Imperial College London
Centre for Energy Policy and Technology

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Electricity Market Reform: Independent Experts Workshop

Meeting Report

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Convened jointly by the UK Energy Research Centre and the Imperial College London Centre for Energy Policy and Technology

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Note about the Meeting

Twenty seven leading independent experts from academia, the consultancy sector, NGOs and think tanks attended the meeting. The participants are listed in section 6. This report is an account of the discussion; comments are non-attributed. Participants were consulted on a first draft of the report. However, responsibility for the final version rests with the UK Energy Research Centre and the Imperial College London Centre for Energy Policy and Technology. Opinions expressed in the report do not necessarily represent UKERC's views.

A variety of viewpoints was represented and no attempt has been made to establish a consensus. This report attempts to draw out the range of opinions and highlight the reasons underlying points of disagreement. This report has fed into a subsequent meeting with stakeholders on 16 February 2011 and the DECC academic panel meeting on 17 February 2011. Arrangements for the meeting were facilitated by the UKERC Meeting Place.

Summary of Key Points

1. The meeting considered both the general shape of the Electricity Market Reform (EMR) package and the four specific elements proposed in the Department for Energy and Climate Change (DECC) and HM Treasury (HMT) consultations. This summary covers first the generic aspects and then, more briefly, the four specific elements.
2. *Direction of Travel.* There was widespread agreement at the meeting that the broad principles underlying the proposed reform — the provision of greater long-term market certainty for capital intensive low carbon generation sources — was correct. As such, the direction of travel suggested by the proposed EMR package was not disputed.
3. *Complexity.* However, there was a widespread view that the proposed EMR package is complex, that it is perhaps more complex than it needs to be to achieve its goals, and that the complexity would in itself constitute a barrier to new entry and the drawing in of new capital. Some specific conclusions derive from the complexity observation.
4. A number of participants expressed the view that the goal of establishing a supportive environment for nuclear energy though mechanisms that de-risked investment while avoiding overt subsidy contributed to the complexity of the package. A more direct approach could be simpler.
5. There was also a view that the coalition agreement binds the government to the measures outlined in the consultation. Relaxing the constraints could lead to a simpler reform package.

6. There was wide support for the proposition that the four-part package contained one element too many. However, there was no consensus about which specific element was surplus to requirements.
7. The role of the *Emissions Performance Standard (EPS)* was most widely questioned. The general view was that the remaining elements of the package would by themselves discourage unabated new build of coal-fired plant. The EPS could thus be seen as a "belt and braces" measure.
8. *Capacity Payments*. The role of capacity payments, *at this point in time*, was questioned by several participants. They were seen to be solving a problem that would emerge ten years down the line when intermittent renewables could play a much bigger role on the system. It was noted that extending the duties of the system operator could provide many of the benefits of capacity payments in a simpler and more cost effective manner. This relates to the *durability* of the proposed reform (see below).
9. *Carbon Price Floor (CPF).* The usefulness of the CPF was the subject of some debate. The main objection was that Feed-in Tariffs (FiTs) provide sufficient incentive by themselves for low carbon generation rendering the CPF largely redundant in terms of new investment, while providing windfall gains to existing low carbon generators. Another concern was the tax mechanism lacked the long-term credibility needed to convince investors. The countervailing view was that the price floor would help regulate the gas/coal balance outside the low carbon sector, and would help ensure that the FiT/Contract for Difference (CFD) offered to nuclear and renewables was "in the money". One participant suggested that it might be possible to give the CPF greater contractual certainty.
10. *Feed-in Tariffs.* For most participants, the FiT is seen as the key element of the reform. There was almost universal agreement that FiTs needed to be technology differentiated to take account of technological maturity and, perhaps, even more specific factors such as distance-to-shore for offshore wind farms. A pragmatic technology-by-technology approach was considered necessary by most. One participant took the view that the relative roles of FiTs and the CPF needed to be rethought, opposing FiTs except for early stage options and suggesting the CPF could be the main mechanism to incentivise nearer market technologies.
11. Several participants regretted the absence of "pure" FiTs from the proposals, noting that they offer the greatest security and simplicity. Premium FiTs were the least favoured option since, although simple, they do not offer price security. The discussion focused on the detailed design of any FiT using a CFD. It was noted that the CFD approach is inherently more complex than a simple FiT, which may create a barrier to entry.
12. The role of auctions was a subject of considerable debate. Several participants argued that the FiTs would need to be progressed, at last initially, through administered prices. It was widely felt that auctioning would not work for technologies such as nuclear or

offshore wind where there are few credible vendors. Auctions would also not work for less mature technologies including wet renewables. Auctioning might work for more mature technologies with a diverse range of suppliers, such as onshore wind. One view was that those technologies best suited to auctioning were also those where there was greater cost transparency and hence administered prices were workable.

13. *Durability.* History suggests that regulatory regimes continue to evolve and there was scepticism that the reforms would result in a regime that did not need further development. As noted in paragraph 8, there was a view that a Capacity Mechanism might be premature. Some participants felt that the implications for current wholesale markets had not been thought through, and indeed that reform of these markets was needed. Options such as a power pool could be back in the frame.
14. *Governance.* There was a widespread view that the lack of attention to governance and institutional issues was a major gap in the consultation. It was noted that the proposals could shift key decisions from market players to government agencies. A particular concern was that a counter-party needed to be identified for the CFD or other variants on the FiT. Several options were identified, but the one that attracted most support was for a public agency at arms-length from government.
15. *Transition.* Although there is an intention to grandfather existing rights and obligations via renewables obligation certificates (ROCs) etc, there was a considerable concern that the transition from one regime to another could create damaging investor uncertainty. This could particularly affect Offshore Wind Round 3 and, given the timeframe, progress towards meeting the requirements of the EU Renewable Energy Directive. Attention to transition issues was considered vital.
16. *The Demand Side.* There was a high level of agreement that the EMR represented a unique opportunity for load-shifting demand side measures and energy efficiency to participate in electricity markets. The proposed reforms were widely seen to be missing this opportunity, although a higher carbon price could incentivise demand-side response. Demand side measures could play a significant role via the Capacity Mechanism or indeed through suitably designed FiTs.
17. *Emissions Performance Standard.* Most participants agreed with the view expressed in the consultation document that the EPS was the element most detached from the overall package. Much of the impact of an EPS – discouragement of new unabated coal – would be achieved via FiTs and/or the CPF.
18. For an EPS to have more than a symbolic impact it would need to cover gas and existing plant. It was noted however that there was understandable nervousness that a binding EPS could discourage investment in gas plant needed to guarantee reliable supply in the mid-2010s. One participant expressed the view that the current proposal could have a perverse effect by encouraging the retention of existing coal plant on the system.
19. The two options proposed for an EPS in the consultation did not attract any comment.

Workshop Report

1. General EMR Comments

a. Why do we need an EMR?

The extent of the transformation to a low-carbon, secure and affordable UK energy system is such that investors are not prepared to provide the capital required given the risks involved. Government is therefore required to intervene to de-risk investment by transferring some of this risk to the customer base. In the Electricity Market Reform (EMR) consultation, it is clear that the government's preferred route to reducing investment risk is to sign long-term contracts, whilst sending long-term signals about the price of carbon and precluding unabated coal power (as well as sending signals about unabated gas plant).The DECC EMR consultation and HMT consultation on the Carbon Price Floor (CPF) outline a series of measures aimed at de-risking investments and sending clear, long-term market signals.

The measures outlined in the consultation derive from the coalition agreement and, as such, are partly political in nature. As discussed below, there was some discussion of the extent to which the diversity of objectives/drivers implied by the agreement might risk overcomplicating the proposals. There was some debate about the relative importance of these political commitments. Clearly, some in the industry have signalled that they cannot invest/raise capital without change.

Some of the experts in our meeting concluded that, whilst not explicit in the DECC consultation document, one goal of the EMR is to drive up wholesale electricity prices in order to ensure investment in nuclear happens without an overt subsidy. Nuclear, because of the high capital investment costs, falling gas price and a low EU Emissions Trading Scheme (ETS) CO_2 price, is not currently an attractive long-term investment. It was suggested that both a CPF, the Feed-in Tariff (FiT) based on Contracts for Difference (CFD) would be more beneficial to nuclear than other low-carbon technologies.

It was noted that the EMR cannot address construction risk, because it affects price risks and earnings only. A key element of the proposed Green Investment Bank (GIB) was to provide mechanisms to help de-risk investment in construction, with the investment subsequently being re-financed off the back of the EMR. However, it is unclear whether the funds available to the GIB, and its mode of operation, will be appropriate for the scale of investment required. One participant noted that the main role of the EMR would indeed be in reducing the cost of capital at the refinancing stage and that this could have a major role both in reducing burdens on consumers and in releasing capital for further investment.

b. Demand side

There was consensus in the workshop that demand side measures were poorly represented ("scandalous" in the words of one participant) in the EMR, considering the government's objectives of low carbon, security and affordability. Demand side management could potentially play a long-term role in energy security and decarbonisation strategies. This is not reflected in the EMR. It was suggested that demand side response in the EMR is pigeon-holed for balancing only. Participants felt that it is assumed that higher electricity prices will lead to energy demand reduction and that demand side measures and have therefore already been taken into account. One participant stressed the role of carbon prices in stimulating demand response. However, demand side measures remain a significant source of uncertainty relating to future demand and the shape of future demand profiles.

For example, between now and 2030 it is expected there will be a shift towards electricity for both transport (e.g. electric vehicles (EVs)) and heating (e.g. heat pump technology). In parallel, it is predicted that the UK will implement some form of smart grid, facilitating enhanced demand side response to price signals. However, whilst it will be possible to shift demand from EV charging and other domestic and industrial uses at peak times, electricity for heating and lighting remains inflexible.

It was noted that an instrument, such as a FiT, could be designed to accommodate energy efficiency. In fact it was noted that the soon to be scaled back Carbon Emissions Reduction Target (CERT) scheme had characteristics of a FiT.

c. Single buyer option

The single buyer model remained attractive to a minority of participants. Reasons cited included simplicity and transparency. It was also suggested that the logic of the EMR seemed to point towards a single buyer model. One participant suggested that perhaps the arrangements sought to provide the characteristics of a single buyer without explicitly labelling them as such. However, it was also pointed out that HMT and the EU third package of energy measures appear to rule out a single buyer model.

d. Institutional arrangements

It is unclear from the EMR what the nature of the institutional arrangements will be. Who will be the counterparty for the CFD? In discussion, three counterparties were discussed: a) the government, through a department such as DECC; b) an arm's length body, such as Ofgem; or c) a market player.

Whilst no consensus was reached, there a degree of agreement that an arm's length government body would be the most appropriate vehicle to administer the CFD. It was suggested that Ofgem could be an appropriate body to act in this capacity.

e. Is the EMR long-term?

There was consensus between workshop participants that the EMR, as it stands, does not represent an end to the reform process. Participants suggested that a more transparent and liquid wholesale market, akin to the various "pools" in operation in other countries, is still required. This would necessitate further changes in the future.

In discussion, participants explored whether the measures in the EMR are long term reforms, or whether they are more focused on the next 10-15 years. It was noted that there have been no less than three market reforms since 1990, which indicates that a long term policy has so far eluded policy makers.

It was suggested some of that the EMR measures (notably the carbon floor and FiTs for high cost options) will lead to an increased wholesale price for electricity, which will result in a pushback from customers if the increase is substantial.

On the subject of prices, some participants found it difficult to reconcile the costs of the EMR measures and the statement in the EMR consultation that wholesale prices will begin to decline in 15 years time.

Several participants suggested that government should recognise that circumstances will change in the future and that regulation must change in response. One participant believed that, while some reforms could be put in place in the short-term, one eye should be kept on 2020. Another asked whether the EMR could be rolled out in an incremental way.

f. Complexity and transparency

The level of complexity and uncertainty of the EMR could be a barrier to making it work and a barrier for new entrants. As an example, it was noted that a recent report from Deutsche Bank [1] suggested that "*investors want TLC—"transparency, longevity, and certainty"- in government energy policies. Countries that offer that will attract capital. Countries that don't will struggle*." The UK was cited as a country which fails the TLC test.

As an example, the EMR consultation dispenses with the simple FiT and instead rules in favour of the CFD FiT, which is the most complex option. We return to this in section 3.

There was concern over whether the complex nature over the proposals would lead to overlap and redundancy. For example, how will ROCs and CFD work together in the interim period? The EMR proposes that the renewables obligation (RO) will remain as a mechanism for renewable projects, accrediting up to 2017. It is unclear whether renewable projects in the transition period from 2013-2014 to 2017 will have a choice in their support mechanism, or whether they will be limited to the RO. This could lead to uncertainty and

[1] Deutsch Bank, Global Climate Change Policy Tracker: An Investor's Assessment report - http://www.dbcca.com/dbcca/EN/investment-research/investment_research_1780.jsp

delays from companies seeking to exploit offshore sites. Participants suggested that the emphasis should therefore be on avoiding hiatus by making the system appear like "business as usual" in the short-term.

g. Are there too many elements in the package?

The general feeling was that there were too many mechanisms in the EMR package and that at least one could be lost.

Of the measures, there was the least enthusiasm for capacity payments (at least in the short term) and the EPS (because other measures would preclude the building of unabated coal plant). These are explained in more detail in sections 4 and 5 below.

h. Other issues

Without reaching firm conclusions, several other issues were raised during the workshop:

- The coalition government's localism agenda appears to be at odds with EMR policy in as much as it will make it even more difficult to get planning permission for onshore wind.
- The government is currently "looking through the toolbox" and is not making firm decisions.
- The government is looking for new entrants, but it is unclear what type of investors would be considered appropriate. For example would the government be happy with Chinese companies investing; would they be happy with the Chinese government investing?
- The EMR does not encompass fundamental reform to wholesale market arrangements (BETTA). This means that bilateral contracts will continue to be central to wholesale markets. An important implication of this is that the reference price against which any FiT or CFD may be set could remain opaque.
- The EMR is separated from the review of transmission access. However, FiTs are proven to work where they are associated with guaranteed off-take and priority access; in the absence of this there is a tangible risk to realising the volume required.

2. Carbon Price Support

The argument for a CPF is that the EU ETS price is too low, too volatile, and lacks credibility in the longer run. A mechanism is therefore required to bring the carbon price up to a sensible level. Since the wholesale electricity price is set by coal or gas plus carbon costs, the effect will be to drive up the wholesale price.

The proposal is that the carbon price floor will be introduced via a modification to the Climate Change Levy, in essence an additional tax on fuels (coal and gas) for electricity generation only. This could represent a double taxation of a fuel given that downstream electricity will also be taxed. It is also unclear whether Carbon Capture and Storage (CCS) would pay the tax.

Some participants argued that the CPF would to some extent de-risk investment in low-carbon technologies, particularly nuclear and onshore wind. Others noted however, that further de-risking, provided by some form of FiT or CFD will also be required for some, if not all technologies. Several participants questioned the need for the CPF at all, given that the proposals for a FiT of some form will provide all the security investors in nuclear or renewables are likely to need.

One participant suggested that the long-term credibility of the carbon price floor could be addressed through some kind of contracting mechanism, perhaps akin to the CfD, but around the carbon price not the electricity price.

Greater physical integration with the EU market via interconnection is seen as beneficial in the future, but physical integration would also require harmonisation of the rules on CPF. Physical integration coupled with a standalone UK carbon price could simply make un-priced carbon flow through the interconnector.

The CPF is designed to prop up the EU ETS and stimulate investment in low-carbon technologies in the UK. There is a risk that if EU member states fail to adopt a similar approach then the UK would reduce emissions at its own expense, while making the EU target easier (and cheaper!) to achieve for other member states. One participant noted that the FiTs, or indeed any other unilaterally adopted policy, had consequences for the EU ETS.

There is uncertainty over the future price of gas; the availability of cheap shale gas will affect the impact of the CPF.

There was some division of opinion over whether a CPF was needed if there is a FiT. Participants focused in particular on the proposition that the FiT will take the form of a CFD. One argument suggested that a well designed CFD would make the CPF redundant. The countervailing view was that the price floor would help regulate the gas/coal balance outside the low carbon sector, and would help ensure that the FiT/CFD offered to nuclear and renewables was “in the money”.

Some participants were concerned that the CPF would result in a windfall profit for existing renewables and nuclear.

3. Feed-in Tariffs

The proposals for a FiT, and in particular the prominence given in the proposals to the use of a CFD, generated considerable discussion during the workshop. The key points arising are recorded below.

A few participants noted that the level of ambition and choice of instrument are linked. If the government is serious about a low-carbon transition on an aggressive timetable through

the achievement of firm short term targets, then more prescriptive intervention is justified; if not then a more market based approach may be pursued. One participant noted that the CfD/FiT proposal would have the general effect of replacing market decision-making by the decisions of a central agency.

Several participants questioned the apparent desire for a single mechanism for all technologies ("one size fits all"). It was suggested that a "pure" FiT might be the most appropriate mechanism for some renewables, whilst a CFD is best suited to nuclear or very large renewable projects. There was some support for a medium-to-long term volume target for key technologies where there is potential for cost reduction, for example CCS. There some concern that a CFD would increase the level of risk for investment in gas due to a lack of certainty of price going forward. This may drive the need for a capacity payment in order to de-risk this investment. However, it was also suggested that the peak capacity margin may be less important in the future as smart grid and demand side response are implemented.

There was considerable debate over the detailed design of any FiT, in particular over how the level of support should be set and whether a CFD, administered price or premium FiT ought to be pursued.

Some participants felt that a simple or "pure" FiT would match the ambition of the government's targets, offer greatest simplicity and had the best track record internationally. Hence, some participants regretted the absence of "pure" FiTs in the proposals. Others noted less favourable international experience in setting the price for a FiT. There is a potential to get the price badly wrong. Spain was cited as an example.

The "premium FiT" option put forward in the consultation did not receive support from any of the participants. Most participants had reservations related to the effectiveness of the mechanism in terms of de-risking investment: It was noted that whilst simple to execute, a premium FiT does not offer security of price, since investors will continue to be exposed to wholesale power price uncertainty. One participant was happy that generators should be exposed to wholesale price volatility, but opposed premium FiTs as proposed in the consultation because it would be technology specific across the whole low carbon market.

The use of auctions to set FiT prices elicited considerable debate, with considerable opposition to auctions expressed by several participants.

Auctions may be attractive to government because of the price discovery opportunities they offer. There was some divergence of view as to the appropriateness of auctions, but a general consensus emerged that auctions should be approached with some caution, that careful design is essential and that they may not be appropriate in every instance. Several participants expressed considerable opposition to auctions, primarily because of previous

experiences with the non-fossil fuel obligation (NFFO) scheme (where bids tended to be optimistically low and delivery was very poor), and "winners curse" in the 3G auction (where bids tended to be too high). Participants noted that DECC and the Committee on Climate Change are relatively bullish on auctions. The following points of caution were noted:

- Auctions can result in undeliverably low, or uneconomically high, bids.
- Auctions with very few players (e.g. an auction to build nuclear power stations) are unlikely to yield the benefits ascribed to auctions in theory.
- Auctions can provide some clarity on costs of technologies, but gaming by participants may distort the outcome, for example, by bumping out competitors.
- Auction processes tend to favour large players; this would act as a barrier to new entrants.

On the subject of technology differentiation, participants noted that the risk profile of technologies differs markedly and that different approaches to FiT are likely to be needed. Examples cited included CCS, offshore wind, community wind projects, bio-energy and energy efficiency. However, it was noted by a couple of participants, that in setting values for different technologies, we should accept that we might get the figures wrong and overpay. However, adjustments could be made quite quickly. Alternatively, the CFD price might be related (on a sliding scale) to the out-turn cost of a project, reducing the developer's risk. It was also pointed out that an administered approach could be combined with a clear timetable of cost regression, hence setting targets for future cost reduction.

The importance of avoiding "capture" in government/industry negotiation was stressed. It was noted that, whilst other countries had become comfortable with taking a view on technology specific costs, the UK had not retained the institutional capacity to do so. It was suggested that an explicit goal for government could be to develop such a capacity.

It was suggested that a one-way CFD could work for wind, by shoring up investment returns. This would be more attracted to investors than a two-way CFD.

One participant thought that the FiT was unnecessary, and would result in market decision-making being replaced by central planning decisions on the part of government. This view was based on the premise that the package should be technology-neutral and that a CPF plus a Capacity Mechanism would, by themselves, encourage low carbon generation. However, innovation support for early stage technologies would still be needed.

4. Capacity Payments

Many participants expressed reservations about a Capacity Mechanism. Participants suggested that a Capacity Mechanism is premature and that the market is ten years away from requiring this. The main objections to capacity payments relate to the potential for

them to encourage unnecessary investment, leading to surplus capacity – burdening consumers with plant that isn't needed. It was noted that capacity payments have the potential to create distortions and can have perverse impacts – for example in discouraging investment in "mid merit" combined cycle gas turbines (CCGT). It was pointed out that gas fired capacity in particular can be delivered relatively quickly should a need arise. Some participants noted that capacity mechanisms can be "gamed" as happened under the pool arrangements, though careful design ought to avoid this.

Others thought that the mechanism should be in place now, even if not required immediately. This would ensure that reserve capacity would be mothballed rather than decommissioned, with the result that it could be brought online quickly in the future without the need for a capital investment cycle. It was thought that modest sums would be required to maintain this capacity. There appears to be a risk that the EMR will support high capital expenditure plant such as nuclear, CCS, and wind, thus reducing incentives for flexible peaking plant.

Other markets, for example in parts of the US, have capacity payments; therefore, an international comparison should be carried out within the context of the EMR.

There is a degree of uncertainty in the assumptions behind the calculation for a capacity payment. For example value of lost load (VOLL) has a ten-fold difference between the CEGB figure (£1kWh), the value used in the power pool (£2kWh) and the Redpoint analysis (£10-30kWh). A participant noted that since there has not been any lost load since then, the current assumed VOLL might be too conservative.

A participant noted that an extension of the duties of the system operator to allow it to contract for strategic reserve services as well as short term system balancing could deliver many of the objectives that capacity mechanisms provide with fewer of the attendant problems, at lower cost and more simply.

There was some debate on whether a smart grid coupled with some energy storage could resolve peak capacity issues. A question was also raised whether inter-seasonal issues associated with electric heating in the 2030s would lead to problems with this approach.

5. Emissions Performance Standard (EPS)

Participants were lukewarm on the concept of EPS. It was recognised that the EPS would send a strong signal to fossil fuel generators and, unlike a CPF, would not entail a direct cost for consumers. There was fear that, if applied to gas plant, it could cause uncertainty/delays for new CCGT projects leading to a 2015-2016 supply crunch. It was mentioned some investors will completely discount a CPF and see EPS as the more acceptable path. Other participants were unsure whether investors would trust an EPS for a long-term signal.

For an EPS to have more than a symbolic impact it would need to cover gas and existing plant. It was noted however that there was understandable nervousness that a binding EPS could discourage investment in gas plant needed to guarantee reliable supply in the mid-2010s. One participant expressed the view that the current proposal could have a perverse effect by encouraging the retention of existing coal plant on the system.

6. List of participants

Janusz Bialek	Durham University
Will Blyth	Oxford Energy Associates
Derek Bunn	LBS
Ben Caldcott	Climate Change Capital
Rachel Cary	Green Alliance
Modassar Chaudry	Cardiff University
Gareth Davies	Poyry
Dan Eager	University of Edinburgh
Richard Green	Birmingham University
Rob Gross	Imperial College London, Centre for Energy Policy & Technology (ICEPT)
Nick Hartley	OXERA
Phil Heptonstall	Imperial College
Neil Hirst	Imperial College
Malcolm Keay	Oxford Institute for Energy Studies
Simon Less	Policy Exchange
John Loughhead	UKERC
Catherine Mitchell	Exeter University
David Newbery	Cambridge University
Ronan O'Regan	PWC
Duncan Sinclair	Redpoint
Jim Skea	UKERC
Simon Skillings	Trilemma
Steve Thomas	Greenwich University
Michael Thompson	CCC
Tim Tutton	Independent
Catherine Waddams	UEA
Jim Watson	SPRU, University of Sussex