Workgroup Consultation

CMP326:

Introducing a 'Turbine Availability Factor' for use in Frequency Response Capacity Calculation for Power Park Modules (PPMs)

Overview: To introduce a cap on the MW element in the Holding Payment calculation to reflect reduced capability to ramp from de-loaded positions – this will be dependent on proportion of turbines available.

Modification process & timetable

1. **Proposal form**
   - 25 October 2019
2. **Workgroup Consultation**
   - 1 February 2021 - 22 February 2021
3. **Workgroup Report**
   - 18 March 2021
4. **Code Administrator Consultation**
   - 06 April 2021 - 06 May 2021
5. **Draft Modification Report**
   - 20 May 2021
6. **Final Modification Report**
   - 01 June 2021
7. **Implementation**
   - TBC

Have 5 minutes? Read our Executive summary

Have 20 minutes? Read the full Workgroup Consultation document

Have 30 minutes? Read the full Workgroup Consultation document and annexes

Status summary: The Workgroup are seeking your views on the work completed to date to form the final solution(s) to the issue raised

This modification is expected to have a:

Medium impact: National Grid Electricity System Operator

Low impact: Power Park Module Generators

Governance route	Standard Governance Route with Workgroup	
Who can I talk to about the change?	**Proposer:** James Stone – National Grid Electricity System Operator James.Stone@nationalgrideso.com Phone: 07971 002704	**Code Administrator Chair**: Paul Mullen paul.j.mullen@nationalgrideso.com Phone: 07794537028
How do I respond?	Send your response proforma to cusc.team@nationalgrideso.com **by 5pm on 22 February 2021**	

Executive Summary

CMP326 seeks to introduce a cap on the MW element in the Holding Payment calculation to reflect reduced capability to ramp from de-loaded positions – this will be dependent on proportion of turbines available.

What is the issue?

Under CUSC Section 4, Power Stations can be instructed to provide "Mode A Frequency Response" in accordance with the terms of the relevant Mandatory Services Agreement (MSA).

The current calculation methods, which determine the holding payments for Primary, Secondary and High Frequency Response, can overestimate the response capability of Power Park Modules when some turbines on the site are unavailable. The Proposer believes that the CUSC needs to reflect the true and accurate response capability of PPMs when some turbines on the site are unavailable to provide response.

What is the solution and when will it come into effect?

Proposers Solution (the "Original"):

Seeks to introduce a cap on the MW element in the Holding Payment calculation to reflect reduced capability to ramp from de-loaded positions – this will be dependent on proportion of turbines available.

Implementation date:

Implementation will be linked to when ESO's new ASB (Ancillary Services Business) system is due to be implemented ~ September 2022 or at such a time as the changes to enable the correct calculations can be activated within this new system.

The Proposer requires a decision to be made by 30 September 2021 as this would allow sufficient time for any required changes to be included in the new system design/build.

What is the impact if this change is made?

There are expected to be minimal system impacts as the changes will be incorporated within the build/scope for the replacement of the ASB system.

The Proposer anticipates based on data from the calendar year 2020 that there would be ~ £40K of savings per annum. The Proposer expects that the savings will increase in line with the expected increase of more wind being available for Mandatory Frequency Response (MFR) in later years.

Interactions

CMP326 will need to follow the process set out in Article 18 of the European Electricity Balancing Guideline (EBGL – EU Regulation 2017/2195)[1] and therefore a 1-month Code Administrator Consultation will be required. This is because CMP326 requires changes to

[1] If the modification has an impact on Article 18 T&Cs, it will need to follow the process set out in Article 18 of the European Electricity Balancing Guideline (EBGL – EU Regulation 2017/2195) – the main aspect of this is that the modification will need to be consulted on for 1 month in the Code Administrator Consultation phase. N.B. This will also satisfy the requirements of the NCER process.

CUSC 4.1.3.9, and so impacts on the EBGL Article 18 Terms and Conditions. We will be interested to hear industry views, on this identified impact, as part of this Workgroup Consultation (please see Question 7 of this Workgroup Consultation).

It is also important that the CMP326 solution(s) put forward does not detrimentally impact the EBGL Article 3 Objectives themselves and therefore we will be seeking industry views on any such impacts as part of both the Workgroup Consultation (please see Question 8 of this Workgroup Consultation) and subsequent Code Administrator Consultation. Annex 5 of this document provides more background on EBGL and lists the current EBGL Article 3 Objectives.

Contents

What is the issue?

The Mandatory Services Agreement (MSA) between the ESO and a Power Station governs the provision of and payment for the service of Frequency Response referred to as 'Mode A Frequency Response'.

Under the CUSC, Power Stations can be instructed to provide Mode A Frequency Response as part of the MSA for which they are paid a 'Holding Payment' – this payment is made for the capability of the unit to provide response and reflects the fact that the site may be operating outside of normal conditions to provide balancing support.

For each of the types of response capability a site can provide when instructed (Primary, Secondary and High Frequency Response), a Holding Payment is calculated using the Power Stations known response capability i.e. the change in power output the site is expected to achieve based on the 'response capability tables' (from compliance testing) at various levels of de-load.

The key part of the Holding Payment calculation where this capability is reflected is the MW variable.

Currently sites with turbines unavailable for response mean the CUSC Section 4 Holding Payment calculation is overestimating their true response capability and therefore overpaying in these situations. As the ESO control room implements more projects, which will enable a greater volume of wind to be instructed for Frequency Response, the need to address the issue around accurate reflection of response capability in the holding payment calculation will become greater.

What is the solution?

Proposer's solution:

CMP326 seeks to introduce a cap on the MW element in the Holding Payment calculation to reflect reduced capability to ramp from de-loaded positions – this will be dependent on proportion of turbines available. The example below illustrates how this will work on practice:

Proposed Solution

Introduce a cap on the MW element in the Holding Payment calculation to reflect reduced capability to ramp from de-loaded positions – this will be dependent on proportion of turbines available

Example using Primary Response

$$P_{CAP} = \frac{Current\ MEL}{Registered\ Capacity}\ x\ Response\ Capability_P$$

Pmw should never exceed the Pcap in the Holding Payment calculation.

$$P_M = \left(P_{PR}\ x\ P_{MW}\ (1 - SF_P)\right) x\ K_T\ x\ K_{GRC}\ x\ \left[\frac{1}{60}\right]$$

De-Load	Primary	Secondary	High
0	0	0	15
10	10	10	15
20	15	20	15
30	15	25	15
	…		
90	15	25	0

Worked Example*

$P_{CAP} = \frac{100}{100}\ x\ 15 = 15MW$ All turbines are available

$P_{CAP} = \frac{80}{100}\ x\ 15 = 12MW$ 4 turbines are unavailable

$P_{CAP} = \frac{50}{100}\ x\ 15 = 7.5MW$ 10 turbines are unavailable

10 nationalgridESO

* Uses example site with 20 Turbines at 5MW each

Workgroup Considerations

The Workgroup convened twice to discuss the perceived issue, detail the scope of the proposed defect, devise potential solutions and assess the proposal in terms of the Applicable Code Objectives.

Consideration of the Proposer's solution

Does the proposed cap also apply to Non-Renewables (Conventional Technologies)?

Although, the Workgroup are happy in principle with the proposal that you are only paid for the response capability you provide they wish to ensure that this was being applied to non-renewables as well. Although the defect relates specifically to Power Park Modules (i.e. non-conventional technologies), the Workgroup agreed that it is important to consider whether or not there is equitable treatment for conventional generation.

The ESO Workgroup Member confirmed that the ESO's control room use a view of reduced wind turbine availability / reduced response already so the question to consider is if the CUSC should be updated so ESO can reflect this reduced response capability in the payments after their instruction for MFR or not.

The ESO Workgroup Member noted that a cap is not relevant for conventional power generation (apart from CCGT with multiple units which already has some form of reduction included in the current system). This is because their generation is usually based on a single generator and not made up of smaller generators (as is the case for turbines for wind generation) and therefore they do not expect ramp rates to be affected. Furthermore, the ESO Workgroup Member noted that conversations with wind turbine manufacturers had concluded that even though a wind farm may have a number of turbines "unavailable" it could still provide the early amounts of response capability quoted in the response tables, so the Proposer argues that this supports the need for a cap rather than a linear calculation for wind generation.

The Workgroup considered an example of a 450MW CCGT that has 2 x 150MW Gas Turbines and a 150MW steam turbine and asked whether or not, the CCGT would receive the full Holding Payment if the steam wasn't available. The Workgroup concluded that:

- Most CCGTs wouldn't work without the steam turbine;
- It is the gas turbines that are the active response providers, so if you have 2 Gas Turbines and 1 steam turbine in a CCGT module you could run with just 1 Gas Turbine and 1 steam turbine.
- However, in the event that 1 Gas turbine is not being used, this is reflected/tabulated (as well as the CCGT scaling factors) in the MSA response tables (and the BM data which includes CCGT scaling factors) within the settlement files. The Holding Payments are therefore adjusted accordingly.

Workgroup's initial conclusion - The Workgroup noted the process for non-renewable generation and concluded that there is no detrimental impact to renewable generation.

What is meant by an "unavailable" turbine?

As the reduction in the Holding Payment is linked to the unavailability of turbines, there is a need for clear definition or to point to an existing definition as to what constitutes an unavailable turbine. The ESO Workgroup Member noted that a Power Park Module (PPM) can have reduced output due to Power Park Units (PPU)[2] being out of service or operating at a reduced rate for various reasons and the amount of available response will be impacted.

The availability of the turbines is determined and declared by the windfarms themselves - reflected via their Power Available signal or them submitting updates to the Maximum Export Limit (MEL) e.g. if a turbine is out for maintenance.

The definition of MEL for PPMs was modified by GC0063[3] and this definition was introduced into CUSC by CMP314[4].In the case of a PPM, the MEL would equate to the Registered Capacity less the unavailable PPUs within the PPM and not include weather corrected MW output from each PPU.

Workgroup's initial conclusion - The Workgroup noted that the availability of turbines is determined and declared by the windfarms themselves in the MEL they submit to the ESO.

Where ESO Control Room are not able to accept the Power Available Signal provided e.g. it may fail data validation, how does this impact the Holding Payment?

The Workgroup were concerned that what they consider a valid Power Available Signal fails validation at the ESO Control room end and there would be a resultant impact on their Holding Payment. The ESO Workgroup Member confirmed the following:

- **Where a Power Available signal fails validation,** the site isn't removed but is flagged as "red", which means the ESO control room shouldn't instruct the site for MFR. Consequently, no Holding Payment is payable from the ESO when there is no active service instruction

- **Where Power Available data is missing** then it is auto-populated with the last known value before the data is sent to ESO's Settlements team. If this issue continues, the ESO control room will end any current response instructions and not issue a further instruction. Consequently, no Holding Payment is payable from the ESO when there is no active service instruction.

The Workgroup noted the ESO Workgroup Member's conclusion and were aware that guidance on the Power Available Quality Standards and data validation is covered in the "**Power Park Module Signal Best Practice Guide**"[5]. A Workgroup Member was

[2] For a windfarm, a Power Park Unit equates to a wind turbine

[3] GC0063 modified the definition to be registered capacity less unavailable units and the Power Available signal was introduced to replace MEL in the ESO headroom calculations.

[4] CMP314 Ofgem decision letter can be found at https://www.nationalgrideso.com/document/151291/download

[5] https://www.nationalgrideso.com/document/149181/download

concerned that they could perversely be penalised (by receiving a reduced Holding Payment) because they have better information that has failed validation. The ESO Workgroup Member noted that operators are responsible for sending the ESO Power Available signal data accounting for considerations in the "Power Park Module Signal Best Practice Guide" and would be aware of the expected level of data and validation requirements/thresholds etc. The spirit of the guide was about trying to be open and transparent and the agreed principle was that the more accurate the data, the better decisions could be made from it. The issues raised by the Workgroup on data accuracy have prompted the ESO to review the accuracy standard within the "Power Park Module Signal Best Practice Guide" and consider whether more information about the way in which BM systems interpret the 1.5% accuracy standard can be shared with industry to support them in maintaining sufficiently accurate Power Available signals (to avoid potential instances of failed validation etc). However, the accuracy standard is not a CUSC document and so changes to it don't fall within the scope of CMP326.

A Workgroup Member noted that if they were in Frequency Sensitive Mode (FSM) they would still be providing response even if their Power Available Signal had failed data validation. However, the ESO Workgroup Member noted that the windfarm would have to be instructed by the ESO control room to be placed into FSM and, if their Power Available Signal had failed data validation, it would be unlikely that they would be instructed to be in FSM and consequently wouldn't receive a Holding Payment.

Workgroup's initial conclusion is to note that there is guidance available to assist operators in providing sufficiently accurate Power Available signals to avoid potential instances of failed validation. However, the concerns raised by Workgroup Members has prompted a separate ESO review of the current accuracy standard document and see what other guidance can be provided. This review is not within the scope of CMP326.

Approach for windfarm extensions to existing sites (that had a Completion Date of 1 April 2016)

All sites that have a Completion Date on or after 1 April 2016 will be required to provide the Power Available signal. However, where this is an extension to an existing site that had a Completion Date on or before 31 March 2015, there is no need to provide a Power Available signal for the existing site. However, the developer may take the opportunity to change the existing plant as well for their own commercial reasons and would raise a Modification Application to the ESO if they wanted to proceed on this basis.

Some Workgroup Members were concerned that although there is no requirement to retrofit the Power Available signal, there is clearly an additional cost for developers (although this is their choice) and one Workgroup Member suggested that ESO may prioritise plant that had a Power Available signal when determining who to call on to provide response capability.

Workgroup's initial conclusion - The Workgroup noted that there is no requirement for a developer to retrofit a Power Available signal on plant that was installed on or before 31 March 2015.

Consideration of other options

No other options have been considered by the Workgroup.

Draft Legal text

The draft legal text for this change can be found in Annex 4.

What is the impact of this change?

National Grid Electricity System Operator

Accurately reflecting response capability in Holding Payments will potentially encourage Power Park Modules (PPMs) to improve turbine availability (where possible) and/or provide more accurate data to the ESO control room. This may result in greater usage of PPMs for frequency response which should drive competition in the market (i.e. with other services such as Frequency Containment Reserve (FCR) and Frequency Restoration Reserve (FRR)) which will support the ESO in increasing competition for the procurement of balancing services.

There are expected to be minimal system impacts as the changes will be incorporated within the build/scope for the replacement of the ASB system.

Power Park Module Generators

There would be a cost of retrofitting the Power Available signal to existing plant installed prior on or before 31 March 2015; however, this is a commercial decision for the developer rather than a requirement.

There would be a cost of creating new procedures and training staff on the new requirements.

There is a possible risk that if the developer decides not to retrofit the Power Available signal to existing plant installed prior on or before 31 March 2015, that the new plant does not work with the existing plant; however, this is a consideration for the developer to weigh up when making this decision.

Although, the above are all considerations that Power Park Module Generators need to consider when deciding whether or not to retrofit the Power Available signal to existing plant, the ESO Workgroup Member noted that the defect that CMP326 seeks to address is specifically whether or not reduced turbine availability is reflected in the Holding Payment calculation.

Cost Savings

The Proposer explained that the analysis suggests that capping would be applied ~7% of the time (majority of which would be at High Frequency). It is anticipated, that based on data from the calendar year 2020 that there would be ~ £40K of savings per annum. The Proposer expects that the savings will increase in line with the expected increase of more wind being available for Mandatory Frequency Response (MFR) in later years. The Workgroup noted that the current cost savings are not substantial; however, they also noted that the system costs would be negligible as long as the changes are incorporated within the scope of changes for the ESO's new ASB system.

Proposer's Assessment against Code Objectives

CUSC Non-charging objectives;

Impact of the modification on the Applicable Objectives:	
Relevant Objective	**Identified impact**
(a) The efficient discharge by the Licensee of the obligations imposed on it by the Act and the Transmission Licence;	**Positive:** ensures that Holding Payments made by the ESO in respect of Frequency Response for PPMs will be fully reflective of the true response capability of the site.
(b) Facilitating effective competition in the generation and supply of electricity, and (so far as consistent therewith) facilitating such competition in the sale, distribution and purchase of electricity;	**None**
(c) Compliance with the Electricity Regulation and any relevant legally binding decision of the European Commission and/or the Agency *; and	**None**
(d) Promoting efficiency in the implementation and administration of the CUSC arrangements.	**None**
*Objective (c) refers specifically to European Regulation 2009/714/EC. Reference to the Agency is to the Agency for the Cooperation of Energy Regulators (ACER).	

When will this change take place?

Implementation date

Implementation will be linked to when ESO's new ASB system is due to be implemented ~ September 2022 or at such a time as the changes to enable the correct calculations can be activated within this new system.

Date decision required by

The Proposer requires a decision to be made by 30 September 2021 as this would allow sufficient time for any required changes to be included in the new system design/build.

Implementation approach

There is ongoing work around the required data being transferred from the Balancing Mechanism to the settlements systems which is due to be completed Q2 2021 as part of the Power Available project.

Once this has been completed, the ASB settlements system will need to be updated to allow the use of this data to then apply the cap calculation to the Holding Payment.

This functionality will be introduced for minimal cost as part of the build/scope for the replacement of the ASB system - therefore, proposed implementation would be approximately September 2022 or at such a time as the changes to enable the correct calculations can be activated within this new system.

How to respond

Standard Workgroup consultation questions

1. Do you believe that CMP326 Original proposal better facilitates the Applicable Objectives? Please provide justification for your responses?
2. Do you support the proposed implementation approach?
3. Do you have any other comments?
4. Do you wish to raise a Workgroup Consultation Alternative request for the Workgroup to consider?

Specific Workgroup consultation questions

5. Do you concur with the CMP326 Workgroup's initial conclusions as set out in the "Workgroup Considerations" section?
6. Will the CMP326 Original Proposal impact on your business. If so, how?
7. Do you agree that CMP326 does impact the European Electricity Balancing Guideline (EBGL) Article 18 terms and conditions held within the CUSC?
8. Do you have any comments on the impact of CMP326 on the EBGL objectives under Article 3?

The Workgroup is seeking the views of CUSC Users and other interested parties in relation to the issues noted in this document and specifically in response to the questions above.

Please send your response to cusc.team@nationalgrideso.com using the response pro-forma which can be found here.

In accordance with Governance Rules if you wish to raise a Workgroup Consultation Alternative Request please fill in the form which you can find here.

If you wish to submit a confidential response, please note that information provided in response to this consultation will be published on National Grid ESO's website unless the response is clearly marked "Private & Confidential", we will contact you to establish the extent of the confidentiality. A response marked "Private & Confidential" will be disclosed to the Authority in full but, unless agreed otherwise, will not be shared with the CUSC Modifications Panel or the industry and may therefore not influence the debate to the same extent as a non-confidential response. Please note an automatic confidentiality disclaimer generated by your IT System will not in itself, mean that your response is treated as if it had been marked "Private and Confidential".

Acronyms, key terms and reference material

Acronym / key term	Meaning
ASB	Ancillary Services Business system
Baseline	The code/standard as it is currently
BM	Balancing Mechanism
BSUoS	Balancing Services Use of System
CCGT	Combined Cycle Gas Turbines
ESO	Electricity System Owner
MEL	Maximum Export Limit - the maximum power a generator can export onto the National Electricity Transmission System. This can be changed at any time.
MSA	Mandatory Services Agreement
PPM	Power Park Module
PPU	Power Park Unit

Reference material:

Power Park Module Signal Best Practice Guide
https://www.nationalgrideso.com/document/149181/download

Annexes

Annex	Information
Annex 1	CMP326 Proposal Form
Annex 2	Terms of Reference
Annex 3	Proposer's Presentation
Annex 4	Legal Text
Annex 5	EBGL Objectives