Reform of the Renewables Obligation and Statutory Consultation on the Renewables Obligation Order 2007
Part 1

An Energy Review Consultation

A Response by Drax Power Limited

January 2007

Drax Power Limited

Drax Power Limited is the operating subsidiary of Drax Group plc, and the owner and operator of Drax Power Station in North Yorkshire. Drax Power Station is the largest, cleanest and most efficient coal-fired power station in the UK. At current output levels its coal and alternative fuel burn approaches some 10 million tonnes per annum, and its six 660MW units supply some 7% of the country's electricity needs.

Drax Power Station was commissioned in two phases: the first 1,980MW were commissioned in 1974 and the second 1,980MW were commissioned in 1986. As the newest of the country's existing coal-fired power stations, Drax intends to be operating at high load factors in 20 years' time, provided that the regulatory framework encourages and sustains the necessary investments in environmental abatement equipment and plant upgrades.

All six of the Power Station's units are fitted with flue gas desulphurisation (FGD) technology, which removes, on average, at least 90% of the sulphur dioxide (SO_2) from the flue gases. All units have been retrofitted with low NO_X (oxides of nitrogen) burners, and emissions of NO_X are being further reduced through retrofitting boosted over fire air (BOFA) technology. On completion of the BOFA technology retrofit, Drax Power Station will be fully compliant with the 2008 requirements of the Large Combustion Plant Directive (LCPD), but large investments will be required to ensure that the plant is compliant with the 2016 requirements.

Over the last two and a half years, Drax has developed the capability to co-fire, that is, blend and burn, renewable biomass materials with coal. For the first quarter of 2006, Drax was achieving throughputs of biomass material of around 2.5% by heat, and as a consequence reducing its emissions of carbon dioxide (CO_2) at a rate of almost half a million tonnes each year. There is the scope to develop this technology still further and significantly increase biomass throughput and hence CO_2 savings. In addition, Drax has also identified technology options that could assist in improving the thermal efficiency of the plant taking it to environmental performance levels approaching those of current gas-fired plants.

EXECUTIVE SUMMARY

1. We are supportive of the overall direction that the Government is proposing in banding the Renewables Obligation (RO). This, taken in concert with a rejuvenated emphasis on energy crop co-firing, is a welcome step and one which we believe should assist in delivering greater savings in emissions of carbon dioxide (CO_2) than if no reforms were attempted.

2. It is, however, essential that the DTI recognises the difference between energy crop co-firing and non-energy crop co-firing in its proposals. Whilst the market for non-energy crops is fairly well developed, the market for energy crops is very immature and will only be developed with a sufficient level of 'market pull' through the RO mechanism.

3. Drax supports the Government's vision of developing a substantial biomass industry and suggests that this would only occur with long-term confidence amongst growers and suppliers on the long-term viability of an energy crop market.

4. Our analysis of the non-energy crop and energy crop markets suggests that two bands are required for co-firing – one for non-energy crops and another for energy crops. The supply curves for each material leads to the conclusion that, whilst non-energy crop co-firing should attract the support of a fraction of a Renewables Obligation Certificate (ROC) per megawatt hour (MWh), energy crops should attract a stable level of support of one ROC per MWh and that this support should be guaranteed for a significant period (up to at least 2012 and possibly up to 2016) in order to underwrite the necessary long-term supply contracts.

INTRODUCTION

5. Co-firing has emerged as a credible renewables technology and it is capable of making a significant contribution to savings in CO_2 emissions. Importantly, only limited plant enhancements are required in existing coal-fired generating plant to enable them to build a long-term presence in renewable energy; Drax itself has aspirations of generating 10% of the Station's output from renewable energy crop materials by the end of 2009 with potentially higher throughputs into the future.

6. The achievement of these targets will depend almost entirely on the outcome of the Government's current consultation. In Part 2 of this consultation response submitted in December 2006, Drax welcomed the proposal to remove some of the regulatory constraints which are inhibiting progress and, in particular, the proposal to 'uncap' energy crop co-firing.

7. We recognise that a significant biomass investment programme at Drax needs to be managed in parallel with the development of a competitive and sustainable UK biomass market. The Government's policy intent in this area has been to use co-firing plant to provide a sufficiently high level of contracts to 'kick-start' an embyronic biomass industry – a policy which Drax wholeheartedly supports and assists, and which is showing encouraging signs of success in Yorkshire and Humberside. Although the main focus for biomass within the RO should be on energy crops, we regard non-energy crop co-firing as an important, but short-term, technology which is part of the transition towards full energy crop co-firing.

8. It is important that Drax and all other coal-fired power stations assist in developing a thriving UK biomass industry of sufficient 'critical mass' to supply energy crops to the power stations at competitive prices over the next decade or two. However, the energy crop industry is currently immature and needs to be given long-term financial stability and support in order to develop into an industrial sector which can supply the nation's needs in an economic manner. Specifically, growers and suppliers need to be able to access long-term contracts (5-10 years) which will enable investment in new crop research, new biomass handling, drying and pelletising equipment and to enable at least a full cycle of growth of perennial crops.

9. Our response to Part 1 of the consultation focuses on co-firing and builds support for banding the RO.

CO-FIRING: A LONG-TERM PROPOSITION *(Addressing Q31)*

10. The conclusion of the recent Energy Review signalled some major shifts in the Government's thinking on the future role of coal-fired electricity generation. The most important of these was the recognition that coal-fired generation is likely to play a significant part in the UK energy mix going forward and, therefore, that Government policy will need to ensure that the environmental impact of this form of generation is effectively managed. As a result, this consultation, together with the forthcoming Biomass Strategy, provides the Government with an opportunity to clearly expound the view that biomass co-firing should be encouraged to play a long-term role in reducing CO_2 emissions from coal-fired power stations through the continued support of co-firing within the RO.

11. Co-firing is one of the most efficient ways of reducing CO_2 emissions from coal-fired power stations. The DTI-commissioned study (Themba Technology, 2006) investigating the carbon balance and sustainability issues surrounding co-firing concluded that "*from an avoided greenhouse gas perspective, the co-firing of biomass with coal represents one of the most effective uses of biomass resources for energy*".

12. It is worth considering the potential for co-firing if all coal plant were incentivised to burn biomass to the limit of technical feasibility. It is suggested that a 10% co-firing burn would be relatively easy to accommodate technically, but, doubling it to 20%, although still feasible, might require some investment in burner technology, mills and air distribution systems. Figure 1 below indicates the magnitude of the potential CO_2 reduction for these levels of co-firing set against the hoped-for reduction from on-shore wind. It is clear that the co-firing resource is of the same magnitude as wind and therefore deserves a similar level of Government support as a fundamental part of both the renewable energy and carbon abatement strategies.

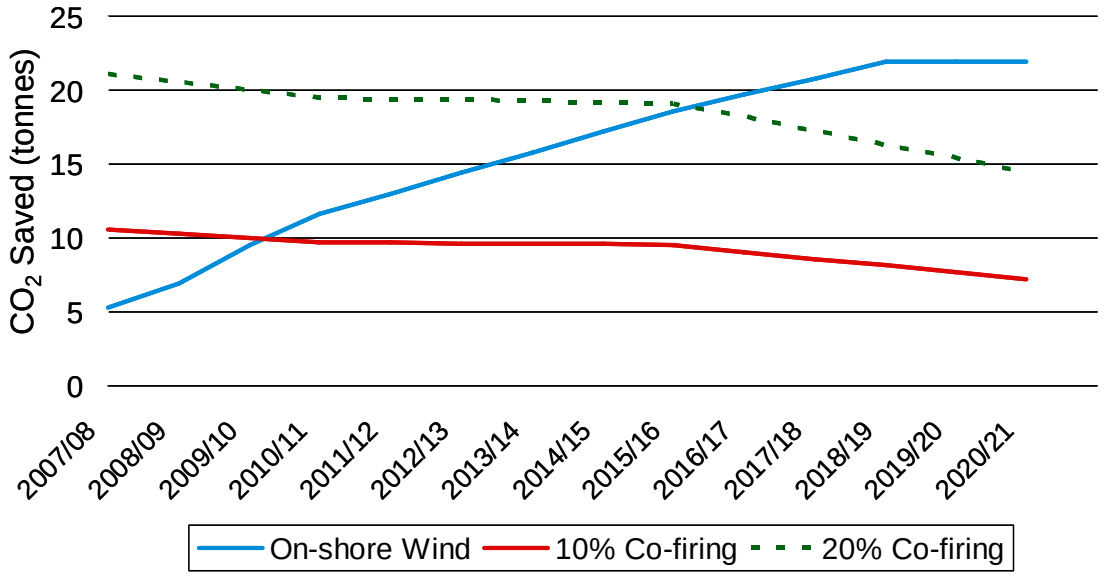

Figure 1 Estimated CO_2 savings: wind vs co-firing (Source: Drax Power)

CO-FIRING: CAPS VERSUS BANDING *(Addressing Qs 32, 33, 57 & 58)*

13. The overall objectives of reform to the RO are broadly consistent with Drax's own objectives to ensure a stable support mechanism to support its energy crop co-firing programme and encourage the uptake of co-firing at other coal-fired power stations. However, the complex interactions between the reform objectives and the proposed changes, and the differences in the underlying economic drivers for co-firing and other renewable technologies, mean that some thought is required to construct an RO banding regime that meets the Government's objectives while still providing a stable support mechanism for energy crop co-firing.

14. The RO co-firing arrangements were originally set in place primarily to develop energy crops and the period up to 2009 was seen as a preparatory period whereby generators would co-fire non-energy crops in order to obtain experience and set up the fuel supply chains ready for larger energy crop volumes arriving on site from 2009.

15. Drax's strategy is to secure significant quantities of energy crop to fuel its co-firing capacity. Drax believes that a base supply of energy crop biomass is essential to deliver sustainable biomass supplies over the medium to long term. However, given the nascent energy crop industry in the UK there is a requirement for a portfolio of such materials to be developed; it is unlikely that any single fuel will satisfy the requirements of the plant. Drax has already signed several long-term contracts with UK suppliers for energy crops, however, it is the start of a long process. Our principal management focus is on increasing the amount of biomass grown through contracts for energy crops with local suppliers for up to ten years.

16. We are hopeful that we can source most of our biomass fuel from the UK since this should be the most competitive and also the lowest 'carbon footprint' source. Although, to achieve this we need to help the UK industry develop sufficiently to meet our potential volume requirements. Imports of biomass and energy crop may be needed, particularly in the short term, if the UK agricultural industry does not gear up to provide the quantities required.

Energy Crops

17. Since the publication of the Government's Energy Review in mid 2006, Drax has been re-assessing the potential for energy crops suitable for co-firing. The focus has moved away from a slow build of energy crops with delivery in 2009 growing to a peak in 2011, as implied by the previous regulatory framework, towards a more immediate procurement programme which can only be achieved if annual energy crops are used.

18. This change in emphasis has turned attention towards annual crops which can be made available to co-firing plant such as Drax. However, this requires a re-think of the approach outlined in the IPA-Mitsui work, commissioned by the DTI in Summer 2006. As shown in Annex 1 (Confidential), the supply curve needs modification to reflect this change of focus.

19. The principle behind Drax's recommendations to the DTI in the Energy Review was to remove the uncertainty of access to ROCs as a result of the current volume caps and thereby to:

- encourage increased co-firing;
- enable greater volumes of energy crops to be contracted; and
- restore the short-term incentives to invest in energy crop development.

20. Specifically, Drax believed that the DTI should remove the volume constraints on ROCs (in particular those on energy crops) in the current Renewables Obligation Order (ROO) and work towards the option of introducing a fractional ROC regime for non-energy

crops, thus preventing 'flooding' of the ROC market by non-energy crops. We are, therefore, very supportive of the overall thrust of the proposals made in both Part 1 and Part 2 of this consultation and believe that the proposals will provide the necessary impetus to develop biomass/energy crops in the volumes anticipated or desired by Drax and other coal-fired power stations, and in so doing deliver both significant carbon savings and the development of a strong energy crop biomass industry in the UK.

21. Drax contributed to the DTI's commissioned consultation on biomass costs (reported as the IPA-Mitsui report in 2006) and concluded that, for an average priced energy crop biomass, a full ROC per MWh is required to support investment in processing, infrastructure and fuel supply chain establishment, as well as to mitigate against the risk that co-firing biomass might cause combustion problems initiating a costly drop in unit output. Such a conclusion is reinforced by this updated assessment which addresses the imperative of bringing forward the co-firing of energy crop biomass from 2009-2011 to 2006-7.

22. It is essential that the DTI recognises the difference between energy crop co-firing and non-energy crop co-firing in its proposals. The market for non-energy crop biomass is fairly well developed with access to extensive amounts of, for example, wood pellets, milled palm nut and olive residue. However the market for energy crops is very immature with only two well established crops – SRC Willow and miscanthus.

23. The supply curve for non-energy crops indicates that substantial amounts of co-firing fuel could be obtained fairly cheaply and in a way which is insensitive to the banding structure unless the non-energy crop band is set at a low level. However, in contrast the supply curve for energy crops (as shown in Annex 1 (Confidential)) is fairly steep, with only a few materials available in low volumes at prices which would be economic without a full ROC. This suggests that for energy crops the requirement for a one ROC per MWh band needs to be guaranteed for a significant period (say up to 2012 and possibly up to 2016) before a review of the underlying economics is undertaken.

24. With the energy crop market in its infancy, confidence amongst growers and suppliers is needed in order to establish the industry. This leads to the conclusion that energy crop co-firing will require a stable level of support in order to underwrite the long-term supply contracts that would be necessary to be signed with biomass producers. A fixed banding level would therefore best support energy crop co-firing.

25. There is a valid argument for energy crop band levels to be 'grandfathered' in order to reflect the long-term nature of the commercial arrangements underpinning energy crop co-firing. Many energy crop suppliers require either capital injection, equity support or long-term bankable contracts before crops can be brought to market in sizeable volumes. On the other hand, there is a now a mature and liquid market in non-energy crops, with these being freely traded internationally. There is no requirement for long-term contract support.

26. Unless the structure of the banding regime can reflect and respond to these differences between energy crop and non-energy crop, there is a risk that previously economic forms of energy crop might not be fully exploited and the UK agricultural sector would be adversely affected. There is, therefore, a need for the RO to stimulate energy crop development.

Non-Energy Crops

27. As indicated in Drax's previous consultation responses and confirmed in the Energy Review proposals, some co-firing, particularly that for non-energy crops, could be 'banded down' to some extent and still remain economically viable. As carbon prices increase, there could come a time when it will become economic to substitute coal by cheaper non-energy crop biomass without RO support. However, we are still some way from this situation, both in terms of carbon price and in the ability to identify large quantities of competitively priced biomass.

28. The IPA-Mitsui study on the economics of co-firing indicated that the volume of non-energy crop biomass available internationally will be sufficient to accommodate any reasonable expectations for the fuel requirements from UK co-firing. Although the report acknowledges that there are other competing uses for these fuel sources, these findings suggest that the supply curve for non-energy crop co-firing will be relatively flat, and therefore banding may not be an effective means of controlling the volume of non-energy crop co-fired ROCs entering the market, unless the banding level is set at very low levels. (Note that for energy crop co-firing, the IPA-Mitsui study suggests that there is a much greater variation in fuel costs as volumes increase and that this conclusion is fully supported by the data given in Annex 1 (Confidential)).

29. If there were a sufficient quantity of lower cost non-energy crop biomass fuel available then the only constraint on co-firing volumes would be the technical and fuel-handling capabilities of the coal-fired plant and hence there would be a potential for large volumes of co-firing to depress ROC prices. On the other hand, setting the band levels too low for co-firing would make it unattractive for coal-fired generators to continue co-firing and hence there could be a significant reduction in output levels. For this reason it will be even more important for the banding regime to be responsive to the underlying drivers on co-firing economics, although it is recognised that these drivers can be very volatile.

30. The implication of this is that, in order to maintain an incentive to co-fire, non-energy crop banding levels may need to be adjusted on a regular basis or set at a level high enough to accommodate any reasonable movements in the underlying economic drivers. On the one hand, the problem with setting conservatively high band levels is that it reduces the potential for banding to achieve any significant improvements in RO efficiency. On the other hand, regular adjustments in banding levels will introduce volatility into the number of co-fired ROCs in the market.

31. Drax recommends the provision of a band for non-energy crops which is sufficient to encourage significant volumes of non-energy crop co-firing but at a level which encourages co-firing of energy crops compared to non-energy crops. Drax's recommendation is that a flat band of (around) 2MWh/ROC is introduced for non-energy crop co-firing complemented by a band of 1MWh/ROC for energy crop co-firing. This would provide an incentive to co-fire general biomass but retain the incentive for companies with co-firing capacity to invest in the development of a sustainable energy crop industry in the UK.

32. An alternative might be to provide a band which is linked to carbon price. This is potentially complex since it would involve a yearly projection of future carbon prices. For example, if there is confidence that the carbon cost in a future year is projected to exceed a certain value, then the ROC value for that year's non-energy crop power would be adjusted downwards.

ENERGY CROP DEFINITION *(Addressing Qs 59 & 60)*

33. As indicated in Annex 1 (Confidential), there is the potential for material generated as part of bio-fuel manufacture to be defined as an energy crop for the purposes of the RO. It is our understanding that Ofgem intends rape meal (for example) to be counted as an energy crop where the corresponding oil is used as a feedstock for bio-fuel production. However, the current energy crop definition and audit procedures set out in Ofgem's guidance do not fit well with current UK agricultural practices for annual crops.

34. The guidance states that, "*the main intended purpose, at (or, in exceptional circumstances, very shortly after) the time of planting, for the crop must be for use as a fuel*." This guidance works well for perennial crops, such as SRC, which are fully contracted at the time of planting. However, it is difficult to implement at present for UK-grown annual crops such as rape seed. Although farmers may plant rape seed intending to sell it as a fuel, they

do not typically contract to do so. Instead they prefer to maintain the flexibility to sell opportunistically into an open market where the price seasonally fluctuates over time from the date of the harvest.

35. Hence there is a mismatch between current practice and Ofgem required practice which could be addressed in the RO reform process. Ideally all material produced from bio-ethanol or bio-diesel plant should be categorised as energy crop although a useful compromise would be for Ofgem/DTI to clarify the maximum length of time after a crop has been planted that the "main intended purpose" can be defined. Setting this time at the existing Rural Payment Agency deadline of the May following planting would bring the Ofgem guidance more into line with current market practice, while not disturbing the requirements for perennial crops.

36. In addition, the DTI is urged to examine the potential of the EU-defined concept of 'equivalence' whereby a generator would contract for a certain volume of fuel prior to harvesting, but, the actual origin of the material would not be known until harvesting/ subsequent delivery. This concept was introduced because of the significant environmental benefit which would result from being able to use local materials rather than to insist on transporting fuels long distances. It is currently being used for energy crops as defined under EU legislation and it has considerable potential value if it could also be applied to energy crops under the RO.

37. The risk that harvesting of miscanthus or SRC not grown for energy purposes could occur under a wider energy crop definition is, we believe, unlikely.

CONCLUSIONS

38. In summary, Drax draws the following conclusions:

- It is essential that the DTI recognises the difference between energy crop co-firing and non-energy crop co-firing in its proposals.
- Energy crops are the way forward for Drax and other coal-fired generators because they contribute towards the development of a UK biomass industry allowing security of long-term volume.
- Whilst the market for non-energy crops is fairly well developed, the market for energy crops is very immature and will only be developed with a sufficient level of 'market pull'.
- Energy crops grown locally require long-term contracts in order to stimulate the market and to encourage innovation in their development.
- Only a few energy crops are available, in low volumes, at prices which would be economic without a full ROC. Hence, co-firing with energy crops will require a stable level of support of 1 ROC per MWh in order to underwrite the necessary long-term supply contracts.
- There is a case for grandfathering banding levels for energy crops in order to reflect the long-term nature of the commercial arrangements underpinning energy crop co-firing.
- Non-energy crops can be procured without the need for long-term contracts, in a form that requires little processing and at prices significantly cheaper than the bulk of energy crops. A fractional RO band should be introduced which encourages significant volumes of non-energy crop co-firing without 'flooding' the RO market; this should be around 2MWh/ROC.