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Agenda

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Renewing the Renewables Obligation: getting the most out of green energy?

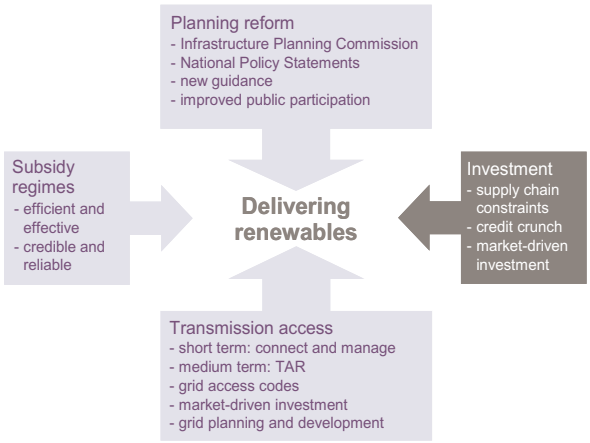
At the heart of the current debate over reform of UK energy policy is how best to bring forth sufficient investment in renewable energy. In relation to the UK's targets for environmental sustainability, it is becoming increasingly apparent that achieving such quantities of energy from renewable sources will require a large portion to come from the electricity sector. Part of the solution to this challenge will be the application of an effective financial incentive for renewable electricity generators

The deployment of renewables will need to increase in the UK in the coming years. In January 2008, the European Commission suggested national targets for the percentage of final energy consumption to come from renewable sources by 2020.[1] The UK's target is 15%, which, it has been estimated, would require some 32% of total electricity output to be sourced from renewables by 2020.[2]

The government is pursuing a number of paths to address the obstacles in the way of meeting this target (see Figure 1). These include modifications to transmission access and to the process of obtaining planning consents for both generation and networks. Delays in connection and planning consents lengthen project timescales and increase investment uncertainty. The Transmission Access Review (TAR) by the regulator, Ofgem, and the Department for Business, Enterprise and Regulatory Reform (BERR) lists a number of measures that should improve the allocation of available connections for new onshore and offshore wind farms, including, in the short term, a policy of 'connect and manage'. Here, new renewables capacity could be given access to the transmission grid as soon as the connection is physically available and before deeper network reinforcements have been made. National Grid would then manage the system to minimise the costs of the additional connections. In the medium term, the TAR proposes fundamental changes to the codes that govern grid access, as well as an acceleration of the process of planning and development of new grid access.

The government's planning reforms have set out a number of proposals for improving the planning procedure. These proposals include an independent Infrastructure Planning Commission that will make decisions on facilities of national significance; updated

Figure 1 Drivers of renewables deployment



Note: The light boxes are regulatory or governmental policies; the dark box is the requirement for market-driven investment.
Source: Oxera.

National Policy Statements specifically covering renewables and electricity networks; and issuing new guidance to aid developers in applying best practice.

An additional determinant of renewables deployment will be the effectiveness of the central subsidy mechanism, the Renewables Obligation (RO). In light of the Commission's targets, BERR has already voiced the need for a re-examination. This is because Oxera modelling for BERR has shown that the RO will deliver considerably less in the way of renewables generation than required.[3]

This article revisits the debate over the RO and alternative renewable support mechanisms such as feed-in tariffs (FITs). The RO was originally designed to be 'technology-neutral', but with the introduction of

banding (see below), the government has moved towards picking winning technologies. Furthermore, with the RO providing a premium above the electricity price, the margins made by some 'low-cost' generators during periods of high electricity prices might be considered excessive. With these developments in mind, the question is raised as to whether separate incentive schemes for different technologies—which recognise and cater for the differences between them—might be favoured by consumers and investors alike?

The challenge ahead

The UK has some of Europe's most enviable renewable resources. It has been estimated that the wind potential alone could be some 1,000TWh per annum.[4] This is almost three times the amount of electricity used by the UK each year.[5] However, current deployment of renewable generation is low. In 2006, only 4.6% of electricity consumed was generated from renewable sources.[6] Such figures compare unfavourably with countries such as Denmark, Italy and Germany, where some 25.9%, 14.5% and 12.0%, respectively, of electricity consumed is generated from renewable sources.[7]

Achieving the new target for the UK of 15% of final energy consumption to come from renewable sources by 2020 would require a tenfold increase in the consumption of renewable energy compared with current levels.[8]

The scale of the task is significant, and a credible and reliable policy regime will be a key factor in providing the appropriate investment incentives for renewable technologies. At the same time, an efficient and effective mechanism should also attempt to minimise the costs to consumers.

The Renewables Obligation

Under RO, the government sets a target each year for electricity suppliers to source a proportion of their electricity from renewable generators. Suppliers prove their compliance by presenting Renewables Obligation Certificates (ROCs) that can be purchased either from green electricity generators or from Ofgem at a pre-specified 'buy-out' price. The value to suppliers of holding a ROC is that they receive a portion of the fund that accrues from those not purchasing ROCs and paying into the buy-out fund. The benefit to renewable generators is the secondary revenue stream that accrues from selling ROCs. The flexibility of the RO comes from the ability of the ROC value to fluctuate proportionately with the difference between the number of ROCs in the market and the RO target (calculated in ROCs). The ROC value falls towards the buy-out price as the level of deployment approaches the RO target, as illustrated in Figure 2.

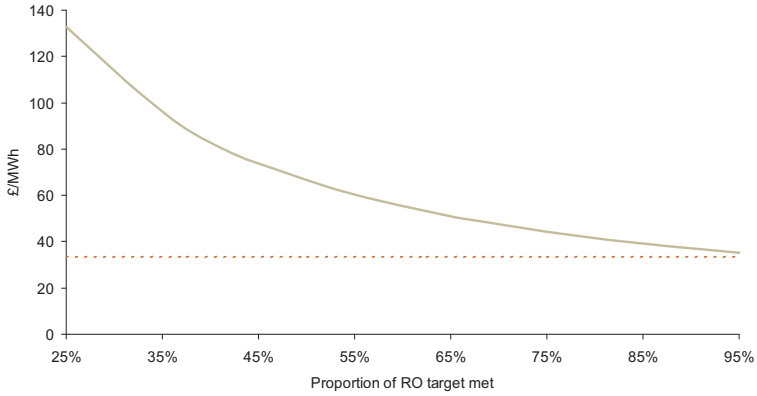
The RO currently awards one ROC to a broad range of technologies for every MWh of green electricity generated. In January this year, BERR published the government's response to the RO reform consultation, detailing a number of modifications to the RO.[9] The major proposals were the introduction of 'banding' and 'guaranteed headroom'.

Banding would result in different technologies receiving a variable number of ROCs per MWh. The suggested bands are outlined in Table 1 for the different technologies. Guaranteed headroom sets the obligation at a level above the forecast level of renewables deployment on a year-by-year basis. This removes the need for pre-determined annual targets. Under the proposed banded regime with headroom, Oxera modelling for BERR has shown that the RO would deliver 14.0% of total electricity consumed through ROC-eligible generation by 2020.[10]

This is somewhat lower than the Commission's target for the UK, which BERR believes would require some 32% of total electricity output to come from renewables by 2020.[11] The government has indicated that it intends to retain the RO as the leading subsidy mechanism for renewables, although, in order to meet the Commission's targets, it recognises that changes would have to be made in two key areas:

– extending the end-date of the RO from 2027 to 2035 or beyond;
– increasing or removing the current cap on the level of the obligation.

Figure 2 ROC value to suppliers as a function of RO target achievement



Note: The dashed horizontal line shows the value of the buy-out fund, set at £33.24/MWh in the 2006/07 obligation period.
Source: Oxera (2005), 'Renewable Generation: Is there a Future for Independent Producers?', *Agenda*, June.

Table 1 Suggested bandings for renewable technologies

Band	Technologies	Level of support: ROCs/MWh
Established 1	Landfill gas	0.25
Established 2	Sewage gas, co-firing on non-energy crop (regular) biomass	0.50
Reference	Onshore wind; hydroelectric; co-firing of energy crops; energy from waste with combined heat and power (CHP); geopressure; other not specified	1.00
Post-demonstration	Offshore wind; dedicated regular biomass	1.50
Emerging	Wave; tidal stream; fuels created using 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, tidal impoundment (eg, tidal lagoons and tidal barrages (<1GW)); microgeneration	2.00

Source: BERR (2008), 'Renewables Obligation Consultation: Government Response', January.

In addition, the government has suggested that it will also look at:

- the advantages and disadvantages of the headroom approach;
- banding—possibly increasing the number of bands to one per technology, or potentially to several bands per technology.[12]

As it stands, the RO makes no distinction between established and emerging technologies. The government's introduction of banding in 2009 is intended to reduce the windfalls given to some low-cost generators, and also increase the incentives for the deployment of higher-cost, emerging technologies. Furthermore, the RO is a premium mechanism, in which the subsidy to renewables generators is provided in addition to the electricity price. The original RO was designed with a forecast electricity price fluctuating at around £40/MWh.[13] Electricity prices have risen substantially in the past year—for example, the average day-ahead price in the UK since the beginning of 2008 has been around £70/MWh.[14] As a result, the revenues that some renewable generators are receiving from ROC plus electricity sales might be somewhat above their generation costs, resulting in substantial margins—although this situation would change if electricity prices were to fall in the future, bringing down revenues and margins. Again, the government has recognised this development and is exploring potential options.

While the RO may not be without flaws, BERR's June 2008 Renewables Strategy consultation suggests that the UK government has decided, at least for now, to retain its use as the central subsidy to incentivise renewables deployment. However, is a single incentive regime the best approach?

An alternative approach

Due to the sheer quantity of renewables required, the speed with which deployment will have to occur between now and 2020, and the existing and forecast state of technological advancement, it is expected that wind will play a large part in the achievement of the UK's targets. The government has already indicated that to accommodate the required increase in the deployment of renewables, the obligation size of the RO would have to rise beyond its current levels. However, this may pose problems for the RO if the construction of wind farms becomes constrained by significant non-price effects such as planning restrictions or access to the transmission network.

Under the RO, where either or both onshore and offshore wind deployment is constrained by non-price factors, the forecast level of renewables deployment might fall some way below the target obligation size. This would lead to a higher ROC price and an increase in the deployment of higher-cost technologies, as long as those technologies were not also constrained by non-price factors. Consequently, the cost to consumers, while unchanged, would be distributed across a smaller volume of renewables, decreasing the efficiency of the scheme.

The government recognises that with the introduction of guaranteed headroom, the possibility of excess ROC price increases would be removed. However, it would also reduce the certainty with which the RO could meet the Commission's 2020 targets.[15]

Another solution might be to focus policy more closely on different technologies that recognise the inherent differences between them. For example, the costs of certain 'established' technologies, such as onshore and offshore wind, are likely to be more predictable than other 'emerging' forms, such as solar photovoltaics. For established technologies, cost and investment uncertainty may be low. On the other hand, the class of emerging technologies may be categorised by high-cost uncertainty due to the likelihood of significant learning effects in the future.

For established technologies such as wind, there might be direct and indirect benefits to removing these technologies from the RO and replacing their subsidy with a FIT. A FIT would set the price that a wind generator would receive for selling green electricity to the grid at a pre-determined level, for a number of years. At the same time, this would reduce the obligation size of an RO without wind. Such an approach might lead to a number of benefits to consumers and investors in both wind and emerging technologies.

– **Consumers may prefer a FIT for established technologies**. A FIT would remove the link between wind generators' revenues and the electricity and ROC price. With greater knowledge of the costs of 'established' technologies, FITs could be set at levels close to generating costs. This would reduce the chance of excess margins when electricity prices were high. Instead, wind generators' revenues would be directly proportional only to the amount of generation, and would not fluctuate with the electricity price.

– **Investors in established technologies may prefer a FIT to the RO**. FITs provide a predictable revenue stream that would more closely resemble their cost structure. As a result, a FIT might lead to a lower cost of capital for established technologies, thereby lowering the investment hurdle for these technologies, and potentially leading to a further increase in their deployment.

– **Investors in emerging technologies may prefer an RO without wind**. As renewables deployment is forecast to be driven largely by wind up to 2020, an RO without wind would be shielded from the effects of non-price restrictions on wind deployment. This may benefit investors in low-volume, emerging technologies that share uncertain cost structures because the ROC price in an RO without wind would be more reactive to the development in costs of these technologies. This would allow for the emergence of a competitive winner from a more level playing field, a result more closely aligned with the original intention of the scheme.

However, a FIT for established technologies is not necessarily the answer to the challenges faced by government. It would require careful work in setting the tariff level and could create short-term investment uncertainty as the policy is developed. However, with large modifications to the RO already required, and electricity prices at historically high levels, the benefits of separate incentives might look increasingly favourable compared with the 'costs' of implementation.

Nevertheless, an effective and efficient subsidy regime is only part of the solution to meet the European Commission's 2020 target. Transmission access reform, improvements to the planning regime, and the reduction of supply chain constraints will all be required, because if non-price constraints become the limiting factor, renewables deployment will suffer whatever the size or structure of the financial incentive.

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[1] European Commission (2008), 'Proposal for a Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources', 2008/0016 (COD).
[2] Department for Business, Enterprise and Regulatory Reform (2008), 'UK Renewable Energy Strategy: Consultation', June, p. 91.
[3] BERR (2008), 'Renewables Obligation Consultation: Updated Modelling for Government Response URN 08/555', January.
[4] Enviros (2005), 'The Costs of Supplying Renewable Energy', September.
[5] BERR (2008), 'Digest of UK Energy Statistics: Electricity'. This reports the 2007 final consumption of electricity at 341TWh.
[6] Source: Eurostat.
[7] Source: Eurostat.
[8] BERR (2008), 'UK Renewable Energy Strategy: Consultation', June.
[9] BERR (2008), 'Renewables Obligation Consultation: Government Response', January.
[10] BERR (2008), 'Renewables Obligation Consultation: Updated Modelling for Government Response URN 08/555', January.
[11] BERR (2008), 'UK Renewable Energy Strategy: Consultation', June, p. 91.
[12] Ibid., p. 97.
[13] Ibid., p. 94.
[14] Source: Bloomberg.
[15] BERR (2008), 'UK Renewable Energy Strategy: Consultation', June, p. 96.

If you have any questions regarding the issues raised in this article, please contact the editor, Derek Holt: tel +44 (0) 1865 253 000 or email d_holt@oxera.com

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