DECC's call for evidence on the role of gas in the electricity market

SSE response

28 June 2012

1. 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?

Electricity generation from natural gas can play an important role in the power sector through to 2030 and beyond. In the short term it will replace aging plant and those closing as a result of emissions directives, thereby ensuring security of electricity supply and providing a lower carbon alternative to coal. In the medium to long term it will provide secure, reliable capacity to support intermittent and inflexible low carbon technologies.

Gas generation has a number of strengths:

- It is a proven, well established technology that investors understand and are comfortable with.
- It has ever improving efficiency levels (H and J class units with generation efficiencies of up to 60% are currently being deployed).
- It is lower carbon than other fossil fuel, ie coal and oil generation and is therefore a good short to medium solution for emissions reduction.
- It provides reliable 'firm' capacity
- It can also be used to reliably load follow, which will be an increasingly valuable characteristic as the UK decarbonises its power sector.
- It has one of the lowest levelised costs of generation and, depending on constraints eg planning, it can be relatively quick to develop and build.
- The global market for gas continues to develop, coming from a wide range of geographic sources.

It must be stressed that whilst gas is lower carbon than other fossil fuels its use does result in significant carbon emissions. Therefore if significant amounts of unabated gas generation are running at relatively high load factors in the 2020s and 2030s then it will be extremely challenging to meet 2030 power sector decarbonisation ambitions and subsequent 2050 binding carbon reduction targets. Even in a scenario in which half of all the UK's electricity output is zero carbon, eg nuclear and renewables and the other half is highly efficient gas generation, then it will still be challenging to decarbonise the power sector much below 150g/kWh. This illustrates the importance of developing gas CCS and ensuring there is suitable economic support in place for its deployment as well as appropriate incentives in place for other low carbon technologies.

In addition there are a number of other challenges associated with gas generation in the UK:

- A dependence on gas generation to provide firm capacity is likely to leave the UK increasingly reliant on a single fuel. This makes the UK more exposed to imports and global gas prices, which, as demand from the rest of the world rises, could lead to increasing volatility and costs.

- Whilst it can be quick to build, the planning process (for Major Infrastructure projects) has been extending the length of time to develop and construct some new CCGT to around six or seven years.

- The UK will have an increasing dependence on gas imports. Currently there is sufficient import infrastructure to meet peak day demand requirements. This is dependent on physical gas flows and having confidence in international traded gas markets.

- There are also concerns as to whether the upstream supply chain of gas generation components will be able to cope with the increase in worldwide demand that may come forward in a short space of time, thereby increasing volatility and overall costs.

2. What role can gas-fired generation play in the future and what level of gas generation capacity is desirable?

In the medium to long term gas generation can provide secure, reliable, flexible capacity to support intermittent and inflexible low carbon technologies – effectively back-up capacity to pick up any shortfalls in supply. As more low carbon plant comes onto the system, gas generation will run at much lower load factors than it has done traditionally.

In terms of quantity, the UK will need enough 'firm' capacity to meet peak demand and provide an adequate capacity margin. Given that new unabated coal- and oil-fired generation are effectively precluded by cost and emissions legislation, it is almost certain that it will be gas generation that is used to supplement and replace existing firm capacity. The final figure will clearly depend on a number of factors including the deployment and capacity factor of low carbon technologies and the Government's decision on an acceptable capacity margin.

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

Currently, expectation of future spark spread – the measure of profitability for gas generation – is the key driver for investment. The level of spark spread is driven mainly by the expected generation capacity margin, which is currently over 20%. As such the market is currently oversupplied, driving down prices and reducing profitability. Low gas generation profitability is further exacerbated by the comparably high profitability of coal, measured by dark spreads.

As illustrated in DECC's analysis[1], spark spreads are currently less than £5/MWh and have been on average below £10/MWh for a few years. These spreads are currently much lower than would be required to make an investment in a new CCGT economically viable, and have actually forced some existing gas plant to either mothball or close as they have become loss-making.

Spark spreads look likely to improve slightly in 2015/16 as both coal and some older gas plant begin to come off the system as a result of age and EU Directives. However even the forecasted spark spreads for this period would be marginal for

[1] DECC, 2012. A call for evidence on the role of gas in the electricity market.

new plant and are therefore unlikely to encourage much, if any, additional investment in new gas generation. In addition, the growing appreciation of the "missing money"-related risks associated with the GB energy market is likely to reduce investors' willingness to fund new gas generation projects in GB. This risk is heightened by the potential competitive disadvantage that gas generation in the UK will face due to the carbon price floor.

Going forward the problem of low spark spreads is compounded by more uncertain future revenues for gas generation as a result of increasing quantities of low carbon, low marginal cost generation coming onto the system. Gas generation will have fewer, less predictable running hours than it does currently. Investors are therefore faced with:

1. Low profitability in the market currently

2. Uncertain, unpredictable returns in the future even if profitability improves.

This uncertainty is one of the main reasons behind the proposed introduction of a capacity market – a mechanism intended to improve revenue certainty and deliver a concise investment signal to investors going forward – a move which SSE fully supports. The capacity market must support both existing and future gas investments. It must provide certainty about the long term size of the market as too short term a market will not provide an adequate investment signal to build new plant and maintain existing plant.

SSE will continue to collaborate with Government over the course of its detailed design process; however, in the near term Government must address the following critical issues:

- Volume setting: Government must decide whether it wants to control either the capacity volume or the capacity price. At present, DECC has chosen to set the desired volume of capacity and discover the price through an auction. Any political interference to adjust the volume after the market has determined the price will significantly distort the outcome.

- Timing of introduction: Government cannot wait until margins are tight to introduce the capacity market or it will be too late to procure the capacity needed to maintain security of supply. Capacity auctions should be run as early as possible to familiarise industry and the System Operator with the process. While there is a supply surplus, capacity auction prices should clear at a low value.

Decisions in several other key areas must also be made as soon as possible to provide industry with the necessary information about how a capacity market will work:

- Incentive / penalty regime

- Auction design and duration of capacity contracts

- Treatment of new and existing plant

- Participation of low carbon plant
- Interaction with system services

Other important factors affecting the economics of investments in new gas plant include:

§ Policy uncertainty – for example potential changes to the European legislation which creates risk around changes in plant returns. The perception of policy and political risk is therefore a key driver for investors.

§ Nuclear life extensions – this would also keep the capacity margin higher, making investment in gas less likely.

§ Emissions Performance Standard – until the EPS has been enshrined in legislation at the level proposed by Government and uncertainty over future requirements to retrofit stations with CCS is removed, it is unlikely that developers will progress with their projects.

4. 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 key barriers to investment in new gas generation in the UK have been outlined in the answer to question three above and are also analysed extensively in the strategy itself. SSE agrees with this analysis, and the Government's proposed solutions for the EPS and the introduction of a capacity market will go some way to alleviating many of the key concerns.

Additional barriers that investors currently face include:

- The infrastructure that be required to support a growing electricity system. This will require large amounts of additional transmission and distribution infrastructure and there are questions as to the public acceptability of this. In addition, the gas network will need to be designed to match the gas flows required to supply peaking but low load factor gas plant. The inherent cost uncertainty resulting from the Transmission Network Use of System charging model also impacts on investment, both the overall risk of investing as well as the risks associated with where to locate new gas generation.

§ CHP requirements: there is currently a requirement under Section 36 of the planning regulations for new gas plants to look for heat customers locally and, if they are found, to include the development of a heat network around the plant. This requirement may undermine investment in new plant in certain areas by reducing the ability of the plant to be flexible and operate according to market signals. In a world where gas generation will be expected to react to load changes, in turn resulting in lower load factors, heat contracts will become increasingly difficult to commit to and this regulation appears to be inconsistent with this role.

§ Grid connection fee structures (both gas and power)

§ Water availability for cooling and CCS purposes. The outcome of the Government's proposals to reform the current water abstraction licensing regime could have a profound impact on the volumes of water necessary to support future generation. The availability of water extraction permits for plant that runs with a reducing load factor may also pose a barrier.

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

SSE supports both the need for a capacity market and the grandfathered EPS and believes that, if designed and implemented correctly, these mechanisms will significantly reduce the barriers to investment that gas generators currently face.

Additional policy areas that also need to be addressed and/or considered have been mentioned above:

- Uncertainty over future CCS requirements (UK or EU) being introduced. The possibility remains that developers will be forced, rather than incentivised, to retrofit CCS, which would fundamentally alter the economics of plant being developed and constructed today. Clarity on this issue is needed so that investors can have the confidence to proceed.

- Policy uncertainty, which can significantly alter the market, changing the return profiles of investments. If investors see these potential changes to existing legislation and/or the introduction of additional legislation as a significant risk, it will further reduce their appetite to invest until this situation becomes clearer.

6. Given a continuing role for gas and the potential 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?

Current supply infrastructure is more than adequate to meet peak day demand, even with a loss of major infrastructure as per the EU security of supply standards, reported by DECC in 2011. This is likely to remain the case until gas generation replaces coal and production from the UKCS declines to low levels in the mid 2020s. Historically, due to the flexibility offered by UKCS supply and, more latterly, LNG supplies, very little gas storage infrastructure has been built. The increasing reliance on gas for a primary source of firm electricity makes it vital that sufficient gas supply and flexibility infrastructure investment is made to meet future peak day demand requirements.

However, the economics of existing and new gas storage facilities are challenging. Maintaining sufficient gas capacity to meet peak day demand levels means a surplus of competing supply capacity the rest of the time. This has resulted in low price volatility that has reduced earnings for fast churn storage (ie non-seasonal storage). If existing storage facilities are to be kept open and more fast churn storage built, then some form of capacity support will be required to cover the costs that current market returns do not provide.

As gas generation is increasingly used to deliver flexible power, corresponding flexibility of the gas infrastructure will be more and more important to support this variable demand while maintaining critical safety-related system inventories. While there are a range of flexible supply offerings to support the gas infrastructure, gas storage – and in particular short and medium range storage – offers the key flexibility solution.

Gas storage facilities are capital intensive with long lead times. Similar to the challenges facing the economics of new gas generation, by the time the electricity market provides the necessary signals to invest in gas storage it will be too late to deliver this infrastructure. Serious consideration should be given to incentivising the operation and investment in fast churn storage with a capacity payment mechanism, to ensure the pace of investment in gas generation does not severely affect security of supply and price volatility.

Without a signal from the market in the near term, investment in the next phase of gas storage projects will continue to be deferred. For example, SSE has carried out work to develop a second phase of gas storage at its Aldbrough facility; however, without a change in the fundamental economics, Aldbrough 2 will not go ahead.

In addition to this, the governance regime for getting a gas connection and exit capacity from National Grid is unclear and subject to change under the RIIO price control. SSE has concerns that about this process, in particular over:

- the interpretation of the Planning Act to cater for system reinforcement of pipelines is excessive at 7 years; and

- there being no mention of modification 376 that allows for customer choice as to when a signal for new exit capacity can be given or when that capacity will be made available. National Grid have proposed a much more restrictive regime that means capacity must be signalled in July, for an October start, at least two years before it is required.

In theory, if unconventional gas is exploited in large volumes globally then this is likely to drive down prices and make CCGT investment more attractive as a result. However it is impossible to say whether a) unconventional gas will be exploited in the volumes required to do this and b) whether increasing global demand would mean that prices dropped. Therefore, until unconventional gas can be included with confidence in future gas availability scenarios, any strategic decisions on gas by Government should be made based on scenarios in which gas demand can be met by UKCS, Norway and LNG imports.