Doosan Power Systems

Doosan Power Systems response to Project Discovery Consultation

Introduction

Doosan Power Systems are pleased to respond to the Consultation published on 3 February 2010.

Doosan Power Systems is a British company, formerly Doosan Babcock, headquartered in Crawley, which operates globally in the power plant industry. We offer new build coal fired power plant and provide after-market retrofits, upgrades and services. We employ around 6000 people and have customers and operations in the UK, mainland Europe (including Czech Republic, Germany and Poland), China, USA, India and Brazil.

Doosan Power Systems and our parent company, Doosan Heavy, are strongly committed to low carbon power generation and will supply carbon capture systems as soon as the market allows. We are very well placed to help governments which are committed to reduction of carbon emissions roll out CCS to the developed and developing world. Doosan Power Systems is nominated as our company's global centre of excellence and R&D Centre for advanced coal-fired boilers and carbon capture.

Response

1. We consider the risks to security of electricity supplies are understated, since the need for derated capacity margin is underestimated. Derated margin is currently about 14% and during two successive winters all this has been needed. The availability of older coal, gas and nuclear plants is likely to decline as they approach their "end of life" and the final closures are likely to be unplanned reactions to plant breakdowns. Some closures may be brought forward to save costs (low load factor coal power plants).

2. In the two "Green Scenarios" considered by OFGEM which most nearly represent government policies, we note that the Key Supply Risk is "generation variability" due to the high penetration of intermittent renewables.

The variability of generation from wind causes problems both at times of high wind and low wind:

> On low wind days the whole capacity of the wind farms must be substituted by alternative reliable generation capacity, approximately doubling the capital investment required.
>
> On high wind days there will be electricity capacity well in excess of demand and other forms of generation will have to be turned off and electricity prices will plummet.

This undermines the economic case for building reliable low carbon generation plants such as nuclear or coal with CCS which have high capital costs and need high load factors. This situation could reinforce the tendency to "dash for gas" since CCGTs are the lowest capital cost plant (though the OFGEM report suggests that the economic case even for CCGTs may be undermined by uncertainty over electricity prices).

We believe this situation arises because government policies do not pay enough attention to the need for a *technically balanced generation portfolio*. Indeed, the policies of very much stronger incentives for one sector (renewables) than for nuclear or CCS seem to be destined to lead to an *imbalanced portfolio*.

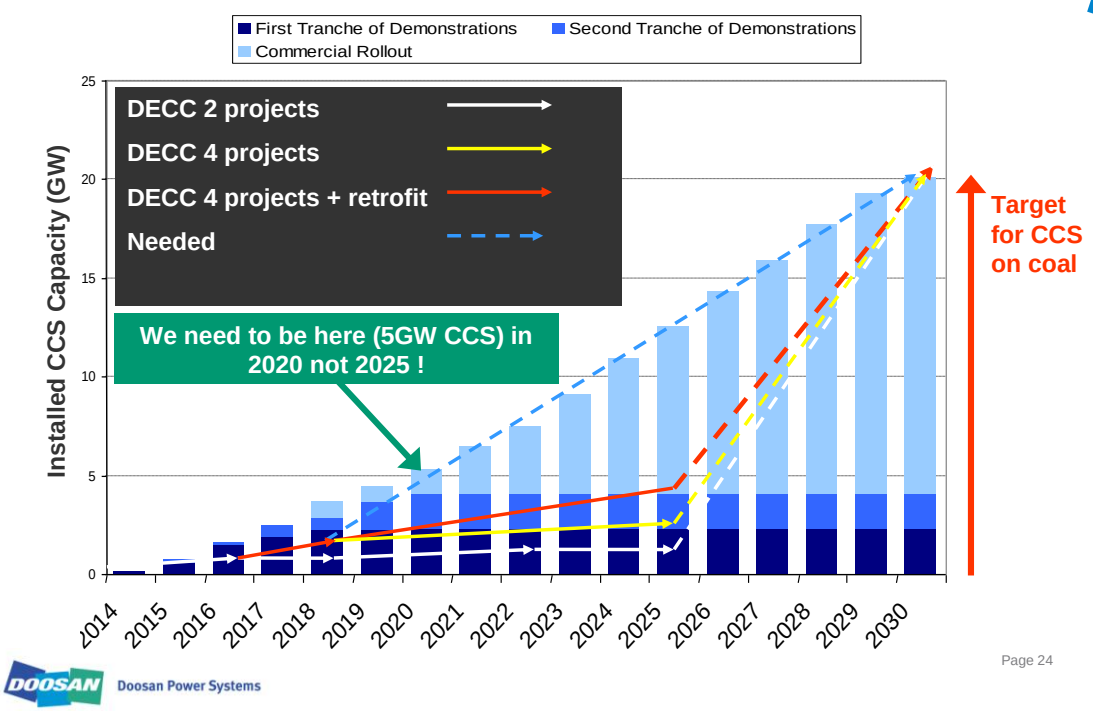
This is a result of the prescription (targets and incentives) for renewables (Renewables Obligation) but no comparable prescription or incentives for nuclear or CCS. It is necessary to indicate the amount of fossil generation plant and CCS which will be needed in a technically balanced electricity generation portfolio.

We recommend modelling the electricity and energy systems taking account of the features of different types of plant (base-load, ramp rates, capacity, cost) and the different features of demand side measures) to establish what a *technically balanced* portfolio would look like. This work should be completed before designing any major changes to the electricity market.

3. The potential contribution of CCS to all targets (security, carbon reduction and cost of electricity) is understated in Project Discovery but the rate of build of CCS which is assumed may be over-optimistic given current government policies.

As illustrated below,we believe an appropriate target for CCS in 2030 is 20GW and as a step towards that we should be seeking 5GW in 2020. We endorse the Advanced Power Generation Technology Forum's (APGTF) strategy which calls for the 'Adoption of a target for the successful deployment of CATs, and in particular CCS, in the UK with a target of 10% of UK power generation (approximately 40TWh) being from fossil-fuel plant fitted with CCS by 2020.' This ambitious 10% target, which corresponds to approximately 5GW of base-load fossil fuel plant, is considered by the APGTF to be necessary as a first step towards the target of having the UK electricity system substantially decarbonised by 2030, with good progress by the mid-2020s.

Rollout of CCS into Operation in UK to Meet Targets



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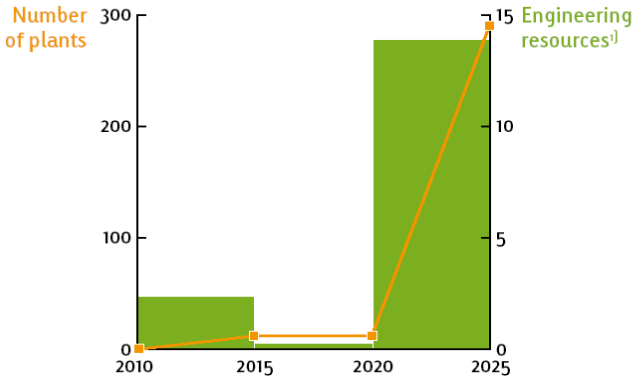
However even the CCS capacity envisaged in Project Discovery will only be achieved if there is early strengthening of the incentives for CCS, including support for the retrofit of CCS to the full capacity of plants built initially with partial CCS. CCS build is limited by what (MW) the government will support and the proposed caveats associated with the rules for support. Currently, the DECC policy is to fund the marginal costs of 4 x 400MW of CCS. Government (and EU) need to be careful on the conditions of support - if electricity companies are exposed to too much risk versus the limited potential reward they will not be able to invest.

4. A more detailed plan is needed for the roll out of CCS. The present policy (UK and EU) is limited to 10 demonstrations by 2015/2016 and rapid “commercialisation“ from 2020. This will not give the necessary build-up of skills and resources. Indeed there is a likelihood that the skills and resources built up and the lessons learned during the demonstration projects will be lost by the time of the “commercialisation”.

This is illustrated in the following figures from the European Power Plant Suppliers Association.

CCS: Towards Early Implementation

Engineering resources to build CO2 capture plants in EU27



Business as usual

- Know-how and engineers not retained after Demo Phase from 2015
- No considerable reduction of CO_2 emissions before 2020

[1)] **Figures for engineering resources are indicative to show relations only**

Source: EPPSA

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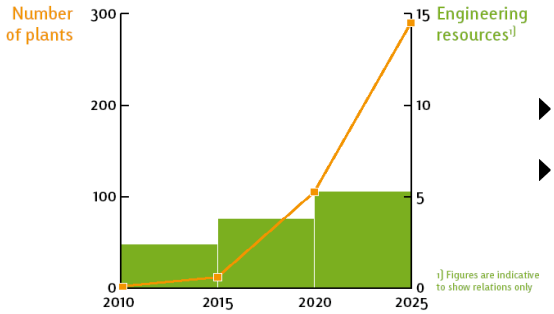

EPPSA proposal

- Continuous build up of know-how and resources
- Early reduction of CO_2 emissions

Source: EPPSA

Commercialisation has to start following demo projects without any delay to maintain skills, obtain full benefit from Demos and accelerate deployment.

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5. The time from project conception to operation of a coal or gas - fired CCS power station is typically envisaged at 5-6 years - the exact arrangements vary with project and the developer involved. However, with the current planning and regulatory process, the time required for gaining approval, particularly for storage sites and for permission to construct pipelines, could well be longer than the time needed for building the power station. Therefore, it is essential that the planning process is reformed in order to ensure that CCS power stations can be constructed and commissioned in the timescales required to meet the UK and global targets.

6. It is becoming more widely recognised that to meet carbon targets in 2030, CCS will be needed on gas power plants as well as coal power plants and other industries. However, CCS on coal better meets security of supply and cost objectives highlighted in Project Discovery and should be given priority. Coal has the particular advantage amongst fossil fuels that it can be stockpiled very cheaply.

Submitted by :

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