

BSSG – Reactive Power

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Agenda

- ◆ Topic
- ◆ CAP169 Background
- ◆ Key Pts
- ◆ Reference

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- ◆ Offshore

Topic

- ◆ Consider the issues highlighted from CAP169 (Provision of Reactive Power from Power Park Modules, Large Power Stations and Embedded Power Stations), specifically the suitability of the default payment arrangements.

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- ◆ Consider the Reactive payments arrangements for Offshore.

Background - Proposal

- ◆ CAP169 proposed by NGET in February 2009.
- ◆ The proposal sought to amend the reactive power provisions in the CUSC, the key components being as follows;
 - ◆ Part 1; Align Grid Code and CUSC – Power Park Modules (PPMs) and Direct Current (DC) Converter despatched and paid
 - ◆ Part 2; Amend the CUSC – large power stations with a reactive range below 15MVAR can request an Mandatory Service Agreement (MSA)
 - ◆ Part 3; Reduced reactive power payment terms (20%) for embedded generators subject to restricted reactive despatch due to the Distribution Network Operators (DNOs) and are unable to be despatched to 0MVAR.

Background - Alternatives

- ◆ The working group developing the proposal came up with 3 alternatives, which were;
 - ◆ Working Group Alternate Amendment 1 (WGAA1) – extends part 3 to sites that experience long term operational restrictions to the reactive power provision
 - ◆ WGAA2 – completely removed part 3. The purpose being that as there was not total agreement on part 3 the authority could chose to make a decision without this component
 - ◆ WGAA3 – Reduce the payment terms of part 3 from 20% to 0% where DNO restrictions prevent the provision of full reactive range

Background – Response / Panel

- ◆ Working Group Consultation responses;
 - ◆ 3 received;
 - ◆ 1 – indicated no support or otherwise for CAP169 or alternatives
 - ◆ 2 – proposed a WG Consultation Alternative Request (WGAA3)
 - ◆ 3 – supported WGAA2
- ◆ At the CUSC Amendment Panel on the 30th October 2009, the panel believed (by majority) that both WGAA1 and WGAA2 better facilitates the applicable CUSC objectives
- ◆ WGAA2 was considered better than WGAA1 (4 to 3)

Background – Authority

- ◆ Ofgem approved WGAA3
- ◆ Reasons;
 - ◆ Ofgem considered that there is enough evidence to determine on WGAA3
 - ◆ Concerns that there was insufficient evidence to justify the assessment of the other options, or the panel recommendation (Not clear the panel has provided a fully informed recommendation)

Background – Authority & Applicable Objectives

- ◆ Applicable Objective a) Discharge of transmission obligations
 - ◆ Mandatory service that should be paid for like other mandatory services
 - ◆ CAP169 plus WGAA's would result in an increase pool of service providers – which would benefit NGET
 - ◆ Concerned CAP169 / WGAA1 and WGAA2 could introduce a payment for a service that may not be accessible in all cases
 - ◆ Restricted MVAr production could also raise the requirements and therefore costs from having to pay other providers
 - ◆ The existing 20% payment condition is considered an incentive for sites to return to full service – different circumstance
 - ◆ There may be a case for some remuneration for potential dynamic benefit provided from these sites
 - ◆ However insufficient evidence was provided to conclude what level
 - ◆ WGAA3 increases pool of providers while avoiding the risk of inappropriately increasing costs to consumers

Background – Authority & Applicable Objectives

- ◆ Applicable Objective b) Competition
 - ◆ CAP169 & WGAA1 could result in inappropriate costs to the consumers
 - ◆ Concerned about discrimination occurring in the provision and payment of this service in cases where NGET can not instruct embedded sites to 0MVA_r
 - ◆ Sufficient evidence is required
 - ◆ Recognise that there may be a case for some remuneration

Key Points

- ◆ Part 3 should be reviewed
 - ◆ More analysis is required to assess what level of remuneration should be provided to reactive power restricted embedded power stations, if any.
 - ◆ It is essential to fully understand how restrictions come about and what choices generators have.
 - ◆ We should endeavour to increase industry responses

Reference – Reactive Payment mechanism

- ◆ CUSC – Section 3
- ◆ Obligatory Reactive Power Service (GC CC8.1)
- ◆ Utilisation Payment – to cover the overall variable costs (based on charging principles App 7)
- ◆ Total Payment
 - ◆ Total Payment (PT) = PU (£/SP/BMU)
 - ◆ PU = Utilisation Payment in respect of each BMU per SP

Reference – Reactive Payment mechanism

◆ Utilisation Payment

◆ $PU = BP_U * U$

◆ $BP_U = 46,270,000 * I * X * Y / 42,054,693$

◆ $I =$ Indexation factor

◆ $X =$ 1, unless there is a technical issue affect service provisions

◆ $Y =$ 1, unless there is a Reactive Despatch Network Restriction, then 0

◆ $U = U_{lead} + U_{lag} \quad (MVARh / SP / BMU)$

Reference – WG discussion

- ◆ NGET explained that restrictions prevent NGET from instructing such generator and can prevent the ability to prevent payment via the 0MVAR despatch method.
- ◆ DNO rep explained that the majority of developers in Scotland had chosen to connect directly to the 33kV DN via cable for lower connection costs and avoided planning issues
- ◆ Payment level
 - ◆ NGET clarified that there was no existing generators that would have reduced payment from CAP169
 - ◆ Views within the group that the DNO could pay restricted generator, although no easy mechanism to achieve this
 - ◆ Discussion about the 20% payment level – Although the existing 20% mechanism is an incentive to return, NGET believes 20% is also applicable for restricted site that a) are obligated to supply the capability and b) provide dynamic support
 - ◆ One member believed there should be zero payment as the generator may require the SO to procure additional MVAR to balance them

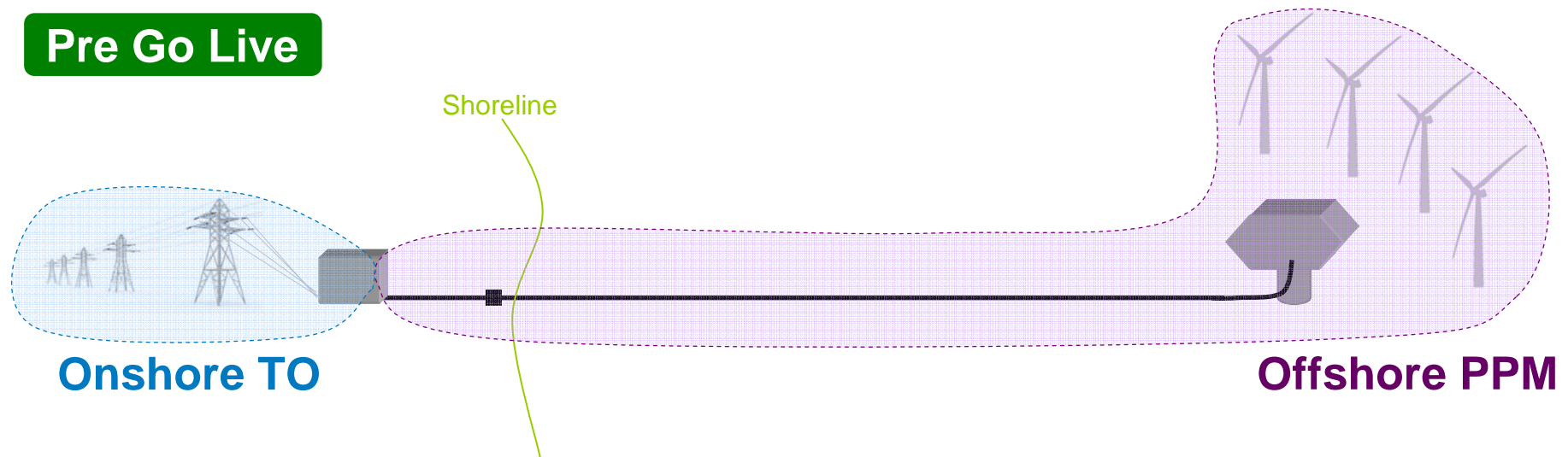
Reference – WG discussion

- ◆ Materiality
 - ◆ NGET provided an estimated materiality associated with Part 3
 - ◆ Possible £1.2m - £2.1m cost from generators with restrictions
 - ◆ 20% payment = £0.24m – £0.42m

Offshore Reactive Issues

Overview of Offshore Regime

Pre Go Live

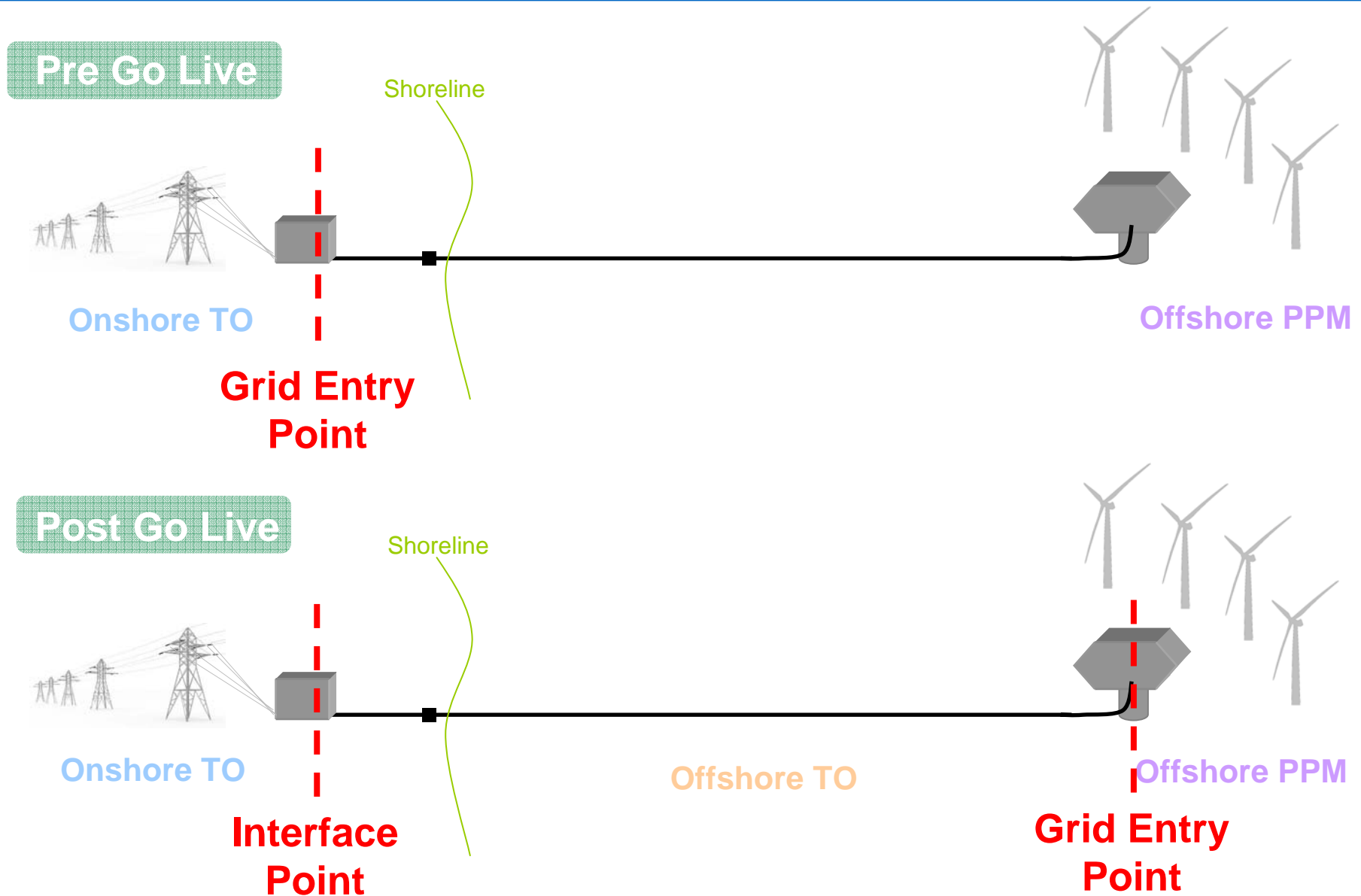


Post Go Live



Offshore Reactive Issues

Key Boundaries



Offshore Reactive Issues

Relevant Industry Framework Obligations

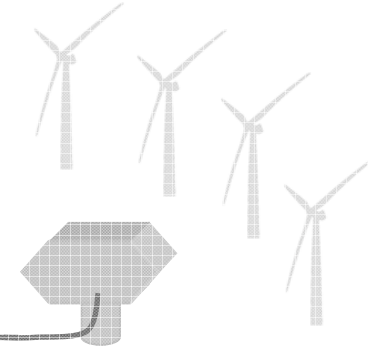
Pre Go Live



Onshore TO

Grid Entry Point

- Grid Code CC6.3.2
- 0.95/0.95 (lead/lag) capability
- Generator assets forming part of PPM



Offshore PPM

Reactive Capability Provided by TO Infrastructure

Post Go Live



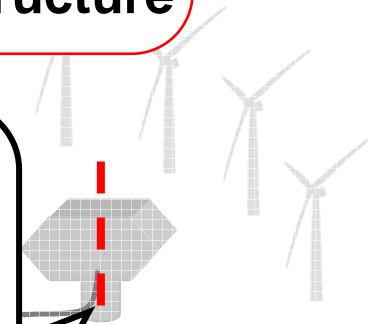
Onshore TO

Interface Point

- **STC Section K**
- 0.95/0.95 (lead/lag) capability
- **TO assets** forming part of offshore network

Grid Entry Point

- Grid Code CC6.3.2
- Ability to maintain unity power factor +/- 5% tolerance
- Generator assets forming part of PPM

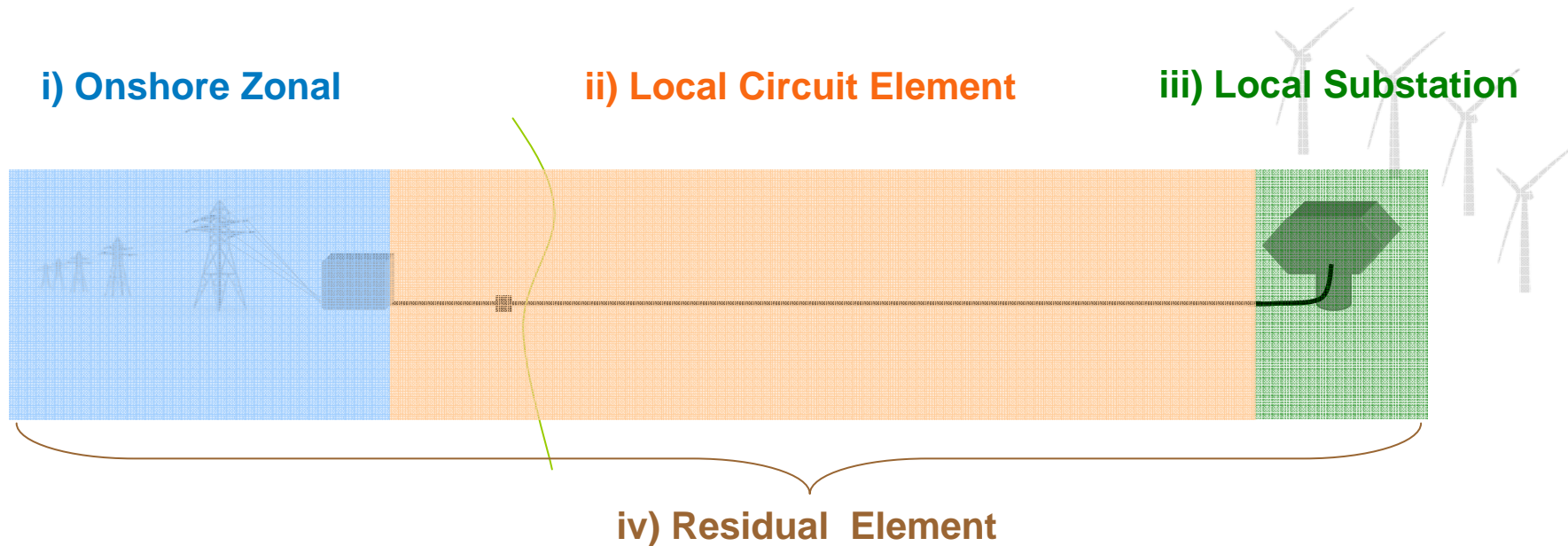


Offshore PPM

Offshore Reactive Issues

Overview of Charging

- ◆ 4 elements of offshore TNUoS tariff



- ◆ Capital and operational costs associated with reactive power provision at the onshore interface point recovered through the **local circuit element**

Offshore Reactive Issues

Commercial Issues for Discussion

- ◆ Appendix 7; Schedule 3 of CUSC outlines principles for basis of default payment arrangements based on the following variable costs:
 - ◆ Additional heat losses as a consequence of RPP
 - ◆ Maintenance costs as a direct result of RPP
- ◆ Payments shall not account for fixed costs
- ◆ Standard Licence Condition C1 *balancing service* definition explicitly excludes “other services...provided by another transmission licensee pursuant to the STC”
- ◆ Grid Code CC8.1 system ancillary services definition excludes provision of obligatory reactive power service from synchronous or static compensation except where this equipment is part of a power park module

Offshore Reactive Issues

Options for Discussion

- ◆ Generator can still collect default rate for obligated reactive output measured at Offshore Grid Entry Point
- ◆ Options for compensating variable costs of RPP at the Interface Point:
 1. *Bilateral Arrangements*
 2. *Balancing Services Payment*
 3. *TNUoS Discount variable costs associated with RRP*
 4. *Reactive Compensation capital costs recovered through residual element of TNUoS*
- ◆ Mindful of potential contractual difficulties