Prospect

The economics of climate change

Submission by Prospect to the Stern Review

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INTRODUCTION

1. Prospect is a trade union representing 105,000 scientific, technical, managerial and specialist staff in the Civil Service and related bodies and major companies. In the energy sector, we represent scientists, engineers and other professional specialist staff in the nuclear industry, the wider electricity supply industry and, increasingly, also in the gas industry. Our members are engaged in operational and technical management, research and development and the establishment and monitoring of safety standards, environmentally and in the workplace. Other members are directly involved in a range of sectors and functions for which environmental issues are of significant professional concern. We are fortunate in being able to draw on their knowledge and expertise to inform our views.

2. The paragraphs below aim to respond to the published terms of reference for this review. However Prospect has commented extensively on the Government's various consultations on energy and environmental issues over the last five years or so, and we would welcome an opportunity to engage in a holistic debate on these issues unencumbered by the boundaries and barriers resulting from fragmentation of government responsibilities across a range of departments and ministers.

Implications for energy demand and emissions of the prospects for economic growth

3. The trajectory of UK electricity forecasts exist in the context of an inexorable rise in global demand, with some commentators suggesting that world demand may rise by 75% over the next two decades.[1] UK demand has risen steadily by 1-2% per year and in our opinion whilst energy efficiency measures may moderate growth rate, demand will continue to rise.

4. The generating capacity to meet this demand continues to undergo significant change with the impending retirement of nuclear and coal plants and the uncertain but policy driven arrival of renewables. The DTI analysis is a convenient starting point for an assessment of the consequences of the change in generation pattern[2]:

2020 Projections of Electricity generation, base case

Gas: 68%
Coal: 13%
Renewables: 11%
Nuclear: 7%

2020 Projections of Electricity generation, carbon savings model

Gas: 59%
Renewables: 25%
Nuclear: 9%
Coal: 7%

[1] The Nuclear Communications Network Feature no 12 13/9/05.
[2] DTI Energy White Paper

5. Nuclear currently provides about 25%. The prospective rundown of nuclear capacity that may be impacted or accelerated by the NDA is as follows[3]:

2005	22%
2008	18%
2012	13%
2013	8%
2023	Less than 3%
2035	0

6. In aggregate around 75% of existing plant of all types will require replacement over the next decade or so. Projections will depend on progress with the introduction of renewables and what decisions are made on replacement capacity for the nuclear power stations that will close once they reach the end of their operating lives. It is important to provide for the capabilities of different generation sources and combinations of sources to meet differing needs. For example CCGT stations give good, fast reaction capacity, including as back up for intermittent renewable sources, whereas nuclear is best suited as base-load generation.

7. If renewables or other generation sources do not meet the short fall, and given the expectation of rising demand, then the capacity margin will diminish to level where continuity of supply will become a high profile issue. The adverse social, economic and political consequences of reaching a point where customers face load shedding due to capacity shortfalls should be self evident.

Economic, social and environmental consequences of climate change

8. As a trade union we are particularly concerned about the employment consequences of climate change, both for those directly affected in energy-intensive sectors and more broadly, taking account of the potential disproportionate impact in some localities and regions. Prospect believes that for all generation sources:

- Investment needs to be assessed both against the positive contribution to achievement of the climate change targets adopted by the Government and a wider range of sustainability principles.
- There should be benefits in further developing relatively new technologies and stimulating new British industries, though this is a competitive market.
- Employment impact beyond the construction phase depends on the extent of domestically produced inputs. Technology sourced locally would have a considerably higher domestic employment impact than imported technology. Employment generated would also be higher to the extent that UK-based firms were able to export their technology.
- Any rigorous analysis would, therefore, need to consider which types of energy production the UK may have a comparative advantage in producing the inputs for, including estimating the future export potential of each, and how policy can appropriately support domestic production.

[3] . Derived from British Nuclear Energy Society data. These figures do not take account of the recently announced life extension to Dungeness B power station.

- Additionally the impact of supply chain activity in supporting employment across more remote areas with fragile economies should not be under-estimated.

9. Transition to a low carbon economy will also have implications for the wider skills base, in particular to maximise the benefits and minimise the costs of change in energy intensive sectors. The approach taken must be forward looking and provide time and support for adjustment not, as in the past, based on post-hoc packages of assistance to deal with the consequences of regional dislocation. It must also focus strongly on quality of employment. Transitional skills strategies must provide support for well-qualified staff at all organisational levels as well as for lower skilled employees who may lack a portable or adaptable skills base. The Government should lead an objective, forward-looking analysis of the balance between the positive employment impacts of growth in R&D and renewables against possible negative consequences of contraction in other energy sectors. This should also take account of indirect effects, such as employment implications in the UK of the terms of trade for energy imports. It will clearly make a difference whether this is for manufactured goods or for services.

Costs and benefits of actions to reduce the net global balance of greenhouse gas emissions

10. In our opinion the UK Government will also need to recognise that reliance on pure market solutions for the generating mix means that achievement of emissions targets is unlikely and supply margins will be increasingly at risk. Government intervention designed to ensure fuel source balance and to stimulate progress on environmental objectives does not require the abandonment of the market in its entirety. But it must mean the creation of a policy framework where market participants are incentivised such that they do not simply choose generation new build options on rate of return considerations and can accommodate shareholder value pressures with broader energy policy aims.

11. The CO_2 reduction targets set by the Royal Commission on Environmental Pollution (RCEP) pose a major challenge. Most scenarios posed by the RCEP involve a nuclear element and the one most clearly founded on proven technology rests to a very large degree on nuclear capability.

12. Prospect believes that there is a continuing role for both nuclear and renewables and that an even-handed approach must be applied to assessing the costs and benefits of each energy source. The Inter-Departmental Analysts Group report published by the DTI shows this to be essential if the UK is to come anywhere near close to meeting the RCEP targets for CO_2 emissions.

13. The Energy Futures Task Force (EFTF) has persuasively argued that the goal should be a system that, as far as is practical, is neutrally designed to be capable of accepting generation close to the points of demand as well as offering opportunities for remote generation from large plants that may have been sited to take advantage of local resources. This though, has significant implications for the development of the transmission network, its protection mechanisms and metering systems to facilitate distributed and diverse generators, ranging from commercial to domestic units. It also has implications for pricing regimes and operating expenditure, particularly for distribution network operators. The regulatory issues arising from this form of generation will also need to be addressed.

14. Major obstacles identified by the EFTF include:

Planning and other consents – A new approach to planning is needed both to reduce the time lags in delivering new investment and to ensure greater coherence between national, regional and local planning decisions.

Manufacturing and installation capacity – Investment needs to be assessed both against the positive contribution to achievement of the climate change targets adopted by the Government and a wider range of sustainability principles. There should be benefits in future developing relatively new technologies and stimulating new British industries, though this is a competitive market.

Providing the supporting infrastructure – In practice, any significant move to generation from renewables will mean that distribution and potentially transmission network operators will need to be incentivised to send micro-generated power to and from where it needs to be. In addition, there will be a need to strengthen and, in some cases, build new networks to meet the needs of new renewable generation. All of this has implications for pricing regimes and operating expenditure, particularly for distribution network operators, though other economic instruments will also be required to incentivise change.

15. In terms of promoting use of renewable sources, it will be important to establish a clear economic value for environmental benefits and to resolve some of the planning difficulties that currently exist. As the Trade and Industry Select Committee has pointed out, the creation of a large number of small-scale (renewable) plants will have repercussions for the electricity transmission and distribution networks. "A critical feature of most renewables is that they are energy sources and not fuels. The difference lies in availability. Fuels are always available for use when required, albeit at a price determined by the market. Energy sources are usually intermittent, but are free. The problem is most difficult with intermittent energy sources, such as wind energy"[4]. This requires either a significant over-investment in capacity, or "capacity credit", to be sure of peak load generation and/or heavy investment in storage capacity. On the other hand, the supply of renewables such as wind power does not depend on the market and other fuels are not always available for use when required since there is a finite "run up period" for all generating plant and specific generating plant is not always available.

16. There is certainly a need for increased research and development in this area, particularly on renewable sources that have not been tackled adequately by the private sector. The development of effective, safe storage systems could also help to smooth out fluctuations in the availability of some renewable sources.

17. Prospect representatives working in this field report that there is a current lack of funding for basic research into renewable energy sources and that this is exacerbated by changing remits from funding bodies, though we note from the first

[4] Resilience of the National Electricity Network, Trade and Industry Select Committee, 2004

annual report on the Government's 10-year framework for science and innovation that increases have recently been agreed to a number of energy R&D programmes. Further, although EU funding regimes appear to offer additional opportunities, there are significant barriers to accessing funding under a regime that emphasises economies of scale and the creation of centres of excellence and operates by means of an application process that is so complex that it is very difficult for small organisations either to resource the bidding process or carry the resultant overheads. Even in larger organisations, the resource required for bidding can prove onerous.

18. Tidal streaming and waste bio-fuels are potentially fruitful areas. The current UK research programme into bio-fuels is fragmented and under-funded and suffers from the fact that no single government department takes a lead in this area. To date most R&D on biofuels for electricity generation has focused on the potential for schemes that would supply local or regional needs. Whilst such schemes can never compete with the economies of scale offered by large power stations, the technology does offer an opportunity to meet the needs of isolated communities. For example, marginal agricultural land can be used to grow willow for biomass, which is then harvested annually and chipped for use in adapted boilers. Farm waste can be spread on the same land area, providing both nutrients for the trees and a safe disposal method that protects watercourses and the wider environment. This also offers the potential for an increase in local employment in rural areas. The development of crop-based bio-fuels for transport is at a very much earlier stage, but again there are potential benefits for rural regeneration and diversification. All generation technologies that produce their own fuel are secure and should receive the appropriate credit. Systems that can additionally run without grid connection are even more secure.

Impact and effectiveness of national and international policies and arrangements to reduce net emissions in a cost effective way

19. In order to capture environmental externalities effectively it is essential to build the costs of carbon pollution back into the system and to incentivise current investment decisions accordingly. Such incentives for investment should encourage the development of all lower-carbon generation technologies including nuclear and coal. To achieve this our view is that the Government should keep open the option of a rationalised harmonised greenhouse gas tax. Providing that it did not conflict with EU regulations, such a tax introduced initially at a low level but with a clear commitment to progressive increases would provide both the incentive and the opportunity to change behaviour. It could also help to ensure a level playing field for all energy sources.

20. In general, we believe that the following criteria should be applied to assessment of all economic instruments to control energy use. Costs should be:

- Proportional to the amount of each greenhouse gas emitted
- Proportional to the relative warming effect of each gas
- Independent of where it is emitted
- Independent of who emits it
- Independent of the process that emits it
- Paid by the emitter when the gas is emitted to the atmosphere
- Applied to all emissions of greenhouse gases and credited for their absorption

- Paid for other by activities that commit the future emission or prevent the future absorption of greenhouse gases.

21. One of the positive lessons from existing measures is that markets are more likely to adopt a longer-term perspective if there is a clear economic and political framework within which to operate. Experience with Climate Change Agreements (CCAs) appears to confirm this and should be taken into account in framing future measures, including allocations under the EU Emissions Trading Scheme. Equally, we recognise that use of emissions trading schemes will feature significantly in international negotiations and action plans. The aim should therefore be to move as quickly as possible to a harmonised and stable approach, not least to guard against companies stalling investment decisions. Where policy direction is unclear and/or subject to sudden shifts, markets will undoubtedly work with a short-term focus. Having said this, it is clear that the UK's national CO_2 reduction targets are likely to remain more ambitious than those for the EU as a whole. It may therefore be appropriate to conceive of a harmonised EU approach setting minimum standards whilst not diluting the UK's domestic commitments.

22. Prospect supports the use of flexible mechanisms agreed under the Kyoto Protocol provided that they are implemented in a controlled and equitable manner. However, helping other countries to adopt low emission technologies should not be seen as a substitute for reducing CO_2 emissions in the UK. International action should be treated as a separate line in the Kyoto emissions budget; for example UK or EU could sign up to an obligation to help other countries to stop emitting a certain amount of greenhouse gases. This part of the action should be seen as the process of bringing everyone up to the best modern standards. This can be seen as analogous to the bilateral and multilateral programmes that have been in operation for the last 20 years to bring safety standards of eastern European nuclear power stations up to modern standards. Considerable improvements have been achieved by a variety of bilateral (UK, USA) and multilateral (EU, EBRD) mechanisms to provide safety improvements and, in some cases, the closure of plants.

Potential of different approaches for adaptation to changes in the climate

23. Regulation, targets, voluntary agreements and economic instruments all have a role to play. However, we agree with the Trade and Industry Select Committee that government needs to take a strategic view about what level of reserve capacity is needed and that it should be prepared to use market mechanisms to encourage construction of extra capacity if required. To capture environmental externalities effectively, it is essential to build the costs of carbon pollution back into the system and to incentivise current investment decisions accordingly.

24. Prospect has two more specific proposals in relation to existing economic instruments:

25. The existence of the Renewables Obligation Certificate Scheme is by far the biggest driver of the current explosion in wind generation. As the Public Accounts Committee has recognised[5], a wind farm developer is likely to make significantly more return from the ROCs earned than the value of the electricity: this is because of the fundamental uncertainty of the generation profile, quite rightly given a low

[5] "Renewable energy" - 2005

value by the market. The RO effectively treats all kWhs as of equal value, unlike the traded electricity market which properly values kWhs taking into account supply and demand, firmness of output predictions, etc. These effects are of concern since they result in the available investment being channelled into currently available technology, i.e. wind, while technologies likely to produce more predictable (and hence more valuable) renewable energy, e.g. tidal, lose out on development funding. The limitation of ROC eligibility to conventional hydro generators of less than 20MW has produced the situation where larger hydro sets have been downsized so that they can qualify. As a result less renewable generation is now derived from hydro than before ROCS was implemented.

26. The challenge is therefore to structure the support to produce desirable outcomes rather than unexpected consequences. If suitably modified or, preferably, replaced with a more accurately targeted scheme designed specifically to encourage reduced carbon or carbon free generation, a number of desirable outcomes could be achieved. A number of more advanced approaches are possible, perhaps the simplest being to frame a modified, or successor to, ROCS based on a multiplier of traded price rather than a fixed kWh price. This would have the effect of giving greater encouragement to investment in the more predictable, and hence more valuable, renewable sources such as biomass and tidal. If recast to include other reduced carbon or carbon free generation, to which new nuclear capacity would be eligible, many of the market's existing concerns about capital investment could be addressed.

27. The key test of such recasting would be whether the resulting RO met the criteria for economic instruments of changing behaviour through imposing proportional additional costs at the point of emissio n, independent of emission source or location. The relative inefficiency of the current RO is forcefully noted by the Public Account Committee in their comment that it is "more expensive than other mechanisms currently being used under the Climate Change Programme" (including the Climate Change Levy and emissions trading programmes). Prospect also shares the concerns of the Public Accounts Committee over the failure to establish "measures or targets to track the industry's progress in reducing costs" and that "consumers will not necessarily benefit (even) if generating costs do fall".

28. The Energy Efficiency Commitment obliges suppliers to invest in capital schemes designed to reduce domestic energy consumption. Annual expenditure is directly proportio nal to the number of customers supplied. This has been very effective in improving home insulation standards and replacing boilers, lighting and other appliances with more energy efficient designs and has been a major contributor to reducing fuel poverty. However, there are physical limits to what is achievable and the time is rapidly approaching when most of the obvious measures will have been carried out. It is a simple fact that there are practical limits to what can be done to improve the thermal performance of existing houses. Companies are now increasingly having to look at "using up" EEC money on less easily justifiable investments such as fuel switching.

29. While it is important that the primary target of EEC should remain the achievement of physical energy efficiency improvement measures, it might be appropriate to consider whether the rules could be modified such that where a home is identified where fuel poverty remains despite achievement of all practical

physical measures, EEC money could be used to directly offset the energy bill to the extent required to eliminate fuel poverty.

30. More broadly, as the Prime Minister has recognised, there is enormous potential for scientific discovery and innovation to contribute positively to climate change mitigation and adaptation strategies. Scientists from many disciplines should be responsible for providing evidence of climate change impacts. Attribution of a particular impact to climate change with high likelihood may be rather challenging and will require increasing multi-disciplinary approach. Such work will not be funded by the private sector and must be properly resourced by government.

31. Practical implementation programmes are certainly required now. However, it should also be noted that the potential for achieving better technical solutions and operational practices depends crucially also on success in addressing challenges of an entirely different nature. These are, in broad terms, about the need to change perceptions and behaviours. Trade unions have a potentially important role in this regard – including in influencing members as consumers as well as in the workplace. For its part, Government needs to address up-front the fact that moving to lower carbon approaches will create losers as well as winners at a range of levels; domestic consumers, employees, local communities, energy-intensive industries and regional economies. This requires sustained political commitment and partnership with a range of stakeholders.