

Agenda

Advancing economics in business

The Energy White Paper: medley or melody?

The UK government has responded to the double challenge of climate change and energy security by overseeing a proliferation of policy instruments. With these instruments being played at an international, European, national and local level, another challenge will be ensuring that a clear melody emerges from the noise. If not, the private sector may not deliver the combination of investments in renewable, nuclear and fossil fuels needed to deliver government aims

The UK government's recent Energy White Paper, which sets out its energy strategy and details how the measures identified in the 2006 Energy Review are to be implemented, marks a further step in the evolution of UK energy policy.¹ The steps might be characterised as: deciding to have a policy (2003); deciding what the policy is (2006); and then deciding how to implement that policy (2007).

Four particular challenges were identified in the 2006 Energy Review, which provide a backdrop to this Energy White Paper:

- climate change and the need to cut the emissions of greenhouse gases, particularly CO₂;
- the slow pace of liberalisation in Continental European energy markets, which causes problems because the UK is increasingly reliant on imported energy;
- the concentration of upstream gas and oil reserves in fewer regions around the world;
- significant investment requirements in UK generation, in the electricity network and in gas infrastructure.

The White Paper itself should be seen as one of four key processes under way in implementing UK policy, the other key elements being the nuclear consultation, the Planning White Paper,² and the Draft Climate Change Bill. See the box below for a summary of the Energy White Paper's main provisions.

Reform of the Renewables Obligation

As part of its long-term commitment to reduce fossil-fuel dependence and decrease climate-damaging carbon emissions, the UK has set targets to increase the proportion of electricity generation from renewable technologies, and the Renewables Obligation (RO) is the

primary mechanism for achieving these goals. Among the White Paper's most clearly defined changes to energy policy are its proposed reforms to the RO. In its current form, the RO contains several inefficiencies and is considered unlikely to meet the aspirational target of delivering 20% of electricity generation from renewable sources by 2020.

In addition to proposing an increase in the level of renewable generation, the 2006 Energy Review raised the question of whether the current mechanism could be improved. Features of the current RO perceived by some as undesirable include the following.

- **High-cost bias.** The RO does not differentiate between levels of support given to higher- and lower-cost technologies. This could lead to technologies such as onshore wind dominating the renewables market in the short term, which might hinder the commercialisation of other technologies that have the potential to make a significant contribution to renewable generation in the long term.
- **Low-cost bias.** Some technologies that are less costly from a financial perspective, such as co-firing, may be given more support than they require, leading to an unnecessarily high cost of the scheme to customers relative to renewables deployed.
- **Investment risk.** Under the current RO mechanism, the Renewables Obligation Certificate (ROC) price may fall sharply if the volume of renewables in the market rises above the obligation size. The risk of this may be adversely affecting current build decisions.

The White Paper proposes several new features to alleviate these problems. As part of the policy-making process, Oxera undertook analysis, using Ernst & Young

Key provisions of the Energy White Paper

The White Paper has a broad scope, and while it may appear to be bursting with new ideas and initiatives, a large element is summarising, reiterating and welcoming policy measures already announced or implemented. This is perhaps particularly the case for transport, but also applies to other areas.

The most notable elements of the White Paper are the proposed reform to the renewables regime; the introduction of a new cap-and-trade scheme for carbon emissions for businesses; the commitment to increased scale for the Energy Efficiency Commitment (EEC); the nuclear consultation; and the lack of any explicit market intervention to ensure security of supply in electricity generation and gas infrastructure (through strategic storage).

The broad measures outlined are as follows.

- *Cutting business energy use.* The new element is the Carbon Reduction Commitment (CRC), a cap-and-trade scheme for carbon emissions of large businesses. In the future, business premises will need to obtain Energy Performance Certificates (EPCs), giving information on the energy efficiency of the building. Also announced is a consultation on making smart meters mandatory for businesses through an obligation on suppliers.
- *Cutting household energy use.* There may be a requirement for all new housing developments to be carbon-neutral from 2016. The EEC for suppliers will be extended again and become the Carbon Emission Reduction Target (and will be more carbon-focused). A more comprehensive energy service company model may be applied after 2012, together with the relaxation of the 28-day rule (to allow customers to be tied into longer contracts). A smart meter trial is ongoing and there could be requirements to provide free real-time displays. EPCs will be introduced for any future housing sales or rentals.
- *Transport.* The White Paper highlights the European Commission fuel efficiency standards, sets out the intention to launch a UK Low Carbon Transport Innovation Strategy, and supports the widening of the EU Emissions Trading Scheme (EU ETS) to include aviation and possibly surface transport in the future. Existing tax measures to reduce transport energy consumption are also cited.
- *Heat and distributed energy.* It is acknowledged that gas will still predominantly be used for heating, but the scope for increased efficiencies is highlighted. Distributed generation barriers will be reduced through measures on licensing, spill payments, information and advice and improving the performance of electricity distribution connections.
- *Renewables Obligation.* The White Paper confirms the intention to increase the target to up to 20%. It also proposes to retain the RPI link on the buyout price (which drives the value of ROCs) beyond 2015/16, introducing banding from 2009, and implementing planning regime and transmission connection improvements. While the White Paper acknowledges the importance of the EU Renewables Directive, it points out that only 2% of the UK's energy supply is renewable, and only 6% of Europe's energy supply is renewable. Achieving the target of 20% by 2020 will therefore be challenging.
- *Carbon Capture Storage (CCS).* A competition is under way to provide a demonstration plant. There is also a focus on improving the regulatory framework for CCS.
- *Maximising domestic fossil-fuel production.* UK oil and gas production is to be enhanced by new measures to encourage the exploitation of the area to the west of Shetland. In addition, the Coal Forum was established in autumn 2006 to develop strategies to maximise the economic production of UK coal.

technology cost data, of the possible impact of changes to the RO.³ To avoid the ROC price crash problem (as discussed in the investment risk point above, the obligation is to be raised to 20% under a 'guaranteed headroom' basis, whereby the size is revised upwards to keep it above generation levels. The buy-out price, which the 2006 Energy Review proposed to freeze, now retains its inflationary link, a move likely to increase deployment. Most significantly, the White Paper proposes to change the level of support that technologies receive according to their economic need. Banding the regime in this way can remove some of the inefficiency that arises from giving sewage gas, landfill gas and co-firing more support than they require and can encourage additional build of emerging technologies, such as offshore wind; this in turn may bring extra benefits from economies of scale, research and development, and other learning so that these emerging technologies may become more competitive.

Critical questions to consider under banding include which technologies might be grouped together, and whether the overall ratio of ROCs to output should remain at 1:1 (with the extra ROCs given to higher-cost technology being equal to those taken away from cheaper options). The government has chosen a four-band regime which seeks to deliver the intended build increase while retaining simplicity and avoiding the cost risks associated with aligning support too closely to individual projected costs. This is outlined in Table 1.

Oxera's latest scenario modelling suggests that the number and level of bands could have a significant impact, not only on deployment, but also the market share received by each technology type. Under the current RO (base case), the onshore wind farm would be expected to produce nearly 50% of ROC-eligible generation by 2020, whereas under a highly

Table 1 Banding proposed by the White Paper

Band	Technologies	Support ROC/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 CHP; other not specified	1.0
Post-demonstration	Offshore wind; dedicated regular biomass	1.5
Emerging technologies	Wave; tidal; advanced conversion technologies; dedicated biomass burning energy crops (with or without CHP); dedicated regular biomass with CHP; solar PV	2.0

Note: EFW CHP, energy from waste combined heat and power; solar PV, solar photovoltaic.
 Source: DTI (2007), 'Meeting the Energy Challenge: A White Paper on Energy', May.

disaggregated (technology-specific) scheme, its market share might be only half that. Figure 1 compares these two extremes with a scenario of reduced co-firing support only and the White Paper proposals. The figure shows that changing the banding levels can have a significant impact on the mix of renewables delivered.

Subject to the results of a consultation exercise that is due to run until September 6th, and the subsequent introduction of primary legislation, the government's planned changes would be implemented from 2009. They are estimated by Oxera to help boost renewable supply to around 15% of the total by 2015/16, a significant step in meeting emissions targets.

Parallel processes: nuclear, planning and climate change

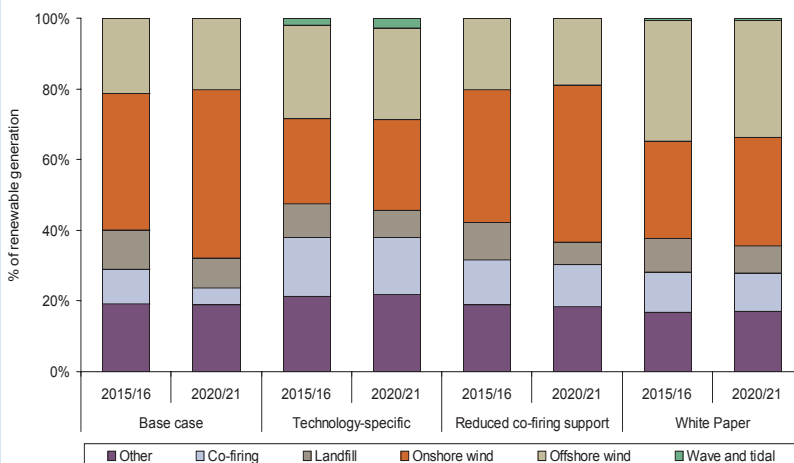
While the RO reform is perhaps the key firm proposal in the White Paper, the parallel nuclear consultation could be just as significant. The nuclear question is the subject of a separate consultation process (for legal reasons), but the White Paper does state that the advantages of new nuclear power stations outweigh the disadvantages.⁴ The focus is on creating the conditions for the private sector to have the option to build new nuclear stations.

Initially, this includes streamlining the planning process (through the Planning White Paper) and resolving issues relating to nuclear fuel, waste and decommissioning contracts. It remains to be seen whether further measures would be needed to persuade private investors to build a new fleet of nuclear stations, if indeed this is what the government wants.

The government's draft Climate Change Bill (March 2007), which sets out tough targets and contains new powers to deliver them, includes the following notable features.

- Clarification of the UK's targets for reductions in CO₂ emissions—26–32% by 2020 and 60% by 2050—and making these legally binding.
- A new system of five-year 'carbon budgets', set 15 years in advance, to provide increased clarity and certainty that will aid investment in low-carbon technologies.
- The formation of a new statutory body, the Committee on Climate Change, to provide expert advice to the government on carbon change issues.

Figure 1 Modelled technology mix under banding options



Source: Oxera.

- Increased government powers to implement emissions reduction policies, particularly the new cap-and-trade schemes.
- A requirement for the government to report every five years on current and predicted impacts of climate change and policy for adaptation.

Key themes: markets and instruments

Markets remain at the heart of the rhetoric of the White Paper, yet two broad features of the government's proposals show that energy policy is not simply a case of setting an appropriate framework and letting the market decide.

The first feature of note is the distinction between market creation, market finesse and obligatory standards. Implementation of energy policy might be described as coming in three movements. The first, is modern, brash and confident—it is the act of creating new markets where none previously existed. This is the realm of carbon emission cap and trade. A bold theme was established with the creation of the EU ETS and this is now being echoed at a national level with new carbon markets for businesses (through the Draft Climate Change Bill), and perhaps over time further towards the residential scale (international echoes of the cap-and-trade theme can be heard as far away as California and Australia).

The second movement is more subtle—it is one of ‘finessing’ markets that already exist, seeking to allow existing incentives to have an effect. The Planning White Paper seeks to remove some of the bureaucratic obstacles to market-driven investments in large-scale energy infrastructure. At the retail level, the implementation of measures such as labelling and smart meters in business and households is intended to encourage individuals to take up the common theme.

The final movement is a jarring theme, clashing with the modernism of the first two movements. It comprises a set of instruments that would be very much at home in the command and control policies of the post-war era. These include building regulations, dictating standards for new businesses and homes, appliance standards, the RO in electricity, and the renewable fuel obligation in transport. While some of these policies merely force individuals and businesses to do things which may already be in their economic interest given current energy prices, the fact that such measures are required is an acknowledgement that markets and economic instruments in themselves may not always be enough to encourage behavioural change.

If the mix of market creation, market finesse and command and control suggests complexity in policy implementation, a second aspect of the White Paper makes the point even more effectively. This is the sheer number of instruments now being deployed in the name of government energy policy.

Economic theory states that it is necessary to have available at least as many policy instruments as there are targets, in order for the market as a whole to work efficiently, or to ‘clear’. As an example from another area of economic theory, firms that wish to hire workers from the labour market have many ‘targets’, including purchasing hours from staff, but also hiring good-quality workers in the first instance and motivating them thereafter. However, firms may have only one instrument

at their disposal (the wage rate) in order to achieve, in effect, two targets (obtaining employment and obtaining effort). Here, wages may be set too high for the economy as a whole, resulting in higher unemployment than otherwise.⁵ By contrast the energy sector now appears to be in danger of suffering from the opposite problem—having so many instruments that they may conflict with each other in delivering a smaller number of targets—energy security and low carbon at least cost. This could be sub-optimal for the economy as a whole.

One might have assumed that the government would ensure that, at its simplest, the market framework would provide a price for carbon abatement and a price for energy security, leaving it up to the private sector to optimise the two at least cost for consumers. A single market for carbon and security would ensure that people buying cars would face the same trade-off between cost, security and carbon as people thinking about investing in new nuclear power stations, wind farms, or loft insulation. By progressively replacing two instruments with one, the government would force sectors and technologies to compete against each other, helping to ensure that the take-up of cheap solutions is maximised and the take-up of expensive ones minimised.

Why then does complexity seem to be the dominant theme? The answer may be that targeted schemes are thought to be more efficient at delivering behavioural change at a modest cost to the consumer than a single market with a single marginal price. Banding may encourage the development of a greater diversity of renewable generation at a lower total cost to consumers than using a single ROC price with equal ROC quantities for all technologies. It allows payments for cheaper technologies to be cut, and incentives to be better targeted at emerging technologies, minimising the aggregate pricing impact (although not necessarily the total resource cost). Thus distributional issues, rather than pure economic efficiency, may be seen as a key driver of complexity in the use of policy instruments. While such motives may be viewed as political, they may also be regarded by many as legitimate concerns of policy-makers.

Conclusions

The Energy White Paper represents an evolution rather than revolution in energy policy. The intended melody from the ‘composer’ is clear—the use of markets to deliver a low-carbon economy with energy security at the least cost. However, while the use of an increasing number of instruments potentially allows for more subtlety in the sound (ie, less apparent cost to the consumer), it also requires a very good conductor to ensure that the melody still emerges.

In practical terms it becomes even more important that the government can account for the different apparent costs of carbon abatement embodied in the different instruments (perhaps justifying high-cost instruments through security benefits, R&D benefits or simply revenue-raising objectives). If this is not done, investment incentives for carbon abatement in cap-and-trade schemes may be undermined by the risk that they will be undercut by more expensive technologies benefiting from targeted initiatives.

The government is understandably reluctant to use a single blunt instrument to deliver a potentially painful change in behaviour. However, the risk of the proliferation of instruments in the White Paper is that if the market does not hear the melody the government thinks it is playing, it may get the wrong mix of investments in the energy sector in the next ten years.

¹ Department of Trade and Industry (2007), 'Meeting the Energy Challenge: A White Paper on Energy', May 21st.

² HM Government (2007), 'Planning for a Sustainable Future: White Paper', May 21st.

³ See Oxera (2007), 'Reform of the Renewables Obligation: What is the Likely Impact of Changes?', May, report prepared for the DTI. Available at www.oxera.com.

⁴ DTI (2007), *op. cit.*, p. 17.

⁵ This is in line with an 'efficiency wage' view of wage-setting and unemployment. In theory, firms may overcome, to an extent, the instrument-target problem through using the additional instrument of incentive schemes (including probationary periods, deferred compensation and bonuses) to elicit effort.

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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