

Rt Hon Chris Huhne, Secretary of State for Energy and Climate Change

17th June 2010

Dear Chris,

CCC advice on the approach to investment in fossil fuel power generation

The path to meeting the UK's 2050 target to reduce emissions by 80% requires that the power sector is largely decarbonised in the period to 2030 (e.g. average emissions should be around 100 g/kWh in 2030 compared to around 500 g/kWh currently).

This will require a coherent approach to phasing out of conventional fossil fuel (i.e. coal and gas) generation. Currently the Government has proposed an approach to phasing out of conventional coal power generation and replacement with coal Carbon Capture and Storage (CCS), but there is no proposal for phasing out of conventional gas fired generation and replacement with gas CCS.

This letter recommends a more balanced approach (i.e. covering coal and gas) to required power sector decarbonisation. Specifically, we recommend that:

- **Given new evidence on the potential competitiveness of gas CCS with other forms of low carbon generation, and the very limited international effort to develop this technology, serious consideration should be given to funding at least one gas CCS demonstration project as part of the four CCS demonstration projects committed to in the Coalition Agreement.**
- **Given the need to decarbonise the power sector in the period to 2030, and therefore the very limited scope for investment in conventional gas generation beyond 2020, an Emissions Performance Standard that would effectively require any new gas plant beyond 2020 to be fitted with CCS should be seriously considered.**

- **We are not proposing that an Emissions Performance standard should cover retrofit of plant added to the system in the period to 2020, given uncertainties over the economics of retrofit and the need for investment in conventional gas fired generation over the next ten years to maintain security of supply.**

I am writing to you now in order to inform your thinking on design of the second competition for CCS demonstration, and design of an Emissions Performance Standard for possible inclusion in the recently announced new energy legislation.

Gas CCS demonstration

Although the Energy Act 2010 allows for the possibility of financing gas CCS demonstration projects, the current plan is that the four demonstration projects committed to by the new Government will all be based on coal generation technologies.

The argument behind this has been that demonstration of coal CCS technology is crucial, both in UK and global contexts, and particularly for countries where in the absence of CCS there would be significant investment in conventional coal-fired generation. UK support for coal CCS demonstration will, together with efforts in other countries (e.g. Australia, Canada, China, US and EU Member States) facilitate possible early roll out of this technology both in the UK and globally.

However, our analysis suggests that there is also likely to be a very important role for natural gas CCS, which could be competitive with coal CCS on a £/MWh generated basis, particularly when operating flexibly and in a low gas price world (also see attachment).

Key considerations are that:

- There is a very limited scope for new conventional gas fired generation beyond 2020 if we are to achieve the decarbonisation needed to meet carbon budgets on the path to the UK's 2050 emissions reduction target (i.e. 80% on 1990 levels).
- At least 25 GW of gas fired plant on the UK system by 2020 will be suitable for retrofit with CCS.
- Even at high load factors and with a reasonably high gas price scenario, gas CCS is competitive with coal CCS (e.g. our analysis suggests that gas CCS could be around £10/MWh cheaper than coal CCS at a gas price of 75 pence/therm as in DECC's central scenario for 2030).
- The cost advantage of gas CCS increases at lower load factors, given that it has relatively low capital costs (e.g. our analysis suggests that gas CCS could have a £35/MWh advantage over coal CCS operating at a 50% load factor in DECC's central gas price scenario). Flexible (i.e. low load factor) low-carbon generation plant will be required in the UK and other countries, particularly to support seasonal demand for electric heating from the 2020s.
- At both high and low load factors, the cost advantage relative to coal CCS increases if gas prices are lower (e.g. at today's gas price of 40 pence/therm, gas CCS could have a £30/MWh advantage over coal CCS operating at high load factors, and significantly more when operating flexibly). The IEA estimates that the cost of shale gas could be in the range 30-50 pence/therm, although we note that there are significant uncertainties and outstanding environmental questions here.

Therefore whilst much of the current global effort on CCS demonstration relates to post-combustion coal and coal gasification (Integrated Gasification Combined Cycle, IGCC), demonstration of natural gas post-combustion CCS would provide an additional and potentially valuable option for required power sector decarbonisation.

UK demonstration would facilitate possible deployment here in the early 2020s. It would fill a current gap as regards development of gas CCS technology, where planned demonstration projects in Norway have been delayed, and where we are not aware of any current or planned demonstration projects in other countries.

Given its potential importance in supporting required power sector decarbonisation in the UK, we recommend that you should seriously consider inviting bids for gas CCS demonstration projects, with at least one of the four demonstration projects being for gas CCS, and possibly more depending on bids received.

An Emissions Performance Standard for gas-fired generation

In the context of coal CCS demonstration, you have proposed that there will be an Emissions Performance Standard which would require retrofit of existing coal plant, and fitting of all new plant with CCS. This is appropriate given the need to decarbonise the power sector through the 2020s, and given the very limited role for conventional coal-fired generation beyond the early 2020s.

There is also a question of whether the Emissions Performance Standard should be extended to cover gas generation; this would potentially provide a coherent approach to fossil fuel (coal and gas) generation and therefore drive down power sector emissions.

Whereas it is clear that the role for existing conventional coal will be very limited in the 2020s, and therefore that conventional coal plant added to the system before 2020 should be retrofitted with CCS in the 2020s, it is less clear when existing gas generation in the period before 2020 should be retrofitted. For example, the economics of gas retrofit will depend on the pace at which the market for electric

vehicles develops, and the rate at which the carbon price increases, both of which are highly uncertain. In addition, setting a standard for gas retrofit now could undermine investment in conventional gas fired plant required over the next ten years in order to maintain security of supply.

In contrast, significant investment in unabated gas generation through the 2020s would conflict with the objective to decarbonise the power sector in this period. The implication is that the appropriate strategy for investment in the 2020s should include possible investment in gas CCS along with investment in other low-carbon technologies, but not investment in conventional gas generation except to the extent this is required for balancing increasing amounts of intermittent renewable generation or to replace retiring peaking plant.

Therefore we recommend that you seriously consider an Emissions Performance Standard for gas-fired generation that would effectively require new gas plant from 2020 to be fitted with CCS, with possible limited exceptions (e.g. for very low load factor plant). This would provide a strong signal about required power sector decarbonisation in the 2020s, and would complement broader electricity market reforms to deliver low-carbon investment from secure generation sources at affordable cost.

We will set out our analysis of gas CCS in full as part of our advice on the fourth carbon budget, to be published before the end of the year. In the meantime, I would be happy to discuss further with you and share the detailed analysis underpinning this letter.

Yours ever,



Adair Turner
Chair, Committee on Climate Change