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CCUS: Proposed Commercial Frameworks for Power and Industrial Carbon Capture, and Transport & Storage

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The development of Carbon Capture Usage and Storage ("**CCUS**") is a key component of the UK's strategy to achieve net zero emissions by 2050. Successful CCUS deployment requires significant government support, particularly through the introduction of a robust regulatory and contractual framework.

It is the UK's aim to deploy CCUS in at least two industrial clusters by the mid-2020s, and for two more clusters to be operational by 2030. Since December 2020, the Department for Business, Energy and Industrial Strategy ("**BEIS**") has published numerous proposals relating to transport, storage and use of carbon.

To date BEIS is considering three principal business models, the Transport & Storage ("**T&S**") Business Model, the Dispatchable Power Agreement ("**DPA**") Business Model and the Industrial Carbon Capture ("**ICC**") Business Model.

This article will outline the key features of each of the business models in turn.[1]

1. T&S Business Model

This model centers around the T&S company ("**T&SCo**"), a privately owned company which will be responsible for the development, construction, financing, operation, maintenance, expansion, and decommissioning of the T&S network.

The result would be to separate (i) generation and capture, and (ii) T&S business models. This would carve out the CCUS T&S network as a distinct asset class that would attract investors with an appetite for specific T&S related risks. Generation and capture would be protected in respect of T&S network issues, whilst the T&S network revenues will be insulated in respect of issues at the generation/capture end.

The T&S Business Model includes (a) heads of terms for the economic licence, (b) heads of terms for the Revenue Support Agreement (which sets out the terms for the RSA Counterparty to provide Revenue Support in specified circumstances), (c) heads of terms for the Government Support Package (which consists of the Supplementary Compensation Agreement and Discontinuation Agreement) and (d) heads of terms for the Liaison Agreement (which sets out proposed terms for the relationship between government and T&SCo, including in relation to proposed changes to project documents or variations to the T&S network).

[1] It is important to note that the current positions taken are "minded-to", and the government is currently consulting on these proposals. Any terms not defined in this article will have the same meaning as in the relevant document published by BEIS.

Key Features of the T&S Business Model	Description
Delivery Model	A private sector delivery model is the preferred approach for the delivery of the T&S network. This allows the CCUS infrastructure to develop more quickly and take advantage of private sector cost efficiencies but within a wider regulatory framework. Government support may be required in various forms, including the provision of capital funding via the £1bn CCS Infrastructure Fund ("**CIF**") to the T&SCo during construction and targeted public sector support for financing the T&SCo (including either debt or equity) that may arise at certain points in the T&SCo's lifetime.
Asset Ownership	The most appropriate model of ownership is thought to be where the T&SCo owns both the onshore and offshore networks/systems, particularly in the early phase of the development of this market when initial decisions are made around cluster sequencing and allocation of support to T&S network users. Despite this integrated ownership model, it is thought to be best for future development of the T&SCo if it applies an accounting separation across assets and therefore, provides separated accounts for key segments of its value chain. The T&SCo should also be established as a separate legal entity. Legal (and financial) separation between the T&SCo, its investors and the users of the network provides an important means of mitigating against the potential for conflicts of interest between the parties.
Network Planning	It is envisaged that the UK T&S capacity will initially be developed at separate clusters, with the potential for future expansion of clusters into a UK carbon network. The T&SCo is expected to be responsible for developing economically efficient plans for new connections to the T&S network. However, in the early phase of the market's development, delivery against such plans will be highly dependent on decisions made by government on the timing and award of support to the proposed T&S network users. This dependency of network planning on government decisions is expected to decline over the longer term as CCUS becomes commercially viable without subsidies for CO_2 price increases and as technology costs and risks across the sector decrease.
Network Codes	As part of the development of a regulatory regime for this new industry, there is a requirement to develop network codes and a code governance process. It is anticipated that BEIS and the Regulator will be responsible for the coordination of network code

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	development by the first T&SCos and that many organisations with different expertise and specialisms will be involved in developing the network codes. Before any changes to any T&S network code take effect, the Regulator will need to approve these changes and where relevant, the Regulator will consult other technical regulators for CCUS (e.g., OGA and OPRED) before approving changes to the T&S network code.
System Operation	It is also expected that each T&SCo will have responsibility for the system operation of its own network, developing guidelines, operating procedures, and management systems to allow it to operate the T&S network in an efficient and safe manner and in a way that meets regulatory requirements.

2. DPA Business Model

Power generation with CCUS (known as "**power CCUS**") will help to support the low cost decarbonization of the UK's electricity system, together with the expansion of other forms of low-carbon generation.

The DPA is the proposed contractual framework for power CCUS and is based on the Contracts for Difference ("**CfD**") Allocation Round 4 standard terms and conditions, as adapted to enable natural gas-fired power CCUS facilities to help meet electricity demand.

The DPA Business Model is split into: (a) the front end agreement (which is entered into between the Generator and the DPA Counterparty), (b) the DPA Contract (which is a set of standard terms common for all DPA recipients), (c) the Direct Agreement (which can be entered into by the DPA Counterparty, the Generator and a Lender/Security Trustee) and (d) the Gain Share Schedule (which outlines the provisions of the proposed gain share mechanism that may be applied to the DPA).

Key Features of the DPA Business Model	Description
Term Length	Term length of between 10 and 15 years, regardless of whether it is a new build, repowered or retrofit.
Performance Tests	Full Load Tests and Start/Up Shutdown Tests which must be carried out in accordance with specified Test Performance Standards. This is to ensure a consistent minimum standard is applied.
Transport and Storage ("T&S") Prolonged Unavailability Events	Prolonged Unavailability Events include: • A Full T&S Outage Event which lasts for at least 6 months; • A T&S Commissioning Delay which lasts for at least 6 months; or

Key Features of the DPA Business Model	Description
	• A T&S Cessation Event such as a notice of discontinuation from the Secretary of State or the revocation of the T&S operator's licence.
Payment Mechanism	Two payments are available: • an availability payment – this is a regular payment for availability of both capture and generation which will be paid regardless of whether a facility is dispatching, and means there will be no incentive for facilities to displace lower cost and lower carbon sources (e.g., renewables and nuclear); and • a variable payment – this is intended to account for increased running costs versus an unabated competitor, thereby making higher carbon generation more expensive. It accounts for factors such as gas cost differential, carbon cost differential, T&S volumetric fee referenced to a theoretical unabated plant. The combination of both an availability payment and a variable payment should enable a plant to operate flexibly, providing value to a low carbon electricity system whilst providing sufficient certainty to investors. As per the CfD, the counterparty will be Low Carbon Contracts Company, with payments passed onto consumers.
Suspension of payments	The DPA Counterparty may suspend payments where: • a project fails to achieve a minimum CO_2 capture rate of 50% for a prolonged period • the Generator is in breach of the metering schematic obligations • the Generator fails to provide the DPA Counterparty with metering access rights • the Generator fails to provide Declaration Capacity Data • the Generator fails to allow the DPA Counterparty to exercise its Declaration Access Right • the Generator fails to undertake an Annual NDC Test • the Generator fails to provide the DPA Counterparty with Annual NDC Test Access Rights • the Generator fails to comply with a SCADA Systems Obligations

Key Features of the DPA Business Model	Description
	• the Generator fails to comply with the Compliance of Technology undertaking • the Generator fails to comply with a T&S Prolonged Unavailability Procedure Obligation
Qualifying Change in Law and Compensation	There are three categories: a) Discriminatory Change in Law (a change in law which specifically applies to the particular project, the particular facility or the particular generator) b) Specific Change in Law (a change in law that specifically applies to generating facilities deploying CO_2 capture technology forming part of such generating facilities) c) Other change in law (a change in law which has an undue and discriminatory effect on the costs incurred by them compared to one of four comparator groups) Compensation will be based on the general principle that the Generator impacted by the change in law should be no better and no worse off than before the change in law.
Termination and Consequences	The DPA Counterparty will have the right to terminate on or after the Start Date in the event of for instance: • Generator insolvency • Non-payment which is not rectified within a specified cure period • Breach of key obligations • A Technical Compliance Termination Event or a Metering Access Termination Event • A Capture Rate Termination Event • A Misleading Declaration Termination Event or a Declaration Access Termination Event The termination fee payable by the Generator will be calculated as follows: *Default Termination Payment = Net Dependable Capacity Estimate x Termination Fee Rate of £35k per megawatt of the Facility's Net Dependable Capacity Estimate.*
Gain Share	Two types of gain share if a Generator's profits exceed an agreed equity IRR threshold: • "Project gain share" for which a project would pay 30% of profits above the agreed threshold every 5 years; and • "Sale gain share" where a project pays 30% of the profits above the agreed threshold of any sale of a material interest in the Generator

Key Features of the DPA Business Model	Description
	before the later of (i) 5 years of the Start Date, or (ii) the date on which the aggregate economic interests of an investor group fall below 60% of their original level.

3. Industrial Carbon Capture Business Model

The ICC Business Model aims to incentivize the adoption of carbon capture technology by industrial users who often have no viable alternative to achieve deep decarbonization. Initial projects under this ICC Business Model will receive funds from the CIF and there may also be ongoing revenue support from the Industrial Decarbonisation and Hydrogen Revenue Support scheme. BEIS also confirmed in 2021 that eligible waste management CCUS projects would be in scope to apply for ICC Business Model support for Phase-2 of the CCUS cluster sequencing process.

The ICC Business Model includes (a) the draft ICC Contract standard terms and conditions for initial projects and (b) a draft front end agreement.[2]

Key Features of the ICC Business Model	Description
Term Length	Term length of 10 years with the option for a one-year extension, up to a total 5 additional years (any extension will be subject to the Emitter achieving certain performance conditions).
Capex and Opex payments	Capex payment rate and strike price (used to calculate opex payments) will be for initial projects negotiated bilaterally and should be based on expected costs of carbon capture for the project, including a rate of return.
T&S Fees	T&S fees will be treated as a pass-through (i.e., the ICC Contract will pay the Emitter to pay the T&SCo) and will be kept separate from the strike price. T&S fees will be capped by reference to maximum values of capacity, output to T&S and size of connection.
Suspension of payments	The ICC Contract Counterparty may suspend payment where for instance the Emitter: • fails to provide the required CO_2 metering data • the Emitter is in breach of the obligation to notify the ICC Contract Counterparty of material changes to metering equipment • (i) fails to provide a capture rate breach rectification plan or (ii) submits an invalid plan

[2] The majority of provisions included in the ICC Contract are not intended to be negotiable on a project-by-project basis, in line with previous CfD models used. The same applies to the DPA.

Key Features of the ICC Business Model	Description
	• fails to provide a valid carbon intensity report within 30 business days of receiving a non-compliance notice
Qualifying Change in Law and Compensation	There are three categories: d) Discriminatory Change in Law (a change in law which specifically applies to the particular project, Capture Plan or Emitter) e) Specific Change in Law (a change in law that specifically applies to industrial installations which deploy CO_2 capture technology) f) Other change in law (a change in law which has an undue and discriminatory effect on the Emitter/project's out-of-pocket costs or savings when compared to comparator groups) Compensation will be based made as either a lump sum and/or staged payments.
Termination and Consequences	The ICC Contract Counterparty will have the right to terminate on or after the Start Date if for instance: • the Emitter is insolvent • the Emitter defaults on credit support • there has been a non-payment by the Emitter which is not remedied within a cure period • the Emitter has breached key obligations • the Emitter has breached the minimum CO_2 capture rate obligation and a capture rate termination event occurs The termination fee payable by the Emitter will be calculated as follows: *Default Termination Payment = f(t) x Maximum Annual CO_2 Capture Quantity (tCO_2/pa) x Termination Fee Rate of a nominal value of £5/tCO_2*

Looking ahead

The deployment of CCUS in the UK represents a major opportunity, in particular for areas which are either heavily industrialised and carbon intensive (e.g., the North East of England), or which are centres for oil and gas production (e.g. the UK Continental Shelf).

In order for CCUS to be at the forefront of the UK's energy transition, the focus will need to be on the details of the CCUS commercial frameworks for T&S, power and ICC business models. If the UK government is to meet its goal of deploying CCUS technologies by 2030, the risk matrix and many of the key elements of the business models will need to be considered and finalised in a fairly short period of time.