overlap is in common with that from EPBD and is therefore already accounted for.

- **Clean energy cashback**

  The Energy Act 2008 provides broad enabling powers for the introduction of clean energy cashback (previously known as feed-in tariffs) for small-scale low-carbon electricity generation, up to a maximum limit of 5 megawatts (MW) capacity - 50 kilowatts (KW) in the case of fossil fuelled CHP. Clean energy cashback will be introduced through changes to electricity distribution and supply licences. These provisions are intended to encourage the uptake of small-scale low-carbon energy technologies while the Renewables Obligation (RO) continues to be the main support mechanism for large scale renewables deployment.

- **Products Policy**

  Products policy is designed to improve the efficiency of a range of products by mandating targeted products meet minimum energy efficiency standards. The net impact should be a reduction in carbon emissions and energy cost savings for users. There will be some overlap between abatement from products policy and the CRC.

Targeting the "policy gap": Appraisal of alternative policies to achieve emissions reductions in the large business and public sector organisations

These policies include a valuable mix of fiscal measures, trading arrangements and direct regulation. However, barriers to cost-effective energy efficiency improvements and emissions reductions in the target sector remain. These barriers include hidden costs, split incentives and other market failures that may be associated with organisation structure, lack of understanding and awareness, and inertia. Government believes there is scope to further reduce these barriers. To reflect this belief, Government has committed to reduce emissions in large business and public sector organisations by 4.4 MtCO2 (1.2 MtC) per year by 2020[35].

In assessing different options, Government was guided by the following principles:

- Measures should attempt to effectively cover large organisations, including both direct energy use emissions and indirect emissions (electricity use);

- Measures should attempt to promote energy efficiency as a means to reduce energy use and therefore deliver carbon savings;

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[34] Available online at: http://www.decc.gov.uk/en/content/cms/consultations/smart_metering/smart_metering.aspx

[35] The Energy Performance of Buildings Directive is expected to produce 0.1 MtC of carbon savings in the target sector, in addition to any savings from the policy on large, non energy-intensive organisations. The Energy Review commitment is for a saving of 1.2 MtC from the sector as a whole.

- Measures should attempt to provide some robustness over emissions reductions;
- Measures should attempt to address both new build and use of existing buildings; and
- Measures should be cost-effective and minimise regulatory burden.

The following sections of this IA assesses the impacts of the CRC (in two alternative variants) compared to a "do nothing" business as usual scenario.

In addition to the options set out in this final IA, Government decided to carry out further appraisal into a wide range of options within the context of the public consultation, in order to enable triangulation of findings with the Carbon Trust analysis of different policy options. NERA were commissioned to investigate further the proposals below[36]:

1. A summary of the CRC Energy Efficiency Scheme, to facilitate comparison with other policies;
2. Expanding the EU Emissions Trading System (EU ETS) to cover the target group;
3. Expanding Climate Change Agreements (CCAs) to cover the target group;
4. Strengthening the implementation of Building Regulations and the European Performance of Buildings Directive (EPBD);
5. Extending the current voluntary UK Emissions Trading Scheme (UK ETS) to cover additional organisations in the target group;
6. Expanding the work of the Carbon Trust;
7. Differentiating Business Rates for buildings to encourage reduced CO_2 intensity;
8. Imposing an obligations on Energy Suppliers (similar to the Energy Efficiency Commitment for household customers) to reduce target group energy consumption;
9. Mandatory Reporting and possibly Benchmarking.

The results of this analysis provided useful triangulation with the conclusion reached by the Carbon Trust in their previous analysis - namely that the UK should take forward a new mandatory auction based cap and trade scheme targeting the large organisations. As a result, in the May 2007 Energy White Paper, Government announced its decision to implement the CRC.

[36] Available online at: http://www.decc.gov.uk/media/viewfile.ashx?filepath=what we do/a low carbon uk/crc/policy/nera-enviros-report-060428.pdf&filetype=4

Annex 2: Assessment of Administrative Costs

The key variables in the analysis of administrative costs undertaken by NERA/Enviros are:

Number of sites per organisation. In the model we consider the effect on businesses with 1, 2, 3, 4, 5, 6-10, 11-50, and 50 or more sites.

Annual electricity consumption per site. Sites vary significantly in their electricity use. NERA/Enviros consider four annual consumption bands: up to 200 MWh, 200-500 MWh, 500-1,000 MWh, and over 1,000 MWh. Because the gains from energy savings for very large energy consuming sites are substantial, close scrutiny of the administration costs of these large sites was not a priority in the NERA/Enviros study.

Management cost day rate. NERA/Enviros assumed a fully absorbed cost of £500 / day. This represents the approximate value of management time and associated overheads, including rent, insurance and central support services. The value of management time needs to reflect the full cost of employment and running the business, not just the variable employment costs. Another point of reference is the market rate for a technical consultancy that would be suitable to do this work—since one option for any covered firm would be simply to contract out all scheme-related activity. This daily rate would also be on the order of £500 / day or more. Again, these rates reflect the fully absorbed costs of the consultants' time.

Management days spent on different administrative activities. Each of these entails a certain amount of effort that will depend on the particular policy implementation as well as the size of the organisation (including the number of covered sites and the total energy bill).

A detailed description of each of these activities is provided below.

Understanding the scheme rules

Irrespective of the eventual design of the scheme companies will need to take time to understand what is required of them. At a very simple level this will include:

- receiving emails and reading associated documentation, including the legal details that back up these schemes;
- checking websites for updates;
- checking details with relevant officials or points of contact;
- understanding definitions;
- understanding the structure of their organisation
- consequences of being included.

For very large organisations, these rules will also need to be understood by more than one person. Often the energy manager or environmental compliance manager will need to explain the scheme to directors of engineering, purchasing and finance. This will require internal discussions and presentations. In very large organisations (for example, major retailers and supermarkets), the time taken up with internal communication can form a significant proportion of the overall overhead of these schemes.

For the fixed price sale we have assumed between one and two person-days for these tasks for organisations with few sites, rising to three to four days for more complex site structures. This relatively small time requirement reflects the simplicity of the fixed-price format, which means

that participants do not need to be as concerned about bidding rules and strategies. It also assumes that rules do not change throughout the scheme's duration.

The increase in the number of days is because in spite of the intended simplicity of the scheme the rules will have to be clearly and legally defined. For example, with organisations with several sites we can foresee a few days time spent determining whether sites should be included or excluded from the scheme. This activity will also need to be reviewed on a yearly basis as site's energy consumption (and metering arrangements) may change. Large organisations also may require more than one person to understand different aspects of the scheme.

In the case of a fixed quantity auction we increase our estimate of the number of days required for understanding the scheme to two to three days for a single site and three to five days for a large multi-site company. The increased time requirements over a fixed price scheme, reflects the generally higher risks of participating in a fixed quantity scheme.

Collection and analysis of data

Most half hourly metered sites will have relatively good data on electricity use. The amount of time required to compile data is likely to depend in part on the required level of accuracy under the scheme. For organisations with established energy management systems or simple energy use profiles, it should be possible to retrieve half hourly metered electricity consumption data relatively quickly. We assume that this data can be collected to a confidence level of around 98 percent. The residual inaccuracy remains for two main reasons:

- incorrectly allocated meters (i.e. meter assigned to the wrong site address);

- meters incorrectly assigned to bill owner (most likely for large multi-site owners).

These types of inaccuracy are however quite rare, but can be significant where businesses have changed ownership of sites. If these inaccuracies can be tolerated then data collection for half hourly electricity meters can be undertaken relatively quickly.

In addition to the above sources of inaccuracy, meters also occasionally fail and cannot provide the necessary data. Although a multi-site organisation will be more likely to be affected by a meter failure at any one time (because such organisations have more meters that can fail), the contribution that such failure makes to overall levels of uncertainty is lower at multi-site organisations because it will only affect a small fraction of total consumption. In cases where meters fail, missing data are filled in by the data aggregators using approved algorithms, which may be based, for example, on average consumption rates from previous days. For single site companies, the error from estimating this consumption will form a higher proportion of the uncertainty in the total annual consumption.

In some cases, it may be necessary to devote time to reconciling internal data systems. For example, billed data sometimes do not correspond to internal consumption data. When determining actual consumption for ETS purposes this can create confusion and time can be spent reconciling these differences.

The same quality data typically are not available for gas consumption. Energy use associated with gas consumption is generally not recorded as accurately and may require additional auditing. Most gas meters in the UK are read monthly "by hand", although automated reading is more common in other countries. The quality of data available for other fuels is considerably lower than that for gas, and data validation may be required for sites that consume oil or other fuels.

The time required to resolve these data issues will vary considerably by organisation. Some organisations (particularly those for whom energy expenditures are substantial) may have detailed databases already in use that can report their total energy consumption and expenditure and that can analyse the performance of individual sites and, possibly, processes. We have allowed for this in our table by assuming for multi site companies that less time is spent gathering data where sites have high energy consumption, and more time is spent for those with low energy consumption.

For small sites we have assumed an average of one to two days to collect electricity and gas consumption data and check that it is of a suitable quality and at the high end 15 days for organisations with a large number of low-consuming sites (up to 500 sites). This estimate reflects the project team's experience in collating data of sufficient quality to be used in a trading scheme across large, multi-site companies. The difference in number of days between small and large sites narrows as the number of sites per organisation increases because sites conform more to a standard retail premises. The number of days required for average-sized organisations may be closer to ten for those that already have in place good energy-tracking systems.

We do not make a distinction between the time required for data collection under fixed price and fixed quantity schemes.

Developing a compliance strategy

The distinction between a compliance strategy under an ETS and simply deciding on whether to invest in energy saving measures is that with the ETS organisations need to decide whether it makes sense for them to undertake investments themselves, and if so, at what level. A comprehensive compliance strategy would outline not only those measures designed to meet a pre-defined "target", but also would try to make the most cost-effective use of the market-based instrument by buying or selling allowances. This requires additional analysis. At a minimum, it requires the organisation to take stock of the abatement opportunities that it may have available, and the approximate costs that such opportunities may entail.

We assume that compliance strategies are only relevant for the fixed quantity type scheme, where participants in the aggregate would be more likely to face emissions caps that are less than they need. Under a fixed price scheme, participants would be somewhat more likely to acquire sufficient allowances to cover their expected need. Where this is the case participants would be more likely to follow business as usual and a compliance strategy in the context of the CRC becomes less meaningful.

Under the fixed quantity type scheme we have estimated a time requirement of one day for a single site and five days for a large multi-site organisation to put in place a compliance strategy. This time estimate includes the need to consider the "make-buy" decision in the context of the CRC but *excludes* the time and costs associated with the identification and evaluation of the energy saving measures themselves. For the purposes of this analysis we assume that these costs have already been taken into account in the models that assess the costs of the measures and are not related to the presence of the scheme.

In practice the time spent developing a compliance strategy will be spent consulting with in-house engineers, plant managers and/or external consultants to identify potential energy-saving measures, quantify energy reduction potential, assess payback periods, and develop implementation plans.

Understand and take part in the auction

Participating in the auction requires a number of actions including:

- reading auction documents and understanding the rules or the auction;

- projecting emissions for future years—depending on the format and timing of the auction, participation may require organisations to predict what their emissions will be in future years as well as the year of the auction. (This can be time-consuming where organisations are buying / selling sites and businesses. Merger and acquisition activity is often a cause of discrepancies in yearly energy and emissions data.);

- combining projections with expectations of abatement measures to arrive at an "optimal" bidding strategy.

For a fixed price sale participation will be more straightforward than in fixed volume auctions. Assuming the organisation has developed some knowledge of the available abatement opportunities and their approximate costs, managers will be able to carry out cost-effective emissions reductions internally, and then purchase sufficient allowances at the auction price to cover their remaining emissions. With a fixed price, participation should result in a cost neutral position providing that the projection of future emissions is accurate. Fixed quantity auctions will be more complicated and will involve the development and submission of detailed bid schedule information.

Companies will also need to factor in uncertainty surrounding price in a future traded market and availability of allowances for purchases via gateway or other mechanism during the auction process.

Under the fixed price sale we have estimated that the time required to secure allowances is one day for a small company and between five and ten days for a 500-site company. These estimates assume that the auction is very simple and easy to understand. It also reflects the outcome of the fixed price sale, which may be more likely to result in companies not being concerned with the "make or buy" decision and simply buying at the auction what they expect to emit.

If a fixed quantity format is used, the number of days for understanding and participating in the auction is likely to be higher – one to three for a single site and 10 to 20 days for a large multi-site company. The reason for this higher figure is that for large companies, such as supermarket chains, the costs of making a mistake in the auction will be higher and hence the analysis will demand more scrutiny.

Trading activities

If all covered organisations and sites participated in the auction and all auction participants were able to predict their future emissions with perfect accuracy, there would be no need for further trading.

However, some participants may decide not to participate in the auction at all, and many sites will find that their initial emissions projections have not been entirely accurate. Both of these will make it necessary to engage in trading of some sort. The main activities required will be:

- understanding mid-year positions and projecting year end positions — for some organisations it may be desirable to monitor actual emissions levels more frequently;

- engaging with the market to buy or sell—this will require making decisions on when and who to trade with as well as performing the actual transaction;

- trading administration—a small amount of time will be needed to ensure that the back office administration (i.e. accounting) is done appropriately, e.g. credit checks, money transfer etc. In the early stages of a scheme these types of costs can be substantial.

NERA/Enviros have allowed for zero to 0.5 days time for this activity for single site participants under a fixed price scheme. Note these estimates reflect averages across all participants. An average of half a day assumes some sites will not engage in trading at all whereas others may undertake one trade. For multi-site participants NERA/Enviros assume four days are required to execute the trade.

Under a fixed quantity auction NERA/Enviros assume one to two days trading activity for a single site participant and seven to ten days for a large organisation. These higher estimates reflect the greater likelihood of participants needing to trade under a fixed quantity auction, because they have not bought sufficient allowances in the auction.

These day estimates include all necessary steps associated with understanding how to trade, finding a counterparty, receiving internal approvals etc. NERA/Enviros have also accounted for brokers' fees in their estimates. Brokers typically charge a commission fee related to the deal size, but for small transactions make a fixed charge. In the CRC and the EU ETS commissions are around 1-2 percent of the deal value for buyers and sellers. Fixed charges are assumed to be around £200 per transaction, based on Enviros experience from managing CCAs.

Submitting data to co-ordinator

This is a relatively straightforward task but will need to be done according to the co-ordinator's specifications to ensure that data is assembled and presented in a consistent format—which may not be the format that the company itself chooses to use for its own internal reporting. Thus although much of the relevant data will have been compiled under Task 1, more effort will be required to organise the data in the format required. NERA/Enviros have allowed for one day for small companies for this task, but increase this to five to six days for multi-site companies that may need to submit data covering hundreds of sites.

NERA/Enviros do not differentiate between fixed price and fixed quantity schemes in the time required to submit data to the scheme coordinator.

Annex 3: Subsectoral Costs and Benefits Breakdown

Table A3.1: Detailed estimates of Coverage and Savings by Subsector at a 10% DR with a 6,000 MWh threshold

Scenario: Permit price: £60 | Recycling percentage: 100% | Recycling method: Proportional

Results	Total NPV	Total PV of Energy Saving	Total PV of Capital Expenditure	Total PV of Admin Cost	Total PV of Permit Costs	Total PV of Recycled Revenue	Years to Positive Cash flow	Annual Carbon Savings (tC/yr) - 2010	Annual Carbon Savings (tC/yr) - 2015	Annual Carbon Savings (tC/yr) - 2020	Covered Emissions (tC/yr)
Aluminium	2.4	5.0	0.6	2.0	61	61	11	320	2,064	4,901	122,504
Bricks											
Cement and Lime											
Ceramics	0.0	0.0	0.0	0.0	0	0	3	3	11	20	146
Chemical	45.1	60.6	11.4	4.1	315	315	5	10,012	40,702	80,495	656,285
Construction	2.8	3.3	0.0	0.5	21	21	1	549	1,483	2,701	42,783
Education	34.2	48.5	11.8	2.4	51	51	7	895	4,055	9,263	103,614
Electrical Engineering	15.7	31.6	10.9	5.0	131	131	5	3,197	10,458	20,885	267,266
Energy											
Food and Drink	14.1	23.2	6.8	2.2	129	129	4	3,507	11,445	20,691	265,345
Glass	8.2	10.1	1.4	0.4	39	39	5	397	4,687	9,322	81,147
Health and social work	23.9	31.4	3.5	4.0	123	123	3	2,993	13,135	25,842	254,230
Hotels and Restaurants	142.1	179.1	17.3	19.7	598	598	4	12,573	49,472	108,677	1,226,611
Mechanical Engineering	20.1	58.3	15.1	23.1	374	374	9	7,314	26,912	52,824	762,852
Other Industries	54.9	67.3	12.3	-	919	919	3	6,384	32,728	79,347	1,848,901
Other NFM											
Paper and board	21.1	28.5	4.7	2.7	255	255	6	3,328	15,682	33,147	517,799

Plastics	19.9	54.4	4.3	30.2	531	531	12	4,318	23,924	54,443	1,072,364
Public administration	334.7	365.2	8.1	22.4	695	695	1	28,187	90,807	181,267	1,452,084
Real estate	45.1	61.2	10.2	5.9	154	154	4	3,537	11,217	21,620	314,044
Retail trade	543.4	633.4	70.7	19.2	907	907	3	39,587	170,278	331,377	1,927,997
Motor vehicles											
Steel	14.5	29.4	6.7	8.2	699	699	11	4,029	23,818	57,648	1,405,670
Transport, storage and communication	22.9	27.2	3.9	0.4	21	21	3	1,420	5,645	10,505	45,157
Vehicle Engineering	44.3	60.5	14.2	2.1	360	360	5	5,873	26,056	54,035	734,016
Water	29.7	35.8	3.3	2.8	99	99	4	3,494	13,814	27,543	207,661
Wholesale trade	415.0	459.8	9.3	35.5	616	616	2	31,889	129,200	258,927	1,321,815
All sectors	**1,854.0**	**2,273.6**	**226.5**	**193.0**	**7,100**	**7,100**	**111**	**173,805**	**707,595**	**1,445,480**	**14,630,290**

Note: The estimates of carbon savings in key milestone years presented in this annex reflect the original NERA/Enviros analysis as they assume January 2008 as the start date for the scheme. Assuming a start date of January 2009, the savings presented in the tables below for 2010, 2015 and 2020 would in fact accrue a year later (i.e. 2012, 2017 and 2022). It must be noted that this table is from the original model, without the new adjustments to the methodology that have taken place since. So it is for illustrative purposes only, to give indicative figures for the breakdown by sector. (Only aggregate figures could be calculated after the adjustments). Greyed-out sectors are excluded from the results because the analysis by NERA/ Enviros suggests they will not have emissions covered by the scheme (their emissions are expected to be covered by the EU ETS and CCAs; in the case of motor vehicles, the sector is also not well-defined in the existing datasets.).

Annex 4: Sensitivity Analysis

The NERA/Enviros model to estimate the impacts of the CRC

The models developed by NERA/Enviros allow us to establish the capital investment and energy saving profile of CO_2 abatement measures that NERA/Enviros expect to be implemented as a direct result of the CRC. The model is based on two databases of technological and behavioural measures: BRE's abatement cost curves for the non-domestic sector and the ENUSIM model for industrial sectors. These were modified by Enviros as part of the EEIR. The scheme is assumed to run over 15 years and it is expected that adopted measures would need to be replaced regularly. The weighted average lifetime of technical/capital measures is nine years, while behavioural measures are assumed to be replaced/reintroduced every three years. The analysis also assumes that measures continue to be replaced at an annual rate of 0.3% a year (however the actual rate may be higher than this if the introduction of the CRC stimulates additional research and development).

Whether a specific measure is cost-effective or not is determined according to the net annual cost per tonne of carbon reduced. If this is below the expected price of carbon in the scheme, it is considered cost-effective and economically beneficial to implement the measure.

The model is sensitive to several input assumptions, including energy prices and the rate of uptake of cost-effective energy efficiency potential; i.e. how quickly firms will abate.

Fuel prices

The default fuel prices assumed in the models are consistent with recent BIS projections (and Government-wide guidance[37]). As the BRE and ENUSIM models cannot easily be rerun with new fuel prices, NERA/Enviros have back-calculated the value of energy savings from the model outputs which can then be adjusted for different fuel price assumptions. This IA uses a "low" price case of 1.7 p/kWh for gas and 6.8 p/kWh for electricity, and a default "high" price case of 2.6 p/kWh and 10.1 p/kWh for gas and electricity respectively. However it should be noted that medium- to long-term projections are subject to considerable uncertainty.

Higher prices lead to higher benefits from the scheme because the savings brought about are higher, whereas lower prices result in lower benefits. The impact of a third lower fuel prices ('low energy prices') than in the default scenario has been modelled, which significantly reduces the NPV of the scheme.

Uptake of cost-effective potential

The extent to which cost-effective potential is realised will depend upon the rate at which each of the technological and behavioural measures is implemented – the uptake rate – which is modelled at 1.5% uptake of cost effective potential per year under a business as usual scenario, increasing rapidly as the CRC is introduced. Table A4.1 below shows the uptake rates assumed

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[37] Available online at: http://www.decc.gov.uk/en/content/cms/statistics/analysts_group/analysts_group.aspx. This guidance provides a time series of prices, while the model uses a single value. As a result Defra have calculated average fuel prices over the policy appraisal lifetime. This does not impact greatly on the results as energy price projections are fairly stable over time.

by NERA/Enviros in their default scenario as well as in the high and low uptake scenarios that they considered in their sensitivity analysis.

Table A4.1: Uptake rates from the new CRC (% of cost effective potential)

		BAU	Low uptake scenario	Default uptake scenario	High uptake scenario
Behavioural measures	End of Year 1	1.5%	0%	10%	20%
	End of Year 4	5%	25%	35%	45%
	End of Year 8	11%	45%	55%	65%
	End of Year 12	17%	65%	75%	85%
	End of Year 16	23%	75%	85%	95%
Capital measures	End of Year 1	1.5%	0%	5%	15%
	End of Year 4	5%	5%	15%	25%
	End of Year 8	11%	25%	35%	45%
	End of Year 12	17%	45%	55%	65%
	End of Year 16	23%	55%	65%	75%

Source: NERA/Enviros

Landlord-tenant split and other parameters' effect on scheme benefits

NERA/Enviros estimated the landlord-tenant split to reduce the cost-effective abatement potential by 16% before accounting for the specific make-up of sites covered by the CRC. A scenario with no landlord-tenant split was run as a sensitivity case.

Other sensitivities that were tested for included a lighter administration regime.

Summary of sensitivity results

In sum, the modelling of financial impacts is sensitive to a number of assumptions and parameters. The most significant, both in terms of uncertainty about likely future values and the impact on the model, is fuel prices; a scenario with fuel prices one-third lower than the high default scenario reduces the estimated NPV benefit of the scheme by nearly two-thirds. The assumption about the uptake rate also is a key uncertainty, as the strength of the theoretical rationale for the scheme (to focus management attention on energy use and encourage target setting) is difficult to establish empirically, and the rate at which measures are taken up is therefore uncertain. The results are less sensitive to other assumptions, such as the administrative regime and landlord-tenant split.

Table A4.2: Summary of sensitivity analysis results from the NERA/Enviros study

(6,000 MWh threshold)

		Percent difference from default (%)	
Scenario	**NPV at 10% DR (£ million)**	**NPV**	**2020 carbon savings**
Default	1,048	-	-
Light admin regime	1,090	4%	0%
No landlord-tenant split	1,279	22%	14%
Low uptake rate	626	-40%	-23%
High uptake rate	1,494	43%	23%
Low energy prices	410	-61%	-12%

Source: NERA/Enviros & Defra adjustments

A more conservative admin costs scenario

Following the publication of the original NERA/Enviros report, the numbers for organisations with more than 50 half hourly metered sites have been revised by NERA/Enviros in order to provide an alternative, more pessimistic picture of the progression of admin costs in relation to site numbers. The revised estimates reflect a more detailed "banding" of large organisations (50-100 sites, 100-200 sites, 200-500 sites and 500+ sites) as a first step to improve the estimates of admin time input. The tables below show the new number of person-days for different sized organisations, with the previous numbers from the NERA/Enviros analysis below for comparison. The new figures are significantly higher than the central case in the original NERA/Enviros report; a rise from 56-57 days to 144-161 person-days. This is accounted for mainly by the inclusion of energy audit activities and an almost fourfold increase in initial data collection and analysis costs, but is also due to a rough doubling of all other estimates. In addition, NERA/Enviros also revised the assumptions on admin time input across the full spectrum of organisations to account for hidden activities that may not have been captured by

the BRE and Enusim cost curves. This further adds between 1 and 15 person-days to the regional estimates, depending on the organisation size.

Table A4.3: Effect of more pessimistic assumptions on admin time input for large organisations (over 50 half hourly metered sites).

Average values for large organisations (over 50 sites) as shown in NERA/Enviros report					
		HH-metered electricity consumption per site (MWh/year)			
		<200	200-500	500-1000	1000+
Understanding the rules	Person-days	4	4	4	4
Initial collection and analysis of energy data	Person-days	14	14	12	12
Developing a compliance strategy	Person-days	5	5	5	5
Understanding and taking part in auction	Person-days	5	5	8	8
Trading activities	Person-days	5	5	6	6
Submitting data to co-ordinator	Person-days	5	5	5	5
Verifying data (external costs)	Person-days	19	19	19	19
Energy audit activities	Person-days	0	0	0	0
Total person-days	**Person-days**	**56**	**56**	**57**	**57**
Co-ordination cost/site	£/site	20	20	20	20

Average values for large organisations (over 50 sites) as subsequently revised by NERA/Enviros under more conservative assumptions					
		HH-metered electricity consumption per site (MWh/year)			
		<200	200-500	500-1000	1000+
Understanding the rules	Person-days	6	6	6	6
Initial collection and analysis of energy data	Person-days	44	44	44	44
Developing a compliance strategy	Person-days	11	11	11	11
Understanding and taking part in auction	Person-days	10	10	10	10
Trading activities	Person-days	8	8	8	8
Submitting data to co-ordinator	Person-days	8	8	8	8
Verifying data (external costs)	Person-days	35	35	35	35
Energy audit activities	Person-days	23	23	29	39
Total person-days	**Person-days**	**144**	**144**	**151**	**161**
Co-ordination cost/site	£/site	80	80	80	80

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Please see the original partial RIA for the Sustainable Development Test.

Annex 5: Enforcement, Penalties and Monitoring, Reporting and Audit (MRA)

Enforcement of scheme

In order to ensure all organisations comply with the requirements of the proposed CRC, a suitable regulator for the scheme will have to be established. Government proposes that the Environment Agency (EA), Scottish Environment Protection Agency (SEPA) and Department of Environment Northern Ireland (DOENI) would act as regulators of the scheme in relation to where an organisation's highest parent or nominated primary member is located in their respective areas. Additionally, Government also proposes that the CRC scheme should be administered by the Environment Agency on behalf of all the UK regulators.

Further information on enforcement, penalties and MRA is available in the March 2009 consultation document and October 2009 Government response.

Penalties for non-compliance with the scheme

As suggested in the previous consultation, and in response to stakeholders views, a light touch regime will require strong penalties, to deter abuse and secure compliance. These penalties will be in line with the Macrory[38] 'Six Penalties Principles', which recommends that sanctions should: aim to eliminate any financial gain or benefit from non-compliance; be proportionate to the nature of the offence and the harm caused, aim to deter future non-compliance, and be based on transparent enforcement of penalties.

Government has drawn on the approaches used in other schemes (e.g. the EU ETS and CCAs) to draw up the proposals for other offences and these are set out in the March 2009 consultation document and October 2009 Government response.

Civil Penalties

The proposed civil penalties have been designed to be proportionate to the offence and fair as possible, taking into consideration the wide range of organisations that will be included in the CRC.

The level of the fines proposed has been calculated in order to ensure that the cost of non-compliance is significantly higher than the costs of compliance, in order to incentivise the correct behaviour. The proposed framework for penalties has been designed to be transparent and practical, to ensure that it is clear to participants when a penalty is incurred, how it is set and calculated, and it is easy to implement for the regulators.

Penalties will be applied where a participant fails to comply with any of their key obligations at any time within the CRC scheme. The key obligations are registration; submitting a Footprint Report; submitting an Annual Report; complying with the performance commitment (surrendering sufficient allowances); reporting correctly; and keeping records. Penalties will be applied to energy suppliers for persistent failure to provide statements to customers or failure to provide information to the administrator and participants for the purpose of qualification.

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[38] Macrory (2006) "Regulatory Justice: Making Sanctions Effective". Available online at: http://www.berr.gov.uk/files/file44593.pdf

Government also proposes the application of a penalty for those organisations that do not qualify for the scheme, but are required to contact the administrator and submit information.

In addition to the specific civil penalties, there will be a general power for the Administrator to issue enforcement notices when it considers that a participant is contravening one of the key requirements of the Order.

The updated civil penalties are summarised in the table below. For a complete description of the proposed civil penalties please refer to the 2009 consultation document and Government response.

Table A5.1 Civil Penalties	
Non-compliance	**Penalties**
Failure to register	• Immediate fine of £5000, imposed for failure to register by the deadline • Further fine of £500 per working day for each subsequent working day of delay up to a maximum of 80 working days • Publication of non-compliance
Failure to Disclose Information	• Where an organisation with a Half Hourly Meter (HHM) that does not meet the qualifying threshold fails to make an information disclosure, a one off fine of £500 per settled HHM for which that organisation is responsible.
Failure to make a complete registration (New penalty)	• Where an organisation registers, but fails to do so on behalf of all parts of their organisation, a fine of £500 per settled half hourly meter for which the organisation is responsible but was not included in its registration • Publication of non-compliance
Failure to provide Footprint Report	• Immediate fine of £5000, for failure to provide a Footprint Report by the reporting deadline • Further fine of £500 per working day for each subsequent day of delay up to a maximum of 40 working days. Total accumulated daily rate fine is doubled after 40 working days • Publication of non-compliance
Failure to provide Annual Report	• Immediate fine of £5000, for failure to provide a Annual Report by the reporting deadline • Further fine of £500 per working day for each subsequent day of delay up to a maximum of 40 working days. Total accumulated daily rate fine is doubled after 40 working days • Emissions are doubled only with regard to that year's performance commitment requirement. • Publication of non-compliance • Administrators will block the transfer of all allowances out of the participant's registry account until report is received • Bottom ranking on the Performance League Table
Incorrect Reporting	• Fine of £40 for each tCO_2 of emissions incorrectly reported, to be applied wherever there is a margin of error greater than 5% • Publication of non-compliance
Incorrect information (New penalty)	• Where an organisation fails to provide accurate information in its reports, and where that information does not affect the emissions totals, a fine of £5,000. • Further, where that inaccurate information affects the participant's performance in the league table, and additional fine of double the amount of any financial gain achieved from improved performance score. • Publication of non-compliance
Failure to comply with the performance commitment (surrendering sufficient allowances)	• Fine of £40/tCO_2 in respect of each allowance that should have been obtained and cancelled • Must obtain and cancel the outstanding balance of allowances. • Continued failure to remedy shortfall will result in recycling payment being withheld until an organisation complies. • If a participant fails to comply by the end of a compliance year, they will not receive their recycling payment. Outstanding allowances will then be added to their performance commitment requirement for the following year • Publication of non-compliance • Administrators will block the transfer of all allowances out of the participant's registry account until all necessary allowances are surrendered
Latent failure to comply with the performance commitment	• Where the non-compliant organisation is still a participant, the shortfall of allowances is added to their forthcoming year's performance commitment total. • Publication of non-compliance • Where the non-compliant organisation is no longer a participant, a fine equal to the value of the shortfall. The value of the shortfall is determined with reference to the price of allowances in the most recent Government sale or auction.
Failure to keep adequate records	• Fine of £40 per tCO_2 of the participants CRC emissions in the most recent compliance year • Publication of non-compliance
Failure of franchisee to provide information to a franchisor	• Where a franchisee has failed to provide information to a franchisor which has prevented the franchisor complying with its obligations under the Order, the administrator may impose and enforcement notice on the franchisee.

Offences

Government proposes that the CRC rely almost exclusively on civil penalties to guarantee compliance with the scheme. However, active and knowing attempts by participants to falsify evidence or obstruct and mislead the administrator are a more serious offence and should bear a more severe punishment.

Below is the revised table which details the types of behaviours that that will be subject to criminal offences within the enforcement framework for the scheme.

Table A5.2 Offences

Offence	Penalty
Falsification and deception • Knowingly or recklessly make false or misleading statement • Falsification of evidence • To pretend to be an authorised person	Summarily • Imprisonment up to three months in England, Wales and Northern Ireland, or twelve months in Scotland • Fine not exceeding £50,000 Indictment • Imprisonment up to two years • Financial penalty (undetermined)
Non-compliance with enforcement • Failure to comply with an enforcement notice • Intentionally obstruct an authorised person • Failure to provide assistance, facilities and information or to permit any inspection • Failure to appear, or prevent any other person to appear, before an authorised person as part of an inspection	

The punishment for criminal offences will vary depending on whether the case is heard under summarily procedure or by indictment.

The Climate Change Act provides Government with wider powers in relation to criminal offences. However, Government considers that it would not be appropriate to provide for offences and punishment more significant than the enforcement system adopted in the EU ETS. As the two schemes complement each other in terms of climate change policy, and considering in some cases there will be organisations that participate in both schemes at the same time, it is important to ensure the framework for criminal offences is consistent, so that neither of the two schemes provides for more stringent criminal offences.

In the case of the CRC, a director or senior executive is required to take ultimate responsibility for their organisation's compliance with the CRC. As an option of last resort where a criminal

offence has been committed, it is proposed that a director or senior executive would be subject to the penalty of imprisonment. It should be emphasised that, on the basis of EU ETS experience, Government does not anticipate any application of such criminal offences.

Standard financial penalties for civil and criminal offences will be applied across the UK. However, different statutory maximum imprisonment terms will be applicable in Scotland from the rest of the UK.

Annex 6: Equality Impact Assessment Form

Stage 1 – Initial Screening

1. Person(s) & project team/directorate /Unit responsible for completing the assessment:

Carbon Reduction Commitment (CRC) Team, National Carbon Markets,
Department of Energy and Climate Change

2. Name of the policy, strategy or project:

Carbon Reduction Commitment - the UK's innovative new mandatory emissions trading scheme covering the large non-energy intensive sector. The scheme is due to come into force in 2010 and will be one of the first of its size and scale in the world.

3. What is the main purpose or aims of the policy, strategy or project?

The Carbon Reduction Commitment is a mandatory cap and trade scheme covering energy use emissions from large business and public sector organisations. The scheme has been designed to fill a "gap" within the coverage of targeted climate change instruments, relating to energy end-use emissions from large, business and public sector organisations, where the UK Government identified there was scope for further carbon savings of approximately 1.5 $MtCO_2$ per year by 2015.

4. Who will be the beneficiaries of the policy/strategy/project?

There will be societal environmental benefits through the reduction of greenhouse gas emissions, either directly or indirectly from participating organisations. Participating organisations will also benefit from reduced energy costs if they engage in energy efficiency / saving measures.

5. Has the policy/strategy/project been explained to those it might affect directly or indirectly?

Yes – extensive stakeholder engagement has been undertaken over the development of the CRC policy position, including three formal consultation exercises, stakeholder workshops and the provision of an email address for stakeholders to ask questions. In addition over 10,000 people have signed up to the CRC mailing list in order to receive quarterly CRC policy updates.

6. Have you consulted on this policy?

Yes - three full consultation exercises have been held to date, with supporting workshops and focus groups involving around 500 people – with participants drawn from across the private and public sectors. In total we have engaged with over 10,000 individuals on the design of this policy. No specific consultation has been undertaken with stakeholder groups primarily representing equality focused issues.

(a) The policy/strategy/project could have a positive impact on any of the equality target groups or contributes to promoting equality, equal opportunities and improving relations within equality target groups.

(b) The policy/strategy/project could have a negative impact on any of the equality target groups, i.e. disadvantage them in any way. If the impact is high, a full EQIA should be completed.

The proposed policy will not have an impact on the community or staff of DECC. No consequences of the policy can be expected to differ significantly according to the characteristics of individuals.

Equality Target Group	(a) Positive Impact		(b) Negative Impact		Reason/Comment
	High	Low	High	Low	
Men					It is not envisaged that the Equality Target Groups will be subject to either positive or negative equality impacts associated with the implementation of this policy. However all the groups could be expected to benefit from the societal benefits associated with the reduction of carbon emissions from this sector. There is no evidence to suggest that any particular group would benefit disproportionately relative to other groups.
Women					As above
Asian or Asian British people					As above
Black or Black British people					As above
White people (including Irish people)					As above
Chinese people					As above
Mixed Race people					As above
Other racial/ethnic group (please specify)					As above
Disabled and Deaf people					As above

Gay, Lesbian and Bisexual people					As above
Transgender people					As above
Older people (50+)					As above
Younger people (17-25) and children					As above
Working Patterns (P/T or part year)					As above
Faith groups (please specify)					As above

8. Please give a brief description of how this policy benefits the equality target groups identified in the above table, i.e. promotes equality?

The CRC scheme is targeted at private and public sector organisations and as such will not directly impact on these Equality Target Groups. However all the stated groups could be expected to benefit from the societal benefits associated with the reduction of carbon emissions from this sector. It is not envisaged that the stated groups will be subject to either positive or negative equality impacts associated with the implementation of this policy. Two general points can be noted, however. Firstly, as with all policies aimed at mitigating impacts of climate change through successful abatement of carbon emissions, benefits can be expected to be focused on those most at risk of climate change, including those with health conditions which make them vulnerable to more frequent and prolonged heatwaves in summer, and those living in developing countries with limited capacity for adaptation. Secondly, the measure is targeted at large corporations and organisations, and specifically excludes SMEs and micro-businesses.

9. If there is a negative impact on any equality target group, is the impact intended or legal?

This policy has no impact on the equality target groups.

If the negative impact is not intended, discriminatory and/or high in impact, complete part 1 and move on to the full assessment.

10. What actions could be taken to amend the policy/strategy/project to minimise the low negative impact?

Not applicable

11. If there is no evidence that the policy/strategy/project promotes equality, equal opportunities or improves relations within equality target groups, what amendments could be made to achieve this?

This policy is targeted at large private and public sector organisations not at individuals.

12. How will the policy, strategy or project be implemented including any necessary training?

Not applicable

Partial Assessment necessary ☐

☐ **No**

Full Assessment necessary: ☐

☐ **No**

This is a new Policy **Yes** ☐

This is a change to an existing policy ☐

This is an existing policy ☐

Predictive **Yes** ☐

Retrospective ☐