Workgroup Report

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**
   - 1 December 2022

Have 5 minutes? Read our Executive summary

Have 20 minutes? Read the full Workgroup Report

Have 30 minutes? Read the full Workgroup Report and annexes

Status summary: The Workgroup have finalised the proposer's solution. They are now seeking approval from the Panel that the Workgroup have met their Terms of Reference and can proceed to Code Administrator Consultation.

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

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:

1 December 2022

The required system functionality will be introduced for minimal cost as part of the build/scope for the replacement of the Ancillary Services Business (ASB) system (expected to be completed ~ September 2022). However, the Proposer has recommended implementation should be 1 December 2022 as this will allow the ESO to further engage with PPMs and wider industry (via the Wind Advisory Group) in order to develop efficient, proportionate and cost-effective arrangements for response capability reporting. It will also allow any data issues (although not within scope of this modification) relating to the potential mismatch between the response capability data windfarms may hold versus that of the Power Available signal to be resolved prior to the calculation change going live in the IT system.

Workgroup conclusions: The Workgroup concluded unanimously that the Original better facilitated the Applicable Objectives than the Baseline (the current CUSC).

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 CUSC 4.1.3.9, and so impacts on the EBGL Article 18 Terms and Conditions. All respondents to the Workgroup Consultation agreed with the Workgroup's conclusion that this change impacts on the EBGL Article 18 Terms of Conditions.

It is also important that the CMP326 solution(s) put forward does not detrimentally impact the EBGL Article 3 Objectives themselves and therefore we sought industry views on any such impacts as part of both the Workgroup Consultation and will ask for views again later in the process as part of the Code Administrator Consultation. Annex 5 of this document provides more background on EBGL and lists the current EBGL Article 3 Objectives.

In the Workgroup Consultation, there was a mix of views as to whether the change better facilitated the EBGL Objectives set out in Article 3. However, one respondent's concerns that CMP326 could reduce the likelihood of renewable energy being eligible to provide mandatory frequency response services would be addressed if the data accuracy issues are resolved. Another respondent argued that to meet the EBGL Objectives, Power Available should be also used for PPMs for Firm Frequency Response (FFR) to allow them to participate in FFR markets. However, the respondent has agreed that this is not within the scope of this change. The ESO Workgroup Member noted that Power Available is only one element to getting wind into firm procured balancing services such as FFR and changes to procurement methods need to be looked at first as an enabler for the consideration of Power Available use in other balancing markets including FFR. The ESO Workgroup Member added that ESO are currently considering this.

Contents

[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.

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.

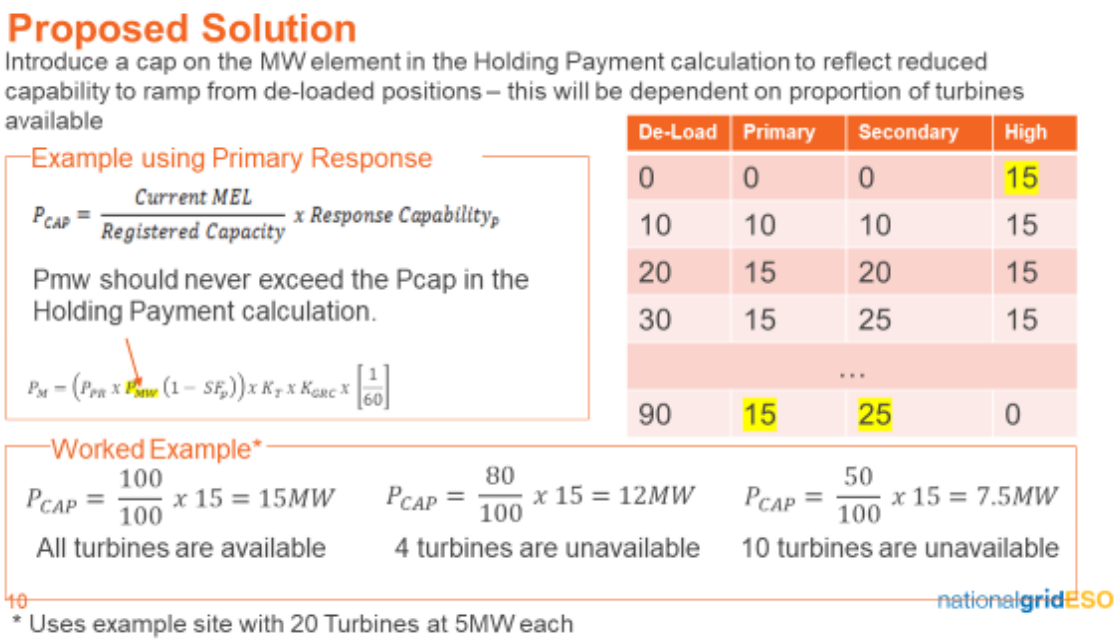
The key part of the Holding Payment calculation where this capability is reflected is the MW variable.

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:



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.

The Workgroup held their Workgroup Consultation between 1 February 2021 and 22 February 2021 and received 4 responses. The full responses can be found in Annex 6. In summary:

- All respondents supported the change.

- However, some respondents noted the mismatch between the response capability data that windfarms hold versus that of the Power Available (PA) signal and how this may result in windfarms either not being instructed for Frequency Response or the potential for reduced Holding Payments being made using PA signals. Another respondent added that a regular reporting process should be put in place about Providers' ongoing Power Available signal performance so that they can react in advance and be able to work on improving accuracy. Although the data accuracy issues are not strictly within the scope of this change, the majority of respondents agreed that these need to be addressed prior to implementation to ensure the expected increased cost savings are realised. Some respondents noted the ongoing work to resolve these issues and the Proposer, in their response, proposed delaying the Implementation Date to December 2022 with a final check that the issues have been resolved before the new functionality is switched on.

- One respondent argued that this change should also be applied to other ancillary services such as Firm Frequency Response to allow Power Park Modules to engage with that market. The respondent recognised this is not within the scope of CMP326; however, there could be merit for a future modification to address this.

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.

A respondent to the Workgroup Consultation noted that in the interests of non-discrimination and fostering effective competition, Power Available should be also used for PPMs for FFR to allow them to participate in FFR markets. The respondent recognised this is not within the scope of CMP326; however, there could be merit for a future modification to address this.

Workgroup's conclusion - The Workgroup noted the process for non-renewable generation and concluded that there is no detrimental impact to renewable generation. The Workgroup also agreed that using Power Available for PPMs for FFR is outside the scope of CMP326.

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

[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

Registered Capacity less the unavailable PPUs within the PPM and not include weather corrected MW output from each PPU.

Workgroup's 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 wouldn't instruct the site for MFR. Consequently, no Holding Payment is payable from the ESO when there is no active service instruction; and

- **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 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.

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

The majority of respondents to the Workgroup Consultation noted the mismatch between the response capability data that windfarms hold versus that of the Power Available signal and how this may result in windfarms either not being instructed for Frequency Response or the potential for reduced Holding Payments being made using Power Available signals. Another respondent added that a regular reporting process should be put in place about Providers' ongoing Power Available signal performance so that they can react in advance and be able to work on improving accuracy. Although the data accuracy issues are not strictly within the scope of this change, the Workgroup agreed that these need to be addressed prior to implementation to ensure the expected increased cost savings are realised. Some respondents noted the ongoing work with the Wind Advisory Group to resolve these issues and the Workgroup were assured by the Proposer that the new functionality would not be switched on until such time as all the data accuracy issues are resolved.

Workgroup conclusion - the data accuracy issues identified must be resolved before the CMP326 solution can be implemented. Workgroup noted the work going on in parallel to ensure that these data accuracy issues are resolved ahead of the proposed Implementation Date of 1 December 2021.

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 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.

Final Legal text

The final 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. As the ESO control room develops more projects to enable renewables generators to play a larger role in the balancing services, this may in turn enable a greater volume of wind to be instructed for Frequency Response, and as such the need to address the issue around the true response capability of PPMs being reflected in settlement payments will become greater.

This greater usage of PPMs for frequency response 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 and a respondent to the Workgroup Consultation noted that the ~ £40K of savings per annum are unlikely to increase unless the data accuracy issues are resolved. However, the Workgroup 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).	

Workgroup Vote

The Workgroup met on 11 March 2021 to carry out their Workgroup Vote. The full Workgroup vote can be found in Annex 7. The table below provides a summary of the Workgroup members view on the best option to implement this change.

The Applicable CUSC (non-charging) Objectives are:

CUSC non-charging objectives

a) The efficient discharge by the Licensee of the obligations imposed on it by the Act and the Transmission Licence;
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;
c) Compliance with the Electricity Regulation and any relevant legally binding decision of the European Commission and/or the Agency *; and
d) Promoting efficiency in the implementation and administration of the CUSC arrangements.

*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).

The Workgroup concluded unanimously that the Original better facilitated the Applicable Objectives than the Baseline (the current CUSC).

When will this change take place?

Implementation date

1 December 2022. The ESO Workgroup Member confirmed that stakeholders would not be required to do anything prior to 1 December 2022 as the proposed change relates to applying a cap to the holding payment calculation within ESO IT systems.

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

The required system functionality will be introduced for minimal cost as part of the build/scope for the replacement of the Ancillary Services Business (ASB) system (expected to be completed ~ September 2022). However, the Proposer has recommended implementation should be 1 December 2022 as this will allow the ESO to further engage with PPMs and wider industry (via the Wind Advisory Group) in order to develop efficient, proportionate and cost-effective arrangements for response capability reporting. It will also allow any data issues (although not within scope of this modification) relating to the potential mismatch between the response capability data windfarms may hold versus that of the Power Available signal to be resolved prior to the calculation change going live in the IT system. This Implementation Date will not only ensure adequate time to resolve such issues to the satisfaction of industry but will also allow sufficient time for the relevant testing/checks to then be performed, only at which point the system functionality will then be switched on.

The change will be included in the ASB system with an effective from date of 1 December 2022. As all payments follow a standard payment calendar as per the CUSC[6], this would mean that any service/response on or after 1 December 2022 would be settled taking into account the cap in the calculation (where applicable) with any service supplied prior to the effective date being settled using the previous calculation.

[6] i.e. services supplied in December 2022 are issued a preliminary statement on the 8th working day of the following month, a final statement on 18th working day of the following month and then payment follows 3 working days after the final statement

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
FFR	Firm Frequency Response
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
Annex 6	Workgroup Consultation Responses
Annex 7	Workgroup Vote