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Air Products

Response to Electricity Market Reform Consultation

Executive Summary

1. Background

- 1.1 Air Products is seeking approval to build a 49MW power plant on Teesside. The proposed facility would use advanced gasification technology to provide renewable electricity for up to 50,000 homes in the North East. The project will create between 500 and 700 jobs during its construction and 50 permanent jobs once it enters commercial operation.
- 1.2 Air Products justified the investment in the UK market based on the current government policies and incentives designed to promote renewable energy generation. While we support the ultimate goal of the Electricity Market Reform Consultation, we hope the uncertainty this process creates to investors in larger projects is addressed as soon as possible. We also hope it is recognized that certain policy changes under consideration could result in investments such as ours being no longer economically justifiable.
- 1.3 The project is currently at the planning stage, with a planning application that has been submitted to Stockton Borough Council on Feb. 15th 2010. We anticipate that the plant could be on-line by early 2014. Air Products expects the success of the plant to lead to the construction of 2-4 additional advanced gasification plants.
- 1.4 Air Products has been an investor and employer in the UK for over 50 years and has built leading global positions in markets such as semiconductor materials, refinery hydrogen, natural gas liquefaction, industrial gases, and advanced coatings and adhesives. Air Products is listed in the FTSE4Good and the Dow Jones Sustainability indices and has operations in over 40 countries, employing about 19,000 people around the world. We currently employ over 1600 people in the UK and Ireland. Wherever Air Products operates, we have earned a reputation for providing environmental and energy solutions that are safe, reliable and cost-effective.
- 1.5 If the proper incentives and policy framework can be established or maintained, we believe the UK has the potential to be a global leader in the development of sustainable energy production and technology with all the corresponding benefits to the UK public and the environment.
- 1.6 The following comments and suggestions are our attempt to advise the government on the policy and incentive framework needed for a global investor and employer such as Air Products to maintain our confidence in the UK renewable energy market. We would be pleased to answer any additional questions or provide additional information as might be helpful.

2. Advanced gasification technology

- 2.1 Advanced gasification produces energy from post-recycled waste. The Teesside plant will process between 300,000 and 350,000 tonnes of waste per year. Unlike other energy-from-waste technologies, such as incineration, the waste is thermally treated in an atmospheric pressure gasifier to produce "syngas" which is then processed and used to fire gas turbines to generate electricity.

- 2.2 After an extensive review of various technology options, Air Products selected plasma gasification because it is the most efficient energy-from-waste technology and has a favourable environmental impact. This gasification technology has been tried and tested overseas, but the Teesside plant will be the first of its kind in the UK.
- 2.3 The level of carbon emissions will resemble those of a combined cycle gas-fired power station (CCGT). The technology is more efficient than incineration and the syngas is “scrubbed” to remove particulates and impurities.
- 2.4 In addition to the favourable carbon and environmental aspects of the technology, advanced gasification also:
 - Provides the United Kingdom with renewable baseload power
 - Helps the United Kingdom meet its obligations on minimising landfill
 - Reduces carbon emissions from landfill
 - Has the potential to produce hydrogen for use as a road transport fuel in the longer term
 - Allows for regional plants to be built around the country and provide the low transmission costs of decentralised supply

3. Electricity Market Reform

- 3.1 In order to proceed with the project in Teesside, Air Products requires certainty over its return on investment. Based on the current price of a Renewables Obligation Certificate, and gasification qualifying for double ROCs, Air Products has a viable business case for investing in the Teesside plant.
- 3.2 Air Products will be seeking some form of renewable energy support in 2014. Assuming that the banding review maintains two ROCs per MWh for gasification, Air Products would apply for RO pre-accreditation in Summer 2010 and full accreditation in late 2013/early 2014 and the project would go ahead under this system.
- 3.3 If the ROCs per MWh for gasification were downgraded in the banding review then this will affect the viability of the project. If a new system of Feed-in Tariffs was introduced in 2014, then we may look to that as an alternative if the compensation amount is comparable to that of the current banding for advanced thermal conversion technologies such as gasification (two ROCs or roughly 90 GBP/MWh for the renewable power portion in 2014).
- 3.4 Assuming that the benefits of advanced gasification continues to be recognised under the Renewables Obligation, we would support a continuation of the RO with the target and headroom concept as it gives us revenue certainty. A fixed ROC might also be acceptable if the banding was maintained as consistent with the current banding (two ROCs for advanced gasification).
- 3.5 We recognise that the government has proposed that Feed-in Tariffs replace the RO. In this case, our preference would be for a system that gives certainty on revenue as advanced gasification plants will have fixed inputs so we will be unable to respond easily to fluctuations in the electricity price. Air Products would therefore favour a Fixed Tariff over a Contract for Difference and a CfD over a Premium Tariff, with a number of caveats.
- 3.6 FiTs would need to deliver at least the same level of financial support for advanced gasification as the technology currently enjoys under the RO.
- 3.7 We note that the government is considering both a centralised decision making process on this or a system of auctions and tenders. Assuming that gasification continues to be recognised at the same level under the RO, we would favour a continuation of centralised setting of support levels. We would urge the government to seek to ensure that the level of support under FiTs matches that of ROCs as far as possible. In contrast, a system of auctions or tenders would create uncertainty in the short term which would delay investment decisions.
- 3.8 If the government opts for auctions or tenders, then there is a risk that emerging technologies such as ours may not receive a sufficient level of tariff due to caution by the market. We would support a mechanism within the auction system that would mitigate this risk.
- 3.9 An auction or tender system may not recognise the additional benefit that advanced gasification offers in diverting waste from landfill, some significant carbon savings, or the fact that advanced gasification provides baseload, renewable power. If an auction system were put in place, it would need to recognise these additional benefits. In this scenario we would argue that a banding system would need to be put in place wherein technologies offering similar benefits are grouped together.
- 3.10 If auctions or tenders are the preferred mechanism, they should take place at an early stage of a project's development, in order to give investors the confidence to engage in the process and bring their project forward.
- 3.11 Given the variation in renewable technologies and the scale of different generators, a one-size-fits-all CfD could benefit certain technologies and generators that can negotiate a higher electricity price at the expense of others. Air Products would favour a technology-specific system similar to the top-up system recommended (per technology) that would mitigate the potential for smaller generators or generators employing an emerging technology in a weaker market position to be put at a disadvantage.

Response to Consultation Questions

Current Market Arrangements

1. Do you agree with the Government's assessment of the ability of the current market to support the investment in low-carbon generation needed to meet environmental targets?

We believe that the current system of the Renewable Obligation recognizes the cost and benefits of advanced gasification which is why we have chosen the UK to develop projects. We believe the UK could partially meet its obligation for renewable power if given enough time for emerging technologies to develop. Providing technology specific certainty of financial support and consistent support across other government agencies such as Ofgem and the Environment Agency is the key to securing investment in any renewable technology, especially advanced gasification.

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

We agree that that UK could be heading for a power shortfall and that there must be a variety of technologies, carbon-based and low-carbon, to meet the energy security and renewable energy needs of the UK. The contribution of renewable energy projects to overall energy security can be enhanced by emphasizing baseload technologies with a consistent, reliable feedstock (such as waste); particularly ones that have a favourable environmental profile such as advanced gasification.

Feed-in Tariffs

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

Assuming the same premium is maintained for emerging technologies such as advanced gasification, we agree with these pros and cons with one comment: under CfD, smaller generators or generators using an emerging technology with a weaker market position may be put at a disadvantage if they are in a weaker bargaining position. A potential con with the FiT system may be the decreased interaction between generators and suppliers.

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

Assuming that the benefits of advanced gasification continue to be recognised under the Renewables Obligation with a double ROC, we would support a continuation of the RO in its current form as it gives us revenue certainty about the return on investment.

We recognise that the government has proposed that Feed-in Tariffs replace the RO. In this case, our preference would be for a system that gives certainty on revenue as advanced gasification plants will have fixed inputs so will be unable to respond easily to fluctuations in the electricity price.

Air Products would therefore favour a Fixed Tariff over a Contract for Difference and a CfD over a Premium Tariff, with two main caveats.

- a) That the fixed price is of comparable compensation (approximately £90/MWh for renewable portion of power) to the current double banding.
- b) That there is some guarantee on the longevity of the tariff (i.e. 20 years as is for the ROC scheme).

We are also concerned that the reputation of FiTs could be undermined by potentially problematic experiences of their use in promoting microgeneration.

5. What do you see as the advantages and disadvantages of transferring different risks from the generator or the supplier to the Government? In particular, what are the implications of removing the (long-term) electricity price risk from generators under the CfD model?

The implication of removing electricity price risk from generators under the CfD model is the potential for greater investment as long as the price is set high enough to cover the costs of new developments.

6. What are the efficient operational decisions that the price signal incentivises? How important are these for the market to function properly? How would they be affected by the proposed policy?

As a baseload generator with fixed, contracted inputs (waste), Air Products will be unable to alter its output in response to price signals.

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

We agree that in theory the cost of capital will be lower under the Fixed Tariffs and the CfD than under the Premium Tariff but the government should consider the effect of introducing a new system on investor confidence or on the potential to reach its renewable energy targets.

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

We believe that the Fixed FIT will provide the greatest certainty, thereby making financing easier to secure.

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

Advanced gasification will produce a stable baseload power output so certainty of revenue is of overriding importance. Fixed tariffs would provide this as would CfD under the right conditions of the value being comparable to that of double ROCs. We would support CfD if there was a mechanism to provide comparable value to double ROCs and if they could be guaranteed for long term periods as the ROCs are.

However, there is currently not enough information available about the levels of support to make a proper assessment. Ultimately, it is essential that the process is streamlined and predictable.

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

For regional scale gasification projects, we need a long term power contract (20 years) with price certainty to justify investing. The ROCs with banding should be used as the basis of setting the price in the market to ensure as much continuity as possible.

Capacity

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

No (see below under 20. and further).

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

Any implementation of this policy seems a reversal of the market liberalisation introduced during the 1990s and is not considered to be required as there are existing mechanisms like Short Term Operating Reserve (STOR) that should be able to provide sufficient reserve capacity.

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

It is important to understand how the costs associated with this mechanism are funded before the effects on wholesale electricity market prices can be determined. Additional reserve capacity may decrease the market price level and volatility, but not if the associated costs are passed through by the generators into the wholesale price at full opportunity cost (as has happened with allowance costs under the EU Emissions Trading Scheme).

22. Do you agree with Government's preference for the design of a capacity mechanism:

- a central body holding the responsibility;
- volume based, not price based; and
- a targeted mechanism, rather than market-wide.

Targets set by central bodies may result in under- or over-allocation of capacity which exposes users to increased risk or additional cost.

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

Continued and increased efforts to facilitate the inclusion of demand-side response in existing mechanisms for providing reserve capacity (STOR, FCDM, etc.) seems to be a more economical option to achieve similar or better results than suggested capacity mechanisms.

Implementation Issues

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

If the mechanism for setting the CfD level is not designed carefully, some technologies might not be rewarded at a level that reflects their benefits in comparison to other technologies. The main difference between the CfD and other models is that small renewable energy producers or those producers with emerging technologies may be under-rewarded by taking a lower than average electricity price as a result of their weaker market position. Technology-specific auctions may mitigate this to some extent.

31. Do you have views on the role that auctions or tenders can play in setting the price for a feed-in tariff, compared to administratively determined support levels?

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

We would oppose the use of an auction on the grounds that it would not reflect the strengths and weaknesses of different technologies, in addition to the cost of energy production. If a tender system is put in place there needs to be a banding system to reflect the fact that technologies offer different benefits, in addition to simply producing renewable energy. Moreover, there should be a floor price in any auction/tender system that would give some level of certainty to renewable energy generators.

There are limitations to what the market can achieve. Caution around emerging technologies might mean they do not enjoy the confidence required by the market to support a sufficient level of tariff. For example, advanced gasification technology is more costly than older less efficient energy to waste technologies. As it is increasingly commercialised the costs of the technology will fall, but in order to lay the groundwork for expansion of the technology there should be a mechanism to support new technologies such as advanced gasification.

The Government should ensure there is a premium for emerging technologies that meet the UK's climate change, energy security, and landfill objectives on top of any market-set rate for renewable electricity.

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

Ideally, support for low carbon technology should be paid per unit of output and be differentiated by the net carbon savings of each technology. In reality, information in the market is limited and it may not recognise the additional benefits that a technology can provide aside from direct carbon benefits. This may lead to only a handful of established technologies and generators benefiting disproportionately from the system.

For example, advanced gasification diverts waste from landfill – while it emits carbon as it produces electricity, it also removes carbon emissions that would otherwise be emitted through landfill of the same waste. Additionally, advanced gasification is the energy from waste technology that is most efficient at generating power. These and other benefits of lower carbon emissions, more inert co-products, and energy product diversity should be recognised in the setting of a FiT and a technology neutral approach may not do so. Therefore we would support a technology-specific approach.

- **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?**

We would support a series of premiums on top of a basic contract for difference that rewarded the additional benefits provided by advanced gasification. This would have the added benefit of enabling the government to continue a similar level of reward to the one under the RO.

- **Should prices be set for individual projects or for technologies?**

We would be in favour of prices being set by individual technologies, rather than individual projects. Setting by technology would allow prices to take into account additional benefits of a technology such as carbon emission savings, but avoid the extra administrative burden created by setting the price project by project.

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

We agree with this assessment and therefore support grandfathering of the RO, the bringing forward of the RO banding review and the maintenance until 2017 of the RO for new projects.

35. 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?

Air Products has submitted a planning application for the approval of a 49 MW advanced gasification plant. The plant is the first of its kind in the UK and represents a considerable step forward in terms of efficiency in turning waste into energy. This is the first of several such plants that we plan to build in the UK, all of which will bring new investment into the area they are constructed; create jobs both in construction of the plants and in operation; generate safe, baseload renewable energy; and help to tackle the UK's waste problem.

In order for us to take this project forward we need certainty around the incentives for producing renewable energy. Our expectation that the plant will be up and running by 2013-14 means that it falls in the period of proposed transition away from the RO to a system of FiTs. To help us make the necessary decisions to invest in this and additional plants, we require a clear idea of the level of support that advanced gasification can expect to enjoy post-2014.

36. We propose that accreditation under the RO would remain open until 31 March 2017. The Government's ambition to introduce the new feed-in tariff for low carbon in 2013/14 (subject to Parliamentary time).

Which of these options do you favour:

- **All new renewable electricity capacity accrediting before 1 April 2017 accredits under the RO;**
- **All new renewable electricity capacity accrediting after the introduction of the low-carbon support mechanism but before 1 April 2017 should have a choice between accrediting under the RO or the new mechanism.**

We would prefer to have a choice between the RO and the new mechanism in case the certainty and amount of revenue stream is improved in the new mechanism. This assumes that carrying both systems can be managed effectively in parallel.

37. 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?**

Grandfathering of advanced gasification under the RO is essential for Air Products to go ahead with their Teesside project, and we welcome the government's decision to do this.

However, the final option available to non-grandfathered technologies suggests that projects could move from support from ROCs to the new scheme. We would like to clarify whether existing projects would be able to move from ROCs to a FiT model of support.

38. Which option for calculating the Obligation post 2017 do you favour?

We would prefer a fixed price for ROCs that is comparable to current prices for advanced gasification first and then the option to continue using target and headroom and as a second preference a fixed price for ROCs. We are opposed to only using the headroom because we are concerned that it could lead to a decline in the value of ROCs over time.