Electricity Market Reform Consultation

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## Options for Decarbonisation

4. Do you agree with the Government's preferred policy of introducing a contract for difference based feed-in tariff (FIT with CfD)?

Broadly, yes.

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 risk from generators under the CfD model?

This is a policy that can reduce risks for consumers and generators, and should therefore be supported. At present, the price a consumer pays for low-carbon electricity fluctuates with the cost of gas, since this strongly affects the wholesale price for power. The low-carbon generator also receives a price which fluctuates with the cost of gas. This raises the risks for both parties. If the low-carbon generator receives an overall revenue that does not vary significantly with the price of gas, and this revenue comes from electricity consumers, then both parties see a reduction in the variability of their payments and receipts.

I am therefore slightly surprised that it has been cast as transferring risk to the Government – presumably the Government would be passing that risk on to taxpayers (present or future) or (more appropriately) to electricity consumers, in which case the policy has the risk-reduction effect I am describing.

6. 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?

We would normally want low-carbon generators with very low marginal costs to run whenever they are available, unless this displaces plants with even lower marginal costs. This would be relevant if we had large volumes of nuclear and wind generation, and high wind at a time of low demand. We would need to constrain off some of the wind generators in order to avoid taking some nuclear generators below their minimum generation levels. There could also be a similar problem if conventional power stations had to shut down for a short period over night – this is often uneconomic, and Australian power stations, for example, frequently bid negative prices into the National Electricity Market in order to signal the high opportunity cost of reducing load below minimum stable generation levels. A CfD-type FIT can ensure that generators' day-to-day decisions are based on short-term prices which reflect the marginal costs of the other generators on the system, *as long as the volume of electricity covered by the CfD does not depend on the low-carbon generator's own output.*

At present, if it is necessary to constrain off a wind generator, it will bid a price equal to *minus* the value of a ROC to buy back its power. In other words, the generator needs to be paid an amount equal to the output-related subsidy that it is giving up by reducing output. If this happens often, it will affect the pattern of wholesale prices and the revenues for other types of plant. The situation would be even worse with a conventional feed-in tariff, in which the amount of money that the generator is giving up is greater and independent of the market price – it would thus need to be paid much more in order to buy back its power. A CfD which is not related directly to the generator's own output gives it an income stream which is independent of its own operating decisions, thus ensuring that those decisions should be based solely on short-term market prices, which ought to give an efficient outcome. If the amount of income gained through the CfD is related to the generator's output (even if averaged over the year) then the generator will be aware that reducing output will reduce its CfD payments and will be reluctant to buy back its output except at negative prices which do not reflect its true costs.

11. Should the FIT be paid on availability or output?

I would argue strongly that the FIT be paid on availability, where this is defined to take account of the hour-to-hour condition of the renewable resource (i.e. wind, sun or water) as well as the physical state of the plant. As argued above, operating decisions will be most efficient if low carbon generators base these on short-term market prices. (This assumes that those prices will contain a sufficient carbon cost to internalise the global warming benefits of low-carbon power.) If generators receive an output-based subsidy, then they will take this into account in their operating decisions, alongside the market price. The main justification for supporting low-carbon generation, over and above any support through carbon pricing, is for technological learning-by-doing, and this mostly comes from building capacity rather than operating it. This means that a subsidy on operations risks leading to less efficient decisions. It is likely that increasing numbers of low-carbon generators will need to be constrained off from time to time, due to transmission constraints or simply surpluses of generation with very low marginal costs, and so the support mechanism should not be output-based.

## *Emissions Performance Standards*

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?

My first impression of the EPS proposal was that it ran the risk of tending to increase carbon emissions over coming decades. The government already has the power to decide not to grant section 36 consent to a station, and could consult on a broad policy that it would no longer grant consent to stations with emissions expected to be greater than a particular level. My understanding of the present policy is that stations will only be given consent if they have CCS on a part of their capacity, and the rest of their capacity is carbon capture ready. There have also been proposals that once CCS is proven to work, generators should be required to retrofit the technology.

My reading of the proposals in the consultation document was that the government would give up the ability to require generators to retrofit CCS technology to any power station. We might hope that rising carbon prices would persuade the generators to do this in any case, but given that we will need a practically zero-carbon electricity sector by 2030, the reserve power of compulsion would seem appropriate.

## Options for Market Efficiency and Security of Supply

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

I have argued in a number of published papers that a capacity market should be introduced to ensure that rarely-needed stations are remunerated.


Green, R.J. (2005) "Electricity and Markets" *Oxford Review of Economic Policy*, vol. 21, no.1, pp. 67-87

Green, R.J. (2008) "Electricity Wholesale Markets: Designs Now and in a Low-carbon Future," *Energy Journal*, vol. 29, Special Issue, pp. 95-124

Green, R.J. (2010) "Are the British Electricity Trading and Transmission Arrangements Future-proof?" *Utilities Policy*, vol. 18, no. 4, pp 186-194


21. What do you think the impacts of introducing a targeted capacity mechanism will be on prices in the wholesale electricity market?

I fear that it will reduce peak prices, and hence that plant that is not frequently used, but is needed more often than that covered by the targeted mechanism, will find itself earning insufficient revenue from the market. This will make it less likely that this plant will remain in operation (or be built speculatively), potentially requiring more and more capacity to be covered by the targeted mechanism...

22. Do you agree with Government's preference for a the design of a capacity mechanism:

a central body holding the responsibility;
volume based, not price based; and
a targeted mechanism, rather than market-wide.

Yes, yes and no (see above)

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

Yes, if transmission constraints are likely to prove significant and some capacity becomes less useful than the rest. Including the ability to have locational pricing in the scheme's design, even if it turns out that there are few binding constraints and prices are in fact uniform, will be a better option than designing a non-locational scheme and then having

to reform it in the face of opposition from generators unwilling to lose revenues.

## Analysis of Packages

26. Do you agree with the Government's preferred package of options (carbon price support, feed-in tariff (CfD or premium), emission performance standard, peak capacity tender)? Why?

I don't know whether the carbon price support is being introduced because we expect that prices in the EU Emissions Trading Scheme will be at the right level on average, but volatile (in which case a hedge could be useful) or because we expect that they will be below the level needed to make the UK's proposed low-carbon investments economic. If the latter, this implies that the EU's targets are more lenient than the UK's targets, in that they can be achieved without these investments. If the UK does invest, then emissions elsewhere in the EU can be higher, and the overall impact on carbon emissions will be negligible. It would be better to negotiate an EU emissions target that was compatible with the UK's target.

## Implementation Issues

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?

Can auctions or tenders deliver competitive market prices that appropriately reflect the risks and uncertainties of new or emerging technologies?

Should auctions, tenders or the administrative approach to setting levels be technology neutral or technology specific?

They should consider the specific characteristics and risks of each technology. In particular, the first few nuclear projects will be subject to significant uncertainties over their construction costs. A fixed-price contract would have to be at a very high cost of capital, or containing a significant margin of error, or both. I would hope that a contract involving a sliding scale mechanism would allow the construction risk to be shared between the consumer and the nuclear developer / constructor, thus reducing the cost of capital and contingencies. At the same time, the developer could be exposed to enough of any over-run to give a strong incentive to keep costs down. Ofgem's recent price controls have used a sliding scale linked to the companies' expected and out-turn investment costs, designed in such a way that companies make more money, the lower their investment costs are, and the more accurate their initial forecast of those costs is. A similar mechanism might be appropriate for the nuclear CfDs.

How should the different costs of each technology be reflected? Should there be a single contract for difference on the electricity price for all low-carbon and a series of technology different premiums on top?

Are there other models government should consider?

Should prices be set for individual projects or for technologies

There should be enough differentiation between projects to reduce the amount of rents gained by low-cost projects. This need not require a unique contract for every

project, but for groups of projects with similar characteristics. The German feed-in tariff provides a lower payment per kWh generated for wind farms in areas with high wind speeds than in those with medium wind speeds. This is entirely rational, as long as there is a need to develop projects in medium-wind areas to hit the targets. Paying stations in a high-wind area the price per unit needed to make the medium-wind stations economically attractive would give those stations more revenue than they need. Similarly, we could develop different CfDs (or CfDs with different prices) for stations in areas with more or less wind. Differentiated CfDs would also allow the government to offset any impact of reforms to transmission pricing that might be brought in by Ofgem. One argument being used against cost-reflective transmission pricing is that it would disadvantage renewable generators where the resource is a long way from demand centres. This is something that should be offset by more generous support for those generators, rather than by giving all generators in those areas, including high-carbon power stations, an implicit subsidy.

Do you think there is sufficient competition amongst potential developers / sites to run effective auctions?

This depends on the technology, and is probably not the case for nuclear.