HM TREASURY

HM Revenue & Customs

Carbon price floor:

support and certainty for low-carbon investment

December 2010

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ISBN 978-1-84532-782-8
PU1055

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Summary Table

Subject of this consultation:	Proposed changes to the climate change levy (CCL) and fuel duty to support and give certainty to the price of carbon in the UK electricity generating sector.
Scope of this consultation:	The Government is consulting on proposals to provide greater certainty and support to the carbon price. The aim is to help create more incentives for investment in low-carbon electricity generation. The Government is also publishing a consultation on wider electricity market reform, which should be read in conjunction.
Who should read this:	Companies and individuals involved in the generation and supply of electricity and/or the supply of fossil fuels used to generate electricity.
Duration:	The consultation runs from 16 December 2010 to 11 February 2011 in order to meet the Budget 2010 commitment to, where appropriate, introduce legislation in the 2011 Finance Bill.
Impact Assessment:	The consultation stage Impact Assessment is at Annex D to this document.
How to respond:	Responses should be sent to Martin Shaw of the Environmental Taxes Team, HM Revenue and Customs (HMRC), at the following email address: Environmentaltaxes.consultation@hmrc.gsi.gov.uk.
Enquiries:	Michael Stansfield of the Environment and Transport Tax team, HM Treasury, can be contacted to discuss this work using the following email address: carbon-price-support@hmtreasury.gsi.gov.uk.
Additional ways to become involved:	The Government intends to hold workshops to discuss stakeholder views on the issues raised in this document, before the end of the consultation process. Please send your expressions of interest to Michael Stansfield and indicate your main areas of interest and preferred dates by 7 January 2011.
Getting to this stage:	This consultation document reflects joint analysis carried out by HM Treasury, HMRC and the Department of Energy and Climate Change after initial discussions with industry.
Legislation:	Subject to the outcome of the consultation, the Government intends to introduce primary legislation in the 2011 Finance Bill, followed by further legislation, including secondary legislation, at a later date. The draft legislation on the Government's proposal in this consultation will be made available for comment in January 2011. If you wish to view the draft legislation, please contact Michael Stansfield.
After the consultation:	The Government will publish its response, including a final Impact Assessment, by Budget 2011. The Government intends that the carbon price support mechanism should take effect from 1 April 2013.

1 Introduction

1.1 Supporting the price for carbon in the UK electricity generation sector can reduce revenue uncertainty and improve the economics for investment in low-carbon generation. This consultation document sets out the Government's proposal for achieving these aims through reforms to the climate change levy (CCL) and, where oil is used for electricity generation, fuel duty.

1.2 The level of the carbon price and its uncertainty is one of a number of factors affecting investment in low-carbon generation. Further reforms of the electricity market are likely to be necessary to tackle other factors constraining investment in low-carbon generation.

1.3 The Government also publishes a detailed consultation on broader reforms to the electricity market that build on the proposal to introduce a carbon price support mechanism. This will be followed by a White Paper in spring 2011. Respondents to this consultation may also be interested in responding to the proposals on electricity market reform (EMR), published alongside this document, as it includes carbon price support with a package of further measures.

1.4 In addition, the Government is keen to engage business and the public on its proposals to create a Green Investment Bank (GIB) that will support investment in low-carbon and other types of infrastructure. The intention is to finalise the policy design of the GIB in the spring.

1.5 This consultation is being conducted in line with the principles outlined in 'Tax policy making: a new approach[1]' published alongside the Budget. The document sets out three stages for tax policy development:

- stage 1 – set out objectives and identify options;
- stage 2 – determine the best option and develop a framework for implementation, including detailed policy design; and
- stage 3 – draft legislation to effect the proposed change.

1.6 This consultation is taking place during stage two of the process. The purpose of this consultation is to seek views on the detailed policy design and a framework for implementing a specific proposal, rather than to seek views on alternative proposals.

1.7 The draft legislation for Finance Bill 2011 will be made available for comment in January 2011 and the Government will publish its response by Budget 2011.

1.8 This consultation is being conducted in line with the Code of Practice on Consultation. A copy of the Code of Practice criteria and a contact for any comments on the consultation process are at Annex A.

How to respond

1.9 The Government welcomes comments and responses to the questions in this consultation paper. Any responses should be e-mailed to Environmentaltaxes.consultation@hmrc.gsi.gov.uk by **11 February 2011.**

[1] Tax policy making: a new approach, HM Treasury, 22 June 2010.

Alternatively, please send responses to:

Martin Shaw
Environmental Taxes
HM Revenue and Customs
3rd floor west
Ralli Quays
3 Stanley Street
Salford, M60 9LA.

Confidentiality disclosure

1.10 Information provided in response to this consultation document, including personal information, may be published or disclosed in accordance with the access to information regimes. These are primarily the Freedom of Information Act 2000 (FOIA), the Data Protection Act 1998 (DPA) and the Environmental Information Regulations 2004.

1.11 If you want the information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals with, amongst other things, obligations of confidence. In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential.

1.12 If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on HM Treasury or HM Revenue and Customs (HMRC). HM Treasury and HMRC will process your personal data in accordance with the DPA and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.

2 Background: supporting the carbon price

2.1 'Freedom, fairness and responsibility: a programme for Government'[1], contains a number of relevant Coalition commitments:

- introduce a floor price for carbon;
- increase the proportion of tax revenues from environmental taxes; and
- make the tax system more competitive, simpler, fairer and greener.

2.2 The Budget[2] built on the commitment to introduce a floor price for carbon. The Chancellor announced that HM Treasury and HMRC would publish proposals in the autumn to reform CCL to provide more support and certainty to the carbon price and encourage investment in low-carbon electricity generation.

2.3 The UK requires up to £200 billion[3] of investment by 2020 to secure a low-carbon energy future. This is necessary to ensure access to more secure supplies of energy and reduce greenhouse gas emissions. The development of new low-carbon technologies will also provide economic opportunities for UK businesses. In order to benefit from these opportunities the Government is committed to creating a more stable environment for investment in low-carbon electricity generation.

Carbon price support

2.4 The Stern Review ('The Economics of Climate Change[4]') sets out a compelling economic case for tackling the negative externalities associated with greenhouse gas emissions so that polluters face the full social cost associated with the environmental damage they cause. The review concluded that a transparent and predictable carbon price is the most cost-effective way to encourage emitters to invest in alternative low-carbon technologies and change consumer spending patterns; and that acting sooner will also ensure a more equitable distribution of the costs of climate change for future generations.

2.5 In the short to medium term, the Government recognises that supporting the carbon price is likely to have a knock-on effect on the wholesale electricity price, which is likely to increase retail electricity prices. However, electricity prices are likely to be even higher in the long term if we continue to rely on finite fossil fuels to power the UK. The Government proposes to act now to encourage additional investment in low-carbon generation.

Decarbonising power

2.6 Emissions from the power sector account for a significant proportion of total UK emissions: 31 per cent of total carbon dioxide (CO_2) emissions and 26 per cent of total greenhouse gas

[1] *The Coalition: our programme for government*, HM Government, 20 May 2010.
[2] *Budget 2010*, HM Treasury, 22 June 2010, page 28.
[3] Ibid.
[4] *The Economics of Climate Change: The Stern Review*, Cambridge University Press, 2007.

emissions in 2009. The decarbonisation of the UK power sector is essential to achieving legally binding carbon budgets and to move to a secure and low-carbon energy system.

2.7 The Government has a commitment to reduce UK greenhouse gas emissions by at least 80 per cent by 2050 (from 1990 levels), and for 15 per cent of the UK's energy to come from renewable sources by 2020. The Government's 2050 Pathways Analysis[5] published in July 2010 considered a range of plausible ways to reduce UK emissions while retaining a secure and reliable energy system. It concluded that decarbonising the power sector and the electrification of heating, transport and industry over the long term would be necessary to meet the 2050 target and that, as a result, electricity supply could need to increase significantly.

EU Emissions Trading System

2.8 The power generation sector and energy intensive industries[6] have had to account for the cost of the carbon they emit since 2005 when the European Union Emissions Trading System (EU ETS, which is a cap-and-trade system) was introduced. The trading of EU carbon allowances (EUAs) has created a dynamic market in carbon so that emissions across the EU can be abated at least cost. From 2013 the EU ETS emissions cap tightens each year following a long-term trajectory, which provides certainty in relation to the environmental benefits of the system. However, for a variety of reasons, the carbon price has not been stable, certain or high enough to encourage sufficient investment in low-carbon electricity generation in the UK.

2.9 This consultation addresses how reform of CCL and fuel duty, in relation to fossil fuels used to generate electricity, could encourage further investment in low-carbon generation by providing greater support and certainty to the carbon price. The consultation does not propose any changes to the existing tax treatment of electricity.

UK energy tax framework

2.10 Taxes on activities that have negative environmental impacts are an important component of both the tax system and the UK's environmental policies. Environment and transport taxes together raise £38 billion (7 per cent of total tax take) and play an important role in encouraging behavioural change and reducing emissions. Transport taxes such as fuel duty, introduced in 1909, are designed primarily to raise revenues for public expenditure.

2.11 The European Union (EU) framework for the taxation of energy products (Directive 2003/96/EC - the Energy Products Directive or EPD) was established in 2004. The UK currently meets its obligations under the EPD through CCL (electricity and other taxable commodities) and fuel duty (hydrocarbon oils, biofuels and road fuel gas). Directive 2008/118/EC (the Holding and Movements Directive or HMD) is also relevant to the design of taxes on energy products.

Climate change levy

2.12 CCL is an environmental tax levied on taxable commodities supplied to businesses and the public sector. The taxable commodities are electricity, gas, solid fuels and liquefied petroleum gas (LPG). The levy encourages energy efficiency to help the UK meet targets for cutting greenhouse gases, including CO_2 emissions. More efficient energy consumption reduces energy costs and can make businesses less vulnerable to energy price volatility.

2.13 The levy applies to taxable commodities when they are supplied to a business or public sector consumer. The supplier is required to register with, and pay the levy to HMRC, generally quarterly. The suppliers usually pass on the cost of the levy to their customers, although this is

[5] *2050 Pathways analysis*, Department of Energy and Climate Change (DECC), July 2010.

[6] From 2012 aviation will also be included.

not mandatory. Supplies to households are excluded from CCL and to minimise the administrative burdens on energy suppliers, supplies of small quantities are always considered to be for domestic use.

Fuel duty

2.14 Oil is subject to fuel duty in the UK under the Hydrocarbon Oil Duties Act 1979. To comply with the EPD and HMD, the producer is required to account for duty on oils when they leave a refinery. Oils used for generating electricity are delivered to the generator with duty paid. The generator later reclaims the duty from HMRC under a drawback system upon providing proof that the oil has been used to generate electricity. This in effect amounts to an exemption from duty for oils used in electricity production.

Table 2.A: Current rates of the climate change levy (all taxable commodities) and current rates of fuel duty (on main oils used to generate electricity)

Taxable commodity under CCL	**Legal rate (set out in CCL legislation)**
Electricity	0.470 penny per kilowatt hour (kWh)
Gas as supplied by a gas utility	0.164 penny per kWh
LPG or other gaseous hydrocarbons supplied in a liquid state for heating	1.050 pence per kilogram (kg)
Solid fuel e.g. coal and coke, lignite; semi-coke of coal or lignite; and petroleum coke	1.281 pence per kg
Taxable commodity under fuel duty (pence per litre)	**Legal rate (set out in fuel duty legislation)**
Fuel oil	10.74[a]
Gas oil	11.18[b]
Source: HM Treasury, 2010	[a] rising to 10.88p on 1 January 2011;[b] rising to 11.33p on 1 January 2011

Relevant CCL and fuel duty exemptions

2.15 There are a number of exemptions and reliefs from CCL[7] and fuel duty[8]. Exemptions relating to electricity generators that are directly relevant to this consultation include:

- supplies of CCL taxable commodities to electricity producers;
- supplies of CCL taxable commodities to combined heat and power (CHP) stations; and
- supplies of oils to electricity generators (including CHPs).

[7] www.hmrc.gov.uk, *climate change levy reliefs and special treatment*, CCL 1/2, CCL 1/3, CCL 1/4.

[8] www.hmrc.gov.uk, fuel duty notice 175 – *Motor & heating fuels: relief from excise duty: oils used to generate electricity*.

3 Low-carbon electricity generation: the carbon price and long-term certainty

3.1 Low-carbon generation technologies are typically more expensive at present than conventional fossil fuel generation. Upfront capital and construction costs tend to be higher, though operational costs are generally much lower. Policies such as the Renewables Obligation, the EU ETS and the CCL exemption for electricity generated from renewable sources already provide incentives to invest in some low-carbon generation.

3.2 Providing greater support and certainty to the carbon price is an important and necessary first step. However, on its own it is likely to be insufficient to encourage the total amount of low-carbon investment required to decarbonise the power sector. The Government presents additional measures in the electricity market reform consultation and the carbon price support proposal is included in each of the four packages for reform.

3.3 The Government recognises there will be challenging issues and difficult decisions to take in order to make the transition to a more secure and low-carbon energy system. Taking the necessary steps is in the UK's long-term interest and the Government will ensure there is a balanced and fair approach to achieving a low-carbon transition in the most cost-effective and affordable way.

3.4 Government intervention also needs to take account of other priorities such as increasing growth and tackling fuel poverty. The Government set out a strategy for future growth at the Budget and Spending Review, and the forthcoming White Paper on growth will set out the long-term plan to return the UK economy to sustainable, balanced growth and to provide the stability business needs to invest and plan. The Government will also introduce the Green Deal so that households and businesses can improve their energy efficiency at no upfront cost, repaying through their savings on energy bills. Additional support for the poorest and most vulnerable householders and hard-to-treat properties will be provided through an energy company obligation from 2012.

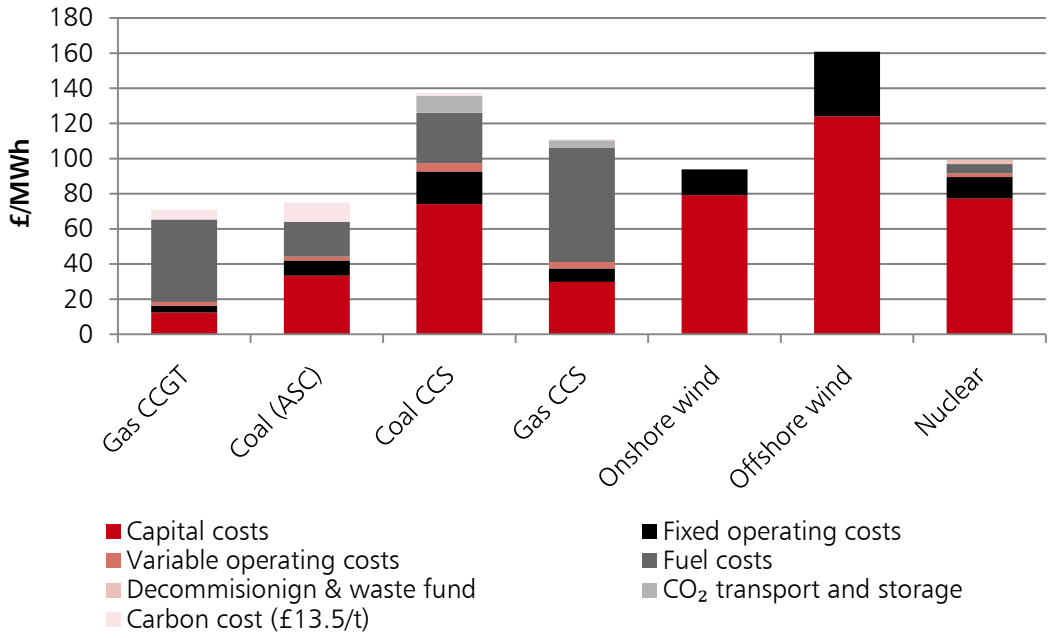
Investment decisions

3.5 There is a range of factors that affect investment decisions and their importance varies across different generation technologies. Establishing the appropriate level of support for the carbon price involves considering a number of factors, including:

- the expected market price of carbon in the future;
- the impact on investment in new low-carbon generation, under different assumptions about generation costs and fossil fuel prices;
- the impact on decisions about how to operate existing generation and decisions to close existing plant;
- the economic and distributional implications of potentially higher electricity prices for consumers and businesses; and

- other potential reforms to the electricity market that will affect the economics of investments in electricity generating capacity.

Chart 3.A: Illustrative levelised costs of a range of generation technologies assuming current prices with 2009 project start (£/MWh)



Source: Mott MacDonald, 2010

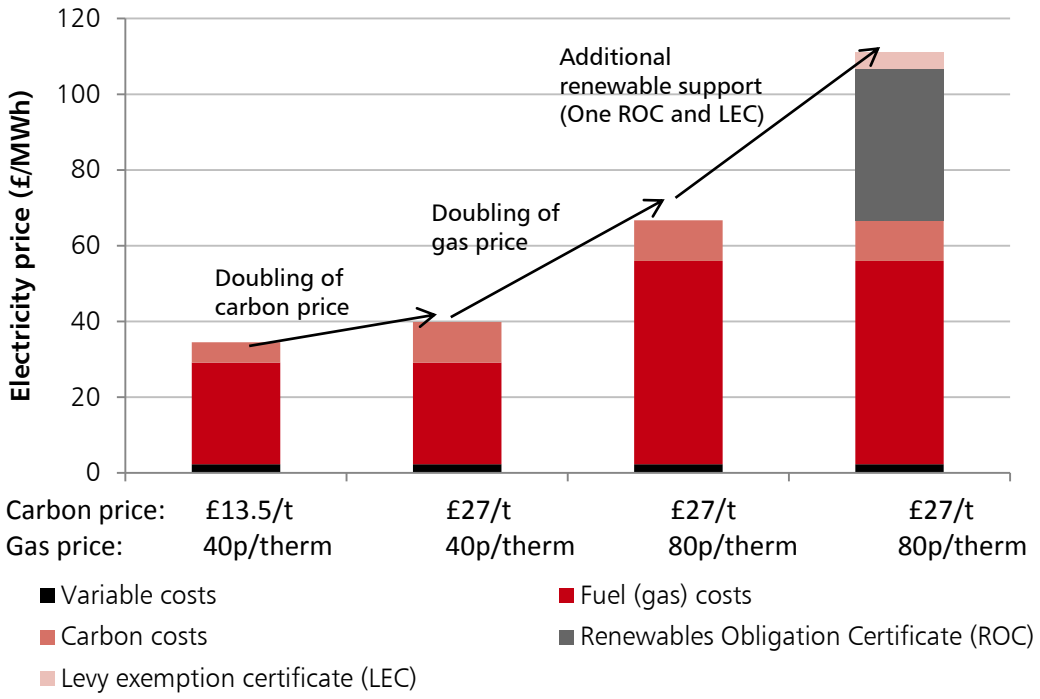
CCGT – Combined cycle gas turbine
ASC - Advanced super critical
CCS - Carbon capture and storage

3.6 The cost, revenue and risk profiles differ substantially for each major generation technology, in particular low-carbon compared with conventional fossil fuel generation. Low-carbon technologies have lower operating costs but because they have much higher up-front capital costs, the total cost per megawatt hour (MWh) generated is typically more expensive than conventional generation (see Chart 3.A). Moreover, a number of low-carbon technologies have yet to be built in the UK on a commercial basis. This makes their costs not only higher than conventional generation but also more uncertain, increasing investment risks.

3.7 The electricity market is distinct in that the price is almost always set by the marginal cost of flexible generation. There are currently no similar sized low-carbon alternatives to flexible gas, coal or oil-based generation. As a result, fossil fuel generation normally sets the price for all generation in the market, including low-marginal cost, low-carbon generation such as nuclear and wind. Fossil fuel costs therefore tend to be correlated with electricity prices, giving fossil fuel electricity generators a natural hedge against price volatility: as fossil fuel prices increase, so do revenues from electricity generation.

3.8 By contrast, low-carbon electricity generators are exposed to price volatility: if fossil fuel prices fall, then electricity prices could fall to a level where the low-carbon generator is unable to recover the costs of investment. Existing incentives for renewable electricity, such as the Renewables Obligation and the exemption from CCL for electricity from renewable sources provide additional price support beyond the wholesale electricity price. The Government issues Renewables Obligation Certificates (ROC) and levy exemption certificates (LEC) when the relevant criteria are met. The relative importance of carbon prices, gas prices and relevant renewable support mechanisms is set out in Chart 3.B.

Chart 3.B: Relative importance of carbon prices, gas prices and renewable support (2020) (assumes gas generation sets the wholesale electricity price)



Source: Department of Energy and Climate Change, 2010

Capital requirements and constraints

3.9 Decarbonising the power sector requires a major expansion in low-carbon generation, such as nuclear, renewables and carbon capture and storage (CCS). This will require substantial and sustained investment beyond current levels; around £110 billion in new generation and grid connections alone is required by 2020. That is why the Spending Review[1] announced up to £1 billion of public funding to support one of the world's first commercial scale CCS demonstration projects. In addition, a significant amount of electricity capacity will be retired over the next decade, as existing plants reach the end of their economic lifetimes. Further investment in transmission and distribution networks is also required.

3.10 Failure to deliver sufficient investment in low-carbon plant now risks increasing the cost of mitigation over the long term. Based on current estimates, over the coming decade annual capital investment in new low-carbon generation capacity needs to more than double[2]. This might increase further during the 2020s. Achieving these annual rates of investment will be very demanding. UK energy utilities also have a range of competing international opportunities and commitments and will have to make choices about where to invest. For example, across the EU it is estimated that capital expenditure required by utilities could be around €1 trillion[3] between 2010 and 2020.

[1] *Spending Review*, HM Treasury, 20 October 2010.
[2] DECC estimates.
[3] *The €1 trillion Euro Decade – Revisited*, Citigroup Global Markets, 29 September 2010.

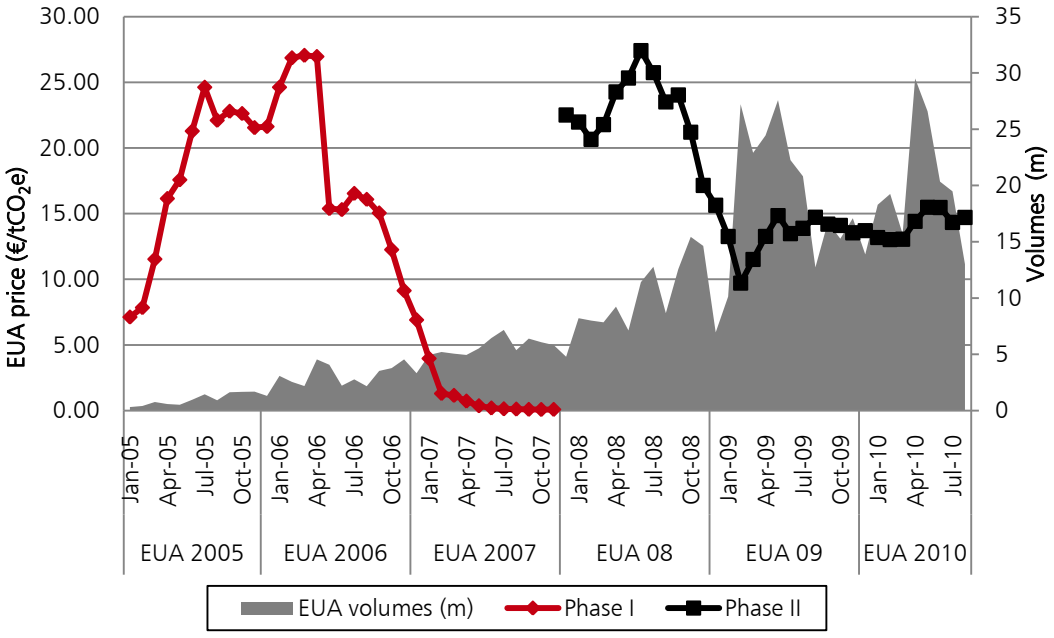
Role of the carbon price

3.11 Developing and implementing a Europe-wide emissions trading system has been a significant policy achievement for EU Member States. It has demonstrated that market-based action to mitigate climate change is possible on an international scale. The EU ETS has achieved certainty over EU net emissions along with a strong signal regarding the future level of the declining cap. However, it has not provided long-term certainty in relation to the carbon price.

3.12 The EU ETS has been in a 'learning-by-doing' period since its introduction in 2005. As a result, several significant changes to improve the system's effectiveness have been made, most notably by Directive 2009/29/EC[4]. Some of these changes were specifically designed to ensure a more stable carbon price between successive phases of trading. However, while these improvements have helped to reduce price volatility, they have not eliminated uncertainty about long-term carbon price trends.

3.13 The carbon price decreased significantly at the end of the first period of trading (2005-2007). This was primarily due to an over-allocation of carbon allowances and the inability to bank allowances between Phases. In 2008, (Phase II 2008-2012), the carbon price peaked at almost €30 per tonne CO_2 (t/CO_2) (£26/tCO_2). Following the global financial crisis and subsequent economic recession, the price then fell below €10/tCO_2 (£9/tCO_2) in the first quarter of 2009. Over the past 12 months, the carbon price has fluctuated between €12-16/tCO_2 (£10-14/tCO_2). However, even allowing for periods of price instability, the volume of carbon traded has grown significantly since 2005.

Chart 3.C: EU ETS prices: Monthly average prices for end of year EUAs (€/tCO_2)



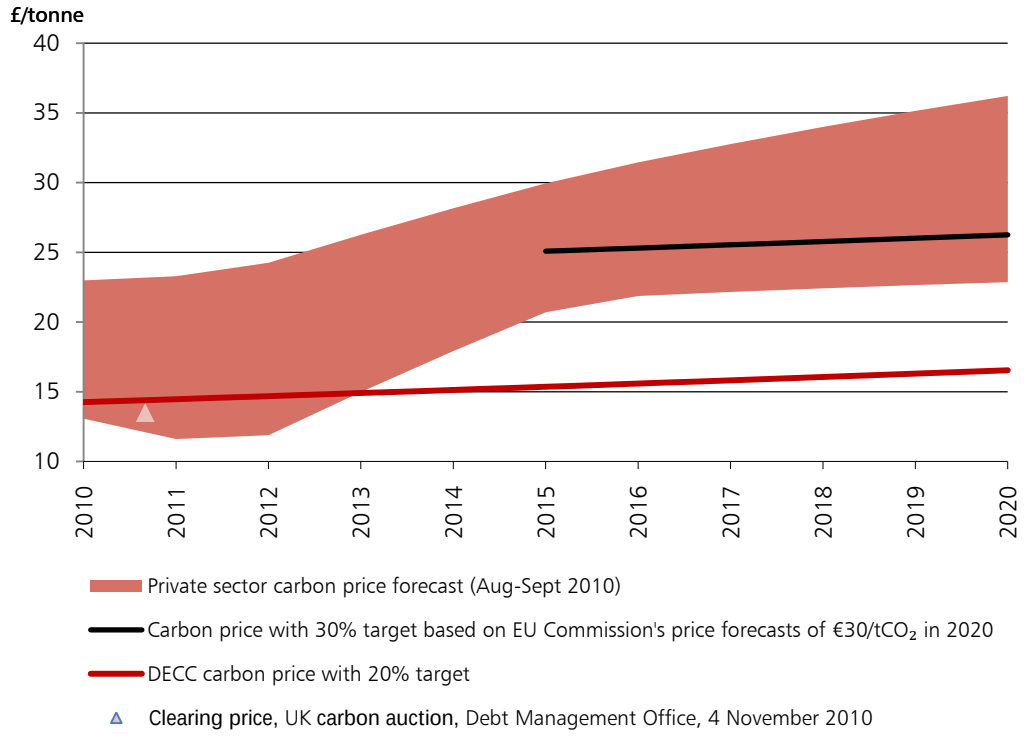
Source: Department of Energy and Climate Change (based on Point Carbon data), 2010

[4] Directive 2009/29/EC, 23 April 2009. This amended Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme.

3.14 The EC Directive[5] provides a clear, declining trajectory for EU-wide emissions from 2013 onwards. Free allocation rules and the number of allowances covering sectors and emissions are being incorporated into the system from 2013. These will be finalised over the next year. This should increase certainty in the EU ETS regulatory framework over the next decade.

3.15 The long-term price of carbon is linked to global action to mitigate climate change. While the carbon price remains less volatile than other commodities, it is subject to a number of inherent uncertainties that are not shared by the fossil fuel markets. These are primarily regulatory. For example, the EU is considering if the EU's 2020 emissions reduction target should be tightened by increasing the greenhouse gas target from a 20 per cent to 30 per cent reduction, based on 1990 levels. This could have a significant impact on future carbon prices[6] and the allocation of emission rights to specific industrial sectors. As such, businesses and investors face a degree of regulatory uncertainty about future carbon prices, which might undermine long-term price signals and investment.

Chart 3.D: EU ETS carbon price forecast



Source: HM Treasury, 2010

3.16 There are significant variations in carbon price forecasts to 2020 (see Chart 3.D). The range in price forecasts from the private sector reflects underlying market and regulatory uncertainty, including the timing, method and amount that the EU ETS cap might be tightened.

3.17 The Government strongly supports a more stringent EU ETS abatement target consistent with the UK's ambition to limit global temperature increases to 2° Celsius above pre-industrial levels. Even following a global agreement, a UK price support mechanism would continue to perform an important role to bolster certainty and provide credible long-term price signals for UK investors.

[5] 2003/87/EC

[6] European Commission, COM (2010) 265 publication suggested €30 t/CO_2 under a cap consistent with a 30 per cent greenhouse gas reduction target.

Carbon price uncertainty and investment decisions

3.18 To make the very large investment decisions needed in low-carbon generation capacity, investors require some certainty about future revenues. Carbon price certainty is particularly important given the long life of low-carbon generation investments. If there is more certainty over future carbon prices, developers should include this as part of their investment appraisals. High levels of uncertainty over future profitability and rates of return could increase the cost of capital for investors and deter investment altogether. If uncertainty is too great, investment will either not go ahead or capital could be diverted to less risky forms of generation.

3.19 While the carbon price is an important factor affecting investment decisions, the gas price is a larger source of uncertainty. Gas prices have historically been more volatile than carbon prices. The gas price accounts for over 75 per cent of the operating costs of gas-fired plants (and therefore typically wholesale electricity prices), while the carbon price makes up around 20 per cent of the wholesale electricity price. However, investors and utility companies are experienced in managing gas price uncertainty and gain a competitive advantage from their ability to manage it. Carbon price uncertainty is predominantly driven by wider regulatory uncertainties and the Government might therefore be better placed to manage some carbon price risk.

Early action

3.20 Given the lead times involved between the decision to invest and the plant generating electricity (for example, around 8 years for nuclear, around 2-3 years for offshore wind and 4-5 years for carbon capture and storage), there is a need to influence investment decisions being taken over the next few years. Therefore, it is important to act now to give an indication of how the Government might intervene to support the carbon price in the future.

3.21 For carbon price support to be credible and factored into these decisions, there is a strong case for the policy to be introduced as soon as is practically possible. If developers also have confidence that the Government will support the carbon price over the long term, for example to 2020 and/or 2030, this should also make a significant and tangible difference to future revenues for new low-carbon investments.

3.22 Supporting the carbon price might have a number of other impacts on the electricity market. The EMR consultation assesses a carbon price support mechanism in conjunction with a wider package of measures to achieve the Government's energy policy objectives.

Box 3.A: Questions on investment:

- 3.A1: What are your expectations about the carbon price in 2020 and 2030? And how important a factor will it be when considering investment in low-carbon generation?
- 3.A2: If investors have greater certainty in the long-term price of carbon, would this increase investment in low-carbon electricity generation in the UK? If so, please explain why.
- 3.A3: How much certainty would investors attribute to a carbon price support mechanism if it were delivered through the tax system?
- 3.A4: In addition to carbon price support, is further reform of the electricity market necessary to decarbonise the power sector in the UK?

4 The Government's proposal

Support and certainty for the carbon price

4.1 To enable a secure low-carbon transition in the UK power sector, the Government believes there is a strong rationale to build on the EU ETS to provide greater support and certainty to the carbon price. An illustration of the carbon price support mechanism is shown in Chart 4.A.

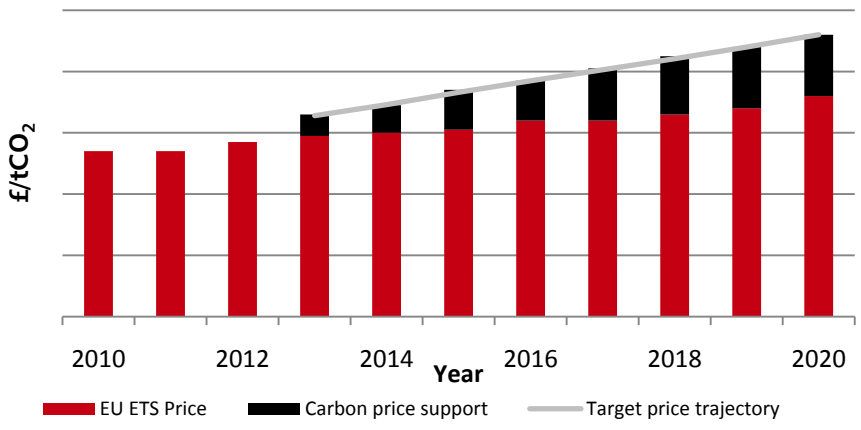
4.2 Greater support and certainty to the carbon price could be achieved by changes to the way CCL and fuel duty are levied on fossil fuels used to generate electricity. In most cases, UK generators are currently exempt from paying a tax on fossil fuels used to generate electricity. However, the EPD allows Member States to tax energy products used to produce electricity 'for reasons of environmental policy'. The Government believes there is a strong environmental case to do so in order to help achieve the UK's long-term emission reduction targets.

4.3 Regardless of whether the fuels used for generation are taxed, the EPD requires the UK to retain a tax on electricity supplied to business or public sector consumers at or above the minimum rate for electricity laid down in the Directive.

4.4 The emissions produced from electricity generation are correlated to the carbon content of the fuel being used. Electricity generators within the EU ETS[1] generally determine their annual emissions by calculating the total amount of fossil fuels burnt in addition to monitoring their atmospheric emissions. Levying CCL or fuel duty on fuels used for electricity generation on the basis of the carbon content provides a straightforward mechanism to provide support and certainty to the long-term carbon price for UK generators.

4.5 The consultation on electricity market reform presents wider options for reform that build on the role of the carbon price support mechanism.

Chart 4.A: Illustration of the carbon price support mechanism



Source: HM Treasury, 2010

[1] Around 98 per cent of total UK electricity generation.

Summary of proposal

Box 4.A: Carbon price support proposal

The Government proposes to introduce a carbon price support mechanism to support investment in low-carbon generation. The Government has decided that this is best achieved by the climate change levy (CCL) and fuel duty being levied on all fossil fuels used in the UK to generate electricity.

In most cases, fossil fuels currently used to generate electricity are exempt from CCL. The Government proposes to remove these exemptions and to tax these commodities at rates that take account of the commodities' average carbon content. These rates will be known as the 'CCL carbon price support rates', and will be different from the main CCL rates levied on consumers' use of gas, coal, LPG and electricity, which will be retained. This does not propose any changes to existing energy supplies paid through CCL.

Oils are not subject to CCL but fuel duty is payable at the point oils leave the refinery. Currently, the duty can be reclaimed in full by the electricity generator but, as part of the carbon price support mechanism, the Government proposes to reduce the amount of fuel duty that can be reclaimed, in effect creating 'oils carbon price support rates'.

Other more detailed features of the Government's proposal include:

- electricity used to generate further electricity will remain exempt from CCL;
- the CCL liability of electricity supplied to the final consumer arising from generation using fossil fuels will be unchanged, as will the treatment of imported electricity;
- fossil fuels used to generate electricity in the UK that is subsequently exported will be liable to the relevant carbon price support rates;
- all fossil fuels burnt in CHP stations will be subject to CCL or fuel duty (at the relevant carbon price support rates) regardless of their rating through the CHP Quality Assurance (CHPQA) programme; and
- supplies of fossil fuels to auto-generators will continue to be liable to CCL and fuel duty but at the relevant carbon price support rate. Auto-generators will no longer be able to reclaim CCL or fuel duty charged on the fossil fuel they use to produce electricity, which is subsequently supplied to the electricity transmission and distribution networks.

Who will be affected?

The Government's proposed changes will affect anyone supplying fossils fuels to a UK generator of electricity, including power stations, CHP stations and auto-generators. Any person who supplies gas, solid fuels or LPG will need to be registered with HMRC for CCL and account for the levy. All suppliers of oils must already be registered with HMRC for fuel duty. Generators of electricity using oils will see a reduction in the amount of fuel duty they are able to reclaim.

Timing

The Government intends to introduce proposals in Finance Bill 2011 (and subsequent secondary legislation) and to bring the proposals into effect from 1 April 2013.

Reform of climate change levy and fuel duty

4.6 The proposal set out below follows the Government's principled approach to ensure fairness and simplicity when making tax policy. As the 'polluter pays principle' forms both the legal basis and policy rationale underpinning the Government's proposal, liability will be directly linked to the environmental damage caused by the generation of electricity from different types of fossil fuels. This is both fair and simple as it removes the need for specific reliefs for certain types of generation.

4.7 When determining the level of the carbon price support mechanism, environmental objectives will need to be balanced appropriately to ensure UK business competitiveness is not unduly undermined and any impacts on households have been fully considered. The impacts on businesses and households are set out in detail in the Impact Assessment (Annex D).

Carbon price support proposal

4.8 The Government's proposal to achieve its objective of providing support and certainty to the carbon price is to:

- remove existing CCL exemptions relating to fossil fuels used in UK electricity generation; and
- reduce the amount of fuel duty that can be reclaimed when oil is used to generate electricity.

4.9 The Government does not propose to make any changes to the way electricity is currently taxed.

4.10 For fossil fuels other than oils, the Government proposes to achieve its objective by removing or amending CCL exemptions in Schedule 6 to the Finance Act 2000. For oils used to generate electricity, the Government proposes to amend the Hydrocarbon Oil Duties (Reliefs for Electricity Generation) Regulations 2005 to reduce the amount of fuel duty that generators will be able to reclaim in order to maintain a consistent level of carbon price support across all fossil fuels.

4.11 In keeping with the environmental objectives of the proposed changes, the Government proposes to tax fossil fuels supplied to all types of electricity generator, including CHP stations and auto-generators.

4.12 As a consequence, gas, solid fuels, LPG and oils used for generation purposes in the UK would become taxable. Electricity used to generate further electricity would remain exempt from CCL. Renewable fuels (for example, water, solar, biomass, etc) used to generate electricity and uranium used in a nuclear power station would continue to be outside the scope of CCL and fuel duty.

4.13 The current position of fuels used to generate electricity and the effect of the proposed changes are shown in Table 4.A. For the purpose of this consultation the extension of CCL to generation fuels and changes to the amount of fuel duty that can be reclaimed on oils used to generate electricity will be referred to as the 'carbon price support mechanism' and the rates as 'carbon price support rate(s)'.

Table 4.A: Carbon price support mechanism for fuels used in electricity generation

Supplies of commodity	Current position[a] when used to generate electricity	Position under Government's carbon price support proposal
Solid fuels (e.g. coal, coke)	Exempt from CCL	Liable to CCL at carbon price support rate for solid fuels
Gas	Exempt from CCL	Liable to CCL at carbon price support rate for gas
LPG	Exempt from CCL	Liable to CCL at carbon price support rate for LPG
Oil	Fuel duty fully reclaimable	Reduction in fuel duty reclaimable
Electricity	Exempt from CCL	Exempt from CCL
Renewables (e.g. solar, wind) and uranium	Outside scope of CCL	Outside scope of CCL

a. Current position does not include auto-generators and CHP stations not meeting the CHPQA quality standards.

Source: HM Treasury, 2010

Administration

4.14 It is important to consider how the carbon price support mechanism will be administered and the associated costs for HMRC, energy suppliers and businesses.

4.15 The supplier of fossil fuels to the generator, rather than the generator itself, would become liable to register with HMRC and account for CCL. Fossil fuel suppliers who only supply power stations will have to register with HMRC for CCL. The Government does not expect there to be many in this position as most suppliers are already likely to be registered. For oils, there should be no additional registrations under the fuel duty regime as refineries must already be registered with HMRC. This should minimise the additional cost of administering a carbon price support mechanism.

4.16 The number of suppliers registered for CCL for each taxable commodity is set out in Table 4.B. As some businesses supply more than one commodity, the total shown exceeds the 245 businesses currently registered for CCL.

Table 4.B: Number of suppliers registered for CCL for each energy product

Energy product	No. of registered suppliers
Electricity	117
Gas	71
Solid fuels	36
LPG	31

Source: HM Revenue and Customs, 2010

4.17 Businesses currently claiming CCL exemptions for taxable commodities used for generation purposes will be familiar with the PP11 supplier certificate. This certificate is provided to an energy supplier by its customer and contains a declaration of the amount of CCL relief to which the customer is entitled. As the rates on fossil fuels used to generate electricity would be different to existing CCL rates, it might be necessary to adapt the PP11 certificate to ensure the new carbon price support rates of CCL are applied to fossil fuels supplied to generators. Alternatively, suppliers affected by the proposals would need to ensure that their accounting systems were able to deal with the new carbon price support rates. HMRC will discuss with energy suppliers the most appropriate mechanism for administering the carbon price support rates.

Box 4.B: Questions on administration:

- 4.B1: What changes would you need to make to your procedures and accounting systems to ensure you correctly account for CCL on supplies to electricity generators?
- 4.B2: How long would you need to make the necessary changes to your systems to account for CCL on supplies to electricity generators?
- 4.B3: Please provide an estimate of how much the system changes would cost, both one-off and continuing?

Electricity generators

4.18 In keeping with the environmental objectives and legal basis of the Government's proposal, and following the principles of fairness and simplicity, the carbon price support mechanism would apply to all types of generators. This includes conventional fuel power stations, fossil fuel CHP stations and auto-generators fired by oil, solid fuel, LPG or gas. Within each of these categories of generator there will be a range of sizes, although auto-generators will generally be small.

4.19 The Government recognises the importance of a diverse and secure supply of generation that different types of generators provide. Many small generators are not included within the EU ETS and therefore do not internalise the cost of carbon that they emit. The Government's proposal would mean that around 1.4 per cent of current UK electricity generation would for the first time pay a price for their carbon emissions. Exempting small generators from the proposed changes would not be consistent with the environmental aims of the proposal, the EPD and the Government's wider commitment to greater fairness and simplicity across the tax system.

Auto-generators

4.20 An auto-generator is a person who produces electricity that is primarily for their own consumption. The current position in relation to auto-generators using fossil fuels is as follows:

- supplies of input fuels (other than oils) made to them are subject to CCL;
- oil inputs used to produce the electricity they use themselves are also taxed as auto-generators are not able to reclaim the fuel duty on these inputs;
- the electricity they use themselves (self-supplies) is exempt from CCL; and
- the CCL or fuel duty levied on the fuel used to produce any excess electricity they supply to the electricity transmission and distribution networks can be relieved or reclaimed, as the electricity incurs CCL when it is supplied to the final customer.

4.21 The Government's proposals will affect auto-generators in the following way:

- for supplies of fossil fuels (other than oils) they will continue to be liable to CCL on their inputs but at the relevant carbon price support rate, consistent with the proposal for supplies to other types of generator;
- they will continue not to be able to reclaim fuel duty already paid on the oils they receive;
- the electricity they use themselves will remain exempt from CCL; and

- the CCL or fuel duty charged on the fossil fuel used to produce electricity that is subsequently supplied to the electricity transmission and distribution networks will no longer be relieved or reclaimable. This will ensure consistency with the Government's proposal to tax all fossil fuels used to produce electricity.

Combined heat and power

4.22 CHP stations generate electricity while capturing usable heat that is produced during the generation process.

4.23 The fuels used by CHP stations currently receive various exemptions or partial reliefs from CCL in recognition of their relative generating efficiency and lower environmental impact compared with separate heat and power generation. The extent of the exemption depends upon the assessment undertaken by the Department of Energy and Climate Change (DECC) through the CHPQA programme.

4.24 Fuel duty on oil used to produce electricity in a CHP station can currently be reclaimed by the generator, although where a station fails to meet the CHPQA standard, the amount of relief is reduced in proportion to the performance shortfall against the CHPQA quality threshold.

4.25 In addition to these tax reliefs, quality-assured CHP stations, which represent the vast majority of all CHP generation in the UK, are also entitled to other forms of support, including:

- exemptions or partial exemptions from CCL for the electricity they generate;
- ring-fenced EUAs for new CHP stations;
- favourable treatment of small-scale CHP in relation to other, large-scale fossil fuel-based electricity generation under the Carbon Reduction Commitment (CRC) Energy Efficiency Scheme, as well as support for the supply of heat;
- 100 per cent first-year capital allowances for spending on qualifying plant and machinery if the electricity produced is supplied to known end users;
- Renewables Obligation certificates for the generation of renewable CHP; and
- exemptions from business rates.

4.26 Supporting the carbon price support will provide an additional incentive for renewable CHP. Fossil fuel-based CHP would still face a significantly lower CCL liability relative to the separate generation of heat and power, as a result of its relative efficiency, and the existing CCL exemptions.

4.27 The Government has considered whether to provide any additional special treatment to CHP plants as part of this proposal. However, given the emphasis on simplicity, fairness and the 'polluter pays' principle, the Government is committed to ensuring that the carbon price support mechanism is introduced with as few exemptions as necessary. Relief from CCL and fuel duty could involve significant design complexities and costs, and there may be State aid implications.

4.28 Taking into account existing preferential treatment for CHP, the Government does not propose to provide a relief for fossil fuels used in CHP stations. Such fuels will be subject to the same carbon price support rate as fossil fuels used by other generators.

4.29 The Government therefore invites views as to whether it is desirable to provide additional preferential treatment for CHP and, if so, the best way of achieving this. The Government would also have to consider whether such support would represent value for money as part of the UK's long-term decarbonisation strategy.

Carbon capture and storage

4.30 It is Government policy to enable the deployment of CCS technologies in the UK's electricity generation sector. The Spending Review announced up to £1 billion for one of the world's first commercial scale CCS demonstration on an electricity generation plant. Demonstration projects are an important step in enabling the commercial deployment of CCS. The carbon price support mechanism will not become a barrier to investment in such demonstrations.

4.31 The Government acknowledges that there are good environmental grounds for introducing a partial relief from CCL for fossil fuels used in CCS plants to reflect the proportion of CO_2 abated and for making a commensurate adjustment to the amount of fuel duty that can be reclaimed on oil used in CCS plants. Subject to State aid approval by the European Commission, the Government proposes to legislate for such a partial relief once the technology has been proven and is available commercially.

Box 4.C: Questions on types of generator:

- 4.C1: Do you agree that all types of electricity generators should be treated equally under the proposed changes? If not, please explain why.
- 4.C2: Is there a case for providing additional or more preferential treatment for CHP? If so, what is the best way of achieving this?
- 4.C3: Do you agree that tax relief should be considered for power stations with CCS? If so, what are the practical issues in designing a relief; what operational standards should a CCS plant meet in order to be eligible; and how might these issues differ for demonstration projects?

Electricity generators - summary

4.32 The impact of the carbon price support for different types of generator and fossil fuels and is shown in Table 4.C.

Table 4.C: Impact by type of generator and fuel

Supplies of fossil fuels made to	Type of fuel used to generate electricity	Current position	Government's proposal
Power station	Gas, solid fuels, LPG	Exempt from CCL	CCL levied at carbon price support rate for relevant commodity
	Oils	Effective fuel duty rate of nil	Fuel duty in effect applies at relevant carbon price support rate
CHP station (good quality)	Gas, solid fuels, LPG	Exempt from CCL	CCL levied at carbon price support rate for relevant commodity
	Oils	Effective fuel duty rate of nil	Fuel duty in effect applies at relevant carbon price support rate
CHP station (not meeting full quality standards)	Gas, solid fuels, LPG	Partially exempt from CCL	CCL levied at carbon price support rate for relevant commodity
	Oils	Partially exempt from fuel duty	Fuel duty in effect applies at relevant carbon price support rate
Auto-generator	Gas, solid fuels, LPG	CCL levied at main rate for relevant commodity unless resulting electricity is sold to a utility for supply to an end user (in which case input fuels are exempt from CCL)	CCL levied at carbon price support rate for relevant commodity
	Oils	Liable to full rate of duty if resulting electricity is used by auto-generator; duty fully reclaimable by generator if resulting electricity sent to grid	Liable to fuel duty at relevant effective carbon price support rate whether electricity is used by auto-generator or sent to grid
CCS plant	Gas, solid fuels, LPG	N/A	Government considering partial relief from CCL
	Oils	N/A	Government considering adjustment to amount of fuel duty reclaimed
Source: HM Treasury, 2010			

Imports and exports of electricity

4.33 The combined import and export of electricity is limited by the current capacity of interconnections to around 3 per cent of total UK generation capacity[2]. The majority of imported electricity is derived from nuclear power stations in northern France (via a 2000MW interconnector).

4.34 There is a further interconnector for electricity traded between Northern Ireland and Ireland (600MW), which currently results in a net export of electricity to Ireland[3]. Since 1 November 2007, there has been a single electricity market in Ireland and Northern Ireland with the trading of wholesale electricity carried out on an 'All-Island basis'.

4.35 By 2012, interconnection capacity for the UK electricity market is expected to increase by around 1500MW, with new links to the Netherlands and Ireland. By 2020 it could increase by a further 4000MW. At the margin, carbon price support might increase incentives for imported electricity but they will remain relatively small compared with overall UK generation. Any potential future impact would need to be assessed within the wider context of differences in the electricity market across the EU.

4.36 Fossil fuels used to generate electricity that is subsequently exported will be liable to CCL (at the relevant carbon price support rate) or, for oils, to an effective higher level of fuel duty than at present as a result of the reduction in the duty that can be reclaimed by generators. To exempt such fuels or repay the tax paid on them upon export of the electricity would run counter to the environmental rationale of the proposal. Further, such a relief could create opportunities for suppliers to claim that electricity generated from fossil fuels in the UK had been exported and that supplies consumed in the UK were derived from renewables and imports.

4.37 There will be no change to the tax treatment of imported electricity in line with EU excise and energy tax directives. Electricity exported from the UK will continue to be exempt from CCL.

Box 4.D: Questions on imports and exports:

- 4.D1: What impact would the Government's proposals have on electricity generators and suppliers that export or import electricity?
- 4.D2: What impact might the proposals have on trading arrangements for electricity?
- 4.D3: What impact might the proposals have on electricity generation, trading and supply in the single electricity market in Northern Ireland and Ireland?

Carbon price support mechanism

4.38 Using an average carbon content of each type of fossil fuel would create a direct relationship between the carbon price support rates on the fuels used to generate electricity and the emissions produced. If the rates levied on these input fuels were determined in relation to the EU ETS carbon price the Government would be able to target an overall annual and long-term carbon price for generators in the UK. However, there are practical limitations to the long-

[2] In 2009, net imports of electricity accounted for less than 1 per cent of total UK electricity supply.

[3] There is also a 500MW interconnector that links Scotland to Northern Ireland.

term certainty that the tax system can provide to investors. Rates are generally set annually. Rates for environmental taxes such as CCL are set a year in advance, and in this context would need to be set in relation to future traded carbon prices.

4.39 These uncertainties could to some extent be mitigated through a cross-party commitment to target a future carbon price over the long term. In addition, there are several potential options to build greater certainty into the design of the carbon price support mechanism, as well as a transparent approach to the exchange rate and discount rate that the Government would use. For example, options include:

- a **rate escalator** set at levels to achieve a specific carbon price trajectory over the life of a Parliament consistent with an overall target for the carbon price in 2020; or
- **annually adjusted CCL rates and fuel duty rebates** that take account of short-term trends in the carbon market and economy to ensure closer targeting of the Government's carbon price trajectory from year to year; or
- **rates set annually based on a carbon market index** averaged over a specific annual or biennial period to reflect future carbon prices.

4.40 The Government's preferred option is to introduce the carbon price support rates at a different level from the main CCL rates and to increase them incrementally from 2013 until the tax-inclusive carbon price is consistent with the Government's target price trajectory. The amount of fuel duty that could be reclaimed on oils would be reduced to a level commensurate with the carbon price implied by the carbon price support rates on gas, LPG and solid fuels. Thereafter, the Government would envisage reviewing the rates (and level of fuel duty that could be reclaimed) to ensure the levels deliver the desired carbon price over the long term.

4.41 The Government believes this would allow businesses to plan with a reasonable degree of certainty. However, the Government is willing to consider alternative approaches and would welcome views from respondents.

Box 4.E: Questions on carbon price support mechanism:

- 4.E1: How should the carbon price support rates be set in order to increase certainty for investors, in particular over the medium and long term?
- 4.E2: Which mechanism (outlined above), or alternative approach, would you most support and why?
- 4.E3: What impact would the proposals have on your carbon trading arrangements?

Indicative carbon price scenarios in 2020 and 2030

4.42 For carbon price support to be credible and factored into investment decisions there is a case for the policy to begin as soon as is practically possible. However, in order to make a real difference to future revenues for new low-carbon investments, developers may need to be confident that the level of support will rise over time to target a combined carbon price (support plus EU ETS) in the future. For simplicity, the consultation looks at 2020 and 2030.

4.43 The range of factors affecting investment decisions makes it difficult to determine the appropriate level of carbon price to target based purely on a comparison of the costs of different generation technologies. Therefore, the Government has set out a range of carbon price scenarios to provide examples of how this would work in practice. However, there are obvious

uncertainties around future carbon prices and the following assumptions could be subject to revision.

4.44 Three illustrative carbon price scenarios for the UK power sector are used: £20, £30 and £40/tCO_2 in 2020 rising to £70/tCO_2 in 2030 (all in real 2009 prices). These scenarios are assessed against a baseline, including existing policy, an EU 20 per cent emissions reduction target and the latest UK emissions projections. These are indicative for the purpose of this consultation and Government would welcome views on the appropriate level of the carbon price over the long term.

4.45 Chapter 5 of this consultation provides a detailed explanation of the scenarios and impacts they have.

Box 4.F: Questions on the future price of carbon:

- 4.F1: Should the Government target a certain carbon price a) for 2020 and b) for 2030? If so, at what level?
- 4.F2: What is the most appropriate carbon price for the UK to meet its emissions reduction targets in the power generation sector? How would this be affected by changes in the structure of the electricity market?
- 4.F3: When would be the most appropriate time for introducing a carbon price support mechanism and what would be the most appropriate level?

5 Impacts on investment in low-carbon generation

5.1 The Government is committed to understanding the wide range of possible impacts that a carbon price support mechanism might have. This section considers the potential impacts of the Government's proposal. The consultation process will also help to inform and refine the Government's understanding of the potential impacts.

Box 5.A: Summary of key impacts

Under the three indicative scenarios outlined below, the modelling suggests a carbon price support mechanism (compared with the baseline) would:

- increase investment in new low-carbon capacity by up to 11 gigawatts (GW) by 2030;
- significantly reduce emissions from UK electricity generation;
- increase wholesale electricity prices over the medium term, though prices would begin to decline in the mid-2020s;
- marginally increase non-domestic electricity bills though in the mid-2020s they would begin to decrease compared to doing nothing;
- affect profit margins for some energy-intensive business, but these impacts need to be seen in the context of wider change to the competitiveness of the tax system over the coming years; and
- increase household electricity bills in the short and medium term, though they would decrease in the mid-2020s.

The estimated present value of quantified costs and benefits to 2030 are as below (further details are given in the Impact Assessment at Annex D):

£ billion (2009 prices)	Scenario one	Scenario two	Scenario three
Benefits			
Carbon savings	£4.9bn	£7.2bn	£12.5bn
Air quality	£0.4bn	£0.9bn	£2.1bn
Costs			
Resource costs	£2.1bn	£6.1bn	£16.4bn
Administrative burden	£0.0bn	£0.0bn	£0.0bn
Net Present Value (benefits-costs)	**£3.2bn**	**£1.9bn**	**-£1.7bn**

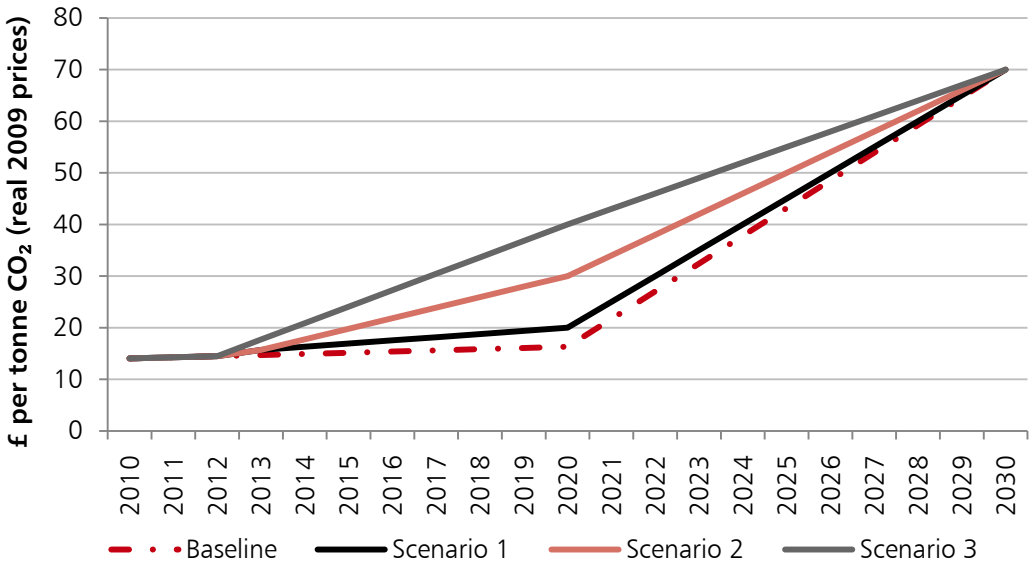
Indicative carbon price scenarios

5.2 In order to look at the impacts, three indicative carbon price support scenarios have been compared with a 'baseline'. These scenarios and the baseline comparison are described below and displayed in Chart 5.A. All figures used are in real 2009 prices. For simplicity, we have

assumed linear trends between the 2013 starting levels of carbon price support and the 2020 levels.

- **Baseline:** The EU ETS price rises in line with DECC's current published projections under a 20 per cent emissions reduction target reaching £16.3/tCO_2 in 2020. After 2020, the price increases at a constant rate to reach £70/tCO_2 in 2030, an illustrative price consistent with global prices to limit the increase in temperature to 2° Celsius.
- **Scenario one**: Carbon price support starting at £1/tCO_2 on top of the prevailing EU ETS price in 2013, with this support rising to target a combined carbon price (support plus EU ETS) of £20/tCO_2 in 2020 and £70/tCO_2 in 2030.
- **Scenario two**: Carbon price support starting at £1/tCO_2 on top of the prevailing EU ETS price in 2013, with this support rising to target a combined carbon price (support plus EU ETS) of £30/tCO_2 in 2020 and £70/tCO_2 in 2030.
- **Scenario three**: Carbon price support starting at £3/tCO_2 on top of the prevailing EU ETS price in 2013, with this support rising to target a combined carbon price (support plus EU ETS) of £40/tCO_2 in 2020 and £70/tCO_2 in 2030.

Chart 5.A: Indicative carbon price support scenarios and baseline



Source: Department of Energy and Climate Change, 2010

5.3 The following analysis considers the impacts of the carbon price support policy in isolation. The EMR consultation considers the impact of a carbon price support mechanism in conjunction with additional reform options.

Electricity generation mix and investment

5.4 The impact of supporting the carbon price depends not only on the level of support given, but also, crucially, on the amount of certainty it provides investors.

5.5 In the baseline scenario there is assumed to be considerable uncertainty around the carbon price. Investors are assumed to base their decisions on flat-lining the carbon price at the level prevailing in the year when they make investment decisions. The carbon price support scenarios not only increase the total carbon price but also are assumed to provide greater certainty about future prices. Investors are assumed to base their decisions on the combined carbon price level

over the five years from the time of the investment decision, after which the price is assumed to flat-line. It is important to note that the impacts on investment derive largely from this assumption of greater confidence in the combined price level compared with the EU ETS prices alone. The sections below discuss the impact this level of support and certainty is likely to have on investment decisions.

Electricity investment and market

5.6 The potential impacts of the different carbon price support scenarios on the electricity market have been assessed using a dynamic model of the electricity market developed by Redpoint Energy. The model simulates investment and generation behaviour. Investment decisions are based on comparing the risk-adjusted long-run marginal costs of all generating technologies by investor type with the expected revenues. This is a simplification of how investment decisions are made and so the results presented below are an illustrative assessment of how a carbon price support mechanism would affect low-carbon investment.

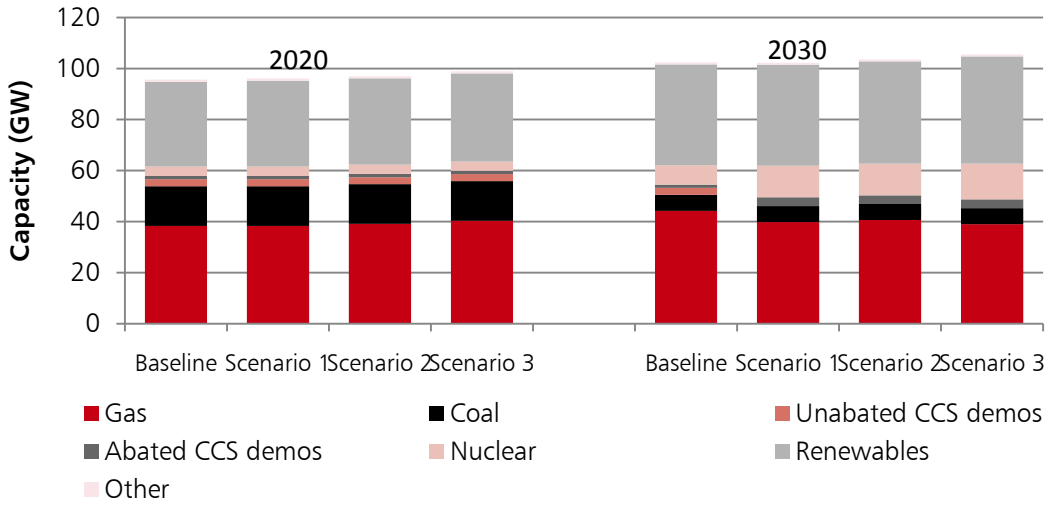
5.7 The assumptions for other key variables affecting investment, namely levelised costs, electricity demand and fossil fuel prices, are consistent with those used for DECC's updated emissions projections[1]. Changing these assumptions would have an impact on the modelling results. For example, assuming lower fossil fuel prices would reduce the amount of low-carbon investment and assuming higher fossil fuel prices would increase low-carbon investment.

5.8 Annex B provides a more detailed account of the assumptions and sensitivities used in the modelling. The same broad approach to modelling has been taken in the EMR consultation.

Low-carbon investment

5.9 The total annual electricity capacity mix by main technology type in 2020 and 2030 for the baseline and illustrative carbon price support scenarios is set out in Chart 5.B.

Chart 5.B: Capacity mix in 2020 and 2030 (GW)



Source: Redpoint Energy, 2010

5.10 The higher and more certain the carbon price is the greater the investment in low-carbon generation capacity. In the carbon price support scenarios, the low-carbon share of total UK

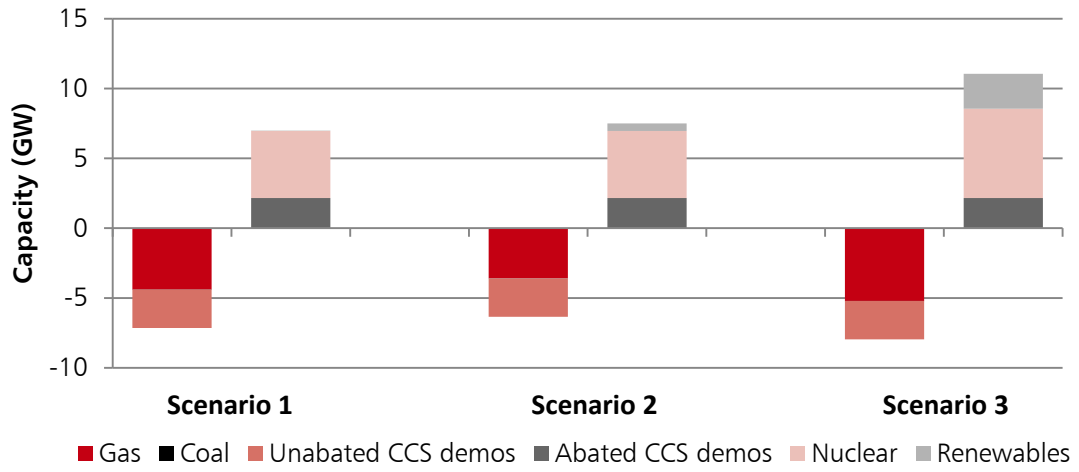
[1] *Updated energy and emissions projections*, DECC, June 2010.

electricity generation reaches more than 65 per cent by 2030 compared with around 50 per cent in the baseline.

5.11 The difference in the amount of capacity in each scenario compared with the baseline in 2030 is set out in Chart 5.C. In scenario one there is an additional 7 GW of low-carbon capacity by 2030 compared with the baseline. This rises to 7.5GW in scenario two and 11.1GW in scenario three. In all three scenarios the unabated parts of CCS demonstration plants become economic to retrofit with CCS in the 2020s, but this does not happen in the baseline.

5.12 As a result of these increases in low-carbon investment, the average amount of emissions produced per unit of electricity generated falls from 207gCO_2/kWh in 2030 in the baseline to 126gCO_2/kWh in scenario one, 124gCO_2/kWh in scenario two and 105gCO_2/kWh in scenario three. This compares with around 486gCO_2/kWh in 2010.

Chart 5.C: Change in capacity mix compared with the baseline in 2030



Source: Department of Energy and Climate Change (based on Redpoint Energy analysis), 2010

5.13 The increased investment in low-carbon generation is driven by expectations of higher revenues, as a result of higher carbon prices increasing electricity prices. In addition, it is also assumed there is more certainty around carbon prices and therefore electricity prices. This reduces some of the revenue uncertainty and risk: it lowers the implied cost of capital (hurdle rate) for all technologies, including conventional plants. However, the impact varies across technologies depending on the proportion of the total revenue that the carbon price accounts for, which in most cases is relatively small given the importance of other factors such as gas prices. For example, the carbon price support mechanism is assumed to reduce the cost of capital for a biomass plant by 0.3 percentage points and a coal plant with CCS by 0.5 percentage points.

5.14 In order to isolate the impact of supporting the carbon price, the results above assume that all other policies, including the Renewables Obligation, remain unchanged between the baseline and the carbon price support scenarios. In reality, the introduction of carbon price support would be likely to lead over time to some adjustment of existing policies. The interactions with other electricity market policies are considered more fully as part of the EMR consultation.

Conventional fossil fuel-based capacity

5.15 A rise in the carbon price induces a change in the operation of coal and gas-fired plants. The higher the level of carbon price support the greater the substitution from coal to less carbon-intensive gas-fired electricity generation.

5.16 The amount of gas capacity and also unabated parts of the CCS demonstration plants is lower in the carbon price support scenarios than the baseline in 2030 (see Chart 5.C).

Security of supply

5.17 Changes in the electricity generation mix will have implications for the security of electricity supply. Given the plant closure and build rates discussed above, our initial view is that the carbon price support scenarios do not impose additional risks for security of supply relative to the baseline. To the extent that carbon price support improves investor certainty, it should improve the timing of investment in new capacity. The increase in low-carbon capacity will help reduce the UK's reliance on imported fossil fuels but will also pose challenges by increasing the amount of inflexible and intermittent generation capacity. The EMR consultation considers implications of a greater amount of low-carbon generation for security of supply in more detail.

Box 5.B: Questions on electricity investment:

- 5.B1: What impact would you expect the carbon price support mechanism to have on investment in low-carbon electricity generation?
- 5.B2: What other impacts would you expect carbon price support to have on investment decisions in the electricity market?
- 5.B3: How should carbon price support be structured to support investment in electricity generation while limiting impacts on the wholesale electricity price?

Existing low-carbon generation infrastructure

5.18 The objective of supporting the carbon price is to increase investment in new low-carbon capacity. Existing plants with high carbon emissions would be likely to face a net reduction in profits because their costs would increase by more than electricity prices. Conversely, existing low-carbon plants (renewable and nuclear) would be likely to benefit from an increase in profits. Efficient fossil fuel plants would also benefit.

5.19 In practice, the impact on individual generating companies would depend on their generation mix: some generating companies might become more profitable and others might experience a decline in profit. Over the long term this will depend on the proportion of low-carbon generation relative to the company's overall generation portfolio and plant efficiency. Moreover, other reforms that might be made to the electricity market; the profile of the carbon price support; and wider changes in the tax system, such as the corporation tax reductions the Government announced at Budget, will also affect net profits. The lower the level of initial carbon price support the less the impact on existing low-carbon generation capacity, and potentially the lower the incentive to invest in new low-carbon generation.

Box 5.C: Questions on existing low-carbon generators:

- 5.C1: Can you provide an assessment of the impact of the proposals on your generation portfolio and overall profitability?
- 5.C2: What would be the implications of supporting the carbon price for existing electricity generators and how should the Government take this into account?

Other electricity market impacts

5.20 Supporting the carbon price has a number of impacts on the electricity market. For example, the policy would be likely to change the relative attractiveness of investment in new coal and gas power stations, as well as decisions about when to retire existing fossil-fuel power stations. Given the need to maintain a secure electricity supply, these other impacts would need to be considered alongside the impact on new low-carbon investment and wider reforms to the electricity market.

Emissions

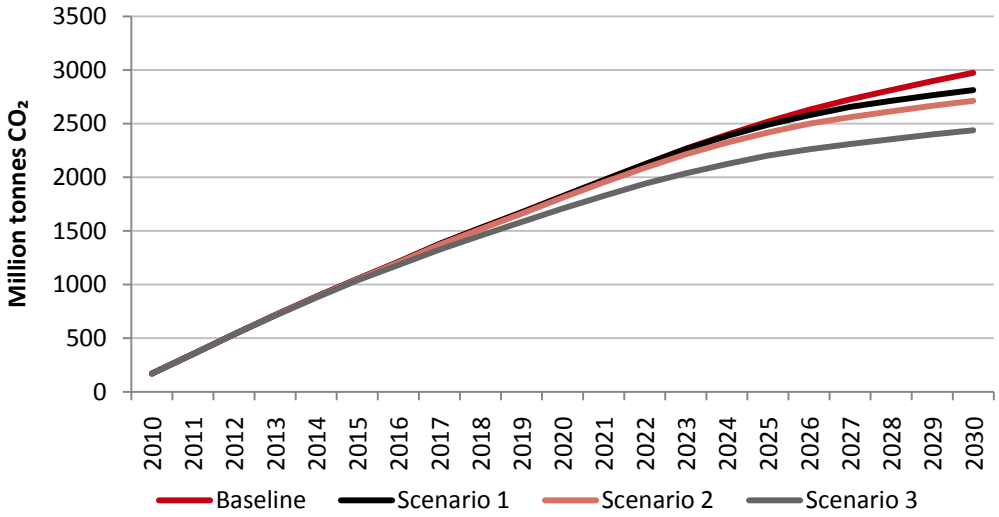
Traded sector (EU ETS)

5.21 Around 98 per cent of emissions associated with UK electricity generation are covered by the EU ETS, the 'traded sector'. The introduction of a UK carbon price support mechanism for those electricity generating plants whose emissions are covered by the EU ETS would not directly impact on the Government's ability to meet its carbon budgets, but should make a contribution to reducing the costs of long-term emission reductions.

5.22 Increased decarbonisation of the UK's electricity generation will also reduce the number of EUAs purchased by UK generators. Over the period to 2030, carbon price support is expected to reduce emissions from UK electricity generation by a total of 162 million tonnes of carbon dioxide ($MtCO_2$) in scenario one, 261 $MtCO_2$ in scenario two and 536 $MtCO_2$ in scenario three, compared with the baseline (see Chart 5.D).

5.23 Valuing these emissions at the Government's central traded carbon value (i.e. the carbon price in the baseline) and discounting at Green Book rates gives cumulative savings in purchases of EUAs of around £4.9 billion-£12.5 billion depending on the scenario.

Chart 5.D: Cumulative CO_2 emissions from UK electricity generation (in the EU ETS)



Source: Redpoint Energy, 2010

5.24 As a result of carbon price support, the majority of additional abatement occurs in the period 2020-2030. During the period to 2030 UK demand for EUAs might be reduced, which might put some downward pressure on the EUA price. The greater the additional UK abatement relative to EU-wide abatement, the greater the potential impact on price. This would also be the case if any EU Member State introduced policies to incentivise emission reductions in its domestic traded sectors. However, wider factors such as future rates of economic growth across the EU, fossil fuel prices and EU and national action on climate change would also need to be considered. If the EU were to move to a 30 per cent emissions reduction target by 2020 the impact would be reduced. Similarly, if carbon price support were set at a low level any potential downward pressure on UK demand for EUAs would be reduced.

Non-traded sector

5.25 Some of the electricity generated in the UK is by plants not covered by the EU ETS and the associated emissions are therefore part of the 'non-traded' sector, for example, on-site electricity generation by non-EU ETS operators. For those plants that would face an increase in the cost of fossil fuels used to generate electricity as a result of carbon price support then consumption of those fuels will decline overall, leading to a reduction in emissions.

5.26 Given the very large number of plants involved, many of which are very small, and the lack of data, it is difficult to estimate any emissions reduction. However, the overall size of emissions covered by these generators is around 2MtCO_2e. This is expected to more than double in future.

5.27 There are also implications for emissions outside electricity generation. Placing an additional cost on a subset of fossil fuel use could increase the costs of electricity relative to other sources of energy. Over the long term this might encourage some switching where the alternative source of energy is considered more economic than electricity. Where switching involves the use of more polluting fossil fuels, non-traded sector emissions would increase.

Wholesale electricity prices

5.28 Wholesale electricity prices are currently set by the costs of the marginal plant supplying the market. This is typically gas-fired plant and sometimes coal. While gas and coal plants continue to set the electricity price, an increase in their costs through carbon price support, would increase electricity prices. This in turn increases the returns for low-carbon investment.

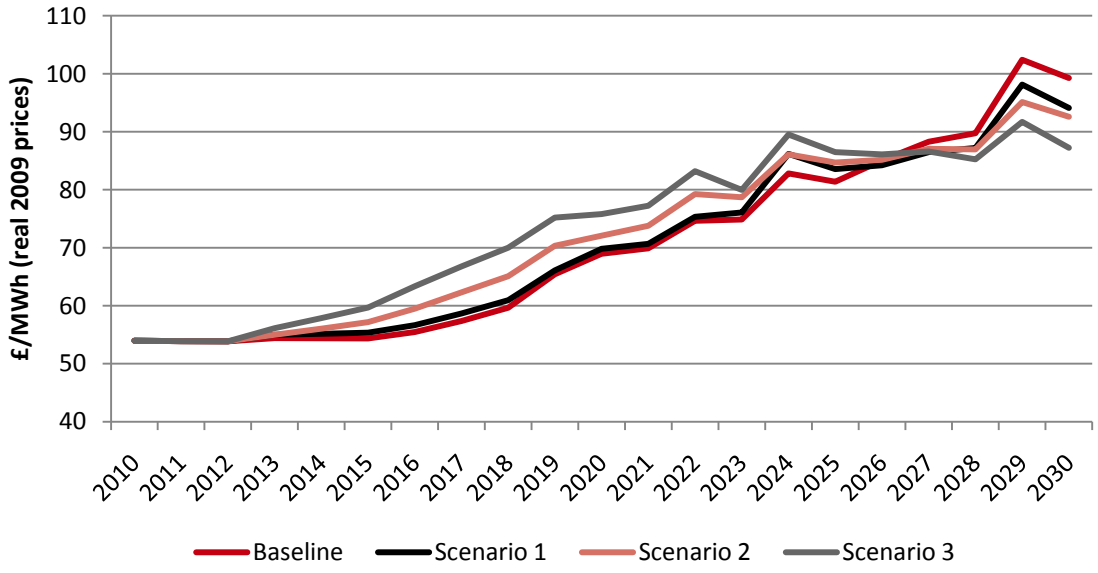
5.29 In the baseline, the average (time-weighted) annual baseload wholesale electricity price increases over time to reflect rising fossil fuel prices, particularly gas, and rising carbon prices. Prices for each trajectory in the different scenarios are set out in Chart 5.E. Under all the carbon price scenarios, the wholesale electricity price would be lower than the baseline from the mid-2020s as new low-carbon technology decarbonises the grid. This will reduce electricity bills for businesses and consumers. The EMR consultation assesses in further detail the impacts of carbon price support in conjunction with other options for reform.

5.30 As well as ensuring secure, low-carbon and affordable energy supplies, the Government is committed to ensuring that people do not live in fuel poverty and that vulnerable consumers receive the appropriate support. On its own, an increase in the wholesale electricity price would tend to increase the risk of fuel poverty for some households.

5.31 However, it is important to consider the effects of Government's policies as a whole against these aims, rather than each in isolation. The Spending Review committed the Government to a substantial and coherent set of measures to address fuel poverty. Social Price Support is being expanded and put on a mandatory basis to assist vulnerable households with their energy bills and will be worth £310 million a year by 2014-15. The Energy Company Obligation will supersede the Carbon Emissions Reduction Target scheme and work alongside the Green Deal to focus additional support on those most vulnerable to fuel poverty.

5.32 Without action, the Government could not meet its objectives for secure, low-carbon energy or for protecting consumers and those vulnerable to fuel poverty. Through implementing a carbon price support mechanism and the measures being introduced to address fuel poverty, the Government can make progress to achieving both objectives.

Chart 5.E: Time weighted baseload electricity prices (£/MWh, real 2009 prices)



Source: Redpoint Energy, 2010

5.33 Higher wholesale electricity prices will have wider impacts on businesses competitiveness. The extent of the impact is likely to be greatest for energy and electricity intensive sectors, and particularly those that are trade intensive and therefore subject to a high degree of international competition. The Impact Assessment attached at Annex D provides details on the indirect effects of the three carbon price support scenarios on household expenditure and business competitiveness.

Box 5.D: Questions on electricity price impacts:

- 5.D1: How do you currently manage fluctuations in the wholesale electricity price?
- 5.D2: What difference will supporting the carbon price make to your business?
- 5.D3: As an electricity generator or supplier, how much of the cost of the carbon price support would you pass on to consumers?
- 5.D4: As a business, how much of the cost of energy bills do you pass on to customers?
- 5.D5: How might your company or sector be affected and would be there any impact on your profit margins?
- 5.D6: Do you have any comments on the assessment of equality and other impacts in the evidence base of the Impact Assessment, included at Annex D?

6 Summary of questions

Summary

6.1 Without major reforms to our electricity market, we could fail to meet our climate goals and our power supplies could become increasingly unreliable. This will not be possible without credible plans to decarbonise the power sector over the long term.

6.2 The UK will need to replace a quarter of existing power plants by 2020, which are aging and unlikely to meet environmental regulations. To achieve this, up to £110 billion of investment in new generation and grid connections is necessary by 2020. This requires more than a doubling of capital expenditure on energy infrastructure compared with the last decade. The Government is determined to achieve this in the most affordable way, in order to provide value for money for the taxpayer and minimise bill increases for consumers and business.

6.3 Supporting the carbon price will help increase incentives for investment in low-carbon electricity generation by reducing revenue uncertainty and improving the economics of low-carbon investment. The Government's proposal to introduce carbon price support for electricity generators is an important first step to achieve this.

Questions

6.4 The following is a summary of all the questions in the consultation document. The questions are designed to seek views on the detailed policy design and help create a framework for implementing Government's proposal, rather than ask for alternative proposals. Any evaluations of the overall impact of the proposal on the respondent's business would also be welcome.

Investment

- 3.A1: What are your expectations about the carbon price in 2020 and 2030? And how important a factor will it be when considering investment in low-carbon generation?
- 3.A2: If investors have greater certainty in the future long-term price of carbon, would this increase investment in low-carbon electricity generation in the UK? If so, please explain why.
- 3.A3: How much certainty would investors attribute to a carbon price support mechanism if it were delivered through the tax system?
- 3.A4: In addition to carbon price support, is further reform of the electricity market necessary to decarbonise the power sector in the UK?

Administration

- 4.B1: What changes would you need to make to your procedures and accounting systems to ensure you correctly account for CCL on supplies to electricity generators?
- 4.B2: How long would you need to make the necessary changes to your systems to account for CCL on supplies to electricity generators?

- 4.B3: Please provide an estimate of how much the system changes would cost, both one-off and continuing?

Types of generator

- 4.C1: Do you agree that all types of electricity generators should be treated equally under the proposed changes? If not, please explain why.
- 4.C2: Is there a case for providing additional or more preferential treatment for CHP? If so, what is the best way of achieving this?
- 4.C3: Do you agree that tax relief should be considered for power stations with CCS? If so, what are the practical issues in designing a relief; what operational standards should a CCS plant meet in order to be eligible; and how might these issues differ for demonstration projects?

Imports and exports

- 4.D1: What impact would the Government's proposals have on electricity generators and suppliers that export or import electricity?
- 4.D2: What impact might the proposals have on trading arrangements for electricity?
- 4.D3: What impact might the proposals have on electricity generation, trading and supply in the single electricity market in Northern Ireland and Ireland?

Carbon price support mechanism

- 4.E1: How should the carbon price support rates be set in order to increase certainty for investors, in particular over the medium and long term?
- 4.E2: Which mechanism, or alternative approach, would you most support and why?
- 4.E3: What impact would the proposals have on you carbon trading arrangements?

Future price of carbon

- 4.F1: Should the Government target a certain carbon price a) for 2020 and b) for 2030? If so, at what level?
- 4.F2: What is the most appropriate carbon price for the UK to meet its emissions reduction targets in the power generation sector? How would this be affected by changes in the structure of the electricity market?
- 4.F3: When would be the most appropriate time for introducing a carbon price support mechanism and what would be the most appropriate level?

Electricity investment

- 5.B1: What impact would you expect the carbon price support mechanism to have on investment in low-carbon electricity generation?
- 5.B2: What other impacts would you expect carbon price support to have on investment decisions in the electricity market?
- 5.B3: How should carbon price support be structured to support investment in electricity generation whilst limiting impacts on the wholesale electricity price?

Existing low-carbon generators

- 5.C1: Can you provide an assessment of the impact of the proposals on your generation portfolio and overall profitability?
- 5.C2: What would be the implications of supporting the carbon price for existing electricity generators and how should the Government take this into account?

Electricity price impacts

- 5.D1: How do you currently manage fluctuations in the wholesale electricity price?
- 5.D2: What difference will supporting the carbon price make to your business?
- 5.D3: As an electricity generator or supplier, how much of the cost of the carbon price support would you pass on to consumers?
- 5.D4: As a business, how much of the cost of energy bills do you pass on to customers?
- 5.D5: How might your company or sector be affected and would be there any impact on your profit margins?
- 5.D6: Do you have any comments on the assessment of equality and other impacts in the evidence base of the Impact Assessment, included at Annex D?

A The code of practice on consultation

A.1 This consultation process is being conducted in line with the Code of Practice for written consultation that sets down the following criteria:

- Formal consultation should take place at a stage when there is scope to influence the policy outcome.
- Consultations should normally last for at least 12 weeks with consideration given to longer timescales where feasible and sensible.
- Consultation documents should be clear about the consultation process, what is being proposed, the scope to influence and the expected costs and benefits of the proposals.
- Consultation exercises should be designed to be accessible to, and clearly targeted at, those people the exercise is intended to reach.
- Keeping the burden of consultation to a minimum is essential if consultations are to be effective and if consultees' buy-in to the process is to be obtained.
- Consultation responses should be analysed carefully and clear feedback should be provided to participants following the consultation.
- Officials running consultations should seek guidance in how to run an effective consultation exercise and share what they have learned from the experience.

A.2 If you feel that this consultation does not fulfil these criteria, or if you have any complaints or comments about the process, please contact:

Richard Bowyer, Tax Consultation Coordinator, HMRC

Tel: 020 7147 0062

E-mail: richard.bowyer@hmrc.gsi.gov.uk

B Assumptions and sensitivities

Baseline

B.1 The baseline modelling runs assume that investors have no foresight of the carbon price (for example, investors take the carbon price in the year that the investment decision is made and 'flat-line' this into the future). Following discussion with investors in generation infrastructure, this is consistent with how investments are likely to be made in practice. Similar foresight is assumed, in relation to fossil fuel prices.

B.2 The baseline assumes that Renewables Obligation banding is set at a level both to achieve the 2020 renewable energy target, and around a 35 per cent share of renewable electricity generation in 2030. It assumes that industry does not incorporate a rising carbon price into decision-making and sets the banding accordingly.

B.3 The Government does not have a target for renewable electricity generation in 2030: the assumption of 35 per cent should not be taken as an indication of a preferred view on renewable electricity generation beyond meeting the EU 2020 target. The Government has asked the Committee on Climate Change for advice on the role of renewable electricity post 2020.

B.4 Baseload electricity prices are considered to reflect the sum of the electricity system's short-run marginal cost, plus an uplift to reflect the amount of 'spare' capacity (measured by the capacity margin).

Carbon price support

B.5 The decarbonisation achieved by a carbon price support mechanism is heavily dependent on the assumptions made about how investors perceive the measure over the long-term.

B.6 Economic modelling of the electricity market assumes that the overall level of electricity demand is the same in the baseline and the carbon price support scenarios. Therefore, the emission savings do not take account of any changes in the level of electricity demand in response to price changes. Accounting for this impact could deliver a further reduction in emissions.

B.7 Investors are assumed to have five years foresight or certainty in relation to the price achieved by the carbon price support mechanism, as this corresponds with the Treasury's internal fiscal forecasting. The carbon price is then assumed to flat line.

B.8 In practice, it is possible that investors will incorporate the impact of a carbon price support mechanism into their 5-year appraisals, but revert back to the prevailing carbon price at the point of the investment decision. If this were the case, carbon price support would have limited impact as this relies on the period of certainty being largely during the construction rather than the operational phase.

C Glossary of abbreviations

C.1 Below is a list of abbreviations used in this document.

CCL	climate change levy
CCLAD	climate change levy accounting document
CCS	carbon capture and storage
CHP	combined heat and power
CHPQA	CHP Quality Assurance
CO_2	carbon dioxide
CRC	carbon reduction commitment
DECC	Department of Energy and Climate Change
DPA	Data Protection Act 1998
DUKES	Digest of UK Energy Statistics
EMR	electricity market reform
EPD	EC Directive 2003/96/EC – Taxation of energy products and electricity (Energy Products Directive)
EU	European Union
EUAs	European Union Allowances
EU ETS	European Union Emissions Trading System
FOIA	Freedom of Information Act 2000
GIB	Green Investment Bank
GW	gigawatt
HMD	EC Directive 2008/118/EC - the Holdings and Movements Directive
HMRC	HM Revenue & Customs
kg	kilogram(me)
kWh	kilowatt hour
LEC	levy exemption certificate
LPG	liquefied petroleum gas
$MtCO_2$	million tonnes of carbon dioxide
$MtCO_2e$	million tonnes of carbon dioxide equivalent
MWh	megawatt hour
NPV	net present value
PV	present value
ROC	Renewables Obligation Certificate
SCM	Standard Cost Model
tCO_2	tonne of carbon dioxide
UK	United Kingdom
VAT	Value Added Tax

D Impact Assessment

Summary: Intervention & Options

Department /Agency:	Title:	
HM Treasury/HMRC	Impact Assessment of proposals to amend the climate change levy and fuel duty to support incentives for low-carbon electricty generation	
Stage: Consultation	**Version:** 1	**Date:** 16 December 2010
Related Publications:		

Available to view or download at:

http://www.hm-treasury.gov.uk/d/consult_carbon_price_support_ia.pdf

Contact for enquiries: Stephen Robinson, HMRC **Telephone:** 0161 827 0613

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

The price of carbon faced by the power sector affects investment decisions in low-carbon technology. Greater low-carbon investment for electricity generation is required to meet the UK's carbon emissions reduction targets and ensure security of supply.

The carbon price, however, has not been high enough or stable enough to provide certainty to encourage this additional investment in low-carbon technology.

Government intervention is necessary to provide more certainty and stability to investors by supporting the carbon price through reform of the climate change levy (CCL) and fuel duty.

What are the policy objectives and the intended effects?

The main objective of providing greater support and certainty to the UK carbon price is to help increase the incentives for investment in low-carbon generation in order to decarbonise the UK power sector.

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

Option 1: To introduce a minimum price for carbon on the fossil fuels supplied to all types of UK electricity generators at rates based upon the fuel's carbon content; and achieving this through reform of CCL and fuel duty. This is the preferred option.

Option 2: Do nothing. Uncertainty around the carbon price would continue to hinder investment in low-carbon generation technologies. This would likely lead to higher long-term electricity prices and put at risk the Government's ability to meet UK emission targets and security of supply objectives.

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

HMRC will conduct a post-implementation review within 3-5 years of implementation.

Ministerial Sign-off For consultation stage 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, benefits and impact of the leading options.

Signed by the responsible Minister:

Date: 15th December 2010

Summary: Analysis & Evidence

Policy Option: 1	Description: To amend existing CCL exemptions and the system of reclaiming fuel duty so that the way fossil fuels supplied to electricity generators are taxed supports the carbon price.

COSTS

ANNUAL COSTS		
One-off (Transition)	**Yrs**	
£ 1.3m	1	
Average Annual Cost (excluding one-off)		
£ 0.2bn to £1.4bn	18	

Description and scale of **key monetised costs** by 'main affected groups' Familiarisation costs of changes to CCL and fuel duty. A small number of suppliers of fossil fuels to electricity generators might have to register for CCL. Suppliers might need to amend their accounting systems and invoices to account for the new rates of CCL. CCL supplier certificates might be required to ensure the correct amount of CCL is charged by suppliers. Between 2013 and 2030 resource costs are estimated to range between £2.1 billion and £16.3 billion.

Total Cost (PV) **£ 2.1bn to £16.3bn**

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

HMRC costs are estimated to be minimal and are a routine part of its normal business activity.

BENEFITS

ANNUAL BENEFITS		
One-off	**Yrs**	
£ nil	1	
Average Annual Benefit (excluding one-off)		
£ 0.5bn to £1.4bn	18	

Description and scale of **key monetised benefits** by 'main affected groups' Between 2013 and 2030, the total emissions savings for the traded sector range between £4.9 billion (scenario one) and £12.5 billion (scenario three) depending on the level of carbon price support. Emissions savings are valued at the Government's central estimate of traded carbon values and discounted. The discounted value for improvements in air quality throughout this period range between £0.4 billion (scenario one) and £2.1 billion (scenario three).

Total Benefit (PV) **£5.3bn to £14.6bn**

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

The following have not been quantified: expected emission savings within the non-traded sector; long-term security of supply benefits; and potentially lower electricity prices over the long term. The flow of Exchequer impacts would be a transfer from private to public sectors and so is not presented as a benefit or cost.

Key Assumptions/Sensitivities/Risks The carbon price forecast is uncertain, especially in the long term, and therefore the estimated carbon benefits which factor in these prices are also uncertain. Similarly, the estimated resource costs are also uncertain as they depend on the projected generation mix resulting from investment decisions and from uncertain technology costs and fossil fuel prices.

Price Base Year 2009	Time Period Years 2013-2030	**Net Benefit Range** (NPV) **£ +3.2bn to -1.7bn**	**NET BENEFIT** (NPV Best estimate) **£ N/A**

What is the geographic coverage of the policy/option?			UK	
On what date will the policy be implemented?			1 April 2013	
Which organisation(s) will enforce the policy?			HMRC	
What is the total annual cost of enforcement for these organisations?			£ N/A	
Does enforcement comply with Hampton principles?			N/A	
Will implementation go beyond minimum EU requirements?			Yes	
What is the value of the proposed offsetting measure per year?			£ N/A	
What is the value of changes in greenhouse gas emissions?			£ 0.5bn to £1.2bn p.a.	
Will the proposal have a significant impact on competition?			No	
Annual cost (£-£) per organisation (excluding one-off)	Micro **n/a**	Small **£800**	Medium **£1,200**	Large **£8,500**
Are any of these organisations exempt?	No	No	N/A	N/A

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

Increase of £48,000 Decrease of £ **Net Impact** **£48,000 increase**

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

Evidence Base (for summary sheets)

1. INTRODUCTION

The Issue

1 The Coalition's Programme for Government committed it to introduce a floor price for carbon. This is one of a number of initiatives designed to encourage greater investment in low-carbon electricity generation.

2 The June 2010 Budget built on this commitment. The Chancellor announced that HM Treasury and HM Revenue and Customs (HMRC) would jointly publish proposals in the autumn to reform the climate change levy (CCL) so as to provide more certainty and support to the carbon price and that, subject to consultation on these proposals, the Government would bring forward the relevant clauses in Finance Bill 2011.

3 This commitment sits alongside a number of other commitments, published today, to reform the electricity market in the UK in order to support the private sector investment needed to meet the Government's decarbonisation and security of supply objectives. This Impact Assessment and accompanying consultation document, which consider supporting the carbon price in isolation, should be seen as part of this wider package.

Policy objectives and intended effects

4 The desired outcome of providing support to the carbon price is to encourage greater investment in low-carbon electricity generation to meet the UK's carbon emissions reduction targets[1]. This would be part of a package of wider market reforms. Supporting the carbon price in the UK electricity sector helps increase incentives for investment in low-carbon generation by:

- signalling the Government's commitment to a low-carbon transition;
- reducing the uncertainty of revenue and investment risk uncertainty; and
- increasing the costs of high carbon emitting technologies relative to more carbon efficient technologies.

Why has the Government decided to intervene in this policy area?

5 To meet the UK's emissions targets a major expansion in low-carbon electricity generation is required. Currently, low-carbon technologies are typically more expensive than conventional fossil-fuel generation technologies on a cost per output generated basis. This is because the upfront capital and construction costs tend to be higher; however, marginal costs once the plant is operational are much lower. Moreover, a number of low-carbon technologies have yet to be built in the UK on a commercial basis. This makes their costs not only higher than conventional generation but also more uncertain, thereby increasing investment risks and the subsequent cost of capital.

6 Policies such as the Renewables Obligation, the European Union Emissions Trading System (EU ETS) and CCL exemption for electricity generated from renewable sources already provide investment incentives for low-carbon generation. However, additional measures will be required to deliver the level of investment required to decarbonise the power sector in the future.

[1] The Government is committed legally to reduce UK greenhouse gas emissions by at least 80 per cent in 2050 (from 1990 levels), and for 15 per cent of UK energy to come from renewable sources by 2020.

7 A range of factors affect investment decisions. One of these is the carbon price. The EU ETS is designed to address the negative externality of carbon dioxide (CO_2) emissions and factor the price of carbon into the development and operation of electricity generation assets. While there is evidence that investors are beginning to factor the carbon price into investment decisions[2], there is uncertainty about how carbon prices will evolve and a question about whether the carbon price delivered through the EU ETS is strong and stable enough to drive the decarbonisation required.

8 There are significant variations in carbon price forecasts to 2020. While the carbon price remains less volatile than other commodities, it contains a number of inherent uncertainties that are not shared by fossil fuels. These are primarily regulatory. For example, the EU is considering if the EU's 2020 emissions reduction target should be tightened by increasing the greenhouse gas target from a 20 per cent to 30 per cent reduction, based on 1990 levels. This could have a significant impact on future carbon prices[3] and the allocation of emissions to specific industrial sectors. As such, businesses and investors face a degree of regulatory uncertainty about future carbon prices, which might undermine long-term price signals and incentives. Therefore, there is a rationale for Government to intervene to provide greater support and certainty to the carbon price.

9 Carbon price support is likely to be insufficient on its own to encourage the total amount of low-carbon investment required to decarbonise the power sector. Therefore, the Government has also published a consultation on wider reforms to the electricity market. This will consider the role of wider reforms including carbon price support.

2. OPTIONS

Option 1 – Government's lead proposal

10 The Government's lead option to achieve its objective of providing support and certainty to the carbon price is to:

- remove existing CCL exemptions on fossil fuels used in UK electricity generation; and
- reduce the amount of fuel duty that can be reclaimed when oil is used to generate electricity.

CCL

11 CCL becomes chargeable when a taxable commodity is supplied to a consumer. Persons registered for the levy are required to submit a CCL 100 Climate Change Levy Return (or the Welsh language version CCL100W) and pay the tax due. Supplies to households are excluded from CCL, and to minimise administrative burdens on energy suppliers, supplies of small quantities[4] are always considered to be for domestic use.

12 New rates of CCL, to be known as the carbon price support rates, will be applied to fossil fuels (other than oils) used in UK electricity generation based upon the carbon content of the fuel.

13 The Government proposes to achieve this by removing or amending CCL exemptions in Schedule 6 to the Finance Act 2000:

- supplies of taxable commodities to electricity producers (paragraph 14); and
- supplies to a combined heat and power (CHP) station (paragraph 15).

[2] New Energy Finance, *Impact of the EU ETS on power sector investments - a survey of European utilities,* 14 December 2009.
[3] European Commission, COM (2010) 265 publication suggested €30 t/CO_2 under a cap consistent with a 30 percent greenhouse gas reduction target.
[4] An example of a supply of a small quantity would be no more than one tonne of coal or coke held out for sale as domestic fuel.

14 The Government will bring forward proposals for legislation to introduce the new carbon price support rates and will also need to propose amendments to other primary or secondary CCL legislation in order to achieve the desired objective.

Fuel duty

15 Oil is not subject to CCL but is liable to fuel duty in the UK under the Hydrocarbon Oil Duties Act 1979. The producer is required to account for duty on oils when they leave the refinery. Consequently, oils used for generating electricity are delivered to the generator with duty paid. The generator may then apply to HMRC for repayment of this duty and in doing so must provide proof that the oil has been used to generate electricity, therefore, oils used in electricity production are, in effect, exempt from duty.

16 The Government intends to continue to tax oils under the fuel duty regime. Taxing oils used in electricity generation would be achieved by reducing the amount of duty that can be reclaimed by the generator when oil is used for this purpose. The amount of the duty repayment would, as for the carbon price support rates for CCL, correlate to the carbon content of the fuel.

Indicative scenarios

17 In order to assess the impacts of the Government's proposal, three indicative scenarios have been compared against a baseline ('do nothing approach'). Under existing assumptions and policies, the three scenarios and baseline are described below and illustrated in Chart 1 (all figures are in real 2009 prices). For simplicity, linear trends are assumed between the 2013 starting levels of carbon price support and the 2020 levels.

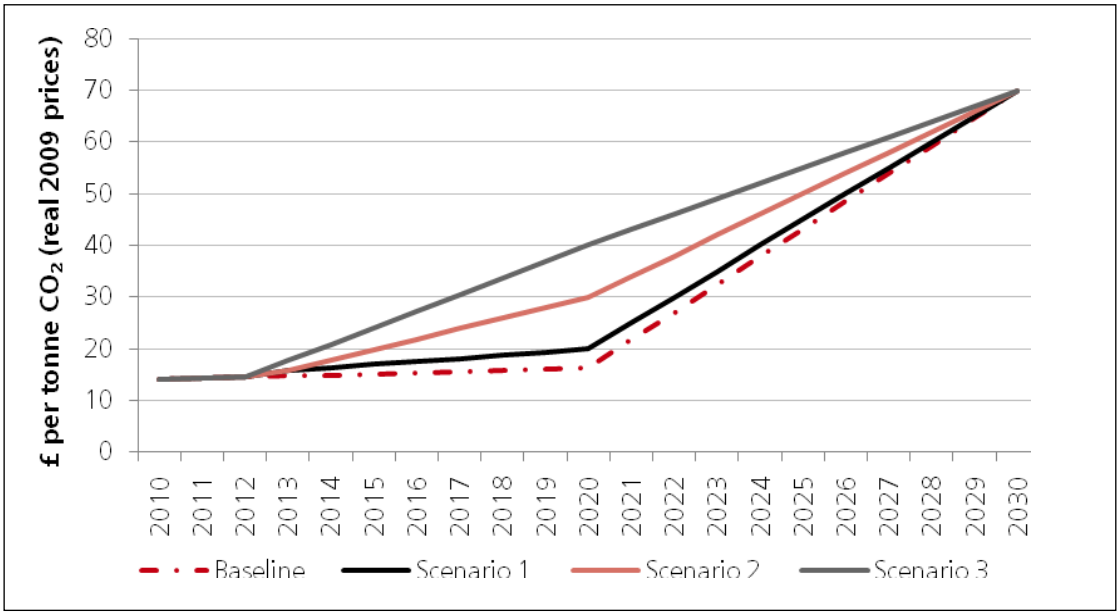
- Baseline: the EU ETS price rises in line with the Department of Energy and Climate Change's (DECC) current published projections under a 20 per cent emissions reduction target reaching £16.3/tCO_2 in 2020. Post 2020, the price increases at a constant rate to reach £70/tCO_2 in 2030, an illustrative price consistent with global prices needed to limit the increase in temperature to an expected 2° Celsius.

- Scenario one: carbon price support starting at £1/tCO_2 on top of the prevailing EU ETS price in 2013, with this support rising to target a combined carbon price (support plus EU ETS) of £20/tCO_2 in 2020 and £70/tCO_2 in 2030.

- Scenario two: carbon price support starting at £1/tCO_2 on top of the prevailing EU ETS price in 2013, with this support rising to target a combined carbon price (support plus EU ETS) of £30/tCO_2 in 2020 and £70/tCO_2 in 2030.

- Scenario three: carbon price support starting at £3/tCO_2 on top of the prevailing EU ETS price in 2013, with this support rising to target a combined carbon price (support plus EU ETS) of £40/tCO_2 in 2020 and £70/tCO_2 in 2030.

Chart 1: Indicative carbon price support scenarios and baseline



Source: Department of Energy and Climate Change, 2010

Rates

18 In order to raise the effective carbon price faced by the EU ETS participants from the prevailing market prices to the target levels, the carbon price support rates on fossil fuels used in electricity generation could be set to reflect these price differences. These carbon-based rates are then converted to energy-based rates using the standard emission factors for different fuels, in pence per KWh and mass.

19 The three indicative carbon price trajectories (£20, £30 and £40/t CO_2 in 2020) that converge on a single long-term price of £70/t CO_2 in 2030 have been assessed against a baseline scenario. These scenarios have been used to provide a sense of the additional liability. They do not represent the Government's definitive or preferred options.

20 Tables 1 and 2 provide the carbon price support rates for the main commodities used in electricity generation for the various indicative carbon price levels; £1, £3, £5 and £10 per tonne of CO_2. These are illustrative rates (effective rates of tax for input fuels). In practice, the Government would provide the corresponding tax rates implied by the targeted carbon price level based on the average carbon content of each taxable commodity supplied for generation.

Table 1: Indicative carbon price support rates for the main fuels used in electricity generation: Unit rates in energy

Carbon price:	Gas (p/KWh)	Coal (p/KWh)	Fuel Oil (p/KWh)	Gas Oil (p/KWh)
£1/tCO_2	0.018	0.031	0.027	0.025
£3/tCO_2	0.055	0.092	0.080	0.076
£5/tCO_2	0.092	0.154	0.133	0.126
£10/tCO_2	0.184	0.308	0.265	0.252

Table 2: Indicative carbon price support rates for the main fuels used in electricity generation: Unit rates in mass

Carbon price:	Gas (p/therm)	Coal (p/Kg)	Fuel Oil (p/litre)	Gas Oil (p/litre)
£1/tCO_2	0.538	0.230	0.314	0.276
£3/tCO_2	1.614	0.690	0.943	0.829
£5/tCO_2	2.690	1.151	1.572	1.381
£10/tCO_2	5.380	2.301	3.144	2.762

21 There are uncertainties surrounding the calculation of future tax rates in the various scenarios. The above rates are presented here to illustrate the methodology. Any revision to the forecast carbon prices would result in significant changes to the rates.

22 Carbon price forecasting is inherently uncertain and any estimate of Exchequer revenue impacts would depend upon the future EU ETS traded carbon price relative to the price targeted through carbon price support. In scenario one, for example, an illustrative revenue path could be in the order of £200 million in 2013-14 to £400 million in 2015-16, though this would depend on the underlying traded carbon price, including whether or not the EU agreed to tighten the ETS cap. A tighter EU ETS cap would increase the carbon price and reduce carbon price support rates and revenues. This illustrative revenue forecast incorporates the behavioural effect - the change in consumption of fossil fuels by electricity generators - as a result of the carbon price support.

Option 2 – do nothing

23 Around £110 billion of investment is likely to be required in low-carbon electricity generation capacity, transmission and back-up by 2020 (DECC, 2010), with a similar amount likely to be required in the 2020s. Current market arrangements, including the investment incentives provided by the carbon price, are unlikely to bring forward this level of investment. This investment is necessary to reduce greenhouse gas emissions, ensure energy security as a significant proportion of existing power stations are closing and to enable the economy to benefit from new low-carbon technologies.

24 Without intervention, the market is unlikely to decide to invest sufficiently in low-carbon technologies to replace the existing capacity and to meet future growth in demand. As such, doing nothing would increase the risks of the UK being unable to meet its emissions reduction target over the long term.

3. COSTS & BENEFITS

Option 1- amendment of existing exemptions in CCL and fuel duty

25 The Government's lead option to achieve its objective is to amend selected CCL exemptions and to reduce the amount of fuel duty that can be reclaimed when oil is used to generate electricity.

Number of businesses affected

CCL

26 Suppliers of gas, solid fuels or liquefied petroleum gas (LPG) to a generator for use in electricity generation would no longer be exempt from CCL. If not already registered for CCL,

the suppliers making those supplies and generators importing such fossil fuels from other EU Member States for use in generation would need to register and account for CCL on those supplies. Generators importing fossil fuels from outside the EU would have the choice of either accounting for CCL at the time of importation or registering for CCL and accounting for the levy through their CCL return.

27 HMRC estimates that the number of new registrations arising as a result of these proposals would be small since most of the suppliers of coal, gas or LPG to electricity producers will already be making supplies of taxable commodities and would be registered for CCL.

Fuel duty

28 The Government intends to continue to allow generators to reclaim duty paid on oils under the fuel duty regime. To ensure consistency with the fossil fuels taxed under CCL, the amount of fuel duty that can be reclaimed for oils used in electricity generation would be reduced from its current level. This proposal would not necessitate any additional claims, as it would, in effect, simply be a rate change. Up to 50 businesses reclaim duty from HMRC each year on oil used in electricity generation.

Electricity generators

29 The proposals would affect all electricity generators that use fossil fuels to generate electricity. There are approximately 80 fossil fuel electricity generators with a capacity of over 1 MW (Digest of UK Energy Statistics, May 2010[5]) and 70 medium and small fossil fuel generators embedded into the National Grid (National Grid, 2010[6]), excluding CHPs. There are approximately 1,400 CHP generators in the UK of which 77 per cent use fossil fuels. In addition, there are a large number of smaller electricity generators which might be used permanently or as back-up generators on which no accurate data is held.

Administrative burdens and overall compliance costs for businesses

30 Businesses affected by the proposed changes will incur both one-off transitional costs and continuing costs. Compliance costs and administration burden costs included in this Impact Assessment are our best estimates of costs for typical efficient and compliant businesses. Therefore, we recognise that there will be businesses whose costs are higher or lower than the ones quoted in this document, owing to variations from business to business. Administration burdens are measured by the Standard Cost Model (SCM) (see Annex A). All estimates of costs and benefits quoted are in 2009 prices in order to be consistent with other estimates of costs and benefits within this Impact Assessment.

One-off costs

31 Businesses required to register with HMRC for CCL, as a result of these proposals, and those 245 businesses already registered, would incur compliance costs and administrative burdens as measured by the SCM. These include the one-off costs of familiarisation with the proposed changes and other transitional costs. Up to 50 businesses reclaiming fuel duty on oil used in electricity generation would also need to familiarise themselves with the reduced levels they can claim.

32 The expected one-off compliance and administration costs fall into the following categories:

- a) familiarisation;

[5] *Digest of UK Energy Statistics*, May 2010 http://www.decc.gov.uk/assets/decc/Statistics/source/electricity/dukes5_11.xls
[6] *National Grid 2020*, http://www.nationalgrid.com/NR/rdonlyres/E2823539-1062-4E0B-8B87-B62C52E2FE4A/41473/NETSSYS2010AppendixF.xls

- b) application to register for CCL;
- c) system changes and invoice or energy bill amendments - new rates of CCL; and
- d) CCL supplier certificate requirements - if the carbon price support rates differ from the main CCL rates.

Familiarisation

33 This category considers the time spent by businesses on reading about and understanding the nature of the changes. Those businesses that might need to consider whether they would be required to register for CCL might spend more time than those affected by rate changes only. Businesses that become subject to one or more of the carbon price support rates would need to complete new or replacement PP11 supplier certificates and PP10 supporting analysis forms. Some businesses may consider consulting advisers or other specialists who may add to costs but, for the purposes of this Impact Assessment, such costs are excluded.

34 Overall, the in-house familiarisation cost for a small business is estimated to be less than £100 rising to £500 for a typical larger business.

35 In total, the cost of all in-house one-off familiarisation activities is estimated to be around £90,000 based upon 245 CCL registered businesses and an estimated 100 unregistered businesses that might be affected by these proposals at a rate of £250 per business.

Application to register for CCL

36 The SCM estimates the cost of registering for CCL to be less than £25 per business. In total the administration cost of businesses registering for CCL is estimated to be less than £1,250 based upon an estimated 50 per cent of those 100 unregistered businesses that might be affected being required to register for CCL.

System changes and invoice or energy bill amendments - new rates of CCL

37 To prepare for the carbon price support mechanism, those businesses already registered for CCL and newly registered businesses might need to amend their accounting systems and invoices or energy bills. In particular, a small number of businesses that are energy suppliers of taxable commodities to both electricity generators and other business consumers might need to ensure that their existing accounting systems can process the new carbon price support rates alongside the existing CCL rates.

38 The cost of system changes and invoice or energy bill amendments will vary considerably depending upon the size and complexity of the accounting system and whether the changes are managed in-house or outsourced. Some large utility energy supplies might incur system change costs of up to £50,000 but these costs are difficult to estimate accurately. System changes (assuming replacement systems are not required) include upgrade costs which might also require systematic testing. Smaller businesses are likely to incur substantially lower costs but these might still be significant sums in proportion to their business costs. In total the cost of all system and invoice changes are estimated to be around £1.1 million based upon an estimated ten large suppliers incurring costs of up to £50,000, 15 medium-sized suppliers incurring up to £20,000 and 155 smaller suppliers incurring costs of up to £2,000 each.

CCL supplier certificate requirements

39 Electricity generators, CHPs and auto-generators might need to inform their energy supplier of the carbon price support rates to ensure the supplier charges the correct amount of CCL to them on their invoices or energy bills. This Impact Assessment assumes that this task would be completed using the existing or an amended supplier certificate process. If this process is not considered suitable, alternatives will be explored through this consultation. In certain cases, HMRC has agreed with the trade bodies representing LPG and solid fuel wholesale suppliers that customers may certify relief on these taxable commodities in a less formal way. These agreements might also need to be reviewed.

40 For each taxable commodity, the onus is primarily on the customer seeking the relief to have it applied correctly to their invoice or energy bill and do so by giving a PP11 supplier certificate to their energy suppliers and a copy of the PP11 and a PP10 supporting analysis form to HMRC. The energy supplier would need to amend their customer accounts in order to charge the effective carbon price support rates of CCL and must give HMRC a summary of PP11 certificates received within 90 days of their receipt.

41 It is assumed that the carbon price support rates applicable on supplies of taxable commodities to electricity generators would not be the same as existing CCL rates on supplies to consumers. Unless another alternative proposal is adopted, it would be necessary for generators of electricity in the UK to use the supplier certificate process and comply with the regulations governing its use. It would be necessary for HMRC to redesign these certificates in order to accommodate the proposals. Some generators (for example, electricity power operators and CHP stations) would need to submit amended certificates whilst other generators, including auto-generators, would in most cases have to complete certificates for the first time.

42 Total CCL relief certificate administration costs as a result of the proposed changes are estimated to be £75,000 based upon it costing £50 for 1,500 electricity generators (excluding back-up type generators).

43 The total administration burden for energy suppliers to amend their customer accounts with the carbon price support rates and provide a summary of these to HMRC is estimated to be less than £2,000 based upon 1,500 accounts taking around five minutes to amend at an hourly rate of £15 per hour.

HMRC costs

44 HMRC would incur costs implementing and publicising the changes. Public notices would need to be updated and guidance for businesses and HMRC would need to be written before the changes are implemented. Publication costs would be incurred although HMRC may minimise costs by publishing via the internet and making hard copies available only upon request.

45 New applications for CCL registration would need to be processed and input to the CCL accounting system to ensure CCL returns are issued and payments processed. HMRC might incur costs ensuring that its accounting system could fully support the expected additional registrations and processes, which ensure correct data capture and analysis.

46 New and replacement PP11/10 forms would need to be processed and captured by HMRC. The design of the PP11/10 forms might also require additional data fields to identify the new rates and energy consumption.

47 The total HMRC one-off costs are estimated to be minimal and would be funded from within its existing budget, since they form part of HMRC's routine business of policy development.

Table 3: Summary of estimated administration and compliance one-off costs for businesses (excluding HMRC)

Administrative one-off costs for businesses	Cost
Familiarisation	£90,000
CCL registration	£1,250
Accounting and invoice changes	£1,110,000
Relief certificates	£75,000
Energy suppliers - processing relief certificates	£2,000
Total	£1,278,250

Average annual continuing costs

48 Businesses that have registered for CCL because of the proposed changes would incur continuing administration burdens as a result of complying with the CCL obligations such as record keeping, submitting CCL returns and paying their CCL liabilities.

49 The continuing CCL administration burden (excluding the climate change levy accounting document (CCLAD) obligation) for an average small business is almost £1,000 per year, rising to £1,200 per year for a medium-sized business and £8,500 per year for a large energy utility. This administration burden includes annual information technology (IT) costs: if these are excluded the annual administrative burden for businesses is between £300 per year for a small business and £400 per year for a large business. Of the expected new registrations, few large suppliers are unregistered and others should not incur the administration burdens of a large business. The CCLAD obligation imposes a requirement to include specific information on an invoice or energy bill. Those newly registered businesses that supply taxable commodities to electricity generators will incur a CCLAD administration burden of approximately 20 pence per invoice or energy bill issued. Total administration continuing costs, including IT costs, are estimated to around £60,000 based upon an estimated 50 new registrations at an average annual cost of a medium-sized business of £1,200.

50 Businesses required to complete the PP11/10 forms and comply with the regulations governing their use are required to review their declarations annually and, if necessary, inform HMRC of any under or over payments of CCL. It is not expected that changes as a result of the proposals would affect the annual review and therefore the cost of this is estimated to be minimal. Similarly the cost to energy suppliers informing HMRC of the claimant's relief would be minimal.

51 HMRC would incur continuing costs as a result of the additional CCL registrations and PP11/10 forms which would involve the processing of returns and compliance activities. However, it is expected that these costs would be met from existing resources.

Net Resource costs

52 The proposed measure is expected to bring forward more low-carbon generation capacity (see the 'impacts on electricity sector investment' section). Most low-carbon generation technologies are currently more expensive (on a total cost per unit of electricity generated) than conventional technologies that burn fossil fuels. Therefore, increasing the amount of low-carbon generation increases the total cost of generating electricity in the short and medium-term, though it may help reduce costs in the longer-term. This represents an increased resource cost to society. Indicative estimates of these increased resource costs to

2030 for each scenario are made by DECC/Redpoint Energy and given in the Table 4. The average annual savings for the period 2013-2030 would be between £0.2 billion and £1.4 billion (not discounted).

Table 4: Present value of net increase in resource costs (excluding costs of carbon) of electricity generation: £billion (real 2009 prices)

Time Period (Years)	Scenario one	Scenario two	Scenario three
2013-2030	£2.1bn	£6.1bn	£16.3bn

Source: Department of Energy and Climate Change/Redpoint Energy, 2010

Benefits (to society): traded sector

53 Potential benefits of the proposal, through encouraging more investment in low-carbon generation technologies, include emission savings from the power sector, improved air quality, stimulating technological innovations and spillover effects and reducing longer-term costs of meeting our climate change targets.

54 This section provides initial estimates for some of these benefits, namely carbon savings and air quality impacts, following standard valuation approaches in the Government guidance[7].

55 The large majority (around 98 per cent) of emissions associated with UK electricity generation is covered by the EU ETS, the 'traded sector'. The introduction of UK carbon price support for those electricity generating plants whose emissions are covered by the EU ETS would not directly impact on the Government's ability to meet its carbon budgets, since the effective cap for UK emissions within the EU ETS will not change, but should help meet the UK's long-term emissions reduction target. For example, by encouraging investment in low-carbon generation technologies with long operating lives which in the future might help facilitate the decarbonisation of the heat and transport sectors through increased electrification.

56 Increased decarbonisation of the UK electricity sector would also reduce the amount of EU Allowances (EUAs) purchased by UK generators. Over the period to 2030, carbon price support is expected to reduce emissions from UK electricity generation by a total of 162 million tonnes of carbon dioxide ($MtCO_2$) in scenario one, 261 $MtCO_2$ in scenario two and 536 $MtCO_2$ in scenario three, compared with the baseline. These reductions, when valued at the traded carbon prices, give the monetary value of the reduction in the purchase of EUAs. Valuing the emission reductions to 2030 at the Government's central estimate of traded carbon value and discounting at Green Book rates gives a saving of between £4.9 billion and £12.5 billion in purchases of EUAs (2009 prices). This methodology is consistent with HM Treasury and DECC guidance on valuing emission savings. The average annual savings for the period 2013-2030 would be between £0.5 billion and £1.2 billion (not discounted).

57 The emission savings and their valuation for each of the scenarios across given years up until 2030 are illustrated in Table 5. Valuation of emission savings for 2013, 2020 and 2030 are in real 2009 prices.

[7] *Valuation of energy use and greenhouse gas emissions for appraisal and evaluation*, HMT & DECC, June 2010

Table 5: Value of UK emissions savings: £ billion (real 2009 prices)

		2013	2020	2030	2013-30	2013-30 (PV)
	Carbon Price (£/tCO_2)	14.7	16.31	70	-	-
Scenario one	Emissions Savings (mt/CO_2)	2	-1	30	162	162
	Valuation (£bn)	0	0	2.1	9.1	4.9
Scenario two	Emissions Savings (mt/CO_2)	2	2	31	261	261
	Valuation (£bn)	0	0	2.2	12.8	7.2
Scenario three	Emissions Savings (mt/CO_2)	6	25	38	536	536
	Valuation (£bn)	0.1	0.4	2.7	21.3	12.5

Source: Department of Energy and Climate Change, 2010

58 In addition, a reduction in the use of fossil fuels used for electricity generation would have benefits for air quality. Table 6 provides an estimate.

Table 6: Present value of benefits for air quality: £billion (real 2009 prices)

Time period	Scenario one	Scenario two	Scenario three
2013-2030	£0.4bn	£0.9bn	£2.1bn

Source: Department of Energy and Climate Change and Department for Environment, Food and Rural Affairs, 2010

Non-traded sector

59 Some of the electricity generated in the UK is by plants not covered by the EU ETS and the associated emissions are therefore part of the 'non-traded' sector – i.e. on-site electricity generation by non-EU ETS operators. The carbon price support mechanism would increase the cost of fossil fuels used to generate electricity in the non-traded sector and lead to a reduction in emissions. The non-traded electricity sector is only responsible for around 2Mt/CO2e[8], although this is expected to more than double in the future. However, it is uncertain how these small individual plants would respond and an assessment of the potential reduction in emissions has not been undertaken.

Summary of costs and benefits

60 The individual costs, benefits and Net Present Value for each of the three scenarios across the period are summarised in Table 7. The average annual cost ranges from between £0.2bn to £1.5bn (not discounted) and the average annual benefit ranges from between £0.6bn to £1.4bn (not discounted).

[8] Equivalent carbon dioxide

Table 7: Summary of costs and benefits (2013 to 2030): £billion (real 2009 prices)

	Scenario one	Scenario two	Scenario three
Benefits			
Carbon Savings	£4.9bn	£7.2bn	£12.5bn
Air Quality	£0.4bn	£0.9bn	£2.1bn
Costs			
Resource Costs	£2.1bn	£6.1bn	£16.3bn
Administrative Burden	£0.0bn	£0.0bn	£0.0bn
Net Present Value[9] (Benefits-Costs)	**£3.2bn**	**£1.9bn**	**-£1.7bn**

Impacts on electricity sector investment

61 The impact of supporting the carbon price depends not only on the level of support given, but also crucially on the amount of certainty it provides to investors.

62 In the baseline there is assumed to be considerable uncertainty around the carbon price. Investors are assumed to base their decisions on flat-lining the carbon price at the level prevailing in the year when they make investment decisions. The carbon price support scenarios not only increase the total carbon price but are also assumed to provide greater certainty. Investors are assumed to base their decisions on the combined carbon price level over the five years from the time of the investment decision (after which it is flat-lined).

63 To assess the potential impacts the level of carbon price support is likely to have on investment decisions in the electricity market, analysis has been undertaken using a dynamic model of the Great Britain electricity market developed by Redpoint Energy which simulates investment and generation behaviour. Investment decisions are based on comparing the risk-adjusted long-run marginal costs of all generating technologies by investor type with the expected revenues. This is a simplification of how investment decisions are made in reality and the results presented below should be regarded as purely illustrative of how supporting the carbon price might impact the amount of low-carbon investment.

64 The level of renewable support provided through the Renewables Obligation is set at a level to deliver around 30 per cent renewable electricity generation by 2020 in the baseline – a level consistent with meeting the UK's 2020 renewable energy target - and an indicative level of 35 per cent by 2030. Renewable support is kept at the baseline level across all carbon price support scenarios, meaning that greater amounts of renewable capacity are delivered in the carbon price support scenarios.

65 The assumptions for other key variables affecting investment, namely levelised costs, electricity demand and fossil fuel prices, are consistent with those used for DECC's June 2010 Updated Emissions Projections[10]. Changing these assumptions would have an impact on the modelling results. For example, assuming lower fossil fuel prices would reduce the amount of low-carbon investment (and vice-versa).

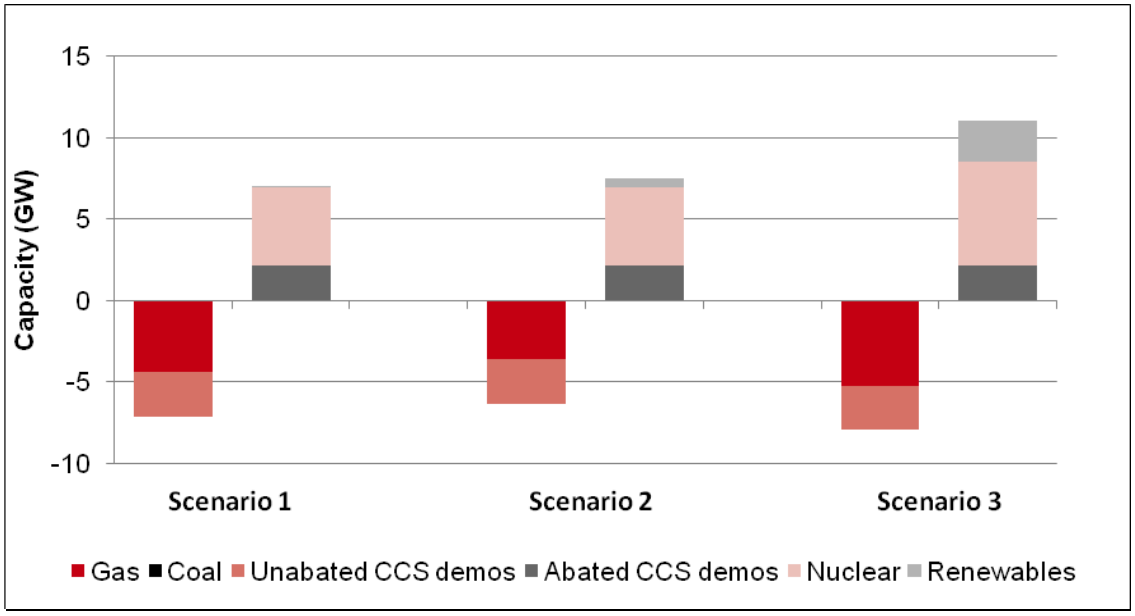
66 The difference in the amount of capacity in each scenario compared with the baseline in 2030 is shown in Chart 2. The impact of the higher and more certain carbon price is to bring forward more low-carbon capacity (renewables, carbon capture storage (CCS) and nuclear). This amount increases the higher the level of carbon price support. In scenario one there is an additional 7.0 gigawatts (GW) of low-carbon capacity by 2030 compared with

[9] Individual costs and benefits may not total the Net Present Value due to the way numbers have been rounded
[10] http://www.decc.gov.uk/en/content/cms/statistics/projections/projections.aspx

the baseline. This rises to 7.5GW in scenario two and 11.1GW in scenario three. In all three carbon price support scenarios the unabated parts of CCS demonstration plants become economic to retrofit with CCS in the 2020s but this does not happen in the baseline.

67 As a result of these increases in low-carbon investment, the average amount of emissions produced per unit of electricity generated falls from 207gCO_2/kilowatt hour (kWh) in 2030 in the baseline to 126gCO_2/kWh in scenario one, then 124gCO_2/kWh in scenario two and 105gCO_2/kWh in scenario three. This compares with around 486gCO_2/kWh in 2010.

Chart 2: Change in capacity mix compared with the baseline in 2030



Source: Redpoint Energy, 2010

68 The amount of gas and coal capacity is lower in the carbon price support scenarios than the baseline in 2030. Coal capacity includes unabated parts of the CCS demonstration plants because it is economically viable to retrofit CCS to some of the originally unabated capacity.

69 In addition, a rise in the carbon price induces a change in the operation of coal and gas-fired plants. Electricity output increasingly switches from coal to less carbon intensive gas-fired generation as the level of carbon price support increases.

Cost of capital

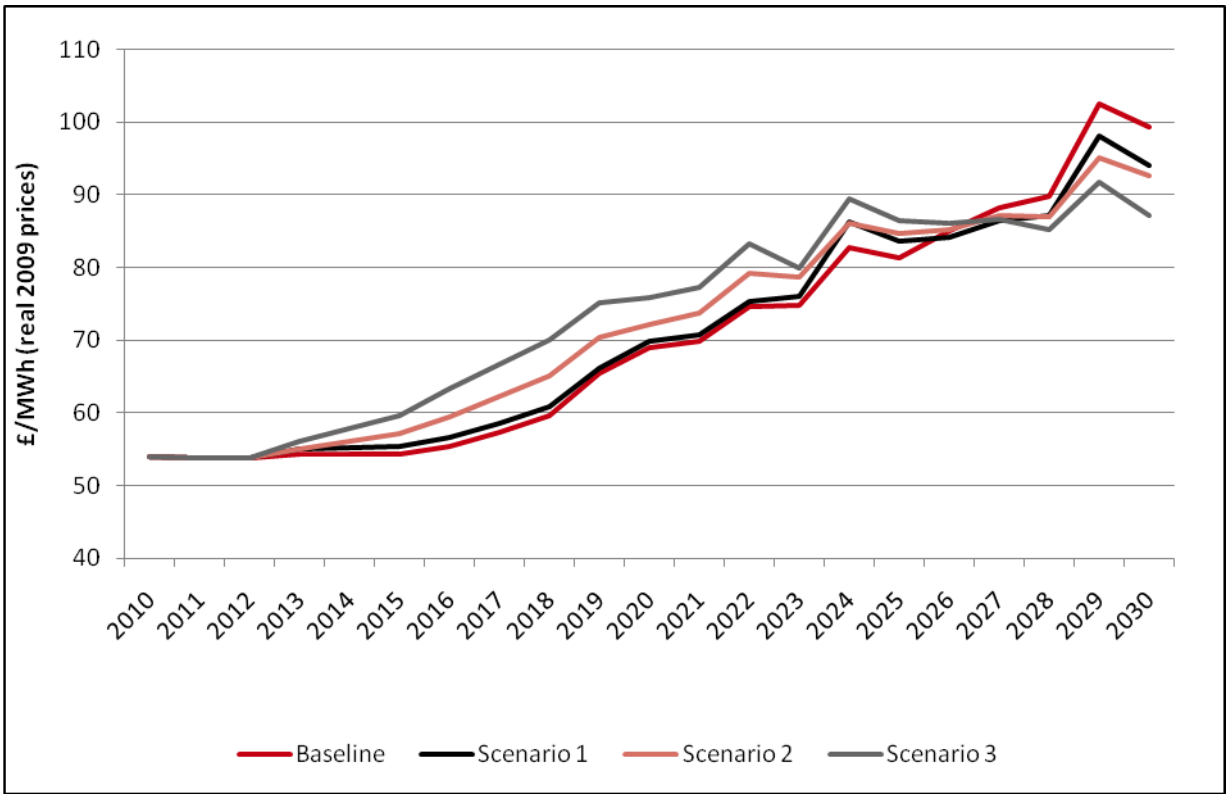
70 The increased investment in low-carbon generation is driven by expectations of higher business revenues, as a result of the higher carbon prices increasing electricity prices. In addition, more certainty of the carbon price and therefore electricity prices are assumed. This reduces revenue uncertainty, so the risk premium is also reduced, therefore lowering the implied cost of capital (hurdle rate) for all technologies (including conventional plants). However, the impact varies across technologies depending on the proportion that the electricity price accounts for of total revenues. For example, in the modelling, carbon price support is assumed to reduce the cost of capital for a biomass plant by 0.3 percentage points and a coal plant with CCS by 0.5 percentage points.

4. WIDER POLICY IMPACTS

Wholesale electricity prices

71 In the Redpoint model the baseload electricity price is a sum of the electricity system short-run marginal cost (which is driven largely by the cost of gas generation but also partly by the cost of gas or coal generation) and an uplift, to reflect the amount of 'spare' capacity (measured by the capacity margin). Chart 3 shows the average (time-weighted baseload) wholesale electricity price under the different scenarios and the baseline.

Chart 3: Time weighted baseload electricity prices (£/MWh, real 2009 prices)



Source: Redpoint Energy, 2010

72 Under the baseline scenario, the wholesale electricity price increases over time to reflect rising fossil fuel prices (particularly gas) and rising carbon prices. Up until 2020, electricity prices in the carbon price support scenarios follow a similar trend as the baseline, but electricity prices are higher as a result of the increased carbon costs for gas and coal plants.

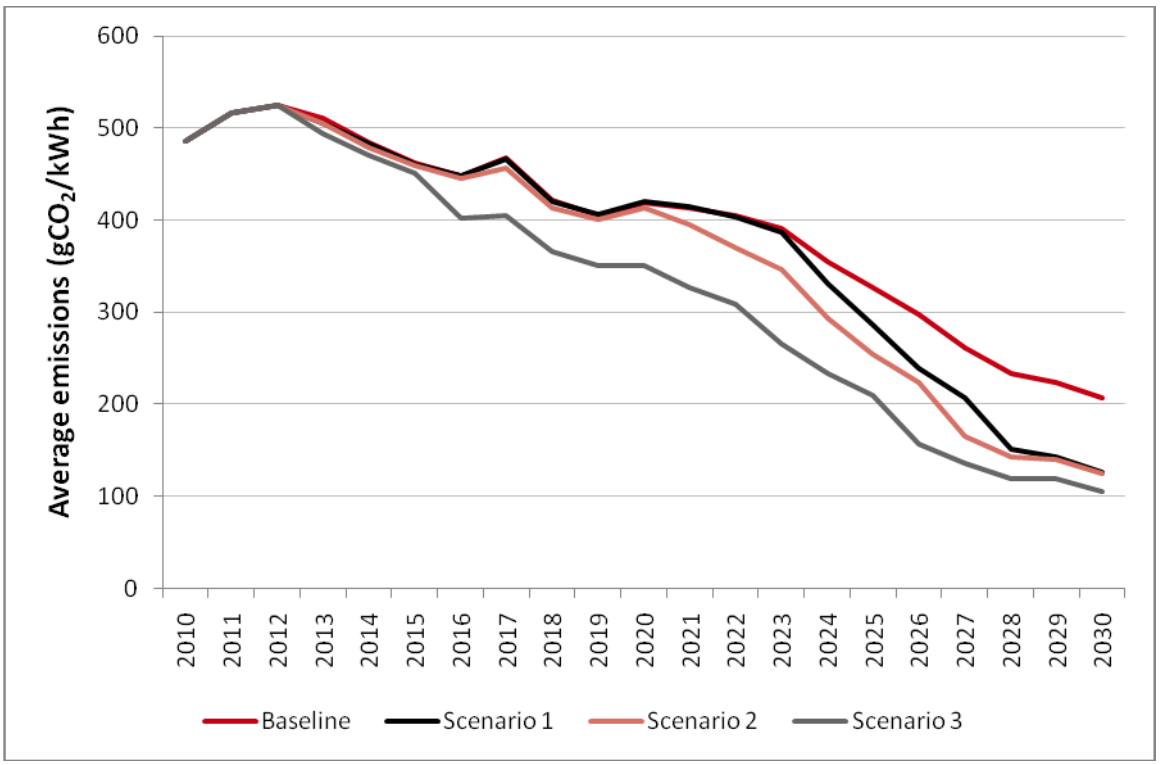
73 In the 2020s, wholesale electricity prices tend to flatten out in the carbon price support scenarios, although prices fluctuate from year to year. By contrast wholesale electricity prices continue to increase in the baseline. As a result, by 2030 prices are higher in the baseline than the carbon price support scenarios.

74 By the late 2020s, there is an increasing amount of low-carbon electricity being generated. This will put downward pressure on wholesale electricity prices. As a result, the overall impact of the carbon price support policy on electricity prices is lower as fewer generators are subject to the carbon price support mechanism. This downward pressure on electricity prices might, in time, reduce incentives for investment in low-carbon electricity generation, which is one of the reasons why the Government is also considering wider reform to the electricity market.

Emissions intensity

75 The average emissions intensity of total electricity generation for the baseline compared with each of the three scenarios is illustrated in Chart 4. In the baseline, average emissions intensity falls from over 500gCO_2/kWh in the early 2010s to around 200gCO_2/kWh by 2030 as coal generation declines and low-carbon generation increases. In scenarios one, two and three emissions intensity falls more sharply than the baseline as a result of greater investment in low-carbon generation technology and, in scenario three, increased switching from coal to gas generation during the 2010s. The greater the level of carbon price support the lower the emissions intensity in 2030, with the result that in scenario three intensity falls to around 105gCO_2/kWh by 2030.

Chart 4: Average emissions intensity of total electricity generation



Source: Redpoint Energy, 2010

Distributional impacts – Businesses

76 Estimates of the impact of carbon price support scenarios on an average medium-sized non-domestic user's electricity bill in 2013, 2016, 2020, 2025 and 2030, in absolute terms and as a percentage change from the baseline electricity bill[11], are set out in Table 8. As with household distributional impacts, this analysis assumes that all carbon price support costs are passed on by electricity generators and the costs of all other policies are unchanged from the baseline scenario[12]. It is also based on DECC's central fossil fuel price assumptions[13].

77 The higher the level of the carbon price support the larger the impact on electricity bills. However, in the late 2020s the impact on bills is negative – i.e. electricity bills are lower in the carbon price support scenarios than in the baseline scenario. This is because the

[11] The policies assumed to be active and unchanged across all scenarios are the climate change levy, Renewables Obligation, EU Emissions Trading System, Products Policy, carbon capture and storage levy, feed-in-tariffs, carbon reduction commitment and climate change agreements. This analysis does not include any other changes to policies resulting from announcements in the Spending Review.

[12] In reality we might expect the cost of certain policies designed to encourage investment in low-carbon electricity generation, such as the Renewables Obligation and carbon capture and storage levy, to fall under higher carbon prices, counteracting some of the direct impact of this policy on energy bills.

[13] http://www.decc.gov.uk/assets/decc/statistics/projections/file51365.pdf

increased amount of low-carbon generation, which has very low short-run marginal costs, puts downward pressure on wholesale electricity prices.

Table 8 Impact on average medium-sized non-domestic user's electricity bill [14] (real 2009 prices)

Year	Scenario one	Scenario two	Scenario three
2013	1%	1%	2%
2016	1%	4%	8%
2020	1%	3%	6%
2025	2%	2%	4%
2030	-3%	-4%	-8%

Source: Department of Energy and Climate Change, 2010

78 Other things being equal, the average medium-sized non-domestic user's annual electricity bill is estimated to increase by between 1 per cent and 2 per cent in 2013, moving to between 1 per cent and 6 per cent in 2020, compared with the baseline. However, by 2030 bills are estimated to be between 3 per cent and 8 per cent lower than in the baseline scenario. The increase in prices above the baseline falls from around 2018 as a greater proportion of low-carbon generation begins to influence the wholesale price.

Carbon leakage and competitiveness

79 A key concern when considering the impact on businesses is competitiveness and the risk of carbon leakage – the relocation of investment or production to countries without carbon constraints – resulting in an overall increase in global emissions and a loss of employment and economic activity for the carbon constrained economy. The impacts on competition from supporting the carbon price are likely to be more severe for energy (specifically electricity) intensive sectors and particularly those that are trade intensive and therefore subject to a high degree of international competition.

80 The published evidence on carbon leakage for the costs of the EU ETS suggests that it is a significant issue for a limited number of sectors. A range of consultants and academics have considered this question (for example, Climate Strategies[15], Oko Institute[16]), and have come to the same conclusion.

81 Carbon leakage can occur as a result of either direct emissions (an installation's own process and combustion emissions) or indirect emissions (the carbon cost that passes through to end consumers in electricity prices). The carbon price support scenarios might lead to increases in average non-domestic retail electricity prices of between 1-2 per cent in 2013 and 1-6 per cent in 2020. This is likely to have a significant impact on a small, but important number of energy intensive sectors in the UK.

82 The Department for Business, Innovation and Skills and DECC are working on a joint project looking at the cumulative impact of energy and climate change policies on energy intensive industries in the UK. The research will be used to advise Ministers on how to decarbonise the economy while maintaining the competitiveness of these industries.

[14] Non-domestic energy consumers include industry, transport, public administration, commercial and agricultural industries. A medium-sized gas user is defined by an annual consumption of between 2,778 and 27,777MWh of gas. A medium-sized electricity user is defined by an annual consumption of between 2,000 and 19,999MWh of electricity. The mid-points of these ranges have been used for this analysis.
[15] *Leakage in a world of unequal carbon prices*, Climate Strategies, Droge et al (2009); *Differentiation and Dynamics of EU ETS Industrial Competitiveness Impacts*, Climate Strategies, Hourcade et al (2007.
[16] *Impacts of the EU Emissions Trading Scheme on the Industrial Competitiveness in Germany*, Oko Institute, Graichen et al (2008).

Sectoral impact

83 Based on initial analysis of energy and trade intensity, the Government considers that the sectors most impacted by carbon price support, taking into account the existing CCL, are as follows:

- aluminium production;
- cement production;
- chemicals-industrial gases, fertilisers;
- clays and kaolin;
- glass manufacture;
- iron and steel manufacture;
- lime production;
- malt production;
- non-woven textiles; and
- paper manufacture and woodboard manufacture.[17]

84 There might be a reduction in profit margins for these sectors, assuming businesses cannot pass on the extra electricity costs they face and have to absorb them entirely. In reality, businesses are likely to pass on some of these costs to consumers and the effect on their profit margins might be smaller.

85 The three carbon price scenarios will have varying impacts on electricity prices faced by industry. Electricity prices increase from the baseline levels in most years then decrease in later years.

86 The extent to which the operating costs and profits are likely to be affected by the proposed policy change depends on market and industry structures. Wider impacts concerning competitiveness, imports and exports are discussed in further detail below.

Fuel switching

87 Other things being equal, an increase in the cost of electricity from fossil fuels relative to other sources of energy supply could encourage some switching where the alternative source of energy is considered more economic. Where this involves switching to the direct use of fossil fuels for users who are not part of the EU ETS, then this will increase emissions in the non-traded sector. For example, companies (in the paper, print, publication and textiles industries) that require bulk heat for drying in their processes and currently use electricity to produce this heat, might be incentivised to switch to using gas to generate this heat, particularly over the long term. There are also implications for the take-up of low-carbon technologies that require electricity supply for their operation – for example, ground source heat pumps and electric vehicles.

Imports and exports

88 The importation and exportation of electricity is limited by the current capacity of interconnections to around 3 per cent of total UK generation capacity[18]. In practice, the majority of imported electricity is derived from nuclear power stations in northern France (via

[17] It is recognised these are distinct sectors, however there is some similarity in their use of raw materials and woodboards are a very small sector, therefore for the purpose of this list, they have been grouped together.

[18] In 2009, net imports of electricity accounted for less than 1 per cent of total UK electricity supply.

a 2000MW interconnector). There is a further interconnector for electricity traded between Northern Ireland and Ireland (600MW), which currently results in a net export of electricity to Ireland[19]. Since 1 November 2007, there has been a single electricity market in Ireland and Northern Ireland with the trading of wholesale electricity carried out on an All-Island basis. By 2012, interconnection capacity for the UK electricity market is expected to increase by around 1500MW, with new links to the Netherlands and Ireland. By 2020, capacity could increase by a further 4000MW.

89 Supporting the carbon price would increase costs for UK electricity generators using fossil fuels and increase UK wholesale electricity prices, relative to outside the UK. Other things being equal, this would increase the incentive for importing electricity into the UK and reduce incentives to export electricity outside the UK. The higher the level of carbon price support the stronger these incentives. However, we do not envisage that increasing the proportion of electricity imported into the UK through supporting the carbon price would have significant implications for the operation of the UK electricity market or for the security of UK electricity supply.

Distributional impacts – Individuals and Households

Electricity bills

90 Estimates of the impact of the carbon price support scenarios on an average household electricity bill (see Annexes for the definition) in 2013, 2016, 2020, 2025 and 2030 (inclusive of VAT at 5 per cent) are shown in Table 9. This analysis assumes that the costs of all other policies (such as the Renewables Obligation) are unchanged from the baseline. In reality, supporting the carbon price would lower the cost of some other policies designed to support low-carbon investment, thereby reducing the overall impact on bills. This is because when the electricity price is higher, technologies such as renewables need a lower level of support through other mechanisms, such as the Renewables Obligation. As with the impact on non-domestic users, the higher the level of carbon price support the greater the impact on household electricity bills and this impact becomes negative in the late 2020s as increasing amount of low-carbon generation puts downward pressure on wholesale electricity prices (compared with the baseline scenario).

Table 9: Potential impact on average household annual electricity bill (in real 2009 prices) (£ per year)

Year	Scenario one	Scenario two	Scenario three
2013	1% (£2)	1% (£2)	2% (£7)
2016	1% (£4)	3% (£14)	6% (£28)
2020	1% (£3)	2% (£11)	5% (£23)
2025	1% (£8)	2% (£12)	3% (£18)
2030	-3% (-£20)	-4% (-£26)	-7% (-£48)

Source: Department of Energy and Climate Change, 2010

91 Other things being equal, average household annual electricity bills increase by between £2 (1 per cent) and £7 (2 per cent) in 2013, rising to between £3 (1 per cent) and £23 (5 per cent) in 2020 compared with the baseline scenario. The impact on bills is lower from 2020

[19] There is also a 500MW interconnector that links Scotland to Northern Ireland.

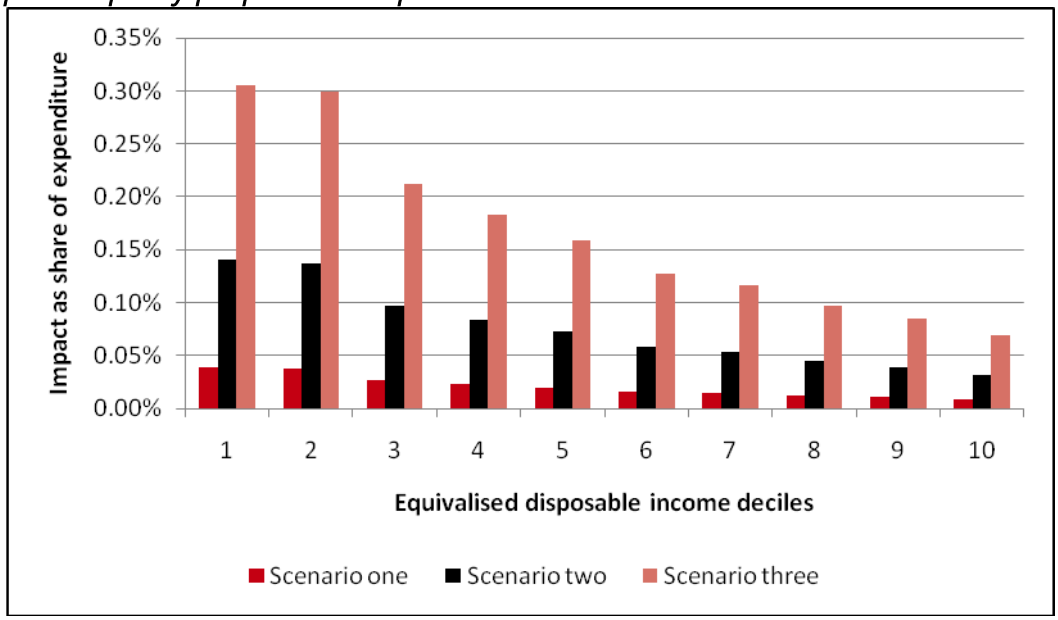
because of the profile of wholesale electricity prices in Chart 3. To put this into context, retail electricity prices have risen on average by 7 per cent since April 2010.

92 Post 2020, the impact on retail electricity bills is more uncertain, but the electricity wholesale prices in Chart 3 suggest that, relative to the baseline, the impact of the carbon price support scenarios would mean lower household electricity bills from the mid-2020s compared with the baseline scenario. By 2030, bills could be between £20 (3 per cent) and £48 (7 per cent) lower than in the baseline.

93 Distributional analysis gives a better idea of the affordability of the impact for different households by looking at the increase in the energy bill as a percentage of expenditure (in addition to the absolute and percentage increase in the bill). Households with higher levels of electricity consumption will face a larger bill increase from the same increase in price. However, poorer households, although facing a lower absolute increase in their electricity bill due to lower levels of consumption, will expend a larger proportion of their expenditure on electricity compared with the baseline.

94 Distributional analysis of expenditure shows that in 2020 the average household in the bottom two income deciles is estimated to spend an extra 0.04 per cent of its expenditure on electricity in scenario one compared with the baseline (Chart 5). By contrast, the average household in the top income decile is estimated to spend an extra 0.01 per cent of its expenditure on electricity after taking into account other climate change policies.

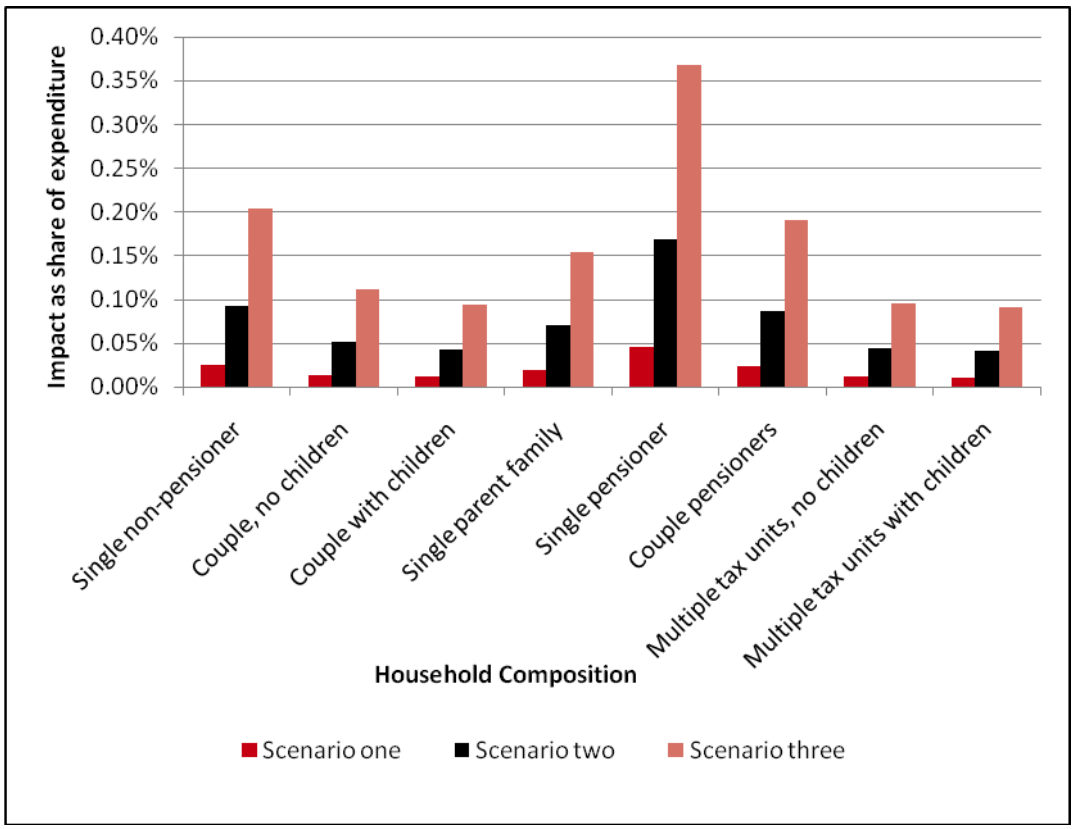
Chart 5: Impact of policy proposal on expenditure across income deciles in 2020



Source: Department of Energy and Climate Change, 2010

95 The bills impact in 2020 across different household compositions is shown in Chart 6. The impact in terms of share of expenditure spent on electricity is greatest for single pensioners who would spend an extra 0.05 per cent of their expenditure on electricity in scenario one, 0.17 per cent in scenario two and 0.37 per cent in scenario three. These levels will vary for different households.

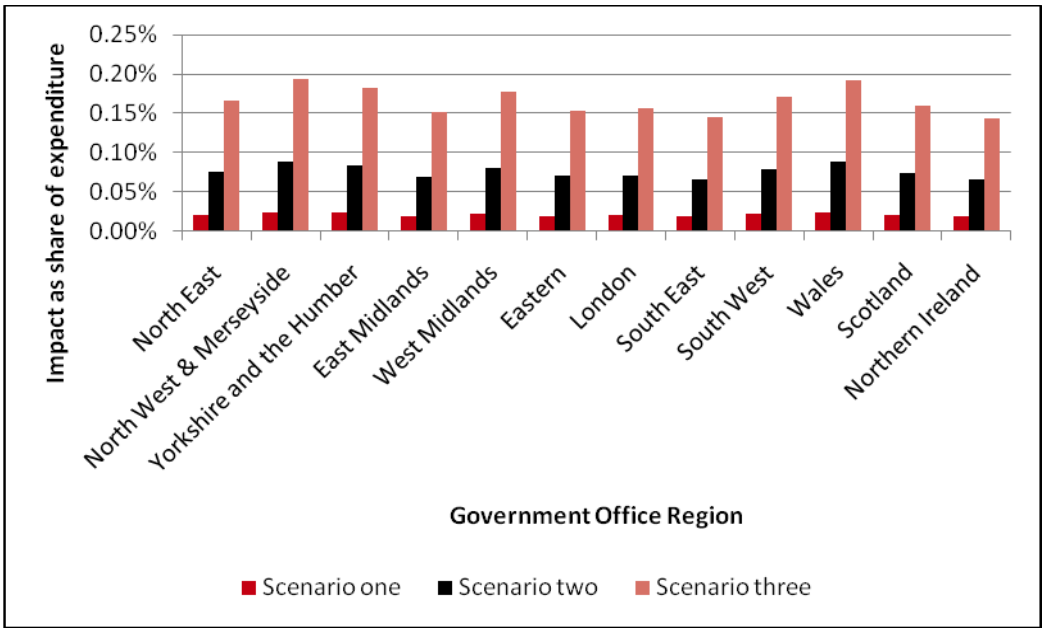
Chart 6: Impact on bills in 2020 across households



Source: Department of Energy and Climate Change, 2010

96 The impact, in terms of share of expenditure spent on electricity in 2020 varies across regions. The greatest bills impact would occur in Wales and North West & Merseyside where households would spend an extra 0.02 per cent of their expenditure on electricity in scenario one, 0.09 per cent in scenario two and 0.19 per cent in scenario three.

Chart 7: Impact on electricity expenditure in 2020 across regions



Source: Department of Energy and Climate Change, 2010

Fuel poverty

97 Estimates of the impact on fuel poverty, as defined for the purposes of the Warm Homes and Energy Conservation Act 2000, in England under each scenario in 2013, 2016 and 2020 are shown in Table 10. The number of households in fuel poverty in England is currently projected to be 4 million in 2010 (DECC, Fuel Poverty Statistics, 2010). Fuel poverty is defined as households who spend at least 10 per cent of their income on fuel in order to achieve an adequate standard of warmth (21˚ Celsius in the main living area, 18˚ Celsius elsewhere).

Table 10: Increase in fuel poverty (number of households) in England per year

	Scenario one	Scenario two	Scenario three
2013	10,000 – 20,000	10,000 – 20,000	30,000 – 60,000
2016	20,000 – 40,000	80,000 – 110,000	140,000 –225,000
2020	10,000 – 20,000	50,000 – 90,000	100,000 – 200,000

Source: Department of Energy and Climate Change, 2010

98 The above table shows the impacts of the carbon price support mechanism but does not take into account potential reductions in fuel poverty from other Government policies. The Government is committed to reducing fuel poverty and supporting vulnerable consumers, as far as is reasonably practicable, as well as ensuring secure and affordable energy supplies. On its own, an increased wholesale electricity price would tend to increase the risk of fuel poverty for some households. But it is important to consider the effects of Government's policies as a whole against these aims, rather than each in isolation.

99 The Spending Review committed the Government to a substantial and coherent set of measures to address fuel poverty. Social Price Support is being expanded and put on a mandatory basis to assist vulnerable households with their energy bills and will be worth £310 million a year by 2014-15. The Energy Company Obligation will supersede the Carbon Emissions Reduction Target scheme and work alongside the Green Deal to focus additional support on those most vulnerable to fuel poverty. Without any action, the Government could not meet its objectives for secure and low-carbon energy or for protecting consumers and those vulnerable to fuel poverty. Through implementing both the measures put forward in this consultation and those being introduced to address fuel poverty, the Government can make progress on both objectives.

Interactions with other policies

100 Analysis is needed to assess the interaction of supporting the carbon price with other policies and reforms that are also seeking to improve the investment case for low-carbon energy technologies, as well as those aimed at improving energy efficiency and also security of supply. In particular, the Government is considering how this policy interacts with the wider set of reform options in the electricity market reform consultation (including feed-in tariffs for low-carbon generation, emissions performance standards and security of supply guarantees). The Government is publishing a consultation on these reforms alongside the carbon price support consultation and this will include such an assessment.

101 Combining a carbon price support mechanism with other policies, such as feed-in tariffs, could reduce the overall costs to the economy of supporting additional low-carbon generation investment. As such, some of the impacts outlined in the above sections could be smaller in a combined package of options. This issue is explored in more detail in the consultation on wider electricity market reforms.

EU ETS carbon price

102 If the EU adopts a 30 per cent EU ETS emission cap (from the current 20 per cent), the carbon price will increase. This would have implications for the rates at which fossil fuels used to generate electricity could be taxed under the proposal in this consultation in order to maintain a 'target price' for carbon.

Climate change agreements

103 The Government announced in its Annual Energy Statement that it is reviewing the future of climate change agreements which currently grant an 80 per cent (65 per cent from 1 April 2011) reduction on CCL if eligible sectors meet energy efficiency targets agreed with the Government. The review will take account of the carbon price support proposals made in this consultation paper and the responses to consultation. More details will be published in due course.

5. SPECIFIC IMPACT ASSESSMENTS

Competition assessment

104 The proposals relate to all UK electricity generators (whether existing or new) and do not directly limit their number or range.

105 The proposals would increase the cost of fossil fuels, according to their carbon content, used to generate electricity in the UK. While the proposals would apply equally to all electricity generators, this would change the costs of some existing electricity generators compared with others, depending on their mix of electricity generating technologies. However, given that generating companies typically have a mixed generation portfolio and that the option to invest in alternative forms of generation is open to them, the proposal should neither limit their number or their ability to compete. Indeed, providing greater certainty over the future carbon price should make new entry into the generation market easier by reducing the cost of capital and expanding the range of finance available.

106 The proposals would also raise electricity prices for UK businesses that consume electricity. For most businesses/sectors the increase in costs will be a small proportion of total costs and should not therefore limit their number or ability to compete. For those sectors where electricity costs are a significant proportion of total costs, all businesses in the sector have the same opportunities to reduce the impact of the proposal on their costs. The proposal should not therefore limit their ability to compete with each other.

107 The proposals do not involve a change to the mechanisms through which electricity is bought or sold and should not therefore reduce the incentives for UK electricity generators to compete with each other. Imports of electricity may become more competitive and some consumers may switch to using other fuels. However, the impact on competition is unlikely to be appreciable due to the modest share of the market these are ever likely to represent.

Small firms impact test

108 Some small businesses might be affected by the proposals, as the transitional compliance costs might represent a slightly higher burden relative to larger businesses as a percentage of their fixed operating costs. However, arrangements for smaller businesses should be less complex than those of larger businesses. This should mean that less time is spent on the transitional compliance burdens and therefore we would not expect them to incur any material disadvantage implementing this change relative to larger businesses.

109 See distributional impact analysis (section 76 – 89) for potential impacts on electricity bills.

Legal aid

110 No new criminal sanctions or civil penalties would be introduced as a result of this change. Businesses registered for CCL and relief recipients would be required to comply with the existing CCL legislation and regulations.

Sustainable development

111 We expect that this change will contribute to the Government's commitment to sustainable development, which consists of five principles:

- living within environmental limits;
- ensuring a strong, healthy and just society;
- achieving a sustainable economy;
- promoting good governance; and
- using sound science responsibly.

Carbon assessment

112 See paragraphs 53-58.

Other environment

113 A reduction in the use of fossil fuels used for electricity generation would have benefits for air quality. The discounted value for improvements in air quality throughout 2013-2030 range between £0.4 billion in scenario one and £2.1 billion in scenario three (see Table 6). The proposal would have little other overall environmental impact although the transitional costs might generate a small amount of paper waste and additional atmospheric emissions from the paper consumption and transport requirements.

Health impact

114 The reform would not be expected to have any negative impact on health, well-being or health inequalities. An improvement in air quality is likely to have a positive health impact, the extent of which has not been quantified.

Race, disability and gender equality

115 The proposed changes to the CCL exemptions and amount of fuel duty reclaimable would impact directly upon fossil fuel suppliers and electricity generators. The distributional analysis in this Impact Assessment (section 90 – 99) illustrates the impact upon bills and specifically fuel poverty. An initial assessment of relevance ascertained that additional Equality Impact Assessment work needs to be carried out and a full Equality Impact Assessment will be prepared and published following this consultation.

116 The Government is committed to focusing the available resources where they will be most effective in tackling the problems underlying fuel poverty. The Spending Review announced the intention to initiate an independent review of the fuel poverty target and definition before the end of the year.

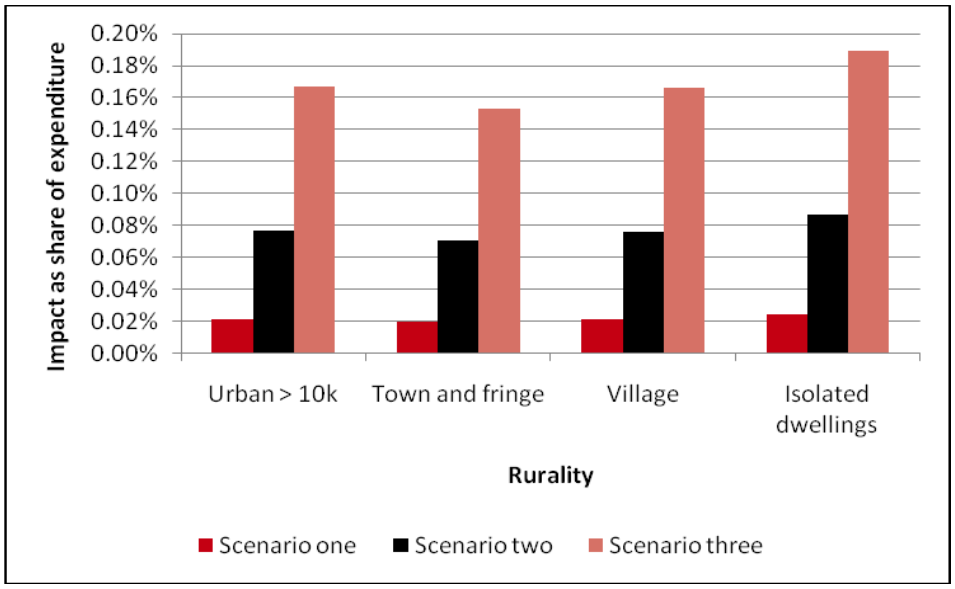
Human rights

117 After initial screening, we identify that the new process does not impact upon human rights.

Rural proofing

118 The impact of electricity bills as a share of expenditure categorised by rurality for each of the scenarios in 2020 is presented in Chart 8. The greatest impact would occur in isolated dwellings where households would spend 0.02 per cent of expenditure on electricity in scenario one, 0.09 per cent in scenario two and 0.19 per cent in scenario three.

Chart 8: Impact on electricity expenditure by dwelling



Source: Department of Energy and Climate Change, 2010

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	Yes	No
Sustainable Development	Yes	No
Carbon Assessment	Yes	No
Other Environment	Yes	No
Health Impact Assessment	Yes	No
Race Equality	Yes	No
Disability Equality	Yes	No
Gender Equality	Yes	No
Human Rights	Yes	No
Rural Proofing	Yes	No

Annexes

Annex A: The 'Standard Cost Model' (SCM)

1) The 'Standard Cost Model' (SCM) has been used to derive an estimate of the costs to business of complying with obligations to disclose information to HMRC or to third parties. The SCM considers which activities a business has to undertake to comply with HMRC obligations and requirements, how many businesses have to comply, and how often they need to comply. The SCM considers the burdens which apply to different sizes of business and whether they outsource their compliance activities. It also differentiates between businesses which use e-solutions and those which do not.

2) The SCM estimates the costs of using agents and other external providers; the costs of undertaking work in-house, using a pre-defined set of activities; and the costs of actually transmitting the information. The SCM does not consider one-off costs or the transitional costs arising from a change in policy. The SCM does not consider costs which a business would have incurred anyway had the relevant HMRC obligation or requirement not existed. It considers the costs which apply to a normally efficient business. The SCM does not consider any wider compliance cost issues, such as the costs of business uncertainty or cash flow costs. The SCM figures in this Impact Assessment are based on wage rates, prices and populations which existed in May 2005 and uplifted to 2009 prices.

Annex B: Distributional Impact Analysis: Methodology

1) The absolute bill impact for the distributional analysis was estimated as the change in wholesale prices due to the carbon price support (including the carbon price component) multiplied by final electricity consumption (and 5 per cent VAT for domestic customers).

Assumptions

2) The analysis:

- was based on DECC's fossil fuel price scenario consistent with an oil price of around $80 per barrel in 2020; and
- assumes no elasticity impacts – i.e. it does not include a second round effect of reduced electricity consumption as a result of higher prices.

Average household definition

3) For the estimated impacts on average households electricity bills, the 'average household' is not a definition related to anything other than energy consumption. Total electricity consumption from the Digest of United Kingdom Energy Statistics (DUKES) has been divided by the number of households to get average consumption per household before applying the impacts of policies.

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This document can be found in full on our website at:
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ISBN 978-1-84532-782-8