Electricity Market Reform
DECC Consultation, December 2010
[redacted]

This document expresses the views of [redacted]

This response contains confidential information. We would be grateful if the Department of Energy & Climate Change (DECC) could ensure that the information remains confidential and not be disclosed to any third party [redacted]

[redacted]

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[redacted]

We believe we have an important role to play in the transition to low carbon generation by working with existing market participants and providing market-based solutions for potential new entrants.

[redacted] has long advocated taking measures to improve the UK wholesale electricity markets, [redacted] and we agree that there is a need to establish a market framework to secure the required investment in low carbon generation. However, we have serious concerns about the proposed suite of reforms and we will comment in more detail in the body of this document. Given the concerns we have, we felt it was more productive to make a general response that incorporates an executive summary of our views outlining the issues we see rather than addressing the specific questions asked.

[redacted]

Executive Summary

[redacted] **see serious issues with the proposals set out in the consultation and so offer some alternatives which we believe will address these concerns and provide effective low carbon incentives. Thus, we support the following package of reforms: Premium FiT, cashout mechanism reform (to a single cashout price) and self-supply restrictions in vertically integrated utilities.**

1. [redacted] does not support the introduction of a carbon price floor. We see a number of very negative unintended consequences that are damaging to the UK electricity market and see many reasons why a carbon price floor may not deliver the intended low carbon investment.
2. [redacted] believes that urgent attention should be given to the causes of low liquidity in the wholesale market and the lack of new entrants with scale in the retail market, as we believe that a vigorously competitive, deep and liquid wholesale market and a vigorously competitive retail market with low barriers to entry are fundamental building blocks in a framework that encourages the £200 billion of investment that the government seeks. Transition to a single price cashout mechanism and the implementation of self supply restrictions would address these fundamental drivers of low liquidity.
3. [redacted] supports the introduction of a mechanism to encourage low carbon investment, but does not support using the contract for difference (CfD) methodology. We consider that CfD instruments are the wrong instrument to encourage low carbon investment, as to achieve the stated aim they are likely to be complicated to design and manage, could damage wholesale market liquidity and have other unintended consequences. We would prefer low carbon investment to be driven by EU ETS carbon prices and a pan-European green certificate scheme. However, of the options proposed we believe the 'Premium FiT' is the best system. It can be designed to make low carbon investments economic and preserves natural competitive pressures of supply and demand in the spot and forward wholesale electricity markets. It is also far easier to align with the existing Renewables Obligation (RO). [redacted] believes that the Premium FiT could be self-funded via charges added to retail tariffs (much like the RO) that are redistributed to those generators under the scheme. We do not support schemes funded via the tax system.
4. [redacted] supports steps to improve security of supply but does not support capacity payments. We believe the case has not been made that capacity payments are required and we believe it is impossible to make any decision without detailed proposals to consider. We believe that a deep and liquid electricity forward market will provide the signals to invest in peaking plants and we refer to the comments we made in point 2 above. If a capacity system is to be put in place, despite our concerns, we have outlined a market-based capacity solution that would deliver security of supply competitively at the lowest cost to consumers.

General Answer

In order to secure investment in new low carbon technology, particularly given that generation projects have a long lead time from planning through to construction, testing and finally operation, it is crucial to secure a stable regulatory market framework that gives investors confidence over an extended time horizon. This enables investors to recoup sums invested and achieve a return. In addition to regulatory stability, generation margins (i.e. profit generated from selling electricity minus fuel and carbon costs) need to be high enough to achieve targeted returns and the electricity, coal, gas and carbon markets liquid enough to ensure that generation margins can be locked in through a hedging programme. If the return is not at least comparable with that achievable in other markets, or if market stability is not sufficient to provide confidence, investors will take the rational decision to place their capital elsewhere. However, in our opinion, investors will reach the same decision if market liquidity is failing.

When we assess market liquidity across all the markets involved in locking in a generation margin in the UK, it is the electricity market that raises the greatest concerns. Coal is an international market, and gas is increasingly becoming an international market. Carbon is a European market.. Furthermore, other markets suffer less from the existence of large companies that vertically integrate upstream activities with downstream retail activities. Thus, we contend that EMR should be focused upon creating the conditions for additional liquidity and vigorous competition rather than the reduction of both. In our view, the set of policies favoured in the DECC consultation have been designed to compensate for lack of liquidity, but are likely to significantly reduce liquidity further. Consequently, the UK power markets will become less attractive to investors, as they become unable to lock in the current electricity market forward price curve and safeguard future returns on investments. This would negatively impact on the UK's transition to a low carbon electricity market by slowing investment, reducing competition and not delivering the policy objectives at the lowest cost to electricity consumers. We believe it would be better to address the root causes of low liquidity. This issue is at the core of our concerns, but we have also set out below what we consider to be other extremely concerning unintended consequences of the policy proposal.

We will discuss each of the main four policy instruments in turn, although we note it has not always been possible to comment on each proposal in isolation as the instruments are very interrelated.

A: Carbon Price Floor

A UK-specific carbon price floor might be assumed to help achieve the desired investment in new low carbon generation, if the EU emissions trading scheme carbon price is considered insufficiently high. However, we see many potentially damaging unintended consequences and we are not confident that this proposal will achieve its intended aim. We have listed the main concerns and unintended consequences we have identified and we would strongly recommend not pursuing this policy idea. Should HM Treasury and DECC choose to implement a carbon price floor, we would advise that clear solutions are needed to each of the specific concerns we have raised below. If subsidies are desired for UK-specific projects, then direct the subsidy at the project rather than the entire market. Both are damaging but targeted subsidies have fewer unintended consequences.

A1. Lack of certainty

Plant owners must be able to calculate with certainty the future carbon support level, so they can adjust their commercial decisions accordingly. As a result, if HM Treasury was to, for example, determine the carbon floor annually, this could severely impede the implementation of a hedging programme further than one year forward. This is because, if fossil plant owners sell their power forward and purchase their carbon and fuel forward, they will still not know whether they have achieved an economic hedge until the floor price is set for that particular period. This uncertainty will rationally lead to a lack of forward selling beyond the period for which the floor has been set and could potentially lead to electricity market liquidity disappearing beyond one year forward. Damaging the wholesale market which is responsible for creating price signals is highly detrimental to the prospects of achieving the government target of £200 billion of new investment.

[redacted] The regulatory risk of the carbon price floor cannot be hedged, so we would have to factor in an adequate 'risk premium' to protect against the potential losses associated with such a risk. Counterparties are already looking to transact products that explicitly remove this unhedgeable risk from their generation portfolio. However, the size of the financial risk (and thus the required risk premium) attached to the uncertainty is sufficient to make the economics of a transaction unworkable for both buyer and seller. This means that at present we consider it to be impossible to enter into such transactions. If a carbon floor is set, the regulatory risk of the floor being adjusted in the future will create exactly the same unhedgeable risk, significantly curtailing the ability for market players to transact forward hedging products.

[redacted]

A2. Difficulty in setting a workable long term scheme

In our view, the carbon floor would have to be set against a market recognised benchmark to allow asset owners to manage their carbon price risk. Failure to do so will prevent fossil plant owners from securing fixed generation margins. (See appendix on discussion on how plant owners lock in operating returns.) Therefore, the only way we see that a carbon floor could practically function would be if a formula was established that compared the difference between the carbon floor for a specific year and average spot market prices for that year (in turn created by averaging a spot market daily index published by an exchange with an actively traded spot market). As mentioned above, this formula would need to remain fixed for a period of time consistent with that over which investors expect returns on their investment.

Such a formula would leave carbon intensive generators having to pay the maximum of the carbon floor price or the carbon market price. So the actual price paid for carbon by that generator is not known until the carbon market price has been compared with the floor for that period. This creates a secondary problem in that it adds costs to the process of locking in the carbon price and securing generating margins as the only way for carbon intensive generators to protect against the carbon floor risk ahead of time in the market is to purchase insurance in the form of a put option on carbon with a strike price set at the carbon floor (we describe this in Appendix A).

In this situation, a generator has two main choices: (i) they decide not to pay the additional cost, and pass this risk on to its retail customers (only possible if the generator is vertically integrated, and leading to higher and more uncertain retail prices), or (ii) they pay the additional cost by purchasing the insurance (in the form of a premium for the put option). This premium could become very expensive in certain market scenarios.

A3. Damage to market competition

We believe the scale of investment the proposal is trying to encourage requires participation from a diverse range of market players, including independents as well as existing vertically integrated utilities. Therefore, it is fundamentally important that market reform does not discourage new market entrants, and their potential to innovate and bring the required investment at the lowest cost to consumers.

The commercial uncertainty resulting from the proposed carbon floor is less easily managed by independents than fully vertically integrated utilities, For example, vertically integrated companies are more shielded from reduced liquidity in the wholesale market, because they can bypass the market and sell the electricity they generate directly to their own retail customers. The option to pass the carbon floor cost on to retail customers is particularly valuable if the carbon floor is subject to being changed from time to time, which makes any kind of long term hedging programme for fossil plant owners effectively impossible. So the carbon floor can be seen to disadvantage independent generators and may form a barrier to entry.

Even for the vertically integrated utilities, a lack of liquidity can be detrimental to these investments as large nuclear projects cannot be financed solely from their own balance sheets and require a large amount of debt financing. Lending banks would be willing to lend more and on better terms if the price of electricity can be hedged so that the commodity risks are reduced. Therefore, reducing electricity market liquidity will make these large investments significantly more expensive, difficult to achieve and probably impossible for non-incumbents. This in turn will lead to reduced competition in the UK power markets. The impact of these changes will be felt ultimately by retail customers.

A4. Carbon floor is unnecessary in a world with Feed in Tariffs

DECC has clarified that the Feed in Tariff (FiT) scheme is intended to cover nuclear plants as well as renewables, meaning that the beneficiaries of the carbon floor and the FiT are exactly the same. We believe it is inefficient to run two separate policy mechanisms that achieve the same policy objective.

Secondly, the carbon floor would feed directly into increased wholesale electricity market prices via an increased marginal cost of generation for fossil fuel generators. However, the electricity market price would be of very little relevance to a low carbon generator if a contract for difference feed in tariff (CfD FiT) is overlaid on top, as proposed and favoured by DECC in the EMR consultation. This is because a rational generator benefiting from the FiT scheme will sell its power into the market so as to exactly match the way in which the CfD is calculated i.e. continuously on the spot market so as to secure a fixed return. In so doing, they would be indifferent to market prices, making the carbon floor redundant.

We note that the proportion of renewables and nuclear in the UK generation portfolio is set to continue to increase for as long as subsidies are in place through a FiT regime. This means an

increasing proportion of the portfolio will be indifferent to market prices and will be shifting from the forward markets to the spot market should the CfD FiT option be implemented. As a result, we believe that both the carbon floor and the CfD FiT will reduce liquidity in the UK power markets.

In conclusion, we see no need for both a carbon floor and a CfD FiT. In this consultation response, we have expressed our deep concerns on the unintended consequences of both the carbon floor and of the proposed CfD FiT. We believe the alternative of a 'Premium FiT' and no carbon price floor is far simpler to implement, offers a straightforward way of evolving from the Renewables Obligation to a FiT, has far fewer unintended consequences, and would maintain a market price signal while offering the required support for low carbon generators. More information on this subject is contained in the Appendix.

Finally, we would strongly advise against making a decision on a carbon floor ahead of the other proposed reforms, as the carbon floor and the various options for the FiT are highly interrelated.

A5. Risk of arbitrage and European investment in preference to UK investment

A carbon price floor artificially raises the price of power in the UK relative to the price in the rest of the EU power markets. Market coupling has recently been implemented across a number of EU Member States; the proposed carbon floor would create a discontinuity in price between the UK and the rest of Europe. This discontinuity in price is an arbitrage opportunity. This arbitrage will be factored into the price paid for capacity on the 2 GW Interconnector France-Angleterre (IFA), and the soon to be operational 1 GW UK-Netherlands interconnector, making this a windfall gain to the interconnector capacity owners.

To some extent the increase in price will be arbitraged away by activity on these interconnectors. If there is a remaining price discontinuity after arbitrage activity on existing interconnectors, there is still a risk that this price signal might not create the investment desired. The cost and time required to build renewables (e.g. offshore wind) is high and involves significant project risk; similarly a nuclear power plant takes years of planning and building. We believe that it would be much cheaper and quicker to invest in a new interconnector that captures the arbitrage, and/or to build a Combined Cycle Gas Turbine (CCGT) plant in e.g. continental Europe and flow the output power into the UK. The final result will mean increased electricity prices for consumers in the UK, increased investment in interconnectors and power plants in the rest of the EU, and mothballing more carbon intensive domestic generation capacity in the UK. This will still achieve UK Government's goal of reducing the UK's carbon dioxide emissions. However, it is not consistent with the UK maintaining energy security.

This issue highlights the weakness of artificially raising UK wholesale electricity prices relative to other European prices in an interconnected power market as a means to achieving domestic generation investment goals. In reality, this type of policy is no longer possible. We highlight the alternative option of levying a charge directly on UK retail prices and redistributing the proceeds to low carbon generators similar to what is done currently under the Renewables Obligation. This would be in the form of the 'Premium FiT' proposed in the EMR consultation, which we will comment further on below.

A6. Risk of making combined heat and power plants in the UK uneconomic

HM Treasury proposes to apply the carbon floor across all forms of fossil generation, without making any exception for combined heat and power (CHP) plants. In addition, National Grid is simultaneously proposing to remove transmission charge benefits (TNuoS and BSuoS) to CHP plants.

In making its transition to a low carbon economy, the UK needs both renewable power and renewable heat. In the absence of district heating networks supplying waste heat from CHP plants to residential housing (in contrast to, for example, Sweden), the UK is more reliant upon increasing the

use of waste heat by industrial and commercial companies. This means that the commercial success of a CHP plant is based upon the continuing existence of a single, or a very small number, of industrial and commercial companies. In other words, the credit risk posed by a CHP project is often the biggest obstacle to obtaining investment, and an investment decision will only take place if there are other offsetting benefits e.g. exemptions under the climate change levy regime and transmission charge payments. As a result, DECC should not assume that the carbon floor can equally be applied to the fuel burned by CHP plants as to other types of fossil fuel plants. Should the carbon floor be applied to fuel supplied to CHP plants, the most likely result is that, where possible, the increased costs will be passed on to the industrial heat consumer (where the contract allows), and otherwise the CHP plant will be mothballed. Only some newer CHP plants may potentially be able to be retrofitted to become small CCGT plants, if the cost of fitting additional steam turbines is not too high, there is enough room onsite and the end efficiency achieved is high enough to compete in the UK generating portfolio. The overall end result will be a much lower usage of waste heat in the UK, which is incompatible with the policy objective of the carbon floor.

A7. Risk of permanent damaging effects to industry in the UK

Electricity demand is rather inelastic in the short term. However, if the price difference between the UK and interconnected power markets created by the carbon floor persists for an extended period, it could lead to permanent demand destruction (as opposed to more elastic demand side response during short term price spikes) in industry as electricity intensive industries transfer activity from the UK to other jurisdictions where electricity prices are lower. This is a particular concern for companies that produce products to be sold in global markets.

A8. Conclusion

For the above reasons, we do not support the carbon floor as a policy instrument. If, despite these serious concerns, DECC still decided to pursue this policy option, it would be less damaging to add a fixed extra tax for carbon, so that generators were charged 'EUA price + £X tax' for each unit of carbon emitted. This would enable forward hedging of carbon to continue and without the extra hedging costs that are incurred when an asymmetric carbon floor requires options to be purchased. This alternative policy recommendation is consistent with our preference for the premium FiT over the CfD FiT, since both allow the underlying power and carbon markets to continue to function, whilst policy objectives are pursued through either a fixed additional cost (for carbon) or a fixed additional subsidy (for low carbon generation).

B: Low Carbon Generation Feed in Tariffs

[redacted] advocates using the EU ETS carbon cap and trade mechanism and a pan-European green certificate scheme as the best way to deliver a lower carbon electricity market across Europe at the lowest cost to consumers. If a pan European scheme cannot deliver the UK government's plans to accelerate development of a low carbon electricity market relative to the EU ETS scheme, of all the proposals put forward under EMR, [redacted] would most support implementing the 'Premium FiT' to create the investment signal to encourage the build of new low carbon generation plant. We are opposed to the CfD FiT proposal as we see many damaging market consequences. We explain our reasoning below, identifying problems with the CfD FiT and the reasons why the Premium FiT is preferable.

B1. CfD FiT forces liquidity away from the forward market to the spot market, damaging ability to hedge ahead of time

A CfD will pay the difference between the FiT level and a 'market price'. A generator will only achieve the price certainty the CfD is designed to offer if they sell their output power in exactly the same way that the market price in the FiT CfD is calculated. If the generator was to sell their power according to a different hedging programme they would be exposed to the price difference between their achieved sale price and the market price the FiT is settled against. So to achieve price certainty and secure returns, the generator would have to hedge according to the hedging programme dictated by the CfD methodology.

Renewable generators are mostly intermittent. Nuclear plants will have periods of scheduled and unscheduled outages. Due to these limitations, we do not see a practical way to set a CfD against anything other than an intra-day market electricity price. Due to periods of outage and intermittency, the only way to provide such generators price certainty is by settling the CfD against the volume weighted average spot electricity market price, averaged only over the hours in which they generate. Any other CfD settlement mechanism would leave generators exposed to the risk of losses when they need to move their maintenance windows, when they have scheduled or unscheduled outages, and/or when the wind speeds are different from those anticipated even when coming into delivery. The plant owners should not be paid a FiT when they do not generate so that physical risk is held by the plant equity owners, not by UK government/taxpayers. Generators should only be guaranteed the FiT support level for hours they actually generate. This is important in order to secure the best deal for consumers and to ensure that plant owners are properly incentivised to run appropriate maintenance schedules.

We see a CfD taking liquidity out of the already illiquid forward markets. While this will happen gradually over time, ultimately up to 75% of the UK's generation plants will consist of renewables and nuclear and under the proposed policy will have moved away from trading in the forward market in order to benefit from the CfD in the spot market. This will damage the forward price signal, which is a key signal to invest for all potential investors in the market, and it will make it extremely difficult to operate as an independent retailer.

B2. Difficulty settling CfD when most generators do not sell large net volumes of power into the market.

A large proportion of plants in the UK are under the ownership of the incumbent vertically integrated utilities (approximately 80%) and a large proportion of supply is held in the same hands (approximately 95% of all retail load, increasing to approximately 99% of retail load to residential customers). Incumbents have understandably set up in such a manner in order to minimise risk in the punitive dual-priced cashout regime. We describe this further in section E. Vertical integration also reduces wholesale price risk for incumbents, as a large proportion of the net output power does not need to be traded in the market.

This highlights a key issue in the existing market that we also see as a fundamental issue for any CfD mechanism: a reform to separate generation and retail arms of the vertically integrated utilities is required.

B3. Risk of not contracting in spot market

Given that up to 75% of the UK's generation portfolio will eventually fall under the FiT tariff scheme, there is a concern regarding how DECC intends to settle the CfD if a plant does not sell its power in the spot market and instead spills its power onto the grid in imbalance. If DECC simply intends to settle the FiT against the highly punitive (i.e. likely to be very low) imbalance electricity price for non-contracted output, the CfD payment would consequently have to be very high to make up the difference. We would view this as not delivering good value for money for taxpayers and would recommend that any FiT mechanism only pays out for power contracted ahead of time in order to minimise the cost of the subsidy to taxpayers. As an example, in Spain, where a small proportion of wind farms receives the equivalent to a CfD, any output not contracted ahead of time in the spot market does not get paid the FiT – this incentivises the wind producers to forecast as well as possible.

However, if up to 75% of the UK's generation portfolio is under a CfD FiT mechanism and is not only selling its power close to delivery (in order to match the CfD pricing formula) but also is being required to sell ahead of the imbalance market (in order to deliver better value to taxpayers), generators will have problems if they cannot sell their power into the spot market despite all efforts to do so. Generators are more likely to have this kind of problem in the future because, firstly, a high percentage would be solely selling power into the spot market in a concentrated space of time in order to match the CfD pricing formula, and secondly, because as the level of renewables increases a supply surge could occur under certain weather conditions which is not matched by demand. For example, windy overnight hours in the summer would become a high risk time period. So a policy conundrum exists: giving the right incentives to generators to minimise costs to taxpayers and contract ahead of the imbalance market leaves them with the material risk of receiving a low power imbalance price and no FiT payment for power that is forced to spill onto the imbalance market due to lack of buyers in the spot market. We cannot see any solution to this conundrum, and once again recommend that a CfD style of FiT is discarded. The CfD not only artificially forces liquidity into a particular window, but the only workable scheme forces it into the spot market, a trading window which opens a long time after most suppliers would want to have contracted the bulk of their forecast demand. A Premium FiT would not force liquidity into the spot market but would leave generators free to choose a sensible forward hedging strategy based upon market prices and their appetite for risk.

B4. Adverse impact on retail consumers – particularly tariff price and its volatility

We question how retail prices can avoid being exposed to high volatility when a large proportion of electricity generation would only be traded in the spot market. This is dangerous for industrial consumers, who might end up needing to pay uneconomically high prices for forward contracts in the remaining illiquid forward market in order to lock-in electricity purchase prices to secure their returns in the front year and beyond. This is also dangerous to residential customer tariffs which could end up being exposed to much more dramatic price spikes due to the uncertainty of purchase price, particularly in winter when demand and therefore spot prices can rise substantially. This unintended consequence could push more residential customers more frequently into fuel poverty.

If ultimately around 75% of the energy generated in the UK is dispatched under CfD FiT, we believe that the wholesale market could become largely irrelevant. Lack of a forward market would make it very difficult for independents on the retail side to offer competitive tariffs if they cannot purchase ahead of time. This would be a very backward step, it would lead to increased exit of independents and it would increase barriers to entry. Reducing the ability for innovative new entrants on the generation and retail sides of the market to bring about the low carbon transition at the lowest cost is not in consumers' best interests. Ultimately, we see a likely outcome of the CfD as proposed being

that the market would become so illiquid that its price signal becomes easily manipulable. This could lead to yet more regulatory reform in the form of regulated retail tariffs in order to minimise the risk of market power issues in a very uncompetitive retail market.

B5. CfD Fit does not incentivise generators to 'beat the index'

The entire point of the FiT is to reduce market risk and increase revenue certainty. If generators are then encouraged to beat the index, the only way they can do this is by trading their power in a different way to the way in which the CfD is calculated. This is not hedging, but speculating, and involves taking on market risk, the very thing the FiT is designed to reduce. We do not see why this would form any kind of market trading incentive to CfD scheme generators and we observe that beating an index is a 'zero sum game' - for every generator that beats the index there must be a generator who loses against the index.

B6. Early closure of flexible fossil fuel generators

The CfD may lead to the early closure of flexible fossil fuel plant that can no longer easily implement an economic hedging programme ahead of time due to the lack of a liquid electricity market in which to secure returns. With government aims to install tens of GW of wind capacity and with nuclear power being relatively inflexible baseload plant, we risk closure of the flexible plant we require to fill in the generation shortfalls when there is little wind.

To remain operational, such generators would require STOR type contracts, leaving every type of generator supported under a regulatory tariff. If this route is chosen, there would be little need for a wholesale market as there would be no supply and demand fundamentals driving a price setting mechanism. We believe wholesale market prices would become meaningless and the market would rapidly reach a liquidity tipping point where trading would be too risky for all participants. At such a point, barriers to entry would be extremely high as it would be virtually impossible for independent suppliers to enter the market without regulatory support. With everything regulated, we would question the point of a wholesale market.

This highlights the risk of collapse of the wholesale market forcing the UK backwards into a centralised regime that would not be attractive to investors.

B7. Need for FiT price certainty to encourage investment

Whichever FiT scheme is chosen to be implemented, it is important that the FiT is guaranteed for long enough for investors to recoup their investment and achieve a return on their investment. If the government does not guarantee the FiT level for long enough, it will not give investors enough certainty and the desired level of new low carbon generation will not be achieved. The current review of solar FiT schemes is an example of exactly the sort of regulatory uncertainty that drives down levels of investor confidence. Investors (in particular nuclear plant investors) ideally seek certainty in the form of a FiT that is set on day one and indexed to inflation for a period of at least 10-15 years. However long the FiT is set, investors will still hold the unhedgeable regulatory risk that further market reform on a timescale beyond the length of general election timescales will damage the economics of these long term projects.

B8. Benefits of the Premium FiT

The Premium FiT is our preferred mechanism of the three proposed for supporting low carbon generation. We see that the Premium FiT neatly sidesteps all the risks of forcing liquidity into particular windows of trading and thereby leaves generators free to set their own sensible forward hedging programme to secure returns. This would mean that nuclear, wind, biomass and fossil fuel plants can all compete in the forward market based on the fundamentals of supply and demand in the forward UK electricity market. This would allow suppliers able to access forward power more

easily too. It reduces the risk of CfD plants not being able to contract in the spot market and instead spilling onto imbalance, as they have the full forward trading time horizon over which to contract.

It is worth pointing out that the Premium FiT is the scheme most consistent with the existing Renewables Obligation (RO). Government has experience of determining the RO subsidy levels at which a range of renewables generators are economic, in the form of the banding scheme. An equivalent scheme could be applied to Premium FiT bands for wind (onshore and offshore), tidal stream, nuclear, solar, biomass and other technologies. It is simple to make the RO consistent with the FiT Scheme – simply by setting the recycled benefit at a fixed level so that the ROC value has no price uncertainty. This could be designed to align the Premium FiT with the RO so that the two schemes sit side by side as the RO rolls off.

As an aside, it is worth pointing out that it is not because the RO is a market mechanism that it has been judged to be unsuccessful in providing certainty to renewable generators. The reason it has not been successful is because (i) the market is very illiquid due to most integrated utilities netting out their ROC requirements and therefore not needing to come to market, and (ii) it is not possible to fix the value of the recycled benefit. It is both of these factors that mean that renewable generators are not easily able to lock in the ROC price they originally anticipated they would be able to achieve (and need in order to obtain financing).

Finally, the Premium FiT could be designed to be self-funding via a 'Low Carbon Levy'. There could be an obligation placed on retail suppliers to collect the premium for the Premium FiT and pass this through to a central body who could redistribute the premium to generators under the Premium FiT scheme. This would neatly side-step the risk to the government budget of very large and unknown funding requirements for a CfD FiT. It would be hard to offer the price certainty investors seek far enough out into the future under a CfD FiT without adding real risk to government budgeting of large funding requirements for the CfD if UK electricity market prices remain stubbornly low, which is not unrealistic in some scenarios (in particular over the next few years, due to most European electricity markets including the UK being oversupplied).

B9. Conclusion

We do not support the CfD FiT but we support the Premium FiT as this will retain a market price signal without damaging market liquidity or risking a decoupling between spot and forward markets in the way that we believe the CfD might. The FiT (in whichever form) does away with the need for a carbon floor as the two policies are duplicative. The Premium FiT alone avoids a large number of unintended market consequences that the combination of the CfD FiT plus the carbon floor would create.

C: Capacity payments

C1. [redacted] do not advocate a capacity mechanism.

[redacted] is strongly opposed to the concept of capacity mechanisms in electricity markets[redacted]

Capacity is a product without utility – without a mandate from a regulator, no-one would purchase such a product. Capacity only has value to a purchaser if it is "callable" at the request of the purchaser to generate, in which case it is either a reserve product or a call option. We believe capacity payments are unnecessary where deep and liquid forward electricity markets exist. [redacted] Examples of markets that are 'energy only' and that seem to function without capacity problems are ERCOT (Texas), Australia and New Zealand, supporting our theory.

We argue that it is far easier to make an investment decision on the basis of a deep and liquid forward electricity market price signal as it is far easier to secure a commodities hedge to lock in a level of forward returns, against which financing can be raised. In contrast, a capacity mechanism is exposed to the risk of regulatory change: in the level of capacity mandated, or the level of capacity payment offered (including risk of removal of subsidy). With no forward market in which to hedge this risk, we argue that it is far harder to raise finance against this unhedgeable forward revenue stream. We have never invested in plant in a market with such risks.

We believe the most important market reform for fostering greater security of supply will directly address the reasons for lack of a deep and liquid forward electricity market in the UK. We believe that such a liquid and vigorous forward market will provide the price signals for investment in new capacity, and the ability to purchase a hedge against which financing can be raised, and will therefore provide security or supply at the best possible price to consumers.

C2. Observations on the design of a capacity market

We have outlined reasons why we are opposed to capacity payments. If, despite the concerns, DECC wish to pursue this type of market reform, we make a few observations on design of a capacity market system that will deliver security of supply in a vigorously competitive market framework at the lowest cost to consumers. We believe a further consultation would be needed to develop the details of a system that might be workable and to ensure unintended consequences are minimised.

C2.1 Regulators and government should not target 'capacity subsidies', but design a market-based system.

A forward market, with supply and demand dynamics for firm capacity would set the price for a level of forward capacity and drive investment in peaking plant to secure system reliability at that particular peaking capacity level. Rights to firm capacity could be traded in the form of capacity certificates, with prices determined in the capacity certificate forward market. A capacity certificate would convey the right for the holder access to 1MW of capacity for a specified period of time. Capacity certificates should be fully tradeable and fungible. Capacity certificates could have locational pricing – this would provide price signals to invest in new capacity in the locations where it is most needed. Capacity market players would include:

- **Load serving entitities** (retail energy suppliers): would be required to purchase capacity certificates in the capacity market, holding sufficient to cover their peak MW load requirements, plus a regulator set capacity margin.
- **Generators** would sell capacity certificates committing them to providing a level of available capacity, with strict economic penalties for failure to provide that available capacity. Supply and demand dynamics along the forward curve for capacity would create the price signal for investment in new capacity.
- **Demand response participants** could sell back to the market excess capacity certificates relating to flexible load they can curtail at times of high demand.
- **Capacity marketers** could provide bids to purchase capacity and offers to sell capacity, but have neither load requirements nor generation capacity themselves.

C2.2 A capacity mechanism needs to facilitate demand response

It is just as important that users of electricity can sell unwanted capacity (and energy) back into the market. This would happen at times when users of energy see the price of energy plus capacity as too high. A user who has purchased more energy than capacity would by definition have interruptibility of supply on the portion for which they have not secured capacity certificates.

Demand side participation in a capacity mechanism ensures that there is a robust price setting mechanism for capacity and it encourages greater elasticity of demand in the UK by way of demand response. We believe that demand response minimises the cost of installed capacity.

Supply contract innovation could enable intensive electricity users to reduce demand and sell excess electricity and capacity back to the market when the market price signal is sufficiently high to make this attractive. We observe that, often, electricity supply contracts in the industrial and commercial sector make it extremely difficult for users to participate in the market in this way as they can typically only purchase/sell physical electricity from/to their supplier. Requiring suppliers to open up the wholesale element of physical supply to other market participants would drive competition in this segment of the market and assist the development of demand-side response.

D: Emissions Performance Standards

We agree that having maximum allowed carbon intensities for power plants could be beneficial. We are however not sure that EPS adds more as a policy instrument above and beyond European legislation such as the EU Emissions Trading Scheme (EU ETS), the Large Combustion Plant Directive (LCPD) and the Industrial Emissions Directive (IED) and so an additional EPS directive seems superfluous.

E: Reform addressing low liquidity and lack of competition

[redacted] believes that vertical integration is defacto evidence of market failure. We observe there is a clear linkage between (i) dual priced punitive cashout, (ii) vertical integration and (iii) low levels of liquidity in electricity forward markets and lack of competition in retail markets in the UK. Two fundamental reforms would address these problems.

The intention of a dual priced cashout mechanism is to encourage participants to contract ahead of time, in order to minimise the cost of balancing the system in real time. Dual priced cashout systems create a strong price risk to market participants and encourage such players to find ways to mitigate against the risk. We note that participants with flexibility in their generation or in their load have tools within their portfolio to reduce the risk – close to 'gate closure' they can adjust their output or demand, up or down, in order to minimise the volume that is exposed to cashout prices. It is retailers who serve inflexible load (independent electricity suppliers), and inflexible generators (such as wind producers) who have the least ability to self-modify in order to minimise imbalance. For both, there is a natural benefit to horizontal aggregation, as this leads to portfolio diversification which reduces the forecasting error as a percentage of the overall portfolio, thus reducing cashout risk. However, there is bigger protection against imbalance on offer when such inflexible elements vertically integrate with complimentary flexible players in the market. Such integrated players minimise cashout risk by flexing generation plant output up or down close to real time in order to provide internal transfers to their retail arm to reflect adjustments in forecast demand. This increased ability to manage volumes exposed to cashout on their retail load is extremely valuable and is the primary advantage of vertical integration.

It is natural that incumbents have migrated towards this natural method of protection against dual-priced cashout. Vertical integration significantly reduces the need for such players to contract sales into the market and contract purchases from the market. Reduced volumes traded in the market, mean reduced liquidity for existing independents to access and damage to the price signal along the forward curve. This encourages integrated utilities to transact increasingly more power internally between generation and retail arms in order to mitigate the wholesale price risk.

A 'vicious circle' is created whereby cashout drives vertical integration, which drives lower liquidity, driving yet further integration. This increases barriers to entry and increases barriers to growth for existing independents. This is bad for competition and ultimately bad for end users. Recent examples of increasing vertical consolidation in the market include: [redacted]. We believe there will be further vertical consolidation and lack of investment from independents without reform of cashout.

We believe that DECC should place at least as much importance on implementing reforms to address these fundamental issues discouraging new investment at present. Reforming the cashout mechanism to a single cashout price would reduce this risk for independents and vertically integrated companies alike, reduce barriers to entry, increase wholesale market liquidity and increase retail competition. A common argument against single cashout prices is that it will reduce the incentive to contract ahead of time. However, we believe the need to lock-in returns ahead of time, driven by investor needs for stable and profitable businesses, will provide plenty of incentive for market participants to contract ahead of time rather than being exposed to the single and volatile cashout price.

Finally, [redacted] advocate self-supply restrictions (one of the proposals from Ofgem to address liquidity concerns) for integrated utilities, as we believe this would drive a step change increase in liquidity in the electricity forward market and a corresponding increase in investor confidence.

F: Final Conclusion

We believe the carbon floor will significantly reduce the wholesale price signal and wholesale market liquidity and it will not deliver its stated low carbon economy policy objectives. Market reform needs to encourage as many new market participants as possible, but it is extremely difficult to see how a meaningful and reliable electricity market price signal can be established that encourages new entrants with the suite of preferred reform proposals put forward. The main alternatives left to new entrants will be to develop renewable generating assets that rely on a fixed return from UK Government under the proposed CfD FiT which will leave them invulnerable to wholesale market prices. However, in this scenario, there is a straightforward trade-off between the advantage to the independent renewable generator and the disadvantage to the UK consumer relying upon a competitive, liquid UK power market.

Given that the carbon price floor is intended to benefit the same plants as the FiT, and the CfD FiT makes those very plants indifferent to market prices, we believe the carbon price floor is unnecessary. We propose that, instead of a carbon price floor and a CfD FiT, the government instead implements the single policy of a Premium FiT with no carbon price floor, and uses the EU emissions trading scheme to drive increases in the price of carbon in line with the rest of Europe. We believe this is a much simpler and more coherent form of market reform that would help encourage the required investment.

We are opposed to the introduction of capacity payments. We believe that actions to address the causes of low liquidity in the electricity forward market are the optimum approach to creating a market environment with deep and liquid forward price signals that encourages investment in peaking plant when it is required. However, should DECC wish to pursue such a market initiative, we have provided comments on the design of a mechanism that would deliver secure capacity competitively at the lowest cost to consumers

We believe that EMR provides a great opportunity for DECC and the government to reduce the layers of legislation low carbon investors have to negotiate at present in order to make an investment decision.

Most importantly, we believe that HM Treasury, DECC and Ofgem must urgently work together to address the reasons for lower liquidity and lack of competition in the UK electricity wholesale and retail markets if they are seeking to encourage a step-change increase in investment in low carbon UK power generation. We see this as the most fundamental problem facing the UK electricity market and is a result of the current market design. We believe the root cause of low liquidity is the cashout mechanism, which drives vertical integration and with it a reduction in the need for major market players to contract in the wholesale market. To those ends, we advocate reform to a single price cashout mechanism and self-supply restrictions. We believe that all steps possible should be taken to reduce barriers to entry so that specialist independents can enter the market and innovate, offering competitive services. This can only help to deliver the investment required at the lowest cost to end users.

Appendix A

Premium FiT

Please refer to the DECC EMR Consultation document for the details of the proposed Premium FiT. Our understanding of the Premium FiT is as follows:

Mechanism: In addition to the electricity revenues gained in the wholesale market, low carbon generators will also be able to claim a fixed FiT benefit for every unit of electricity generated.

Benefits:

- **Additional low carbon financial support** in the form of the fixed subsidy improves the economics of low carbon generation projects so they can better compete with high carbon generation technologies which usually have lower capital costs.
- **Market mechanism preserved:** Similar to the carbon floor support, low carbon generation project feasibility is improved. The key difference that it is no longer necessary to distort the wider wholesale electricity market price signal and liquidity to achieve the government's policy objective.
- **More visibility**: If the FiT is implemented in phases whereby only projects which opt-in to a given phase are eligible for the particular level of fixed support for that generation type for that phase, the government can better anticipate the cost of FiT support and closely monitor the level of low carbon generation incentivised.
- **More flexibility**: We believe that any low carbon generation support needs to be stable and defined for a long period going forward. A tranche based Premium FiT allows the government to tailor the level of support it gives going forward at specific pre-announced intervals with changing market dynamics, without the risk of going back on previous promises it made.
- **Simpler to retain consistency with Renewables Obligation (RO)**: The Premium FiT is like a RO scheme with a fixed ROC price and fixed 'Recycle Benefit' and could be collected by retailers, passed to government, who then redistribute to FiT beneficiaries. The ROC price under the current RO could be fixed to become consistent with the Premium FiT. This is a simple, natural way to run off the old scheme in parallel.

How a Fossil fuel power station hedges to lock in a return

A high carbon intensity generator aims to runs its generation plant profitably to lock in returns for its investors. In order to run, it must purchase fuel and carbon and pay for its operation and maintenance costs. It uses its fuel to generate electricity that it sells to the market. The only way of locking-in a profit is by fixing the purchase price for fuel and carbon at the same time as the generator fixes the sale price for electricity. The danger of not locking in these prices simultaneously is that those market prices not locked in move, so that it is no longer possible to secure a profit. The 'hedging' process is described more formally below.

Why Fossil Fuel Power Station Owners would hold an option position due to the Carbon Floor

A high carbon intensity electricity generator will run their plant when the price of electricity P_{elec} is higher than the price of fuel P_{fuel} plus the price of carbon P_{carbon} plus the variable operation and maintenance costs VOM . Under the existing market arrangements, its variable income for running would be $Income_{old}$, given by:

$$Income_{old} = P_{elec} - P_{fuel} - VOM - P_{carbon} \qquad (1)$$

In a 'Carbon Floor World' the carbon cost element above becomes:

$$Max(P_{carbon}, Floor) \quad (2)$$

The cost of carbon is the higher of the floor price or the market price of carbon. So in the Carbon Floor World the income is given by $Income_{new}$:

$$Income_{new} = P_{elec} - P_{fuel} - VOM - Max(P_{carbon}, Floor)$$

$$Income_{new} = P_{elec} - P_{fuel} - VOM - P_{carbon} - Max(Floor - P_{carbon}, 0)$$

$$Income_{new} = Income_{old} - Max(Floor - P_{carbon}, 0) \quad (3)$$

So income is reduced by an amount specified by the second term on the right hand side of equation 3. This is the payoff of a put option on carbon, with a strike price set at the carbon floor. At a time before expiry of the option (before the carbon price has been established) the put option has two components of value: (i) the intrinsic value (the difference between Floor Price of carbon and the current carbon price) and (ii) the extrinsic value (the 'time value' due to market volatility and the time to expiry. This is the element that option holders aim to capture value from by 'gamma trading'). For further details on option pricing, please refer to 'Options, Futures and other Derivatives' by John C. Hull.

To purchase this put option on carbon would require the payment of a premium. This premium will be sensitively dependent on carbon market prices and market volatility and could become very expensive in certain market scenarios.

The vertically integrated utilities would hold an advantage over independents in a carbon floor world due to their ability to pass the increased hedging cost on to their retail portfolio. This is unfair to independent generators and will form a barrier to entry.