AMENDMENT REPORT VOLUME 1

CUSC Amendment Proposal CAP167

Definition of a threshold(s) associated with a request for a Statement of Works

The purpose of this report is to assist the Authority in their decision of whether to implement Amendment Proposal CAP167

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I DOCUMENT CONTROL

a National Grid Document Control

Version	Date	Author	Change Reference
0.1	19/01/09	National Grid	Draft for comment
0.2	27/01/09	National Grid	Draft for Panel comment and vote
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1.0	18/02/09	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	

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1.0 SUMMARY AND RECOMMENDATIONS

Executive Summary

1.1 CAP167 *Definition of a threshold(s) associated with a request for a Statement of Works* proposed to amend the CUSC to provide definitive clarification in the assessment of whether a Small Embedded Power Station (SEPS) development (or the aggregate effect of multiple projects) is likely to have a significant impact on the GB transmission system. The proposal recommended that a CUSC Working Group be established to undertake the required analysis and decide on an appropriate MW threshold(s) to be inserted into the CUSC, which will provide transparent criteria for determining whether there could be a significant impact and whether a DNO is therefore required to request a Statement of Works from National Grid for small generation projects connecting to its system.

1.2 The Working Group agreed that in preference over defined MW threshold(s) in the CUSC, it would be more appropriate to develop a process to sit in the CUSC, defining the relevant criteria to be taken into account when defining threshold(s) in a document outside of the CUSC. This was considered to provide greater flexibility in amending threshold(s) which might be required due to changes in the transmission system or generation and demand backgrounds.

1.3 The Working Group considered that a set of criteria should be developed to assess whether a request for a Statement of Works is required or not, to be applied throughout Great Britain. Having agreed on a process to be used to determine MW thresholds, there was considerable disagreement amongst the Working Group as to which specific criteria should be considered as appropriate in determining the impact of SEPS on the transmission system. As a consequence, three Amendment Proposals were developed by the Working Group.

1.4 The 'Original' Proposal was put forward by National Grid and further developed by the Working Group. In this Proposal, an assessment of the impact of SEPS against the GB Security and Quality of Supply Standard (SQSS) criteria was considered appropriate, in addition to giving consideration to commercial proportionality in terms of the administrative burden that might be placed on SEPS as a result of the Statement of Works process. This would form the basis of a Relevant Embedded Small Power Station (RESPS) methodology which would be developed in consultation with the industry and used to determine relevant thresholds by GSP which would define when it was necessary for a DNO to request a Statement of Works on behalf of a SEPS. The Original Working Group Proposal is included as Annex 1, in addition to a draft methodology which would be consulted upon to determine MW thresholds.

1.5 Working Group Alternative Amendment 1 (WGAA1) was raised by ENW Ltd and CE Electric UK and is included as Annex 2. Both ENW Ltd and CE Electric UK recognised that there are on occasion difficulties in the DNO being able to determine the significance of the impact of SEPS connection applications on the GB transmission system and that by establishing appropriate requirements at each GSP this would remove many of the current difficulties and provide increased transparency to all parties.

1.6 However, it was considered inappropriate (on the grounds of proportionality, wider competition and environmental objectives) by ENW Ltd and CE Electric UK that the criteria used by the GBSO in establishing and determining these

requirements should include the consideration of wider transmission issues (i.e. those that will provide benefits over and above the absolute minimum to allow the SEPS to connect). Consequently, it was proposed that an assessment be based on 1) the impact of the SEPS assessed against the GB SQSS, but limited to those criteria relevant to establishing essential sole use works required on the GB Transmission System due to the connection of a SEPS and which will not be of material benefit to any existing User and 2) the administrative and cost burden.

1.7 Working Group Alternative Amendment 2 (WGAA2) was raised by Scottish Hydro-Electric Power Distribution (SHEPD) and is included as Annex 3. In summary, SHEPD felt that the Original Amendment could not be raised in the absence of an assessment of the impact on the cost of carbon as part of a GB SQSS assessment of economic and efficient operational / transmission investment costs.

Working Group Recommendation

1.8 The Working Group believes that its Terms of Reference have been completed and CAP167 has been fully considered. Opinions on the options considered by the group were divided. The majority of the Working Group members believed that only WGAA1 achieves the Applicable Objectives. One member of the Working Group believed that the Original better achieves the Applicable Objectives.

Voting Results	**Pro**	**Anti**
Original better than Baseline	1	9
WGAA1 better than Baseline	7	3
WGAA2 better than Baseline	0	10

1.9 By a majority (8:1), Working Group members agreed that the WGAA1 better achieves the Applicable Objectives than the Original. By a majority (6:4), Working Group members agreed that WGAA2 better achieves the Applicable Objectives than the Original.

1.10 Given the interaction of CAP167 with the Transmission Access Review, an overwhelming majority of the Working Group recommended that the assessment of this modification by the Authority should be done following the assessment of CUSC Amendment Proposals CAP161-166.

Amendment Panel's Recommendation

1.11 The CUSC Panel voted on whether they believed the Original, WGAA1 and WGAA2 BETTER meet the Applicable CUSC Objectives than the current baseline. The results of the vote are described in the following table:

Voting Results	**Pro**	**Anti**
Original better than Baseline	2	6
WGAA1 better than Baseline	4	4
WGAA2 better than Baseline	0	8

1.12 When considering which of the proposals BEST meets the Applicable Objectives, none of the proposals obtained a majority vote. 1 Panel member considered that the Original best meets the Applicable Objectives, 4 Panel members considered that WGAA1 best meets the Applicable Objectives and 3 Panel members did not support any of the Proposals.

1.13 On the basis that neither the Original proposal, WGAA1 nor WGAA2 received a majority vote from the CUSC Panel in terms of BETTER meeting the Applicable CUSC Objectives than the current baseline, an Authority decision to implement any of these options could be the subject to an appeal to the Competition Commission.

National Grid's Recommendation

1.14 National Grid considers that the Original Working Group Amendment better facilitates the relevant CUSC objectives from both an economic and efficient perspective and facilitating competition in the generation business, whilst presenting a solution which is proportionate to the defect which it seeks to address.

1.15 National Grid considers that the process for determining the thresholds at which a SEPS is required to request a Statement of Works should be the same as that undertaken when a Statement of Works is requested. As such, it is appropriate and proportionate to consider the impact of SEPS on wider transmission investment costs or operational constraint costs, whichever is most economic. By ignoring these wider issues and focusing on 'sole use' assets, National Grid does not consider that WGAA1 better meets the applicable CUSC objective of economic and efficient.

1.16 National Grid believes that the cost of carbon should be included as part of the overall assessment of the CAP167 Amendment Proposal, but considers that when determining the impact on the transmission system, a MWh of generation from a renewable and non-renewable generator has the same effect, and therefore the inclusion of carbon within the methodology is not appropriate.

1.17 Considering the above, National Grid supports the implementation of the Original Working Group Amendment proposal on the grounds that National Grid believe it is the only proposal of those developed by the Working Group which better meets both of the applicable CUSC objectives; from an economic and efficient perspective, by considering the impact of SEPS on the wider transmission system; and facilitating competition in the generation business by assessing generation projects based on their individual impact on the GB transmission system rather than their definition of size, whilst clearly identifying where existing network capacity exists.

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. It addresses issues relating to the definition of a threshold(s) associated with a request for a Statement of Works.

2.2 Further to the submission of the Amendment Proposal CAP167 (see Annex 7) 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 CAP167.

2.3 CAP167 was proposed by National Grid and submitted to the CUSC Amendments Panel for consideration at their meeting 16th May, 2008. The CAP167 Working Group Report was submitted to the CUSC Amendments

Panel meeting on 5th December, 2008. Following evaluation and consultation by the Working Group, the Amendments Panel determined that CAP167 was appropriate to proceed to wider industry consultation by National Grid.

2.4 Following the 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 also been included and a 'summary' of the representations also provided. Copies of each of the responses to the consultation are included in Volume 2 of this document.

2.5 This consultation document has been prepared in accordance with the terms of the CUSC. An electronic copy can be found on the National Grid Website, www.nationalgrid.com/uk/Electricity/Codes/.

3.0 PROPOSED AMENDMENT

3.1 Following the implementation of CAP097 in July 2006: *"Revision to the Contractual requirements for Small and Medium Embedded Power Stations",* Section 6.5 of the CUSC requires a compulsory request for a Statement of Works from National Grid by the relevant DNO in respect of proposed embedded medium sized generators (<100MW and =>50MW National Grid). For proposed embedded small generators (<50MW National Grid, <30MW SPT, <10MW SHETL) however, a request for a Statement of Works from National Grid by the relevant DNO, is required only where that DNO believes that the proposed small power station connection may have a significant impact on the GB transmission system.

3.2 National Grid does not consider that the DNO has access to all of the necessary information to accurately assess the impact which a small embedded development, or the aggregate effect of multiple developments, may have on the GB transmission system.

3.3 In practice, due to the varying interpretations of the wide range of issues which need to be considered by the DNO, in certain circumstances it has not always been possible for National Grid and the DNO to agree when the development of a small embedded generator (or multiple generators) has a significant impact on the GB transmission system. In National Grid's view, this has created difficulties in transmission investment planning, accurate forecasting of demand levels and operational outage and fault level planning.

3.4 CAP167 proposed to amend the CUSC to provide definitive clarification in the assessment of whether a small embedded power station development (or the aggregate effect of multiple projects) is likely to have a significant impact on the GB transmission system. The proposal recommended that a CUSC Working Group be established to undertake the required analysis and decide on an appropriate MW threshold(s), which will provide transparent criteria for determining whether there could be a significant impact and whether a DNO is therefore required to request a Statement of Works from National Grid for small generation projects connecting to its system.

3.5 For the avoidance of doubt, CAP167 does not propose to amend the existing Statement of Works application and offer process and any such changes are out of scope for this CUSC Amendment. Nor does it seek in any way to change the definitions of Small, Medium and Large in the context of embedded power stations.

4.0 SUMMARY OF WORKING GROUP DISCUSSIONS

Defect

4.1 National Grid presented an overview of CAP167 and the perceived defect which the proposal was raised to address, namely that the DNO alone is not necessarily best placed to identify when a SEPS may have a significant impact on the GB transmission system.

4.2 Members of the Working Group had differing views on the existence, scale and significance of the defect with some believing that now was not an appropriate time to address the issue due to wider reform that might change the context, with others believing that simply greater co-ordination was required between each DNO and the GBSO. There was real concern that greater co-ordination was required between the various industry Working Groups such as those for the Transmission Access Review (TAR) and GB Queue. It was considered that without such co-ordination there is a real risk of policy confusion, cross-over and the undermining of policy.

4.3 National Grid disagreed with these views and considerable discussion followed, with examples presented as to when a DNO and the GBSO could not agree as to whether the connection of a SEPS would have a significant impact on the transmission system. The main area of disagreement was identified as operational costs remote from the local network with a subsidiary topic being the duration and significance of such effects given changing circumstances and developments in the wider system over time.

4.4 Some members of the Working Group believed that there was no defect as such, as the principles of the CUSC relate to asset related costs, either on the Main Interconnected Transmission System (MITS) or at the connection point, and that operational costs were not relevant for connection considerations under the CUSC.

4.5 The Working Group noted that differing approaches were being used by different DNOs to determine whether a SEPS has a significant effect on the GB transmission system, and therefore whether an application for a Statement of Works was required. It was considered that in the absence of guidance from the GBSO, the DNO does not have access to the necessary information to enable it to determine in a consistent manner which projects may have a significant impact. A number of parties believed that there should be clear mandatory thresholds, but there was a strong view amongst some members that this should relate principally or solely to technical impacts on the local network.

Materiality of the defect

4.6 National Grid made a presentation (included as Annex 9) explaining the salient points of the defect, including the materiality of indicative constraint costs at the Cheviot boundary and within Scotland, in addition to examples of different types of works that had been identified in previous Statement of Works applications.

4.7 In summary, National Grid considered that the additional constraint costs as a result of all the generation projects connecting to the transmission and distribution networks in Scotland, far outweighed the cost of transmission investment on a £/kW capacity basis and when considering relevant Licence objectives, this could not be considered as economic and efficient operation of the transmission networks.

4.8 Whilst the Working Group questioned many of the assumptions behind the analysis presented, there was a general agreement that increased volumes of generation could potentially result in increased operational constraint costs particularly in locations where existing constraints are prevalent, in Scotland and the Cheviot boundary region for example.

4.9 On 4 September 2008, National Grid published a System Operator Consultation on the Development of an Incentive Target Indexation Methodology.[1] This provides further background of the increases in constraint costs experienced within Scotland and at the Cheviot boundary since the implementation of BETTA, and forecasts significant increases in these for 2008/9 which are predominantly due to changes in generation patterns, but also transmission system outages and demand levels.

4.10 The Working Group considered the information presented and debated some of the assumptions to ensure that the data was reasonable and realistic. Some members of the Working Group regarded the assumptions as being extreme and that the extent of the costs was being significantly over-estimated. The Working Group suggested that the forecast constraint costs should not be based on the contracted background for the connection of new generation, but based on a best view estimate. Issue was taken with the inclusion of constraint costs arising from large wind projects in the presentation and it was proposed that constraint costs arising only from SEPS should be detailed. In particular the marginal costs arising from the output of say a 1MW SEPS were not demonstrated in the analysis. Some members of the Working Group felt that without this information, the materiality of the defect remained unclear.

4.11 Specific concerns were raised on the assumptions made regarding the failure to include an increased Cheviot boundary capability of 2800MW by winter 2010, and 3300MW by winter 2011, together with the impact on capability during outages in addition to the absence of consideration of the constraint benefit that would be realised by the completion of the Tealing reactive compensation works. Whilst it was considered appropriate that 26 week outage assumptions were relevant to deliver the 3300MW upgrade, the assumption to extend this period of outage beyond this date was considered questionable.

4.12 Additionally, the Working Group put forward an argument that constraints due to construction works should not be included in an assessment of this nature, as all other boundary assessments and references to England & Wales are based solely on a typical maintenance outage pattern.

4.13 SP Distribution noted that 71MW of consented SEPS in southern Scotland had been deferred by the Statement of Works process until 2018, largely as a result of the identification of wider MITS works, with one deferral as a result of local transmission works being required at a GSP.

4.14 The Working Group discussed the process by which SEPS (currently captured by CAP097 and affected by the Statement of Works process) could advance their deferred projects following either (i) the completion of transmission system works upon which the energisation of their connections had been made contingent, and/or (ii) upon the project gaining necessary consents. It was considered that there was currently no mechanism by which

[1] http://www.nationalgrid.com/NR/rdonlyres/D52D4713-E311-4257-9CBC-62BB89BA6A88/28024/Indexationconsultationdocument_posted.pdf

such projects could be advanced due to their non-inclusion in the development of the GB Queue and the Working Group recommended that this should be highlighted in this Report.

4.15 It was noted that following Working Group consideration of the point above, National Grid made a presentation to the User Seminar in September 2008, which clarified the intention to ensure that SEPS are incorporated into the GB Queue and have connection dates advanced where possible, as part of an interim connect and manage regime.[2]

4.16 Some Working Group members felt that more funding for MITS constraints was required to allow small (and indeed larger) renewable generation to connect, but it was accepted that more funding for constraints would result in additional costs to other Users. It was considered by some however, that these needed to be offset by taking into account environmental benefits. It was also noted that any additional constraint costs would not bite immediately, but in 2-3 years.

Proposed solution

4.17 The Working Group debated the solution proposed in the Amendment of introducing an additional threshold(s) in the CUSC, and specifically how this interacted with the current Grid Code thresholds for Small, Medium and Large Power Stations. The background behind the determination of the existing Grid Code thresholds was discussed and the majority of the Working Group expressed a concern regarding the determination of additional threshold(s) in the CUSC which might be different to the existing definitions of Small, Medium and Large Power Stations.

4.18 The Working Group debated the impact that a low threshold(s) would have on developers, especially those who are not CUSC parties and therefore not party to the CUSC process. The Working Group discussed at a high level what the proposed threshold(s) might be, i.e. GSP specific, DNO specific, or a single GB threshold. Concern was expressed by parties that by potentially lowering the threshold at which a SEPS would be captured by the Statement of Works process, this would result in delays to embedded generation projects connecting to the distribution networks and potentially place a disproportionate administrative burden on small developers.

4.19 The Working Group debated the disadvantages of introducing fixed Statement of Works thresholds into the CUSC and considered that as the circumstances on the transmission system are constantly subject to change, any fixed threshold(s) could quickly become out of date and require amendment. As a result of this, the majority of the Working Group believed that fixed Statement of Works threshold(s) in the CUSC would be an inappropriate solution to the defect.

4.20 The Working Group agreed that it might be more appropriate to develop a process which sits in the CUSC, defining the relevant criteria to be taken into account when defining threshold(s) in a document outside of the CUSC. This would provide greater flexibility in amending threshold(s) due to changes in the transmission system or generation and demand backgrounds. It was considered that a set of criteria should be developed to assess whether a

[2] http://www.nationalgrid.com/NR/rdonlyres/1A1E95FB-0250-4AA4-8E3F-86AAEF7F0A57/28212/UserSeminarSeptember2008.pdf

request for a Statement of Works is required or not, applicable to the whole of GB.

4.21 The Working Group considered that any process and set of criteria should be developed with the aim of providing the same treatment for all embedded power stations, whether small, medium or large, with no 'cliff-edge' differentiating between the type of treatment which a generator receives as the classification of that generator changes.

Criteria

4.22 Lengthy debate ensued amongst the Working Group as to what should or should not be considered as a relevant criterion in assessing whether a SEPS would have a significant impact on the transmission system. It was not possible for the Working Group to agree on a set of criteria and this resulted in the development of three Working Group Amendment Proposals which are detailed in Section 5 of this Report. The following Section captures the debate which took place amongst the Working Group on the various potential criterion identified.

4.23 National Grid presented a strawman which included a set of criteria and an indicative process with the intention of stimulating debate within the Working Group. The strawman included a criterion to determine whether local generation will have an impact on the MITS. Many members of the Working Group considered this to be inappropriate and that the criterion should be limited to the connection point (including any local infrastructure works).

4.24 The Working Group agreed that the current Grid Code thresholds defining SEPS (<50MW National Grid, <30MW SPT and <10MW SHETL) could be treated as default values if no wider or local Grid Supply Point (GSP) issues exist, meaning that a Statement of Works would not normally be requested. In practice, using the SHEPD region as an example, this would mean that if there were no wider or local issues, the default value of 10MW would apply and a request for a Statement of Works would not be required. However, in the event that there were local or, for the purposes of the strawman discussed, wider issues, then a local threshold would need to be assessed. The Working Group agreed that a methodology would be required to define how each of the criteria would be applied.

4.25 It should be noted that the Working Group did not agree entirely on the requirement for wider transmission issues to be relevant nor that the operational costs, rather than essential capital works triggered by the project be considered. Some Working Group members believed that 'local' only implications should be considered and the whole Statement of Works process should be reviewed. The Working Group did agree however, that the latter was out of scope for this Amendment.

Reverse power flows

4.26 The Working Group was divided as to whether the consideration of reverse power flows should be included in the criteria. It was noted that in one DNO region at least, the existence (or creation) of a reverse power flow currently formed part of the internal criteria which that DNO used to make an assessment of the circumstances in which a Statement of Works might be triggered, although it was not necessarily considered that the existence of a reverse power flow was a reason in itself to require an application for a Statement of Works and, having submitted an application, a reason for determining works. It was noted that in another DNO region, reverse power flows are considered normal, acceptable events by the DNO.

4.27 National Grid considered that in locations where transmission circuits cannot handle flows onto the transmission system there will be a requirement to take a constraint action, which may not necessarily be available locally. As a result of this, impact on the MITS power flows should be considered as appropriate criterion. This point was not accepted by all of the Working Group members as some believed that operational costs are not captured in the CUSC definition of Material Effect.

Cost of carbon

4.28 The Working Group debated at length, as to whether an assessment of the cost of carbon should be considered an appropriate criterion. Consideration of carbon quickly became a much more fundamental issue for the Working Group, including the level to which this should be considered. Consequentially, this resulted in the development of WGAA2.

4.29 Consideration was given to the steer provided by the CUSC Amendments Panel that the Working Group was confusing the definition of a significant effect on the transmission system by including the cost of carbon in the assessment of the Amendment itself, whereas it should be considered in accordance with Ofgem's recent guidance: *Environmental Issues and the Code Objective.*[3]

4.30 The Panel noted that the criteria for determining significant effect on the transmission system should not be concerned with the cost of carbon since a MWh will have the same impact on the transmission system whether it is generated from a renewable or non-renewable source. To include the cost of carbon at this stage risks double counting any carbon costs/savings and risks discrimination between classes of Users which is inconsistent with the Transmission Licence and therefore the applicable CUSC objectives unless it can be objectively justified. It was considered that when the Working Group has agreed the criteria (or a number of WGAA's) for determining significant effect, the group should then undertake the necessary assessment for the impact of the modification including the cost of carbon.

4.31 A number of the Working Group argued that the Panel's views on excluding the cost of carbon as a criterion for establishing MW thresholds were logically flawed and more generally, the Working Group was uncertain as to whether or not this should be included as a criterion in the assessment stage, although the majority agreed that it should be considered.

4.32 It was considered by some that if you don't include the carbon benefit as part of the trigger assessment, opting instead to only consider it when assessing the CUSC Modification Proposal (and any Alternative), then you would never get it recognised as a material factor that should be included in the criteria for determining the MW guidance / trigger. These members argued that the cost of carbon must be considered in both processes – this did not create double-counting, it simply ensured consistency.

4.33 Some of the Working Group considered that there is a need to include the carbon benefit (i.e. £/MWh) to offset the cost of constraints. Some members believed that by failing to do so would undermine any meaningful cost – benefit analysis.

[3] http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?file=Open%20letter%20response-%20final%20version%20of%20letter%2030%20June.pdf&refer=Licensing/IndCodes/Governance

4.34 Additionally, the Working Group debated the importance of the benefit of a renewable MW from a small generator, particularly as a contributor towards the EU GB 2020 target and that any new generator could cause a constraint on the transmission network, but not all new generation is renewable. In this instance, the renewable generator would be discriminated against as its contribution towards carbon reduction would not be recognised. This pointed towards the need to include carbon costs in the Statement of Works process.

4.35 Some Working Group members considered that an assessment of the cost of carbon should not form part of the criteria as this would unduly discriminate against non-renewable generators and therefore would not better facilitate the applicable CUSC Objectives. The Working Group agreed that any potential discrimination in favour of renewable generators must be objectively justified and some agreed that the cost of carbon was a sound basis on which to do this.

4.36 Alternative views were presented amongst the Working Group as to why an assessment of the cost of carbon should not form part of the assessment criteria when determining MW thresholds, on the basis that the overall economic viability of generation is set by the background economic conditions, and by specific government incentives including the Renewable Obligation Certificate (ROC) scheme. It could be considered that the ROC scheme can be seen as a proxy for the carbon cost, and thus the general costs of connection are already factored into the viability of a scheme against a general background. To include an additional assessment of carbon could be considered to be double counting ROCs.

4.37 Some members argued that the ROC mechanism was not visible to the Statement of Works regime and that to consider that the costs were somehow already factored into any assessment would be unsound. It was also noted to be the case that the costs of ROCs to consumers is fixed, and therefore increased volumes of generation does not affect the costs to consumers.

4.38 However, other Working Group members hypothesised that once connected, an embedded generator might contribute to the need to constrain other generators. However, constraints are generally applied through the Balancing Mechanism (BM), with generators bidding to take energy actions. The energy actions will embody carbon costs to the extent that these costs are associated with the energy, generally through the ROCs. This will generally imply that high carbon energy (with low or zero ROC value) will be constrained first, thereby factoring the cost of carbon into system operation.

4.39 The Working Group could not agree unanimously as to whether the cost of carbon should be included within the criteria and it was therefore agreed that there would be a requirement for an additional proposal (Alternative Amendment 2) which would be based on the Original proposal (which does not consider carbon costs) plus an additional consideration of carbon costs as a relevant criterion.

Wider Vs 'sole User' transmission issues

4.40 The Working Group debated whether an assessment of the impact of a SEPS on the transmission system should take into account the wider transmission system, or be limited to a more 'local' level based on the assets for which the SEPS would be the sole beneficiary. Various definitions of local were considered, including; non-MITS, Appendix H1 works, and the definition associated with local charging. It was however recognised that unless the

term 'local' is used in the legal text, it was not necessarily important to define the term and its use in this document which is primarily to aid understanding.

4.41 It was felt that for England & Wales, such works would only cover the transmission connection asset works (i.e. the GSP). In Scotland however, this would cover both the transmission connection asset works and where relevant, any radial transmission reinforcement works.

4.42 Some Working Group members expressed views that local demand will be met by local generation but this in turn will have an impact on the MITS and a concern was expressed that this would lead to a threshold(s) of zero MW. The Working Group questioned as to whether National Grid could undertake an Impact Assessment on the thresholds once developed including wider issues. The Working Group Chair expressed concerns with this approach as Impact Assessments are a statutory power of public bodies and might result in National Grid acting outside of the remit of the transmission licence.

4.43 Some Working Group members argued that it is institutionally implicit that the impact from SEPS on the MITS is deemed not to be significant and that any impact should be handled operationally. To include this criterion as part of the assessment would expose SEPS to the GB Queue which might be wholly and politically unacceptable. SEPS connections could not individually be the trigger for MITS investment and they should be treated entirely as changes in demand.

4.44 National Grid explained that the transmission licence places an obligation on National Grid to facilitate competition in the generation and supply of electricity business and presented the view that access should therefore be allocated in an efficient and co-ordinated manner. Presently, those parties wishing to connect generation to the transmission system which trigger the requirement for investment on the wider transmission network are only eligible to connect upon completion of those wider works by the relevant TO. In order to provide a level playing field, National Grid considered that this should be equally applicable for SEPS connecting to distribution networks which could potentially trigger the requirement for wider transmission investment.

4.45 In addition, given that the Statement of Works process considers the impact of a generator on the wider transmission system, National Grid believed that the criterion used to define when a request for a Statement of Works is required, should be consistent with the process itself.

Balancing services costs

4.46 Within the SQSS, Appendix E[4] provides guidance on the economic justification for investment in transmission system equipment and/or the purchase of services. These are considered justified if the net present value of the additional investment and/or service costs are less than the net present value of the expected operational or unreliability cost that would otherwise arise. The operational costs considered normally include: transmission power losses; frequency response; reserve; reactive power requirements; and system constraints; and may include costs arising from rearrangement of transmission maintenance times; or modified for additional contracts for other services.

[4] http://www.nationalgrid.com/NR/rdonlyres/FBB211AF-D4AA-45D0-9224-7BB87DE366C1/15460/GB_SQSS_V1.pdf

4.47 National Grid did not consider that increased operational costs if inefficient (i.e. where operational costs are higher than the cost of investment) should be borne by the end consumer. In view of this, National Grid considered that operational costs should be considered as an appropriate criterion in assessing when a request for a Statement of Works is required.

4.48 Some members of the Working Group considered that the existing thresholds used for defining Small, Medium and Large Power Stations are effectively based solely on technical effects and are necessary to ensure technical compliance and for Use of System charging requirements and that they also reflected proportionality in terms of impact on the network. It was considered that this should remain the case going forward. The Working Group debated the issue and considered that the thresholds are there for technical reasons, not commercial. Some members of the Working Group noted that this is an issue of timing and customers are benefiting from a lower carbon environment whilst temporarily paying for constraints.

4.49 Some members of the Working Group believed that the GBSO should simply live with increased operational costs, whatever they may be, however the fall-back is that any assessment of constraints should be done so against a *realistic* background, not a contracted one – the baseline should either be what is there now or what is *likely* (not contracted) to be present prior to the proposed connection date of a SEPS.

Technical issues

4.50 National Grid noted that generation connected locally will reduce local demand and the imports into a GSP from the transmission system will therefore reduce proportionately. However, this may result in increased flows across the MITS, which may in turn increase constraints, whether on a voltage, stability or thermal basis. Given that the action to manage such constraints may not be local, National Grid considered that local demand should be considered as appropriate criterion.

4.51 National Grid noted that local generation may facilitate the outages of Supergrid Transformers and as such, the impact of local generation should be considered an appropriate criterion.

4.52 The Working Group discussed the treatment of new or modified generating units that would supply on-site demand, such as Cogen schemes. Some members of the Working Group considered that such generating units at SEPS should not be captured by this proposal as clearly these generating units would not be using the transmission system. It was therefore considered by some that on-site generation / demand should only be subject to this proposal based on the net MW export onto the distribution system. Whilst sympathetic to this concern, some Working Group members felt that to potentially not include such generation would discriminate against a SEPS that didn't have a load directly associated with it, but the net effect would be to reduce demand at the GSP.

Administrative and cost burden

4.53 Some Working Group members expressed concern that where a requirement for wider transmission reinforcement has already been identified, this would result in thresholds of zero MW and hence, all SEPS would be subject to the Statement of Works process. It was noted that if a time delay similar to that experienced by SEPS currently involved in the Statement of Works process were to occur, this would stifle any small community-based schemes (irrespective of whether the cost burden was high or not).

4.54 The Working Group agreed that it is important that the administrative and regulatory burden for smaller participants in the electricity generation market is proportionate, i.e. fees associated with an application for a Statement of Works should not reduce the viability of a project or act as a barrier to entry for small community projects. This was considered as appropriate criterion, which could lead to the implementation of a de minimis level for generation projects.

De minimis MW threshold

4.55 The Working Group considered that a de minimis MW Threshold should determine the limit at which the GBSO was not concerned with SEPS. Whilst it was considered that a SEPS below a pre-defined limit could in theory, have a significant impact on the transmission system, a de minimis MW threshold would exclude some SEPS from the Statement of Works process on the grounds of commercial proportionality and a desire not to stifle local community-based projects by subjecting their connection to a severe time delay.

4.56 It was considered by the Working Group that a zero MW threshold would mean that any (i.e. including a 1kW photovoltaic) generation installation would require a request for a Statement of Works to be submitted. Concern was raised given that in practice, generators connected under G83/1 only need to notify the DNO after the connection has been made.

4.57 Additionally, it was noted that the data used to undertake the required analysis will have its limitations. Data sources were recognised to potentially be within 1% accurate, which on a 240MW SGT is 2.4MW. The network models used to undertake the analysis will have assumptions incorporated into the data sets and the algorithms will not be 100% accurate and typically, if the same analyses is undertaken on two different analysis packages, the differences between the answers is typically in the region of 2-3%

4.58 It was noted that the DNO would always undertake network analysis to assess the impact on the DNO assets as part of the connection design process and any concerns regarding transmission switchgear from a fault level say, would be identified at this stage. It therefore seemed quite unlikely that transmission transformers or circuits would be excessively overloaded by the connection and additional export of a de minimis threshold.

4.59 Some Working Group members suggested that annual national demand growth might represent a good proxy for determining such a de minimis level. This was considered by the Working Group as a reasonable basis upon which to calculate a de minimis threshold.

4.60 Alternatively, some Working Group members proposed that in order to ensure that the administrative and cost burden on relevant small embedded generation projects is proportionate, a de minimis level for small projects should be determined based on 10% of the England & Wales Medium Power Station threshold of 50W, i.e. 5MW be adopted as a universal de mimimis.

4.61 In summary, for all of the reasons above, the Working Group agreed that the application of a de minimis threshold was appropriate. In terms of determining this threshold, this was considered to be part of the development of the RESPS methodology which would be part of an industry consultation process.

4.62 Having agreed that a de minimis threshold was necessary, the Working Group gave consideration as to how the size of a SEPS would be defined in terms of the published MW thresholds. The Working Group felt that Registered Capacity was appropriate on the grounds that Registered Capacity is defined in the CUSC by reference to the Grid Code (to which DNOs are bound by both), and also in the Distribution Code.

Summary of criteria

4.63 As a Working Group, having been unable to agree entirely on a single set of appropriate criteria, it was considered that more than one Working Group Alternative Amendment (WGAA) would be required. This resulted in an Original Proposal, WGAA1 and WGAA2.

4.64 National Grid proposed that: 1) the impact on investment costs of reinforcing the GB transmission system; 2) the impact on operational constraint and reserve costs of the GB transmission system; 3) the administrative cost burden; and 4) consideration of technical issues such as but not limited to impact on MITS power flows, local demand, impact on SGT circuit outages, voltage step change issues, fault levels and stability should all be considered as appropriate criteria. In applying each criterion as part of a RESPS Methodology (included as part of the Original Amendment Proposal included in Annex 1), National Grid considered that this constituted an assessment of each GSP against the GB SQSS,[5] in addition to a consideration of the administrative burden, which would be considered in the form of a de minimis MW limit. This was presented to the Working Group in the presentation included in Annex 9 of this document.

4.65 ENW Ltd and CE Electric UK proposed that an assessment should be based on 1) the impact of the SEPS assessed against the GB SQSS, but limited to those criteria relevant to establishing essential sole use works required on the GB Transmission System due to the connection of a SEPS and which will not be of material benefit to any existing User and 2) the administrative and cost burden. This formed the basis of WGAA1, which is included as Annex 2 of this document.

4.66 SHEPD considered that as the cost of carbon is not currently considered in an SQSS assessment, an additional Alternative Amendment was required to include this. This is represented in WGAA2, which is included as Annex 3 of this document.

Process

4.67 The Working Group agreed that having identified a range of appropriate criterion it would be necessary to develop a process by which the criterion can be applied that ultimately result in MW thresholds by GSP at which point a DNO would be required to apply for a Statement of Works on behalf of a SEPS.

4.68 The Working Group agreed that the first stage in the process should be for National Grid to draft a RESPS Methodology, which details exactly how the CUSC criteria as defined by the Amendment, will be applied in respect of the GSP thresholds. It was considered that it would then be appropriate for National Grid to consult with DNOs and TOs in reasonable timescales, regarding a draft methodology.

[5] http://www.nationalgrid.com/uk/Electricity/Codes/systemcode/workingstandinggroups/wg167/

4.69 Following a consultation with the DNOs and TOs, the Working Group considered that the draft methodology should then be published for industry comment, allowing at least 28 days for responses. Only after having given consideration to these responses, would it then be appropriate for National Grid to publish the final methodology and apply it to calculate some indicative MW thresholds by GSP.

4.70 Having published indicative threshold(s) with justification for the basis of setting the threshold(s), the Working Group considered that a further industry consultation period of at least 28 days would be appropriate for parties to express their considerations.

4.71 Following this second consultation, the Working Group agreed that it would then be appropriate for National Grid to publish final MW thresholds for each GSP on the National Grid website, with supplementary information to identify the basis upon which the threshold has been determined in accordance with the methodology.

4.72 The Working Group agreed that National Grid should have an ongoing obligation contained in the CUSC, to keep the thresholds under review, with an annual review of the methodology in co-operation with the DNOs and TOs. It was considered appropriate that CUSC and interested parties should have the right to raise comments and concerns at any point, to be considered by National Grid when undertaking the review process.

Disputes

4.73 It was proposed that the existing CUSC dispute resolution process in Section 7 shall apply to the methodology and the thresholds for CUSC parties (including the DNO's). CUSC parties will be able to dispute the methodology and thresholds if the GBSO has not followed the criterion or process in accordance with the CUSC.

4.74 The existing STC disputes process in Section H shall apply to the methodology and the thresholds. STC parties will be able to dispute the methodology and thresholds if the GBSO has not followed the criterion or process in accordance with the STC.

4.75 Some members of the Working Group expressed concern regarding SEPS who are not party to the CUSC. It was debated as to whether a developer could be party to the CUSC but without an agreement with National Grid. This was noted as an issue and the Working Group clarified that all unlicensed parties to the CUSC must have an active agreement with National Grid or they will cease to be a party (CUSC 5.1.3). However, the SEPS would be able to refer their connection offer to Ofgem following the Statement of Works process.

Assessment of environmental impact of CAP167

4.76 Following Ofgem's letter dated 30th June, 2008 *"Proposed Guidance - Environmental Issues and the Code Objectives",* The Working Group gave consideration as to how the environmental impact of CAP167 could be assessed, in addition to how the financial impacts of greenhouse gas emissions can be factored in when considering whether the implementation of CAP167 is more economic and efficient than the status quo, in accordance with applicable CUSC objective (a).

4.77 A methodology was agreed by which this analysis should be undertaken, taking into account:

- Working Group forecasts representative of renewable SEPS connecting to the SHEPD, SPD and ENW distribution networks between 2008 and 2018;
- assumed load factors for wind and hydro-electric plant;
- publicly available data regarding energy displaced by renewable SEPS;
- publicly available information regarding the Shadow Price of carbon; and
- GBSO provided forecasts of operational constraint costs.

4.78 The detailed analysis undertaken by the Working Group is included as Annex 8. In summary, the Working Group was able to conclude that the implementation of CAP167 could significantly delay the connection timescales of renewable SEPS in some locations, to which a carbon cost can be attributed. The operational constraint analysis conducted by National Grid however, concludes that in some locations, most notably the Seven Year Statement B2 and B6 (Cheviot) boundaries, the implementation of CAP167 could be responsible for significant savings in constraint costs which far outweigh the carbon benefit which would be realised by the connection of renewable SEPS.

5.0 WORKING GROUP ALTERNATIVE AMENDMENTS

Alternative Amendment 1

5.1 Working Group Alternative Amendment 1 was raised by ENW Ltd and CE Electric UK and is included as Annex 2.

5.2 Both ENW Ltd and CE Electric UK recognised that there are on occasion difficulties in the DNO being able to determine the significance of the impact of embedded small power station connection applications on the GB transmission system and that by establishing appropriate requirements at each GSP this would remove many of the current difficulties and provide increased transparency to all parties.

5.3 However, it is considered inappropriate (on the grounds of proportionality, wider competition and environmental objectives) by ENW Ltd and CE Electric UK that the criteria used by the GBSO in establishing and determining these requirements should include the consideration of wider transmission issues (i.e. those that will provide benefits over and above the absolute minimum to allow the SEPS to connect).

5.4 Consequently, it was proposed that an assessment based on 1) the impact of the SEPS assessed against the GB SQSS was considered to be appropriate, but limited to those criteria relevant to establishing essential sole use works required on the GB Transmission System due to the connection of a SEPS and which will not be of material benefit to any existing User and 2) the administrative and cost burden should be considered as appropriate criterion.

Alternative Amendment 2

5.5 Working Group Alternative Amendment 2 was raised by SHEPD and is included as Annex 3.

5.6 SHEPD felt that the Original Amendment could not be raised in the absence of an assessment of the impact on the cost of carbon as part of a GB SQSS assessment of economic and efficient operational / transmission investment costs.

6.0 ASSESSMENT AGAINST APPLICABLE CUSC OBJECTIVES

Proposed Original Amendment

6.1 Opinion was divided amongst Working Group members as to whether the implementation of CAP167 Original Amendment would better facilitate the 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.

A summary of the Working Group assessment is included below.

Efficient discharge of licence obligations / Efficient & Economic

Promotes	Demotes
• Decision as to whether a SEPS has a significant impact on the transmission system is based on a full assessment of SEPS against SQSS background conditions which are used to manage the transmission system efficiently. • Published MW thresholds avoid inefficiency by notifying potential SEPS developers of where transmission capacity does not exist. • Published MW thresholds provide clarity to DNOs in terms of determining whether a SEPS could have a significant impact on the transmission system or not, by providing transparency at an early stage. • Calculation of MW thresholds applied across GB removes the perverse incentives to differentiate between Small and Medium sized Powers Stations which might currently exist due to the different arrangement regarding the Statement of Work process.	• The proposal is an over-engineered solution to the perceived defect and a commercially disproportionate level of administration. • The proposal is not required as the supposed defect could be resolved by the mere provision of further clarification from the GBSO to the DNO as to when a SEPS should be considered to have a significant impact on the transmission system. • SEPS are sufficiently small for their impact on the transmission system to be disregarded and it would be inefficient for consideration to be given to SEPS. • The proposal potentially discourages SEPS from applying for connection to the distribution networks as SEPS seeking connection should not be exposed to transmission issues.

Facilitates Competition

Facilitates	Frustrates
• Published MW thresholds avoid inefficiency by notifying potential SEPS developers of where transmission capacity does not exist, or where connection would exacerbate existing operational constraints. • Proposal provides a level playing field in terms of the same access allocation process for generation projects which have an impact on the transmission system, regardless of whether they are Large, Medium or Small.	• Does not sufficiently consider community projects, which have limited options in terms of their decision to locate. • Disproportionate level of administration for SEPS. • SEPS seeking connection to the distribution networks should not be exposed to transmission issues and this proposal potentially discourages SEPS from applying

• Application of de minimis MW thresholds considers commercial proportionality.	for a connection.

Working Group Alternative Amendment 1

6.2 There was varying opinion amongst the Working Group as to whether the implementation of CAP167 WGAA1 would better facilitate the 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.

A summary of the Working Group assessment is included below.

Efficient discharge of licence obligations / Efficient & Economic

Promotes	Demotes
• As Original, published MW thresholds avoid inefficiency by notifying potential SEPS developers of where transmission capacity does not exist. • As Original, published MW thresholds provide clarity to DNOs in terms of determining whether a SEPS could have a significant impact on the transmission system or not, by providing transparency at an early stage. • As Original, calculation of MW thresholds applied across GB removes the perverse incentives to differentiate between Small and Medium sized Powers Stations which might currently exist.	• Does not take into account wider transmission investment costs which may lead to an earlier connection than is efficient, with the additional operational costs being socialised across all Users (via BSUoS) rather than being reflected back onto the User responsible for those costs. • Decision as to whether a SEPS has a significant impact on the transmission system is not based on a full assessment of SEPS against SQSS background conditions which are used to manage the transmission system efficiently.

Facilitates Competition

Facilitates	Frustrates
• As Original, published MW thresholds avoid inefficiency by notifying potential SEPS developers of where transmission capacity does not exist, or where connection would exacerbate existing operational constraints. • As Original, proposal provides a level playing field in terms of the same access allocation process for generation projects which have an impact on the transmission system, regardless of whether they are Large, Medium or Small. • As Original, application of de minimis MW thresholds considers commercial proportionality and ensures consistent treatment with demand growth in importing	• Does not provide a clear signal to developers as to where existing wider transmission capacity exists. This may lead to inefficient siting decisions being made by developers. ”Inefficient” do not necessarily frustrate competition – this needs elaboration. • Does not provide a level playing field in terms of the same access allocation process directly connected or Large/Medium, and SEPS which have an impact on the transmission system as the criteria used to determine thresholds is different from those of the Statement of Works criteria. Lack of a level playing field is one of the key regulatory mechanisms to promote competition.

areas. • Better than Original, does not expose SEPS to wider transmission issues by only considering 'near' transmission issues.	

Working Group Alternative Amendment 2

6.3 There was varying opinion amongst Working Group as to whether the implementation of CAP167 WGAA2 would better facilitate the CUSC Objective(s) of;

(c) the efficient discharge by the Licensee of the obligations imposed upon it by the act and the Transmission Licence; and

(d) facilitating effective competition in generation and supply of electricity and facilitating such competition in the sale, distribution and purchase of electricity.

A summary of the Working Group assessment is included below.

Efficient discharge of licence obligations / Efficient & Economic

Promotes	**Demotes**
• Better than the Original, as decision to whether a SEPS has a significant impact on the transmission system is based on a full assessment, including the cost of carbon of SEPS against SQSS background conditions which are used to manage the transmission system efficiently. • Better than Original as inclusion of cost of carbon may facilitate increased connection of low carbon SEPS. • As Original, published MW thresholds avoid inefficiency by notifying potential SEPS developers of where transmission capacity does not exist. • As Original, published MW thresholds provide clarity to DNOs in terms of determining whether a SEPS could have a significant impact on the transmission system or not, by providing transparency at an early stage. • As Original, calculation of MW thresholds applied across GB removes the perverse incentives to differentiate between Small and Medium sized Powers Stations which might currently exist.	• As Original, the proposal is an over-engineered solution to the perceived defect and a commercially disproportionate level of administration. • As Original, the proposal is not required as the supposed defect could be resolved by the mere provision of further clarification from the GBSO to the DNO as to when a SEPS should be considered to have a significant impact on the transmission system. • As Original, SEPS are sufficiently small for their impact on the transmission system to be disregarded and it would be inefficient for consideration to be given to SEPS. • SEPS connecting to the distribution networks should not be exposed to transmission issues and this proposal potentially discourages SEPS from applying for a connection.

Facilitates Competition

Facilitates	**Frustrates**
• As Original, published MW thresholds avoid inefficiency by notifying potential SEPS developers of where transmission capacity does not exist, or where connection would	• As Original, does not sufficiently consider community projects, which have limited options in terms of their decision to locate.

exacerbate existing operational constraints. • As Original, proposal provides a level playing field in terms of the same access allocation process for generation projects which have an impact on the transmission system, regardless of whether they are Large, Medium or Small, • As Original, application of de minimis MW thresholds considers commercial proportionality and ensures consistent treatment with demand growth in importing areas.	• As Original, disproportionate level of administration for SEPS. • As Original, the proposal potentially discourages SEPS from applying for connection to the distribution networks as SEPS seeking connection should not be exposed to transmission issues. • More than Original, potentially unduly discriminates against non-renewable SEPS. • More than Original, potentially discriminates between directly connected or Large/Medium embedded generators and SEPS. For directly connected or Large/Medium, an assessment of the works required to accommodate them considers transmission costs only (carbon impact is excluded).

7.0 PROPOSED IMPLEMENTATION

7.1 The Working Group proposes that the RESPS methodology should be published to no later than 5 months following an Authority decision. Following this, RESPS thresholds should be published within a further 5 months. This allows a maximum implementation period of 10 months following an Authority decision.

7.2 In order to facilitate the implementation of CAP167 within the timescales proposed by the Working Group, National Grid recommends that the proposed legal text to give effect to CAP167 is implemented no later than 10 days following an Authority decision.

8.0 IMPACT ON THE CUSC

8.1 CAP167 requires amendments to Section 6 and Section 11 of the CUSC.

8.2 The text required to give effect to the Original Proposal is contained as Part A of Annex 4 of this document.

8.3 The text to give effect to Working Group Alternative Amendment 1 is attached as Part B of Annex 4 of this document.

8.4 The text to give effect to Working Group Alternative Amendment 2 is attached as part C of Annex 4 of this document.

9.0 IMPACT ON INDUSTRY DOCUMENTS

Impact on Core Industry Documents

9.1 CAP167 has an impact upon the System Operator – Transmission Owner Code (STC) due to the input required from the Transmission Owners in the development stage of the RESPS methodology.

10.0 WORKING GROUP RECOMMENDATION

10.1 The Working Group believes that its Terms of Reference have been completed and that CAP167 has been fully considered. Opinions on the options considered by the Working Group were divided. The majority of the Working Group members believed that only WGAA1 better achieves the Applicable Objectives than the baseline. One member of the Working Group believed that the Original better achieves the Applicable Objectives.

Voting Results	**Pro**	**Anti**
Original better than Baseline	1	9
WGAA1 better than Baseline	7	3
WGAA2 better than Baseline	0	10

10.2 By a majority (8:1), Working Group members agreed that the WGAA1 better achieves the Applicable Objectives than the Original. One Working Group member believed that none of the proposals better achieve the Applicable Objectives.

10.3 By a majority (6:4), Working Group members agreed that WGAA2 better achieves the Applicable Objectives than the Original.

10.4 Given the interaction of CAP167 with the Transmission Access Review, an overwhelming majority of the Working Group recommended that the assessment of this modification by the Authority should be done following the assessment of CUSC Amendment Proposals CAP161-166.

10.5 Details of those Working Group members that participated in the voting process are included in Annex 6.

11.0 NATIONAL GRID VIEW

11.1 National Grid considers that the Original Working Group Amendment better facilitates the relevant CUSC objectives from both an economic and efficient perspective and facilitating competition in the generation business, whilst presenting a solution which is proportionate to the defect which it seeks to address.

11.2 National Grid believes that the DNO does not have access to the relevant information to determine when a small embedded generator has a significant impact on the GB transmission system. In many cases, this issue has been resolved simply, with communication between National Grid and the relevant DNO. CAP167 would not have been necessary had this been the case throughout Great Britain.

11.3 National Grid acknowledges the concerns of the Working Group and the wider industry regarding the timing of the decision to raise CAP167. In National Grid's view however, the need to provide definitive clarification of when a DNO should be required to request a Statement of Works on behalf of a SEPS is justified at this time given the significant impact which such generators have (and would continue to have in the absence of CAP167) on the GB transmission system in some locations of the network. National Grid accepts the concerns that the materiality of the defect might not have been accurately identified at the Working Group Consultation stage. This has

since been addressed by the analysis provided in Annex 8 of the Working Group Consultation (and this Amendment Report) which clearly identifies the significant operational costs associated with small embedded generation projects connecting north of the SYS B2 and B6 boundaries.

11.4 Concerns that CAP167 either conflicts with or will be superseded by the Transmission Access Review are at this stage, premature. It is true that CAP167 may be superseded to an extent in the event that a connect and manage regime (with fully socialised costs) is implemented, but it is worth noting that this is only one of multiple options for transmission access presented by the review. National Grid therefore considers that the proposals of CAP167 should be considered in the round.

11.5 CAP167 proposes to amend the CUSC to provide definitive clarification in the assessment of whether a SEPS development (or the aggregate effect of multiple projects) has a significant impact on the GB transmission system and recommended that the Working Group establish appropriate MW thresholds. National Grid believes that the alternative process (applicable to all of the options) developed by the Working Group for determining MW thresholds is a more appropriate solution than fixing values within the CUSC however, on the grounds that the requirements of the transmission system can change over time and the process developed provides greater flexibility to modify the thresholds giving cognisance to this.

11.6 National Grid believes that the concerns of industry parties that the process and methodology by which thresholds are calculated is too complex and a disproportionate solution to the issue which it is seeking to address are unfounded. The process and (Original) methodology represent what in many cases, is the same as existing processes for agreeing thresholds between the GBSO and DNOs by applying the GB SQSS. The CAP167 Original proposal merely seeks to formalise this process and in the event that two parties cannot agree, places the final decision with National Grid rather than the DNO, offering a disputes process for the party involved should they disagree with any part of the process or the outcome. It is worth noting, that the Working Group was unanimous in developing and agreeing this process.

11.7 CAP167 is not an attempt to redefine the current thresholds which exist for Small, Medium or Large embedded power stations which will all continue to exist. The intention of CAP167 is to clearly set out a process and criteria for determining when SEPS have a significant impact on the transmission system and identify when a request for a Statement of Works is required. In National Grid's opinion, this addresses the current 'cliff-edge' which exists in the treatment between SEPS and larger embedded projects by considering each on the basis of the impact that they have on the transmission system, thus providing greater equality in the process for obtaining access for all categories of embedded and transmission connected generation.

11.8 National Grid considers that the process for determining the thresholds at which a SEPS is required to request a Statement of Works should be the same as that undertaken when a Statement of Works is requested. As such, it is appropriate and proportionate to consider the impact of SEPS on wider transmission investment costs or operational constraint costs, whichever is most economic. By ignoring these wider issues and focusing on 'sole use' assets, National Grid does not consider that WGAA1 better meets the applicable CUSC objective of economic and efficient.

11.9 National Grid believes that the cost of carbon should be included as part of the overall assessment of the CAP167 Amendment Proposal, but considers that when determining the impact on the transmission system, a MWh of generation from a renewable and non-renewable generator has the same effect, and therefore the inclusion of carbon within the methodology is not appropriate.

11.10 Considering all of the above, National Grid supports the implementation of the Original Working Group Amendment proposal on the grounds that National Grid believe it is the only proposal of those developed by the Working Group which better meets both of the applicable CUSC objectives; from an economic and efficient perspective, by considering the impact of SEPS on the wider transmission system; and facilitating competition in the generation business by assessing generation projects based on their individual impact on the GB transmission system rather than their definition of size, whilst clearly identifying where existing network capacity exists.

12.0 INDUSTRY VIEWS AND REPRESENTATIONS

12.1 Responses to the Working Group Consultation

12.1.1 The following table provides an overview of the representations received. Copies of the representations are contained in Consultation document Volume 2.

Reference	Company	Supportive	Comments
CAP167-WGC-01	AC Renewables	No	Disproportionate solution to the perceived defect. Consideration of wider transmission system issues is inappropriate.
CAP167-WGC-02	British Wind Energy Association	No	Do no disagree with the principle of a RESPS methodology, but consultation provides no guidance as to whether CAP167 would result in an increase of SoW referrals.
CAP167-WGC-03	Community Energy Scotland (in conjunction with Highlands & Islands Enterprise)	WGAA1	Embedded generation should not be exposed to wider transmission system issues.
CAP167-WGC-04	Electricity Northwest	WGAA1	Consideration of the impact of embedded generation should be limited to sole use works.
CAP167-WGC-05	E.on UK	No	Perceived defect has not been clearly identified and the proposal puts forward a highly complex solution when improved communication could resolve the issue.
CAP167-WGC-06	International Power	No	This is a Grid Code / GB SQSS issue and such changes should not be made via the CUSC process.
CAP167-WGC-07	Renewable Energy Association	No	Extra administrative burden does not warrant the small

			improvement. Specific net export and import rights are needed, to be held by DNOs.
CAP167-WGC-08	RWE npower	WGAA1	All proposals provide clarity as to whether a DNO is required to request a Statement of Works on behalf of an embedded generator. Wider system reinforcements should not necessarily be excluded.
CAP167-WGC-09	Scottish Power	WGAA2	Supports the creation of a process within the CUSC, with the relevant criteria defined in a separate document. Cost of carbon assessment should be included.
CAP167-WGC-10	Scottish Renewables Forum	WGAA1 and WGAA2	No evidence of a defect, but no consistency across the DNOs in how this issue is dealt with. Cost of carbon should be a consideration in any cost/benefit analysis.
CAP167-WGC-11	Scottish & Southern Energy	No	There is no defect to address.

12.1.2 No Working Group Consultation Alternative Requests were received.

12.1.3 None of the eleven respondents supported the implementation of the Original Working Group Amendment Proposal, whilst many opposed it. Four respondents supported the implementation of WGAA1, whilst two respondents supported the implementation of WGAA2. A summary of the general comments contained in the Working Group Consultation responses is included below:

Defect

12.1.4 A number of respondents did not feel that the perceived defect had been clearly identified and questioned its materiality.

12.1.5 One respondent noted that the defect is framed around the need for an agreed technical methodology to assess the impact of embedded generators on the transmission system. The respondent did not have any cause to disagree with this principle, but noted that it will be important to assess the impact of any methodology as and when it is developed. A number of further respondents considered that to date, different DNOs have implemented CAP097 guidance in different ways and greater clarity would therefore be beneficial.

Proposals

12.1.6 A number of respondents recognised that on occasion, it may be difficult for a DNO alone to effectively determine the significance of the impact of a SEPS connection application on the GB transmission system. It was considered that the proposed identification and subsequent publication by National Grid of appropriate MW thresholds at each GSP is a reasonable solution to the issue of the identification of material impact by DNOs. Such a process was perceived to provide greater levels of transparency to the potential presence of any local issues that could be considered to have a significant impact on the GB transmission system to prospective developers.

12.1.7 Respondents expressed general concern regarding the impact of CAP167 on SEPS and in the event of implementation, the likelihood of delays to renewable projects will not help to achieve UK 2020 carbon reduction targets. Concern was expressed that any of the methodologies would result in an increase in the number of Statement of Works referrals and it was considered that the Working Group Consultation provided no guidance on this point. Clarification was requested.

Proportionality of the proposals

12.1.8 Many respondents to the Working Group Consultation expressed concern that the proposed solutions presented by the Working Group are excessive and not proportionate to the defect, particularly when wider transmission system issues are considered. One respondent considered that the proposals put forward a highly complex solution to the supposed defect which could be resolved by improving the communication process between the GBSO and DNOs to clarify when a SEPS has a 'significant impact' on the transmission system and thus requires a Statement of Works. It was noted that a 'significant impact' in this instance was not defined by the Working Group and it is unclear what this relates to.

12.1.9 One respondent considered that where MITS boundary capabilities are typically in the order of several 1000's MW, generators of 3MW typically represent much less than 0.1% of the relevant transmission capacities. The respondent considered that a more appropriate amendment would be to establish an import and export limit at each GSP, which would be the responsibility of the DNO who would be required to apply for changes to these limits from time to time to address significant changes in demand or generation. The respondent considered that such an approach would allow the DNO the option of actively managing embedded generation to remain within existing GSP limits without being delayed by works arising from the Statement of Works.

12.1.10 One respondent considered that SEPS below a certain size (e.g. 6 to 8 MW should not be prevented from connecting due to transmission considerations and should be excluded from having to be subject to the Statement of Works process.

12.1.11 One respondent considered that CAP097 itself was based on the wrong way of looking at the real issues associated with SEPS and that a more fundamental review of how flows onto and off the transmission network are treated is required. The respondent felt that specific net import or export rights are needed as an enduring solution, which should probably be held by DNOs.

Interaction with the Transmission Access Review

12.1.12 One respondent considered that in conjunction with the concurrent work on transmission system operation and management (Transmission Access Review and other CUSC amendments) there is perhaps a risk that the work and results of the CAP167 amendment process will undermine or add further complexity to a future transmission / distribution network interface.

12.1.13 One respondent noted the ongoing discussions under Connect and Manage for CUSC Parties, and that alternative options available to mitigate against rising costs could include better active management of the distribution networks to manage export from the GSP, including constraint of an embedded generator by the DNO. It was considered that the

implications arising from the TAR could potentially negate the defect or the solutions presented for CAP167.

12.1.14 A further respondent considered that the direction of reform being developed by the TAR is pointing ever more towards greater use of derogations to relax the GB SQSS and towards connect and manage philosophies. The inclusion of deeper and therefore much diluted operational impacts in the Statement of Works process for SEPS under the Original proposal is therefore pulling in a diametrically opposed direction to other reforms.

12.1.15 One respondent was concerned about the timing and the scope of this CUSC Amendment Proposal. On timing, the ongoing work associated with the TAR was noted and, given the resource deployed (rightly) on the TAR, it was questioned as to whether CAP167 can be given due consideration. Furthermore, the respondent considered that CAP167 is superseded by the TAR work (including the CUSC Amendment Proposals, review of the GB Security and Quality of Supply Standard, optimisation of the GB Queue, and interim Connect and Manage). The respondent considered that at this time, it is particularly important that CUSC Amendment Proposals are brought forward in a manner that is both resource efficient and coordinated, taking due cognisance of what is being considered and proposed within the wider TAR forum; hence avoiding a 'silo' approach to policy making. On scope, the respondent was concerned that, if implemented, the Original Amendment and (to a lesser extent) WGAA2 have the potential to undermine a large part of Government policy, particularly in relation to distributed generation.

Wider transmission issues

12.1.16 Many respondents considered that wider transmission issues such as investment in wider transmission infrastructure and the cost of operational constraints should not be applicable to SEPS. One respondent considered that given that the main driver to restrict connections to the distribution system is to decrease operational costs for the GBSO, this is an overly burdensome solution to an operational problem.

12.1.17 One respondent considered that the impact of SEPS should be assessed against the GB SQSS, but limited to those criteria relevant to establishing essential sole use works required on the GB transmission system due to the connection of a SEPS which will not be of a material benefit to any existing User.

12.1.18 Whilst one respondent supported the implementation of WGAA1, it was noted that they did not necessarily believe that wider system reinforcement should be excluded in deriving the RESPS criteria. A further respondent considered that the 'sole user' and 'wider' options presented were not necessarily appropriate, and that the most appropriate solution would probably fall somewhere between the two options presented. The respondent did not wish to raise an Alternative Amendment however.

Carbon

12.1.19 Six respondents considered that the cost of carbon should be considered when determining the economic balance between delaying connection for reinforcement, and connecting in advance of reinforcement, consistent with ongoing work in this area including Ofgem's proposals for interim connect and manage.

12.1.20 One respondent was uncertain as to the need to include for an assessment of carbon costs in the RESPS methodology.

12.1.21 Two respondents did not believe the cost of carbon to be relevant in determining RESPS criteria. One respondent considered that the cost of carbon is included in the GB SQSS and can be seen in the interim reports of the GB SQSS Review Groups (see 1320MW-1800MW debate). Those options that seek to attribute a cost of carbon should not be a factor in defining whether a Statement of Works is required as it could be double counted and is irrelevant for determining whether an embedded generator is having an impact on the transmission system. The respondent highlighted that all embedded generation should be taken into consideration equally when considering the effects of this amendment proposal as it is a SEPS, and not a renewables, issue that is being addressed.

Governance

12.1.22 One respondent noted that the proposals effectively give the decision on the methodology (and its consequences) to National Grid. This takes any existing decision-making away from the DNOs, and, compared to an option which would define thresholds or the methodology in the CUSC, does not appear to give Ofgem any discretion. The respondent considered that it is appropriate for DNOs, the Scottish Transmission Owners, embedded generators and Ofgem to have some meaningful input into the definition of any thresholds and that it is vitally important that there is a formal process for assessing the impact of any changes in the methodology and in the thresholds.

De minimis limit

12.1.23 In the event that any of the proposals developed by the Working Group are implemented, the majority of respondents to the Working Group Consultation considered that it would be appropriate to adopt de minimis limits which would serve to prevent an unnecessary administrative burden on the smallest of embedded generation projects. The majority of respondents considered that a GB-wide approach towards determining a de minimis threshold would be preferable in this event.

12.1.24 One respondent considered that setting a de minmis value at each GSP, whether calculated regionally or GB-wide, is effectively redefining a 'small' power station and the setting of specific thresholds on an annual basis creates inherent uncertainty for development projects as they may not be caught one year and when the values are subsequently revised the following year the project may find itself caught by the process when previously it was not.

12.1.25 One respondent noted that the existing de minimis threshold (below which distributed generation need not apply to the GBSO for transmission access) was set in 2006 by the Regional Differences Working Group (RDWG) of the Grid Code, based on extensive analysis of the costs and benefits prepared and presented by National Grid. The respondent considered that if these thresholds are to be reset, then a technical group equivalent to the RDWG would be the most appropriate forum to address this issue.

Implementation timescales

12.1.26 One respondent considered that the delivery of a RESPS methodology within 5 months of an Authority decision may be very ambitious if an agreed method for the calculation of carbon emissions impacts and costs is to be

included in the methodology. The majority of respondents however, considered the proposed timescales for CAP167 to be reasonable.

12.2 Responses to the Company Consultation

12.2.1 The following table provides an overview of the representations received. Copies of the representations are contained in Amendment Report Volume 2.

Reference	Company	Comments
CAP167-CR-01	BWEA	Would like to refer to its previous response to the Working Group Consultation. Wholly endorses the inclusion of carbon benefits in cost benefit assessments, and considers this is a necessary and appropriate factor to consider when making a regulatory decision on raising the limit at which projects need to wait for system upgrades.
CAP167-CR-02	CES	Concerned about the proposed change, for community developed renewable projects. Materiality of the defect is unclear and better communication between GBSO and DNOs could resolve much of the perceived problem. Wider transmission issues should not impinge on the connection of SEPS and do not believe there is a defect with the status quo. WGAA1 better meets applicable CUSC objective of facilitating effective competition. Assessment of CAP167 should be done after the CAP161-166 amendment proposals.
CAP167-CR-03	EDF Energy	WGAA1 is a pragmatic solution which better meets the applicable objectives than baseline. Original proposal was not entirely unsatisfactory, but has a flaw in that it takes into account wider transmission constraints and therefore potentially disproportionate. Might be that these simplistic thresholds would have to give way to a more dynamic system balancing relationship between GBSO and DNOs in the future – for example a dynamic export / import limit at each GSP.
CAP167-CR-04	EON UK	As stated in Working Group Consultation response, of the view that CAP167 does not identify the perceived 'defect' clearly. The proposal puts forward a highly complex solution to the supposed defect which could be resolved by improving the communication process between the GBSO and DNOs.
CAP167-CR-05	HIE	Particularly concerned at the prospect of more SEPS having to apply for a SoW as this could prevent small scale renewables in the Highlands and Islands of Scotland which offer significant community benefit and economic development opportunity. WGAA1 better meets the applicable CUSC objective of facilitating effective competition. Wider transmission issues should not be considered when determining thresholds at GSPs.
CAP167-CR-06	REA	Views have not changed from those submitted in response to the Working Group consultation. On balance, do not feel that it would be sensible to proceed with this proposed change or any of the

		WGAA's. Whilst proposal(s) may very slightly improve the current unsatisfactory position, the extra administrative burden of doing so does not warrant this small improvement. Feel that specific net import or export rights are required, probably held by DNOs.
CAP167-CR-07	RWE	Not convinced that the defect which CAP167 seeks to address is either material or needs to be resolved before the outcome of the TAR. Favoured approach would be for the apparent defect to be resolved as part of the established procedures that exist between National Grid and the relevant DNO, as opposed to the relatively complex solution(s) proposed. Authority assessment of CAP167 should be done following the TAR. Consider that WGAA1 better meets the current CUSC baseline by providing clarity to Users and facilitating the connection of SEPS to the distribution network.
CAP167-CR-08	SP Energy Networks	To date, SPEN has submitted 12 requests for SoW from NGET (for SEPS of capacities 4.5MW to 30MW), all of which have resulted in connection dates being significantly delayed for reasons of wider transmission system reinforcements. Do not consider this position to be reasonable. Desire to see changes to the current CUSC provisions as a result of the need for clearly defined criteria to be developed and understood as to the circumstances under which a SEPS connection should be delayed from connecting. Supportive of WGAA1 as a more proportionate approach to assessing SEPS connection applications against compliance with the full GB SQSS, whilst better meeting the applicable CUSC objectives. Also, adoption of a SoW process based on these principles will enable DNOs to work more closely with NGET in determining actions that can be taken by the DNO locally on the distribution network.
CAP167-CR-09	SP Energy Wholesale	Supports WGAA1, whish provides a transparent methodology for preparing a publicly available list of MW thresholds for each GSP. Concerned that the final decision in any disputes process should not lie with National Grid, but should be open to independent resolution.
CAP167-CR-10	Scottish Renewables	As in response to the Working Group consultation, there is no evidence of a defect, but unfortunately there is no consistency across the DNOs in how this issue is dealt with. If CAP167 is progressed, support WGAA1 as better meets the applicable objectives of the CUSC. Support the principle of the cost of carbon being considered in decision making, but do not explicitly support WGAA2.
CAP167-CR-11	SSE	Do not believe that there is a defect to the CUSC and, in relation to the CUSC applicable objectives, baseline is both better and best. All proposals are an unnecessary and disproportionate response to an issue that could more effectively be resolved on

		a bilateral basis between the transmission licensees and the affected DNO. Inefficient to implement CAP167 without due and proper consideration of the implications for the TAR and, specifically, the fundamental review of the GB SQSS, CAPs 161-166 and the work being undertaken to facilitate GB Queue Management. There is a real risk that CAP167 (either as a whole or in part) will be rendered redundant as a consequence or, worse, would contradict the TAR measures.
CAP167-CR-12	Wind Prospect	WGAA1 appears to be the better option. Assumes that the GSP and boundary limits will be freely published so that developers can make a reasonable estimate as to whether the connection of projects will be delayed by the SoW process.

12.3 Views of Core Industry Document Owners

12.3.1 None received.

13.0 AMENDMENTS PANEL RECOMMENTATION

13.1 The CUSC Panel voted on whether they believed the Original, WGAA1 and WGAA2 BETTER meet the Applicable CUSC Objectives than the current baseline. The results of the vote are described in the following table:

Voting Results	**Pro**	**Anti**
Original better than Baseline	2	6
WGAA1 better than Baseline	4	4
WGAA2 better than Baseline	0	8

13.2 When considering which of the proposals BEST meets the Applicable Objectives, none of the proposals obtained a majority vote. 1 Panel member considered that the Original best meets the Applicable Objectives, 4 Panel members considered that WGAA1 best meets the Applicable Objectives and 3 Panel members did not support any of the Proposals.

13.3 On the basis that neither the Original proposal, WGAA1 nor WGAA2 received a majority vote from the CUSC Panel in terms of BETTER meeting the Applicable CUSC Objectives than the current baseline, an Authority decision to implement any of these options could be the subject to an appeal to the Competition Commission.

ANNEX 1 – ORIGINAL PROPOSAL

CUSC Criteria
This section details the criteria and process to be used by the GBSO when establishing and determining thresholds above which a Relevant Embedded Small Power Station (RESPS) is considered to have a significant impact on the GB Transmission System and hence when a DNO should submit a request for a Statement of Works in response to a connection request from a RESPS.

Criteria

1. The current Grid Code thresholds of =>10MW in SHETL area, =>30MW in SPT area and =>50MW in NGET area will not be amended by this process. The definitions for Small, Medium and Large will still apply. The process below will apply to all SEPS. The DNO will still be required to submit a request for a Statement of Works from National Grid for all medium sized embedded power station projects.

2. National Grid will publish MW thresholds (with co-operation from the relevant TO's and DNOs) above which it is necessary for a DNO to submit a request for a Statement of Works in response to a connection request from a RESPS. Such thresholds will be published on a GSP-specific basis and also a 'transmission system boundary' basis having applied the process outlined below and having considered the following criteria which will be set out in the CUSC:

    - Compliance with GB Security and Quality of Supply Standard, taking into account the administrative and cost burden placed upon Embedded Small Power Station projects.

    It should be noted that in considering the administrative and cost burden placed upon a SEPS, this will lead to the application of a de minimis value determined in accordance with the RESPS Methodology, outlined below.

Process

The following text outlines the process by which National Grid as GBSO determines appropriate MW thresholds for each GSP on the GB transmission network based on the criteria identified above. This process will be set out in the CUSC.

1. CUSC requires GBSO to prepare a Relevant Embedded Small Power Station Methodology which details how the CUSC criteria will be applied in respect of the GSP thresholds.

2. GBSO consults with DNOs and TOs within reasonable timescales, regarding the draft Relevant Embedded Small Power Station Methodology.

3. GBSO publishes a draft Relevant Embedded Small Power Station Methodology on the NGET website (with links via the DNO websites) for industry consultation over a period of 28 days.

4. GBSO publishes final Relevant Embedded Small Power Station Methodology in cognisance of industry responses.

5. In accordance with the Relevant Embedded Small Power Station Methodology, the GBSO will publish indicative MW thresholds for each GSP with additional guidance providing justification for the thresholds.

6. GBSO consults with industry parties over a period of 28 days regarding indicative MW thresholds and justifications.

7. GBSO publishes final MW thresholds for each GSP on the National Grid website, with supplementary information to identify the basis upon which the threshold has been determined in accordance with the methodology.

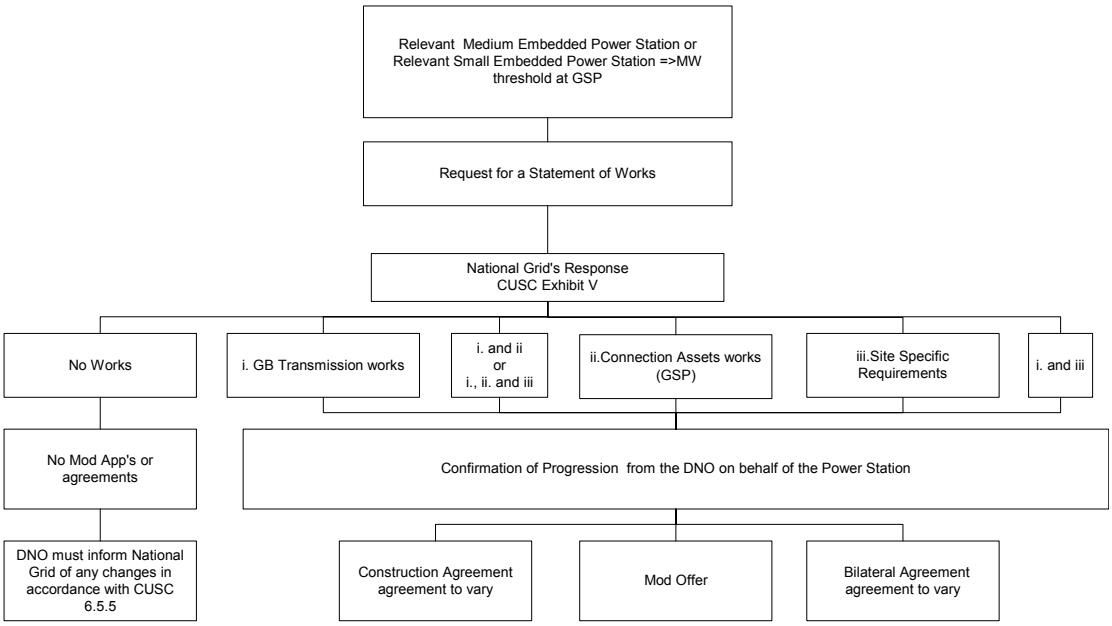
8. GBSO has an ongoing obligation contained in the CUSC, to keep the thresholds under review, with an annual review of the methodology in co-operation with the DNOs and TOs. CUSC and interested parties have the right to raise comments and concerns at any point, to be considered by the GBSO when undertaking the review process.

9. The existing CUSC dispute resolution process in Section 7 shall apply to the methodology and the thresholds for CUSC parties (including the DNO's). CUSC parties will be able to dispute the methodology and thresholds if the GBSO has not followed the criteria or process in accordance with the CUSC.

10. The existing STC disputes process in Section H shall apply to the methodology and the thresholds. STC parties will be able to dispute the methodology and thresholds if the GBSO has not followed the criteria or process in accordance with the STC.

Having published MW thresholds, those SEPS with a capacity in excess of the threshold at the relevant GSP will require the DNO to submit a request for a Statement of Works from National Grid on their behalf, which will be assessed in accordance with the Statement of Works process outlined below.

Statement of Works process:



Draft RESPS Methodology

For the avoidance of doubt, this methodology will be consulted upon with industry parties in accordance with Sections 1-4 of the process outlined above. This represents an initial draft methodology based on the Original Proposal discussed in the Working Group with the aim of informing the CAP167 consultation process only. Clearly, the methodology could be different in the event that a WGAA is implemented.

Determination of MW thresholds
The methodology used to assess the impact of a small embedded generation projects is clearly defined in the Statement of Work process, namely where National Grid has undertaken an initial assessment of the significance of a project [and believe the power station has a significant impact on the GB Transmission System (for the avoidance of doubt, such significant impact involves either party in an expenditure of more than £10,000)] and advised of the following implications:

i. Requirement for works on the GB Transmission System where such works are not at a connection site.
ii. Requirement for works to the GB Transmission System at a Connection Site (Grid Supply Point)
iii. Necessity for Site Specific Requirements (at the site of connection) of the Power Station.

To this end, the proposed methodology for identifying when an application for Statement of Works is necessary, is driven by inverting the Statement of Works process and identifying the areas where compliance with the obligations in the GB SQSS would be breached, defined by a specific trigger level(s) which will be a factor of headroom at either the GSP or system boundary.

The trigger levels would be defined by two separate figures:

1. A specific MW threshold for each Grid Supply Point (GSP); and
2. A 'boundary' related MW threshold.

1. GSP threshold
The GSP threshold would be assessed against the Week 24 data submissions provided by the DNO against the obligations within Chapter 2 *Design of Generation Connections* of the SQSS.

This assessment could take place in the same timescales as the existing demand compliance assessment, i.e. submissions by Week 28 would result in an identifiable threshold for each GSP by Week 52. The output would be a cumulative MW threshold for each GSP that would cover compliance across the 7 year submission period.

In addition, the Transmission Owner (TO) in conjunction with the DNO, would need to determine the impact of a proposed embedded connection on the fault levels at the GSP and adjacent Transmission substation.

2. Boundary threshold
The boundary related threshold would be assessed against Chapter 4 *Design of the Main Interconnected Transmission System* of the GB SQSS. Effectively, this would

provide a DNO regional assessment of the cumulative MW threshold that would trigger the requirement to assess any new RESPS. Such a threshold may take the form of a single value per DNO network, or multiple values per DNO networks where there is more than one 'boundary'.

De minimis threshold

In order to ensure that the administrative and cost burden on RESPS is proportionate, a de minimis level for small projects could be determined based on annual levels of demand growth. Given that growth in demand is not delayed to allow for investment, it seems appropriate that this should also be the case for similar levels of 'negative demand growth'.

On the basis of a one percent increase in demand over the average size of a GSP across Great Britain, this could be expected to be between 2-3MW. In terms of considering commercial proportionality and the impact that this modification might have on SEPS, a figure of 3MW seems proportionate at this time.

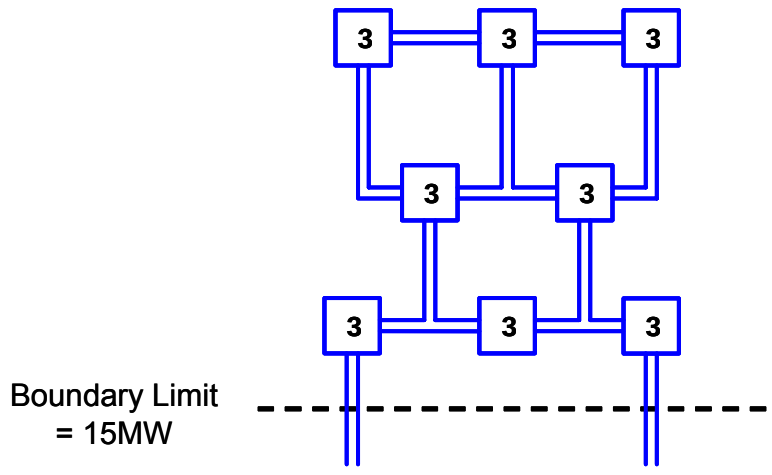
Application of MW thresholds

Example 1

In the simplistic example below, a DNO network comprising 8 GSPs for each of which, the above methodology has been applied resulting in a de minimis threshold of 3MW. In addition to this, applying the above boundary methodology, a DNO boundary threshold of 15MW has been determined.

GSP threshold

In this instance, the DNO will be permitted to connect multiple SEPS at each GSP, so long as each SEPS does not have a registered capacity in excess of 3MW. There will be no requirement for the DNO to notify the GBSO of the connection of such generation, other than that supplied as part of annual Week 24 data, where this would be picked up as negative demand.



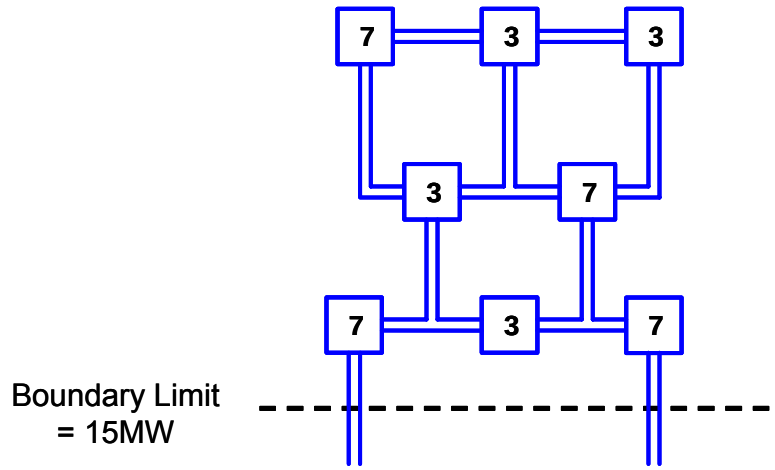
Boundary threshold

In this example, in the event that 10 x 2.9MW SEPS wished to connect at the same GSP, this would result in a combined 29MW connecting behind a system boundary with a limit of 15MW. As each of these generators is considered to be below the de minimis threshold however, all connections would be permitted without the requirement for a DNO to request a Statement of Works on behalf of each SEPS.

Example 2

GSP threshold

In the example below, all SEPS below the de minimis threshold would again be permitted to connect without the requirement for a DNO to request a Statement of Works. For those GSPs with a threshold in excess of the de minimis (i.e. those with a 7MW threshold), SEPS with a capacity of less than these thresholds would be permitted to connect without requesting a Statement of Works via the DNO.



Boundary threshold

In this example however, each DNO would be required to monitor each of those SEPS above the de minimis limit (but below the GSP threshold) which connect to the distribution network and, when the cumulative volume of these projects exceeds the boundary limit of 15MW in one year, this will trigger the requirement for a request for a Statement of Works for all subsequent connections (above the de minimis limit) in that year. This will require the DNO to maintain data records of each SEPS above the de minimis threshold which connects to their network, by GSP.

In terms of data provision, this would form part of the existing Week 24 data, which where relevant, would be seen as negative demand. Based on this information, National Grid would review and, where appropriate, revise the GSP and boundary limit thresholds on an annual basis.

ANNEX 2 – WORKING GROUP ALTERNATIVE AMENDMENT 1

1 Introduction

Following the implementation of CAP097 in July 2006: "Revision to the Contractual requirements for Small and Medium Embedded Power Stations", Section 6.5 of the CUSC requires a compulsory request for a Statement of Works from National Grid by the relevant DNO in respect of proposed Embedded Medium Power Stations (<100MW and =>50MW NGET). For proposed Embedded Small Power Stations (<50MW NGET, <30MW SPT, <10MW SHETL) however, a request for a Statement of Works from National Grid by the relevant DNO, is required only where that DNO believes that the proposed Embedded Small Power Station connection may have a significant impact on the GB transmission system.

National Grid does not consider that the DNO has access to the necessary information to accurately assess the impact which an Embedded Small power Station development, or the aggregate effect of multiple developments, may have on the GB transmission system. In practice, due to the varying interpretations of the wide range of issues which need to be considered by the DNO, it has not always been possible for National Grid and the DNO to agree when the development of an Embedded Small Power Station (or multiple developments) is likely to have a significant impact on the GB transmission system.

Consequentially, National Grid has raised CAP167, which proposes to amend the CUSC to provide definitive clarification in the assessment of whether an Embedded Small Power Station development (or the aggregate effect of multiple developments) is likely to have a significant impact on the GB transmission system. For the avoidance of doubt CAP167 does not propose to amend the existing Statement of Works application and offer process and any such changes are out of scope for this CUSC Amendment. The existing process is detailed in Annex 1.

This paper aims to develop a process to be governed by the CUSC, identifying the relevant criteria which should be followed by National Grid, with cooperation from the TOs and the DNOs in assessing when an Embedded Small Power Station project is likely to have a significant impact on the GB transmission system and consequently, whether a request for a Statement of Works by the DNO is required or not.

It should be noted that the TOs are not party to the CUSC and reciprocal changes will be required within the STC to give effect to CAP167 as proposed.

2 Background to the Alternative Proposal

Following careful consideration of the Original CAP167 amendment proposal ENW and CE Electric UK have decided to raise an alternative proposal for consideration by the CAP167 Working Group. Both ENW and CE recognise that there are on occasion difficulties in the DNO being able to determine the significance of the impact of Embedded Small Power Station connection applications on the GB transmission system and that by establishing appropriate requirements at each GSP this would remove many of the current difficulties and provide increased transparency to all parties. However, it is considered inappropriate (on the grounds of proportionality, wider competition and environmental objectives) by ENW and CE that the criteria used by the GBSO in establishing and determining these requirements should include the consideration of wider transmission issues (i.e. those that will provide benefits over and above the absolute minimum to allow the embedded Small Power Station to connect).

3 ENW / CE Electric UK CAP167 Alternative Amendment Proposal

The section details the criteria and process to be used by the GBSO when establishing and determining thresholds above which an Embedded Small Power Station is considered to have the potential to have a significant impact on the GB Transmission System and hence when a DNO should submit a request for a Statement of Works in response to a connection request from an Embedded Small Power Station.

3.1 Criteria

1. The current Grid Code thresholds of =>10MW in SHETL area, =>30MW in SPT area and =>50MW in NGET area will not be amended by this process. The definitions for Small, Medium and Large will still apply. The criteria and process below will only apply to Embedded Small Power Stations. The DNO will still be required to submit a request for a Statement of Works from National Grid for all medium embedded power station projects. However, it is recognised that in certain circumstances, related to local transmission issues, Embedded Small Power Stations might have a significant effect on the GB Transmission System, and it may become appropriate for the DNO to submit a request for a Statement of Works to National Grid relating to a connection request from Embedded Small Power Stations with declared MW output below the Grid Code thresholds.

2. To provide better transparency to the potential presence of any local issues that is considered to have a significant impact on the GB Transmission System, National Grid will publish requirements in the form of specific MW thresholds on an individual GSP basis above which it is necessary for a DNO to submit a request for a Statement of Works in response to a connection request from an Embedded Small Power Station. Such thresholds will be published on a GSP-specific basis having applied the "Relevant Embedded Small Power Station Methodology" considering each of the following criteria which will be set out in the CUSC:

    1. **The impact of the SEPS assessed against the GB SQSS, but limited to those criteria relevant to establishing essential sole use works required on the GB Transmission System due to the connection of a SEPS and which will not be of a material benefit to any existing User**. [i.e. only that investment that is essential to connect the Embedded Small Power Station project in question, and where reinforcement works will not have any other material benefit to any other User of the transmission system – Annex 2]

    2. **The administrative and cost burden on relevant small embedded generation projects.** [It is important that the administrative and regulatory burden for smaller participants, including small community projects in the electricity generation market is proportionate. It is not appropriate that the marginal effects on the Transmission System of connecting an Embedded Small Power Station should affect its connexion costs or timings except in unusual circumstances where any costs can specifically and significantly ascribed to it. General marginal costs on the Transmission System imposed by Embedded Small Power Stations should be borne by Users of the Transmission System in general.]

3.2 Process

The following text outlines the process by which National Grid as GBSO determines appropriate MW thresholds for each GSP on the GB transmission network based on the criteria identified in Section 3.1. This process will be set out in the CUSC.

1. CUSC requires GBSO to prepare a Relevant Embedded Small Power Station (RESPS) Methodology which details how the CUSC criteria will be applied in respect of the GSP thresholds – See Section 4.

2. GBSO consults with DNOs and TOs within reasonable timescales, regarding the draft Relevant Embedded Small Power Station Methodology.

3. GBSO publishes a draft Relevant Embedded Small Power Station Methodology on the NGET website (with links via the DNO websites) for industry consultation over a period of 28 days.

4. GBSO publishes final Relevant Embedded Small Power Station Methodology in cognisance of industry responses.

5. In accordance with the Relevant Embedded Small Power Station Methodology, the GBSO will publish indicative MW thresholds for each GSP with additional guidance providing justification for the thresholds.

6. GBSO consults with industry parties over a period of 28 days regarding indicative MW thresholds and justifications.

7. GBSO publishes final MW thresholds for each GSP on the National Grid website, with supplementary information to identify the basis upon which the threshold has been determined in accordance with the methodology.

8. GBSO has an ongoing obligation contained in the CUSC, to keep the thresholds under review, with an annual review of the methodology in co-operation with the DNOs and TOs. CUSC and interested parties including prospective generators have the right to raise comments and concerns at any point, to be considered by the GBSO when undertaking the review process.

9. The existing CUSC dispute resolution process in Section 7 shall apply to the methodology and the thresholds for CUSC parties (including the DNO's). CUSC parties will be able to dispute the methodology and thresholds if the GBSO has not followed the criteria or process in accordance with the CUSC.

10. The existing STC disputes process in Section H shall apply to the methodology and the thresholds. STC parties will be able to dispute the methodology and thresholds if the GBSO has not followed the criteria or process in accordance with the STC.

Having published MW thresholds, those generators equal to or in excess of the threshold at the relevant GSP wishing to connect to the distribution network, the DNO on their behalf must request a Statement of Works from National Grid which will be assessed in accordance with the process below:

4 Draft RESPS Methodology

For the avoidance of doubt, this methodology will be consulted upon with industry parties in accordance with Sections 1-4 of the process outlined above. This represents an initial draft methodology based on WGAA1 developed by the Working Group with the aim of informing the CAP167 consultation process only.

4.1 Determination of MW thresholds

NGET will assess the threshold by considering a theoretical Embedded Small Power Station and incrementing the MW Registered Capacity of the theoretical ESPS until an investment of material effect (i.e. > £10k capital expenditure) on NGET's or the User's assets is necessary to resolve a violation of GB SQSS, and where the benefits from the solution only affect the theoretical ESPS. The MW increment at which the theoretical ESPS triggers the investment is the RESP Threshold.

The GSP threshold would be assessed using the existing Week 24 data submissions provided by the DNO as the current background against which the theoretical ESPS assessment would be made.

This assessment could take place in the same timescales as the existing demand compliance assessment, i.e. submissions by Week 28 would result in an identifiable threshold for each GSP by Week 52. The output would be a specific MW threshold for each GSP.

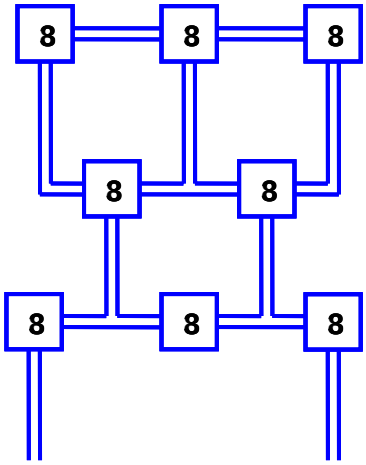
4.2 De minimis threshold

In order to ensure that the administrative and cost burden on relevant small embedded generation projects is proportionate, a de minimis level for small projects should be determined. It is proposed that 10% of the SEPS threshold be adopted as a de mimimis threshold for each TO area i.e. 1MW SHETL area, 3MW in SPT area and 5MW in NGET area.

4.3 Application of MW thresholds

4.3.1 Example 1

In the simplistic example below, a DNO network comprising 8 GSPs for each of which, the above methodology has been applied resulting in a threshold of 8MW at each GSP.

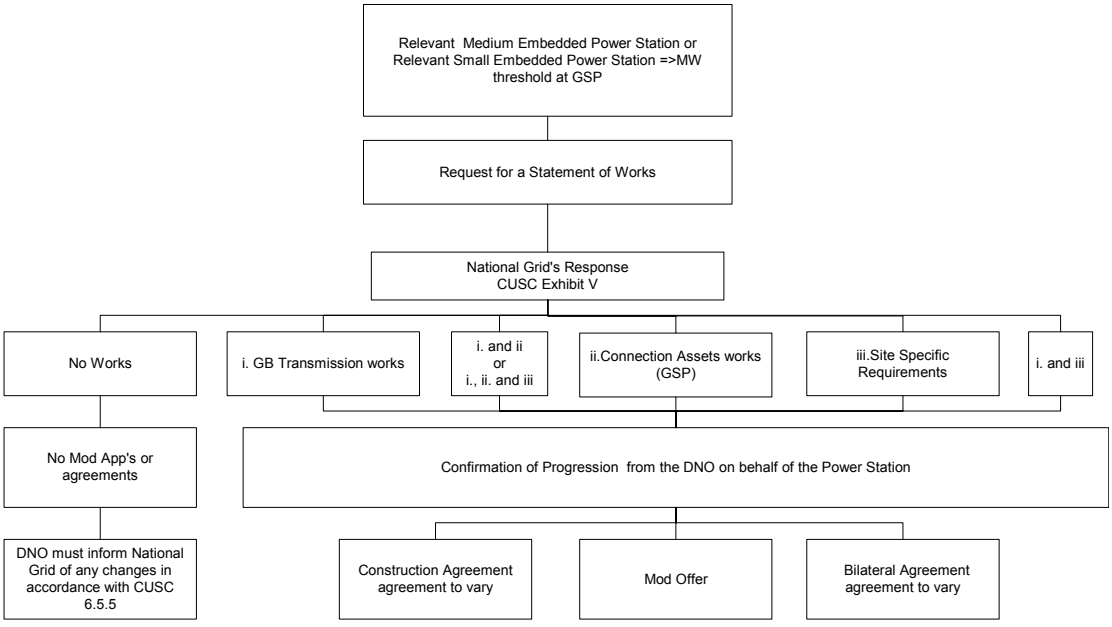


4.3.2 GSP threshold

In this instance, the DNO will be permitted to connect multiple SEPS at each GSP, so long as the registered capacity[6] of any single SEPS at this GSP does not exceed 8MW. There will be no requirement for the DNO to notify the GBSO of the connection of such generation, other than that supplied as part of existing annual Week 24 data set. Where the connection of a generator exceeds the 8MW threshold, the DNO will be required to request a Statement of Works on behalf of that generator.

To further clarify this point; in the event that two 7.9MW generators wished to connect at the same GSP in the same year (i.e. between the period of assessment by the GBSO of the MW threshold), this would NOT require a request for a Statement of Works for either project.

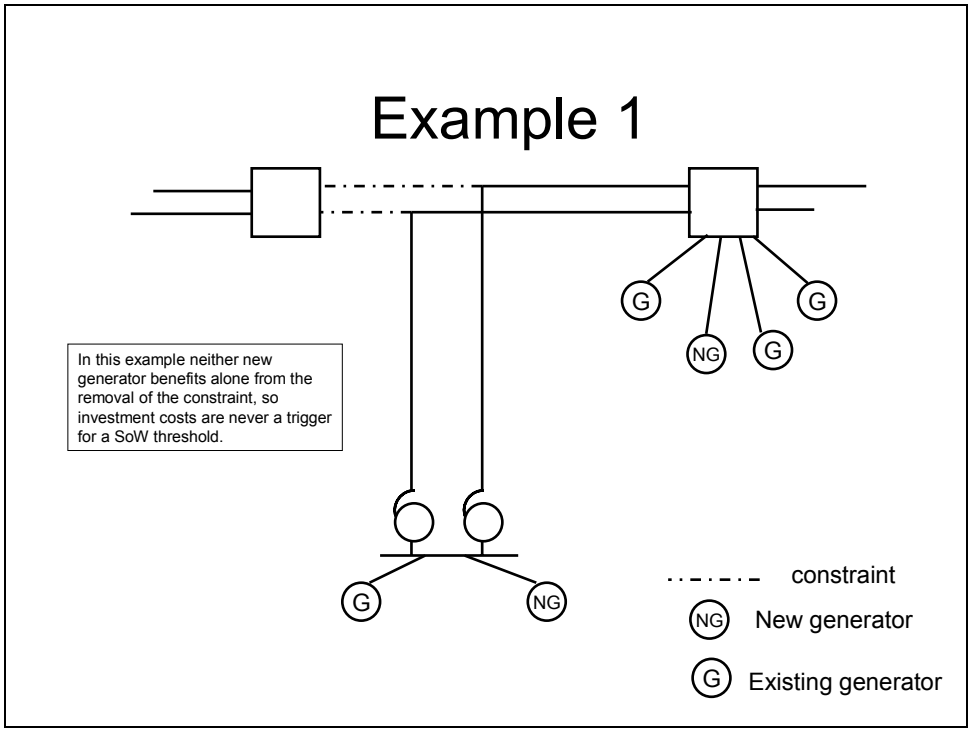
Annex 1



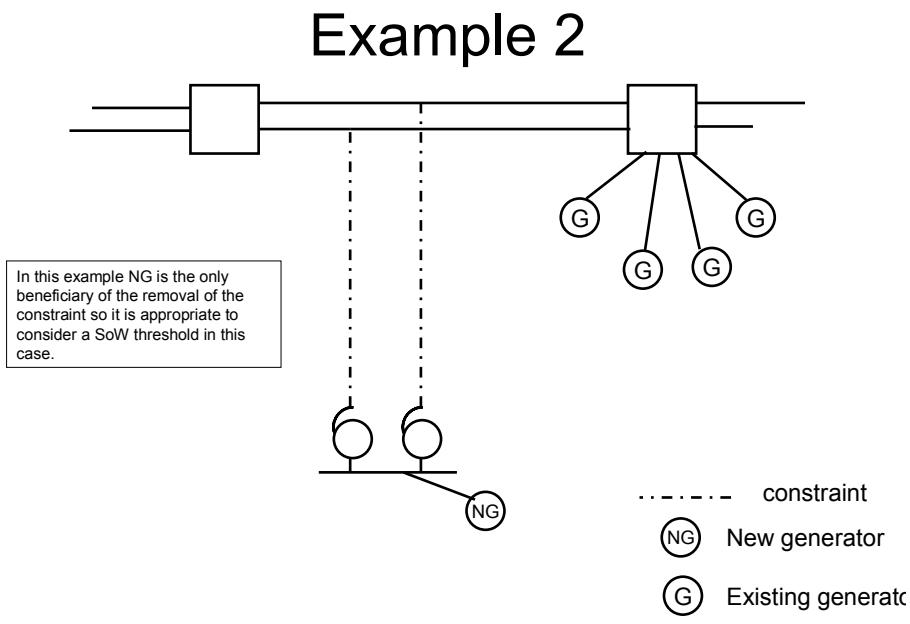
[6] Registered Capacity as defined in the Grid Code

Annex 2

Two examples are presented here to help clarify the 'sole beneficiary' criteria for a Statement of Works (Section 3.1).



In Example 1 there is an existing constraint which is manifest on the transmission system. The connection of the new generator NG has the potential of increasing the power flows across this constraint. However, any reinforcement of the transmission network to remove/reduce the size of the constraint would benefit all local generation G + NG and not just NG. As such, these investment costs are not considered to be a trigger for setting the GSP Statement of Works threshold.



In Example 2 the connection of new generation NG at the GSP has the potential to affect the thermal or other technical constraint, as described in Criteria 3, associated with the connection assets. In this instance any works to reinforce the transmission network to remove/reduce the constraint would benefit only the new generator NG and existing generation G would see no material benefit. In this instance, this should inform the setting of the Statement of Works MW threshold at the GSP.

ANNEX 3 – WORKING GROUP ALTERNATIVE AMENDMENT 2

CUSC Criteria
This section details the criteria and process to be used by the GBSO when establishing and determining thresholds above which a RESPS is considered to have a significant impact on the GB Transmission System and hence when a DNO should submit a request a Statement of Works in response to a connection request from a RESPS.

Criteria:

1. The current Grid Code thresholds of =>10MW in SHETL area, =>30MW in SPT area and =>50MW in NGET area will not be amended by this process. The definitions for Small, Medium and Large will still apply. The process below will apply to all Embedded Small Power Stations. The DNO will still be required to submit a request for a Statement of Works from National Grid for all medium sized embedded power station projects.

2. National Grid will publish MW thresholds (with co-operation from the relevant TO's and DNOs) above which it is necessary for a DNO to submit a request for a Statement of Works in response to a connection request from a RESPS. Such thresholds will be published on a GSP-specific basis and also a 'transmission system boundary' basis having applied the process outlined below and having considered the following criteria which will be set out in the CUSC:

    - Compliance with GB Security and Quality of Supply Standard, taking into account the administrative and cost burden placed upon Embedded Small Power Station projects.
    - An assessment of the cost of carbon in the economic assessment undertaken as part of the SQSS.

    It should be noted that in considering the administrative and cost burden placed upon an Embedded Small Power Station, this will lead to the application of a de minimis value determined in accordance with the RESPS Methodology.

Process

The following text outlines the process by which National Grid as GBSO determines appropriate MW thresholds for each GSP on the GB transmission network based on the criteria identified above. This process will be set out in the CUSC.

1. CUSC requires GBSO to prepare a Relevant Embedded Small Power Station Methodology which details how the CUSC criteria will be applied in respect of the GSP thresholds.

2. GBSO consults with DNOs and TOs within reasonable timescales, regarding the draft Relevant Embedded Small Power Station Methodology.

3. GBSO publishes a draft Relevant Embedded Small Power Station Methodology on the NGET website (with links via the DNO websites) for industry consultation over a period of 28 days.

4. GBSO publishes final Relevant Embedded Small Power Station Methodology in cognisance of industry responses.

5. In accordance with the Relevant Embedded Small Power Station Methodology, the GBSO will publish indicative MW thresholds for each GSP with additional guidance providing justification for the thresholds.

6. GBSO consults with industry parties over a period of 28 days regarding indicative MW thresholds and justifications.

7. GBSO publishes final MW thresholds for each GSP on the National Grid website, with supplementary information to identify the basis upon which the threshold has been determined in accordance with the methodology.

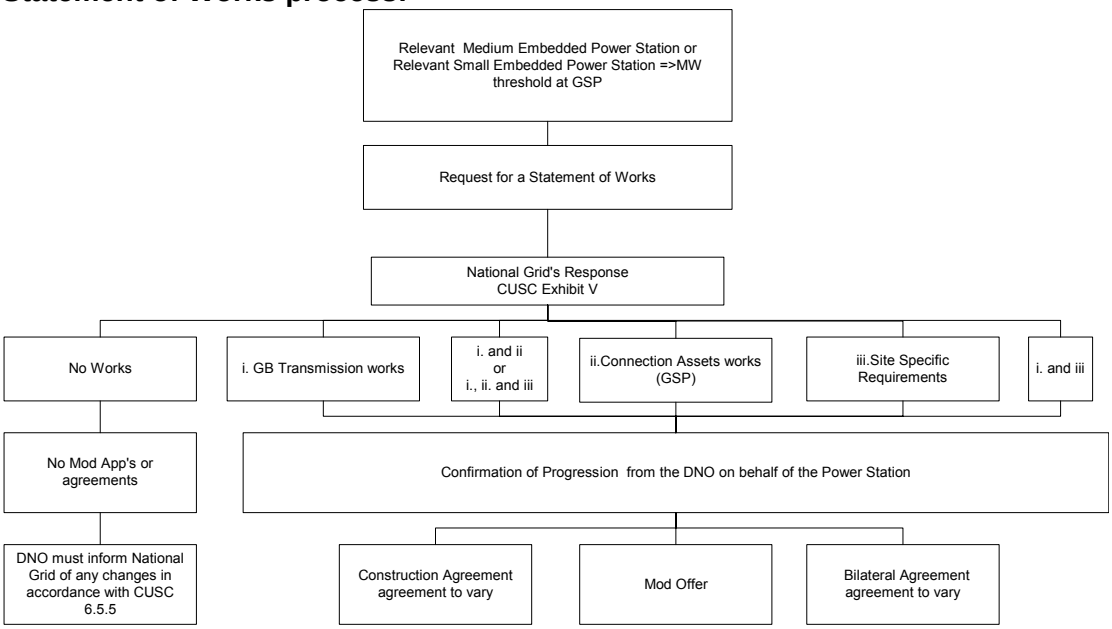
8. GBSO has an ongoing obligation contained in the CUSC, to keep the thresholds under review, with an annual review of the methodology in co-operation with the DNOs and TOs. CUSC and interested parties have the right to raise comments and concerns at any point, to be considered by the GBSO when undertaking the review process.

9. The existing CUSC dispute resolution process in Section 7 shall apply to the methodology and the thresholds for CUSC parties (including the DNO's). CUSC parties will be able to dispute the methodology and thresholds if the GBSO has not followed the criteria or process in accordance with the CUSC.

10. The existing STC disputes process in Section H shall apply to the methodology and the thresholds. STC parties will be able to dispute the methodology and thresholds if the GBSO has not followed the criteria or process in accordance with the STC.

Having published MW thresholds, those Relevant Embedded Small Power Stations with a capacity in excess of the threshold at the relevant GSP will require the DNO to submit a Request for a Statement of Works from National Grid on their behalf, which will be assessed in accordance with the Statement of Works process outlined below.

Statement of Works process:



ANNEX 4 – PROPOSED LEGAL TEXT TO MODIFY THE CUSC

Part A - Text to give effect to the Original Proposed Amendment

The proposed Legal text to modify the CUSC is detailed below by inserting the coloured underlined text and deleting the text shown struck through.

ORIGINAL

RESPS Thresholds	the MW thresholds as identified, published and maintained by **The Company** in accordance with the **RESPS Methodology** pursuant to Paragraph 6.5A.
Relevant Embedded Small Power Station or RESPS	an **Embedded Small Power Station** whose **Registered Capacity** is greater than or equal to the relevant **RESPS Thresholds** ~~that the **User** who owns or operates the **Distribution System** to which the **Embedded Small Power Station** intends to connect reasonably believes may have a significant system effect on the **GB Transmission System;**~~ .
RESPS Criteria	**The Company's** assessment criteria set out in the **GBSQSS,** taking into account the administrative and cost burden
RESPS Methodology	the methodology based on the **RESPS Criteria** which will be utilised to determine the **RESPS Thresholds** and which is established and maintained by **The Company** pursuant to Paragraph 6.5A.

6.5.5 Statement of Works

6.5.5.1 Any **User** who owns or operates a **Distribution System** shall as soon as reasonably practicable upon receipt of a request for a connection to and / or for the use of that **User's Distribution System** from a **Relevant Embedded Medium Power Station** or a **Relevant Embedded Small Power Station** submit to **The Company** a **Request for a Statement of Works**. Such a submission by a **User** who owns or operates a **Distribution System** of a **Request for a Statement of Works** will be substantially in the form of Exhibit U.

6.5.5.2 The **Request for a Statement of Works** must include the Technical Information in respect of such **Power Station** and its proposed date of connection to and / or for the use of the **Distribution System**.

6.5.5.3 **The Company** will within 28 days of the submission of a **Request for a Statement of Works** respond in writing to the **User** who owns or operates a **Distribution System** with a **Statement of Works** substantially in the form of **Exhibit V.** The **User** who owns

or operates a **Distribution System** shall forward such **Statement of Works** to the **Power Station** as soon as reasonably practicable.

6.5.5.4 The **User** who owns or operates a **Distribution System** shall have 90 **Business Days** from such notification under Paragraph 6.5.5.3 to return to **The Company** a completed and signed **Confirmation of Project Progression,** in the form attached to the **Statement of Works** together with the appropriate fee. The **User** who owns or operates a **Distribution System** shall forward a copy of such **Confirmation of Project Progression** to the **Power Station** as soon as reasonably practicable.

6.5.5.5 The **Confirmation of Project Progression** together with the information included in the **Request for a Statement of Works**, and any further details as may be required by **The Company** shall be deemed to be a **Modification Application** for the purposes of the **Charging Statements** and Paragraphs 1.3.2, 6.9.2, 6.9.4 and 6.10 of the **CUSC** which shall apply thereto.

6.5.5.6 Where **The Company** believes the **Power Station** has no significant impact on the **GB Transmission System** (for avoidance of doubt, such significant impact involves either party in an expenditure of more than £10,000) or the **Statement of Works** indicates that no works are required nor any **Site Specific Requirements** are necessary, the **Statement of Works** completes the process required for in respect of the **Request for a Statement of Works** for the purposes of Paragraph 6.5.1(a)(i) and the **User** who owns or operates a **Distribution System** may **Energise** the connection of the **Power Station** or permit the use of its **Distribution System** by the **Power Station.**

6.5.5.7 Where **The Company** believes the **Power Station** has a significant impact on the **GB Transmission System** (for avoidance of doubt, such significant impact involves either party in an expenditure of more than £10,000) and the **Statement of Works** indicates that works are required and/or **Site Specific Requirements** are necessary, should the **User** who owns or operates a **Distribution System** fail to return to **The Company** a signed and completed **Confirmation of Project Progression** (together with the appropriate fee) within 90 **Business Days** from such notification under Paragraph 6.5.5.3, the **Request for a Statement of Works** shall be deemed withdrawn and the **User** who owns or operates a **Distribution System** shall not energise the connection of nor permit the use of its **Distribution System** by the **Power Station** that was the subject of the **Request for a Statement of Works** in the manner described in the **Request for a Statement of Works.**

6.5.5.8 The **User** who owns or operates a **Distribution System** shall notify **The Company** in writing if the proposed date of connection or any other of the details included in or provided pursuant to the **Request for a Statement of Works** for such **Power Station** for which a **Request for a Statement of Works** has been submitted, changes and the **User** who owns or operates a **Distribution System** shall (except where **The Company** agrees in writing that a revised **Statement of Works** is not reasonably required) submit a revised **Request for a Statement of Works**

6.5.5.9 If **The Company** has notified the **User** that no works are required on the **GB Transmission System** pursuant to Paragraph 6.5.5.3, **The Company** may notify the **User** in writing within 28 days of the submission of a **Request for a Statement of Works** that **Site Specific Requirements** are necessary at the site of connection of the **Power Station.** Any **Site Specific Requirements** notified to the **User** shall be incorporated through an agreement to vary the **Bilateral Agreement** between **The Company** and the **User** for the appropriate **Grid Supply Point** of such **User**.

6.5.5.10 If **Site Specific Requirements** are necessary and a **Modification Application** has been submitted pursuant to Paragraph 6.5.5.4, then any such **Site Specific Requirements** shall be included in the **Modification Offer.**

6.5.5.11 The **User** shall notify **The Company** in writing if the proposed date of connection for such **Power Station** for which a **Request for a Statement of Works** has been submitted changes and shall submit a revised **Request for a Statement of Works**.

6.5A RESPS Methodology and RESPS Thresholds

6.5A.1 **The Company** shall prepare a draft **RESPS Methodology** in consultation with owners and operators of **Distribution Systems** and **Relevant Transmission Licensees**. Following this initial consultation **The Company** shall publish the **RESPS Methodology** on **The Company** website for a period of 28 days for **CUSC Parties** and other interested parties to provide comments to **The Company**.

6.5A.2 Following the 28 day period of consultation specified at Paragraph 6.5A.1 **The Company** shall publish the final **RESPS Methodology** on **The Company** website.

6.5A.3 Following publication of the **RESPS Methodology** pursuant to Paragraph 6.5A.2 **The Company** shall prepare a draft of the **RESPS Thresholds**.

6.5A.4 Once prepared **The Company** shall publish the draft **RESPS Thresholds** on **The Company** website for a period of 28 days for **CUSC Parties** and other interested parties to provide comments to **The Company**.

6.5A.5 Following the 28 day period of consultation specified at Paragraph 6.5A.4 **The Company** shall publish the final **RESPS Thresholds** on **The Company** website.

6.5A.6 **The Company** shall monitor the final **RESPS Thresholds** and, if appropriate, revise the **RESPS Thresholds** in accordance with the process in Paragraphs 6.5A.3 to 6.5A.5.

6.5A.7 **The Company** shall review the **RESPS Methodology** annually and assess whether any amendments are required. If **The Company's** view is that no amendments are required **The Company** shall publish its view on **The Company** website.

6.5A.8 If in **The Company's** view amendments are required to the **RESPS Methodology** such amendment will be undertaken in accordance with the process in Paragraph 6.5A.1 to 6.5A.3. Upon each amendment of the **RESPS Methodology The Company** will review the published **RESPS Thresholds** in accordance with the process in Paragraph 6.5A.3 to 6.5A.5.

6.5A.9 **The Company** will monitor the appropriateness of the published **RESPS Thresholds** and shall review the published **RESPS Thresholds** at least once a year. If in **The Company's** view amendments are required to the **RESPS Thresholds** any amendments will be undertaken in accordance with the process in Paragraphs 6.5A.3 to 6.5A.5.

6.5A.10 **Amendment Proposal** CAP 167 effects certain changes to sections 6 and 11 of the **CUSC**. Certain of these changes are conditional upon the process set out at Paragraph 6.5A.1 to 6.5A.5 having been completed. Consequently:

(i) the provisions of Paragraphs 6.5A.6 and 6.5A.7 shall not apply in respect of an **Embedded Small Power Station** until **The Company** has published the final **RESPS Thresholds** relevant to such **Embedded Small Power Station** on **The Company** website pursuant to Paragraph 6.5A.5; and

(ii) and until such time the definition of **Relevant Embedded Small Power Station** shall be as follows:

Relevant Embedded Small Power Station	an **Embedded Small Power Station** that the **User** who owns or operates the **Distribution System** to which the **Embedded Small Power Station** reasonably believes may have a significant system effect on the **GB Transmission System**.

Part B - Text to give effect to the Working Group Alternative Amendment 1

The proposed legal text to give effect to the Working Group Alternative Amendment 1 is the same as that for the Original Amendment, with the exception of the definition of RESPS Criteria, which will be defined as follows:

RESPS Criteria	**The Company's** assessment of the criteria set out in the **GBSQSS,** limited to those criteria relevant to establishing essential sole use works required on the GB **Transmission System** due to the connection of a **Power Station** which will not be of material benefit to any existing **User,** taking into account the administrative and cost burden.

Part C – Text to give effect to the Working Group Alternative Amendment 2

The proposed legal text to give effect to the Working Group Alternative Amendment 2 is the same as that for the Original Amendment and WGAA1, with the exception of the definition of RESPS Criteria, which will be defined as follows:

RESPS Criteria	**The Company's** assessment of the criteria set out in the **GBSQSS,** taking into account the cost of carbon and the administrative and cost burden

ANNEX 5 – WORKING GROUP TERMS OF REFERENCE AND MEMBERSHIP

RESPONSIBILITIES

1. The Working Group is responsible for assisting the CUSC Amendments Panel in the evaluation of CUSC Amendment Proposal CAP167 tabled by National Grid at the Amendments Panel meeting on 16 May, 2008.

2. The proposal must be evaluated to consider whether it better facilitates achievement of the applicable CUSC objectives. These can be summarised as follows:

   (a) the efficient discharge by the Licensee of the obligations imposed on it by the Act and the Transmission Licence; and

   (b) facilitating effective competition in the generation and supply of electricity, and (so far as consistent therewith) facilitating such competition in the sale, distribution and purchase of electricity.

3. It should be noted that additional provisions apply where it is proposed to modify the CUSC amendment provisions, and generally reference should be made to the Transmission Licence for the full definition of the term.

SCOPE OF WORK

4. 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.

5. In addition to the overriding requirement of paragraph 4, the Working Group shall consider and report on the following:

- Identify all the current issues regarding the lack of transparency and guidance for determining significant impact on the transmission system prior to an application for a request for a Statement of Works for Relevant Small Embedded Power Stations;

- Undertake the required analysis and determine an appropriate process for establishing MW threshold(s) which will provide transparent criteria of whether a DNO is required to request a Statement of Works from National Grid for small generation project connecting to their system;

- Consider possible alternative options;

- Identify all the consequences of each option including but not limited to:

    - the impact on the CUSC and any other associated documents within the framework;

- the impact on CUSC Parties and other affected parties such as the administrative and cost burden; and
- the impact on the industry and wider issues as appropriate in accordance with the Applicable CUSC Objectives.

- Undertake analysis of the environmental impact in accordance with Ofgem's final clarification and guidance on the treatment of carbon costs under the current industry code objectives for the proposed amendment and any Working Group Alternatives that will be presented to the Panel in the groups final Working Group Report

- Identify advantages and disadvantages of each option;

- Consider implementation issues and propose a solution to resolve any issues; and

- Where possible consider and identify recommendations for further improvements to the Statement of Works process that could be progressed in the future.

6. 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.

7. 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.

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

9. 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.

10. The Working Group is to submit their final report to the CUSC Panel Secretary on 21 August, 2008 for circulation to Panel Members. The conclusions will be presented to the CUSC Panel meeting on 29 August, 2008.

MEMBERSHIP

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

Chair	Emma Carr
National Grid	Craig Maloney
Industry Representatives	Leonida Bandura
	Alan Creighton
	Ray Hunter
	Robert Longden
	Paul McGimpsey
	Alec Morrison
	Paul Mott
	John Norbury / Bill Reed
	Steven Pottinger
	Dan Randles / Mike Kay
	David Walker
	Dave Wilkerson
Authority Representative	Cheryl Mundie
Technical Secretary	Parry Batth

NB: Working Group must comprise at least 5 Members (who may be Panel Members)

12. 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 CAP167 is that at least 5 Working Group members must participate in a meeting for quorum to be met.

13. 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.

14. Working Group Members or their appointed alternate is required to attend a minimum of 50% of the Working Group Meetings to be eligible to participate in the Working Group vote.

15. The Technical Secretary 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 Report.

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

RELATIONSHIP WITH AMENDMENTS PANEL

17. 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.

18. 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

19. 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

20. The Working Group Chairman shall prepare a final report to the 29 August 2008 Amendments Panel responding to the matter set out in the Terms of Reference.

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

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

23. The Chairman (or another member nominated by him) will present the Working Group report to the Amendments Panel as required.

ANNEX 6 – WORKING GROUP ATTENDANCE REGISTER

Working Group Member	26/06	11/07	21/07	30/07	12/08	01/09	10/09	26/09	06/11	Attendance (%)	Vote
Emma Carr – Chair (National Grid)	√	√	√	√	√	√	X	-	-	89%	
Duncan Burt – Chair (National Grid – Acting on behalf of Emma Carr)	-	-	-	-	-	-	-	√	-		
Robert Smith – Chair (National Gird – Acting on behalf of Emma Carr)	-	-	-	-	-	-	-	-	√		
Parry Batth – Technical Secretary (National Grid)	√	√	√	√	√	X	√	X	√	78%	
Craig Maloney – Acting on behalf of the Proposer (National Grid)	√	√	√	√	√	√	√	√	√	100%	√
Cheryl Mundie (Ofgem)	X	√	√	√	√	√	√	-	-	89%	
Min Zhu (Ofgem – Acting on behalf of Cheryl Mundie)	-	-	-	-	-	-	-	√	-		
Lesley Nugent (Ofgem – Acting on behalf of Cheryl Mundie)	-	-	-	-	-	-	-	-	√		
Alan Creighton (CE Electric –UK)	√	√	√	X	X	√	X	√	√	67%	√
Alec Morrison (SSE Power Distribution)	√	√	√	√	√	X	√	√	√	89%	√
Dan Randles (Electricity North West)	√	√	√	-	-	√	√	√	√	100%	√
Mike Kay (Electricity North West - Acting as alternate to Dan Randles)	-	-	-	√	√	-	-	-	-		
David Walker (Tullo Wind Energy, Ben Aketil Wind Energy, Boyndie Wind Energy, Dunbeath Wind Energy, supported by the Scottish Renewable Forum)	√	√	√	√	√	X	√	√	√	89%	√
John Norbury (RWE)	√	-	-	√	X	√	X	√	√	78%	√
Bill Reed (RWE - Acting as alternate to John Norbury)	-	√	√	-	X	-	X	-	-		
Leonida Bandura (E.ON)	√	√	√	√	√	√	√	√	√	100%	√
Paul McGimpsey (SP Distribution & SP Manweb)	√	√	√	√	√	√	√	√	X	89%	√
Robert Longden (Airtricity)	√	√	√	X	X	√	√	√	√	78%	√
Steven Pottinger (Baillie Windfarm limited, Spittal Hill Windfarm & Scottish Renewables)	√	√	X	√	√	√	√	√	X	78%	
Ray Hunter (RES)	√	√	√	√	X	√	√	X	X	67%	√
Dave Wilkerson (Centrica)	X	X	X	X	X	X	X	X	X	0%	
Paul Mott (EDF)	X	X	X	X	X	X	X	X	X	0%	
Mo Cloonan – Observer (Community Energy Scotland)	√	√	√	√	√	√	√	√	√	100%	

*Includes attendance of Working Group member and their alternative representative.

ANNEX 7 – AMENDMENT PROPOSAL FORM

CUSC Amendment Proposal Form	**CAP:167**

Title of Amendment Proposal:

Definition of a threshold(s) associated with the request for a Statement of Works

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

It is proposed to amend the CUSC to provide definitive clarification in the assessment of whether a small embedded power station development (or the aggregate effect of multiple projects) has a significant impact on the GB transmission system.

The proposal recommends that a CUSC working group is established to undertake the required analysis and decide on an appropriate MW threshold(s), which will provide transparent criteria of whether a DNO is required to request a Statement of Works from National Grid for small generation projects connecting to their system.

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

Following the implementation of CAP097 in July 2006: "Revision to the Contractual requirements for Small and Medium Embedded Power Stations", Section 6.5 of the CUSC requires a compulsory request for a Statement of Works from National Grid by the relevant DNO in respect of proposed embedded medium sized generators (<100MW and =>50MW National Grid). For proposed embedded small generators (<50MW National Grid, <30MW SPT, <10MW SHETL) however, a request for a Statement of Works from National Grid by the relevant DNO, is required only where that DNO believes that the proposed small power station connection has a significant impact on the GB transmission system.

National Grid does not consider that the DNO has access to the necessary information to accurately assess the impact which a small embedded development, or the aggregate effect of multiple developments, may have on the GB transmission system. In practice, due to the varying interpretations of the wide range of issues which need to be considered by the DNO, in certain circumstances it has not always been possible for National Grid and the DNO to agree when the development of a small embedded generator (or multiple generators) has a significant impact on the GB transmission system. This has created difficulties in transmission investment planning, accurate forecasting of demand levels and operational outage and fault level planning.

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

The impact on the CUSC would include but may not be limited to changes to Section 6.5 (General Provisions) and Section 11 (Interpretations and Definitions).

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

Potential impact on the DCODE and DCUSC.

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

None.

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

Potential impact on embedded generator / DNO Bilateral Agreements.

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

The proposed amendment would better facilitate the achievement of Applicable CUSC Objective (a), the efficient discharge by the licensee of the obligations imposed upon it under the Act and by the licence, in that the proposal will increase the visibility of small embedded generation projects that have a significant impact on the transmission system and in turn will, improve the ability to plan transmission investment, forecast levels of demand, and plan operational outages.

The proposed amendment would also better facilitate the achievement of Applicable CUSC Objective (b), facilitating effective competition in the generation and supply of electricity, and (so far as consistent therewith) facilitating such competition in the sale, distribution and purchase of electricity by providing a level playing field in the connection application process for generation wishing to connect to the distribution and transmission networks in terms of their impact on the transmission system, especially in areas of constrained capacity.

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:	**Craig Maloney** **National Grid** **01926 655896** **craig.maloney@uk.ngrid.com**
Details of Representative's Alternate: Name: Organisation: Telephone Number: Email Address:	**Hêdd Roberts** **National Grid** **01926 655385** Hedd.roberts@uk.ngrid.com
Attachments (Yes/No): No **If Yes, Title and No. of pages of each Attachment:**	

Notes:

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

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

The completed form should be returned to:

Beverley Viney
Panel Secretary
Commercial Frameworks
National Grid
National Grid House
Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA

Or via e-mail to: Beverley.Viney@uk.ngrid.com

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

3. 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 8 – CAP167 ENVIRONMENTAL ASSESSMENT

Assessment of CAP167 on the impact on the Cost of Carbon

1 Executive summary

Following Ofgem's letter dated 30th June, 2008 *"Proposed Guidance - Environmental Issues and the Code Objectives"*[7], this paper sets out the methodology by which the CAP167 Working Group have assessed how the financial impacts of greenhouse gas emissions can be factored in when considering whether the implementation of CAP167 is more economic and efficient than the status quo, in accordance with applicable CUSC objective (a).

In summary, the implementation of CAP167 has the potential to delay the connection timescales of renewable Small Embedded Power Station (SEPS) in some locations, to which a carbon cost can be attributed. The operational constraint analysis conducted by National Grid however, concludes that in some locations, most notably the Seven Year Statement (SYS) B2 and B6 (Cheviot) boundaries, the implementation of CAP167 could represent significant savings in constraint costs which far outweigh the carbon benefit that would be realised by the connection of renewable SEPS.

2 Background

The CAP167 Working Group considered that by determining thresholds at which SEPS would be required to make an application for a Statement of Works via the relevant Distribution Network Operator (DNO), the impact of CAP167 could result in the delay to the connection of renewable SEPS, to which a cost of carbon should be attributed.

Whilst in reality it was noted that a request for a Statement of Works might not necessarily mean a delay to a project (in the event that works were not identified), for the purpose of this analysis it is assumed that a request for a Statement of Works would result in a delay in the connection of each project by 8 years. This assumption was based on the fact that some connection offers being made at present stretch out as far as 2018 and beyond and, based on the assumption that it would otherwise take approximately 2 years to connect if no wider works were required, 8 years seemed a reasonable assumption.

Given that CAP167 is most likely to impact on the Scottish Hydro-Electric Power Distribution Ltd (SHEPD) and SP Distribution Ltd (SPD) networks, the analysis presented focuses on the potential impact on each of these DNOs in addition to the Electricity North West Ltd (ENW) distribution network which presents a proxy for England & Wales, given that CAP167 will be applicable throughout Great Britain in the event that it is implemented. Forecasts of SEPS connections considered to be a reasonable proxy by the Working Group for each of the three DNOs connecting between 2008/9 and 2017/18 are provided in Appendix 1. In addition to the annual connection of SEPS in terms of MW capacity, the forecasts also provide a further breakdown of the projects in terms of bands of MW capacity within the existing SEPS Grid Code definitions (<10MW SHEPD, <30MW SPD and <50MW ENW).

It should be noted that the projects identified are based on forecast connections for wind and hydro plants and for the purpose of this analysis, the impact of other 'renewable' fuel-types such as biomass and CHP is not considered on the basis that the complexity involved in calculating the carbon benefit of such plants would not be proportionate for this piece of analysis and the Amendment.

[7] http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?file=Open%20letter%20response-%20final%20version%20of%20letter%2030%20June.pdf&refer=Licensing/IndCodes/Governance

Losses

The impact of distributed generation on network losses would require due consideration on a site by site basis. For a traditional distribution network, power normally flows from the GSP down through the voltage levels. Injection of power from distributed generation changes the pattern of power flow and therefore the energy losses during the transportation of electrical energy. The relationship between distributed generation and network losses is quite complex and dependent on the location of connection, its operation/export profile, the type of network and the interaction between demand and generation.

A given embedded generation connection could either decrease or increase the losses on a distribution or transmission network. Given that some 98% of a typical DNOs carbon footprint arises from network losses, which are typically in the range 5-8% of the electricity distributed, the potential impact of a given SEPS on carbon emissions could be significant, but each connection would need to be evaluated on a site specific basis. Given this level of complexity, the Working Group decided that it would not be possible to incorporate the effect of distribution or transmission network losses into this piece of analysis.

3 Cost of Carbon

The Working Group considered that the use of DEFRA's forecasts of the Shadow Price of Carbon (SPC) would be appropriate for this piece of analysis. These are publicly available from the DEFRA website[8] and included as Table 1 below.

Table 1 Shadow Price of Carbon

Shadow price of carbon (£/tCO_2e)	2010	2011	2012	2013	2014	2015	2016	2017
	27.0	27.6	28.1	28.7	29.2	29.8	30.4	31.0

** All values are in 2007 prices*

Consideration was given as to the fuel-type which would potentially have been displaced by the connection of renewable SEPS. As carbon emissions vary significantly by fuel- type, and the displacement of different fuel types by renewable SEPS would vary by location, the Working Group decided that the average CO_2 emissions from all fuels for 2007 would be an appropriate basis upon which to assess CAP167. Based on data taken from the *Digest of United Kingdom Energy Statistics 2008* publication from BERR[9] contained in Table 2 below, a figure of 501 tonnes per GWh of energy is therefore used.

Table 2 Estimated carbon dioxide emissions from electricity generation

Fuel-type	Emissions (tonnes of CO_2 per GWh electricity supplied)		
	2005	2006	2007
Coal	932	928	939
Oil	675	606	658
Gas	408	415	405
All fossil fuels	651	674	643
All fuels (inc nuclear and renewable)	483	506	501

**Data taken from Table 5C of the BERR Digest of United Kingdom Energy Statistics 2008 publication.*

Based on the SPC values contained in Table 1, and an estimated average CO_2 emission of 501 tonnes per GWh of energy per year, Table 3 provides the estimated carbon costs which would result from the implementation of CAP167 and subsequent delay in the connection of renewable generation on a £/MWh basis.

[8] http://www.defra.gov.uk/environment/climatechange/research/carboncost/pdf/HowtouseSPC.pdf
[9] http://www.berr.gov.uk/energy/statistics/publications/dukes/page45537.html

Table 3 Estimated CO2 emissions

CAP167 Cost of carbon (£/MWh)	2010	2011	2012	2013	2014	2015	2016	2017
	13.53	13.83	14.08	14.38	14.63	14.93	15.23	15.53

** All values are in 2007 prices*

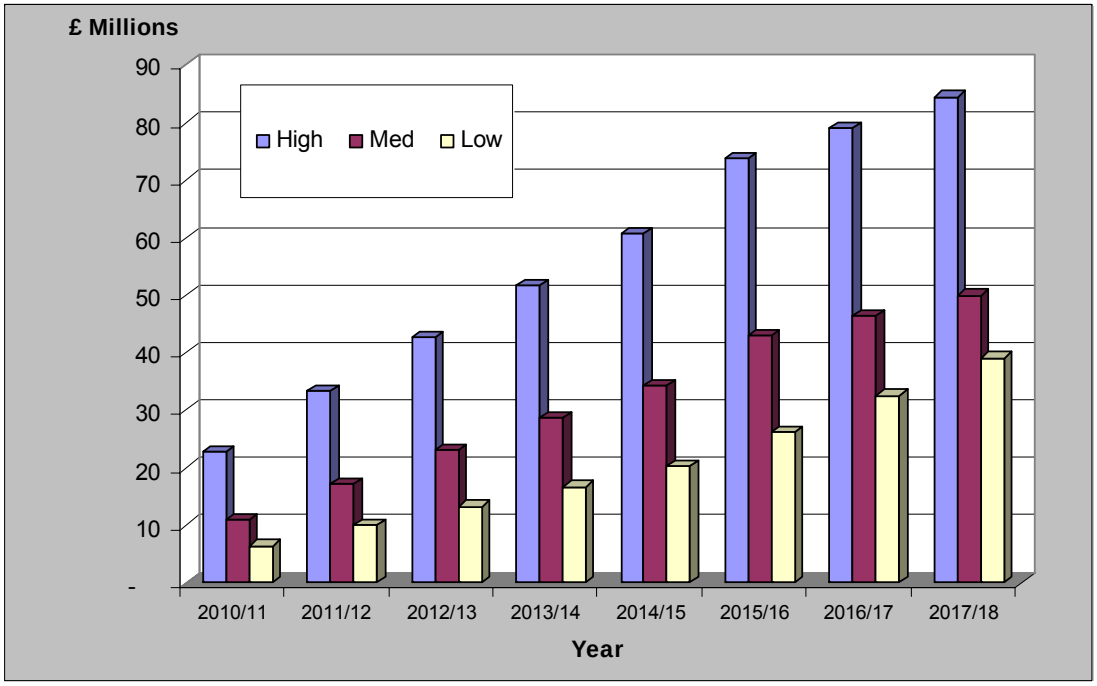
In absolute terms, based on the Working Group forecasts provided in Appendix 1 and an assumed average load factor of 35% for renewable SEPS, Figure 1 presents the cumulative carbon costs for all of the three DNOs under 'high' 'medium' and 'low' case scenarios.

The 'high' case scenario assumes that all SEPS in excess of 2.5MW for each of the DNOs are captured by the Statement of Works process as a result of CAP167, and subsequently delayed for a period of 8 years.

The 'medium' case scenario assumes that all SEPS in excess of 5.0MW in SHEPD, 10MW in SPD and 15.0MW in ENW are captured by the Statement of Works process as a result of CAP167, and subsequently delayed for a period of 8 years.

The 'low' case scenario assumes that SEPS in excess of 7.5MW in SHEPD, 20.0MW in SPD and 30.0MW in ENW are captured by the Statement of Works process as a result of CAP167, and subsequently delayed for a period of 8 years.

Figure 1 Absolute cost of carbon (cumulative)



***** *All values are in 2007 prices*

4 Cost of operational constraints

Having calculated a cost of carbon on both a £/MWh and an absolute basis using the forecasts of SEPS connections between 2010/11 and 2017/18, in order to assess the impact of CAP167 it is necessary to compare these with the forecast costs of operational constraints which would be avoided over these timescales.

National Grid used the same probabilistic model as that used for CAP164 in order to calculate the forecast operational constraint costs at the SYS B2 boundary (SHEPD), Cheviot boundary (SPD) and SYS B7 boundary as a proxy for constraints in Northern England, for years 2010/11, 2012/13, 2014/15 and 2017/18. The assumptions used in the model are included as Appendix 2, whilst electrical diagrams identifying the relevant SYS boundaries are included as Appendix 3.

Figure 2 highlights the prevalence of operational constraining actions across each of the aforementioned boundaries. For those years not studied specifically (i.e. 2011/12, 2013/14, 2015/16 and 2016/17) results have been interpolated.

Figure 2 Hours of active constraints (per year)

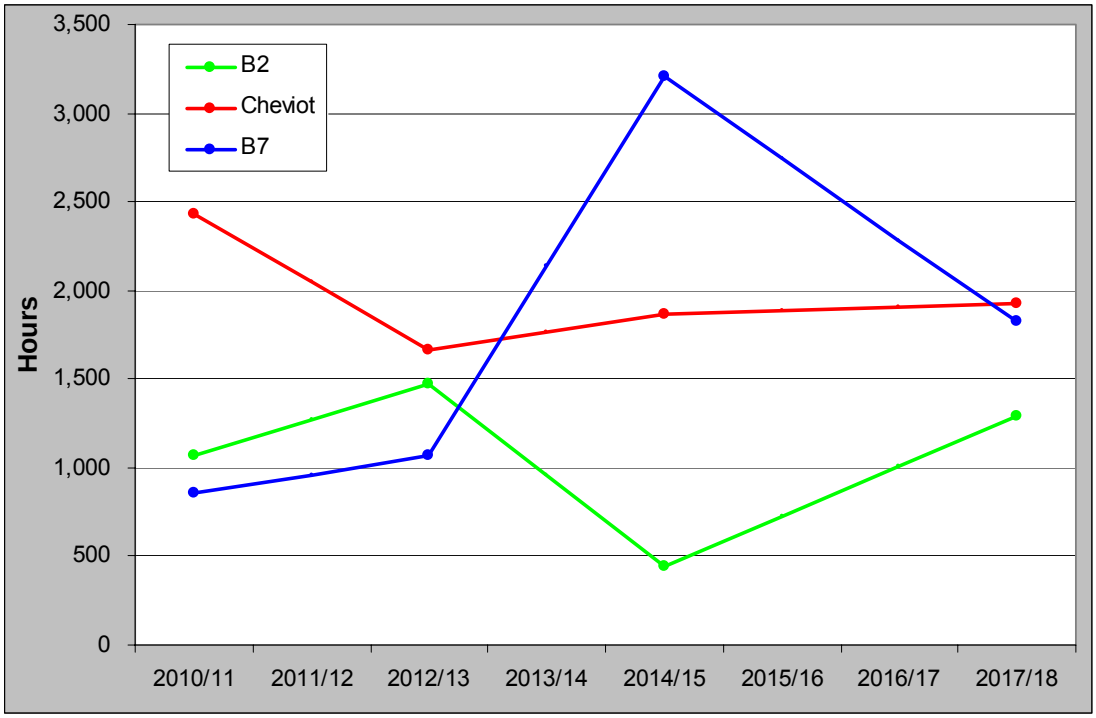


Figure 2 highlights a significant increase in the incidences of operational constraints at the B7 boundary between 2012/13 and 2014/15. This is the result of a significant increase in generation volumes north of the B7 boundary between these two years, coupled with a significant increase in the B2 and B6 boundary capabilities during the summer intact and summer outage seasons. Over the same timescale, B7 boundary capabilities remain the same however. So, whilst the increased volumes of generation in Scotland do not exacerbate B2 or B6 constraints, the impact of the increased volume of generation flows across the B2 and B6 boundaries is not entirely alleviated, but shifted south to the B7 boundary.

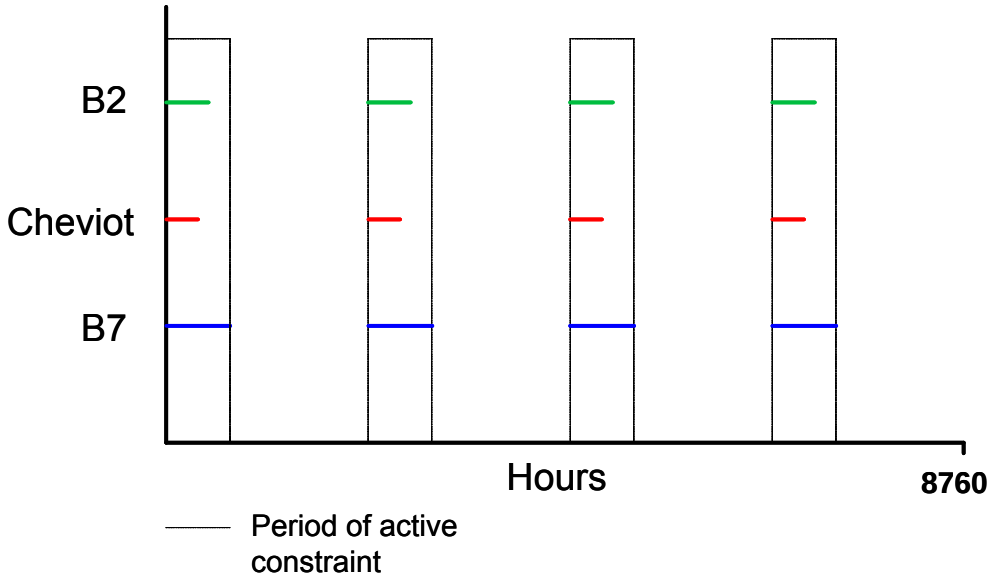
Whilst the probabilistic model identifies the active hours of constraint at each boundary by season, there are limitations in that it does not identify the specific hours at which the constraints are active at each of the boundaries. Specific hours of constraint are important to determine the overall impact on constraint costs,

because active constraints on different boundaries can be prevalent at the same time (minimum impact) or at different times (maximum impact).

In order to assess the impact of generation located north of the B2 boundary on Cheviot and B7 constraints, and the impact of generation located north of the Cheviot boundary on B7 constraints, this analysis therefore considers a high and low case scenario based on the timing of constraining actions at each of the boundaries throughout the period of analysis.

The low case scenario assumes a 100% overlap in terms of the timing of constraints at each boundary where possible. For example, where the number of hours of constraints is greater at the B2 boundary than the Cheviot and B7 boundaries, it is assumed that 100% of energy generated throughout the year is constrained at the B2 boundary. Where the prevalence of constraints is less at the B2 boundary than the Cheviot however, it is assumed that an appropriate proportion of energy flows beyond the B2 boundary and contributes towards constraints at the Cheviot boundary. Likewise, where the prevalence of constraints is greater at the B7 boundary than the Cheviot, then it is again assumed that a proportion of energy flows beyond the Cheviot boundary and contributes towards constraints on the B7 boundary. Figure 3 represents this diagrammatically.

Figure 3 Low case constraints scenario



The high case scenario is applied in the same way, but assumes 0% overlap in the timing of constraints at each boundary. For example, where a proportion of energy flows beyond a boundary and contributes towards constraints at the next boundary, it is assumed that this energy contributes towards the constraints at that boundary for every hour in which that constraint is active throughout a year. Figure 4 represents this diagrammatically.

Figure 4 High case constraints scenario

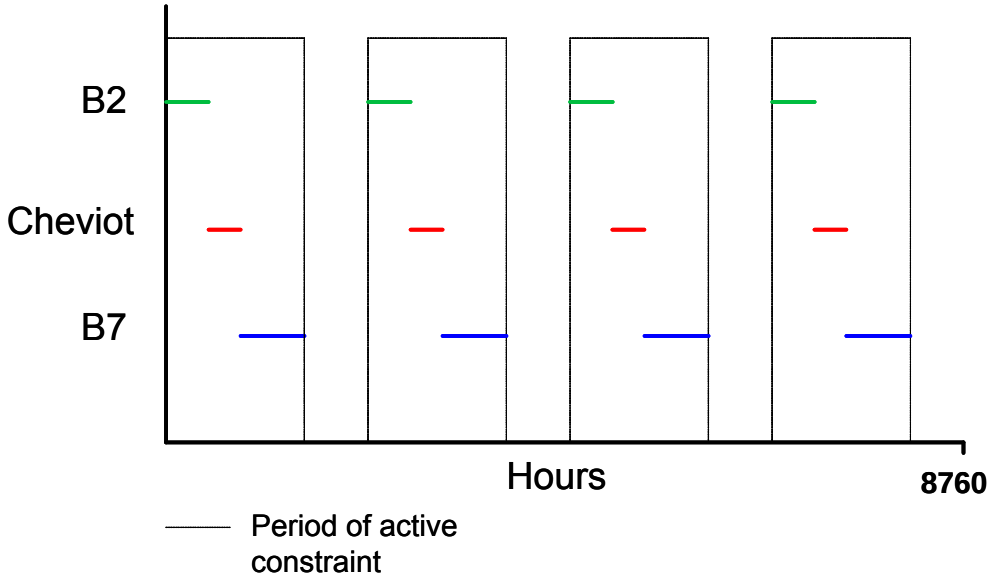


Table 4 identifies the prevalence of constraints at each of the boundaries for both scenarios, as a percentage of 8760 hours. For those years not studied specifically, results have been interpolated.

Table 4 Prevalence of constraints

Boundary	Scenario	Active constraints (%)							
		2010/11	*2011/12*	2012/13	*2013/14*	2014/15	*2015/16*	*2016/17*	2017/18
B2	High	42.8	*41.7*	40.8	*46.2*	52.6	*50.6*	*48.8*	47.3
	Low	25.9	*22.1*	18.6	*22.5*	32.6	*28.2*	*24.0*	20.9
Cheviot	High	34.8	*31.8*	28.9	*39.6*	50.1	*46.1*	*42.2*	38.2
	Low	27.8	*23.4*	19	*23.5*	33.3	*29.2*	*25.1*	22.0
B7	High	9.7	*10.9*	12.2	*24.4*	36.6	*31.3*	*26.1*	20.8
	Low	9.7	*10.9*	12.2	*24.4*	36.6	*31.3*	*26.1*	20.8

Table 5 identifies the average constraint costs calculated by the probabilistic model at each of the boundaries between 2010/11 and 2017/18, based on current levels of generator pricing, in addition to the annual volume of total generation (TWh) constrained at each of these boundaries. Again, for those years not studied specifically, results have been interpolated.

Table 5 Average constraint costs / volume

	2010/11	*2011/12*	2012/13	*2013/14*	2014/15	*2015/16*	*2016/17*	2017/18
B2 Cost (£/MWh)	85.70	*76.14*	66.58	*66.11*	65.64	*71.10*	*76.55*	82.01
B2 Volume (TWh)	0.21	*0.29*	0.36	*0.24*	0.11	*0.24*	*0.38*	0.51
Cheviot Cost (£/MWh)	97.59	*89.20*	80.82	*81.12*	81.43	*84.55*	*87.68*	90.80
Cheviot Volume (TWh)	1.10	*0.97*	0.85	*0.98*	1.11	*1.15*	*1.19*	1.23
B7 Cost (£/MWh)	102.44	*91.17*	79.90	*78.19*	76.47	*76.11*	*75.75*	75.39
B7 Volume (TWh)	0.25	*0.31*	0.36	*1.04*	1.71	*1.34*	*0.98*	0.62

Based on the prevalence of constraints identified in Table 4, and the average constraint costs identified in Table 5, Figure 5 compares the forecast cost of operational constraints at each boundary based on these parameters, with the carbon benefit identified in Table 3 on a £/MWh energy basis.

It should be noted that for the B7 boundary, a single set of results is provided for both the low and high case scenarios. This is due to the fact that a unit of energy located north of this boundary (but south of the Cheviot boundary) does not interact with constraints at the B2 or Cheviot boundaries which are considered in this piece of analysis. If the analysis was to be extended throughout Great Britain however,

generation in this location could exacerbate operational constraints on boundaries south of the B7, which may increase the results presented.

By 2017/18 it becomes necessary to take constraining actions on wind generation. As these volumes are relatively small at this stage however, this has been ignored in this analysis when calculating the carbon benefit.

Figure 5 Operational constraint costs Vs carbon benefit (£/MWh)

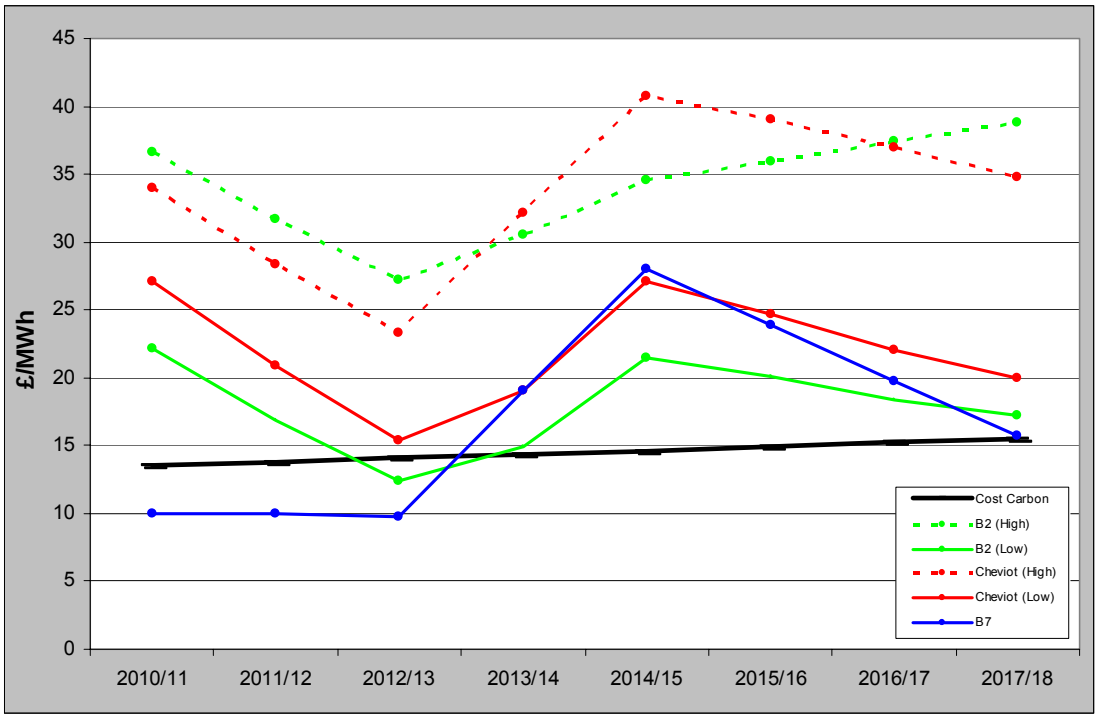


Figure 5 identifies that there are instances when the cost of carbon is greater than the cost of operational constraints, most notably on the B7 boundary in northern England as far out as 2012/13. Whilst other boundaries in England & Wales have not been included in this analysis, it is true that this is also the case in a number of regions where minimal hours of constraining actions are identified for the duration of the analysis.

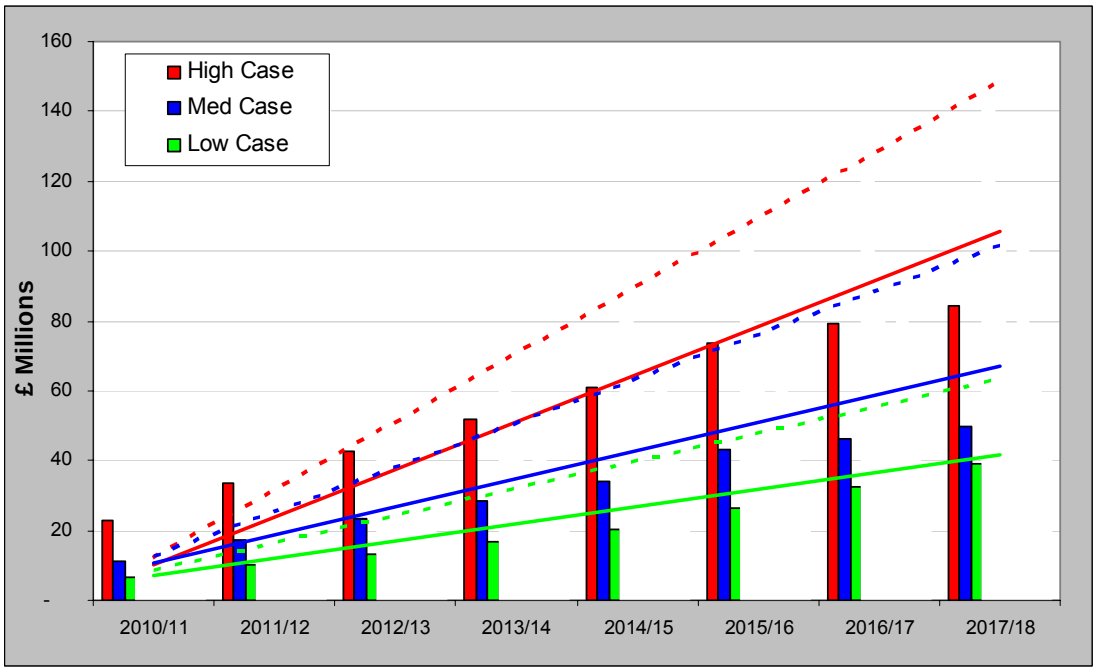
At the B2 and Cheviot boundaries however, Figure 5 identifies that even based on a low case scenario, the costs of operational constraining actions are significantly higher than the carbon benefit. Whilst the high case scenario is probably unrealistic due the fact that there is a likelihood that constraints at each of the B2, Cheviot and B7 boundaries would be prevalent simultaneously, the actual costs of constraints is likely the fall somewhere between the low and high case scenarios which in the majority of instances, is greater than the carbon benefit.

Figure 6 compares the absolute cost of operational constraining actions on a cumulative basis with the absolute cost of carbon presented in Figure 1. Each bar represents the cost of carbon for the high, medium and low CAP167 scenarios. The solid lines represent the cumulative costs of operational constraining actions for each scenario, based on the low case view of constraints. The dotted lines represent the cumulative costs of operational constraining actions for each scenario, based on the high case view of constraints.

Whilst the B7 boundary is not necessarily representative of the ENW distribution network, the Working Group forecasts of volumes of generation connecting in this DNO region have been used as the basis of the B7 analysis. It is important to note that the operational constraint costs of the volumes of generation included in the

analysis are based on the prevalence of constraints using the baseline scenario for generation. If such additional volumes of generation were to be included as part of the baseline, it is likely that this would have the impact of increasing the prevalence of active constraints. Nevertheless, this analysis represents a reasonable proxy for determining the costs of constraints.

Figure 6 Absolute cost of carbon Vs absolute constraint cost



5 Conclusion

Based on the results from this analysis, it is a reasonable conclusion to make that in some locations throughout Great Britain, the carbon benefit afforded by the connection of renewable SEPS will be greater than the cost of operational constraining actions. This is true for the earlier years of the analysis of the B7 boundary, and many boundaries throughout 'southern' Great Britain. In the application of CAP167, having undertaken an assessment of the impact of a SEPS on the cost of operational constraining actions on the transmission system, this will be reflected in the calculation of the threshold which determines when a Statement of Works is required from a DNO on behalf of a SEPS.

In locations where the prevalence of operational constraints is high however, such as the B2, Cheviot and B7 boundaries studied in the latter period of this analysis, it is reasonable to arrive at the conclusion that the operational costs of constraining actions will far outweigh the potential carbon benefit from connecting renewable SEPS in these locations. On this basis, the implementation of CAP167 should be viewed as being more efficient than the status quo from an economic and efficient perspective, having factored in the impacts on greenhouse gas emissions.

APPENDIX 1 Working Group Forecasts of SEPS

1a SHEPD

Generation Size	2008/9	2009/10	2010/11	2011/12	2012/13	*2013/14*	*2014/15*	*2015/16*	*2016/17*	*2017/18*
<= 2.5MW	19.4	22.1	6.4	16.0	16.0	*16.0*	*16.0*	*16.0*	*16.0*	*16.0*
>2.5MW & <=5.0MW	5.0	31.8	10.0	15.6	15.6	*15.6*	*15.6*	*15.6*	*15.6*	*15.6*
>5.0MW & <=7.5MW	7.5	7.5	7.5	7.5	7.5	*7.5*	*7.5*	*7.5*	*7.5*	*7.5*
>7.5MW & <=10.0MW	-	9.9	19.0	9.6	9.6	*9.6*	*9.6*	*9.6*	*9.6*	*9.6*
Total	**31.9**	**71.3**	**42.9**	**48.7**	**48.7**	***48.7***	***48.7***	***48.7***	***48.7***	***48.7***
Cumulative	**31.9**	**103.2**	**146.1**	**194.7**	**243.4**	**292.1**	**340.8**	**389.4**	**438.1**	**486.8**

1b SPD

Generation Size	2008/9	2009/10	2010/11	2011/12	2012/13	*2013/14*	*2014/15*	*2015/16*	*2016/17*	*2017/18*
<= 10MW	-	24.0	8.3	16.7	8.3	8.3	8.3	*10.6*	*10.6*	*10.6*
>10MW & <=20MW	-	14.0	34.0	34.0	51.0	34.0	34.0	*28.7*	*28.7*	*28.7*
>20MW & <=30MW	27.0	146.0	81.0	60.0	60.0	60.0	60.0	*70.6*	*70.6*	*70.6*
Total	**27.0**	**184.0**	**123.3**	**110.7**	**119.3**	***102.3***	***102.3***	***109.9***	***109.9***	***109.9***
Cumulative	**27.0**	**211.0**	**334.3**	**445.0**	**564.3**	**666.6**	**768.9**	**878.8**	**988.7**	**1,098.6**

1c ENW

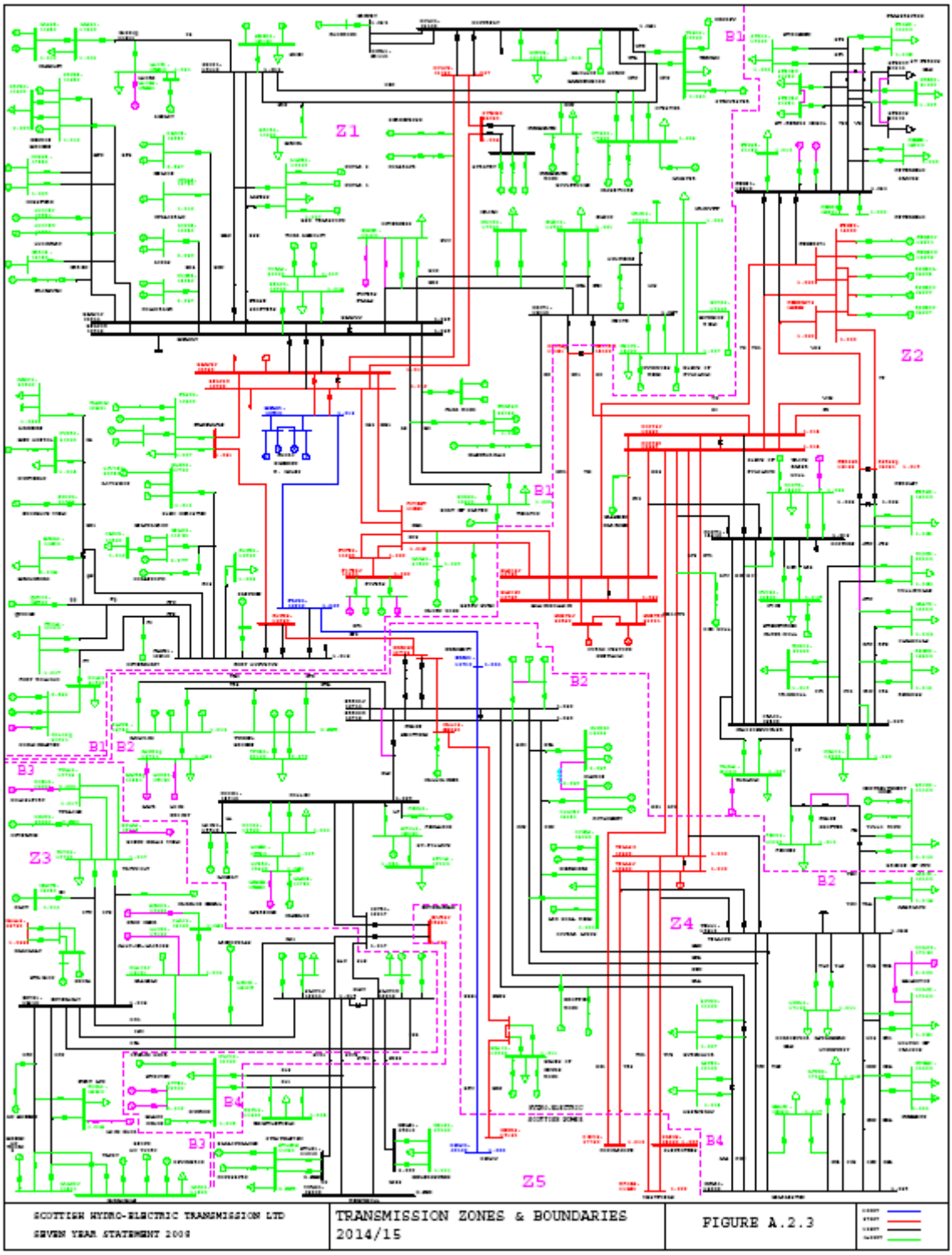
Generation Size	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
<= 15MW	14.0	14.0	48.0	48.0	48.0	48.0	48.0	97.0	97.0	97.0
>15MW & <=30MW	-	20.0	20.0	19.0	-	-	-	18.0	18.0	18.0
>30MW & <=50MW	-	-	-	30.0	-	-	-	-	-	-
Total	**14.0**	**34.0**	**68.0**	**97.0**	**48.0**	**48.0**	**48.0**	**115.0**	**115.0**	**115.0**
Cumulative	**14.0**	**48.0**	**116.0**	**213.0**	**261.0**	**309.0**	**357.0**	**472.0**	**587.0**	**702.0**

APPENDIX 2 Probabilistic Modelling Assumptions

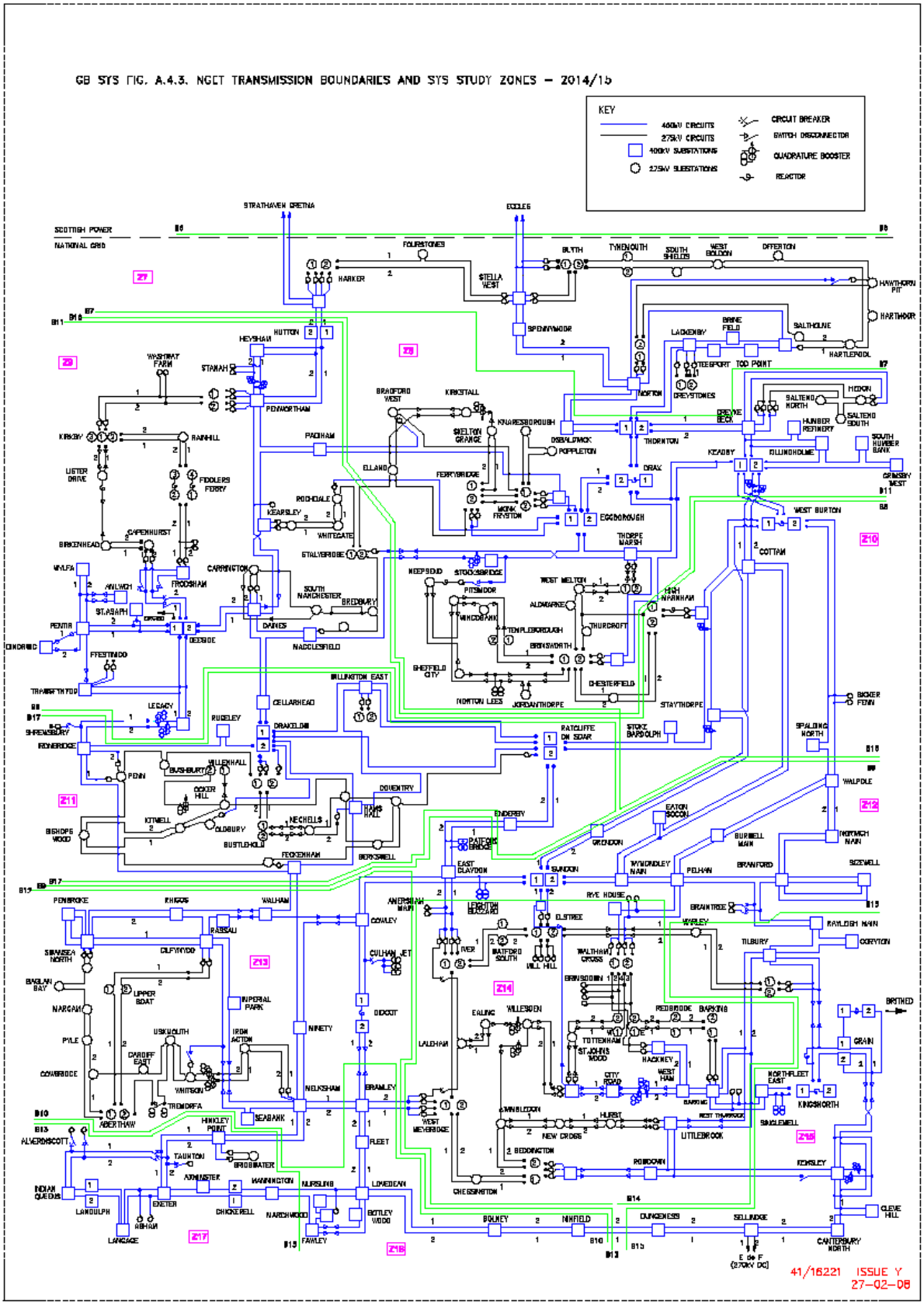
- SYS data taken from the TEC register between 2008/9 to 2014/15.
- Demand as per SYS.
- Consideration of LCPD plants factored in by removing from the background generation at 2015. No consideration taken into the capacity of LCPD affected plants between 2008/9 and 2015.
- Assume all nuclear AGR stations are granted a 5-year life extension.
- Assume all nuclear plant removed from the background generation at the end of their lifetime (after including additional 5 years for AGR station)
- Background developed with assumptions that plant ending in a certain year will not contribute capacity in the following year i.e. plant ending in 2015 will not contribute capacity in the year 2016/17.
- Data split into SYS study zones.
- Data in each SYS study zone categorised by generation type.
- Generation merit order per SYS study zone established by ranking plant according to generation fuel, using the merit order established in the GBSQSS consultation document (Review for onshore intermittent generation).
- Additional assumptions on the merit order:
    - CHP and thermal categorised with base gas; and
    - CCGT plant split between base gas and marginal gas based on the year of plant commission (i.e. any plant commissioned after mid-1997 assumed to be base gas)
- Capacity extrapolated from 2014/15 beyond (using trends between 2008 and 2015) by pro-rating wind only.
- All other generation types assumed to maintain the same capacity between 2014/15 and 2017/18 (after consideration of LCPD and nuclear drop-outs).
- Generator pricing as current levels.
- Generator volumes established using probabilistic analysis techniques as described in the SQSS consultation.
- Model uses the SQSS constrain model, see Annex 5 of *GBSQSS Consultations Document (Review for onshore intermittent generation)*
- Boundary capabilities based on SYS. Beyond 2014, 'pseudo reinforcements' established to maintain a near compliant system for the given background.
- B2 Boundary capabilities as follows:
    - Winter 2010 = 1500MW; Summer In = 1300MW; Out = 800MW
    - Winter 2012 = 2500MW; Summer In = 1300MW; Out = 800MW
    - Winter 2014 = 2500MW; Summer In = 2200MW; Out = 1500MW
    - Winter 2017 = 3200MW; Summer In = 2200MW; Out = 1500MW
- Cheviot capabilities as follows:
    - Winter 2010 = 2200MW; Summer In = 2000MW; Out = 1600MW
    - Winter 2012 = 3200MW; Summer In = 2400MW; Out = 2000MW
    - Winter 2014 = 3200MW; Summer In = 2800MW; Out = 2400MW
    - Winter 2017 = 4000MW; Summer In = 3500MW; Out = 3000MW
- B7 capabilities as follows:
    - Winter 2010 = 3400MW; Summer In = 3000MW; Out = 2500MW
    - Winter 2012 = 4000MW; Summer In = 3500MW; Out = 3000MW
    - Winter 2014 = 4000MW; Summer In = 3500MW; Out = 3000MW
    - Winter 2017 = 4000MW; Summer In = 3500MW; Out = 3000MW

APPENDIX 2 SYS Boundaries

SHETL



NGET


GB SYS FIG. A.4.3. NGET TRANSMISSION BOUNDARIES AND SYS STUDY ZONES – 2014/15
KEY
400kV CIRCUITS
275kV CIRCUITS
400kV SUBSTATIONS
275kV SUBSTATIONS
CIRCUIT BREAKER
SWITCH DISCONNECTOR
QUADRATURE BOOSTER
REACTOR
SCOTTISH POWER
NATIONAL GRID
Z7
Z8
Z9
Z10
Z11
Z12
Z13
Z14
Z15
Z16
Z17
Z18
41/16221 ISSUE Y
27-02-08

ANNEX 9 – MEETING 2 PRESENTATION SLIDES

CAP167

Definition of a threshold(s) associated with a request for a Statement of Works

11 July 2008

nationalgrid

CAP167
Agenda

- Statement of Works Process
- CAP167
- Materiality of the defect on operational costs
  - Cheviot boundary
  - Within Scotland
  - England & Wales
- Transmission investment costs
- Significant impact?
  - Initial thoughts

nationalgrid

Statement of Works

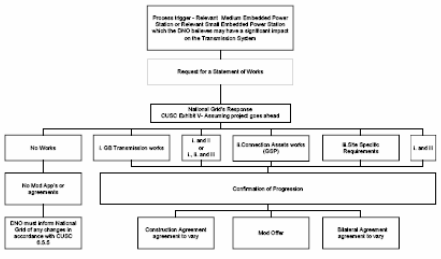
nationalgrid

CAP167
Statement of Works

- CAP097: "Revisions to the Contractual Requirements for Small and Medium Embedded Power Stations"
  - Raised by National Grid in June 2005
  - Following a Working Group Report and Consultation, CAA2 was approved by the Authority in June 2006
  - Requiring the DNO to make a request for a Statement of Works from National Grid in respect of all proposed medium sized embedded generators (<100MW and =>50MW NGET)
  - For proposed small generators, request for Statement of Works required where DNO believes that a proposed small generation project may have a significant impact on the GB transmission system (NGET <50MW, SPT <30MW, SHETL <10MW)

nationalgrid

CAP167
Statement of Works – process



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CAP167
Statement of Works – example (1)

- There are three types of works which may be included within a Statement of Works and are detailed below:

1. Examples of works required on the GB Transmission System
   - Upgrade to an overhead line
   - Installation of reactive compensation – SVC's and MSC's
   - Switchgear replacement / up-rating
2. Examples of works required on Connection Assets
   - Installation of additional transformer capacity
   - Switchgear up-rating

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CAP167
Statement of Works – example (2)

3. Examples of Site Specific Requirements
   - Details of operational metering in accordance with Grid Code CC6.4.4 and CC6.5.6
   - Details of any technical, design and operational criteria in accordance with Grid Code e.g. Power system stabilisers, Voltage requirements etc Grid Code CC6.3.8

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CAP167
Statement of Works – current experience

- 28 applications for SoW since 1st January 2007
- 13 of those applications works has been identified
- Applications were from:
  - North East
  - North West
  - South East
  - Southern Scotland
  - South West
- Majority of applications are from Southern Scotland

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CAP167

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CAP167
Where are we now?

- In decision letter, Ofgem:
  - expressed concern that the DNO would not necessarily have access to sufficient information to form an accurate view of the impact that a proposed embedded power station may have on the GB transmission system
  - Noted that there is an established interface between National Grid and the DNO's and it should therefore be possible for all parties to agree circumstances that are likely to have a significant impact
- In practice, this has not been the case
  - CAP167

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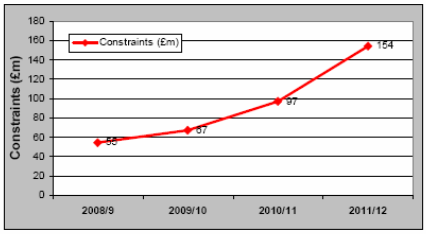
CAP167
Materiality of the defect – Cheviot (1)



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CAP167
Materiality of the defect – Cheviot assumptions

- Merit position, hence unconstrained generation of each major power station in Scotland is considered at 24 demand conditions throughout the year
- Cheviot boundary capability modelled for three seasons, namely:
  - 2200MW in Winter
  - 2000MW in Summer (intact)
  - 1200MW in Summer (outage)
- Forecasts assume:
  - Current levels of conventional plant
  - 29% load factor for wind
  - Mixture of inter-trip and Bid-Offer constraint prices averaging £45-50/MWh £/MWh (mild against recent experience of constraints of this severity)
  - Continuing Cheviot reinforcement outages of 26 weeks every summer

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CAP167
Materiality of the defect – Cheviot (2)

- Incremental constraint is approximately 750GWh for each GW of wind
  - For 25% of the time wind generates, there will be a constraint on conventional plant
- Resulting volumes and costs of Cheviot constraints against growing wind capacity in Scotland are as follows:

Year	Wind	Constraints	Cost
2008/9	1500MW	1200GWh	£55m
2009/10	1800MW	1500GWh	£67m
2010/11	2700MW	2100GWh	£97m
2011/12	3800MW	3200GWh	£154m

- Not studied beyond 2011/12 but given future commissioning of wind post Beauly-Denny, believe that constraints of this order are likely to continue
- Each extra MW of wind capacity increase Cheviot constraints by £40k
  - Constraint price of £40/kW

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CAP167
Materiality of the defect – within Scotland

- Studies applied a generic average of 8 weeks of boundary circuit outage across each summer
- SYS B1 Boundary (enclosing NW of SHETL)
  - +240MW of wind costs +£30m of constraints (~£125/kW)
- SYS B2 Boundary (SHETL North-South)
  - +360MW of wind costs +£14m of constraints (~£40/kW)
- SYS B5 Boundary (SHETL + Longannet)
  - Currently subject to protracted reinforcements
  - Less clear-cut that it will cause constraints of similar order between 2009-2015

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CAP167
Transmission investment allowances

NGET	Wider (£/kW)
South & South West	0
Thames Estuary	60
London	0
South Wales	25
East of England & Home counties	65
West Midlands	0
East Midlands	55
North West & North Wales	45
Yorkshire & Lincolnshire	60
North East	50

NGET Wider investment average = £51.43/kW

	BASELINE			REVENUE DRIVER
	Volume (MW)	Allowance (£m)	Unit cost (£/kW)	Unit cost (£/kW)
SPTL	1,734	94.4	54.44	52
SHETL	1,489	35.4	23.77	32

- Separate revenue driver for transfer capability across Scotland-England boundary of £275/kW

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Materiality - Summary

	Constraint cost (£/kW) Per annum	Investment cost (£/kW)	Annuitised investment cost (£/kW)
SYS B1 boundary	125	32	2.85
SYS B2 boundary	40	32	2.85
Cheviot boundary	40	275	24.46

- Illustrative, to the extent that it is not possible to install +1kW of capacity
- Cost of constraints significantly higher than the annuitised cost of investment

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Significant impact?

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CAP167
Significant impact – Initial thoughts?

- CUSC 6.5.5.7 values significant impact as £10,000 expenditure
  - Clearly inappropriate
  - When a constraint is active, daily spend averages £10-100k.
- When assembling constraint forecast for a year, each constraint group is forecast to the nearest £100k
- For E&W, a typical annual forecast of £20m is spread amongst 20 constraint groups
- Accordingly, of £500k for **one constraint** might be considered significant by National Grid
  - A constraint of 500MW depth occurring for 10hrs at a high constraint price of £100/MWh; or
  - A constraint of 50MW depth occurring for 10hrs/day over 20 days at a milder constraint price of £50/MWh

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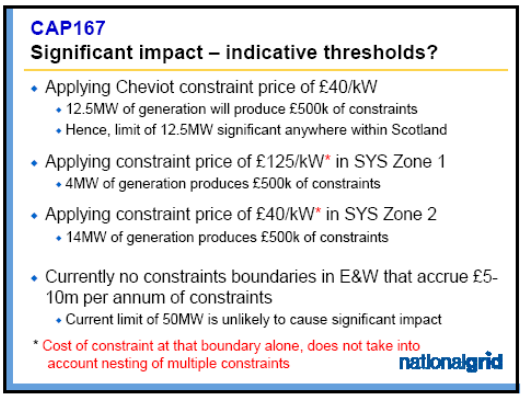
CAP167
Significant impact – indicative thresholds?
Applying Cheviot constraint price of £40/kW
12.5MW of generation will produce £500k of constraints
Hence, limit of 12.5MW significant anywhere within Scotland
Applying constraint price of £125/kW* in SYS Zone 1
4MW of generation produces £500k of constraints
Applying constraint price of £40/kW* in SYS Zone 2
14MW of generation produces £500k of constraints
Currently no constraints boundaries in E&W that accrue £5-10m per annum of constraints
Current limit of 50MW is unlikely to cause significant impact
* Cost of constraint at that boundary alone, does not take into account nesting of multiple constraints
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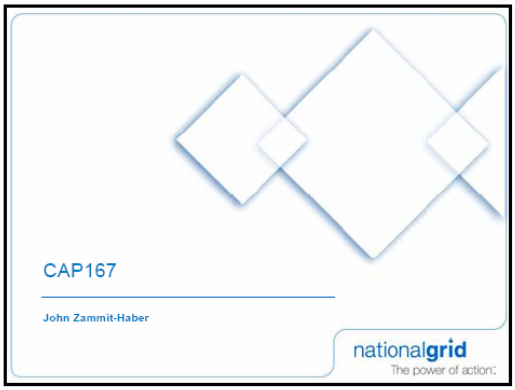
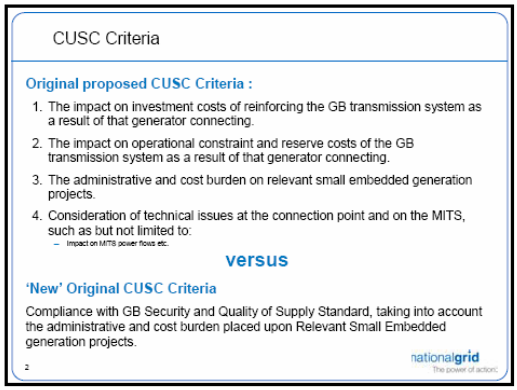
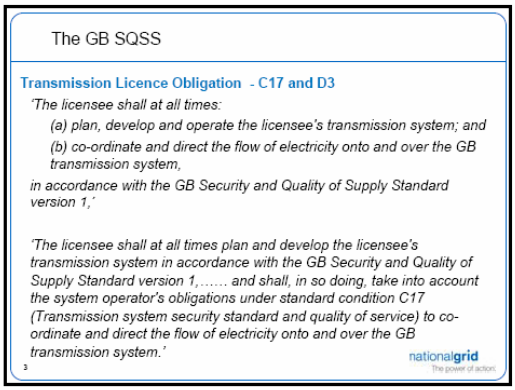
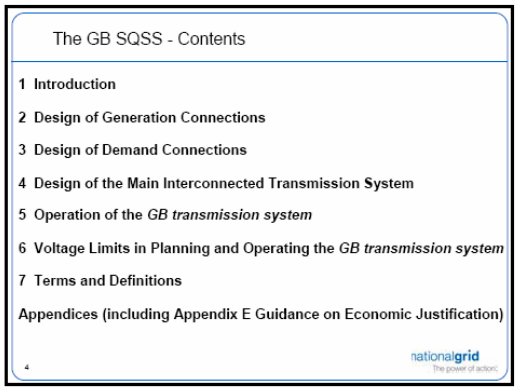
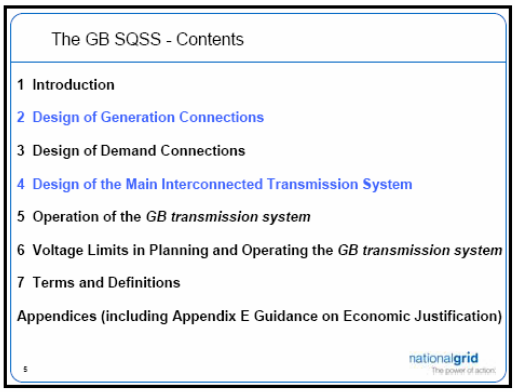
ANNEX 10 – SQSS / ORIGINAL AMENDMENT PRESENTATION SLIDES

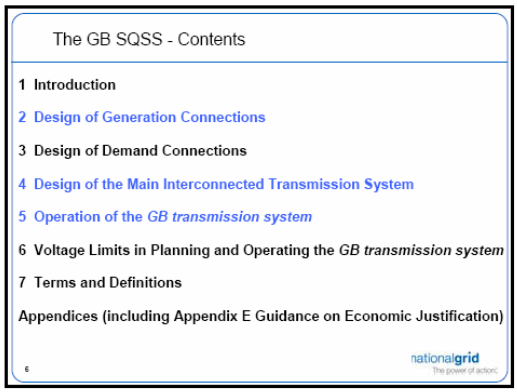












The GB SQSS - 2 Design of Generation Connections

'The criteria in this section will also apply to the connections from a GSP to the GB transmission system by which power stations embedded within a customer's network (e.g. distribution network) are connected to the GB transmission system.'

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Principle behind setting the thresholds

To connect as much embedded generation without breaching the Transmission Licences i.e. retaining compliance with the GB SQSS.

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Why refer to GB SQSS

The impact on investment costs of reinforcing the GB transmission system as a result of that generator connecting.

- Use criteria in chapters 2 and 4 of GB SQSS to determine non – compliance and therefore the required reinforcements.

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Why refer to GB SQSS

The impact on operational constraint and reserve costs of the GB transmission system as a result of that generator connecting.

- Use criteria in chapters 5 of GB SQSS determine what events the system needs to be secured against.
- GB SQSS compliance provides an economical and efficient balance between Capital and Operational costs.
- Non compliance can incur significant additional operational costs, which could be deemed uneconomic and inefficient.

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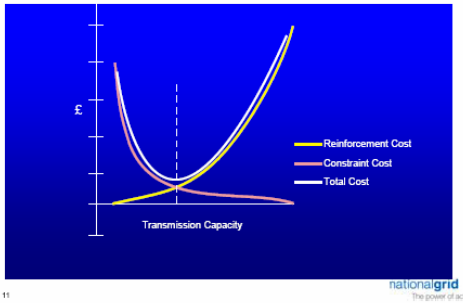
Why refer to GB SQSS



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Why refer to GB SQSS

Consideration of technical issues at the connection point and on the MITS, such as but not limited to:

- Impact on MITS power flows.
- Local demand.
- Impact of generation on Supergrid Transformer circuit outages.
- Voltage / voltage step change issues.
- Fault levels.
- Stability.

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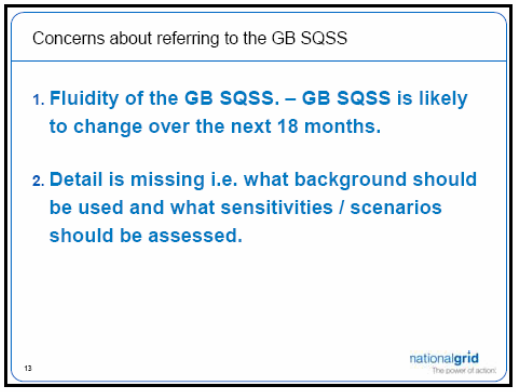
Concerns about referring to the GB SQSS
1. Fluidity of the GB SQSS. – GB SQSS is likely to change over the next 18 months.
2. Detail is missing i.e. what background should be used and what sensitivities / scenarios should be assessed.
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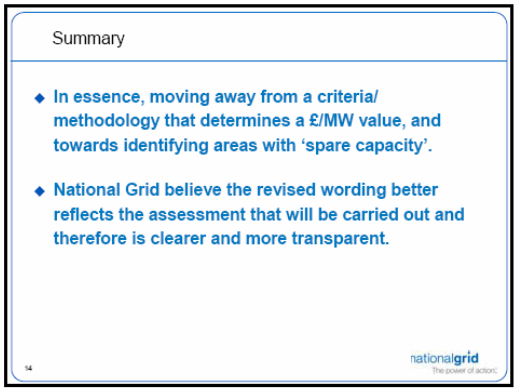
Summary
◆ In essence, moving away from a criteria/ methodology that determines a £/MW value, and towards identifying areas with 'spare capacity'.
◆ National Grid believe the revised wording better reflects the assessment that will be carried out and therefore is clearer and more transparent.
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