EXPLANATORY MEMORANDUM TO

THE RENEWABLES OBLIGATION (AMENDMENT) ORDER 2010

2010 No. 829

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

This memorandum contains information for the Joint Committee on Statutory Instruments.

2. Purpose of the instrument

2.1 The Renewables Obligation (the "RO") is the Government's main policy measure to encourage the development of electricity generation capacity using renewable sources of energy in the UK. The Renewables Obligation (Amendment) Order 2010 ("this Order") amends the Renewables Obligation Order 2009 (SI 2009/785) (the "2009 Order"). The RO is enshrined in legislation by the 2009 Order and sections 32 to 32M of the Electricity Act 1989.

2.2 To meet our challenging 2020 renewable energy targets, we need to increase deployment of renewable generation capacity in the UK. This Order introduces changes to extend and modify the RO, helping drive greater deployment of renewable generation. This includes extending the RO end date an extra 10 years to 2037; removing the 20% cap on the Obligation; and increasing headroom to 10% from 2011. It also increases the level of support for new offshore wind generation that meets specific criteria following evidence that costs have risen. Finally it makes provision for certain micro and other generators who will be covered by a new mechanism – a 'Feed in Tariffs' scheme from April 2010.

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

3.1 The Joint Committee should note that while this instrument applies to England and Wales, there are complementary Orders in Scotland and Northern Ireland which together in effect create a UK RO. This Order amends some provisions in the 2009 Order which deal with the RO in a UK context.

3.2 The European Commission are in the process of assessing the Order for the purpose of providing state aids approval. We anticipate that we will receive this approval before the Order is made.

3.3 As set out at 7.6, below, some of the provisions in this Order relate to the new Feed-In Tariffs (FITs) scheme which the Government is proposing to introduce for small-scale low-carbon electricity generation. The FITs scheme will be made under the powers in sections 41 to 43 of the Energy Act 2008, and is intended to come into force on 1st April 2010. The Government is to publish its response to the FITs scheme consultation exercise on 1st February. This Order amends the 2009 Order to deal with certain generators who, in the absence of provision to the contrary, would be entitled to receive ROCs and FITs in respect of the same electricity from 1 April 2010. The terms of the FITs scheme will be finalised shortly, and the amending provisions of this Order anticipate those terms. Once the FIT scheme is finalised, we will review the provisions of this Order to ensure they work as intended.

3.4 The Joint Committee may also want to be aware of two other major policies reflected in this Order, namely the introduction of a 20 year limit on support under the RO and the increase in support for offshore wind. In relation to the former, a station is normally entitled to ROCs for 20 years from the date the station is accredited. In addition, however, a generating station can benefit from a further period of support by increasing the size of the generating station. In this event electricity generated using that additional capacity is entitled to 20 years' support from the date the capacity first forms part of the station. What in any given case constitutes a generating station

and the capacity of that station is a question of fact which falls to the Authority, as the body required to administer the RO, to determine. Equally, it is a question of fact for the Authority to determine the date on which capacity first forms part of a station and, in the case of offshore wind generating stations, when a wind turbine forms part of the station in order to benefit from the increase in support.

4. Legislative Context

4.1 This Order is made under Electricity Act 1989 (the Act) as amended by Section 37 of the Energy Act 2008.

4.2 Under section 32 of the Act, Scottish Ministers make any Renewables Obligation Order for Scotland. To date this has been made in terms virtually identical to the England and Wales Order. It is intended that a new Renewables Obligation Scotland Order, to complement this Order, will come into force on the same date as this Order.

4.3 Articles 52-55 of the Energy (Northern Ireland) Order 2003 (2003 No 419, NI 6) substituted by the Energy (Amendment) Order (Northern Ireland) 2009 (S.R. 2009 No. 35) replicate the provisions of sections 32 to 32M of the Act. A Northern Ireland Renewables Obligation Order (the "NIRO") will be made on the back of these powers. It is intended that this order will come into force on the same date as this Order.

5. Territorial Extent and Application

5.1 This instrument applies to England and Wales.

5.2 Similar Orders will be laid before the Scottish Parliament and the Northern Irish Assembly.

6. European Convention on Human Rights

6.1 Lord Hunt, Minister of State for the Department of Energy and Climate Change has made the following statement regarding Human Rights:

In my view the provisions of the Renewables Obligation Order 2009 are compatible with the Convention rights.

7. Policy background

- ***What is being done and why***

7.1 The EU Renewable Energy Directive 2009 set binding targets for Member States to source a proportion of their total energy from renewable. The UK Renewable Energy Strategy published in July 2009 set out the UK's Action plan for achieving our target of sourcing 15% of our total energy from renewables by 2020. The central scenario for the breakdown of this target between heat, electricity and transport proposes that around 29% of our electricity will need to come from large scale electricity generation. The reforms are necessary to modify and extend the RO to help drive the increased deployment needed to meet these targets.

7.2 This Order amends the 2009 Order introduced 1 April 2009.

7.3 Articles 3-7 amend Part 2 of the 2009 Order which sets out how the Obligation is calculated. Following adoption of the EU 2020 renewables energy targets, which will require renewable electricity generation to increase beyond 20% of total electricity, we have removed the 20% cap on the size of the Obligation. We have also increased the level of headroom (the set margin between predicted demand and supply of ROCs) from 8% to 10% from 2011 to mitigate the risk of a price crash

7.4 Article 8 introduces new articles 17A – 17E. 17A limits support to a maximum of 20 years in light of the extension of the Renewables Obligation to 2037. 17B – 17E enables the transfer of stations with a capacity of up to 5MW meeting specific criteria to the proposed new feed-in tariff regime.

7.5 The extension to 2037 was announced in the 2008 Pre-Budget Announcement, with the intention of giving investors certainty of a return on their investment necessary to incentivise them to invest in new generation up to 2020. The limit on support to a maximum of 20 years was introduced to avoid overcompensation resulting from the extension. Articles 15 and 17 make amendments to Schedules 1 and 3, which enable the Renewables Obligation to continue to operate until 31 March 2037.

7.6 The FIT regime meets a Government promise made during the passage of the Energy Act 2008 to introduce a scheme for electricity generation under 5MW. The FIT is expected to be introduced in Great Britain (but not in Northern Ireland) from 1 April 2010. Articles 17B – 17E provide transitional arrangements for existing and new stations. Article 17B removes all microgenerators eligible for FITs from the ROO, whilst 17C-17D gives certain small generators a choice between the FIT and the RO. Article 14 makes a consequential amendment made necessary by the above new Articles.

7.7 Article 9 amends the banding for new offshore wind generation meeting specific criteria. As announced in Pre-Budget 2009, following the outcome of an early review of the banding for offshore wind, we decided to increase the level of support to offshore wind from 1.5ROCs/MWh to 2ROCs/MWh for stations accredited between April 2010 and March 2014. The increased support is also available where capacity is added to a station in that period.

7.8 Articles 10 and 11 cover the circumstances where ROCs can be revoked or withheld. This was in response to requests from industry for greater clarity about when ROCs which had been presented by suppliers could be revoked by Ofgem where it has been determined that they were incorrectly issued.

7.9 Article 12 expressly provides that where a supplier fails to make a late payment by the required date they have not discharged their Obligation (so Ofgem may launch enforcement action).

7.10 Article 13 excludes electricity generated from sewage gas or landfill gas from being required to provide sustainability reporting information, given the nature and source of the biomass content of each.

7.11 Article 16 includes definitions of dedicated biomass with CHP and dedicated energy crops with CHP generation types not included in the 2009 Order.

7.12 Article 18 makes minor amendment to Schedule 4 to remove unnecessary references to the Northern Ireland authority.

8. Consultation outcome

8.1 The Electricity Act requires us to consult, before the Order is made, with certain bodies, including Ofgem, electricity suppliers and generators of electricity from renewables sources. We carried out an extensive consultation exercise between July 2009 and October 2009 with over 150 responses received. Industry feedback has been positive and they have generally been supportive of our policy changes. A summary of responses can be found in the Government Response at http://www.decc.gov.uk/en/content/cms/consultations/elec_financial/elec_financial.aspx.

9. Guidance

9.1 We have included with the Order Explanatory Notes which provide guidance on individual clauses. Ofgem, who administer the RO, publish guidance documents for different categories of generator wishing to benefit from the RO.

10. Impact

10.1 An Impact Assessment is attached.

10.2 The Renewables Obligation applies to:

- businesses which are licensed suppliers of electricity;
- businesses which generate eligible renewable electricity;
- charities, voluntary bodies, or the public sector to the extent they act as either generators of eligible renewable electricity or as licensed suppliers.

10.3 While there is some cost to individual businesses of producing their certificates to Ofgem, or of claiming their certificates we believe that it is commensurate with the reward achieved, and no more than is proportionate and appropriate.

10.4 The Renewables Obligation is administered by Ofgem, it therefore imposes a number of duties on the Authority with associated costs. There is provision in the Order to allow for these costs to be met from monies paid into the buyout fund. Where these monies are not sufficient then the Department of Energy and Climate Change, the Scottish Executive and the Northern Ireland Assembly will make up the shortfall.

10.5 The Renewables Obligation will also have an impact on consumers, as costs to licensed suppliers are expected to be passed on. Modelling indicates this should not be a significant increase on those costs expected under the 2009 Order – but that the amount of renewable electricity generated should be significantly greater.

11. Regulating small business

11.1 The legislation applies to small business. Most affected small businesses (including firms employing up to 20 people) and householders are likely to operate generators with a declared net capacity of less than 50 kilowatts. DECC is in the process of introducing a feed-in tariff for new generation under 5MW in Great Britain Existing generation eligible for a feed in tariff under 50kW will be transferred to the new scheme once it is operational. Existing generation between 50kW and 5MW will remain in the RO, but new generation of this size (accredited after 15 July 2009) will be given a one off choice between the RO and the FIT.

12. Monitoring & review

12.1 The Government has undertaken to carry out reviews of the Banded RO on an agreed timetable. The first two reviews will take place in time for any changes to the banding levels to be introduced on 1st April 2013 and 1st April 2018.

12.2 The Government will continue to monitor the performance of the RO and liaise closely with Ofgem on issues relating to the administration of the RO and compliance with it.

12.3 It is expected that a new Order will be introduced for 1 April 2011.

13. Contact

Kathryn Wood at the Department of Energy and Climate Change, Tel: 0300 068 6158 or email: Kathryn.Wood@DECC.gsi.gov.uk can answer any queries regarding the instrument.

Summary: Intervention & Options

Department /Agency:	Title:	
DECC	Impact Assessment accompanying the Renewables Obligation Order 2010 (URN 09D/850)	
Stage: Final	**Version:** 1	**Date:** July 2009

Related Publications: (1) Renewable Financial Incentives (RFI) consultation July 2009; (2) Renewable Energy Strategy July 2009; (3) Redpoint study; (4) Ernst and Young report

Available to view or download at:

http://www. http://decc.gov.uk/en/content/cms/consultations/elec_financial/elec_financial.aspx

Contact for enquiries: Ben Marriott **Telephone:** 0300 068 5022

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

- The UK will need to radically increase its use of renewable electricity if it is to meet its EU target for renewable energy in 2020. The private sector needs to be incentivised through modification and extension of the RO to ensure the additional deployment of large-scale renewable generation.
- Offshore wind, which is expected to make a key contribution to the achievement of the UK's 2020 15% renewable energy target, requires additional support under the RO.
- The introduction of a Feed in Tariff for small-scale electricity will require transitional arrangements for small-scale generators within the RO.

What are the policy objectives and the intended effects?

Issue 1: to achieve an increase in large-scale renewable electricity consumption in the UK from around 5.5% in 2008 up to around 29% (Renewable Energy Strategy (RES) lead scenario) by 2020 by:

- creating a longer term framework for the RO (extension from 2027 to 2037), removing the current cap of 20% on renewable generation and moving away from a fixed obligation level towards a "headroom-only" approach

Issue 2: ensuring up to 2GW offshore wind projects currently under threat get sufficient support to proceed.

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

In the Renewables Energy Strategy consultation, consideration was given to introducing a feed-in tariff or tender system to replace the RO. In order to maintain investor confidence, the decision was made to retain the RO as the primary means of incentivising large-scale renewable electricity generation. But in order to meet the 2020 Renewables target, several changes to the RO are needed:

- Removal of the 20% cap on renewable generation and relying on either "headroom only" or extending and increasing the line of fixed targets. The former is better value for consumers and no less effective.
- Increasing the level of headroom; from 8% to 10% to mitigate the risk of a ROC price crash
- As set out in the RES, extension of the RO to 2037 is necessary, but participation should be limited to 20 years.
- Options to provide additional support to offshore wind. Accreditation-based criteria maintain consistency with the rest of the RO, and have a number of benefits over criteria based on project specifics.

When will the policy be reviewed to establish the actual costs and benefits and the achievement of the desired effects? A banding review will take place in time to be implemented on 1st April 2013. Progress against the UK's National Renewable Action Plan will be reviewed every two years by the European Commission.

Ministerial Sign-off For Final 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: David Kidney Date: 25 January 2010

Summary: Analysis & Evidence

Policy Option: 1A	Description: Minimum Change Option for 29% renewable generation (Base Case)

COSTS

ANNUAL COSTS	
One-off (Transition) **Yrs**	Description and scale of **key monetised costs** by 'main affected groups'
£	Resource costs (not including carbon cost in the counterfactual) around £2.6 bn p.a. in 2020, and around £41 bn lifetime to 2030. Onshore grid reinforcement costs are estimated at a further £3.0bn to 2020. Covers costs of RO extension, headroom increase, obligation size increase and 20-year participation period.
Average Annual Cost (excluding one-off)	
£ 3.0 bn	**Total Cost** (PV) **£ 44 bn**

Other **key non-monetised costs** by 'main affected groups' Non-monetised costs include indirect costs to economy of higher electricity prices and administrative costs of the RO. Consumer costs exceed resource costs due to inefficiency of the subsidy mechanism leading to some degree of rents.

BENEFITS

ANNUAL BENEFITS	
One-off **Yrs**	Description and scale of **key monetised benefits** by 'main affected groups' Benefits are monetised carbon benefits from the replacement of fossil fuels in electricity generation. Carbon saved in the electricity sector is covered by the ETS and leads to an avoided purchase of EUAs. Value of the carbon saved is £10 billion.
£	
Average Annual Benefit (excluding one-off)	
£ 710 m	**Total Benefit** (PV) **£ 10 bn**

Other **key non-monetised benefits** by 'main affected groups' Non-monetised benefits include making a large contribution to achieving the 2020 renewables target and hence avoiding infraction; encouraging innovation and hence reducing the cost of meeting the UK's long-term carbon targets; diversifying the energy mix; reducing dependence on fossil fuels; and business and employment opportunities in developing and deploying renewable energy technologies.

Key Assumptions/Sensitivities/Risks Costs and benefits are estimated using central fossil fuel prices, technology costs and carbon price assumptions. The numbers are based on economic modelling from Redpoint independent consultants. Costs are measured against "status quo" of policies and measures set out in the Government Response to consultation published alongside the Energy Bill 2008 (ie pre-RES).

Price Base Year 2008	Time Period Years 20	**Net Benefit Range** (NPV) **£**	**NET BENEFIT** (NPV Best estimate) **£ -34 bn**

What is the geographic coverage of the policy/option?			UK	
On what date will the policy be implemented?			2010	
Which organisation(s) will enforce the policy?			DECC and Ofgem	
What is the total annual cost of enforcement for these organisations?			£ unknown	
Does enforcement comply with Hampton principles?			Yes/No	
Will implementation go beyond minimum EU requirements?			No	
What is the value of the proposed offsetting measure per year?			n/a	
What is the value of changes in greenhouse gas emissions?			£ n/a	
Will the proposal have a significant impact on competition?			Yes	
Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large
Are any of these organisations exempt?	Yes/No	Yes/No	N/A	N/A

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

Increase of £ Decrease of £ **Net Impact** £

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

Summary: Analysis & Evidence

Policy Option: 2A (note this is not an alternative to 1A)	Description: Increase in banding for offshore wind from 1.5 to 2 ROCs/MWh for projects accredited between April 2010 and March 2014.

COSTS

ANNUAL COSTS	
One-off (Transition) **Yrs**	Description and scale of **key monetised costs** by 'main affected groups' Resource costs (not including carbon cost in the counterfactual) around £250 m pa in 2020, and around £5.3 bn lifetime to 2030.
£	
Average Annual Cost (excluding one-off)	
£ 360 m	**Total Cost** (PV) **£ approx 5.3 bn**

Other **key non-monetised costs** by 'main affected groups' Non-monetised costs include indirect costs to economy of higher electricity prices.

BENEFITS

ANNUAL BENEFITS	
One-off **Yrs**	Description and scale of **key monetised benefits** by 'main affected groups' Benefits are monetised carbon benefits from the replacement of fossil fuels in electricity generation. Carbon saved in the electricity sector is covered by the ETS, valued at the forecast carbon price. Value of the carbon saved is around **£700 million**.
£	
Average Annual Benefit (excluding one-off)	
£ 48 m	**Total Benefit** (PV) **£ 700 m**

Other **key non-monetised benefits** by 'main affected groups' Non-monetised benefits include helping to reach the renewable energy target and thus for the UK to avoid infraction; encouraging innovation and hence reducing the cost of meeting the UK's long-term carbon targets; diversifying the energy mix; reducing dependence on fossil fuels; and business and employment opportunities in developing and deploying offshore wind power.

Key Assumptions/Sensitivities/Risks Costs and benefits are estimated using central fossil fuel price, technology costs and carbon price assumptions. The numbers are based on economic modelling from Redpoint independent consultants. Costs are measured against a scenario where offshore wind banding remains at 1.5 ROCs per MWh.

Price Base Year 2008	Time Period Years 20	**Net Benefit Range** (NPV) **£**	**NET BENEFIT** (NPV Best estimate) **£ approx -4.6 bn**

What is the geographic coverage of the policy/option?			UK	
On what date will the policy be implemented?			2010	
Which organisation(s) will enforce the policy?			DECC and Ofgem	
What is the total annual cost of enforcement for these organisations?			£ unknown	
Does enforcement comply with Hampton principles?			Yes/No	
Will implementation go beyond minimum EU requirements?			N/a	
What is the value of the proposed offsetting measure per year?			n/a	
What is the value of changes in greenhouse gas emissions?			£ n/a	
Will the proposal have a significant impact on competition?			Yes	
Annual cost (£-£) per organisation (excluding one-off)	Micro	Small	Medium	Large
Are any of these organisations exempt?	Yes/No	Yes/No	N/A	N/A

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

Increase of £ Decrease of £ **Net Impact** £

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

Evidence Base (for summary sheets)

[Use this space (with a recommended maximum of 30 pages) to set out the evidence, analysis and detailed narrative from which you have generated your policy options or proposal. Ensure that the information is organised in such a way as to explain clearly the summary information on the preceding pages of this form.]

Strategic Overview

The EU Renewable Energy Directive commits the UK to meeting 15% of its energy needs from renewable sources by 2020. To achieve this, renewable electricity supply from large-scale generation will need to increase from around 5% today to around 29% (RES lead scenario) by 2020. Further growth (around 1 to 2%) will need to come from smaller-scale generation, including microgeneration. Under the RES lead scenario, renewable heat will reach 12% of heat by 2020.

The Renewables Obligation (RO), introduced in 2002, is the Government's main policy mechanism for incentivising the deployment of renewable electricity generation in the UK. Since its introduction, the RO has been subject to a number of changes aimed at improving its efficiency and effectiveness. The most recent reforms came into effect on 1st April 2009. The key feature of these reforms was the introduction of banding. Different technologies now receive different numbers of ROCs in order to reflect their underlying generation costs.

The Renewable Energy consultation in the summer of 2008 made the case for an expanded and extended RO as the framework for growth in deployment of large-scale renewable generation. The RES was published on 15th July 2009 which provides a high-level framework for meeting our 2020 targets.

There have already been several announcements on the future of the RO. In the 2008 Pre-Budget Report, the Government announced its intention to extend the RO until at least 2037 and in the 2009 Budget, the intention to review the support for offshore wind under the RO was announced.

The Renewable Electricity Financial Incentives (REFI) consultation[1] detailed the proposals to:

1) Remove the 20% cap on the RO
2) Increase headroom from 8% to 10% over a four-year period
3) Allow headroom-only to set the level of the obligation rather than using fixed targets from 2016/17 onwards
4) Introduce a twenty-year time limit on support under the RO
5) Extend the lifetime of the RO from 2027 to 2037
6) Increase the ROC banding from 1.5 to 2 ROCs/MWh for offshore wind projects signing wind turbine contracts in 2009/10 and getting a foundation constructed before the end of 2011, and from 1.5 to 1.75 ROCs/MWh for offshore wind projects signing wind turbine contracts in 2010/11 and getting a foundation constructed before the end of 2012.
7) Transition microgeneration from the RO to the new Feed-In Tariffs (FITs) scheme
8) Retain the co-firing cap at 12.5%

[1] Available here: http://www.decc.gov.uk/en/content/cms/consultations/elec_financial/elec_financial.aspx, published July 2009.

9) Modify the RO to allow renewable generation outside the UK, that meets specific criteria to participate

10) Introduce a revenue stabilisation scheme for large-scale renewable electricity generators.

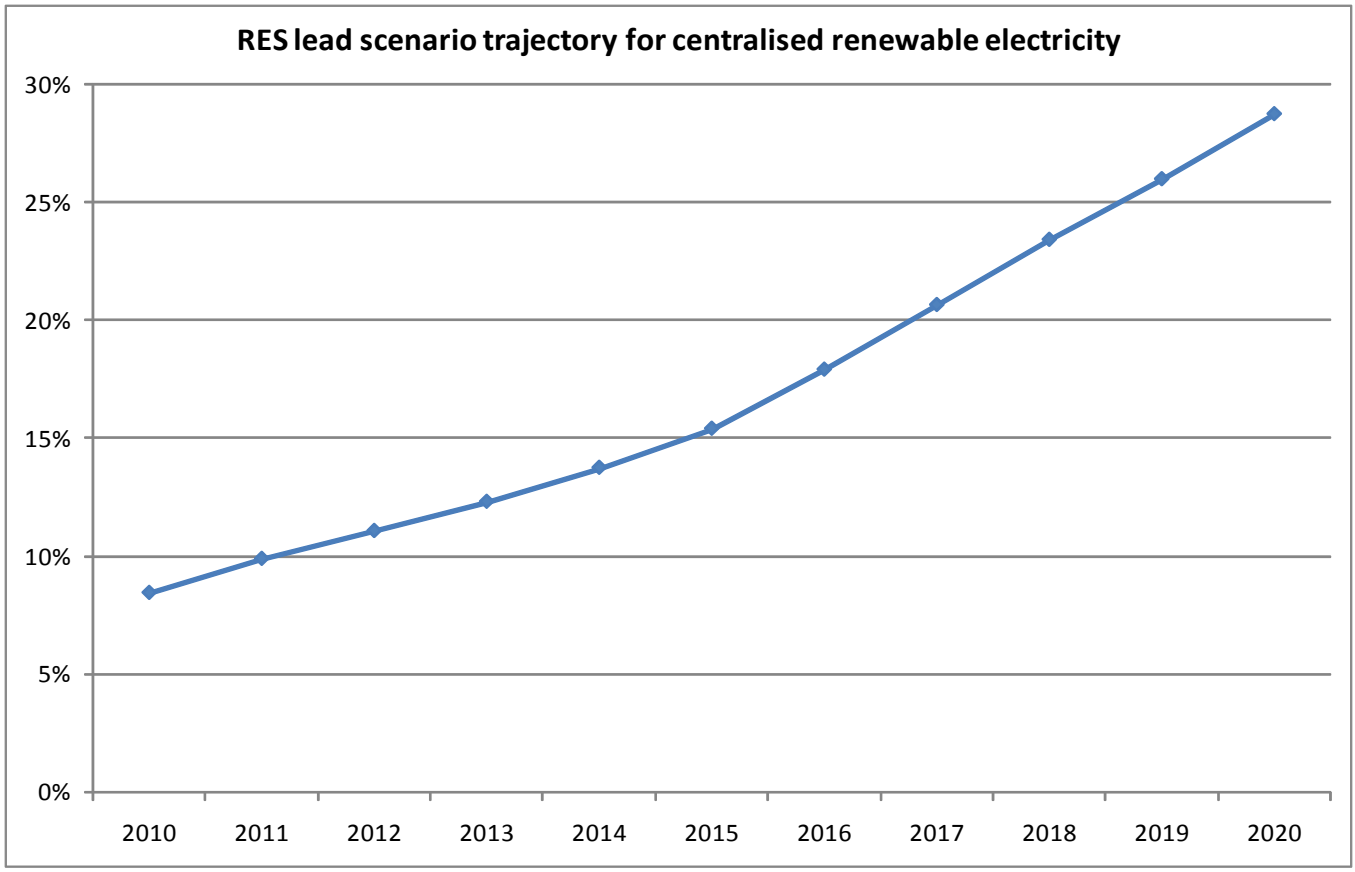
As detailed in the Government response to the RO aspects of the consultation, proposals 1, 2 (amended), 3, 4, 5, 6 (amended) and 7 will be taken forward in the Renewables Obligation Order 2010, subject to state aid and parliamentary procedure. Proposal 8 does not require any changes to the RO, whilst more work will be carried out on proposals 9 and 10 next year.

The small amendment to proposal 2 is to move to 10% headroom directly in 2011/12 rather than over a four-year period, whilst proposal 6 has been amended to increase offshore wind banding to 2 ROCs/MWh for all projects accredited between April 2010 and March 2014.

Objectives of Renewables Obligation Order (ROO) 2010

The objective is to increase renewable electricity to the level required as the contribution towards our overall target of 15% renewable energy by 2020. It is estimated that this will be around 29% from large-scale renewable electricity by 2020. The Government aims to do so in a cost-effective way, and in a way that is most compatible with Government's other policy objectives.

This increase in ambition to achieve around 29% large-scale renewable electricity by 2020 will be driven by ensuring the RO incentivises the private sector to invest enough in renewable generation: projects built before 2020 get at least 18 years of RO support, headroom will have a stabilising effect on the ROC price and maintain confidence in the level of subsidy, and the removal of the cap on the level of the RO should provide this confidence. The size of the obligation (and hence the level of subsidy as well as the amount of renewables generation) is then expected to increase rapidly year-on-year.



Source: modelling by Redpoint for DECC

Modifications of the RO needed to meet the RES target

The objectives of the proposals set out in the Government response to the Renewables Obligation part of the Renewable Electricity Financial Incentives consultations and in the draft Renewables Obligation Order (ROO) 2010 are to:

1) Extend the lifetime of the RO from 2027 to 2037
    - Because of the long term nature of renewable electricity projects, if the RO were to expire on its current end date of 2027, it would be unlikely to incentivise new investment much beyond 2015. Extending the RO to 2037 will give long term certainty to investors to at least 2020 that they will receive support for renewable electricity projects
2) Introduce a 20 year time limit on support under the RO
    - By extending the RO to 2037, a time limit on eligibility needs to be set, as it would not be cost-effective to allow projects to continue to claim ROCs for the full life-time of the RO where that exceeds the amount of support they really need for economic viability. As RO support is based on a 20-year period, participation has been limited to 20 years. The introduction of the new time limit on participation will be grandfathered to protect existing investments.
3) Remove the 20% renewable electricity limit from the RO
    - The current 20% limit on RO generation would restrict the UK's ability to reach the 2020 renewable energy target. Removal will ensure generation can grow and be guaranteed support from the RO.
4) Retain the concept of headroom, replacing fixed targets after 2015/16
    - The original purpose of fixed targets was to provide a clear trajectory towards our target for renewable generation that would create a "scarcity signal" if deployment lagged behind. However, experience has shown that this scarcity signal has not been effective as deployment has been hampered by other constraints such as grid connection and planning and the price spikes which result are too short term to influence developers' decisions to invest. Government believes that fixed targets can therefore drive up ROC prices, increasing the cost of the RO to consumers, without necessarily increasing deployment.
    - Headroom will continue to operate alongside fixed targets to 2015/16. In determining the Obligation level from 2011/12 to 2015/16, it will be the higher of fixed target and the prediction of renewables generation in the period plus 10% headroom that sets the level. The size of the Obligation has already been set using headroom for the 2010/11 Obligation period. From 2016/17 onwards, the obligation level is expected to be set through the prediction of renewables generation plus headroom.[2] Headroom ensures that the chances of an oversupply of ROCs and hence a ROC price crash are low, and thus increases incentives to invest.
5) Increase the level of headroom from 8% to 10%

[2] Fixed targets will still be in operation from 2016/17 onwards, but will not be increase any further. It is therefore expected that the level of the obligation will be set by the predicted level of generation for the period plus headroom.

- Recent research and industry feedback indicates that the current level of Aheadroom of 8% above deployment levels is too low to give investors confidence that a ROC price crash will be avoided. The level of headroom will therefore be increased from 8% to 10% in one step as of the 2011/12 Obligation period. The Government previously suggested stepping this up in four 0.5% point increments, but has decided that given the risks it should be increased directly to 10% from 2011/12.

6) Amend the RO so that some offshore wind projects qualify for an increase in ROC support.

   - Over the winter of 2008-9, DECC were approached by a number of offshore wind developers who argued that the economics of offshore wind projects had been particularly hard hit by the credit crunch, coming at a time when their supply chain costs were already rising. A study was commissioned to look into the costs faced by projects looking to achieve financial close in the next year. The results appeared to demonstrate that a combination of factors had led to significant increases in costs over a relatively short period. These factors include: increased costs due to the immature supply chain; increased foreign exchange costs where the majority of capital costs are priced in Euros or Danish Kroner and increased cost of risk (reflected in increased borrowing costs) in the current financial climate. An early review of the offshore wind banding was initiated, and following review by the Renewables Advisory Board (RAB) and statutory consultation, the Secretary of State for Energy and Climate Change has decided, subject to state aid and parliamentary procedure, that there should be an increase in offshore wind banding for stations or capacity receiving full accreditation between 1st April 2010 and 31st March 2014.

7) Enable transition of eligible microgenerators (up to 50kW) and small generators (50kW – 5MW) to the FITs scheme

   - Despite the changes made to the RO within the past few years to make it easier for microgenerators to access support - for example, allowing them to appoint an agent and submit annual claims - it remains a scheme better suited to large-scale generation. By contrast, the simplicity and income certainty of feed-in tariffs makes them much better suited to the needs of households and other microgenerators. In addition, the administrative burden placed on Ofgem by the microgeneration section of the RO has always been disproportionate to the level of support provided.

   - The introduction of a FITs scheme for small-scale electricity generation up to a maximum of 5MW will provide an alternative support mechanism for small generators of most technologies that would previously have been eligible for support under the RO. Whilst small generators already accredited under the RO before the publication of the RES will remain under the RO, small generators up to the maximum capacity of the FITs scheme who have not applied for RO accreditation before this date will be able to choose between the two schemes.

Rationale for Government Intervention

The EU Renewables Directive commits the EU to meet 20% of its energy needs from renewable sources by 2020, with the UK's individual target at 15%. In order to meet this, Government needs to financially support large-scale renewable electricity technologies, as current costs are higher than their conventional alternatives and deployment would not occur in the timescales required. Renewable technologies are also needed as part of the global effort to reduce emissions – the need for urgency and the risk of higher damage costs in the future underpin the

need for action now. In the electricity sector new technologies can struggle to compete with conventional technologies and policies to support early stage development and bring costs down longer term is critical. The cost of deploying new technologies typically falls as volumes increase, supply chains are established and commitments to further expansion rise.

The market on its own will not deliver the required development and deployment of renewable technologies to achieve the UK's carbon reduction targets. This is because the carbon price is not yet high enough or certain enough to support these higher cost technologies, and there are market failures such as positive externalities from innovation, asymmetric information and uncertainty, and increasing returns to scale in the power sector.

The RO as it now stands is unlikely to result in more than about 15% of renewable generation by 2020. In order to increase the proportion of renewable electricity to the levels set out in the RES and required by the EU target, the RO will need to be modified and extended. Subject to Parliamentary procedure and State Aid approval, the Government plans to implement changes in April 2010 to make the RO more effective.

Despite the introduction of banding, there is evidence that offshore wind generation now under development is not, for various reasons, currently economically viable. If the 2020 target is to be met, a large volume of offshore wind generation will be needed – wind will make the largest single contribution to the target. For this reason, consideration needs to be given to providing additional support under the RO to these projects so that they come on-stream as originally envisaged, maintain investor confidence and mitigate the risk of not achieving the RES target.

Not all of the uplift in renewable generation capacity will come from large-scale generation. Deployment of small-scale renewable generation can play a valuable part. For this reason, the Energy Act 2008 included provision to allow for the establishment of a FITs scheme to subsidise new renewable generation of up to 5MW in size. The intention is to introduce this scheme in April 2010. Generation which currently benefits from the RO but which qualifies for the new FITs scheme will need to be transitioned efficiently from one scheme to the other.

Analysis of the options and the costs and benefits

Introduction

The analysis presented here builds on analysis presented in the Impact Assessment on the RO – Minimum Change, which was published with the Renewable Energy Financial Incentives consultation[3] and considered the difference between Headroom and an alternative option for reaching around 29% centralised renewable electricity by 2020, known as Fixed Targets. This IA presents the analysis of the impact of the minimum change option to reach 29% renewable electricity in 2020, and separately analyses the impact of modifications announced since the RO IA. Further analysis of the contract for difference options[4] and the possibilities of renewables trading and joint projects under the flexibility mechanisms in the Renewable Energy Directive will be conducted in 2010. The IA goes on to look at offshore rebanding and the transition arrangement for small generators from the RO to FITs.

All costs and benefits are reported in 2009 prices discounted to 2009, and using the assumption of updated carbon price projections.[5]

[3] Available at: http://www.decc.gov.uk/en/content/cms/consultations/elec_financial/elec_financial.aspx

[4] Initial analysis was presented in a separate IA published with the REFI consultation.

[5] Available at: http://decc.gov.uk/en/content/cms/what_we_do/lc_uk/valuation/valuation.aspx

In the summary sheet for **policy option 1A**, the costs and benefits of the preferred option, minimum change, are consistent with those presented in the Minimum Change impact assessment, and are based on the same underlying assumptions, with the exception that this analysis uses the updated set of Government carbon price forecasts, expresses monetised costs and benefits in 2009 prices and discounts to 2009. The counterfactual used is that of a 'do nothing' status quo scenario with Energy White Paper 2007 policies only.

In the summary sheet for **policy option 2A** (not an alternative to policy option 1A and overlapping with it), the costs and benefits of the preferred option, increasing the banding for offshore wind projects accredited from 2010/11 to 1013/14 from 1.5 ROCs/MWh to 2 ROCs/MWh are presented in line with the assumptions for minimum change, except for the assumptions on offshore wind banding. The counterfactual used is that of 1.5 ROCs/MWh for offshore wind from now to 2030.

There are four main parts to the analysis of options and costs and benefits presented below:

1A) Minimum change (policy option 1A)

This IA first looks at the costs and benefits of the first five modifications listed above (pp 7&8) collectively – which has been have termed 'minimum change' (henceforth minimum change), in comparison to a do nothing option of retaining Energy White Paper 2007 policies, but not extending the RO to meet electricity's share of the 2020 renewables target.

Minimum change keeps in place the fixed targets up to 2015/16, such that the level of the obligation in each annual period is set by the higher of one: the fixed target, and two: the ex-ante prediction of renewables generation for the period plus the level of headroom. From 2016/17 onwards, fixed targets are not increased, so it is expected that the level of the obligation will be set by the ex-ante prediction of renewables generation for the period plus headroom. The level of headroom in this option is assumed to be 10% from 2011 onwards.

1B) Moving to 10% headroom from 2011/12

This section of the analysis considers the difference between increasing the level of headroom to 10% in 2011 and staggering the increase from 8% headroom to 10% headroom in 0.5 percentage point increases over 4 years.

2A) Rebanding offshore wind (policy option 2A)

Thirdly, the IA analyses the impact of different options for rebanding offshore wind to 2 ROCs for a limited period. It considers the impact of issuing 2 ROCs according to different eligibility criteria. These impacts have been analysed compared to a counterfactual where offshore wind banding stays at 1.5 ROCs/MWh from now to 2030, but including the other policy modifications that are included in the Minimum Change option above. This assumption enables the analysis of the 2 ROCs/MWh rebanding against current RO banding.

The Minimum Change option estimates (option 1) includes the assumption of rebanding the RO in later years, to achieve 29% renewable electricity. There is therefore some degree of overlap between the estimated impacts of the minimum change, and those of the preferred offshore wind rebanding policy scenario. They both assume 2 ROCs/MWh for offshore wind for projects accredited (and hence starting to generate electricity) in 2013/14. Prior to that date, the preferred offshore wind policy has 2 ROCs/MWh from

2010/11 to 2012/13, whilst minimum change assumed 1.5 ROCs/MWh. From 2014/15 onwards, the assumptions are reversed, with minimum change only assuming 2 ROCs/MWh. whilst the banding in the modelling scenario for policy option 2A is assumed to revert to 1.5 ROCs/MWh. Note, however, that all the modelling is based on cost assumptions at the time of modelling, which are likely to change over time. The modelling here does not prejudice the results of future banding reviews.

3) Transferring eligible microgenerators from the Renewables Obligation to the Feed-in Tariff scheme, and enabling new small generators to choose between the two schemes

Finally, the IA discusses the impacts of the proposed arrangements for micro-(up to 50kW installations) and small-generators (50kW to 5 MW) with regard to transfer or not from the RO to FITs.

Because of the overlap between the assumptions for policy options 1A and 2A, some of the impacts, in particular those relating to extra support for offshore wind projects accredited in 2013/14, are counted in both. There is a discussion about the degree of overlap and a very approximate estimate of overall costs for both policy options together under part 2A below.

1A) Increasing the effectiveness[6] of the RO to achieve the renewable energy target – Minimum Change Option

The analysis of this option covers modifications (1) to (5) on pp 7 to 8. These are:

Extension of RO to 2037

Extension of participation period to 20 years for new projects

Fixed annual targets and headroom to 2015/16 and then "headroom only"[7]

20% cap on Obligation size lifted

Obligation size increased as necessary to maintain headroom

Increase in headroom from 8% to 10% in 2011/12

The analysis was conducted by Redpoint energy et al., and the underlying assumptions are set out in the report published alongside the Renewable Energy Strategy.[8] The Redpoint analysis aimed to set out the minimum changes necessary to achieve 29% renewable electricity by 2020. The modelling included some rebanding of the RO from 2013 onwards.

The impact is measured above a 'do nothing' option (status quo). Under this option the RO would not be modified to increase the amount of renewable deployment in the electricity sector, resulting in around 14% of renewable generation by 2020. This assumes no change to the RO beyond announced changes to the Renewable Obligation in the Government Response to the consultation on the long-term reform of the RO, published alongside the Energy Bill 2008.

[6] Effectiveness is defined here as the proportion of renewable electricity generation in total UK electricity generation.

[7] "Headroom only" refers to the fact the line of fixed targets will not be increased beyond 2015/16, and so it is expected that the prediction of renewables generation plus headroom will set the level of the obligation.

[8] Available at: http://decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/res/res.aspx

The baseline costs and benefits of the do nothing option are given in Table 1 below:

Table 1: Characteristics of the Status Quo 'do nothing' option, 2009 prices

	2020	Lifetime to 2030
Generation costs	£18bn	£390bn
Carbon Emitted/ MtCO2	150	2900
Consumer cost[9]	£21bn	£460bn

All figures quoted to two significant figures

The generation costs in table 1 refer to the costs attributable to UK electricity generation, including the cost of generation from both renewable and fossil fuel sources, the cost of carbon emitted (estimated at the EUA price)[10], an estimate of the cost of unserved energy and demand side response. The costs to consumers of this generation are slightly higher than generation costs due to margins and rents.

Impact of Minimum Change

The Impact of the Minimum Change option, compared to the Status Quo scenario are given in Table 2 below:

Table 2: Quantified Costs and Benefits of the Minimum Change Option relative to the status quo counterfactual, 2009 prices

	2020	Lifetime to 2030
Gross resource costs *(additional generation costs gross of carbon compared to counterfactual)*	£2.6bn	£41bn
Reduction in Carbon Emitted/ MtCO2	22	400
Value of Carbon Reduction	£380m	£10bn
Grid reinforcement costs	£230m	£3.0bn
NPV of monetised costs and benefits for UK economy (= net resource cost, that is net of carbon)	£2.5bn	£34bn
Additional consumer cost[11]	£3.1bn	£42bn

All figures quoted to two significant figures

Resource costs include all costs associated with the increase in renewable generation, over and above the costs of the the counterfactual fossil fuel technology. These estimates include the high cost of the renewable technologies, and other costs, for example, the grid connection costs. The separate cost entitled grid costs includes the costs of further reinforcement to the grid that would be necessary to support additional renewable generation. The estimate of grid costs is taken from the ENSG report[12] taking account of overlapping costs included in the Redpoint analysis.

[9] Defined here as the sum of the net renewables subsidy, wholesale cost and balancing costs. The net renewable subsidy is made up of the RO subsidy, climate change levy exemption subsidy and balancing costs.

[10] Available at: http://decc.gov.uk/en/content/cms/what_we_do/lc_uk/valuation/valuation.aspx

[11] This is the increase in net renewables subsidy, wholesale cost and balancing cost, plus the cost of grid reinforcement.

[12] Available at: http://www.ensg.gov.uk/index.php?article=126

The minimum change option leads to an increase in generation costs compared to the status quo as a result of the increased proportion of renewable electricity, which costs more than the fossil fuel alternative. The consumer cost increases as well, mainly reflecting the increase in the renewables obligation needed to incentivise this additional generation.

In addition to the carbon-related benefit quantified above at around £10 billion from 2010 to 2030, minimum change is likely to have other benefits which have not been monetised. These include encouraging innovation, economic benefits in developing new industries and jobs, and security of supply benefits through diversity of supply and reduced dependence on imported fossil fuels compared to the dependence that would pertain in the status quo counterfactual. However, there are also non-monetised costs of minimum change, especially the macroeconomic costs of higher electricity prices, as well as displacement and crowding out effects. RO administration costs are not included in the monetised costs either, but are expected to rise with the increasing size of the RO.

In some sectors such as electricity generation - where new technologies can struggle to compete with conventional technologies due to increasing returns to scale, multi-faceted uncertainty and knowledge spillovers - policies to support the market for early-stage technologies are critical. The cost of deploying new technologies typically falls as volumes increase, supply chains are established, and commitments to further expansion get firmer.

Minimum change is likely to encourage renewables innovation and hence reduce the future costs of reaching the UK's long-term greenhouse gas emission targets. A recent report from the UK Energy Research Council[13] illustrated this effect of innovation in low-carbon technologies, including renewables. It compared the cost of meeting the 2050 target with and without the accelerated development of seven low-carbon technologies, of which 4 are renewable. UKERC found that accelerated development of low-carbon technologies could reduce the cost of meeting the 2050 target by £36bn over 2010-2050. The Committee on Climate Change report Change report suggests that renewable technologies will play an important role in decarbonising the electricity sector without an unduly high cost penalty.[14] In addition, macroeconomic modelling by HMRC, has found that a higher rate of cost reduction (an increase in the learning rate from 5% to 6%) in wind generation could reduce the GDP losses associated with climate change policies in 2020 by around 0.05% of GDP, or around £1bn.

Renewable energy will play an important role in global carbon abatement. Accelerated development of zero / low carbon emissions technologies could have a considerable impact in reducing global marginal abatement costs in the medium term.

Analysis of the costs and benefits of minimum change stops in 2030, as that is the last date in Redpoint's model. At this date there will still be operational renewables plant that was incentivised by minimum change. This plant will be associated with continued resource costs post-2030 (annuitised capital costs, operation and maintenance costs etc. over and above the level in the status quo scenario) and continued offsetting benefits including carbon-related benefits.

[13] UKERC, 2009, Decarbonising the UK Energy System: Accelerated Development of Low-Carbon Energy Supply Technologies

[14] http://www.theccc.org.uk/reports/

The minimum change option has a net present value (social) cost per tonne of CO_2e abated which is greater than the comparator carbon cost.[15] This means the extension and expansion of the RO is counted as a cost-ineffective method of carbon abatement. However, minimum change will imply additional benefits beyond carbon reduction (for example, in terms of meeting the renewable energy target, increasing the diversity of our energy supply and promoting innovative technologies) which is not reflected in the analysis of cost-effectiveness.

For a fuller analysis of the impacts of minimum change on the electricity market, on security of supply, on business jobs and the economy, please refer to the RES IA for the centralised electricity sector and to the overall RES IA.[16]

Analysis of the role of renewables in meeting the UK's 2050 target of an 80% cut in greenhouse gas emissions will be taken forward in 2010 through DECC's project looking at options and pathways to 2050.

[15] The comparator is calculated as the weighted average (according to when the abatement occurs) of the discounted traded carbon price projection from 2010 to 2030.

[16] Available at: http://decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/res/res.aspx

1B) Moving from 8% to 10% headroom as of the obligation period 2011/12

Modelling by Redpoint for DECC looked at moving from 8% to 10% headroom as of the obligation period 2011/12, instead of moving gradually from 8% to 10% by 0.5 percentage points a year, finally reaching 10% headroom in 2014/15, as was previously modelled by Redpoint for DECC for the Renewable Energy Strategy. It found that there was no net resource cost or carbon benefit to the UK economy as a whole from the change, but the small increase in size of the Renewables Obligation would lead to a transfer of £39 million discounted over three years from consumers to producers, that is to say there would be a cost of £39 million spread over electricity consumers, which would be a shared benefit between electricity suppliers and renewables generators. The profile of costs is £19 million in 2011/12, £15m in 2012/13 and £8m in 2013/14 (all values discounted to 2009 at the social discount rate). This increase in subsidy cost is included in the total subsidy costs of minimum change above.

The result in the Redpoint modelling that an early move to 10% headroom has no net cost or benefit is because there is no change in the level of renewables deployment. In practice, however, moving from 8% to 10% headroom early will reduce the chances of a ROC price crash in those years, and this will increase investor confidence and in practice could marginally increase the level of renewables build from 2011/12 to 2013/14 and could reduce investor hurdle rates. Any extra renewables build will be associated with a resource cost, since renewables generation is more expensive than conventional electricity generation, but this effect is likely to be small for this minimal change.

RO administration costs should not be affected by the early move to 10% headroom.

2A) Amend the RO so that offshore wind projects qualify for an increase in ROC support

Evidence from Ernst & Young (2009)[17] suggests that the costs of offshore generation have increased significantly in recent years, and hence up to 2GW of offshore wind farms may not go ahead without increased support.

The proposal announced at Budget 2009 was to increase the banding from 1.5 ROCs/MWh to 2 ROCs/MWh for projects signing firm contracts between the budget announcement and 31st March 2010, with a foundation in the water by end 2011; and to 1.75 ROCs for projects signing firm contracts between 1st April 2010 and 31st March 2011, with a foundation in the water by end 2012. The Renewable Advisory Board (RAB) recommended using accreditation-based criteria for consistency with the rest of the RO. After further consideration of the evidence and responses to the consultation, Government considered moving to accreditation-based criteria, as

1. It is in line with support for other RO Bands:
    - It makes the transition to future banding changes easier to manage.
    - It is understood by, accepted and already used by industry.
    - It therefore avoids setting a precedent for future changes to the RO and the pressure to look at project specifics when setting the bands.
2. It avoids the complexity of defining new criteria of 'contract signing', and the difficulties faced in auditing and administrating it, given the authority's systems are set up to deal with ROCs

[17] Ernst & Young (2009), *Cost of and financial support for offshore wind*

based on accreditation. For example, where one contract covers multiple turbines for more than one wind farm it would be difficult to quantify where turbines were being used.

3. It avoids the resulting increase in costs of the scheme's administrative burden that all RO participants and ultimately consumers would have to bear.

4. It removes the risk of a developer putting in a foundation to qualify, then completing build at much later date.

The contract criteria were ruled out as a viable option due to the difficulty of 1) identifying particular milestones or characteristics which are common to all offshore wind projects and are resistant to gaming in such a way that these can be defined in the legislation; and 2) the associated issues with auditing. The options considered were therefore for accreditation, specifically 2 ROCs/MWh for projects being accredited in a window starting in either April 2010 or April 2011 and finishing in either March 2013, March 2014 or March 2015. The preferred option is to start in April 2010 and to finish in March 2014.

Alternative policy options to a higher banding for supporting offshore wind over and above the 1.5 ROCs/MWh level in place since April 2009 include capital grant support, tax credits, production credits and loans/credit support. These would all imply additional administrative costs in set-up and monitoring and very significant costs to the exchequer in spending or foregone revenue. Changing the RO banding for offshore wind implies minimal additional administrative costs and no additional monitoring costs. It also ensures simplicity by retaining support within the existing system. Whilst capital grant support has the advantage of being more easily targeted, it may be more discounted by private investors in the assessment of project economics, given the policy risk that future government could divert public spending to other priorities.

Costs of offshore wind rebanding (policy option 2A)

The table below details the resource costs and the consumer costs relative to the option of leaving the banding at 1.5 ROCs/MWh for two accreditation window options, including the preferred option of 2 ROCs/MWh for all projects accrediting from April 2010 to March 2014. These costs are from Redpoint modelling for DECC, based on DECC assumptions on the amount of offshore wind capacity that is built in each year. A significant proportion of these costs are included in policy option 1A, minimum change, which assumes some technologies will have to 'band-up' to reach 29% renewable electricity in 2020.

Table 3 Impact of offshore wind rebanding options, 2009 prices

	NPV (= resource cost net of carbon)		**Subsidy cost[18]**	
Option	In 2020	2010 to 2030	In 2020	2010 to 2030
2A) 2 ROCs/MWh if accredited April 2010 to March 2014, policy option 2A	£240 million	£4.6 billion	£230 million	£4.9 billion
Of 2A, very approximately	*£200 million*	*£3.8 billion*	*£190 million*	*£4.1 billion*

[18] Defined here as the net renewables subsidy, which itself is the sum of RO subsidy, climate change levy exemption subsidy and balancing costs.

this much is additional to the costs of Minimum Change, i.e. policy option 1A				
2 ROCs/MWh if accredited April 2010 to March 2015	£410 million	£7.6 billion	£390 million	£7.7 billion

All figures quoted to two significant figures

Although the original contracts-based criteria would have involved a lower subsidy cost, because there would have been less deadweight, it was not considered a viable option because of legal and practical implementation issues. The additional transfer from consumers to producers associated with the accreditation options is estimated at around £1 billion. However, there would be have been potential indirect impacts on projects not receiving extra support under the contract criteria. For example, competing with other projects who receive higher levels of support, could increase these projects' operating and maintenance (O&M) costs if the supply of such services is restricted. It is also possible they would not have committed to proceed with their project had they known the O&M costs were to go up. Increasing offshore wind banding clearly for a four-year window will increase investor confidence significantly, albeit at a significant cost to the consumer.

It has been very approximately estimated that around 84% of the impact of offshore wind rebanding against its counterfactual is not included in the impact of minimum change against its counterfactual. On this basis table 3 gives the estimated costs from offshore wind banding that are additional to those of Minimum change.

This very approximate calculation gives a total NPV for minimum change policy option 1A and offshore wind rebanding policy option 2A together of £37 billion, with an annual cost in 2020 of £2.7 billion.

The re-banding of offshore wind should not increase the administration costs of the RO, but if individual offshore wind projects that are built as a result of the change are deemed to have the potential to cause significant adverse environmental impacts, they are required to undertake an Environmental Impact Assessment (Directive 85/337/EEC) as part of the planning process.

Cost estimates in Budget 2009 and Pre-Budget Report 2009

Budget 2009 included an estimate of the extra RO subsidy cost associated with the contracts-based proposal to reband offshore wind, based on the difference between the support projects would get, 2 ROCs/MWh, and the existing level of support 1.5 ROCs/MWh. This estimate was £575 million over the three years from 2011/12 to 2013/14, based on £3.5 billion total over the twenty-year assumed operational life of the wind farms.

On this calculation basis of extra support, i.e. looking at the extra support over standard levels, rather comparing to a full counterfactual as above, the estimate of the extra RO subsidy cost associated with the contracts option (found to be legally difficult to implement and operationally difficult to administer) has fallen from £3.5 billion to £1.3 to 2.2 billion, due to updating of assumptions. The estimate of the extra RO subsidy cost on this basis for the accreditation proposal from 2010/11 to 2013/14 is £2.6 billion. Therefore, on this basis, the change in criteria for eligibility for the increase in offshore wind banding is estimated to have increased the level of support by at least £400 million, as reported in the Pre-Budget Report 2009.

Benefits of offshore wind rebanding

i) Carbon Abatement

There are carbon-related benefits from offshore wind compared to fossil fuel generation. This reduction takes place in the EU-Emissions Trading Scheme (ETS) sector, and, given the cap on emissions, there will not be an additional reduction in the overall level of CO2 emissions. But there will be cost savings through avoided emissions elsewhere in the traded sector, valued using the projected ETS carbon price, at around £700 million from 2010 to 2030. These are included in the NPV in table 3.

Offshore wind technologies will play a key role to meeting our Climate Change targets beyond 2020, with Climate Change Committee modelling using Markal suggesting that renewables, CCS and nuclear will all play significant roles in decarbonising the electricity mix by 2030, which will be necessary to meet an 80% emissions reduction in 2050. Given the scale of offshore wind resource in comparison to other renewables (according to SKM (2008)[19] it has the largest potential resource in the UK (except wave, but it is around 10-15 years ahead of wave), offshore wind is likely to make the largest contribution to renewables electricity generation to 2050.

ii) Innovation

While it is not possible to measure the impact on innovation from this short term additional support, supporting new offshore projects now will lead to reduced costs in the long term. The importance of innovation in low-carbon technologies, including renewables (especially offshore wind), has been underlined by a recent report from the UK Energy Research Centre.[20] Accelerated development of low-carbon technologies including renewables could reduce the cost of meeting the 2050 target by £36bn over 2010-2050.

Macroeconomic modelling by HMRC suggests that the overall GDP effect from increasing the learning rate for wind by one percentage point, would improve 2020 GDP by 0.03%, or around £950m.[21] It is also just for the year 2020; the overall effect over a longer time period would be much larger.

Forthcoming research from the Carbon Trust suggests that a high learning rate (successful innovation) combined with a high UK market share (through an active manufacturing policy) lift the net present value to 2050 of supporting offshore wind from - £1bn to over £65bn, which would imply the benefits of offshore wind support outweigh the costs, although this analysis is 'gross' and does not include macroeconomic crowding out and displacement effects. This forthcoming research for the Carbon Trust argues strongly that offshore wind should be supported from the net benefits to the UK angle, and from the angle of carbon abatement – that successful large-scale deployment offshore wind is necessary to meet the UK's carbon reduction targets, as well as bringing down the costs of global abatement.

iii) Industrial benefits

The UK is already and will remain for the foreseeable future the largest single market for offshore wind in the world. It is estimated there could be at least 12.5GW of offshore wind by 2020 (RES lead scenario), and up to double this (the recent Strategic Environmental

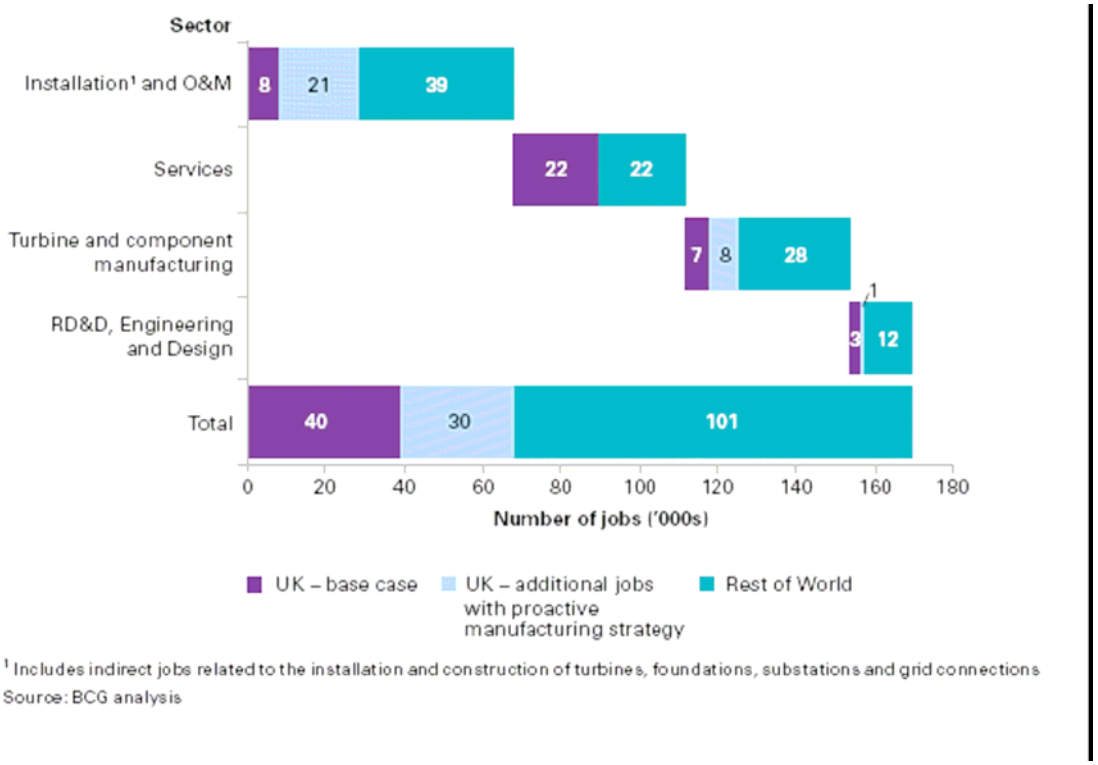
[19] SKM (2008), *Quantification of Constraints on the Growth of UK Renewable Electricity Generating Capacity*

[20] UKERC, 2009, *Decarbonising the UK Energy System: Accelerated Development of Low-Carbon Energy Supply Technologies*

[21] Does not include higher RD&D cost of achieving the higher learning rate.

Assessment (SEA) on offshore energy, found there is the potential for some 25GW). At this higher level, the UK would constitute over half of the total European supply of offshore wind, set to be 40,000MW according to the European Wind Energy Association.

The economic value to the UK from this level of deployment varies depending on its ability to attract major turbine manufacturers to base their operations in UK, or to establish indigenous industries, with the associated supply chain. Carbon Trust analysis, based on an offshore wind industry size of 29GW, which the industry may reach perhaps in the 2020s, estimates that success in doing so will increase the benefits to the UK from around 40,000 jobs to around 70,000 jobs (as detailed in the chart below) and £2bn of annual revenues. There will, however, be fewer jobs in other parts of the economy, such as fossil fuel generation, as a result of developing offshore wind.



The estimated additional jobs from the attraction of offshore wind manufacturers and the supply chain will be skilled and of high value. Innovas[22] estimated the average market value per employee in the wind energy sector to be £125,850 (based on sales not GVA), compared to the national average per employee (i.e. all sectors) of £54,400. Many of these jobs are also likely to be in assisted areas.

iv) Impact on energy security of supply

DECC analysis suggests the renewable energy target as a whole could reduce UK consumption of fossil fuels by around 10% in 2020, and imply a 20 to 30% reduction in gas imports compared to what they would have been otherwise, with offshore wind playing a key role in achieving the renewable energy target.

The intermittency of offshore wind can also have negative effects on security of supply. However, analysis undertaken by Redpoint for the Renewable Strategy Consultation[23] and the

[22] Innovas, 2009, *Low Carbon and Environmental Goods and Services: an industry analysis*

[23] Implementation of EU 2020 Renewable Target in the UK Electricity Sector: Renewable Support Schemes. Redpoint et al (2008)

Renewable Strategy[24] suggests that the risks to electricity security of supply from the increase in intermittent wind generation implied by the renewables targets are manageable before 2020, assuming that the market provides adequate price signals to provide the incentive for market participants to invest in sufficient conventional generation including back-up generation.

The Low Carbon Transition Plan concluded that the risks to energy security of supply from increased intermittent generation are manageable before 2020, but that it could potentially be more of a problem post-2020, as the proportion of low-carbon generation increase. Since the transition plan was published, the analysis has been updated. This new analysis was published as part of the response to the CCS consultation,[25] and showed an improved picture for de-rated capacity margins (a key security of supply metric) in the period to 2020.

The offshore rebanding policy has a net present value (social) cost per tonne of CO_2e abated which is greater than the comparator carbon cost.[26] This means the it is counted as a cost-ineffective method of carbon abatement. However, incentivising offshore wind deployment will imply additional benefits beyond carbon reduction (for example, in terms of meeting the renewable energy target, increasing the diversity of our energy supply and promoting innovative technologies) which is not reflected in the analysis of cost-effectiveness.

Whilst the potential costs of supporting offshore wind are clearly considerable, it is a key technology. Wind is expected to make the largest single contribution to the 15% target for renewable energy in 2020. The chances of meeting the target will be reduced if such a significant amount of offshore wind projects do not proceed and the UK may be infracted if it fails to reach the target. The scale of UK offshore wind deployment will also bring the potential to provide significant business benefits and jobs, potentially attracting manufacturing and supply chain investment, although these will be mitigated by higher energy costs and displacement effects in the rest of the economy.

3) Transferring eligible microgenerators (up to 50kW) from the Renewables Obligation to the Feed-in Tariff scheme, and enabling new small generators (50kW – 5MW) to choose between the two schemes

The main impact of transferring eligible microgenerators from the RO to FITs and providing new small generators with a choice between the two schemes will be the potential change in level of subsidy cost to electricity consumers. This change could be positive or negative, since the levels of feed-in tariffs have not been set yet. It will also depend on the relative efficiency of the two schemes. The impact of different tariff levels is considered in the Impact Assessments for Feed-in Tariffs. Any differences in the level of support relative to the RO will ultimately feed back through to electricity consumers' bills.

Though there will initially be administrative costs to Ofgem in transferring microgenerators from the RO to FITs, it will be more cost-effective over the long term to maintain a single scheme for microgeneration rather than two schemes in parallel.[27] There will also be benefits from allowing

[24] Redpoint, forthcoming, *Implementation of the EU 2020 Renewables Target in the UK Electricity Sector: RO Reform*

[25] Available at: http://www.decc.gov.uk/en/content/cms/consultations/clean_coal/clean_coal.aspx

[26] The comparator is calculated as the weighted average (according to when the abatement occurs) of the discounted traded carbon price projection from 2010 to 2030.

[27] Although some technologies may only be eligible for support under the RO, assuming not all the technologies will be eligible for feed-in tariffs.

new small generators to choose between the RO and FITs, because it should enable them to pick the scheme that is more appropriate for them. Smaller generators are likely to find the FITs simpler and less burdensome than the RO.

Distributional impacts

Consumers will face higher costs than the UK economy as a whole as a result of these changes to the RO, and electricity suppliers and renewables generators will gain some rents. The overall consumer cost[28] from policy option 1A, minimum change to reach around 29% renewable generation in 2020 is estimated at £3.1 billion in 2020 and £42 billion total to 2030, while the net cost to the economy is estimated at £2.5 billion in 2020 and £34 billion total to 2030.

Policy option 2A, the offshore wind rebanding of projects, accrediting from April 2010 to March 2014, will increase net renewables subsidy costs[29] by around £4.9 billion total from 2010 to 2030 (compared to not changing the banding for offshore wind). It will increase rents to electricity suppliers and renewables generators. The total cost to the economy (compared to not changing the banding) is estimated at £4.6 billion.

As detailed above, there is an overlap in the assessment of the impacts of policy options 1A and 2A. The very approximate estimate of the consumer cost of both policies together taking account of the overlap is around £46 billion total from 2010 to 2030. The very approximate estimate of the total additional cost to the economy of policy options 1A and 2A together is £37 billion.

These impacts on consumer costs can also be described in terms of the impact on consumer electricity bills. This analysis has been carried out for policy option 1A only, minimum change. The table below shows the impacts on annual bills of minimum change, with an average over the period of 8% for domestic bills and 7% for industrial bills. Note these estimates do not consider the interaction of the different policies affecting electricity bills.

Table 4 Estimated impact of minimum change on consumer bills against the status quo counterfactual

Year	Percentage increase in domestic bills	Percentage increase in industrial bills
2015	1%	1%
2020	12%	11%
Average 2010 to 2030	8%	7%

All figures quoted to one decimal place

These impacts are very similar to those published with the RES and Low Carbon Transition Plan, which showed the impact of the extended RO as being a 12% increase to both domestic and industrial bills in 2020, and an annual average increase of 9% on domestic bills and 8% on industrial bills. The new estimates of bill impacts in this IA are slightly lower, as new estimates of carbon prices have pushed up the level of the counterfactual bills.

[28] Defined as the sum of the impacts on net renewables subsidy, balancing costs, wholesale prices and grid reinforcement costs.

[29] Net renewables subsidy is defined as the sum of RO subsidy, climate change levy exemption subsidy and balancing costs. Changes in net renewables subsidy are part of the impact on consumers. No estimate is made here of total cost to consumers of policy option 2A, offshore wind rebanding.

Enforcement

The RO is administered and enforced by Ofgem, who report annually on their administration of the RO and conduct regular audits in relation to compliance with the RO.

Monitoring & Evaluation

DECC is responsible for monitoring the impact of the RO on the development of renewable energy and collects detailed information on growth in renewable energy generation and projects under development.

Specific Impact Tests

Competition Assessment

The RO is a market-based instrument that operates in a competitive market for electricity. It is open to all participants in renewable generation. The way in which the RO recycles money from the buy-out fund should act as a positive incentive to competition between suppliers, and reduce barriers to entry for renewable electricity generators.

There has been some concern expressed that our proposals to increase RO support for offshore wind farms meeting particular criteria risks favouring those wind farms, compared with others who fail to meet the criteria, in connection with procuring particular services, e.g. jack-up boats. The Government do not believe that this is a significant risk. The aim of the policy change is to level the competitive playing field by providing wind farms which were adversely affected by the recent economic downturn with increased support to redress the competitive difference they are experiencing.

Small firms impact test

The major impact of the RO on the large majority of small business is likely to come from increased costs of electricity which, while affecting all electricity consumers, are likely to represent a larger proportion of income for smaller companies, as they are less likely to have their own generation compared to – particularly - larger industrial users with heavy electricity requirements.

The majority of smaller businesses involved in renewables generation are likely to be transferred over to FITs, the simplicity and income-certainty of which makes them better suited to small business needs. Small businesses involved in licensed electricity supply should not experience any additional burdens from the proposals.

Sustainable Development

The RO is aimed at increasing the deployment of renewable electricity generation in order to move the UK away from fossil fuel dependency towards a low carbon economy in preparation for a future when supplies of gas and oil will become tighter and more expensive.

The RO includes sustainability reporting requirements for the use of biomass in electricity generation. This will be reported annually and will help inform Government policy on sustainable use of biomass for electricity generation.

Carbon Assessment

The GHG emission reductions in the electricity sector will be determined by the overall cap on emissions (relative to what emissions would have been in the absence of the cap) and while the deployment of renewables in the electricity sector will reduce emissions in the UK power sector and help towards the meeting of the EU Emissions Trading Scheme cap on emissions, it will not result in *additional* GHG emission reductions overall in the EU above the reductions implied by the cap. There is, nevertheless, a benefit associated with these avoided carbon emissions in the UK power sector, in terms of avoided purchase of EU-ETS allowances (EUAs) and/or additional selling of EUAs.

The megatonnes of carbon saved in the UK power sector by minimum change and by offshore wind rebanding are reported below, alongside their valued at the forecast carbon price. Note there is a significant degree of overlap between these two policies, so the numbers are not additive.

Table 5 Estimated carbon saving within UK power sector of minimum change against the status quo counterfactual within UK power sector and associated value at forecast EUA price

Year	Mt of carbon dioxide	Value at forecast EUA price
2020	22	£380 m
Total to 2030	400	£10 bn

All figures quoted to two significant figures

Table 6 Estimated carbon saving within UK power sector of offshore wind rebanding against offshore wind counterfactual and associated value at forecast EUA price

Year	Mt of carbon dioxide	Value at forecast EUA price
2020	1.1	£19m
Total to 2030	32	£700m

All figures quoted to two significant figures

It has been very approximately estimated that around 84% of the impact of offshore wind rebanding against its counterfactual is not included in the impact of minimum change against its counterfactual. This implies a total impact of minimum change and offshore wind rebanding of around 420 megatonnes of carbon reduction, valued at around £11 billion.

Rural Proofing

A large proportion of renewable energy is produced in rural areas and affects businesses involved in the generation of renewable energy and rural communities living in the vicinity of new developments. Increasing the proportion of energy from renewable sources will mean more renewable energy developments in rural areas.

Certain forms of renewable development impact disproportionately on rural areas and there can be resistance to new developments. However, any resistance needs to be viewed in the light of Government's commitment to increasing renewable energy to meet its longer term goals and in order to tackle climate change. In addition, a high proportion of the new renewable generation needed between now and 2020 will take the form of offshore wind generation, some of which will be built some distance from shore.

Although there has been no separate or explicit assessment of the needs of rural areas, the proposals are set within this wider policy context and aim to ensure that the impacts on consumers and their bills are reasonable.

Separate legislation exists with a focus on ensuring that the environmental and social impacts of development are fully taken into account, outside the scope of the RO.

Development of RO policy has been subject to extensive consultation. This has previously included business interests within the renewables sector and consumer interests. It has also included relevant rural business groups (including NFU and CLA as well as wind sector) but has not sought to engage rural community groups in particular.

RO policy has also been informed by advisory boards including the Renewables Advisory Board and Biomass Implementation Advisory Group (BIAG). These are primarily industry groups and include rural business interests as appropriate (e.g. the NFU and CLA are represented on BIAG).

Environmental Impacts

The RO provides the Government's support scheme for renewables electricity generation. It incentivises investment in renewables projects which help to move the UK away from fossil fuel dependency towards a low carbon economy with consequential carbon savings from displaced fossil fuel generation.

Individual projects supported under the RO that are deemed to have the potential to cause significant adverse impacts are required to undertake an Environmental Impact Assessment (Directive 85/337/EEC) as part of the planning process.

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	Yes/No
Small Firms Impact Test	Yes	Yes/No
Legal Aid	No	Yes/No
Sustainable Development	Yes	Yes/No
Carbon Assessment	Yes	Yes/No
Other Environment	Yes	Yes/No
Health Impact Assessment	No	Yes/No
Race Equality	No	Yes/No
Disability Equality	No	Yes/No
Gender Equality	No	Yes/No
Human Rights	No	Yes/No
Rural Proofing	Yes	Yes/No