B9 Coal Limited response to

DECC Consultation on Electricity Market Reform

B9 Coal is developing game-changing projects in the field of carbon capture and storage, combining CCS and coal gasification with highly efficient alkaline fuel cells from AFC Energy to create first-of-a kind Integrated Gasification Fuel Cell (IGFC) power stations.

B9 Coal has brought together partners from varied sectors and backgrounds to develop a model that offers efficient conversion of coal to electricity whilst enabling very high levels of carbon capture as an integral part of the process.

Coal gasification produces syngas which is then passed through a clean-up process resulting in separate streams of hydrogen and carbon dioxide. The hydrogen is used to power AFC Energy's highly efficient alkaline fuel cells, whilst the carbon dioxide is captured ready for transport and storage.

AFC Energy's alkaline fuel cell achieves greatly enhanced efficiency compared to conventional power generation and operates at low temperature and low pressure. The system has been designed for commercial application and is therefore low-cost (the company has eliminated the need for precious metals) and easy to manufacture and maintain. In addition, the use of hydrogen allows the system to load follow to meet peak energy demand.

With hydrogen as a feed-stock, fuel cell power stations are not only highly efficient and flexible in output, they are also fuel flexible. The system has the ability to switch between and mix hydrogen produced from coal, gas, biomass and electrolysis sources. Such characteristics offer strategic energy security benefits in terms of utilising potential UK coal resources as well as the ability for grid balancing and back-up for intermittent sources of renewable electricity.

13a North Audley Street
London W1K 6ZA
T: +44 (0)20 7499 8313
E: info@B9coal.com
www.B9coal.com

In October 2010, B9 Coal announced a partnership with Powerfuel Power Limited, outlining plans to incorporate AFC Energy's alkaline fuel cell at Powerfuel's Hatfield site. The Hatfield project is among the most advanced CCS projects in Europe and has been entered for the European Union's NER 300 funding mechanism for new renewable and CCS projects.

B9 Coal and Electricity Market Reform

B9 Coal believes that the Electricity Market Reform is a necessary tool in the evolution to a decarbonised power sector. While regulatory liberalisation of the 1990s permitted the establishment of a competitive electricity market with vastly reduced retail prices, the current market does not retain the ability to incentivise the development of a decarbonised generation, distribution and supply network without running the risk of vastly increased costs and supply insecurity.

While the EMR is designed to take various technologies and businesses into account, there are some issues of particular relevance to emerging technologies such as CCS. Furthermore, pioneering low-carbon technologies such as the alkaline fuel cell deployed by B9 Coal can offer significant advantages in terms of cost, efficiency and flexibility which will be of significant benefit to the electricity market as a whole; this should therefore be highlighted and accounted for within the EMR.

The key issues included in the consultation document of relevance to B9 Coal are:

Feed-in Tariffs (FITs): B9 Coal favours the replacement of the current system with that of a FIT. In order to stimulate long-term investment in pioneering clean energy projects, such as that proposed by B9 Coal, the long-term risk of such projects must be shared amongst developers, investors and Government, and therefore the introduction of a premium FIT is the most suitable model. By paying a premium on top of the wholesale electricity price the Government would be indicating confidence in the project, and in turn would embed long-term stability in the alternative energy sector.

13a North Audley Street
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Capacity Mechanism: The future UK electricity sector will be largely decarbonised, with the majority of base-load electricity supplied from renewable generators. While this scenario will result in reduced emissions and decreased reliance on fossil fuels, there will also be significant drawbacks. Renewable sources of energy such as wind, solar and tidal are inherently unreliable, and will therefore necessitate a vastly increased back-up source of power to ensure a sustained supply at all times. Fossil fuel power stations will be relied upon to load-follow and adjust their output to meet demand, but with traditional models this system will be highly inefficient.

The B9 Coal Integrated Gasification Fuel Cell (IGFC) model differs from traditional fossil fuel generators in its scalability and its ability to adjust output while maintaining efficiency levels. The IGFC model could therefore provide the necessary capacity in a decarbonised electricity sector, if the necessary support and incentives were present in the market. B9 Coal therefore believes that a premium payment should be available to generators, within the structure of a targeted capacity mechanism, in order to reward highly-efficient load-following generators.

Emissions Performance Standard: B9 Coal supports the introduction of an Emissions Performance Standard in order to disincentivise the construction of unabated fossil fuel power stations. However, the current model's level is too high and will serve to encourage the development of unabated gas power stations and discourage investment in Carbon Capture and Storage projects.

B9 Coal would therefore favour the introduction of an EPS set at a level low enough to include restrictions on gas power stations, in addition to coal. The proposed model as it stands runs the risk of jeopardising the UK's ability to meet emissions reduction targets.

B9 Coal suggests the introduction of an EPS with a sliding scale to 2030 in line with CCC national emissions trajectories to 2030 and beyond. The EPS policy would have specific emissions limits for individual power stations set at the time of planning consent and 'grandfathered' over operational lifetime or through significant upgrade.

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Consultation Questions

Current Market Arrangements

Q1 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?

Yes

Q2 Do you agree with the Government's assessment of the future risks to the UK's security of electricity supplies?

Yes. While market liberalisation has led to a competitive electricity sector, the challenges of decarbonising by 2050 will require significant additional incentives and assistance to encourage new and innovative entrants in to the electricity market.

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

Feed-in Tariffs

Q3 Do you agree with the Government's assessment of the pros and cons of each of the models of feed-in tariff (FIT)?

No Comment

13a North Audley Street
London W1K 6ZA
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E: info@B9coal.com
www.B9coal.com

Q4 Do you agree with the Government's preferred policy of introducing a contract for difference based feed-in tariff (FIT with CfD)?

No.

B9 Coal favours the introduction of a Premium FIT as this mechanism will provide the necessary incentives for investment into pioneering low-carbon energy generation.

Alternatively B9 Coal would favour a contract for difference based FIT with a 'strike' price linked to electricity prices AND fuel price fluctuations. Indexing the price to wholesale electricity prices alone will not protect fossil fuel generators from fuel price fluctuations.

Q5 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?

- Incentivises investment in pioneering technologies
- Removes speculation over security of supply on long-term basis
- Robust price projections permit planning on part of Government, consumers and suppliers or generators
- A premium FIT is favourable as it protects generators from wholesale electricity price fluctuations while incentivising long-term investment.

Q6 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?

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Q7 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?

Yes.

However, B9 Coal is concerned that the FIT with CfD model may disincentivise the development of fossil fuel generation as this sector is susceptible to fluctuations in fuel price (unlike nuclear and renewables).

A FIT with CfD would only be favourable if the 'strike' price was index-linked to fuel price.

Q8 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?

Risk-averse investors will be reluctant to maintain or initiate investment in low-carbon power generation without the presence of a risk-sharing mechanism. Therefore a premium FIT will protect investors from long-term fluctuations while maintaining incentives for efficient generation.

Q9 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?

No Comment

Q10 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?

Liquidity in the wholesale market is vital in order for the development of low-carbon power generation and to incentivise generators to meet peak electricity demand which will underline UK energy security.

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Q11 Should the FIT be paid on availability or output?

Output.

Generators who can load-follow should be rewarded for flexibility in output. The IGFC model proposed by B9 Coal encourages truly flexible power generation rather than simply oversized capacity.

Emissions Performance Standards

Q12 Do you agree with the Government's assessment of the impact of an emissions performance standard on the decarbonisation of the electricity sector and on security of supply risk?

Yes – B9 Coal agrees that restrictions should be placed on the construction of new unabated fossil fuel power plants (coal and gas) and would therefore suggest the introduction of an EPS with a sliding scale to 2030 in line with CCC national emissions trajectories to 2030 and beyond.

B9 Coal agrees that while Coal is an important part of the UK's energy mix, it must adapt to meet decarbonisation targets. Therefore restrictions on the construction of new unabated coal power plants are in line with our objective of developing clean coal projects combining CCS with coal gasification and highly efficient alkaline fuel cells.

However, B9 Coal believes that the current EMR proposal will incentivise the construction of new unabated gas power stations (while discouraging investment in coal CCS), and therefore call for the level of the EPS to be reduced so as to incentivise the construction of gas CCS projects across the UK.

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Q13 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?

B9 Coal would favour an Emissions Performance Standard that includes restrictions on gas power stations in addition to coal. The proposed EPS level is too high and runs the risk of incentivising the construction of unabated gas power stations as opposed to low-carbon alternatives, and in turn of jeopardising the UK's ability to meet emissions reduction targets.

In addition, leaving gas power stations unabated would undermine the UK CCS demonstration programme as in this scenario investors would be reluctant to invest in highly expensive coal CCS projects as opposed to the alternative, unabated gas power stations.

As above, B9 Coal would suggest the introduction of an EPS with a sliding scale to 2030 in line with CCC national emissions trajectories to 2030 and beyond. The EPS policy would have specific emissions limits for individual power stations set at the time of planning consent and 'grandfathered' over operational lifetime/significant upgrade.

Q14 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?

Yes.

B9 Coal is in favour of 'grandfathering' in order to reduce speculation on future policy/political risk.

13a North Audley Street
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Q15 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?

Yes – A sliding EPS should be applied to existing plant in order to incentivise the development of CCS facilities and thus low-carbon fossil generation.

There is a need to clearly define the terms 'significant life extensions or upgrades'.

Q16 Do you agree with the proposed review of the EPS, incorporated into the progress reports required under the Energy Act 2010?

Yes – A sliding EPS should be informed by climate science as it progresses in future years and the incorporation into Energy Act progress reports would be appropriate as it could then link with future national emissions trajectories.

Q17 How should biomass be treated for the purposes of meeting the EPS? What additional considerations should the Government take into account?

B9 Coal's technology has the ability to co-fire quantities of biomass in the gasifier resulting in carbon-negative emissions. B9 Coal calls for the inclusion of strong incentives for carbon-negative power generation as this mode of operation could be crucial in avoiding dangerous global warming.

Q18 Do you agree the principle of exceptions to the EPS in the event of long-term or short-term energy shortfalls?

Yes – For short-term shortfalls.

No – For long-term shortfalls. B9 Coal would be concerned that generators may simply choose to rely on exemption periods arising, or that the definition of periods of energy shortfall could be open to abuse.

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Options for Market Efficiency and Security of Supply

Q19 Do you agree with our assessment of the pros and cons of introducing a capacity mechanism?

Yes – See response below.

Q20 Do you agree with the Government's preferred policy of introducing a capacity mechanism in addition to the improvements to the current market?

B9 Coal agrees that a capacity mechanism, sufficiently incentivised, would do much to ensure adequate capacity is available to guarantee security of supply, for example on windless winter nights when the output from the UK's wind and solar capacity would be very low.

It should be noted that the capacity margin in the future energy infrastructure will need to be increased significantly as the total capacity of intermittent renewable energy technologies increases. The margin of reliable back-up required to minimise disruption to the electricity grid, and hence consumers, may be close to that of peak consumer electricity demand in winter.

B9 Coal would therefore favour a targeted capacity payment premium for technologies with the ability to load follow and meet electricity demand efficiently and cost-effectively.

Q21 What do you think the impacts of introducing a targeted capacity mechanism will be on prices in the wholesale electricity market?

No Comment

Q22 Do you agree with Government's preference for the design of a capacity mechanism:
• a central body holding the responsibility;

Yes

13a North Audley Street
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• volume based, not price based; and

Yes

• a targeted mechanism, rather than market-wide.

Yes. B9 Coal is in favour of a targeted mechanism which will reward load following technologies.

Q23 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?

No Comment

Q24 Which of the two models of targeted capacity mechanism would you prefer to see implemented:

• Last-resort dispatch; or

• Economic dispatch.

No Comment

Q25 Do you think there should be a locational element to capacity pricing?

No Comment

13a North Audley Street
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Analysis of Packages

Q26 Do you agree with the Government's preferred package of options (carbon price support, feed-in tariff (CfD or premium), emissions performance standard, peak capacity tender)? Why?

B9 Coal agrees that in order to achieve decarbonisation targets a number of market and non-market mechanisms must be employed. The enhanced certainty on costs and returns will serve to provide more stability and hence incentivise investment in low-carbon power generation.

To summarise, B9 Coal agrees with:

- A relatively small carbon floor price (so as not to distort the EU ETS)
- Premium FITs (to account for possible fuel and electricity price fluctuations damaging investor confidence)
- Capacity payments (which include incentivising load-following technologies)
- A sliding EPS (on coal and gas schemes informed by CCC progress reports)

However, B9 Coal would warn against any mechanism which would result in windfall profits to existing generators, and calls for this to be avoided through relevant policy mechanisms. Any such revenues should be reinvested in green infrastructure.

Q27 What are your views on the alternative package that Government has described?

No Comment

Q28 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?

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13a North Audley Street
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Q29 How do you see the different elements of the preferred package interacting? Are these interactions different for other packages?

No Comment

Q30 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?

Without significant overhaul the Government's preferred package will continue to incentivise the construction of unabated gas power stations. This would risk undermining the Government's CCS demonstration programme, and does not address the key issues of energy security, carbon emissions reduction and consumer prices.

A key implementation risk is the incentivisation of the wrong mix of technologies, particularly the under-provision of load-following capacity, and the under-valuing of technologies which have multi-fuel capability and carbon-negative potential.

Implementation Issues

Q31 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?

Auctions/tenders will encourage market participants to achieve the best deal for generators and consumers. B9 Coal would favour a tendering process that encourages the element of competition as an incentive for innovation and improvement.

Administratively determined support will hamper market mechanisms from developing a competitive future electricity market.

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

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13a North Audley Street
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E: info@B9coal.com
www.B9coal.com

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

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?

No Comment

• Are there other models government should consider?

No Comment

• Should prices be set for individual projects or for technologies

No Comment

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

No - In the initial stages of CCS.

Yes - Post-demo for CCS, with necessary support mechanisms.

• 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?

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13a North Audley Street
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E: info@B9coal.com
www.B9coal.com

Q32 What changes do you think would be necessary to the institutional arrangements in the electricity sector to support these market reforms?

No Comment

Q33 Do you have view on how market distortion and any other unintended consequences of a FIT or a targeted capacity mechanism can be minimised?

No Comment

Q34 Do you agree with the Government's assessment of the risks of delays to planned investments while the preferred package is implemented?

There are numerous risks at present facing CCS project developers. These risks have been commented on in detail by the CCSA.

Q35 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?

No Comment

Q36 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;

13a North Audley Street
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www.B9coal.com

• 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.

No Comment

Q37 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?

No Comment

Q38 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

No Comment

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