Department for
Business, Energy
& Industrial Strategy

Carbon Capture, Usage and Storage

An Update on the Dispatchable Power Agreement Business Model

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Contents

Disclaimer

This update sets out the government's current proposals on the potential business model for power plants with Carbon Capture Usage and Storage (CCUS). The proposals, as set out in the document, in whatever form they are expressed, are indicative only and do not constitute an offer by government and do not create a basis for any form of expectation or reliance.

The proposals are not final and are subject to further development by the government, and approval by Ministers, in consultation with relevant regulators and the devolved administrations, as well as the development and Parliamentary approval of any necessary legislation, and completion of necessary contractual documentation. We reserve the right to review and amend all provisions within the document, for any reason and in particular to ensure that proposals provide value for money (VfM) and are consistent with the current subsidy control regime.

This update takes into account engagement that has taken place during 2021 since publication of the Carbon Capture, Usage and Storage Business Models update in December 2020. This includes engagement with the Power CCUS Expert Group, project developers, and relevant regulators.

BEIS will continue such engagement as it works to refine its proposals, including engagement with the devolved administrations, to ensure that the proposed policies take account of devolved responsibilities and policies across the UK.

Introduction

In December 2020, we published an update on the Dispatchable Power Agreement (DPA) model. The purpose of this document, which should be read in conjunction with the December publication, is to set out further details and updates regarding the DPA, reflecting work undertaken since December 2020 and feedback we have received to date.

The key objectives for the DPA were set out in the December 2020 publication and are summarised below:

Provide sufficient investor confidence

It is important to balance the inherent uncertainty of a dispatchable role with the need for power CCUS to be an investable proposition. The design of the DPA availability payment mechanism forms a basis for a level of revenue certainty, but investors will need to consider the revenues which they can make from the wholesale electricity market and other markets such as those for balancing and ancillary services when building a business case. The DPA is designed to ensure the investment proposition remains without removing the incentives of the CCUS project to participate efficiently in existing markets.

Incentivise the plant to react to the wholesale electricity market

By providing availability payments which are decoupled from dispatch, the plant should be incentivised to react to market prices and provide dispatchable output without incentivising the power CCUS project to generate at all times, which would displace lower-cost and lower-carbon sources of generation such as renewables and nuclear. The flexibility of power CCUS projects should allow it to complement the intermittency of renewables by adjusting output to meet changes in electricity demand, whilst still capturing emissions from generation.

Displace comparable unabated generation and react to carbon prices

The variable payment should be designed to be sufficient to ensure that the power CCUS project dispatches ahead of the unabated equivalent reference plant by accounting for the difference in costs arising from installing carbon capture equipment. Incentivising a power CCUS plant to displace higher carbon alternatives will maximise the contribution of these plants to electricity system decarbonisation. The level of the payment should be reactive to carbon prices and power plant costs, meaning that it is only paid when necessary.

Ensure affordability and value for money for consumers

Costs of the DPA will be recovered from consumers. This means that any spend should be efficient and look to deliver Value for Money (VfM) for consumers through minimising unit costs, maximising competition and reducing barriers to entry.

We will continue to extensively engage with prospective developers and wider stakeholders in 2021 to test and further develop the business model design outlined in this document. Our

objective is to create frameworks which deliver on our deployment ambitions and create a sustainable market for CCUS infrastructure and capture services.

This document is being published alongside the Cluster Sequencing for Carbon Capture Usage and Storage Deployment: Phase 1 document, the updates to the Business Models for CO_2 transport and storage and industrial carbon capture and an update on the design of the CCS Infrastructure Fund.

Legal and Contractual Framework

We set out below our updated thinking on the key commercial and structural principles for the Dispatchable Power Agreement (the "DPA"). As outlined in the December 2020 Business Models Update publication, the DPA will be the key tool used to encourage low carbon electricity generation by bringing forward investment in power CCUS plants initially in GB where there is an existing Contract for Difference (CfD) regime, but potentially across the UK, and to incentivise such facilities to operate in dispatchable mode at the appropriate place in the merit order.

Unless stated otherwise in this section, terms not defined in this section will have the same meaning given to them in the DPA Heads of Terms[1] (DPA HoTs). For the purposes of this document, the December 2020 DPA HoTs have not been updated to reflect the positions discussed below, but these positions will be reflected in the next iteration of the DPA HoTs.

Term, Target Commissioning Window and Longstop Date

Term of the DPA

We propose that the DPA should have a 15 year contract term for new build power CCUS plants, following the successful precedents from standard CfD contracts and Capacity Market (CM) agreements. This position is based on a trade-off between value for money for consumers and bankability for investors. Longer contracts may help to provide greater investment certainty and may serve to lower annual costs to consumers. However, shorter contracts are likely to provide a lower overall cost to consumers across the term of the DPA and may serve to prevent ‘lock-in’ of technologies in the power sector. A 15 year DPA term appears to represent an effective balance between these competing considerations.

We propose that a shorter DPA term is likely to be appropriate for retrofit projects, potentially 10 years, with the final term length subject to further consideration by BEIS. This reduced contract term length is intended to reflect the lower total capital investment likely to be required for retrofit projects and the expected shorter remaining useful asset life compared to a new build project. In addition, we intend to consider further the eligibility for retrofit DPAs and what level of repowering or refurbishment activity could be carried out as part of a retrofit project, and we will carry out work to understand the potential for unabated plants with long term CM agreements to access a DPA to retrofit CCUS.

Target Commissioning Window

The DPA contract term will commence on the earlier to occur of the "Start Date" (i.e. when the project is commissioned) and the last day of a specified "Target Commissioning Window" of 12 months, which will be adjusted day-for-day for any delays that occur due to "Force Majeure"

[1] Annex D of the December 2020 Business Models Update publication

(i.e. where the Generator's failure/delay is caused by circumstances beyond its control). Each eligible Generator will have the flexibility to commission its Facility (being both the power plant and the capture plant) at any time within the Target Commissioning Window. This is on the basis that the Government acknowledges that the technical challenges associated with constructing and commissioning projects can mean it is often not possible for developers to be confident that a project can be delivered by a specified delivery date. As a result, Generators will be allowed this specified penalty-free window in which they can meet the conditions needed to trigger payments under the DPA. As long as a Facility fulfils the relevant Operational Conditions Precedent within this window, the relevant Generator will be eligible to receive payments under the DPA for the full duration of the contract term (subject to the provisions of the DPA).

If a Generator fails to commission the Facility by the end of the Target Commissioning Window, the term of the DPA will commence and the 15 year term will start to reduce, without the Generator becoming eligible for payments under the DPA. This means that the duration of the Generator's DPA will reduce by an amount commensurate with the length of the delay up until the Longstop Date. This is a proportionate response to late delivery of low carbon electricity under the contract and provides a financial incentive for the developer to commission the capacity and capture rate as soon as reasonably practicable following the execution of the DPA.

We have considered the merits of both a shorter and a longer period for the Target Commissioning Window. We consider that a period of 12 months is appropriate for the initial contract(s) to account for the level of potential construction schedule risk inherent in FOAK power CCUS projects, while ensuring that a project developer is incentivised to put forward and agree a realistic target commissioning date as part of the CCUS Cluster Sequencing process. A shorter period may place too great a risk of construction overrun onto the developer, while a longer period would reduce the confidence of other parties in the target commissioning date provided, including for the operation of the CCUS cluster and for electricity system security of supply.

Longstop date

Failure to fulfil the relevant Operational Conditions Precedent by a Longstop Date – being a further period of 12 months following the expiry of the Target Commissioning Window – will give the relevant authority the right to terminate the DPA. This right will be included in the DPA to: i) prevent consumer subsidies being committed to projects which secure DPAs but which never fully commission; and ii) provide an incentive for developers to more accurately assess the capacity and capture rate of the projects they intend to construct and commission[2]. This will ensure that budget is made available for other, more viable projects, and will provide the Government with more confidence that it can meet its decarbonisation targets.

[2] Further work is required to develop the approach for applying DPAs and these criteria to power CCUS facilities which include multiple generation and/ or capture trains.

Qualifying Change in Law

We outline below our updated proposals in respect of the scope of "Qualifying Change in Law" under the DPA.

BEIS intends to follow the overall approach taken to the Qualifying Change in Law ("QCiL") definitions in the AR3 CfD when it comes to the equivalent definitions in the DPA, providing a degree of cost and revenue protection for Generators in respect of QCiLs that constitute "discriminatory changes in law", "specific changes in law" or "other changes in law". The precise scope of such cost and revenue protection will need to be developed further by BEIS and be aligned with both the payment mechanics in, and the overall economic model and policy drivers for, the DPA. Notwithstanding this, in summary, BEIS proposes the following three categories of QCiLs under the DPA (note that this section is intended to be a summary of the drafting which is more fully set out in Annex B):

- Discriminatory Change in Law: as per the AR3 CfD, this will be defined as a change in law which specifically applies to: (A) the particular Project, (B) the particular Facility or (C) the particular Generator.
- Specific Change in Law: this is a change in law which specifically applies to:
    - Technology-Specific: generating facilities which deploy CO_2 Capture Technology, or the CO_2 Capture Technology forming part of such generating facilities, and not to other generating facilities. By way of example, this would capture a new law that specifically applies to all CCGT facilities that deploy CO_2 Capture Technology, but not to unabated CCGT facilities.
    - Holding Companies: the holding of shares in companies, the membership of partnerships, limited partnerships or limited liability partnerships, the participation in joint ventures (whether or not incorporated) or the holding of economic interests in an undertaking whose main business is the development, construction, operation and maintenance of generating facilities as described in (i) the limb above and not other generating facilities. This limb is designed to ensure that changes in law which apply to the holding/parent company (rather than the abated generator subsidiary) will be captured by the Specific Change in Law definition.
- Other Change in Law: this is a change in law which does not specifically apply to the relevant Facility (i.e. it is not a "Specific Change in Law") and is not directly discriminatory (i.e. it is not a "Discriminatory Change in Law"), but has an undue and discriminatory effect on a Generator's out-of-pocket costs when compared to one of the comparator groups set out below:
    - Comparator Group A: all other generators which operate generating facilities deploying CO_2 Capture Technology;
    - Comparator Group B: all generators which operate generating facilities deploying the same or similar generation technology (or combustion process) as the Facility but which do not deploy CO_2 Capture Technology (e.g. a new law which has an

undue, discriminatory effect on an abated CCGT generator(s), when compared to all unabated CCGTs);

- Comparator Group C: all generators which operate generating facilities deploying one (1) or more Material Generation Technologies. Following the AR3 CfD, Material Generation Technologies will be defined as any generating technology that accounts for at least 1% of all the installed generation capacity in the UK; or
- Comparator Group D: all generators which operate generating facilities deploying CO_2 Capture Technology other than the relevant Generator's CO_2 Capture Technology (e.g. a new law which has a discriminatory effect on Supercritical CO_2 cycle projects, when compared to projects utilising other CO_2 capture technologies).

As with the AR3 CfD, QCiL protection will not be available to Generators in respect of "Foreseeable Changes in Law", the definition of which will follow the AR3 CfD.

Payment Mechanism

The proposed DPA consists of two payments: an Availability Payment for low carbon generation capacity and a Variable Payment to adjust the position of the power CCUS plant (referred to as the 'Facility' in Annex D) in the merit order relative to unabated CCGTs.

Updates to the Availability Payment Formula

The following updates are proposed to the Availability Payment formula and are detailed below.

- Updates to the overall Availability Payment calculation to enable more efficient settlement of payments;
- Updates to the Availability of Generation calculation to make better use of the available data from Balancing Mechanism Reporting Services (BMRS[3]);
- Updates to the Availability of Capture calculation to ensure that this is more widely applicable and comparable across different projects and power CCUS technologies; and
- An update to how Net Dependable Capacity is tested.

These are detailed below in addition to the presentation of the proposed updated formula for calculating the Availability Payment. Worked examples are presented in Annex A.

Calculation of Availability Payment

$$AP = \sum (AG_i \times AC_i \times NDC \times APR_i) + TSCF$$

Term	Definition	Source
AP	Availability Payment in the AP Billing Period (£)	Calculated
AG_i	Availability of Generation applicable to Settlement Unit i (%)	Calculated

[3] The BMRS is the primary channel for providing operational data relating to the GB Electricity Balancing and Settlement arrangements. It is used extensively by market participants to help make trading decisions and understanding market dynamics and acts as a prompt reporting platform as well as a means of accessing historic data, including data provided to comply with the Regulation on Wholesale Electricity Market Integrity and Transparency (REMIT).

Term	Definition	Source
AC_i	Availability of Capture applicable to Settlement Unit i (%)	Calculated
APR_i	Availability Payment Rate per Settlement Unit i (£/MW/Settlement Unit)	Agreed in DPA and [fully/ partially] indexed to inflation
$TSCF$	T&S Capacity Fee in the AP Billing Period (£)	Defined in T&S Connection Agreement
NDC	Net Dependable Capacity (MW)	Measured through the OCP Acceptance Test or (where relevant) by the Longstop Acceptance Test and through Annual NDC Tests

Table 1: Definition of terms in the Calculation of Availability Payment formula

Calculation of Availability of Generation

- For a Settlement Unit with no power plant outage/ derating event occurring during the Settlement Unit:

$$AG_i = 1$$

- For a Settlement Unit with a power plant outage/ derating event n either starting, continuing, or ending during the Settlement Unit

$$AG_i = AG_{OE_n} = 1 - \frac{\sum\left(\left(NAC_{OE_n} - NAC_j\right) \times \Delta T_j\right)}{NAC_{OE_n} \times \Delta T_{Settlement\ Units}}$$

Term	Definition	Source
AG_{OE_n}	Availability of Generation during Outage/ Derating Event n	Derived from data declared on BMRS

Term	Definition	Source
NAC_j	Net Available Capacity during time segment j (MW)	Derived from data declared on BMRS
ΔT_j	Duration of time segment j (hours)	Derived from data declared on BMRS
NAC_{OE_n}	Net Available Capacity immediately preceding Outage/ Derating Event n (MW)	Derived from data declared on BMRS
$\Delta T_{Settlement\ Units}$	Total duration of Settlement Units impacted by Outage/ Derating Event n (hours)	Derived from data declared on BMRS

Table 2: Definition of terms in the Calculation of Availability of Generation formula

Proposed updates to the Availability of Generation calculation

For Settlement Units with no qualifying power plant outage or derating events occurring, Availability of Generation will be equal to one. During Settlement Units with qualifying power plant outage or derating events starting, continuing or ending, Availability of Generation will be equal to one minus the sum of the Net Available Capacity reduction during time period(s) j multiplied by the duration of time period(s) j, divided by the product of the Net Available Capacity immediately preceding the outage or derating event n and the total duration of Settlement Units impacted by the outage or derating event. The sum of time period(s) j may be less than the total duration of Settlement Units impacted by the outage or derating event.

Qualifying power plant outage/derating events shall include any outages or derating of the plant net power output due to events which are attributable to the Generator.

Updates to using Net Dependable Capacity

Net Dependable Capacity (NDC) will be defined by the tests performed upon commissioning of the Facility (and, if applicable by the Longstop Date), and this will be capped at the Net Dependable Capacity Estimate as agreed in the DPA. Therefore the NDC achieved by the Generator could be lower than the Net Dependable Capacity Estimate subject to the relevant limitations in the DPA.

The NDC will be updated on an annual basis through an annual testing regime. This will ensure that Availability Payments are adjusted for the actual capacity available accounting for

any degradation of the power CCUS plant, and will act to incentivise the Generator to maintain the Facility to the highest standard possible.

We propose that NDC is not used to calculate Availability of Generation during Settlement Units with a power plant outage or derating event. This calculation will instead use the Net Available Capacity immediately preceding the outage or derating event, which will better represent the actual capacity of the plant in the time period relevant to the outage.

Calculation of Availability of Capture

- For a Capture Plant Outage Event[4] which qualifies for a Capture Plant Outage Relief Event (i.e. Settlement Units with a Capture Plant Outage Event that occurs as a direct result of a T&S Outage Event not attributable to the Generator)[5]

$$AC_i = DCR_i$$

- For a Non-Operational Period (i.e. Settlement Units with no net generation output and no Capture Plant Outage Relief Event)

$$AC_i = DCR_i$$

- For an Operational Period (i.e. Settlement Units with net generation output and no Capture Plant Outage Relief Event)

$$AC_i = ACR_{ph}$$

Term	Definition	Source
ACR_{ph}	Achieved CO_2 Capture Rate in the AP Billing Period (%)	Calculated
DCR_i	Deemed CO_2 Capture Rate (%)	Calculated[6]

Table 3: Definition of terms in the Calculation of Availability of Capture formula

This concept is summarised in the following table (**Error! Reference source not found.**) of e xample Settlement Unit scenarios and accompanying logic tree diagram (Figure 1):

[4] For the purposes of the DPA payment mechanism, the definition of "Capture Plant Outage Event" set out in Annex D of the December 2020 Business Models Update publication will be updated to refer to events which prevent the Capture Plant from being able to capture and/or export to the T&S network some or all of the CO2 generated by the Power Plant (whether as a result of Capture Plant or T&S Network unavailability, curtailment or derating).
[5] As set out in Annex D to the December 2020 Update on Business Models (the DPA HoTs) clause 10.4 (b).
[6] See explanation of calculation of Deemed Capture Rate in this document (p. 18).

Capture Plant Outage Event	Capture Plant Outage Relief Event	Net Generation Output during Settlement Unit	Category
No	n/a	Positive	Operational Period
Yes	Yes	Positive	Capture Plant Outage Relief Event
Yes	No	Positive	Operational Period
No	n/a	Zero or negative	Non-Operational Period
Yes	Yes	Zero or negative	Capture Plant Outage Relief Event
Yes	No	Zero or negative	Non-Operational Period

Table 4: Table summarising the example Settlement Unit scenarios for Availability of Capture

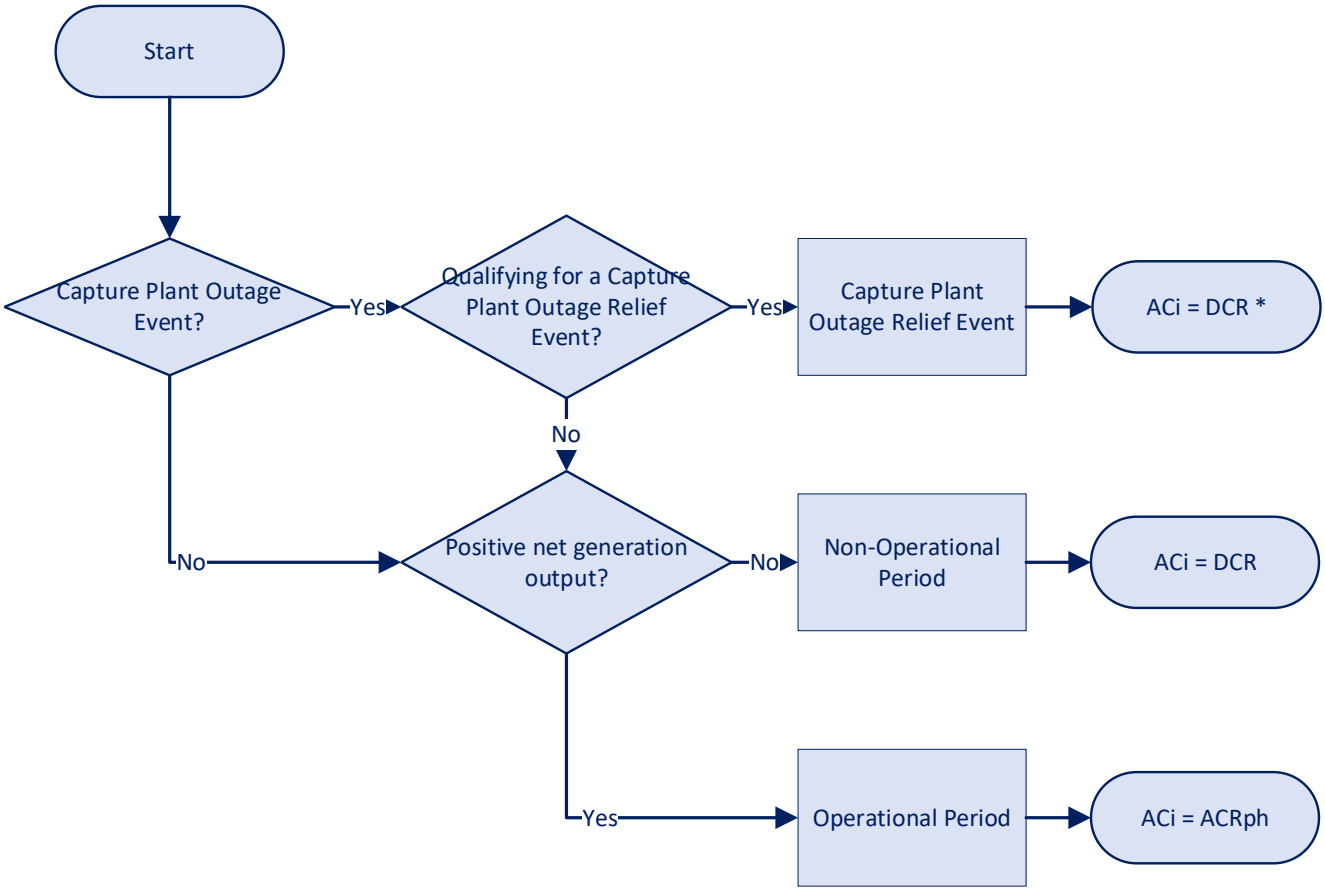


Figure 1: Flow diagram showing logical tests to determine Availability of Capture in certain Settlement Unit scenarios. *Generated CO_2 during a Capture Plant Outage Relief Event period will be deemed as $CO2_{gen\_TS}$ for the purposes of the ACR_{ph} calculations.

Calculation of Achieved CO_2 Capture Rate

$$ACR_{ph} = \frac{CO2_{exp}}{CO2_{gen} - CO2_{gen\_TS}}$$

Term	Definition	Source
$CO2_{exp}$	Total Metered CO_2 Output in the AP Billing Period (tCO_2)	Metered on entry to T&S network at the CO_2 Delivery Points
$CO2_{gen}$	Total Calculated CO_2 Generated in the AP Billing Period (tCO_2)	Calculated from Total Metered Fuel Consumption and the Fuel

Term	Definition	Source
		Composition using JEP[7] methodology
$CO2_{gen\_TS}$	Calculated CO_2 during Capture Plant Outage Relief Events in AP Billing period (tCO_2)	Calculated from Total Metered Fuel Consumption and the Fuel Composition using JEP methodology

Table 5: Definition of terms in the Calculation of Achieved CO_2 Capture Rate formula

Updates to the Availability of Capture calculation

This term is intended to link the Availability Payment to the availability and performance of the capture unit (referred to as the 'Capture Plant' in the DPA HoTs) in capturing CO_2. There is no existing framework for reporting Availability of Capture which could form the basis for this part of the Availability Payment formula. In order to measure this, it is necessary to consider Capture Plant Outage Relief Event Periods, Non-Operational Periods, and Operational Periods.

For Settlement Units with Capture Plant Outage Relief Event (i.e. Settlement Units with T&S export derating/outage due to reasons attributable to a party other than the Generator), the Availability of Capture shall equal the Deemed CO_2 Capture Rate (as described below).

For Non-Operational Periods (i.e. Settlement Units with no net generation output and no Capture Plant Outage Relief Event), the Availability of Capture shall equal the Deemed CO_2 Capture Rate.

For Operational Periods (i.e. Settlement Units with net generation output and no Capture Plant Outage Relief Event), the Availability of Capture shall equal the Achieved CO_2 Capture Rate.

Deemed Capture Rate

The Deemed Capture Rate shall be based on the lower of two numbers, either:

- The previous 12 month rolling average Achieved CO_2 Capture Rate. For the first AP Billing Period in the DPA term, the Deemed CO_2 Capture Rate shall equal the CO_2 Capture Rate demonstrated during the OCP Acceptance Tests. For subsequent months during the first year of the DPA (i.e. month 2 through to month 12), the Deemed CO_2 Capture Rate shall be based upon the average Achieved CO_2 Capture Rate for all previous months, before sufficient historical data is available from month 13 onwards to establish the previous 12 month rolling average; or

[7] Joint Environmental Programme

- The current availability of capture as declared by the Generator. The DPA Counterparty may have the right to request validation of any declared availability of capture through tests. We will undertake further work to set out the methodology and framework for making availability of capture declarations.

Target Capture Rate

Further to the December 2020 publication, we intend to remove the concept of a Target Capture Rate from the Availability of Capture calculation. Developers will now be required to build their assumptions around the expected achievable capture rate into their Availability Payment Rate proposals. The rationale for this is that this:

- Will enable a more straightforward comparison across power CCUS projects which have differing capture rates;
- Will allow plants to receive increased Availability Payments during periods of higher capture rates, which may offset some periods where capture rates are lower than expected (e.g. during start-up of the power CCUS plant); and
- Allow Generators to take advantage of improvements in performance from upgrades CCUS equipment to enable higher capture rates.

Minimum capture rate

In the event that the Achieved CO_2 Capture Rate in successive AP Billing Periods falls below a minimum threshold level for a set number of consecutive AP Billing Periods, the DPA Counterparty may (following notification to the Generator of its intention to exercise such right) suspend or withhold Availability Payments and Variable Payments until such time as the Achieved CO_2 Capture Rate for a subsequent AP Billing Period is greater than or equal to the minimum threshold level.

The minimum threshold level and number of consecutive periods will be determined following further consideration by BEIS, however the intention is to set this at a suitable level such that continued failure to achieve this standard for a prolonged period would warrant suspension or withholding of payments. This is not intended to be triggered by short outages or small derating events of the capture plant. It is expected that this will further incentivise the Generator to properly maintain the plant and execute corrective measures within a reasonable timeframe where unexpected issues arise.

Definition of a Settlement Unit and Billing Period for the Availability Payment

BEIS is still considering the appropriate length for a Settlement Unit for the Availability Payment, however we are currently minded to set this at thirty minute periods. This aligns with the wider wholesale electricity market structure.

In addition, we are currently minded to set the Availability Payment Billing Period at one calendar month, subject to further consideration.

DPA Payment Mechanism – additional updates

Additional Start Costs

This refers to any additional start costs which are incurred by the Generator over and above those incurred by an unabated reference plant for the same start profile. Such additional costs may include additional fuel costs due to higher energy demand during start up; additional operating costs; and additional maintenance costs caused by thermal stresses to the capture plant and/ or accelerated degradation of the solvent in a post-combustion capture plant. At the same time, certain costs may be reduced compared to an unabated plant, in particular CO_2 emissions costs. Overall, we anticipate that the most significant discrepancy in start costs compared to an unabated reference plant will be the combination of fuel costs and reduction in CO_2 emissions costs.

We do not intend for the DPA to provide any specific compensation to a Generator related to additional costs incurred during start-up by a Facility relative to an unabated equivalent plant. We consider that:

- For initial FOAK contracts, a plant may not be expected to undergo frequent cold starts in the early years of a DPA, meaning that compensation for additional start costs may not be substantial;
- Over time, with increasing CO_2 emissions prices, it could be expected that the additional costs of a start of a Facility relative to an unabated reference plant will decrease; and
- Designing a mechanism to compensate these costs in a sufficiently accurate way, and which does not provide the Generator with an ongoing advantage over all others forms of flexible generation, presents significant challenges and would add substantial complexity to the DPA mechanism overall.

Compensation for running when not required by the electricity market

This refers to a scenario where a power CCUS Facility in receipt of a DPA may be the sole emitter connected to a T&S network at the point of T&S commissioning. In this event, it may not be possible for the Facility to operate in a dispatchable mode due to the need for a constant flow of CO_2 for commissioning and operation of CO_2 storage. Stakeholders have proposed to BEIS that a specific form of compensation could be made available to a Facility in order to run ‘baseload’ (i.e. continuously, excepting maintenance or outage events) even when this generation is not required by the electricity market.

We do not intend for the DPA to provide specific compensation to a Generator related to any period where a Facility is required to run baseload for any period during the DPA term. We consider that integrated cluster planning should be the primary strategy for meeting any CO_2 storage commissioning and operational requirements.

Next Steps

This document reflects the work we have done to date to progress the DPA design following publication of the December 2020 document. We will continue to develop further the detailed structures and mechanisms of with the objective of finalising the DPA model in 2021. This work will be undertaken in close coordination with the development of the business models for T&S, industrial carbon capture, hydrogen and CIF.

In relation to the DPA business model further updates planned for 2021 include:

Update	Indicative date
DPA Update	Q3

Glossary

Term	Description
AR3	Allocation Round Three (referring to the third contract for difference allocation round for renewable technologies).
AP	Availability Payment
BEIS	Department for Business, Energy and Industrial Strategy
BMRS	Balancing Mechanism Reporting Services
CCGT	Combined Cycle Gas Turbine
CCUS	Carbon Capture, Usage and Storage
CCS	Carbon Capture and Storage
Cluster	Transportation and storage network (incorporating the onshore and offshore network and offshore storage facility) and an associated first phase of carbon capture projects.
CfD	Contract for Difference
CIF	CCS Infrastructure Fund
CM	Capacity Market
CO_2	Carbon Dioxide
DPA	Dispatchable Power Agreement
December 2020 document	The Carbon Capture, Usage and Storage Business Models update published in December 2020: https://www.gov.uk/government/publications/carbon-capture-usage-and-storage-ccus-business-models
FEED	Front End Engineering Design
FID	Final Investment Decision
FOAK	First-Of-A-Kind
GB	Great Britain
HMG	Her Majesty's Government.

HoTs	Heads of Terms (for the Dispatchable Power Agreement)
ICC	Industrial Carbon Capture
ICC Contract	Industrial Carbon Capture Contract
JEP	Joint Environmental Programme
MW	Megawatt
MWh	Megawatt hours
NDC	Net Dependable Capacity
OCP	Operational Conditions Precedent
QCiL	Qualifying Change in Law
REMIT	Regulation on Wholesale Energy Market Integrity and Transparency
Storage	Geological store for the captured CO_2 from the end of the injection well.
TCW	Target Commissioning Window
T&S	Transport and Storage
T&SCo	A company licensed to provide transport and storage services
UK	United Kingdom of Great Britain and Northern Ireland
VfM	Value for Money

Annex A: Availability Payment Worked Examples

The following worked examples consider a CCGT with post combustion capture plant with Net Dependable Capacity of 1100 MW (at reference site conditions) and design capture rate of 90% for operation during an AP Billing Period from 1st February 2021 to 28th February 2021 (total number of Settlement Units in AP Billing Period = 1344). The rolling average Achieved Capture Rate for the previous 12 months is 91% (used in the examples below, where relevant, as the Deemed Capture Rate).

The Availability Payment Rate is assumed to be £100/kW/year (which equates to £5.7077626/MW/Settlement Unit with 17520 Settlement Units in a year). For simplification, the T&S Capacity Fee (TSCF) is assumed to be zero for each example.

For simplification, it is assumed that the plant operates at base load of 1000 MW net output at current site conditions during periods of unrestricted operation (note this is different to the Net Dependable Capacity at reference site conditions[8]).

[8] Site conditions refer to ambient temperature, relative humidity & pressure)

Example 1 – Outage/derating of power plant

During the AP Billing Period, there is a single outage/derating of the power plant which is recorded to REMIT with the following outage/derating profile. There are no other outage or derating events throughout the AP Billing Period.

- T&S available
- Power plant outage from 01/02/2021 9:15 to 01/02/2021 10:15
    - 9:15 - 9:45 – plant generating with Plant Net Output 500 MW and Net Available Capacity 500 MW
    - 9:45 - 10:00 – plant shutdown with Plant Net Output 0 MW and Net Available Capacity 0 MW
    - 10:00 - 10:15 - plant shutdown with Plant Net Output 0 MW and Net Available Capacity 500 MW
- Power plant fully available during all other settlement units

Summary of events:

Period Start	**Period End**	**Net Available Capacity (MW)**	**Plant Net Output (MW)**	**Operational Capture Rate[9] (%)**	**Deemed Capture Rate (%)**
01/02/2021 00:00	01/02/2021 09:15	1000	1000	90%	n/a
01/02/2021 09:15	01/02/2021 09:45	500	500	90%	n/a
01/02/2021 09:45	01/02/2021 10:00	0	0	0%	91%
01/02/2021 10:00	01/02/2021 10:15	500	0	0%	91%
01/02/2021 10:15	1/03/2021 00:00	1000	1000	90%	n/a

[9] Note, this term is used for purposes of explanation of the operating status of the capture plant during the relevant period for the worked example, and does not correspond to a specific term in the DPA HoTs.

Summary of Settlement Units:

SU Start	SU End	Net Available Capacity (MW)	AGi	Plant Net Output (MW)	Operational Capture Rate (%)	$CO2_{gen}$ (tCO_2)	$CO2_{exp}$ (tCO_2)	$CO2_{gen\_TS}$ (tCO_2)	Period Type for ACi	Applicable ACi	∑(AGi x ACi x NDC x APR)[10]
01/02/2021 00:00	01/02/2021 09:00	1000	100%	1000	90%	3600	3240	0	OP	ACR_{ph} = 90%	101712
01/02/2021 09:00	01/02/2021 09:30	1000 (15m) 500 (15m)	58.33%	1000 (15m) 500 (15m)	90% (15m) 90% (15m)	100 (15m) 50 (15m)	90 (15m) 45 (15m)	0 (15m) 0 (15m)	OP	ACR_{ph} = 90%	3296
01/02/2021 09:30	01/02/2021 10:00	500 (15m) 0 (15m)	58.33%	500 (15m) 0 (15m)	90% (15m) 0% (15m)	50 (15m) 0 (15m)	45 (15m) 0 (15m)	0 (15m) 0 (15m)	OP	ACR_{ph} = 90%	3296
01/02/2021 10:00	01/02/2021 10:30	500 (15m) 1000 (15m)	58.33%	0 (15m) 1000 (15m)	0% (15m) 90% (15m)	0 (15m) 100 (15m)	0 (15m) 90 (15m)	0 (15m) 0 (15m)	OP	ACR_{ph} = 90%	3296
01/02/2021 10:30	1/03/2021 00:00	1000	100%	1000	90%	264600	238140	0	OP	ACR_{ph} = 90%	7475856
						268500	*241650*	*0*			*7587457*
						ACR_{ph} = 241650 / (268500 – 0) = 90%					

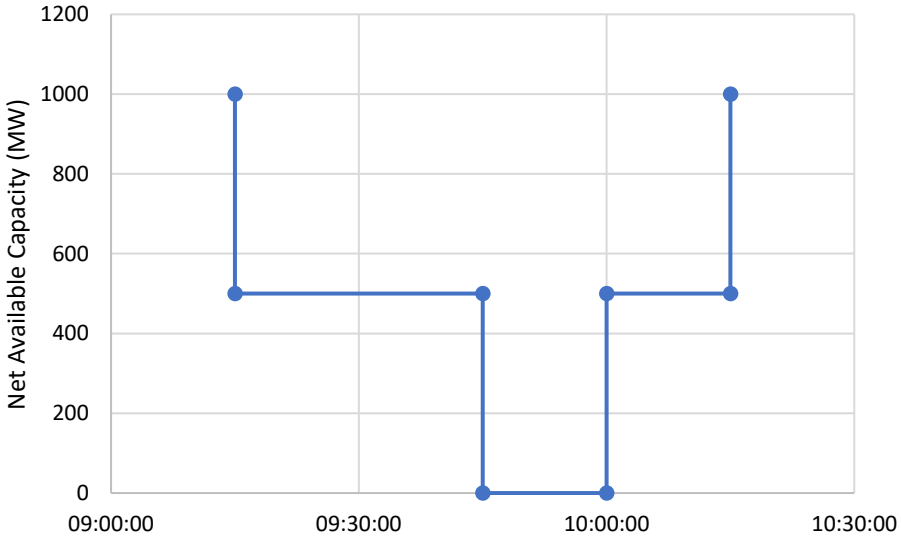
Therefore, total Availability Payment for the month = £7,587,457

[10] Note, values in this column are rounded to nearest whole number. Total summation of AP over Billing Period may therefore differ due to rounding errors.

Availability of Generation during Power Plant Outage/Derating:

REMIT Data			**Calculation**		
Segment Start Time	Segment End Time	NAC_j	Segment Duration ΔT_j	Reduced Output (NAC_{OEn} - $NAC_{j)}$	(NAC_{OEn} - $NAC_{j)}$ * ΔT_j
		MW	h	MW	MW*h
01/02/2021 09:15	01/02/2021 09:15	NAC_{OEn} = 1000	0.0	0	0
01/02/2021 09:15	01/02/2021 09:45	500	0.5	500	250
01/02/2021 09:45	01/02/2021 10:00	0	0.25	1000	250
01/02/2021 10:00	01/02/2021 10:15	500	0.25	500	125
					Sum = 625

This is displayed more clearly in the following diagram:



Availability of Generation for the impacted Settlement Units is calculated as follows:

$$AG_{OE_n} = 1 - \frac{\sum\left((NAC_{OE_n} - NAC_j) \times \Delta T_j\right)}{NAC_{OE_n} \times \Delta T_{Settlement\ Units}}$$

Where:

$$\sum\left((NAC_{OE_n} - NAC_j) \times \Delta T_j\right) = 625 \text{ MW*h}$$

$$NAC_{OE_n} = 1000 \text{ MW}$$

- (Note this is the Net Available Capacity immediately preceding the outage/derating event at current site conditions)

$$\Delta T_{Settlement\ Units} = 10:30 - 09:00 = 1.5 \text{ hours}$$

- (Note this includes total duration of the impacted settlement units, including periods before and after the outage)

$$AG_{OE_n} = 1 - \frac{625}{1000 \times 1.5} = 58.33\%$$

Therefore:

- For all 3 Settlement Units between 01/02/2021 09:00 and 01/02/2021 10:30
  - $AG_i = 58.33\%$
- For all other Settlement Units in AP Billing Period
  - $AG_i = 100\%$

Example 2 – Capture Plant Outage Relief Event

- Capture Plant Outage Event occurring as a direct result of a T&S Outage Event not attributable to generator from 01/02/2021 9:15 to 01/02/2021 11:45
- Power plant fully available & generates during the T&S Outage Event
- Power plant fully available during all other settlement units too

Summary of events:

Period Start	Period End	Net Available Capacity (MW)	Plant Net Output (MW)	Operational Capture Rate (%)	Deemed Capture Rate (%)
01/02/2021 00:00	01/02/2021 09:15	1000	1000	90%	n/a
01/02/2021 09:15	01/02/2021 11:45	1000	1000	0%	91%
01/02/2021 11:45	1/03/2021 00:00	1000	1000	90%	n/a

Summary of Settlement Units:

SU Start	SU End	Net Available Capacity (MW)	AGi	Plant Net Output (MW)	Operational Capture Rate (%)	$CO2_{gen}$ (tCO_2)	$CO2_{exp}$ (tCO_2)	$CO2_{gen\_TS}$ (tCO_2)	Period Type for ACi	Applicable ACi	∑(AGi x ACi x NDC x APR)
01/02/2021 00:00	01/02/2021 09:00	1000	100%	1000	90%	3600	3240	0	OP	ACR_{ph} = 90.0%	101712
01/02/2021 09:00	01/02/2021 09:30	1000 (15m) 1000 (15m)	100%	1000 (15m) 1000 (15m)	90% (15m) 0% (15m)	100 (15m) 100 (15m)	90 (15m) 0 (15m)	0 (15m) 100 (15m)	CPORE	DCR = 91%	5713
01/02/2021 09:30	01/02/2021 10:00	1000	100%	1000	0%	200	0	200	CPORE	DCR = 91%	5713
01/02/2021 10:00	01/02/2021 10:30	1000	100%	1000	0%	200	0	200	CPORE	DCR = 91%	5713
01/02/2021 10:30	01/02/2021 11:00	1000	100%	1000	0%	200	0	200	CPORE	DCR = 91%	5713
01/02/2021 11:00	01/02/2021 11:30	1000	100%	1000	0%	200	0	200	CPORE	DCR = 91%	5713
01/02/2021 11:30	01/02/2021 12:00	1000 (15m) 1000 (15m)	100%	1000 (15m) 1000 (15m)	0% (15m) 90% (15m)	100 (15m) 100 (15m)	0 (15m) 90 (15m)	100 (15m) 0 (15m)	CPORE	DCR = 91%	5713
01/02/2021 12:00	1/03/2021 00:00	1000	100%	1000	90%	264000	237600	0	OP	ACR_{ph} = 90.0%	7458904
						268800	*241020*	*1000*			*7594897*
						ACR_{ph} = 241020 / (268800 – 1000) = 90.0%					

Therefore, total Availability Payment for the month = £7,594,897

Example 3 – Capture Plant Outage Event not qualifying for relief

- Capture Plant Outage Event occurring as a result of a T&S Outage Event attributable to generator from 01/02/2021 9:15 to 01/02/2021 11:45
- Power plant fully available & generates during the T&S Outage Event
- Power plant fully available during all other settlement units too

Summary of events:

Period Start	Period End	Net Available Capacity (MW)	Plant Net Output (MW)	Operational Capture Rate (%)	Deemed Capture Rate (%)
01/02/2021 00:00	01/02/2021 09:15	1000	1000	90%	n/a
01/02/2021 09:15	01/02/2021 11:45	1000	1000	0%	n/a
01/02/2021 11:45	1/03/2021 00:00	1000	1000	90%	n/a

Summary of Settlement Units:

SU Start	SU End	Net Available Capacity (MW)	AGi	Plant Net Output (MW)	Operational Capture Rate (%)	$CO2_{gen}$ (tCO_2)	$CO2_{exp}$ (tCO_2)	$CO2_{gen\_TS}$ (tCO_2)	Period Type for ACi	Applicable ACi	∑(AGi x ACi x NDC x APR)
01/02/2021 00:00	01/02/2021 09:00	1000	100%	1000	90%	3600	3240	0	OP	ACR_{ph} = 89.67%	101334
01/02/2021 09:00	01/02/2021 09:30	1000 (15m) 1000 (15m)	100%	1000 (15m) 1000 (15m)	90% (15m) 0% (15m)	100 (15m) 100 (15m)	90 (15m) 0 (15m)	0 (15m) 0 (15m)	OP	ACR_{ph} = 89.67%	5630
01/02/2021 09:30	01/02/2021 10:00	1000	100%	1000	0%	200	0	0	OP	ACR_{ph} = 89.67%	5630
01/02/2021 10:00	01/02/2021 10:30	1000	100%	1000	0%	200	0	0	OP	ACR_{ph} = 89.67%	5630
01/02/2021 10:30	01/02/2021 11:00	1000	100%	1000	0%	200	0	0	OP	ACR_{ph} = 89.67%	5630
01/02/2021 11:00	01/02/2021 11:30	1000	100%	1000	0%	200	0	0	OP	ACR_{ph} = 89.67%	5630
01/02/2021 11:30	01/02/2021 12:00	1000 (15m) 1000 (15m)	100%	1000 (15m) 1000 (15m)	0% (15m) 90% (15m)	100 (15m) 100 (15m)	0 (15m) 90 (15m)	0 (15m) 0 (15m)	OP	ACR_{ph} = 89.67%	5630
01/02/2021 12:00	1/03/2021 00:00	1000	100%	1000	90%	264000	237600	0	OP	ACR_{ph} = 89.67%	7431155
						268800	*241020*	*0*			*7566267*
						ACR_{ph} = 241020 / (268800 – 0) = 89.67%					

Therefore, total Availability Payment for the month = £7,566,267

Example 4 – Capture Plant Outage Relief Event together with Power Plant Outage

- Capture Plant Outage Event occurring as a result of a T&S Outage Event not attributable to generator from 01/02/2021 9:15 to 01/02/2021 11:45
- Power plant outage from 01/02/2021 9:15 to 01/02/2021 10:15
    - 9:15 - 9:45 – plant generating with Plant Net Output 500 MW and Net Available Capacity 500 MW
    - 9:45 - 10:00 – plant shutdown with Plant Net Output 0 MW and Net Available Capacity 0 MW
    - 10:00 - 10:15 - plant shutdown with Plant Net Output 0 MW and Net Available Capacity 500 MW
- Power plant fully available during all other settlement units

Summary of events:

Period Start	Period End	Net Available Capacity (MW)	Plant Net Output (MW)	Operational Capture Rate (%)	Deemed Capture Rate (%)
01/02/2021 00:00	01/02/2021 09:15	1000	1000	90%	n/a
01/02/2021 09:15	01/02/2021 09:45	500	500	0%	91%
01/02/2021 09:45	01/02/2021 10:00	0	0	0%	91%
01/02/2021 10:00	01/02/2021 10:15	500	0	0%	91%
01/02/2021 10:15	1/02/2021 11:45	1000	1000	0%	91%
01/02/2021 11:45	1/03/2021 00:00	1000	1000	90%	n/a

Summary of Settlement Units:

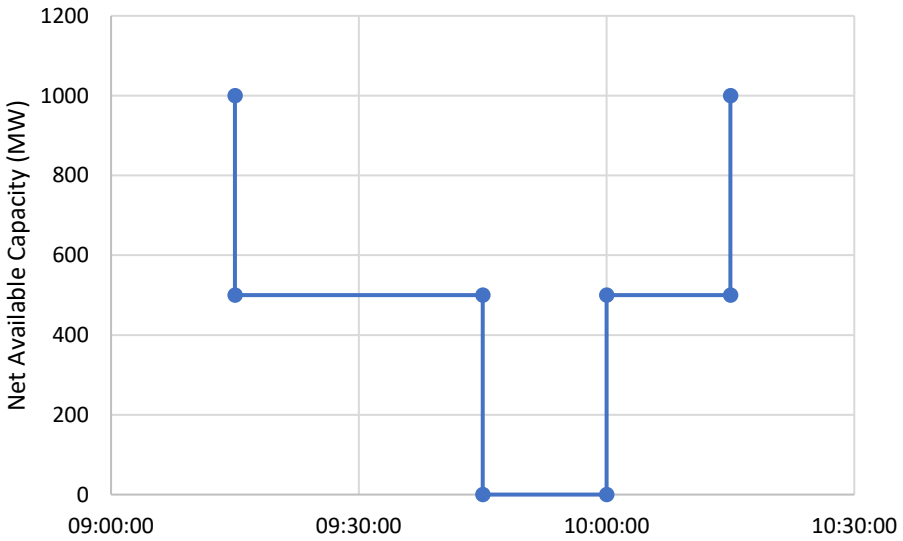
SU Start	SU End	Net Available Capacity (MW)	AGi	Plant Net Output (MW)	Operational Capture Rate (%)	$CO2_{gen}$ (tCO_2)	$CO2_{exp}$ (tCO_2)	$CO2_{gen\_TS}$ (tCO_2)	Period Type for ACi	Applicable ACi	∑(AGi x ACi x NDC x APR)
01/02/2021 00:00	01/02/2021 09:00	1000	100%	1000	90%	3600	3240	0	OP	ACR_{ph} = 90.0%	101712
01/02/2021 09:00	01/02/2021 09:30	1000 (15m) 500 (15m)	58.33%	1000 (15m) 500 (15m)	90% (15m) 0% (15m)	100 (15m) 50 (15m)	90 (15m) 0 (15m)	0 (15m) 50 (15m)	CPORE	DCR = 91%	3333
01/02/2021 09:30	01/02/2021 10:00	500 (15m) 0 (15m)	58.33%	500 (15m) 0 (15m)	0% (15m) 0% (15m)	50 (15m) 0 (15m)	0 (15m) 0 (15m)	50 (15m) 0 (15m)	CPORE	DCR = 91%	3333
01/02/2021 10:00	01/02/2021 10:30	500 (15m) 1000 (15m)	58.33%	0 (15m) 1000 (15m)	0% (15m) 0% (15m)	0 (15m) 100 (15m)	0 (15m) 0 (15m)	0 (15m) 100 (15m)	CPORE	DCR = 91%	3333
01/02/2021 10:30	01/02/2021 11:00	1000	100%	1000	0%	200	0	200	CPORE	DCR = 91%	5713
01/02/2021 11:00	01/02/2021 11:30	1000	100%	1000	0%	200	0	200	CPORE	DCR = 91%	5713
01/02/2021 11:30	01/02/2021 12:00	1000 (15m) 1000 (15m)	100%	1000 (15m) 1000 (15m)	0% (15m) 90% (15m)	100 (15m) 100 (15m)	0 (15m) 90 (15m)	100 (15m) 0 (15m)	CPORE	DCR = 91%	5713
01/02/2021 12:00	1/03/2021 00:00	1000	100%	1000	90%	264000	237600	0	OP	ACR_{ph} = 90.0%	7458904
						268500	*241020*	*700*			*7587755*
						ACR_{ph} = 241020 / (268500 – 700) = 90.0%					

Therefore, total Availability Payment for the month = £7,587,755

Availability of Generation during Power Plant Outage/Derating:

REMIT Data			Calculation		
Segment Start Time	Segment End Time	NAC_j	Segment Duration ΔT_j	Reduced Output $(NAC_{OEn} - NAC_{j)}$	$(NAC_{OEn} - NAC_{j)} * \Delta T_j$
		MW	h	MW	MW*h
01/02/2021 09:15	01/02/2021 09:15	NAC_{OEn} = 1000	0.0	0	0
01/02/2021 09:15	01/02/2021 09:45	500	0.5	500	250
01/02/2021 09:45	01/02/2021 10:00	0	0.25	1000	250
01/02/2021 10:00	01/02/2021 10:15	500	0.25	500	125
					Sum = 625

This is displayed more clearly in the following diagram:



Availability of Generation for the impacted Settlement Units is calculated as follows:

$$\boldsymbol{AG_{OE_n} = 1 - \frac{\sum\left((NAC_{OE_n} - NAC_j) \times \Delta T_j\right)}{NAC_{OE_n} \times \Delta T_{Settlement\ Units}}}$$

Where:

$\sum\left((NAC_{OE_n} - NAC_j) \times \Delta T_j\right)$ = 625 MW*h

NAC_{OE_n} = 1000 MW

- (Note this is the Net Available Capacity immediately preceding the outage/derating event at current site conditions)

$\Delta T_{Settlement\ Units}$ = 10:30 - 09:00 = 1.5 hours

- (Note this includes total duration of the impacted settlement units, including periods before and after the outage)

$AG_{OE_n} = 1 - \frac{625}{1000 \times 1.5}$ = 58.33%

Therefore:

- For all 3 Settlement Units between 01/02/2021 09:00 and 01/02/2021 10:30
  - AG_i = 58.33%.
- For all other Settlement Units in AP Billing Period
  - AG_i = 100%

Example 5 – Capture Plant Outage Event not qualifying for relief together with Power Plant Outage

- Capture Plant Outage Event occurring directly as a result of a T&S Outage Event attributable to generator from 01/02/2021 9:15 to 01/02/2021 11:45
- Power plant outage from 01/02/2021 9:15 to 01/02/2021 10:15
    - 9:15 - 9:45 – plant generating with Plant Net Output 500 MW and Net Available Capacity 500 MW
    - 9:45 - 10:00 – plant shutdown with Plant Net Output 0 MW and Net Available Capacity 0 MW
    - 10:00 - 10:15 - plant shutdown with Plant Net Output 0 MW and Net Available Capacity 500 MW
- Power plant fully available during all other settlement units

Summary of events:

Period Start	Period End	Net Available Capacity (MW)	Plant Net Output (MW)	Operational Capture Rate (%)	Deemed Capture Rate (%)
01/02/2021 00:00	01/02/2021 09:15	1000	1000	90%	n/a
01/02/2021 09:15	01/02/2021 09:45	500	500	0%	n/a
01/02/2021 09:45	01/02/2021 10:00	0	0	0%	n/a
01/02/2021 10:00	01/02/2021 10:15	500	0	0%	n/a
01/02/2021 10:15	1/02/2021 11:45	1000	1000	0%	n/a
01/02/2021 11:45	1/03/2021 00:00	1000	1000	90%	n/a

Summary of Settlement Units:

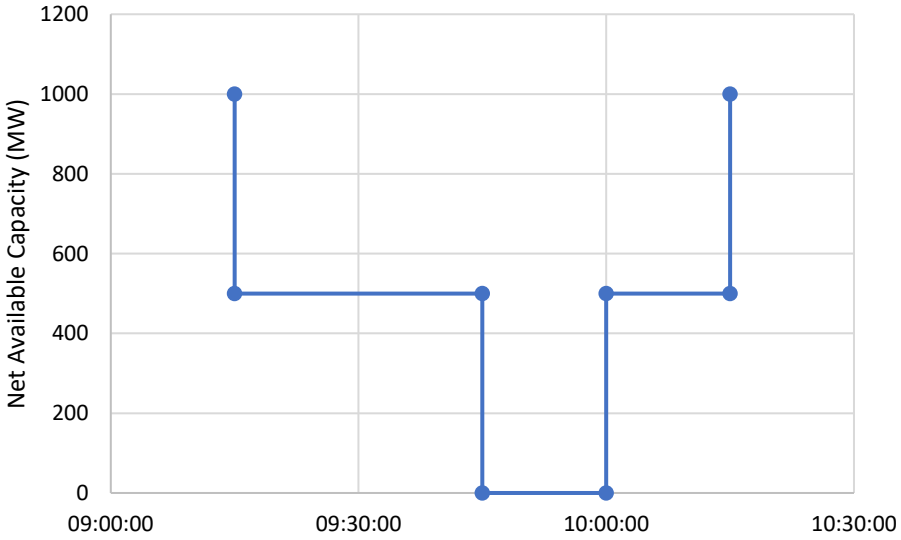
SU Start	SU End	Net Available Capacity (MW)	AGi	Plant Net Output (MW)	Operational Capture Rate (%)	$CO2_{gen}$ (tCO_2)	$CO2_{exp}$ (tCO_2)	$CO2_{gen\_TS}$ (tCO_2)	Period Type for ACi	Applicable ACi	∑(AGi x ACi x NDC x APR)
01/02/2021 00:00	01/02/2021 09:00	1000	100%	1000	90%	3600	3240	0	OP	ACR_{ph} = 89.77%	101447
01/02/2021 09:00	01/02/2021 09:30	1000 (15m) 500 (15m)	58.33%	1000 (15m) 500 (15m)	90% (15m) 0% (15m)	100 (15m) 50 (15m)	90 (15m) 0 (15m)	0 (15m) 0 (15m)	OP	ACR_{ph} = 89.77%	3288
01/02/2021 09:30	01/02/2021 10:00	500 (15m) 0 (15m)	58.33%	500 (15m) 0 (15m)	0% (15m) 0% (15m)	50 (15m) 0 (15m)	0 (15m) 0 (15m)	0 (15m) 0 (15m)	OP	ACR_{ph} = 89.77%	3288
01/02/2021 10:00	01/02/2021 10:30	500 (15m) 1000 (15m)	58.33%	0 (15m) 1000 (15m)	0% (15m) 0% (15m)	0 (15m) 100 (15m)	0 (15m) 0 (15m)	0 (15m) 0 (15m)	OP	ACR_{ph} = 89.77%	3288
01/02/2021 10:30	01/02/2021 11:00	1000	100%	1000	0%	200	0	0	OP	ACR_{ph} = 89.77%	5636
01/02/2021 11:00	01/02/2021 11:30	1000	100%	1000	0%	200	0	0	OP	ACR_{ph} = 89.77%	5636
01/02/2021 11:30	01/02/2021 12:00	1000 (15m) 1000 (15m)	100%	1000 (15m) 1000 (15m)	0% (15m) 90% (15m)	100 (15m) 100 (15m)	0 (15m) 90 (15m)	0 (15m) 0 (15m)	OP	ACR_{ph} = 89.77%	5636
01/02/2021 12:00	1/03/2021 00:00	1000	100%	1000	90%	264000	237600	0	OP	ACR_{ph} = 89.77%	7439458
						268500	*241020*	*0*			*7567676*
						ACR_{ph} = 241020/ (268500 – 0) = 89.77%					

Therefore, total Availability Payment for the month = £7,567,676

Availability of Generation during Power Plant Outage/Derating:

REMIT Data			Calculation		
Segment Start Time	Segment End Time	NAC_j	Segment Duration ΔT_j	Reduced Output ($NAC_{OEn} - NAC_{j)}$	($NAC_{OEn} - NAC_{j)} * \Delta T_j$
		MW	h	MW	MW*h
01/02/2021 09:15	01/02/2021 09:15	NAC_{OEn} = 1000	0.0	0	0
01/02/2021 09:15	01/02/2021 09:45	500	0.5	500	250
01/02/2021 09:45	01/02/2021 10:00	0	0.25	1000	250
01/02/2021 10:00	01/02/2021 10:15	500	0.25	500	125
					Sum = 625

This is displayed more clearly in the following diagram:



Availability of Generation for the impacted Settlement Units is calculated as follows:

$$\boldsymbol{AG_{OE_n} = 1 - \frac{\sum\left((NAC_{OE_n} - NAC_j) \times \Delta T_j\right)}{NAC_{OE_n} \times \Delta T_{Settlement\ Units}}}$$

Where:

$\sum\left((NAC_{OE_n} - NAC_j) \times \Delta T_j\right)$ = 625 MW*h

NAC_{OE_n} = 1000 MW

- (Note this is the Net Available Capacity immediately preceding the outage/derating event at current site conditions)

$\Delta T_{Settlement\ Units}$ = 10:30 - 09:00 = 1.5 hours

- (Note this includes total duration of the impacted settlement units, including periods before and after the outage)

$$AG_{OE_n} = 1 - \frac{625}{1000 \times 1.5} = 58.33\%$$

Therefore:

- For all 3 Settlement Units between 01/02/2021 09:00 and 01/02/2021 10:30
  - $AG_i = 58.33\%$.
- For all other Settlement Units in AP Billing Period
  - AGi = 100%

Annex B: Proposed Qualifying Change in Law Drafting

Introductory Notes

These definitions are preliminary and indicative for the Dispatchable Power Agreement ("DPA"). These definitions do not constitute definitive drafting of the DPA's terms.

These definitions should be read in conjunction with the document: i) 'An update on the assessment of potential business models for Carbon Capture, Usage and Storage', May 2021; and ii) Annex D of the December 2020 Business Models Update publication.

BEIS reserves the right to review and amend the definitions set out in this Annex.

Proposed Definitions for Qualifying Change in Law

"Qualifying Change in Law" means:

- a Discriminatory Change in Law;
- a Specific Change in Law; or
- an Other Change in Law,

which, in each case, is not a Foreseeable Change in Law. [The annulment, suspension, revocation or other modification of any decision in relation to state aid/subsidy control in respect of the Agreement or Dispatchable Power Agreements by the European Commission or other Competent Authority shall not constitute a Qualifying Change in Law][11];

"Discriminatory Change in Law" means a Change in Law the terms of which specifically (and not merely indirectly or consequentially or by virtue of the disproportionate effect of any Change in Law that is of general application) apply to:

- the Project and not to the design, development, construction, conversion, installation, completion, testing, commissioning, operation, maintenance and decommissioning of any other project;
- the Facility and not to any other generating facility; or
- the Generator and not to any other person;

"Specific Change in Law" means a Change in Law the terms of which specifically (and not merely indirectly or consequentially or by virtue of the disproportionate effect of any Change in Law that is of general application) apply to:

[11] Note to Reader: State Aid/Subsidy Control provisions are subject to further review by BEIS.

- generating facilities which deploy CO_2 Capture Technology, or CO_2 Capture Technology forming part of such generating facilities, and not to other generating facilities, or the generation from, or generation related processes carried out at, other generating facilities; or
- the holding of shares in companies, the membership of partnerships, limited partnerships or limited liability partnerships, the participation in joint ventures (whether or not incorporated) or the holding of any other economic interest in an undertaking whose main business is the development, construction, operation and maintenance of generating facilities referred to in paragraph (a) above and not other generating facilities;

"Other Change in Law" means a Change in Law made by Her Majesty's Government of the United Kingdom or which Her Majesty's Government of the United Kingdom has formally required a Competent Authority to make and which in either such case has an undue (being not objectively justifiable) discriminatory effect on the out-of-pocket costs incurred or saved by the Generator or the Project when compared with the out-of-pocket costs incurred or saved as a result of such Change in Law by:

- all other generators which operate generating facilities deploying CO_2 Capture Technology;
- all generators which operate generating facilities deploying the same or similar generation technology (or combustion process) as the Facility but which do not deploy CO_2 Capture Technology;
- all generators which operate generating facilities deploying one (1) or more Material Generation Technologies; or
- all other generators which operate generating facilities deploying CO_2 Capture Technology other than the Facility's CO_2 Capture Technology,

in each case in the United Kingdom, provided that the fact that a Change in Law has a disproportionate effect shall not, of itself, mean that it is discriminatory;

Other Definitions

"Change in Law" means:

- the coming into effect, amendment, supplement, termination, repeal, replacement or withdrawal of or to: (i) any Law [or Directive][12]; (ii) any Industry Document; or (iii) any Required Authorisation; or
- a change in the interpretation or application of any Law, [Directive], Industry Document or Required Authorisation by any Competent Authority,

in each case after the date of the Agreement and save (in each case) to the extent that the Change in Law:

[12] Note to Reader: This term is subject to further review by BEIS.

- arises out of, or in connection with, a breach of or default under or with respect to, that Law, [Directive], Industry Document or Required Authorisation by the Generator or any of its Representatives;
- arises out of, or in connection with, a failure by the Generator or any of its Representatives to act in accordance with the Reasonable and Prudent Standard; or
- represents no more than a continuous improvement or development of good practice which would be complied with in respect of a generating facility deploying the CO_2 Capture Technology by a generator acting in accordance with the Reasonable and Prudent Standard;

"CO2 Capture Technology" means technology which:

- captures [some or all of the] carbon dioxide [or any substance consisting primarily of carbon dioxide];
- temporarily stores, processes and exports carbon dioxide [(or any substance consisting primarily of carbon dioxide)] [for permanent storage and disposal]; and
- carries out any other process which is preparatory or ancillary to limbs (a) and (b) of this definition;

"Foreseeable Change in Law" means a Change in Law which is reasonably foreseeable on the date of the Agreement and which falls within one of a number of categories of foreseeable Changes in Law which will be set out in the Agreement [and which will reflect the definition of "Foreseeable Change in Law" in the AR3 CfD Standard Terms and Conditions];

"Generation Technology" means a generation technology deployed by a generating facility;

"Material Generation Technologies" a Generation Technology that accounts from time to time for at least one per cent. (1%) of all installed generation capacity (expressed in MW) in the United Kingdom;

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