



**National Grid**

**CONSULTATION DOCUMENT**

**CUSC Amendment Proposal CAP010  
Mandatory Response Imbalance Exposure**

Amendment Ref	CAP010
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Prepared by	National Grid

## DOCUMENT CONTROL

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0.1	04/03/02	National Grid	Initial Draft for internal comment
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## DISTRIBUTION

Name	Organisation
CUSC Parties	Various
Panel Members	Various
Interested Parties	Various
National Grid Industry Information Website	

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## 1.0 Executive Summary

- 1.1 All licensed generators are required to provide the service of mandatory frequency response as set out in CC.8.1 of the Grid Code. Prior to the introduction of NETA it was recognised that generators would incur imbalance charges under the BSC when mandatory frequency response was provided. A mechanism was introduced at NETA Go-live that was intended to compensate generators for this imbalance exposure due to providing response. The mechanism, known as imbalance compensation, included an element to compensate for the cost or avoided cost of energy production. This mechanism was implemented via the NETA Implementation Scheme in the Mandatory Services Agreements (MSA) and codified into the CUSC.
- 1.2 Following NETA Go-live, a number of providers raised concerns that the imbalance and energy compensation as calculated by the mechanism, did not, in certain circumstances, adequately cover the costs incurred as a result of the provision of frequency response. In order to address these concerns, the arrangements were reviewed by an informal, pre-CUSC Working Group and resulted in the submission of CUSC Amendment Proposal CAP001 by National Grid. However, because no agreement was reached within the Working Group on the price of the energy delivery due to the provision of frequency response, CAP001 only addressed the volume issue and hence the imbalance component of the compensation. CAP001 followed the Urgent Amendment Procedure and was approved by the Authority on 15 November 2001 with an effective implementation date of 21 September 2001.
- 1.3 Prior to the Authority's approval of CAP001, Innogy plc submitted CUSC Amendment Proposal CAP010. This seeks to modify the element in the payment for mandatory frequency response that compensates the service provider for energy delivery resulting from provision of the service. CAP010 proposes the use of Bid and Offer prices instead of the current method of using a single value reference price derived from the average of SSP and SBP for the previous month.
- 1.4 The CUSC Amendments Panel, at their meeting on 9 November 2001, actioned the Balancing Services Standing Group (BSSG) to act as a Working Group (in accordance with CUSC 8.17.1) to consider Amendment Proposal CAP010. Terms of Reference were agreed for the BSSG (in respect of CAP010) and further to three meetings and associated debate and correspondence, it was the combined view of the BSSG that the current mechanism for frequency response imbalance compensation should be modified as per the CAP010 Amendment Proposal.

- 1.5 In the BSSG debate, it was noted that National Grid objected to the implementation of CAP010 as drafted and in addition some members remained neutral to the proposal, stating that they had sympathy for both viewpoints.
- 1.6 The Working Group Report was presented to the CUSC Amendments Panel on 22 February 2002. At the meeting, the Amendments Panel endorsed the Working Group Report agreeing that the specific terms of reference for the Group had been met. The Amendments Panel also agreed that the issue should proceed to wider consultation by National Grid (in accordance with CUSC 8.19.1).
- 1.7 This document initiates this wider consultation process and invites views on Amendment Proposal CAP010. The consultation closing date is 12 April 2002.

## 2.0 Introduction

- 2.1 This is a consultation document issued by National Grid under the rules and procedures specified in the Connection and Use of System Code (CUSC) as designated by the Secretary of State. It addresses issues associated with the Mandatory Frequency Response provisions set out in Section 4 of the CUSC.
- 2.2 Further to the submission of Amendment Proposal CAP010 (see Annex 1) and the consideration of the Amendment Proposal by the Balancing Services Standing Group (BSSG), this document seeks views from Industry members relating to the proposed amendment. Such an amendment would result in changes to Section 4 of the CUSC (as detailed in Annex 2).
- 2.3 This document outlines the nature of the CUSC changes that are proposed for implementation. It indicates any relevant issues that arose in the BSSG discussions and also incorporates National Grid's and the Amendments Panel's views on the way forward concerning this Amendment. Representations received in response to this consultation document will be included in National Grid's Amendment Report that will be furnished to the Authority for their Direction.
- 2.4 This consultation document has been prepared in accordance with the terms of the CUSC. An electronic copy can be found on the National Grid website, at <http://www.nationalgridinfo.co.uk/cusc>.

## 3.0 Responses to Consultation

- 3.1 Please send your responses to this consultation document to National Grid by no later than close of business 12 April 2002.
- 3.2 Please address all comments to the following e-mail address: [david.friend@uk.ngrid.com](mailto:david.friend@uk.ngrid.com) and entitle your email 'CAP010 Consultation Response'.

Alternatively, comments may be addressed to:

David Friend  
Commercial Development  
National Grid Company plc  
National Grid House  
Kirby Corner Road  
Coventry  
CV4 8JY                      Fax: 024 7642 3298

## 4.0 Amendment Proposal, Alternatives Considered and Working Group Discussion

A full copy of the CAP009 Working Group report is available on the National Grid website at:

[http://www.nationalgridinfo.co.uk/cusc/admin/scripts/uploads/CAP010\\_WG\\_Report\\_-\\_Version\\_1.0.pdf](http://www.nationalgridinfo.co.uk/cusc/admin/scripts/uploads/CAP010_WG_Report_-_Version_1.0.pdf)

### 4.1 The Proposed Amendment Proposal

4.1.1 The current methodology for calculating imbalance compensation payments for the Mandatory Service of Frequency Response compensates service providers for costs incurred under the BSC. These payments are based on the expected volume of energy delivered in a Settlement Period and an estimate of the cost to the service provider of that variation.

4.1.2 The payment mechanism can be represented simply as follows. When the net response energy delivered in a Settlement Period is positive (low frequency response) the mechanism refunds a Reference Price and subtracts the SSP the generator would have received under the BSC (assuming this was positive).

$$LF_{MWh} \times (\text{Reference Price} - \text{SSP})$$

4.1.3 When the net response energy delivered in a Settlement Period is negative (high frequency response) the mechanism refunds the SBP paid by the generator under the BSC and subtracts a Reference Price.

$$HF_{MWh} \times (\text{SBP} - \text{Reference Price})$$

4.1.4 Since NETA Go-live there have been moves to improve the accuracy with which expected variation in the volume is calculated (CAP001 and CAP009) in order to reflect better the imbalance costs faced by providers. However, it is recognised that the 'Reference Price' remains a source of inaccuracy.

4.1.5 The reference price in any month is applied to all providers and is calculated as the average of the previous month's SBP and SSP data. To date, this mechanism for calculating the reference price has generated prices that have varied from one month to the next and have generally been considered to be higher than the actual cost of production. It should be noted that where a provider has a symmetrical response characteristic i.e. delivering on average equal volumes of low and high frequency response, the impact of the reference price is cancelled out. However, certain generators who provide on average more high frequency than low frequency response e.g. those operating at or near MEL, will be disadvantaged by a

reference price higher than their actual production costs. Conversely, generators who provide on average more low frequency response will clearly gain under the current mechanism.

- 4.1.6 A table of reference prices since NETA 'Go-live' is shown in the table below:

Month	£/MWh	Month	£/MWh
Apr-01	25.34	Sep-01	23.10
May-01	36.95	Oct-01	18.54
Jun-01	28.37	Nov-01	16.36
Jul-01	30.86	Dec-01	22.56
Aug-01	21.85	Jan-02	24.06

- 4.1.7 The change as proposed by this Amendment seeks to reflect better the generating Units' costs by replacing the 'reference price' currently used with a mechanism that uses Bid prices (for high frequency response energy) and Offer prices (for low frequency response energy). The effect would be to compensate the service provider in such a manner that it would treat the variation in the volume of energy supplied as if that variation had been achieved by way of a series of Bid/Offer Acceptances (each of one minute duration).
- 4.1.8 CUSC Amendment Proposal CAP010 proposes that the response energy volume continues to be calculated on a per minute basis (as per CAP001 and CAP009 methodologies). This per-minute volume profile will then be related to the Unit's Bid/Offer data to determine the expected energy variation falling in each Bid/Offer pair submitted for the Unit. Thus, the volume of energy delivered in each minute to be valued at the Offer or Bid price in each Bid/Offer pair would be calculated. The payment for the delivered Response energy would be the sum of the Offer payments over the Settlement Period less the sum of the Bid payments.
- 4.1.9 Finally, the imbalance compensation element of the payment in each Settlement Period would continue to be calculated by reference to SSP or SBP depending on whether the total expected Response energy is positive or negative.

## 4.2 Alternative Amendments

- 4.2.1 In accordance with the Terms of Reference for the BSSG, the group also considered whether any Alternatives to CAP010 existed. Although the group discussed three possible options, on the basis of majority opinion, the BSSG considered that none of the options presented a viable Alternative to either the CAP010 methodology or the extant methodology. In view of this, no 'formal' Alternative to CAP010 was put forward by the BSSG. In spite of this, the BSSG did recommend the CUSC Amendments Panel to note that the BSSG did consider and discuss some potential Alternative Amendments. Further

to this the Amendments Panel also requested that the options that were discussed and debated within the BSSG should be documented in this Consultation Document, thereby providing an opportunity for the Industry to comment on them. In view of this, the three options that were discussed and debated by the BSSG are briefly outlined below.

#### *Fuel Based Reference Price*

- 4.2.2 National Grid explained that service providers were continuing to raise concerns over the Reference Price and hence the level of imbalance compensation as calculated under the current mechanism. National Grid pointed out that without the development of an Alternative Proposal, should the Authority wish to reject CAP010, it would be left with no option but to determine that the current Reference Price mechanism continued to be used. In view of this and National Grid's objections to CAP010, National Grid was keen that an Alternative Proposal be developed and put forward by the BSSG.
- 4.2.3 National Grid's preferred solution was to derive reference prices by fuel type and a paper was circulated outlining a proposed fuel based Reference Price mechanism ([see Annex 5 of the Working Group Report](#)). This proposal largely builds upon the work previously undertaken by the informal, pre-CUSC Working Group. National Grid argued that this method was the simplest way of deriving a Reference Price to closely reflect the actual cost or saved cost of energy production.
- 4.2.4 Some BSSG members argued that this method of deriving reference prices could have as many difficulties as have emerged with an average of historic system buy and system sell prices. Specifically, these difficulties were:
- Some plant categories cannot be covered by published data, specifically hydro and pumped storage plant would have no obvious reference price, and dual fired generating units would also need some form of special consideration;
  - Specific plants may show significantly different cost attributes depending on aspects such as a unique design, various environmental constraints - for example ash disposal costs and thermal efficiencies widely different to those assumed in the heat rates;
  - There could be a poor correlation between the reference fuel cost and that incurred by the plant in its operation. This difficulty is most obvious when looking at the relationship between the quarterly average fuel price and the movement in the daily spot price;
  - The availability of the data will generally be two quarters in arrears leading to a sustained mismatch between the reference price and the underlying cost; and

- Would require a similar modification to the despatch procedures as that required for the bid/offer price proposal.

4.2.5 Whilst National Grid shared some of the concerns it's view was that a table of reference prices split by fuel type offered a close approximation of actual production costs. National Grid argued that this method of deriving reference prices by plant category was clearly more appropriate than the current method, addressed its concerns on cost reflectivity, and did not pose any of the concerns raised by CAP010. Nevertheless, the BSSG did not support this option.

#### *System Average Offer/Bid Reference Prices*

4.2.6 A BSSG member proposed a potential Alternative to CAP010 based upon using the average of accepted Offer prices (for low frequency response) and the average of accepted Bid prices (for high frequency response). The Group discussed this proposal, but it was agreed that such methodology was not appropriate.

#### *Fixed Price Reference Price*

4.2.7 The possible Alternative of using a fixed-price reference price was also briefly discussed. The group widely agreed that this was not a viable solution as a single fixed-price could not possibly reflect the production costs of different generator types (i.e. production costs of oil sets are different to coal sets).

### **4.3 Working Group Views and Discussion**

#### *Discussion*

4.3.1 The proposer outlined why generators' costs of production vary for a number of reasons (e.g. due to the size, type and age of plant, non-fuel costs, ash disposal etc). The proposer stated that a bids/offers approach was seen as the best available measure for cost of production in a competitive market. The arguments behind a bids/offers approach are described in detail in [Annex 3 of the Working Group Report](#) but in summary, the proposer believes bids and offers:

- Are reflective of frequently changing fuel prices;
- Are reflective of variation of costs with load; and
- Will remove the perverse incentive to deliver one type of response (high or low) ahead of the other.

4.3.2 The majority of BSSG members supported the use of Bids and Offers to pay for response energy and believed that it was an improvement over the existing methodology. Notwithstanding this however, National Grid did not agree and argued that the use of bids and offers to value frequency response energy was unacceptable. National Grid cited several arguments ([see Annex 4 of the Working Group Report](#)),

however, in summary, National Grid believes that using Bids and Offer to value response energy:

- Moves from cost reflective to value based principles without any benefits of a market mechanism;
- Would lead to an increase in the costs of providing frequency response and a subsequent increase in BSUoS charges;
- Provides the potential for service providers to preclude selection by submitting extreme prices;
- Would blur the distinction between short term energy balancing and frequency response and prohibit competition in such services;
- Will make optimal despatch in control time-scales difficult and require development of despatch systems; and
- Does not represent a step in the right direction towards enduring frequency response market arrangements.

4.3.3 The proposer disagreed with National Grid's views as outlined and stated they believed that the use of Bid/Offer prices did not:

- Depart from the cost reflective principles suggesting that Bid/Offer prices were a good indicator of the incremental costs incurred by a generator in producing more or less energy;
- Present any additional potential for providers of this service to preclude selection; and
- Complicate the control room optimisation algorithm any more than for other Balancing Services.

4.3.4 National Grid did not move from its position and whilst it accepted that there were deficiencies with the current Reference Price approach it did not accept that CAP010 was an appropriate way of addressing the problem for the reasons stated in 4.3.2. Therefore National Grid proposed the Fuel Based Reference Price alternative as discussed in 4.2.3.

### *Conclusion*

4.3.5 Following extensive discussion and debate between BSSG members, it was clear there were two opposing views within the BSSG relating to the CAP010 Amendment Proposal. In addition some members remained neutral to the proposal, stating that they had sympathy for both viewpoints. On balance, most BSSG members supported the Amendment as proposed, however, National Grid did not support the Amendment.

## 5.0 Summary of Views

### 5.1 National Grid Initial View

- 5.1.1 National Grid does not support the CAP010 Amendment Proposal as submitted by Innogy plc. This is on the grounds that the proposal does not better facilitate achievement of the Applicable CUSC Objectives set out in Condition C7F, paragraphs 1a and 1b. With regards paragraph 1a, National Grid is of the view that the costs of frequency response provision would increase under the CAP010 proposal (meaning BSUoS charges would increase) with no perceived improvements or benefits. With regards paragraph 1b, National Grid believes that using the same prices for frequency response as those used for short-term energy balancing would prohibit competition in such Balancing Services by ‘blurring’ the distinction between such services. Furthermore, such a mechanism would not create any competitive pressure on the costs of providing frequency response.
- 5.1.2 With regards to the way forward, National Grid is committed to the development of an implementation plan for a Frequency Response Market (the Balancing Services Standing Group is considering this issue). National Grid believes it is important that the issues raised by CUSC Amendment Proposal CAP010 should be considered in the context of the whole market debate. Whilst CAP010 moves from cost to value based principles, National Grid believes this does not necessarily represent a step in the right direction towards full frequency response market arrangements (that should deliver benefits to the industry as a whole). Implementation of CAP010 would require significant investment in National Grid’s IT systems for both Control Room optimisation and Settlement purposes ([as outlined in Section 8 of the WG Report](#)). This is in addition to the changes that would be required to the systems of service providers. If, as we suspect, Bid/Offer payment for Frequency Response energy does not form part of enduring frequency response market arrangements, then this significant investment will be wasted.

### 5.2 Amendments Panel Initial View

- 5.2.1 The CUSC Amendments Panel were satisfied that the BSSG had discharged it’s Terms of Reference and agreed that the matter be subject to consultation by National Grid (in accordance with 8.19.1). The Amendments Panel also agreed that the alternative proposals and issues discussed by the BSSG should be included in the Consultation, thereby providing an opportunity for the industry to comment on them.

## **6.0 Views Invited**

6.1 National Grid is seeking the views of interested parties relating to CUSC Amendment Proposal CAP010. In particular views are invited on:

- Whether CAP010 proposes a more appropriate treatment of the energy delivered when providing frequency response;
- National Grid's arguments against the use of Bids and Offers to value mandatory frequency response energy; and
- The proposed alternatives that were discussed by the BSSG.

6.2 Responses should be sent to National Grid by no later than close of business Friday, 12 April 2002 to the address shown in Paragraph 3.2 above.

## **Annex 1 – CUSC Amendment Proposal**

## Amendment Proposal Form

Those wishing to propose an Amendment to the CUSC should do so by filling in this "Amendment Proposal Form" that is based on the provisions contained in Section 8.15 of the CUSC. The form seeks to ascertain details about the Amendment Proposal so that the CUSC Panel can determine more clearly whether the proposal should be considered by a Working Group or go straight to wider National Grid Consultation.

The Panel Secretary will check that the form has been completed, in accordance with the requirements of the CUSC, prior to submitting it to the Panel. If the Panel Secretary accepts the Amendment Proposal form as complete, then he will write back to the Proposer informing him of the reference number for the Amendment Proposal and the date on which the Proposal will be considered by the Panel. If, in the opinion of the Panel Secretary, the form fails to provide the information required in the CUSC, then he may reject the Proposal. The Panel Secretary will inform the Proposer of the rejection and report the matter to the Panel at their next meeting. The Panel can reverse the Panel Secretary's decision and if this happens the Proposer will be informed by the Panel Secretary.

The completed form should be returned to:

**Mark Cox**  
Panel Secretary  
Commercial Development  
National Grid Company plc  
**National Grid House**  
Kirby Corner Road  
Coventry, CV4 8JY

Or via e-mail to:

[CUSC.Team@uk.ngrid.com](mailto:CUSC.Team@uk.ngrid.com)

(Participants submitting this form by email will need to send a statement to the effect that the proposer acknowledges that on acceptance of the proposal for consideration by the Amendments Panel, a proposer which is not a CUSC Party shall grant a licence in accordance with Paragraph 8.15.7 of the CUSC. A Proposer which is a CUSC Party shall be deemed to have granted this Licence.)

**Proposers Name:**

(Name of party making the proposal. An Amendment Proposal may be made by a CUSC Party, a BSC Party or by "energywatch")

Innogy plc

**Proposers Representative:**

(The name of the person representing the Proposer (and his alternate) for the purposes of the Amendment Process)

David Tolley (Alternate - Raoul Thulin)

**Organisations Name and Address:**

(Organisation on whose behalf the Amendment is proposed)

Innogy plc  
Windmill Hill Business Park  
Whitehill Way  
Swindon  
Wiltshire  
SN5 6PB

**Capacity in which the Organisation Proposes to make an Amendment:**

(i.e. CUSC Party, BSC Party or "energywatch")

CUSC Party

**Description of the issue or defect which the proposed Amendment seeks to address:**

(This should be in reasonable, but not excessive detail)

Current payments for the Mandatory Service of Frequency Response include an element intended to compensate the service provider for exposure to system prices resulting from the settlement imbalances incurred by the provision of the Service. The calculation of this payment is based on the variation in the expected volume of energy delivered in a Settlement Period and an estimate of the cost to the service provider of that variation. Where the variation in the energy produced is positive, a payment equal to the difference between the estimated cost of production and SSP is made for each MWh of expected energy. Where the variation in the energy produced is negative, the payment is based on the difference between SBP and the estimated cost of production.

Since NETA Go-live there have been moves to improve the accuracy with which expected variation in the volume is calculated (CAP001) in order to reflect better the imbalance costs faced by providers. However, the value that is applied to the imbalance volume (known as the 'reference price') remains a source of significant inaccuracy in estimating the cost of the imbalance. The reference price in any month is applied to all providers and is calculated as the mid-point of the previous month's average SBP and SSP.

The application of a single reference price to all units providing the service - irrespective of fuel type, plant loading or local conditions - results in a cost estimate that does not reflect any generating unit's actual costs. This means that imbalance compensation payments will not reflect the costs of imbalance exposure, with the attendant risk of market failure.

**Description of the proposed Amendment and of its nature and purpose:**

*(This should be in reasonable but not excessive detail)*

The change proposed by this Amendment seeks to reflect better the generating Units' costs by replacing the 'reference price' currently used with Bid prices for energy delivered in response to positive frequency deviations and Offer prices for energy delivered in response to negative frequency deviations. The effect will be to compensate the service provider in such a manner that it would treat the variation in the volume of energy supplied as if that variation had been achieved by way of a series of Bid/Offer Acceptances each of a minute's duration. In a competitive environment Bids and Offers should be the best indicators of marginal costs available.

This proposal assumes that the method for calculating expected energy is that promoted in CAP001, although it would also cater for any changes that might be adopted in the future.

The required calculation might be achieved by calculating the expected variation in energy delivered as a result of Response provision in each minute. Under the CAP001 methodology, this would be by reference to the average System Frequency deviation during the minute and the relevant Response matrix in the applicable Ancillary Services Agreement. Relating this to the Unit's Bid/Offer data determines the expected energy variation falling in each Bid/Offer pair submitted for the Unit. Thus, the volume of energy delivered in each minute to be valued at the Offer or Bid price in each Bid/Offer pair is calculated. The payment for the delivered Response energy is the sum of the Offer payments over the Settlement Period less the sum of the Bid payments.

Finally the compensation payment is calculated as the difference between the payment for the delivered Response energy and the imbalance payment calculated by reference to SSP of SBP depending on whether the total expected Response energy is positive or negative. The direction of the payment would be so as to replace the imbalance payment (which may be a cost or a credit) with a payment for the delivered Response energy as if it were a Bid/Offer acceptance in the BM.

**An indication of those parts of the CUSC which would require amendment in order to give effect to (or would otherwise be affected by) the proposed amendment and an indication of the nature of those amendments or effects.**

*(This should be given where possible)*

Section 4.1.3 – calculation of payments and payment formulae. Amendment required to reflect revised payment for energy delivered when providing Frequency Response as outlined above.

**Reasons why the Proposer believes that the proposed Amendment would better facilitate achievement of the Applicable CUSC Objectives as compared with the current version of the CUSC with background information in support thereof.**

The Transmission Licence obligates National Grid to purchase ancillary services from the most economical sources available to it having regard to the quantity and nature of the ancillary services.

This proposed amendment would better facilitate the efficient discharge of this licence obligation by aligning more accurately payments made with costs incurred, producing greater transparency in the relative costs of service provision. This in turn will ensure that the most economic sources of mandatory frequency response continue to make their full capability available for despatch by National Grid.

**An indication of the impact of the proposed Amendment on Core Industry Documents.**  
*(This should be given where possible)*

No impact on core industry documents is foreseen.

**An indication of the impact of the proposed Amendment on relevant computer systems and processes used by CUSC Parties.**  
*(This should be given where possible)*

The proposed amendment will require modification to the billing system used by National Grid to calculate the Frequency Response payments.

**A statement to the effect that the Proposer acknowledges that on acceptance of the proposal for consideration by the Amendments Panel a Proposer shall grant a Licence in accordance with Clause 8.15.7 of the CUSC.**

*(A signature to this effect must be given by a proposer which is not a CUSC Party)*

## **Annex 2 – Proposed Text to Modify CUSC**

## LEGAL TEXT TO ACCOMPANY CAP010

### 4.1.3 Frequency Response

#### *Introduction*

- 4.1.3.1 Each applicable **User** is obliged to provide (for the avoidance of doubt, as determined by any direction in force from time to time and issued by the **Authority** relieving that **User** from the obligation under its **Licence** to comply with such part or parts of the **Grid Code** or any **Distribution Code** or, in the case of **NGC**, the **Transmission Licence**, as may be specified in such direction) the **Mandatory Ancillary Service of Frequency Response** referred to in **Grid Code CC 8.1** by means of **Frequency** sensitive generation in accordance with the terms of this Paragraph 4.1.3 and a **Mandatory Services Agreement** but subject always to and in accordance with the relevant part or parts of the **Grid Code** applicable thereto.

#### *Definitions*

- 4.1.3.2 For the purposes of this Paragraph 4.1.3:
- (i) “**Frequency Response Service**” means the **Mandatory Ancillary Service of Frequency Response** and any **Commercial Ancillary Service of Frequency Response** as may be agreed to be provided by a **User** from time to time;
  - (ii) the **Mandatory Ancillary Service of Frequency Response** shall constitute operation of a **BM Unit** in accordance with **Grid Code CC 6.3.7** and **BC 3.5** (with the exception of **BC 3.5.2**), including, without limitation, under normal operating conditions with the speed governor set so that it operates with an overall speed droop of between 3% and 5% so as to provide the applicable levels of **Response** referred to in Paragraph 4.1.3.7;
  - (iii) the term "instruction" means a communication whether by telephone or automatic logging device or facsimile from **NGC** to the **User** instructing a **User** in accordance with **Grid Code BC 2.8** and this Paragraph 4.1.3 to provide any **Frequency Response Service**, and derivations of the term shall be construed accordingly;
  - (iv) the amendment of an existing instruction shall be deemed to be a new instruction;
  - (v) an instruction will prevail until either it is countermanded by **NGC** or until the **BM Unit** to which the instruction relates is **De-synchronised** (whichever is first to occur).

#### ***NGC's Instructions to provide Mode A Frequency Response***

- 4.1.3.3 For the purposes of instructions and calculation of payments, the **Mandatory Ancillary Service of Frequency Response**

as described in this Paragraph 4.1.3 shall be referred to as "**Mode A Frequency Response**".

4.1.3.4 **NGC** may at any time instruct a **User** to operate any one or more **BM Unit(s)** so as to provide the following components of **Mode A Frequency Response**:-

- (a) **Primary Response**;
- (b) **Secondary Response**;
- (c) **High Frequency Response**,

in any of the permissible combinations set out in the relevant table in the **Mandatory Services Agreement**.

4.1.3.5 **NGC** shall not instruct a **User** to provide **Mode A Frequency Response** and any **Commercial Ancillary Service of Frequency Response** simultaneously.

4.1.3.6 In the event that any instruction to provide **Frequency Response** does not state whether the instruction is to provide **Mode A Frequency Response** or any **Commercial Ancillary Service of Frequency Response**, such instruction shall be deemed to be an instruction to provide **Mode A Frequency Response**.

***User's Obligation to Provide Response***

4.1.3.7 When a **User** is instructed in accordance with Paragraphs 4.1.3.4 and/or 4.1.3.6 to operate a **BM Unit** so as to provide any component(s) of **Mode A Frequency Response**, that **User** shall operate that **BM Unit** so as to provide, for any **Frequency Deviation** and at any level of **De-Load**, at least the amount of **Primary Response** and/or **Secondary Response** and/or **High Frequency Response** set out respectively in the relevant tables in the **Mandatory Services Agreement** (as such tables are to be interpreted in accordance with Paragraph 4.1.3.11).

***Calculation of Payments***

4.1.3.8 The payments to be made by **NGC** to a **User** hereunder in respect of the provision of any **Mode A Frequency Response** from a **BM Unit** shall be comprised of **Holding Payments** and ~~Imbalance Compensation~~ **Delivery Payments** and shall be determined in accordance with the formulae in, respectively, Paragraphs 4.1.3.9 and 4.1.3.9A and in accordance with Paragraphs 4.1.3.10 to 4.1.3.12 inclusive.

***Payment Formulae - Holding Payments***

4.1.3.9 The **Holding Payments** for a **BM Unit** to be made by **NGC** to a **User** referred to in Paragraph 4.1.3.8 shall be calculated in accordance with the following formula:-

$$HP_M = P_M + H_M + S_M$$

Where:

$HP_M$  is the **Holding Payment** to be made to the **User** calculated in £ per minute.

$P_M$  is the payment per minute to be made by **NGC** to the **User** for the **Ancillary Service of Primary Response** provided by the **User** from the **BM Unit** concerned pursuant to an instruction from **NGC** to provide **Mode A Frequency Response**, and is calculated as follows:-

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

$H_M$  is the payment per minute to be made by **NGC** to the **User** for the **Ancillary Service of High Frequency Response** provided by the **User** from the **BM Unit** concerned pursuant to an instruction from **NGC** to provide **Mode A Frequency Response**, and is calculated as follows:-

$$H_M = (H_{PR} \times H_{MW} (1 - SF_H)) \times K_T \times K_{GRC} \times \left[ \frac{1}{60} \right]$$

$S_M$  is the payment per minute to be made by **NGC** to the **User** for the **Ancillary Service of Secondary Response** provided by the **User** from the **BM Unit** concerned pursuant to an instruction from **NGC** to provide **Mode A Frequency Response**, and is calculated as follows:-

$$S_M = (S_{PR} \times S_{MW} (1 - SF_S)) \times K_T \times K_{GRC} \times \left[ \frac{1}{60} \right]$$

In this Paragraph 4.1.3.9, the following terms shall have the following meanings:-

- $P_{PR}$  = the appropriate payment rate for **Primary Response** set out in the **Mandatory Services Agreement**;
- $P_{MW}$  = the **Primary Response** capability (expressed in MW) for the level of **De-Load** of the **BM Unit** concerned at the end of the minute in which the service is provided;
- $H_{PR}$  = the appropriate payment rate for **High Frequency Response** set out in the **Mandatory Services Agreement**;
- $H_{MW}$  = the **High Frequency Response** capability (expressed in MW) for the level of **De-Load** of the **BM Unit** concerned at the end of the minute in which the service is provided;
- $S_{PR}$  = the appropriate payment rate for **Secondary Response** set out in the **Mandatory Services Agreement**;
- $S_{MW}$  = the **Secondary Response** capability (expressed in MW) for the level of **De-Load** of the **BM Unit**

- concerned at the end of the minute in which the service is provided;
- $K_T$  = the ambient temperature adjustment factor. **NGC** and each **User** acknowledge and agree, as between **NGC** and that **User**, that  $K_T$  shall be deemed to be 1 for the purposes of calculating payments until such time as they agree upon an appropriate formula and a suitable method of measuring the ambient temperature on a minute by minute basis which shall be set out in the **Mandatory Services Agreement**. In the event that any agreed method of measuring the ambient temperature on a minute by minute basis should fail following its implementation, then **NGC** and each **User** acknowledge and agree, as between **NGC** and that **User**, that  $K_T$  shall be deemed to be 1 until the method of measuring the ambient temperature on a minute by minute basis is restored;
- $K_{GRC}$  = where the **BM Unit** is a **CCGT Module**, the plant configuration adjustment factor set out in the relevant table in the **Mandatory Services Agreement** for the configuration of the **BM Unit** concerned at the time at which the capability to provide the service is carried, otherwise 1;
- $SF_P$  = 0, subject to Paragraph 4.1.3.25 (e);
- $SF_S$  = 0, subject to Paragraph 4.1.3.25 (e);
- $SF_H$  = 0, subject to Paragraph 4.1.3.25 (e).

*Payment Formulae - ~~Imbalance Compensation~~  
Payment/Delivery Payments*

- 4.1.3.9A (a) The ~~Imbalance Compensation~~ **Delivery Payments** for **BM Unit i** in **Settlement Period j** to be made by **NGC** to a **User** referred to in Paragraph 4.1.3.8 shall be comprised of an ~~Imbalance Energy Payment and Compensation Payment~~, a **Non-Delivery Payment**, ~~Payment and an Energy Payment~~ and shall be calculated in accordance with the following formulae:-

$$DP_{ij} = ICP_{ij} + RNDC_{ij} + EP_{ij}$$

But so that where ~~ICP<sub>ij</sub>~~  $DP_{ij}$  is negative such amount shall be paid by the **User** to **NGC**.

Where:

~~ICP<sub>ij</sub> is the Imbalance Compensation Payment~~  $DP_{ij}$  is the **Delivery Payment** for **BM Unit i**, in **Settlement Period j**, to be made to or, as the case may be, by the **User**;

~~IEP<sub>ij</sub>~~  $ICP_{ij}$  is the **Imbalance Energy Compensation Payment** for **BM Unit i**, in **Settlement Period j**, calculated in accordance with Paragraph 4.1.3.9A (b) below; ~~and~~

$RNDC_{ij}$  is the **Non-Delivery Payment** for **BM Unit i**, in **Settlement Period j**, calculated in accordance with Paragraph 4.1.3.9A (c) below; and

$EP_{ij}$  is the **Energy Payment for BM Unit i**, in **Settlement Period i**, calculated in accordance with Paragraph 4.1.3.9A (d) below.

- (b) The **Imbalance Energy Compensation Payment** ( ~~$IEP_{ij}$~~ )( $ICP_{ij}$ ) shall be calculated as follows:-

$$ICP_{ij} = LFICP_{ij} + HFICP_{ij}$$

Where:

~~$LFIEP_{ij}$~~  ~~$LFICP_{ij}$~~  is the low frequency response imbalance **energy compensation** payment for **BM Unit i**, in **Settlement Period j**, and  ~~$HFIEP_{ij}$~~  ~~$HFICP_{ij}$~~  is the high frequency response imbalance **energy compensation** payment for **BM Unit i**, in **Settlement Period j**, and are calculated as follows:-

if  $RE_{ij} > 0$ , then

$$LFICP_{ij} = |RE_{ij}| * (-SSP_j)$$

and

$$HFICP_{ij} = 0$$

otherwise

$$LFICP_{ij} = 0$$

and

$$HFICP_{ij} = |RE_{ij}| * (SBP_j)$$

Where  ~~$IE_{ij}$~~  ~~$RE_{ij}$~~  is the expected **imbalance response** energy for **BM Unit i** in **Settlement Period j** calculated as follows:-

$$RE_{ij} = \int_0^{SPD} FR_{ij}(t)dt$$

Where:

~~$\int_0^{SPD} dt$  is the integral at times t, over the **Settlement Period** duration.~~

$FR_{ij}(t)$  is the expected change in **Active Power** output for **BM Unit i**, at time t (resolved to the nearest integer minute), expressed in MW derived from the relevant table set out in the **Mandatory Services Agreement**

(as such table is interpreted in accordance with Paragraph 4.1.3.11) by reference to the level of **De-Load** of the **BM Unit** concerned at the end of the minute and the mean **Frequency Deviation** over that minute when that **BM Unit** is providing **Mode A Frequency Response** and zero at all other times.

For this purpose: -

- (i) for a positive **Frequency Deviation** the expected change in **Active Power** output of **BM Unit i** shall be derived from the high frequency response table set out in the **Mandatory Services Agreement** and shall be signed negative; and
- (ii) for a negative **Frequency Deviation**, the expected change in **Active Power** output of **BM Unit i** shall be derived from:
  - A) the Primary Response data in the case of a **BM Unit** being instructed to deliver **Primary Response** without **Secondary Response**; or
  - B) the mean of the Primary Response and **Secondary Response** data in the case of a **BM Unit** being instructed to deliver **Primary Response** and **Secondary Response**,

in each case shown in the low frequency response tables set out in the **Mandatory Services Agreement** and shall be signed positive.

$$\text{reference price} = \frac{(\overline{SBP}_{month} + \overline{SSP}_{month})}{2}$$

Where:-

~~$\overline{SBP}_{month}$  and  $\overline{SSP}_{month}$  are the calculated time weighted average of SBP, and SSP, respectively (each as defined in the **Balancing and Settlement Code**) for the preceding calendar month in which the service is provided.~~

- (c) The **Non-Delivery Payment** ( $RNDC_{ij}$ ) shall be calculated as follows:-

$$RNDC_{ij} = CND_{ij} - CNDR_{ij}$$

Where:

$CNDR_{ij}$  is a quantity referred to in this Paragraph 4.1.3.9A (c) as the **BM Unit Period Non-Delivery Charge (Revised)** determined as follows:-

In respect of each **Settlement Period**  $j$ , for each **BM Unit**  $i$ , a quantity referred to in this Paragraph 4.1.3.9A (c) as the **Period BM Unit Non-Delivered Offer Volume (Revised)** ( $QNDOR_{ij}$ ) will be determined as follows:-

$$QNDOR_{ij} = \min \left( \max(QME_{ij} + RE_{ij} - QM_{ij}, 0), \sum_n QAO_{ij}^n \right)$$

where  $\sum_n$  represents the sum over all **Bid-Offer Pair Numbers** for the **Accepted Offer Volumes** for the **BM Unit**.

In respect of each **Settlement Period**  $j$ , for each **BM Unit**  $i$ , a quantity referred to in this Paragraph 4.1.3.9A (c) as the **Period BM Unit Non-Delivered Bid Volume (Revised)** ( $QNDBR_{ij}$ ) will be determined as follows:-

$$QNDBR_{ij} = \max \left( \min(QME_{ij} + RE_{ij} - QM_{ij}, 0), \sum_n QAB_{ij}^n \right)$$

where  $\sum_n$  represents the sum over all **Bid-Offer Pair Numbers** for the **Accepted Bid Volumes** for the **BM Unit**.

Now, in respect of each **Settlement Period**  $j$ , for each **BM Unit**  $i$ , if the **Period BM Unit Non-Delivered Offer Volume (Revised)** is greater than zero then to determine values of a quantity referred to in this Paragraph 4.1.3.9A (c) as the **Offer Non-Delivery Volume (Revised)** ( $QNDOR_{ij}^n$ ), the **Period BM Unit Non-Delivered Offer Volume (Revised)** will be apportioned across accepted **Offers**, in the following way:-

In respect of each **Settlement Period**  $j$ , for each **BM Unit**  $i$ , the set of all accepted **Offers** will be ranked in order of decreasing price. The accepted **Offer** with the highest price will be allocated **Non-Delivery Order Number 1**, the next highest priced accepted **Offer** will be allocated **Non-Delivery Order Number 2** and so on until all accepted **Offers** for the **Settlement Period** have been allocated a **Non-Delivery Order Number**. The set of accepted **Offers**  $\{QAO_{ij}^{n_1}, QAO_{ij}^{n_2}, \dots, QAO_{ij}^{n_u}, \dots\}$  is then a ranked set of accepted **Offers**.

The **Offer Non-Delivery Volume (Revised)** will be allocated to the first accepted **Offer** in the list first, then, once the first accepted **Offer** has been wholly accepted, to the second accepted **Offer** and so on until the **Period BM Unit Non-Delivered Offer Volume (Revised)** is fully apportioned.

Then the **Offer Non-Delivery Volume (Revised)** for accepted **Offer**  $n$ , is:

$$QNDOR_{ij}^n = \min(QAO_{ij}^{n_u}, RQNDOR_{ij}^{u-1})$$

where  $RQNDOR_{ij}^{u-1}$  is a quantity referred to in this Paragraph 4.1.3.9A (c) as the **Remaining Period BM Unit Non-Delivered Offer Volume (Revised)** determined as:

$$RQNDOR_{ij}^u = RQNDOR_{ij}^{u-1} - QNDOR_{ij}^{n_{u-1}}$$

and  $RQNDOR_{ij}^0 = QNDOR_{ij}$

and  $QNDOR_{ij}^{n_o} = 0$ .

Now, in respect of each **Settlement Period**  $j$ , for each **BM Unit**  $i$ , if the **Period BM Unit Non-Delivered Bid Volume (Revised)** is less than zero then to determine values of a quantity referred to in this Paragraph 4.1.3.9A (c) as the **Bid Non-Delivery Volume (Revised)** ( $QNDBR_{ij}^n$ ), the **Period BM Unit Non-Delivered Bid Volume (Revised)** will be apportioned across accepted **Bids**, in the following way:-

In respect of each **Settlement Period**  $j$ , for each **BM Unit**  $i$ , the set of all accepted **Bids** will be ranked in order of increasing price. The accepted **Bid** with the lowest price is allocated **Non-Delivery Order Number** 1, the next lowest priced accepted **Bid** is allocated **Non-Delivery Order Number** 2 and so on until all accepted **Bids** for the **Settlement Period** have been allocated a **Non-Delivery Order Number**. The set of accepted **Bids**  $\{QAB_{ij}^{n_1}, QAB_{ij}^{n_2}, \dots, QAB_{ij}^{n_u}, \dots\}$  is then a ranked set of accepted **Bids**.

The **Bid Non-Delivery Volume (Revised)** will be allocated to the first accepted **Bid** in the list first, then, once the first accepted **Bid** has been wholly accepted, to the second accepted **Bid** and so on until the **Period BM Unit Non-Delivered Bid Volume (Revised)** is fully apportioned.

Then the **Bid Non-Delivery Volume (Revised)** for accepted **Bid**  $n$ , is:

$$QNDBR_{ij}^n = \max(QAB_{ij}^{n_u}, RQNDBR_{ij}^{u-1})$$

where  $RQNDBR_{ij}^{u-1}$  is a quantity referred to in this Paragraph 4.1.3.9A (c) as the **Remaining Period BM Unit Non-Delivered Bid Volume (Revised)** determined as:

$$RQNDBR_{ij}^u = RQNDBR_{ij}^{u-1} - QNDBR_{ij}^{n_{u-1}}$$

and  $RQNDBR_{ij}^0 = QNDBR_{ij}$

and  $QNDBR_{ij}^{nb} = 0$ .

In respect of each **Settlement Period**  $j$ , for each **BM Unit**  $i$ , for each accepted **Offer**, a quantity referred to in this Paragraph 4.1.3.9A (c) as the **Non-Delivered Offer Charge (Revised)** will be determined as follows:-

$$CNDOR_{ij}^n = QNDOR_{ij}^n \times \max((PO_{ij}^n - SBP_j), 0) \times TLM_{ij}$$

In respect of each **Settlement Period**  $j$ , for each **BM Unit**  $i$ , for each accepted **Bid**, a quantity referred to in this Paragraph 4.1.3.9A (c) as the **Non-Delivered Bid Charge (Revised)** will be determined as follows:-

$$CNDBR_{ij}^n = QNDBR_{ij}^n \times \min((PB_{ij}^n - SSP_j), 0) \times TLM_{ij}$$

In respect of each **Settlement Period**  $j$ , for each **BM Unit**  $i$ , the **BM Unit Period Non-Delivery Charge (Revised)** ( $CNDR_{ij}$ ) will be determined as follows:-

$$CNDR_{ij} = \sum_n (CDNOR_{ij}^n + CNDBR_{ij}^n)$$

where  $\sum_n$  represents the sum over all **Bid-Offer Pair Numbers** for the **BM Unit**.

(d) The Energy Payment ( $EP_{ij}$ ) shall be calculated as follows:-

$$EP_{ij} = OEP_{ij} + BEP_{ij}$$

Where:

$OEP_{ij}$  is the Offer Energy Payment for BM Unit  $i$  in Settlement Period  $j$  and  $BEP_{ij}$  is the Bid Energy Payment for BM Unit  $i$  in Settlement Period  $j$  and are determined as follows:-

In respect of each Settlement Period  $j$ , for each BM Unit  $i$  and at each time  $t$  the Instantaneous Offer Volume  $FRO_{ij}(t)$  will be determined as follows:-

$$FRO_{ij}(t) = \max(FR_{ij}(t), 0)$$

In respect of each Settlement Period  $j$ , for each BM Unit  $i$  and at each time  $t$  the Instantaneous Bid Volume  $FRB_{ij}(t)$  will be determined as follows:-

$$FRB_{ij}(t) = \min(FR_{ij}(t), 0)$$

In respect of each Settlement Period  $j$ , for each BM Unit  $i$  and at each time  $t$  the Instantaneous Bid-Offer Acceptance Volume  $BOA_{ij}(t)$  will be determined as follows:-

$$\underline{BOA_{ij}(t) = \sum_k \sum_n (qAB_{ij}^{kn}(t) + qAO_{ij}^{kn}(t))}$$

Now, in respect of each **Settlement Period j**, for each **BM Unit i**, for **Bid-Offer Pair Number n** and at time **t** the **Frequency Response Offer Volume (FRO<sub>ij</sub><sup>n</sup>(t))** is determined as follows:-

For  $n > 0$ ,

$$\underline{FRO_{ij}^n(t) = \max \left( \min \left( BOA_{ij}(t) + FRO_{ij}(t), \sum_{n'=0}^n qBO_{ij}^{n'}(t) \right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t) \right) - \max \left( \min \left( BOA_{ij}(t), \sum_{n'=0}^n qBO_{ij}^{n'}(t) \right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t) \right)}$$

For  $n < 0$ ,

$$\underline{FRO_{ij}^n(t) = \min \left( \max \left( BOA_{ij}(t) + FRO_{ij}(t), \sum_{n'=n}^0 qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^0 qBO_{ij}^{n'}(t) \right) - \max \left( \min \left( BOA_{ij}(t), \sum_{n'=n}^0 qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^0 qBO_{ij}^{n'}(t) \right)}$$

Now, in respect of each **Settlement Period j**, for each **BM Unit i**, for **Bid-Offer Pair Number n** and at time **t** the **Frequency Response Bid Volume (FRB<sub>ij</sub><sup>n</sup>(t))** is determined as follows:-

For  $n > 0$ ,

$$\underline{FRB_{ij}^n(t) = \max \left( \min \left( BOA_{ij}(t) + FRB_{ij}(t), \sum_{n'=0}^n qBO_{ij}^{n'}(t) \right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t) \right) - \max \left( \min \left( BOA_{ij}(t), \sum_{n'=0}^n qBO_{ij}^{n'}(t) \right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t) \right)}$$

For  $n < 0$ ,

$$\underline{FRB_{ij}^n(t) = \min \left( \max \left( BOA_{ij}(t) + FRB_{ij}(t), \sum_{n'=n}^0 qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^0 qBO_{ij}^{n'}(t) \right) - \max \left( \min \left( BOA_{ij}(t), \sum_{n'=n}^0 qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^0 qBO_{ij}^{n'}(t) \right)}$$

In respect of each **Settlement Period j**, for each **BM Unit i**, the **Offer Energy Payment (OEP<sub>ij</sub>)** will be determined as follows:-

$$\underline{OEP_{ij} = \sum_n \left( PO_{ij}^n \times \int_0^{SPD} FRO_{ij}^n(t) dt \right)}$$

In respect of each Settlement Period j, for each BM Unit i, the Bid Energy Payment (BEP<sub>ij</sub>) will be determined as follows:-

$$BEP_{ij} = \sum_n \left( PB_{ij}^n \times \int_0^{SPD} FRB_{ij}^n(t) dt \right)$$

(d)(e) In this Paragraph 4.1.3.9A, the following terms shall have the meanings ascribed to them in the **Balancing and Settlement Code**:-

“Accepted Offer Volumes”  
 “Accepted Bid Volumes”  
 “Bid”  
 “Bid-Offer Pair Numbers”  
 “BM Unit Period Non-Delivery Charge”  
 “CND<sub>ij</sub>”  
 “Non-Delivery Order No.1”  
 “Non-Delivery Order No.2”  
 “Offer”  
 “PB<sub>ij</sub><sup>n</sup>”  
 “PO<sub>ij</sub><sup>n</sup>”  
 “qAO<sub>ij</sub><sup>kn</sup>(t)”  
 “qAB<sub>ij</sub><sup>kn</sup>(t)”  
 “QAB<sub>ij</sub><sup>n</sup>”  
 “QAO<sub>ij</sub><sup>n</sup>”  
 “QM<sub>ij</sub>”  
 “QME<sub>ij</sub>”  
 “SSP<sub>j</sub>”  
 “SBP<sub>j</sub>”  
 “SPD”

In this Paragraph 4.1.3.9A,  $\int_0^{SPD} dt$  is the integral at times t, over the Settlement Period duration and time t is resolved to the nearest integer minute.

4.1.3.10 **NGC** and each **User** acknowledge and agree, as between **NGC** and that **User**, that no **Holding Payment** or **Imbalance Compensation Delivery Payment** shall be payable except in relation to periods in respect of which instructions have been issued by **NGC** pursuant to this Paragraph 4.1.3.

**Paragraphs 4.1.3.11 to 4.1.3.27 unchanged by this Amendment Proposal.**

## 4.4 CHARGING PRINCIPLES

### 4.4.1 Application

The provisions of this Paragraph 4.4 shall apply to payments made by **NGC** to a **User** pursuant to **Mandatory Services Agreements** in respect of the provision of the **Mandatory Ancillary Service of Frequency Response**, and (if agreed between **NGC** and a **User**) may also be incorporated by reference into any other **Ancillary Services Agreement** as a term thereof so as to apply in respect of payments made by **NGC** to that **User** in respect of the provision of other **Ancillary Services** (but for the avoidance of doubt not so as to thereby create any obligations on **NGC** and that **User** under the **CUSC** in respect thereof).

### 4.4.2 Charging Principles - General

- 4.4.2.1 These principles are to be used to establish the basic arrangements but are not intended to stifle innovation in the development of new services or the giving of appropriate economic signals.
- 4.4.2.2 The charges shall be "cost reflective" ie. based and founded upon the actual or estimated costs directly incurred or to be incurred by the **User** for the purpose of providing the service or capability concerned.
- 4.4.2.3 Where a capability to provide an **Ancillary Service** is required by the **Grid Code** from all **BM Units** or **CCGT Units** (as opposed to a capability made available by agreement between **NGC** and a **User** from some only of the **User's BM Units** or **CCGT Units**), no **Ancillary Service** capability payment shall be made.
- 4.4.2.4 The cost of "Grandfathering" **User's** Equipment (i.e. bringing equipment owned by the **User** on 30<sup>th</sup> March 1990 to a condition of compliance with the **Grid Code**) shall not be included in **Ancillary Services** payments. Where a **Derogation** is withdrawn or reduced in scope then, except in relation to **Frequency Response**, the **User** shall be entitled to take the cost of meeting the withdrawal or reduction in the scope of the **Derogation** into account in its charges.
- 4.4.2.5 Subject to the other provisions of this Paragraph 4.4.2, the charges shall take due account of any change in or amendments to the **Grid Code** or any other statutory or regulatory obligation coming into force after 30<sup>th</sup> March 1990 affecting the provision of **Ancillary Services**.
- 4.4.2.6 If as a result of any changes to the **Balancing and Settlement Code** the **User** ceases to be entitled to receive payment under the **Balancing and Settlement Code** in respect of any elements of **Ancillary Services** provided by it which are expressed in this Paragraph 4.4 to be paid for under the **Balancing and Settlement Code**, the **User** shall be entitled to charge for such elements under an **Ancillary Services Agreement**. Where, however, such change entitles the **User** to be paid for any elements of **Ancillary Services** which are expressed in this Paragraph 4.4 to be

paid for under an **Ancillary Services Agreement** the **User** shall cease to be entitled to charge for such elements under an **Ancillary Services Agreement**.

#### 4.4.3 Charging Principles – Frequency Response

- 4.4.3.1 The variable cost of producing **Primary Response**, **Secondary Response**, **High Frequency Response** shall include sums in respect of the additional inefficiency costs incurred in providing these services but shall not include any sums payable in respect of any costs which are the subject of Paragraph 4.4.3.3.
- 4.4.3.2 Part-loading of a **BM Unit** at a level other than that specified in a **Physical Notification** in order to provide **Frequency Response** will normally be achieved by the issue of a **Bid- Offer Acceptance**.
- 4.4.3.3 In recognition of the costs likely to be incurred when providing under the ~~Balancing and Settlement Code~~ when providing **Frequency Response**, an additional amount based upon an expected delivery of **Frequency Response** energy shall be payable under Paragraph 4.1.3.9A and shall reflect exposure to energy imbalance and non-delivery charges~~when providing these services shall be payable under Paragraph 4.1.3.9A.~~ under the **Balancing and Settlement Code** when providing these services and the costs or avoided costs of production in respect of such expected energy delivery.

### Related Changes to Definitions for CUSC Paragraph 11.3

<b>“Holding Payment”</b>	that component of the payment for <b>Mode A Frequency Response</b> calculated in accordance with Paragraph 4.1.3.9;
<del>“Imbalance Compensation Payment”</del>	<del>that component of the payment for <b>Mode A Frequency Response</b> referred to in Paragraph 4.1.3.9A comprising the <b>Imbalance Energy Payment</b> and the <b>Non-Delivery Payment</b>;</del>
<del>“Imbalance Energy Payment”</del>	<del>that component of the <b>Imbalance Compensation Payment</b> calculated in accordance with Paragraph 4.1.3.9A(b);</del>
<del>“Delivery Payment”</del>	<del>that component of the payment for <b>Mode A Frequency Response</b> calculated in accordance with Paragraph 4.1.3.9A and comprising an <b>Imbalance Compensation Payment</b>, a <b>Non-Delivery Payment</b> and an <b>Energy Payment</b>;</del>
<del>“Imbalance Compensation Payment”</del>	<del>that component of the <b>Delivery Payment</b> calculated in accordance with Paragraph 4.1.3.9A(b);</del>
<del>“Energy Payment”</del>	<del>that component of the <b>Delivery Payment</b> calculated in accordance with Paragraph 4.1.3.9A(d);</del>
<del>“Non-Delivery Payment”</del>	<del>that component of the <b>Delivery Payment</b> calculated in accordance with Paragraph 4.1.3.9A(c);</del>