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Our ref.

Call for Evidence on the Role of Gas in the Electricity Market

Executive summary

- DONG Energy finds the **Gas Strategy timely and important** in reaching the long term policy goals of the Government.

- DONG Energy believes **gas fired power generation is essential** in the process of decarbonising the economy, enhancing security of supply, because gas fired generation:
  - is an attractive companion to variable renewables production.
  - is highly efficient, low CO_2 emitting and flexible in responding to variable net demand.
  - can be established at relatively low capital costs and therefore entails limited policy lock-in, thus enabling phase-in of new technologies as they develop.

- DONG Energy believes that a **well-diversified gas supply** provides the best basis for gas in the electricity sector. In this regard domestic production will continue to play an important role if a continuation and further strengthening of incentive schemes for establishment of **new domestic sources of gas** production and related transport infrastructure is provided.

- DONG Energy, while applauding low carbon policy measures like the Carbon Floor Price and the Emission Performance Standard, is **concerned that current market and regulatory frameworks do not support gas fired power** and would offer the following recommendations.

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Recommendations:

- Maintain and develop the initiatives to support higher CO_2 prices to ensure investment incentives are aligned with climate goals.

- Make the value of flexibility clear to generators preferably through clear price signals and market based system services or alternatively through a targeted capacity mechanism to flexible, efficient and low CO_2 emitting capacity. A market wide capacity mechanism to all technologies regardless of their capabilities might be counterproductive in respect to the climate goals and future system operation.

- Improve liquidity and competition in the wholesale market through a self-supply restriction with separation of the trading department of generation and supply that incentivise vertically integrated companies to trade openly or through a 40-50% trading obligation through gross bidding arrangements.

- Consider other measures to support the process of decarbonisation via fuel switching, such as a coal tax as introduced in the Netherlands.

DONG Energy would be pleased to discuss any of the issues raised in the call of evidence response in the Appendix and look forward to engaging with DECC and others on this.

Should you have any questions relating to our response, please contact either Danielle Lane on 020 7811 5200 or Jakob Forman on +45 99 55 91 66.

Yours sincerely

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Appendix

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About DONG Energy

DONG Energy is one of the leading energy groups in Northern Europe. We are headquartered in Denmark. Our business is based on procuring, producing, distributing and trading in energy and related products in Northern Europe. We have approximately 6,000 employees and generated DKK 57 billion (£ 6.2 billion) in revenue in 2011.

In the United Kingdom DONG Energy is one of the most active offshore wind investors and operators with a total capacity of approximately 5 GW, including four offshore wind farms in operation, a stake in further four sites currently under construction and a strong pipeline of future projects.

In thermal generation, DONG Energy is operating the highly efficient CCGT power station Severn near Newport in South Wales. The new energy-efficient gas-fired power station has the capacity to generate up to 824 MW net of electricity.

This spring we established DONG Energy Sales UK with an annual supply of around 2.5 billion cubic metres of natural gas after acquiring the gas supply business Shell Gas Direct.

The DONG Energy UK oil and gas exploration and production activities started in 2001 upon being awarded three exploration licences. Today the portfolio includes 24 UK licences. DONG Energy is one of the largest acreage holders West of Shetland. We are a partner in the Laggan and Tormore gas discoveries and have a number of other West of Shetland developments in the pipeline.

Developments of the UK electricity and gas market arrangements and structures are very important to DONG Energy both in terms of present generation capacity and oil and gas production, but certainly also for our significant future investment programme.

a) What are the main strengths and weaknesses of gas generation in helping deliver a secure, affordable route to decarbonisation through to 2020 and then by 2050?

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DONG Energy fully support the Government's objectives on delivering climate friendly, secure and affordable energy. These objectives reflect the DONG Energy vision of decarbonising our production mix in Northern Europe and during the next 30 years cutting our CO_2 emissions per produced KWh to 15 per cent of the current level.

Gas generation as the cost efficient flexibility provider

As the most environmentally friendly fossil fuel natural gas can play a major role as a complement to renewables in the process of decarbonising the power sector. Natural gas makes the journey reliable. It is available and can be stored.

Efficient gas fired power plants offer a significant reduction in carbon emissions compared to coal. In a future with a significant integration of renewables, gas generation is the cost efficient supplier, serving the increasing need for flexibility to guarantee grid stability and security of supply. Gas fired power plants can be switched on and off at short notice, making gas fired generation the fuel of choice to accommodate sudden changes in electricity demand and supply.

Gas generation plants are a well proven technology that can be constructed with relatively short lead times and at comparatively low capital expenditures. With gas fired power plants there will be no long term lock-in of environmentally unsound or expensive technologies and gas generation would thereby enable the phase-in of new technologies as they develop.

The role of thermal generation is, however, likely to change due to the greater deployment of variable renewable generation, making the ability to operate in a flexible and responsive manner increasingly important. The nature of e.g. wind generation could make flexible generators more reliant on short-term trades and ancillary service revenues. It is therefore crucial that these markets and systems are well-functioning, liquid and transparent.

In short, gas generation – more than any other fossil fuel generation technology - complements the environmental attractiveness of renewables, while ensuring continuity of energy supply for the consumers.

b) What role can gas fired generation play in the future and what level of gas generation capacity is desirable?

The increase in the share of supply from variable renewables will change the nature of the power system. The system will still require that supply and demand balance continuously to remain stable and this can be secured through different means:

I. One being sufficient flexible capacity on the system to meet fluctuating net demand, i.e. demand not already served by the output of variable renewables.
II. Another being demand side management that can make a significant contribution when demand with intelligent systems and smart meters becomes price responsive.
III. In addition physical market coupling through interconnectors will enhance the access to a larger pool of balancing resources.

Flexible capacity
With the new generation mix it will be more volatile and costly to balance the system if the dispatchable resource base continues to be dominated by unresponsive generation. While having sufficient firm capacity to meet peak system demand remains necessary, it is no longer sufficient to the task of delivering power system reliability at least cost. Therefore, the quantity of firm capacity no longer constitutes the sole basis upon which resource adequacy should be determined. Put another way, the most challenging threat to reliability is no longer overall peak system demand, but the changes in opposite direction of demand and variable supply sources.

As mentioned before gas fired generation has a key role to play as an obvious flexibility provider for balancing the system and contributor to security of supply. It will, however, be a challenge for gas fired generation that the annual load factor i.e. the running hours will be significant lower than today.

It is therefore important that the future electricity market design ensures that existing and new capacity and resources have the right capabilities. The nature and value of the required dynamic capabilities from both supply and demand should be apparent to the investor. At the same time the resources that do not possess the required flexibility should not be incentivised in the same way.

Demand side management
Additionally, demand side management (DSM) should play a role in balancing the electricity system in the future. It would, however, still take some years before DSM can make a significant contribution and even then it would not cut all peaks and eliminate volatility. DSM would help short-term balancing, but would probably not meet the longer-term back-up requirement in a significant manner.

Interconnectors
In order to enhance the decarbonisation of the power sector at least costs it would also be important to tap the benefits of physical market coupling through interconnectors. Experiences in other North European electricity markets show that being well interconnected to the surrounding markets enables a cost efficient integration of high shares of renewable generation. An interconnector between the UK and Denmark would be a natural step in the integration of markets in the North Sea area. Such a connection would make it possible to exploit renewables more optimally as eg. the wind profiles vary across the region. At the same time, the aggregate need for back-up capacity would be reduced as the same flexible capacity can be used in multiple regions. Thus, an interconnection between the UK and Denmark would increase the share value of renewables and be beneficial for security of supply.

Level of gas generation
In the described future power system the desired level of back-up gas fired capacity is complex to forecast. It is a fact, however, that National Grid already now requires a significant amount of flexible capacity to balance the grid.

It is important that the right products for back-up and system services are defined in a transparent manner and that the needed level of capacity to balance the integration of renewables is priced on market terms.

The right level of gas generation capacity would then be set by the market.

c) What are the key factors driving the economics of investing in new gas-fired power generation and how are these factors likely to change?

In broad terms DONG Energy agree with the analysis put forward in the call for evidence background paper on the difficult situation for gas fired generation within the present framework.

The key factors driving the economics of new gas-fired generation are in short the investment costs, electricity prices, gas price, CO_2 price, relative fuel costs, operational and maintenance costs, transmission network use of system charges, balancing services use of system charges, insurance and decommissioning costs.

Market signals
In the current fuel and CO_2 price environment, gas-fired generation usually has higher variable costs than coal. Further, the economic recession is squeezing electricity demand and prices in general.

The CO_2 price is not at the moment sending any signal to the market to start decarbonising the economies in Europe, because of oversupply of EUAs. While acknowledging the Government's introduction of a carbon floor price the present CO_2 price level will not be sufficient to guide new investments in gas generation.

Operational regimes for power stations such as gas-fired CCGTs will become erratic and annual load factors will decrease. Wholesale prices are likely to become increasingly volatile and the risks to investors in gas generation could increase. Therefore there is a need to price the system services that flexible generation can provide. A smaller share of the total revenue will in the future come from the wholesale market and more will have to come from intraday and balancing markets, and ancillary services.

When looking at the investment climate, certain other factors also come into play.

Well-functioning markets
The present market condition with a lack of liquidity in the wholesale market preventing efficient hedging will impede independent generators in particular from making new investments.

Regulatory certainty
The policy framework and regulatory stability is also of major importance. The potential introduction of a capacity mechanism is creating further uncertainties. Additionally, the plans for a market wide model with capacity payment to all will not necessarily benefit gas generation as further developed below.

d) What barriers do investors face in building new gas generation plants in the UK? What are the key regulatory uncertainties that may prevent debt and equity investors making a final investment decision in gas generation and supply infrastructure?

The number and the magnitude of the regulatory changes in the UK power sector is creating a large degree of uncertainty to all investments. It is getting complex and difficult to forecast normal market dynamics and to value potential investments.

Capacity mechanism
One key uncertainty is embedded in the design of and potential implementation of a market wide capacity mechanism.

DONG Energy believes that resource adequacy and security of supply would be most cost efficiently delivered through well-functioning wholesale markets with sufficient liquidity, where investment incentives and price signals are transparent and trustworthy to all investors in the market. A market wide capacity mechanism is likely to reduce wholesale electricity prices in an unpredictable way because the capacity element that is currently inherent in the electricity price will be paid for through the capacity payment.

There is a significant risk that the market wide capacity mechanism can make gas generation investments more difficult. If all generation in the market are paid for by

capacity, including inflexible, high CO_2 emitting technologies, this will most likely keep these inefficient technologies online for a longer period. This would postpone the investments in new flexible and highly efficient gas generation and result in higher CO_2 emissions.
Instead dynamic capabilities and flexibility needed to deliver system reliability in the long term should be valued in order to get the right investments for the future.

Further there is a concern that if wrongly designed, the capacity mechanism will conserve the present strong vertical integration, which makes it difficult for independent generators to compete on equal terms. One of the design options the reliability option has a key challenge in this respect.

Lack of liquidity
Another barrier and key regulatory uncertainty relates to the lack of liquidity in the UK wholesale market.
The UK electricity market arrangement that was designed for liquid traded markets has unintentionally led to a trend of significant vertical integration. The consequent large portion of self-supply and internal trades leaves no incentive to trade openly and is the main cause of lack of transparent price discovery to the consumers, suppliers and generators, as well as low liquidity in the open market. Low liquidity in the wholesale electricity market has for many years acted as a barrier to effective competition and to investments by independent generators e.g. in gas generation.

The recent initiatives taken by some companies to trade in the day ahead auction, while being a positive development, seem uncoordinated, too fragile and slow moving to create a robust day ahead price that can successfully be used for financial forward hedging products. Hence, there is a need to have more attention on making market improvements and focusing on increasing liquidity in the different electricity market, forward, day-ahead, intraday, and balancing.

DONG Energy believes that a self-supply restriction with a separation of the trading department of supply and generation would solve the fundamental market structure problem, incentivise vertically integrated companies to trade openly and solve the liquidity problem. Alternatively a well-functioning market could be facilitated through a requirement of a minimum of 50% gross bidding on the day ahead auction by the vertically integrated companies and mandatory market making on the curve in order to develop financial hedging products.

e) Are there any other policy issues that need to be addressed beyond the Government's proposals for the capacity mechanism and the EPS?

We have commented on the capacity mechanism above.

In terms of the EPS, DONG Energy applauds this policy tool to enhance investment in the most climate friendly technologies including gas.

Certain other instruments can have an even more immediate impact on guiding the market towards investments in a more climate friendly direction, such as the coal tax recently introduced in the Netherlands.

In general there is a clear need for clarity on policy direction and regulatory interventions. Regulatory uncertainty and instability inevitably put a hiatus on investments.

f) Given a continuing role for gas and the potential for increased volatility in gas demand, to what extent is gas supply and related infrastructure a barrier to investment in gas fired generation? What impact will unconventional gas have on the case for investing in gas generation and the supporting infrastructure?

Gas supply

Gas generation relies on flexible, stable, secure and cost efficient gas supplies. DONG Energy believes that a well-diversified gas supply provides the best basis for gas fired generation. It is therefore important to have enabling framework conditions for bringing gas to the market.

The UK has historically had a large domestic gas production sector, and very significant gas reserves remain, both in mature and more unexplored basins. However, such reserves are frequently very costly to develop and/or found in remote locations. The benefits of domestic gas production in terms of security of supply, economic benefits to the nation and flexibility are obvious, and it would therefore be incumbent on the government to ensure the continued viability of domestic gas production. In view of the challenges faced, a continuation and further strengthening of incentive schemes for establishment of new domestic sources of gas production and related transport infrastructure is required. The policy framework and regulatory stability is also of rising importance to the gas producing sector, given increasingly long development lead times and escalating costs.

Flexible gas transmission

Flexible operation of gas fired generation in the future also requires flexible gas supply, not least in the short term. It is important that National Grid is required to optimise their operation of the transmission grid to maximise flexibility in gas supply. Further, there is a need to optimise the interplay between distribution networks and National Grid in order to facilitate gas supply flexibility for gas generation, which is embedded in the distribution network. Already now this is causing problems for gas generation in delivering flexible outputs for the electricity balancing mechanism. On this basis there is a need for the rules on gas transmission to be revised from a holistic viewpoint.