Summary: Intervention & Options URN: 09D/700

Department /Agency:	Title:	
DECC	Impact Assessment of changes to the Renewables Obligation (RO) (to be implemented in 2010)	
Stage:	**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.

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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 may require additional short term support under the RO, subject to the outcome of the review and consultation.

The UK intends to make use of flexibility mechanisms in the Renewables Directive to ensure it meets its targets cost-effectively. The RO will need modifying to allow generation from outside the UK to participate (subject to a number of conditions).

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?

To achieve an increase in large scale renewable electricity consumption in the UK from 4.5% in 2006 up to around 29% [RES lead scenario] by 2020 by:

- creating a longer term framework for the RO, removing the current cap of 20% on renewable generation and moving away from a fixed obligation level towards a headroom-only approach
- ensuring 3GW offshore wind projects currently under threat get sufficient support to proceed, subject to the outcome of the review and consultation.
- allowing non-UK generation to be eligible for RO support.

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

We have considered relying on "headroom only" or extending and increasing the line of fixed targets. The former is likely to be cheaper for consumers and no less effective. We also consider increasing the level of headroom.

As set out in the RES, extension of the RO to 2037 is necessary, but participation should be limited to 20 years. The 20% cap on renewable generation should also be removed but not replaced to allow us to reach our targets.

Temporary additional support through additional ROCs will be considered for some offshore wind generation.

The RO may be used to facilitate trading of renewable energy to contribute to our 2020 target. The RES sets out the circumstances under which the UK would be open to trading projects under the flexibility mechanisms provided by the EU Directive.

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 **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:

Summary: Analysis & Evidence

Policy Option: A	Description: Headroom only Option for 29% renewable generation

COSTS

ANNUAL COSTS	
One-off (Transition) **Yrs**	Description and scale of **key monetised costs** by 'main affected groups' Resource costs (net of cost of carbon, valued at the forecast carbon price) around £1.8 bn pa in 2020, and around £30.4 bn lifetime to 2030.
£	
Average Annual Cost (excluding one-off)	
£ 2.1 bn	**Total Cost** (PV) **£ approx 30.4 bn**

Other **key non-monetised costs** by 'main affected groups' Costs itemised are resources costs of RO extension, headroom increase, obligation size increase, 20 year participation period. Costs do not include onshore transmission and distribution costs.

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 is netted off the resource costs above, valued at the carbon price. Value of the carbon saved is £5.9 billion compared to the status quo.
£	
Average Annual Benefit (excluding one-off)	
£	**Total Benefit** (PV) **£**

Other **key non-monetised benefits** by 'main affected groups' Additional benefits could include diversifying the energy mix; reducing dependence on fossil fuels; business and employment opportunities in developing and deploying renewable energy technologies.

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 "status quo" of policies and measures set out in the 2007 Energy White Paper (ie pre-RES).

Price Base Year 2008	Time Period Years 20	**Net Benefit Range** (NPV) **£**	**NET BENEFIT** (NPV Best estimate) **£ -30.4 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 OGD
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?	Yes/No
What is the value of the proposed offsetting measure per year?	£ unknown

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: Constant Prices** **(Net) Present Value**

Summary: Analysis & Evidence

Policy Option: X (note this is not an alternative to A)	**Description: Increase in banding for offshore wind to 2 ROCs/MWh for one year then 1.75ROCs/MWh for a further year, before falling to 1.5ROCs/MWh.**

COSTS

ANNUAL COSTS	Description and scale of **key monetised costs** by 'main affected groups' Resource costs (net of cost of carbon, valued at the forecast carbon price) around £500m pa in 2020, and around £10 bn lifetime to 2030.
One-off (Transition) **Yrs**	
£	
Average Annual Cost (excluding one-off)	
£ 670m	**Total Cost** (PV) **£ approx 10 bn**

Other **key non-monetised costs** by 'main affected groups' Costs itemised are resources costs over 21 years of generation from 3 GW of offshore wind capacity that it is assumed would not go ahead without the increase in banding level. Costs do not include onshore transmission and distribution costs.

BENEFITS

ANNUAL BENEFITS	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 is netted off the resource costs above, valued at the carbon price. Value of the carbon saved is around £1.9 billion.
One-off **Yrs**	
£	
Average Annual Benefit (excluding one-off)	
£	**Total Benefit** (PV) **£**

Other **key non-monetised benefits** by 'main affected groups' Additional benefits could include diversifying the energy mix; reducing dependence on fossil fuels; bringing down the costs of the renewables target and carbon budgets; business and employment opportunities in developing and deploying renewable energy technologies.

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 "status quo" of policies and measures set out in the 2007 Energy White Paper (ie pre-RES).

Price Base Year 2008	Time Period Years 20	**Net Benefit Range** (NPV) £	**NET BENEFIT** (NPV Best estimate) £ **-10 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 OGD
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?	Yes/No
What is the value of the proposed offsetting measure per year?	£ unknown

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: Constant Prices** **(Net) Present Value**

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 central scenario) by 2020. Further growth will need to come from smaller-scale generation, including microgeneration.

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 1 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 levelised costs.

The Renewable Energy Strategy (RES) consultation last summer made the case for an expanded and extended RO as the framework for growth in deployment of large-scale renewable generation. We have recently published the final RES which provides a high-level framework for meeting our 2020 targets.

We have already made several announcements on the future of the RO. In the Pre-Budget Report last November, we announced our intention to extend the RO until at least 2037 and in the Budget in April, we announced our intention to review the support for offshore wind under the RO.

Consultation

The changes outlined in this impact assessment are intended to increase the effectiveness of the RO and include extending the RO to 2037, limiting participation to 20 years, removing the 20% limit on renewable generation and increasing the level of headroom.

This IA also looks at our proposals relating to the rebanding of offshore wind, the introduction of trading arrangements to allow for the import of non-UK renewable electricity and the arrangements to transition small scale renewable generation to the new Feed-In Tariffs (FITs) scheme. These proposals are subject to a statutory consultation (attached) which sets out more details. Responses to this consultation will inform the final version of the secondary legislation needed to implement these proposals - the Renewables Obligation Order 2010 (ROO 2010).

This IA should be read alongside the impact assessment covering the proposals on increasing the efficiency of the RO. These proposals are outlined in the same statutory consultation, but are at an earlier stage of development and will not be implemented by the 2010 Order.

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 needed. 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. Evidence suggests that the cost of deploying new technologies typically falls as volumes increase, supply chains are established and commitments to further expansion rise (Ref: UKERC, 2009, 'Decarbonising the UK Energy System: Accelerated Development of Low-Carbon Energy Supply Technologies')

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 of 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. If we want 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, we plan to implement changes to make the RO more effective in April 2010.

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 short-term additional support under the RO to these projects so that they come on-stream as originally envisaged. The outcome of the review and consultation will determine whether any changes are made.

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 capacity. 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.

Meeting the 2020 target will involve additional cost to consumers. The Renewable Energy Directive allows Member States to elect to participate in various flexibility mechanisms involving cooperating with other Member States and non-EU countries to achieve part of their respective targets. There is evidence that taking advantage of these flexibility mechanisms could reduce the cost to the UK consumer of compliance with the target. It would therefore make sense to provide for this option, if needed.

Objectives

The objectives of the proposals to be set out in the ROO 2010 are to:

- Extend the lifetime of the RO from 2027 to 2037
- Introduce a 20 year time limit on support under the RO
- Remove the 20% renewable electricity limit from the RO
- Retain the concept of headroom, replacing fixed targets after 2015/16, and, subject to consultation, increasing the level of headroom from 8% to 10%
- Modify the RO to allow renewable generation outside the UK, that meets specific criteria, to participate
- Subject to the outcome of the review and consultation, amend the RO so that some offshore wind projects qualify for an increase in ROC support.
- Enable transition of eligible microgenerators (up to 50kW) and small generators (50kW – 5MW) to the FITs scheme.
- Consider whether a change needs to be made to the co-firing cap

Extension of the lifetime of the RO

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.

Introducing 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. A 20 year RO participation period balances the need to provide investors with long term certainty with the cost of the RO scheme to consumers. The introduction of the new time limit on participation will be grandfathered to protect existing investments.

Removing the 20% renewable electricity limit from the RO

The current 20% limit on RO generation will restrict our ability to reach the higher target prescribed by the Renewable Energy Directive. Because of the uncertainty around predicting what the proportion of renewable generation needs to be for the target to be met as far ahead as 2020, we will remove and not replace this limit with effect from 1 April 2010.

Retaining 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. While the fixed targets currently in place should be retained, from 2016, RO targets will be set through the headroom mechanism only. In practice we expect that headroom will begin to determine RO target levels by around 2013, as deployment begins to catch up with targets.

Increasing the level of headroom from 8% to 10%.

Our recent research and industry feedback indicates that the current level of headroom of 8% above deployment levels is too low to give investors confidence that a ROC price crash will be avoided. We are therefore proposing to increase the level of headroom from 8% to 10% in 0.5% annual increments, beginning in 2010.

We are however consulting on whether a price stabilisation mechanism should be introduced to remove some or all of the risk to generators of ROC price fluctuations. If such a mechanism were to be introduced, then the increase in headroom might not be required and the headroom level would be revisited at that point. A separate IA covers this.

Offshore wind

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. DECC believes that, subject to the outcome of the review and consultation, there may be a need to increase the level of ROC support to these projects.

Transition of eligible microgenerators and small generators to FITs

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 microgenerators of most technologies that would previously have been eligible for support under the RO. Provision will need to be made to move these generators out of the RO and into the new FITs scheme. 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.

Modifying the RO to allow renewable generation outside the UK to participate, subject to meeting specific criteria.

Under the Renewable Energy Directive, there are a number of options for use of cooperation mechanisms (flexibilities) to which the UK intends to be open in order to reduce the costs of meeting its target. The UK's 15% renewable energy target will be particularly challenging given our relatively low starting point, and the use of flexibility mechanisms to meet the last percentage point could potentially save considerable sums that would of course have a corresponding impact on consumer bills.

Consideration of whether a change to the co-firing cap is necessary

Concerns have been raised on the effect of the co-firing cap on the ROC market for independent co-firers. We therefore commissioned consultants Oxera to look at these concerns in more detail. Their report is due to be finalised later this summer (2009), but interim findings from the report suggest that in the long run the cap is unlikely to have a significant impact on co-firing. However, in the shorter term – 2011-2014 – it is possible that the cap may restrict independent generator's ability to sell ROCs, due to large plants closing, for example older plant affected by the Large Combustion Plant Directive, running at a higher capacity than originally envisaged. As the recommendations and supporting analysis are not due to be published until later this summer this partial IA does not include any analysis on the impacts of any such change. The full IA will provide this later in the year.

Analysis of the options and the costs and benefits

- ***Increasing the effectiveness of the RO***

(i) 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.

(ii) Measures to increase the effectiveness of the RO: there are two main options for making the RO consistent with the 2020 target. These options are discussed below.

Option A Minimum Change/Headroom Only After 2015/16

- Extension of RO to 2037
- Extension of participation period to 20 years for new projects
- Fixed annual targets to 2015/16 and then headroom only
- 20% cap on Obligation size lifted
- Obligation size increased as necessary to maintain headroom
- Increase in headroom from 8% to 10% by 2014

Option B Fixed Targets + Headroom ("Fixed Target")

- Extension of RO to 2037
- Extension of participation period to 20 years
- Existing targets until 2012/13 and then linear interpolation to 2020 target (adjusted for net banding)[1]
- Obligation size increased (if required past this point) to maintain headroom
- Increase in headroom from 8% to 10%

Redpoint/Trilemna (2009) were instructed to look at the impact of each of these options on effectiveness (amount of renewable deployment) and efficiency (additional amount paid by consumers to the underlying generation costs). Details of the modelling assumptions and

[1] The logic for this target profile is that it provides an increased incentive ahead of 2015 but not before there is some prospect of the current bottlenecks in grid connection and planning having begun to reduce.

results from research conducted by Redpoint/Trilemma are summarised in their report '*Implementation of the EU 2020 Renewables target in the UK Electricity Sector: RO reform*, Published June 2009' published alongside the RES strategy.

Table 1 below compares the change in efficiency and effectiveness of the Fixed Target Option against the Minimum Change equivalent scenario of renewable deployment (28%) under several fossil fuel assumptions.

Table 1

	Fixed Target (Base Fossil Fuel Prices)	**Fixed Target** (Price shocks Fossil Fuel Prices)	**Fixed Target** (Low Fossil Fuel Prices)
Effectiveness (%)	**0%**	**0%**	**+0.5%**
Efficiency (%)	**0%**	**0%**	**-1.7%**

Note: All the scenarios are compared to the Minimum Change/Headroom Only Equivalent

The Base and Price Shock scenarios showed negligible differences. Low case results indicate that fixed targets make only a relatively small difference in effectiveness, whilst disproportionately reducing efficiency.

Definitions/Assumptions:

Costs are measured against a 'status quo', which is the counterfactual for assessing the impact of the different support schemes. It represents 'business as usual', where renewables policy follows the existing regime, with banding of the RO and an upper limit on the obligation size of 20%.

Resource costs presented are net resource costs, taking account of the value of carbon abated – valued at the forecast carbon price used in the Renewable Energy Strategy Analysis (see RES Analytical Annex available on the DECC website).

The maximum building rates were chosen with reference to external research by SKM consultants, who analysed barriers to renewable electricity and estimated possible scenarios of build of renewable technologies to meet the 2020 target.

Banding levels have been adjusted consistent with achieving a particular level of renewable generation

Additional assumptions on fossil fuel prices, carbon price, new plant costs and electricity demand are described in detail in the Redpoint study.

- ***Modifying the RO to allow renewable generation outside the UK to participate, subject to meeting specific criteria***

Meeting some of the renewables target through the trading mechanisms in the Renewable Energy Directive (paying for renewable deployment in other Member States or third countries; or importing directly connected renewable energy generation) could potentially save a significant proportion of the costs.

Based on the estimates of renewable potential among EU Member States developed by Pöyry (2008)[1], trading on a least cost basis with all European countries, renewable energy abroad could be purchased by the UK to count towards its target at £20/MWh. Renewable energy from France and Ireland only out of the EU-27 (directly connected projects only therefore), could be purchased at a significantly higher price. These trading costs are lower bounds, given that they

assume renewable energy abroad can be bought at cost. The savings from trading also depend on the domestic renewable energy generation which imported electricity is assumed to replace.

If the RO were to subsidise renewable electricity in countries across Europe, the scale of potential savings from trading one percentage point of the 15% target, could be of the order of £400-600m in 2020. The lower end of the range is based on trading with France and Ireland only; the upper end of the range is based on trading across the EU-27. It is assumed that trading replaces the most expensive domestic renewable generation in large-scale and small-scale electricity generation, renewable heat and renewable transport, proportionately according to their shares in the RES central scenario. These potential savings represent around 9-15% of total resource costs associated with the UK renewable energy target in 2020.

There is a high degree of uncertainty as to renewable energy potential around Europe in excess of Member States' domestic targets under the Renewable Energy Directive, and also as to the costs of meeting the targets domestically in the UK. These potential cost savings are therefore purely illustrative, and probably towards the upper end of the possible range since they do not take into account any costs of the trading mechanisms themselves.

Using the RO to realise some of these potential resource cost savings would imply extra administrative costs falling to the exchequer. There is also a risk that opening up the possibility of trading will diminish investor confidence in renewables in the UK. However, this risk should be mitigated by the strong signal given to investment of a clear, credible long-term market for renewables by the Renewable Energy Strategy; and by the fact that retaining the flexibility to use trading increases the UK's chances of hitting the challenging 2020 target.

- ***Amend the RO so that offshore wind projects qualify for an increase in ROC support, subject to the outcome of the review and consultation***

Evidence from Ernst & Young (2009)[2] suggests that the costs of offshore generation have increased significantly in recent years, and hence up to 3GW of offshore wind farms may not go ahead without increase support. The policy proposal is to increase the banding from 1.5 ROCs/ MWh to 2 ROCs/MWh for projects reaching financial close in 2009/10 and to 1.75 ROCs for projects reaching financial close in 2010/11. Alternative policy options 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

It is estimated that up to 3GW offshore wind could be eligible for the additional support. The resource cost to the economy of this generation relative to Combined Cycle Gas Turbine generation (the marginal plant) is estimated at up to £10bn (discounted) over the period from 2011 to 2031. Without this extra support, it is assumed that the 3GW of offshore wind capacity would not proceed, so the resource cost would not be incurred, but a lower level of offshore wind would be deployed. This impact assessment is considered against the counterfactual of pre-existing policies in place at the time of the 2007 Energy White Paper. If an alternative counterfactual were used – for example that of a particular scenario to achieve the Renewable Energy Strategy – then resource costs would be different. In particular, the headroom option

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

shown in this IA shows the minimum changes needed to meet the RES target. This includes some banding up of technologies to reach 29% large scale generation by 2020, and it is likely that the majority of the resource costs shown for this Offshore wind re-banding are covered in the Headroom-only costs.

Benefits

i) Carbon Abatement

There are also carbon-related benefits from offshore wind compared to fossil fuel generation. This reduction takes place in the EU-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 at the projected ETS carbon price, around £1.9bn (£1-2.6bn with low/high carbon price projections).

Offshore wind will play a key role 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)[3] 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[4]. 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.[5] It is also just for the year 2020; the overall effect over a longer time period would be much larger.

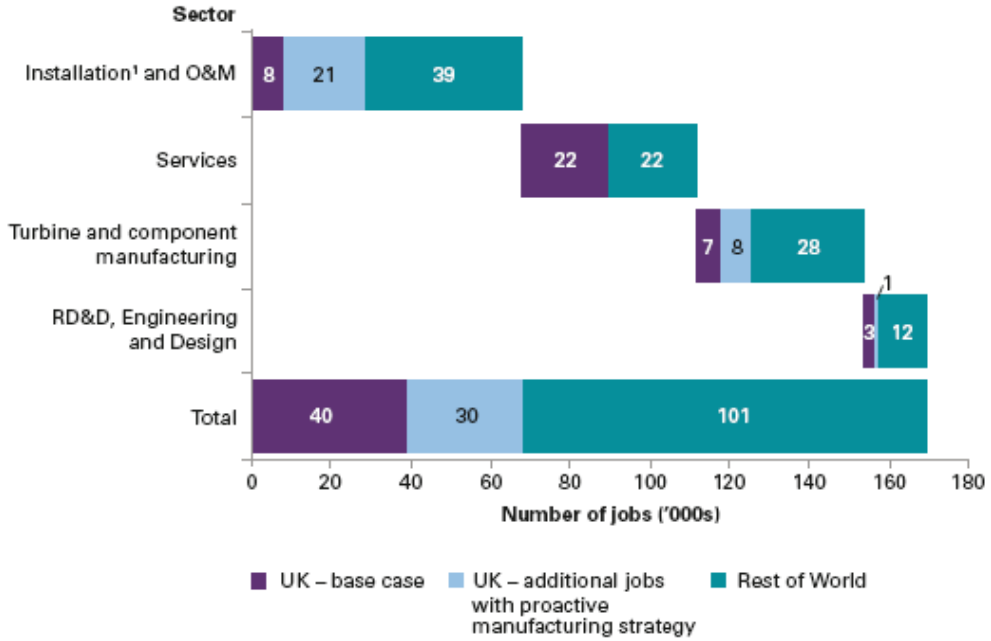
Forthcoming research from the Carbon Trust suggests that a high learning rate (successful innovation) combined with a high UK market share (through an active manufacturing policy) lift the net present value to 2050 of supporting offshore wind from - £1bn to over £65bn, which would imply the benefits of offshore wind support outweigh the costs, although this analysis is 'gross' and does not include 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.

[3] SKM (2008), *Quantification of Constraints on the Growth of UK Renewable Electricity Generating Capacity*
[4] UKERC, 2009, *Decarbonising the UK Energy System: Accelerated Development of Low-Carbon Energy Supply Technologies*
[5] Does not include higher RD&D cost of achieving the higher learning rate.

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 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 our ability to attract major turbine manufacturers to base their operations in UK, 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.



[1] Includes indirect jobs related to the installation and construction of turbines, foundations, substations and grid connections
Source: BCG analysis

The estimated additional jobs from the attraction of offshore wind manufacturers and the supply chain will be skilled and of high value. Innovas[6] 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 by that time, 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[7] and the

[6] Innovas, 2009, *Low Carbon and Environmental Goods and Services: an industry analysis*
[7] Implementation of EU 2020 Renewable Target in the UK Electricity Sector: Renewable Support Schemes. Redpoint et al (2008)

Renewable Strategy[8] 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.

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.

- ***Transferring eligible microgenerators (up to 50kW)) from the Renewables Obligation to the Feed-in Tariff scheme, and enabling new small generators (50kW – FITs upper limit) 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.

There may be transition costs for generators of <=50kW who will be automatically transferred from the RO to FITs. We are currently scoping out the possible level of these costs and developing proposals to mitigate them.

There will also be benefits from allowing 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.

Enforcement

The ROO 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

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

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. We do not believe that this is a significant risk but have asked that respondents to the consultation provide us with evidence. 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 a FITs, the simplicity and income certainty of which makes them much 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 help towards the meeting of the cap, it will not result in *additional* GHG emission reductions in the electricity sector above that implied by the cap. The Carbon saved is netted off the resource costs above, valued at the forecast carbon price. All assumptions used for this analysis, including fossil fuel and carbon prices, can be found in the Analytical Annex published with the Renewable Energy Strategy.

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

Annexes

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