Offshore Electricity Transmission Access and Compensation

Industry Workshop on 3rd December 2007

Introduction

National Grid Electricity Transmission (NGET) convened an Offshore Electricity Transmission Access and Compensation workshop at National Grid House, Warwick, on 3rd December 2007. The purpose of the workshop was to initiate discussion amongst interested parties on the rights and obligations associated with access to offshore electricity transmission networks. NGET initiated the session as part of its contribution to the joint Ofgem and BERR programme for developing offshore electricity transmission arrangements.

Responses are invited to the questions posed at the end of this document, along with other relevant views, by 8th February 2008*. Responses should be sent to gbso.offshore@uk.ngrid.com.

Discussion

The discussion was conducted in three parts:

1) Background – Security and Quality of Supply Standard (SQSS) recommendations relating to offshore electricity transmission;
2) Access and Compensation; and
3) Consultation proposals for Offshore Transmission Charging.

NGET representatives outlined progress and decisions to date with reference to Ofgem and BERR's policy proposals, and to a number of initiatives which are currently in progress and relevant to offshore transmission. The presentation material is included as an appendix to these notes.

The discussions, as well as responses to the questions posed in these notes, will be used to inform NGET's report to Ofgem and BERR to inform their development of policy in this area.

Background - SQSS Recommendations

This introductory presentation reviewed the basis of the economic analysis performed on behalf of the SQSS sub-group (originally convened as a sub-group of the Offshore Transmission Expert Group, known as ‘OTEG’). It also summarised the group’s recommendations, confirmed in the government response of April 2007, as:

- For Offshore Platforms:
  - AC – minimum of 2 transformers required, each with a capacity equivalent to at least 50% of generator capacity where installations are larger than 120MW;
  - DC – minimum of 1 DC converter up to 1,000MW;

- For the offshore cable circuit:
  - Minimum of single cable with a rating of 100% of the total installed capacity of the associated offshore wind farms;

- Design variations are permissible.

* Extended from 25th January 2008 for wider distribution.
Further work relating to the SQSS which has recently concluded was also noted. This includes the connection of offshore gas turbines, overhead line components of the offshore network, network interfaces, voltage step change and substation configuration. It is expected that the new SQSS drafting would be available in early 2008.

**Access and Compensation**

**Access**

This part of the session started with a summary of the current transmission access arrangements applied onshore where users’ rights to export to the transmission system, allowing exports up to a defined Transmission Entry Capacity (TEC), are enshrined in the CUSC in paragraph 2.3.

The arrangements applied onshore when connections are not fully compliant with the SQSS were discussed. These have comparable levels of redundancy to the minimum security standard proposed for offshore connections and hence could set a precedent for offshore arrangements. The following features were highlighted:

- Limitations on exports to the Transmission Systems are defined in Clause 10 of the relevant Bilateral Connection Agreement (BCA) between NGET and the User;
  - Named circuits and outage conditions are listed to define ‘Allowed Interruptions’;
  - Outages are notified through the Grid Code OC2 process;
- The user is obliged to reduce its Maximum Export Limit (MEL) in response to an outage;
- A Transmission Related Agreement (TRA) recovers any costs triggered by taking bids in the Balancing Mechanism where the user fails to reduce its output by reducing its MEL; and
- NGET has the right to reduce the users Transmission Entry Capacity (TEC) in the event of consistent failure to reduce MEL in the event of an allowed interruption.

The principles behind the CUSC amendment CAP149 (known as ‘TEC-lite’) and subsequent alternatives were also discussed. If approved, the amendment will formalise parts of the existing bilateral process described above. It may also instigate a new process for notification of transmission outages and will mean that conditions which trigger an access restriction are more precisely defined.

The consultation on CAP149 alternatives was due to be published shortly¹. NGET expressed the views that:

- If CAP149 or one of its alternatives is approved, the principles would apply to offshore electricity transmission;
- That if CAP149 was not approved the same principles would apply but through the existing BCA based arrangements; and
- If an offshore user’s connection meets the minimum capacity and redundancy requirements which apply onshore, they should have the same rights as an onshore equivalent.

¹ in the event, the [CAP149 Consultation Alternative Proposal](#) was published on 7th December 2007
No specific objections were raised against this approach but the need to define allowed interruptions rigorously and consistently was emphasised.

The current arrangements for sharing capacity if a restriction is applied were also discussed. If these affect one party only, sharing is determined by the user. Where more than one party is involved, then pro-rating is applied. These principles could be applied offshore, although one attendee commented there was justification for more sophisticated arrangements.

**Compensation**

Three potential routes for compensating offshore transmission users in the event of an access restriction were outlined as part of NGET’s presentation. These were:

- Bid Offer Acceptances in the Balancing Mechanism;
- ‘CAP048’ payments for disconnection (ie TNUoS rebates); and
- Offshore Transmission Owner (OFTO) Incentives.

The policy positions that had been developed in this area and discussed in Ofgem and BERR’s most recent publications were also recapped:

- Onshore principles should apply offshore unless there is a good reason for them not to;
- Compensation would not be applicable to offshore connections built to the minimum offshore security standard;
- Offshore generators would be eligible for compensation due to restrictions triggered by onshore events; and
- Compensation would be applicable to offshore connections built to a level commensurate with full redundancy (ie equivalent to current onshore standards).

This led into a discussion over whether offshore users should be eligible for compensation through the Balancing Mechanism in the event of an offshore equipment failure. NGET questioned whether this was appropriate given that:

- Offshore networks are likely to be discrete networks which:
  - give no scope for NGET acting as System Operator (SO) to alleviate offshore constraints by network reconfiguration; and
  - are suited to discrete performance measures (which are difficult to define for highly interconnected networks but more readily defined for simpler networks);
- The SO will have no direct influence over offshore network reliability.
- Competition within an offshore constraint is likely to be very limited; and
- There was a question as to why onshore consumers should bear any direct costs associated with offshore equipment issues.

These factors led NGET to conclude that the most appropriate source of compensation for offshore users should be an OFTO incentive, given that the OFTO would have most influence over offshore network reliability.

It was also suggested that the same principle should to any ‘CAP048’ style payments and that it would seem appropriate (and consistent with the access rights discussed previously) that if a user had chosen, and was paying for, a level
of redundancy which was at least equivalent to the current onshore minimum standard that this compensation should be available. It was noted that the transmission licence changes for funding ‘CAP048’ payments by Transmission Owner (TO) revenue recovery (with potential development into TO incentives) had been consulted on by Ofgem in November 2007².

A number of attendees at the meeting concurred with this position but sought to re-emphasise that offshore users should be treated equitably with onshore users if restrictions are caused by problems on the onshore network. In other words, the GSBO would be expected to evaluate cost effectiveness and accept the necessary Bids or Offers using the same methodology for onshore and offshore users in the event of an onshore constraint.

One attendee suggested that the entitlement to ‘CAP048’ compensation should be proportionate to redundancy rather than only available once a certain threshold, equivalent to the onshore minimum standard, was reached. Another attendee suggested that use of a definitive minimum standard threshold was reasonable when applied to the generic industry charging and compensation arrangements in place.

One attendee also asked whether the proposal for ‘CAP048’ style compensation involved splitting onshore and offshore components – would users only receive a TNUoS rebate for the offshore component of their charges if the triggering event was offshore? A number of attendees suggested a full rebate was appropriate.

### Charging Treatment of SQSS Design Variations

The ongoing work relating to the charging discount³ applicable to onshore connections which are not fully compliant with the SQSS was discussed along with its potential application to offshore connections.

The discount is a mechanism which allows adjustments to be made to baseline charges which are set using a measure of the average level of redundancy across the transmission system, currently 1.8. The adjustments reflect the specific, normally lower, levels of redundancy provided by individual user connection arrangements and have been developed to reflect the costs of these connections more appropriately.

The presentation set out how a charging discount can be derived calculating a specific, local security factor and then applying this to the appropriate circuit length, expansion constant and expansion factor (which together reflect the cost of a the circuit).

By using the relevant capacity ratios, a continuum of redundancy levels can be catered for. Effectively, this process displaces the global security factor used in the baseline charge calculations meaning that for offshore transmission, locational charges would be based purely on actual costs (ie you pay for what you get).

The requirement for a cap and collar for the local security factor at 1 and 1.8, was discussed. This would reflect the assumption that the minimum security factor for a connection compliant with the SQSS as applied offshore is 1 and that a security factor of greater than 1.8 would seem better than achievable onshore. It was

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² Transmission licence consultation [Recovering the costs of compensation for temporary physical disconnection (CAP048)]

³ More information is given in the Transmission Charging consultation, [Charging arrangements associated with SQSS design variations based on customer requests]
suggested that the cap should not apply if the capacity which drove the security factor higher than 1.8 was at the user’s request.

Other queries were raised over how circuit capacity would be defined bearing in mind the cyclic ratings achievable in operational timescales and also on how the availability of spare capacity could be signalled through charges.

**Charging**

The issues and responses arriving from the Offshore Charging pre-consultation were discussed leading into NGET’s proposals for the formal offshore charging consultation.

These proposals were summarised as:

- The boundary between connection and Use Of System assets should be at the offshore substation LV busbar as it is onshore;
- Circuit Expansion factors should be set to represent the specific cost of the particular development due to the lack of historic cost data and potential for variation in unit costs between projects;
- Offshore substations should be treated as non-locational assets with circuits treated as locational assets which is in both cases consistent with onshore arrangements; and
- The treatment of HVDC equipment would be the same as AC equipment with the exception that converter costs would be treated as a locational asset rather than a non-locational substation asset.

One query was raised over the treatment of reactive equipment which was likely to be needed on offshore networks to facilitate the offshore Grid Code subgroup recommendations with respect to offshore generator reactive capability. It was suggested that it may be appropriate to treat these as locational assets.

NGET also set out its thoughts on how charges relating to the distribution network component of embedded transmission connections could be treated, favouring an excluded service approach.

One attendee commented that in the case of an embedded transmission connection, they were unable to evaluate the rights users would have and what they would pay at this stage.

Another attendee suggested that embedded transmission should be treated as deep connection assets for charging purposes where users have a capacity of less than 100MW. Some issues were raised as to how this threshold would be defined – would it relate to user capacity or network capacity for instance.

**Questions**

**Access**

Do you agree that the principles applied to customer request design variations (as represented in the current arrangements or in the CUSC amendment CAP149) should extend to offshore connections which, whilst compliant with the offshore standards in the SQSS, do not have the same levels of circuit redundancy as compliant onshore connections?

Currently, if a restricted capacity had to be shared between parties, entitlements would be set by pro-rating the different parties’ capacities. Are more sophisticated
arrangements required at this stage for offshore networks or is sufficient flexibility delivered through pro-rating and short term access products?

**Compensation**

Should Offshore Transmission users be compensated for a loss of access due to a problem on the onshore component of the transmission system on the same basis as onshore users?

Do you agree that the most appropriate source for compensation to offshore users in the event of an offshore access restriction is the Offshore Transmission Owner under and OFTO Incentive framework?

Should ‘CAP048’ style compensation payments only be available to offshore users who have a connection standard equivalent to the minimum standard specified in the SQSS for onshore users?

Should any ‘CAP048’ compensation cover the onshore component of charges as well as the offshore component?
## Attendees

<table>
<thead>
<tr>
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<tr>
<td>Phillip Baker</td>
<td>BERR</td>
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<td>Graeme Cooper</td>
<td>BWEA</td>
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<td>Mark Fitch</td>
<td>KEMA Consulting</td>
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<td>Colin Green</td>
<td>Ofgem</td>
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<td>John Greasley</td>
<td>NGET – Offshore Programme</td>
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<tr>
<td>Tom Ireland</td>
<td>NGET – Electricity Access and Charging</td>
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<tr>
<td>Laura Jeffs</td>
<td>Centrica</td>
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<td>Paul Jones</td>
<td>E.ON</td>
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<td>Rachel Lockley</td>
<td>British Energy</td>
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<td>Robert Longdon</td>
<td>Airtricity</td>
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<td>Jim McCulloch</td>
<td>Scottish Power Transmission</td>
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<td>Bridget Morgan</td>
<td>Ofgem</td>
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<td>Dafydd Rickard</td>
<td>Cardiff power</td>
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<td>Hedd Roberts</td>
<td>NGET – Electricity Access and Charging</td>
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<td>Ivo Spreeuwenberg</td>
<td>NGET – System Development</td>
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<td>Graham Stein</td>
<td>NGET – Offshore Programme</td>
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<td>Brian Taylor</td>
<td>NGET – Network Operations</td>
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<tr>
<td>David Tolley</td>
<td>RWE Npower</td>
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<tr>
<td>Andrew Truswell</td>
<td>NGET – Electricity Access and Charging</td>
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<tr>
<td>Peter Waghorn</td>
<td>Cornwall Consulting</td>
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Offshore Access Workshop

National Grid House
3 December 2007

Agenda

- Introduction and Context
- Background – SQSS Recommendations
- Access and Compensation
  - Rights to export / CAP149
  - Compensation / Design Variations
- Offshore Charging Proposals
- Next Steps and Way Forward

- Discussion invited throughout session

Context – existing obligations

- GBSO has obligations to:
  - Have in force a CUSC
  - Have in force a Grid Code
  - Have in force a BSC (Elexon)
  - Establish Charging Methodologies
- TOs have obligations to:
  - Plan and develop system in accordance with SQSS
- Common obligation with other Transmission Licensees:
  - Have in force an STC

Context – offshore regime

- National Grid is GBSO designate for offshore
- Existing licence obligations in respect of codes etc. likely to be rolled out offshore
- GBSO is contributing to Ofgem/BERR project to develop offshore regime
  - Development of offshore SQSS
  - Grid Code drafting
  - Leading on SO-TO code
  - Development of charging methodology
  - Development of connection application processes
  - Development of transmission access
  - CUSC drafting
Offshore access - questions

- What does ‘offshore access’ mean?
  - What rights does a User have?
  - What obligations apply?
  - How is access allocated?
- Are the onshore arrangements appropriate?
- What is the interaction with the offshore security standard?
- What about TO incentives?

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Development of SQSS for offshore

OTEG SQSS sub-group

- Defined scope of offshore network and
- Requirement for change based on:
  - The cost of offshore transmission equipment
  - The variable output of the generation

- Deterministic standards as a result of cost benefit analysis
- Agreed CBA methodology for further work carried out by SEDG Centre
Development of SQSS for offshore

OTEG SQSS sub-group

- Scope of ‘offshore transmission system’
  - Offshore Platform (AC) – Minimum of 2 transformers each with a capacity of 50% of the windfarm (>120MW)
  - Offshore Platform (DC) – Minimum of 1 DC converter up to 1000MW
  - Single cable with min. rating of max. export from windfarm (<1320MW)
  - Design variation permissible

Further Work

- Cost Benefit Analysis looking at security requirements for:
  - Connection of gas turbines offshore
  - An OHL forming part of the offshore transmission system
  - Interface between offshore and onshore network
  - Voltage step change limits
  - Substation configuration and switching arrangements

SQSS Drafting:
- New chapters for offshore:
  - Design of Generation Connections
  - Operation of Transmission System
  - Voltage Limits
  - Substation Configuration and Switching

Development of SQSS for offshore

Further Work

- Recommendations from further work to feature in the next OfGEM/BERR licensing consultation document
- Draft SQSS document available in early 2008

Offshore Access Workshop

Access and Compensation

Andrew Truswell / Hêdd Roberts
National Grid House
3 December 2007
Offshore Access Workshop
*Rights, Obligations and Allocation*

- **Rights**
  - Right to export
    - Limitations on export rights to be defined in CUSC?
  - Right to be paid compensation if access withdrawn
    - What compensation schemes would apply offshore?
- **Obligations**
  - Obligation to pay charges
    - Offshore Charging proposals and SQSS Design Variations
  - Obligation to comply with technical standards
    - Grid Code Subgroup and STC Working Group
- **Allocation**
  - First come first served, if user commitment provided
    - Connection application workshop planned for January
    - Impact of Transmission Access Review?

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**Right to export**
*Onshore arrangements*

- Right to export up to Transmission Entry Capacity (TEC) enshrined in CUSC 2.3
- Where connections not fully compliant, limitations on export defined in Clause 10 of Bilateral Connection Agreement (BCA)
  - Named Circuits and Outage Conditions defined in BCA
  - Outages notified through Grid Code OC2 process
  - User reduces Maximum Export Limit (MEL)
  - Transmission Related Agreement (TRA) in place to recover any costs incurred in constraining output in Balancing Mechanism (BM) where User fails to reduce MEL
  - National Grid can reduce TEC where User consistently fails to reduce MEL without justification

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**Right to export**
*CAP149*

- CAP149 proposed to implement “TEC-lite”, but more support for alternatives
- Under amended CUSC 2.3, right to export would be constrained by Restrictions on Availability
- Restrictions on Availability defined in BCA
- Formalise existing requirement to reduce MEL and for TRA
- New process to notify circuit outages, restrictions and restorations (and provide more details about them)
- Named circuits to be defined more precisely
- No option for National Grid to reduce TEC – would proceed straight to Default
- Consultation on consultation alternatives imminent

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- Next Steps and Way Forward
Right to export

Offshore

- CAP149 would work unchanged offshore
- Due to the lower security standard offshore, would be appropriate to limit export as per CAP149
  - Right to export constrained by Restrictions on Availability
  - Named Circuits and Outage Conditions defined in BCA
  - Same process for reduction of MEL and for TRA
  - Notification process – OC2 or CAP149 WGAA1?
- Restrictions on availability would be applied to a connection compliant with the offshore GBSQSS rather than to a Design Variation Non-Firm Connection
- We believe this represents an appropriate way forward
  - If CAP149 approved, would work offshore
  - If not, could use existing process

Sharing restrictions

- If more than one generator is connected to an OFTO network, any access restrictions would need to be shared between generators
  - Where all generators form same party, user can determine sharing
  - Otherwise, default would be pro-rating
    - Are there arrangements that could give more flexibility?

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Compensation

Onshore compensation schemes

- Existing onshore arrangements:
  - Bid-Offer Acceptances in Balancing Mechanism (BM) if required to reduce generation in response to an event
  - “CAP048” payments for disconnection
    - For planned outages, a daily TNUoS rebate
    - For unplanned outages, Market Index Data price for first 24 hours, and daily TNUoS rebate thereafter
  - But only Users with fully GBSQSS compliant connections eligible
- Where connections not fully compliant onshore:
  - Outage conditions defined in BCA classed as an “Allowed Interruption”
  - No compensation paid for such interruptions
Compensation

**Linkage between charging and compensation**

- Currently, no incentive to apply for a Design Variation connection:
  - Reduced redundancy and no eligibility for compensation
  - No change in TNUoS charge
- If GBSQSS Design Variations modification is approved:
  - Onshore generators with design variation connections will not be entitled to compensation but will benefit from discounted charges

**GBSQSS Design Variations**

**Eligibility for TNUoS discount**

- Charges for security as based on the GB average LSF of 1.8
  - \((ZM\text{km} \times EC \times EF \times LSF)\)
- Discount based on reduced LSF and applicable length

- Single circuit connections
  - Based on LSF of 1 for Xkm

- Multiple circuit partial redundancy connections
  - Based on LSF of 1.5 for Ykm

**GBSQSS Design Variations**

**Proposed discount for single circuit connections**

- Proposed GBSQSS Design Variations charging modification would discount TNUoS charges for connections with reduced redundancy
- Existing global Locational Security Factor = 1.8
- For single circuit connections, discount would be:

  \[
  \text{Discount (\£/kW)} = \frac{L_{sc} \times EC \times EF \times 0.8}{1000}
  \]

  Where
  - \(L_{sc}\) = Applicable circuit length of single circuit (km)
  - \(EC\) = Expansion Constant (\£/MWkm)
  - \(EF\) = Expansion Factor
  - 0.8 effectively reduces the LSF of 1.8 to 1 i.e. a single circuit

**GBSQSS Design Variations**

**Partial Redundancy Circuit Connections**

- For partial redundancy circuit connections, discount would be:

  \[
  \text{Discount (\£/kW)} = \frac{L_{sc} \times EC \times EF \times \text{PRF}}{1000}
  \]

  Where
  - \(L_{sc}\) = Applicable circuit length of single circuit (km)
  - \(EC\) = Expansion Constant (\£/MWkm)
  - \(EF\) = Expansion Factor
  - \(\text{PRF}\) = Partial Redundancy Factor

  \[
  \text{PRF} = \frac{\text{LSF} - \text{RTC}}{\Sigma\text{TEC}}
  \]

  Where
  - \(\text{RTC}\) = Route Transmission Capacity (MW) of the Partial Redundancy Connection
  - \(\Sigma\text{TEC}\) = Sum of Transmission Entry Capacity (MW) for all generation at the connection node
GBSQSS Design Variations

**Offshore application**
- Modification designed to work offshore, to reflect reduced redundancy offshore recommended by SQSS subgroup
- For a single circuit connection offshore, the LSF applied to the offshore element would effectively be 1
- For a partial redundancy connection, would be between 1 and 1.8
- Example
  - 100MW generator connected by two 75MW cables
  - Partial Redundancy Factor would be 1.8 – (150/100) = 0.3
  - Effective LSF applied to offshore connection would be 1.5
- Summary of proposed modification
  - Generators connected offshore by a single circuit will not pay for any redundancy offshore
  - Generators connected offshore by multiple circuits will pay for any redundancy, to a maximum of 1.8

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**Defining redundancy offshore**
- If a 100MW generator is connected:
  - By a single cable, irrespective of size, there is zero redundancy
  - By two 50MW cables, the Partial Redundancy Factor is 1
- If the same generator is connected:
  - By two 100MW cables, the PRF is 0 (capped)
  - By three 50MW cables, the PRF is 1.8-(150/100) = 0.3
  - By eleven 10MW cables, the PRF is 1.8-(110/100) = 0.7
  - All of these are secure for N-1
- If the same generator is connected:
  - By two 90MW cables, the PRF is 1.8-(180/100) = 0,
  - but this connection is not secure to N-1

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Charging and compensation

**Linkage offshore**
- Offshore:
  - Default will be zero redundancy
  - Generators benefiting from increased redundancy will pay increased charges
  - At what point should Users be eligible for compensation?
    - Not at all?
    - Full compliance with Chapter 2 of SQSS (i.e. onshore standards)?
  - At some other level (where multiple cables)?

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Compensation

**Potential offshore compensation schemes (1)**
- Three potential compensation mechanisms:
  - Bid-Offer Acceptances
  - CAP048 payments
  - Payments from TO incentive schemes
- Ofgem/BERR July document and Ofgem second scoping document:
  - Onshore principles should apply offshore
  - Compensation would not be applicable for offshore connections built to the minimum offshore security standard
  - Offshore generators would still be eligible for compensation for constraints arising onshore
  - Compensation would apply to offshore connections built to a level commensurate with full redundancy
- Current consultation on CAP048 payments
  - These would be funded through TO price controls, and therefore recovered from consumers
**Compensation**

**Potential offshore compensation schemes (2)**

- Should Users of offshore networks (even those compliant with onshore standards) receive compensation through the BM?
  - Discrete networks
  - GBSO has no influence over reliability
  - Lack of competition?
  - Should consumers be exposed to costs?
- Proposed that OFTO will have an availability incentive
  - More appropriate that offshore generators benefit directly from these schemes, than through GBSO/BM?
- Similarly, any CAP048 payments would be funded by OFTO

**Embedded Transmission**

- Any compensation for an event on the distribution system would have to be funded by the DNO
- Existing principle for embedded generation is no compensation

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**Access and Compensation**

**Summary**

- CAP149 and GBSQSS Design Variation proposals establish principles for offshore regime
- No compensation would be payable through the BM or CAP048 process for connections built to minimum offshore security standard
  - Generator may benefit from OFTO incentive scheme
- If “full redundancy”, generator may be eligible for some compensation
  - CAP048 payments funded by OFTO
  - Would it be appropriate to make payments through BM?

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Offshore Charging Consultation

Pre-consultation

- Pre-consultation issued in July 2007
  - 9 responses
- Three main issues highlighted
  - Offshore Connection / Use of System Boundary
    - Offshore substation LV busbar; or
    - Offshore substation HV busbar; or
    - Onshore Connection point
  - Offshore Circuit Expansion Factors
    - Generic or Specific
  - HVDC
    - Inclusion of convertor station costs in either a generic or specific expansion factor

### Offshore Charging Consultation

#### Pre-consultation Responses

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<th>Expansion Factor</th>
<th>HVDC Cable Expansion Factor</th>
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### Offshore Charging Consultation

#### Offshore Connection / Use of System Boundary

- Three options:
  - Offshore substation LV busbar
    - Consistent with onshore / plugs methodology, would facilitate multiple LV connections; substation costs socialised?
  - Offshore substation HV busbar
    - Cost reflective charging of substation assets; but counter to plugs, sharing rules required, would expose users to costs from OFTO over provision of assets and actions of other users
  - Onshore Connection point
    - Most cost-reflective, would avoid “rebalancing effect”; but counter to rationale for regime and plugs (incl 2km rule), sharing, over-provision
  - National Grid proposal
    - Offshore substation LV busbar, consistent with onshore
Offshore Charging Consultation

**Expansion Factors**

- **Options:**
  - **Generic**
    - Simple, would give certainty and predictability; but no historic data, not cost reflective (could be significant cost differences)
  - **Specific** – 2 sub-options:
    - Recover entire OFTO revenue as locational; or
    - Split between locational (cable) and non-locational (substation)
  - Specific with split would be more cost-reflective than generic and consistent with onshore, but would require new process to determine split
  - **National Grid proposal**
    - Specific, with locational / non-locational split
    - Long term aspiration to move to generic if appropriate

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**HVDC**

- **Options for HVDC Expansion Factors:**
  - **Generic vs specific**
  - Inclusive or exclusive of cost of convertor station
  - **Generic**, inclusive approach may deter use
  - **No historic data**; few likely to be built
  - **Convertor stations - costs disproportionate to residual**; intrinsically linked to a specific line
  - **National Grid proposal**
    - Specific, inclusive of convertor station costs

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**Other Issues**

- **Generation Charging Zones**
  - Current criteria of £2/kW – each offshore zone likely to contain only one node
  - £2/kW is fixed – intend to separately consult on this
  - Still unlikely to result in multiple node zones offshore

- **Locational Security Factor**
  - Separate consultation on SQSS design variations
  - Offshore SQSS subgroup recommended zero redundancy offshore
    - Design variation consultation therefore designed to address this

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**Embedded Transmission (1)**

- **Not addressed in pre-consultation**
  - DNO will levy charges on GBSO (consistent with those for D connected large power stations)
- **Conceptually simplest solution:**
  - Charge OFTO as an excluded service (through a new STC charging process)
    - Charging only one party (pass charge straight through)
    - Keeps out of RPI-X – not a transmission service
    - Straightforward treatment of capital contributions
    - Allows bespoke charging timetable, to match DNOs’
    - Ultimately charge falls cost reflectively on relevant generators
    - BUT results in very convoluted cashflows
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**Embedded Transmission (2)**

- **Other options:**
  - Charge specific generators as an excluded service
    - Much simpler cashflows; still an excluded service; cost reflective
    - May need to split charge between generators
  - Charge specific generators through TNUoS
    - Much simpler cashflows; cost reflective; no new charge required
    - Complexity and implications of RPI-X (e.g. capital contributions)
  - Socialise through residual
    - Much simpler cashflows; no new charge required
    - Zero cost reflectivity; implications of RPI-X

- **National Grid proposal**
  - Charge OFTO as an excluded service
  - Would require new STC charging process, rather than change to existing methodology

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**Embedded Transmission (3)**

- **Charging “islanded” transmission**
  - Will essentially ignore disconnect between T networks

- **Embedded “benefits”**
  - Offshore generators <100MW connected at 132kV to a DNO currently receive BSUoS and Demand TNUoS
  - Once offshore transmission regime goes live, will be liable to pay BSUoS and Generation TNUoS
  - Although will qualify for small generators’ discount (assuming scheme extended and no other solution)
  - This is inherent in classifying 132kV as transmission

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Offshore Charging Consultation

**Summary**

- Intend to issue offshore charging consultation in early December, proposing:
  - Offshore connection charging boundary at the offshore substation LV busbar;
  - Specific expansion factors for locational elements of offshore connections, and recovery of non-locational through the residual;
  - Specific expansion factors for HVDC connections, including convertor station costs; and
  - Recovery of charges levied on the GBSO by DNOs for embedded transmission from OFTOs as an excluded service.

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Agenda

- **Introduction and Context**
- **Background – SQSS Recommendations**
- **Access and Compensation**
  - Rights to export / CAP149
  - Compensation / Design Variations
- **Offshore Charging Proposals**
- **Next Steps and Way Forward**
Next Steps and Way Forward

- CAP149 Consultation Alternative Consultation
  - Will be issued imminently
- GB ECM-09 Design Variations
  - Consultation closed, report to be issued to Authority
- GB ECM-08 Offshore Charging
  - Consultation to be published soon
- Access and Compensation
  - Issues and notes from this meeting will be written up and circulated, and comments invited
  - A report will then be sent to Ofgem for consideration
  - CUSC drafting will reflect the outcome of this