ofgem Promoting choice and value for all gas and electricity customers

Ofgem's response to BERR consultation on reform of the Renewables Obligation

Document type: Response to government consultation

Ref: 222/07

Date of publication: 13 September 2007

Target audience: This document will be of interest to BERR, renewable energy generators, environmental bodies and agencies, energy suppliers, energy market participants, customers and other interested parties.

Overview:

The Government introduced the Renewables Obligation (RO) - a scheme that uses electricity customers' money to support renewable electricity generation - in April 2002. The Government is currently consulting on proposals to amend the RO and change the level of support offered to different renewable technologies. We support strongly the Government's efforts to reduce carbon dioxide emissions to tackle climate change. But we do not think that either the existing scheme or the Government's proposed changes are the best way to either promote renewable generation or to cut carbon dioxide emissions. We think that the current scheme costs customers more than it needs to and we do not think the government's proposals are a good idea. We explain why in this response and also develop our thinking on alternative support mechanisms that we think could lead meet the Government's renewable and carbon emissions targets at lower costs to electricity customers.

Contact name and details: Giles Stevens, Head of European Strategy and Environment

Tel: 020 7901 7082

Email: giles.stevens@ofgem.gov.uk

Team: European Strategy and Environment

Context

Tackling the effects of climate change is one of the most significant global challenges we currently face. The energy sector is responsible for around 44% of greenhouse gas (GHG) emissions in the UK, and has a major role to play in meeting this challenge. The development of a low carbon energy sector is therefore a priority for government at both a national and European level. The UK Government has put in place a number of measures to encourage the development and further deployment of renewable energy generation technologies including the Renewables Obligation (RO). The RO is essentially a financial support scheme that uses electricity customers' money to provide commercial incentives for investment in new renewable electricity generation technologies. The Government is currently consulting on proposed reforms to the RO and this document sets out Ofgem's response to the consultation. Ofgem has two separate roles which are relevant to responding to this consultation. Firstly, we are the independent regulator of the sector, with a primary duty to protect the interests of present and future customers. We are also responsible for administration of the scheme. The response is set out in two parts reflecting these different roles and responsibilities.

Associated Documents

- Materials from Ofgem seminar: Making sure renewable policy delivers, May 2004 http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=37&refer=Sustainability/Environmnt/Policy
- Assessment of the benefits from large-scale deployment of certain renewable technologies, April 2005 http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=6&refer=Sustainability/Environmnt/Policy
- Ofgem's response to the preliminary consultation on the 2005-6 review of the Renewables Obligation, June 2005 http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=127&refer=Sustainability/Environmnt/Policy
- Sustainable Development Report 2006 http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=25&refer=Sustainability/Environmnt/Policy
- Reform of the Renewables Obligation 2006: Ofgem's response, January 2007 http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=125&refer=Sustainability/Environmnt/Policy
- Renewables Obligation: Annual report 2005-06, 28 February 2007 http://www.ofgem.gov.uk/Sustainability/Environmnt/RenewablObl/Documents1/17098-3607.pdf

Table of Contents

Summary

Sustainable development is at the heart of Ofgem's thinking. The energy sector contributes around 44% of the UK's green house gas (GHG) emissions, and has a considerable role to play in tackling the causes of climate change.

Given our statutory duties and role as an independent regulator, we want to help the Government manage the transition to a low carbon economy at the lowest possible cost to customers. This is important for all energy customers but particularly for those customers in fuel poverty.

The UK has played a key leadership role in helping to establish the EU Emissions Trading Scheme (EU ETS) that is designed to reduce carbon dioxide emissions. Under this cap and trade scheme a price for carbon dioxide emissions has been established and this now forms part of wholesale electricity prices across the EU. It is also beginning to provide commercial incentives for electricity generators to consider investing in a range of technologies including renewables that have lower carbon emissions than existing generation technologies. The current EU ETS is limited in its effectiveness as it only gives investors short term certainty on carbon allowances until 2012. The European Commission is trying to agree the future of the scheme beyond 2012. If the Commission succeeds in setting much tougher caps for much longer periods, the incentives to invest in lower carbon generation technologies such as renewables will increase as the cap on total carbon emissions is reduced and the price of carbon increases.

Since the RO consultation last year there has been the significant development of the Heads of Government across the EU signing up to a target to ensure that 20% of primary energy is supplied by renewables by 2020, in addition to a new overall carbon commitment.

The Government now has targets to achieve two objectives: reduce carbon emissions and meet the renewables target. Although meeting the renewables target will help to meet the carbon emissions target there may be cheaper low carbon technologies than renewables. Given our remit, we would prefer to see Government focus on tackling climate change directly through reducing carbon dioxide emissions rather than setting targets for particular technologies such as renewables. We think the EU ETS should be at the heart of the Government's approach. We also think that any domestic policies need to be consistent with the EU ETS and be robust to future developments in the ETS scheme. But given the Government's EU commitments and domestic targets it is clear that renewable energy will have a very important contribution to make in the UK.

The Government's consultation

In May 2007 the Government launched a consultation on its proposals to reform the RO. The RO places an obligation on all electricity suppliers to buy an increasing amount of renewable electricity until 2027 (or alternatively face a penalty buy out price). The RO has been successful in stimulating investment in renewable electricity in the UK.

The Government is proposing to reform the RO from the current arrangements, where all forms of renewable technology are supported by the same amount, to "banding" the RO. Banding will provide different levels of financial support to different renewable technologies. These proposals will mean that offshore wind generation, for example, will receive a higher level of support than onshore wind generation.

Ofgem's views

Historically, the effectiveness of the RO has been limited by two key external factors; delays associated with the planning process and with connecting to the transmission grid (which is also related to the planning process). Delays in the planning process for new wind farms and development of transmission lines are slowing the growth of renewables in response to the strong financial incentives created by the RO. The total cost of the RO to customers is capped. This is because if the volume of renewable generation is below the target the cost to customers is fixed at the level of the obligation multiplied by the buy-out price. But these penalty payments are "recycled" to renewable generators raising the level of support they receive and increasing the cost of any carbon emission reductions under the scheme.

One of the main reasons the Government introduced the RO was to help tackle climate change. At the time, there was no emissions trading scheme and so conventional generators did not face any costs associated with their carbon dioxide emissions. The Government also had other objectives for the RO such as encouraging technological innovation and promoting the development of a renewables industry in the UK.

The RO currently values all renewable technology in the same way. It was intended to make sure that the lowest cost renewables technologies are deployed to meet the government's target to manage the cost to customers of the scheme. The scheme has been estimated to cost both business and domestic consumers over £1.8 billion to date.

The proposal to band the RO has fundamentally changed the nature of the scheme. The proposals aim to encourage renewable technologies that are currently uneconomic to come to market. This approach of attempting to select technologies could have a detrimental effect on consumers. It will be very hard for the Government to forecast or predict accurately how much additional subsidy is needed for each technology and therefore the appropriate band to place them in. If renewables technologies are placed in the wrong band, as our initial analysis suggests could be the case for some technologies, they will be given too much or too little subsidy.

There is mounting evidence that while the RO has been effective at reducing carbon emissions that other schemes or policies could have delivered the same (or greater) emissions reductions at lower costs. In 2006/07, the cost of carbon abatement through the RO was in the range £65-140/tCO2 depending on the fuel that is assumed to be displaced. In contrast the cost of abatement in the UK Emissions Trading Scheme is around £18/tCO2 and in the EU Emissions trading scheme it has

been between £0-22/tCO2 due to variations in allowance prices. Other policies within the UK include the Climate Change Levy in which costs are around £5-11/tCO2, and the Energy Efficiency Commitment in which some carbon abatement can be achieved at negative cost (due to the associated energy cost savings).

There is also increasing evidence that there are more efficient and effective policy tools which can be used to encourage renewables deployment. The European Commission compared the costs and associated effectiveness of "feed-in tariffs" to support renewables implemented in Europe with corresponding quota schemes, such as the RO. The analysis showed that the RO was the most expensive and least efficient method of support. However, it is also clear that the RO scheme's effectiveness has been hampered by the delays in planning for wind farms and transmission lines.

We think that given the high cost to customers and the limited effectiveness of the scheme, the Government should consider alternatives to the RO. While we recognise that the Government considered alternatives to the RO last year, we think that the new commitment that 20% of energy is to be supplied by renewables by 2020 requires a more fundamental rethink of current policy and a review of alternative policy instruments. In our response we outline some lessons that can be drawn from international experience of the effectiveness of supporting renewable technologies and put forward more details about a potential alternative support scheme based around long term renewable contracts.

Administering the scheme

We also play an important role in administering the RO. Although we have concerns about the RO scheme and the planned reforms, we will continue to advise BERR on how to translate its policy proposals into practical administrative solutions, drawing on our experience as scheme administrator. This is particularly important as some of the detailed implementation issues are still to be finalised.

The proposals set out in the Government's consultation will be more complex to administer than the current arrangements. This increase in administrative complexity will result in a corresponding increase in our costs of administering the scheme. We estimate that we will incur set up costs of around £0.5 million and that our administration costs will increase by around £0.2 million per year.

We remain concerned about the current arrangements for funding our costs of administering the RO. We do not think it is appropriate for these costs to be recovered directly from customers through network businesses through the licence fee procedure. We urge the Government to review the arrangements for funding the administration of all environmental programmes.

1. Part 1: Comments on the government's proposals

Chapter Summary: In this chapter we set out our detailed comments on the government's proposals to introduce a banded RO. We are concerned that banding the RO will result in higher costs to customers i.e. more money for the same amount of carbon that is saved. In this chapter we explain our detailed concerns over the proposed bands that the government has developed for particular technologies. We then go on to outline some potential alternatives support mechanisms for renewables that would not have the same problems as the RO.

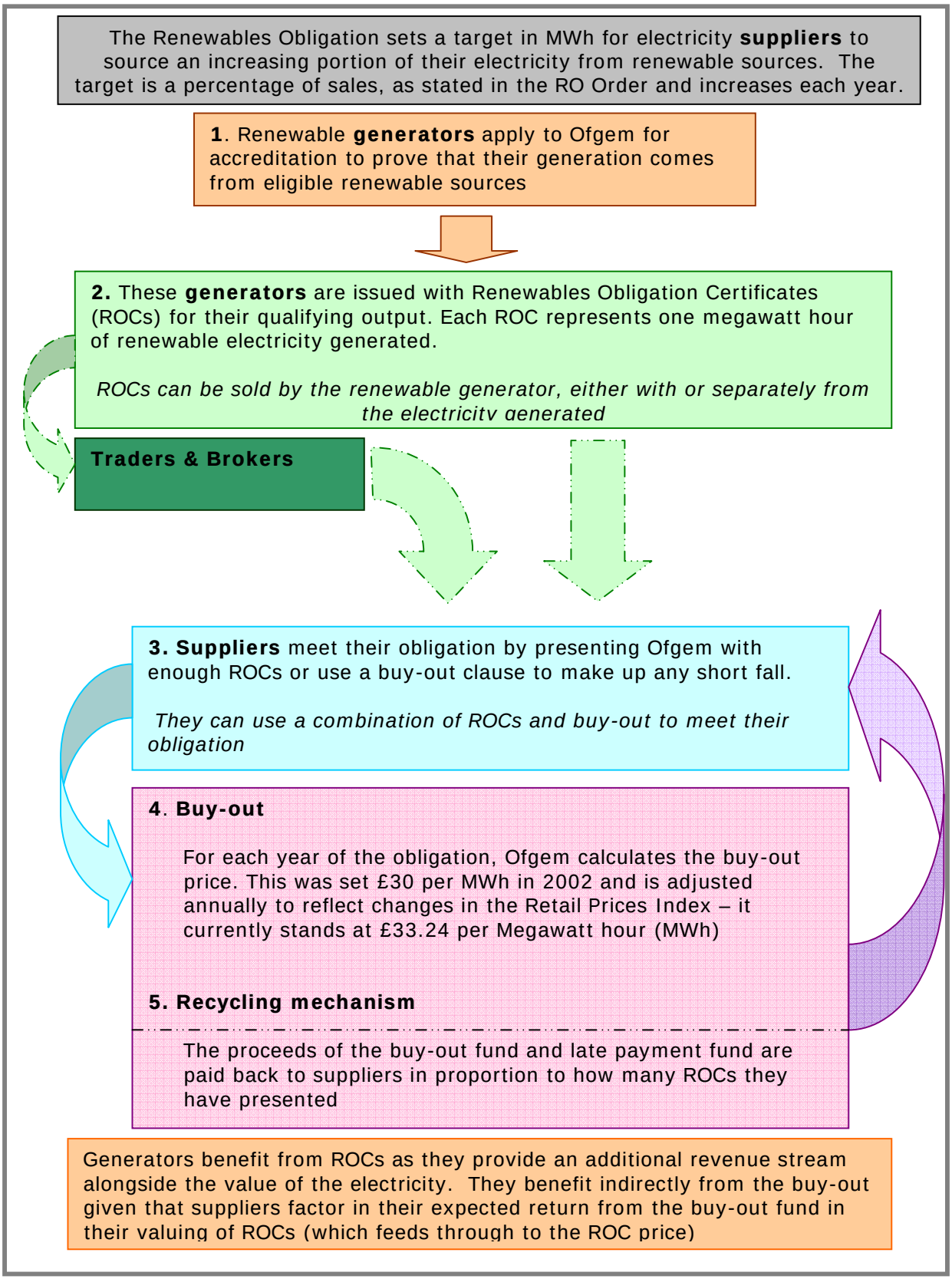
1. Background

How the RO currently works

1.1. The RO was set up as a quota/obligation scheme. It sets a target for electricity suppliers to source an increasing proportion of their electricity from renewable generators over time. All renewable technology is treated the same in that every form of technology eligible for the RO receives the same level of financial support as another. The diagram below shows how the RO works in practice.

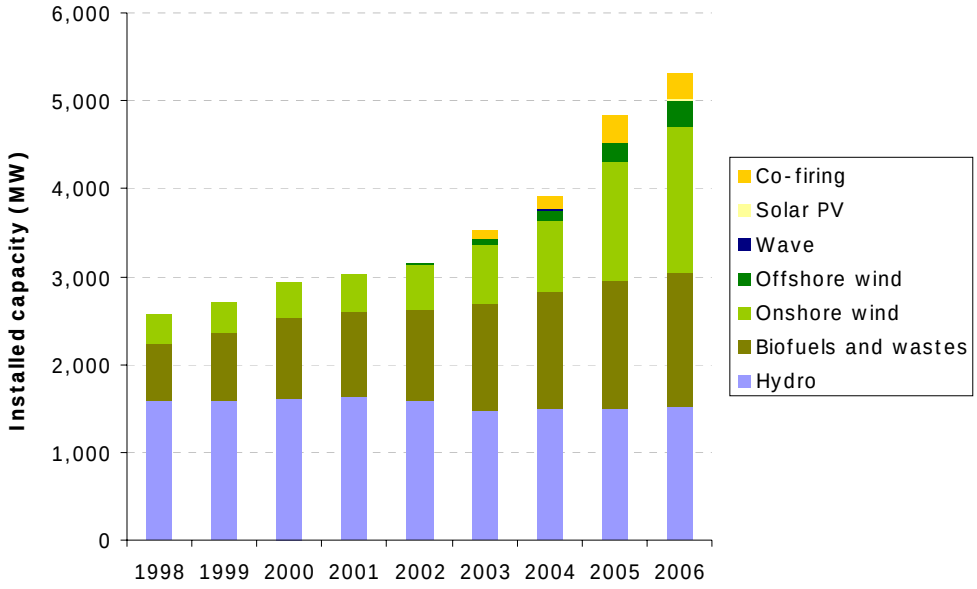
1.2. Suppliers meet their obligation by presenting Ofgem with enough ROCs or use a buy-out clause to make up any shortfall. They can use a combination of ROCs and buy-out. All payments received from suppliers are referred to as 'buy-out payments' and form the 'buy-out funds' for the obligation period. Ofgem redistribute the funds, including any interest accrued, through the single recycling mechanism to suppliers.

1.3. The buy-out funds are redistributed to suppliers in proportion to the total number of ROCs that each has presented across the obligations. For example, a supplier that presented ROCs representing 3 per cent of the total number of ROCs presented across all three obligations would get back 3 per cent of the total sum of the three buy-out funds. That would still be the case if that supplier had only presented ROCs in respect of just one of the obligations.


The Renewables Obligation sets a target in MWh for electricity **suppliers** to source an increasing portion of their electricity from renewable sources. The target is a percentage of sales, as stated in the RO Order and increases each year.
1. Renewable **generators** apply to Ofgem for accreditation to prove that their generation comes from eligible renewable sources
2. These **generators** are issued with Renewables Obligation Certificates (ROCs) for their qualifying output. Each ROC represents one megawatt hour of renewable electricity generated.
ROCs can be sold by the renewable generator, either with or separately from the electricity generated
Traders & Brokers
3. Suppliers meet their obligation by presenting Ofgem with enough ROCs or use a buy-out clause to make up any short fall.
They can use a combination of ROCs and buy-out to meet their obligation
4. Buy-out
For each year of the obligation, Ofgem calculates the buy-out price. This was set £30 per MWh in 2002 and is adjusted annually to reflect changes in the Retail Prices Index – it currently stands at £33.24 per Megawatt hour (MWh)
5. Recycling mechanism
The proceeds of the buy-out fund and late payment fund are paid back to suppliers in proportion to how many ROCs they have presented
Generators benefit from ROCs as they provide an additional revenue stream alongside the value of the electricity. They benefit indirectly from the buy-out given that suppliers factor in their expected return from the buy-out fund in their valuing of ROCs (which feeds through to the ROC price)

Assessing the performance of the RO

1.4. The RO was introduced by the Government in April 2002 to encourage investment in renewable generation. The chart below shows installed generating capacity for renewable generation since 1998.



Source: Digest of UK Energy Statistics - BERR 2007

1.5. As the chart illustrates, the RO in its present form has been successful in bringing on substantial new investment in renewables capacity, leading to carbon emission savings of 17MtCO2. However this has not been sufficient to meet the targets set for the percentage of electricity supplied to come from renewables.

1.6. There have been two main barriers to the development of renewable technologies. The main problems in the UK are delays in getting planning decisions and transmission grid connection delays. Delays in the planning process for new wind farms and the transmission lines needed to connect them are slowing the growth of renewables, particularly onshore wind. It is estimated that there is currently 8GW of capacity held up in the onshore planning system and a further 3.2GW awaiting consent offshore, which in total could provide electricity capacity to around 6 million homes[1]. Since the cost to customers is fixed by the level of the obligation, these external constraints on the supply of renewable generation have increased the cost

[1] As reported by the British Wind Energy Association (BWEA) in January 2007 http://www.britishwindenergy.co.uk/pdf/briefings/ukwindstatusJan07.pdf

per tonne of carbon saved. We welcome and support the Government's proposals in its White Paper to look at reform of the planning regime to provide faster decisions for key pieces of infrastructure including energy infrastructure.

1.7. Although the RO has been successful in supporting more renewable generation (and would have been even more successful without the planning problems) this has come at a very high cost to customers compared to other carbon abatement measures. In 2006/07, the cost of carbon abatement through the RO was in the range £65-140/tCO2 depending on the fuel that is assumed to be displaced. In contrast the cost of abatement in the UK Emissions Trading Scheme is around £18/tCO2 and in the EU Emissions trading scheme it has varied between £0-22/tCO2 due to variations in allowance prices. Other policies within the UK include the Climate Change Levy in which costs are around £5-11/tCO2, and the Energy Efficiency Commitment in which some carbon abatement can be achieved at negative cost (due to the associated energy cost savings).

2. Moving to banded ROCs

How the new arrangements would work

1.8. The Government's proposals set out a banded approach that rewards different technologies at different rates. The Government has proposed four bands:

- 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; and
- Technologies in the Emerging Technology Band will receive 2 ROCs/MWh.

1.9. The Government's proposals also set out a headroom mechanism that increases the obligation size if volumes are high in order to avoid a ROC price crash. The mechanism ensures that the obligation size, expressed in ROCs, is at least 6% higher than generated volumes.

Overall implications for customers

1.10. The proposed banding and headroom mechanism would result in increases in the burden that business and domestic customers have to pay. Our analysis suggests that the cost to domestic customers will increase from around £8 to around £28 per year by 2015/16 (nominal prices). Oxera's report[2] to Government projects a total additional cost (discounted in 2007 prices) of £1.4bn over the life of the

[2] Reform of the renewables Obligation: What is the likely impact of changes? Oxera May 2007

scheme. The table below illustrates the costs to consumers of the present and proposed scheme in more detail.

1.11. We present a high case and low case scenario around these cost estimates. The modelling by Oxera shows an average increase in the obligation size, expressed as a percentage of electricity sales, under the headroom mechanism by around 1 percentage point. In the high and low case we examine the impact of increasing the obligation size by 2 percentage points and 0.5 percentage points respectively. We also consider the impact of changes in forecast electricity sales on total costs. We therefore examine the effect of a 5% increase and decrease in these electricity requirements in the high case and low case respectively.

Projected costs of the existing and proposed RO

		Year			
		2005/06	**2010/11**	**2015/16**	**2020/21**
Projected cost of existing RO obligation (£m)		583	1268	2169	2617
Projected cost of banded ROCs (£m)	**High case**	583	1331	2573	3105
	Difference	0	63	404	488
	Base case	583	1268	2271	2759
	Difference	0	0	102	141
	Low case	583	1205	2127	2567
	Difference	0	-63	-42	-50

		Year			
		2005/06	**2010/11**	**2015/16**	**2020/21**
Projected cost of existing RO obligation (per household £ p.a.)		8	17	28	31
Projected cost of banded ROCs (per household £ p.a.)	**High case**	8	18	33	37
	Difference	0	1	5	6
	Base case	8	17	29	33
	Difference	0	0	1	2
	Low case	8	16	27	31
	Difference	0	-1	-1	0

Source: Oxera, Ofgem analysis

1.12. Additionally, Ofgem is concerned that the costs to consumers may be understated in BERR's analysis. Our main concerns are that:

- BERR's assessment that the banding on its own does not increase the cost to consumers appears to be based on the observation that the obligation on suppliers and the buyout price remains unchanged. However, Oxera's modelling for BERR shows that in the banded proposal the fact that higher cost technologies are deployed leads to a net banding position (i.e. ROC/MWh) in 2015/16 of 1.12.

This suggests that a higher cost is passed onto consumers for every MWh of renewable energy produced;
- The banding proposal also triggers the headroom mechanism in Oxera's analysis thereby extending the obligation size and required total subsidy;
- BERR note that the higher resource cost induced by the banding proposal will lead to higher electricity prices of the order of 7%. This is not included in Oxera's assessment of the costs to the consumer.

Detailed comments - banding

1.13. Overall, our analysis suggests that the Government's banding proposals are sufficient to ensure that in the majority of cases technologies will be brought to market. In some cases this will only happen where they receive the recycled benefit whereas in others it appears this is unnecessary.

1.14. We have examined the required support for each technology from the RO, calculated as the difference between the levelised cost data provided by E&Y[3] and the central wholesale electricity price from the Oxera report (less a 10% discount assumed to be written into Power Purchase Agreements) and LEC revenue. We have compared this with the support provided by the proposed RO banding by determining the ROC value in future years with and without the recycled benefit[4]. This suggests that the value of the support to the Post Demonstration band (1.5 ROCs) may be greater than that required, and that received by the Emerging band (2 ROCs) may be insufficient.

1.15. Unbalanced bands will increase the pressure for changing the bands in future. This will undermine confidence in the scheme and increase uncertainty. It is also likely to increase the costs of meeting the RO targets. There could potentially be oversupply of technologies that receive too much subsidy. Other technologies will lose out if they receive too little subsidy. This will lessen the extent of competition between technologies and is likely to raise the costs to customers of funding the scheme. The table below provides an assessment of the bands.

[3] Impact of banding the Renewables Obligation - Costs of electricity production, E&Y April 2007

[4] With recycled benefit assumes that 70% of the Renewables Obligation is met and so there is uplift in the ROC value of 1/0.7 over the buy-out price (43%). This is consistent with historic ROC values of c. £45/MWh

Assessment of proposed RO support by band

Established (0.25 ROCs)	Reference (1 ROC)	Post demonstration (1.5 ROCs)	Emerging (2 ROCs)
Co-firing (regular) Sufficient support to 2010 with recycled benefit	***Onshore wind*** Sufficient support to 2020 with recycled benefit	***Offshore wind*** Sufficient support to 2020 with recycled benefit (and would be with a 1.2-1.25 banding)	***Wave*** Insufficient support with recycled benefit
Landfill Sufficient support to 2015 with recycled benefit	***Hydro*** Sufficient support to 2020 without recycled benefit	***Dedicated (regular) biomass*** Sufficient support to 2020 with recycled benefit (and would be with a 1.3 banding)	***Tidal*** Insufficient support with recycled benefit
Sewage gas Sufficient support to 2020 with recycled benefit	***Co-firing (energy crops)*** Sufficient support to 2020 without recycled benefit		

Source: E&Y, Oxera, Ofgem analysis

1.16. The main effect of the banding appears to be to stimulate more offshore wind deployment. This reduces the forecast reduction in total renewables deployment growth under the existing scheme, which is due in part to the planning constraints associated with building more onshore wind. Hence the assumed build rates of both onshore and offshore wind are key variables in the analysis. The Post Demonstration band (1.5 ROCs) would receive the required support with a ROC value of £34/MWh, which suggests that the proposed support may be generous if ROC values are close to historical values of c. £45/MWh.

1.17. Offshore wind economics may improve given the reduction in forward steel prices. We also note that the "time frame for ROC revenue is a more dominant factor in investment decisions than ROC banding" (Oxera). This suggests that required support for offshore may be less if replacement support mechanisms were modelled post 2027. Taking these factors into account suggests that the proposed banding could distort competition and lead to oversupply of certain technologies and undersupply of others.

3. Looking ahead

1.18. While we recognise that the government last year considered alternatives to the RO, since the RO consultation there has been the significant development of the Heads of Government across the EU signing up to a target to ensure that 20% of energy is supplied by renewables by 2020. To meet this target it is very likely that the current 2020 renewable electricity target of 20% will have to increase

significantly. This makes it even more important to make any renewable support scheme as effective as possible.

Reliance solely on EU ETS price

1.19. The main mechanism for pricing the costs associated with CO2 emissions in the EU is the EU ETS. The present DG ENV consultation on phase 3 of the EU ETS is attempting to create longer term certainty on allocations that will offer the market longer term certainty and potential price signals[5]. Once clarity on arrangements is given, the government could rely solely on the carbon price via the market to select different low carbon technologies rather than picking winners through the RO.

1.20. The advantage of a market based approach is that it will encourage investment in the least cost technologies and should lead to emission reduction targets being met at the lowest possible cost to customers. An alternative to relying purely on the market to price carbon would be for the EU or UK government to introduce a floor price. For example the government could set the floor price at its current estimate of the shadow price of carbon[6]. This would reduce the risk of the carbon price falling in the event that the EU over allocates allowances in subsequent phases of the scheme. It would also increase the certainty available to investors looking to invest in lower carbon generation technologies such as renewables.

Contracts for difference

1.21. In our January response we proposed that Government considered an alternative based on long-term contracts for difference (CfD). We suggested that this may offer a number of advantages over alternative models including:

- reduced cost to customers;
- greater certainty for investors;
- reduced regulatory risk and greater security for investors if the wholesale electricity price falls; and

[5] Our response to the review of the EU Emissions Trading Directive is available on our website: http://www.ofgem.gov.uk/Sustainability/Environmnt/Policy/Documents1/ETS%20Review%20response_web.pdf

[6] Defra has set out interim guidance on the shadow price of carbon, which replaces the previously used social cost of carbon. The shadow price of carbon captures the damage costs of climate change caused by each additional tonne of greenhouse gas emitted measured in CO2 equivalent. See http://www.defra.gov.uk/environment/climatechange/research/carboncost/index.htm

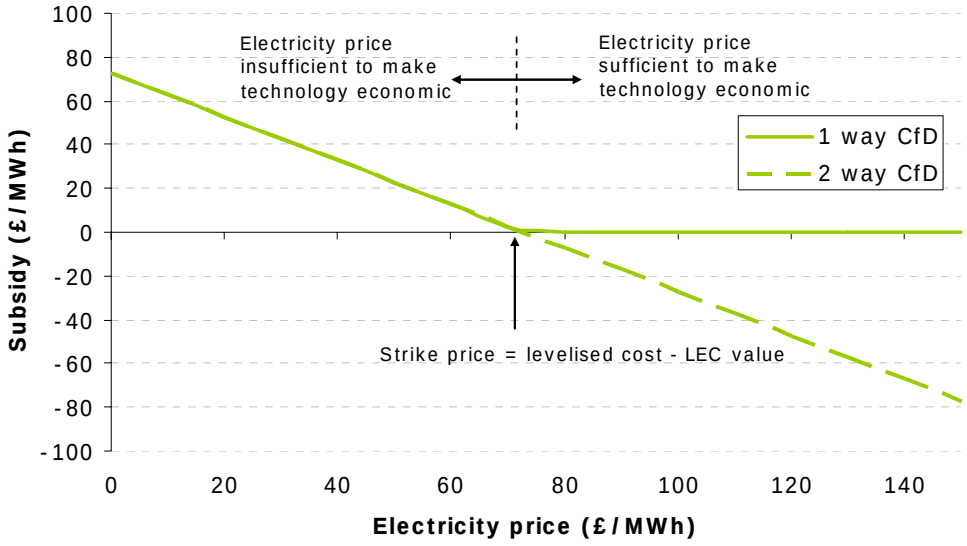
- progressive movement towards a single carbon-price market, while still recognising the place for targeted renewables support.

1.22. At a high level we suggested that its key features could be as follows:

- Awarding long term contracts for the supply of renewable electricity following transparent, open auctions. This would involve calling for bids in successive rounds until a particular price or volume target is reached;
- Contracts would be firm and would include penalties for non-delivery and cover fixed time periods;
- Prospective developers would bid on the basis of a fixed price - with the subsidy paid to the renewable generator being made as the difference between the contract price and a published index of the wholesale electricity price. The generator would be responsible for connection, grid, balancing costs etc, and would factor these in when bidding its fixed price;
- A scheme administrator would make payments to generators holding contracts and would levy the funds to make these payments (and the costs of administering the scheme) to suppliers based on their market share (calculated in the same way as the current obligation and would be similar to all suppliers paying the buyout).

1.23. As the diagram shows a CfD can be structured in two different ways.

1-way and 2 -way Contracts for Differences



Source: Ofgem

1.24. A 1-way CfD pays out if the electricity price is below the contract price, while the benefits of higher prices are kept by the generator. Customers still benefit in the case of high prices as they do not provide unnecessary support. A 2-way CfD requires the generator to pay the difference back to customers if the electricity price exceeds the contract price.

1.25. The contracts would be firm with penalties for non-delivery. So, unlike the Non Fossil Fuel Obligation (NFFO), generators would have to build and honour the contracts. A clear and transparent system of penalties would need to be designed and enforced to ensure that such long term contracts were effective.

1.26. We still think the Government should consider alternatives to the RO such as long term contracts for difference. We would be very willing to work with them to develop it into a workable option. The key benefits we see are that it will reduce to lower costs to customer of meeting renewables targets as it would allow technologies to compete for subsidy and would avoid over-rewarding certain technologies.

1.27. Our initial analysis suggests that over the last two years, if a contract for difference had been in place, this could have potentially reduced the level of subsidy required (and hence the cost to customers) by approximately 40-60%. Of course, this analysis is over a period of high and volatile wholesale electricity prices (that was largely unforeseen and driven by very high gas prices) but the principle of capping the level of subsidy which renewable generators receive to protect customers is a key lesson which the Spanish government has learnt from its arrangements. In Spain the Government is introducing a cap and floor mechanism to its support mechanism for renewables. This followed Spanish renewable generators earning significantly high rates of return as wholesale prices in Spain were high. The Government could either return the savings to customers or increase the targets and reduce carbon emissions further without raising the cost to customers compared with the RO.

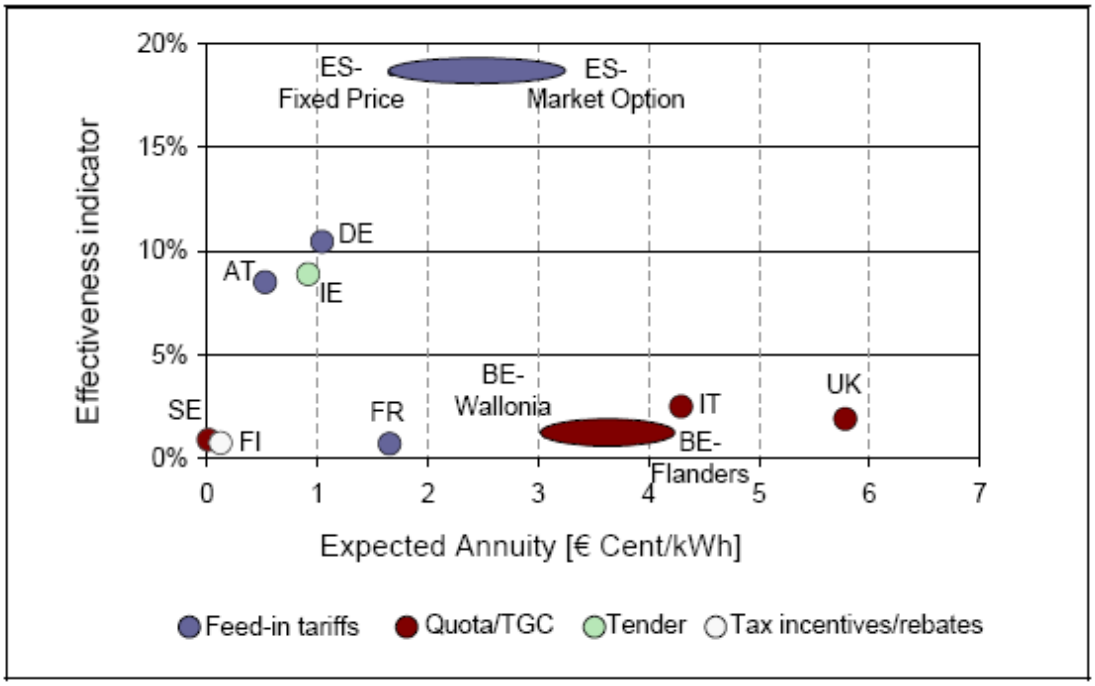
1.28. In Appendix 2 we set out further how contracts for difference might work in practice and provide analysis to illustrate further how it would have protected customers in the past.

Feed-in tariffs

1.29. A further potential method of bringing new technologies to market is feed-in tariffs. Feed-in tariffs essentially introduce a system whereby renewable energy generators receive a premium price for the energy that they produce. The price that the generators receive is fixed but there can be variations in the prices between different generation technologies. Feed-in tariffs also generally incorporate a 'must-take' obligation upon the operator of the electricity grid which requires that they must allow access to the grid for renewable generation.

1.30. Feed-in tariffs are used in a number of member states across the EU, including Germany, France and Ireland, to incentivise the development and deployment of renewable energy generating technologies.

Cost and effectiveness of renewable support mechanisms



Source: Communication from the Commission: The support of electricity from renewable energy sources, 7 December 2005

1.31. The graph above highlights some analysis undertaken by the European Commission which compares the costs and associated effectiveness of feed-in tariffs implemented in Europe with corresponding quota schemes, such as the RO. The analysis illustrates that feed-in tariffs are arguably more successful (in terms of deployment of renewable technologies at lower costs) than green certificates such as the RO. The analysis seems to suggest that quota schemes are relatively more expensive but have facilitated less investment in renewable generation.

1.32. The analysis therefore supports the conclusion that, to date, feed-in tariffs have been most successful at developing renewable energy markets. Appendix 3 summarises the advantages and disadvantages of feed-in tariffs based on those that are currently in operation across the world. The review suggests that feed-in tariffs have a number of advantages including facilitating increased flexibility and diversity of supply, greater investment in research and development, reduced barriers to entry and increased competition, ease of administration and enforcement and wider benefits associated with economic development. However, the disadvantages associated with feed-in tariffs is that it can be difficult to set the tariff at the right level in that where they are set too high they will unnecessarily increase electricity prices and in the event that they're too low, they may not facilitate significant investment. In addition, feed-in tariffs are less likely to drive competition between suppliers as a minimum price is guaranteed and therefore the incentives toward cost minimisation are lower.

1.33. Ofgem recommends that Government examine further whether in a GB context feed-in tariffs could be an efficient method to meet the 2020 target.

Reform of RO

1.34. A final option is to reconsider 'green certificates' to make them work more efficiently. The main problems in the UK are planning and grid connection delays. Delays in the planning process for new wind farms and the transmission lines needed to connect them are slowing the growth of renewables, particularly onshore wind. Since the cost to customers is fixed by the level of the obligation, these external constraints on the supply of renewable generation have increased the cost per tonne of carbon saved. We welcome and support the Government's proposals in the White Paper which are designed to unlock these constraints.

1.35. In 2005-2006 the total buy-out fund was £126,704,565. Including the option of a buy-out allows the supplier an alternative to buying ROCs. The money from the buy-out feeds back to generators as when a generator sells a ROC it is sold at the expectation of what the price will be including the recycling effect. So although the money goes to suppliers they have effectively already handed it over to the generator when buying the ROC. If this link was broken then the renewable price would be capped at the buy-out price and this is what generators would receive. The result of this would lead to the creation of a fund associated with that proportion of the target that suppliers had paid the penalty price.

1.36. It is therefore necessary to consider alternatives to recycling. Instead of recycling, one alternative is that revenues could be invested into a capital grants programme to develop further renewables. In this case the funds from the scheme could be used to promote the development of alternative early horizon technologies. Similar to this the fund could be used to promote competitions for demonstration plants such as Carbon Capture and Storage. In both these examples it would be important to ensure that there is not duplication or double counting with other schemes.

1.37. It may be that a better use of the fund could be for other areas related to sustainable development. For example the money from the fund could be reallocated to those customers that are defined as 'fuel poor'. This would help them to finance their energy bills. The difficulty with this approach is that it is hard to identify and target these customers. The measure of fuel poor is dynamic and changes over time and as such a proxy needs to be found. Once the customers have been identified, a financial payment could then be made. However, in this case it would be difficult to ensure that these monies were used towards paying off bills. An alternative would to target fuel poor through directly financing energy efficiency measures such as cavity wall insulation.

1.38. Ofgem suggests that Government examine the RO regime at present to consider whether it could be made more effective.

2. Part 2: Administrative issues

Chapter Summary: In this chapter, we comment on the administrative implications of the proposals based on our experience as scheme administrator.

Overview

2.1. Ofgem plays an important role in administering the RO. We work hard to ensure that our processes are efficient and that we administer the scheme in a customer-focused way. We have worked closely with BERR to help it to translate its policy proposals into practical administrative solutions. We are keen to continue this dialogue, particularly as further work needs to be done on the detailed implementation of many of the proposals.

2.2. There is no doubt that the proposals set out in the consultation will be more complex to administer than the current arrangements. This increase in administrative complexity will result in a corresponding increase in our costs of administering the scheme.

Comments on Specific Proposals

Banding

2.3. A banded RO will be more complex to administer than the current arrangements as, to determine the number of ROCs to be issued, we will need to take account of the technology used as well as the amount of electricity generated.

2.4. We are pleased that Ofgem will not be asked to set the bands. However, if Ministers take these decisions – even if they are informed by independent advice - there is a risk that the bands will be set at different levels in each of the jurisdictions. This would not achieve the White Paper commitment to maintain a strong UK-wide ROC market operating on a consistent basis. It would also lead to additional administrative complexity and, unless geographical restrictions were placed on accreditation, could result in generators making tactical decisions about the Order under which they sought accreditation.

2.5. So that we can continue to administer the RO effectively, it is important for BERR to ensure that there is no overlap between bands. For example, since the consultation was published, we have received queries about whether sewage gas using an Advanced Conversion Technology should be placed in the “Established” or “Emerging Technologies” band.

2.6. Under the RO, we have accredited a number of households which measure the electricity generated by more than one technology (generally wind turbines and photovoltaic panels) through a single meter. We do not think it is appropriate to insist that these households install additional metering to measure separately the

electricity generated from each technology. To prevent this from happening, BERR could either introduce a separate band for microgeneration or enable us to issue ROCs based on the banding of the dominant technology.

Grandfathering

2.7. The grandfathering proposals will be very complex to administer and will lead to more scope for error in the ROC issue process. We will need to put in place extra controls to address this.

2.8. The additional complexity is a result of the following factors:

- Rights will be grandfathered when banding is introduced and each time the bands change;
- Technologies banded up will be treated differently from technologies banded down;
- There will special arrangements for projects in receipt of capital grants; and
- Grandfathered rights will be time limited.

2.9. In practice, we will quickly move to a position where we are administering generator-specific ROC multiples/fractions. And, if any of these generators increase their capacity, we will be administering two different ROC multiples/fractions for the same station.

2.10. Because of this additional complexity, the ROC "entitlement" of individual generators will be less transparent. We expect this to result in an increase in the volume of queries we receive.

2.11. Since the consultation was issued, we have seen an increase in the level of interest in preliminary accreditation as generators in "banded down" technologies recognise that they need to have this in place by 1 April 2009 to secure grandfathered rights.

2.12. We agree that, in the case of small generators, the trigger point for grandfathering should be the accreditation date. Because of the short lead time between the planning and the build stage, we do not think it is appropriate for households to apply for preliminary accreditation. We would, however, encourage BERR to consider the interaction between banding, grandfathering and the amalgamation of output by agents as we expect this to result in administrative difficulties for us.

Headroom

2.13. It is clear from the consultation paper that further work needs to be done on the detailed arrangements for implementing the headroom model. We would be happy to work with BERR on this.

2.14. We think it is important to ensure that obligation levels are set before the start of the relevant obligation period as this will provide certainty to the market and will be easier for us to administer.

Ski Slopes

2.15. We are concerned about the administrative implications of the ski slope mechanism as we do not think the models presented are workable. In our response to the last consultation, we set out our concerns about the Eufinium, Poyry and Virtual Payments Models. Our concern with the Co-Operative Model is that it appears to assume that we can accurately forecast the number of ROCs to be presented for compliance purposes. This is not the case.

2.16. If BERR intend to implement this proposal, further work needs to be done to develop an appropriate mechanism. We are pleased that BERR has decided to establish a working group to do this and we are keen to be represented on this.

Sustainability and Waste

2.17. We are pleased that BERR has acknowledged the difficulties generators face in measuring the biomass content of waste and has decided to "deem" this.

2.18. We agree that generators burning waste should have the opportunity to receive ROCs on a biomass content that is higher than 35% where they can demonstrate that this is the case. However, we expect all generators burning Municipal Solid Waste to receive ROCs at the deemed level. This is because, to date, none of these has been able to measure accurately the biomass fraction of the waste they have burned.

2.19. We would welcome clarity from BERR about how we should deal with the issuing of ROCs to waste generators in cases where we are certain that the biomass content of the fuel is significantly lower than 35%.

2.20. The current arrangements for determining whether a crop is an energy crop place a significant administrative burden on us, generators, processors and farmers. To demonstrate that a crop was grown primarily for the purpose of being used for energy at the time of planting, generators need to put together extensive paper trails which we then need to assess. The arrangements would be more transparent and easier to administer if BERR removed the current definition and simply listed in the legislation the energy crops it would like to support.

2.21. It is important to note that generators are making investment decisions now on the basis of the current definition of energy crops. For this reason, we urge BERR to clarify its policy position as soon as possible.

Other Comments

Funding

2.22. The proposals will result in an increase in administrative complexity and a corresponding increase in our costs of administering the scheme. We estimate that we will incur set up costs of around £0.5 million and that our administration costs will increase by around £0.2 million per year.

2.23. We are disappointed that the consultation does not include a proposal to use some of the buy-out fund to pay for our costs of administering the Renewables Obligation. We do not think it is appropriate for these costs to be recovered from network businesses through the licence fee procedure. We urge the Government to review the arrangements for funding the administration of all environmental programmes.

Appendices

Index

Appendix 1 - Detailed comments on cost benefit analysis

1.1. Below we make specific comments on a number of key assumptions within the Oxera model and E&Y supporting cost data.

Costs to consumers

1.2. Cost to consumers may be understated as increases in electricity prices are excluded and there is predicted to be a net banding position greater than 1 which leads to greater support per MWh (but the same per ROC).

1.3. Oxera's analysis suggests that the banding proposal can increase total renewables generation to 14.2% of total electricity sales in 2020/21 compared to 11.5% in the base case scenario in which the RO is unchanged.

Build rates for offshore wind

1.4. E&Y have proposed a maximum build rate for onshore wind of 620MW p.a. by 2016-20, but no such equivalent for offshore wind. Oxera have subsequently used a figure of 1GW p.a. We note that this is nearly twice that implied by the E&Y forecasts of total offshore electricity generation per annum using a capacity factor of 35%.

1.5. Given that a major outcome of the banded proposal appears to be to stimulate significantly more offshore wind, we propose that consideration should be given to a scenario in which this build rate is reduced, and closer examination given to the point at which this becomes a binding constraint in the Oxera model.

Offshore wind costs

1.6. Both offshore and onshore wind costs proposed by E&Y are higher than the levelised costs suggested by the BERR financial models developed in 2006 as part of the Energy Review[7]. E&Y have suggested that recent revisions in capital costs have arisen due to high steel prices. However, we note that forward prices show that steel prices are forecast to fall in the remainder of this year and in 2008. Furthermore, we note that E&Y's assumed operating costs for offshore of £81,000/MW/yr in 2006 represents an almost two fold increase over the £46,000/MW/yr included in the 2006 BERR model.

[7] A collection of model were prepared as part of the Energy Review 2006 to compare the generating costs of different technologies to inform policy analysis. See http://www.berr.gov.uk/energy/review/models/page32771.html

1.7. Without further indication of the cause of this high operating cost estimate by E&Y, these observations may provide evidence that less support is required for offshore wind than suggested by the Oxera modelling on the basis of E&Y cost data, and that consideration should be given to the required banding for offshore under these revised costs.

Carbon and wholesale electricity prices

1.8. Renewable generation is supported indirectly by the carbon price through the higher electricity prices that it is able to achieve. The Oxera base case uses wholesale electricity prices from BERR's Updated Energy and Carbon Emissions Projections[8], which includes a carbon price of €20/tCO2 and €25/tCO2 in 2010/11 and 2015/16 respectively.

1.9. While this appears consistent with current forward prices, we believe that increased impetus for emissions reductions, such as the EU's target of a 20% reduction in emissions by 2020 may support considerably higher prices. This is corroborated by the latest forecasts by Deutsche Bank[9] which show a carbon price projection of €35/tCO2 over the period 2008-20, as well as modelling by the European Commission, which suggests that the carbon price required to achieve its emission reduction scenario would be €21/tCO2 in 2015 rising to €37/tCO2 by 2020[10].

[8] Updated energy and carbon emissions projections –The energy white paper, BERR May 2007
[9] Deutsche Bank Global Markets research July 2007
[10] Limiting Global Climate Change to 2 degrees Celsius - The way ahead for 2020 and beyond, European Commission January 2007

Appendix 2 - How the contract for difference works

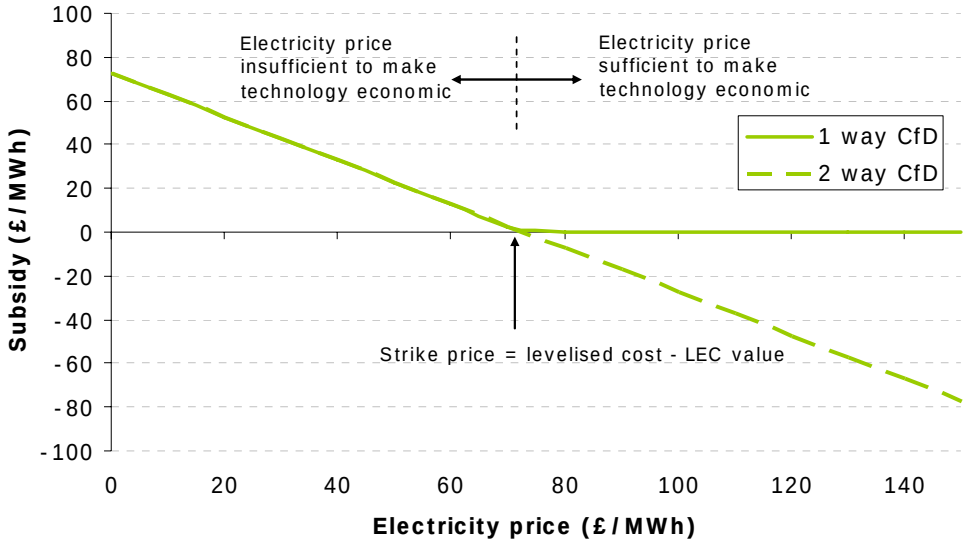
1.1. Contracts for Differences provide support to technologies only when they need it.

1.2. A strike or contract price is determined for each technology which specifies the electricity price below which the contract will provide support. If set equal to the levelised cost of the technology minus LEC revenue, the contract will pay out when the electricity price is insufficient to support the technology but not when the electricity price is sufficient high.

1.3. Contracts can be allocated via auction in which generators of renewable energy bid to offer electricity under a given contract price, which if competitive can help reveal the costs of the underlying technology. The auction process can be technology neutral and encourage the lowest cost generators if there are only a limited number of contracts awarded.

1.4. As the diagram shows a CfD can be structured in two different ways.

1-way and 2-way Contracts for Differences



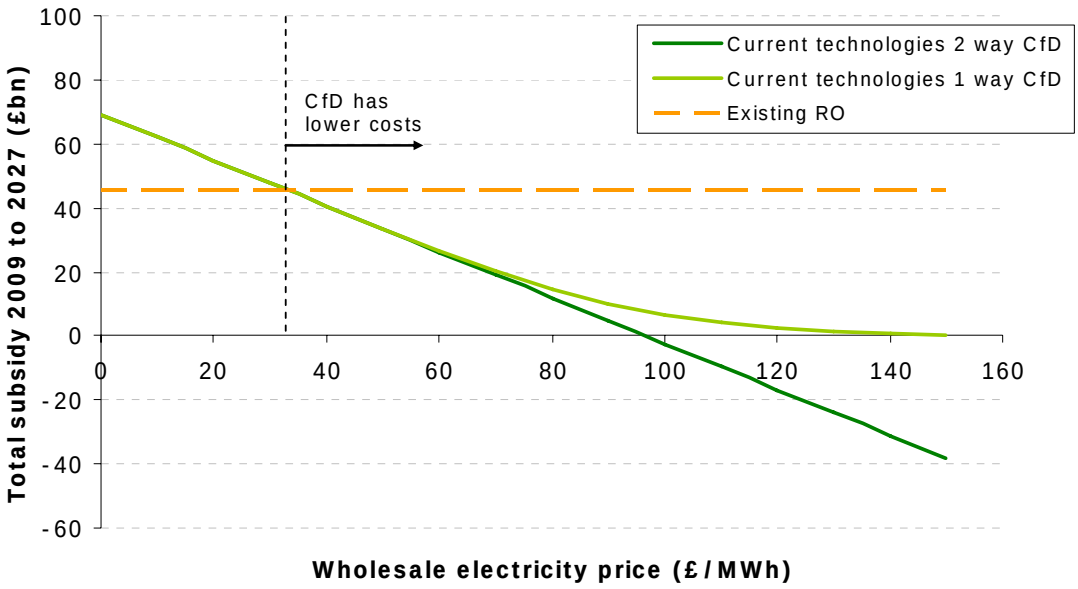
Source: Ofgem

1.5. A 1-way CfD pays out if the electricity price is below the contract price, while the benefits of higher prices are kept by the generator. The government still benefits in the case of high prices by not providing unnecessary support. A 2-way CfD requires the generator to pay the issuer of the contract in the event that the electricity price exceeds the contract price.

1.6. E&Y have provided BERR with a range of levelised costs for different renewable technologies. They represent a constant annual cost equivalent in present value terms to the total cost of operating and building a generating plant over its economic life. The mid-values in this range have been used to construct illustrative contract prices below. They are calculated as the levelised cost minus a LEC value of £4.3/MWh.

Co-firing	£/MWh	48.2
Landfill	£/MWh	43.7
Onshore wind	£/MWh	72.7
Offshore wind	£/MWh	87.0
Other	£/MWh	71.3

Base case costs of supporting renewables



Source: E&Y, Oxera, Ofgem analysis

1.7. The chart above shows the total subsidy (undiscounted nominal prices) required to support the forecast generation under the existing RO between 2009 and 2027. Subsidy costs have been determined on an annual basis for co-firing, landfill, onshore wind, offshore wind and other technologies by subtracting the wholesale electricity price (used in the Oxera report) from the contract price (equal to the levelised cost of the technology minus LEC revenue). This is then multiplied by the volume generated as predicted by the Oxera analysis.

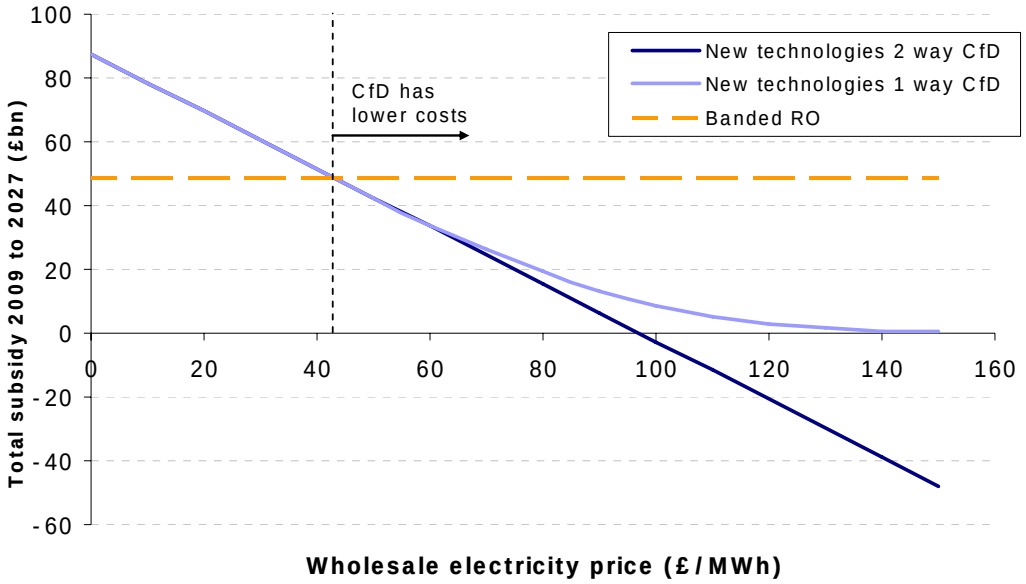
1.8. Subsidy costs decrease with the outturn electricity price, and would yield a net income to the Government if prices were high enough under a 2 -way CfD. Subsidy

costs under a 1-way CfD gradually reduce to zero as the electricity price increases as support for individual technologies eventually becomes unnecessary.

1.9. In contrast, the cost of the existing RO, calculated as the obligation size multiplied by the buyout price, is invariant to the electricity price. The cost of the CfD scheme would be likely to be lower than the existing RO if wholesale electricity prices are above £30-40/MWh.

1.10. It is necessary to note that the subsidy costs of the CfD scheme may actually be lower if it encourages a different (and lower cost) generation mix than the RO. The proposed banding of the RO encourages a diverse but more expensive range of technologies that would also be more costly to support with CfDs.

Proposed cost of supporting renewables

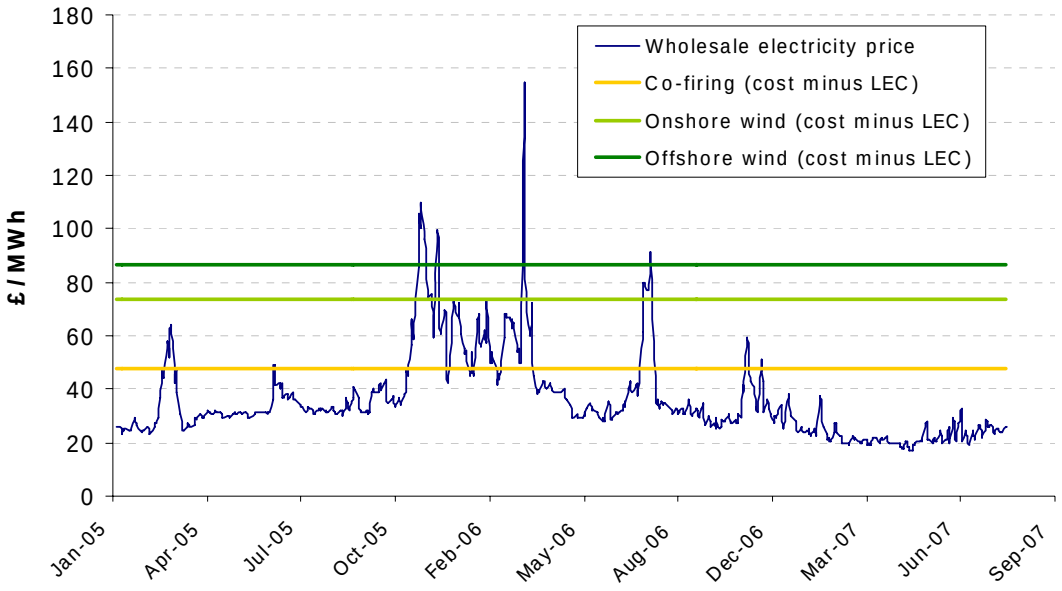


Source: E&Y, Oxera, Ofgem analysis

1.11. The chart above shows the total (undiscounted) subsidy required to support the forecast generation under the proposed banded RO between 2009 and 2027. A higher average contract price is required to support more expensive technologies which increases the total subsidy. The cost of the CfD scheme would be likely to be lower than the existing RO if wholesale electricity prices are above £40-45/MWh. Note that the subsidy costs of the CfD scheme may actually be lower if it encourages a different (and lower cost) generation mix than the RO.

1.12. Volatile prices mean that there are likely to be periods in which the CfD scheme gives less support than the RO and others in which it gives more.

Subsidy savings from volatility



Source: Bloomberg, E&Y

1.13. There have been sustained periods between 2005 and 2007 when electricity prices have been greater than the required contract price for co-firing and instances when it has been greater than that for onshore wind. However, historically there have been sufficient price spikes to mean that a CfD scheme would have been cheaper than the RO.

Historic and illustrative costs of the RO and CfDs

£m	2005/06	2006/07
Cost of RO	583	755
Cost of CfD (1 way)	219	434

1.14. The cost of the RO has been estimated as the buy-out price multiplied by the obligation size. The cost of the CfD scheme has been estimated by calculating the support to provide the actual number of ROCs issued to each technology on a daily basis by multiplying the difference in the contract price and electricity price by the share of ROCs for each technology, assuming a uniform distribution of generation over the year. If the CfD scheme were to be based on weekly or monthly average electricity prices some of the observed price spikes would be smoothed out, increasing the total subsidy.

1.15. A key assumption to ensure that contracts for difference work is that they are seen as a contract both ways. Unlike the Non Fossil Fuel Obligation it is essential

that generators only get rewarded where they actually deliver. Where they don't they should be sufficiently incentivised not to do so through the use of penalties. A clear and transparent system of penalties would need to be designed and enforced to ensure the efficient operation of the CfDs.

Appendix 3 - Evaluation of feed-in tariffs

1.1. Numerous studies have been undertaken with respect to the relative merits of feed-in tariffs as compared with other support schemes for renewable generation. The table below provides an overview of some of the generally acknowledged advantages and disadvantages associated with the use of feed-in tariffs.

Advantages	**Impacts on the economy:** Feed-in tariffs are recognised as being relatively more successful in the deployment of renewable generation which sponsors job creation through the development of local manufacturing/construction and therefore facilitates economic development.
	Research and development: As a result of the achievement of high returns, developers are keen to invest in research and development activities to drive down costs and ensure that they maximise profit.
	Locational diversity: Deployment of technologies under feed-in tariffs is not dictated by investment in least cost projects and therefore the projects implemented are less likely to be located in the same areas due proximity of natural resources. Feed-in tariffs are likely to be more flexibly deployed to take advantage of a range of resource potentials, reducing potential opposition.
	Technological diversity: Where payments under feed in tariffs vary by technology type, they are more likely to encourage diversity of technology deployment.
	Long term certainty: The certainty associated with a fixed price encourages longer term investments which will pay off over time e.g. investments in research and development. This also assists in obtaining financing.
	Implementation and administration: Feed-in tariffs are generally easy to implement, administer and enforce. They are also transparent and, once determined do not require government monitoring, except perhaps to periodically amend any associated tariff bandings.
	Flexibility: It is possible to change the tariffs periodically to take account of changes in technology as well as any changes in the marketplace.
	Promotion of competition: Feed-in tariffs can assist smaller developers due to the fact that they the electricity grid operator has an obligation to purchase the electricity they produce.
Dis-advantages	**Setting of the tariff is crucial:** it can be difficult to set the feed-in tariff at the right level. Where tariffs are set too high they will unnecessarily increase electricity prices and in the event that they're too low, they may not facilitate significant investment.
	Cost minimisation: Feed-in tariffs are less likely to drive competition between suppliers as a minimum price is guaranteed and therefore the incentives toward cost minimisation are lower.

Appendix 4 - The Authority's Powers and Duties

1.1. Ofgem is the Office of Gas and Electricity Markets which supports the Gas and Electricity Markets Authority ("the Authority"), the regulator of the gas and electricity industries in Great Britain. This Appendix summarises the primary powers and duties of the Authority. It is not comprehensive and is not a substitute to reference to the relevant legal instruments (including, but not limited to, those referred to below).

1.2. The Authority's powers and duties are largely provided for in statute, principally the Gas Act 1986, the Electricity Act 1989, the Utilities Act 2000, the Competition Act 1998, the Enterprise Act 2002 and the Energy Act 2004, as well as arising from directly effective European Community legislation. References to the Gas Act and the Electricity Act in this Appendix are to Part 1 of each of those Acts.[11]

1.3. Duties and functions relating to gas are set out in the Gas Act and those relating to electricity are set out in the Electricity Act. This Appendix must be read accordingly[12].

1.4. The Authority's principal objective when carrying out certain of its functions under each of the Gas Act and the Electricity Act is to protect the interests of consumers, present and future, wherever appropriate by promoting effective competition between persons engaged in, or in commercial activities connected with, the shipping, transportation or supply of gas conveyed through pipes, and the generation, transmission, distribution or supply of electricity or the provision or use of electricity interconnectors.

1.5. The Authority must when carrying out those functions have regard to:

- The need to secure that, so far as it is economical to meet them, all reasonable demands in Great Britain for gas conveyed through pipes are met;
- The need to secure that all reasonable demands for electricity are met;
- The need to secure that licence holders are able to finance the activities which are the subject of obligations on them[13]; and
- The interests of individuals who are disabled or chronically sick, of pensionable age, with low incomes, or residing in rural areas.[14]

[11] entitled "Gas Supply" and "Electricity Supply" respectively.
[12] However, in exercising a function under the Electricity Act the Authority may have regard to the interests of consumers in relation to gas conveyed through pipes and vice versa in the case of it exercising a function under the Gas Act.
[13] under the Gas Act and the Utilities Act, in the case of Gas Act functions, or the Electricity Act, the Utilities Act and certain parts of the Energy Act in the case of Electricity Act functions.
[14] The Authority may have regard to other descriptions of consumers.

1.6. Subject to the above, the Authority is required to carry out the functions referred to in the manner which it considers is best calculated to:

- Promote efficiency and economy on the part of those licensed[15] under the relevant Act and the efficient use of gas conveyed through pipes and electricity conveyed by distribution systems or transmission systems;
- Protect the public from dangers arising from the conveyance of gas through pipes or the use of gas conveyed through pipes and from the generation, transmission, distribution or supply of electricity;
- Contribute to the achievement of sustainable development; and
- Secure a diverse and viable long-term energy supply.

1.7. In carrying out the functions referred to, the Authority must also have regard, to:

- The effect on the environment of activities connected with the conveyance of gas through pipes or with the generation, transmission, distribution or supply of electricity;
- The principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed and any other principles that appear to it to represent the best regulatory practice; and
- Certain statutory guidance on social and environmental matters issued by the Secretary of State.

1.8. The Authority has powers under the Competition Act to investigate suspected anti-competitive activity and take action for breaches of the prohibitions in the legislation in respect of the gas and electricity sectors in Great Britain and is a designated National Competition Authority under the EC Modernisation Regulation[16] and therefore part of the European Competition Network. The Authority also has concurrent powers with the Office of Fair Trading in respect of market investigation references to the Competition Commission.

[15] or persons authorised by exemptions to carry on any activity.
[16] Council Regulation (EC) 1/2003

Appendix 5 - Glossary

B

Buy-out price

An amount, calculated annually by Ofgem, which suppliers can opt to pay instead of meeting their renewable obligation through the presentation of ROCs.

C

Carbon capture and geological storage (CCS)

CCS is a technology concept to reduce the atmospheric emissions of carbon dioxide that result from various industrial processes, in particular from the use of fossil fuels (mainly coal and natural gas) in power generation. It involves capturing carbon dioxide (CO2) from large point sources such as power plants and subsequently storing it away safely instead of releasing it into the atmosphere.

Contract for difference (CfD)

A contract which specifies payments that are equal to the difference between an underlying price and a price written into the contract.

Climate Change Levy (CCL)

The Climate Change Levy was introduced on 1 April 2001, with the aim of encouraging improvements in energy efficiency and reductions in greenhouse gas emissions. It applies to energy used in the non-domestic sector (industry, commerce and the public sector). Renewable source electricity is exempt from the CCL.

E

Emissions Trading

A system allowing the trade of emission reduction credits, to facilitate compliance with emissions allowances at least cost.

Energy Efficiency Commitment (EEC)

The EEC places an obligation on electricity and gas suppliers to install measures in customers' homes to improve energy efficiency.

EU Emissions Trading Scheme (EU ETS)

A cap and trade scheme in which EU Member State Governments are required to set emissions limits for all installations in their country covered by the scheme. It is an

administrative approach used to reduce the cost of pollution control by providing economic incentives for achieving reductions in the emissions of pollutants.

F

Feed-in tariffs

The price per unit of electricity that a utility or supplier has to pay to a generator for renewable electricity.

H

Headroom mechanism

A proposed mechanism within the RO that would increase the obligation placed on suppliers if anticipated volumes of renewable generation are high in order to avoid a ROC price crash. The mechanism ensures that the obligation size, expressed in ROCs, is at least 6% higher than generated volumes.

R

Recycled benefit

The redistribution of the buyout fund to suppliers. Payments are proportional to the extent to which the supplier has met their renewable obligation.

Renewables Obligation (RO)

The RO places an obligation on licensed electricity suppliers in the United Kingdom to source an increasing proportion of electricity from renewable sources. Suppliers meet their obligations by presenting Renewables Obligation Certificates (ROCs) or payment into the buyout fund.

Renewables Obligation Certificates (ROCs)

A transferable certificate received by eligible renewable generators for each MWh of electricity generated. ROCs are traded separately from power and are used by suppliers to fulfil their Renewable Obligations under the utilities Act 2000.

T

Tonnes of Carbon Dioxide Equivalent (tCO2)

Mass of greenhouse gas emissions measured in tonnes which has the equivalent impact as 1 tonne of carbon dioxide emissions. Emissions of other gases are converted to carbon equivalent using global warming potentials.

U

UK Emissions Trading Scheme (UK ETS)

A scheme which began with an auction in March 2002, in which companies and other organisations (known collectively as 'Direct Participants') bid emission reductions over the five years 2002 to 2006 in return for a share of £215 million incentive funding from the Department. From April 2002 the Direct Participants and other organisations could trade their emissions 'allowances' - the emissions allowed after the promised reductions. Each year, Direct Participants are issued with allowances equal to their target emissions for the year, and at the end of each year, each must hold enough allowances to cover its actual emissions for that year.