

DEPARTMENT OF ENERGY AND CLIMATE CHANGE CONSULTATION ON ELECTRICITY MARKET
REFORM

RESPONSE BY THE GRANTHAM INSTITUTE FOR CLIMATE CHANGE AND THE CENTRE FOR
ENERGY POLICY AND TECHNOLOGY (ICEPTⁱ), IMPERIAL COLLEGE LONDON

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ⁱ ICEPT have also led the production of a UKERC submission for the Electricity Market Reform consultation, which goes into additional detail on aspects of the consultation, notably on the Feed in Tariff proposals.

Current Market Arrangements and Shape of the Proposed Package

Question 1. Do you agree with the Government's assessment of the ability of the current market to support investment in low-carbon generation needed to meet environmental targets?

Question 2. Do you agree with the Government's assessment of the future risks to the UK's security of electricity supplies?

Question 19. Do you agree with our assessment of the pros and cons of introducing a capacity mechanism?

Question 20. Do you agree with the Government's preferred policy of introducing a capacity mechanism in addition to the improvements to the current market?

Question 26. Do you agree with the Government's preferred package of options?

The Grantham Institute and the Centre for Energy Policy and Technology share the view that a new policy framework is essential to enable the UK to achieve the target of reducing greenhouse gas emissions by at least 80% by 2050 and we therefore welcome this consultation.

We agree with the analysis in the Consultation Document of the performance of the current electricity market system and the need for change. The current arrangements do not adequately reflect the environmental costs of carbon emissions. Moreover, wholesale power price uncertainty and (potential) volatility create considerable price risks for prospective investors in high capital cost, low marginal cost generation assets such as offshore wind and nuclear power.

Without new incentives it is highly unlikely that the UK market will deliver the investment that is needed to reduce the UK's carbon emissions and meet the objective of largely de-carbonising the power sector by the 2030s. The Committee on Climate Change (CCC) have suggested the need for investment in 30-40 GW of low carbon capacity in the decade from 2020 in order to drive average emissions from generation down to around 50gCO₂/kWh by 2030¹. There is now an urgent need to put in place cost effective incentives to bring forward and deploy these low carbon power technologies. We agree that this should be the main focus of the government's immediate initiatives.

These comments concentrate mainly, therefore, on the incentives needed to bring forward low carbon technologies. The Consultation Document also puts forward suggestions for a new capacity mechanism in the interests of energy security. We have some concerns about the number of changes that can be considered and implemented adequately in a short period and it seems to us that these proposals could be given further study and a longer timetable.

The key conclusion drawn by the International Energy Agency from its analysis of renewables support schemes around the world is that incentives need to be technology specific, reflecting the degree of maturity of each technology². We therefore believe that support must be tailored to

¹ UK Climate Change Committee Analysis 2010: <http://www.theccc.org.uk/carbon-budgets/scenarios-to-meet-budgets>

² IEA 2008. Deploying Renewables, Principles for Effective Policies. Klein et al (2008) Evaluation of different feed-in tariff design options. Fraunhofer Institute Paper: http://www.sunwindandwater.org/FITs_Best_Practices_Paper_2nd_edition_final.pdf

individual technologies and the stage of development that they have reached. Our comments are structured to reflect this, starting with the least developed technologies, still at the R&D stage. As clean technologies mature they should, however, be allowed to compete on a level playing field with a single price of carbon. For this reason we also support, in principle, the introduction of a minimum carbon price, initially at a low level. However, careful attention to the details of a carbon pricing mechanism is essential³.

Research and Development

The least mature technologies require government support for R&D. Obvious examples include wave and tidal power, alternative CCS technologies, and new generations of solar PV. Although arguably beyond the scope of this consultation, the government's programme for bringing forward low carbon power technologies should include enhanced R&D spending in key areas, wherever possible in partnership with industry.

Carbon Capture and Storage

Carbon Capture and Storage (CCS) is critical for global climate change mitigation because it is the only option for low carbon coal combustion. Coal is by far the cheapest and most accessible source of energy for many developing economies. China and India are currently emitting around 7 Gt p.a. from coal combustion (nearly twice the total energy related emissions of OECD Europe) and this figure is set to approximately double, even assuming that China and India meet their Copenhagen energy intensity commitments⁴.

CCS is at a transitional stage. While much of the component technology is proven, CCS has not yet been demonstrated as an integrated system on a full scale power plant. Until substantial experience has been gained with full scale demonstration projects uncertainties will remain as to the costs, performance, and acceptability of CCS, and its suitability for large scale commercial use. The UK has relevant engineering capabilities, suitable storage geology beneath the North Sea, and offshore expertise. One of the most important contributions that the UK can make to global mitigation, and to placing UK industry in a leading position on climate change technologies, is to press ahead with the UK's CCS programme. We welcome the commitment that the Government has made to a programme of four full-scale CCS demonstration plants. We agree with the recommendation of the Committee on Climate Change that one of these should be for a gas fired plant because, as the Consultation Document points out, gas power is likely to play an important role for many years in the UK, as in other parts of the world.

The UK's first CCS project, at Longannet, is at an advanced stage of preparation, and grant finance has been promised. Because of the big uncertainties of construction cost and performance, CCS is not yet suitable for market based incentives such as Feed-in Tariffs. There are now uncertainties over the implementation of the CCS Levy powers in the Energy Act 2010, and the UK's CCS Roadmap has been postponed until the Autumn. We strongly urge that the Government should come forward with assurance of finance for the remaining three projects, at least partly in the form of grant

³ These issues are discussed further in response to the HM Treasury consultation on Carbon Price Support: UKERC 2011. Response to the 2011 HM Treasury Carbon Floor Price Consultation. www.ukerc.ac.uk/support/tiki-download_file.php?fileId=1453

⁴ IEA 2010. World Energy Outlook 2010.

funding or equivalent. Possible delays to the UK's CCS programme represent one of the most serious risks to the government's plans.

As and when CCS emerges from the demonstration stage then some form of premium payment such as a feed in tariff is likely to be appropriate. We would note that unlike nuclear and most renewables CCS input prices (coal or gas) *will* tend to correlate with wholesale electricity prices. For this reason a *premium FiT* is better suited to CCS than it is to nuclear or wind power. Ultimately, it may be possible to incentivise CCS through carbon pricing alone, along with other mature low carbon technologies. However, we are many years away from such a prospect.

Restricting Unabated Coal

Question 12. 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?

We agree that all new coal power stations should be required to include CCS. Provided that, as the Consultation Document proposes, the requirement is only applied to new plant, and is not such as to require all new gas stations to include CCS, we do not believe there is a significant risk to security of supply. However, if it is possible to place the necessary restrictions on new unabated coal through planning regulations we think that that may be a simpler means of achieving the desired result.

Nuclear Power

Question 4. Do you agree with the Government's preferred policy of introducing a contract for differences based feed-in-tariff?

Question 5. What do you see as the advantages and disadvantages of transferring different risks from the generator or the supplier to the Government? In particular, what are the implications of removing the (long-term) electricity price risks from generators under the CfD model?

Question 31. Do you have views on the role that auctions or tenders can play in setting the price for a feed-in tariff, compared to administratively determined support levels?

Question 33. Do you have views on how market distortion and any other unintended consequences of a FITcan be minimised?

Nuclear power has the potential to deliver low carbon electricity on a large scale and hence could play a key role in meeting carbon mitigation targets. The technology is at a much more advanced stage than CCS. There is extensive commercial experience of nuclear power and the reactor models most likely to be employed in a new UK programme (EPR and Westinghouse 1000) are evolutionary advances on previous designs and are already under construction in other parts of the world. Nevertheless there will be significant cost and performance risks in the UK's first round of GEN III + reactors and they will need the incentive of technology specific support.

Investment in new nuclear power can be more exposed to wholesale price uncertainty than investment in fossil fuel plants⁵. We broadly accept the proposition set out in the consultation

⁵ Gross R., Blyth W, Hepenstall P; Risks revenues and investment in electricity generation; Why policy needs to look beyond cost, Energy Economics, 2010, Vol 32, Pages 796-804.

document that some form of fixed term, stable, power purchase price is likely to provide investors in new nuclear and many renewable options with a lower risk environment. This ought to both improve the prospects of investment coming forward and reduce the cost of capital somewhat for such investment. By way of caution, we would also note that the technological and regulatory uncertainties are such that significant project risks will remain, even after the price of electricity has been guaranteed.

For nuclear power, the notion of a long run price or feed in tariff (FIT) combined with a contract for differences has merit. The incentive needs to be technology specific, and set at the minimum level needed for the first construction round. We do not think that providing this protection from market risk for an initial programme of, say, four nuclear plants need undermine competition in the market as a whole. However, the aim should be that further reactor rounds, whose risks will be better understood, should be given reduced and more market oriented incentives. Given the limited number of credible players and the difficulty, with nuclear power, of achieving a fully arms length relationship with government, we do not believe that an auction would be appropriate mechanism for determining the level of price support. For this reason it is important that the government develops the institutional capacity and intellectual capital required to administer prices effectively, and avoid 'capture' by market participants⁶.

Renewables

Question 35. Do you agree with the principles underpinning the transition of the Renewables Obligation into the new arrangements? Are there other strategies which you think could be used to avoid delays to planned investments?

Targeted support is already in place for renewables, including onshore and offshore wind, and this needs to continue. The IEA's analysis⁷ shows that feed-in tariffs have generally been a more cost effective means of stimulating renewables than renewable obligations of the kind currently employed by the UK. We broadly agree, therefore, with the proposals in the Consultation Document for transitioning existing wind energy to premium FITs with appropriate grandfathering to protect the value of incentives for already committed investments. We are concerned that the government's favoured proposition for a CfD/FIT for *all* renewables post 2017 attempts to impose a 'one size fits all' solution on a very diverse set of technologies. It may introduce unnecessary complexities, discourage some investors (particularly small investors) and discourage new entry. For some renewables a simple FIT offers a more straightforward solution⁸.

Industry commentators already argue that the EMR process has created delays. The main danger associated with the creation of a new policy framework for renewables from 2017 is that investors will perceive an option value attached to waiting until the benefits of the new arrangements become clear. It is therefore important to signal at the earliest possible stage that the new arrangements will

⁶ The various aspects of the government's proposals for the FIT/CfD are explored in more depth in the ICEPT / UKERC submission on the Electricity Market Reform consultation.

⁷ IEA 2008. Deploying Renewables, Principles for Effective Policies.

⁸ Couture et al (2010) A Policymaker's Guide to Feed-in Tariff Design. NREL Report.

<http://www.nrel.gov/docs/fy10osti/44849.pdf>. The ICEPT / UKERC submission also furthers a number of these issues.

not be more generous than the RO. Since the new arrangements are intended to be less risky than the RO it is reasonable that they should also be less remunerative.

Question 26. Do you agree with the Government's preferred package of options ?

Question 28. Will the proposed package of options have wider impacts on the electricity system that have not been identified in this document, for example on electricity networks?

Question 29. How do you see the different elements of the package interacting? Are these interactions different for other packages?

In summary, we would support the early introduction of the following measures. Financing four CCS demonstration projects through the CCS Levy, FIT with contracts for differences for an initial programme of nuclear power, gradual transitioning of renewables to FIT, a minimum price of carbon set at a low level, and an EPS or planning regime designed to prevent new unabated coal plant. We do not think these measures, combined, would have negative unforeseen impacts on electricity markets. We are more concerned that early introduction of capacity measures and/or changes in market operation might have such effects and, as stated above, we think these require more time for consideration.