



UKERC

UK Energy Research Centre

Response to the 2011 DECC Electricity Market Reform

10 March 2011

Authors

Professor [REDACTED] and [REDACTED] (UKERC HQ, Imperial College), [REDACTED]
(Imperial College), Professor [REDACTED] and [REDACTED] (University of Exeter), Dr
[REDACTED] (University of Oxford), Professor [REDACTED] (UCL)

Submitted on behalf of UKERC by [REDACTED]
[REDACTED]

E mail to: [REDACTED]@ukerc.ac.uk
www.ukerc.ac.uk

THE UK ENERGY RESEARCH CENTRE

The UK Energy Research Centre carries out world-class research into sustainable future energy systems.

It is the hub of UK energy research and the gateway between the UK and the international energy research communities. Our interdisciplinary, whole systems research informs UK policy development and research strategy.

www.ukerc.ac.uk

Executive Summary

- UKERC endorses the principles underlying the proposed package of reforms and supports the broad direction and aspirations of the EMR. However we believe that the package is unnecessarily complex and that some important issues, such as governance arrangements and price transparency in wholesale markets have received insufficient attention, or are absent.
- A system of feed-in tariffs differentiated by and tailored to specific technologies, coupled with a capacity mechanism, would be sufficient to deliver the twin goals of promoting investment in low carbon generation and ensuring security of supply.
- The feed-in tariff (FiT) is the key element of the EMR package. However, a “one size fits all” approach to FiT design is not appropriate. Low carbon technologies are diverse in terms of technological maturity, cost structure and risk profiles and different technologies may merit different approaches.
- We regret that fixed FiTs have been excluded as they are the lowest risk option and they have a proven track record globally in encouraging investment in renewables. Contracts for differences (CfDs) may be appropriate for nuclear, while biomass generation and CCS could be supported by premium FiTs.
- The Emission Performance Standard (EPS) appears to be the most dispensable part of the EMR packages since other measures, such as carbon price support, will effectively inhibit investment in new unabated coal in the UK.
- A capacity mechanism will be needed to give assurance that sufficient capacity will be installed to guarantee security of supply though it may be some time before the mechanism is needed.
- We would recommend approaching auctions for FiTs with caution as, for many technologies, the pre-conditions for a successful auction are not in place. These include the need for established technologies, a vibrant, diversified and competitive market, and a well developed supply chain. Administered prices or “beauty contest” type tenders could be used initially with a move to auctioning at a later date.
- The key risk associated with the proposed package is that its complexity and uncertainty surrounding its implementation could lead to an investment hiatus threatening the attainment of both low carbon generation and security of supply goals.

Consultation response

The UK Energy Research Centre welcomes this opportunity to provide input to the DECC Electricity Market Reform Consultation. We have focused only on those questions where we believe we may have something to offer. The observations have benefited from discussions at two separate meetings, the first comprising independent experts and the second comprising industry and other stakeholders. The first meeting was convened jointly by UKERC and the Imperial College Centre for Energy Policy and Technology and the second by these two organisations plus the University of Exeter Energy Policy Group and the Sussex Energy Group.

Current Market Arrangements

1. 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?

UKERC wholly endorses the premise underlying the proposed package of reforms, namely that the current form of "energy-only" market arrangements will not support investment in capital intensive low carbon generation on the scale and at the pace required to meet the UK's climate change and renewable energy objectives. In 2007, UKERC highlighted the problems associated with investment in high capital cost, low or zero marginal cost technologies in a market dominated by fossil fuel burning generation, where fuel price and electricity price are closely linked¹. There is evidence to suggest that market designs which reduce the wholesale price risks faced by investors² in such plants may reduce the cost of capital, hence help to deliver energy policy goals more cost effectively³.

For these reasons UKERC supports the broad direction and aspirations of the proposed reforms. We have substantive comments about many of the details however. We also believe that some important issues, particularly governance, received insufficient attention in the consultation document. Some key requirements, such as the changes

¹ Gross R, Blyth W, Heptonstall P, *Investment in electricity generation: the role of costs, incentives and risks*, UKERC Report, Imperial College, London, 2007, ISBN:1 903144051

² Policies to create long run fixed price contracts (such as Feed in Tariffs) reassign some risks to consumers. Risks are reallocated rather than removed.

² Policies to create long run fixed price contracts (such as Feed in Tariffs) reassign some risks to consumers. Risks are reallocated rather than removed.

³ Gross R, Blyth W, Heptonstall P, *Risks, revenues and investment in electricity generation: Why policy needs to look beyond costs*, Energy Economics, 2010, Vol:32, Pages:796-804([doi](#))

needed to create a truly transparent, liquid wholesale market and provisions to ensure off-take, are currently absent from the proposals.

We view the proposed "feed-in tariff" as being the centrepiece of the reform package which will play the largest part in promoting low carbon generation. However, we have views about both feed-in tariff design and the links/overlaps with other elements of the reform package.

UKERC facilitated a debate among both independent experts and industry stakeholders during the consultation period and it is evident that views are divided even among those who have no direct commercial stake in the outcome⁴. This response draws on that debate and identifies where UKERC has been able to reach a robust collective view – which may not be shared by all of those who engaged in the process. The key high level messages are:

- a) The reform package is unnecessarily complex. That complexity may in itself constitute a barrier to entry. We understand that the Coalition Agreement contained undertakings on specific elements of the reform package. However, we would urge that a flexible approach be taken to the undertakings in order to deliver the overarching objectives of EMR.
- b) The lack of attention to governance arrangements in the consultation is a source of concern. There was widespread agreement at UKERC's second EMR workshop that governance could usefully have been the starting point for the reforms with instrument design following, rather than preceding, institutional considerations. The general view was the body best served to act as counter-party to the feed-in tariffs would be a public body at arm's-length from government. There was less agreement as to whether an existing body (such as Ofgem) could fulfil the role or whether conflicting objectives (market design v market regulation) would make it better to establish a new body.
- c) A "one size fits all" approach to feed-in tariff design would not be appropriate. Low carbon technologies – onshore wind, offshore wind, other renewables, nuclear, CCS – vary widely in terms of their technological maturity, cost structure and risk profiles.
- d) The reform package does not extend to the design of the wholesale market itself. The bilateral principles of BETTA will be left unchanged. This creates problems, notably a lack of transparency in wholesale power prices and questionable opportunities for new entrants. Many of the independent experts at UKERC's workshops argued that a return to some form of 'pool' would offer considerable benefits and complement the measures proposed in the consultation.

⁴ We have attached the report from the first workshop to this submission. The report from the second workshop is currently in draft form and will be sent to DECC when it is finalised.

- e) An opportunity has been missed to give greater consideration to demand side participation in electricity markets. This could go beyond demand side response stimulated through the capacity mechanism, and encompass real demand reductions through the feed-in tariff component of the package. This would encourage some of the lowest cost carbon abatement measures available and would make it easier to comply with the Renewable Energy Directive by lowering the level of final energy demand against which the percentage targets are measured.
- f) Greater attention could have been given to the EU dimension and interaction with EU policies, notably the Emissions Trading Scheme. Going beyond the scope of the existing consultation, it is essential that the UK has a clear strategy for advancing its interests in Europe and a clear vision of the role that EMR can play in advancing that strategy.
- g) We are sceptical that the EMR package will prove to be a genuinely “enduring” reform as further pressures and contingencies, including those affecting the basic design of wholesale and retail markets, will continue to be felt.

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

There are two risks to security of supply. The one identified in the consultation document, with which we agree, is the risk that insufficient conventional capacity will be retained or built to complement variable, or 'intermittent', renewable generation when it plays a bigger role in the generation mix. There is evidence to suggest that volatile prices and a suppressed average wholesale price, hence significant impact on investment in conventional generation, will result⁵. This underpins the discussion related to the need for a capacity mechanism of some kind. This risk lies some years ahead.

A second, and more immediate risk, is that insufficient CCGT capacity will come on line to compensate for nuclear and coal plant when they retire around 2015. The evidence for a short term 'energy gap' is mixed and pre-EMR a reasonable case could be made that whilst capacity margins will become rather less generous than they have been historically, adequate levels of new capacity will be available, albeit all of it gas⁶. The impact of the economic downturn is also mixed, since it has reduced peak demand growth but has also been cited as a reason to delay power station investment⁷.

⁵ Steggals, Gross, Heptonstall, 2011, *Winds of change: How high wind penetrations will affect investment incentives in the GB electricity sector* Energy Policy 39 (2011) 1389–1396

⁶ Gross R, Heptonstall P, Collins C, Is there an 'Energy Gap?', Proceedings of ICE, Energy, 2008, Vol:161, Pages:145-157, ISSN:1751-4231

⁷ E.on 2009 – Dr Paul Golby statement on the Kingsnorth decision
<http://www.youtube.com/watch?v=kYkWH8aOuS8>

Our primary concern is that the complexity and residual uncertainty about the EMR package means that the reform process itself risks engendering delays in investment. Hence in the short term EMR could exacerbate the short term security risk rather than mitigate it. The main energy companies argue that this is already the case⁸. As yet we do not believe this effect has manifested in a form that can be quantified independently. However *prima facie* there is cause for concern, which underlines the importance of providing clear indications of purpose, dealing with key elements of the package expeditiously, whilst not (for reasons described below) making changes that are premature.

Options for Decarbonisation

Carbon Price Support

This is the subject of a separate HM Treasury / HMRC consultation. Readers of this consultation with specific comments on the carbon price support mechanism should cover these in a separate submission to the HM Treasury / HMRC consultation, which can be found at http://www.hm-treasury.gov.uk/consult_index.htm

For information, we provide a summary of the UKERC response to the consultation response below.

UKERC is broadly supportive of the principle that carbon should be priced. However, for reasons set out in our response we do not believe that carbon price support is sufficient in itself to incentivise investment in low carbon generation. Neither, in itself, is it an economically efficient mechanism to encourage such investment. For these reasons we believe that the proposals to provide long run fixed prices (FITs/CfDs) should be viewed as the primary instruments for delivering low carbon investment, at least in the immediate future.

Our submission to the HMT consultation⁹ also highlights important concerns relating to the potential for duplication/overlap between the carbon price support and the FITs, hence perhaps unnecessary complexity. We also draw attention to various windfall gains for operators of existing low carbon plant, paid for by consumers.

⁸ ECC 2011 2 Feb Evidence session of the Energy and Climate Change Select Committee review of the government's Energy Market Reform proposals

<http://www.publications.parliament.uk/pa/cm201011/cmselect/cmenergy/c742-iii/c74201.htm>.

⁹ UKERC response to HMT Carbon Floor Price consultation, February 2011,

http://www.ukerc.ac.uk/support/tiki-download_file.php?fileId=1453

In the workshops UKERC convened on the EMR a dividing line opened up between experts. Some experts are supporters of carbon pricing as the primary instrument, largely on grounds of economic theory and aversion to technology specific interventions. Others support fixed prices, largely on grounds of technology readiness and the needs of investors. The positions of electricity market participants appear to map very closely to their portfolios. Those with existing low carbon plant favour the carbon price support, those without and/or with considerable coal assets, do not.

Feed-in Tariffs

3. Do you agree with the Government's assessment of the pros and cons of each of the models of feed-in tariff (FIT)?

We welcome the fact that the Government has recognised the advantages that long run, fixed price contracts offer in terms of attracting investment. The advantages of such schemes over certificate trading schemes such as the Renewables Obligation (RO) have been manifest for many years¹⁰ and a wide range of analysts have made the case for fixed price support schemes, notably fixed FITs¹¹.

The literature on this subject emphasises the importance of *simplicity* as well as longevity and contractual security. We are concerned that the government's discussion of each model pays insufficient attention to simplicity of operation. Given the diversity of low carbon technologies in terms of technological maturity, cost structure and risk profiles, we believe that a "horses for courses" approach to FiT design would be preferable.

Fixed FITs

We believe that a strong case can be made for retaining a simple FiT for a wide range of renewable energy projects, and a variety of scales, tailored to technological maturity and various technical factors (such as distance from shore in marine installations).

¹⁰ Mitchell, C., Bauknecht, D., Connor, P.M. (2006). Effectiveness through risk reduction: a comparison of the renewable obligation in England and Wales and the feed-in system in Germany. *Energy Policy*, 34(3), 297-305.

¹¹ CEC 2008, *The support of electricity from renewable energy sources -Accompanying document to the Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources*, Commission of the European Communities, Brussels, SEC(2008) 57. Deutsche Bank, 2009, *Paying for Renewable Energy, TLC at the right price*. DB Climate Change Investment Research, available online at www.dbcca.com/research
Hamilton, K. 2006, *Investment: Risk, Return and the Role of Policy (UKERC Working Paper)*, UKERC, London.
IEA 2008, *Deploying Renewables - Principles for Effective Policies*, International Energy Agency, Paris

Contracts for Differences (CfD)

We understand the Government's desire to balance the investment certainty offered by fixed prices against the objective of incentivising efficient dispatch which the proposed CfD model promises. However we believe that the government pays excessive attention to dispatch issues, which compromises the goal of providing a simple, low risk policy environment that will attract a wide range of investors and be accessible to new entrants. CfD based on the annual average wholesale price leaves variable renewable generators still exposed to market risk, notably compared to nuclear.

Efficient dispatch is likely to be more important (and indeed feasible) for some options, notably new nuclear and perhaps some large renewable installations, than for smaller wind farms. Moreover, the entities likely to be considering large and complex investments are more likely to be comfortable with the relative complexity of the CFD compared to the smaller investors the government also wishes to attract.

Exposure to short run wholesale prices is by no means the only method by which efficient dispatch can be delivered. In the case of wind farms there may be a strong case for an element of centralised dispatch by the System Operator (SO), as practiced in Spain. Indeed, 'dispatch' in this instance is something of a misnomer – since we cannot control the winds the only problem that can be addressed is over-production by large wind fleets when demand is low. Therefore the sole requirement is some provision for curtailment, which combines the *capability* for the SO to curtail when needed (and only when essential) and some *compensation* payment to generators, that is cost reflective. Proper discussion of these possibilities should be provided and we hope that this will be a feature of future developments related to FiTs and arrangements for grid operation.

Premium FiTs

Premium FiTs would be simple to administer and could be made to work, particularly for the larger scale development of well proven technologies (onshore wind). However, we do agree with the government's overall assessment. Premium FiTs would leave investors exposed to wholesale market risk and they do not offer long term price security or enhanced opportunities for new entrants.

The possible exceptions to the 'fixed price' rule are biomass and CCS. Because it is storable and dispatchable and because it has a *fuel cost*, biomass fired plant is better suited to a role in a traditional wholesale market than nuclear, wind or other renewables. Premium FiTs could be offered to conventional biomass combustion and co-firing. There may be a case for providing a fixed price for more innovative advanced biomass technologies with high capital costs and greater technology risk. The relative merits of each instrument in terms of supporting a dedicated UK growing industry need to be explored. We are not aware of any analysis of this aspect.

At the current time the costs, network externalities associated with pipeline development and uncertainties surrounding CCS suggest that there is a strong case for capital subsidy. If the potential global application of CCS is to be explored it is important that the demonstration plants go ahead. Post demonstration stage, a premium FIT might be the best way to incentivise future CCS plants.

In the long run it is conceivable that both CCS and biomass (particularly co-firing) could be supported entirely through carbon price support, depending on the level of support and degree of certainty investors ascribe to the carbon price support.

Demand side

We believe that the consultation has missed an opportunity by not considering the potential to extend the use of FITs to the demand side. This would require consideration of the role of the retail market, through which the majority of electricity users interact with the wholesale market, as well as the Green Deal and the proposed Energy Company Obligation (ECO) in both of which suppliers have a direct role.

There is broad agreement that improved energy efficiency offers the potential for substantially reducing the costs of delivering a low carbon power system. Energy efficiency technologies can be considered perfect examples of the high capital, low fuel cost (in this case, negative fuel cost) investments that the proposed wholesale market reform is seeking to encourage.

Much of this investment on the demand side may, in principle, be done outside the context of energy markets. However, even within the Green Deal, investment by third parties still requires direct energy supplier engagement to collect customer payments. Moreover, there is considerable experience of using energy market actors to deliver energy efficiency improvements, both in the UK and overseas. The existing UK Carbon Emission Reduction Commitment (CERT) approach has been used as a model by a number of other European countries and already reduces electricity peak demand significantly¹². However, it is essentially a tradable certificate approach based upon energy supplier obligations, and therefore shares the problems of lack of price transparency and market liquidity with its analogues in renewable energy support mechanisms.

The logic of the consultation document analysis – that a price based mechanism is more efficient for low carbon generation investment – may well therefore extend to energy efficiency support. At this stage the detailed analysis to confirm such a conclusion has

¹² Eyre, N., Pavan, M. and Bodineau, L. (2009) Energy Company Obligations to Save Energy in Italy, the UK and France: What have we learnt? *Proceedings of the European Council for an Energy Efficient Economy*.

not been done. There would clearly need to be significant differences between a generation FIT and an energy efficiency FIT, for example in the use of deemed as opposed to measured outcomes. However, the Government is committed to a long term Energy Company Obligation of unspecified design to replace CERT, and therefore we believe such an analysis should be undertaken as part of the process for designing ECO.

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

For the reasons set out above in Q3 we do not. We would much prefer to see a differentiated system that gives greater priority to simplicity and retains a role for fixed FITs.

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?

For some categories of low carbon generation there is a clear case for socialising the wholesale price risks associated with electricity markets dominated by fossil fuel generators¹³. The reasons are that high capital cost, low marginal cost forms of generation, such as nuclear power or wind energy have no control over wholesale prices, cannot respond to price signals dictated by movements in fossil fuel prices and hence are exposed to a risk that debt cannot be serviced during periods (which may extend to several years and cannot be predicted in advance) of low fossil fuel and wholesale power prices. An important corollary of this is that during periods of high fossil fuel prices some forms of non-fossil power may benefit from power prices considerably higher than are needed. In such circumstances, it can be argued that consumers are paying higher prices than are necessary. This is particularly likely where a premium for low carbon generation is paid on top of wholesale price, irrespective of the level of the wholesale price. This is the case under the RO and would be the case with a premium FIT.

The principal downside of fixed prices and socialising risks is that the Government or government appointed intermediary needs to fix the price and may get the price 'wrong'. If prices are set too high, consumers will pay more than they need to. Evidence from around the world suggests that the risk of over-rewarding generation should not be overstated, and that fixed price schemes generally pay *less* per MWh than schemes that seek to obviate the need to administer a price and retain exposure to wholesale price risks¹⁴.

¹³ Gross R, Blyth W, Heptonstall P, *Investment in electricity generation: the role of costs, incentives and risks*, London, Imperial College, 2007, ISBN:1 903144051

¹⁴ IEA 2008, *Deploying Renewables - Principles for Effective Policies*, International Energy Agency, Paris

We believe that minimising this risk requires the development of sufficient institutional capacities and expertise to take an informed judgement about technology readiness, costs and price levels. There may also be some role for price discovery through auctions, as we discuss below in Q31.

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?

N/A

7. Do you agree with the Government's assessment of the impact of the different models of FITs on the cost of capital for low-carbon generators?

We have not undertaken any analysis of the possible impact of removing price risks on the cost of capital, nor are we aware of other solid empirical evidence. There is no clear precedent that we are aware of that permits the effective comparison of the CfD option to the fixed FIT. Investor risk assessments are hugely context specific and will differ between countries and instruments. We therefore regard the assumptions made in the Consultation Document as speculative. Since analysis of investment costs is highly sensitive to discount rate assumptions, it is important to interpret the modelling results with caution.

We agree that, *in principle*, the lowest risk option is a fixed FIT, followed by a CfD. We agree that in most cases a premium FIT offers less de-risking than a fixed FIT or CfD. However, how investors view the relative merits of fixed FIT vs. CfD in practice is an empirical issue and will depend in part on what type of investor, in which technology and what stage in the project cycle we are concerned about.

We also agree that de-risking price is likely to have a relatively modest effect in comparison to various technology risks at the project development stage and especially for technologies with greater technical or regulatory uncertainty.

A longer term issue with profound impact on both costs to consumers and the availability of capital in the sector will be how investors view the various arrangements when successful projects are re-financed. Institutional investors are likely to favour both the CfD and fixed FITs. At the refinancing stage significant technology risk (associated with construction and initial operation) will have been removed or reduced. Revenue risks associated with market price will dominate; hence long run fixed prices will provide investors with greater security¹⁵.

¹⁵ Hamilton, K. 2006, *Investment: Risk, Return and the Role of Policy (UKERC Working Paper)*, UKERC, London

In principle the creation of FiT schemes is likely to facilitate the entry of more risk-averse investors, lower the cost of capital, release equity for re-investment and hence enhance the UK's progress towards a secure, low carbon system. In practice, key deployment details such as grid access and the counter-party to any FiT/CfD will make a huge impact on whether this potential can be realised.

8. What impact do you think the different models of FITs will have on the availability of finance for low-carbon electricity generation investments from both new investors and existing the investor base?

The preceding points in Q7 about re-financing are also relevant to this question. Complex and high risk projects such as nuclear power stations and offshore wind farms are likely to attract more risk-averse investors at the refinancing stage. Less risky projects (particularly onshore wind) could be attractive to a range of investors from project development onwards.

However, the consultation does not discuss the differential needs of different investors. There is a need to be clear about whether (and which) policies seek to target:

- Smaller investors (such as local communities/individuals)
- Institutional investors directly (pension funds)
- Existing utilities through providing greater access to cheaper finance (effect on share value, cost of capital)

Policies targeting the first would favour a simple FiT, the second a simple FiT and/or a regulated asset base approach, while the latter may be comfortable with both a premium FiT and/or a CfD depending on their existing portfolio and corporate strategy. Some utilities argue that their ability to manage wholesale price risk represents competitive advantage¹⁶.

In comparing fixed and CfD FiTs we would note that the former are well proven around the world, whereas the latter are used in only a limited number of cases. We would expect fixed FiTs to be generally more familiar and more attractive to more investors.

We believe, as supported by the evidence in Table 5 of the Consultation Document, that fixed FiTs are the lowest risk option and that the consultation is wrong to discount them.

¹⁶ Oral evidence from SSE presented to the ECC 2011 2 Feb Evidence session of the Energy and Climate Change Select Committee review of the government's Energy Market Reform proposals <http://www.publications.parliament.uk/pa/cm201011/cmselect/cmenergy/c742-iii/c74201.htm>

9. What impact do you think the different models of FITs will have on different types of generators (e.g. vertically integrated utilities, existing independent gas, wind or biomass generators and new entrant generators)? How would the different models impact on contract negotiations/relationships with electricity suppliers?

N/A

10. How important do you think greater liquidity in the wholesale market is to the effective operation of the FIT with CfD model? What reference price or index should be used?

Greater wholesale price *transparency* as well as liquidity is important to all three options. In the absence of a clear reference price, the level of support needed is difficult to discern. For a variety of reasons, prices under the balancing mechanism may not be fully representative of wholesale prices, whilst bilateral contracts within vertically integrated utilities can never provide the same level of transparency that would exist under an independent spot market (or 'pool')¹⁷.

Greater transparency over average price is essential to making a CfD function effectively. Where wholesale prices are opaque and in effect an abstraction from commercial bilateral contracts there is considerable potential for market participants to manipulate perceived prices in order to try to 'game' the CfD system to their benefit. We believe that the market reform cannot be carried through successfully in the absence of a far more fundamental review of the wholesale market. A strong case can be made that some form of market 'pool' would be advantageous to the government's objectives. It is possible that its absence will undermine key aspirations and militate against the workings of key provisions of the EMR package.

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

The FIT should be paid on output rather than availability as the latter could be subject to gaming. The capacity mechanism can be used to reward availability. Intermittent generation could also be compensated for availability during periods of curtailment by via the System Operator as discussed in the response to Question 3.

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?

¹⁷ Baker, P., Mitchell, C., & Woodman, B. 2009, *The Extent to Which Economic Regulation Enables the Transition to a Sustainable Electricity System*, UK Energy Research Centre, London, 2009: REF UKERC/WP/ESM/2009/013

We regard the Emissions Performance Standard (EPS) as the least substantive part of the EMR package. It was described in one of our workshops as “harmless ornamentation” reflecting a general view that other elements of the EMR package would effectively inhibit investment in new unabated coal in the UK and the measure could be seen as “belts and braces”. However, there was a minority view that it could actually be counter-productive by incentivising companies to keep old unabated coal running for longer than they otherwise would have done.

The reasoning behind the “harmless ornamentation” perspective is as follows:

- a) Since CO₂ is a ubiquitous, long-lived pollutant, low carbon generation is best incentivised by market signals rather than by restrictive plant-specific regulatory measures.
- b) To make an EPS effective it would need to be extended and made more elaborate. For example, restrictions on coal will encourage investment in gas which is not covered. Elaboration could therefore involve: extending the EPS to gas at a clearly signalled later date; applying the EPS at the time of major retrofits; and/or limiting the remaining operating hours of unabated plant.
- c) However, for each of these options it is possible to envisage gaming and unintended consequences. Setting a planned date for CCS on gas at some point well into the future could encourage an investment rush to beat the deadline; setting an earlier date could discourage new investment thereby causing risks to security of supply; setting a size threshold could encourage the undersizing of new plant. All of these types of behaviour have been associated with past environmental regulation.

Our general conclusion is that the EPS will be fairly ineffective but that no EPS at all would be preferable to an elaborate “gamable” EPS.

13. 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?

N/A

14. 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?

N/A

15. Do you agree that the EPS should be extended to cover existing plant in the event they undergo significant life extensions or upgrades? How could the Government implement such an approach in practice?

N/A

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

N/A

17. How should biomass be treated for the purposes of meeting the EPS? What additional considerations should the Government take into account?

A more realistic approach to the life cycle GHG emissions associated with biomass is needed. They are certainly not zero. This should be reflected in any treatment of biomass.

18. Do you agree the principle of exceptions to the EPS in the event of long-term or short-term energy shortfalls?

N/A

Options for Market Efficiency and Security of Supply

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

We agree that a capacity mechanism will be needed to give assurance that sufficient capacity will be installed to guarantee security of supply. The alternative, to continue to rely on increasingly volatile prices in the wholesale market, would increase the cost of capital and potentially inhibit adequate levels of investment. As the consultation document notes, capacity mechanisms have been adopted in a range of jurisdictions round the world, including in the Irish Single Electricity Market, on pragmatic grounds.

We note however that the problems of price volatility and security of supply will not emerge for some time until intermittent generation plays a much larger role on the electricity system. It will be the late 2010s at the earliest before capacity payments are needed. Given the timetable for EMR it would be prudent to start preparing for the introduction of a capacity mechanism to provide assurance that investment in new fossil plant, which will be expected to operate and provide capacity support in an era of intermittent generation, will be appropriately rewarded.

We do not believe that there is a theoretically correct way of designing a capacity mechanism and that a pragmatic approach, drawing on existing experience is required. As UKERC has not systematically reviewed international experience, and since there is a plurality of views within the Centre, we are not in a position to address the more detailed design questions posed below. However, we would emphasise that simplicity

and transparency should be the guiding principles. Specifically, we would recommend avoiding elaborate designs that seek to squeeze out only modest gains in terms of cost.

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

Yes, see response to question 19

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

N/A

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.

N/A

23. What do you think the impact of introducing a capacity mechanism would be on incentives to invest in demand-side response, storage, interconnection and energy efficiency? Will the preferred package of options allow these technologies to play more of a role?

We do not believe that a capacity payment will have any significant impact on energy efficiency. Of course, there is substantial potential for a demand side response to any capacity payment and we endorse the analysis in the consultation paper. However, this will primarily take the form of load switching and should not be confused with changes in efficiency. Most energy efficiency is not dispatchable and therefore incentivising energy efficiency is logically undertaken in energy not capacity markets, for example as set out in our response to Question 3.

24. Which of the two models of targeted capacity mechanism would you prefer to see implemented:

- Last-resort dispatch; or
- Economic dispatch.

N/A

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

N/A

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?

We believe that a system of feed-in tariffs differentiated by and tailored to specific technologies, coupled with a capacity mechanism, would be sufficient to deliver the twin goals of promoting investment in low carbon generation and ensuring security of supply. All of the incentives for low carbon generation can be captured through the feed-in tariffs.

The main contribution of carbon price support to the EMR agenda will be: a) to "fine-tune" the balance between coal and gas in power generation, much as the EU ETS currently does; and b) to discourage new investment in unabated coal. It is for the latter reason that we regard the EPS as potentially redundant, as noted in our answer to question 12.

There are also negative consequences associated with carbon price support. While raising revenue, it will obviously increase electricity prices and bring windfall gains to operators of existing low carbon generation. It will also exert downward pressure on the EU ETS price thereby reducing abatement incentives in other parts of Europe. We can see the value of carbon price support in regulating fossil fuel generation but are lukewarm in view of the other negative consequences.

27. What are your views on the alternative package that Government has described?

Referring to the four packages covered in Chapter 5 of the consultation document, we do not believe that Option 1 (carbon price support, EPS, targeted capacity mechanism) will secure the basic goals of the reform. Some form of feed-in tariff is central to securing investment in low carbon generation and that support needs to be tailored to different technologies as argued in the response to Questions 1 and 3. The technology-neutral package, which we might aspire to in a couple of decades in the future when low carbon technologies have matured, will not deliver the UK's goals in the more near term.

As we believe that a "one size fits all" to feed-in tariffs is not appropriate, we believe that a blend of Options 2-4 could be considered. For example, nuclear could be supported by CfD. A premium feed-in tariff might best suit coal with CCS or biomass. A vast range of international experience has shown that a fixed feed-in tariff is extremely effective in encouraging investment in renewables as discussed in the response to Questions 3 and 8.

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?

N/A

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

N/A

Implementation Issues

30. What do you think are the main implementation risks for the Government's preferred package? Are these risks different for the other packages being considered?

The key risk is that the complexity of the proposed package and uncertainty surrounding its implementation leads to an investment hiatus which threatens the attainment of low carbon generation and security of supply goals.

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?**
- **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?**
- **Do you think there is sufficient competition amongst potential developers / sites to run effective auctions?**
- **Could an auction contribute to preventing the feed-in tariff policy from incentivising an unsustainable level of deployment of any one particular technology? Are there other ways to mitigate against this risk?**

A variety of means can be used to determine FiT prices and we re-iterate that a single system will not suit all technologies. Neither is it necessary for a single approach to be used for all time. Different approaches can be developed as cost information is revealed, technologies mature, and supply chains improve. Moreover, institutional learning opportunities should be sought out, such that the Government (or arms-length agency) develops its own expertise on costs and prices.

The Consultation refers loosely to auctions and tenders. *Tenders* need not be associated with *auctions*. Evaluating 'bids' on a non-auction basis (sometimes referred to as a 'beauty contest') where the quality of the bid as well as the price is considered, is well established in the energy area and other regulated sectors. This approach was used by the Crown Estate when evaluating Round 3 offshore wind applications. When considering the full range of options to promote low carbon technologies this approach needs to be considered carefully.

In the first UKERC EMR workshop, participants with industrial experience were particularly unhappy about the prospects for successful auctions, preferring an administered price approach. The administered price approach is well proven internationally, and has been demonstrated to result in lower premiums per MWh than more market based systems¹⁸.

Administered pricing has the potential to be used as a means of price discovery, for example by making financial reporting a condition of contract. It can also be used to *drive down prices* by setting ambitious forward targets through aggressive degeneration of support levels over time.

Auctions: Advantages and Disadvantages

Auctions can be useful when tendering for projects based on well known technologies, in a vibrant, diversified and competitive market with a well developed supply chain. Auctions can be an appropriate and cost effective means to deliver capacity or system services.

Auctions are poorly suited to setting revenue support levels for relatively risky emerging technologies that have yet to be proven on the scale envisaged (like CCS, offshore wind, wave, tidal and some biomass technologies). In many cases, core technology costs are based upon estimates and models rather than experience. In addition, where supply chains are largely absent, costs of key components/construction tasks cannot be known accurately. Cost escalations have become a prevalent feature of the offshore wind market in Britain, in part because of early optimism, part because of supply chain issues¹⁹.

Auctions may also be inappropriate for technologies that have not been developed in the UK context for many years and which are associated with particularly rigorous regulatory requirements during construction (viz. nuclear). Under such conditions market participants seldom have sufficiently good cost information available ex-ante to

¹⁸ IEA 2008, *Deploying Renewables - Principles for Effective Policies*, International Energy Agency, Paris

¹⁹ Greenacre, Gross and Heptonstall, *Great Expectations, the cost of offshore wind in UK Waters*, UKERC Report, 2010

be able to provide well judged bids. A further problem for nuclear is that with only two vendors of nuclear technology being considered for UK new build it is not clear that the potential value of an auction in terms of price discovery would be realised.

Experience with Auctions

The problems associated with governments auctioning various opportunities or rights are well documented. The phenomenon known as 'winner's curse' can occur when market participants bid for a licence/opportunity in the absence of adequate information. Analysts note that the existence of winner's curse cannot be readily determined *a priori*. It is an empirical phenomenon rather than something that can be demonstrated from theoretical principle²⁰. The energy sector already has experience of poor *ex-ante* cost data, cost escalations and disappointing auctions. Other means of price determination are better proven. Most countries using feed in tariffs administer the price, using degression to drive down prices.

Classic winner's curse occurs when companies overpay for a licence/asset, for example in the 3G licence auctions in the telecommunications sector. Conversely, in low carbon capacity auctions participants may make unrealistically low bids in order to win contracts. There is evidence that this happened in the UK under the former NFFO, leading to low completion rates²¹. Lessons drawn from the NFFO experience should be applied in implementing EMR.

It is important to note that whilst the NFFO failed in part because there were no penalties for non-delivery, imposing such penalties would not of itself remove any of the underlying problems associated with insufficient information about cost, nascent supply chains and uncertainty about technology performance.

Barriers to Entry

Auctions can create barriers to entry, favouring large companies over smaller players. This is because they are risky to participate in and bidding requires considerable upfront investment. Experience with NFFO again suggests that it was unfavourable to smaller players, benefitted incumbents and did not help support a UK supply chain²². A side effect was that the UK has never developed a 'supporting public' for renewable energy analogous to the local investors in wind power common in Germany and Denmark²³.

²⁰ Mackley, J. R. K. 2008, "European 3G auctions: Using a comparative event study to search for a winner's curse", *Utilities Policy, European Regulatory Perspectives*, vol. 16, no. 4, pp. 278-283

²¹ Mitchell, C. & Connor, P. 2004, *Renewable energy policy in the UK 1990-2003*, Energy Policy, vol. 32, no. 17, pp. 1935-1947

²² Ibid

²³ Gross and Heptonstall, *Time to stop experimenting with UK renewable energy policy*, ICEPT Working Paper October 2010, Ref: ICEPT/WP/2010/003

Given that a key objective of the EMR is to encourage new entrants and de-risk investment, the scope for auctions to play a significant role may be limited for some time. A mixture of administered prices and "beauty contest" style tendering processes may play a far bigger role in the short to medium term with a move to auctions at a later date.

32. Do you have view on how market distortion and any other unintended consequences of a FIT or a targeted capacity mechanism can be minimised?

N/A

33. Do you agree with the Government's assessment of the risks of delays to planned investments while the preferred package is implemented?

N/A

34. 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?

This text addresses questions 34 – 37. Because of the time taken to get planning and grid connection in place, 2017 is already a short term prospect for many renewable developers. The EMR process creates uncertainty about the future. The key objectives for government in avoiding delay therefore have to be to prevent projects that are currently well advanced from being delayed and to prevent the 'pipeline' from becoming focused only on post 2017 conditions. It is imperative that the government convincingly persuades investors of its commitment to grandfathering and allays fears that projects developed prior to 2017 might be subject to retrospective changes in support.

The principal perceived risks for investors are:

- That future remuneration levels will be more generous than they are now
- That retrospective changes will result in unintended consequences post 2017 for investment made between now and 2017

Both possibilities create an option value associated with waiting. The first possibility needs to be dealt with in two ways.

1. The government should make clear that developers *should in no way expect the new arrangements to be more generous than the old*. Indeed because a well designed FIT reduces risks, the expectation should be that remuneration levels will fall.

2. The government should accept that support levels prior to 2017 are likely to need to be higher than they might otherwise have needed to be in the absence of change. For example, ROC multiples for offshore wind may need to stay closer to 2 ROCs for longer than might have been the case before the EMR was announced.

Unintended consequences should be guarded against carefully. Simplicity in future arrangements assists investors in taking a view on future developments.

- 35. We propose that accreditation under the RO would remain open until 31 March 2017. The Government's ambition to introduce the new feed-in tariff for low carbon in 2013/14 (subject to Parliamentary time). Which of these options do you favour:**
- All new renewable electricity capacity accrediting before 1 April 2017 accredits under the RO;
 - All new renewable electricity capacity accrediting after the introduction of the low-carbon support mechanism but before 1 April 2017 should have a choice between accrediting under the RO or the new mechanism

See answer to Q 34.

- 36. Some technologies are not currently grandfathered under the RO. If the Government chooses not to grandfather some or all of these technologies, should we:**
- Carry out scheduled banding reviews (either separately or as part of the tariff setting for the new scheme)? How frequently should these be carried out?
 - Carry out an "early review" if evidence is provided of significant change in costs or other criteria as in legislation?
 - Should we move them out of the "vintaged" RO and into the new scheme, removing the potential need for scheduled banding reviews under the RO?

See answer to Q 34.

- 37. Which option for calculating the Obligation post 2017 do you favour?**
- Continue using both target and headroom
 - Use Calculation B (Headroom) only from 2017
 - Fix the price of a ROC for existing and new generation

See answer to Q 34.

