

# **CONSULTATION DOCUMENT**

**GB ECM-24**

**Modification proposal to the Transmission Network  
Use of System Charging Methodology to update  
charging arrangements associated with Offshore  
Transmission Networks**

**April 2010**

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## 1. Executive Summary

- 1.1 This consultation document sets out National Grid's proposals for an update to the charging arrangements for offshore transmission networks.
- 1.2 These updates include clarifications of the methodology and its application in line with modification proposal GBECM-08 (Option 1) which was not vetoed by the Authority in March 2009.
- 1.3 In addition, this consultation puts forward proposals for methodology changes associated with charging arrangements for offshore transmission networks that have not previously been consulted upon, which National Grid believe better meet the relevant transmission licence objectives.
- 1.4 The need for an update has predominately arisen out of the receipt of more detailed information about actual offshore projects by National Grid that was not available at the time of GB ECM-08 and difficulties that have arisen in the subsequent practical application of this information within the existing methodology.
- 1.5 The clarifications proposed within this consultation are:
  - Inclusion of interest during construction and project overheads into offshore asset values used to allocate OFTO revenues between chargeable assets in the same proportion as those asset values, unless better information is provided;
  - Inclusion of costs that are not attributable to a recognised asset category within the methodology into recognisable asset components (i.e. transformer, switchgear, etc.) by pro-rating on the basis of asset value, unless better information is provided;
  - Inclusion of text in the methodology that explicitly outlines the previously approved approach (as part of GB ECM-08) that HVDC converter costs will be included as part of the local circuit component of the tariff for those projects utilising HVDC technology.
- 1.6 The changes to the methodology proposed within this consultation are:
  - Revision of the method utilised for deriving the platform rating used in the offshore substation local tariff calculation from adopting the 'higher' of the switchgear or transformer ratings to the 'lower' of the two;
  - Outline explicitly that the cost of asset spares will be added to the component of offshore revenue with which it is associated for the purposes of calculating the offshore tariff;
  - Revision of the methodology associated with offshore circuit expansion factors in order to introduce harmonic filter equipment into the offshore local circuit revenue;
  - Introduction of a pass through of any historic DNO capital contributions that from part of the OFTO's tender revenue stream through Embedded Transmission Use of System (ETUoS) charges for transitional projects where relevant;
  - Revise the methodology associated with ETUoS charges to allow for the pass through of distribution charges not applied on the basis of a generators capacity (i.e. TEC).

- 1.7 Furthermore, this consultation also presents options for the treatment of operational costs associated with reactive compensation equipment provided by the OFTO at the onshore interface point as a condition of Section K of the SO-TO Code.
- 1.8 Exclusion of the incremental operational costs (not including losses) which would be incurred as a direct result of the despatch of reactive power from the calculation of the expansion factor for the local circuit component of the offshore generation tariff is proposed.
- 1.9 It is National Grid's intention to raise a separate conclusions report for the treatment of operational costs associated with reactive compensation in order to avoid any negative interactions with the other proposed clarifications and modifications.
- 1.10 National Grid welcomes all industry views on these proposals as well as any alternatives.
- 1.11 This document has been published under GB ECM-24 on the National Grid charging website at the following address:

<http://www.nationalgrid.com/uk/Electricity/Charges/modifications/uscmc/>

## 2. Introduction

- 2.1 As the transmission licensee, authorised to co-ordinate and direct the flow of electricity onto and across the transmission system within Great Britain, National Grid has duties under the Electricity Act to develop and maintain an efficient, co-ordinated and economical transmission system and to facilitate competition in generation and supply.
- 2.2 Along with these high level duties, National Grid is obliged under its transmission licence:
- (i) to keep the Use of System Charging and Connection Charging Methodologies at all times under review
  - (ii) to make such modifications of the Use of System Charging Methodology as may be requisite for the purpose of better achieving the relevant objectives, which are:
    - (a) to facilitate effective competition in generation and supply;
    - (b) to result in charges which reflect, as far as reasonably practicable, the costs incurred by transmission licensees in their transmission businesses;
    - (c) in so far as is consistent with a) and b) above, as far as reasonably practicable, they properly take account of the developments in transmission licensees' transmission businesses.
  - (iii) to make such modifications of the Connection Charging Methodology as may be requisite for the purpose of better achieving the relevant objectives, which are:
    - (a) to facilitate effective competition in generation and supply;
    - (b) to result in charges which reflect, as far as reasonably practicable, the costs incurred by transmission licensees in their transmission businesses;
    - (c) in so far as is consistent with a) and b) above, as far as reasonably practicable, they properly take account of the developments in transmission licensees' transmission businesses;
    - (d) in so far as is consistent with a), b) and c) above, of facilitating competition in the carrying out of works for connection to the GB transmission system.
- 2.3 In addition to the relevant objectives above, the transmission licence also prohibits National Grid from discriminating against any User or class of Users unless such different treatment reasonably reflects differences in the costs of providing a service.

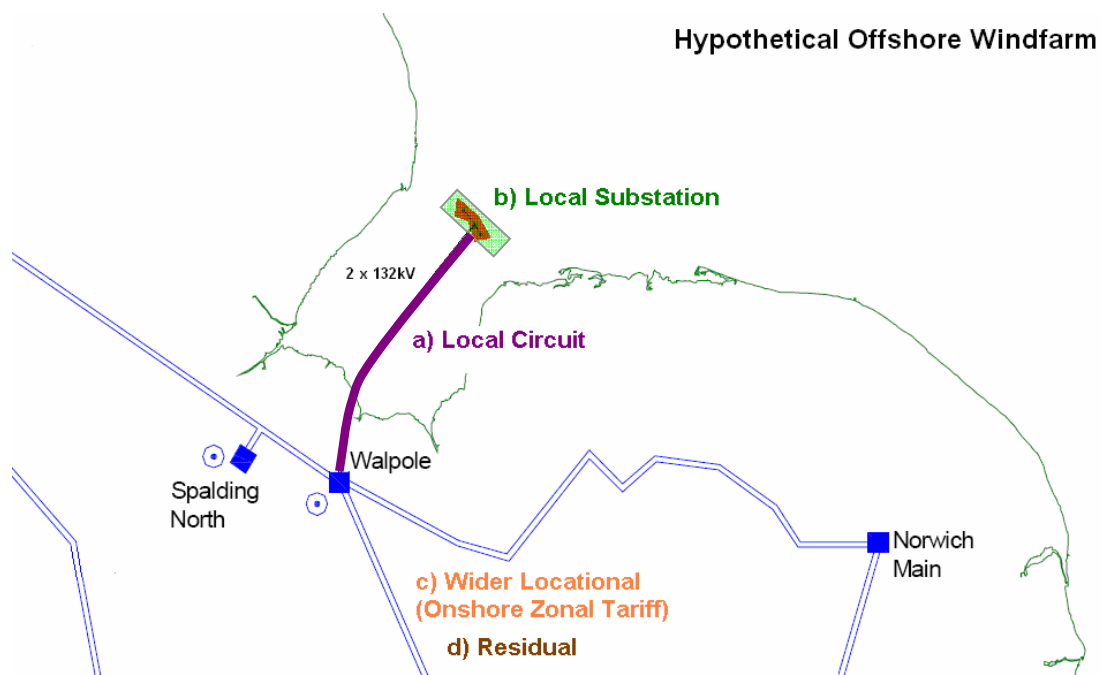
- 2.4 Before making a modification to the Use of System Charging or Connection Charging Methodology, National Grid is also required by the transmission licence to consult with CUSC Users on the proposed modification and allow them a period of not less than 28 days within which to make written representations.
- 2.5 The purpose of this document is to set out for consultation National Grid's proposals for updates to the charging arrangements for offshore transmission networks, which have applied since the activation of the regulatory regime for offshore transmission in June 2009.
- 2.6 These proposals take the form of both straightforward clarifications to established arrangements in order to ensure transparency in the way they are applied in practice and proposed modifications to the arrangements with a view to better meeting the relevant transmission licence objectives set out above.

### 3. Background

- 3.1 The introduction of the Offshore Transmission regime will create a number of Offshore Transmission Owners (OFTOs) responsible for building, owning and maintaining offshore transmission assets. The resulting OFTO agreed revenue will be passed to the industry through Transmission Network Use of System (TNUoS) tariffs.
- 3.2 In the development of a competitive offshore regulatory regime Ofgem proposed that the current licence driven approach applied onshore would be an appropriate basis for developing offshore charging arrangements. As the designate offshore system operator National Grid has worked closely with Ofgem in developing the necessary changes to the industry framework to facilitate this regime, including those changes required to include charging for Users connected to offshore transmission networks.
- 3.3 In July 2007 National Grid issued a pre-consultation document<sup>1</sup> discussing the main issues that would need to be addressed in order to extend the application of the onshore charging regime offshore, followed by a consultation document<sup>1</sup> in December of that year setting out proposals to modify the Use of System Charging Methodology to implement a charging regime offshore. Subsequently, supplementary development was highlighted as being required and, after additional analysis and impact assessment, a further consultation document<sup>1</sup> was published by National Grid setting out final proposals in December 2008. This was followed, in the same month, by a conclusions report<sup>1</sup> to the Authority.
- 3.4 On the 30<sup>th</sup> of March 2009, Ofgem published their decision<sup>1</sup> not to veto National Grid's proposals as outlined in the aforementioned conclusions report, considering that the proposals had "a positive competitive effect".
- 3.5 The key features of these proposals included:
- i) The extension of the concept of transmission 'local' and 'wider system' infrastructure assets, the costs of which are recovered under the TNUoS charging methodology.
  - ii) The extension of the application of existing principles in defining the boundary between 'local' and 'wider' infrastructure assets for the purposes of TNUoS charges.
  - iii) The CUSC and STC will continue to set out 'customer choice' in defining the ownership boundary between generation circuits and the point of connection to the transmission network offshore. Subject to the conditions outlined in the NETS SQSS, this boundary can be set by agreement between NGET and the generator.
  - iv) The TNUoS charges for both onshore and offshore generation will continue to be levied on the basis of their booked capacity (i.e. currently, Transmission Entry Capacity) and both the offshore and onshore TNUoS tariff are structured to include the four charge elements, shown in Figure 1, below.

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<sup>1</sup> All documents relating to the development of offshore charging arrangements to date are available on National Grid's website under GB ECM-08 at: <http://www.nationalgrid.com/uk/Electricity/Charges/modifications/uscmc/>



**Figure 1 – Elements of Offshore TNUoS Tariff**

- a) 'Local' circuit charge – relating to the cost of transmission infrastructure assets used by generators to connect to the MITS that will form part of the calculation of the specific expansion factor (includes the cable, reactive compensation and HVDC converters)
  - b) 'Local' substation charge – relating to the unit costs of the local infrastructure substation assets required for each connection (includes the transformer, switchgear and platform)
  - c) 'Wider' locational charge – calculated on the basis of zonal averaging approaches and the generic cost base for carrying unit power over a unit distance (i.e. the expansion constant)
  - d) Residual charge – comprising the residual non-locational element that ensures that the total income from TNUoS charges recover the relevant allowed revenue for all onshore and offshore transmission licensees (includes all elements of TO revenue not associated with locational assets)
- v) The majority of assets forming part of the offshore transmission network will be categorised as 'local' and recovered from the local circuit and local substation elements of the tariff. These will be derived using the same principles as under the onshore arrangements whilst including the introduction of specific details necessary for calculating offshore tariffs.
- a) Local circuit expansion factors and local circuit security factors will be defined for each OFTO.
  - b) The local substation tariff would be based on both assets located on each OFTO platform and the offshore platform itself, but will contain a discount to reflect the fact that the onshore substation tariff does not include civil costs.
  - c) The wider locational and residual tariffs are based on the existing calculation method.
- vi) Offshore generation will be added into the Transport & Tariff model in order to reflect its impact on the onshore transmission network.

- vii) The current split of revenue recovery between generation and demand (27%/73%) will be unchanged.
- viii) For offshore transmission networks connecting directly to a distribution network onshore, the NETSO will be responsible for payment of charges for the connection to and use of the distribution network. This cost will be recovered directly from offshore generators through an Embedded Transmission Use of System (ETUoS) charge.
- 3.6 As outlined above, National Grid has previously consulted upon charging arrangements for offshore transmission networks and subsequently modified the methodology upon the non-veto of one of the options within the conclusions report by the Authority.
- 3.7 These arrangements were largely built upon the premise that offshore charging remain consistent with onshore charging as far as practicable and reasonable. Where offshore charging arrangements are not wholly consistent with those onshore, these differences are due mainly to the need to take into account the following physical differences between onshore and offshore transmission:
- Compared with onshore, offshore connections have a higher capital cost; and
  - Compared to onshore, there is a wider variation in the size, cost and design of individual projects.
- 3.8 Following receipt of more detailed information about actual offshore projects that was not available at the time GB ECM-08 was developed, assessment of this information coupled with the differences outlined in 3.7, above, has led to the need for further revisions to the Use of System Charging Methodology.
- 3.9 When it has come to applying the methodology and utilising this data in practice, it has become clear that there are some areas that would benefit from clarification and modest revision of the methodology as well as other areas where the existing policy requires revision in order to best meet the relevant objectives.
- 3.10 The following clarifications and modifications are therefore brought forward in line with National Grid's obligation to keep the charging methodology under review.
- 3.11 Section 4 outlines issues that National Grid believe to be clarifications to existing policy and Section 5 outlines issues that are considered to be revisions or additions to existing policy. Section 6 proposes a solution to the treatment of operational costs for reactive power provision at the onshore interface point as highlighted in the conclusions report of GB ECM-08.

## 4. Proposed Clarifications

### Description of Proposed Clarifications

- 4.1 As National Grid has embarked upon requesting the necessary information from offshore developers for transitional projects and begun to implement the offshore charging methodology in earnest, the need for clarification of how the policy would be applied in some areas has emerged.
- 4.2 The clarifications, outlined below, predominately arise out of the potential for perceived ambiguities within the methodology as approved under GB ECM-08. In this section National Grid is seeking to remove any ambiguity, such that the application of the methodology in practice is transparent to all users of the transmission network and other relevant stakeholders.
- 4.3 Whilst National Grid believes that the clarifications contained within this section are useful in terms of increasing the transparency of how the charging methodology will be applied offshore, they are believed to be wholly consistent with the policy approved by the Authority on the 30<sup>th</sup> of March 2009.
- 4.4 Specifically, in its application of the methodology, National Grid will seek to expose individual users to the cost implications of their decisions as this will enable those parties to make efficient decisions on the location and design of their connection.
- 4.5 Consistent with the approach outlined in 4.4, National Grid is proposing to clarify the following elements of how the Use of System Charging Methodology will be applied in practice for offshore users:
  - i) The treatment of interest during construction (IDC) and project overheads for the purposes of calculating offshore tariffs;
  - ii) The treatment of offshore asset values and associated costs classified as 'Other' by developers of transitional projects in response to the information request circulated by National Grid;
  - iii) Through a revision of the text associated with offshore expansion factors, explicitly include the cost associated with converter stations into the local circuit component of the offshore tariff for HVDC connections.
- 4.6 The proposed changes to the text of the methodology also take the opportunity to replace the reference to the GBSO with National Electricity Transmission System Operator (NETSO), in order to retain consistency with other framework codes modified in the implementation of the offshore regime. Eight references are to be changed in total.
- 4.7 These proposals are described in more detail below, and proposed drafting of the required modifications to the Statement of the Use of System Charging Methodology are included as Appendix 1.
  - i) **Treatment of IDC and Project Development Overheads**
- 4.8 Both offshore and onshore tariffs are constructed in such a way as to signal the cost of providing incremental capacity to those connecting to the transmission network at a particular location. This is consistent with the relevant objectives of the Use of System Charging Methodology.

- 4.9 As outlined above, the offshore charging arrangements were developed on the premise that they remain consistent with charging onshore as far as practicable and reasonable.
- 4.10 The transmission price controls of onshore transmission owners (TOs) do not include a specific allowance for interest during construction (IDC), as TOs are typically funded for capital expenditure during construction. Accordingly all project financing costs are included within the allowed rate of return, as no other financing costs are provided for in the allowed revenue. The allowed return is a component of the annuity factor, which is used to convert the cost of capital projects into expansion factors representing the annual marginal cost of network expansion. Hence, all onshore project financing costs are reflected locationally through the onshore tariff.
- 4.11 Conversely, the offshore allowed revenue includes project financing costs during construction, as these costs are part of the transfer value of the offshore network and not allowed during construction as is the case onshore. As these costs are part of delivering incremental capacity offshore, it is National Grid's view that they should also be reflected locationally through the offshore tariff.
- 4.12 As a result, in calculating offshore tariffs, National Grid will include the cost of IDC in the offshore asset values, ensuring that they are included in the locational signal. Where any IDC costs are not specifically attributable to a specific asset category they will be pro-rated across the various categories on the basis of the relative cost of each.
- 4.13 Project development overheads such as leases, surveys, design, project management and other similar costs will be treated in the same manner as IDC, above, as these costs are project specific and incurred only to provide incremental transmission capacity offshore and therefore should be included in the locational signal.
- 4.14 It is National Grid's view that asset values are a good proxy of how to target both IDC and project development overheads where more specific information is not available and that this approach remains consistent with the Authority's decision on GB ECM-08 and the principle outlined in 4.4, above.
- 4.15 National Grid does not believe that there are any revisions to the Use of System Charging Methodology required for this clarification.
- ii) Treatment of costs classified as 'Other' by developers of transitional projects**
- 4.16 For offshore generation projects that have passed crucial milestones in their development and as a result are the first to transition onto the offshore regime through the initial tender rounds, National Grid has had to request the necessary information for calculating charges from developers.
- 4.17 National Grid welcomes the involvement and level of engagement of developers to date in this process. Despite good intentions, the responses from developers to this information request have been mixed in terms of the quality and granularity of data provided. In particular, National Grid notes that a surprisingly large amount of cost is being lumped into an 'Other' category in some instances. Often these costs were largely comprised of IDC and project development overheads.

- 4.18 This does not align with the intention of this category in the data request, which was simply to allow for a small proportion of the overall costs that were not attributable to a particular asset or category of expenditure by developers to be declared in their submissions.
- 4.19 In addition, the original approved methodology did not feature an 'Other' category of asset. Therefore National Grid believes that the majority of these costs should be attributable to a specific asset category. In light of further guidance provided on how to value assets and associated costs, National Grid expects that there will be less need to use this category.
- 4.20 Where some costs remain unable to be more appropriately allocated elsewhere, these will be pro-rated across the various asset categories on the basis of the relative cost of each in accordance with the principle outlined in 4.4, above.
- 4.21 National Grid does not believe that there are any revisions to the Use of System Charging Methodology required for this clarification.

**iii) Inclusion of HVDC Converter Stations into Methodology Text**

- 4.22 The conclusions report for GB ECM-08 proposed:

*"The cost of offshore HVDC links are to be recovered through specific expansion factors, including the cost of converter stations, consistent with the proposed process for offshore AC circuits."*

- 4.23 The reasoning behind this methodology for the recovery of OFTO revenue associated with HVDC converters took into consideration:
- i) The fact that HVDC links differ from their AC equivalent as a converter station is required at either end of the link in addition to the generic AC substation assets;
  - ii) Converter stations are interactive with the cost of the associated cable (i.e. the cable cost per km is lower when this technology is employed) and therefore the use of a generic expansion constant would lead to projects farther from the shore subsidising those with closer connections;
  - iii) The relative size of the annuitised cost of an HVDC converter at £9.2/kW – £22.8/kW (utilised by OTEG) far outweighs the generation TNUoS residual of £3.48/kW in 2010/11.
- 4.24 National Grid proposes to revise the text associated with offshore expansion factors so that offshore circuit revenue associated with HVDC connections explicitly includes the revenue of the necessary converter stations, reflecting the position previously consulted upon and endorsed by the Authority under GB ECM-08.
- 4.25 The necessary revisions to the text of the Methodology are included in Appendix 1.

## 5. Proposed Modifications

### Description of Proposed Modifications

5.1 In addition to the clarifications outlined in section 4, National Grid is also proposing the following modifications to the Use of System Charging Methodology:

- i) Revise the method utilised for arriving at the platform rating (in kW) within the offshore substation local tariff calculation;
- ii) Outline explicitly the treatment of asset spares for the purposes of calculating the offshore tariff;
- iii) Include harmonic filter equipment in the offshore local circuit cost used to determine offshore circuit expansion factors;
- iv) Introduce a pass through of any historic DNO capital contributions that from part of the OFTO's tender revenue stream through ETUoS charges for transitional projects where relevant;
- v) Revise the methodology associated with the pass through of distribution charges not calculated by the DNO on the basis of a generators capacity (i.e. TEC) through ETUoS.

5.2 These proposals are described in more detail below, and proposed drafting of the required modifications to the Statement of the Use of System Charging Methodology are included as Appendix 1.

#### **i) Platform Rating for Calculation of Offshore Substation Local Tariff**

5.3 The offshore substation tariff is the sum of transformer, switchgear and platform components. Each component is made up of the ratio of OFTO revenue (£) and post-fault continuous rating associated with the transformers, switchgear and the platform (kW) to arrive at a £/kW tariff.

5.4 Currently, the rating of the platform component is determined as the higher of the transformer and switchgear ratings.

5.5 National Grid is proposing that the platform rating be determined as the lower of the transformer and switchgear ratings.

5.6 Given the nature of switchgear, particularly circuit breakers, and their primary function of dealing with fault currents it has become clear that utilising the higher of the transformer and switchgear ratings to determine the rating of the platform would be likely to lead to an overstatement of the maximum asset capability and thus unjustifiably increase socialisation of the offshore platform across all users.

5.7 This overstatement of the maximum asset capability is evident from analysis provided to NG by offshore project developers. Employing this data, the 'utilisation' (i.e. Generator TEC / Asset Rating) of the components making up the substation element of the tariff for an illustrative offshore generator can be calculated for both the existing and proposed methodology. These are shown in Table 1, below.

**Table 1 – Illustrative Local Substation Asset Utilisation**

Platform Rating Calculated on:	Average 'Utilisation' (TEC/Rating)		
	Switchgear	Transformer	Platform
<i>Existing Methodology:</i> Higher of Transformer and Switchgear	58%	74%	<b>54%</b>
<i>Proposed Methodology:</i> Lower of Transformer and Switchgear	58%	74%	<b>78%</b>

- 5.8 The level of socialisation that results from the existing methodology was not anticipated at the time the Authority decided not to veto GB ECM-08, partly due to the level of information available at that time.
- 5.9 Following receipt of more detailed information about actual offshore projects and subsequent assessment of this information, National Grid believes that the existing methodology could lead to inefficient investment decisions by developers and may at worst provide perverse incentives.
- 5.10 In order to address this concern National Grid's proposed modification would increase the asset utilisation of the platform (as defined in 5.7) by reducing the platform rating. In turn, this would reduce the amount of headroom that is typically socialised on the offshore platform.
- 5.11 It is National Grid's view that this proposed modification would better meet the relevant objectives. Specifically that a change in the methodology, which applies the lower of the switchgear or transformer ratings to the platform element when calculating the tariff for an offshore generator, would result in charges which better reflect the user's utilisation of the offshore asset and the costs incurred by transmission licensees.
- 5.12 In an attempt to quantify the impact on tariffs of the proposed change in methodology, the same offshore data as referred to above has been used to illustrate the average effect on the substation component of the offshore tariff and the overall local tariff. This is shown in Table 2, below.

**Table 2 – Illustrative Impact on Local Element of Offshore Tariff**

Local Tariff Component	Illustrative Tariff (£/kW)		
	Existing Methodology	Modification Proposal	% Change
Substation			
Switchgear	0.3	0.3	0
Transformers	1.7	1.7	0
Platform	7.9	10.7	35
Onshore Civils Discount	- 0.4	-0.4	0
Total	9.5	12.3	29
<b>Substation + Circuit *</b>			
Total	28.7	32.6	14*

\* The nature of the local circuit component means that it is likely to be much more variable than the local substation component. For this reason, the % change will reduce for projects located further from the onshore interface point.

5.13 As a result of an increase in costs targeted to offshore generators (i.e. that are no longer funded by all users of the transmission network through the residual), the local substation element of the tariff of an illustrative offshore generator is likely to increase in the region of 29%, whilst the impact on the overall local tariff component could be in the region of 14%. This percentage increase on the overall local component is highly dependent on the length of the offshore circuit, amongst other assumptions, and both numbers should therefore be treated as illustrative in nature.

5.14 The necessary revisions to the text of the Methodology are included in Appendix 1.

## **ii) Treatment of Asset Spares**

5.15 Previous consultations for offshore charging arrangements have not addressed the issue of spare assets, which may be retained by the OFTO in case of equipment failure.

5.16 It is National Grid's view that this is one area where consistency with onshore arrangements may not be appropriate due the differences between offshore and onshore outlined in 3.7, above.

5.17 Unlike onshore, many of the asset spares can only be deployed to a particular offshore system due to non-standard specifications. As such, National Grid is proposing to include the OFTO revenue associated with asset spares into the tariff component with which it is associated.

5.18 Therefore in terms of the local substation component, transformer spares would form part of the revenue associated with the transformer element, switchgear spares would form part of the revenue associated with the switchgear element and all remaining offshore substation spares would fall under the platform element.

5.19 It follows that any spares associated with reactive compensation and/or the circuit from the platform to the first onshore substation would be included in the local circuit component. Likewise, OFTO revenue linked to any spares associated with the first onshore substation will be recovered through the residual element of the tariff.

5.20 National Grid notes that, based on data provided by developers of transitional projects, the percentage of the total asset value of these projects associated with asset spares is approximately 0.3%. Whilst this figure may change for enduring projects, the overall impact of the proposed modification is likely to remain relatively small.

5.21 It is National Grid's view that this proposed addition to the methodology would better meet the relevant objectives and result in tariffs that are more reflective of the costs incurred by transmission licensees.

5.22 The necessary revisions to the text of the Methodology are included in Appendix 1.

### iii) Treatment of Harmonic Filtering Equipment

- 5.23 The specific treatment of harmonic filtering equipment has also not been specifically outlined in any previous consultations.
- 5.24 Harmonic distortion is a change in the voltage waveform from its ideal sinusoidal form (at 50Hz in Great Britain) due to the connection of non-linear loads to the system. Some of the associated adverse effects include the heating of induction motors, transformers and capacitors. Levels of harmonic distortion must therefore be kept within acceptable levels on the electricity transmission network in order to prevent damage to equipment. This can be achieved through the use of harmonic filtering equipment.
- 5.25 Inverters used within power electronics to recreate AC waveforms are an example of such a non-linear load, introducing harmonic distortions onto the network.
- 5.26 The major components of an offshore generation connection that comprise power electronics will generally be the wind turbines themselves (for almost all technologies in use offshore today), HVDC converters when the connection to shore is a DC rather than AC one, and reactive compensation equipment such as SVCs that are thyristor controlled.
- 5.27 As such, given the location specific nature of the above components and the association of this equipment with assets that are already form part of the locational element of the offshore tariff, National Grid proposes to treat all harmonic filtering equipment in a similar manner as reactive compensation equipment and HVDC converter stations.
- 5.28 Therefore, all OFTO revenue associated with harmonic filtering would be included in the calculation of the offshore expansion factor for the local circuit component of offshore tariffs.
- 5.29 It is National Grid's view that this proposed addition to the methodology would better meet the relevant objectives and result in tariffs that are more reflective of the costs incurred by transmission licensees. This approach is consistent with the principle outlined in 4.4, above.
- 5.30 The necessary revisions to the text of the Methodology are included in Appendix 1.

### iv) Pass Through of Historic DNO Capital Contributions Forming Part of an OFTO's Tender Revenue Stream

- 5.31 It has come to National Grid's attention that the transfer value of some transitional projects being purchased by OFTOs may include historic distribution capital contributions, which will therefore be included within the tender revenue stream of the OFTO.
- 5.32 The Embedded Transmission Network Use of System (ETUoS) charge is a mechanism that was put in place to pass through distribution charges levied on the NETSO to the offshore generator.

- 5.33 At the time of drafting the charging methodology to accommodate the offshore regulatory regime, it was not envisaged that distribution charges would form part of the OFTO's tender revenue stream at any point. Therefore, the methodology is unable to deal with this situation.
- 5.34 In order to amend this, National Grid proposes to alter the methodology to ensure that all distribution charges are passed through to the offshore generator in the manner that was originally intended through GB ECM-08.
- 5.35 National Grid believes that this is consistent with charging cost-reflectively and bringing forward amendments to reflect developments.
- 5.36 The necessary revisions to the text of the Methodology are included in Appendix 1.

**v) ETUoS for Single DNO Charge Relating to Multiple Generators**

- 5.37 The methodology for the pass through of charges levied by a Distribution Network Operator on the NETSO, via ETUoS, is intended to levy these charges onto the offshore generator in exactly the same proportion as would have occurred prior to Go-Live.
- 5.38 The specific nature of the ETUoS charge and the payment profile for these will therefore depend upon the charging arrangements of the relevant DNO, with reference made to the DNO's charging statement.
- 5.39 The current text of the methodology indicates that:
- “Where a DNO's charge relates to more than one offshore generator, the related ETUoS charge will be pro-rated based on the TEC of the relevant offshore generators connected to that offshore network.”*
- 5.40 The charging and access framework for electricity transmission does not currently distinguish between different generation technologies. However, in developing common distribution charging methodologies, it is likely that a DNO's tariff will differ for generators with distinctive load factors.
- 5.41 Therefore, pro-rating ETUoS on the basis of TEC is unlikely to achieve the intended outcome due to differences in between the nature of transmission and distribution tariffs.
- 5.42 Although the distribution charging methodologies have not been finalised at the time of writing, National Grid believes that it is prudent to establish how distribution charges relating to two generators of different technologies can be passed through from the NETSO to the offshore generator in the manner that was originally intended through GB ECM-08.
- 5.43 From discussion with DNOs, it is likely that they will be able to provide the NETSO with sufficient information to distinguish each charge by generator so that a straight pass through should be possible.
- 5.44 National Grid is proposing to alter the text within the methodology to reflect this straight pass through to the relevant offshore generators. Pro-rating based on the TEC will continue to form the backstop method for pass through where no better information is available to the NETSO.

- 5.45 National Grid believes that this is consistent with charging cost-reflectively and bringing forward amendments to reflect developments.
- 5.46 The necessary revisions to the text of the Methodology are included in Appendix 1.

## 6. Operational Costs Associated with Reactive Power Provision at the Onshore Interface Point

- 6.1 As a result of analysis carried out by the Grid Code subgroup of the Offshore Transmission Expert Group (OTEG), the redrafting of the SO-TO Code (STC) to accommodate regulated transmission offshore has included a requirement (within section K) on the OFTO to provide a 0.95 lead/lag reactive capability at the interface point between the onshore and offshore network.
- 6.2 This analysis demonstrated that the additional cable capacity required (due to the charging currents arising out of the capacitive effect of the AC cable) in order to provide this capability at the offshore grid entry point rather than at the onshore interface point would be uneconomic.
- 6.3 The Grid Code has also been updated to reflect a requirement on offshore generators to meet a minimum requirement of unity power factor (0 MVAR) with a tolerance of +/- 5% of Rated MW in MVAR at the default offshore Grid Entry Point.
- 6.4 The technical requirement under the STC is consistent with arrangements prior to Go-Live of the offshore regime, outlined in the Grid Code and CUSC, where offshore generators are required to provide a 0.95 lead/lag reactive capability at the grid entry point (which becomes the interface point referred to in 6.1 at Go-Live).
- 6.5 The transference of associated commercial arrangements is not quite as straight forward as the technical requirements set out above as a result of both the change in location of the grid entry point (from onshore to offshore) and the change in party on which the obligation falls (from the generator to the OFTO).
- 6.6 Prior to Go-Live, the location of the grid entry point and the obligatory provision of reactive capability are co-located. The offshore generator funds this reactive capability, provides it with their own assets and is able to receive default payments when reactive power is despatched in accordance with Schedule 3 of the CUSC.
- 6.7 Appendix 7 in Schedule 3 of the CUSC outlines the principles that form the basis of the default payment arrangements for the provision of obligatory reactive power service. In summary it describes that default payments should be based upon the following variable costs (actual or estimated) incurred:
- Additional heat losses as a consequence of providing reactive power; and
  - Maintenance costs incurred as a direct result of reactive power output.
- 6.8 Furthermore, it explicitly states that without limitation, the totality of payments shall not take into account the fixed costs of achieving initial compliance.
- 6.9 After Go-Live of the offshore regime, when the grid entry point shifts to the offshore platform and the reactive capability no longer forms part of an Offshore Power Park module, the generator continues to fund the reactive capability at the interface point (indirectly through use of system charges) but no longer directly provides the service and is no longer able to receive payments under the framework as currently drafted.

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- 6.10 Issues with the current framework include the definition of a *Balancing Service* within standard condition C1 of the transmission licence which explicitly excludes “other services....provided by another transmission licensee pursuant to the STC”. In addition the definition of *System Ancillary Services* in Grid Code CC.8.1 (which in turn refers to CC.6.3.2) excludes provision of the obligatory reactive power service from synchronous or static compensation except where this equipment is part of a Power Park Module.
- 6.11 Therefore, under the current framework offshore generators would only receive an income for reactive power generated in meeting their own contribution to the net reactive capability of the offshore system (i.e. at the interface point), and this would only apply if they provided a reactive capability in excess of the minimum Grid Code requirement outlined in 6.3, above.
- 6.12 The use of system charging methodology for offshore generators includes the cost of reactive compensation equipment, including associated operational costs, within the local circuit component of the offshore tariff. Thus targeting these costs at the offshore generator.
- 6.13 In summary, generators are currently entitled to payments when reactive power is despatched at the default rate. This default payment rate is intended to meet the incremental operational and maintenance costs of providing reactive power as outlined in 6.7. However, in the case of offshore, these costs exclude the losses in the compensation equipment as these are treated as transmission losses. The payments would therefore be limited to the incremental cost of maintenance activity.
- 6.14 By moving the grid entry point from the onshore transmission system to the offshore platform and placing the reactive capability obligation on the OFTO the offshore generator, although directly funding the costs associated with the provision of reactive power, is no longer entitled to the default payments.
- 6.15 This arrangement could be considered inconsistent with current onshore arrangements. However, it has been previously recognised that offshore transmission has different physical characteristics to onshore transmission that may warrant differential treatment under certain circumstances.
- 6.16 By continuing to require the reactive capability at the interface with the onshore network as opposed to at the offshore Grid Entry Point, the offshore generator does benefit from the reduction in cable capacity that would otherwise be required if the obligation remained at the Grid Entry Point as explained in 6.2. This benefit of a reduction in cable capacity is also targeted at the offshore generator through the local circuit component of the offshore tariff.
- 6.17 Therefore, in order to increase the cost reflectivity of the current arrangements, National Grid proposes to exclude the relevant incremental operational costs from the offshore expansion factor calculation for the local circuit component of the offshore tariff. It is thought that the amount to be excluded could be calculated specifically on a project by project basis out of estimated incremental maintenance cost information provided directly by the OFTO through the tender process.

- 6.18 This approach would fund the relevant incremental operational costs through the residual element of the TNUoS tariff from all users of the system. The offshore generator therefore avoids the targeting of these costs, thus removing the need for remuneration to be provided to the generator. Although different to how this payment would be funded currently by users of the system through BSUoS, National Grid believe it is consistent with the treatment of operational costs associated with TO owned reactive equipment onshore that are also recovered through the residual element of the TNUoS tariff.
- 6.19 By calculating the cost exclusion on a project specific basis National Grid believes that this proposal is consistent with the approach outlined in 4.4, above, and therefore promotes effective competition.
- 6.20 If approved, it is intended that a similar cost exclusion could be applied to HVDC connections where the reactive capability is likely to be an inherent capability of the Voltage Source HVDC converters.
- 6.21 An alternative option of a balancing services type payment was originally considered as part of the implementation of the offshore regime. Whereas the proposed option would require only a minor amendment to the charging methodology, the balancing services payment method would require much more complicated changes to the framework to address the issues highlighted in 6.10 as well as additional changes to the CUSC and minor amendments to IS systems. National Grid's main difficulty with implementing a balancing services payment would be the contractual issues surrounding payments for a service which is not being directly provided by the contracting counter party.
- 6.22 On balance, National Grid believes the proposed change to the charging methodology achieves the same result as the balancing services alternative, but does so in a more efficient manner.
- 6.23 This consultation seeks views on the proposed approach, the alternative of a balancing services payment and any other alternative solutions which have the potential to better meet the relevant objectives.
- 6.24 National Grid's intention is to put forward a separate conclusions report to the authority on this proposal, contained within Section 6 of this consultation, in an attempt to avoid any negative interactions with the clarifications and modifications outlined in Sections 4 and 5.

## **7. Implementation**

### **Impact on Other Industry Documents**

- 7.1 It is not anticipated that the proposed modification will require amendments to other industry documents, although National Grid welcome the views of the industry on this.

### **Implementation Date**

- 7.2 The implementation date for the proposed changes outlined will be 28 days after furnishing the conclusions report to the Authority, subject to non-veto and the potential for an impact assessment. National Grid currently anticipates that the conclusions report would be issued in late May 2010.

## 8. Responses to this Consultation

Comments and views are invited on the issues raised in this consultation document. To ensure that your comments and views are considered as part of National Grid's Conclusions Report to the Authority, responses must be received by close of business on **14<sup>th</sup> May 2010**.

If you wish to provide comments on this consultation document, responses are welcome via email to: [ivo.spreeuwenberg@uk.ngrid.com](mailto:ivo.spreeuwenberg@uk.ngrid.com)

Alternatively, Users can send their comments in writing, addressed to:

Ivo Spreeuwenberg  
Electricity Charging & Access Development  
National Grid Electricity Transmission plc  
National Grid House  
Warwick Technology Park  
Gallows Hill  
Warwick  
CV34 6DA

If you have any further queries, please do not hesitate to contact Ivo on 01926 655897.

## Appendix 1: Proposed drafting of the Statement of the Use of System Charging Methodology for Clarifications and Changes

Amend the 'Offshore Circuit Expansion Factors' section of Chapter 2 of the Statement of the Use of System Charging Methodology, inserting the blue coloured underlined text and deleting the blue coloured struck through text, as shown below. Text altered as a result of clarifications only is market in blue for reference.

### Offshore Circuit Expansion Factors

2.50 Offshore expansion factors (£/MWkm) are derived from information provided by OFTOs for each offshore circuit. Offshore expansion factors are OFTO and circuit specific. Each OFTO will periodically provide, via the STC, information to derive an annual circuit revenue requirement. The offshore circuit revenue shall include revenues associated with the OFTO's reactive compensation equipment, harmonic filtering equipment, asset spares and HVDC converter stations.

2.51 In the first year of connection, the offshore circuit expansion factor would be calculated as follows:

$$\frac{CRevOFTO1}{L \times CircRat} \div \text{Onshore 400kV OHL Expansion Constant}$$

Where:

CRevOFTO1	=	The offshore circuit revenue in £ for Year 1
L	=	The total circuit length in km of the offshore circuit
CircRat	=	The continuous rating of the offshore circuit

2.52 In all subsequent years, the offshore circuit expansion factor would be calculated as follows:

$$\frac{AvCRevOFTO}{L \times CircRat} \div \text{Onshore 400kV OHL Expansion Constant}$$

Where:

AvCRevOFTO	=	The annual offshore circuit revenue averaged over the remaining years of the onshore <u>GBSO National Electricity Transmission System Operator (NETSO)</u> price control
L	=	The total circuit length in km of the offshore circuit
CircRat	=	The continuous rating of the offshore circuit

2.53 Prevailing OFTO specific expansion factors will be published in this statement. These shall be re-calculated at the start of each price control when the onshore expansion constants are revisited.

Amend the 'Offshore substation local tariff' section of Chapter 2 of the Statement of the Use of System Charging Methodology, inserting the red coloured underlined text and deleting the red coloured struck through text, as follows:

### Offshore substation local tariff

- 2.71 All offshore chargeable generation is subject to an offshore substation tariff. The offshore substation tariff shall be the sum of transformer, switchgear and platform components.
- 2.72 Each tariff component, expressed in £/kW, shall be the ratio of the OFTO revenue (£) and rating associated with the transformers, switchgear or platform (kW) at each offshore substation. The OFTO revenue of each tariff component shall include that associated with asset spares. In the case of the platform component, the relevant rating shall be the ~~higher~~ lower of the transformer or switchgear ratings. As with the offshore circuit expansion factors, the OFTO revenue associated with each tariff component shall be averaged over the remaining years of the [GBSO NETSO](#) price control.
- 2.73 For 2009/10 a discount of £0.35/kW shall be provided to the offshore substation tariff to reflect the average cost of civil engineering for onshore substations. This will be inflated by RPI each year and reviewed every price control period.
- 2.74 Offshore substation tariffs shall be inflated by RPI each year and reviewed every price control period.
- 2.75 The revenue from the offshore substation local tariff is calculated by:

$$SLTR = \sum_{\text{All offshore substations}} \left( SLT_k \times \sum_k Gen_k \right)$$

Where:

SLT<sub>k</sub> = the offshore substation tariff for substation k  
 Gen<sub>k</sub> = the generation connected to offshore substation k

Amend the 'Embedded Transmission Use of System Charges "ETUoS" ' section of Chapter 5 of the Statement of the Use of System Charging Methodology, inserting the coloured underlined text and deleting the coloured struck through text, as follows:

### **Embedded Transmission Use of System Charges "ETUoS"**

- 5.24 The ETUoS charges are a component of Use of System charges levied on offshore generators whose offshore transmission connection is embedded in an onshore distribution network. The charge relates to the provision and use of the onshore distribution network.
- 5.25 The main purpose of ETUoS charges is to pass through the charges that are levied by the DNO on the GBSO NETSO to the offshore generator(s). This charge reflects the charges levied by the DNO for the costs of any works on and use of the DNO network in accordance with the DNO's charging statements and will include, but is not limited to, upfront charges and capital contributions in respect of any works as well as the ongoing and annual Use of System charges for generation connected to the distribution network.
- 5.26 In the case of some relevant transitional offshore generation projects, ETUoS will also be used to pass through historic DNO capital contributions forming part of the OFTO tender revenue stream.
- 5.27 The specific nature of the ETUoS charge and the payment profile for these will depend upon the charging arrangements of the relevant DNO and reference should be made to the relevant DNO's charging statement. In terms of applicable transitional offshore generation projects the ETUoS payment profile will be consistent with the recovery of the OFTO revenue stream.
- 5.28 Where a DNO's charge relates to more than one offshore generator, the related ETUoS charge will represent a straight pass through of the distribution charge specific to each relevant offshore generator. Where specific information is not available, charges will be pro-rated based on the TEC of the relevant offshore generators connected to that offshore network.
- 5.29 Invoices for ETUoS charges shall be levied by the GBSO NETSO on the offshore generator as soon as reasonably practicable after invoices have been received by the GBSO NETSO for payment such that the GBSO NETSO can meet its payment obligations to the DNO. The initial payments and payment dates will be outlined in a User's Construction Agreement and/or Bilateral Agreement.
- 5.30 As the ETUoS charges reflect the DNO charges to the GBSO NETSO, such charges will be subject to variation when varied by the DNO. Where the User disputes regarding the ETUoS charge please note that this will result in a dispute between the GBSO NETSO and DNO under the DCUSA.

*Renumber existing paragraphs 5.31 onwards accordingly.*