



# National Grid

## AMENDMENT REPORT

### CUSC Proposed Amendment CAP047

### **Introduction of a competitive process for the Provision of Mandatory Frequency Response**

*The purpose of this report is to assist the  
Authority in their decision of whether to  
implement Amendment Proposal CAP047*

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## 1.0 SUMMARY AND RECOMMENDATION

- 1.1 CUSC Amendment Proposal CAP047: Introduction of a competitive process for the provision of Mandatory Frequency Response, seeks to facilitate competition in the provision of Frequency Response services by increasing transparency and provider's ability to vary prices. The Amendment Proposal has three elements:
- (i) The right to amend payment rates such that Users can submit "holding prices" to be applied in each calendar month for Mandatory Frequency Response service;
  - (ii) A requirement upon National Grid (NG) to publish market data describing prices and volumes of Mandatory Frequency Response services procured in previous months, and submitted prices for each BMU; and
  - (iii) Lifting of the cost reflective charging principles as currently applied to "holding" payments.
- 1.2 CAP047 was proposed by Innogy and submitted to the Amendments Panel on 21<sup>st</sup> March 2003. The Amendments Panel subsequently actioned the Balancing Services Standing Group (BSSG) to act as a Working Group to consider CAP047 and report back to the June CUSC Panel.
- 1.3 The BSSG Working Group Report on CAP47 was submitted, and the decision was taken by the CUSC Amendments Panel to consult with the industry. As part of the report, the BSSG also submitted an Alternative Amendment (A) for consideration as part of the consultation. The CAP047 Consultation Document was circulated on 4 July 2003 to CUSC Parties, Panel members and interested parties, with comments requested by 20 August 2003. In response to the consultation, 13 responses were received, one of which put forward Alternative Amendment (B) which is detailed in this Report.

### National Grid Recommendation

- 1.4 On the basis of the representations received, National Grid recommends that both the original Amendment Proposal and Alternative Amendment (A) are rejected. Whilst the majority of the views received supported the implementation of Alternative Amendment (A), three respondents disagreed with the implementation of either the original Amendment Proposal or Alternative Amendment (A), believing there to be scope for significant cost increases without sufficient benefits for customers, particularly given the potential market concentration issues.
- 1.5 National Grid proposes that Alternative Amendment (B) is approved for implementation as of 1<sup>st</sup> October 2004. National Grid remains supportive of the introduction of markets in areas such as Balancing Services. However, NG remains concerned that significant price increases could occur as a result of the introduction of market forces, and while Alternative (B) will not remove this effect, it will help mitigate such risk. Alternative (B) will allow for a smoothed introduction of market based principles in relation to the provision of frequency response, and should offer a degree of comfort to those

respondents who were not supportive of the original Amendment Proposal. Adoption of this alternative would allow some price based competition to develop whilst ensuring that prices are not manipulated in order to sterilise capacity or unduly increase the costs of Frequency Response provision.

## **2.0 PURPOSE AND SCOPE OF THE REPORT**

- 2.1 This Amendment Report has been prepared and 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 related to the introduction of a competitive process for the provision of Mandatory Frequency Response.
- 2.2 Further to the submission of Amendment Proposal CAP047 (Annex 1) and the subsequent wider industry consultation that was undertaken, this document is addressed and furnished to the Gas and Electricity Markets Authority (“the Authority”) in order to assist them in their decision as to whether to implement Amendment Proposal CAP047.
- 2.3 This document outlines the nature of the CUSC changes that are proposed. It incorporates National Grid’s recommendations to the Authority concerning the Amendment. Copies of all representations received in response to the consultation have been also been included and a ‘summary’ of the representations received is also provided. Copies of each of the responses to the consultation are included as Annex 3 to this document.
- 2.4 This Amendment Report 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.nationalgrid.com/uk/indinfo/cusc>

### **3.0 DESCRIPTION OF THE PROPOSED AMENDMENT**

#### **Background**

- 3.1 All licensed generators are required to provide the service of mandatory Frequency Response as set out in CC8.1 of the Grid Code. The provisions for payment of the service are contained within Section 4 of the CUSC, and are currently based on a number of cost reflective charging principles that are also set out in the CUSC.
- 3.2 At present, a generator receives two payments under the CUSC when providing Mandatory Frequency Response:
- Holding Payment – this is a £/MW/hr payment during the period where a generator receives an instruction to provide the service consistent with the Cost Reflective Charging Principles; and
  - Response Energy Payment – this is a £/MW/hr payment paid for the volume of the service that is expected to be delivered.
- 3.3 The Amendment Proposal CAP047 proposes three elements:
- Revision of the provisions regarding the right to amend payment rates such that the User can submit “holding” prices to be applied in each calendar month for each mandatory Frequency Response service (Primary, Secondary, High). Submissions to be made by 15<sup>th</sup> business day of the month prior to the month in which the prices would apply;
  - A requirement for NG to publish market data describing prices and volumes of frequency response services procured in previous months, submitted prices for each service by BMU, and their future requirements; and
  - Lifting of cost reflective charging principle as currently applied to the “holding” payments.
- 3.4 Where a provider chooses not to submit prices for a BMU in any one month, the previous month’s prices should apply. In the event that no price has previously been submitted, the prices for each service shall be deemed to be nil. The System Operator (SO) shall only instruct the provision of Frequency Response from such a BMU where no other source of Frequency Response is available to meet the total system requirement at the time of instruction.

#### **Working Group Discussions**

- 3.5 In acting as a Working Group in relation to CAP047, the BSSG agreed that evolution of the current arrangement for the procurement of mandatory frequency response would better facilitate the Applicable CUSC objectives. Each element of the Amendment Proposal is considered below, along with the views of the BSSG.

#### **Information publication and transparency**

- 3.6 The BSSG agreed that an appropriate information publication and submission process was required to support CAP047. The BSSG discussed the original Proposal and concluded that refinements would be beneficial. These are discussed in further detail in relation to the Alternative Amendment A in Annex 2.

### **Volume of Service Available**

- 3.7 The BSSG discussed whether CAP047 would affect the volume of frequency response available to the SO. The BSSG agreed that the volume of Frequency Response available would not be affected, and that CAP047 only had the ability to impact the price associated with this volume.

### **Market liquidity/competition issues**

- 3.8 The BSSG discussed liquidity associated with Frequency Response provision. National Grid provided analysis about the number of market participants and their market share (based on actual payments made during 2002/03) which resulted in a Hirschmann-Herfindal Index (HHI)<sup>1</sup> of approximately 1400. Furthermore, the National Grid representative stated that a HHI of 1800 was commonly accepted as a level where concerns about a particular market's liquidity would be raised.
- 3.9 National Grid provided a paper 'Depth of Mandatory Response Market & Associated Cost Issues' (attached at Annex 7). The analysis provided illustrated that at a simplistic level there would be sufficient contracted capability to meet the demand for response services at any one time. However, other issues would need to be taken into account which would have the potential to erode levels of response that are available for delivery (e.g. a generators PN level; technical derogations). Additionally, at times of summer minimum demand when much of the derogated plant may be running, a significant increase in BM activity would be required to ensure that there is sufficient responsive plant available on the System. This view was countered by another member of the BSSG who felt that the Proposal would increase the likelihood of more useful response being made available at these times by flexible plant if there was a mechanism for satisfactory remuneration. However, in order for the more flexible plant to be brought forward, response prices would need to be high enough to make this economically efficient.
- 3.10 In terms of the interaction with the BM, the National Grid analysis noted that the Proposal would lead to a 'market within a market'. This is because the availability of response would depend upon a generator's operating level within the BM, and on occasion, response would only be available once a bid or an offer had been accepted. Specifically, at times of low system demand, gensets would tend to run at lower load levels meaning that in order to ensure sufficient high frequency capability significant BM bid/offer activity would be required. This would also be true for the reverse scenario for periods of high system demand as the costs involved in changing a Unit's load may outweigh

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<sup>1</sup> The Hirschmann-Herfindal Index is a measure of market concentration and is calculated by summing the percentage market shares of each participant. Thus HHI = 10000 is a monopolistic market, and HHI = 0 is an infinitely liquid market

the costs of provision of the service. The counter view to this was put that providers would seek to maximise BM activity by maintaining competitive prices for response and that the two markets would interact in order to achieve a more efficient solution to the scheduling of response.

- 3.11 In support of the Amendment Proposal, it was argued that the increase in competition, coupled with a degree of freedom in pricing for the service and interaction with the BM would ensure an efficient outcome. The BSSG questioned whether energy prices or Frequency Response prices were more important to generators, i.e. pricing high in the BM to avoid being called for Frequency Response. For example, would a generator place a low BM price and a high response price so as to avoid being called for response services? If CAP047 was implemented then generators in these circumstances could submit a higher price for the service, thereby making themselves less attractive to the SO to provide the service. One member noted that if prices were high then the SO could look elsewhere for the service and the market would respond by submitting lower holding prices in the next month. A minority of members noted that if the requirement is dictated by system dynamics then the SO must purchase the service whatever the cost. Another member believed that the incentive to provide Frequency Response could only get better following implementation of CAP047.
- 3.12 In summary, the majority of the BSSG agreed that there was sufficient liquidity in the provision of Frequency Response to ensure that the revised market arrangements would lead to overall more efficient costs of providing response. A minority of the BSSG disagreed with this view.

#### **Cost impact of CAP047**

- 3.13 The NG analysis (Annex 7) stated that the overall cost of frequency response could increase by £45m over a two-year period. This increase was based on the following assumptions:
- Almost all mandatory response providers would have increased their prices by 50-100%. This assumption was based on previous experience of instances where market arrangements had been introduced for the procurement of Balancing Services. There were no particular assumptions on times of year etc;
  - NG has managed a fairly limited re-allocation of response holding;
  - There would be a modest increase in both the BM volumes on response actions as plant is re-loaded to avoid the higher prices, complete with subsequent price rises as Generators pay more attention to the BM prices of responsive plant; and
  - Consequently BM costs of response would also rise but by less than those associated with Ancillary contracts.
- 3.14 The view among BSSG members was divided as to the cost impact of the Amendment Proposal. Several members believed that the proposed market would result in a decrease in the overall costs associated with the provision of



the service (ie the Frequency Response costs and the costs incurred in the Balancing Mechanism). This was based on the view that there would be sufficient competition in the provision of the service and that CAP047 would provide generators with an extra degree of freedom to optimise the balance between the response holding price and the BM price. However, no quantifiable analysis was provided to support this view. An additional view was given that it was difficult to envisage costs reducing from the current levels when the current levels are cost-reflective and the BSSG agreed that the costs of Frequency Response (when considered in isolation) would probably increase.

- 3.15 Those BSSG members concerned about potential cost increases associated with CAP047 considered that CAP047 represented too much of a 'leap of faith' in market principles and that no hard evidence had been provided to offer any assurance that CAP047 would result in more efficient costs when the overall costs of provision of the service were considered.
- 3.16 The BSSG discussed the demand/supply elasticity of Frequency Response. Two members felt that it was arguable as to whether provision of the service could ever be truly competitive as whilst there was sufficient capability and hence competition could exist, this would not be true of demand for the service. In a normal market an increase in prices to an unacceptable level would lead to a decrease in demand for the product. However, in the case of Frequency Response the level of service would be dictated by system dynamics and level of the system rather than price.
- 3.17 The BSSG agreed that the full benefits of CAP047 would only be realised if the dispatch algorithm in the control room were able to optimise energy balancing and Frequency Response holding costs at the same time. The NG representative informed the BSSG that the current optimisation technique had been designed with the current relative levels of BM prices and response holding prices in mind (i.e. the BM prices dominating the response holding prices). The NG representative indicated that, whilst the current optimisation tool could cope with the CAP047 process (in terms of monthly price changes), if the relative balance between the BM prices and response holding prices were to shift then it may not result in the optimum solution. It was suggested that significant work would be required to develop the current algorithm to ensure that it fully optimised costs in a CAP047 world. The BSSG noted this issue.
- 3.18 In summary, the majority of the BSSG agreed that the overall costs of the provision of Frequency Response would decrease with CAP047. The remaining minority contended that no evidence had been provided to support this assertion.

### **Other Features**

- 3.19 The National Grid paper contained a discussion relating to other features that could be introduced with CAP047.

- 3.20 Price caps – it was suggested that as a way of easing concerns over potential cost increases, a price cap should be introduced. The BSSG agreed that a price cap associated with CAP047 would not be appropriate.
- 3.21 Monitoring and incentivisation arrangements – it was suggested that a value-based service should be supported by robust monitoring to ensure that the service was delivered and that the appropriate payments were withheld if non-delivery occurred. The BSSG agreed with the concept of monitoring and agreed that further consideration should be given as to how it could be implemented, although it was not seen as a pre-requisite for CAP047.

#### **4.0 IMPLEMENTATION AND TIMESCALES**

- 4.1 Whilst the BSSG did not propose an implementation date and the Consultation document referred to 1 April 2004, should the Authority be minded to approve the Amendment Proposal National Grid proposes an implementation date of 1<sup>st</sup> October 2004. This would be necessary to allow sufficient time for changes to the Mandatory Services Agreements to be executed, and for all necessary IT systems to be developed.

#### **5.0 IMPACT ON THE CUSC**

- 5.1 The Proposed Amendment would require amendment of Section 4 of the CUSC (Balancing Services) and Section 11 (Interpretation and Definitions).
- 5.2 The legal text required to give effect to the Proposed Amendment is contained as Annex 4 of this document.

#### **6.0 ASSESSMENT AGAINST APPLICABLE CUSC OBJECTIVES**

- 6.1 The applicable CUSC Objectives are set out in Paragraph 1 of Condition C&F of the Transmission Licence. CUSC Amendments should better facilitate achievement of the Applicable CUSC Objectives. These can be summarised as follows:
- (a) The efficient discharge by NGC of the obligations imposed on it by the Act and the Transmission Licence; and
  - (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.
- 6.2 It is argued by the Proposer that the Amendment Proposal will better facilitate the Applicable CUSC objective (B), in that by removing the link to cost reflectivity with respect of the Holding Payment, further competition in the provision of Frequency Response would be encouraged, thereby facilitating competition in the generation and supply of electricity.
- 6.3 However, National Grid does not believe that the Amendment Proposal would better facilitate Applicable CUSC Objective (A), as the proposals would result in increasing costs, without any associated benefits to the SO and end

consumers, and therefore would not facilitate the efficient discharge of NGC's obligations under the Transmission Licence.

## **7.0 IMPACT ON CUSC PARTIES**

7.1 The proposed Amendment would facilitate the ability of CUSC Parties providing Frequency Response services to vary prices submitted with respect to "Holding Prices".

## **8.0 IMPACT ON CORE INDUSTRY DOCUMENTS**

### **Proposed Amendment**

Possible changes to the Procurement Guidelines may be required as a result of the requirements to publish information in relation to price submissions and utilisation data.

## **9.0 ALTERNATIVE AMENDMENTS**

### **Description of Alternative Amendment (A) – Proposed by BSSG**

9.1 During analysis and consideration of the Amendment Proposal, the BSSG identified an Alternative Amendment which would better facilitate achievement of the Applicable CUSC Objectives. The Alternative Amendment is broadly similar to the original Amendment Proposal, but proposes the following changes:

- Removal of the requirement in the Amendment Proposal for National Grid to publish future requirements from the service. The BSSG noted that this information is already available to providers in the form of the Weekly Operational Planning (WOP) Report and Demand forecasts published by National Grid.
- Where a provider does not submit prices for a BMU in any month, the previous month's prices should apply. Where no prices were submitted previously, the deemed price for each service would be those that applied prior to any implementation of CAP047 Alternative Amendment as per the MSA. The BSSG unanimously believed that using the £/MW/hr figure in a User's MSA was preferable to a default position of zero as put forward by the original Amendment Proposal.
- If there is no price available for the previous month or prior to any implementation of CAP047 Alternative Amendment (ie a newly commissioned generator) then if no prices are submitted, the prices should default to zero. The BSSG agreed that in such cases the price should default to zero, as this places the correct incentives on the new provider to offer a price

9.2 The BSSG agreed that an Alternative Amendment Proposal should be raised to capture the above points (see Annex 2).

- 9.3 The legal text to give effect to Alternative Amendment (A) in accordance with the detailed comments made in the consultation response is set out in [Annex

#### **Assessment Against Applicable CUSC Objectives**

- 9.4 The BSSG asserted that Alternative Amendment (A) better facilitated the Applicable CUSC Objectives compared to the original Amendment Proposal as it would allow the System Operator to despatch Frequency Response in a more economic and efficient manner. However, all other comments relating to the better facilitation of the Applicable CUSC Objectives as contained in Section 6 above remain.

#### **Implementation and Timescales**

- 9.5 The implementation and timescale details for Alternative Amendment (A) do not differ from the original Amendment Proposal.

#### **Changes required to Core Industry Documents to give effect to the Proposed Amendment and Alternative Amendment**

- 9.6 The changes required to Core Industry Documents do not differ to those proposed as a result of the Original Amendment Proposal.

#### **Changes and/or Developments required to central computer systems and processes used for arrangements established under Core Industry Documents**

- 9.7 The changes required do not differ to those proposed as a result of the Original Amendment Proposal.

#### **Description of Alternative Amendment (B) – Proposed by National Grid**

- 9.8 Alternative Amendment (B) was proposed as a response to the industry consultation on CAP047. At the time of submission all interested parties were notified that this Alternative was placed on the National Grid Information Website which was prior to the closure of the consultation. Alternative Amendment (B) is based on the Original Proposal as submitted by Innogy, but has the following additional features:

- The cost reflective charging principles for Frequency Response remain as currently drafted within the CUSC. However, the ability to alter holding prices per BMU on a monthly basis will be introduced. This revision will be subject to a maximum cap of 1.25 times the existing MSA cost reflective price (ie the price contained in the MSA prior to any implementation of CAP047) in year 1 and 1.5 times the existing MSA cost reflective price in year 2. This arrangement will be subject to review at the end of the two-year period. For the avoidance of doubt, the indexation arrangements relating to the MSA price as currently drafted will remain.

- Monitoring and clawback arrangements will be included to encourage accurate service delivery. In the interim, measures will be introduced which result in holding prices defaulting to the MSA price should participants under deliver against contracted levels more than a pre-defined number of times. More enduring arrangements will be established over the initial two-year period and will be implemented subject to the outcome of the two-year review.

9.9 The legal text to give effect to Alternative Amendment (B) in accordance with the detailed comments made in the consultation response is set out in Annex 6.

### **Assessment Against Applicable CUSC Objectives**

9.10 The Proposer of Alternative Amendment (B) asserts that it would better facilitate the move towards the smooth introduction of Frequency Response markets under the applicable CUSC objectives. Adoption of this alternative would allow some price-based competition to develop whilst ensuring that prices are not manipulated in order to sterilise capacity or unduly increase the overall cost of provision of the service of frequency response by the System Operator. This is particularly important when one considers that there is no “demand elasticity” in relation to the procurement of this service, (ie the System Operator has to procure the required volume regardless of the price). The retention of the link to the cost reflectivity principles within the Charging Principles would allow the market to establish itself and determine whether true competition exists before complete pricing freedom occurs.

### **Implementation and Timescales**

9.11 The proposed implementation timescale for Alternative Amendment (B) is 1<sup>st</sup> October 2004. This would allow sufficient time for alterations to the MSA’s and the development of systems to enable the receipt and the subsequent communication of holding prices.

### **Changes required to Core Industry Documents to give effect to the Proposed Amendment and Alternative Amendment**

9.12 The changes required to Core Industry Documents do not differ to those proposed as a result of the Original Amendment Proposal.

### **Changes and/or Developments required to central computer systems and processes used for arrangements established under Core Industry Documents**

9.13 The changes required do not differ to those proposed as a result of the Original Amendment Proposal.

## **10.0 VIEWS AND REPRESENTATIONS**

- 10.1 This Section contains a summary of the views and representations made by consultees during the consultation period in respect of the Proposed Amendment and the Alternative Amendment (A).

#### Views of Panel Members

- 10.2 No views received during consultation

#### View of Core Industry Document Owners

- 10.3 No responses to the CAP047 Consultation were received from Core Industry Document Owners or owners of other Industry documents.

#### Responses to Consultation

- 10.4 The following table provides an overview of the representations received. Copies of the representations are attached as Annex 3.

Reference	Company	Supportive	Comments
CAP047-CR-01	Gaz de France	No	<ul style="list-style-type: none"> <li>Removal of Cost Reflective Charging Principles and LC7C would breach NGC's Licence.</li> <li>Likely to increase NGC's costs.</li> <li>Amount of useful response would fall.</li> </ul>
CAP047-CR-02	British Energy	No	<ul style="list-style-type: none"> <li>Will not better facilitate CUSC objectives.</li> <li>Ownership of plant which provides significant amounts of Frequency Response (FR) in the hands of too few market participants</li> </ul>
CAP047-CR-03	Enfield Energy	Yes	<ul style="list-style-type: none"> <li>Additional benefits of Alternative Amendment A are marginal, though positive and would facilitate effective competition in the generation of electricity.</li> <li>Will improve volume of response offered.</li> <li>Would allow true costs of response to be realised.</li> </ul>
CAP047-CR-04	British Gas Energy Management Group	Yes	<ul style="list-style-type: none"> <li>In support of Alternative Amendment (A) which would encourage competition for FR.</li> <li>Do not believe introduction of price caps is necessary.</li> <li>Unsure if proposed change in methodology would encourage new providers to come forward.</li> </ul>

			<ul style="list-style-type: none"> <li>Analysis suggests that there is sufficient available contracted capability.</li> </ul>
CAP047-CR-05	EDF Energy	Yes	<ul style="list-style-type: none"> <li>Alternative Amendment (A) would better meet Applicable CUSC Objectives than the original.</li> <li>The introduction of competitive market would provide clear signals as to the value of response would encourage new/existing providers to make additional response available.</li> <li>A price cap would not be compatible with the introduction of competitive market arrangements for Frequency Response.</li> </ul>
CAP047-CR-06	EDF Trading Ltd; EDF (Generation)	Yes	<ul style="list-style-type: none"> <li>Alternative Amendment (A) better meets the Applicable CUSC Objectives.</li> <li>Should not adversely affect the volume of service.</li> <li>Costs for securing response may marginally rise.</li> <li>The concepts of price caps do not sit well within a market structure.</li> </ul>
CAP047-CR-07	Innogy; Innogy Cogen Trading Ltd; npower Ltd; npower Northern Supply Ltd; npower Yorkshire Supply Ltd; npower Northern Ltd; npower Yorkshire Ltd.	Yes	<ul style="list-style-type: none"> <li>Alternative Amendment (A) better meets the Applicable CUSC Objectives.</li> <li>Will increase the volume of response available to the SO.</li> <li>Agree with removal of Cost Reflective Charging Principles.</li> <li>Will both permit more competition in the provision of response and encourage new providers.</li> <li>May produce response from the demand-side.</li> <li>Price caps are not consistent with a market mechanism intended to encourage competition.</li> </ul>
CAP047-CR-08	PowerGen	Yes	<ul style="list-style-type: none"> <li>Support Alternative Amendment Proposal (A).</li> <li>Implementation would facilitate effective competition and would increase the volume of response</li> </ul>

			<p>offered to the SO.</p> <ul style="list-style-type: none"> <li>• Agree with removal of Cost Reflective Charging Principles.</li> <li>• Not clear why price caps should be implemented here.</li> </ul>
CAP047-CR-09	Scottish & Southern Energy; Southern Electric; Keadby Generation Ltd and SSE Energy Supply Ltd.	Yes	<ul style="list-style-type: none"> <li>• The Alternative Amendment (A) could better facilitate competition in the provision of response.</li> <li>• The volume of response should not be affected.</li> <li>• Agree with removal of Cost Reflective Charging Principles.</li> <li>• Not persuaded that price caps are needed.</li> </ul>
CAP047-CR-010	Edison Mission	Yes	<ul style="list-style-type: none"> <li>• Equally supportive to CAP47 and Alternative Amendment (A).</li> <li>• Believe CAP047 would encourage new players.</li> <li>• Free, fair and open markets should not have price caps.</li> </ul>
CAP047-CR-011	National Grid	No	See views in this Amendment report
CAP047-CR-012	Derwent Co-generation	Yes	<ul style="list-style-type: none"> <li>• Would encourage new players.</li> <li>• Would allow value of Response to be derived by market forces.</li> </ul>

10.5 National Grid received a total of twelve responses to the consultation on CUSC Amendment Proposal CAP047. In addition, one response was received after the deadline for submissions to the Consultation. This has been attached in Annex 3 for completeness, but has not been commented upon in the following text.

10.6 In general, the majority of responses were supportive of the Alternative Amendment Proposal (A), raised by the BSSG, as better facilitating the achievement of the Applicable CUSC Objectives. One respondent (NGT) raised a further Alternative Amendment. Despite its availability for comment, no respondents offered views on Alternative (B) within the consultation timescales.

10.7 Respondents were asked to specifically consider and respond to the following issues:

**Does CAP047 or the Alternate Amendment Proposal better meet the Applicable CUSC objectives?**

10.8 Nine of the respondents considered that the Amendment Proposal better met the Applicable CUSC Objectives as stated by the Proposer, whilst three were not of this view. One respondent was of the view that implementation of CAP047 would be in breach of NGC's Licence. One further respondent believed that as the ownership of plant which offered this services was in the



hands “of too few market participants for there to be sufficient competition” and concluded that implementation of CAP047 “would represent a “significant leap of faith” given the lack of competition and absence of any hard evidence that costs would fall.”

**Do you believe that the implementation of CAP047 would affect the volume of service offered to the System Operator?**

- 10.9 Nine respondents were minded that implementation of CAP047 would either not adversely affect the volume of Frequency Response services available or, would encourage more participants to provide these services, whilst one respondent believed the amount of available response would fall. Two respondents offered no comment.

**What do you believe the impact of costs to be as a result of the implementation of CAP047?**

- 10.10 No consensus of view was secured for this issue. Views ranged from anticipating no increase in costs; anticipating costs to reduce to anticipating an increase in cost for the provision of frequency response services.
- 10.11 One respondent raised concern that as an Interconnector User, if the total costs did rise by £45m, as suggested by NGC, and flowed through to BSUoS, it would have no ability to offset these costs against revenues generated from a Frequency Response market. One further respondent believed that because the cost recovery methodology is funded by BSUoS, parties providing the service would be incentivised to manage the costs appropriately, whilst another viewed any increase in BSUoS ultimately being paid by customers without any particular improvement in service.

**What benefits do you believe could be derived from CAP047?**

- 10.12 The majority of respondents believed that the implementation of CAP047 and subsequent opening up of the provision of Frequency Response to competition would lead to a more economical and efficient service. However, three respondents questioned whether a true market could ever exist for this service due to the limited scope for procurement of this service.

**Do you agree with the removal of the Cost Reflective Charging Principles?**

- 10.13 Seven respondents confirmed that they agreed with the removal of Cost Reflective Charging Principles, believing that a move to an open and transparent market for the provision of FR services would be appropriate. Additionally, one respondent suggested that by the removal of this Principle any element of cross subsidy would also be removed and would encourage future investment and development in this service. One respondent suggested that the removal of the Cost Reflective Principles was not necessary in order to introduce competition and correct the problem of under recovery. Four respondents offered no direct comment.

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**Given the potential issues with Despatch Optimisation, do you believe this to be an issue that requires a solution prior to the implementation of CAP047?**

- 10.14 Seven respondents stated that they did not believe there was an issue with Despatch Optimisation prior to implementation of the Amendment Proposal. One of these respondents further added that as NGC had stated that in some circumstances the results may not be optimal and this would be an issue that would require addressing to achieve the full benefits of CAP047, this should not delay implementation.
- 10.15 One respondent referred to National Grid's opinion that significant work on the Control Room despatch algorithm would be required and concluded that the overall cost benefit of CAP047 would be "therefore highly questionable". Another respondent stated that any change to algorithm must be completed prior to implementation to ensure that sub-optimal decisions are not taken. Two respondents offered no comment.

**Do you believe that CAP047 will introduce more competition in to Frequency Response, and in particular, do you believe that it will encourage new providers of the service to come forward?**

- 10.16 Eight respondents confirmed their belief that implementation of CAP047 would introduce more competition in to this market and encourage new providers to come forward. One of which added that "at worst we believe it would stay the same." One respondent stated that no evidence had been offered that CAP047 would encourage new providers, whilst another respondent was unsure. Two respondents offered no comment.

**Do you believe monitoring and 'claw back' to be a pre-requisite to any introduction of market forces into Frequency Response?**

- 10.17 Seven respondents advised that they did not consider monitoring and "claw back" to be pre-requisite to the implementation of CAP047, suggesting that sufficient and suitable arrangements were already in place. Two respondents considered such arrangements to be a pre-requisite in order to ensure that enhanced payments were not paid when a service was not delivered. Three respondents offered no comment.

**Should safeguards such as price caps also be implemented?**

- 10.18 Eight respondents considered price caps to be incompatible with the introduction of market arrangements, suggesting that proper price signals should be allowed to emerge without pre-agreed ceilings. Two respondents suggested that price caps should be used to protect Users from unwarranted costs until such time that the market is proved to work. Two respondents offered no comment.

## 11.0 National Grid Recommendation.

- 11.1 Whilst National Grid remains supportive of moves to introduce market principles into areas such as Balancing Services, NG does not believe that implementation of CAP047 would introduce a competitive process for the provision of Mandatory Frequency Response services and would not therefore better meet the applicable CUSC objectives. As a result, National Grid recommends that both the original Amendment Proposal and Alternative Amendment (A) are rejected.
- 11.2 It is National Grid's belief that CAP047 would result in increasing costs with respect to Frequency Response services without any associated benefits to either the System Operator or customers as a whole. NG finds it difficult to see how the removal of the Cost Reflective Charging Principles associated with Mandatory Frequency Response could result in anything other than a significant cost rise. Market participants may also be able to, in effect, undermine the Grid Code obligation to provide responsive capability through the submission of high prices.
- 11.3 Similarly, it is arguable as to whether a market for Frequency Response could exhibit proper market forces as unlike other markets, the provision of frequency response is very much "demand inelastic". Irrespective of price, the System Operator cannot choose to forgo the procurement of the last MW of response on the basis that its provision is too costly. Indeed, in the shorter term it is arguable that the System Operator could be deemed to be a distressed buyer and therefore open to possible price manipulation. Any occurrence of this would ultimately lead to customers paying for a more expensive service with no perceivable increase in benefits. These views have also been echoed in some of the responses received following the recent consultation.
- 11.4 In order to facilitate a smoothed introduction of market principles in relation to the provision of Frequency Response, whilst mitigating the potential for significant price increases with no associated benefit, NG believes that Alternative Amendment (B) should be implemented. Adoption of this alternative would allow some price based competition to develop whilst ensuring that prices are not manipulated in order to sterilise capacity or unduly increase the costs of Frequency Response provision to the System Operator. Alternative Amendment (B) should also offer some degree of comfort to those respondents who were not supportive of the Original Amendment Proposal as the market would be allowed to establish and determine whether true competition exists before complete pricing freedom occurs.

## **12.0 COMMENTS ON DRAFT AMENDMENT REPORT**

Comments to the Draft Amendment Report were received from British Gas Trading and EDF Energy Trading.

### **British Gas Trading** – copy attached.

These comments on Alternate Amendment (B) have not been included within the Final Amendment Report as the closing date was Wednesday 20 October. A copy of BGT's response, however, has been attached for information.

### **EDF Energy Trading**

EDF's comments mainly related to the BSSG Report detailed in paragraphs 3.15 & 3.16 and as such have not been included within this Report as this has been commented upon previously. A further comment related to an incorrect title contained within the document which has been amended.

### **Gaz de France**

Gaz de France commented that Alternate Amendment (B) had not been included within the original Consultation.



energy management group

**Charter Court  
50 Windsor Road  
Slough  
Berkshire  
SL1 2HA**

Tel. (01753) 758137  
Fax (01753) 758368  
04 September 2003

John Greasley  
National Grid Company plc  
National Grid Transco House  
Warwick Technology Park  
Warwick  
CV34 6DA

Dear John,

**Re: CAP047 – Introduction of a competitive process for the provision of Mandatory Frequency Response**

Thank you for the opportunity of responding to the Amendment Report considering CAP047. British Gas Trading (BGT) does not support Alternative Amendment (B) and still believes Alternative Amendment (A) will better facilitate Applicable CUSC Objective (A).

The original Amendment Proposal proposed to introduce market forces into the provision of Mandatory Frequency Response. BGT are unsure how the introduction of an arbitrary cap on the Mandatory Service Agreements will allow for the smooth introduction of Frequency Response markets. BGT believe that market fundamentals should be left to work without enforcing pre-agreed ceilings. BGT note and concur with the majority of the respondents to the original consultation that caps are not compatible with introducing of a competitive market.

If you have any questions regarding this response please ring me 01753 758137 or Simon Goldring on 01753-758051.

Yours sincerely,

Mark Manley  
Account Manager

**ANNEX 1 – CAP047 Amendment Proposal Form**

<b>CUSC Amendment Proposal Form</b>	<b>CAP: 047</b>
<b>Title of Amendment Proposal:</b> <b>Introduction of a competitive process for the provision of Mandatory Frequency Response</b>	
<b>Description of the Proposed Amendment</b> This amendment seeks to facilitate competition in the provision of Frequency Response services by increasing transparency and providers' ability to vary prices. It will also facilitate the eventual development of a frequency response market along the lines contemplated by the BSSG.  The proposed amendment has three elements: <ul style="list-style-type: none"> <li>• Revision of the provisions regarding the right to amend payment rates such that the User can submit 'holding' prices to be applied in each calendar month for each mandatory frequency response service (Primary, Secondary and High). Such submissions to be made by the 15<sup>th</sup> business day of the month prior to month in which the prices shall apply.</li> <li>• A requirement for National Grid to publish market data describing prices and volumes of frequency response services procured in previous months, submitted prices for each service by BMU, and their future requirements for the service.</li> <li>• Lifting of the cost reflective charging principle as currently applied to the 'holding' payments.</li> </ul> Where a provider chooses not to submit prices for a BMU in any month, the previous month's prices shall apply. In the case that no price has previously been submitted, the prices for each service shall be deemed to be nil but the SO shall only instruct the provision of Frequency Response from such BMU where no other source of Frequency Response is available to meet the total system requirement at the time of instruction.	
<b>Description of Issue or Defect that Proposed Amendment seeks to Address</b> The current arrangements in CUSC for the provision of mandatory Frequency Response services do not enable parties to actively compete in the provision of those services. Furthermore, circumstances can emerge whereby service providers cannot fully recover their costs. Adoption of this amendment will not only provide a framework for competition in the provision of the service, but also give confidence that costs can be fully recovered under changing market conditions thus enhancing the security of the system.	
<b>Impact on the CUSC</b> Likely changes would include: Change to 4.1.3.13 to separate the amendment of levels of response from payment rates. This might be achieved by limiting 4.1.3.13 to payment rates and making 4.1.3.14 reciprocal.  Drafting of 4.1.3.13 to permit the monthly submission by users of "holding" prices to apply in each calendar month.	

<b>Changes to 4.4 (Charging Principles)</b>	
Consequential changes to 4.1.3.15 / 16 / 18 (dispute resolution for changes to payment rates).	
Consequential changes to 4.1.3.20 / 21 / 22 (Triennial Review of prices).	
Consequential changes to 4.5 (indexation)	
Introduction of a requirement on National Grid to publish market data. This may require review of confidentiality clause 6.15.	
<b>Impact on Core Industry Documentation</b>	
Changes to MSAs to remove payment rates.	
Possible changes to Procurement Guidelines in relation to information to be published.	
<b>Impact on Computer Systems and Processes used by CUSC Parties</b>	
National Grid would be required to update 'holding' prices for the purposes of economic despatch monthly rather than annually or when changes are agreed.	
<b>Details of any Related Modifications to Other Industry Codes</b>	
<b>Justification for Proposed Amendment with Reference to Applicable CUSC Objectives**</b>	
By introducing market forces into the provision of Frequency Response, the modification would facilitate effective competition in the generation of electricity.	
<b>Details of Proposer:</b>	
Organisation's Name:	Innogy plc
Capacity in which the Amendment is being proposed: (i.e. CUSC Party, BSC Party or "energywatch")	CUSC Party
<b>Details of Proposer's Representative:</b>	
Name:	Raoul Thulin
Organisation:	Innogy plc
Telephone Number:	01793 892634
Email Address:	<a href="mailto:raoul.thulin@innogy.com">raoul.thulin@innogy.com</a>
<b>Details of Representative's Alternate:</b>	
Name:	David Tolley
Organisation:	Innogy plc
Telephone Number:	01793 892650
Email Address:	<a href="mailto:david.tolley@innogy.com">david.tolley@innogy.com</a>

**Attachments (Yes/No):**  
**If Yes, Title and No. of pages of each Attachment:****Notes:**

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 Amendments 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 Panel Secretary will inform the Proposer.

The completed form should be returned to:

Richard Dunn  
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 that is a CUSC Party shall be deemed to have granted this Licence).

Applicable CUSC Objectives\*\* - These are defined within the National Grid Company Transmission Licence under Section C7F, paragraph 15. Reference should be made to this section when considering a proposed amendment.



**Annex 2 – CAP047 Alternate Amendment Proposal (A)**

<b>CUSC Amendment Proposal Form</b>	<b>CAP 047</b>
<b>Title of Amendment Proposal:</b> Introduction of a competitive process for the provision of Mandatory Frequency Response	
<b>Description of the Proposed Amendment</b> This amendment seeks to facilitate competition in the provision of Frequency Response services by increasing transparency and providers' ability to vary prices. It will also facilitate the eventual development of a frequency response market along the lines contemplated by the BSSG.  The proposed amendment has three elements: <ul style="list-style-type: none"> <li>• Revision of the provisions regarding the right to amend payment rates such that the User can submit 'holding' prices to be applied in each calendar month for each mandatory frequency response service (Primary, Secondary and High). Such submissions to be made by the 15<sup>th</sup> business day of the month prior to month in which the prices shall apply.</li> <li>• A requirement for National Grid to publish market data describing prices and volumes of frequency response services procured in previous months and submitted prices for each service by BMU.</li> <li>• Lifting of the cost reflective charging principle as currently applied to the 'holding' payments.</li> </ul> <p>Where a provider chooses not to submit prices for a BMU in any month, the previous month's prices shall apply. In the case that no price has previously been submitted, the prices for each service shall be deemed to be those that applied immediately prior to the implementation of this modification proposal. In the case that there has been no applicable price available for the previous month or prior to the implementation of this modification, for example in the case of a new User, then, if no prices are submitted, the prices shall default to nil.</p>	
<b>Description of Issue or Defect that Proposed Amendment seeks to Address</b> The current arrangements in CUSC for the provision of mandatory Frequency Response services do not enable parties to actively compete in the provision of those services. Furthermore, circumstances can emerge whereby service providers cannot fully recover their costs. Adoption of this amendment will not only provide a framework for competition in the provision of the service, but also give confidence that costs can be fully recovered under changing market conditions thus enhancing the security of the system.	
<b>Impact on the CUSC</b> Likely changes would include: <ul style="list-style-type: none"> <li>Change to 4.1.3.13 to separate the amendment of levels of response from payment rates. This might be achieved by limiting 4.1.3.13 to payment rates and making 4.1.3.14 reciprocal.</li> <li>Drafting of 4.1.3.13 to permit the monthly submission by users of "holding" prices to</li> </ul>	

<p>apply in each calendar month.</p> <p>Changes to 4.4 (Charging Principles)</p> <p>Consequential changes to 4.1.3.15 / 16 / 18 (dispute resolution for changes to payment rates).</p> <p>Consequential changes to 4.1.3.20 / 21 / 22 (Triennial Review of prices).</p> <p>Consequential changes to 4.5 (indexation)</p> <p>Introduction of a requirement on National Grid to publish market data. This may require review of confidentiality clause 6.15.</p>	
<p><b>Impact on Core Industry Documentation</b></p> <p>Changes to MSAs to remove payment rates.</p> <p>Possible changes to Procurement Guidelines in relation to information to be published.</p>	
<p><b>Impact on Computer Systems and Processes used by CUSC Parties</b> National Grid would be required to update 'holding' prices for the purposes of economic despatch monthly rather than annually or when changes are agreed.</p>	
<p><b>Details of any Related Modifications to Other Industry Codes</b> (<i>where known</i>):</p>	
<p><b>Justification for Proposed Amendment with Reference to Applicable CUSC Objectives</b> By introducing market forces into the provision of Frequency Response, the Modification would facilitate effective competition in the generation of electricity.</p>	
<p><b>Details of Proposer:</b> Organisation's Name:</p>	Innogy plc
<p><b>Capacity in which the Amendment is being proposed:</b> (i.e. CUSC Party, BSC Party or "energywatch")</p>	CUSC Party
<p><b>Details of Proposer's Representative:</b> Name: Organisation: Telephone Number: Email Address:</p>	<p>Raoul Thulin Innogy plc 01793 892634 <a href="mailto:raoul.thulin@innogy.com">raoul.thulin@innogy.com</a></p>
<p><b>Details of Representative's Alternate:</b> Name: Organisation: Telephone Number: Email Address:</p>	<p>David Tolley Innogy plc 01793 892650 <a href="mailto:david.tolley@innogy.com">david.tolley@innogy.com</a></p>

**Attachments (Yes/No):**  
**If Yes, Title and No. of pages of each Attachment:**

## **CAP047 Alternative Amendment – Process Strawman**

### Draft Methodology for Frequency Response Price Submissions and Data Publishing - revised following discussion at BSSG 29/05/03

- Because of the link between System Demand and the requirement for Frequency Response, published demand forecasts and the Weekly Operational Policy will provide service providers with market information.
- Providers to submit prices for each BMU giving prices per MW for Primary, Secondary and High Response by 15<sup>th</sup> business day of the month. The submission of prices will be in an agreed format (probably using spreadsheet files). The intention will be to minimise manual intervention - perhaps by highlighting prices that are to be changed.
- Where no price has been submitted, prices will default to the prices in place during the previous month. These may be the pre CAP047 prices where no prices have been submitted under CAP047 provisions. (This is different from the proposal as submitted following discussion at BSSG)
- National Grid publishes submitted prices and volumes available at Optimum Load Point by BMU.
- Following the publication by National Grid of submitted prices, providers shall be entitled to dispute any differences between data submitted and that which has been published. Such dispute must be raised within three working days of the publication of the data by National Grid. Where the parties agree that the published data differs from the data submitted, National Grid shall correct the data and re-publish.
- At start of following month, by 9<sup>th</sup> working day, National Grid publishes holding volumes instructed by BMU for each service.

**Annex 3 – Copies of Representations Received to Consultation**

This Annex includes copies of any representations received following circulation of the Consultation Document (circulated on 4 July 2003, requesting comments by close of business on 20 August 2003).

Representations were received from the following parties:

<b>No.</b>	<b>Company</b>	<b>File Number</b>
1	Gaz de France	CAP047-CR-01
2	British Energy	CAP047-CR-02
3	Enfield Energy Centre Limited	CAP047-CR-03
4	British Gas Trading Ltd	CAP047-CR-04
5	EdF Energy	CAP047-CR-05
6	EdF Energy Trading Ltd	CAP047-CR-06
7	Innogy	CAP047-CR-07
8	PowerGen	CAP047-CR-08
9	Scottish and Southern Energy plc	CAP047-CR-09
10	Edison Mission	CAP047-CR-10
11	National Grid Transco	CAP047-CR-11
12	Conoco Phillips	CAP047-CR-12
13	Derwent Cogeneration Limited	CAP047-CR-13

<b>Reference</b>	CAP047-CR-01
<b>Company</b>	Gaz de France

8<sup>th</sup> July 2003

**Gaz de France Energy Supply Solutions (GdF ESS) – Response to Consultation CAP047.**

Dear John

Thank you for the opportunity to respond to the consultation on CAP047, Proposals for a “Market” for Mandatory Frequency Response. Gaz de France is unable to support CAP047 or its alternatives and as such have a number of points Gaz de France Energy Supply Solutions would like to raise, which I have addressed below in answer to the aspect you are seeking views on.

**“Does CAP047 (or the Alternative Amendment) meet the Applicable CUSC objectives?”**

Mandatory Frequency Response is currently paid for on a “cost reflective” basis, and as such is in line with NGT’s Licence objectives to reflect as far as possible the costs incurred by NGT in Transmission business. The removal of Cost Reflective Charging Principles would breach this Licence objective.

As outlined below, CAP047 also does not meet condition C7C of the Licence and reduces competition in supply impacting on other licence requirements to encourage fairness and competition in the supply and sale of electricity.

**“What do you believe the impact on costs will be as a result of the implementation of CAP047?”**

Of primary interest to Gaz de France ESS is the likely increase in costs to National Grid, (and hence users) from the proposal as it stands. National Grid’s analysis indicates that costs would increase significantly over a two-year period based on certain assumptions. This is countered by some BSSG members who believe the overall cost of Mandatory Frequency Response, (holding and BM payments), would be lower.

Gaz de France Energy Supply Solutions is concerned that no evidence for the reduction in the costs of Mandatory Frequency Response via CAP047 has been presented to counter National Grid’s analysis showing that prices could rise. Given this, it is questionable how such a modification can proceed as no clear benefit has been established. In addition as Mandatory Response is paid for on a “cost reflective” basis at the moment, logic would seem to dictate this would lead to it being close to minimum cost and that any “market” would only increase prices. Also, Gaz de France Energy Supply Solutions does not believe that a “leap of faith” in market principles is justified or acceptable given a change to the market of this magnitude. There is no evidence that any benefit in terms of cost or quality of service provision is provided by CAP047.

A further adverse side effect of any increase in costs brought about by CAP047 would be to increase BSUoS. The effect of this could be balanced, for some users, by increased Frequency Response incomes, however anyone who pays BSUoS but does not generate will be worse off. This means that the 18% of suppliers who are not vertically integrated will pay more BSUoS but have no route to recover any of this. These users have not contributed to the increase in cost, yet would pay more, conflicting with Licence condition C7C, which states NGT shall only make charges between different classes of users which reflect the cost of provision of service to those users. Whilst the basis of charging may be the same for all users, the split of the costs between the 18% of non-vertically integrated suppliers and the rest of the market would not fairly reflect the costs of provision as it effectively moves the revenue recovery.

In addition to this, favouring vertically integrated suppliers harms competition, because all suppliers will make an allowance for BSUoS payments in their supply prices, (as a cost of operation). Vertically integrated players could then use a cross subsidy to reduce the BSUoS element of energy supply prices hence squeezing non-vertical players out of the market. This is categorically against the conditions in NGT's licence, which state that changes should facilitate competition in generation and supply of electricity and competition in sale, distribution and purchase of electricity.

**“What benefits do you believe could be derived from CAP047?”**

One of the benefits of CAP047 is cited as being the introduction of a market into Mandatory Frequency Response. Whilst this is a laudable ideal, the concern arises as to whether a true market can ever exist for this service.

Firstly, NGT have limited scope for the procurement of Frequency Response from other sources should the holding price for Mandatory Response become too high. This could force NGT into the position of a distressed buyer.

Secondly, the CAP047 Working Group report states that analysis of a potential Mandatory Market gave a Hirschmann-Herfindahl Index of 1400. An NGT representative stated at BSSG that an HHI of 1800 would constitute a level whereby the level of market liquidity would be questioned. This being the case, it means at the moment the Response market would be dominated by 7 or 8 players compared to the 5 or 6, (or less), that would cause liquidity concerns. The loss or withdrawal of a single player would potentially destabilise the market, and thus must lead to concerns over the “leap of faith” required.

Finally, whilst National Grid's paper on the “Depth of Mandatory Response Market & Associated cost issues” contends that simply there is enough capacity to meet demand for Response at any time it acknowledges there are other issues. The primary issue is the erosion of Response available for delivery leading to an increase in BM activity to bring plant onto the system. This again could lead to either unfeasibly high holding payments being made or the system having to run without the required level of Response, neither of which are ideal outcomes.

**“Do you agree with the removal of the Cost Reflective Charging Principles?”**

CAP047 was proposed ostensibly to introduce competition and to address the problem of under-recovery of costs by generators for the provision of the Mandatory Service at certain times. In recognition it would seem fair that service providers are able to revise their prices to reflect costs. However the removal of the Cost Reflective Charging Principle is not required to do this.

Would it not be possible to allow service providers to submit prices that have been agreed in advance with NGT as reflective of costs or revise and speed-up the current methodology of changing the cost reflective prices? We believe, (by encouraging cost minimisation in the provision of response), this would allow for a measure of competition whilst retaining the safeguard of cost reflectivity in such a potentially illiquid market. We further believe this to better reflect the objectives of the CUSC than the proposed CAP047.

In summary Gaz de France Energy Supply Solutions do not support in any way the lifting of the Cost Reflective Charging Principle in relation to CAP047.

**“Do you believe the implementation of CAP047 would effect the volume of service offered to the System Operator?”**

No clear evidence of a change in response level has been provided in respect to CAP047. However Gaz de France ESS are of the opinion that under CAP047 there would be two drivers:

1. Players not wishing to provide a Mandatory Service could raise their holding prices significantly to avoid a requirement to provide the services.
2. High prices in the Response market could tempt players to join the market at that high level.

In both cases the amount of response, on paper, does not fall. However the amount of useful response, namely that which is below a “reasonable” price threshold, would fall. Thus to procure the same volume would cost more.

**“Given the issues with Despatch Optimisation, do you believe that this is an issue that requires a solution prior to CAP047 implementation?”**

The BSSG agreed that any benefits from CAP047 would only be realised if the despatch algorithm is able to optimise energy balancing and Frequency Response costs. Further it was stated by NGT that should the balance between BM prices and Response prices shift then a sub-optimal solution may result. Gaz de France ESS are of the opinion that a solution to this issue must be provided prior to any implementation of CAP047 if the wider market is not to be distorted.

**“Do you believe that CAP047 will introduce more competition into Frequency Response, and in particular, will it encourage new players to come forward?”**

We believe that no evidence has been presented that supports the supposition that new providers or increased competition will result from CAP047.



**“Do you believe monitoring and “clawback” to be a pre-requisite to any introduction of market forces into Frequency Response?”**

Gaz de France Energy Supply Solutions are of the opinion that before CAP047 is implemented a robust monitoring and “clawback” regime must be put in place for the Mandatory providers. This would bring them into line with what we believe occurs in the Commercial marketplace. This would also ensure that providers did not receive enhanced payment levels for a service that was not provided.

**“Should safeguards such as price caps also be implemented?”**

Consideration of safeguards is at odds with the “leap of faith” in a market solution required to support CAP047. Gaz de France Energy Supply Solutions believe that users must be protected from an unwarranted increase in Response costs and hence safeguards are appropriate, if only in the short term to prove the market. We would support safeguards such as a price cap or the retention of the Cost Reflective Charging Principles.

**Summary**

In summary Gaz de France Energy Supply Solutions does not believe that the proposed “leap of faith” in market principles is acceptable as there is no evidence that any benefit in terms of cost or quality of service provision is provided by CAP047. As such we are unable to support the proposed changes as they stand.

I hope this covers all the areas upon which you requested views? If you require any further information or clarification on the above, please feel free to contact myself or Russell Reading.

Yours faithfully

Mark Bailey  
Head of Special Markets

CC: Richard Ford - OFGEM

---

<b>Reference</b>	CAP047-CR-02
<b>Company</b>	British Energy

20<sup>th</sup> August 2003

Dear John,

**BRITISH ENERGY RESPONSE TO CUSC AMENDMENT PROPOSAL CAP047  
INTRODUCTION OF A COMPETITIVE PROCESS FOR THE PROVISION OF  
MANDATORY FREQUENCY RESPONSE**

Thank you for the opportunity to comment on the above CUSC amendment.

**Key Points:**

- **While British Energy is supportive of moves to introduce market principles and transparency to the procurement of balancing services we do not believe either the original or alternative amendment proposals will better facilitate CUSC objectives.**
- **The ownership of plant which provides significant amounts of frequency response is concentrated in the hands of too few market participants for there to be sufficient competition and hence for a market mechanism to work. The implementation of CAP047 would therefore represent a significant 'leap of faith' given the lack of competition and absence of any hard evidence that costs would fall.**

**Detailed Comments:**

The ownership of flexible plant is concentrated in the hands of too few market participants for there to be sufficient competition. Analysis undertaken by the CAP047 Working Group supports this view where high Hirschmann-Herfindal indices were calculated which are indicative of limited market liquidity. The exercise of market power in the provision of frequency response services is therefore a significant cause for concern.

National Grid analysis shows that the overall cost of frequency response could increase by £45m over a two-year period as a result of CAP047. This would create a significant increase in BSUoS that would ultimately be paid by customers without seeing any particular improvement in service. Its also hard to see how CAP047 will result in any cost reductions given that the present charges are based on the principle of cost reflectivity.

We also consider that this amendment could have an adverse effect on system operation as providers could commercially try to exclude themselves from providing

the mandatory service by posting extreme holding charges. In circumstances where the SO has a licence obligation to secure the system the prospect for very high frequency response costs in these situations is a very real one.

It has also been identified that any limited benefits from CAP047 would require significant work on the control room despatch algorithm and presumably expenditure by National Grid. The overall cost benefit of CAP047 is therefore highly questionable.

To conclude, CAP047 represents a significant 'leap of faith' in the ability of a market mechanism to work given the lack of competition and lack of hard evidence that costs will fall. The proposal should therefore be rejected.

Yours sincerely



John Capener  
Head of Trading Arrangements & Network Access

<b>Reference</b>	CAP047-CR-03
<b>Company</b>	Enfield Energy Centre Limited

**Enfield Energy Centre Limited Response to CUSC Amendment Proposal  
CAP047 - Introduction of a competitive process for the  
provision of Mandatory Frequency Response**

Thank you for the opportunity to respond to this consultation, we think the introduction of a Frequency Response Market is a big step forward in furthering competition in the generation of electricity. We would like to offer the following response to your questions:

**1) Does CAP047 better meet the Applicable CUSC objectives?**

Yes, CAP047 will facilitate the effective competition in the generation of electricity.

**2) Does Alternative Amendment better meet the Applicable CUSC objectives?**

Yes, EECL feels the additional benefits of the Alternative Amendment (over the Original Amendment) are marginal though positive.

**3) Do you believe that the implementation of CAP047 would affect the volume of service offered to the System Operator?**

CAP047 will ultimately improve the volume of Frequency Response offered by parties. In the short term providers will be paid enough to cover the full cost of providing the service (unlike with the present arrangements) and in the long term providers will be encouraged to invest in the service (both new entrants and current providers). This will ultimately increase the volumes of Frequency Response available and should reduce the overall costs to the system.

**4) What do you believe the impact on costs to be as a result of the implementation of CAP047?**

The costs associated with implementing the modification appear to be small (both for NGC and providers). CAP047 will remove the subsidy that exists between the Balancing Mechanism and Frequency Response arrangements, this will encourage participants to price competitively in both markets and allow the true cost of Frequency Response to be realised.

**5) What benefits do you believe could be derived from CAP047?**

CAP047 will allow providers to fully recover the costs of provision and in return for modest reward they will be encouraged to invest in the service and ultimately

reduce costs. This modification will remove the cross subsidy that exists between the Balancing Mechanism and current Frequency Response arrangements

**6) Do you agree with the removal of the Cost Reflective Charging Principles?**

Yes

The current arrangements force parties to provide this service at a loss and offer no incentive to either improve the service or make it available. NGC currently administers the arrangements such that only direct costs can be included in a parties Frequency Response Holding Payments meaning that indirect costs (such as lost revenue due to increased frequency in maintenance downtime) are excluded and parties either accept an overall loss or require a cross subsidy from the BM.

NGC have further exacerbated this problem by despatching generators for small volumes of frequency response to provide fine frequency control. This has meant that even if a generator has only a small amount of headroom they are asked to continually provide the service without being compensated through Bids and Offers.

Removing the Cost Reflective Charging Principles will not only remove any cross subsidy but also encourage future investment and development in the service.

**7) Given the potential issues with Despatch Optimisation, do you believe this to be an issue that requires a solution prior to the implementation of CAP047?**

We do not believe that there is an issue with Despatch Optimisation. The optimisation problem will not be changed in any material way (simply changing from cost reflective to non cost reflective will not impact the scheduler). Indeed at present (under paragraph 4.1.3.13 of the CUSC) any party may request a change to their payment rates (at 2 month intervals) and yet this does not seem to affect the scheduler.

We can see no reason that suggesting the scheduler is biased to optimise on Bids and Offers should have any impact on this modification. A cynical person may suggest that NGC wish to use this issue to delay implementation.

**8) Do you believe that CAP047 will introduce more competition into Frequency Response, and in particular, do you believe that it will encourage new providers of the service to come forward?**

Yes, in addition existing providers (and new entrants) will be encouraged to invest in providing the service and reducing costs.

**9) Do you believe monitoring and “clawback” to be a pre-requisite to any introduction of market forces into Frequency Response?**

**EECL believes that monitoring of the service is appropriate and that a non delivery mechanism already exists through the Imbalance Settlement rules, given that the service is provided automatically (that is it requires no intervention from an operator) it is difficult to see what non delivery rules (other than as at present) could be appropriate.**

**10) Should safeguards such as price caps also be implemented?**

No EECL feels that this would impinge on the merits of this modification, implementing price caps can only give the message that NGC and Ofgem do not believe markets work.

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<b>Reference</b>	CAP047-CR-04
<b>Company</b>	British Gas Trading Limited

Dear John,

**Re: CAP047 – Introduction of a competitive process for the provision of Mandatory Frequency Response**

Thank you for the opportunity of responding to this consultation document considering CAP047. British Gas Trading (BGT) supports the Alternative Amendment and believes it will better facilitate Applicable CUSC Objective (A). The Alternative Amendment proposes to introduce market forces into the provision of Mandatory Frequency Response, which we believe will encourage competition for this provision.

The move toward a market based structure for Mandatory Frequency Response has the ability to reduce the cost of providing the service. BGT make this assumption on the basis of the increased flexibility offered to parties to submit their own prices but also the greater interaction with the Balancing Mechanism. The enhanced flexibility and increased interaction will allow the service providers to submit prices at appropriate levels to reflect the value of the service rather than the cost of the service. Furthermore because of the cost recovery methodology which is funded by BSUoS, parties providing the service will be incentivised to manage the costs appropriately.

BGT note with concern the suggestion to implement price caps to provide safeguards against spiralling costs. BGT do not believe the introduction of such caps is necessary in view of the funding methodology as no perverse incentives exist. Also BGT believe that market fundamentals should be left to work without enforcing pre-agreed ceilings.

BGT concur with the view of the BSSG that the volume of frequency response available would not be affected in an adverse manner. However, BGT are unsure if the proposed change in the methodology will encourage new providers of the service to come forward. However in view of the analysis provided by NGC during the process of analysing the proposal it suggests that there is already sufficient contracted capability available.

Yours sincerely,

Mark Manley  
Account Manager

<b>Reference</b>	CAP047-CR-05
<b>Company</b>	EdF Energy

Dear John,

**CAP47: Introduction of a Frequency Response Market**

EDF Energy are pleased to provide the attached comments on in response to the CAP47 consultation.

If you have any queries regarding this response please do not hesitate to contact me.

Yours sincerely

Rupert Judson  
Transmission Infrastructure  
& Development Manager

**1. Does CAP047 better meet the Applicable CUSC objectives?**

EDF Energy consider that CAP047 does better meet the applicable CUSC objectives by facilitating competition for the provision of mandatory frequency response services and thereby promoting the efficient operation of the transmission system.

**2. Does Alternative Amendment better meet the Applicable CUSC objectives?**

EDF Energy consider that the refinements to the proposed amendment put forward as an Alternative Amendment Proposal would better meet the Applicable CUSC objectives than the original amendment proposal.

**3. Do you believe that the implementation of CAP047 would affect the volume of service offered to the System Operator?**

A competitive market would provide appropriate price signals to existing and potential frequency response providers of the need for additional response capability. EDF Energy believe that this would encourage market participants to make more frequency response available at times of system stress.

**4. What do you believe the impact on costs to be as a result of the implementation of CAP047?**

EDF Energy believe that the costs of mandatory frequency response holding payments will be driven by competition. The analysis provided by National Grid



shows that the current market share of frequency response services has a Hirschmann-Herfindahl index well within levels that are generally accepted as indicative of a reasonably competitive market. Furthermore, the analysis showed that a number of separate companies provided frequency response services in 2002-03 and EDF Energy believe that the number of participants will provide more than enough competition to maintain prices at reasonable levels under normal circumstances.

National Grid have put forward a scenario of significant increase in the costs of mandatory frequency response based on an assumption that prices for mandatory frequency response will be increased by 50–100%. However, no supporting information is provided to back up this assumption and we therefore find it difficult to accept this as a likely scenario.

**5. What benefits do you believe could be derived from CAP047?**

EDF Energy believe that the introduction of competition to the provision of Mandatory Frequency Response Services will allow participants to better reflect the costs and value of providing frequency response capability in their holding prices which will in turn lead to a competitive and more economically efficient market for these services.

The ability of prices to reflect the value of frequency response services will encourage participants to make additional frequency response capability available at times of system stress. Such price signals may also encourage the demand side to consider the participating in the market for frequency response services.

**6. Do you agree with the removal of the Cost Reflective Charging Principles?**

Yes. The proposed competitive market for frequency response services will only deliver the benefits described above if prices are allowed to reflect the value of the service. This may not always be related to the direct costs of providing this service.

**7. Given the potential issues with Despatch Optimisation, do you believe this to be an issue that requires a solution prior to the implementation of CAP047?**

No. On the basis of the information provided by National Grid, we believe that the proposed amendment, or alternative amendment could be implemented without prior changes to the despatch optimisation algorithms used by the National Grid control room. Furthermore, it is our view that the methods employed by the National Grid control room in operating the transmission system are outside the scope of the CUSC and the System Operator incentive scheme should ensure that National Grid are properly incentivised to find optimal solutions to operating the system.

**8. Do you believe that CAP047 will introduce more competition into Frequency Response, and in particular, do you believe that it will encourage new providers of the service to come forward?**

EDF Energy believe that a competitive market would provide clear signals as to the value of frequency response services and would therefore encourage new providers and existing providers to make additional response available.

**9. Do you believe monitoring and “clawback” to be a pre-requisite to any introduction of market forces into Frequency Response?**

The introduction of a competitive market for frequency response should also promote the provision of good quality frequency response. Participants who consistently underperform will be less likely to achieve good prices for their services and will also be exposed to imbalance prices due to the changes implemented in the BSC by modification P71. We therefore do not believe that there is a need for any additional monitoring or incentivisation arrangements to be put in place.

**10. Should safeguards such as price caps also be implemented?**

EDF Energy do not believe that a price cap would be compatible with the introduction of competitive market arrangements for frequency response. Not only would such a price cap be arbitrary but it would also reduce the benefits of introducing a competitive frequency response market. In order for the market to provide the necessary signals to encourage additional capacity to be made available, prices need to be allowed to fluctuate according to the level of supply and demand. We would only be prepared to accept a price cap as a short term transitional measure for the implementation of a fully competitive market for frequency response holding prices.

<b>Reference</b>	CAP047-CR-06
<b>Company</b>	EdF Energy Ltd and EDF (Generation).

Dear John,

### **CAP047 Consultation Response**

Please find herewith the comments/answers made on behalf of EdF Trading Ltd and EdF (Generation) to the questions given in the CAP047 Consultation document 'Introduction of a competitive process for the provision of Mandatory Frequency Response'.

1. Does CAP047 better meet the Applicable CUSC objectives?

Yes. In our view CAP047 does better meet the CUSC Objectives by permitting a frequency response market to exist, that is transparent, competitive and open to all parties.

2. Does Alternative Amendment better meet the Applicable CUSC objectives?

Yes and more so than the main proposal, because of the more sensible approach with regards to the default price if a price has not been offered in a given month.

3. Do you believe that the implementation of CAP047 would affect the volume of service offered to the System Operator?

Possibly. It should not adversely affect the volume of service, but an efficient market for the service should lead to other parties offering the provision of more response.

4. What do you believe the impact on costs to be as a result of the implementation of CAP047?

The costs for securing the service may well rise. Although competitive pressures may keep prices down, current prices are arguably not cost reflective at present and some providers are understood to be already making a loss. Therefore, we would not be surprised if the total cost did increase marginally, even with opportunities to optimize between the frequency response and the energy markets. We would be very concerned though if the total costs did rise by £45m as suggested by NGT, especially as these costs would flow through to BSUoS and as an Interconnector User on the IFA we have no ability to offset these costs against revenues from a frequency response market. The size of any cost increase would therefore need monitoring.

5. What benefits do you believe could be derived from CAP047?

CAP047 will lead to the creation of a transparent competitive market in frequency response provision. It is likely that it will also promote efficiency, both from being market based as well as allowing more frequent price changes.

6. Do you agree with the removal of the Cost Reflective Charging Principles?

Yes. We have an energy market and it is only logical that there is a frequency response market that exists alongside that. The only other logical alternative is to return to a more central plannist regime overall.

7. Given the potential issues with Despatch Optimisation, do you believe this to be an issue that requires a solution prior to the implementation of CAP047?

No. If there are issues then they exist whether CAP047 is implemented or not.

8. Do you believe that CAP047 will introduce more competition into Frequency Response, and in particular, do you believe that it will encourage new providers of the service to come forward?

Yes, on both counts. At worst we believe it would stay the same, but where prices do make it worthwhile to provide then service providers will indeed come forward.

9. Do you believe monitoring and “clawback” to be a pre-requisite to any introduction of market forces into Frequency Response?

We had understood that the current provisions in this area were already adequate and working well and, as such, fail to see why anything further is required.

9. Should safeguards such as price caps also be implemented?

The concept of price caps do not sit well within a market structure and, as such, they should not be introduced into the CAP047 proposal as an Alternative. If it is seen that the frequency response market has not worked, or that monopolistic anti-competitive behaviour is evidenced, then another CUSC amendment can always be made to reverse the situation.

Should you wish to discuss any of these points further with me, then please don't hesitate to contact me.

Yours sincerely

Steve Drummond  
UK Market Adviser to EDFT

<b>Reference</b>	CAP047-CR-07
<b>Company</b>	Innogy

### ***CUSC Amendment Proposal CAP047***

#### ***Introduction of a competitive process for the Provision of Mandatory Frequency Response***

The following comments are made on behalf of Innogy, Innogy Cogen Trading Ltd., npower Ltd., npower Northern Supply Ltd., npower Yorkshire Supply Ltd, npower Northern Ltd, npower Yorkshire Ltd.

1. As the originator of CAP047, Innogy supports the changes set out in the proposal. However, following the debate that has taken place in the BSSG, we are also of the view that the alternative developed by the BSSG is a more practical modification. We would therefore support the alternative in preference to the original.
2. We have a general concern that by focussing on the detailed issues raised in the BSSG the consultation paper masks the wider discussion that took place concerning the underlying purpose of the proposed amendment. CAP047 is intended to liberalise the provision of frequency response by introducing competitive processes that are similar to those for other Balancing Services and the Balancing Mechanism. Our view is that if this is not done then the provision of energy by way of frequency response will become increasingly inefficient, and at certain times there will be a growing risk of market failure.
3. The efficient provision of frequency response cannot be measured solely in terms of the cost of the service as defined by the existing charging principles. At present potential providers will also need to take account of other costs. These will include BM actions that are no longer available to the service provider, the costs that exist in associated arrangements such as fuel contracts, risks inherent in the service for some technologies, and the capital costs of providing the capability. A consideration of these costs may well persuade a potential provider to seek to operate in an unlicensed capacity or alternatively to seek derogation from certain requirements of the Grid Code.
4. Generally the System Operator will not have visibility of these costs so cannot expect to optimise their interaction. Unless a market process is adopted the economically efficient outcome will not emerge and the cost of electricity production will be higher than necessary. Furthermore in the case of the demand side where the cost of providing the service will depend upon the foregone output of a manufactured product, the times at which it is worth providing the service will not be apparent unless a market price is visible.
5. The principal argument for introducing more freedom in the prices offered for the provision of frequency response is that it will allow prospective service providers

to assess the relative worth of the service and thus invest as they see fit to meet future demand. In the short term it will also enable marginal providers of the service to enter the market when there is the prospect of limited supply and thus higher prices. NGC's own analysis demonstrates that for much of the year there will be more than a sufficiency of providers to ensure healthy competition in the provision of frequency response. Only at periods of exceptionally low demand (summer nights) or high system demand (winter peaks) is there likely to be any prospect of shortage.

6. If prices can be varied to reflect marginal costs then prospective providers such as out of merit fossil plant, CCGTs that operate with limited ranges, or demand side providers including embedded generation can be attracted when appropriate to ensure provision of the service. In this context the ability of parties to vary prices must be relatively short term so that they can respond to changing market conditions.
7. The consultation paper generally obfuscates these wider market considerations. Their significance should not be lost at a time when government policy is likely to lead to a substantial growth in wind generation where the provision of frequency response would generally be wasteful of resources, and at times when capacity margins are narrowing.
8. The consultation document issued by National Grid raises a number of specific questions in relation to the proposal. These are answered below.

### Consultation questions

- Does CAP047 better meet the Applicable CUSC objectives?**  
*We believe that CAP047 does better meet the Applicable CUSC objectives. By allowing more regular and transparent changes to 'holding' prices for Frequency Response, the proposal would better meet objective (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.*
- Does the Alternative Amendment better meet the Applicable CUSC objectives?**  
*The alternative amendment also better meets the Applicable CUSC objectives for the same reasons.*
- Do you believe that the implementation of CAP047 would affect the volume of service offered to the System Operator?**  
*We believe that CAP047 will increase the volume of the service available to the SO. By enabling providers to vary prices more frequently and with greater ease, there will be far less incentive on prospective providers not to provide the service. Currently, although Frequency Response is a mandatory service, providers who are reluctant to provide the service may limit the chances of being instructed by the use of Bid/Offer prices or by changing parameters such as MEL and SEL. With the implementation of CAP047, providers would*

have no reason to try to limit their provision of Frequency Response. Therefore, the volume of service available should increase.

□ **What do you believe the impact on costs to be as a result of the implementation of CAP047?**

*The direct impact of the proposal on holding payments cannot be readily assessed. However, analysis of the availability of response suggests that there is a sufficient depth to ensure effective competition and thus a downward pressure on costs at all times. We do not believe that National Grid's analysis of the HHI is sufficiently complete to support the conclusion that has been drawn in paragraph 5.5. It would be useful to know how the calculated Index varies throughout the year since we imagine that for much of the year a significantly lower figure would be obtained. At times of relative shortage the analysis fails to take into account prospective non-mandatory providers such as the demand side. Also, the adoption of CAP047 would obviate the need to reflect unrecoverable costs from the provision of the service in the Bid/Offer prices submitted, and thus produce a downward pressure on the cost of Bid/Offer acceptances. This effect would tend to reduce the overall cost seen by the System Operator.*

□ **What benefits do you believe could be derived from CAP047?**

*Increased competition should lead to more efficient provision of the service overall. At times of shortage, the resultant price signal will encourage providers to ensure that the service is fully available and thus help to ensure the continued security of the system. This should produce a lower overall cost to the operation of the system, and enhance the security of supply.*

□ **Do you agree with the removal of the Cost Reflective Charging Principles?**

*Yes. For effective competition to develop, the correct price signals need to emerge from the market. It is therefore necessary to lift the Cost Reflective Charging Principles as applied to holding payments.*

□ **Given the potential issues with Despatch Optimisation, do you believe this to be an issue that requires a solution prior to the implementation of CAP047?**

*No. We do not believe that the improvement of the despatch optimisation is a pre-requisite to the adoption of CAP047. If the present optimisations are retained we do not believe the economics of the system will be any the worse. NGC has not yet made clear to what extent potential difficulties might result in non-efficient despatch of Frequency Response. We would suggest that the despatch algorithm could be reviewed in light of operational experience in the event that CAP047 is approved.*

□ **Do you believe that CAP047 will introduce more competition into Frequency Response, and in particular, do you believe that it will encourage new providers of the service to come forward?**

*Yes on both counts. We are of the firm view that CAP047 will both permit more competition in the provision of the service and encourage new providers. By allowing prices to be varied more frequently and transparently, relevant price signals are likely to emerge at certain times of year. Such signals will encourage providers to maintain full capability. There may also be*

opportunities for enhanced services to be offered where possible, thus increasing the availability of the service and promoting competition at times of greatest need. These will include new providers from the demand-side who do not currently see sufficient value in average prices but may make demand reduction services available at times of peak requirement and peak prices.

□ **Do you believe monitoring and “clawback” to be a pre-requisite to any introduction of market forces into Frequency Response?**

No. National Grid is currently able to impose sanctions on persistently poor providers by not instructing them to provide response and thus deprive them of income. Under the provisions proposed by CAP047 the same powers will ensure that providers maintained their capability at all times and in particular at times of greatest system need. More generally Innogy supports the introduction of a practical monitoring system based on the contract requirements provided that this is cost effective. It is not a pre-requisite for the introduction of market forces into Frequency Response. Sufficient monitoring is already available to National Grid to ensure that persistently poor providers could not benefit from the provision of CAP047.

□ **Should safeguards such as price caps also be implemented?**

No. Price caps are not consistent with a market mechanism intended to encourage competition and to allow appropriate price signals to emerge that will match supply and demand. The introduction of price caps would simply reintroduce the possibility of market failure. For practical reasons it may be necessary to limit the number of digits in a price submission so as to avoid costly system changes. However, if such limits are introduced or imposed by system capabilities, then they should be reviewed regularly to ensure that they do not interfere with the proper development of a market for frequency response.

□ **Do you believe that CAP047 will introduce more competition into Frequency Response, and in particular, do you believe that it will encourage new providers of the service to come forward**

Yes, for the same reasons given in response to the third



<b>Reference</b>	CAP047-CR-08
<b>Company</b>	PowerGen

30<sup>th</sup> July 2003

Reference :CAP047 Introduction of a competitive process for the provision of Mandatory Frequency Response.

Dear John

**Reference:**

Powergen support the CAP047 **alternative amendment** proposal. We also welcome the opportunity to share our thoughts on the questions raised within the consultation document. We consider the alternative amendment to better facilitate the relevant CUSC objectives. We whole heartedly agree with the BSSG on the issue of historic BMU price submission, in that the utilisation of figure from a User's MSA is preferable to a default position of zero.

**Does CAP047 better meet the Applicable CUSC objectives?**

See Below

**Does Alternative Amendment better meet the Applicable CUSC objectives?**

Yes. *This proposal will facilitate effective competition for the provision of Mandatory Frequency Response.*

**Do you believe that the implementation of CAP047 would affect the volume of service offered to the System Operator?**

*It is reasonable to assume that the implementation of CAP047 will increase the volume of service offered to the SO. Primarily, this is because the resultant market transparency would increase confidence and encourage other players to join.*

**What do you believe the impact of costs to be as a result of the implementation of CAP047?**

*Initially, the move from cost reflective to value reflective pricing may lead to a slight price rise. However, we are confident that the effect of competition will be to bring prices back to today's levels.*

**What benefits do you believe could be derived from CAP047?**

*We believe that there are many benefits from utilising the CAP047 model of Mandatory Frequency Response. The creation of a transparent market will encourage competition and promote efficiency. It would also facilitate the ability to price on a monthly basis rather than just annually. Furthermore, it would enable value to be ascribed to frequency response within year.*

**Do you agree with the removal of the Cost Reflective Charging Principles?**

Yes

**Given the potential issues with Despatch Optimisation, do you believe this to be an issue that requires a solution prior to the implementation of CAP047?**

No. *It could reasonably be suggested that it has always been an issue that the NGC has not optimised fully against costs of generation and costs of frequency response. The changes which are required would be neither hindered nor changed by CAP047.*

**Do you believe that CAP047 will introduce more competition in to Frequency Response, and in particular, do you believe that it will encourage new providers of the service to come forward?**

Yes. *As mentioned previously, the transparency of the competitive market would give new providers confidence to participate.*

**Do you believe monitoring and 'claw back' to be a pre-requisite to any introduction of market forces into Frequency Response?**

*Powergen is of the view that suitable monitoring already exists. Any market requires a level of quality assurance, along with redress, if what is supplied does not match that which was promised.*

**Should safeguards such as price caps also be implemented?**

No. *These safeguards are not required elsewhere and so it is not clear why they would be required in this instance.*

We believe that the changes proposed under amendment CAP047 will better meet the CUSC objectives, and provide a stimulus for both efficiency and effective competition. As such, Powergen support the alternative amendment for CAP047 and look forward to its implementation in the near future.

Yours Sincerely

Neil Smith  
Regulatory Analyst



<b>Reference</b>	CAP047-CR-09
<b>Company</b>	Scottish and Southern Energy plc

Dear Sirs,

This response is sent on behalf of Scottish and Southern Energy, Southern Electric, Keadby Generation Ltd. and SSE Energy Supply Ltd.

In relation to the questions listed in the Consultation Document, "CUSC Amendment Proposal CAP047 Introduction of a competitive process for the provision of Mandatory Frequency Response" dated 4<sup>th</sup> July 2003, we have the following comments to make:-

**Does CAP047 better meet the Applicable CUSC objectives?**

Yes. It better facilitates competition in the provision of Frequency Response services by increasing a provider's ability to vary prices along with associated improvements in transparency. We agree with the BSSG that the evolution of the current arrangements (along the lines of CAP047) would better facilitate meeting the Applicable CUSC objectives. Furthermore we believe CAP047 will encourage the development of a market for Frequency Response services.

**Does Alternative Amendment better meet the Applicable CUSC objectives?**

Yes. On balance the appropriate information and submission process required to support CAP047, as outlined in section 7.1, better meets the Applicable CUSC objectives.

**Do you believe that the implementation of CAP047 would affect the volume of service offered to the System Operator?**

No. We agree with the BSSG, that the volume of frequency response should not be affected as CAP047 impacts on the price associated with the volume.

**What do you believe the impact on costs to be as a result of the implementation of CAP047?**

We agree with the BSSG, that the overall costs of the provision of frequency response should decline with CAP047. Furthermore, we doubt that the £45M figure put forward by National Grid has merit.

**What benefits do you believe could be derived from CAP047?**

The creation of an open and transparent market for the provision of Frequency Response services in a timely and appropriate fashion.

**Do you agree with the removal of the Cost Reflective Charging Principles?**

Yes. Moving to an open and transparent market for the provision of Frequency Response services is appropriate.

**Given the potential issues with Dispatch Optimisation do you believe this to be an issue that requires a solution prior to the implementation of CAP047?**

No.

**Do you believe that CAP047 will introduce more competition into Frequency Response, and in particular, do you believe that it will encourage new providers of the service to come forward?**

Yes. As noted above moving to an open and transparent market for the provision of Frequency Response services is appropriate. It permits new and existing Parties to participate with confidence.

**Do you believe monitoring and 'clawback' to be a pre-requisite to any introduction of market forces into Frequency Response?**

Yes. We agree with the BSSG, that the concept of monitoring should be considered, although we do not believe it is a pre-requisite for CAP047.

**Should safeguards such as price caps be implemented?**

No. As these 'safeguards' are not applicable in other circumstances we are not persuaded that they are needed in this case.

**Do you believe that CAP047 will introduce more competition into Frequency Response, and in particular, do you believe that it will encourage new providers of the service to come forward?**

Yes. In conclusion CAP047 (i.e. the Alternative) ensures that the Applicable CUSC objectives are better met. We support its approval.

Regards  
Garth Graham  
Scottish and Southern Energy plc

<b>Reference</b>	CAP047-CR-10
<b>Company</b>	Edison Mission

Dear John,

**CUSC Amendment Proposal CAP047**  
**Introduction of a Competitive Process for the Provision of Mandatory Frequency Response**

Thank you for the opportunity to comment on the proposed CUSC amendment CAP047. In general, we are supportive of this proposal as we believe that a market – based solution will deliver both the correct pricing signals and fair rewards for the provision of mandatory frequency response.

In response to your specific questions with regards to the proposal:

*Does CAP047 better meet the applicable CUSC objectives?*

The applicable CUSC objectives are a) the efficient discharge of the System Operator's licence obligations; and b) the facilitation of effective competition. We believe that whilst the current system for mandatory frequency response meets objective a), it has no element of competition and so cannot meet objective b). CAP047 will provide a mechanism for meeting objective b) without affecting objective a) and hence, is an improvement on the current system.

*Does the Alternative Amendment better meet the applicable CUSC objectives?*

The Alternative Amendment shares much of the same attributes as the Original Amendment and only really varies in some of the operational details. As such, we believe that the comments in regard of the CUSC objectives for the Original Amendment above are equally applicable to the Alternative Amendment.

*Do you believe that the implementation of CAP047 would affect the volume of service offered to the System Operator?*

We believe that a market-based system would evolve such that those players who were able to offer more volume cost-effectively would do so. NGC have argued that the lack of cost reflectivity will be a barrier to entry for new players as they cannot be guaranteed their costs. However, that could only happen if players consciously submitted offers that were below their costs and hence the revenue effects of providing frequency response is completely in the hands of the providers themselves. On the contrary, we believe CAP047 would encourage new players to enter this market (e.g. the demand side) as opportunities to make a return on the service provision would be present and hence the overall volume of frequency response may actually increase.

*What do you believe the impact on costs to be as a result of the implementation of CAP047?*

We do not agree with NGC's assertion that the removal of cost-reflective charging can only increase costs (a statement which is at odds with their later assertion that new players will be at a cost disadvantage – see above). As noted before, we believe that a 'merit order' of frequency response will emerge as a result of the move to a market-based system. The ability to charge on a commercial basis will encourage participants to compete to provide this service. Lower cost providers will be encouraged to offer additional response creating the opportunity that overall costs to the System Operator will reduce.

*What benefits do you believe could be derived from CAP047?*

The principal benefit will be to allow the value of mandatory frequency response to be derived by market forces rather than the cost-based system currently in force. This will encourage more efficiency in the provision of this service to the overall benefit of the system and its users as a whole.

*Given the potential issues with Despatch Optimisation, do you believe this to be an issue that requires a solution prior to the implementation of CAP047?*

The despatch of frequency response should be considered in the light of both holding payments and the costs to position BMUs such that they are able to deliver the service. NGC have stated that their current systems are capable of dealing with CAP047 but that in some circumstances the results may not be optimal. Hence, although in the long term this is an issue which should be addressed if the full benefits of CAP047 are to be realised, we do not believe that its implementation should be delayed if the systems, albeit not perfect, are available now.

*Do you believe that CAP047 will introduce more competition into Frequency Response and, in particular, do you believe that it will encourage new providers of the service to come forward?*

As we have mentioned above, we believe that the introduction of competition will encourage new providers as the incentive to make a return will drive those who are able to provide additional volume and encourage new participants where before, when there was merely the opportunity to recover costs, there would have been little interest.

*Do you believe monitoring and 'clawback' to be a pre-requisite to any introduction of market forces into Frequency Response?*

An integral part of any market is the delivery of that which is contracted for. Hence, if it is to be effective, we believe that CAP047 should be accompanied by a robust monitoring regime to ensure the compliance of accepted frequency response offers. That said, the long history of successful provision of mandatory frequency response by current participants means that, whilst a monitoring regime should be an ultimate goal, it should not be viewed as a prerequisite or a reason for delaying the introduction of CAP047.

*Should safeguards such as price caps also be implemented?*

Free, fair and open markets should not have price caps as they can distort the price signals that drive the introduction of new services and participants. If, during periods of system stress, price caps prevent the recovery of costs for more expensive providers of frequency response then there will be no incentive for the investment in such response provision which could eventually have severe consequences for the overall security of the system.

In summary, we believe that the introduction of CAP047 will be to the overall benefit of all participants in the wholesale market by encouraging efficiency and the possible introduction of new participants to the fast reserve market. We note the concerns that have been expressed by some parties, but believe them to be groundless and what is required is the discussed 'leap of faith' that the market will provide the best and most efficient solution.

We hope that our comments have been helpful and look forward to seeing the final results of the consultation exercise.

Yours sincerely,

Simon Lord  
Ancillary Services Manager



<b>Reference</b>	CAP047-CR-11
<b>Company</b>	National Grid Transco

National Grid Transco remains supportive of moves to introduce market principles into areas such as Balancing Services. However, we do not believe that CAP47 will introduce a competitive process for the provision of mandatory frequency response services and therefore does not better meet the applicable CUSC objectives.

#### CAP047 Amendment Proposal

It is our belief that CAP047 will result in increasing costs with respect to frequency response services, without the appearance of any associated benefits to either the System Operator or customers as a whole. We find it difficult to see how the removal of the cost reflective charging principles associated with mandatory frequency response could result in anything other than a significant cost rise. While the proposer asserts that the Amendment Proposal does not seek to alter the mandatory nature of this service, it is our belief that providers will be able to commercially exclude their service under this proposal through the submission of high prices.

Similarly, it is arguable as to whether a market for frequency response could exhibit proper market forces as unlike other markets, the provision of frequency response is very much “demand inelastic” at this time. Irrespective of price, the System Operator cannot chose to forgo the procurement of that last MW of response on the basis that its provision is too costly. Indeed in the shorter term, the System Operator could be deemed to be a distressed buyer and therefore open to possible price manipulation. Ultimately, customers will end up paying for a more expensive service with no perceivable increase in benefits. These views have been expressed further as part of “National Grid’s initial view” within the July consultation document.

As a result of the above, National Grid Transco is therefore of the view that both the original CAP047 Amendment Proposal, and the focused alternative subsequently developed by the BSSG, should be rejected.

#### Way forward

As stated above, we continue to support the evolution of markets to provide balancing services. To this end, we believe that further discussion should be undertaken with the industry with a balanced spectrum of industry participants, in particular including supplier interests as discussions to date have appeared more focused between the generating community and the System Operator. The introduction of markets must be shown to deliver benefits to the energy industry as a whole and all of the necessary modifications should be worked up in parallel and discussed at the BSSG. This would ensure that all aspects of a desired market and the associated timetable are agreed in full prior to any modifications being submitted.

#### Alternative proposal

Whilst the approach outlined above is National Grid Transco's preference, should it be deemed appropriate to introduce market based arrangements for frequency response procurement on an incremental basis, we would like to propose an alternative amendment that builds on the Amendment Proposal submitted by Innogy.

This proposal is as follows:

- The cost reflective charging principles for frequency response remain as currently drafted within the CUSC. However, the ability to alter holding prices per BMU on a monthly basis will be introduced. This revision will be subject to a cap of 1.25 times the existing Mandatory Service Agreement (MSA) cost reflective price in year 1 and 1.5 times the existing MSA cost reflective price in year 2. This arrangement will be subject to review at the end of the two-year period.
- Monitoring and clawback arrangements will be included to encourage accurate service delivery. In the interim, measures will be introduced which result in holding prices defaulting to the MSA price should participants under deliver against contracted levels more than a pre-defined number of times. More enduring arrangements will be established over the initial two-year period and will be implemented subject to the outcome of the two-year review.

The proposed implementation date for this alternative amendment proposal is the 1<sup>st</sup> October 2004. This will allow sufficient time for alterations to the MSA's and the development of systems to enable the receipt and the subsequent communication of holding prices. Indeed, it is our view that none of the Amendment Proposals currently under consideration as part of this consultation process could be implemented prior to October 2004.

#### Justification for alternative proposal

National Grid Transco believes that this better facilitates the move towards the smooth introduction of frequency response markets under the applicable CUSC objectives. Adoption of this alternative would allow some price based competition to develop whilst ensuring that prices are not manipulated in order to sterilise capacity or hold the System Operator to ransom. The retention of the link to the cost reflectivity principles within the Charging Principles will allow the market to establish itself and determine whether true competition exists before complete pricing freedom occurs. If more than half of the response providers have raised their prices to the cap, then it is arguable that a competitive market for frequency response has not materialised. If, however costs do not materially change from those levels currently experienced whilst exhibiting some dynamism, then it is arguable that the market is relatively competitive.

National Grid Transco  
14 August 2003.

<b>Reference</b>	CAP047-CR-12
<b>Company</b>	Conoco Phillips (received after submission deadline)

20<sup>th</sup> August 2003

Dear Richard,

**CAP047, 'Introduction of a competitive process for the provision of Mandatory Frequency Response'.**

Below are Immingham CHP's views on the questions contained within the CAP047 consultation document:

- **Does Alternative Amendment better meet the Applicable CUSC objectives?**

The Alternative Amendment better facilitates the achievement of Applicable CUSC Objective b, facilitating effective competition in the generation of electricity through introducing a market mechanism within the procurement of frequency response by National Grid.

- **Do you believe that the implementation of CAP047 would affect the volume of service offered to the System Operator?**

Through the development of a mandatory frequency response market, created by CAP047, we would not expect the volume of frequency response to be affected. The development of a competitive frequency response market would merely impact the price associated with this volume.

- **What do you believe the impact on costs to be as a result of the implementation of CAP047?**

CAP047 would result in a decrease in the overall costs associated with the procurement of frequency response as a consequence of competition arising in the provision of the service. We would also expect competitive pricing arising within the Balancing Mechanism (BM) as a result of market participants no-longer having to submit high pricing within the BM to avoid being called for a non-cost reflective payment for frequency response.

- **What benefits do you believe could be derived from CAP047?**

The following benefits are derived from operating within a CAP047 world:

- Increasing transparency through publishing prices and volume of mandatory frequency response procured in the previous months and submitted prices for each BM Unit;

- Ability to vary prices via the 'holding' prices to be applied in each calendar month shall enhance competition;
- Facilitating competition by attracting new entrants within the provision of frequency response services;
- Increasing the likelihood of more useful response being made available through introducing a competitive market;
- The interaction of the BM market and frequency response provisions leading to greater efficiency as providers would seek to maximise BM activity by maintaining competitive prices for response.

Overall an increase in competition, degree of freedom in pricing for the service and the interaction with the BM would ensure an efficient outcome in a CAP047 world.

- **Do you agree with the removal of the Cost Reflective Charging Principles?**

The implementation of CAP47, introduction of a competitive process for the provision of mandatory frequency response, shall result in the retirement of the 'cost reflective charging principles' contained within the MSA. It is appropriate to remove the principles as a result of competitive prices developing for the procurement of mandatory frequency response.

- **Given the potential issues with Despatch Optimisation, do you believe this to be an issue that requires a solution prior to the implementation of CAP047?**

Should the Authority approve CAP047, it is proposed it should come into effect from 1 April 2004. National Grid has sufficient time to undertake the required work, to develop the current algorithm to ensure that it fully optimises costs in a CAP047 environment. However, this particular work could also be completed after the implementation of CAP047 therefore a solution is not required prior to the 1 April 2004.

- **Do you believe that CAP047 will introduce more competition into Frequency Response, and in particular, do you believe that it will encourage new providers of the service to come forward?**

As a result of CAP047 allowing participants to vary prices associated with the provision of mandatory frequency response, competition shall develop and new entrants will arise. The new entrants shall be those providers of frequency response that are now capable of fully recovering their costs, through submitting a cost-reflective holding price, thus creating a mechanism for satisfactory remuneration. We would expect an increase in the number of participants based on 2002/03 where payments for mandatory frequency response were confined to 4 market players receiving nearly 70% of the total contracted income.

- **Do you believe monitoring and "clawback" to be a pre-requisite to any introduction of market forces into Frequency Response?**

It is necessary to consider how the monitoring and incentivisation arrangements could be implemented, however it is not a pre-requisite for CAP047.

- **Should safeguards such as price caps also be implemented?**

The introduction of a price cap within a CAP047 environment, defeats the objective of establishing competition in the provision of mandatory frequency response.

Please do not hesitate to contact me on 020 7408 6233 if you have any question or queries regarding the issues discussed within this submission.

Yours sincerely,



Rekha Patel  
Power Regulatory Analyst

<b>Reference</b>	CAP047-CR-13
<b>Company</b>	Derwent Cogeneration Limited

Our Ref: DCL/PJP/EJ17.756

15<sup>th</sup> August 2003

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Mr John Greasley  
National Grid Company plc  
National Grid Transco House  
Warwick Technology Park  
Gallows Hill  
Warwick  
CV34 6DA

Dear Mr Greasley

**CUSC Amendment Proposal CAP047: Introduction of a Competitive Process for the Provision of Mandatory Frequency Response**

Derwent Cogeneration Limited welcomes the opportunity to comment on the above CUSC Amendment proposal. DCL owns a 214MW CHP CCGT embedded in the East Midlands Electricity 132kV system, which also supplies high pressure steam to the adjacent Acordis chemical plant in Derby.

In general, we are supportive of this proposal as we believe that a market-based solution will deliver both the correct pricing signals and fair rewards for the provision of mandatory frequency response.

We believe that a market-based system would evolve such that those players who were able to offer more volume cost-effectively would do so. NGC have argued that the lack of cost reflectivity will be a barrier to entry for new players as they cannot be guaranteed their costs. However, that could only happen if players consciously submitted offers that were below their costs and hence the revenue effects of providing frequency response is completely in the hands of the providers themselves. On the contrary, as a relatively new entrant to the market, we believe CAP047 would encourage new players as opportunities to make profits would be present and hence the overall volume of frequency response may actually increase.

The principal benefit will be to allow the value of mandatory frequency response to be derived by market forces rather than the cost-based system currently in force. This will encourage more efficiency in the provision of this service to the overall benefit of the system and its users as a whole.

/continued

Derwent Power Station PO Box 489 Spondon Derby DE21 7ZS Tel No: 01332 666300 Fax No: 01332 669829

Registered Office: Lansdowne House Berkeley Square London WU 6ER  
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As we have mentioned above, we believe that the introduction of competition will encourage new providers as the incentive to make additional profit will drive those who are able to provide additional volume and encourage new participants where before, when there was merely the opportunity to recover costs, there would have been little interest.

In summary, we believe that the introduction of CAP047 will be to the overall benefit of all participants in the wholesale market by encouraging efficiency and the possible introduction of new participants.

We hope that our comments have been helpful and look forward to seeing the final results of the consultation exercise.

Yours sincerely

Perry Power  
General Manager

## Annex 4 – Legal Text to give effect to CAP047 Amendment Proposal

*For the avoidance of doubt, the proposed changes are indicated with coloured text only. Coloured underlined text will be inserted, and coloured strikethrough text will be deleted.*

### Proposed Changes to Section 4 of the CUSC (Balancing Services) and Section 11 (Interpretation and Definitions)

#### Section A - Proposed Changes to Paragraph 4.1.3 of the CUSC (Frequency Response)

##### 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 Subject to Paragraph 4.1.3.4A, **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**.

4.1.3.4A Where in respect of any calendar month Paragraph 4.1.3.13(f)(i) applies in respect of a **BM Unit**, **NGC** shall not instruct the **User** in accordance with Paragraph 4.1.3.4 to operate that **BM Unit** in the next following calendar month so as to provide any of the components of **Mode A Frequency Response** unless **NGC** is unable to meet its requirement for **Mode A Frequency Response** from alternative **BM Unit(s)**.

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**.
- 4.1.3.7 **User's Obligation to Provide Response**  
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 Frequency Response Capability Data tables in the **Mandatory Services Agreement** (as such tables are to be interpreted in accordance with Paragraph 4.1.3.11).
- 4.1.3.7A For the avoidance of doubt a **User** shall ensure that the **Transmission Entry Capacity** for the relevant **Connection Site** shall be sufficient to enable it to comply with its obligations under Paragraph 4.1.3.7 above at all times and in respect of all relevant **BM Units**.
- 4.1.3.8 **Calculation of Payments**  
**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 Response Energy 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.**
- 4.1.3.9 **Payment Formulae - Holding Payments**  
**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** [determined in accordance with Paragraph 4.1.3.13 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** [determined in](#)

- accordance with Paragraph 4.1.3.13 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** determined in accordance with Paragraph 4.1.3.13 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 4.1.3.25-21 (e);
- $SF_S$  = 0, subject to Paragraph 4.1.3.25-21 (e);
- $SF_H$  = 0, subject to Paragraph 4.1.3.25-21 (e).

- 4.1.3.9A **Payment Formulae – Response Energy Payment**
- (a) The **Response Energy 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 calculated in accordance with the following formulae:-

$$REP_{ij} = RE_{ij} \times \text{Reference Price}$$

But so that where  $REP_{ij}$  is negative such amount shall be paid by the **User** to **NGC**.

Where:

$REP_{ij}$  is the **Response Energy Payment** to be made to or, as the case may be, by the User; and

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

$$RE_{ij} = \int_0^{SPD} \left[ \max(FR_{ij}(t), 0) \times (1 - SF_{LF}) + \min(FR_{ij}(t), 0) \times (1 - SF_H) \right] \times K_T \times K_{GRC} dt$$

Where:

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

$SF_{LF}$  is equal to  $SF_P$  in the case of a **BM Unit** being instructed to deliver **Primary Response** without **Secondary Response** or the mean of  $SF_P$  and  $SF_S$  in the case of a **BM Unit** being instructed to deliver **Primary Response** and **Secondary Response**.

$SF_P$ ,  $SF_S$ ,  $SF_H$ ,  $K_T$  and  $K_{GRC}$  have the meanings ascribed to them in Paragraph 4.1.3.9.

$FR_{ij}(t)$  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 Frequency Response Power Delivery Data table 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 table entitled “High Frequency Response Power Delivery – Mode A” 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 table entitled “Primary Response Power Delivery – Mode A” in the case of a **BM Unit** being instructed to deliver **Primary Response** without **Secondary Response**; or
- B) the table entitled “Primary & Secondary Response Power Delivery – Mode A” in the case of a **BM Unit** being instructed to deliver **Primary Response** and **Secondary Response**,

in each case 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  $SBP_j$  and  $SSP_j$  respectively for the preceding calendar month in which the service is provided.

- (b) (not used)
- (c) (not used)
- (d) In this Paragraph 4.1.3.9A, the following terms shall have the meanings ascribed to them in the **Balancing and Settlement Code** :-

“ $SSP_j$ ”  
“ $SBP_j$ ”  
“SPD”

- 4.1.3.10 **NGC** and each **User** acknowledge and agree, as between **NGC** and that **User**, that no **Holding Payment** or **Response Energy 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.

- 4.1.3.11 *Interpretation of Tables – Levels of Response*  
The figures for **Response** set out in the Frequency Response Capability Data tables and Frequency Response Power Delivery Data tables in the **Mandatory Services Agreements** shall be given in relation to specific **Frequency Deviations** and to specific levels of **De-Load** for a **BM Unit**. Such tables shall, for the purposes of Paragraphs 4.1.3.7 and 4.1.3.9A(a), be construed in accordance with this Paragraph 4.1.3.11. Subject to Paragraphs 4.1.3.11(d) and (e):-

- (a) for a **Frequency Deviation** at a given time differing from the figures given in a table, the level of **Response** shall be calculated by linear interpolation from the figures specified in the table in respect of **Frequency Deviations**;
- (b) for a level of **De-Load** at a given time differing from the figures given in a table, the level of **Response** shall be calculated by linear interpolation from the figures specified in the table in respect of levels of **De-Load**. For the avoidance of doubt, **Frequency Sensitive Mode** shall not be instructed for any **De-Load** greater

than the maximum level of **De-Load** given in the relevant Frequency Response Capability Data table;

- (c) in respect of any time in relation to which both Paragraphs 4.1.3.11(a) and (b) apply, the level of **Response** shall be calculated by dual linear interpolation from the figures specified in the table in respect of **Frequency Deviations** and in respect of levels of **De-Load**;

and

- (d) for any **Frequency Deviation** greater than the greatest **Frequency Deviation** given in a table (whether positive or negative), the level of **Response** shall be calculated by reference to the greatest **Frequency Deviation** (positive or negative, as the case may be) given in that table; and
- (e) for the purposes of calculating levels of **Response** in respect of **Frequency Deviations** lower than those specified in a table, the relevant table(s) shall be deemed to specify a level of zero **Response** for a **Frequency Deviation** of zero.

- 4.1.3.12 *Interpretation of Tables – Levels of Holding Payment*  
The Frequency Response Summary Data table in the **Mandatory Services Agreement** shall set out figures in respect of given levels of **De-Load** for the purposes of calculating payment in accordance with the formulae in Paragraph 4.1.3.9. Where the level of **De-Load** of the **BM Unit** is other than one of the levels given in such table, then the figure for  $P_{MW}$ ,  $S_{MW}$  or  $H_{MW}$  as the case may be, shall be calculated by linear interpolation from the figures in such table in respect of levels of **De-Load**.

*~~User's Request to Amend Levels of and/or Payment Rates for Response~~*

- ~~4.1.3.13~~ Each **User** shall have the right, as between **NGC** and that **User**, not more than once every two months (or otherwise at any time with the specific agreement of **NGC**) to request in writing an amendment to the levels of **Response** set out in the Frequency Response Capability Data tables and/or the Frequency Response Power Delivery Data tables in the **Mandatory Services Agreement** and/or, provided such request is made in accordance with the relevant charging principles set out in Paragraph 4.4, the payment rates referred to in the



~~Payment Rates table(s) in the **Mandatory Services Agreement**. NGC's agreement to such a request shall not be unreasonably withheld or delayed.~~

**User's submission of Holding Payment Rates**

4.1.3.13 The following terms shall apply to determine the payment rates for **Primary Response**, **High Frequency Response** and **Secondary Response** used in the calculation of **Holding Payments** in accordance with Paragraph 4.1.3.9 which shall apply in respect of the provision of **Mode A Frequency Response** by the **User** to **NGC** from one or more **BM Units** in a calendar month (and, for the purposes thereof, all dates specified in this Paragraph 4.1.3.13 unless stated otherwise refer to the immediately preceding calendar month):-

- (a) By the fifth **Business Day** of the calendar month, **NGC** shall publish on its web-site information relating to **NGC's** requirement for **Mode A Frequency Response** (in MW) in the next following calendar month.
- (b) By the fifteenth **Business Day** of the calendar month, the **User** may in relation to any of its **BM Units** identified in a **Mandatory Services Agreement** to which the **User** is a party submit a single notification to **NGC** (in a form and by such method as shall be prescribed by **NGC** from time to time) specifying in respect of that **BM Unit** the payment rates to apply in determining the **Holding Payments** for the provision of **Mode A Frequency Response** during the next following calendar month, each such notification to specify:-
  - (i) the **BM Unit** in question;
  - (ii) the payment rate for **Primary Response**;
  - (iii) the payment rate for **High Frequency Response**; and
  - (iv) the payment rate for **Secondary Response**.
- (c) Payment rates submitted by the **User** in accordance with Paragraph 4.1.3.13(b) must be:-
  - (i) quoted in pounds sterling to the nearest penny;

- (iii) quoted in units of £/MW/h; and
- (iii) no greater than £[9999.99].
- (d) Upon receipt of a notification from the **User** made in accordance with Paragraph 4.1.3.13(b), **NGC** shall publish details of such notification in a report issued in accordance with Paragraph 4.1.3.13(A)(a) and, subject always to rectification (if any) of payment rates pursuant to Paragraph 4.1.3.13(e), **NGC** shall apply published payment rates for **Primary Response, High Frequency Response** and **Secondary Response** in calculating the **Holding Payments** for the relevant **BM Unit** in the next following calendar month.
- (e) The **User** shall have the right, to be exercised within one **Business Day** of the publication of payment rates in respect of a **BM Unit** in accordance with Paragraph 4.1.3.13(d), to notify **NGC** (in a form and by such method as shall be prescribed by **NGC** from time to time) of any discrepancy between those payment rates and the actual payment rates submitted by the **User** in respect of that **BM Unit** in accordance with Paragraph 4.1.3.13(b). Upon receipt of any such notification, **NGC** shall rectify the report issued in accordance with Paragraph 4.1.3.13A(a) and shall publish the rectified report in accordance with Paragraph 4.1.3.13A(b).
- (f) In the absence of a notification from a **User** in accordance with Paragraph 4.1.3.13(b) in respect of the provision by a **BM Unit of Mode A Frequency Response** in the next following calendar month, then the payment rates for **Primary Response, High Frequency Response** and **Secondary Response** to apply in determining the **Holding Payments** for that **BM Unit** in respect of that calendar month shall be determined as follows:-
- (i) where the **User** has never in respect of any previous calendar month submitted a notification in accordance with Paragraph 4.1.3.13(b) in respect of the provision by that **BM Unit of Mode A Frequency Response**, the payment rate to apply to the provision of each of **Primary Response, High Frequency Response** and

Secondary Response from that **BM Unit** in that calendar month shall be deemed to be £00.00/MW/h.

(ii) in all other cases, the payment rates for **Primary Response, High Frequency Response** and **Secondary Response** which shall apply in respect of the provision by that **BM Unit of Mode A Frequency Response** in that calendar month shall be the payment rates most recently published in accordance with Paragraph 4.1.3.13A(a) or (b) (as the case may be) for that **BM Unit** in respect of a previous calendar month;

(g) Paragraph 4.4.2.2 shall not apply to the payment rates for **Primary Response, High Frequency Response** and **Secondary Response** determined in accordance with this Paragraph 4.1.3.13.

Publication of **Holding Payment Rates** and other information

4.1.3.13A (a) **NGC** shall use reasonable endeavours to publish on its web-site by the 16th **Business Day** of each calendar month, a report containing the following information in respect of each applicable **User's BM Unit(s)** which shall apply in respect of the next following calendar month:-

(i) the payment rates for **Primary Response, High Frequency Response** and **Secondary Response** to apply in determining the **Holding Payments** for the next following calendar month as determined in accordance with Paragraph 4.1.3.13;

(ii) the available **Response** volume (in such form and manner as shall be prescribed by **NGC** from time to time).

(b) Where any payment rates published in a report issued in accordance with Paragraph 4.1.3.13A(a) are rectified by **NGC** in accordance with Paragraph 4.1.3.13(e), **NGC** shall as soon as reasonably practicable thereafter publish the rectified report on its web-site.

(c) In respect of each **Operational Day** in a calendar month, **NGC** shall, by the ninth **Business Day** of

the calendar month following that calendar month, publish on its web-site in respect of all **BM Units** details of instructions issued by **NGC** in accordance with Paragraph 4.1.3.4 for each of **Primary Response, High Frequency Response** and **Secondary Response** (in such form and manner as shall be prescribed by **NGC** from time to time).

(d) Each **User** consents to the disclosure by **NGC** of the information referred to in Paragraphs 4.1.3.13A(a) and (b) in so far as it relates the provision of **Mode A Frequency Response** from its **BM Unit(s)**, provided always that **NGC** shall not be bound to comply with the provisions of Paragraphs 4.1.3.13A(a) and (b) with regard to the provision of information to the extent that to do so would be likely to restrict, distort or prevent competition in the provision of **Mode A Frequency Response**.

4.1.3.14 **NGC's Requests to Amend Levels of Response**  
Where either the **User** or **NGC** reasonably considers in light of operating experience that the levels of **Response** set out in the Frequency Response Capability Data tables and/or the Frequency Response Power Delivery Data tables in the **Mandatory Services Agreement** do not represent the true operating capabilities of a **BM Unit(s)**, the **User** or **NGC** (as the case may be), ~~**NGC**~~ shall have the right not more than once every two months (or otherwise at any time with the specific agreement of the other party to the **Mandatory Services Agreement** ~~relevant **User**~~) to request (provided always that such request be accompanied by a reasonable justification therefor) that the levels of **Response** set out in the relevant response table(s) in the **Mandatory Services Agreement** be reviewed and, if appropriate, amended by agreement with such other party, **User** such agreement not to be unreasonably withheld or delayed.

4.1.3.15 **Procedure for Amendments to Levels of ~~and/or~~ Payment Rates for Response**  
Any amendments agreed by **NGC** and a **User** pursuant to Paragraphs ~~4.1.3.13 or~~ 4.1.3.14 or determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** in the circumstances referred to in Paragraph 4.1.3.16 shall not become effective until (in the case of agreed amendments) a date at least five **Business Days** after an amending agreement is entered into between **NGC** and the **User** in accordance

with the **Mandatory Services Agreement** or, in the case of determined amendments, such other date as may be determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** subject always to Paragraphs 4.1.3.17 and 4.1.3.198.

- 4.1.3.16 *Failure to Agree Amendments*  
If **NGC** and a **User** are unable to agree any amendments requested pursuant to Paragraphs ~~4.1.3.13 or~~ 4.1.3.14 within 28 days of either of them serving on the other notice of its intention to invoke the **Dispute Resolution Procedure** then either party may initiate the procedure for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.
- 4.1.3.17 *Dispute Resolution Procedure*  
**NGC** and each **User** acknowledge and agree, as between **NGC** and that **User**, that rule 12.1(p) of the **Electricity Arbitration Association** shall apply to any arbitration proceedings initiated pursuant to Paragraph 7.4 in the circumstances referred to in Paragraph 4.1.3.16, but that the changes determined by any arbitrator or panel of arbitrators shall not apply in respect of any period prior to the date on which the **Dispute Resolution Procedure** is invoked.
- ~~4.1.3.18~~ *Implementation of Determinations*  
~~Subject to Paragraph 4.1.3.17, any changes to payment rates determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** in the circumstances referred to in Paragraph 4.1.3.16 shall apply with effect from the date specified in the determination and consequential adjustments shall be made in the next practicable **Provisional Monthly Statement** issued following the date of the determination. If any such changes are so determined to apply in respect of any period prior to the date of determination then in respect of such period until actual payment (or, as the case may be, repayment) **NGC** shall pay to the **User** (where such payment rates are determined to be greater than current payment rates) the excess together with interest thereon at the **Base Rate** and the **User** shall repay to **NGC** (where such payment rates are determined to be less than current payment rates) the amount by which **NGC** has overpaid the **User** together with interest thereon at the **Base Rate**.~~
- 4.1.3.198 Any amendments to levels of **Response** determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** in the circumstances referred to

in Paragraph 4.1.3.16 shall take effect from the date five **Business Days** following the relevant determination.

*Triennial Review*

- ~~4.1.3.20~~ Without prejudice to Paragraphs 4.1.3.13 to 4.1.3.19 inclusive, ~~NGC~~ and each ~~User~~ shall review the payment rates for the ~~Mandatory Ancillary Service of Frequency Response~~ set out in each relevant ~~Mandatory Services Agreement~~ and shall adjust such payment rates by such amount or in such manner as shall be fair and reasonable (on the basis of the charging principles set out in Paragraph 4.4) on the date specified for such purpose in the ~~Mandatory Services Agreement~~ and on each third successive anniversary thereof during the currency of that ~~Mandatory Services Agreement~~ ("~~Triennial Review Date~~").
- ~~4.1.3.21~~ ~~NGC~~ and the ~~User~~ shall meet to discuss and endeavour to agree any such adjustment to the payment rates (which shall be calculated on the basis of the charging principles set out in Paragraph 4.4) no later than five months prior to the ~~Triennial Review Date~~. If ~~NGC~~ and the ~~User~~ have not agreed the amount of any such adjustment by the date which is one month prior to the ~~Triennial Review Date~~, either of them may initiate the procedure for resolution of the issue as an ~~Other Dispute~~ in accordance with Paragraph 7.4. ~~NGC~~ and the ~~User~~ acknowledge and agree that rule 12.1(p) of the ~~Electricity Arbitration Association~~ shall apply to any arbitration proceedings initiated in consequence thereof.
- ~~4.1.3.22~~ If any adjustment to the payment rates has not been ascertained (by agreement or determination) by the ~~Triennial Review Date~~ in accordance with the provisions of Paragraphs 4.1.3.20 and 4.1.3.21, ~~NGC~~ and the ~~User~~ shall pay to the other for any interval between the ~~Triennial Review Date~~ and the date when such payment rates have been ascertained as aforesaid any sums due to that other party for the ~~Mandatory Ancillary Service of Frequency Response~~ calculated at the corresponding payment rates applicable during the period immediately preceding the ~~Triennial Review Date~~ without indexation. Upon any adjustment to the payment rates (or any of them) being ascertained as aforesaid, any additional amount or reduced amount payable or repayable for the period commencing on the ~~Triennial Review Date~~ and ending on the date when the payment rates shall have been ascertained, shall be paid or repaid by the party liable for such payment or repayment together with interest on the additional amounts which would have been payable (or the

~~amounts by which the payments would have been reduced as the case may be) had the adjustment been ascertained at the **Triennial Review Date** at the rate applicable to overdue payments provided in Paragraph 4.3.~~

*Implementation of Continuous Monitoring System*

- 4.1.3.2319 To the extent the same shall be acceptable to **NGC** and a **User** on the basis of a cost benefit analysis, **NGC** and a **User** agree, as between **NGC** and that **User**, to the implementation of a continuous monitoring system as soon as is reasonably practicable. The continuous monitoring system shall be in accordance with the relevant principles set out in Paragraph 4.1.3.25-21 for the purposes of confirming performance of the **BM Units** and adjusting payments pursuant to this Paragraph 4.1.3.

*Incident Based Monitoring System*

- 4.1.3.2420 Pending implementation of the continuous monitoring system, **NGC** and each **User** agree, as between **NGC** and that **User**, to implement an incident based monitoring scheme for the purpose of confirming the performance of the **BM Units** pursuant to this Paragraph 4.1.3. Such incident based monitoring scheme shall be in accordance with the relevant principles set out in Paragraph 4.1.3.2521. Neither **NGC** nor the **User** shall unreasonably withhold or delay such agreement and/or implementation.

*Genset Response Monitoring Introduction*

- 4.1.3.2521 (a) This Paragraph 4.1.3.25-21 sets out the principles relating to:
- (i) the proposed continuous monitoring system to be implemented pursuant to Paragraph 4.1.3.2319; and
  - (ii) the incident based monitoring system to apply until such time as implementation of the continuous monitoring system takes place.

Some elements of the continuous monitoring system are currently undergoing testing and development and it is accepted that if final testing of these elements proves unsatisfactory alternatives will need to be developed. Further, implementation of the continuous monitoring system shall be subject to its acceptability to

**NGC** and **Users** on the basis of a cost benefit analysis.

Wherever possible the technical specification of both the incident based monitoring system and the continuous monitoring system will be designed so as to enable future development or enhancement.

*Aims of Project*

- (b) The aim of the monitoring project (which includes, without limitation, the development of the incident based monitoring system and the continuous monitoring system) is to develop a response monitoring system which will measure the response performance of generators against the levels of **Frequency Response** required to be provided under **Mandatory Services Agreements**.

*Incident Based Monitoring Scheme*

- (c) Details of the incident based monitoring scheme (including without limitation the definitions of Shortfall Period and Incident, the calculation of service delivery and the determination of Incident start and end times) will be more particularly set out in a document entitled "Procedure for Incident Based Response Monitoring" ("the PIRM Document") to be produced by **NGC** and agreed by all relevant **Users** (such agreement not to be unreasonably withheld or delayed).

For the avoidance of doubt during the period during which the incident based monitoring scheme applies, and prior to the implementation of the continuous monitoring system, for the purposes of the formulae in Paragraphs 4.1.3.9 and 4.1.3.9A, the values of  $SF_P$ ,  $SF_S$  and  $SF_H$  shall be zero, such that no payment reduction shall apply during such period in respect of shortfall.

*Continuous Based Monitoring Scheme – Confirmation of Response Delivery*

- (d) The main objective of the continuous monitoring scheme is to provide a quantitative measure of **Frequency Response** delivery against which payment can be justifiably made and to reduce payments if delivery does not comply with the **CUSC** and the **Mandatory Services**



**Agreement.** As the capability of a **BM Unit** to provide the level of **Response** required pursuant to this Paragraph 4.1.3 for any change in **System Frequency** occurring during the period of delivery of Response pursuant to a prior change in **System Frequency** will be affected by the level of **Response** then being delivered, relevant fluctuations in **System Frequency** should to this extent be taken into account by the continuous monitoring scheme for the purpose of calculating payment levels.

*Determination of Response Shortfall*

(e) For the purposes of the continuous monitoring system, the **Response** shortfall may take three forms:-

- (i) average **Primary Response** under-delivery;
- (ii) average **Secondary Response** under-delivery;
- (iii) average **High Frequency Response** under-delivery,

in each case over a Shortfall Period (such term to be defined prior to implementation of the continuous monitoring system).

Upon the implementation of the continuous monitoring system, for the purposes of determining any such average under-delivery,  $SF_P$ ,  $SF_S$  and  $SF_H$  shall be the average under-delivery of **Primary Response**, **Secondary Response** and **High Frequency Response** respectively during the Shortfall Period in which the **Ancillary Service** was, or should have been, provided. For the purposes of the formulae in Paragraphs 4.1.3.9 and 4.1.3.9A, such average under-delivery will be determined using a continuous plant response assessment algorithm which is under development and which will be agreed with the **User** prior to its implementation and expressed in terms of  $0 \leq SF \leq 1$ .

*Measurement of System Variables*

- (f) In relation to the continuous monitoring system measurement of **System Frequency** and generator output power will be required local to the **BM Unit**. **Synchronised** time tagging of both power and **Frequency** will be required.

**Frequency** is required as the fundamental driving variable of the contract model software. Access to a voltage source to enable **Frequency** to be measured is not expected to cause any difficulty. The measurement of generator output power will also be required every second. Cost effective access to this measurement is, however, less straight forward. Covered below are two options describing how this will be achieved. It is expected that normally the FMS interface unit will be the method used; however, where the **BM Unit** concerned has derogations from FMS, method two may be used.

*FMS Interface Unit*

- (g) The use of the Final Metering System (FMS) represents a logical method of measurement since it eliminates the high cost associated with running cables to access CTs and VTs.

The high accuracy integrated data from FMS will be used to re-generate a power profile and curve fitting techniques will be applied to improve accuracy. This instantaneous power curve will then be sampled every second to obtain the required values.

*Direct Measurement*

- (h) Where for the reasons detailed in Paragraph 4.1.3.2521(f) it is not possible to use the FMS interface unit, the use of 'ISAT' type transducers will be employed to interface between the monitoring equipment and the measurement transformers' secondary circuit.

It is envisaged that generators seeking derogations from FMS will be supportive in establishing convenient VT and CT secondary connections for this purpose.

*Contract Model*

- (i) The contract model is the heart of the continuous monitoring system and it is crucial to the philosophy behind the system, namely that

of modelling the **Mandatory Services Agreement** and not the **BM Unit** itself.

Given the difficulty in measuring **Frequency Response** directly on loaded plant, the need to compare changes in power delivery against expectation is evident. Comparison against this model output, which in turn is based on agreed and legally binding contracts, permits an identifiable quantity of non conformity to be measured and payments to be suitably reduced.

Therefore, since the **Mandatory Services Agreement** itself is the quantifying factor, there can be no redress due to assumptions regarding the technical attributes of the **BM Unit** other than those taken into account in setting the levels of **Response**.

*Functional Objective*

- (j) In relation to the continuous monitoring system, the model will comprise software which uses system and instructed variables to access the contract look-up tables. The look-up tables used will precisely mimic the response tables set out in **Mandatory Services Agreements**. These variables in turn will be processed using an algorithm to determine the levels of **Response** expected at any instant in time.

It is intended that this process will be effective during both small and large **Frequency Deviations**. Indeed with regard to reduction in payment and estimated **Response** capability, response to small **Frequency Deviations** is extremely important.

*Input Data*

- (k) In relation to the continuous monitoring system, inputs to the contract model will include **Frequency**, all contract table data, target load, **Target Frequency**, the latest genset availability, the response instruction, LF setting (if electronically despatched) and any other information required which may be specified in the **Mandatory Services Agreement**.

*Comparator*

- (l) In relation to the continuous monitoring system, the comparator will determine the difference

between the measured change in the level of **Output** from the **BM Unit** by way of **Frequency Response** and the change in **Output** level that is specified in the **Mandatory Services Agreement**.

~~Additional Costs~~

~~4.1.3.26 Save where expressly provided otherwise in the **CUSC** or any **Mandatory Services Agreement** if:-~~

~~(a) a **User** is of the opinion that in order to comply with any change in or amendment to the **Grid Code** (other than the withdrawal of or reduction in the scope of a **Derogation**) or any statutory or regulatory obligation coming into force after the **Commencement Date** of the relevant **Mandatory Services Agreement** that **User** is obliged to incur costs and expenses for the purpose of carrying out modifications to any **BM Unit** or **CCGT Unit** or otherwise for the purposes of changing the manner of operation of a **BM Unit** or **CCGT Unit** in relation to the provision of the **Mandatory Ancillary Service of Frequency Response**; or~~

~~(b) **NGC** is of the opinion that by reason of any change in or amendment to the **Grid Code** or any statutory or regulatory obligation coming into force after the **Commencement Date** of the relevant **Mandatory Services Agreement** a **User** is able to make savings in the cost and expense of providing the **Mandatory Ancillary Service of Frequency Response** from any **BM Unit** or **CCGT Unit**;~~

~~then either the **User** or **NGC** as the case may be may by notice in writing require the other to agree any adjustment in the rates and prices for the **Mandatory Ancillary Service of Frequency Response** and the **BM Unit** or **CCGT Unit** concerned as set out in the relevant **Mandatory Services Agreement** having regard to the charging principles set out in Paragraph 4.4. If **NGC** and that **User** cannot agree to an adjustment in such rates and prices within a month of receipt by either of them of the other's written notice, either of them may initiate the procedure for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.~~

4.1.3.2722 If, at any time during the term of a **Mandatory Services Agreement**, there is a variation in the security

standards with which **NGC** is obliged to comply and such variation would, in a **User's** reasonable opinion, materially affect the operation of the services to be provided under that **Mandatory Services Agreement**, **NGC** and that **User** shall negotiate in good faith with a view to agreeing and implementing appropriate amendments to any relevant **Mandatory Services Agreement**. If they are unable to reach agreement within 28 days of either of them serving on the other notice of its intention to invoke the **Dispute Resolution Procedure**, either of them may initiate the procedure for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.

## Section B - Proposed Changes to Paragraphs 4.4 and 4.5 of the CUSC (Charging Principles and Indexation)

### 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 [Save where otherwise expressly provided in this Paragraph 4.4, 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 or any costs which are incurred under the **Balancing and Settlement Code** in providing these services. **Holding Payments** shall be determined in accordance with Paragraph 4.1.3.13 and, as specified in Paragraph 4.1.3.13(g), therefore need not be cost reflective.~~
- 4.4.3.21 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**.

- 4.4.3.32 In recognition of the energy production costs likely to be incurred or avoided 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.

## 4.5 INDEXATION

### 4.5.1 Application

The provisions of this Paragraph 4.5 ~~shall~~ may 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~~ **Balancing Services Agreement (other than a Mandatory 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~~ **Balancing Services (other than Mandatory 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).

### 4.5.2 Indexation provisions

- 4.5.2.1 The rates and/or prices to be indexed shall be specified in the **Balancing Services Agreement** as applicable for a 12 month period commencing 1<sup>st</sup> April (“the base year”), and these rates and/or prices will be adjusted annually to take account of general price inflation. The index used will be the Retail Prices Index (RPI) with 1987 = 100 base.
- 4.5.2.2 The source of the RPI index is to be the monthly Office for National Statistics “Business Monitor MM23.”
- 4.5.2.3 The rates and/or prices to be indexed shall be increased (or reduced as appropriate) for the subsequent 12 month period commencing 1<sup>st</sup> April by the following factor:-

$$\frac{RPI_2}{RPI_1}$$

Where

$RPI_2$  is the RPI for March immediately prior to commencement of that 12 month period

$RPI_1$  is the RPI for March immediately prior to commencement of the base year.

- 4.5.2.4 The rates and/or prices to be indexed shall be increased (or reduced as appropriate) for the subsequent 12 month period commencing 1<sup>st</sup> April by the following factor:-

$$\frac{RPI_3}{RPI_1}$$

Where

$RPI_3$  is the RPI for March immediately prior to commencement of that 12 month period

$RPI_1$  is the RPI for March immediately prior to commencement of the base year.

- 4.5.2.5 In subsequent years indexation will continue in accordance with the above, with always the numerator of the factor representing the RPI of the 12 month period in question and the denominator of the factor being the RPI for March immediately prior to the base year.
- 4.5.2.6 In the event that RPI ceases to be published or is not published in respect of any relevant month or it is not practicable to use RPI because of a change in the method of compilation or some other reason, indexation for the purposes of this Paragraph 4.5 shall be calculated by **NGC** using an index agreed between **NGC** and the relevant **User** with a view to determining the relevant price after indexation that would be closest to the relevant price after indexation if RPI had continued to be available. If **NGC** and a relevant **User** are unable to agree a suitable index, either of them may initiate the **Dispute Resolution Procedure** for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.
- 4.5.2.7 For the avoidance of doubt, the provisions of Paragraph 11.3 with regard to determination of an alternative index should the **Retail Prices Index** not be published or there is a material change to the basis of such index shall not apply with respect to the rates and/or prices the subject of this Paragraph 4.5.



**Section C - Proposed Changes to Paragraph 11.3 of the CUSC (Definitions)**

~~“Triennial Review Date”~~ \_\_\_\_\_ ~~as defined in Paragraph 4.1.3.20;~~ |

“Operational Day” \_\_\_\_\_ as defined in the Grid Code; |

## Proposed Changes to Schedule 2 - Exhibit 4 of the CUSC (Mandatory Services Agreement)

*For the avoidance of doubt, the proposed changes are indicated with coloured text only. Coloured underlined text will be inserted, and coloured strikethrough text will be deleted.*

### 4. FREQUENCY RESPONSE

#### 4.1 Paragraph 4.1.3 of CUSC

The provisions of this Clause 4 give effect to the provisions of Paragraph 4.1.3 of the **CUSC** in respect of the provision by the **User** from the **BM Units** of the **Mandatory Ancillary Service of Frequency Response** and the payments to be made by **NGC** to the **User** in respect thereof.

#### 4.2 Term

- 4.2.1 The provisions of this Clause 4 shall be deemed to have applied in relation to each **BM Unit** with effect from 00.00 hours on the [date hereof] [**Commencement Date**] and shall continue thereafter unless and until this **Mandatory Services Agreement** is terminated. For the avoidance of doubt, in the event this **Mandatory Services Agreement** is terminated in relation to any individual **BM Unit**, the provisions of this Clause 4 shall terminate in relation to that **BM Unit** only.
- 4.2.2 Termination of this Clause 4 shall not affect the rights and obligations of **NGC** and the **User** accrued as at the date of termination.

#### 4.3 Provision of Frequency Response

- 4.3.1 The **Parties** agree that:-
- (a) [subject always to Sub-Clause 4.64,] for the purposes of Paragraph 4.1.3.7 of the **CUSC**, the figures set out in the response tables in Appendix 1, Section B, Part I represent the amount of **Primary Response**, **Secondary Response** and **High Frequency Response** referred to therein;
  - (b) [subject always to Sub-Clause 4.64,] for the purposes of Paragraph 4.1.3.9 of the **CUSC**, the figures set out in the summary response table in Appendix 1, Section B, Part II represent the capabilities in respect of **Primary Response**, **Secondary Response** and **High Frequency Response** at given levels of **De-Load** referred to therein;
  - (c) for the purposes of Paragraph 4.1.3.4 of the **CUSC**, the table in Appendix 1, Section B, Part III shows the permissible

combinations of **Primary Response**, **Secondary Response** and **High Frequency Response** referred to therein;

(d) for the purposes of Paragraph 4.1.3.9 of the **CUSC**, the figures (if any) set out in the plant configuration table in Appendix 1, Section B, Part II represent the plant configuration adjustment factors referred to therein to be applied where the **BM Unit** is a **CCGT Module**;

~~(e) for the purposes of Paragraph 4.1.3.9 of the **CUSC**, the payment rates in Appendix 2, Section B constitute the payment rates in respect of **Primary Response**, **Secondary Response** and **High Frequency Response** referred to therein; and~~

(fe) [subject always to Sub-Clause 4.64,] for the purposes of Paragraph 4.1.3.9A(a) of the **CUSC** in respect of calculation of the **Response Energy Payment**, the response values in Appendix 1, Section B, Part IV represent the Frequency Response Power that is deemed to be delivered in respect of **Primary Response**, **Secondary Response** and **High Frequency Response**.

#### ~~4.4~~ **Indexation**

~~The payment rates set out in Appendix 2, Section B are specified at April [ ] base, and shall from 1<sup>st</sup> April each year be indexed in accordance with Paragraph 4.5 of the **CUSC**.~~

#### ~~4.5~~ **Triennial Review**

~~For the purposes of Paragraph 4.1.3.20 of the **CUSC**, the first **Triennial Review Date** shall be [ ];~~

#### 4.64 **[Commissioning and Provisional Response Levels**

Without prejudice to Paragraphs ~~4.1.3.13 and~~ 4.1.3.14 of the **CUSC**, the **User** acknowledges that the levels of **Response** set out in the response tables in Appendix 1, Section B, Parts I, II and IV are indicative figures only during the period in which the relevant **Generating Unit(s)** is being commissioned and the **User** hereby undertakes to use its reasonable endeavours to forward to **NGC** levels of **Response** which represent the true operating characteristics of such **Generating Unit(s)** for inclusion in Appendix 1, Section B, Parts I, II and IV as soon as possible following completion of commissioning.]

**APPENDIX 2****SECTION B (FREQUENCY RESPONSE)****PAYMENT RATES**

Table 1	Payment Rates	
Response Type	Payment Code	Payment Rate (£/MW/h)
Primary Response	$P_{PR}$	
Secondary Response	$S_{PR}$	
High-Frequency Response	$H_{PR}$	

**Not Used**

## Annex 5 – Legal Text to give effect to CAP047 Alternative Amendment Proposal (A)

*For the avoidance of doubt, the proposed changes are indicated with coloured text only. Coloured underlined text will be inserted, and coloured strikethrough text will be deleted.*

### Proposed Changes to Section 4 of the CUSC (Balancing Services) and Section 11 (Interpretation and Definitions)

#### Section A - Proposed Changes to Paragraph 4.1.3 of the CUSC (Frequency Response)

##### 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).

4.1.3.3 **NGC's Instructions to provide Mode A Frequency Response**  
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**.

4.1.3.7 **User's Obligation to Provide Response**  
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 Frequency Response Capability Data tables in the **Mandatory Services Agreement** (as such tables are to be interpreted in accordance with Paragraph 4.1.3.11).

- 4.1.3.7A For the avoidance of doubt a **User** shall ensure that the **Transmission Entry Capacity** for the relevant **Connection Site** shall be sufficient to enable it to comply with its obligations under Paragraph 4.1.3.7 above at all times and in respect of all relevant **BM Units**.

*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 **Response Energy 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** [determined in accordance with Paragraph 4.1.3.13 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** [determined in accordance with Paragraph 4.1.3.13 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** [determined in accordance with Paragraph 4.1.3.13 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 4.1.3.25-21 (e);

$SF_S =$  0, subject to Paragraph 4.1.3.25-21 (e);

$SF_H =$  0, subject to Paragraph 4.1.3.25-21 (e).

*Payment Formulae – Response Energy Payment*

4.1.3.9A (a) The **Response Energy 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 calculated in accordance with the following formulae:-

$$REP_{ij} = RE_{ij} \times \text{Reference Price}$$

But so that where  $REP_{ij}$  is negative such amount shall be paid by the **User** to **NGC**.

Where:

$REP_{ij}$  is the **Response Energy Payment** to be made to or, as the case may be, by the User; and

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

$$RE_{ij} = \int_0^{SPD} \left[ \max(FR_{ij}(t), 0) \times (1 - SF_{LF}) + \min(FR_{ij}(t), 0) \times (1 - SF_H) \right] \times K_T \times K_{GRC} dt$$

Where:

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

$SF_{LF}$  is equal to  $SF_P$  in the case of a **BM Unit** being instructed to deliver **Primary Response** without **Secondary Response** or the mean of  $SF_P$  and  $SF_S$  in the case of a **BM Unit** being

instructed to deliver **Primary Response** and **Secondary Response**.

$SF_P$ ,  $SF_S$ ,  $SF_H$ ,  $K_T$  and  $K_{GRC}$  have the meanings ascribed to them in Paragraph 4.1.3.9.

$FR_{ij}(t)$  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 Frequency Response Power Delivery Data table 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 table entitled “High Frequency Response Power Delivery – Mode A” 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 table entitled “Primary Response Power Delivery – Mode A” in the case of a **BM Unit** being instructed to deliver **Primary Response** without **Secondary Response**; or
  - B) the table entitled “Primary & Secondary Response Power Delivery – Mode A” in the case of a **BM Unit** being instructed to deliver **Primary Response** and **Secondary Response**,

in each case 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  $SBP_j$  and  $SSP_j$  respectively for the preceding calendar month in which the service is provided.

- (b) (not used)
- (c) (not used)
- (d) In this Paragraph 4.1.3.9A, the following terms shall have the meanings ascribed to them in the **Balancing and Settlement Code** :-

“**SSP<sub>j</sub>**”  
“**SBP<sub>j</sub>**”  
“**SPD**”

- 4.1.3.10 **NGC** and each **User** acknowledge and agree, as between **NGC** and that **User**, that no **Holding Payment** or **Response Energy 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.

- 4.1.3.11 *Interpretation of Tables – Levels of Response*  
The figures for **Response** set out in the Frequency Response Capability Data tables and Frequency Response Power Delivery Data tables in the **Mandatory Services Agreements** shall be given in relation to specific **Frequency Deviations** and to specific levels of **De-Load** for a **BM Unit**. Such tables shall, for the purposes of Paragraphs 4.1.3.7 and 4.1.3.9A(a), be construed in accordance with this Paragraph 4.1.3.11. Subject to Paragraphs 4.1.3.11(d) and (e):-

- (a) for a **Frequency Deviation** at a given time differing from the figures given in a table, the level of **Response** shall be calculated by linear interpolation from the figures specified in the table in respect of **Frequency Deviations**;
- (b) for a level of **De-Load** at a given time differing from the figures given in a table, the level of **Response** shall be calculated by linear interpolation from the figures specified in the table in respect of levels of **De-Load**. For the avoidance of doubt, **Frequency Sensitive Mode** shall not be instructed for any **De-Load** greater

than the maximum level of **De-Load** given in the relevant Frequency Response Capability Data table;

- (c) in respect of any time in relation to which both Paragraphs 4.1.3.11(a) and (b) apply, the level of **Response** shall be calculated by dual linear interpolation from the figures specified in the table in respect of **Frequency Deviations** and in respect of levels of **De-Load**;

and

- (d) for any **Frequency Deviation** greater than the greatest **Frequency Deviation** given in a table (whether positive or negative), the level of **Response** shall be calculated by reference to the greatest **Frequency Deviation** (positive or negative, as the case may be) given in that table; and
- (e) for the purposes of calculating levels of **Response** in respect of **Frequency Deviations** lower than those specified in a table, the relevant table(s) shall be deemed to specify a level of zero **Response** for a **Frequency Deviation** of zero.

- 4.1.3.12 *Interpretation of Tables – Levels of Holding Payment*  
The Frequency Response Summary Data table in the **Mandatory Services Agreement** shall set out figures in respect of given levels of **De-Load** for the purposes of calculating payment in accordance with the formulae in Paragraph 4.1.3.9. Where the level of **De-Load** of the **BM Unit** is other than one of the levels given in such table, then the figure for  $P_{MW}$ ,  $S_{MW}$  or  $H_{MW}$  as the case may be, shall be calculated by linear interpolation from the figures in such table in respect of levels of **De-Load**.

*~~User's Request to Amend Levels of and/or Payment Rates for Response~~*

- ~~4.1.3.13~~ Each **User** shall have the right, as between **NGC** and that **User**, not more than once every two months (or otherwise at any time with the specific agreement of **NGC**) to request in writing an amendment to the levels of **Response** set out in the Frequency Response Capability Data tables and/or the Frequency Response Power Delivery Data tables in the **Mandatory Services Agreement** and/or, provided such request is made in accordance with the relevant charging principles set out in Paragraph 4.4, the payment rates referred to in the

~~Payment Rates table(s) in the **Mandatory Services Agreement**. NGC's agreement to such a request shall not be unreasonably withheld or delayed.~~

***User's submission of Holding Payment Rates***

4.1.3.13 The following terms shall apply to determine the payment rates for **Primary Response**, **High Frequency Response** and **Secondary Response** used ~~in the calculation of Holding Payments~~ in accordance with Paragraph 4.1.3.9 which shall apply in respect of the provision of **Mode A Frequency Response** by the **User** to **NGC** from one or more **BM Units** in a calendar month (and, for the purposes thereof, all dates specified in this Paragraph 4.1.3.13 ~~unless stated otherwise~~ refer to the immediately preceding calendar month):-

- (a) By the fifth **Business Day** of the calendar month, **NGC** shall publish on its web-site ~~information relating to NGC's~~ requirement for **Mode A Frequency Response** (in MW) in the next following calendar month.
- (b) By the fifteenth **Business Day** of the calendar month, the **User** may in relation to any of its **BM Units** ~~identified in a Mandatory Services Agreement to which the User is a party~~ submit a single notification to **NGC** (in a form ~~and by such method as shall be prescribed by NGC from time to time~~) specifying in respect of ~~that BM Unit~~ the payment rates to apply in determining the **Holding Payments** for the provision of **Mode A Frequency Response** during the next following calendar month, each such notification to specify:-
  - (i) the **BM Unit** in question;
  - (ii) the payment rate for **Primary Response**;
  - (iii) the payment rate for **High Frequency Response**; ~~and~~
  - (iv) the payment rate for **Secondary Response**.
- (c) Payment rates submitted by the **User** in accordance with Paragraph 4.1.3.13(b) must be:-
  - (i) quoted in pounds sterling to the nearest penny;

- (ii) quoted in units of £/MW/h; and
- (iii) no greater than £[9999.99].
- (d) Upon receipt of a notification from the **User** made in accordance with Paragraph 4.1.3.13(b), **NGC** shall publish details of such notification in a report issued in accordance with Paragraph 4.1.3.13(A)(a) and, subject always to rectification (if any) of payment rates pursuant to Paragraph 4.1.3.13(e), **NGC** shall apply published payment rates for **Primary Response, High Frequency Response** and **Secondary Response** in calculating the **Holding Payments** for the relevant **BM Unit** in the next following calendar month.
- (e) The **User** shall have the right, to be exercised within one **Business Day** of the publication of payment rates in respect of a **BM Unit** in accordance with Paragraph 4.1.3.13(d), to notify **NGC** (in a form and by such method as shall be prescribed by **NGC** from time to time) of any discrepancy between those payment rates and the actual payment rates submitted by the **User** in respect of that **BM Unit** in accordance with Paragraph 4.1.3.13(b). Upon receipt of any such notification, **NGC** shall rectify the report issued in accordance with Paragraph 4.1.3.13A(a) and shall publish the rectified report in accordance with Paragraph 4.1.3.13A(b).
- (f) In the absence of a notification from a **User** in accordance with Paragraph 4.1.3.13(b) in respect of the provision by a **BM Unit of Mode A Frequency Response** in the next following calendar month, then the payment rates for **Primary Response, High Frequency Response** and **Secondary Response** to apply in determining the **Holding Payments** for that **BM Unit** in respect of that calendar month shall be determined as follows:-

  - (i) where the **User** has never in respect of any previous calendar month submitted a notification in accordance with Paragraph 4.1.3.13(b) in respect of the provision by that **BM Unit of Mode A Frequency Response**, the payment rate to apply to the provision of each of **Primary Response, High Frequency Response** and

Secondary Response from that BM Unit in that calendar month shall be deemed to be either:-

(aa) the payment rates for **Primary Response, High Frequency Response** and **Secondary Response** prevailing immediately prior to the date of implementation of **Amendment Proposal CAP047**; or

(bb) where no payment rates as referred to in paragraph (aa) above subsisted at the date of implementation of **Amendment Proposal CAP047**, £00.00/MW/h; or

(ii) in all other cases, the payment rates for **Primary Response, High Frequency Response** and **Secondary Response** which shall apply in respect of the provision by that **BM Unit of Mode A Frequency Response** in that calendar month shall be the payment rates most recently published in accordance with Paragraph 4.1.3.13A(a) or (b) (as the case may be) for that **BM Unit** in respect of a previous calendar month;

(g) Paragraph 4.4.2.2 shall not apply to the payment rates for **Primary Response, High Frequency Response** and **Secondary Response** determined in accordance with this Paragraph 4.1.3.13.

Publication of **Holding Payment Rates** and other information

4.1.3.13A (a) NGC shall use reasonable endeavours to publish on its web-site by the 16th **Business Day** of each calendar month, a report containing the following information in respect of each applicable **User's BM Unit(s)** to apply in respect of the next following calendar month:-

(i) the payment rates for **Primary Response, High Frequency Response** and **Secondary Response** to apply in determining the **Holding Payments** for the next following calendar month as



determined in accordance with Paragraph 4.1.3.13;

(ii) the available **Response** volume (in such form and manner as shall be prescribed by **NGC** from time to time).

(b) Where any payment rates published in a report issued in accordance with Paragraph 4.1.3.13A(a) are rectified by **NGC** in accordance with Paragraph 4.1.3.13(e), **NGC** shall as soon as reasonably practicable thereafter publish the rectified report on its web-site.

(c) In respect of each **Operational Day** in a calendar month, **NGC** shall, by the ninth **Business Day** of the calendar month following that calendar month, publish on its web-site in respect of all **BM Units** details of instructions issued by **NGC** in accordance with Paragraph 4.1.3.4 for each of **Primary Response, High Frequency Response and Secondary Response** (in such form and manner as shall be prescribed by **NGC** from time to time).

(d) Each **User** consents to the disclosure by **NGC** of the information referred to in Paragraphs 4.1.3.13A(a) and (b) in so far as it relates to the provision of **Mode A Frequency Response** from its **BM Unit(s)**, provided always that **NGC** shall not be bound to comply with the provisions of Paragraphs 4.1.3.13A(a) and (b) with regard to the provision of information to the extent that to do so would be likely to restrict, distort or prevent competition in the provision of **Mode A Frequency Response**.

4.1.3.14 **NGC's** *Requests to Amend Levels of Response*  
Where either the **User** or **NGC** reasonably considers in light of operating experience that the levels of **Response** set out in the Frequency Response Capability Data tables and/or the Frequency Response Power Delivery Data tables in the **Mandatory Services Agreement** do not represent the true operating capabilities of a **BM Unit(s)**, the **User** or **NGC** (as the case may be) **NGC** shall have the right not more than once every two months (or otherwise at any time with the specific agreement of the other party to the **Mandatory Services Agreement** ~~relevant **User**~~) to request (provided always that such request be accompanied by a reasonable justification therefor) that

the levels of **Response** set out in the relevant response table(s) in the **Mandatory Services Agreement** be reviewed and, if appropriate, amended by agreement with such other party, User such agreement not to be unreasonably withheld or delayed.

*Procedure for Amendments to Levels of ~~and/or~~  
Payment Rates for Response*

- 4.1.3.15 Any amendments agreed by **NGC** and a **User** pursuant to Paragraphs ~~4.1.3.13 or~~ 4.1.3.14 or determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** in the circumstances referred to in Paragraph 4.1.3.16 shall not become effective until (in the case of agreed amendments) a date at least five **Business Days** after an amending agreement is entered into between **NGC** and the **User** in accordance with the **Mandatory Services Agreement** or, in the case of determined amendments, such other date as may be determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** subject always to Paragraphs 4.1.3.17 and 4.1.3.19~~8~~.

*Failure to Agree Amendments*

- 4.1.3.16 If **NGC** and a **User** are unable to agree any amendments requested pursuant to Paragraphs ~~4.1.3.13 or~~ 4.1.3.14 within 28 days of either of them serving on the other notice of its intention to invoke the **Dispute Resolution Procedure** then either party may initiate the procedure for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.

*Dispute Resolution Procedure*

- 4.1.3.17 **NGC** and each **User** acknowledge and agree, as between **NGC** and that **User**, that rule 12.1(p) of the **Electricity Arbitration Association** shall apply to any arbitration proceedings initiated pursuant to Paragraph 7.4 in the circumstances referred to in Paragraph 4.1.3.16, but that the changes determined by any arbitrator or panel of arbitrators shall not apply in respect of any period prior to the date on which the **Dispute Resolution Procedure** is invoked.

*Implementation of Determinations*

- ~~4.1.3.18~~ Subject to Paragraph 4.1.3.17, any changes to payment rates determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** in the circumstances referred to in Paragraph 4.1.3.16 shall apply with effect from the date specified in the determination and consequential adjustments shall be made in the next practicable **Provisional Monthly Statement** issued following the date of the

~~determination. If any such changes are so determined to apply in respect of any period prior to the date of determination then in respect of such period until actual payment (or, as the case may be, repayment) **NGC** shall pay to the **User** (where such payment rates are determined to be greater than current payment rates) the excess together with interest thereon at the **Base Rate** and the **User** shall repay to **NGC** (where such payment rates are determined to be less than current payment rates) the amount by which **NGC** has overpaid the **User** together with interest thereon at the **Base Rate**.~~

- 4.1.3.198 Any amendments to levels of **Response** determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** in the circumstances referred to in Paragraph 4.1.3.16 shall take effect from the date five **Business Days** following the relevant determination.

*Triennial Review*

- ~~4.1.3.20 Without prejudice to Paragraphs 4.1.3.13 to 4.1.3.19 inclusive, **NGC** and each **User** shall review the payment rates for the **Mandatory Ancillary Service of Frequency Response** set out in each relevant **Mandatory Services Agreement** and shall adjust such payment rates by such amount or in such manner as shall be fair and reasonable (on the basis of the charging principles set out in Paragraph 4.4) on the date specified for such purpose in the **Mandatory Services Agreement** and on each third successive anniversary thereof during the currency of that **Mandatory Services Agreement** ("**Triennial Review Date**").~~
- ~~4.1.3.21 **NGC** and the **User** shall meet to discuss and endeavour to agree any such adjustment to the payment rates (which shall be calculated on the basis of the charging principles set out in Paragraph 4.4) no later than five months prior to the **Triennial Review Date**. If **NGC** and the **User** have not agreed the amount of any such adjustment by the date which is one month prior to the **Triennial Review Date**, either of them may initiate the procedure for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4. **NGC** and the **User** acknowledge and agree that rule 12.1(p) of the **Electricity Arbitration Association** shall apply to any arbitration proceedings initiated in consequence thereof.~~
- ~~4.1.3.22 If any adjustment to the payment rates has not been ascertained (by agreement or determination) by the **Triennial Review Date** in accordance with the provisions of Paragraphs 4.1.3.20 and 4.1.3.21, **NGC**~~

~~and the User shall pay to the other for any interval between the Triennial Review Date and the date when such payment rates have been ascertained as aforesaid any sums due to that other party for the Mandatory Ancillary Service of Frequency Response calculated at the corresponding payment rates applicable during the period immediately preceding the Triennial Review Date without indexation. Upon any adjustment to the payment rates (or any of them) being ascertained as aforesaid, any additional amount or reduced amount payable or repayable for the period commencing on the Triennial Review Date and ending on the date when the payment rates shall have been ascertained, shall be paid or repaid by the party liable for such payment or repayment together with interest on the additional amounts which would have been payable (or the amounts by which the payments would have been reduced as the case may be) had the adjustment been ascertained at the Triennial Review Date at the rate applicable to overdue payments provided in Paragraph 4.3.~~

*Implementation of Continuous Monitoring System*  
4.1.3.2319 To the extent the same shall be acceptable to **NGC** and a **User** on the basis of a cost benefit analysis, **NGC** and a **User** agree, as between **NGC** and that **User**, to the implementation of a continuous monitoring system as soon as is reasonably practicable. The continuous monitoring system shall be in accordance with the relevant principles set out in Paragraph 4.1.3.25-21 for the purposes of confirming performance of the **BM Units** and adjusting payments pursuant to this Paragraph 4.1.3.

*Incident Based Monitoring System*  
4.1.3.2420 Pending implementation of the continuous monitoring system, **NGC** and each **User** agree, as between **NGC** and that **User**, to implement an incident based monitoring scheme for the purpose of confirming the performance of the **BM Units** pursuant to this Paragraph 4.1.3. Such incident based monitoring scheme shall be in accordance with the relevant principles set out in Paragraph 4.1.3.2521. Neither **NGC** nor the **User** shall unreasonably withhold or delay such agreement and/or implementation.

*Genset Response Monitoring*  
*Introduction*  
4.1.3.2521 (a) This Paragraph 4.1.3.25-21 sets out the principles relating to:

- (i) the proposed continuous monitoring system to be implemented pursuant to Paragraph 4.1.3.19; and
- (ii) the incident based monitoring system to apply until such time as implementation of the continuous monitoring system takes place.

Some elements of the continuous monitoring system are currently undergoing testing and development and it is accepted that if final testing of these elements proves unsatisfactory alternatives will need to be developed. Further, implementation of the continuous monitoring system shall be subject to its acceptability to **NGC** and **Users** on the basis of a cost benefit analysis.

Wherever possible the technical specification of both the incident based monitoring system and the continuous monitoring system will be designed so as to enable future development or enhancement.

*Aims of Project*

- (b) The aim of the monitoring project (which includes, without limitation, the development of the incident based monitoring system and the continuous monitoring system) is to develop a response monitoring system which will measure the response performance of generators against the levels of **Frequency Response** required to be provided under **Mandatory Services Agreements**.

*Incident Based Monitoring Scheme*

- (c) Details of the incident based monitoring scheme (including without limitation the definitions of Shortfall Period and Incident, the calculation of service delivery and the determination of Incident start and end times) will be more particularly set out in a document entitled "Procedure for Incident Based Response Monitoring" ("the PIRM Document") to be produced by **NGC** and agreed by all relevant **Users** (such agreement not to be unreasonably withheld or delayed).

For the avoidance of doubt during the period during which the incident based monitoring

scheme applies, and prior to the implementation of the continuous monitoring system, for the purposes of the formulae in Paragraphs 4.1.3.9 and 4.1.3.9A, the values of  $SF_P$ ,  $SF_S$  and  $SF_H$  shall be zero, such that no payment reduction shall apply during such period in respect of shortfall.

*Continuous Based Monitoring Scheme – Confirmation of Response Delivery*

- (d) The main objective of the continuous monitoring scheme is to provide a quantitative measure of **Frequency Response** delivery against which payment can be justifiably made and to reduce payments if delivery does not comply with the **CUSC** and the **Mandatory Services Agreement**. As the capability of a **BM Unit** to provide the level of **Response** required pursuant to this Paragraph 4.1.3 for any change in **System Frequency** occurring during the period of delivery of Response pursuant to a prior change in **System Frequency** will be affected by the level of **Response** then being delivered, relevant fluctuations in **System Frequency** should to this extent be taken into account by the continuous monitoring scheme for the purpose of calculating payment levels.

*Determination of Response Shortfall*

- (e) For the purposes of the continuous monitoring system, the **Response** shortfall may take three forms:-
- (i) average **Primary Response** under-delivery;
  - (ii) average **Secondary Response** under-delivery;
  - (iii) average **High Frequency Response** under-delivery,

in each case over a Shortfall Period (such term to be defined prior to implementation of the continuous monitoring system).

Upon the implementation of the continuous monitoring system, for the purposes of determining any such average under-delivery,  $SF_P$ ,  $SF_S$  and  $SF_H$  shall be the average under-delivery of **Primary Response**, **Secondary**

**Response and High Frequency Response**

respectively during the Shortfall Period in which the **Ancillary Service** was, or should have been, provided. For the purposes of the formulae in Paragraphs 4.1.3.9 and 4.1.3.9A, such average under-delivery will be determined using a continuous plant response assessment algorithm which is under development and which will be agreed with the **User** prior to its implementation and expressed in terms of  $0 \leq SF \leq 1$ .

*Measurement of System Variables*

- (f) In relation to the continuous monitoring system measurement of **System Frequency** and generator output power will be required local to the **BM Unit**. **Synchronised** time tagging of both power and **Frequency** will be required.

**Frequency** is required as the fundamental driving variable of the contract model software. Access to a voltage source to enable **Frequency** to be measured is not expected to cause any difficulty. The measurement of generator output power will also be required every second. Cost effective access to this measurement is, however, less straight forward. Covered below are two options describing how this will be achieved. It is expected that normally the FMS interface unit will be the method used; however, where the **BM Unit** concerned has derogations from FMS, method two may be used.

*FMS Interface Unit*

- (g) The use of the Final Metering System (FMS) represents a logical method of measurement since it eliminates the high cost associated with running cables to access CTs and VTs.

The high accuracy integrated data from FMS will be used to re-generate a power profile and curve fitting techniques will be applied to improve accuracy. This instantaneous power curve will then be sampled every second to obtain the required values.

*Direct Measurement*

- (h) Where for the reasons detailed in Paragraph 4.1.3.2521(f) it is not possible to use the FMS interface unit, the use of 'ISAT' type transducers will be employed to interface between the monitoring equipment and the measurement transformers' secondary circuit.

It is envisaged that generators seeking derogations from FMS will be supportive in establishing convenient VT and CT secondary connections for this purpose.

*Contract Model*

- (i) The contract model is the heart of the continuous monitoring system and it is crucial to the philosophy behind the system, namely that of modelling the **Mandatory Services Agreement** and not the **BM Unit** itself.

Given the difficulty in measuring **Frequency Response** directly on loaded plant, the need to compare changes in power delivery against expectation is evident. Comparison against this model output, which in turn is based on agreed and legally binding contracts, permits an identifiable quantity of non conformity to be measured and payments to be suitably reduced.

Therefore, since the **Mandatory Services Agreement** itself is the quantifying factor, there can be no redress due to assumptions regarding the technical attributes of the **BM Unit** other than those taken into account in setting the levels of **Response**.

*Functional Objective*

- (j) In relation to the continuous monitoring system, the model will comprise software which uses system and instructed variables to access the contract look-up tables. The look-up tables used will precisely mimic the response tables set out in **Mandatory Services Agreements**. These variables in turn will be processed using an algorithm to determine the levels of **Response** expected at any instant in time.

It is intended that this process will be effective during both small and large **Frequency Deviations**. Indeed with regard to reduction in payment and estimated **Response** capability,



response to small **Frequency Deviations** is extremely important.

*Input Data*

- (k) In relation to the continuous monitoring system, inputs to the contract model will include **Frequency**, all contract table data, target load, **Target Frequency**, the latest genset availability, the response instruction, LF setting (if electronically despatched) and any other information required which may be specified in the **Mandatory Services Agreement**.

*Comparator*

- (l) In relation to the continuous monitoring system, the comparator will determine the difference between the measured change in the level of **Output** from the **BM Unit** by way of **Frequency Response** and the change in **Output** level that is specified in the **Mandatory Services Agreement**.

~~Additional Costs~~

~~4.1.3.26 Save where expressly provided otherwise in the **CUSC** or any **Mandatory Services Agreement** if:-~~

~~(a) a **User** is of the opinion that in order to comply with any change in or amendment to the **Grid Code** (other than the withdrawal of or reduction in the scope of a **Derogation**) or any statutory or regulatory obligation coming into force after the **Commencement Date** of the relevant **Mandatory Services Agreement** that **User** is obliged to incur costs and expenses for the purpose of carrying out modifications to any **BM Unit** or **CCGT Unit** or otherwise for the purposes of changing the manner of operation of a **BM Unit** or **CCGT Unit** in relation to the provision of the **Mandatory Ancillary Service of Frequency Response**; or~~

~~(b) **NGC** is of the opinion that by reason of any change in or amendment to the **Grid Code** or any statutory or regulatory obligation coming into force after the **Commencement Date** of the relevant **Mandatory Services Agreement** a **User** is able to make savings in the cost and expense of providing the **Mandatory Ancillary Service of Frequency Response** from any **BM Unit** or **CCGT Unit**;~~

~~then either the **User** or **NGC** as the case may be may by notice in writing require the other to agree any adjustment in the rates and prices for the **Mandatory Ancillary Service** of **Frequency Response** and the **BM Unit** or **CCGT Unit** concerned as set out in the relevant **Mandatory Services Agreement** having regard to the charging principles set out in Paragraph 4.4. If **NGC** and that **User** cannot agree to an adjustment in such rates and prices within a month of receipt by either of them of the other's written notice, either of them may initiate the procedure for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.~~

- 4.1.3.2722 If, at any time during the term of a **Mandatory Services Agreement**, there is a variation in the security standards with which **NGC** is obliged to comply and such variation would, in a **User's** reasonable opinion, materially affect the operation of the services to be provided under that **Mandatory Services Agreement**, **NGC** and that **User** shall negotiate in good faith with a view to agreeing and implementing appropriate amendments to any relevant **Mandatory Services Agreement**. If they are unable to reach agreement within 28 days of either of them serving on the other notice of its intention to invoke the **Dispute Resolution Procedure**, either of them may initiate the procedure for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.

## Section B - Proposed Changes to Paragraphs 4.4 and 4.5 of the CUSC (Charging Principles and Indexation)

### 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 [Save where otherwise expressly provided in this Paragraph 4.4.2](#), the charges shall be "cost reflective" i.e. 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 or any costs which are incurred under the **Balancing and Settlement Code** in providing these services. **Holding Payments shall be determined in accordance with Paragraph 4.1.3.13 and, as specified in Paragraph 4.1.3.13(g), therefore need not be cost reflective.**
- 4.4.3.21 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**.
- 4.4.3.32 In recognition of the energy production costs likely to be incurred or avoided 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.

## 4.5 INDEXATION

### 4.5.1 Application

The provisions of this Paragraph 4.5 ~~shall~~ **may** 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~~ **Balancing Services Agreement (other than a Mandatory 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 Balancing Services (other than Mandatory 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).

#### 4.5.2 Indexation provisions

4.5.2.1 The rates and/or prices to be indexed shall be specified in the **Balancing Services Agreement** as applicable for a 12 month period commencing 1<sup>st</sup> April (“the base year”), and these rates and/or prices will be adjusted annually to take account of general price inflation. The index used will be the Retail Prices Index (RPI) with 1987 = 100 base.

4.5.2.2 The source of the RPI index is to be the monthly Office for National Statistics “Business Monitor MM23.”

4.5.2.3 The rates and/or prices to be indexed shall be increased (or reduced as appropriate) for the subsequent 12 month period commencing 1<sup>st</sup> April by the following factor:-

$$\frac{RPI_2}{RPI_1}$$

Where

$RPI_2$  is the RPI for March immediately prior to commencement of that 12 month period

$RPI_1$  is the RPI for March immediately prior to commencement of the base year.

4.5.2.4 The rates and/or prices to be indexed shall be increased (or reduced as appropriate) for the subsequent 12 month period commencing 1<sup>st</sup> April by the following factor:-

$$\frac{RPI_3}{RPI_1}$$

Where

$RPI_3$  is the RPI for March immediately prior to commencement of that 12 month period

RPI<sub>1</sub> is the RPI for March immediately prior to commencement of the base year.

- 4.5.2.5 In subsequent years indexation will continue in accordance with the above, with always the numerator of the factor representing the RPI of the 12 month period in question and the denominator of the factor being the RPI for March immediately prior to the base year.
- 4.5.2.6 In the event that RPI ceases to be published or is not published in respect of any relevant month or it is not practicable to use RPI because of a change in the method of compilation or some other reason, indexation for the purposes of this Paragraph 4.5 shall be calculated by **NGC** using an index agreed between **NGC** and the relevant **User** with a view to determining the relevant price after indexation that would be closest to the relevant price after indexation if RPI had continued to be available. If **NGC** and a relevant **User** are unable to agree a suitable index, either of them may initiate the **Dispute Resolution Procedure** for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.
- 4.5.2.7 For the avoidance of doubt, the provisions of Paragraph 11.3 with regard to determination of an alternative index should the **Retail Prices Index** not be published or there is a material change to the basis of such index shall not apply with respect to the rates and/or prices the subject of this Paragraph 4.5.

**Section C - Proposed Changes to Paragraph 11.3 of the CUSC (Definitions)**

~~“Triennial Review Date”~~ \_\_\_\_\_ as defined in Paragraph 4.1.3.20; |

“Operational Day” \_\_\_\_\_ as defined in the **Grid Code**; |

## Proposed Changes to Schedule 2 - Exhibit 4 of the CUSC (Mandatory Services Agreement)

*For the avoidance of doubt, the proposed changes are indicated with coloured text only. Coloured underlined text will be inserted, and coloured strikethrough text will be deleted.*

### 4. FREQUENCY RESPONSE

#### 4.1 Paragraph 4.1.3 of CUSC

The provisions of this Clause 4 give effect to the provisions of Paragraph 4.1.3 of the **CUSC** in respect of the provision by the **User** from the **BM Units** of the **Mandatory Ancillary Service of Frequency Response** and the payments to be made by **NGC** to the **User** in respect thereof.

#### 4.2 Term

4.2.1 The provisions of this Clause 4 shall be deemed to have applied in relation to each **BM Unit** with effect from 00.00 hours on the [date hereof] [**Commencement Date**] and shall continue thereafter unless and until this **Mandatory Services Agreement** is terminated. For the avoidance of doubt, in the event this **Mandatory Services Agreement** is terminated in relation to any individual **BM Unit**, the provisions of this Clause 4 shall terminate in relation to that **BM Unit** only.

4.2.2 Termination of this Clause 4 shall not affect the rights and obligations of **NGC** and the **User** accrued as at the date of termination.

#### 4.3 Provision of Frequency Response

4.3.1 The **Parties** agree that:-

- (a) [subject always to Sub-Clause 4.64,] for the purposes of Paragraph 4.1.3.7 of the **CUSC**, the figures set out in the response tables in Appendix 1, Section B, Part I represent the amount of **Primary Response**, **Secondary Response** and **High Frequency Response** referred to therein;
- (b) [subject always to Sub-Clause 4.64,] for the purposes of Paragraph 4.1.3.9 of the **CUSC**, the figures set out in the summary response table in Appendix 1, Section B, Part II represent the capabilities in respect of **Primary Response**, **Secondary Response** and **High Frequency Response** at given levels of **De-Load** referred to therein;
- (c) for the purposes of Paragraph 4.1.3.4 of the **CUSC**, the table in Appendix 1, Section B, Part III shows the permissible



combinations of **Primary Response**, **Secondary Response** and **High Frequency Response** referred to therein;

(d) for the purposes of Paragraph 4.1.3.9 of the **CUSC**, the figures (if any) set out in the plant configuration table in Appendix 1, Section B, Part II represent the plant configuration adjustment factors referred to therein to be applied where the **BM Unit** is a **CCGT Module**;

~~(e) for the purposes of Paragraph 4.1.3.9 of the **CUSC**, the payment rates in Appendix 2, Section B constitute the payment rates in respect of **Primary Response**, **Secondary Response** and **High Frequency Response** referred to therein; and~~

(fe) [subject always to Sub-Clause 4.64,] for the purposes of Paragraph 4.1.3.9A(a) of the **CUSC** in respect of calculation of the **Response Energy Payment**, the response values in Appendix 1, Section B, Part IV represent the Frequency Response Power that is deemed to be delivered in respect of **Primary Response**, **Secondary Response** and **High Frequency Response**.

#### ~~4.4~~ **Indexation**

~~The payment rates set out in Appendix 2, Section B are specified at April [ ] base, and shall from 1<sup>st</sup> April each year be indexed in accordance with Paragraph 4.5 of the **CUSC**.~~

#### ~~4.5~~ **Triennial Review**

~~For the purposes of Paragraph 4.1.3.20 of the **CUSC**, the first **Triennial Review Date** shall be [ ];~~

#### **4.64 [Commissioning and Provisional Response Levels**

Without prejudice to Paragraphs ~~4.1.3.13 and~~ 4.1.3.14 of the **CUSC**, the **User** acknowledges that the levels of **Response** set out in the response tables in Appendix 1, Section B, Parts I, II and IV are indicative figures only during the period in which the relevant **Generating Unit(s)** is being commissioned and the **User** hereby undertakes to use its reasonable endeavours to forward to **NGC** levels of **Response** which represent the true operating characteristics of such **Generating Unit(s)** for inclusion in Appendix 1, Section B, Parts I, II and IV as soon as possible following completion of commissioning.]

**APPENDIX 2****SECTION B (FREQUENCY RESPONSE)****PAYMENT RATES**

Table 1	Payment Rates	
Response Type	Payment Code	Payment Rate (£/MW/h)
Primary Response	P <sub>PR</sub>	
Secondary Response	S <sub>PR</sub>	
High Frequency Response	H <sub>PR</sub>	

**Not Used**

## Annex 6 – Legal Text to give effect to CAP047 Alternate Amendment Proposal (B)

### CAP047 - ALTERNATIVE MODIFICATION PROPOSAL (B)

#### Annex 2 - Proposed Changes to Section 4 of the CUSC (Balancing Services) and Section 11 (Interpretation and Definitions)

*For the avoidance of doubt, the proposed changes are indicated with coloured text only. Coloured underlined text will be inserted, and coloured strikethrough text will be deleted.*

#### Section A - Proposed Changes to Paragraph 4.1.3 of the CUSC (Frequency Response)

##### 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 Frequency Response Capability Data tables in the **Mandatory Services Agreement** (as such tables are to be interpreted in accordance with Paragraph 4.1.3.11).

4.1.3.7A For the avoidance of doubt a **User** shall ensure that the **Transmission Entry Capacity** for the relevant **Connection Site** shall be sufficient to enable it to comply with its obligations under Paragraph 4.1.3.7 above at all times and in respect of all relevant **BM Units**.

*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 Response Energy 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** determined in accordance with Paragraph 4.1.3.13 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** determined in accordance with Paragraph 4.1.3.13 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** determined in accordance with Paragraph 4.1.3.13 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 4.1.3.25-27 (e);
- $SF_S$  = 0, subject to Paragraph 4.1.3.25-27 (e);
- $SF_H$  = 0, subject to Paragraph 4.1.3.25-27 (e).

*Payment Formulae – Response Energy Payment*

- 4.1.3.9A (a) The **Response Energy 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 calculated in accordance with the following formulae:-

$$REP_{ij} = RE_{ij} \times \text{Reference Price}$$

But so that where  $REP_{ij}$  is negative such amount shall be paid by the **User** to **NGC**.

Where:

$REP_{ij}$  is the **Response Energy Payment** to be made to or, as the case may be, by the **User**; and

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

$$RE_{ij} = \int_0^{SPD} \left[ \max(FR_{ij}(t), 0) \times (1 - SF_{LF}) + \min(FR_{ij}(t), 0) \times (1 - SF_H) \right] \times K_T \times K_{GRC} dt$$

Where:

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

$SF_{LF}$  is equal to  $SF_P$  in the case of a **BM Unit** being instructed to deliver **Primary Response** without **Secondary Response** or the mean of  $SF_P$  and  $SF_S$  in the case of a **BM Unit** being instructed to deliver **Primary Response** and **Secondary Response**.

$SF_P$ ,  $SF_S$ ,  $SF_H$ ,  $K_T$  and  $K_{GRC}$  have the meanings ascribed to them in Paragraph 4.1.3.9.

$FR_{ij}(t)$  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 Frequency Response Power Delivery Data table 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 table entitled "High Frequency Response Power Delivery – Mode A" 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 table entitled “Primary Response Power Delivery – Mode A” in the case of a **BM Unit** being instructed to deliver **Primary Response** without **Secondary Response**;  
or

(B) the table entitled “Primary & Secondary Response Power Delivery – Mode A” in the case of a **BM Unit** being instructed to deliver **Primary Response** and **Secondary Response**,

in each case set out in the **Mandatory Services Agreement** and shall be signed positive.

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

Where:

$\overline{SBP}_{\text{month}}$  and  $\overline{SSP}_{\text{month}}$  are the calculated time weighted average of  $SBP_j$  and  $SSP_j$  respectively for the preceding calendar month in which the service is provided.

(b) (not used)

(c) (not used)

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

“ $SSP_j$ ”  
“ $SBP_j$ ”  
“SPD”

4.1.3.10 **NGC** and each **User** acknowledge and agree, as between **NGC** and that **User**, that no **Holding Payment** or **Response Energy 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.

4.1.3.11 *Interpretation of Tables – Levels of Response*  
The figures for **Response** set out in the Frequency Response Capability Data tables and Frequency

Response Power Delivery Data tables in the **Mandatory Services Agreements** shall be given in relation to specific **Frequency Deviations** and to specific levels of **De-Load** for a **BM Unit**. Such tables shall, for the purposes of Paragraphs 4.1.3.7 and 4.1.3.9A(a), be construed in accordance with this Paragraph 4.1.3.11. Subject to Paragraphs 4.1.3.11(d) and (e):-

- (a) for a **Frequency Deviation** at a given time differing from the figures given in a table, the level of **Response** shall be calculated by linear interpolation from the figures specified in the table in respect of **Frequency Deviations**;
  - (b) for a level of **De-Load** at a given time differing from the figures given in a table, the level of **Response** shall be calculated by linear interpolation from the figures specified in the table in respect of levels of **De-Load**. For the avoidance of doubt, **Frequency Sensitive Mode** shall not be instructed for any **De-Load** greater than the maximum level of **De-Load** given in the relevant Frequency Response Capability Data table;
  - (c) in respect of any time in relation to which both Paragraphs 4.1.3.11(a) and (b) apply, the level of **Response** shall be calculated by dual linear interpolation from the figures specified in the table in respect of **Frequency Deviations** and in respect of levels of **De-Load**;
- and
- (d) for any **Frequency Deviation** greater than the greatest **Frequency Deviation** given in a table (whether positive or negative), the level of **Response** shall be calculated by reference to the greatest **Frequency Deviation** (positive or negative, as the case may be) given in that table; and
  - (e) for the purposes of calculating levels of **Response** in respect of **Frequency Deviations** lower than those specified in a table, the relevant table(s) shall be deemed to specify a level of zero **Response** for a **Frequency Deviation** of zero.

*Interpretation of Tables – Levels of Holding Payment*

- 4.1.3.12 The Frequency Response Summary Data table in the **Mandatory Services Agreement** shall set out figures in respect of given levels of **De-Load** for the purposes of calculating payment in accordance with the formulae in Paragraph 4.1.3.9. Where the level of **De-Load** of the **BM Unit** is other than one of the levels given in such table, then the figure for  $P_{MW}$ ,  $S_{MW}$  or  $H_{MW}$  as the case may be, shall be calculated by linear interpolation from the figures in such table in respect of levels of **De-Load**.

**User's submission of Holding Payment Rates**

- 4.1.3.13 The following terms shall apply to determine the payment rates for **Primary Response**, **High Frequency Response** and **Secondary Response** used in the calculation of **Holding Payments** in accordance with Paragraph 4.1.3.9 which shall apply in respect of the provision of **Mode A Frequency Response** by the **User** to **NGC** from one or more **BM Units** in a calendar month (and, for the purposes thereof, all dates specified in this Paragraph 4.1.3.13 unless stated otherwise refer to the immediately preceding calendar month):-

- (a) By the fifth **Business Day** of the calendar month, **NGC** shall publish on its web-site information relating to **NGC's** requirement for **Mode A Frequency Response** (in MW) in the next following calendar month.
- (b) By the fifteenth **Business Day** of the calendar month, the **User** may in relation to any of its **BM Units** identified in a **Mandatory Services Agreement** to which the **User** is a party submit a single notification to **NGC** which shall be compliant with Paragraphs 4.1.3.13(c) and (d) (in a form and by such method as shall be prescribed by **NGC** from time to time) specifying in respect of that **BM Unit** the payment rates which, subject always to Paragraphs 4.1.3.13(g), (h) and (i), shall apply in determining the **Holding Payments** for the provision of **Mode A Frequency Response** during the next following calendar month, each such notification to specify:-
- (i) the **BM Unit** in question;
- (ii) the payment rate for **Primary Response**;
- (iii) the payment rate for **High Frequency Response**; and

- (iv) the payment rate for **Secondary Response**.
- (c) Payment rates submitted by the **User** in accordance with Paragraph 4.1.3.13(b) must be:-
- (i) quoted in pounds sterling to the nearest penny; and
- (ii) quoted in units of £/MW/h.
- (d) Any payment rates for **Primary Response, High Frequency Response** and **Secondary Response** submitted by the **User** in respect of any of its **BM Units** in accordance with Paragraph 4.1.3.13(b) shall not:-
- (i) in respect of any calendar month in the 12 month period commencing at 00.00 hours on 1 October 2004 exceed the applicable **Frequency Response Default Payment Rate** for **Primary Response, High Frequency Response** or **Secondary Response** (as the case may be) for that **BM Unit** multiplied by a factor of 1.25;
- (ii) in respect of any calendar month in the 12 month period commencing at 00.00 hours on 1 October 2005 exceed the applicable **Frequency Response Default Payment Rate** for **Primary Response, High Frequency Response** or **Secondary Response** (as the case may be) for that **BM Unit** multiplied by a factor of 1.5; and
- (iii) in respect of any calendar month in the period commencing at 00.00 hours on 1 October 2006 exceed the applicable **Frequency Response Default Payment Rate** for **Primary Response, High Frequency Response** or **Secondary Response** (as the case may be) for that **BM Unit** multiplied by a factor of 1.5.
- (e) Upon receipt of a notification from the **User** made in accordance with Paragraph 4.1.3.13(b), **NGC** shall publish details of such notification in a report issued in accordance with Paragraph 4.1.3.14(a) and, subject always to:-

- (i) rectification (if any) of payment rates pursuant to Paragraph 4.1.3.13(f); and/or
- (ii) the substitution of deemed payment rates in accordance with either of Paragraphs 4.1.3.13(g), (h) and (i),

NGC shall apply published payment rates for **Primary Response, High Frequency Response** and **Secondary Response** in calculating the **Holding Payments** for the relevant **BM Unit** in the next following calendar month.

- (f) The **User** shall have the right, to be exercised within one **Business Day** of the publication of payment rates in respect of a **BM Unit** in accordance with Paragraph 4.1.3.13(e), to notify **NGC** (in a form and by such method as shall be prescribed by **NGC** from time to time) of any discrepancy between those payment rates and the actual payment rates submitted by the **User** in respect of that **BM Unit** in accordance with Paragraph 4.1.3.13(b). Upon receipt of any such notification, **NGC** shall rectify the report issued in accordance with Paragraph 4.1.3.14(a) and shall publish the rectified report in accordance with Paragraph 4.1.3.14(b).
- (g) In the absence of a notification from a **User** which is submitted in accordance with Paragraphs 4.1.3.13(b) -in respect of the provision by a **BM Unit of Mode A Frequency Response** in the next following calendar month, the payment rates for **Primary Response, High Frequency Response** and **Secondary Response** to apply in determining the **Holding Payments** for that **BM Unit** in respect of that calendar month shall be determined as follows:-
  - (i) unless paragraph 4.1.3.13(g)(ii) below applies, the payment rates for **Primary Response, High Frequency Response** and **Secondary Response** which shall apply in respect of the provision by that **BM Unit of Mode A Frequency Response** in that calendar month shall be the payment rates most recently published in accordance with Paragraph 4.1.3.14(a) or (b) (as the case may be) for that **BM Unit** in respect of a previous calendar month;

- (ii) where the User has never in respect of any previous calendar month submitted a notification in accordance with Paragraph 4.1.3.13(b) in respect of the provision by that BM Unit of Mode A Frequency Response, the payment rate to apply to the provision of each of Primary Response, High Frequency Response and Secondary Response from that BM Unit in that calendar month shall be deemed to be the Frequency Response Default Payment Rates.
- (h) Where any one or more of the payment rates for Primary Response, High Frequency Response and Secondary Response submitted by a User to NGC in relation to a BM Unit in accordance with Paragraph 4.1.3.13(b) is not compliant with all of the requirements of Paragraphs 4.1.3.13(c) and (d) (hereinafter referred to as “the Non-Compliant Payment Rate(s)”), then such Non-Compliant Payment Rate(s) shall not apply and, for the purposes of determining the Holding Payments for that BM Unit in respect of that calendar month, the payment rates to apply in place of such Non-Compliant Payment Rate(s) shall be determined as follows:-
- (i) unless Paragraph 4.1.3.13(h)(ii) below applies, the Non-Compliant Payment Rate(s) in respect of that BM Unit shall be replaced in that calendar month by the relevant payment rate(s) for Primary Response, High Frequency Response and/or Secondary Response (as the case may be) which were most recently published in accordance with Paragraph 4.1.3.14(a) or (b) (as the case may be) for that BM Unit in respect of a previous calendar month;
- (ii) where no such payment rate(s) have been published, the Non-Compliant Payment Rate(s) shall be replaced in that calendar month by the applicable Frequency Response Default Payment Rate(s) for Primary Response, High Frequency Response and/or Secondary Response (as the case may be) in respect of that BM Unit.

(i) Where in any calendar month the **User** has been 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**, and in respect of more than two such instructions the **User** has failed (otherwise than due to **Force Majeure**) to operate that **BM Unit** so as to provide **Mode A Frequency Response** then, **NGC** may, at its discretion, determine that the payment rates to apply to the provision of each of **Primary Response**, **High Frequency Response** and **Secondary Response** from that **BM Unit** in the next following calendar month (and for the avoidance of doubt for that calendar month only) shall be deemed to be the **Frequency Response Default Payment Rates**. Accordingly any payment rates submitted by the **User** in respect of that **BM Unit** in accordance with Paragraph 4.1.3.13(b) in respect of the next following calendar month shall not apply.

(i) Paragraph 4.4.2.2 shall not apply to the payment rates for **Primary Response**, **High Frequency Response** and **Secondary Response** submitted in accordance with Paragraph 4.1.3.13(b).

Publication of **Holding Payment Rates** and other information

4.1.3.14 (a) **NGC** shall use reasonable endeavours to publish on its web-site by the sixteenth **Business Day** of each calendar month, a report containing the following information in respect of each applicable **User's BM Unit(s)** to apply in respect of the next following calendar month:-

(i) the payment rates for **Primary Response**, **High Frequency Response** and **Secondary Response** to apply in determining the **Holding Payments** for the next following calendar month as determined in accordance with Paragraph 4.1.3.13 (if any);

(ii) the available **Response** volume (in such form and manner as shall be prescribed by **NGC** from time to time).

(b) Where any payment rates published in a report issued in accordance with Paragraph 4.1.3.14(a) are either:-

(i) rectified by NGC in accordance with Paragraph 4.1.3.13(f); or

(ii) not applicable by virtue of the application of the **Frequency Response Default Payment Rates** in accordance with a determination by NGC pursuant to Paragraph 4.1.3.13(i),

NGC shall as soon as reasonably practicable thereafter publish the rectified report on its web-site.

(c) In respect of each **Operational Day** (or part thereof) in a calendar month, NGC shall, by the ninth **Business Day** of the calendar month following that calendar month, publish on its web-site in respect of all **BM Units** details of instructions issued by NGC in accordance with Paragraph 4.1.3.4 for each of **Primary Response, High Frequency Response** and **Secondary Response** (in such form and manner as shall be prescribed by NGC from time to time).

(d) Each **User** consents to the disclosure by NGC of the information referred to in Paragraphs 4.1.3.14(a) and (b) in so far as it relates to the provision of **Mode A Frequency Response** from its **BM Unit(s)**, provided always that NGC shall not be bound to comply with the provisions of Paragraphs 4.1.3.14(a) and (b) with regard to the provision of information to the extent that to do so would be likely to restrict, distort or prevent competition in the provision of **Mode A Frequency Response**.

***User's Request to Amend Levels of and/or Default Payment Rates for Response***

4.1.3.4315 Each **User** shall have the right, as between **NGC** and that **User**, not more than once every two months (or otherwise at any time with the specific agreement of **NGC**) to request in writing an amendment to the levels of **Response** set out in the Frequency Response Capability Data tables and/or the Frequency Response Power Delivery Data tables in the **Mandatory Services Agreement** and/or, provided such request is made in accordance with the relevant charging principles set out in Paragraph 4.4, ~~the payment rates referred to in the Payment Rates table(s) in the Mandatory Services Agreement~~ the **Frequency Response Default**



**Payment Rates.** NGC's agreement to such a request shall not be unreasonably withheld or delayed.

**NGC's Requests to Amend Levels of Response**

4.1.3.4416 Where NGC reasonably considers in light of operating experience that the levels of **Response** set out in the Frequency Response Capability Data tables and/or the Frequency Response Power Delivery Data tables in the **Mandatory Services Agreement** do not represent the true operating capabilities of a **BM Unit(s)**, NGC shall have the right not more than once every two months (or otherwise at any time with the specific agreement of the relevant **User**) to request (provided always that such request be accompanied by a reasonable justification therefor) that the levels of **Response** set out in the relevant response table(s) in the **Mandatory Services Agreement** be reviewed and, if appropriate, amended by agreement with such **User**, such agreement not to be unreasonably withheld or delayed.

*Procedure for Amendments to Levels of and/or **Default Payment Rates for Response***

4.1.3.4517 Any amendments agreed by NGC and a **User** pursuant to Paragraphs 4.1.3.43-15 or 4.1.3.44-16 or determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** in the circumstances referred to in Paragraph 4.1.3.46-18 shall not become effective until (in the case of agreed amendments) a date at least five **Business Days** after an amending agreement is entered into between NGC and the **User** in accordance with the **Mandatory Services Agreement** or, in the case of determined amendments, such other date as may be determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** subject always to Paragraphs 4.1.3.47-19 and 4.1.3.49-218.

*Failure to Agree Amendments*

4.1.3.4618 If NGC and a **User** are unable to agree any amendments requested pursuant to Paragraphs 4.1.3.43-15 or 4.1.3.44-16 within 28 days of either of them serving on the other notice of its intention to invoke the **Dispute Resolution Procedure** then either party may initiate the procedure for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.

*Dispute Resolution Procedure*

4.1.3.4719 NGC and each **User** acknowledge and agree, as between NGC and that **User**, that rule 12.1(p) of the **Electricity Arbitration Association** shall apply to any

arbitration proceedings initiated pursuant to Paragraph 7.4 in the circumstances referred to in Paragraph 4.1.3.4618, but that the changes determined by any arbitrator or panel of arbitrators shall not apply in respect of any period prior to the date on which the **Dispute Resolution Procedure** is invoked.

*Implementation of Determinations*

4.1.3.4820 Subject to Paragraph 4.1.3.4719, any changes to ~~payment rates~~ the **Frequency Response Default Payment Rates** determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** in the circumstances referred to in Paragraph 4.1.3.46-18 shall apply with effect from the date specified in the determination and consequential adjustments shall be made in the next practicable **Provisional Monthly Statement** issued following the date of the determination. If any such changes are so determined to apply in respect of any period prior to the date of determination then in respect of such period until actual payment (or, as the case may be, repayment) **NGC** shall pay to the **User** (where such **Frequency Response Default Payment Rates** ~~payment rates~~ are determined to be greater than current **Frequency Response Default Payment Rates** ~~payment rates~~) the excess together with interest thereon at the **Base Rate** and the **User** shall repay to **NGC** (where such **Frequency Response Default Payment Rates** ~~payment rates~~ are determined to be less than current **Frequency Response Default Payment Rates** ~~payment rates~~) the amount by which **NGC** has overpaid the **User** together with interest thereon at the **Base Rate**.

4.1.3.4921 Any amendments to levels of **Response** determined by an arbitrator or panel of arbitrators under the **Dispute Resolution Procedure** in the circumstances referred to in Paragraph 4.1.3.16 shall take effect from the date five **Business Days** following the relevant determination.

*Triennial Review*

4.1.3.2022 Without prejudice to Paragraphs 4.1.3.43-15 to 4.1.3.4921 inclusive, **NGC** and each **User** shall review the ~~payment rates for the Mandatory Ancillary Service of~~ **Frequency Response Default Payment Rates** set out in each relevant **Mandatory Services Agreement** and shall adjust such **Frequency Response Default Payment Rates** ~~payment rates~~ by such amount or in such manner as shall be fair and reasonable (on the basis of the charging principles set out in Paragraph 4.4) on the date specified for such purpose in the

**Mandatory Services Agreement** and on each third successive anniversary thereof during the currency of that **Mandatory Services Agreement** (“**Triennial Review Date**”).

- 4.1.3.2423 **NGC** and the **User** shall meet to discuss and endeavour to agree any such adjustment to the **Frequency Response Default Payment Rates** ~~payment rates~~ (which shall be calculated on the basis of the charging principles set out in Paragraph 4.4) no later than five months prior to the **Triennial Review Date**. If **NGC** and the **User** have not agreed the amount of any such adjustment by the date which is one month prior to the **Triennial Review Date**, either of them may initiate the procedure for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4. **NGC** and the **User** acknowledge and agree that rule 12.1(p) of the **Electricity Arbitration Association** shall apply to any arbitration proceedings initiated in consequence thereof.
- 4.1.3.2224 If any adjustment to the **Frequency Response Default Payment Rates** ~~payment rates~~ has not been ascertained (by agreement or determination) by the **Triennial Review Date** in accordance with the provisions of Paragraphs 4.1.3.20–22 and 4.1.3.2423, **NGC** and the **User** shall pay to the other for any interval between the **Triennial Review Date** and the date when such **Frequency Response Default Payment Rates** ~~payment rates~~ have been ascertained as aforesaid any sums due to that other party for the **Mandatory Ancillary Service** of **Frequency Response** calculated at the corresponding **Frequency Response Default Payment Rates** ~~payment rates~~ applicable during the period immediately preceding the **Triennial Review Date** without indexation. Upon any adjustment to the **Frequency Response Default Payment Rates** ~~payment rates~~ (or any of them) being ascertained as aforesaid, any additional amount or reduced amount payable or repayable for the period commencing on the **Triennial Review Date** and ending on the date when the **Frequency Response Default Payment Rates** ~~payment rates~~ shall have been ascertained, shall be paid or repaid by the party liable for such payment or repayment together with interest on the additional amounts which would have been payable (or the amounts by which the payments would have been reduced as the case may be) had the adjustment been ascertained at the **Triennial Review Date** at the rate applicable to overdue payments provided in Paragraph 4.3.

*Implementation of Continuous Monitoring System*

- 4.1.3.2325 To the extent the same shall be acceptable to **NGC** and a **User** on the basis of a cost benefit analysis, **NGC** and a **User** agree, as between **NGC** and that **User**, to the implementation of a continuous monitoring system from, or as soon as is reasonably practicable after, 00.00 hours on 1 October 2006. The continuous monitoring system shall be in accordance with the relevant principles set out in Paragraph 4.1.3.25–27 for the purposes of confirming performance of the **BM Units** and adjusting payments pursuant to this Paragraph 4.1.3.

*Incident Based Monitoring System*

- 4.1.3.2426 Pending implementation of the continuous monitoring system on or after 00.00 hours on 1 October 2006, **NGC** and each **User** agree, as between **NGC** and that **User**, to implement an incident based monitoring scheme for the purpose of confirming the performance of the **BM Units** pursuant to this Paragraph 4.1.3. Such incident based monitoring scheme shall be in accordance with the relevant principles set out in Paragraph 4.1.3.2527. Neither **NGC** nor the **User** shall unreasonably withhold or delay such agreement and/or implementation.

*Genset Response Monitoring Introduction*

- 4.1.3.2527 (a) This Paragraph 4.1.3.25–27 sets out the principles relating to:
- (i) the proposed continuous monitoring system to be implemented pursuant to Paragraph 4.1.3.25; and
  - (ii) the incident based monitoring system to apply until such time as implementation of the continuous monitoring system takes place.

Some elements of the continuous monitoring system are currently undergoing testing and development and it is accepted that if final testing of these elements proves unsatisfactory alternatives will need to be developed. Further, implementation of the continuous monitoring system shall be subject to its acceptability to **NGC** and **Users** on the basis of a cost benefit analysis.

Wherever possible the technical specification of both the incident based monitoring system and

the continuous monitoring system will be designed so as to enable future development or enhancement.

*Aims of Project*

- (b) The aim of the monitoring project (which includes, without limitation, the development of the incident based monitoring system and the continuous monitoring system) is to develop a response monitoring system which will measure the response performance of generators against the levels of **Frequency Response** required to be provided under **Mandatory Services Agreements**.

*Incident Based Monitoring Scheme*

- (c) Details of the incident based monitoring scheme (including without limitation the definitions of Shortfall Period and Incident, the calculation of service delivery and the determination of Incident start and end times) will be more particularly set out in a document entitled "Procedure for Incident Based Response Monitoring" ("the PIRM Document") to be produced by **NGC** and agreed by all relevant **Users** (such agreement not to be unreasonably withheld or delayed).

For the avoidance of doubt during the period during which the incident based monitoring scheme applies, and prior to the implementation of the continuous monitoring system, for the purposes of the formulae in Paragraphs 4.1.3.9 and 4.1.3.9A, the values of  $SF_P$ ,  $SF_S$  and  $SF_H$  shall be zero, such that [\[, subject always to Paragraph 4.1.3.13\(i\),\]](#) no payment reduction shall apply during such period in respect of shortfall.

*Continuous Based Monitoring Scheme – Confirmation of Response Delivery*

- (d) The main objective of the continuous monitoring scheme is to provide a quantitative measure of **Frequency Response** delivery against which payment can be justifiably made and to reduce payments if delivery does not comply with the **CUSC** and the **Mandatory Services Agreement**. As the capability of a **BM Unit** to provide the level of **Response** required pursuant to this Paragraph 4.1.3 for any change in **System Frequency** occurring during the period

of delivery of Response pursuant to a prior change in **System Frequency** will be affected by the level of **Response** then being delivered, relevant fluctuations in **System Frequency** should to this extent be taken into account by the continuous monitoring scheme for the purpose of calculating payment levels.

*Determination of Response Shortfall*

- (e) For the purposes of the continuous monitoring system, the **Response** shortfall may take three forms:-
- (i) average **Primary Response** under-delivery;
  - (ii) average **Secondary Response** under-delivery;
  - (iii) average **High Frequency Response** under-delivery,

in each case over a Shortfall Period (such term to be defined prior to implementation of the continuous monitoring system).

Upon the implementation of the continuous monitoring system, for the purposes of determining any such average under-delivery,  $SF_P$ ,  $SF_S$  and  $SF_H$  shall be the average under-delivery of **Primary Response**, **Secondary Response** and **High Frequency Response** respectively during the Shortfall Period in which the **Ancillary Service** was, or should have been, provided. For the purposes of the formulae in Paragraphs 4.1.3.9 and 4.1.3.9A, such average under-delivery will be determined using a continuous plant response assessment algorithm which is under development and which will be agreed with the **User** prior to its implementation and expressed in terms of  $0 \leq SF \leq 1$ .

*Measurement of System Variables*

- (f) In relation to the continuous monitoring system measurement of **System Frequency** and generator output power will be required local to the **BM Unit**. **Synchronised** time tagging of both power and **Frequency** will be required.

**Frequency** is required as the fundamental driving variable of the contract model software. Access to a voltage source to enable **Frequency** to be measured is not expected to cause any difficulty. The measurement of generator output power will also be required every second. Cost effective access to this measurement is, however, less straight forward. Covered below are two options describing how this will be achieved. It is expected that normally the FMS interface unit will be the method used; however, where the **BM Unit** concerned has derogations from FMS, method two may be used.

*FMS Interface Unit*

- (g) The use of the Final Metering System (FMS) represents a logical method of measurement since it eliminates the high cost associated with running cables to access CTs and VTs.

The high accuracy integrated data from FMS will be used to re-generate a power profile and curve fitting techniques will be applied to improve accuracy. This instantaneous power curve will then be sampled every second to obtain the required values.

*Direct Measurement*

- (h) Where for the reasons detailed in Paragraph 4.1.3.2526 (f) it is not possible to use the FMS interface unit, the use of 'ISAT' type transducers will be employed to interface between the monitoring equipment and the measurement transformers' secondary circuit.

It is envisaged that generators seeking derogations from FMS will be supportive in establishing convenient VT and CT secondary connections for this purpose.

*Contract Model*

- (i) The contract model is the heart of the continuous monitoring system and it is crucial to the philosophy behind the system, namely that of modelling the **Mandatory Services Agreement** and not the **BM Unit** itself.

Given the difficulty in measuring **Frequency Response** directly on loaded plant, the need to compare changes in power delivery against

expectation is evident. Comparison against this model output, which in turn is based on agreed and legally binding contracts, permits an identifiable quantity of non conformity to be measured and payments to be suitably reduced.

Therefore, since the **Mandatory Services Agreement** itself is the quantifying factor, there can be no redress due to assumptions regarding the technical attributes of the **BM Unit** other than those taken into account in setting the levels of **Response**.

*Functional Objective*

- (j) In relation to the continuous monitoring system, the model will comprise software which uses system and instructed variables to access the contract look-up tables. The look-up tables used will precisely mimic the response tables set out in **Mandatory Services Agreements**. These variables in turn will be processed using an algorithm to determine the levels of **Response** expected at any instant in time.

It is intended that this process will be effective during both small and large **Frequency Deviations**. Indeed with regard to reduction in payment and estimated **Response** capability, response to small **Frequency Deviations** is extremely important.

*Input Data*

- (k) In relation to the continuous monitoring system, inputs to the contract model will include **Frequency**, all contract table data, target load, **Target Frequency**, the latest genset availability, the response instruction, LF setting (if electronically despatched) and any other information required which may be specified in the **Mandatory Services Agreement**.

*Comparator*

- (l) In relation to the continuous monitoring system, the comparator will determine the difference between the measured change in the level of **Output** from the **BM Unit** by way of **Frequency Response** and the change in **Output** level that is specified in the **Mandatory Services Agreement**.



*Additional Costs*

4.1.3.2628 Save where expressly provided otherwise in the **CUSC** or any **Mandatory Services Agreement** if:-

- (a) a **User** is of the opinion that in order to comply with any change in or amendment to the **Grid Code** (other than the withdrawal of or reduction in the scope of a **Derogation**) or any statutory or regulatory obligation coming into force after the **Commencement Date** of the relevant **Mandatory Services Agreement** that **User** is obliged to incur costs and expenses for the purpose of carrying out modifications to any **BM Unit** or **CCGT Unit** or otherwise for the purposes of changing the manner of operation of a **BM Unit** or **CCGT Unit** in relation to the provision of the **Mandatory Ancillary Service of Frequency Response**; or
- (b) **NGC** is of the opinion that by reason of any change in or amendment to the **Grid Code** or any statutory or regulatory obligation coming into force after the **Commencement Date** of the relevant **Mandatory Services Agreement** a **User** is able to make savings in the cost and expense of providing the **Mandatory Ancillary Service of Frequency Response** from any **BM Unit** or **CCGT Unit**,

then either the **User** or **NGC** as the case may be may by notice in writing require the other to agree any adjustment in the ~~rates and prices for the Mandatory Ancillary Service of Frequency Response~~ **Default Payment Rates** and the **BM Unit** or **CCGT Unit** concerned as set out in the relevant **Mandatory Services Agreement** having regard to the charging principles set out in Paragraph 4.4. If **NGC** and that **User** cannot agree to an adjustment in such rates and prices within a month of receipt by either of them of the other's written notice, either of them may initiate the procedure for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.

4.1.3.2729 If, at any time during the term of a **Mandatory Services Agreement**, there is a variation in the security standards with which **NGC** is obliged to comply and such variation would, in a **User's** reasonable opinion, materially affect the operation of the services to be provided under that **Mandatory Services Agreement**, **NGC** and that **User** shall negotiate in good faith with a view to agreeing and implementing appropriate

amendments to any relevant **Mandatory Services Agreement**. If they are unable to reach agreement within 28 days of either of them serving on the other notice of its intention to invoke the **Dispute Resolution Procedure**, either of them may initiate the procedure for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.

## Section B - Proposed Changes to Paragraphs 4.4 and 4.5 of the CUSC (Charging Principles and Indexation)

### 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 Save where otherwise expressly provided in this Paragraph 4.4, The charges shall be "cost reflective" i.e. 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 In the determination of Frequency Response Default Payment Rates, 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 or any costs which are incurred under the Balancing and Settlement Code in providing these services. For the avoidance of doubt, Holding Payments determined by reference to payment rates for Primary Response, Secondary Response, High Frequency Response submitted in accordance with Paragraph 4.1.3.13(b) need not be cost reflective (as specified in Paragraph 4.1.3.13(i)).
- 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 energy production costs likely to be incurred or avoided 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.

## 4.5 INDEXATION

### 4.5.1 Application

The provisions of this Paragraph 4.5 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 the Frequency Response~~ Default Payment Rates as set out in Mandatory Services Agreements, and (if agreed between **NGC** and a **User**) may also be incorporated by reference into any other **Balancing 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 **Balancing 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).

### 4.5.2 Indexation provisions

4.5.2.1 The rates and/or prices to be indexed shall be specified in the **Balancing Services Agreement** as applicable for a 12 month period commencing 1<sup>st</sup> April ("the base year"), and these rates and/or prices will be adjusted annually to take account of general price inflation. The index used will be the Retail Prices Index (RPI) with 1987 = 100 base.

4.5.2.2 The source of the RPI index is to be the monthly Office for National Statistics "Business Monitor MM23."

4.5.2.3 The rates and/or prices to be indexed shall be increased (or reduced as appropriate) for the subsequent 12 month period commencing 1<sup>st</sup> April by the following factor:-

$$\frac{RPI_2}{RPI_1}$$

Where

$RPI_2$  is the RPI for March immediately prior to commencement of that 12 month period

$RPI_1$  is the RPI for March immediately prior to commencement of the base year.

4.5.2.4 The rates and/or prices to be indexed shall be increased (or reduced as appropriate) for the subsequent 12 month period commencing 1<sup>st</sup> April by the following factor:-

$$RPI_3$$

$RPI_1$

Where

$RPI_3$  is the RPI for March immediately prior to commencement of that 12 month period

$RPI_1$  is the RPI for March immediately prior to commencement of the base year.

- 4.5.2.5 In subsequent years indexation will continue in accordance with the above, with always the numerator of the factor representing the RPI of the 12 month period in question and the denominator of the factor being the RPI for March immediately prior to the base year.
- 4.5.2.6 In the event that RPI ceases to be published or is not published in respect of any relevant month or it is not practicable to use RPI because of a change in the method of compilation or some other reason, indexation for the purposes of this Paragraph 4.5 shall be calculated by **NGC** using an index agreed between **NGC** and the relevant **User** with a view to determining the relevant price after indexation that would be closest to the relevant price after indexation if RPI had continued to be available. If **NGC** and a relevant **User** are unable to agree a suitable index, either of them may initiate the **Dispute Resolution Procedure** for resolution of the issue as an **Other Dispute** in accordance with Paragraph 7.4.
- 4.5.2.7 For the avoidance of doubt, the provisions of Paragraph 11.3 with regard to determination of an alternative index should the **Retail Prices Index** not be published or there is a material change to the basis of such index shall not apply with respect to the rates and/or prices the subject of this Paragraph 4.5.

### Section C - Proposed Changes to Paragraph 11.3 of the CUSC (Definitions)

“Frequency Response Default Payment Rates” in respect of a **BM Unit**, the payment rates for **Primary Response, High Frequency Response and Secondary Response** (as amended from time to time in accordance with the relevant terms of Paragraphs 4.1.3) set out in the **Payment Rates table(s)** of the relevant **Mandatory Services Agreement**;

<del>“Triennial Review Date”</del>	<del>as defined in Paragraph 4.1.3.20;</del>	
<u>“Operational Day”</u>	<u>as defined in the <b>Grid Code</b>;</u>	

## Annex 3 - Proposed Changes to Schedule 2 - Exhibit 4 of the CUSC (Mandatory Services Agreement)

*For the avoidance of doubt, the proposed changes are indicated with coloured text only. Coloured underlined text will be inserted, and coloured strikethrough text will be deleted.*

### 4. FREQUENCY RESPONSE

#### 4.1 Paragraph 4.1.3 of CUSC

The provisions of this Clause 4 give effect to the provisions of Paragraph 4.1.3 of the **CUSC** in respect of the provision by the **User** from the **BM Units** of the **Mandatory Ancillary Service of Frequency Response** and the payments to be made by **NGC** to the **User** in respect thereof.

#### 4.2 Term

4.2.1 The provisions of this Clause 4 shall be deemed to have applied in relation to each **BM Unit** with effect from 00.00 hours on the [date hereof] [**Commencement Date**] and shall continue thereafter unless and until this **Mandatory Services Agreement** is terminated. For the avoidance of doubt, in the event this **Mandatory Services Agreement** is terminated in relation to any individual **BM Unit**, the provisions of this Clause 4 shall terminate in relation to that **BM Unit** only.

4.2.2 Termination of this Clause 4 shall not affect the rights and obligations of **NGC** and the **User** accrued as at the date of termination.

#### 4.3 Provision of Frequency Response

4.3.1 The **Parties** agree that:-

- (a) [subject always to Sub-Clause 4.6,] for the purposes of Paragraph 4.1.3.7 of the **CUSC**, the figures set out in the response tables in Appendix 1, Section B, Part I represent the amount of **Primary Response**, **Secondary Response** and **High Frequency Response** referred to therein;
- (b) [subject always to Sub-Clause 4.6,] for the purposes of Paragraph 4.1.3.9 of the **CUSC**, the figures set out in the summary response table in Appendix 1, Section B, Part II represent the capabilities in respect of **Primary Response**, **Secondary Response** and **High Frequency Response** at given levels of **De-Load** referred to therein;
- (c) for the purposes of Paragraph 4.1.3.4 of the **CUSC**, the table in Appendix 1, Section B, Part III shows the permissible



combinations of **Primary Response**, **Secondary Response** and **High Frequency Response** referred to therein;

- (d) for the purposes of Paragraph 4.1.3.9 of the **CUSC**, the figures (if any) set out in the plant configuration table in Appendix 1, Section B, Part II represent the plant configuration adjustment factors referred to therein to be applied where the **BM Unit** is a **CCGT Module**;
- (e) for the purposes of Paragraph 4.1.3.9-13 of the **CUSC**, the payment rates in Appendix 2, Section B constitute the ~~payment rates~~ **Frequency Response Default Payment Rates** in respect of **Primary Response**, **Secondary Response** and **High Frequency Response** referred to therein; and
- (f) [subject always to Sub-Clause 4.6,] for the purposes of Paragraph 4.1.3.9A(a) of the **CUSC** in respect of calculation of the **Response Energy Payment**, the response values in Appendix 1, Section B, Part IV represent the Frequency Response Power that is deemed to be delivered in respect of **Primary Response**, **Secondary Response** and **High Frequency Response**.

#### 4.4 Indexation

The **Frequency Response Default Payment Rates** ~~payment rates~~ set out in Appendix 2, Section B are specified at April [ ] base, and shall from 1<sup>st</sup> April each year be indexed in accordance with Paragraph 4.5 of the **CUSC**.

#### 4.5 Triennial Review

For the purposes of Paragraph 4.1.3.20 of the **CUSC**, the first **Triennial Review Date** shall be [ ].

#### 4.6 [Commissioning and Provisional Response Levels

Without prejudice to Paragraphs 4.1.3.13 and 4.1.3.14 of the **CUSC**, the **User** acknowledges that the levels of **Response** set out in the response tables in Appendix 1, Section B, Parts I, II and IV are indicative figures only during the period in which the relevant **Generating Unit(s)** is being commissioned and the **User** hereby undertakes to use its reasonable endeavours to forward to **NGC** levels of **Response** which represent the true operating characteristics of such **Generating Unit(s)** for inclusion in Appendix 1, Section B, Parts I, II and IV as soon as possible following completion of commissioning.]

## APPENDIX 2

### SECTION B (FREQUENCY RESPONSE)

**FREQUENCY RESPONSE DEFAULT PAYMENT RATES**

Table 1	Payment Rates	
Response Type	Payment Code	Payment Rate (£/MW/h)
Primary Response	P <sub>PR</sub>	
Secondary Response	S <sub>PR</sub>	
High Frequency Response	H <sub>PR</sub>	

## Annex 7 – Paper by National Grid “Depth of Mandatory Response Market & Associated Cost Issues”

- As part of the BSSG’s consideration of CAP47, National Grid undertook an action to provide analysis on the depth and competitiveness of the frequency response market, and the subsequent impact on cost. This note fulfils that action.

### Contracted volumes

- Response capability will alter depending on the loading level of each genset. For the purposes of this analysis, the overall volume of mandatory service contracted has been based upon the Optimum Load Point (typically the third deload point).

	Primary Volume	Secondary Volume	High Volume
Fuel	MW	MW	MW
Coal	2730	1862	2767
Gas	1684	1165	1880
Oil	287	142	411
Hydro	216	139	162
Nuclear	82	82	88
<b>Totals</b>	<b>4999</b>	<b>3390</b>	<b>5308</b>

- These figures already reflect the loss of service provision at Grain, Killingholme PG, High Marnham and Drakelow and reduced availability on hydro.
- Any requirement for frequency holding is dependent upon the level of demand at the time and the largest potential generation or demand loss. Typical requirements are shown in the table below. It should be noted however that the deterministic requirement has a floor of 550MW of response required irrespective of demand level. This is known as the minimum dynamic level.

	Demand	Primary Response	Secondary Response	High Response
Summer Minimum	20GW	1259MW	1265MW	1086MW
Winter Peak	55GW	550MW*	822MW	731MW

**N.B. Both scenarios assume 1320MW as the largest generation loss, and 1120MW demand loss.**

\* - Minimum dynamic level.

At a simplistic level, this analysis shows that there is sufficient contracted capability to meet the demand for response services at any one time.

5. *However, the above simplistic analysis looks at all the Response capability of plant currently registered on the system. Much of this capability will be unusable at any point in time – the genset may be unavailable, it may not be generating, it may be on bars but it may not be possible to re-load the genset to a loading level at which useful response may be held. We define “accessible response” as the response that is available at any time on the system given the loading level of all gensets on bars. Initial indications are that “accessible” response capability totals less than 150% of our requirement for more than half the year.*
6. Additionally, based on 2002/03 payments for mandatory frequency response, 4 market players receive nearly 70% of the total contracted income associated with this service.

### **Derogations**

7. At any one time, there is a certain amount of plant that is deemed to be non-responsive, either through explicit derogations or short to medium term technical issues. At present, 9.5GW of plant is derogated against the Grid Code requirements. An additional 5GW of plant is experiencing longer term technical difficulties in relation to the provision of this service, and 5GW on a short term basis. It is reasonable to assume that this same level of short to medium term non-responsive plant will occur at any one time throughout the year. This equates to approximately 30% of the current installed capacity upon the system. Response services are therefore only provided on 70% of plant currently on the system. It is likely that at times of summer minimum, the derogated plant will be running, leading to the likelihood of significant BM activity in order to ensure sufficient responsive plant is available on the system.

### **BM Interaction**

8. On top of the erosion of contract capability through the existence of derogated or short to medium term non-responsive plant, capability can be decreased even further by the position taken by any particular genset at gate closure.
9. Typically gensets loaded to their full rating are unable to provide Primary or Secondary response. Conversely, gensets loaded to their Stable Export Limit (SEL) are unable to provide High frequency response. The relationship between the total system demand and typical genset load levels poses potential problems. At times of low system demand, gensets tend to run at lower load levels meaning that in order to ensure sufficient high frequency capability significant BM bid/offer activity is required. Conversely the reverse is true for periods of high system demand. Similarly, instances may exist where particular units are equivalent to FPN 0, and therefore need to be brought on through either some form of pre gate contract or within the BM before they can provide the response service.
10. Under the current CUSC arrangements, the costs incurred in loading gensets to a suitable level in order to access the service may be many times that of the

AS contract cost for the service. This means that the delivery of all mandatory services is intrinsically linked (both technically and commercially) to the wholesale and Balancing market, and that the provision of frequency response services can only be considered as a “market within a market”.

### **Demand / Supply elasticity**

11. It is arguable as to whether the provision of Frequency response services can ever be truly competitive. While the market for the provision of services is competitive in the sense that sufficient capability exists, the same cannot be said of demand. In any normal market, if prices rose to an unacceptable level, demand for the product should eventually fall in response. This is quite clearly not the case for frequency response where the level of service held is dictated by system dynamics and the level of system demand rather than by the price. With system demand being very much an exogenous variable, the level of response required is therefore also exogenous.

### **Implications CAP047**

#### **Effect on Costs of Frequency Provision**

12. At present, costs associated with the provision of frequency response services are circa £80m per annum. Last year, the cost of holding response alone amounted to circa £26m irrespective of additional balancing services also required.
13. Under CAP47, National Grid believes that there is a strong likelihood that prices associated with the provision of response will rise going forward. Given the freedom to vary price as opposed to the current cost reflective methodology, a price rise of some magnitude seems inevitable. A view that is further supported by the fact that no price/volume elasticity exists within this particular market and market share analysis. Irrespective of the magnitude of price increase, the System Operator will be required to purchase a deterministic volume of response in accordance with system demand and the associated largest single loss, at any one time.
14. As part of the CAP47 process, National Grid has considered the subsequent effect on prices, and therefore total costs. While there are scenarios in which the costs to the industry could reduce, as generators are able to re-allocate response provision within their portfolios, it is National Grid’s belief that these savings would not materialise within the Balancing costs of response. Instead, the analysis undertaken suggests that costs associated with frequency response, including balancing actions, could increase by £45m over a two-year period. This increase is based on the following assumptions:
  - Almost all mandatory response providers have increased their prices by 50-100%. There are no particular assumptions on times of year etc.
  - NGC has managed a fairly limited re-allocation of response holding.
  - There is a modest increase in both the BM volumes on response actions as plant is re-loaded to avoid the higher prices, complete with

- subsequent price rises as Generators pay more attention to the BM prices of responsive plant.
- Consequently BM costs of response also rise but by less than those associated with Ancillary contracts.

### **Additional Features Required**

15. Given the magnitude of cost increases predicted above, if CAP47 were to proceed in its current format in relation to holding payments, additional features would also be a necessary requirement in order to derive any associated benefit.

### **Price Caps**

16. As previously mentioned, the provision of response services is viewed as a price inelastic market. The ability to freely vary the price of response services could cause prices to rise to a level that is in theory only curtailed by limitations of the despatch software. With this in mind, National Grid would want to see a price cap introduced in order to prevent services either curtailing capability in a commercial manner, or introducing significant price increases.

### **Monitoring and Incentivisation Arrangements**

17. At present, while the provision of response is monitored against pre-agreed levels, incentivisation to meet these levels is more of an implicit nature, which has been deemed appropriate given the cost reflective nature of the service.
18. By moving to a situation that allows response services to be charged according to their perceived value as opposed to the costs incurred, the issue of delivery according to contract becomes even more pertinent. National Grid believes that any move towards a more value based charging mechanism should be accompanied by the appropriate mechanisms for monitoring and incentivising delivery of the service as pre agreed. Indeed, there may also be instances where a superior service may be rewarded further.
19. Should such complimentary arrangements not be implemented as part, or alongside CAP47, there is a strong likelihood that situations could occur where commercial rates are being paid for a service which is not being delivered in part or in full.

21 May 2003.