BSSG Interconnector Issues

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Background

- The Grid Code (GC) obligates Interconnectors (completed after 1st April 2005) to provide Frequency Response (FR)
  - By virtue of the Interconnector connection agreement, the interconnector owners are obligated to provide FR
- However the current arrangements make the provision of such services problematic
- To date, no interconnector has fallen within the obligation, therefore no impact
- This will change in the near future……

Purpose of today's meeting is……

1. To identify the issues
   - Seek agreement or otherwise of the issues
2. Discuss at a high level the possible solutions
   - What are they
   - Pros and cons
3. What are the next steps
   - Actions
   - Next Meeting

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High Level TOR

- Examine CUSC obligations and commercial mechanism for FR
- Identify feasible options that will facilitate the provision of FR from future interconnectors, whilst ensuring that undue discrimination does not exist as compared to other providers of FR services.
- Identify all the impacts of each option on the CUSC, BSC, Licence Methodologies and any other associated documents within the framework;
- Agree and recommend a preferred option

What are the problem areas?

1. Does the CUSC facilitate Interconnectors (IC) to provide FR?
2. Would IC be disadvantaged through the settlement processes by providing FR?
3. Is the FR payment methodology appropriate for IC providers?
4. What if there are mandatory FR requirements at both TSO?

Issue 1 - Does the CUSC facilitate IC to provide FC?

- The Mandatory Service Agreement (MSA) and CUSC section 4 appropriate Interconnector?
- Problems are;
    1. IC is not a Genset (referenced within the FR data tables)
        - Genset is defined as ‘A Generating Unit, Power Park Module or CCGT Module at a Large Power Station or any Generating Unit, Power Park Module or CCGT Module which is directly connected to the National Electricity Transmission System’
    2. De-Load, power reduction of a Genset
        - De-Load is defined as ‘The condition in which a Genset has reduced or is not delivering electrical power to the System to which it is Synchronised’
    3. Use of BM Units throughout – is this appropriate?
        - Do we mean BM Unit within the Interconnector context?
        - Interconnector BM Units come as a pair – Production and Consumption (this of relevance's to issue 2

Issue 1 - Mandatory Service Agreement tables for reference

APPENDIX 1 – DATA (Cont.)
SECTION B (FREQUENCY RESPONSE)
Part I - Frequency Response Data

Station:
BM Unit Nos.

Table 1	Low Frequency Response – Mode A						
Genset De-Load (MW)	δf_p (Hz)	Primary Response (MW)	Secondary Response (MW)				
			δf_s= - 0.1Hz	δf_s= - 0.2Hz	δf_s= - 0.3Hz	δf_s= - 0.4Hz	δf_s= - 0.5Hz
	-0.1						
	-0.2						
	-0.3						
	-0.4						
	-0.5						
	-0.6						
	-0.7						
	-0.8						

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Issue 1 – Does the CUSC allow IC to provide FC?

- What should be the principle of any solution?
  - Definitional terms applicable to IC that have the same meaning to the IC that the current terms have to generators
- Possible Solutions
  1. New terms that relate to both Gensets and DC Converters
  2. Supplement Genset and De-load with IC terms
- Potential Impacts
  - CUSC modification
  - Grid Code modification
- Next Move?

Issue 2 – Would IC be disadvantaged through the settlement processes by providing FR?

- Would IC providers be exposed to GB imbalance volumes?
- Problems are;
  1. Can Applicable Balancing Services Volume (QAS_{ij}) be allocated to the Interconnector Error Administrator (IEA)?
     - BSC appears silent on the matter
     - If yes, as there are two IEA BM Units (Production and Consumption) how would this work?
  2. The Applicable Balancing Service Volume Data (ABSVD) is not designed for IC
     - MEL, SEL, FPN substitutes required
     - Possible system change

Issue 2 – Would IC be disadvantaged through the settlement processes by providing FR?

- What should be the principle of any solution?
  - Equal treatment of IC providers and other providers
- Possible Solutions – Can QAS be applied to IEA
  1. Do nothing – assuming Elexon can clarify the BSC allows the application of QAS_{ij} (still have the Produiction/Consumption problem)
  2. Raise a BSC modification to enable
- Possible Solutions – ABSVD
  1. Investigate possible alternative variables with which to calculate FR for IC
- Potential Impacts
  - BSC modification
  - CUSC modification
  - ABSVD modification
- Next Move?

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Issue 2 – Graphical representation of FR calculated volumes

A generator delivers response as illustrated in Figure 2.

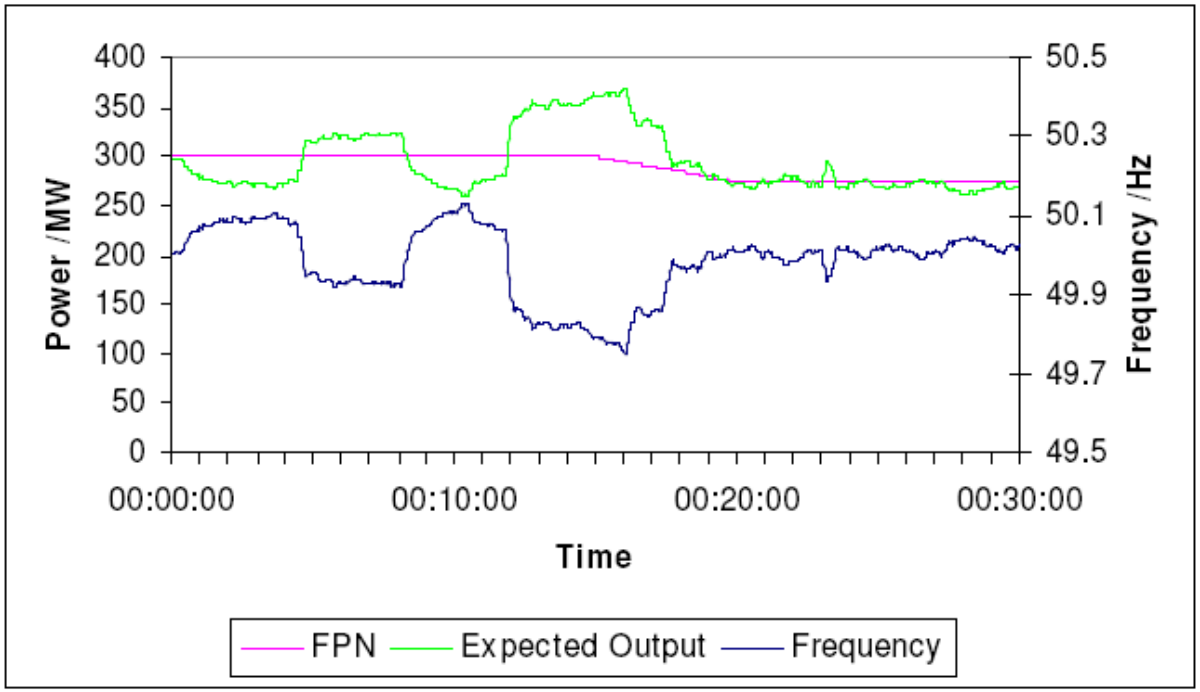

Figure 2 Example of Response Delivery

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Issue 3 – Payment Methodology

- Is the FR payment methodology appropriate for IC providers?
- Problems are;
    1. Response energy not designed for IC providers
        - IC costs are likely to be made up from the imbalance exposure within the other connected market (assuming GB imbalance volumes are accounted for) rather than the cost of fuel
        - However, different markets could result in a different cost base
    2. Holding prices monthly duration – appropriate risk?
        - If the response energy formula is considered appropriate then IC providers would need to price the risk within the holding payment – monthly pricing could drive very high prices
- See hand out for the comparison of imbalance prices to FR payments

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Issue 3 – Payment Methodologies

- What should be the principle of any solution?
  - Should there be equitable treatment of IC provider as compared to other FR providers considering the differences?
  - The need for a generic solution – the cost base of next IC could be different
- Possible Solutions
  - Do nothing
    - Risk of pricing would fall on the provider – service would have to be very highly priced and may subsequently never be used
  - Treatment of such volumes as SO-SO trades – thereby avoiding imbalance IC imbalance exposure
    - How would equitable treatment be achieved under this option?
    - Static response is achieved in this manner
  - Develop a new response payment formula for IC providers that over time attempts to hold the provider neutral to the cost of imbalance (similar to option 2)
    - Would be more equitable than other options but would still be expensive
- Potential Impacts
  - CUSC modification
- Next Move?

Issue 4 - What if there are mandatory FR requirements at both TSO?

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For Reference - How the payment works

- FR has two payments associated;
  - Holding Payment
  - Response Energy Payment
- Holding Payment – $HP_m = P_m + H_m + S_m$ (Sum of primary, secondary and high holding payment)
- Primary HP – $P_m = P_{PR} * P_{MW} (1 - SF_P)) * K_T * K_{GRC} * [1/60]$
  - P_{PR} = Submitted price in £/MW/h
  - P_{MW} = Response capability at the given De-Load point
  - SF_P = 0
  - K_T = Ambient temperature adjustment factor
  - K_{GRC} = CCGT configuration adjustment
  - Secondary and high have the same formula

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How the payment works continued

- Response Energy Payment – $REP_{ij} = RE_{ij}$ * reference price
- $RE_{ij} = \int_0^{SPD} [\max(FRij(t),0) \times (1 - SF_{LF}) + \min(FRij(t),0) \times (1 - SF_H)] \times K_T \times K_{GRC} dt$
  - $FR_{ij}(t)$ = expected change in active power output derived from the FR power delivery data tables
- $RE_{ij} > 0$
  - Reference price = max ($\sum_s\{PXP_{sj} * QXP_{sj}\}/\sum_s\{QXP_{sj}\}*1.25,0$)
    - $\sum_s$ = sum of all data providers
- $RE_{ij} < 0$
  - Reference price = max ($\sum_s\{PXP_{sj} * QXP_{sj}\}/\sum_s\{QXP_{sj}\}*0.75,0$)
    - PXP_{sj} = Market Index Price
    - QXP_{sj} = Market Index Volume
    - SDP = Settlement Period Duration

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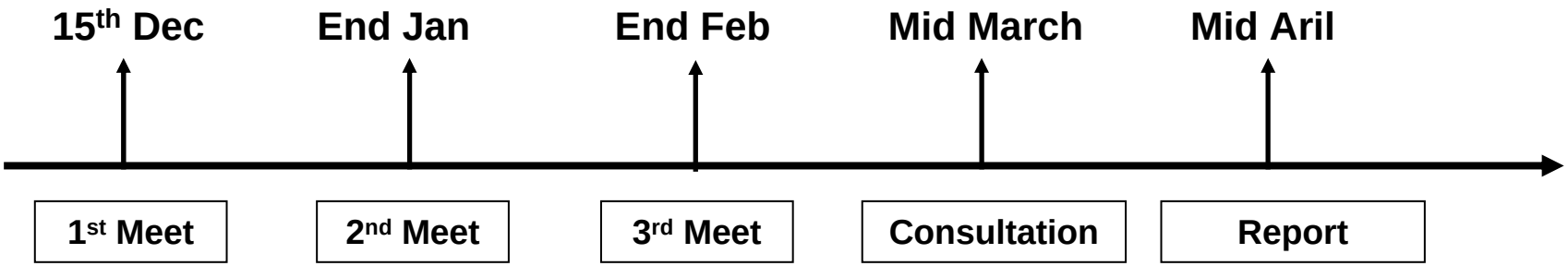
Suggested timeline



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