Alstom response to UK Government's Gas Generation Strategy consultation

28 June 2012

Summary

(i) Gas plays a critical role in providing a reliable and flexible electricity system that meets demand. Gas generation plants are quick to build (around 3 years); have relatively low capital costs; and are flexible in responding to changes in electricity demand.

(ii) The UK will need new gas generation capacity to ensure security of supply, as coal and nuclear power stations close, and to balance the electricity system as more intermittent wind power is deployed.

(iii) But it is unclear to us how the Government plans to balance the need for gas-fired generation and the UK's legally binding Fourth Carbon Budget, which includes an underlying assumption of around 50g CO2/kwh for the power generation sector by 2030. That level cannot be reached without CCS on gas, where there are currently fewer plans for demonstration projects in Europe than there are for CCS on coal.

(iv) Low power prices and high gas prices have collapsed clean spark spreads, with many companies in Europe only running plants in open-cycle during short periods. This situation is delaying proposed new gas-fired capacity from being built. That has resulted in a high proportion of current gas power building being concentrated in the Middle East and Asia.

(v) We agree with the Government's conclusion that 'while the immediate outlook for gas plants on the system is difficult given current spark spreads, the medium term outlook is more favourable'.

(vi) In terms of the proposed capacity mechanism, we are in favour of a market-wide mechanism to be introduced from 2014 and not left 'on the shelf' awaiting a future Government decision.

Context

1. Alstom strongly supports the UK Government's target of reducing emissions by 80% by 2050. We agree with the assessment that – in order to meet the 2050 target – the UK power sector needs to be largely decarbonised by 2030. This needs to be achieved by using the full portfolio of technologies, by increasing the efficiency of power generation, and by applying CCS to fossil fuel generation as speedily as practicable.

2. As the supplier of around 25% of the world's installed power generation capacity (and around 50% in the UK), Alstom has wide experience of power plant design and construction in over 70 countries. We offer technologies and services for all energy sources: gas, coal, oil, geothermal, biomass, hydro, nuclear, wind, marine and solar.

3. We have built four of the last six UK gas-fired power stations: Langage; Pembroke; Staythorpe; and Grain. On CCS, we have developed 18 CCS pilot and demonstration projects (on both coal and gas) around the world, including the proposed White Rose project at Drax in Yorkshire. Alstom Grid is one of the top three global players in electrical transmission – with its centre of excellence in Stafford - and is helping to develop the intelligent grids of tomorrow.

Consultation questions

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?

4. We agree with the Government's view that:

- Gas plays a critical role in providing a reliable and flexible electricity system that meets demand.
- Gas generation plants are quick to build (around 3 years); have relatively low capital costs; and are flexible in responding to changes in electricity demand.
- The UK will need new gas generation capacity to ensure security of supply, as coal and nuclear power stations close, and to balance the electricity system as more low carbon technology becomes available.
- The switch from coal to gas plants is helping the UK along the path towards decarbonisation. Emissions from power stations have fallen by 23% since 1990. While demand has increased by 18% since 1990, the carbon intensity of power generation has fallen from 690 gCO2/kWh in 1990 to around 500 gCO2/kWh now, largely thanks to the switch from coal to gas.

5. We also agree with the Government that the role of gas beyond 2030 – when the UK aims to have largely decarbonised the power generation sector – needs careful consideration. We agree with the statement in the consultation paper that:

> 'dependent upon the pace of development and deployment of other generation technologies and the rate at which their costs reduce, gas generation may continue to play a crucial role in the provision of baseload capacity in the coming decades, also acting as an effective policy 'hedge'. It could play a significant ongoing role in a decarbonised electricity system with Carbon Capture & Storage (CCS)'

6. But it is unclear to us how the Government plans to balance the need for gas-fired generation and the agreement of the UK's legally binding Fourth Carbon Budget, which includes an underlying assumption of achieving a carbon intensity of around 50g CO2/kwh for the power generation sector by 2030. That level

cannot be reached without CCS on gas, where there are currently fewer plans for demonstration projects in Europe than there are for CCS on coal.

7. If we assume that 10-20 GW of UK gas plant currently on the system continue to operate in 2030, and a substantial number of consented plant are built, it is likely that the UK will have more than 30GW of unabated gas plant on the system in 2030. If these plant run as base load, the average carbon intensity of the power generation sector will be way above the level assumed for the Fourth Carbon Budget.

8. We note the Committee on Climate Change's letter to the Secretary of State (27 March 2012) following the announcement of the EPS grandfathering. The Committee's advice to the Government included 'scenarios for reducing power sector emission from the current level of around 500g CO2/kWh to 50g CO2/kWh by 2030'. That would necessitate investment in around '10GW of unabated gas-fired generation' from now up to 2030, 'resulting in total gas-fired capacity of 30GW by 2030'. The 30GW 'would play an important role generating at low annual load factors (e.g less than 10% on average in 2030) to balance intermittent renewable generation'. But 'if the 30GW of gas-fired capacity were to generate as baseload plant in 2030, this would raise average emissions to 200g CO2/kWh', which is well above the assumptions in the Fourth Carbon Budget.

9. Alstom modelling shows that for Europe as a whole, even if CCS was applied to all new Combined Cycle Power Plants built from 2016 (which will not happen), that measure would only deliver *half the abatement needed from EU gas plants for a 450ppm scenario*. European countries would also need to retrofit the existing stock.

10. We see this situation as a fundamental issue for Government to clarify for investors, who rightly see a high degree of policy risk. The grandfathering of the Emissions Performance Standard (450g CO2/kWh) for all new gas plants out to 2045 is likely to encourage more than 10GW of new plant on to the system, when allied with capacity payments and changes in the gas price over the medium term. There is therefore a continuing degree of uncertainty about the Government's long-term intentions on decarbonisation and new gas build. The Government's decisions here will not only affect investment in gas, but also nuclear, renewables and CCS – all markets of interest to Alstom.

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

11. Alstom is a leader in the new UK gas market, where we have a more than 50% market share of gas turbines >40MW ordered between 2006-2010. As noted in the previous answer, we believe gas-fired generation has a crucial role to play in filling the gap due to:

    - Medium term retirement of coal, oil gas and nuclear stations (20% of plant).
    - Possible lengthening lead times for new nuclear and renewables.
    - Balancing increased levels of intermittent wind generation on the system.

12. We agree with the Government's analysis that:

- More than 3 GW of new Combined Cycle Gas Turbine (CCGT) capacity is to come online in 2012.
- A significant volume of new CCGT capacity is in the planning pipeline; more than 15 GW of capacity has been consented and a further 1 GW is under consideration.
- Despite the considerable sum of capacity in the pipeline, there is still uncertainty over if and when it will be built.

13. The UK currently has around 90 GW of generating capacity, with around 16% surplus capacity over electricity demand at peak times. Government modeling suggests that around 60–80 GW of new electricity capacity will need to be built by 2030, and of this around 40–70 GW will need to come from low carbon technologies. The table below illustrates a number of different potential forecasts for 2030:

	DECC's Carbon Plan (GW)	**National Grid *Future Scenarios* (GW)**		
		Going green	**Slow progress**	**High Growth**
Gas (unabated)	No figure given	13	21	13
Nuclear	10-15	17	10	15
Renewables	35-50	64	41	74
CCS	10	13	11	11

Note: National Grid's 'Going Green' scenario is consistent with 50g Co2/kWh by 2030

14. While we note that analysis, we do not have a 'desirable figure' for gas generation capacity, or indeed any other form of capacity. We agree with the view in the Government's Carbon Plan that:

> 'the precise share of gas in the overall energy mix over the Fourth Carbon Budget will be determined by a number of factors…….In the longer term, there will be a more fundamental shift in the role of gas in electricity supply. From 2030 onwards, a major role for gas as a baseload source of electricity is only realistic with large numbers of gas CCS plants'.

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? 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?

15. Efficiency, flexibility and price are the key decision criteria for our UK customers.

16. In Europe, gas-fired generation was increasing by 4% a year through to 2009, but, since the economic slowdown, it has been declining by roughly 6% a year. Low power prices and high gas prices have collapsed clean spark spreads, with many companies in Europe only running plants in open-cycle during short periods. This situation is delaying proposed new gas-fired capacity from being built. That has

resulted in a high proportion of current gas power building being concentrated in the Middle East and Asia.

17. We agree with the Government that there 'are strong reasons to believe that [these market conditions] will not be the case indefinitely'. We note that DECC's current projections 'suggest that wholesale electricity prices will increase, as current excess capacity margins are expected to decline later in the decade as a result of the retirement of existing coal and nuclear plants…… Tighter margins should lead to an increase in the baseload wholesale price, which should improve the investment case'.

18. We also agree with the Government that, in the longer term, the amount of nuclear and wind generation will increase, which will mean that gas-fired generation will dispatch less. That is likely to create uncertainty as flexible plants will be increasingly reliant on volatile, unpredictable prices to secure the revenues needed to justify investment.

19. We agree with the Government's conclusion that 'while the immediate outlook for gas plants on the system is difficult given current spark spreads, the medium term outlook is more favourable when we consider the market fundamentals and as the role for gas generation becomes clearer'. It should also not be forgotten that gas plants are relatively bankable compared to other power technologies.

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

20. As noted earlier, the Government's approach to CCS on gas is an important policy issue for gas generation's longevity. The DECC CCS Roadmap sees around 10GW of CCS by 2030. Industry representatives – such as the CCSA – argue that 20-30GW will be needed by 2030 if the industry is to take off and for the Government to meet future Carbon Budgets efficiently.

21. While we understand the rationale for the grandfathering of the EPS at 450g until 2045 for all new gas plant, we are concerned that unless a very strong incentive exists for these gas-fired power stations to fit CCS, they will not do so. The combination of a grandfathered EPS for all new gas plant and no/poor incentives for gas CCS will ultimately mean that the Government will not be able to achieve future carbon budgets.

22. In terms of the proposed capacity mechanism, we are in favour of a market-wide mechanism to be introduced from 2014 and not left 'on the shelf' awaiting an annual decision from Ministers on its use. That would act as a disincentive to invest in gas generation. If designed correctly, we believe a capacity mechanism can provide greater revenue certainty by providing fixed payments for capacity, which in turn may reduce the cost of capital. This increased certainty will enable investments to be made with greater confidence.

5. 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?

23. This area is largely outside Alstom's sphere of expertise. But we note that, currently, there are big differences in gas prices across world:

    US: low prices due to domestic shale gas.
    Asia: prices very high, partly due to post-Fukushima demand.
    EU: prices moderating, but high.

24. In general, we expect the price of gas to come down as global supplies increase. We also note that all major agencies predict a bright future for gas if policy frameworks are balanced. We expect shale gas – if it can be developed successfully - to have an impact on the global market. The key to its success will be balanced regulation, as set out in the recent IEA report: 'Golden Rules for the Golden Age of Gas'.

Background on Alstom UK

25. Alstom UK employs around 6,500 people in the UK at around 30 locations and has an annual turnover of about £1bn. We are responsible for the maintenance, refurbishment and operation of nearly half of the country's existing power plants, providing a full mix of power generation technologies, combining traditional and renewable energy sources with clean power solutions.

26. In the UK, Alstom has constructed four of the last six gas-fired power plants providing close to 6 GW of new generation. Alstom UK's boiler retrofit unit is a centre of expertise for biomass co-firing and has experience in all types of boiler retrofitting, including NOx reduction, performance improvement and fuel flexibility. We have developed the Alstom-Drax CCS demonstration project, which is currently being considered for EU NER funding. We are also delivering three onshore wind farms; developing a 6MW turbine particularly suited to the UK offshore market; and have invested in Scottish-based AWS Ocean Energy.