

dti

**RENEWABLE
ENERGY**

Reform of the Renewables
Obligation

MAY 2007

This consultation is published alongside the Energy White Paper *Meeting the Energy Challenge*. The wide range of measures set out in the White Paper take forward our commitment to meeting the two long-term energy challenges. They are:

- tackling climate change by reducing carbon dioxide emissions both within the UK and abroad; and
- ensuring secure, clean and affordable energy as we become increasingly dependent on imported fuel.

Further information on the White Paper and related documents is available on the DTI website: www.dti.gov.uk/energy/whitepaper/consultations

Renewable Energy

Reform of the Renewables Obligation

Why is DTI conducting this consultation?

In the Energy Review Report: *The Energy Challenge* the Government set out a series of proposals for the reform of the Renewables Obligation (RO). These were the subject of a consultation, *Reform of the Renewables Obligation and Statutory Consultation on the Renewables Obligation Order 2007*, issued in October 2006.

The Energy White Paper, *Meeting the Energy Challenge*, published on 23 May 2007 sets out how the RO will be reformed. This consultation sets out, and seeks views on, the detailed implementation of the changes that are being introduced. These include:

- extension of the obligation level to a maximum of 20% on a headroom basis;
- ‘banding’ the RO to provide groups of technologies needing similar levels of support with the encouragement to bring forward generation solutions; and
- removal of the current caps on co-firing.

These changes to the RO are subject to the necessary State Aid clearance and the successful passage of primary legislation. It is our intention to introduce a bill when Parliamentary time allows. This would mean the changes coming into force on 1 April 2009 at the earliest. However, to provide the certainty that investors need the Government is seeking views now on the precise arrangements and banding levels that would apply after the legislation is in place.

A Regulatory Impact Assessment is included in this consultation document.

Issued on: 23 May 2007

Respond by: 6 September 2007

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Foreword by Lord Truscott, Parliamentary Under Secretary of State for Energy



Energy is essential to almost every aspect of our lives and the success of our economy. *Meeting the Energy Challenge* highlights the challenges we face in addressing climate change and ensuring security of energy supplies. *Meeting the Energy Challenge* sets out the Government's new international and domestic energy strategy to respond to these changing circumstances, address the long-term energy challenges we face and deliver our goals. A key part of responding to this challenge is to increase the proportion of our electricity coming from renewable sources by supporting the deployment of new generating capacity through the Renewables Obligation.

The Renewables Obligation (RO), which came into force in 2002, is the Government's main policy measure for supporting the development of renewable electricity in England and Wales. The Scottish RO and the Northern Ireland RO support the development of renewable electricity generation in Scotland and Northern Ireland respectively; all three Obligations are closely linked, creating a strong UK market for renewable electricity. The RO has been successful in stimulating growth in renewable electricity generation – it has more than doubled since 2002 – and a project pipeline of more than 11 GW is in place across the UK.

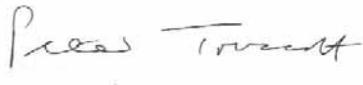
However, there are constraints on the availability and deployment of the cheaper forms of renewables. This means that to move beyond 10% of electricity generated from renewable sources and towards the Government's long-term aspirations for renewable energy other technologies, such as offshore wind and biomass, need to come forward. More generally, it is necessary to ensure that the right long-term framework is in place to support investment decisions today.

That's why, during the Energy Review, the Government looked closely at a number of options for reforming the RO. Our proposals, set out in the July Energy Review Report and subsequent consultation, aimed to address these challenges. In *Meeting the Energy Challenge* the Government set out its decisions on the future direction of the RO.

In addition, March's Spring Council saw EU leaders approve a climate change and energy package including a binding target of a 20% share of renewable energies in overall EU consumption by 2020. It is too early to be certain on the UK target within this overall figure until the Commission establishes its burden sharing criteria. However, it underlines the importance of our domestic ambitions to continue to see an increasing proportion of our electricity coming from renewable sources. The changes set out in *Meeting the Energy Challenge*, and detailed in this document, will set us further along the path to meeting these ambitions.

The proposed changes are dependent on the passage of legislation. However, recognising the need of the investor and development community for as much detail and certainty on the future regime as early as possible, this consultation sets out in detail how the new regime will operate when it comes into force. It also seeks views on the banding arrangements and levels that will apply.

Responses to the consultation will be considered carefully before finalising the banding arrangements.

A handwritten signature in black ink, appearing to read "Lord Truscott".

Lord Truscott
Parliamentary Under Secretary of State for Energy

1. Introduction

Summary of Proposals

1.1 The Energy White Paper, *Meeting the Energy Challenge*, announced the Government's decision on future reform of the Renewables Obligation (RO) for England and Wales. This follows last year's Energy Review Report which announced our intention to:

- a. increase the level of the Obligation above the level previously announced if actual generation requires, to a maximum level equivalent to 20%;

And the "*Reform of the Renewables Obligation and Statutory Consultation on the Renewables Obligation Order 2007*" which closed on 5 January 2007 which proposed to:

- b. band the RO to provide differentiated levels of support for different technologies;
- c. introduce a mechanism intended to maintain Renewables Obligation Certificate (ROC) prices in a situation of ROC oversupply.

1.2 The Government believes banding the RO will provide the flexibility necessary to increase deployment of renewable electricity generation in the years following 2009 and respond to the UK share of the EU 2020 target. Any changes to the Obligations in Scotland and Northern Ireland will be subject to separate consultations and Parliamentary agreement, once the necessary primary legislation has been secured.

1.3 The approach that the Government has taken has focused on the period up to 2015. Deployment beyond 2015 will depend strongly on developments in technological innovation, technology costs and other policy instruments aimed at mitigating the effects of climate change, in particular greenhouse gas emissions. When considering proposals to band the RO, our objectives were to:

- bring on additional deployable technologies by providing appropriate levels of support and certainty for future investments through the RO while maintaining broadly similar costs to consumers;
- protect the position of existing renewable energy projects and investors and also those projects under construction or which come into operation prior to the introduction of a new regime; and

- allow adjustments to the RO to avoid over-subsidisation of technologies as costs and revenues evolve.

- 1.4** The Government recognises that banding the RO represents a significant amendment to the current system. This consultation sets out the proposed way forward, identifying questions remaining to be answered on the detailed arrangements to apply when the reforms to the RO are introduced. It also includes details of the transitional arrangements that will apply in the run up to the new arrangements being brought into force.
- 1.5** The Government will consult widely on the issues raised in this consultation document over the next fifteen weeks, in accordance with Government guidance on public consultation exercises.

Timetable

- 1.6** The RO is set out in legislation called the Renewables Obligation Order (ROO). This is a form of secondary legislation known as a Statutory Instrument. It sets out the detail of the RO and can only be amended if it is first subject to a consultation and then debated and approved by both Houses of Parliament.
- 1.7** The powers enabling the Government to introduce the ROO are set out in the enabling primary legislation. The primary legislation for the ROO is the Electricity Act 1989 as amended, for example by the Energy Act 2004, which enabled the ROO to accommodate the introduction of the Northern Ireland Renewables Obligation. Banding the RO will require further modifications to the primary legislation through a new Act of Parliament. This process can take some time.
- 1.8** Although changes will not be introduced until 1 April 2009 at the earliest, the Government recognises that both the investment and development communities need to have as much certainty as possible over the future regulatory framework, if projects are not to be delayed. This consultation sets out for comment arrangements that the Government proposes to bring forward via future legislation (primary and secondary) in a way which should provide the reassurance that investors are seeking.
- 1.9** Following this consultation, the Government will take a decision on the form that a banded RO will take. A statutory consultation on the details of the implementation will be required.
- 1.10** These changes will be contingent on obtaining State Aid approval from the European Commission as the recycling of the buy-out fund is considered to be a state aid. The original RO was notified to the Commission and approved prior to its introduction in 2002 and subsequent changes have also been notified to and approved by the Commission.

How to respond

- 1.11** Responses to this consultation must be received by 6 September 2007. These can be submitted by e-mail, letter or fax to:

Stephen Clark
Renewables Obligation Policy
Department of Trade and Industry
2nd Floor
1 Victoria Street
London SW1H 0ET

Tel: 020 7215 5014
Fax: 020 7215 2890
E-mail: roco.info@dti.gsi.gov.uk

- 1.12** When responding please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of an organisation, please make it clear whom the organisation represents and, if applicable, how members' views were assembled.

Additional copies

- 1.13** You may make copies of this document without seeking permission. Printed copies of the consultation document can be obtained from:

DTI Publications Orderline
ADMAIL 528
London SW1W 8YT

Tel: 0845 015 0010
Fax: 0845 015 0020
Minicom: 0845 015 0030
www.dti.gov.uk/publications

- 1.14** An electronic version can be found at www.dti.gov.uk/files/file39497.pdf

Confidentiality & Data Protection

- 1.15** Your response may be made public by the DTI. If you do not want all or part of your response or name made public, please state this clearly in the response. Any confidentiality disclaimer that may be generated by your organisations' IT system or included as a general statement in your fax cover sheet will be taken to apply only to information in your response for which confidentiality has been specifically requested.

- 1.16** Information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the access to information regimes (these are primarily the Freedom of Information Act 2000 (FOIA), the Data Protection Act 1998 (DPA) and the Environmental Information Regulations 2004). If you want other information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence.
- 1.17** In view of this, it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the Department.
- 1.18** The Department will process your personal data in accordance with the DPA and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.

Help with queries

- 1.19** Questions about the policy issues raised in the document can be addressed to Stephen Clark at the address in paragraph 1.1.
- 1.20** If you have comments or complaints about the way this consultation has been conducted, these should be sent to:
- Kathleen McKinlay, Consultation Co-ordinator
Department of Trade and Industry
Better Regulation Team
1 Victoria Street
London SW1H 0ET
- E-mail: Kathleen.McKinlay@dti.gsi.gov.uk
Tel: 020 7215 2811
Fax: 020 7215 2235
- 1.21** A copy of the Code of Practice on Consultation is in Annex C.

2. Banding the Renewables Obligation

Summary of Chapter 2

- Subject to Parliamentary approval, the Government will introduce banding.
- Banding the RO is predicted to increase the deployment of renewables by over 40% over 2009-2015 compared to the existing RO.
- Banding will follow the multiple/fractional ROC model.
- The Obligation on suppliers will be to present a certain number of ROCs rather than to supply a certain amount of renewable electricity.
- Bands will be based on technology groupings.

2.1 The RO was introduced in 2002 and represents the Government's main policy measure for stimulating the growth of electricity generation from renewable sources¹; and for achieving both the target of 10% of electricity from renewable sources by 2010 and our aspiration to double this to 20% by 2020. The RO in its current form is designed to bring forward the most economic renewable technologies and so levels of support do not differentiate between technologies.

Future development of renewables in the UK

2.2 The Government believes that renewables have a significant role to play in the future electricity generation mix and that the stimulus provided by the development of a carbon market through the EU Emissions Trading Scheme (EU ETS) and the RO will lead to further growth in renewables development over the coming years. However, the pace of growth towards the Government's target (and aspiration) for renewable electricity could be constrained by a number of factors, in particular: delays in the planning and grid connection of renewable energy projects, constraints on the practical resource available for the most economic forms of renewable energy, and the higher costs of renewable energy projects in less mature or emerging technology areas, such as offshore wind and biomass.

¹ www.dti.gov.uk/energy/sources/renewables/policy/obligation/page15630.html

- 2.3** The Government recognises the urgency in tackling planning and grid constraints, both in terms of accelerating deployment and reducing project risk and costs. *Meeting the Energy Challenge*² discusses the steps the Government is taking to address barriers in these areas. Taken together we believe that these changes will significantly improve the development lifecycle, reducing development costs and risks.
- 2.4** There are constraints on the availability and deployment of the cheaper forms of renewables which mean that, to meet the Government’s long-term targets for renewable energy we will need a significant contribution from renewable sources that are currently more expensive. As a technology-neutral instrument, the RO has thus far proved less successful in bringing forward development of the less well developed renewable technologies.
- 2.5** The majority of respondents agreed that, in the absence of additional funding through separate mechanisms, banding the RO was the best option. The modelling Oxera³ have carried out for us indicates that leaving the RO unchanged will mean that we will not be on a trajectory to achieve our aspiration of doubling our 2010 target of 10% renewable generation by 2020. Under the central assumptions⁴ for the model an unchanged RO is predicted to deliver 8.1% (26.8 TWh) and 11.4% (39.3 TWh) of electricity from ROC eligible renewable sources by 2010 and 2015 respectively. It is clear that a change is necessary to increase deployment and flexibility for the RO within acceptable costs to consumers.
- 2.6** Our decision to band was also informed by our own modelling of the changes and associated cost benefit analysis. This work was based on:
- an analysis and informal consultation on current market costs of each technology. This work was undertaken on our behalf by Ernst & Young. A report, giving details of the cost review findings and those organisations consulted, can be found at www.dti.gov.uk/files/file39038.pdf; and
 - modelling of the renewable electricity market, undertaken on our behalf by Oxera. Details of this work are also published at www.dti.gov.uk/files/file39039.pdf.

Details of our cost benefit analysis are available in the attached Regulatory Impact Assessment. In summary, modelling (using the Central Assumptions for future technology costs and electricity prices) suggests that we will be able to deliver 13.5% of electricity from ROC eligible renewable sources by 2015 under a banded scenario (7.4 TWh additional generation). The increase in ROC eligible renewable electricity between 2009 and 2015 is over 40% higher than under the base scenario. These figures do not take account of the renewable technologies which are not supported by the RO, including existing large hydro-electric schemes, conventional Energy from Waste (EfW) power stations and microgeneration installations not

2 www.dti.gov.uk/energy/whitepaper/

3 www.dti.gov.uk/files/file39039.pdf

4 The central assumptions include: the electricity and carbon prices from the central scenario of the Updated Energy Projections (UEP) forecast; that future costs of renewable technologies are those predicted by Ernst and Young. The central assumptions do not include any of the expected benefits from reform of the planning and grid access regimes set out in *Meeting the Energy Challenge*.

claiming ROCs. We estimate that this will amount to around 6.2 TWh of electricity supply by 2015.

Proposed approach

2.7 The earlier consultation considered two potential broad approaches to banding the RO:

- award more than 1 ROC per MWh (multiple ROCs) to some technologies, and less than 1 ROC per MWh (fractional ROCs) to others (this document refers to this approach as the ‘multiple ROC’ approach); and
- create separate obligations for the different technologies, with different buy-out prices and targets (the ‘multiple obligation’ approach).

2.8 The Government believes the multiple ROC approach has a number of clear advantages:

- it leaves it up to the market to decide what generation mix is appropriate and in so doing should promote better decision-making that takes into account all aspects of project development and operation;
- it reduces the overall complexity of banding, recognising that banding makes the RO more complex; and
- simplifies the protection of existing projects.

2.9 It is important to note that while we refer to fractional and multiple ROCs, in practice Ofgem will continue to issue whole ROCs. The multiple ROC approach means that a technology in the 0.25 ROC per MWh band will have to generate 4 MWh in order to claim 1 ROC, and a technology in a 2 ROC per MWh band will need to generate 0.5 MWh to claim 1 ROC. The number of ROCs will be calculated by multiplying the electricity generated from a given project for each power station’s monthly (or annual) ROC claim during an obligation period by the banding index and rounding any partial ROCs of 0.5 or greater up to the nearest whole ROC and any below 0.5 ROCs down. For example, an offshore wind farm generating 2,001 MWh in a month will receive 3,002 ROCs. This is calculated by multiplying the amount of generation in MWh by the banding factor for offshore wind which is 1.5 which comes to a total of 3,001.5. This number is then rounded up to 3,002.

2.10 The majority of respondents to the recent consultation on the proposal to introduce banding supported this approach.

Key principles

2.11 In introducing banding, the Government believes that the following key principles are essential to ensure the success of the system:

- grandfathering – the position of those who have made significant investments should be protected in terms of the number of ROCs they receive (this issue is discussed in Chapter 4);
- notification – any reduction in support for a technology should only be made after a reasonable notice period. This should be at least enough time for a typical project to go from financial close to operation;
- transparency – the process for setting the bands should be open and clear and involve consultation with industry and other key interested parties; and
- reliability – the market should have confidence that the bands will be set on the basis of an independent and objective assessment of the commercial position and prospects of different renewable technologies.

2.12 These principles were endorsed by the vast majority of the consultation responses, and have formed the basis for the arrangements set out in this document. Banning the RO on this basis provides the opportunity to:

- increase total renewables growth;
- increase RO efficiency in terms of renewables capacity with only moderate increase in the costs to consumers;
- help bring forward developing technologies.

How will a multiple ROC Obligation work?

2.13 As it stands, the RO places an obligation on electricity suppliers to supply a certain amount of eligible renewable electricity (evidenced by presenting ROCs), or to pay a buy-out price. But with a banded RO, one ROC will not necessarily be equivalent to one MWh of renewable electricity – it could be more or less, depending on the technology. The number of ROCs presented by an electricity supplier at the end of an obligation year will no longer exactly represent the volume of renewable energy in MWh supplied by that supplier.

2.14 For this reason, the introduction of a banded multiple ROC obligation would involve converting the existing legislative obligation on suppliers to supply a specified proportion of electricity from eligible renewable sources (or pay a buy-out price) into a legislative obligation to present a specified number of ROCs (or pay a buy-out price). In practice, as evidence of renewable electricity supply is demonstrated by the presentation of ROCs, electricity suppliers already operate on this basis within the current RO.

2.15 The Government proposes that in the first instance this conversion to a ROC obligation would be made on the basis of the Government's announcements on RO levels and retaining (for the purposes of calculating the ROC obligation) the 1:1 relationship between a supplier's obligation in MWh and their obligation in ROCs.

- 2.16** Thus for example, the RO level for 2011/12 is set at 11.4%. For an electricity supplier with sales of 50 TWh, this would represent, under the current RO, an obligation to supply 5.7 TWh, or 5,700,000 MWh, of electricity from renewable sources. Under a banded RO, this would be converted to an obligation to present 5,700,000 ROCs (or to pay a buy-out price for each ROC not presented). This approach may in time be overtaken by the implementation of headroom (see Chapter 5).
- 2.17** Another implication of the change to a banded RO with a legislative obligation to present ROCs is that suppliers could meet their obligation by supplying either more or less actual renewable energy than would be the case under the present system. Continuing the example in paragraph 2.16, a supplier with an obligation to present 5,700,000 ROCs could potentially meet that obligation using either mainly renewable energy sources that attracted multiple ROCs or mainly through renewable energy sources that were awarded fractional ROCs. In the former case, the supplier would supply less actual renewable electricity than under the current RO (but with higher proportions from more expensive and developing renewable technologies). In the latter case, the supplier would supply more actual renewable electricity than under the current RO.
- 2.18** Later in this Chapter we explain how future RO levels will be set. Under our guaranteed headroom proposals future increases in RO levels will be calculated on the basis of the number of ROCs expected to be in circulation. This mitigates the risk that breaking the 1:1 equivalence between MWh and ROCs could undermine the RO, either by entrenching high levels of recycling or reducing or even eliminating the future revenue certainty that guaranteed headroom is designed to provide.

Net neutrality of Banding

- 2.19** The creation of a banded multiple ROC obligation breaks the existing direct link between the overall size of the electricity market, and the actual amount of renewable energy which would be required to meet the RO. Therefore, the Government recognises that decisions on bands might have the effect of either putting more ROCs into the market than the number of MWh generated (this may be referred to as “net banding up”) or fewer ROCs than MWh (“net banding down”).
- 2.20** While some element of net banding up or down is almost inevitable in a banded RO, the Government’s view is that it will be important to set bands in a way which preserves the overall stability of the ROC market. This is especially the case given the Government’s announcements on RO levels in the Energy Review Report⁵ (see Chapter 5 of this document for further discussion) which seek to add additional long-term certainty to the minimum ROC price likely to be achieved in a banded RO.

5 www.dti.gov.uk/energy/review/

- 2.21** On this basis, in our recent consultation document, the Government indicated that, for the purposes of retaining the credibility of the RO as the key mechanism for achieving the Government’s renewable energy targets, it would be important to aim to achieve a broad balance between the additional supply of ROCs created by “banding up” of certain technologies with the reduced supply of ROCs created by the “banding down” of others. In short, the aim would be to ensure that, for example, an RO level of 13.4% in 2013/14 could be satisfied by something reasonably close to 13.4% of actual renewable energy.
- 2.22** Our proposal to set future bands on a net neutral basis attracted a significant level of comment. Most responses suggested that fixed targets for net neutral banding would be too difficult to achieve and maintain given current technology costs. In addition such an approach could artificially constrain the level of support provided to each technology, leading to less overall generation than might otherwise be the case.
- 2.23** Although our general intention would be to aim for a net neutral banding approach, we acknowledge that the risks set out above exist and on that basis we will not strictly apply this approach in setting banding levels.
- 2.24** The overriding goal of the RO remains to promote the deployment of renewables at a reasonable cost to consumers in a way that best supports progress towards our 10% target and aspiration to double this by 2020. On that basis, we believe net neutrality remains an important guiding principle in informing future decision-making to ensure that the RO supports progress towards these targets and maintains both consumer and investor confidence. We believe that this can be delivered by future reviews of banding taking into account the principles set out at paragraph 4.4 – in particular that the bands should be set taking into account the impact on the number of ROCs likely to be in the market, and aim to maintain investor confidence and ensure that consumers get value for money.

Number of Bands

- 2.25** In the recent consultation the Government proposed that bands should be set by technology, and asked for views on whether bands could also cover sub-sets of technologies (for example, separate bands for smaller and larger projects). In doing so, we recognised the trade-off between the ability to fine-tune support to projects and the increasing complexity of the RO – the more bands there are, the more complex it will be to administer and potentially to predict ROC values.
- 2.26** More than two-thirds of the responses to the consultation agreed that bands should be set by technology. However many responses argued that, at least initially, technologies should be grouped so that those at an approximately equivalent position in technology development and cost should be grouped together. When asked directly how many bands there should be the majority argued for no more than six bands.

- 2.27** Our approach has been to assess the expected current and forward costs over the next few years for each of the technologies set out in our previous consultation document. We have found that these costs⁶ seem to fall into loose groupings which reflect at least in general terms the market and technological development that the technologies have reached to date. We are, however, also aware that there is a considerable degree of uncertainty over cost predictions, as has been evidenced in the movements in costs over the past two years since previous studies⁷. For example the cost of wind generation has risen by over 20% mostly due to higher international demand driving increased prices for wind turbines. Given these uncertainties, the Government does not think it appropriate to make fine distinctions between the levels of support given to different technologies but rather to take groups of technologies and set support levels which reflect the general position of that group.
- 2.28** The costs arise from two principal sources, capital costs which are often the major issue for technologies such as wind, and fuel costs which are most significant for the biomass using technologies. Taking both of these sources of cost into account the Government has identified groups which can in the initial phase of a banded RO be treated in similar fashion. These bands are set out in Chapter 3. The allocation of technologies to these groups result from an empirical observation of the costs they face and does not mean that the numbers of bands and distribution of technologies may not change in future (after appropriate consultation).

6 www.dti.gov.uk/files/file39038.pdf

7 Enviro, *The costs of Supply Renewable Energy*, Sept 2005 www.dti.gov.uk/files/file21118.pdf

3. Proposed Bands for implementation from 1 April 2009

Summary of Chapter 3

- 4 bands are proposed:
 - technologies in the Established Band will receive 0.25 ROCs/MWh;
 - technologies in the Reference Band will receive 1 ROC/MWh;
 - technologies in the Post-Demonstration Band will receive 1.5 ROCs/MWh;
 - technologies in the Emerging Technologies Band will receive 2 ROCs/MWh.
- Microgeneration projects will be placed in the same bands as large scale generation using the same technology.

3.1 This Chapter sets out the bands that, subject to the outcome of this consultation and a statutory consultation on a future Renewables Obligation Order, will apply when the new arrangements are brought into force. The target date for implementation is 1 April 2009 subject to the availability of Parliamentary time and State Aids clearance. We are setting the bands out now to provide a clear view for developers to build projects with confidence. An early indication is necessary to prevent any delay as renewable projects can take several years to develop.

3.2 In order to assess the banding levels, we commissioned Ernst and Young to look at the costs of RO eligible technologies. Their report is published alongside this consultation⁸. Ernst and Young used their own experience of financing renewable projects, existing reports and consultation with interested parties to produce an estimate of the levelised cost (including capital, cost of capital, fuel, operating and maintenance costs) per MWh for each technology at four key points – 2006, 2010, 2015 and 2020. The levelised costs are presented as a range to illustrate that costs can vary due to a number of factors (grid, planning, wind speed, efficiencies) for each technology. The range, and the spread of projects across it, is not necessarily the same for each technology. This also reflects the uncertainty in costs going forward for emerging technologies and learning curve effects.

⁸ www.dti.gov.uk/files/file39038.pdf

3.3 It is not the Government’s intention through banding to provide all projects with exactly the support level they need. This would not incentivise developers to site and build economic projects or reflect some of the natural constraints on the limits of future resource. For example we do not think that multiple ROCs should be provided for the development of wind farms at sites where wind speed is low and grid or customers are distant. The RO was developed as a market mechanism to pull forward the most economic and efficient projects and this remains our aim within the bands set out below. This ensures that the cost to the consumer is minimised and market principles are maintained.

3.4 The Government is proposing a banding regime based on modelling taking into account our policy objectives (set out in Chapter 2). Cost data on eligible technologies were fed into an economic model of the renewables generation market which takes into account revenue from electricity, Climate Change Levy Exemption Certificates (LECs) and the carbon price. A report of the modelling work is published alongside this consultation⁹. The modelling shows that electricity and carbon prices are currently not sufficient to promote deployment for all projects from any technology without support from the RO. A variety of support scenarios were run through the model to assess the impact on:

- generation;
- resource costs;
- costs to the consumer, firms and the Exchequer.

The costs and benefits of options are discussed in further detail in the partial Regulatory Impact Assessment accompanying this consultation.

Overview of Proposed bands

3.5 The following table and sections provides an overview of each proposed band. Annex D provides an overview of technology costs and current deployment and future deployment levels.

Band	Technologies	Level of support ROCs/MWh
Established	Sewage gas; landfill gas; co-firing of non-energy crop (regular) biomass	0.25
Reference	Onshore wind; hydro-electric; co-firing of energy crops; EfW with combined heat and power; other not specified	1.0
Post-demonstration	Offshore wind; dedicated regular biomass	1.5
Emerging technologies	Wave; tidal stream; advanced conversion technologies (anaerobic digestion, gasification and pyrolysis); dedicated biomass burning energy crops (with or without CHP), dedicated regular biomass with CHP; solar photovoltaics; geothermal	2.0

⁹ www.dti.gov.uk/files/file39039.pdf

Established – 0.25 ROCs/MWh

- 3.6** There are some technologies which are relatively mature and low risk in that they require low levels of capital investment sometimes on existing sites and may have other regulatory requirements or income streams to support their business cases. These include the generation of electricity from:
- **Landfill gas (LFG) and sewage gas.** The technologies deployed to convert the gas into energy are well developed in comparison to many and sites are often located relatively close to grid connections. The use of LFG is subject to the Landfill Regulations (2002) which imply that LFG should be combusted in an engine wherever feasible or else it must be flared. The generation capacity for sewage gas is assumed to be essentially saturated. The cost analysis and modelling work we have commissioned predicts that despite the low costs that they face there would be little additional growth in the capacity even under an unbanded RO.
 - **Co-firing of regular biomass.** This requires comparatively little additional investment and receives (in the case of coal-fired power stations) increased incentives from the additional avoided costs from EU ETS carbon price. The modelling assumes that EU ETS will produce a cost of carbon of €20/tonne CO₂ in 2010. The avoided cost of co-firing is that of the coal and carbon avoided. This amounts to £28.40/MWh in 2010/11. A more detailed consideration of the issues surrounding co-firing and biomass more generally is set out in Chapter 6.

Reference Band – 1 ROC/MWh

- 3.7** Technologies which are relatively mature but require significant capital investment include onshore wind farms and hydro-electric schemes. Also included in this band will be EfW power stations which produce combined heat and power (CHP) and the co-firing of energy crops. The rationales for their inclusion are discussed below.
- **Onshore wind and hydro-electric** are both well established technologies but which require significant capital investment proportionate to the electricity generated. They also have a wide range of levelised costs which reflects the degree to which their output is dependent on the energy from the wind or water which passes through the turbine. Onshore wind is assessed as having a significant potential to deploy new capacity over the lifetime of the RO although the cost effectiveness will decline if the most advantageous available sites are developed first. The availability of further economical hydro-electric sites is significantly more limited.
 - **Co-firing Energy Crops:** The energy crop supply chain is under-developed, resulting in higher costs for projects that want to use energy crops. The Government also believes that there is a policy rationale for supporting the development of energy crops for the longer term future of the renewable energy market¹⁰. Generation of electricity using energy crops can therefore generally

¹⁰ www.defra.gov.uk/environment/climatechange/index.htm

expect to be in a higher band than equivalent technologies using “regular¹¹” biomass (except those that fall into the emerging technology band). This will provide certainty for those planting energy crops and recognises the fact that energy crops often need to be planted some years ahead of first harvest. There is also the need to promote the supply chain and necessary processing centres to enable large scale utilisation of energy crops. The issue of energy crops is discussed in more detail in Chapter 6.

- **EfW with CHP:** The Ilex report on extending eligibility to EfW with CHP¹² estimated that increased deployment of EfW with CHP power stations would lead to additional carbon savings above and beyond ineligible EfW facilities. The Ernst and Young report took into account the additional income from waste gate fees, and indicated that we need to maintain support at the level equivalent to this band. We also propose to address the barriers to accreditation under the RO that this fuel supply faces (see Chapter 6).
- **Others:** Projects that apply for accreditation under the RO and future technologies that have not been allocated a particular band will join the RO within the reference band pending the next review of the bands.
- **Tidal Impoundment:** Tidal impoundment technologies such as tidal barrages or lagoons work on similar principles to conventional hydro-electric schemes containing water behind a dam to be released to drive a turbine, as opposed to tidal stream technologies discussed at paragraph 3.9. This technology has not been included in our cost analysis to date. Chapter 5 of *Meeting the Energy Challenge* contains details of a major study underway on tidal power. The study is looking at a broad range of issues including the economics of tidal impoundment technologies and so will inform further analysis on the RO's role in supporting this technology.

Q1: Are there any technologies that will fall into the reference band as ‘others’ that should be given a different support level? Please provide evidence as to the technology and cost.

Post-Demonstration Band – 1.5 ROCs/MWh

3.8 There is a further group of technologies where the technology is relatively well developed but the deployment in a commercial fashion still presents significant challenges.

- **Offshore wind** is a technology which is now ready for large scale deployment but faces higher costs and risks than the more mature onshore wind sector. As a result offshore wind does not receive enough support from the RO in its current form and is justified in receiving greater levels of support. The overall assessment of the potential deployment of offshore wind over the period to 2015 is greater than that for onshore wind.

¹¹ “Regular” here refers to biomass which is neither waste nor energy crops as defined in the Renewables Obligation Order 2006 and amended by the Renewables Obligation Amendment Order 2007.

¹² www.dti.gov.uk/files/file22325.pdf

- **Dedicated Biomass power stations:** The analysis in the Ernst and Young report suggests that dedicated biomass projects do not at present receive enough support, but have the potential to deploy increased capacity over the coming years. Existing projects have come forward through a mixture of grant support, being part of an industrial process and utilising fuels that would otherwise be disposed of in landfill and therefore are supported by the avoided Landfill Tax payment. The Government is proposing to set the level for dedicated biomass projects to take account of the fact that there are a range of biomass costs and power stations may use a combination of feed stocks. The Government believes that it is appropriate to distinguish the level of support for power stations that utilise energy crops and/or CHP as the market for Energy Crops and heat are less well developed so these projects will be in the emerging technologies band (see paragraph 3.9).

Q2: Do you agree that it is appropriate to distinguish between energy crop and regular dedicated biomass projects?

Emerging Technologies Band – 2.0 ROCs/MWh

3.9 There is then a group of emerging technologies which need to show much greater reductions in costs if they are to become competitive even with other renewables and whose scope for large scale deployment is uncertain. They may require development in terms of their business model or in the underlying technology. The costs for these are generally much higher than for the other technologies and here we will not be banding to cover the full deployment costs. The RO is intended to support mass deployment of near commercial projects and we believe that it would be inappropriate to use it as the sole method of support for those technologies that are still in a research, development or early demonstration phase. These technologies are generally eligible for grant support (e.g. marine technology through the Marine Renewables Deployment Fund (MRDF))¹³. *Meeting the Energy Challenge* set out the funding mechanisms available at each of the development stages – these measures collectively will help to bring forward emerging renewable technologies efficiently. Details of Government support for energy R&D, including the Environmental Transformation Fund, can be found in Chapter 6 of *Meeting the Energy Challenge*. We propose, therefore, to set the banding of these technologies so that they are provided with a target level of costs that they can aim for with a prospect of support for an economic business case. These include:

- **Wave and tidal stream** which are at a demonstration phase and require further technology development. Although the UK has a large potential resource to generate energy from marine, it is not expected to make a significant contribution to UK energy until 2020 when the Ernst and Young analysis suggests a potential expected maximum of 2.6TWh. The BWEA response to the Energy Review Report was more optimistic at 7.88TWh. The disparities between these figures

¹³ More information on the Marine Renewables Deployment Fund is available from: www.dti.gov.uk/energy/sources/renewables/business-investment/funding/marine/page19419.html

exposes the great uncertainty about the speed and scale of marine technology deployment. Since 1999 around £30 million has already been committed for the research and development of marine energy technologies. In addition, a further £50 million MRDF and additional funding from the Scottish Executive has been allocated to support the first larger-scale demonstrations. We believe that existing capital support schemes (such as the MRDF) from the DTI, Carbon Trust and Devolved Administrations combined with revenue support from the RO at the highest multiple will provide the right conditions to continue the pull through of marine technologies in the UK;

- **Advanced conversion technologies**, which include anaerobic digestion, pyrolysis and gasification are also at a demonstration phase. They present potential advantages in efficiency for using biomass and therefore merit continued support. For example, anaerobic digestion has potential to generate renewable energy from manures and slurries and certain organic wastes, whilst at the same time mitigating methane emissions from agriculture and landfill. The UK Biomass Strategy sets out other measures to drive a faster growth in anaerobic digestion by local authorities, businesses and farmers;
- **Dedicated biomass power stations with CHP**. CHP is a more efficient way of using biomass and avoiding carbon emissions than power stations generating electricity alone. However at present the heat market needs to develop further as outlined in Chapter 3 of *Meeting the Energy Challenge*. Therefore it is appropriate to provide additional support over that given to dedicated biomass power stations providing only electricity;
- **Electricity generated by burning energy crops in dedicated biomass power stations**. The allocation into this band reflects both the additional risks and costs inherent in the immature supply chains for energy crops;
- **Solar photovoltaic (PV)**. There is a role for PV to play in generating electricity in the UK but natural constraints on available resource in the UK mean that this will be targeted at a smaller scale. In order to be competitive PV requires the next generation of technology to come forward and a business model for the incorporation into construction to become the norm. The Government has supported PV technologies through a number of capital grant initiatives – PV Demonstrator and the Clear Skies programme and currently through the Low Carbon Buildings Programme¹⁴. The Government work on distributed generation and microgeneration will support the continued development of the UK PV market.

Q3: Do you agree with the rationale for grouping technologies in this way?

Q4: Do you agree with the proposed banding levels? If not, please provide evidence as to why these should be changed. Views are also invited on the reports by Ernst and Young and Oxera published alongside this consultation document

Other Issues

3.10 Geopressure. Electricity generated from geopressure (for example, using naturally-occurring high pressure gases to drive a turbine coupled to a generator) is eligible to earn ROCs, though none has ever been issued by Ofgem to date. The Government views the eligibility of electricity generated from geopressure where it occurs in conjunction with fossil fuel (e.g. natural gas) as an anomaly in the legislation and wishes to exclude geopressure associated with fossil fuels from the RO on the grounds it is not a renewable source of electricity. Geopressure not associated with fossil fuels will continue to be eligible.

Q5: Do you agree with the proposal that Geopressure occurring in conjunction with fossil fuel should be excluded from the RO?

3.11 Microgeneration is an important contributor to renewables generation and we have introduced several changes to the RO to make it easier for microgenerators to access the benefits of the RO. However, we believe that other policy mechanisms will prove more effective at driving the installation and progression of renewable microgeneration. For the purposes of simplicity we propose to place microgeneration projects in the same technology bands as large scale generation.

3.12 The October 2006¹⁵ consultation on Reform of the RO included a statutory consultation on proposals which came into force on 1 April 2007. This consultation also invited views on longer term issues relating to the RO and microgeneration. Specifically:

- Type approval and deeming of output from small generators where microgeneration equipment meeting certain standards for the equipment and its installation is deemed, for the purposes of claiming ROCs, to have generated a certain amount of renewable electricity.
- The Energy Efficiency Commitment (EEC)¹⁶ and interaction with the RO.

3.13 Responses on the issue of type approval and deeming were mixed. Whilst many were supportive of introducing a simplified system for claiming ROCs they also still felt it would be necessary for generators to demonstrate actual generation at some point during an obligation period. Other responses did not support this proposal as they felt it could subject the system to fraud. Comments on wider aspects of the scheme were also made such as suggestions to simplify the accreditation process. With regard to EEC, respondents generally felt that the EEC and RO schemes were quite different and that, although care should be taken to avoid double counting of carbon savings, otherwise the two should continue to be kept separate.

¹⁵ Details of the Government Response to Statutory Consultation on ROO 2007 can be found at www.dti.gov.uk/consultations/page34162.html

¹⁶ www.defra.gov.uk/environment/energy/eec/index.htm

- 3.14** The Energy Review Report committed to the Government’s 2006 Microgeneration Strategy¹⁷ being implemented aggressively by the Government including a number of recommendations to make it easier for small generators to benefit from the RO. This commitment is restated in *Meeting the Energy Challenge* along with a package of measures to remove barriers to and encourage more widespread deployment of distributed generation.
- 3.15** *Meeting the Energy Challenge* is clear that in the long-term microgeneration can make a significant contribution in terms of carbon savings. However, although we have simplified the administration of the RO to make it more accessible to microgenerators, the Obligation was designed to support large scale deployment of renewables and we do not feel that it is the best way to deliver the incentives that the microgeneration industry require. OFGEM will continue to streamline the administrative processes in the RO for small generators where possible. However, we do not propose to take forward more fundamental changes to the RO such as the deeming of generation discussed in paragraph 3.12. A more detailed response dealing with the issue of deeming of generation for the issue of ROCs will be published as an action falling from the Microgeneration Strategy.

17 www.dti.gov.uk/energy/sources/sustainable/microgeneration/strategy/page27594.html

4. Setting bands and when they will apply

Summary of Chapter 4

- The Government remains committed to the principle of grandfathering.
- After initial band setting, bands will be reviewed so that changes come into force at similar times as future phases of the EU ETS (on current expectations 1 April 2013 and 1 April 2018).
- Ministers will set the bands and for future reviews will be advised by an independent committee of experts.
- Any changes to bands will be announced 18 months prior to introduction.
- Triggers will be set for allowing early reviews in extreme circumstances.
- Special arrangements for projects in receipt of capital grants will apply.

Independence of advice on band setting

- 4.1** A significant number of respondents to the previous consultation supported an approach which included an independent element to band setting. We are therefore proposing that when setting the bands the advice would be provided by an independent body on a UK-wide basis. Advice would be published in full and would be provided with regard for wider regional priorities and considerations. Decisions would continue to be taken by Ministers in DTI, Scotland and Northern Ireland, and the intention is that the advice will provide a common starting point to help facilitate agreement of banding levels on a UK-wide basis. The Government recognises the value of consistency between the three Obligations. There is a common interest in ensuring a strong and stable market for ROCs and we are committed to working with the Devolved Administrations to achieve that.
- 4.2** The Government is looking at whether the Committee on Climate Change proposed in the draft Climate Change Bill would be an appropriate body to provide advice on this issue. The main remit of the Committee would be to provide advice on setting UK emissions targets and EU ETS caps. However, it is also anticipated that the Committee will provide advice on other climate change related issues specified by

the Government, which could include RO band setting. This option is dependent on successful passage through Parliament of the draft Climate Change Bill. As the Committee is not yet established, the indicative banding set out here has been developed from analysis and modelling published alongside this document.

Criteria to be taken into account

- 4.3** The process of determining the bands will be a critical factor in ensuring the success of a banded RO, and as such will reflect the four key principles of grandfathering, notification, transparency and reliability referred to in paragraph 2.11.
- 4.4** In setting the bands the Independent Advisory Committee and Ministers will be required to consider the following:
- a) the bands should take account of the full project costs (including the costs of scoping, planning, construction, grid connection, transmission charges etc.) and incomes (for example, due to the wholesale price of electricity, the avoided cost of schemes such as the EU ETS, Landfill Tax and the Climate Change Levy etc.);
 - b) the bands should aim to deliver the maximum deployment for a given level of support of renewable generation over the following 5-10 years and sustainable beyond that, recognising the risks in predicting costs and technologies over that time and that retaining the confidence of investors will be key to delivering that outcome;
 - c) the bands should be set taking into account the impact on the number of ROCs likely to be in the market, and aim to maintain investor confidence and ensure that consumers get value for money;
 - d) bands should take into account the cost effectiveness and long-term potential of different renewable technologies in delivering the Government's renewable energy targets. It is not the Government's intention that banding should restrict development of the most economic forms of renewables, or to provide permanently high levels of support for very expensive forms of renewable energy;
 - e) wider strategic issues, such as sustainability, carbon emission reduction, cost effectiveness and the Government strategies for waste management, and biomass.

Expertise of Committee members

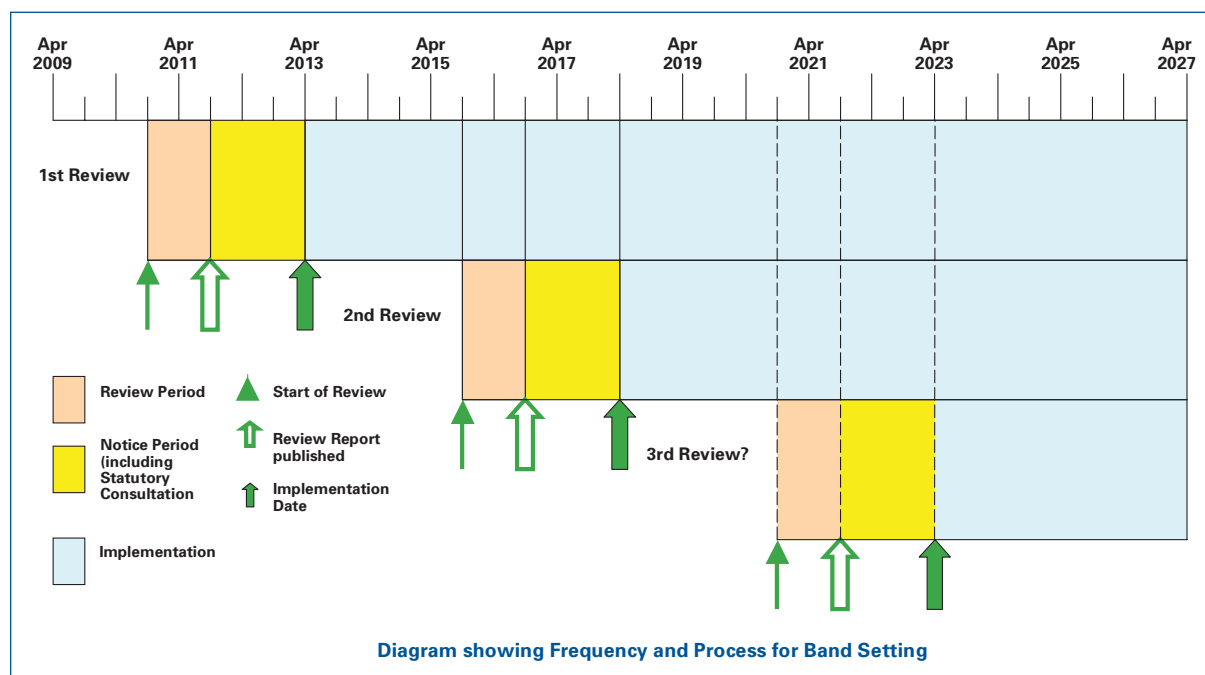
- 4.5** The RO is a complex market-based mechanism and the Committee:
- should have an understanding of wider the Government climate change policies;
 - have/develop expert understanding of the Government policies underpinning the RO and its operation;

- have expert understanding of the renewables market and the ROC market;
- have full understanding of issues surrounding investor confidence and deploying the full range of renewables technologies for example on cost, timelines and other barriers; and
- have an understanding of the regional impact of their advice.

Q6: Do you agree with the principle of providing independent advice to Ministers to help agree UK wide bands, and on who should provide that advice?

Frequency of band setting

- 4.6** Our previous consultation document asked how the Government should balance the need for a stable and predictable system for investors and developers, in which the bands did not change too often, with a need to change support levels over time to reflect changes in the cost of renewable technologies and other market developments. Two options were presented, reviews on a time basis or reviews triggered by the deployment of a particular volume of generating capacity. The majority of opinion was clear that there should be a limit on how often the bands should change and that the reviews should happen on an agreed timetable rather than being triggered by particular levels of installed capacity for each technology.
- 4.7** The consultation document proposed a range of 3-5 years between reviews and while there was a strong view that reviews should happen no more often than this, there was no clear preference for any particular period within this range with similar levels of support for three, four and five year periods.
- 4.8** The operation of this system clearly needs to be read in the context of the approach that the Government proposes to take over grandfathering. Paragraph 4.19 sets out our decision, for generators over 50 kW, to switch from our original proposal to grandfather based on the point of first supply to one based on the point on which preliminary accreditation is effective.



4.9 The support levels required for renewables will in the future be increasingly dependent on the carbon price under the EU ETS. For that reason there seems to be a good argument for reviews of the banding levels under the RO to be linked to the timetable for the different phases of the EU ETS. EU ETS Phase II will run from 2008 to 2012 and modelling of the initial banding levels has taken advantage of the predicted prices for carbon under Phase II which have become more certain as the elements of the National Allocation Plan have been confirmed by the Commission. Phase III is currently expected to run from 2013 until 2017.

4.10 The Government therefore proposes that the first two reviews of the RO banding levels should take place in time for any changes to the banding levels to be introduced on 1 April 2013 and 1 April 2018.

4.11 Any future review of the RO will be made on the basis of a technical review of the costs and other principles by the Independent Advisory Committee (see paragraph 4.4). The Government will make proposals, based on their report, which will be subject to a public consultation. The results of this exercise will be announced at least 18 months in advance of introduction. The announced bands will be subject to the statutory consultation required before introduction of a ROO that will bring the banding regime into effect.

Q7: Do you support this approach to timing of reviews?

4.12 Setting limits on how often bands can be changed does increase the potential impact of a band being set at not quite the right level to bring on a particular technology, or of not being able to respond quickly to changes in the costs of a

technology in response to external factors. One possible way of addressing this risk would be to add a caveat, which could be activated in extreme cases. This could then trigger an early review by Government of one or more of the bands.

- 4.13** The previous consultation asked for views on this principle and the majority of respondents agreed that this was a sensible provision as long as the conditions which would amount to an extreme case were set out in advance.
- 4.14** The proposed criteria to trigger an early review are:
- a. significant change in grid connection/transmission regime;
 - b. new technology eligible under the RO emerges with potential to deploy on large scale;
 - c. other major support scheme with impact on renewables market starts, ends or is subject to significant changes;
 - d. demonstrated significant variation in net costs (for an individual technology) changing the economic case from that assumed in the setting of banding levels;
 - e. ROCs from co-firing (regular) contribute to more than 10%¹⁸ of the obligation see Chapter 6;
 - f. over-compliance of obligation; or
 - g. other unforeseen event with significant effect on the operation of the RO.
- 4.15** A review could be triggered following one or a combination of the criteria being met.
- 4.16** The Government does not believe that the review of one technology will necessarily require a wholesale review of the banding regime for all technologies.
- Q8: Do you agree with the criteria set out in paragraph 4.14? Should there be any additional criteria?**

Grandfathering

Commitments from Previous Consultation

- 4.17** The Government remains committed to the principle of grandfathering, as set out in the 2005 Review of the RO and in the Energy Review Report published in July 2006. Any reduction in the number of ROCs/MWh will only apply to future projects. The exception to this is co-firing (see paragraph 4.24).

¹⁸ 10% was chosen to mirror the former cap on co-firing.

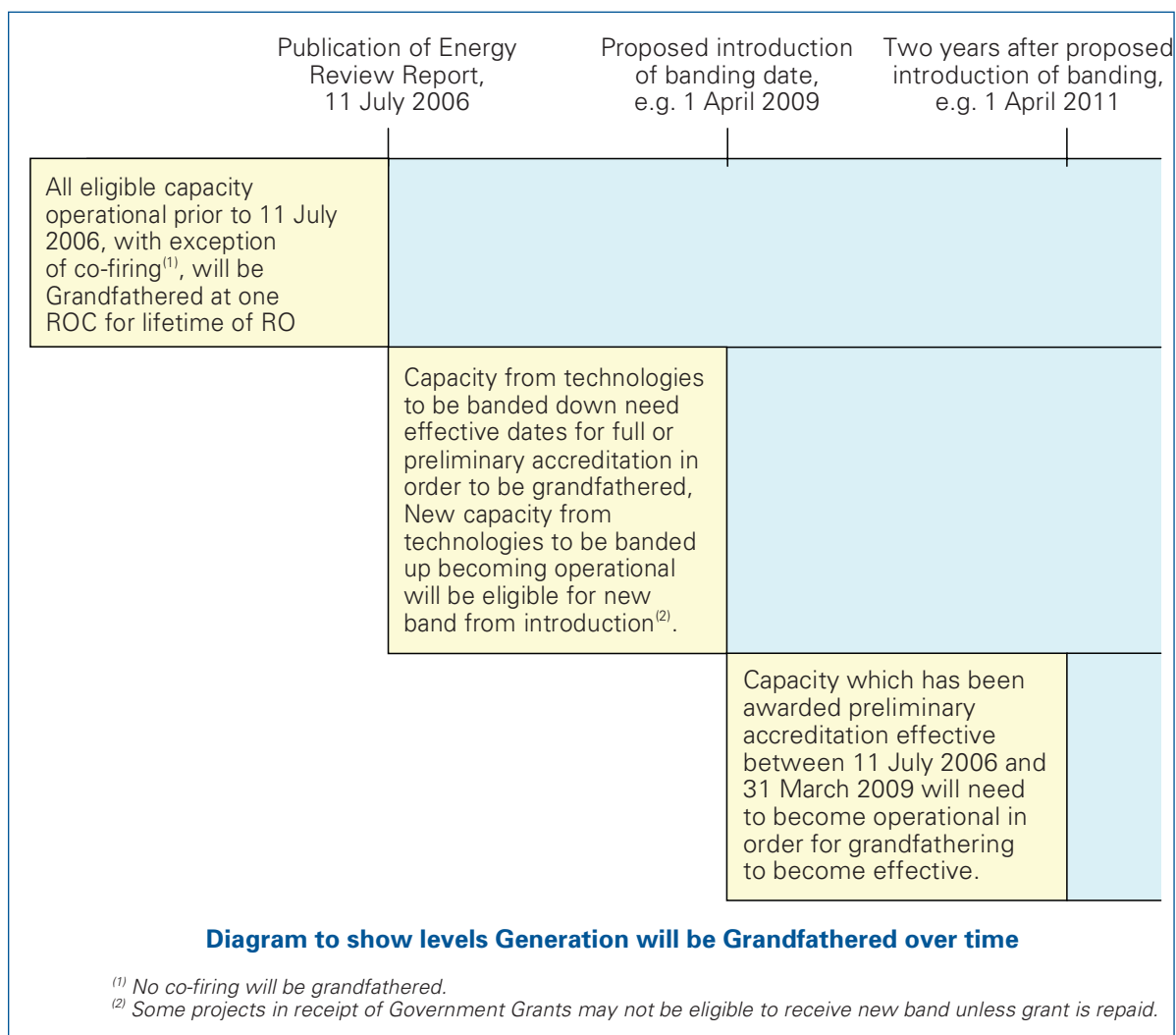
- 4.18** The Government set out a number of commitments with regard to the grandfathering of projects in the Energy Review Report which can be found at www.dti.gov.uk/energy/review/page31995.html
- 4.19** In the consultation document published on 9 October 2006 the Government indicated that it was willing to consider a trigger point for grandfathering earlier than first supply of electricity for which ROCs may be claimed. There was no consensus on the appropriate trigger point from respondents to the consultation, although the majority favoured an earlier trigger date than first supply. We now propose to grandfather based on the date of planning consent.

Proposals on Grandfathering

- 4.20** The Government proposes that when banding is introduced (i.e. on 1st April 2009 under current plans), with the exception of co-firing and projects in receipt of capital grants:
- Eligible generating capacity which was operational on or before the publication of the Energy Review Report which raised the possibility of banding the RO (11 July 2006) will retain its entitlement of 1 ROC/MWh regardless of technology;
 - Generating capacity which became operational or achieved planning consent after 11 July 2006 but before 1 April 2009 will, subject to accreditation requirements set out in paragraph 4.21;
 - retain its entitlement of 1 ROC/MWh in the case of technologies being banded down (i.e. for which entitlement post 1 April 2009 will be less than 1 MWh);
 - move to its higher entitlement in the case of technologies being banded up (i.e. for which entitlement post 1 April 2009 will be more than 1 MWh). This is to avoid any incentive to delay projects in order to benefit from higher banding.
 - Generating capacity which becomes operational on or after 1 April 2009 will receive entitlement according to the bands in place.
- 4.21** In the case of generating capacity which has or will become operational after 11 July 2006 but before 1 April 2009, grandfathering rights as set out in paragraph 4.20 will be conditional on appropriate accreditation by Ofgem.
- Power stations over 50 kW will need to apply for and receive:
 - i. preliminary accreditation with an effective date before 1 April 2009 and
 - ii. full accreditation with an effective date that is within two years of the introduction of banding (i.e. an effective accreditation date that is on or before 31 March 2011 based on the current timetable for EU ETS).
 - In the case of power stations of 50 kW and under, which is generally not subject to the same planning requirements or lead times for building, grandfathering of

rights as set out in paragraph 4.20 will be on the basis of first supply of electricity and full accreditation by Ofgem to be effective before the introduction of banding.

- 4.22 Additional capacity in existing power stations:** Where a power station that was operational on or before 11 July 2006 has notified Ofgem of additional capacity installed since 11 July 2006, this additional capacity will for the purposes of the RO be allocated to a band as though it was a new power station becoming operational on the date at which the revised accreditation becomes effective. The electricity generated could be calculated either as a fraction pro rata to the installed capacities or be subject to separate metering. The arrangements for this will be informed by the responses to the consultation.
- 4.23** If any operators believe that they have (or will have) increased the capacity of a power station due to receive more than 1 ROC/MWh after 11 July 2006 and the publication of this document they will need to inform Ofgem of this even if they have previously notified Ofgem under the existing arrangements.
- 4.24 Co-firing:** Co-firing will not benefit from these grandfathering proposals. As co-firing requires relatively little capital investment at the generating power station compared to other forms of renewable projects, it would not be appropriate to grandfather bands for co-fired power station. When the band containing co-firing is introduced, and if it were subsequently changed, that band would apply to all co-firers irrespective of when the capacity became operational. This rationale was set out in the October 2006 consultation document, and was supported by the great majority of consultation responses.
- 4.25 Projects in receipt of grants:** Some projects coming into operation after 11 July 2006 are in receipt of grants awarded before that date. As these grants were allocated on the basis that the project would receive 1 ROC/MWh support, it would not be appropriate for them to benefit also from the higher bands. However the Government proposes, subject to State Aid clearance from the European Commission, to give projects in this category the option of returning the grant and becoming eligible for the higher banding. We believe that this will ensure that consumer value for money is protected and projects are not delayed while investors and others wait for the introduction of higher bands, allowing smoother growth of generation.
- 4.26 Subsequent changes to bandings:** The principles set out above will be applied on an equivalent basis for the next review of banding. For example, if it were decided that a particular technology were to move to a higher band as from 1 April 2013, generating capacity using that technology and which became operational after the announcement of the review but before 1 April 2013 would move to the higher banding as from 1 April 2013. Conversely, if it were decided in a future review that a particular technology were to move to a lower band as from 1 April 2013, generating capacity using that technology and which became operational after the announcement of the review but before 1 April 2013 would retain its pre-April 2013 banding.



- Q9: Do you agree that the proposed trigger points for grandfathered rights, including the transitional arrangements for projects consented on 1st April 2009, are appropriate?**
- Q10: Should the electricity generated from power stations that add additional capacity after the point at which they are grandfathered be calculated as a fraction pro rata to the installed capacities and/or be subject to separate metering at the generators' discretion?**
- Q11: Do you agree with the proposed treatment of projects under 50 kW as set out in para 4.22?**

Duration of grandfathering

- 4.27** It has been suggested that our approach to grandfathering is too generous. The argument is that as projects are typically financed on a 15-20 year business case²⁷, guaranteeing the return beyond this time is unnecessary to stimulate investment. If true this would represent poor value for money to the consumer. It would be possible to account for this by limiting the period for which grandfathering would be applicable.
- 4.28** One way that this might work in practice would be to grandfather all projects for 20 years from the date of first supply. At the end of this period schemes would be moved into the lowest band (the band for Established technologies, receiving 0.25 ROC/MWh) on the grounds that any further investment after 20 years would be low-risk e.g. repowering of wind farms. For example, a power station first operating in 2002 would only be grandfathered until 2022.
- 4.29** Ministers have committed that RO eligible NFFO 3, 4 and 5 projects would remain eligible for the full support of the Obligation when their contracts expire. If a 20 year limit to grandfathering was imposed it is arguable that the limit should apply from the commencement of supply under a NFFO contract.
- Q12: Is there any reason why RO support at the grandfathered level would need to continue after the initial investment had been paid back?**
- Q13: Accepting that there will be variation between projects, is 20 years a fair proxy for project financing timescales?**
- Q14: Should this provision apply to projects under NFFO 3, 4 and 5 from date of contract, date of first supply or date of commencement in RO?**

¹⁹ Duration of projects in terms of financing and business case are discussed in the Ernst and Young Report published alongside this document.

5. RO Levels in a Banded RO

Summary of Chapter 5

- The Government remains committed to its existing announcements on RO levels rising to 15.4% by 2015/16 as a minimum.
- The RPI link to buy-out price will be retained.
- The level of the Obligation will be extended to 20% on a headroom basis.
- Headroom will be set as percentage of ROCs rather than electricity supply. This will be 6% of the expected ROCs in a year.
- Headroom will be introduced alongside banding.
- A cross industry working group will be established to consider the introduction of an appropriate mechanism to prevent a crash in the ROC market.

5.1 At present, the level of the RO is set to rise to 15.4% of electricity by 2015/16, and remain at that level thereafter until 2027 – the end date for the RO in the legislation. The Government remains committed to its existing announcements on RO levels up to 2015/16 as a minimum.

5.2 The Government recognises that long-term certainty around the price of ROCs is a major factor in decisions to develop and finance new renewable energy projects, and will be critical to the success of a banded RO. We also recognise that increasing deployment will tend to decrease the ROC price and increase the risk of over-compliance. We will, as necessary, increase the RO to keep it ahead of the predicted number of ROCs from the introduction of banding.

5.3 The proposals to increase the RO to 20% on a headroom basis do not apply to Scotland or Northern Ireland as they have separate Obligations. Any changes to the Obligations in Scotland and Northern Ireland will be subject to separate consultations and Parliamentary agreements. It is the Government's wish to maintain a consistent market across the UK and therefore we will be consulting with the devolved administrations with the aim that a headroom mechanism and any ski-slope mechanism would apply in all three jurisdictions covered by the RO.

5.4 The implementation of these proposals is discussed in paragraphs 5.17–5.26.

Extending RO levels to 20% on a “guaranteed headroom” basis

- 5.5** The Government’s commitment to maintain RO levels above renewable generation up to a level of 20% is not a commitment to increase RO levels to 20% by 2020. Any increases in RO levels above those already announced will be contingent upon appropriate growth in renewable generation. That said, if growth in renewable generation was extremely rapid, the level of the RO could potentially rise to 20% before 2020 under a guaranteed headroom approach.
- 5.6** In the earlier consultation document the Government proposed that a guaranteed headroom of 1% of the electricity supply market should be sufficient to provide long-term confidence on the support provided by the RO, given the ability of suppliers to bank ROCs and our intention to modify the RO to remove the risk of ROC price crashes. The majority of those who responded to the consultation argued that a headroom set in terms of the electricity supply market would carry risks given the loss of a direct equivalence between generation and ROCs which will occur when banding is introduced. The clear preference was for headroom to be set as a percentage of the ROCs to be issued in the relevant obligation period. A headroom based on ROCs would remove the risk that net banding up would cause a sustained over-compliance in ROCs while generation continued to fall short of the nominal obligation. Taking these comments into account the Government intends to implement headroom on the basis of 6% of the expected ROCs in a given obligation period – this would be approximately equivalent to one percentage point of headroom on the electricity supply market for an obligation of 16.7%.
- 5.7** The way that the Government predicts that this would work is as follows.
- 5.8** Each year, the DTI will estimate the likely level of ROCs to be issued in the next obligation period, taking into account both already installed capacity and anticipated new projects likely to come on line during the forthcoming obligation period. If this estimate, which would be compiled after consultation with industry, when multiplied by 106% was below the existing level of the RO (calculated in ROCs), the RO would be raised to a level 6% above the anticipated number of ROCs for that obligation period.
- 5.9** The following example illustrates how this might work in practice. The final year for which the RO has already been set is 2015/16. The level set is 15.4% of the total electricity demand. If the total market is 373 TWh then the RO would be 57.4 million ROCs. If the predicted ROC issue for the following obligation period (2016/17) is less than $57.4 \text{ million} / 1.06 = 54.2 \text{ million}$ then the level of the RO would not be increased.
- 5.10** If however the predicted number of ROCs to be issued in 2016/17 was say 55 million then the RO would be increased to $55 \text{ million} \times 1.06 = 58.3 \text{ million}$ ROCs as long as the obligation would not exceed a level equivalent to 20% of the electricity supply market if one ROC was equivalent to one MWh.

- 5.11** There is a possibility that the obligation may be exceeded before 2015. For that reason the Government proposes to introduce headroom from the date on which banding is implemented. This would not replace the current commitment to increase the size of the obligation in regular increments up to 15.4% in 2015 but would act as an additional measure of security. In practice, the process set out in paragraph 5.8 would be followed if the previously announced obligation for the obligation period in question did not allow sufficient headroom.
- 5.12** A number of comments should be made at this stage about the proposed approach:
- a) The Government’s objective is that the method described provides a minimum underpinning guarantee, for the life of the RO, about the level of the RO up to 20% renewables. It is not intended to rule out the possibility that the Government could, in the future, decide to set RO levels that were higher than the minimum level of guaranteed headroom would require, or for more than one obligation period ahead. It may remain desirable to set RO levels for a number of obligation periods ahead in order to provide greater market certainty, or avoid the need for repeated legislation to make minor changes to RO levels.
 - b) The approach does not provide an absolute guarantee that the demand for ROCs created by the RO will be greater than supply during any particular obligation period. The RO level would be set on the basis of an estimate. Annual variations in rainfall or wind speeds or other supply factors could lead to unpredictably high levels of renewable generation and thus an excess of ROCs over demand. However, the Government considers that, with 6% guaranteed headroom, and bearing in mind the ability of suppliers to bank 25% of their ROCs for presentation in the following obligation period, an excess of ROC supply over demand arising is highly unlikely.
 - c) It would be possible to calculate the level of the Obligation at a number of points in time from two years before the beginning of the obligation period through to the point at which all the ROCs for the obligation period have been presented. On one hand, the earlier the announcement is made the more notice suppliers will have while on the other the later the analysis is performed the greater is the certainty that the headroom will be precisely 6%.
- 5.13** In the Government’s view, the change to setting headroom in ROCs reduces the need for a mechanism (the “ski-slope”) that allows for a gradual tapering down of ROC values in the event of an excess of ROCs over demand. However this change does not remove the need to manage the RO once 20% generation has been achieved. This is discussed in more detail in paragraphs 5.17–5.26.
- Q15: Is a guaranteed headroom of 6% of ROCs adequate, given the ability of suppliers to bank ROCs and our intention to also remove the risk of a ROC price crash through introducing the ski-slope?**
- Q16: At what point in time should the level of Obligation for a given obligation period be announced?**

Retaining the RPI link to the buy-out price

- 5.14** In the Energy Review Report, the Government proposed removing from 2015/16 the link between the buy-out price under the RO and the Retail Price Index (RPI) in order to mitigate the expected increase in the cost of the RO to consumers once the obligation began to rise above the previous 15.4% limit.
- 5.15** Since that time we have seen rises in the costs of renewable electricity technologies. Moreover, new analysis²⁰ commissioned to inform our banding proposals indicates that we are likely to see further rises in the costs of renewable electricity technologies in the period to 2010/11. The implication of this is that the projected deployment of renewables is now lower than at the time we published the Energy Review Report. The updated analysis also indicates that the projected level of renewables deployment for the banding regime under consideration would lead to a fall in the total financial support provided by the RO when compared to the existing regime, even though it would increase the overall level of renewables deployment. A number of respondents to the recent renewables consultation²¹ made a similar observation and argued strongly against the removal of the RPI link from 2015/16 on the basis that it would lead to an overall reduction in the support available to renewables.
- 5.16** One of our objectives when considering proposals to band the RO was to increase deployment of renewables, while maintaining broadly similar costs to consumers. The Government has therefore decided to retain the link between the buy-out price and RPI from 2015-16 as part of confirming new proposals to band the RO. This will provide a greater stimulus for the deployment of renewables over the lifetime of the RO. A banded RO retaining RPI is predicted to deploy around 40% more renewables between 2009 and 2015 than the current regime would have over the same period.

Preventing ROC price crashes: the “cliff edge” issue

- 5.17** In the last consultation the Government addressed the issue of what would happen should the market for ROCs remain over-compliant for an extended period, with the risk that ROC prices could fall steeply as some ROCs could not be redeemed – the “cliff-edge” problem. The Government made clear that it believed the risk to be small but one which needed to be addressed especially if there were to be significant net banding up.

²⁰ www.dti.gov.uk/files/file39038.pdf

²¹ *Reform of the Renewables Obligation and Statutory Consultation on the Renewables Obligation Order 2007*²¹
www.dti.gov.uk/files/file34470.pdf

- 5.18** The suggested solution was the introduction of a mechanism known as a ski-slope which would reduce the risk of an over-supply of ROCs. Three mechanisms were put forward for discussion – the Pöyry Energy (Ilex) solution, the Eufinium Solution, and the Virtual Payment solution.
- 5.19** Responses to the consultation were mixed. A narrow majority – not including the major suppliers – favoured the introduction of a ski-slope. A clear majority of those who expressed a preference supported the Virtual Payment mechanism. Support for the Pöyry and Eufinium mechanisms was roughly equal.
- 5.20** For all of the proposed solutions a number of important issues were raised which required further exploration. The Government therefore commissioned additional analysis. The initial findings, alongside the consultation responses, have informed the Government’s proposals on the way forward.
- 5.21** The Government has reached the following initial conclusions:
- The Eufinium Solution in particular is likely to decrease the likelihood of additional renewables being brought forward, as it ties up working capital due to the need to make cash payments into the buy-out fund in the event of over-supply.
 - The Virtual Payments solution is possibly more complex than first thought and would not easily be able to develop complete information allowing it to operate as envisaged.
 - The Pöyry solution may be implementable if the process is changed a little to meet the objection regarding negative balances on the buy-out fund. Reversing the steps, e.g. making a cash call on presenters of ROCs before making a payment out to suppliers who have over-presented ROCs should overcome this problem.
- 5.22** An alternative solution was suggested by the Co-Operative Group. It allows that in the event of over-presentation of ROCs the RO percentage is adjusted upwards such that the RO percentage equals the total ROCs presented, and the buy-out price is adjusted downwards such that the value of the total number of ROCs multiplied by the floor price remains equal to the number of ROCs in the 20% compliance case multiplied by the unadjusted floor price, e.g.:

RO percentage	= 20%
Buy-out Price	= £50
Total ROCs presented	= 22%
Over presentation of ROCs	= $((22/20)-1) \times 102 = 10.2\%$
Revised RO percentage	= $20 \times 110.2\% = 22.04\%$
Revised Buy-out Price	= $£50 \times (102\%-10.2\%) = £45.90$

(The factor of 102 was chosen to allow for leakage of ROCs from the system due to non-presentation of ROCs by some suppliers.)

- 5.23** This proposal appears to work with mutualisation and goes some way towards addressing the perceived threat to liquidity of firms which have been identified with the other mechanisms. However, further analysis needs to be carried out.
- 5.24** A number of responses suggested that the ski-slope mechanism was overly complicated. These respondents were particularly concerned it would introduce uncertainty into the buy-out price, destabilising longer term planning and disincentivising investment.
- 5.25** Given the concerns of respondents, the Government believes that it should delay introducing a ski-slope mechanism until more work has been done to ensure that any chosen mechanism is fit for purpose. However, the Government intends to take a power in primary legislation, subject to Parliamentary approval, with the aim of introducing a ski-slope through secondary legislation in the event it is thought desirable, consulting on the mechanism to be used at that time.
- 5.26** Due to the importance of this issue in ensuring investor confidence the Government will establish a cross-industry working group, comprising representatives from generators, suppliers, investors and Ofgem to test possible solutions and inform our choice of an appropriate mechanism. Expressions of interest are welcomed.
- Q17: Do you agree with the intention to take a power to introduce a ski-slope in primary legislation subject to a later need?**

6. Co-firing and Sustainability of Biomass

Summary of Chapter 6

- The cap on the proportion of the obligation that can be met through co-firing will be removed.
- Larger generators will be required to report on the source and sustainability of the biomass that they use.
- We will work to remove technical barriers to the use of waste in EfW projects that are currently eligible under the RO.

Co-firing

- 6.1** When the RO was first introduced, there was a debate as to whether co-firing – the burning of biomass alongside fossil fuels – should be included as an eligible technology. Some raised concerns that it may extend the life of coal power stations, locking in carbon emissions. It was also felt that that an entirely technology-neutral RO would provide co-firing with more support than it requires; and that the speed with which levels of co-firing could be increased risked destabilising the ROC market. In the light of these concerns, the RO currently has a cap of 10% on the proportion of a suppliers' obligation that can be met through co-firing.
- 6.2** As coal continues to play a role in electricity generation, it makes sense to abate the carbon emissions from coal power stations as much as possible. The Government believes that co-firing potentially has a long-term role to play in this context, as part of a wider carbon abatement strategy for fossil fuels. This view was endorsed by the majority of respondents to the consultation. Furthermore, the current cap fragments the market in ROCs. We therefore propose to remove the cap on co-firing within the RO.
- 6.3** At the same time, we recognise that co-firing is over-rewarded in the current RO. We are therefore proposing to reduce the level of support it receives. At the proposed banding support level, co-firers will be required to generate 4 MWh to receive 1 ROC. This should address concerns over the impact on other renewables

and on other biomass using industries. Removing the cap should allow co-firers more certainty in their planning.

- 6.4** Despite our proposal to band down co-firing, some respondents to our earlier consultation expressed concerns about the potential volatility of co-firing volumes and the impact that these could have on the ROC market. To address these concerns, we have included an emergency review criterion that would be triggered if co-fired ROCs surrendered represented more than 10% of the total Obligation. This, in combination with the regular reviews of banding levels, will allow for the support level to respond to changes in the economics of co-firing, reducing any risk to the overall ROC market and other technologies.
- 6.5** An alternative approach (favoured by some respondents) would be to maintain a cap on the number of co-fired ROCs that can be surrendered. Setting a cap of 10% of ROCs would allow for four times more co-firing than currently without any additional impact on the ROC market. We do not intend at this point to impose such a cap but we would welcome views on whether the idea would be preferable to our proposed approach.
- 6.6** The support level we are proposing has been set to recognise that the level of capital investment required for co-firing is comparatively small and the industry has typically assumed that these would be recouped over a five year period . It is likely that many of the initial investments for the handling of regular biomass will have been made and paid back by 2009. To continue providing support at a level which includes an element for full capital costs risks over-rewarding co-firing with a consequent damaging impact on value for money for consumers, the ROC market and on the other users of biomass.
- 6.7** The Ernst and Young report makes it clear that a considerable part of the potential regular biomass supply is imported, and discusses the recent volatility of the international biomass market. We do not wish to add to price volatility by setting future UK support levels to reflect what may be an inflated price for imported biomass.
- 6.8** The modelling by Oxera suggests that, depending on developments within the carbon market within the lifetime of the RO, it may in the future be possible to entirely remove co-firing of non-energy crops from the RO and support it entirely through the carbon price alone.

- Q18: Do you agree with the need for a special co-firing criterion for an emergency review of banding? Is 10% of ROCs an appropriate trigger point?**
- Q19: Do you agree with the Government’s proposal that reducing support and reviewing the co-firing band for regular biomass if it contributes 10% of ROCs makes a cap on co-firing unnecessary? If not, please provide evidence as to what the likely impact of uncapping co-firing at the proposed level of support would be and the level of cap appropriate.**

Energy Crops

- 6.9** Energy crops are defined within the RO as:
- “a plant crop planted after 31st December 1989 and which is grown primarily for the purpose of being used as fuel or which is one of the following:
- (a) *miscanthus giganteus*;
- (b) *salix* (also known as short rotation coppice willow); or
- (c) *populus* (also known as short rotation coppice poplar)”
- 6.10** The Government remains committed to promoting energy crops because of the need to increase the total biomass resource that is available for energy use and minimise the impacts on other biomass using industries, the security of supply benefits of having indigenous biomass sources and the new opportunities they present for farmers.
- 6.11** We are also aware that farmers have planted and are planting energy crops on the basis that the RO will provide a clear market for their product; and we recognise the commitment and investment that some generators have made to encourage co-firing with energy crops.
- 6.12** For this reason, since April 2007 the limit on energy crops within the overall cap on co-firing has been removed. Building on this approach, when banding is introduced energy crops will be given a higher support level in comparison to other biomass. This will provide a significant market incentive to plant and use energy crops in all biomass applications including co-firing. It also reflects the fact that the development of these new crops, and those power stations that use them, may require additional investment, as well as the ongoing fuel and other operation and maintenance costs.
- 6.13** We are also proposing that ROCs from energy crop co-firing should not be counted towards the 10% of obligation met through co-fired ROCs that would trigger a review of support levels to provide additional security to growers.
- 6.14** However, we will closely monitor the materials co-fired as energy crops to ensure that additional support levels are not leading to behaviour that does not support sustainable energy crop supply chains. If evidence were to emerge that this was

happening then we would consult further on the case for actions to reduce this impact.

Q20: Do you agree with the proposed treatment of energy crops set out in paragraphs 6.9–6.14?

Sustainability

6.15 The Government believes that it is important to ensure that the most sustainable forms of co-firing and biomass are incentivised over the long-term. This view was echoed by a large majority of respondents to the previous consultation. Key concerns over sustainability are land use change (particularly deforestation) and the distance transported.

6.16 The Themba Technology report²³ on sustainability illustrated that the carbon balance for co-firing was positive. It also found that most current forms of co-firing using wastes that would otherwise have gone to landfill or other fuels from sustainable sources have benefits. However, it suggested that it would be important to continue to monitor this position.

6.17 We therefore propose to ask biomass users for a range of information that captures the benefits of using existing schemes. These reporting requirements should cover all those claiming ROCs on biomass, whether CHP, co-firing or dedicated power stations. In recognition of the different biomass volumes used and relative sustainability impact, it is proposed that a threshold on sustainability reporting is introduced.

6.18 We propose to require biomass users to present Ofgem with an annual report containing the following information:

- biomass used, origin and volumes;
- whether it is a waste/residue or co-product or energy crop;
- whether it has been sourced under any quality standards (sustainability in particular, RTFO, RTSPO, IPPC on land use)²⁴;
- what the land use has been from 2005; and
- whether producers/generators are under any voluntary code of conduct.

6.19 This will allow us to gather and make public information on sustainability so that we can assess whether any additional information may become necessary to report on in the future.

²³ www.dti.gov.uk/files/file34448.pdf

²⁴ The Themba Technology Report suggested that there were a number of accreditation approaches already in place or under development, such as the UK Woodland Assurance Standard, the Roundtable on Sustainable Palm Oil, and the Assured Combinable Crop Scheme, which could be applied to biomass used for electricity. It also suggested that these existing codes of practice may be capable of adaptation.

- 6.20** We will monitor the development of any European sustainability standards on biomass used for electricity and look to include in the RO if appropriate.
- 6.21** We propose that should operators fail to provide this information, Ofgem will have the power to freeze the issue of those ROCs they are due until such time as they comply.
- Q21: Do you agree that sustainability requirements should cover all biomass users?**
- Q22: Should those generating less than 50 kW be exempted from sustainability reporting? Should any other threshold be used**
- Q23: Do you agree with the criteria to address sustainability for biomass?**
- Q24: Do you agree that Ofgem should freeze the ROCs of operators who do not provide the necessary information on sustainability?**

Waste

Determining Biomass Fraction of Waste

- 6.22** Certain EfW technologies can claim ROCs on the biomass fraction of waste, which is classed as a renewable energy source under the EC Directive on Renewables. These technologies are gasification, pyrolysis, anaerobic digestion and EfW with CHP. Electricity only waste incinerators are driven by gate fee income and so do not need further support.
- 6.23** While the intent is clear it has proved very difficult to accurately determine how much of the energy content of mixed waste streams derives from biomass materials. This is because residual waste is highly variable in composition, reflecting its source (i.e. municipal or commercial), different recycling policies and even seasonal factors. Comprehensive sampling and measurement of mixed wastes for the purposes of determining how much of its energy content derives from biomass materials is complex and prohibitively expensive.
- 6.24** The Government, Ofgem and industry have been working together to find a solution. One such solution would be to deem the fossil fuel content of waste, so that operators of eligible facilities would be able to claim ROCs on the remaining biomass energy content. The level at which to deem the fossil fuel fraction needs to be carefully set, due to the variable and changing composition of mixed wastes (e.g. as recycling increases) and to minimise the risk of ROCs being erroneously awarded to non-biomass wastes. It is also important that the RO does not encourage combustion of waste streams that should be recycled. These factors all point towards a high deemed level of fossil fuel.

- 6.25** The Landfill Allowance Trading Scheme (LATS) deems collected municipal waste to be 68% biodegradable in content. This will change as local authorities continue to introduce measures to reduce waste arisings (such as by promoting home composting) and increase separate collections of food waste and other waste streams for recycling. Our analysis suggests that removing a large proportion of recyclable materials from the residual waste stream (including, for example, high levels of food and green waste in line with the Government's aspirations) would reduce its biomass energy content to around 35%. This is illustrated by the scenarios in Annex E, which suggest that high rates of recycling could result in a residual biomass energy content in the range 30–38%. Commercial waste is generally expected to be more homogenous in nature, making it easier to monitor. However, a mixed sample of commercial waste has a very similar biomass energy content to municipal waste.
- 6.26** In the light of this we propose 65% as the deemed value of the fossil fuel content (unless we know that the biomass energy content is lower). This reflects the Government's aspirations for much higher levels of recycling and is felt to be suitably conservative to address the potential concerns with deeming.
- 6.27** The Government believes this approach should be supplemented by a provision that allows operators to present Ofgem with evidence in accordance with fuel measurement and sampling guidelines (that are applicable to all technologies using biomass) of a lower fossil fuel energy content. For example, international standards are being developed for some solid recovered fuels which require a minimum biomass fraction higher than the residual value of the proposed deemed fossil fuel fraction. Ofgem would then assess this evidence and ongoing measurement proposals prior to granting more ROCs than would be provided by the deemed value.
- 6.28** These proposed changes would not be expected to have a significant impact on the RO. A report²⁵ commissioned as part of the 2005-06 RO review estimated future additional EfW-CHP amounting to 3-5% of the RO by 2020. This was projected to be a mix of existing power station conversion and new facilities serving either community heating schemes or industrial demand.
- Q25: Do you agree that deeming the fossil fuel content of waste is appropriate? Should operators be given the opportunity to present Ofgem with evidence that the fossil fuel content is lower?**
- Q26: Is 65% fossil fuel the right level to deem? Does the remaining 35% receiving ROCs provide a suitable incentive through the RO without compromising the Government's aspirations for increased recycling?**

²⁵ Ilex Consulting, *Extending ROC eligibility to energy from waste plant with CHP*.

Making RO neutral to waste (Solid Recovered Fuels)

- 6.29** In the previous consultation, consultees were asked about remaining barriers to waste in the RO, to which a few respondents suggested that the RO was a barrier to recovering EfW amongst other issues like the Waste Incineration Directive (WID) and planning issues. WID is essential to protect health and the environment allowing EfW projects to contribute sustainably to our long-term waste management and energy objectives. Recognising the significant potential of EfW and waste derived fuels, we are considering modifying the current restrictions whereby ROCs cannot be claimed for eligible biomass when they are co-fired in a fossil fuel power station alongside waste. This would not result in extending the eligibility of wastes but would allow co-firers to use waste feed stocks without losing ROCs for eligible biomass.
- 6.30** We consulted on making the RO neutral to waste in the 2005-06 RO Review, but it was not progressed then due principally to concerns about the risk of ROCs being awarded for combustion of mixed wastes. This risk should be mitigated by extending neutrality only to solid recovered fuels (i.e. not to unsorted, mixed waste), which is the waste feedstock most likely to be of interest to power generators, industrial intensive energy users and biomass energy power stations. This would help open markets for waste derived fuels, with benefits for security of supply and lower carbon generation, without disrupting operators' existing ROC businesses. It would also complement the EfW with CHP provisions. Mixed waste incinerators, which operate as gate fee businesses, would be unaffected by such a change.
- 6.31** Power stations co-firing waste derived fuels would need to demonstrate its GCV to Ofgem to allow ROCs to be awarded for eligible biomass fuels. We would welcome views on the feasibility of this approach and rigour needed, given ROCs will not be awarded for this feedstock. This change will require a definition of solid recovered fuels in the legislation, which it is proposed to base on that in CEN343.²⁶
- Q27: Do you agree that the RO should be made 'neutral to waste (SRF)' in this way? Would there be any negative consequences? Do you agree that a CEN based definition is appropriate?**

²⁶ Solid fuel prepared from non-hazardous waste to be utilised for energy recovery in incineration or co-incineration plants, and meeting the classification and specification requirements laid down in prCEN/TS 15359. N.B. "Prepared" here means processed, homogenised and up-graded to a quality that can be traded amongst producers and users.

Annex A: List of Questions

- Q1:** Are there any technologies that will fall into the reference band as 'others' that should be given a different support level? Please provide evidence as to the technology and cost.
- Q2:** Do you agree that it is appropriate to distinguish between energy crop and regular dedicated biomass projects?
- Q3:** Do you agree with the rationale for grouping technologies in this way?
- Q4:** Do you agree with the proposed banding levels? If not, please provide evidence as to why these should be changed. Views are also invited on the reports by Ernst and Young and Oxera published alongside this consultation document
- Q5:** Do you agree with the proposal that Geopressure occurring in conjunction with fossil fuel should be excluded from the RO?
- Q6:** Do you agree with the principle of providing independent advice to Ministers to help agree UK wide bands, and on who should provide that advice?
- Q7:** Do you support this approach to timing of reviews?
- Q8:** Do you agree with the criteria set out in paragraph 4.14? Should there be any additional criteria?
- Q9:** Do you agree that the proposed trigger points for grandfathered rights, including the transitional arrangements for projects consented on 1st April 2009, are appropriate?
- Q10:** Should the electricity generated from power stations that add additional capacity after the point at which they are grandfathered be calculated as a fraction pro rata to the installed capacities and/or be subject to separate metering at the generators' discretion?
- Q11:** Do you agree with the proposed treatment of projects under 50 kW as set out in para 4.21?

- Q12:** Is there any reason why RO support at the grandfathered level would need to continue after the initial investment had been paid back?
- Q13:** Accepting that there will be variation between projects, is 20 years a fair proxy for project financing?
- Q14:** Should this provision apply to projects under NFFO 3, 4 and 5 from date of contract, date of first supply or date of commencement in RO?
- Q15:** Is a guaranteed headroom of 6% adequate, given the ability of suppliers to bank ROCs and our intention to also remove the risk of a ROC price crash through introducing the ski-slope?
- Q16:** At what point in time should the level of Obligation for a given obligation period be announced?
- Q17:** Do you agree with the intention to take a power to introduce a ski-slope in primary legislation subject to a later need?
- Q18:** Do you agree with the need for a special co-firing criterion for an emergency review of banding? Is 10% of ROCs an appropriate trigger point?
- Q19:** Do you agree with the Government's proposal that reducing support and reviewing the co-firing band for regular biomass if it contributes 10% of ROCs makes a cap on co-firing unnecessary? If not, please provide evidence as to what the likely impact of uncapping co-firing at the proposed level of support would be and the level of cap appropriate.
- Q20:** Do you agree with the proposed treatment of energy crops set out in paragraphs 6.9–6.14?
- Q21:** Do you agree that sustainability requirements should cover all biomass users?
- Q22:** Should those generating less than 50 kW be exempted from sustainability reporting? Should any other threshold be used?
- Q23:** Do you agree with the criteria to address sustainability for biomass?
- Q24:** Do you agree that Ofgem should freeze the ROCs of operators who do not provide the necessary information on sustainability?
- Q25:** Do you agree that deeming the fossil fuel content of waste is appropriate? Should operators be given the opportunity to present Ofgem with evidence that the fossil fuel content is lower?

- Q26:** Is 65% fossil fuel the right level to deem? Does the remaining 35% receiving ROCs provide a suitable incentive through the RO without compromising the Government's aspirations for increased recycling?
- Q27:** Do you agree that the RO should be made 'neutral to waste (SRF)' in this way? Would there be any negative consequences? Do you agree that a CEN based definition is appropriate?

Annex B: Regulatory Impact Assessment

Partial Regulatory Impact Assessment for Banding of the Renewables Obligation

Part 1 – General Issues

1. Title of Proposal

1.1 Banding of the Renewables Obligation (RO).

2. Introduction

2.1 The Energy White Paper, *Meeting the Energy Challenge*, published on 23 May 2007 sets out our plans to reform the RO following a Government consultation, *Reform of the Renewables Obligation and Statutory Consultation on the Renewables Obligation Order 2007*, which closed on 5 January.

2.2 The consultation this partial RIA accompanies, sets out, and seeks views on, the detailed implementation of the changes that are being introduced. Information provided in response to this consultation will be incorporated into the final version of the RIA.

3. Background

3.1 The RO²⁷, introduced in 2002, is the Government's main policy measure to encourage the development of electricity generation capacity using renewable energy sources in the UK. It is underpinned by a substantial package of financial and non-financial supporting mechanisms and active assistance to the industry to develop its competitive potential. The RO has already provided, and will continue to provide, an impetus for the new renewable generating capacity that will be needed to meet the UK's current 10% target for electricity produced from renewable energy sources and as a basis for further reductions in carbon dioxide emissions.

²⁷ The details of the RO are contained in the Renewables Obligation Order 2006 in England and Wales, the Renewables Obligation (Scotland) Order 2006 in Scotland, and the Northern Ireland Renewables Obligation Order 2006 and the Renewables Obligation Order 2006 (Amendment Order) 2007. RIAs were produced for the implementation of the Obligation in England & Wales and Scotland in 2002; the amendments to the Obligation in 2004 and 2007; the new powers set out in the Energy Act 2004; the Consolidated Orders in 2005 and 2006; and the new powers in the Climate Change and Sustainable Energy Act 2006.

- 3.2 The RO requires licensed electricity suppliers to ensure specified amounts of the electricity they supply are from renewable sources. For 2007/08, this level is 7.9% and rises to 15.4% in 2015/16. Without the financial support provided by the RO, most forms of renewable electricity would not be economic.
- 3.3 The RO does not operate in a vacuum. Movement in a number of external factors affect the effectiveness of the RO in supporting renewables technologies. An example of this is the cost of wind generation which has risen by some 25% over the past two years due in large part to the increased prices of wind turbines driven by international increases in demand, as well as underlying rises in costs of raw materials.

4. *Regulatory Burdens and Compensatory Simplification*

- 4.1 The details of the RO are set out in secondary legislation, introduced in 2002, with subsequent amendments in 2004, 2005, 2006 and 2007. The major regulatory burden imposed by the RO is that, in order to provide additional support for the generation of electricity from renewable sources, costs to all electricity consumers are increased. These costs are capped by the levels of the RO and the “buy-out” price in the RO. The previous RIAs referred to in Footnote 27 considered the costs and benefits of the introduction and subsequent extension of the RO at the time that those measures were introduced.
- 4.2 The RO also imposes some regulatory burdens on renewable generators and the electricity supply industry in relation to the administration required to benefit from and comply with the scheme. Amendments introduced by the Renewables Obligation Order 2007 include a small number of detailed changes that will make it easier for renewable generators to benefit from the RO, and electricity suppliers to comply with it. This will reduce the regulatory burdens on business, particularly small businesses. Equally, the measures to introduce banding of the RO aim to improve the performance of the RO and make it easier for the renewables sector as a whole to benefit from the RO. Removal of current regulations around co-firing will also reduce the complexity of compliance.

5. *Business sectors affected by the RO*

General

- 5.1 The main business sectors affected are:
- companies involved in the supply of electricity to all electricity consumers;
 - companies involved in the generation of renewable electricity;
 - large consumers of electricity who may be particularly affected, given that the RO increases the cost of electricity; and
 - users of biomass materials for purposes other than electricity generation may be affected through increased competition for these materials.

- 5.2 The Government’s proposals on RO levels are designed to bring forward more renewables generation by increasing the effectiveness of the RO, while maintaining broadly similar costs to consumers. The proposals increase support to some forms of renewable generation, while reducing subsidy to others. Where it incentivises additional generation there will be a cost to firms in terms of the cost of the additional technology. Details of these costs to firms are given in Part 2. The firms cost represents the cost of the additional technology, net of electricity revenues. Revenues and payments from the buy-out fund recycling are regarded as being internalised among firms and not added to the costs.
- 5.3 The precise outcome will depend on the impact of the changes on renewables generation, which in turn rely on a number of external market forces. Among those factors external to the RO are future electricity prices, future carbon prices, and future capital and operating costs for renewables. Sensitivity analysis carried out indicates that a 10% reduction in the future generation costs has potential to increase the level of ROC eligible renewable electricity generation by 10–15% in 2015. Improvements in grid and planning will provide an additional boost.

Small Business

- 5.4 The major impact of the RO on the large majority of small businesses is likely to come from increased costs of electricity which will affect all electricity consumers. Details of the estimated increases in electricity prices are given in Part 2.
- 5.5 There are a number of small businesses active in the generation of renewable energy and/or the supply of electricity to customers in the UK, and these are likely to be affected by the changes to the RO. The DTI has held meetings with many relevant interested parties, companies and trade associations in the renewable energy sector and the proposals to band the RO have received support from a number of smaller companies actively developing projects or supplying technologies in these areas.
- 5.6 Measures introduced as part of the Renewables Obligation Order 2006 (Amendment Order) 2007 are aimed at making it easier for smaller generators of renewable electricity – in many cases small businesses – to participate in the RO. These changes have been generally welcomed.

6. *Competition Assessment*

- 6.1 The RO is a market-based instrument that operates in a competitive market for electricity. The rules of the RO apply in a non-discriminatory way to all participants in the renewables industry and electricity sector. The Government’s intention is that this will remain the case.

7. Enforcement and Sanctions, Compliance and Monitoring

- 7.1 The Renewables Obligation Order (ROO) are administered and enforced by Ofgem. Non-compliance is considered a breach of a 'relevant requirement' of a supplier's licence and Ofgem may impose appropriate sanctions. Ofgem reports annually²⁸ on its administration of the RO and conducts regular audits in relation to compliance with the RO.
- 7.2 The DTI 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.
- 7.3 The changes proposed will introduce few, if any, additional enforcement or inspection measures on business in line with Hampton principles. They do not introduce any new powers of sanction.

8. Post-Implementation Review

- 8.1 In the consultation document the Government has undertaken to carry out reviews of the Banded RO on an agreed timetable. The Government has proposed that the first two reviews of the RO banding levels should take place in time for any changes to the banding levels to be introduced on 1 April 2013 and 1 April 2018.
- 8.2 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.

9. Consultation

- 9.1 The longer-term changes for the RO were first proposed as part of the Energy Review Report. The Government has held a preliminary consultation on these proposals and the consultation which this RIA accompanies, sets out in more detail the proposed way forward.
- 9.2 DTI will hold meetings with a wide range of interested parties during this consultation period to discuss these issues further, as well as receiving written responses to the consultation and so far as is possible receiving individual representations from interested parties.
- 9.3 The proposals outlined here will then be subject to the normal processes for bringing forward primary legislation. During primary legislation the proposals will be subject to parliamentary scrutiny. There will then be a statutory consultation on the secondary legislation needed to implement the proposals. A further more detailed RIA on the proposed changes will be developed in the light of issues raised during consultation and the further development of the proposals.

28 www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=73&refer=Sustainability/Environmnt/ RenewablObl

Part 2 – Proposals

10. Reform of the RO

What is the proposal?

10.1 To:

- Amend the RO so more expensive renewable energy generation technologies, especially those at an earlier point in their development of technology and business model, are awarded more than 1 Renewables Obligation Certificate (ROC)/MWh of electricity generation (multiple ROCs) while projects in more economic technologies are awarded less than 1 ROC/MWh (fractional ROCs);
- Increase the level of the Obligation above the level previously announced if actual generation requires (known as 'headroom'), to a maximum level equivalent to 20%;
- Subject to the outcome of the cross-industry working group, introduce a mechanism to mitigate the risk of a collapse in the price of a ROC in the event of full compliance with the Obligation; and
- Remove the current cap on the proportion of the obligation that suppliers can meet through co-firing biomass with fossil fuels.

10.2 The Government also wishes to increase investor confidence in the predictability of the value of RO. Existing projects and those operational prior to the introduction of banding, with the exception of co-firing (which requires comparatively low levels of capital investment), will be grandfathered at 1 ROC/MWh for at least 20 years from their date of operation. Mechanisms may also be introduced to mitigate the risk of a collapse in the price of a ROC in the event of full compliance with the Obligation.

Way forward?

10.3 The RO was devised as a technology-neutral instrument designed to bring forward the most economic forms of renewable generation. The Government believes it has been broadly effective in achieving this goal; renewable generation has grown significantly and there is a large pipeline of projects under development. Total generation from RO eligible renewable sources was 4% of electricity in 2005, up from 1.8% in 2002.

10.4 However, due to, among other factors, increased costs for renewables generation the RO, in its current form, seems unlikely to achieve Government targets. Government work on how to bring forward additional renewables generation without prejudicing investment undertaken on the basis of the RO has led to the development of banding. The RO needs long term certainty to operate to its fullest potential.

10.5 In order to develop this work the Government commissioned Ernst & Young to research the costs of different renewable generation technologies, and to provide

levelised costs of technologies under the RO, taking into account their capital and operational costs. This data was then provided to Oxera and formed the basis of their modelling work of changes to the RO, including the introduction of banding, the ski-slope and headroom mechanisms, and changes to the planning regime. Reports from both of these consultants are published alongside this consultation document.

- 10.6 Oxera used their model of the renewable generation market, which simulates the future pattern of renewables investment, based on assumptions as to the future revenue stream and costs of various renewable generation technologies (based on the Ernst & Young report). They analysed a number of scenarios of RO reform, examining the impact on the renewables generation market. The scenarios included: leaving the RO unchanged; giving each technology a separate band dependant on need; and various ways of grouping technologies in different bands with differing levels of support. Other elements such as the implementation of a headroom mechanism to mitigate the risk of ROC price crashes were also modelled.
- 10.7 This work allowed the Government to identify a short list of scenarios which begin to deliver on our policy goals of increasing renewables generation against the 10% target and aspiration of 20% by 2020, through incentivising new renewables technologies and increasing carbon emissions savings, whilst increasing value for money for the consumer and increasing the efficiency of the RO. Oxera ran a number of sensitivity tests on the electricity price, the carbon price and technology costs, as well as some assumptions about the impact of reduced capital costs due to reform of planning and grid connection.

What are the options?

- 10.8 The Oxera Report published alongside this consultation presents results from the modelling work in more detail. The options selected highlight particular effects of banding at specific levels and we would appreciate comments from consultees. All of the scenarios quoted use the central case and are discounted over the lifetime of the RO, in line with HMT Green Book methodology and discount rates.

Option One – Do Nothing

- 10.9 The assumptions made about the current Obligation scenario (the base case) are:
- each MWh generated earns one ROC (i.e. no banding);
 - it is based on the current trajectory to an obligation of 15.4% by 2015/16;²⁹
 - it includes RPI-indexation of the buy-out price for the lifetime of the RO (until 2027);
 - that the energy crop co-firing remains uncapped from 1 April 2007, and existing caps on non-energy crop co-firing are maintained – implying a cap of 10% until 2010/11, 5% until 2015/16 and nothing thereafter

²⁹ An equivalent cap of 6.3% exists for Northern Ireland starting in 2012/13.

- 10.10 The modelling indicates that unchanged (the “do-nothing” scenario), the RO will deliver 8.1% electricity from ROC eligible renewables generation by 2010 against a target of 10% and 11.4% by 2015 and 11.5% by 2020. Under this option the level of generation does not come near to the maximum obligation level of 15.4%.
- 10.11 Under central electricity price/central technology cost assumptions, this level of generation is achieved at a total subsidy cost of £27.3 billion over the lifetime of the policy. This cost is assumed to equate to the cost to consumers, the figures in the table assume 100% cost pass-through. Over the lifetime of the technologies supported through the RO, this option saves 90.6 million tonnes of carbon (MtC).
- 10.12 Under the central electricity price/central technology cost assumptions, the lifetime resource cost (i.e. the cost of the renewable technologies) is estimated at £14.6 billion. Assuming this resource cost is passed through to electricity prices, we estimate that the RO under this option leads to increased electricity prices of around 5%. The difference between the subsidy cost and the resource cost is therefore estimated at £9.1 billion over the lifetime of the renewable technologies. This represents the ‘deadweight’ cost of the RO – a measure of the efficiency of the instrument.
- 10.13 The deadweight cost is due in part to the amount by which technologies receive subsidy under the RO which is greater than the level needed for them to be economic. For example co-firing and landfill gas technologies which have very low capital costs and are over-subsidised by the current model. It is this deadweight element that the RO reforms are aiming to address.

Option One: Do Nothing	2015 ¹			Lifetime		
	Low	Central	High	Low	Central	High
Resource Cost £bn	0.8	0.8	0.7	14.1	14.6	13.8
Carbon Saved MtC	3.3	3.8	4.2	78.9	90.6	102.9
NPV Cost-Benefit £bn (cost+/-benefit-)	0.6	0.5	0.4	9.2	9.0	7.4
Cost-Effectiveness £/tC				179	161	134
RO Deadweight Cost £bn	0.5	0.5	0.6	9.6	9.1	9.9
Distributional Analysis						
Exchequer Cost £bn	0.1	0.1	0.1	1.6	1.9	2.1
Firms Cost £bn	0.8	0.8	0.7	13.4	13.8	12.9
Consumer Cost £bn	1.3	1.3	1.3	23.7	23.7	23.7

Notes:

1. All costs are at 2007 real prices, discounted. The low scenario is modelled assuming technology costs are 10% higher in the central case, with a lower level of renewable generation. High costs assume technology costs are 10% lower than in the central case, with a higher level of generation, and therefore costs.

Option Two – Banding Package with many Bands (Scenario One)

- 10.14 This scenario assumes a separate band for each technology, with bands set to make the central step of each individual technology supply curve economic. Co-firing is uncapped. Co-firing is set at 0.4 ROCs/MWh in this scenario.
- 10.15 A headroom mechanism is included, which increases the level of the obligation when the headroom threshold is breached, ensuring that the actual number of ROCs is 6% higher than generated volumes from 2009/10 with a ski-slope mechanism included to prevent the 'cliff-edge' problem when ROC volumes exceed the obligation size.
- 10.16 Under central electricity price/central technology cost assumptions, the modelling indicates that this scenario would deliver 10.2% generation from ROC eligible renewables generation by 2010, 13.8% by 2015 and 13.8% by 2020. This option brings forward significant increases in the amount of generation from co-firing (due to the removal of the cap on co-firing), offshore wind, and for a lesser extent wave and tidal (due to the banding up of these technologies). The higher banding levels increase both the actual deployment for renewable electricity as well as leading to more ROCs being issued than the level of generation in MWh. If ROCs are converted on a one for one basis, the level of ROCs in 2027/28 is 67 TWh compared to a volume of generation of 52 TWh. Combined with the increase in absolute deployment, this has the impact of reducing the ROC price, and therefore expected revenues, which in turn is predicted to decrease investment in onshore wind, despite onshore wind continuing to receive one ROC.
- 10.17 This level of generation is achieved at a lifetime cost to consumers of £28.8 billion over the lifetime of projects supported by the RO technologies, saving 107.1 MtC emissions. Overall therefore, this option increases the level of renewables generation but at considerable cost to the consumer. Over the lifetime of the RO, the cost to the consumer increases by £5.1 billion.
- 10.18 This option increases the overall resource cost incurred through the RO, and increases the cost/tonne of carbon, and the Net Present Value (NPV) cost, compared to option one. This is because the banding regime brings forward more expensive technologies (i.e. offshore wind and wave and tidal). This increased resource cost, combined with a reduction in the total subsidy, results in a reduction in the lifetime deadweight of £2.0 billion compared to option one – representing increased efficiency of the subsidy. The higher level of resource cost results in a slightly higher estimated impact on electricity prices, of around 8%, compared to around 5% in option one. This option delivers slightly higher intermittent generation under option one (wind and wave and tidal power) which means that this option will incur slightly higher system balancing costs than under option one.
- 10.19 However, this scenario is complex, and is more precise than it is really possible to be when predicting future costs. This banding regime is likely to require banding levels to be reset on a more frequent basis than one with fewer bands, introducing increased uncertainty for investors, and leading to Government trying to predict the market and pick winners, something consultation responses have strongly advised against.

Option Two: Scenario 1	2015 ¹			Lifetime		
	Low	Central	High	Low	Central	High
Resource Cost £bn	1.2	1.2	1.3	20.1	21.7	23.0
Carbon Saved MtC	4.0	4.7	5.5	89.5	107.1	128.7
NPV Cost-Benefit £bn (cost+/-benefit-)	0.9	0.9	0.9	14.4	14.9	14.9
Cost-Effectiveness £/tC				224	203	179
RO Deadweight Cost £bn	0.2	0.4	0.4	4.3	7.1	6.5
Distributional Analysis						
Exchequer Cost £bn	0.1	0.1	0.1	1.9	2.3	2.7
Firms Cost £bn	1.1	1.2	1.2	19.3	20.8	21.9
Consumer Cost £bn	1.3	1.6	1.7	24.4	28.8	29.4

Notes:

1. All costs are at 2007 real prices, discounted. The low scenario is modelled assuming technology costs are 10% higher in the central case, with a lower level of renewable generation. High costs assume technology costs are 10% lower than in the central case, with a higher level of generation, and therefore costs.

Option Three – Banding Package with Four Bands

10.20 This scenario is the same as option two, though it simplifies the number of bands to be introduced, with each technology being assigned to one of four banding levels:

- Technologies in the Established Band will receive 0.25 ROCs/MWh
- Technologies in the Reference Band will receive 1 ROC/MWh
- Technologies in the Post-Demonstration Band will receive 1.5 ROCs/MWh
- Technologies in the Emerging Technologies Band will receive 2 ROCs/MWh

10.21 One of the most important features of this option is that it reduces the level of subsidy to the most expensive technologies compared to option two. This in turn reduces the divergence between the number of ROCs and the level of generation, which was found under option two. Under this option ROC prices remain at a level which allows an increase in the level of onshore wind generation, while retaining the level of support necessary to bring forward increases in generation from biomass and offshore wind. The smaller number of bands also allows greater flexibility, and reduces the need for frequent reviews.

10.22 The modelling indicates that under central electricity and central technology cost assumptions, this scenario would deliver 8.6% ROC eligible renewables generation by 2010, 13.5% by 2015 and 13.5% by 2020. Actual deployment will depend on the validity of those assumptions. Additional policy measures proposed by Government including reforms to the planning and grid access regimes are intended to remove regulatory barriers to the deployment of renewable electricity generation. These policies are still in development and it has not been possible to assess the impact of these changes has been assumed in this modelling work.

10.23 Under these assumptions, the total subsidy is estimated at £25.1 billion (an increase in total subsidy of £1.4 billion compared to option one) over the lifetime of the RO. This option saves 103.1 MtC of Carbon over the lifetime of the technologies, an increase of 12.5 MtC over option one.

10.24 This option, is predicted to bring forward similar levels of new renewables generation to option two, but does so for a much lower increase in the cost to consumers of roughly £3.7 billion compared to option two or scenario one.

10.25 Resource costs under this option are estimated at £19.4 billion over the lifetime, an increase of £4.8 billion over option one. Cost/tonne of carbon is £188 higher than option one, but lower than option two. The increased resource cost and reduced consumer cost leads to an estimated lifetime deadweight cost of £5.7 billion. This is a reduced deadweight cost of £3.4 billion compared to option one – making it the most efficient of the options considered here. The higher resource cost implies higher electricity prices than under option one – an estimated 7% increase – higher than under option one, but lower than under option two. This option leads to a higher level of intermittent generation than under option one, which will incur some additional system balancing costs. Using UK Energy Research Centre (UKERC)³⁰ estimates of the costs of intermittent generation, this leads to an additional cost of approximately £60-70 million over the lifetime of the RO.

10.26 This is the Government’s favoured Option.

Option Three: Four Bands	2015 ¹			Lifetime		
	Low	Central	High	Low	Central	High
Resource Cost £bn	1.1	1.1	1.1	19.9	19.4	19.1
Carbon Saved MtC	3.9	4.5	5.1	86.8	103.1	123
NPV Cost-Benefit £bn (cost+/-benefit-)	0.8	0.8	0.7	14.4	12.9	11.5
Cost-Effectiveness £/tC				229	188	155
RO Deadweight Cost £bn	0.2	0.3	0.5	3.8	5.7	9.5
Distributional Analysis						
Exchequer Cost £bn	0.1	0.1	0.1	1.8	2.2	2.6
Firms Cost £bn	1.1	1.1	1.0	19.1	18.5	18.1
Consumer Cost £bn	1.3	1.4	1.6	23.7	25.1	28.6

Notes:

1. All costs are at 2007 real prices, discounted. Low scenario is modelled assuming technology costs are 10% higher in the central case, with a lower level of renewable generation. High costs assume technology costs are 10% lower than in the central case, with a higher level of generation, and therefore costs.

30 www.ukerc.ac.uk

What are the costs?

- 10.27 Introducing a banded obligation on its own will not increase the total amount of cost subsidy in the RO, and will not therefore increase costs to consumers. Under the central assumptions option three is predicted to cost consumers an additional £1.4 billion, compared to option one, over the lifetime of the RO. The out-turn will vary with the actual level of deployment – increased deployment will be accompanied by increased costs to consumers.
- 10.28 The change will result in additional investment in renewables generation, in particular in higher cost technologies and will result in an increased resource cost of £4.8 billion. This resource cost is the cost to the economy of producing renewable energy as opposed to conventional generation. However, the ability to target support in a banded RO, means that banding has the potential to significantly increase the efficiency of the RO (reducing the ‘deadweight’ element of the subsidy) through providing support levels more closely linked to the needs of different technologies.
- 10.29 Changes to the RO will result in changes to its administration which will result in increased costs to the RO administrator. The Government has no plans to change the funding arrangements for the administration of the RO. However, we will keep open the option of changes should they be necessary.

Annex C: Consultation Criteria

1. Consult widely throughout the process, allowing a minimum of 12 weeks for written consultation at least once during the development of the policy.
2. Be clear about what your proposals are, who may be affected, what questions are being asked and the timescale for responses.
3. Ensure that your consultation is clear, concise and widely accessible.
4. Give feedback regarding the responses received and how the consultation process influenced the policy.
5. Monitor your department's effectiveness at consultation, including through the use of a designated consultation coordinator.
6. Ensure your consultation follows better regulation best practice, including carrying out a Regulatory Impact Assessment if appropriate.

The complete code is available on the Cabinet Office's web site, address www.cabinet-office.gov.uk/servicefirst/index/consultation.htm

Annex D: 2010 Levelised Technology Costs and Current and Projected Supply

Technology	Cost of Energy £/MWh ²⁹	2006 Supply ³⁰ TWh	Supply TWh 2015 Projected	
			No Change	Banded RO ³¹
Sewage Gas	28-53	0.3	0.9	0.9
Landfill Gas	32-63	4.1	4.3	4.2
Co-firing	51-75	2.2	3.9	5
Onshore Wind	54-106	3.4	15.2	12.4
Energy from Waste with CHP	75-83	0	1.1	0.9
Hydro-electric	46-97	2.3	2.9	2.8
Offshore Wind	82-102	0.7	8.4	16.7
Dedicated Biomass (regular)	77-114	1	2.6	2.8
Dedicated Biomass (energy crops) & Biomass CHP	119-180	0	0	0.6
Wave and Tidal Stream	121-282	0	0	0.3
Anaerobic Digestion/ Gasification/Pyrolysis	103-202	0	0	0.1
Solar PV	488-717	0	0	0

²⁹ These figures are from the range of levelised costs for 2010 as presented in the Ernst and Young report which accompanies this consultation. Some technologies have been grouped.

³⁰ These figures only represent the electricity supply on which RO Certificates have been claimed.

³¹ The figures, taken from the Oxera report, indicate estimated generation in the Obligation period 2015/16 and take into account proposed policy changes.

Annex E: Analysis on Biomass Fraction of Waste for Use in Deeming the Fossil Fuel Fraction of Waste

	Biomass %	GCV (MJ/kg)	Unsorted waste			Scenario A ³²			Scenario B ³³		
			% waste	Total GCV	Biomass GCV	% waste	Total GCV	Biomass GCV	% waste	Total GCV	Biomass GCV
Paper and card	100	12.6	18.0	2268.0	2268.0	2.7	340.2	340.2	9.0	1134.0	1134.0
Plastic film	0	23.6	2.7	637.2	0.0	9.5	2249.3	0.0	8.6	2039.0	0.0
Dense plastic	0	26.7	3.5	934.5	0.0	1.4	373.8	0.0	2.1	560.7	0.0
Textiles	50	15.9	2.4	381.6	190.8	1.2	190.8	95.4	1.4	229.0	114.5
Absorbent hygiene products	50	8.0	2.2	176.0	88.0	7.8	621.3	310.6	7.0	563.2	281.6
Wood	100	18.3	3.2	585.6	585.6	1.6	292.8	292.8	2.4	439.2	439.2
Other combustibles	50	15.6	1.5	234.0	117.0	5.3	826.0	413.0	4.8	748.8	374.4
Non-combustibles	0	2.8	12.3	344.4	0.0	43.4	1215.7	0.0	39.4	1102.1	0.0
Glass	0	1.5	6.6	99.0	0.0	3.3	49.5	0.0	3.3	49.5	0.0
Ferrous metal	0	0.0	1.6	0.0	0.0	0.8	0.0	0.0	0.8	0.0	0.0
Non-ferrous metal	0	0.0	0.4	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0
Kitchen waste	100	5.3	17.2	911.6	911.6	4.3	227.9	227.9	4.3	227.9	227.9
Green waste	100	6.5	19.2	1248.0	1248.0	1.9	124.8	124.8	1.9	124.8	124.8
Fines	50	4.8	4.0	192.0	96.0	14.1	677.8	338.9	12.8	614.4	307.2
WEEE	0	7.6	4.5	342.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hazardous household waste	0	0.0	0.6	0.0	0.0	2.1	0.0	0.0	1.9	0.0	0.0
TOTAL			99.9	8353.9	5505.0	99.7	7189.9	2143.6	100.0	7832.6	3003.6
Biomass GCV					66%			30%			38%

Base data from:

Carbon Balances and Energy Impacts of the Management of UK Wastes: Table 3.2 (GCV); Table 1.24 (municipal waste composition England), Table B1.2 (recycling and recovery upper limits – for Scenario A), Impact of EfW and recycling policy on UK GHG emissions: Table 3.1 (% biodegradability)

³² Scenario A: Removed 85% paper/card, 75% food, 90% green, 50% wood, 50% textiles, glass & metals, 60% dense plastic, WEEE

³³ Scenario B: Removed 50% paper/card, 75% food, 90% green, 25% wood, 40% textiles & dense plastic, 50% glass & metals, WEEE

