AMENDMENT REPORT VOLUME 1

CUSC Amendment Proposal CAP169

Provision of Reactive Power from Power Park Modules, Large Power Stations and Embedded Power Stations

The purpose of this report is to assist the Authority in their decision of whether to implement Amendment Proposal CAP169

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National Grid Document Control

Version	Date	Author	Change Reference
V0.1	14/10/09	NATIONAL GRID	Draft for industry comment
V0.2	22/10/09	NATIONAL GRID	Draft for Panel Recommendation vote
V0.3		NATIONAL GRID	Draft for Panel comment following vote
V1.0		NATIONAL GRID	Formal version for submission to the Authority

b Distribution

Name	Organisation
The Gas and Electricity Markets Authority	Ofgem
CUSC Parties	Various
Panel Members	Various
National Grid Industry Information Website	

1.0 SUMMARY AND RECOMMENDATIONS

Executive Summary

1.1 CAP169 Provision of Reactive Power from Power Park Modules, Large Power Stations and Embedded Power Stations was raised by National Grid and submitted to the CUSC Amendments Panel for consideration at their meeting on the 27th February 2009. CAP169 proposes to amend the CUSC based on three discreet areas relating to Reactive Power.

1.2 Part 1 of CAP169 seeks to align the CUSC requirements with those of the Connection Conditions of the Grid Code in relation to Power Park Modules. The Grid Code has been amended[1] to mandate the reactive capability requirement from Power Park Modules. Part 1 of CAP169 proposes the corresponding changes be made to the CUSC to ensure that Reactive Power from Power Park Modules can be despatched and providers can be paid accordingly.

1.3 Part 2 of CAP169 seeks to extend the obligation on National Grid to conclude/amend Mandatory Services Agreements (MSAs) with all Large Power Stations, with a reactive capability below 15 Mvar, upon request from the Large Power Station. This reconciles the fact that all Large Power Stations are obliged to have the necessary capability, but the CUSC does not currently oblige National Grid to conclude MSAs with those with a range below 15 Mvar.

1.4 Part 3 of CAP169 seeks to introduce amended payment terms for the provision of Reactive Power from certain embedded generators, recognising that some embedded generators are under connection restrictions which prevent National Grid from despatching them to 0 Mvar. Where such restrictions are in place CAP169 proposes a payment of 20% (in line with existing default payment terms, in CUSC Schedule 3 appendix 1, when other restrictions are in place).

1.5 CAP169 was raised by National Grid, and a Working Group was established to review the implications of the Amendment Proposal. Consequential Grid Code changes are required to facilitate the proposal, therefore the Working Group established was a joint CUSC and Grid Code Working Group, to allow the relevant changes for both codes to be considered and developed in parallel.

1.6 Working Group Alternative Amendment 1 (WGAA1) was raised by National Grid and looks to extend part 3 of CAP169 to cover long term Reactive Power despatch restrictions, in place for 12 months or more, not known at the time of connection.

1.7 Working Group Alternative Amendment 2 (WGAA2) was prepared by National Grid on behalf of the CAP169 Working Group. The alternative proposes CAP169 parts 1 and 2, with part 3 removed. This alternative was raised following agreement on parts 1 and 2 by the Working Group. It was recognised by the Working Group that there were differing views on part 3 and this alternative would ensure that should the Authority be minded to implement parts 1 and 2, this would not be inhibited by any concerns that may exist with regards to part 3.

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[1] Grid Code amendment G/06 Power Park Modules and Synchronous Generating Units http://www.nationalgrid.com/uk/Electricity/Codes/gridcode/consultationpapers/2006/

1.8 A WG Consultation Alternative Request (WGAA3) was made which proposes that where a third party restriction exists (preventing the embedded unit providing the service in accordance with an instruction from National Grid) £0 (zero) payment should be made.

Working Group Recommendation

1.9 At the Working Group meeting on 4th June 2009 five members of the Working Group (of seven eligible to vote) voted:

View against applicable CUSC objectives	Better than baseline	Not Better than baseline	Best
Original	2	3	0
WGAA1	2	3	2
WGAA2	3	2	2
WGAA3	1	4	1

1.10 In line with definitions for a Working Group Alternative Amendment, the Working Group chair gave consideration to the alternative proposals, noting that within the Working Group there had been valid and extensive discussion with regards all options and only five members of the group voted on the proposals. The chair concluded that it was appropriate to allow the industry further opportunity to comment on all the options through consultation by the Company (including on WGAA3 proposed as result of the Working Group consultation) and the full range of options should be available for the Authority's consideration. The group agreed that this seemed reasonable.

Amendments Panel Recommendation

1.11 To be inserted after Panel recommendation

National Grid's Recommendation

1.12 National Grid believes that the original, WGAA1 and WGAA2 better meet the Applicable CUSC Objectives, and believes that WGAA1 best meets the Applicable CUSC Objectives. Full justification for this view is contained within section 14 of this Amendment Report.

2.0 PURPOSE AND INTRODUCTION

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.

2.2 Further to the submission of Amendment Proposal CAP169 (see Volume 1, Annex 1) and the subsequent wider industry consultation that was undertaken by National Grid, this document is addressed and furnished to the Gas and Electricity Markets Authority ("the Authority") in order to assist them in their decision whether to implement Amendment Proposal CAP169.

2.3 CAP169 was proposed by National Grid and submitted to the CUSC Amendments Panel for consideration at their meeting on 27th February 2009.

The CAP169 Working Group Report was submitted to the CUSC Amendments Panel meeting on 31st July 2009. Following evaluation and consultation by the Working Group, the Amendments Panel determined that CAP169 was appropriate to proceed to wider industry consultation by National Grid.

2.4 Following completion of the consultation referred to in 2.3 above, 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 in Volume 2 of the CAP169 Amendment Report.

2.5 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 www.nationalgrid.com/uk/Electricity/Codes/.

3.0 PROPOSED AMENDMENT

3.1 CAP169 contains three parts relating to Reactive Power with the intention of improving the Reactive Power provisions within the CUSC. It was raised by National Grid as one Amendment Proposal to allow consideration of the complete suite of Reactive Power proposals that National Grid proposes for amendment at this time.

Part 1 – Provision of Reactive Power from Power Park Modules

3.2 Part 1 of CAP169 looks to amend various sections of CUSC to accommodate the provision of Reactive Power from Power Park Modules. Currently, the vehicle to enable National Grid to despatch and pay providers for Reactive Power, the Mandatory Services Agreement (MSA), does not reflect the capability requirement as per Grid Code CC6.3.2 for Power Park Modules i.e. within the capability data tables. It is therefore proposed that additional tables be added to the MSA pro forma in the CUSC (Schedule 2, Exhibit 4). CAP169 also looks to update the Reactive Power Definitions and Interpretations section in line with the Grid Code CC8.1 to reflect that Reactive Power from Power Park Modules is a Mandatory (not Enhanced) Ancillary Service.

3.3 Sections of CUSC associated with Reactive Power also require amendment in order to accommodate the additional referencing of Power Park Modules as an alternative category to Generating Units and CCGT Modules.

3.4 The proposal looks to make similar changes to include the further category of DC Converters for which the Reactive Power requirement has also been added to Grid Code CC6.3.2.

Part 2 - Provision of Reactive Power from Large Power Stations

3.5 Current provisions in the CUSC oblige National Grid to conclude or amend MSAs if the Reactive Power capability of the Generating Unit is 15Mvar or more. However, all Large Power Stations are obliged to be signatory to the CUSC, and therefore through the Grid Code have the obligation to provide a Reactive Power Service. Part 2 of CAP169 seeks to extend the obligation whereby, upon request from a Large Power Station with a reactive capability below 15Mvar, National Grid is obliged to conclude a MSA.

Part 3 – Recognition of Distribution Network Restriction on Reactive Power

3.6 Generators directly connected to a distribution network produce Reactive Power which is of benefit to the distribution network operators (DNOs) and National Grid and assists in managing voltage on the networks. DNOs may impose restrictions which prevent instruction(s) from National Grid to the embedded generator to reduce output to 0 Mvar. These restrictions result in National Grid being unable to instruct the relevant generator to achieve the economic and efficient use of the Reactive Power across the National Electricity Transmission System, despite the imposed requirement and capability being in place.

3.7 Part 3 of CAP169 seeks to facilitate partial payment to those embedded generators under such connection restrictions by DNOs. This partial payment reflects the Grid Code requirement and dynamic benefit from generators under restriction, whilst acknowledging that it is not possible for National Grid to despatch Reactive Power from such generators to 0 Mvar in line with Transmission system operation requirements.

3.8 Payment proposed under such restriction would be in line with current arrangements in CUSC Schedule 3, Appendix 1 whereby a 20% payment is made as a result of certain conditions (including failure to have the Mvar range which includes the ability to provide 0 Mvar at the Commercial Boundary).

Consequential Grid Code Changes

3.9 A revision to the Grid Code is required with regards part 1 of CAP169 whereby the appropriate capability data table for submission of revised Mvar capability by Power Park Modules is required within BC2 Appendix 3.

3.10 Part 3 of CAP169 also requires the Grid Code to be amended to facilitate communication of the specified restriction from both the DNO and the embedded generator.

4.0 SUMMARY OF WORKING GROUP DISCUSSIONS

4.1 Within the Working Group National Grid provided a detailed overview of the Amendment Proposal, the changes envisaged and the defect the proposal seeks to address. National Grid explained that CAP169 was written in three parts, and the Working Group discussed each of the parts in turn.

Materiality

4.2 National Grid prepared for the Working Group an estimate of the financial implications of CAP169. This assessment was updated and refined following the publication of the 2009 Seven Year Statement and is based on the forecast of 2011/12. Details of the assessment and assumptions used can be found in annex 3

4.2.1 **Estimate of materiality for part 1** The extension of appropriate MSAs for Power Park Modules introduced through Part 1 is estimated to result in MSAs for an additional 403MW of embedded Power Park Modules with capacity above 48MW by 2011/12. Based on the assumptions applied this would equate to a cost of ***£0.48m***.

4.2.2 **Estimate of materiality for part 2** The proposal to amend the obligation to conclude MSAs, upon request, with all Large Power

Stations with a reactive range below 15Mvar is estimated to increase the capacity eligible to receive MSAs to 1519MW. This could equate to a cost of ***£1.82m*** were such generators to request MSAs, or a lower range of ***£0.55m*** if no generation below 48MW requests MSAs.

4.2.3 **Estimate of materiality for part 3** If part 3 is introduced the 20% payment would result in a reduction in the estimate of this cost to between ***£0.11m and £0.36m*** (this spread being dependent on the number of Large Power Stations below 48MW which request MSAs).

4.2.4 Annex 3 provides details of the data and assumptions used in preparing this materiality estimate. In particular, please note, the forecast of embedded capacity is taken from the 2009 Seven Year Statement for 2011/12 and the assumption is that going forward all forecast large embedded generation in Scotland will be subject to such restrictions.

Part 1 – Provision of Reactive Power from Power Park Modules

4.3 National Grid explained that this part of the proposal seeks to amend various sections of the CUSC to accommodate the provision of Reactive Power from Power Park Modules. This part of the proposal was raised to align the CUSC provisions with the already updated provisions within the Grid Code.

4.4 The main changes required for this part of the proposal are the introduction of additional referencing to Reactive Power from Power Park Modules, and an alternative set of capability data tables within the MSAs to accommodate the requirements for Reactive Power from Power Park Modules. Moreover, an additional section (CUSC Schedule 3, appendix 8 part 3) has been included to enable the conversion of Reactive Power capability from the LV to the HV side of the generator step up transformer for Power Park Modules where required.

4.5 Currently, for conventional generators, the MSA records Reactive Power capability at the generator stator terminal (LV side of generator step up transformer) and at the Commercial Boundary (HV side of the generator step up transformer). Payments are made for utilisation of the Reactive Power service at the Commercial Boundary to account for losses across the generator step up transformer. Applying these same principles to Power Park Modules, using current definitions, was not suitable because it would have resulted in completing a MSA per wind turbine rather than the whole module and would not account for the losses across the Power Park Module step up transformer.

4.6 In order to resolve these issues it was proposed that, where applicable, the CUSC definition of 'Commercial Boundary' could be adapted within the individual MSA. The current CUSC Section 11 definition of 'Commercial Boundary' already allows this flexibility and means that the CUSC definition does not need to be changed.

4.7 The Working Group queried whether defining the Commercial Boundary within the MSA in this way had any impact upon any other technical or ownership boundaries but National Grid confirmed that this boundary was only applicable to the relevant MSA and the payment for Reactive Power. It was also queried whether defining the Commercial Boundary in each case was necessary given that the Grid Code requirement and metering requirements were clearly set out in the other codes. National Grid confirmed that this was necessary given the various categories, and therefore Grid Code requirements for wind farms, and the differing asset ownership

arrangements in Scotland (where the relevant Transmission Owner may own the Power Park Module step up transformer).

4.8 It was recognised by the Working Group that due to the aforementioned variations in asset ownership that the location of Reactive Power metering at Power Park Modules could also vary (metering could be located at the LV or HV side of the Power Park Module step up transformer). National Grid originally proposed that this be accounted for via an additional definition within the CUSC but the Working Group highlighted that this could be dealt with by the Aggregation of Reactive Power Metering Methodology (referred to in CUSC Schedule 3, appendix 4). The consequential changes proposed to this document are discussed in more detail in Section 9 of this document.

4.9 The Working Group questioned, in relation to Reactive Power meters, whether the meters themselves could compensate for the difference between LV and HV Reactive Power readings i.e. internal compensation, and whether this would have an impact on the proposed changes. National Grid confirmed that there could be meters which internally compensate but that this would be considered and catered for on a case by case basis. This case by case assessment of meter type is current practice by National Grid (and by ELEXON in the case of Active Power).

4.10 The original CUSC Amendment Proposal stated that there may be changes required to the communication systems which feed to and from the National Grid Electricity Control Centre, namely Electronic Data Transfer (EDT) and Electronic Despatch Logging (EDL), to despatch Reactive Power from Power Park Modules. Following review of requirements, National Grid confirmed that the current systems could be used to facilitate Reactive Power despatch instructions to Power Park Modules and that no changes were required.

4.11 Finally, the CUSC text associated with the MSA and Reactive Power refers in the main to 'Generating Units' which would again lead to a solution at the wind turbine level rather than at the Power Park level. It was therefore proposed that any such CUSC text which referred to 'Generating Unit' be changed to 'Generating Unit or Power Park Module'. Similar amendment to referencing is required to accommodate DC Converters to correspond to an additional change previously made within the Grid Code (CC6.3.2).

4.12 Following the discussion and clarification of the proposal as outlined above, the Working Group agreed that no alternatives were required to part one of the proposal.

Part 2 - Provision of Reactive Power from Large Power Stations

4.13 National Grid explained that the current provisions in the CUSC only oblige National Grid to conclude MSAs (and facilitate appropriate despatch and remuneration) with Generating Units with a reactive capability of 15 Mvar or above. Part 2 of CAP169 looks to extend this obligation to include all Large Power Stations upon request from the Large Power Station with a reactive capability below 15 Mvar.

4.14 The Working Group discussed part 2 of the proposal and agreed that it offers a proportionate solution regarding MSAs. It was felt to be a more appropriate solution than obliging National Grid to conclude MSAs with all Large Power Stations with a reactive capability below 15 Mvar as the relevant generator may not actively wish a MSA to be in place, due to the level of remuneration likely to be received and additional administrative requirements introduced.

This proposed solution, more appropriately, allows Large Power Stations with a capability below 15 Mvar to request MSAs if they so wish.

4.15 The Working Group questioned the implications of a MSA relating to Reactive Power on Frequency Response obligations, and National Grid clarified that the relevant Grid Code requirements for each of these services would not change. The group also questioned if there were additional Grid Code obligations introduced through signature to a MSA, National Grid explained that there were no additional obligations introduced as the obligations were applied through the Grid Code.

4.16 Following the discussion outlined above, the Working Group agreed that no alternatives to part two of the proposal were required.

Part 3 – Recognition of Distribution Network Imposed Restriction on Reactive Power

4.17 Part 3 of CAP169 seeks to facilitate partial payment (20%) to embedded generators subject to connection restrictions imposed by the DNOs to which they are connected which prevent receipt of Reactive Power instruction(s) from National Grid to 0 Mvar.

4.18 National Grid explained that such restrictions prevent National Grid from being able to instruct the relevant generator with regards use of Reactive Power across the National Electricity Transmission System. Moreover they remove the ability for payment to be turned off to such generators through instruction to 0 Mvar.

4.19 The Working Group discussed specific restrictions where embedded generators were required, by the DNO, to follow local voltage conditions for local voltage control purposes. The group agreed that whilst this was not a specified range restriction it clearly also represents a restriction on National Grid's ability to instruct to 0 Mvar.

Reasons for Restrictions

4.20 A DNO observer informed the Working Group that the majority of developers in Scotland have chosen to connect directly to the 33kV distribution network, with a cable connection driven by concerns of low connection costs and avoiding planning issues. By requesting such embedded generators to operate in voltage control mode, rather than unity power factor, breaching of the statutory voltage limit is avoided. This allows reactive support to be spread across all Users and minimises reactive demand from the DNO networks.

4.21 The observer stated that if future payments are to be made to the embedded generator providing reactive support, this may have to be balanced by reflecting the costs onto sites that present a reactive demand on the network. The status quo seems a sensible alternative where such small parties are not involved in the reactive market. Another option identified would be to force connection at 132kV although such connections may be unpopular with developers as such directly connected generators would have higher connection costs.

4.22 National Grid acknowledged that whilst this reason was provided by one DNO observer contributing to the Working Group, it is not possible to state that this is the only reason for such restrictions being in place.

4.23 National Grid also highlighted that whilst it is useful to understand the reasons for such restrictions, the purpose of CAP169 is to determine appropriate payment from National Grid as System Operator to an embedded generator under such restrictions, recognising the System Operator requirements and benefits.

Payment Terms

4.24 National Grid clarified for the Working Group that there are no existing generators which will see a reduction in Reactive Power payments following implementation of CAP169, as there are no existing generators under such restrictions with populated MSAs. However, were part 1 of CAP169 implemented there are existing generators who would receive amended MSAs and would be likely to be under such restrictions.

4.25 The view expressed within the Working Group was that the most appropriate means for payment to embedded generators under such restrictions may be for the DNO imposing the restriction to pay for the Reactive Power output. The Working Group acknowledged, however, that whilst this may appear a suitable model it is not within the jurisdiction of the CUSC or Grid Code to introduce such a change.

4.26 The Working Group discussed the extension of the 20% default payment value within the existing CUSC provisions (Schedule 3, Appendix 1). Currently this default payment of 20% is applied in specified circumstances where a reactive restriction is in place (including the inability to provide 0 Mvar).

4.27 When appropriate, the reduced payment applies following receipt by National Grid of a submission of revised Mvar capability (set out in BC2, appendix 3 of the Grid Code). Such a form is submitted to National Grid's Electricity Control Room. The revised data is input into the operational systems to provide National Grid's control engineers with the latest capability data. National Grid's settlement team is also advised of the restriction, and as appropriate will adjust the associated default payment (in accordance with the payment criteria set out in Schedule 3 of the CUSC). Payment will only be reduced to 20% when one or more of the specific criteria are met. If appropriate the station will receive the reduced payment until such time as further notification is received by National Grid that the capability range has been restored.

4.28 Although the generator in question may be unable to provide the full Mvar capability, they may still be called upon to provide Mvar within the redeclared range.

4.29 During the entirety of the restriction, as appropriate, the reduced default payment of 20% will be made.

4.30 CAP169 proposes that the principles and processes used to compensate for existing provisions be extended to DNO imposed restrictions.

4.31 National Grid believes that the 20% payment recognises the Grid Code requirement for Reactive Power capability and the dynamic benefit this provides, whilst also recognising that it is not possible for National Grid as Transmission System Operator to despatch the Reactive Power from such generators to 0 Mvar in line with system operation requirements.

4.32 It was suggested by the Working Group that the existing reduced default payment arrangements are aimed at incentivising generators to restore full reactive capability in order to return to full payment. This is in contrast to a restriction imposed by a DNO on an embedded generator where the ability to make use of the full Reactive Power range is outside of the generator's control. National Grid acknowledged the nature of existing restrictions within Schedule 3 of the CUSC, however considers that the 20% payment remains appropriate for the restrictions under consideration in CAP169 (as outlined in 4.31 above through recognising the dynamic response service provided and the Grid Code capability requirement imposed).

4.33 The group also discussed that a 20% payment for a DNO restricted capability may effectively provide more favourable terms than those received by some generators with the full capability available which are instructed to 0 Mvar on a continual basis.

4.34 One member of the Working Group stated that generators under such connection restrictions should not be paid at all for the provision of Reactive Power. This view was based on the fact the Mvar production from restricted embedded generators may in fact contribute to a requirement for additional balancing actions, therefore increasing costs to other system users.

4.35 The potential differential treatment between active and reactive power was noted in the Working Group. This relates to the fact that embedded generators receive no payment if constrained for active power, yet part 3 of CAP169 proposes a 20% payment for a reactive restriction. National Grid clarified that the difference was justifiable on the basis that the specific reactive range is defined as a capability requirement in the Grid Code, and the proposed payment recognises the continued provision of a dynamic service from those for which the range is restricted. Therefore, National Grid considers that the 20% payment proposed is appropriate.

Possible Alternatives to part 3

4.36 The Working Group brainstormed a number of possible alternatives to part 3 of the original CAP169 Amendment Proposal. The ideas from the brainstorm and discussion are outlined below:

4.37 *Restriction applicable to all embedded generators unable to receive a reactive despatch instruction (without reference to 0Mvar)*. National Grid explained that the original CAP169 Amendment Proposal was drafted with reference to 0 Mvar to ensure that it did not capture other forms of reactive range restriction (such as those with a restricted range that are able to pass through 0 Mvar). The ability to turn payment off (by instruction to 0) is critical for the proposal to ensure that the facility to turn off payments is available. Therefore National Grid believes reference to 0 Mvar is crucial to the Amendment Proposal. This idea was not progressed as a Working Group Alternative Amendment.

4.38 *Removal of reactive capability requirement, or separation of steady state and dynamic capability requirements, for embedded generators under restrictions which prevent instruction from National Grid to 0 Mvar.* The Working Group debated whether the reactive capability requirements within the Grid Code should be amended for those under such restrictions, either by removing the capability requirement entirely or removing the steady state requirement. The Working Group agreed that the current Grid Code requirement for steady state capability inherently provides dynamic capability. The group also agreed that amending the capability requirements within the Grid Code was a

disproportionate solution to the issue under consideration. National Grid reiterated that the original Amendment Proposal seeks to remunerate appropriately for the dynamic capability and cost incurred through the Grid Code obligation via the 20% payment being proposed. This idea was not progressed as a Working Group Alternative Amendment.

4.39 *Embedded generators with DNO restrictions that prevent instruction from National Grid to 0 Mvar should have a nominal 0 within the restricted range and would receive 0 or 20% payment when instructed to this point*. *Other instructions within the specified restricted range would be possible, with full payment made.* National Grid explained that this proposal would introduce significant settlement system changes to both set up and implement on an ongoing basis. In National Grid's view it would be complex to administer, without introducing appropriate additional benefits to the original Amendment Proposal. The Working Group debated the possible alternative with some members acknowledging that it may introduce a more complete solution to the original Amendment Proposal; however the Working Group agreed that there were significant additional complexities that would be required for implementation. Therefore, whilst the Working Group recognised the merit in this idea, it was not progressed as a Working Group Alternative Amendment.

4.40 *Connection and operational restrictions*. The group discussed a possible alternative covering both connection restrictions (known up front at time of connection as with the original CAP169 proposal) and long term operational restrictions not known at the time of connection. National Grid's view is that any restriction lasting longer than 12 months should be considered in the same way as a connection condition. Restrictions in place for such protracted periods are likely to be as a result of configuration of the DNO network and the embedded connection to this network. Moreover once 12 months has been exceeded multiple outage years begin to be impacted. National Grid expressed that this possible alternative represents an equitable solution to ensure that both connection conditions and long term restrictions are covered.

4.40.1 The Working Group discussed the proposed 12 month window which would be triggered following initial notification of a restriction until further notification that the restriction has been removed is received. The group agreed that, whilst the 12 month period was arbitrary, it felt appropriate.

4.40.2 The Working Group discussed the possible incentive for a restriction to be temporarily removed to prevent the 12 month period from being met. Whilst there may be no incentive on the DNO to remove the restriction it was agreed that a prudent approach would be to specify that the 12 month period may be non-consecutive within a specified period longer than 12 months. The Working Group agreed that 12 months within 24 months felt appropriate.

4.40.3 The Working Group also discussed when the reduced payment would most appropriately be applied. It was initially suggested that it should be applied for the full time a restriction was in place (with either the length of time for the restriction communicated up front, or 80% of the previous 12 months payment being clawed back once 12 months had been exceeded). The Working Group discussed that this may introduce inequitable treatment for generators during the initial 12 months (for instance with a restriction lasting just under 12 months resulting in full payment for the duration of the restriction whilst a

restriction lasting just over 12 months would result in a 20% payment for the duration of the restriction). The group agreed that it would be more equitable for the 20% payment to apply only once the initial 12 months has been exceeded.

4.40.4 For clarification purposes the group considered that this process would apply as follows:

- Initial count of a "Temporary Enduring Reactive Despatch Network Restriction" would begin on notification of the first "Temporary Enduring Reactive Despatch Network Restriction";
- The length of time the "Temporary Enduring Reactive Despatch Network Restriction" is in place would be recorded, with a trigger regarding the payment mechanism when 12 months is reached;
- If the restriction is removed before 12 months is reached the count will stop until such times as notification of a further "Temporary Enduring Reactive Despatch Network Restriction" is received;
- Upon receipt of a further "Temporary Enduring Reactive Despatch Network Restriction" the count will continue (provided that 24 months has not lapsed since receipt of the previous notice of removal of the restriction);
- Payment will be reduced when 12 (consecutive or) non-consecutive months of "Temporary Enduring Reactive Despatch Network Restriction" has been in place within an initial total of 24 consecutive months.

4.40.5 Following discussion within the Working Group National Grid developed this proposal into a Working Group Alternative Amendment (WGAA1). See section 5 for details.

4.41 *Removal of part 3 from the Amendment Proposal*. Given the agreement within the Working Group that part 1 and part 2 of the original Amendment Proposal introduce positive changes to the current version of the CUSC, whilst part 3 generated greater debate, the Working Group considered the merit of raising an alternative which would include parts 1 and 2, but not part 3 of CAP169. It was felt by the Working Group that this would be a prudent approach to ensure that any concerns which may exist with regards to part 3 do not impact on the implementation of parts 1 and 2 should the Authority be minded to implement parts 1 and 2.

4.41.1 A member of the Working Group pointed out that should this alternative be implemented the number of embedded generators that may thereafter enter into a MSA and receive full payment for the provision of Reactive Power, but be unable to be despatched to 0 Mvar, is likely to increase. As such a further Amendment Proposal to address this may be required in the future.

4.41.2 On behalf of the Working Group National Grid prepared a Working Group Alternative Amendment (WGAA2). See section 5 for details.

WG Consultation Alternative Request

4.42 During the Working Group consultation, one WG Consultation Alternative Request was received. This alternative proposes that where a third party restriction exists (preventing the embedded unit providing the service in accordance with National Grid instruction) £0 (zero) payment should be made. Under such circumstances, National Grid would not be permitted to issue any instruction.

4.42.1 The proposer of the WG Consultation Alternative Request considers that this proposal is more appropriate than WGAA1 and the original which could distort competition by providing an artificially low cost service to National Grid (in preference to those not under restriction) and would have the potential to increase the BSUoS costs paid by other parties. As such the proposer considers that this alternative resolves the original defect identified by CAP169 without introducing a new perverse defect. The proposer considers that the defect identified could get significantly worse in the future with increased connection of embedded generation and potential implementation of parts 1 and 2 of CAP169.

4.42.2 On discussion of the WG Consultation Alternative Request, the majority of the Working Group did not support this alternative as it does not provide any recognition of the capability requirement which is in place on such embedded generators through the Grid Code, and does not provide any remuneration for the dynamic service provided. Moreover, it was considered that 0 payment does not align with the existing default payment mechanism in the CUSC, where 20% is paid when certain restrictions are in place (including the inability to provide 0 Mvar).

4.42.3 This proposal is being taken forward as WGAA3.

Environmental Assessment

4.43 The Working Group considered whether a carbon costing exercise was required for CAP169, and concluded that the baseline carbon profile would not be altered as result of CAP169. This conclusion was based on the fact that the main impact of CAP169 will be on payment provisions and access to a Reactive Power service which is already provided for (through the Grid Code capability requirement). Therefore, the Working Group concluded that CAP169 will have no direct impact on the environment.

Offshore

4.44 Drafting for CAP169 (and the alternatives) has been prepared using the industry code baseline following the implementation of Offshore Go-active (as designated by the Secretary of State on the 24th June 2009).

4.45 It is recognised that the offshore Reactive Power arrangements require additional debate and consideration in collaboration with the industry. It is anticipated that this may result in the requirement for amendment to the Charging Methodologies and may require an amendment to the CUSC. The defined terms used in drafting CAP169 reflect both onshore and offshore generation to ensure consistency with the existing offshore provisions, where MSAs are applicable for both offshore and onshore generation. This should ensure that the drafting for CAP169 does not preclude future application for offshore (or require further additional code amendment) once the Reactive Power provisions for offshore are finalised.

5.0 WORKING GROUP ALTERNATIVE AMENDMENTS

Alternative Amendment 1

5.1 WGAA1 was raised by National Grid and is included in Annex 4.

5.2 As outlined in 4.40 it relates to part 3 of CAP169 and extends CAP169 to cover long term restrictions not communicated at the time of connection.

Alternative Amendment 2

5.3 WGAA2 was prepared by National Grid on behalf of the Working Group and is included in Annex 5.

5.4 As outlined in 4.41 it contains parts 1 and 2 of the original Amendment Proposal with part 3 removed.

Alternative Amendment 3

5.5 WGAA3 was raised as a WG Consultation Alternative Request by EdF Energy and is included in Annex 6.

5.6 As outlined in 4.42 it proposes 0 payment where a 3rd party restriction exists (preventing the embedded unit providing the service in accordance with an instruction from National Grid). It also proposes that where such a restriction has been notified no despatch instruction will be issued by NGET.

6.0 ASSESSMENT AGAINST APPLICABLE CUSC OBJECTIVES

Original Amendment

6.1 Opinion was divided amongst Working Group members as to whether the implementation of the CAP169 original amendment would better facilitate the Applicable CUSC Objective(s) of;

(a) the efficient discharge by the Licensee of the obligations imposed upon it by the act and the Transmission Licence; and
(b) facilitating effective competition in generation and supply of electricity and facilitating such competition in the sale, distribution and purchase of electricity.

6.2 A summary of the views given by the Working Group is included below:

<table>
<tr><td colspan="2">(a) The efficient discharge by the Licensee of the obligations imposed upon it by the act and the Transmission Licence</td></tr>
<tr><td>Promotes</td><td>Demotes</td></tr>
<tr><td>▪ Ensuring that National Grid can despatch Reactive Power from Power Park Modules, and Large Power Stations, and facilitate payment for this service – increasing the pool of potential Reactive Power providers resulting in increased stability and National Electricity Transmission System security
▪ Aligns CUSC and Grid Code
▪ Ensure appropriate remuneration (with full payment only where access to the service is available and partial payment when network operator imposed restriction on instruction to 0Mvar are in place) – thereby ensuring the economic and efficient operation of the system</td><td>▪ 20% payment may introduce perverse incentive for restrictions not to be removed</td></tr>
<tr><td colspan="2">(b) Facilitating effective competition in generation and supply of electricity and facilitating such competition in the sale, distribution and purchase of electricity</td></tr>
</table>

Promotes	*Demotes*
▪ Provides appropriate remuneration for a restricted service, ensuring inappropriate cost for a restricted service is not picked up by other parties through BSUoS payments	▪ Introduces price anomalies whereby a provider receiving reduced payment may be used as an alternative source to a non-restricted provider ▪ May not reflect cost incurred by embedded generators under restriction for Reactive Power capability

WGAA1

6.3 Opinion was divided amongst Working Group members as to whether the implementation of WGAA1 would better facilitate the Applicable CUSC Objective(s) of;

(a) the efficient discharge by the Licensee of the obligations imposed upon it by the act and the Transmission Licence; and
(b) facilitating effective competition in generation and supply of electricity and facilitating such competition in the sale, distribution and purchase of electricity.

6.4 A summary of the views given by the Working Group is included below.

(a) The efficient discharge by the Licensee of the obligations imposed upon it by the act and the Transmission Licence	
Promotes	*Demotes*
▪ Ensuring that National Grid can despatch Reactive Power from Power Park Modules, and Large Power Stations, and facilitate payment for this service – increasing the pool of potential Reactive Power providers resulting in increased stability and Transmission system security ▪ Aligns CUSC and Grid Code ▪ Ensure appropriate remuneration (with full payment only where access to the service is available and partial payment when network operator imposed restriction on instruction to 0Mvar are in place) covering both connection and operational restrictions – thereby ensuring the economic and efficient operation of the system	▪ 20% payment may introduce perverse incentive for restrictions not to be removed
(b) Facilitating effective competition in generation and supply of electricity and facilitating such competition in the sale, distribution and purchase of electricity	
Promotes	*Demotes*
▪ Provides appropriate remuneration for a restricted service (both operational and connection), ensuring inappropriate cost for a restricted service are not picked up by other parties through BSUoS	▪ Introduces price anomalies whereby a provider receiving reduced payment may be used as an alternative source to a non-restricted provider ▪ May not reflect cost incurred by

payments	embedded generators under restriction for Reactive Power capability

WGAA2

6.5 Opinion was divided amongst Working Group members as to whether the implementation of WGAA2 would better facilitate the applicable CUSC Objective(s) of:
(a) the efficient discharge by the Licensee of the obligations imposed upon it by the act and the Transmission Licence; and
(b) facilitating effective competition in generation and supply of electricity and facilitating such competition in the sale, distribution and purchase of electricity.

6.6 A summary of the views given by the Working Group is included below.

(a) The efficient discharge by the Licensee of the obligations imposed upon it by the act and the Transmission Licence	
Promotes	*Demotes*
▪ Ensuring that National Grid can despatch Reactive Power from Power Park Modules, and Large Power Stations, and facilitate payment for this service – increasing the pool of potential Reactive Power providers resulting in increased stability and Transmission system security ▪ Aligns CUSC and Grid Code	▪ Introduces perverse incentive for restrictions not to be removed ▪ By increasing pool of providers exacerbates problem part 3 seeks to address ▪ May lead to uneconomic and inefficient use of the Transmission system (through paying for a service that cannot be used)
(b) Facilitating effective competition in generation and supply of electricity and facilitating such competition in the sale, distribution and purchase of electricity	
Promotes	*Demotes*
	▪ Increases anomaly whereby restricted embedded generators receive payment for a service not required or able to be accessed

WGAA3

6.7 Opinion was divided amongst Working Group members as to whether the implementation of WGAA3 would better facilitate the Applicable CUSC Objective(s) of;
(a) the efficient discharge by the Licensee of the obligations imposed upon it by the act and the Transmission Licence; and
(b) facilitating effective competition in generation and supply of electricity and facilitating such competition in the sale, distribution and purchase of electricity.

6.8 A summary of the view given by the Working Group is included below.

(a) The efficient discharge by the Licensee of the obligations imposed upon it by the act and the Transmission Licence	
Promotes	*Demotes*
▪ Ensuring that National Grid can despatch Reactive Power from	

Power Park Modules, and Large Power Stations, and facilitate payment for this service – increasing the pool of potential Reactive Power providers resulting in increased stability and Transmission system security ▪ Aligns CUSC and Grid Code ▪ Does not exacerbate the defect whereby restricted generators are paid for a service for which access is not available	
(b) Facilitating effective competition in generation and supply of electricity and facilitating such competition in the sale, distribution and purchase of electricity	
Promotes	*Demotes*
▪ Recognises potential additional cost for Reactive Power from restricted embedded generators to other users ▪ Ensures no differential treatment of units fully compliant with the CUSC and Grid Code when compared to a unit under Network Operator restriction	▪ Does not reflect capability requirement met (and provided for) by embedded generator or dynamic service provided

7.0 PROPOSED IMPLEMENTATION

7.1 National Grid proposes that CAP169 (the original and any of the Working Group Alternative Amendments) should be implemented three months after an Authority decision to allow all MSAs which require amendment to be prepared. The Working Group agreed that this proposed implementation date seemed reasonable.

8.0 IMPACT ON THE CUSC

8.1 CAP169 requires amendment to the following sections of the CUSC:

8.1.1 Part 1: Section 1, Section 4, Section 11, Schedule 2 and Schedule 3

8.1.2 Part 2: Schedule 3 (2.8ii and Appendix 6, 1.2)

8.1.3 Part 3: Section 11 (definitions for Network Operator, Reactive Despatch Network Restriction and Pre-Connection Reactive Despatch Network Restriction) and Schedule 3 (Appendix 1, 2e and Appendix 2, 2e)

8.1.4 The text required to give effect to the Original Proposal is contained as Part A of Amendment Report Volume 2. Most of the changes required relate to part 1 of CAP169, apart from those specifically detailed above for parts 2 and 3.

8.2 The draft text to give effect to the WGAA1 is attached as Part B of Amendment Report Volume 2. In addition to the changes proposed for the original, this will require introduction of an additional definition for Temporary

Enduring Reactive Despatch Network Restriction, and different drafting for the changes to Schedule 3 (appendices 1 and 2).

8.3 The detail of the text to give effect to the WGAA2 is attached as Part C of Amendment Report Volume 2 – only requiring those amendments outlined above (in 8.1.1 and 8.1.2) in relation to parts 1 and 2 of CAP169

8.3.1 The detail of the text to give effect to the WGAA3 is attached as Part D of Amendment Report Volume 2. WGAA3 will require the same amendments as the original for parts 1 and 2. For part 3, only Reactive Despatch Network Restriction will require definition. For Schedule 3 the same change will be required to appendix 2 as for the original (and WGAA1), and appendix 1 will require drafting to reflect 0 payment when a reactive despatch network restriction is in place.

9.0 IMPACT ON INDUSTRY DOCUMENTS

Impact on Core Industry Documents

Grid Code

9.1 A revision to the Grid Code is required with regards part 1 of CAP169 whereby the appropriate capability data table for submission of revised Mvar capability by Power Park Modules is required within BC2 Appendix 3.

9.2 Part 3 of CAP169 also requires the Grid Code to be amended to facilitate communication of the specified connection restriction from both the DNO and the embedded generator. It was proposed that this be introduced to PC.A.3.2.2 (with corresponding changes required to DRC Schedule 11 and OC2).

9.3 Additional definitions would be required in the Grid Code to facilitate part 3:

9.3.1 Reactive Despatch Instruction - as defined in the CUSC

9.3.2 Commercial Boundary - as defined in the CUSC

9.3.3 Reactive Despatch Network Restriction - A restriction placed upon an Embedded Generating Unit, Embedded Power Park Module or DC Converter at an Embedded DC Converter Station by the Network Operator that prevents the Generator or DC Converter Station owner in question (as applicable) from complying with any Reactive Despatch Instruction with respect to that Generating Unit, Power Park Module or DC Converter whether to provide Mvars over the range referred to in CC 6.3.2 or otherwise.

9.4 As well as the changes outlined in 9.1-9.3 for the original, WGAA1 would require additional Grid Code changes to be introduced to facilitate communication of operational restrictions, with the proposal to amend BC1.6 and BC2 Appendix 3.

9.5 WGAA2 would only require the Grid Code change outlined in 9.1 above.

9.6 WGAA3 would require the same Grid Code drafting as WGAA1 (detailed in 9.1 - 9.4 above). The Grid Code (BC2) will also require an additional clause to reflect that where a reactive despatch network restriction is in place no instruction will be given.

9.7 As the CAP169 Working Group was a joint CUSC and Grid Code Working Group the proposed Grid Code changes were discussed within the Working Group. A parallel Grid Code consultation was conducted on the changes outlined above. A final report for the Grid Code will be furnished to the Authority and available at the following link: http://www.nationalgrid.com/uk/Electricity/Codes/gridcode/consultationpapers

Methodology for the Aggregation of Reactive Power Metering

9.8 CAP169 requires minor amendment to the Methodology for the Aggregation of Reactive Power Metering to accommodate potential metering configurations of Power Park Modules.

9.9 The changes being proposed to the document as a result of CAP169 are similar to those being proposed to the CUSC. They seek to amend the terminology used within the methodology to include Power Park Modules (as an alternative to Generating Units) to ensure that Power Park Module Reactive Power metering configurations are accounted for within the current metering categories. It is envisaged by National Grid, having considered a number of Power Park Module metering configurations, that Category A of the methodology document is likely to apply in most cases.

9.10 The changes proposed are included in Amendment Report Volume 2.

Impact on other Industry Documents

9.11 In the Amendment Proposal National Grid indicated that control room software EDL and EDT would require updating to allow an instruction to be sent to Power Park Modules to change slope setting or setpoint voltage. Upon review National Grid believes that such changes are not required to implement CAP169, therefore no changes to these systems will be brought forward as a result of CAP169.

10.0 INDUSTRY VIEWS AND REPRESENTATIONS

Responses to the Working Group Consultation

10.1 The following table provides an overview of the representations received to the Working Group consultation. Copies of the representations are contained in Amendment Report Volume 2**.**

Reference	Company	Supportive	Comments
CAP169-WGC-01	British Wind Energy Association	No view expressed	Notes that dynamic and steady state requirements are not necessarily the same and the potential separation of steady state and dynamic should have been investigated further by the Working Group.
CAP169-WGC-02	Edf Energy	No	Whilst CAP169 proposes a solution to align the CUSC with the Grid Code, the proposed solution introduces a new defect in relation to Embedded Power Stations.
CAP169-WGC-03	RWE NPower	WGAA2	Parts 1 and 2 facilitate efficient procurement of Reactive Power. Part 3 does not deal with the obligations on the generator to maintain

			capability and introduces potential pricing anomalies.

10.2 Of the responses received, one did not indicate support or otherwise for the original or alternatives proposed. One response did not support the original or either alternative, but instead proposed a WG Consultation Alternative Request. The final response indicated support for WGAA2.

10.3 Support for WGAA2 was given by one respondent on the basis that parts 1 and 2 of the proposal facilitate the efficient procurement of Reactive Power by expanding the number of available providers that can be instructed and remunerated under the terms of a MSA. However, part 3 only addresses the payment made for a 3rd party restriction, without dealing with the obligations on the generator to maintain capability. The respondent considered that this would introduce pricing anomalies whereby a provider receiving reduced payments may provide an alternative source of Reactive Power to a provider that is not restricted.

10.4 One respondent did not support the original or alternatives on the basis that the proposed solution introduces a new defect in relation to embedded generators. Whilst the respondent supports the principles of parts 1 and 2 of the proposal, it would exacerbate the defect whereby embedded units under a network operator imposed restriction on Reactive Power may not be able to act in accordance with instructions from National Grid. The respondent considered that amending the payment structure in the CUSC in relation to a 3rd party restriction is not the correct approach. The inability to vary Reactive Power provision in accordance with an instruction from National Grid may introduce the requirement for National Grid to procure additional Reactive Power from an alternative unit, incurring additional cost which would be paid for by all Users. Moreover in line with the response detailed above, the respondent considered that potential pricing anomalies would be introduced by part 3 of WGAA1 and the original. This respondent proposed a WG Consultation Alternative Request (detailed in 4.42).

Responses to The Company Consultation

10.5 The following table provides an overview of the representations received to the consultation by the Company. Copies of the representations are contained in Amendment Report Volume 2.

Reference	Company	Supportive	Comments
CAP169-CR-01	EDF ENERGY	Supportive of WGAA3	• Parts 1 and 2 have merit against the applicable CUSC objectives • The existing default 20% payment rate is intended for other circumstances and was designed to incentivise generators with restrictions to invest in or change their plant to remove the restriction • For CAP169 the restriction is outwith the generators' control so the default payment lacks justification • It is better that the payment rate in regard to this DNO restriction be zero (as proposed in WGAA3) • From the Grid Code E/09 consultation it was noted that on occasion the DNO restrictions are in place because the generator originally requested a particular type of connection • The original, WGAA1 and WGAA2 are distortive of competition by offering a low cost service to National Grid compared to those not under

			restriction
CAP169-CR-02	Electricity North West Limited	Merit in WGAA1 and WGAA3 Comfortable with WGAA2	• Response combines comments on CAP169 and Grid Code consultation E/09 – only those comments relevant to CAP169 are summarised in this table • Uncertain why there appears to be no DNO reps formally on the CAP169 WG – Peter Twomey had been put forward specifically as a member of the Working Group • In response to the consultation question regarding the reason for DNO network restrictions – ENW believes that restriction on DNO network capability in relation to distributed generation will generally be at the request of the distributed generator as part of the connection process (i.e. distributed generators often request as cheap a connection as possible). It can also be possible that issues such as the appearance and disappearance of large point loads can bring new restrictions to a DNOs system, and where constraining the generation by agreement in certain circumstances is more cost-effective than reinforcing • It would be better to modify the CUSC so that NGET could choose whether or not to contract with distribution connected generation for ancillary services • Can see merit in WGAA1 and WGAA3 • Comfortable with WGAA2, but note that this will leave the issue of NGET's exposure to inappropriate reactive power payments to embedded generators • None of the proposed changes will bear on DNOs
CAP169-CR-03	E.ON UK and E.ON Energy Trading	Supportive of WGAA2 Cautious support of WGAA1	• Support the changes proposed in part 1 - a sensible alignment of CUSC and Grid Code • Support part 2 as a proportionate response to a potential issue of discrimination • There is no code forum where the economics of embedded reactive power can be discussed easily • Have sympathy for the idea that DNOs should be exposed to the financial consequences of their decision, however, the codes do not offer an obvious framework for this to happen • The implementation of part 2 may bring the issue part 3 seeks to address more firmly into the CUSC arena • Welcome the intent of part 3 to enable generators with permanent restrictions to receive some payment, equally there may be very long term network restrictions with the same effect • Consider the concerns about the potential for pricing anomalies to be valid – if the change is made it may be worth mandating the Balancing Services Standing Group to monitor the effects of part 3 • Some of the other solutions discussed in the Working Group are more technically appropriate – for example redefining the zero point for payment calculations (whilst acknowledging that this would

			be more complicated to settle and could take many months to implement) • Support WGAA2 • Cautiously support WGAA1 and would wish to see its effects closely monitored
CAP169-CR-04	RWE group of companies, including RWE Npower plc, RWE Supply and Trading GmbH and RWE Innogy	Supportive of WGAA2	• Support parts 1 and 2 – would allow a greater pool of providers to be available and therefore facilitate greater competition in the provision of such services • Unconvinced that part 3 is the correct approach • The current 20% payment serves as an incentive to restore capability, which is not an option available to embedded generators subject to DNO restrictions • A restriction applied by a DNO does not necessarily mean the generator cannot still provide a useful Reactive Power service • Recognise that the loss of ability to instruct a unit to 0MVAr does remove National Grid's ability to 'turn off' payments for the service • Circumstances might arise where a provider subject to a DNO restriction could provide a cheaper alternative to National Grid – thus undermining competition • WGAA3 would have the effect of reducing the options available to National Grid, which would not better facilitate competition • The implementation time proposed appears reasonable

11.0 COMMENTS ON THE DRAFT AMENDMENT REPORT

11.1 National Grid received one response following the publication of the draft Amendment Report. This response came from EDF ENERGY and indicated that the CAP169 draft Amendment Report appears to be a fair and accurate report. A copy of this representation is contained in Amendment Report Volume 2.

12.0 WORKING GROUP RECOMMENDATION

12.1 At the Working Group meeting on June 4th 2009 five members of the Working Group (of the seven eligible to vote) voted:

View against Applicable CUSC Objectives	Better than baseline	Not Better than baseline	Best
Original	2	3	0
WGAA1	2	3	2
WGAA2	3	2	2
WGAA3	1	4	1

12.2 The CAP169 Working Group had an observer in attendance at all meetings, from a DNO. The observer's view was that the 20% payment in the original and WGAA1 seem appropriate, with WGAA3s proposal of 0 payment not recognising the dynamic contribution made to the networks.

12.3 In line with the definition for Working Group Alternative Amendment, the Working Group chair considered the alternative proposals, acknowledging that it is important for the full range of options to be available for the Authority's consideration. Moreover within the Working Group there had been valid and extensive discussion with regards all options and it is appropriate to allow the industry further opportunity to comment (including on WGAA3 proposed as result of the Working Group consultation). Therefore, the chair concluded that it was appropriate for all three Working Group Alternative Amendments to proceed to consultation by the Company.

13.0 AMENDMENTS PANEL RECOMMENDATION

13.1 *To be completed after the Amendments Panel.*

14.0 NATIONAL GRID VIEW AND RECOMMENDATION

14.1 National Grid believes that the original, WGAA1 and WGAA2 better meet the Applicable CUSC Objectives, and believes that WGAA1 best meets the Applicable CUSC Objectives.

14.2 Parts 1 and 2 of CAP169 (as outlined in the original and all of the Working Group Alternative Amendments) will introduce the correct commercial arrangements within the CUSC regarding MSAs for both Power Park Modules and Large Power Stations with a reactive range below 15 Mvar. These commercial arrangements will increase the pool of Reactive Power providers available for use by National Grid in operating the system. This will result in increasing the National Electricity Transmission System stability and security. It will also facilitate the payment mechanism by which to remunerate these Reactive Power providers in accordance with the existing terms outlined in the CUSC. Finally parts 1 and 2 will ensure alignment between the provisions required through the Grid Code and the CUSC.

14.3 With regards part 3 of CAP169, National Grid supports the proposals specified in the original and WGAA1. National Grid believes that both of these proposals seek to ensure appropriate remuneration through ensuring full payment for Reactive Power is made only in instances where full access to the service is available for the purposes of Transmission system operation whilst partial payment is made when restrictions on instruction to 0 Mvar are in place. National Grid believes that this reduced level of payment appropriately recognises that full access to the Reactive Power service is not available in these instances, in line with the existing default payment mechanism in the CUSC. It also recognises that such restricted embedded generators are still able to provide a valuable dynamic service for the operational of the system and reflects the Grid Code requirement to provide such capability. As such National Grid believes that the original better meets the Applicable CUSC Objectives, whilst WGAA1 best meets the Applicable CUSC Objectives as it covers both connection and long term operational restrictions.

14.4 National Grid acknowledges the view expressed in the Working Group that the DNO imposing the restriction should pay for the Reactive Power. National Grid also recognises the difficulties outlined with regards progressing issues such as those raised by part 3 of CAP169 which influence economics across distribution and transmission networks as raised in response to the Company consultation. However, National Grid would highlight that CAP169 seeks to ensure appropriate payment from National Grid, as National Electricity Transmission System Operator, to embedded

generators under restrictions. National Grid continues to consider that the 20% payment outlined in the original and WGAA1 is appropriate (for the reasons outlined in 14.3 above).

14.5 Whilst National Grid believes that WGAA2 better facilitates the CUSC Objectives, through addressing parts 1 and 2 of the original proposal, it is important to note that through not addressing the defect that part 3 seeks to address it may indeed exacerbate this defect. As such, whilst supporting WGAA2, National Grid notes that there is a risk that WGAA2 may lead to uneconomic and inefficient use of the National Electricity Transmission System through paying fully for a service that cannot be fully utilised.

14.6 National Grid recognises the rationale for WGAA3 being raised, particularly that it is appropriate to ensure that embedded generators under such restrictions do not benefit in multiple ways as a result of the restriction (for instance a benefit beyond the full or 20% payment could be a reduced cost connection to the DNO). However, National Grid believes that CAP169 seeks to ensure appropriate payment from National Grid as National Electricity Transmission System operator, and as such National Grid would consider that zero payment to embedded generators under such restriction is not an appropriate payment. By paying zero to an embedded generator under such restrictions, the dynamic response service being provided by such a generator is not being recognised. Nor is the specified Grid Code requirement to have the reactive capability. Moreover, it is not possible to ascertain the reasons (or potential parties that benefit) from any such restriction. As a result of this, National Grid considers that WGAA3 does not better facilitate the Applicable CUSC Objectives.

14.7 One response to the Company consultation suggested that were CAP169 implemented to include any form of part 3 of the proposal, it may be useful to mandate the Balancing Services Standing Group to monitor the effects of part 3. National Grid supports this proposal which could be implemented through amending the terms of reference for the Standing Group. National Grid has an internal Reactive Power group which monitors and reports on despatch instructions. The scope of this group could be extended were CAP169 implemented, with a report being prepared for submission to the Balancing Services Standing Group.

14.8 National Grid acknowledges the governance point raised in response to the Company consultation regarding the presence of DNO representation on the Working Group. National Grid's understanding was that Peter Twomey was an observer to the group representing UUES (who are not a CUSC party). This position was signed off through the Terms of Reference for the group by the Balancing Services Standing Group on the 2nd April 2009 and the Amendments Panel on the 24th April 2009. The reference to DNO representative in 4.20 has been amended to reflect DNO observer to avoid confusion on this matter. Whilst based on this interpretation Peter Twomey was unable to vote formally as a member of the Working Group, his views expressed were fully aired in the group and in 12.1 his views on the vote were explicitly recorded. National Grid acknowledges that whilst it is not possible to amend the Working Group terms of Reference or vote at this stage, this should allow the Authority to understand the views expressed by all attendees, including the observer, at the Working Group.

ANNEX 1 – ORIGINAL PROPOSAL

CUSC Amendment Proposal Form	CAP:169

Title of Amendment Proposal:

Provision of Reactive Power from Power Park Modules, Large Power Stations and Embedded Power Stations

Description of the Proposed Amendment *(mandatory by proposer)*:

Amendment Proposal Part 1

This Amendment Proposal looks to amend various sections of CUSC to accommodate the provision of Reactive Power from Power Park Modules. Currently, the vehicle to enable National Grid to despatch and pay Providers for Reactive Power, the Mandatory Services Agreement (MSA), does not reflect the capability requirement as per Grid Code CC6.3.2 for Power Park Modules i.e. within the Capability Data Tables. It is therefore proposed that additional tables be added to the MSA pro forma in CUSC (Schedule 2 Exhibit 4). This Amendment Proposal also looks to update the Reactive Power Definitions and Interpretations section (Schedule 3, Part I, Clause 1) in line with the Grid Code CC8.1 provisions to reflect that Reactive Power from Power Park Modules is a Mandatory (not Enhanced) Ancillary Service.

The current Capability Data Tables within the MSA for Synchronous Generators are not applicable to Power Park Modules due to differences in the Grid Code (CC.6.3.2) requirement. For Synchronous Generators the Reactive Capability requirement is at Rated MW at the LV Stator Terminals whereas the requirement for a Power Park Module is at the Grid Entry Point or User System Entry Point (if embedded) in England and Wales or the HV terminals of the 33/132kV or 33/275kV or 33/400kV transformer in Scotland. It is proposed that the MSA pro forma shall capture the reactive capability at 100%, 50%, 20% and 0% Rated MW for a Power Park Module. Table A of Capability Data Tables shall capture the capability at the Commercial Boundary and Table B will capture the capability at the Grid Entry Point (or User System Entry Point).

In order to account for all types of connection configurations of Power Park Modules and remove any ambiguity as to the location of the Commercial Boundary in each case, it is proposed that the Commercial Boundary, at which the Provider will be paid for provision of Reactive Power, is defined within each Power Park Module MSA. The current definition of Commercial Boundary within CUSC allows this flexibility and will therefore not need amending.

Sections of CUSC associated with Reactive Power provision (see 'Impact on the CUSC' below) also require amendment in order to accommodate the addition of Power Park Modules as an alternative option to Generating Units and CCGT Modules. The proposal also looks to make similar changes to include DC Converters for which the Reactive Power requirement has also been previously added to Grid Code CC6.3.2. Certain sections also require amendment to reflect that Reactive Power supplied by Power Park Modules from synchronous compensation or static compensation is a System Ancillary Service and Obligatory Reactive Power Service (in line with Grid Code CC8.1)

Amendment Proposal Part 2

CUSC Schedule 3, Clause 2.8 states that National Grid is only "obliged" to conclude or amend Mandatory Service Agreements if the Reactive Power capability of the Generating Unit is 15Mvar or more. This equates to a Generating Unit with a size of approximately 45MW. Large Power Stations are defined as those which in NGET's Transmission system have a Registered Capacity of 100MW or more; in SPT's Transmission system have a Registered Capacity of 30MW or more; and in SHETL's Transmission system have a Registered Capacity of 10MW or more. As such all three categories of Large Power Stations are obliged to be signatory to the CUSC, and therefore through the Grid Code have the obligation to provide a Reactive Power Service. However National Grid is only obliged to amend/conclude Mandatory Service Agreements with those above approximately 45MW. This Amendment Proposal seeks to extend the obligation whereby, upon request from a Large Power

Station with a reactive capability below 15Mvar, National Grid is obliged to conclude a Mandatory Service Agreement.

Amendment Proposal Part 3
A function of the technical specifications that are placed upon Generators by National Grid results in a control philosophy that produces or consumes Reactive Power dependant on the voltage at the Point of Connection (as defined in the Grid Code) to the Distribution System. As generators export Active Power onto the system they cause the voltage at the Point of Connection to rise. The control system is designed in such a manner so that when this occurs generators will consume Reactive Power to control the voltage.

Generators directly connected to Distribution System produce Reactive Power which is of benefit to the distribution network operator (DNO) and National Grid and assists in managing voltage on their network. Some DNOs impose connection restrictions which prevent instruction(s) from National Grid to the embedded generator to reduce output to 0 Mvar. These restrictions would result in National Grid being unable to instruct the relevant generator to achieve economic and efficient use of the Reactive Power across the Transmission system, despite the imposed requirement and capability being in place.

The Proposed Amendment seeks to facilitate partial payment to those embedded generators under such restriction conditions by DNOs. This partial payment reflects the Grid Code requirement and dynamic benefit from generators under restriction, whilst acknowledging that it is not possible for National Grid to despatch Reactive Power from such generators to 0 Mvar in line with Transmission system operation requirements.

Payment under such restrictions would be in line with current arrangements in CUSC Schedule 3, Appendix I (2) whereby a 20% payment is made in the event that certain conditions are not met. This Amendment Proposal would therefore seek to include an additional provision in CUSC Schedule 3, Appendix I (2).

Description of Issue or Defect that Proposed Amendment seeks to Address *(mandatory by proposer)*:

Amendment Proposal Part 1

Grid Code CC6.3 and CC8.1 have already been amended[2] to document the reactive capability requirements of Power Park Modules. Corresponding changes to CUSC were not made; hence the existing Mandatory Services Agreement template does not explicitly cater for the required method of recording the capability of Power Park Modules. The proposed changes are therefore driven by the requirement to update CUSC to reflect changes made to Grid Code CC 6.3.2 to allow National Grid to despatch Reactive Power from Power Park Modules, and for Providers to be paid accordingly. It is envisaged that the proposed changes will increase the pool of potential providers of Reactive Power and result in increased system security.

The Proposed Amendment also looks to ensure alignment with the Grid Code by ensuring Reactive Power from Power Park Modules is classified as an Obligatory Reactive Power Service and Mandatory Ancillary Service.

Amendment Proposal Part 2
The Proposed Amendment looks to extend Schedule 3, Part 1, Clause 2.8 to ensure that National Grid is obliged to conclude/amend Mandatory Service Agreements with all Large Power Stations, with a reactive capability below 15Mvar, upon request from the Large Power Station.

Amendment Proposal Part 3

The Proposed Amendment seeks to ensure that appropriate payments are made for the provision of a Reactive Power service from embedded generators. It recognises that some embedded generators have connection conditions which prevent National Grid, as GBSO, from despatching through 0 Mvar,

[2] Grid Code amendment G/06 Power Park Modules and Synchronous Generating Units http://www.nationalgrid.com/uk/Electricity/Codes/gridcode/consultationpapers/2006/

and thereby using the service for the purpose of Transmission system operation.

When such circumstances occur a 20% payment will be applied to reflect the capability obligation imposed on such generators, and the associated dynamic benefits. However, the full payment will not be made in recognition of the inability of National Grid to make use of the Reactive Power service through providing a despatch instruction to 0 Mvar.

It is envisaged that the Proposed Amendment will allow the most economic and efficient operation of the system by facilitating appropriate remuneration in all circumstances

Impact on the CUSC *(this should be given where possible)*:

Changes would be required to Section 1, Section 4, Schedule 3, Schedule 11 and Schedule 2 Exhibit 4, Schedule 3 Part 1.

Further details of the proposed changes are as follows:

Section 1: Applicability of Sections and Related Agreements Structure

- Addition of referencing to Power Park Modules and DC Converters

Section 4: Balancing Services

- Addition of referencing to Power Park Modules and DC Converters

Section 11: Definitions

- Addition of definition of DC Converter

Schedule 2 Exhibit 4: Mandatory Services Agreement

- Clause 3.2.2 expanded to include non-synchronous generating units, DC Converter and Power Park Module in line with changes to Grid Code
- Clause 3.3 (Capability Data) expanded to include two further sections for Power Park Modules. These two further sections refer to new capability tables for Power Parks in Appendix 1
- New Capability Tables added to Appendix 1 depending upon the capability of the Power Park i.e. as per Grid Code CC6.3.2(d) (i) or (ii); the second table in each set is required only in a situation where metering is not located at the Commercial Boundary
- Commercial Boundary of the Power Park Module to be defined in the MSA in the definitions section

Schedule 3, Part 1: Balancing Services Market Mechanism – Reactive Power

- Clause 1.1 amended to reflect that a Power Park Module, where Synchronous or static compensators within the Power Park Module may be used to provide Reactive Power, is classified as Obligatory Reactive Power Service.
- Clause 1.2(b) amended to reflect that a Power Park Module, where Synchronous or static compensators within the Power Park Module may be used to provide Reactive Power, is no longer classified as a Commercial Ancillary Service.
- Clause 2.8(a) amended to reflect the obligation to conclude/amend Mandatory Service Agreements with any Large Power Station with a reactive capability below 15Mvar on request from the Large Power Station.
- Appendix I (2) with an additional provision added to Clause 2, to reflect that a 20% payment will be made at such times when the BM Unit is unable to comply with a Reactive Despatch Instruction to zero Mvar, based on a restriction imposed by the Network Operator.

Impact on Core Industry Documentation *(this should be given where possible)*:

Minor amendments would be required to the Methodology for the Aggregation of Reactive Power Metering to accommodate potential metering configurations of Power Park Modules.

Corresponding change to Grid Code whereby DNOs will be required to communicate when such restrictions are in place.

Impact on Computer Systems and Processes used by CUSC Parties *(this should be given where possible)*:

The control room software EDL and EDT will need to be updated to allow an instruction to be sent to a Power Park Module asking it to change its slope setting or setpoint voltage.

Details of any Related Modifications to Other Industry Codes *(where known)*:

None

Justification for Proposed Amendment with Reference to Applicable CUSC Objectives** *(mandatory by proposer)*:

National Grid believes that this proposal will better facilitate CUSC Applicable Objective

(a) The efficient discharge by the licensee of the obligations imposed upon it under the Act and by the Transmission Licence

by ensuring that National Grid can despatch Reactive Power from Power Park Modules, and Large Power Stations, and facilitate payment for this service. This will increase the pool of potential providers of reactive power and result in increased stability and Transmission system security.

The proposal will also ensure appropriate remuneration through ensuring full payment is made only in instances where full access to the service is available for the purposes of Transmission system operation, whilst partial payment (reflecting the Grid Code obligation and associated dynamic benefits) is made when restrictions on instruction to 0 Mvar are in place. Thereby ensuring the system is operated and managed in the most economic and efficient manner.

This amendment will ensure alignment of the CUSC and the Grid Code.

Details of Proposer: Organisation's Name:	National Grid
Capacity in which the Amendment is being proposed: (i.e. CUSC Party, BSC Party or "energywatch")	CUSC Party
Details of Proposer's Representative: Name: Organisation: Telephone Number: Email Address:	 Carole Hook National Grid 01926 654211 carole.hook@uk.ngrid.com
Details of Representative's Alternate: Name: Organisation: Telephone Number: Email Address:	 Katharine Clench National Grid 01926 656036 Katharine.clench@uk.ngrid.com
Attachments (Yes/No): **If Yes, Title and No. of pages of each Attachment:**	

ANNEX 2 – WORKING GROUP TERMS OF REFERENCE

Working Group Terms of Reference and Membership

TERMS OF REFERENCE FOR CAP169 WORKING GROUP

1. The Balancing Services Standing Group (BSSG) has been actioned to act in the capacity of a Working Group for the evaluation of CAP169. Nominations from parties not currently represented on the BSSG have been invited.

2. Given the consequential Grid Code change which may be required as a result of CAP169 an invitation for Grid Code Panel representation has also been made. Therefore these Terms of Reference apply to a joint Working Group with the Grid Code, under the governance of the CUSC. An overview of the governance process envisaged is outlined in annex 1.

RESPONSIBILITIES

3. The Working Group is responsible for assisting the CUSC Amendments Panel in the evaluation of CUSC Amendment Proposal CAP169 tabled by National Grid at the Amendments Panel meeting on 27th February 2009.

4. The Working Group is also responsible for considering the corresponding Grid Code changes required by the proposal, and reporting accordingly to the Grid Code Review Panel.

5. The relevant aspects of the proposal must be evaluated to consider whether it better facilitates achievement of the applicable CUSC and Grid Code objectives.

SCOPE OF WORK

6. The Working Group must consider the issues raised by the Amendment Proposal and consider if the proposal identified better facilitates achievement of the Applicable CUSC Objectives. The consequential Grid Code changes must be evaluated in line with the Grid Code objectives.

7. In addition to the overriding requirement of paragraph 6, the Working Group shall consider and report on the following specific issues:

   - Identify the consequences of the proposed amendment/any WGAAs, including, but not limited to:
     - Impact on the CUSC/Grid Code and any other associated documents
     - Impact on CUSC/Grid Code parties and other affected parties
     - Impact on industry and wider issues as appropriate in accordance with the applicable CUSC/Grid Code objectives

  - Review with regards to the Guidelines for the Assessment of Carbon Costs Associated with Code Amendments
- Consider implementation

8. The Working Group is responsible for the formulation and evaluation of any Working Group Alternative Amendments (WGAAs) arising from Group discussions which would, as compared with the Amendment Proposal, better facilitate achieving the applicable CUSC objectives in relation to the issue or defect identified.

9. The Working Group should become conversant with the definition of Working Group Alternative Amendments which appears in Section 11 (Interpretation and Definitions) of the CUSC. The definition entitles the Group and/or an individual Member of the Working Group to put forward a Working Group Alternative Amendment if the Member(s) genuinely believes the Alternative would better facilitate the achievement of the Applicable CUSC Objectives. The extent of the support for the Amendment Proposal or any Working Group Alternative Amendment arising from the Working Group's discussions should be clearly described in the final Working Group Report to the CUSC Amendments Panel.

10. There is an obligation on the Working Group Members to propose the minimum number of Working Group Alternatives where possible.

11. All proposed Working Group Alternatives should include the proposer(s) details within the Final Working Group Report, for the avoidance of doubt this includes Alternative(s) which are proposed by the entire Working Group or subset of members.

12. There is an obligation on the Working Group to undertake a period of Consultation in accordance with CUSC 8.17. This consultation will relate only to proposed changes to the CUSC (as with usual practice for CUSC Working Group consultations any relevant consequential Grid Code changes will be outlined in the consultation). The Working Group Consultation period shall be for a period of 2 weeks as determined by the Amendments Panel.

13. Following the Consultation period the Working Group is required to consider all responses including any WG Consultation Requests. As appropriate the Working Group will be required to undertake any further analysis and update the Original and/or Working Group Alternatives. All responses including any WG Consultation Requests shall be included within the final report including a summary of the Working Groups deliberations and conclusions.

14. The Working Group is to submit their final report to the CUSC Panel Secretary on 18th June 2009 for circulation to Panel Members. The conclusions will be presented to the CUSC Panel meeting on 26th June 2009.

15. The Working Group will also prepare a report for submission to the Grid Code Review Panel. The Working Group will endeavour to prepare this report for consideration by the Grid Code Review Panel at the meeting on May 21st 2009.

MEMBERSHIP

16. Membership of the joint Working Group for CAP169 will be drawn from the Grid Code Review Panel, or their nominated representatives, the BSSG, additional nominated CUSC party representatives and the Authority.

17. It is recommended that the Working Group has the following members:

Chair	Malcolm Arthur	
National Grid	Carole Hook/Katharine Clench	
Industry representatives	Jonathan Atyeo	GDF
	Claver Chitambo	RES
	James Evans	British Energy
	Claire Maxim	E.on (GCRP member)
	Campbell McDonald	SSE (GCRP member)
	Christopher Proudfoot	Centrica
	Raoul Thulin	RWE
Authority representative	Lesley Nugent	Ofgem
	Roberta Fernie	Ofgem
Technical Secretary	Bushra Akhtar	National Grid
Observer	Peter Twomey	UUES

18. The Chair of the Working Group and the Chair of the CUSC Panel must agree a number that will be quorum for each Working Group meeting. The agreed figure for CAP169 is that at least 5 Working Group members must participate in a meeting for quorum to be met.

19. A vote is to take place by all eligible Working Group members on the proposal and each Working Group Alternative, as appropriate, as to whether it better facilitates the CUSC Applicable Objectives and indicate which option is considered the BEST with regard to the CUSC Applicable Objectives. The results from the vote shall be recorded in the Working Group Report. A recommendation regarding any proposed Grid Code change should also be made.

20. Working Group Members or their appointed alternates are required to attend a minimum of 50% of the Working Group Meetings to be eligible to participate in the Working Group vote.

21. The Technical Secretary is to keep an Attendance Record, for the Working Group meetings and to circulate the Attendance Record with the Action Notes after each meeting. This will be attached to the Final Working Group Report.

22. The membership can be amended from time to time by the CUSC Amendments Panel.

RELATIONSHIP WITH AMENDMENTS PANEL

23. The Working Group shall seek the views of the Amendments Panel before taking on any significant amount of work. In this event the Working Group Chairman should contact the CUSC Panel Secretary.

24. The Working Group shall seek the Amendments Panel advice if a significant issue is raised during the Consultation process which would require a second period of Consultation in accordance with 8.17.17.

25. Where the Working Group requires instruction, clarification or guidance from the Amendments Panel, particularly in relation to their Scope of Work, the Working Group Chairman should contact the CUSC Panel Secretary.

MEETINGS

26. The Working Group shall, unless determined otherwise by the Amendments Panel, develop and adopt its own internal working procedures and provide a copy to the Panel Secretary for each of its Amendment Proposals.

REPORTING

27. The Working Group Chairman shall prepare a final report to the 26th June 2009 CUSC Amendments Panel responding to the matter set out in the Terms of Reference including all Working Group Consultation Reponses and Requests.

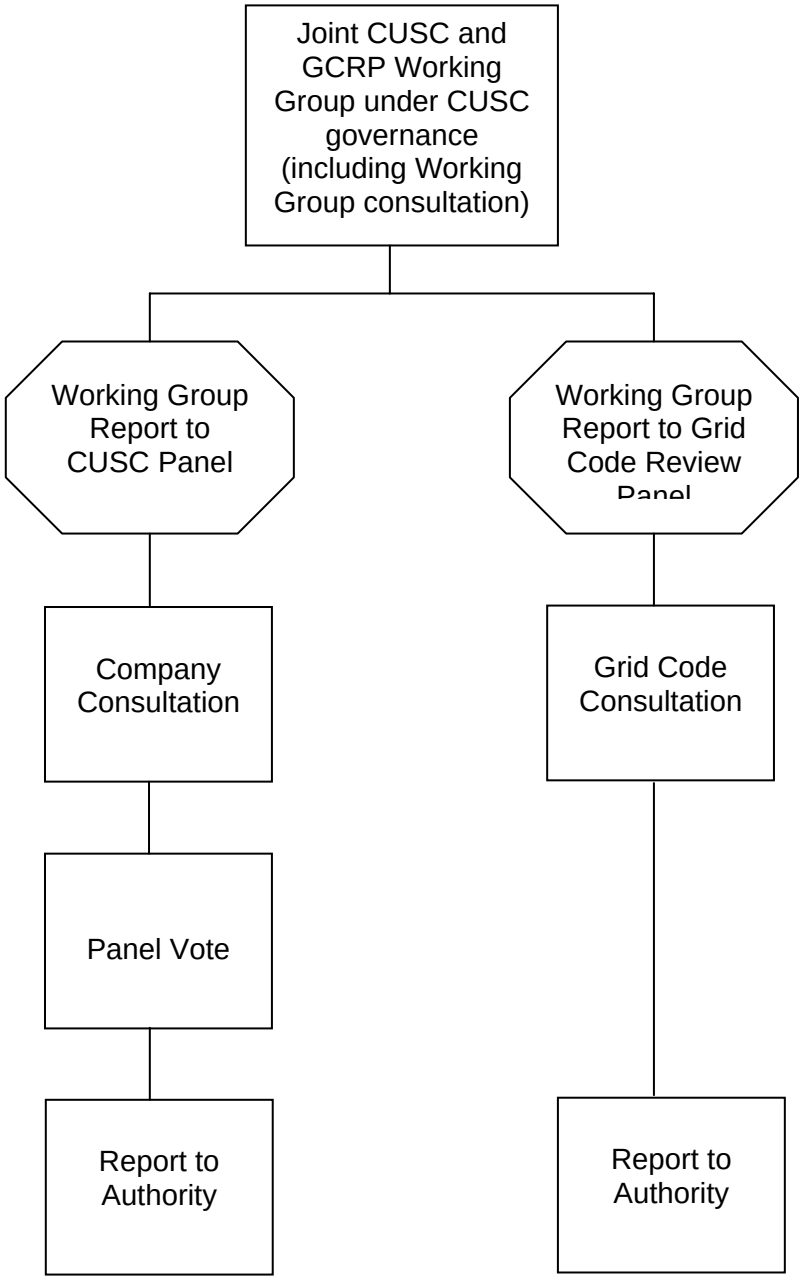
28. A report will also be prepared for submission to the Grid Code Review Panel. The Working Group will endeavour to prepare this for consideration at the meeting on May 21st 2009.

29. A draft Working Group Report must be circulated to Working Group members with not less than five business days given for comments.

30. Any unresolved comments within the Working Group must be reflected in the final Working Group Report.

31. The Chairman (or another member nominated by him) will present the Working Group report to the Amendments Panel and Grid Code Review Panel as required.

Annex 1


Joint CUSC and GCRP Working Group under CUSC governance (including Working Group consultation)
Working Group Report to CUSC Panel
Working Group Report to Grid Code Review Panel
Company Consultation
Grid Code Consultation
Panel Vote
Report to Authority
Report to Authority

ANNEX 3 – MATERIALITY ESTIMATE

Estimate of Materiality of CAP169:

Estimate of Embedded Generation under restriction

Based on the 2009 Seven Year Statement (SYS) in Scotland (SHETL and SPT) by 2011/12 there will be approximately:

- 1711MW of embedded Large Power Stations (of which 647MW will be above 48MW)
    - 1519MW of which does not currently have MSAs (consisting of Power Park Modules, new Large Power Stations and Large Power Stations with a capacity below 48MW) – of this 455MW is above 48MW
- 1037MW of embedded Large Power Park Modules (of which 403MW will be above 48MW)

Estimate of Reactive Output

The reactive output from a sample of five large embedded generators with a total capacity of 250MW from the period August 2007 - August 2008, gives a total reactive absorption of 75,000 MVArh. This would equate to 300MVArh per MW.

Assumptions:

- Embedded capacity will be in line with the 2009 SYS forecast
- Embedded connection restrictions preventing National Grid despatch to 0Mvar are in place only on Scottish Distribution networks
- All large embedded generation in Scotland (not already connected without such restrictions[3]) will be subject to such restrictions
- £/MVArh cost estimate of £4/MVArh
- Reactive absorption in line with a sample of 5 existing embedded generators

Estimate of materiality for part 1

The extension of appropriate MSAs for Power Park Modules introduced through Part 1 is estimated to result in MSAs for an additional 403MW of embedded Power Park Modules with capacity above 48MW by 2011/12. Based on the above assumptions this would equate to a cost of ***£0.48m****.*

Estimate of materiality for part 2

The proposal to amend the obligation to conclude MSAs, upon request, with all Large Power Stations with a reactive range below 15Mvar is estimated to increase the capacity eligible to receive MSAs to 1519MW. This could equate to a cost of ***£1.82m*** were such generators to request MSAs, or a lower range of ***£0.55m*** if no generation below 48MW requests MSAs.

Estimate of materiality for part 3

If part 3 is introduced the 20% payment would result in a reduction in the estimate of this cost to between ***£0.11m and £0.36m*** (this spread being dependent on the number of Large Power Stations below 48MW which request MSAs).

[3] Please note that MSAs are in place for 192MW of existing embedded generation (above 48MW) which are not subject to embedded connection restrictions on the ability to be despatched to 0Mvar – this has therefore not been included for the purposes of this estimate of the materiality of CAP169.

CAP169 Materiality Estimate

2010/11 Figure 3.5 SYS 2009

Tranmission Licencee		Total MW	Only Power Park Modules (PPMs)	PPMs, new Large Power Stations and Large Power Stations with a capacity below 48MW
SPT	Total Embedded	604	354	484
	Total Embedded 48MW and above	282	110	162
SHETL	Total Embedded	1107	683	1035
	Total Embedded 48MW and above	365	293	293
	TOTAL	**1711**	**1037**	**1519**
	TOTAL 48MW AND ABOVE	**647**	**403**	**455**

		MW	Mvarh/MW	Total Mvarh	£/mvarh	Total cost (£)	20%
	sample output	*250*	*300*	*75000*	*£ 4.00*	*£ 300,000.00*	*£ 60,000.00*
SYS 09 calculation	**total embedded**	1711	300	513300	£ 4.00	£ 2,053,200.00	£ 410,640.00
	total embedded above 48MW	647	300	194100	£ 4.00	£ 776,400.00	£ 155,280.00
SYS 09 calculation only PPMs	**total embedded**	1037	300	311100	£ 4.00	£ 1,244,400.00	£ 248,880.00
	total embedded above 48MW	403	300	120900	£ 4.00	**£ 483,600.00**	**£ 96,720.00**
SYS 09 calculation all PPMs above 48MW, new generation and all below 48MW	**total embedded**	1519	300	455700	£ 4.00	**£ 1,822,800.00**	**£ 364,560.00**
	total embedded above 48MW	455	300	136500	£ 4.00	**£ 546,000.00**	**£ 109,200.00**

ANNEX 4 - WORKING GROUP ALTERNATIVE AMENDMENT 1

CAP169 Alternative Amendment Proposal - Long term restrictions not known at time of connection (proposed by National Grid)

The original Amendment Proposal CAP169 describes connection conditions which prevent despatch from National Grid (as NETSO) through 0Mvar. Such conditions would be known by the relevant Network Operator and embedded generator and communicated to National Grid upfront prior to connection. National Grid would also consider that any operational restrictions preventing despatch through 0 Mvar lasting longer than 12 months are long term restrictions and should be considered in the same way as permanent connection conditions. Therefore, this alternative seeks to extend part 3 of the original CAP169 to include long term reactive despatch restrictions where the restriction is in place for 12 months or more.

National Grid believes that 12 months is an appropriate period of time to signal such a long term reactive despatch restriction, as restrictions for such protracted periods are likely to be as a result of the configuration of the DNO network and the embedded connection to this network, rather than representing a short term temporary operational restriction. Moreover once the 12 month period has been exceeded the restriction begins to impact upon multiple outage years.

The 20% payment associated with such restrictions will be applied once the 12 month period has been exceeded (with full payment made until this 12 month period is reached). It will continue to apply until such time as notification is received that the restriction has been removed.

The 12 month period may be non-consecutive over a continuous period of 24 months. This is to ensure that there is no impact on the appropriate payment terms by temporarily removal of the restriction.

The element associated with the payment terms would be facilitated through the CUSC Schedule 3. Administration of this payment mechanism can be achieved through the existing settlements system and processes in place. As with the connection restrictions, National Grid would foresee communication of the long term reactive despatch restrictions being facilitated through the Grid Code.

Benefits

National Grid considers that this alternative proposal would allow the most economic and efficient operation of the system by facilitating appropriate remuneration in all circumstances – capturing both up front connection conditions and long term reactive despatch restrictions not known at the time of connection.

National Grid believes that this will offer an equitable solution ensuring that both categories as described above are treated in the same way, whilst not capturing short term temporary operational restrictions. The reduction in payment will not commence until 12 months has passed to ensure equitable treatment within this initial 12 months.

Through this, National Grid believes that this extension to the original Amendment Proposal will bring additional benefits to the original Amendment Proposal through extending the circumstances in which partial payment for Reactive Power will be

made when there is an extended period with a restriction in place on the ability to despatch to 0 Mvar.

Changes Proposed

CUSC

Over and above the changes proposed to the original CAP169, this alternative will require an alternative amendment to the CUSC, Schedule 3, appendix 1 and 2

- Point 2e describing notification of a reactive despatch restriction either:
  - Pre-connection (as with the original), or
  - On a temporary (operational) basis

A new definition will also be required for "Temporary Enduring Reactive Despatch Network Restriction" (which could either be for 12 consecutive months or 12 non-consecutive months with any 24 consecutive month period).

Grid Code

Over and above the changes proposed to the original Amendment Proposal, this alternative proposal will require additional Grid Code changes to facilitate communication of temporary reactive despatch restrictions.

It is proposed that communication of restrictions should be made by both the relevant Network Operator and the generator. In order to facilitate this, there are likely to be changes made to Grid Code sections BC1.6 (extending the existing Network Operator obligation relating to one Operational Day to cover more than one Operational Day) and BC2 Appendix 3 (extending the existing communication of revised Mvar data (relating to capability) to cover Reactive Despatch Network Restrictions).

ANNEX 5 – WORKING GROUP ALTERNATIVE AMENDMENT 2

Draft Working Group Alternative Amendment 2 – Parts 1 and 2 of CAP169 (proposed by the CAP169 WG)

Description

CAP169 introduces three discreet changes relating to Reactive Power. These were raised by National Grid as one Amendment Proposal to allow complete consideration of the changes relating to Reactive Power that National Grid would like to see introduced to the CUSC at this time.

During Working Group discussion of the proposal it was clear that Amendment Proposal part 1 (as defined in the CAP169 Amendment Proposal relating to Reactive Power from Power Park Modules) and Amendment Proposal part 2 (as defined in the CAP169 Amendment Proposal relating to Reactive Power from Large Power Stations with a reactive capability below 15Mvar) raised little concern or debate within the group and were generally accepted as positive changes to the current version of the CUSC. However, Amendment Proposal part 3 (as defined in the CAP169 Amendment Proposal relating to embedded generators) generated greater debate within the group with alternatives to this section more likely to be introduced.

This draft Working Group Alternative Amendment contains Amendment Proposal part 1 and Amendment Proposal part 2 of the original Amendment Proposal, with Amendment Proposal part 3 removed.

Benefits

Given the agreement by the Working Group on Amendment Proposal part 1 and Amendment Proposal part 2 of CAP169 it was felt by the group that a prudent approach would be to raise a draft Working Group Alternative Amendment to CAP169 which comprises only Amendment Proposal part 1 and Amendment Proposal part 2. This should ensure that if, following submission of the Amendment Report to the Authority, there is a view that Amendment Proposal part 3 should not be implemented the implementation of Amendment Proposal part 1 and Amendment Proposal part 2 will not be adversely affected.

Changes Proposed

The changes proposed with this draft Working Group Alternative Amendment would be the same as those proposed for Amendment Proposal part 1 and Amendment Proposal part 2 of CAP169. In terms of the indicative text prepared for the original Amendment Proposal CAP169 this would see removal of the following changes:

- Definition of Network Operator and Restricted Despatch Restriction
- Schedule 3, appendix 1, 2e
- Schedule 3, appendix 2, 2e

ANNEX 6 – WG CONSULTATION ALTERNATIVE REQUEST/WGAA3

CUSC WG CONSULTATION REQUEST FORM

Please send your completed form along with your completed Working Group Consultation Response to cusc.team@uk.ngrid.com by 1st June 2009.

Please note that any responses received after the deadline may not receive due consideration by the Working Group.

Respondent Name and contact details	*James Evans* *James.evans@british-energy.com*
CAP169 [Add – Title of the Amendment]	Provision of Reactive Power from Power Park Modules, Large Power Stations and Embedded Power Stations.
Capacity in which the WG Consultation Request is being raised : (i.e. CUSC Party, BSC Party or "National Consumer Council ")	CUSC Party

Description of the Proposal for the Working Group to consider*(mandatory by proposer):*

In the event of a Distribution imposed restriction on the provision of Reactive Power by an embedded Generator then that Embedded Generator will receive £0 (zero) payment for any reactive power provided and will not receive instructions from National Grid (for the purpose of reactive Power provision).

Description of the difference(s) between your proposal compared to Original / Working Group Alternative(s) *(mandatory by proposer):*

Where a restriction is imposed by Distribution on an embedded Generator under the current proposal this would result in 20% of the normal payment for any reactive Power provided. Under this alternative, £0 (zero) payment would be made and National Grid would not instruct the unit to vary Reactive Output.

Justification for the proposal (*including why the Original proposal / Working Group Alternative(s) does not address the defect*) *(mandatory by proposer)*:

Part 3 of CAP169 attempts to address the new defect that Parts 1 & 2 will introduce such that an Embedded Generator may benefit from a restriction imposed by Distribution. The proposed solutions are not appropriate, as they could distort competition by providing an artificially low cost service provision to National Grid in preference to units of any type not subject to a restriction. In addition the effects on BSUoS and the negative demand circumstance resulting in BSUoS payment to the embedded unit (rather than from) combine to form a perverse incentive on the unit not to resolve the restriction.

Impact on the CUSC *(this should be given where possible)*:
Impact on Core Industry Documentation *(this should be given where possible)*:
Impact on Computer Systems and Processes used by CUSC Parties *(this should be given where possible)*:
Justification for the proposal with Reference to Applicable CUSC Objectives* *(mandatory by proposer)***:** This proposal better facilitates objective (a) by resolving the original defect identified and by preventing the original solution introducing a new perverse defect. This proposal better facilitates objective (b) by ensuring that there is no differential treatment of units fully compliant with the CUSC and Grid Code when compared to a unit under Distribution restriction.

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

Notes:

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

ANNEX 7 – WORKING GROUP ATTENDANCE

CAP169 WORKING GROUP ATTENDANCE

Name	Company	12/03/2009	02/04/2009	06/05/2009	04/06/2009	26/06/2009 (teleconference)	09/07/2009 (teleconference)
Claire Maxim	Eon	Yes	Yes	No	No	No	Yes
Raoul Thulin	RWE	Yes	Yes	Yes	Yes	Yes	Yes
Christopher Proudfoot	Centrica	No	Yes	No	No	No	No
Jonathan Atyeo	GdF	No	Yes	Yes	Yes	No	No
Claver Chitambo	RES	Yes	Yes	Yes	Yes	No	No
James Evans	British Energy	No	Yes	No	Yes	Yes	Yes
Campbell McDonald	SSE Generation	Yes	Yes	Yes	No	No	No
OBSERVER							
Peter Twomey	UUES	No	Yes	Yes	Yes	Yes	No
Neil Sanderson	SSE	No	No	No	No	Yes	No
Hamish Dallachy	Scottish Power	No	No	No	No	Yes	No
ALTERNATE							
John Morris	British Energy	Yes	No	Yes	No	No	No
OFGEM							
Bridget Morgan		No	No	No	No	Yes	Yes
National Grid							
Malcolm Arthur	Chair	Yes	Yes	Yes	No	Yes	Yes
Katharine Clench	Alternate Proposer	Yes	Yes	Yes	Yes	Yes	Yes
Carole Hook	Proposer	Yes	Yes	Yes	Yes	No	Yes
Tom Ireland	NG Grid Code Rep	No	No	Yes	Yes	Yes	Yes
Bushra Akhtar	Technical Secretary	No	No	Yes	Yes	Yes	Yes
David Smith	Alternate Chair	No	No	No	Yes	No	No
Brian Taylor	GCRP rep	No	No	No	No	No	Yes