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CCSA response to DECC Consultation on Possible Models for a Capacity Mechanism

Introduction

The CCSA welcomes this opportunity to respond to the *Consultation on possible models for a Capacity Mechanism* for the UK electricity market, as part of the Government's Electricity Market Reform White Paper published in July 2011.

The CCSA brings together a wide range of specialist companies across the spectrum of CCS technology, as well as a variety of support services to the energy sector. The CCSA exists to represent the interests of its members in promoting the business of Carbon Capture and Storage (CCS) and to assist policy developments in the UK, EU and internationally towards a long-term regulatory framework for CCS as a means of abating carbon dioxide (CO₂) emissions.

The proposals contained in the consultation are at an early stage of development and the CCSA is therefore unable to provide a formal submission to the specific questions contained in the consultation. Nevertheless, the CCSA believes that a Capacity Mechanism is potentially an important tool to support the development and utilisation of CCS within the UK's electricity system.

UK CCS Demonstration programme

The UK has committed to develop four projects that will demonstrate CCS on fossil fuel power plants. CCS demonstration projects face a number of first-of-a-kind risks requiring the development of funding arrangements tailored to address these risks. The CCSA believes that the UK demonstration projects will need to negotiate bespoke funding arrangements with DECC that meet project-specific requirements. It is however important that clarity on how the CCS demonstration projects will be treated in the Capacity Mechanism is provided as early as practicable. The Capacity Mechanism has the potential to provide an important additional source of revenue for projects that could aid the delivery of Projects 2-4 in the UK demonstration programme should these projects meet the Capacity Mechanism's eligibility requirements. In addition, the Capacity Mechanism has the potential to make an important contribution to the wider deployment of CCS after the demonstration programme.

Overview

It is important to have clarity on how the Capacity Mechanism will be implemented and how it will interact with the Feed-in Tariff with Contract-for-Difference (FiT CfD). This is especially important in the case of CCS which, in addition to being low-carbon, has a number of other important characteristics which might warrant support under both mechanisms.

CCS has a number of characteristics that make it a valued part of the future energy mix, as well as making a useful contribution to either a Strategic Reserve or Capacity Market model of Capacity Mechanism. These include;

1. Generating secure, low-carbon electricity from fossil fuels,
2. Potential to provide a flexible source of generation,
3. Firm, reliable generation capacity that could be sold forward,
4. Generating additional capacity at times of system stress,
5. Providing additional capacity that is capable of sustained running.

These characteristics are considered further below.

Secure, low-carbon electricity

As the UK moves forward with decarbonising the power sector there will increasingly be a need for low-carbon, reliable and flexible sources of generation and CCS power plants could be the technology most suited to meeting this requirement.

Fossil-fuel power plants fitted with CCS emit substantially lower emissions of CO₂ than unabated power plants. Given the current and future reliance of the UK power generation system on fossil fuels it is clear that fossil-fuel power plants fitted with CCS will play a critical role in the decarbonisation of the UK power sector. The consultation is unclear on whether the Capacity Mechanism will explicitly support low-carbon generation and it is important that clarity is provided on this point. However, over the medium to long-term the power sector will need to be virtually decarbonised and the structure of the Capacity Mechanism should be consistent with this goal. Fossil fuels are widely used in the electricity generation sector as global reserves are abundant, widely dispersed and can be produced at relatively low cost thereby making an important contribution to the secure supply of electricity. As the electricity mix is decarbonised then coal and natural gas power plants fitted with CCS in the energy mix will help maintain the diversity of generation sources and thus the security of the UK electricity generation system.

Flexible generation

It is also important to note that both coal and gas plants can operate a lot more flexibly than other key generation sources such as renewables and nuclear. Information on the flexibility of coal and gas plants fitted with CCS should be gained from the UK's demonstration programme, but it is expected that fossil plants fitted with CCS will still retain a significant degree of flexibility. The consultation recognises the importance of flexibility as an important contribution to security of supply but is not clear on how the Capacity Mechanism will recognise and reward flexibility. The CCSA believes that it is important that the Capacity Mechanism should recognise and reward flexibility, as CCS plants will be in a position to provide a vital source of flexible, low-carbon generation to complement the intermittent generation that characterises renewables.

It is likely that CCS plants will operate, at least initially, as baseload plant as this is expected to be the most effective strategy to expedite the recovery of the investment costs. However, CCS plants could also run with some of the plant capacity reserved for a Capacity

Mechanism with the remainder operating as baseload or mid-merit. This additional capacity could then be called on to generate when required. The reserved CCS capacity also has the advantage of reliability which is an important requirement for any reserve generation. The consultation notes that the precise nature of the interaction between the FiT CfD and Capacity Mechanism is uncertain at present. However, it is important that the EMR mechanisms can be tailored to incentivise innovative generation investments and operational practices that meet the objectives of the EMR.

Firm, reliable capacity

Fossil fuel power plants fitted with CCS capacity represent a firm and reliable form of low-carbon generating capacity and these valuable characteristics should be appropriately rewarded by the Capacity Mechanism. In a Capacity Market model, CCS power plants offer a high level of de-rated capacity as there will be a very high probability that the CCS capacity will be available when required. This contrasts with capacity from intermittent sources of electricity such as wind power. Were this intermittent capacity to be sold forward there would be no guarantee that the capacity would actually be able to generate during the delivery period if, for example, it coincided with anti-cyclone conditions and associated low wind speeds which, in winter, could coincide with colder temperatures and higher power demand.

Ability to generate additional capacity

CCS plants have the option to generate additional capacity that can be utilised during times of system stress, i.e. when there is a tight demand / supply balance. The current generation of CCS plant have an energy penalty of 20 – 25% depending upon the capture technology chosen. This means that the energy required to run the capture part of the CCS chain plant reduces the generating output of the power station by 20-25%. At times when there is a requirement for extra generating capacity, the capture part of the chain could be “switched off”, thereby substantially increasing the capacity of the plant that is despatching electricity to the grid. Clearly when the capture plant is not operating, CO₂ emissions from the CCS plant will be higher. However, this could be managed so that average annual emissions remain below the 450gCO₂/kWh enshrined in the Emissions Performance Standard.

The option to generate additional electricity during times of system stress by turning off the capture part of the CCS chain has the added advantage that the additional capacity provided is capable of sustained running, i.e. when required the additional capacity is available for an extended period of time. This is possible if the power plant is designed to operate without the capture plant and the fuel that will be used to supply the additional electricity will have originally been procured by the generator to meet the necessary CCS chain requirements. This fuel will then be readily available for power generation during periods of system stress. This contrasts with other sources of stand by capacity that could be used at times of system stress which may have limited sustained running capability; such as Demand Side Response, which may only be able to supply the additional capacity for relatively short periods of time, or peaking plant, which may fail to procure enough fuel for sustained running.

Next steps

The CCSA is keen to engage further with DECC on the delivery of an effective Capacity Mechanism. This is an innovative policy issue and as the Capacity Mechanism work evolves further we would welcome the opportunity to provide additional inputs – both written and in person - on how CCS can contribute to the chosen model for a Capacity Mechanism and on the appropriate design of the mechanism to ensure that it delivers its objectives.

The views expressed in this paper cannot be taken to represent the views of all members of the CCSA. However, they do reflect a general consensus within the Association.