

Electricity Market Reform

Submission by Prospect to the Department for
Energy and Climate Change

March 2011

www.prospect.org.uk

Introduction

1. Prospect is a trade union representing 122,000 scientific, technical, and 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 and radioactive waste management industries, the wider electricity supply industry and, increasingly, also in the gas industry. Our members include experts developing carbon capture and storage technologies and those with regional responsibility for promoting sustainable energy systems. They are engaged in operational and technical management, research and development and the establishment and monitoring of safety standards, environmentally and in the workplace. We are fortunate in being able to draw on this broad range of knowledge and expertise to inform our views.

2. We believe that the need for action to deliver secure and sustainable energy policies is urgent, and that a step change in policy is necessary to deliver the necessary emissions reductions to curtail dangerous climate change. Control of carbon is the key issue. We agree that alongside nuclear and clean coal, renewable energy sources will have an important role to play in 2020 and beyond. Investment, facilitation and action are urgently required to deliver this vision, including in areas beyond the scope of this consultation – for example on workforce skills. The paragraphs below respond to selected questions in the consultation document and then comment on some of the issues of broader concern to us.

Consultation Questions

Q1: Do you agree with the Government's assessment of the ability of the current market to support the investment in low-carbon generation needed to meet environmental targets?

3. Yes, Prospect's view is that this will not be realised by relying on markets alone and that government will need to take a more proactive approach to ensure policy and financial stability. It is not sufficient to rely on market price signals: the market alone cannot provide reliable price signals to 2020 due to uncertainty and volatility of global gas and oil prices. Coupled with the lack of certainty over future energy policy and regulation, this manifests in costs of capital that are not justified by operational risk. The consultation paper does not address the need for investment in networks and the impact of network regulation. In fact, much renewable and low-level thermal capacity, such as CCGT plant below 350 MW, is attached to distribution networks, not the national grid. So, policy needs also to consider the needs of distribution network operators for skills and capital and the need for adjustments to regulation to achieve this.

4. Whilst many of our members would, for good reason, favour large-scale, centralised supply-side solutions, Prospect supports a diverse and balanced energy policy so we would not want to see renewables or other newer technologies crowded out. However we believe that the current approach to renewables disadvantages clean coal and biomass and focuses heavily on wind. On the other hand, the greater clarity that would result from specifying the generation mix should help to encourage investment. It would also give greater certainty over

future workforce requirements and could facilitate a greater focus on R&D to deliver the most efficient technologies and the skilled workforce to operate those technologies within the specified framework.

5. The Government's approach must also take account of the fact that the major UK companies are largely European owned and most countries are facing the need to renew their generation and network at the same time as the UK. This means that if the UK fails to offer sufficient certainty or investment returns, it is logical for these companies to allocate scarce capital to other markets where these features exist. It should also be noted that the history of investment by independent power producers has not been happy as vertical integration obscures price signals and deters investment by independent power producers. All of these factors will also impact the supply chain in respect of plant manufacture and the development of a skills base that enables the objectives of energy policy to be met. Experience from the dash for gas shows that a failure to create the correct incentives for investment in the UK led to the development of technology overseas and the loss of high-skilled, high technology, high quality jobs.

6. We believe that the original concept that light-touch regulation was only a stopgap before full competition could be introduced was a delightful intellectual fantasy. Networks are as close to a natural monopoly as possible and the benefits of competition to the consumer can only be achieved by clear and robust intervention to set a market with clear understanding of the desirable outcomes for the consumer. The complexity of regulation can obscure energy policy objectives and continued uncertainty can create a perception of regulatory risk that inhibits investment. The original concept has largely lost what relevance it had to consumer aspirations as it fails to tackle the constraints of delivering public policy through privately financed and commercially-operated licence holders.

7. Investment in all forms of energy generation is long-term in nature, and requires a greater degree of certainty than currently exists over future energy policy and the long-term price for carbon. Whilst welcoming the provisions of the Climate Change Act and work in progress to strengthen the European Union Emissions Trading Scheme, Prospect is concerned that the time horizons of these measures may be too short to encourage the necessary investment. Prospect does therefore support the introduction of a stable floor price for carbon alongside strategic government support to stimulate innovation and UK supply chains. We are also concerned that the ETS needs to be robust enough to be effectively regulated since failures in regulation undermine the credibility of the scheme. consideration should be given to measures that would allow for an element of the carbon price reinvested in trialling new technologies. Prospect members who work in the electricity industry have a broader concern that the EU will enforce different rules, which may not align with the UK government's view of how the market should operate.

Q2: Do you agree with the Government's assessment of the future risks to the UK's security of energy supplies?

8. Any modelling of future scenarios on energy demand and how it is met must more clearly factor in the engineering characteristics of the available technology. The considerable efforts to decarbonise electricity supply will be rendered useless if the construction and commissioning of new, thermally based generating stations fails to keep pace with the proliferation of renewable technologies. Large,

centralised stations utilising gas, clean coal and nuclear are absolutely essential to delivery of network stability and security, complementing the diverse nature of renewables. However, it should be noted that UK gas reserves could be largely exhausted by the 2020s and that converting domestic heating from gas to renewable sources will inevitably be a long-term process. It would therefore be imprudent to base energy security of supply on imported gas, which is essential for domestic heating, at a time of global energy shortages.

9. Further, stakeholders must not make the fundamental mistake of simply equating the capacity of a generating set in a large, conventional power station to so many wind turbines; the physics of each scenario are very different to one another. Renewable energy generating technologies have made massive progress in recent years in terms of system voltage and frequency control but are, as yet, to demonstrate anything close to the transient stability of large synchronous machines. Failure to appreciate this could have profound consequences for the stability of the transmission networks and the national economy. Moreover we believe that a wide range of low-carbon technologies needs to be developed rather than rely on a single renewable source.

10. It is therefore important that the regulatory framework is flexible enough to encourage investment in network improvements and new generation stations that can clearly demonstrate that they will provide system stability to complement and facilitate the connection of more large-scale renewable generation sites to the transmission networks. We believe that the development of networks regulation needs to recognise the need for investment in new plant, new techniques and new skills, as the operation of smart grids is key to reducing the carbon intensity of the UK economy. The recession has reduced energy demand and diluted any sense of urgency to invest in new capacity. However, the combined effect of tightening emissions constraints and buoyant gas prices could create a generation gap by the end of the decade unless firm action is taken now.

Feed-in tariffs

11. Prospect considers that the dual objectives of the Renewables Obligation, i.e. to reduce carbon dioxide (CO₂) emissions from electricity production and to develop long-term CO₂ free generation technologies to become economically viable in their own right, would be most effectively pursued through separate measures. The costs are higher than they need to be because energy companies make rational choices to operate by the most profitable means to produce renewable electricity. However the scheme attempts to promote a range of technologies, so gives subsidies big enough to encourage the more expensive ones. This creates financial "deadweight". Though there is obviously a case for this whilst developing new technology, the FIT 'contract for difference' model would be a more efficient approach than extending the RO. It should provide security for the development of novel technologies and, through long-term contracts, provide a secure base for the development of UK fuel sources. However, Prospect is not convinced that this should be based on rewarding operators for plant availability rather than actual output, since some other form of capacity payment would be more appropriate for encouraging load-following plant.

12. Although the consultation paper takes a rather dismissive stance, extending the Regulatory Asset Base (RAB) approach could also provide a good way forward if it also incorporated improvements to the regulatory model. This will best support the need for differing approaches to generation and transmission/distribution: New generation projects have a direct benefit for operators whilst reinforcing the technical capacity of networks and the skills of their professional staff has benefits for all users of these networks. However, there is a need for a change in language given that Ofgem has shifted towards a total cash approach so stopping any preference for capital expenditure over operating costs. It is also important to recognise that efficient operation of distributed generation will have a significant environmental benefit.

Q6: What are the efficient operational decisions that the price signal incentivises? How important are these for the market to function properly? How would they be affected by the proposed policy?

13. Given the long-term nature of energy investment, the key requirement is for stable long-term price signals that encourage long-term behaviour. FIT with a contract for difference (CfD) can adjust the market to reward long-term thinking providing the process is transparent and does not favour vertically-integrated companies whose decisions mirror other large rivals rather than favouring diversity of supply.

Emissions performance standards

14. It is welcome that the consultation paper acknowledges that coal-fired power stations do have a continuing role, not least as a flexible fuel source to provide back-up generation, and Prospect supports the principle that this should be on the basis that action is taken to reduce their emissions. However, it is not proposed to apply an Emissions Performance Standard (EPS) retrospectively to existing plant, except where it undergoes a significant life extension or upgrade – the circumstances of which have yet to be defined. Perversely this creates an incentive not to invest in major efficiency measures such as efficient turbines or supercritical operation both of which reduce carbon emissions by 10%. The current proposals militate against coal and create a perception that investment in coal plant to reduce NOX emissions through Selective Catalytic Reduction will be futile. There is therefore a risk of increasing pollution for the remainder of the decade as coal plant is worked to destruction as its operation beyond 2021 becomes impossible. Given the advantages of CCS, the higher target of 600g CO₂/KWh seems the best option as this will help to encourage investment in what remains a commercially unproven technology. The Government should also take forward its commitment to public investment in four CCS projects as the earliest opportunity.

Q12. Do you agree with the Government's assessment of the impact of an emission performance standard on the decarbonisation of the electricity sector and on security of supply risk?

15. As Shadow Energy Minister Charles Hendry argued persuasively for an EPS to set a clear direction for investors of what the industry is working towards and what is required of it. Prospect certainly supports the need for a clear, long-term and stable policy direction to support investment decisions. We also believe that

government should be prepared to commit public financial support, at least at demonstration stage to prove that the technology works to scale. 1

16. However, against this background of broad support, we have some concerns over the potential practical implications of introducing an EPS. For example, the technology within gas turbine plant is such that installed plant would require significant and costly adjustment to achieve the EPS aim of reducing or restricting emissions. This would affect energy security if all plants were modified within similar timescales. Given the technological aspects of CCGT plant, high efficiency is only achieved at periods of constant load so EPS would reduce the contribution of such plant to load-following.

17. To the extent that EPS increases the capital cost of plant, increases maintenance or operational demands, or results in more fuel being burnt, it will contribute to increased costs. It could also lead to a further decoupling of energy prices from the raw fuel cost, since the cost of the fuel - whether coal or gas - will be a smaller percentage of the overall power station operating costs

Q13. Which option do you consider most appropriate for the level of the EPS? What considerations should the Government take into account in designing derogations for projects forming part of the UK or EU demonstration programme?

18. An EPS should not incentivise investment in gas with no carbon abatement to the exclusion of clean coal technologies. This would further weaken diversity and security of supply and potential lock in dependency on imported gas – exposing UK consumers to future hikes in international oil and gas prices. The use of FIT should remove this incentive for the greater use of gas which threatens to reduce security of supply as UK gas supplies exhaust over the next fifteen years.

Q14/15. Do you agree that the EPS should be aimed at new plant, and 'grandfathered' at the point of consent? How should the Government determine the economic life of a power station for the purposes of grandfathering? Do you agree that the EPS should be extended to cover existing plant in the event that they undergo significant life extensions or upgrades? How could the Government implement such an approach in practice?

19. The proposals for a transition-period for the conversion of existing coal plant to clean-coal technology on the basis of a secure long-term price are welcome. In Prospect's view it is important to quickly select the best forms of both pre-combustion and post-combustion CSS for coal trials quickly as the technology is unlikely to be effective before 2020. Without a clear future for coal deep-mining in the UK will cease despite ample reserves at world prices. Coal burn across the world is likely to continue to rise so shutting off this technology for the UK will lose another opportunity for exports and lead to greater reliance on gas when wind availability is low.

Q16. Do you agree with the proposed review of the EPS, incorporated into the progress reports required under the Energy Act 2010?

20. A review of EPS standards is desirable on the basis of a commitment that existing coal and CCGT plant retain existing emissions standards.

Q17. How should biomass be treated for the purpose of meeting the EPS? What additional considerations should the government take into account?

21. It is important to avoid creating unintended consequences depending on the specific generating method used. Biomass is not necessarily a preferable option unless produced from local sustainable crops. Whilst we do understand the desire to promote certain new technologies, Prospect does not accept that using the EPS is the most appropriate means to achieve this objective. For example, co-firing coal and biomass has technological and environmental advantages as the ash characteristics of co-fired fuel are considerably more environmentally benign than biomass-only ash. The EPS should not disadvantage biomass from sustainable sources as this technology has significant benefits for existing coal plant at relatively low cost whilst new technology is developed.

22. We would expect to see firm commitments in the course of 2011 to bring forward investment in the other three CCS demonstration projects committed by Government.

Options for market efficiency and security of supply

Q19. Do you agree with the assessment of the pros and cons of introducing a capacity mechanism?

23. Prospect broadly agrees with the assessment. It is vital that capacity payments remain stable in order to encourage investment. The fear of a fall in payments will have a destabilising effect and, in our view, suggests that a bidding process would not be appropriate at this stage. Capacity payments should incentivise real availability so should be linked to the volume of generation available and to other services to maintain grid stability such as reactive voltage, location, speed of response to an unexpected rise in demand, and reliability. This requires establishing the factors that determine the value of spare capacity and reward the plant that meets those requirements. It is also very important that the shape of capacity payments is consistent with other incentives.

Q20. Do you agree with the Government's preferred policy of introducing a capacity mechanism in addition to the improvements to the current market?

24. Yes, this is vital in order to encourage the construction of new plant to meet fluctuating demand. A consequence of high levels of wind power is increased variation in unplanned plant non-availability due to the unpredictable nature of wind flows around individual wind farms. This intermittent pattern of generation places a higher premium on back-up capacity which is largely un-rewarded. Currently the market for responding to unexpected peaks in demand is highly inefficient as there is no predictable reward for constructing and operating fossil-fuel plant with low level and unpredictable patterns of operation. At present capacity is only rewarded when plant runs. Therefore consideration needs to be given to the most efficient way of providing a long-term reward to generators who

provide reserve capacity to cover intermittency. The risk is that without such support, prices will become highly volatile and investment will be deterred. Perversely current systems reward thermal plant that is most efficient at baseload generation thus reducing flexibility: much gas CCGT plant needs reconfiguration to operate on a load-following basis.

25. Prospect therefore agrees that there is a case for introducing capacity payments, though, as indicated below this approach would need to be complemented by other measures.

Q24. Which of the two models of the targeted capacity mechanism would you prefer to see implemented: last-resort dispatch or economic dispatch.

26. Prospect's preference is for the economic dispatch model.

Q25. Do you think that there should be a locational element to capacity pricing?

27. Since directly extractive renewable generation (wind, wave, tidal) has to be sited where the renewable energy source exists, it is inevitable that this will very rarely be near load centres. Currently transmission pricing is geographically based, which is a legitimate mechanism for encouraging construction of fossil fuel fired or nuclear generation near the load centres, but acts as an additional disincentive to remote renewable generation. We would suggest that transmission charging rules be amended so that specific types of renewable generation automatically qualify for the lowest band of transmission charges regardless of location. This should not apply to renewable energy technologies that involve burning a fuel, e.g. biomass, since in choosing a location for this it is right that all economic factors including the relative costs of transporting fuel and electricity should be considered.

Analysis of packages

Implementation issues

28. The consultation paper recognises the need for new institutional arrangements to effectively co-ordinate and deliver the range of proposed new policy instruments. This is both welcome and important. It also provides an opportunity to bring greater coherence to the proliferation of structures and responsibilities that already exist across government. To ensure that this opportunity is not wasted, there is a need for clarity about what is actually needed. In Prospect's view the challenge is to deliver a stable long-term balanced energy policy that will decarbonise electricity supply and ensure security. This requires action both to distance energy policy from the exigencies of the electoral cycle and to provide a regulatory framework that supports investment in infrastructure, innovation and skills. Prospect would therefore support the introduction of an Energy Agency, operating at arm's length from government but accountable to Parliament, that would balance the public interest with market solutions.

29. However it also requires a consistent strategy across government and cannot be achieved on the cheap. Prospect members have neatly summarised the challenge as follows: Ofgem and DECC have differing objectives (one wants prices down for consumers the other wants prices up so generators build new plants). The

major problem is that the framework to attain either of these objectives does not exist. It is now critical that the Government delivers the funding to support its aspirations. For example, decisive action is needed in the Budget to bring forward a Green Investment Bank. Analysts have argued that to make a significant impact, the green investment bank would need £6bn, and needs to be established as a genuinely independent bank. The Chancellor should also set out the timetable and scale of funding for further CCS demonstration projects.

30. Cost will also be a key issue for consumers. Whilst the consultation paper gives an overall assurance that costs will rise less by 2030 than they would under current arrangements, it is clear that the price trajectory is upwards and that there may be sharper increases in the shorter-term as the market adjusts to the new requirements. These will have a differential impact on consumers and different types and size of business, depending on their circumstances, and for some may be hard to bear. The Government should publish independent analysis of the likely impacts and consult measures and support to be provided to mitigate the impact on the fuel poor and ensure just transition for jobs and companies that will be at risk. As recognised by the Minister for Business Enterprise at the Government's Advanced Manufacturing Growth Summit in January, progress will depend partnership between government, industry and the workforce.

31. So it is a major omission that the consultation paper has nothing to say about investment in staff and skills, which will be crucial to delivery and to sustaining progress. Decisions elsewhere in Government to reduce skills funding and increase university tuition fees may well have an adverse impact. It is certainly true that engineering skills will be at a premium. The evidence from our relationships with the companies in the industry is of a tightening of the labour market for engineering, technical and craft skills. In taking forward the proposals for electricity market reform the Government must work with Sector Skills Councils to make an assessment of the skills and training investment needed to match its ambitions. In doing so, it will need to locate a workforce strategy for new energy infrastructure within the much wider infrastructure challenge that the UK faces in the next decade. As also recognised at the Advanced Manufacturing Growth Summit, the prospective Green Economy Roadmap could make a valuable contribution in this regard providing that it provides a vision that is not confined to the market and that it recognises that people are a key part of the pipeline.

