

Stage 03: Attachment A: Detailed Assessment for P237

P237: Standard BM Unit configuration for Offshore Power Park Modules

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About This Document:

This is Attachment A to the main Assessment Consultation document.

This attachment provides further supporting details of how the Modification Group's discussions have led it to its initial views.

What stage is this document in the process?

| | |
|----|----------------------------|
| 01 | Initial Written Assessment |
| 02 | Definition Procedure |
| 03 | Assessment Procedure |
| 04 | Report Phase |



Where can I find full technical definitions of these terms?

You can find the full BSC definitions of Power Park Module, Generating Unit and BM Unit in [Annex X-1](#) and [Section K3](#).

All Grid Code definitions are contained in the Grid Code [Glossary and Definitions](#).

What is a Power Park Module?

The term **Power Park Module** relates to generators who use an Intermittent Power Source. The Grid Code defines an Intermittent Power Source as being 'the primary source of power for a Generating Unit that cannot be considered as controllable (e.g. wind, wave or solar)'. A wind turbine is therefore one example of an intermittent Generating Unit.

The new regime for Offshore Transmission came into effect ('Go Active') on 24 June 2009, and is expected to 'Go Live' in June 2010. As part of Go Active, the Secretary of State made changes to the industry codes (including the Grid Code and the BSC) to support the intended Offshore arrangements.

As a result, the Grid Code now makes a distinction between Onshore Power Park Modules and Offshore Power Park Modules. The new Grid Code definitions are:

- **Onshore Power Park Module** – A collection of Onshore Generating Units (registered as a Power Park Module under the PC¹) that are powered by an Intermittent Power Source, joined together by a System with a single electrical point of connection to the Onshore Transmission System (or User System if Embedded). The connection to the Onshore Transmission System (or User System if Embedded) may include a DC Converter.
- **Offshore Power Park Module** – A collection of one or more Offshore Power Park Strings (registered as a Power Park Module under the PC). There is no limit to the number of Power Park Strings within the Power Park Module, so long as they either:
 - Connect to the same busbar² which cannot be electrically split; or
 - Connect to a collection of directly electrically connected busbars of the same nominal voltage and are configured in accordance with the operating arrangements set out in the relevant Bilateral Agreement.

The BSC continues to refer generically to Power Park Modules. It cross-refers to the Grid Code's definition of this term, which makes the distinction between Onshore and Offshore.

The Grid Code's definition of Offshore Power Park Module also introduces the following new term:

- **Offshore Power Park String** - a collection of Offshore Generating Units that are powered by an Intermittent Power Source, joined together by cables forming part of a User System with a single point of connection to an Offshore Transmission System. The connection to an Offshore Transmission System may include a DC Converter.

The new definition of an Offshore Power Park Module differs from that for Onshore, in that it requires these Offshore Power Park Strings to be connected to the same busbar or to a set of connected busbars.

¹ Planning Code (part of the Grid Code).

² You can find an explanation of what a busbar is in Section 3 of this Attachment.

What changes have been raised from Issue 37?

The P237 solution developed through the [Issue 37](#) Group's discussions. The Panel raised Issue 37 to consider whether the current BSC requirements for BM Unit configurations and metering are suitably flexible to accommodate the changing designs for generation and, in particular, for new Offshore generation build.

The Issue Group recommended 4 changes to the BSC, which have all since been raised as Modification Proposals. Table 1 below summarises each issue and the Issue Group's proposed solution. It also gives the corresponding Modification Proposal numbers for reference.

Three of the Issue 37 changes impact Offshore generators. While there are individual benefits associated with each of these changes, the Issue Group considered that the combined benefits of all 3 together will be greater. If all the changes are approved, there will therefore be efficiency benefits in implementing them in parallel.

Table 1 – Modification Proposals raised from Issue 37

| Modification Proposal | Description of proposed change |
|--|---|
| P237 - Standard BM Unit configuration for Offshore Power Park Modules | Allows Parties the option of having a single BM Unit (or reduced number of BM Units), subject to the Transmission Company's agreement, in order to reduce costs and administration. |
| P238 - Removal of the requirement to Meter each Boundary Point for Offshore Power Park Modules | <p>Allows Parties to treat all Exports from (or Imports to) a BM Unit comprising Offshore Power Park Modules as a single Export (or Import).</p> <p>The Party must ensure appropriate compensation is applied to Meter readings to account for losses between the location of the metering and the commercial boundary.</p> |
| P240 - Switching Plant and Apparatus between BM Units | Allows Parties to switch output between BM Units (without the need to re-register the BM Unit(s)) to resolve issues such as loss of connection or partial Plant failure. |
| P241 - Relaxation of requirement to separately Meter Licensable Generating Units | <p>Removes the requirement to separately Meter the flows to each Generating Unit within a Combined Cycle Gas Turbine (CCGT) Module with a single Boundary Point.³</p> <p>Many sites only Meter the net output at the CCGT Module's single Boundary Point, so will be non-compliant with the existing BSC provisions.</p> |

³ A Boundary Point is the point at which a generator's Plant/Apparatus is connected to a Distribution System or to the Transmission System.

2 Group's Terms of Reference



Who is the SSMG?

A standing group of industry experts, who the Panel has appointed to consider potential BSC changes in a number of subject areas – including BM Unit issues.

The P237 Modification Group consists of members of the Settlement Standing Modification Group (SSMG), supplemented with:

- Members of the Issue 37 Group; and
- The Transmission Company's expertise on the Grid Code requirements for intermittent generators.

The same Group is also considering P238 in parallel. Section 4 contains full details of the Group's membership.

Table 2 below summarises:

- The different areas which the Group has considered as part of its P237 Terms of Reference, as set by the Panel; and
- The Group's initial conclusion in each area.

For each area, the table also shows whether you can find further details of the Group's discussion within the main consultation document or in this Attachment A.

Table 2 – P237 Assessment Procedure Terms of Reference

| Area of Terms of Reference | Group's conclusion | See: |
|--|---|--------------------------------------|
| Does the identified issue only affect Offshore, and not Onshore, Power Park Modules? | Yes, the specific issue which P237 identifies is limited to Offshore. The solution will therefore not disadvantage Onshore intermittent generators. | Attachment A: Section 3 |
| What types of configuration for an Offshore intermittent generator are affected by the issue, and what are the specific benefits of P237 for each affected configuration type? | Some Offshore generators will not be impacted at all. Others will be impacted to different extents. The Group has provided worked examples of the effects of the issue and P237's benefits for different types of configuration. | Attachment A: Section 3 & Appendix 1 |
| Should there be any further criteria for the aggregation of multiple Offshore Power Park Modules in a single BM Unit? | No, it is best to leave maximum flexibility for both the Transmission Company and Offshore generators to agree what is an appropriate aggregation. | Main document: Section 3 |
| If the Transmission Company does not agree to the registration of an aggregated BM Unit, should the Lead Party be able to appeal this to the Panel? | The Lead Party can apply for a non-standard BM Unit configuration in these circumstances. This is an existing ability and not part of the P237 solution. | Main document: Section 3 |

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| Area of Terms of Reference | Group's conclusion | See: |
|--|---|---|
| Does P237 impact any BSC Agents? | <p>The Group is undertaking an impact assessment in parallel with this consultation, to establish the extent of any impact.</p> <p>The Group expects that any associated costs will not be significant.</p> | Main document: Section 4 |
| <p>What are the benefits of P237:</p> <ul style="list-style-type: none"> • In isolation; and • Combined with other Issue 37 changes? | <p>P237 will deliver additional benefits in combination with P238 and/or P240.</p> <p>See the Group's worked examples for details of these benefits.</p> | <p>Main document: Section 5</p> <p>Attachment A: Section 3 & Appendix 1</p> |



What is a transformer?

A transformer is a device used to transfer energy from one circuit to another, which may be at different voltage levels.

Example Offshore configurations

To illustrate the issue which P237 identifies, the Group has considered a number of example configurations for Offshore wind farms.

The Group has concluded that there are benefits from allowing more than one Offshore Power Park Module (OPPM) to be treated as a single BM Unit.

These are:

- Avoiding the **administrative overheads** of additional BM Units;
- Avoiding unnecessary **metering** and **data collection**; and
- Avoiding the need to change **Aggregation Rules** when the operational configuration of the wind farm is changed.

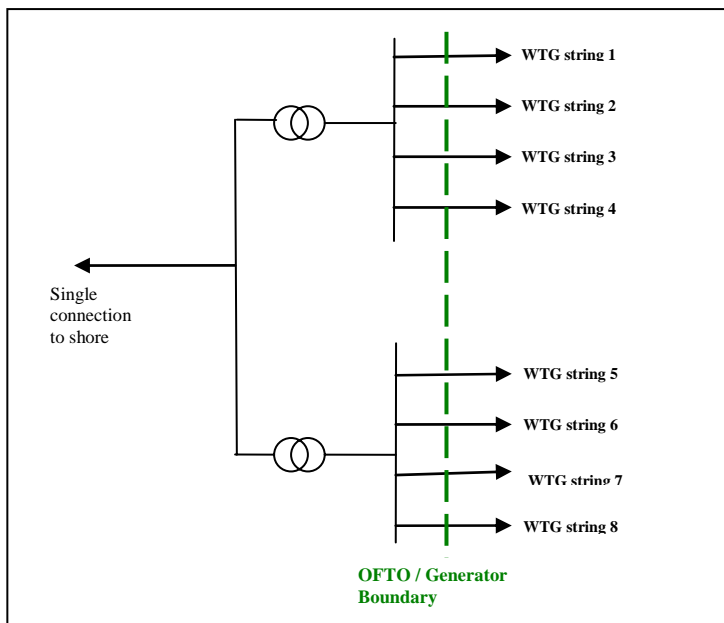
However, not all of these potential benefits apply to all Offshore wind farm configurations.

The benefits of P237 for a particular scheme will depend on the design of the Offshore platform and the location of the commercial boundary, as illustrated in the following worked examples.

Example 1 – 2 Power Park Modules with commercial boundary on Low Voltage side of platform and with 1 connection to shore

The following example shows a platform with two OPPMs.

In this example, the commercial boundary is on the Low Voltage (LV) side of the platform. Each OPPM comprises 4 Offshore Power Park Strings of wind turbine generators (WTGs), shown to the right of a transformer (denoted by interlocking circles).



Under the existing BSC provisions, the standard BM Unit configuration is for each OPPM to form a separate BM Unit. This example configuration will therefore be treated as 2 BM Units (unless the Party is granted a non-standard BM Unit configuration).

Benefits of P237 in isolation:

P237 will allow the 2 OPPMs in this example to be treated as a single BM Unit. This will deliver administrative benefits to the generator (e.g. by reducing the number of required Physical Notifications), and to the Transmission Company (e.g. by avoiding the need to issue separate Bid Offer Acceptances to each OPPM).

Combined benefits with P238:

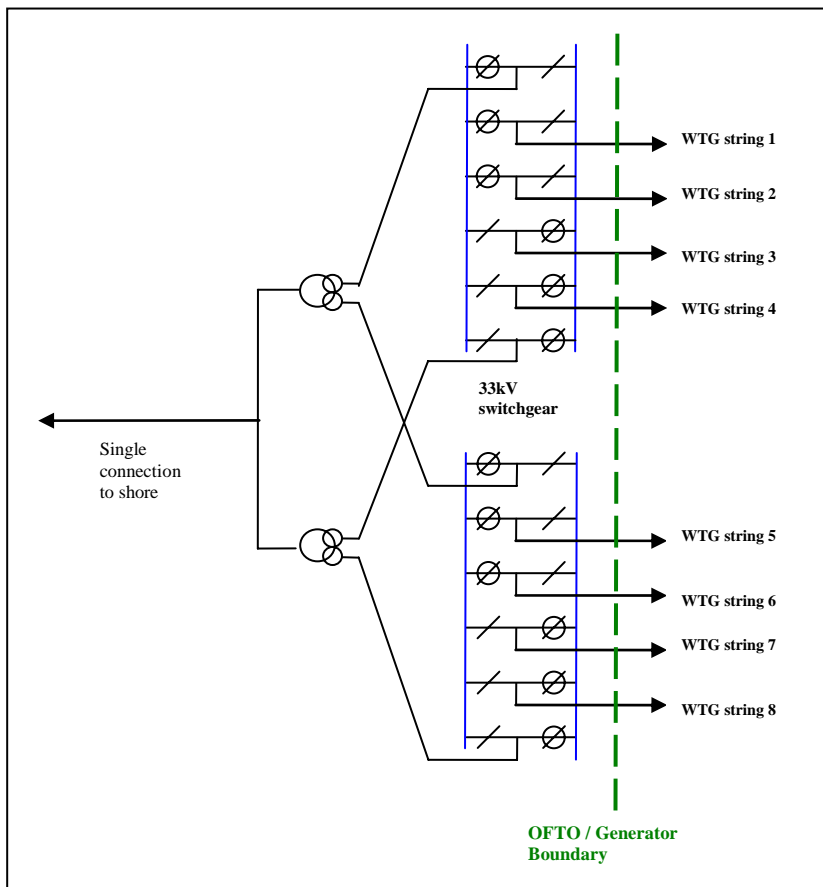
P237 on its own does not affect the metering requirements for this example configuration, as metering will still be required for each Boundary Point. However, if P238 is approved, P237 will allow a single Meter for the whole BM Unit (rather than separate metering of each OPPM).

Example 2 – Double busbar configuration with 1 connection to shore

In this example there are 2 double busbars (shown in blue) and a single connection to shore.

Each incoming or outgoing circuit connects to one or other side of the double busbar. Its purpose is to allow maintenance of one side or the other of the busbar while continuing to operate the associated connections, and to allow segregation of circuits to minimise the impact of any fault. This allows greater flexibility in which strings are routed through which transformer.

Note that this example is hypothetical: as far as the Group is aware the only projects using this type of double busbar arrangement are those with 2 connections to shore.



What is a busbar?

A busbar is an electrical conductor that makes a common connection between several circuits.

From discussion with National Grid, this hypothetical configuration would form 4 OPPMs (1 per busbar). Under the existing BSC rules, the standard configuration is to treat each OPPM as a separate BM Unit. However, the difficulty with this is that the 'Plant' associated with each OPPM would change each time the switchgear is reconfigured.

Benefits of P237:

P237 would allow the whole wind farm in this hypothetical example to be treated as a single BM Unit, without the generator needing to apply for a non-standard configuration. Treating the wind farm as a single BM Unit avoids the need for re-registration of BM Units and for changes to Aggregation Rules each time the configuration changes.

Appendix 1 gives 2 further examples of how P237 benefits new configurations.

Does the issue just affect Offshore generators?

The Issue 37 and P237 Groups have considered whether Onshore Power Park Modules:

- Currently encounter similar issues regarding BM Unit configurations; and/or
- Could encounter such issues in the future.

Because of the difference in what the Grid Code now counts as a Power Park Module for an Offshore generator compared to Onshore, the existing BSC provisions may require Offshore generators to register more BM Units than are actually needed by the Transmission Company to operate the Transmission System.⁴

For Offshore generation, the boundary with the Offshore Transmission Operator will be the commercial boundary. Onshore there is no 'Offshore Transmission Operator', and the Power Park Module may be all the Plant up to the connection point; there is no restriction on the Power Park Module to being a single busbar or a group of connected busbars.

The Group has discussed the requirements for Onshore Power Park Modules, and can not see any evidence that any Onshore intermittent generators will be disadvantaged by P237.

The Group notes that some Onshore generators have historically had similar configuration issues, which have been handled through the use of non-standard BM Unit configurations. However, the Group notes that this is now a legacy issue from these generators' pre-BETTA⁵ designs. The Group therefore does not expect there to be an issue for Onshore generators in the future (so P237 therefore does not disadvantage Onshore renewables).

The Group asks the Transmission Company, as part of its impact assessment, to confirm that it supports these views.

The Group notes that the most significant renewable developments are likely to be Offshore, and that designs of generation will vary.

⁴ The 'Transmission Company' here means the GB System Operator, and should not be confused with the Offshore Transmission Owners (OFTOs) which are being procured as part of the new Offshore regime. References to the 'Transmission System' mean the National Electricity Transmission System, which includes Offshore waters.

⁵ The British Electricity Trading and Transmission Arrangements were introduced in 2005.



Where can I find other P237 documents?

Visit the P237 page of ELEXON's website [here](#).

Table 3 – P237 timetable and related changes

| Date | Assessment activity |
|----------|---|
| 28/04/09 | ISG discusses issues with Offshore metering and BM Units |
| 14/05/09 | Panel raises Issue 37 |
| 03/06/09 | Issue 37 Group holds its first meeting |
| 23/06/09 | Issue 37 Group holds its second and final meeting |
| 26/06/09 | Centrica raises P237 and P238 |
| 09/07/09 | ELEXON presents the Issue 37 report to the Panel |
| 09/07/09 | ELEXON presents the P237 and P238 IWAs to the Panel / Panel submits P237 and P238 to the Assessment Procedure |
| 17/07/09 | Modification Group holds its first meeting for P237 and P238 |
| 21/07/09 | RWE Npower raises P240 and P241 |
| 28/07/09 | ELEXON issues the P237 and P238 Assessment Consultation documents for industry consultation, and for impact assessment by BSC Agents and the Transmission Company |
| 11/08/09 | Participants return Assessment Consultation responses / BSC Agents and the Transmission Company return impact assessments |
| 13/08/09 | ELEXON presents the P240 and P241 IWAs to the Panel |
| 14/08/09 | Modification Group holds its second meeting for P237 and P238 |
| 04/09/09 | ELEXON submits the Group's P237 and P238 Assessment Reports to the Panel |
| 10/09/09 | ELEXON presents the Group's P237 and P238 Assessment Reports to the Panel |

Table 4 – Estimated P237 progression costs up to an Authority decision

| Meeting cost | External legal/ expert cost | BSC Agent impact assessment cost | ELEXON resource |
|-------------------|-----------------------------|----------------------------------|--|
| £500 ⁶ | £0 | £7,000 | 46 man days, equating to c.£12.5k ⁷ |

⁶ This has reduced from the £750 estimate in the IWA, as only 2 rather than 3 meetings will be needed.

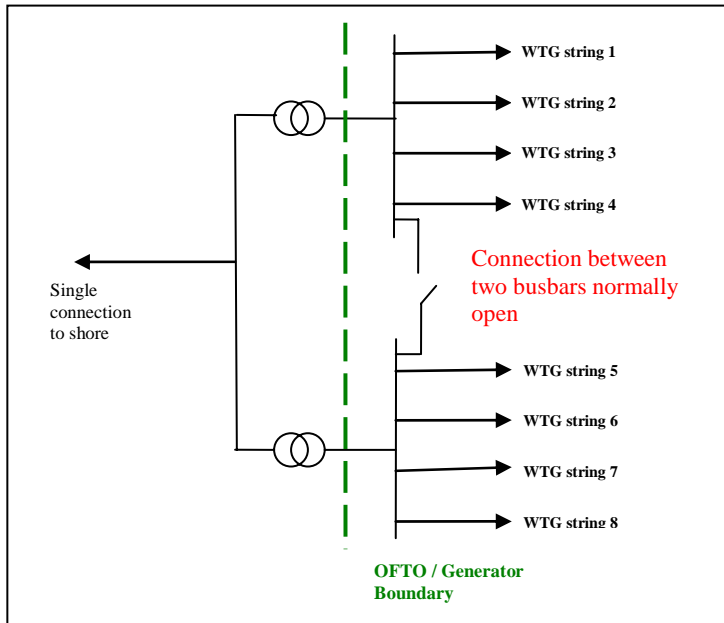
⁷ This has reduced from the original IWA estimate of 57 man days (c.£15.5k), as there has been less Group discussion (and therefore less time spent drafting documents) than ELEXON originally envisaged.

Table 5 – P237 Modification Group attendance

| Member | Organisation | 17/07/09 |
|-----------------|--------------------------------------|----------|
| David Jones | ELEXON (Chair) | Y |
| Kathryn Coffin | ELEXON (Lead Analyst) | Y |
| Chris Stewart | Centrica (Proposer) | Y |
| Ian Pashley | National Grid | Y |
| Gary Henderson | SAIC | Y |
| Esther Sutton | E.ON UK | Y |
| Andy Colley | SSE | Y |
| Fiona Irwin | Great Gabbard Offshore Winds Limited | Y |
| Ed Marr | RWE Npower | Y |
| Attendee | Organisation | 17/07/09 |
| John Lucas | ELEXON (Technical Support) | Y |
| Natalie Pike | ELEXON (Lawyer) | Y |
| Yvonne Naughton | Ofgem | Y |

Example 3 – Capability to connect 2 busbars

This is similar to Example 1, but with an additional capability to join the 2 busbars together (e.g. in response to a fault in one of the transformers) and with the boundary moved from the turbines to the left of the busbars.



This will form 2 OPPMs (and will continue to be treated as 2 OPPMs under the Grid Code even when the switch is closed to join the 2 busbars).

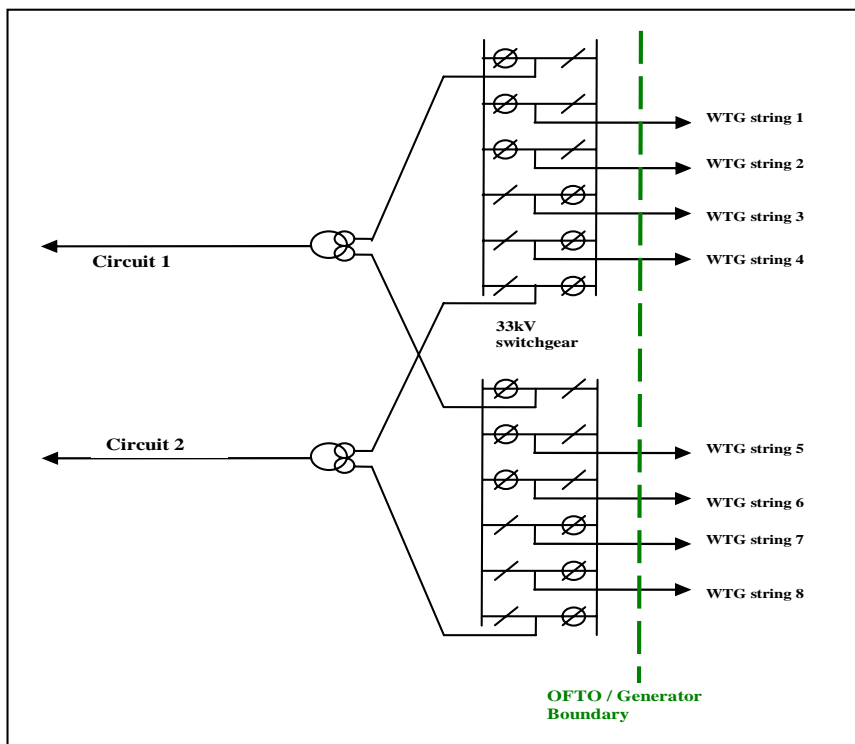
If P237 is not approved, and the standard BSC configuration remains that each OPPM forms a separate BM Unit, the only way of correctly calculating the Metered Volumes will be to install metering on the connection between the 2 BM Units.

Benefits:

P237 benefits this configuration in the same way as Example 1, with the additional benefit of removing the need for metering on the connection between the 2 busbars.

Example 4 - Double busbar configuration with 2 connections to shore

This is similar to Example 2, but with 2 connections to shore rather than 1.



This type of configuration is extremely difficult to handle satisfactorily without a Modification Proposal to address the 'switching issue' (i.e. without P240).

However, its treatment under the existing BSC rules would seem to be as follows:

- By default, each of the 4 OPPMs will form a BM Unit.
- The Transmission Company will need to be able to despatch separately the Plant on the 2 circuits to shore, so there is no possibility of applying for a non-standard configuration that treats the whole wind farm as a single BM Unit. At best, the site could be treated as 2 BM Units (1 per connection to shore).
- The BSC does not allow strings of turbines to be switched from one transformer to another without going through a re-registration process (with a lead time of at least 30 days).

Benefits of P237 in isolation:

The benefits of P237 are therefore limited in this case. P237 will potentially allow the site to be treated as 2 BM Units rather than 4, without the need to apply for a non-standard configuration.

Combined benefits with P240:

If P237 and P240 are implemented together, this will address the fundamental 'switching' problem between the OPPMs.