

Report from Offshore Transmission Embedded Transmission Working Group

1. Introduction

- 1.1. The Offshore Transmission Embedded Transmission working group (OTETWG) was established by Ofgem/BERR to assist with the development of the detailed arrangements for embedded transmission connections. OTETWG was required to:
 - 1.1.1. Consider how current arrangements for embedded large power stations¹ should apply to embedded transmission connections.
 - 1.1.2. Identify any additional requirements needed in the regulatory framework for embedded transmission connections.
- 1.2. OTETWG met three times and this report summarises the findings of OTETWG's review and the possible options considered. The report provides recommendations in respect of the detailed arrangements needed for embedded transmission connections and also notes areas where further work is needed.
- 1.3. OTETWG has noted areas of this review that interact with work being progressed by other Offshore Transmission work streams. OTETWG did not consider the impact of these interactions on the other work areas.
- 1.4. OTETWG has identified a number of areas where further work is required and has provided recommendations for Ofgem/BERR's consideration.

2. Current Arrangements for Embedded Large Power Stations

- 2.1. Pre-Connection Application
 - 2.1.1. Generators will generally seek information about possible connection options at an early stage of a power station development project to evaluate viability of the generation project.
 - 2.1.2. The GBSO² publishes information about the GB transmission system annually in its Seven Year Statement (SYS). The GBSO provides quarterly updates for its SYS publication. Distribution licensees publish information about the higher voltage parts of their distribution systems annually in their Long Term Development Statements (LTDS). This information about existing (and planned changes) to existing network infrastructure, is available for use by generators.
 - 2.1.3. In addition it is common for developers of generation projects to seek information directly from the relevant network licensee(s). The type of information requested varies depending on the generator's requirements but may extend to a detailed feasibility study. Licensees usually charge for providing information requested by (or on behalf of) a potential customer.

¹ The Grid Code defines the term Large Power Station. In summary, a power station is large if it is:

- 100MW or greater and is connected to National Grid Electricity Transmission plc's transmission system.
- 30MW or more and is connected to SP Transmission Limited's transmission system.
- 10MW or more and is connected to Scottish Hydro-Electric Limited's transmission system.

² GB System Operator.
Created 14/02/2008 20:17
Modified 22/02/2008 13:48

2.1.4. The current arrangements do not:

2.1.4.1. Require a developer to seek detailed information from the relevant transmission and/or distribution licensee before making a connection application.

2.1.4.2. Define minimum requirements for responses by the relevant transmission or distribution licensee to all types of information request (ie no standard content, charge or timescale is defined).

2.1.5. Whilst it is common for a generator to seek information ahead of making a connection application, it is not a mandatory requirement before a connection application can be submitted. The value of information gathered at the pre-application stage was noted particularly in respect of preparing a comprehensive connection application in response to which an offer of connection can be provided.

2.2. Connection Application

2.2.1. Generator would apply to the relevant distribution licensee for connection to and use of the distribution system in respect of the proposed embedded large power station. Each distribution licensee defines arrangements for connection applications in its Condition 4B statement³.

2.2.2. As part of the connection application, the distribution licensee requires information about:

2.2.2.1. The party seeking the connection to the distribution system.

2.2.2.2. The party who will use the distribution system.

2.2.2.3. When the connection to the distribution system is required.

2.2.2.4. Where the connection is required.

2.2.2.5. The import and/or export capacity of the requested connection.

This minimum data requirement is defined in the Electricity Act⁴. The distribution licensee may require other technical and/or operational data from the party requesting the connection.

2.2.3. The generator would also apply (likely to make the application at a similar time) to the GBSO for use of the GB transmission system. The GBSO defines arrangements for use of system applications in the CUSC⁵ which includes a proforma application form. The GBSO has also defined and published its process for dealing with applications for connection to and/or use of the GB transmission system that interact with one or more other applications.

2.3. Connection Offer

2.3.1. Distribution licensees are required to offer terms for connection to its distribution system within three months of the connection application. Connection offers from a distribution licensee are usually open for acceptance for 90 days. Each distribution licensee defines in its Condition 4B statements its arrangements for managing interactive offers of connection.

³ Statement published by distribution licensees in accordance with standard condition 4B of the electricity distribution licence.

⁴ Section 16 of the Electricity Act.

⁵ Connection and Use of System Code

2.3.2. The distribution connection offer will contain details of the design of the connection, the connection charges (generally on a firm basis) and the time required to provide the new connection. The distribution connection offer will include terms and conditions but may also include a construction agreement and/or a connection agreement for ongoing use of the distribution system.

2.3.3. The GBSO is required to offer terms for connection to the GB transmission system within three months of receipt of a connection application. The GBSO is required to offer terms for use of the GB transmission system within one month of the use of system application. The time allowed for the GBSO to offer terms is extended to three months if construction works on the GB transmission system are required to allow the applicant use of the GB transmission system. OTETWG observed that it is common for works to be required on the GB transmission system to accommodate use of system applications. Offers for use of system from the GBSO are open for acceptance for three months.

2.4. Contractual Arrangements

2.4.1. Contracts are required that define the arrangements for charges for distribution services, conditions for use of the distribution system, conditions needed due to impact of the embedded large power station on the GB transmission system, (in some cases) charges for use of the GB transmission system and payments to the generator for exported electricity.

2.4.2. Under the current regulatory arrangements there is a need for:

2.4.2.1. A contractual agreement between the distribution licensee and generator for connection to the distribution system.

2.4.2.2. A contractual agreement between the distribution licensee and the generator for use of the distribution system (if registered as a BSC trading party); or

2.4.2.3. A contractual agreement between the supply licensee and generator in respect of the use of the distribution system (if power station is below 100MW and is registered via a supplier under the BSC⁶), and

2.4.2.4. A contractual agreement between the distribution licensee and the supply licensee for use of the distribution system. This is part of the DCUSA⁷.

2.4.2.5. A contractual agreement between the GBSO and the generator for use of the GB transmission system. This contractual agreement will be of one of the following types depending on whether the generator wishes or is required by virtue of the size of the power station, to have transmission system access rights:

2.4.2.5.1. A Bilateral Embedded Generator Agreement (BEGA) – includes rights to use the GB transmission system.

2.4.2.5.2. A Bilateral Embedded Licence Exemptable Large Power Station Agreement (BELLA) – does not include rights to use the GB transmission system.

⁶ Balancing and Settlement Code

⁷ Distribution Connection and Use of System Agreement

2.5. Metering

- 2.5.1. The BSC defines requirements for metering that is used for settlement purposes. Depending on the choice made by the generator, the BSC obligations may apply directly to the generator or via a supplier. The metering requirements vary depending on the size of the generation or demand being metered.
- 2.5.2. The BSC requires that all flows to and from the GB transmission system and to and from BSC trading parties should be metered. In respect of distribution connected demand, the DCUSA defines metering requirements which reflect the BSC requirements.
- 2.5.3. The Grid and Distribution Codes define requirements for operational metering required at the boundary between a power station and the transmission or distribution network.

2.6. Charging Arrangements

- 2.6.1. Distribution licensees publish their charging methodologies which include details of distribution charges for embedded large power stations. In general the charges will consist of:
 - 2.6.1.1. A capitalised charge for connection to the distribution system.
 - 2.6.1.2. A capitalised charge for operation, repair and maintenance of any additional assets required for the connection that are not recovered through enduring use of system charges.
 - 2.6.1.3. A monthly charge for use of the distribution system.
- 2.6.2. If transmission charges are applicable to the embedded large power station, then these are calculated in accordance with the GBSO's charging methodology.

2.7. Embedded Benefits

- 2.7.1. Some generators that are connected to the distribution system can choose to register for embedded benefits. Embedded benefits are available to generators in respect of any distribution connected large power stations where operation of the power station could be permitted by an exemption from the requirement to hold a generation licence. Generators are normally required to hold a generation licence to operate power stations of 100MW or greater.
- 2.7.2. Embedded benefits are the costs that can be avoided by a generator in respect of distribution connected power stations that are smaller than 100MW. The avoided costs may include BSC charges, Transmission Network Use of System (TNUoS) and Balancing Services Use of System charges. A generator that chooses to register for embedded benefits, is not eligible to receive compensation from the GBSO if the output from its power station is restricted due to constraints on the GB transmission system.
- 2.7.3. A generator who has chosen to register for embedded benefits is also able to choose how it registers under the BSC. The generator is able to register directly under the BSC or register via a supplier. Different mechanisms apply in respect of how the embedded benefits would be delivered to the generator depending on the BSC registration option selected by the generator.

2.8. Operational Interfaces

- 2.8.1. The distribution licensee will generally own, control and operate circuit breakers at the interface between the distribution system and the customer.
- 2.8.2. The GBSO has operational interfaces with the generator and the distribution licensee. There is also an operational interface between the generator and the distribution licensee.
- 2.8.3. Arrangements are defined in the Grid Code, Distribution Code and site specific agreements between the GBSO and generator and the distribution licensee and generator that set out how these operational interfaces are and will be managed. These include requirements to notify, agree and exchange safety rules between relevant parties.
- 2.8.4. Arrangements are defined for operational planning timescales in Operating Code ("OC") 2 of the Grid Code and Distribution Operating Code 2 of the Distribution Code. These arrangements define the data exchange arrangements to facilitate the co-ordination of network outages with planned generator outages.
- 2.8.5. Large embedded power stations are normally required to provide the GBSO with half hourly Physical Notifications (PNs) under the Grid Code Balancing Codes. Indicative information about intended output from the power station is required at the day ahead stage and final information is required at gate closure (one hour ahead). In respect of a power station connected to a distribution system, the generator is required to reflect distribution system constraints in PNs that it submits to the GBSO (ie generator can only include in a PN export that it expects to be able to deliver to the transmission system). In addition, distribution licensees are required by the Grid Code⁸ to notify the GBSO of any relevant restrictions on the distribution system at the day ahead stage.

3. Other Relevant Arrangements

- 3.1. OTETWG considered that there were other relevant parallels in current arrangements (or arrangements that were being developed under normal code governance arrangements). OTETWG considered the following as part of this review:
 - 3.1.1. Proposed changes to DCUSA to define arrangements for connections between two distribution networks.
 - 3.1.2. STC arrangements for developing offers of connection to the GB transmission system.

4. Key Differences between Embedded Large Power Stations and Embedded Transmission Connections

- 4.1. The developer of an offshore generator project will apply to the GBSO for connection to and use of the transmission system. The power station would be transmission connected but the transmission connection would be connected via a distribution system.
- 4.2. The GBSO will/may be seeking information in respect of a possible (or an offer for) connection to a distribution system for a network that will be owned by a third party transmission licensee (an offshore transmission owner – "OFTO").

⁸ Balancing Code (BC) 1.6.1.

- 4.3. The GBSO will/may be seeking an offer for use of the distribution system by a third party (the offshore generator).
- 4.4. The GBSO will need to define onshore connection requirements before the offshore transmission system has been designed or the OFTO appointed. Including pre-application information obtained by the offshore generator, as part of a connection application request is likely to be very valuable to the GBSO when progressing the connection application request
- 4.5. The GBSO will/may need to procure services that are within the scope of the EU procurement rules. There are a number of possible service providers as each distribution licence applies on a GB wide basis.
- 4.6. All contractual relationships in respect of embedded transmission connections will involve the GBSO.

5. Arrangements Needed for Embedded Transmission Connections

5.1. Pre-Connection Application

- 5.1.1. OTETWG noted that the SYS provides very limited information in respect of embedded large power stations, observing that data in respect of the higher voltage parts of the distribution system is presented in the relevant LTDS.
- 5.1.2. OTETWG did not identify a need for changes to the scope of information presented in the SYS or the LTDS in respect of offshore generators that are connected via a distribution network.
- 5.1.3. OTETWG noted that BERR and the Crown Estates are developing proposals for a Strategic Environmental Assessment (SEA). The GBSO advised that it is contributing to this work and noted that the additional information in the SEA is intended to provide information for developers of offshore generation projects.
- 5.1.4. Under the current arrangements an offshore generator is able to seek information/feasibility studies from transmission and/or distribution licensees. OTETWG noted the expectation that developers of offshore generation projects are very likely to continue to seek information about possible connection options before submitting a formal connection application.
- 5.1.5. There was general agreement that including pre-application information as part of the connection application would greatly improve the efficiency of the connection application process. It is also expected to improve the quality/robustness of the initial connection offer that would be provided to the offshore generator. It was also suggested that it may be appropriate for a reduced application fee to apply when the offshore generator provides relevant pre-application information as part of its formal connection application to the GBSO, if for example the pre-application information allows some connection options to be ruled out without further evaluation as part of the formal offer process.
- 5.1.6. OTETWG acknowledged that there may be confidentiality provisions that need to be addressed before pre-application work may be disclosed to a third party. It was also recognised that pre-application findings will not necessarily still be valid as there may have been other network changes in the period between the pre-application stage and a formal connection application. Concerns were also raised that the introduction of a mandatory, pre-application stage could impose delays for new generation projects.
- 5.1.7. OTETWG noted that the offshore generator will be responsible for defining its connection requirements as part of the GBSO's connection application process.

OTETWG recommends that the CUSC connection application proforma is reviewed to identify if changes are needed to the scope of information that is required in respect of offshore generator connection applications.

5.1.8. OTETWG did not reach a common view about whether there should be a mandatory pre-application stage for offshore generators or whether it would be more appropriate to rely on incentives for generators to seek information from network licensees to inform a connection application. **OTETWG recommends** that further consideration is given to the incentives on offshore generators to seek and disclose pre-application information.

5.2. Connection Application Process

5.2.1. Under the proposed offshore transmission arrangements the offshore generator would submit an application for a transmission connection under the CUSC to the GBSO.

5.2.2. Ofgem/BERR have set out views in their Offshore Transmission publications that a two stage connection application process is required as part of the new offshore transmission arrangements. Ofgem has also set out proposals for a framework where on receipt of a connection application from an offshore generator, The GBSO should:

5.2.2.1. Notify Ofgem of the application. Ofgem currently proposes that on receipt of such a notification, Ofgem would seek Expressions of Interest from parties who wish to tender for the provision of offshore transmission services⁹.

5.2.2.2. Progress application assessment and design works and make an initial offer to the generator of connection to and use of the transmission system within three months. The offer is expected to define the works required on the onshore system for the offshore generator's connection, set out costs of the works identified and provide an expected completion date.

5.2.2.3. Notify Ofgem of the generator's decision in respect of the initial offer. Ofgem has proposed that it would seek tenders for the provision of offshore transmission system services in respect of connection offers that are accepted by the offshore generator at least one month before a tender window opens.

5.2.2.4. Make a full offer to the offshore generator for connection to and use of the transmission system following Ofgem awarding a transmission licence to the successful bidder at the conclusion of the tender process. This offer is expected to define all works required to provide the connection requested by the offshore generator, set out costs of the connection and define a completion date for the connection.

5.3. Connection Application Process – Initial Offer

5.3.1. This review has noted the proposed two stage approach for preparing transmission connection offers for offshore generators. OTETWG has not considered any changes to the GBSO's current connection application process. OTETWG understood that the GBSO is currently developing detailed proposals for developing connection application processes to incorporate arrangements for applications from offshore generators.

⁹ Ofgem is currently seeking views specifically on the appropriate trigger for the tender process to begin. OTETWG noted that the proposed arrangements are subject to change.

- 5.3.2. OTETWG considered a number of process models for the assessment of embedded transmission connection applications following receipt by the GBSO of a connection application from an offshore generator. These are included as Appendix 1.
- 5.3.3. OTETWG considered the pros and cons of each model. The results of this assessment are included as Appendix 2. OTETWG is not able to provide a recommendation on a preferred process model at this stage.
- 5.3.4. OTETWG noted that a number of the options presented may not be feasible due to the need for the GBSO's actions to be consistent with European procurement rules. **OTETWG recommends** that further work is undertaken to review the restrictions within procurement rules that are relevant when the GBSO is seeking distribution services.
- 5.3.5. In the absence of a preferred process model, OTETWG has not identified specific changes that are needed to the regulatory framework that are needed for embedded transmission. However it was noted that currently the framework does not define arrangements for the GBSO as a customer of a distribution licensee. OTETWG acknowledged that changes would be needed to the DCUSA, Distribution Code and possibly each distribution licensee's Condition 4B statement to recognise that in some circumstances the GBSO would be seeking distribution services from a distribution licensee.
- 5.4. Connection Stage Application – Full Offer
- 5.4.1. Ofgem's proposed tender process will conclude with the award of a transmission licence to the successful bidder for the provision of offshore transmission services in respect of specific offshore generator connection request(s). The new transmission licensee will be required to provide an offer to the GBSO for the provision of the offshore transmission system. The design of the offshore transmission system may have consequential impacts on the design of the onshore works identified in the initial offer made to the offshore generator. For example, there may be a need to change the location of the connection point between the offshore transmission system and the onshore network.
- 5.4.2. If the initial offer made to the offshore generator included an embedded transmission option, the GBSO may need to seek a variation to the offer made by the distribution licensee (which had been reflected in the offer made to the offshore generator). Distribution licensees confirmed that they have processes in place to manage requests from an applicant to amend the terms of connection offers and agreements.
- 5.4.3. OTETWG questioned whether it would be more efficient to defer consideration of options for connection of an offshore transmission system to a distribution system until there was more certainty about the design of the offshore transmission system (in terms of voltage of the offshore transmission assets and the landing point for the offshore cables). Distribution licensees noted that distribution connection options available for offshore transmission systems were likely to be more sensitive to the location of the onshore landing point than transmission system connection options due to the size and location of existing distribution system assets.
- 5.4.4. OTETWG considered that there may be merit in also considering a process model where embedded transmission connection options are only investigated by the GBSO in parallel with Ofgem's tender process. It was suggested that offers for connection to and use of a distribution system could then be sought by the GBSO (where required) from relevant distribution licensees to form part of the full offer.

5.4.5. **OTETWG recommends** that a model where options to connect an offshore transmission system via a distribution system are investigated by the GBSO (by requesting information, feasibility studies and/or offers of connection from one or more distribution licensees) in parallel with Ofgem's tender process.

5.5. Contractual Arrangements

5.5.1. In respect of embedded transmission connections there would need to be:

5.5.1.1. A contractual agreement between the generator and the GBSO for connection to and use of the transmission system. This agreement together with the CUSC, will define the generator's rights to use the transmission system. The rights to use the transmission system would need to reflect the rights secured by the GBSO to use the distribution system.

5.5.1.2. A contractual agreement between the GBSO and the OFTO for the provision of offshore transmission services. This will set out the terms for construction of transmission assets and define the capability of the offshore transmission system.

5.5.1.3. A contractual agreement between the GBSO and the distribution licensee for provision of distribution services (if required). This will set out the terms for construction of distribution assets and define the GBSO's rights to use the distribution system up to a defined Maximum Export Capacity and Maximum Import Capacity. The agreement would define capability in terms of real and reactive power flows.

5.5.1.4. A contractual agreement between the GBSO and the onshore transmission licensee for provision of transmission services (if required). This will set out the terms for construction of transmission assets and define the capability of the relevant parts of the onshore transmission system.

5.5.1.5. An interface agreement between the generator and the OFTO in respect of the offshore connection point. This will define arrangements relevant at the point of physical connection (eg site access and other safety related matters).

5.5.1.6. An interface agreement between the OFTO and the distribution licensee in respect of the connection point between the offshore transmission system and the onshore distribution system. This will define arrangements relevant at the point of physical connection (eg site access and other safety related matters).

5.5.2. One distribution licensee raised concerns about the proposal to require it to enter into an operational agreement with a party with whom it does not have a connection agreement. This distribution licensee added that it would be possible to establish a three way operational agreement between the distribution licensee, GBSO and OFTO.

5.6. Construction

5.6.1. OTETWG noted that on acceptance of an offer of transmission connection made to an offshore generator, there will be a construction agreement between the two parties which will define key milestones for the construction programme. The construction agreement will also include requirements for both the GBSO and the offshore generator to develop a detailed work programme for the construction and commissioning phases.

- 5.6.2. OTETWG also noted that on the GBSO's acceptance of a connection offer from a distribution licensee, there would be an agreement for construction works. OTETWG observed that there are differences between the format of the agreements for construction that are offered by each distribution licensee. However it was generally considered that the content of these different types of agreement are broadly similar and would be tailored to reflect specific aspects of each connection request.
- 5.6.3. OTETWG noted the need to coordinate all construction works required to provide a transmission connection for an offshore generator. **OTETWG recommends** that construction agreements should include obligations to develop coordinated work programmes as a minimum. **OTETWG recommends** that further consideration is given to whether there is a need to introduce a requirement for the GBSO, OFTO and distribution licensee to develop a combined work programme. OTETWG noted that the STC¹⁰ already includes this type of requirement when more than one transmission licensee needs to carry out work to facilitate a new connection. OTETWG assumes that this STC obligation would apply to OFTOs.

5.7. Metering

- 5.7.1. The current BSC would require settlement metering to be installed at each end of the offshore transmission system. The BSC Panel is able to grant dispensations from the metering requirements and if requested would consider each case on its merits.
- 5.7.2. OTETWG discussed two possible alternative options in respect of settlement metering requirements for the offshore transmission system. These options were to only require settlement metering at the:
- 5.7.2.1. Offshore connection between generator(s) and the offshore transmission system and apply scaling factors to determine the volumes for the onshore connection point.
 - 5.7.2.2. Onshore connection point and apply scaling factors to determine the output from the offshore generator.
- 5.7.3. OTETWG noted the difficulties with installing metering which needs to be routinely checked, offshore. OTETWG also recognised that installing metering at the onshore connection point would only be viable if there was a single Balancing Mechanism Unit (BMU) at the offshore connection point. OTETWG noted the interaction with the recommendation made by the Grid Code sub group in respect of what a generator should be allowed to register as a single BMU offshore. **OTETWG recommends** that the metering requirements for an offshore transmission system are considered further in light of decisions in respect of the Grid Code requirements that should apply offshore.
- 5.7.4. OTETWG also discussed responsibility for installing settlement metering equipment at the connection point between an offshore transmission system and a distribution system. OTETWG noted that under the current arrangements, the distribution licensee is responsible for installing settlement metering at other types of interface points between a distribution system and the GB transmission system. OTETWG considered this arrangement may not be appropriate to apply in respect of offshore transmission system connections as such connection points are established to provide distribution services for transmission connections.
- 5.7.5. OTETWG noted that under the DCUSA, users of the distribution system are responsible for installing settlement metering. **OTETWG recommends** that current BSC and/or DCUSA arrangements should be developed to ensure that a distribution

¹⁰ System Operator Transmission Owner Code

licensee is able to treat offshore transmission connections consistently to other types of customer connections to the distribution system.

5.8. Operation

5.8.1. OTETWG considered that changes are needed to the existing framework to reflect that the power station will be transmission connected. OTETWG reviewed the existing Grid Code OC2 arrangements in respect of coordination of transmission system outages with generator and relevant distribution system outages in respect of embedded large power stations. **OTETWG recommends** that existing Grid Code OC2 arrangements are extended to enable coordination of offshore generator outage plans with relevant transmission and distribution system outages.

5.8.2. One key difference between embedded transmission connections and embedded large power station connections is that under the proposed offshore transmission arrangements the generator connected to an offshore transmission system would not have a direct interface with the distribution licensee. Therefore the offshore generator would not have direct knowledge of any distribution constraints when making PN submissions for offshore BMUs in accordance with Grid Code requirements.

5.8.3. The GBSO would be required (by its connection agreement with the distribution licensee) to ensure that the power flows (real and reactive) and voltages at the point of connection between the offshore transmission system and the distribution system remain within specified limits. Depending on the design of the connection (which depends on the connection requested by the GBSO), restrictions on the capability of the distribution system may need to apply.

5.8.4. OTETWG were informed that distribution licensees are increasingly using automated systems to manage access to distribution systems. OTETWG noted that if automated systems are used to manage distribution network restrictions in respect of an offshore transmission system connection, there is likely to be a need for specific conditions to be included in the agreement between the GBSO and distribution licensee (that are reflected in the agreement between the GBSO and the OFTO).

5.8.5. OTETWG noted the existing Grid Code obligation (BC1.6.1) for distribution licensee notification of distribution system constraints that are relevant to transmission system operation and to embedded large power station connections.

5.8.6. OTETWG considered two types of arrangements for information exchange from a distribution licensee to the GBSO about distribution system availability. These options were to require the distribution licensee to notify the GBSO:

5.8.6.1. Of distribution system availability on a half hourly basis.

5.8.6.2. When distribution system constraints (planned or unplanned), that impact on the capability of the offshore transmission system connection apply.

5.8.7. **OTETWG recommends** that arrangements based on the option of notifying all parties (the GBSO, OFTO and generator) or relevant network and/or access restrictions are developed. OTETWG considers that there is merit in considering defining these requirements in the Grid Code as the Grid Code already includes data notification requirements in respect of other types of interface points between the transmission and distribution systems. OTETWG considered that these existing arrangements could be extended to include parts of the distribution system that provide connection for an offshore transmission system.

- 5.8.8. Under the current arrangements, the compensation arrangements defined under the CUSC framework when a generator's access is restricted, do not apply when the restriction is due to distribution system unavailability. It is not proposed to amend this exception as part of the new offshore transmission arrangements.
- 5.8.9. OTETWG recognised that there is a need to develop the contractual arrangements between the GBSO and the offshore generator, so that the compensation arrangements managed by the GBSO continue to exclude distribution system constraints. OTETWG notes that similar exclusions from the compensation arrangements can apply in respect of defined transmission system restrictions (eg in cases where customer has requested a design variation). These exclusions are set out in separate agreements between the GBSO and the generator under the current arrangements.
- 5.8.10. **OTETWG recommends** that the CUSC and Grid Code arrangements should be reviewed to maintain the exclusion of distribution system constraints from the GBSO administered compensation arrangements.
- 5.8.11. This review has only considered the operational interface required between the GBSO and the distribution licensee in respect of the impact of the distribution system on the availability of the offshore transmission system. OTETWG noted that the operational interface between GBSO and OFTO will be defined in the STC and that the STC working group has previously made recommendations.
- 5.8.12. OTETWG did not identify any specific additional information that a distribution licensee would require to operate a distribution system with one or more embedded transmission connections.

5.9. Charging

- 5.9.1. Distribution licensees noted that currently they normally offer connections to customers on a fixed price basis. However, distribution licensees also advised or circumstances where they would reserve the right to vary the charge in a connection offer in specific circumstances (eg when planning consents are required). OTETWG agreed that changes may be needed to the distribution licensee's normal offer arrangements due to the expected lead time between the acceptance of an initial offer and the required completion date for the connection.
- 5.9.2. OTETWG considered that the changes needed to distribution licensees' charging arrangements depend on the stage in the GBSO's connection application process when the distribution licensee is asked to make a connection offer to the GBSO. OTETWG noted that changes are more likely to be needed if the distribution licensee is required to make an offer to the GBSO to inform an initial offer to an offshore generator. This need is due to the time delay that would be expected before construction works will commence.
- 5.9.3. OTETWG identified two options for managing the risk to the distribution licensee of offering terms to the GBSO at the initial offer stage. These options were for the distribution licensee to:
- 5.9.3.1. Include indicative costs in its connection offer to the GBSO that are reconciled with actual costs when construction works are initiated or completed. This would align with the GBSO's process when making transmission connection offers.
 - 5.9.3.2. Reserve rights in its initial offer to update charges following the appointment of the OFTO.

- 5.9.4. OTETWG noted that the risks to the distribution licensee of retaining the current process of normally offering distribution connections on a fixed price basis would be lower if the distribution licensee made an offer to the GBSO at a later stage in the transmission connection application process.
- 5.9.5. **OTETWG recommends** that the basis of a distribution licensee offer should be changed if distribution licensees are required to make an offer to the GBSO at the initial offer stage.
- 5.9.6. OTETWG noted that as the contractual counterparty, the GBSO would be responsible for the distribution licensee connection and use of system charges. OTETWG further observed that the GBSO will consider options for the recovery of these distribution licensee charges as part of its development of charging arrangements for offshore transmission.

6. Recommendation

- 6.1. OTETWG has reviewed the current arrangements for embedded large power stations and has identified a number of areas where these arrangements could be developed to accommodate embedded transmission connection. OTETWG makes the following recommendations to Ofgem/BERR, in respect of the areas where OTETWG considers that further work is needed to inform development of their proposals for embedded transmission as part of the offshore transmission project.
- 6.2. OTETWG recommends that:
- 6.2.1. Commercial drivers for generators to seek pre-application information and disclose relevant information as part of a formal connection application should be reviewed and where feasible developed.
- 6.2.2. The CUSC connection application proforma is reviewed and developed to identify any further information which is required from offshore generators.
- 6.2.3. EU procurement rules are reviewed to identify any restrictions that are relevant to the GBSO when seeking distribution services.
- 6.2.4. DCUSA, Distribution Code and distribution licensee Condition 4B statements are reviewed to identify changes that are needed (if any) to recognise that the GBSO may be seeking distribution services.
- 6.2.5. A process model where embedded transmission connection options are not considered by the GBSO at the initial application stage, but are investigated by the GBSO in parallel with Ofgem's tender process.
- 6.2.6. Further consideration is given to whether there is a need to introduce a requirement for the GBSO, OFTO and distribution licensee to develop a combined work programme.
- 6.2.7. Metering requirements for an offshore transmission system are assessed in light of the changes proposed to the Grid Code for offshore (in respect of what may be registered as a BMU offshore).
- 6.2.8. Arrangements in DCUSA and BSC are developed to define responsibilities for installing metering at the connection point between an offshore transmission system and a distribution system that are consistent with requirements that apply to other types of distribution system users.

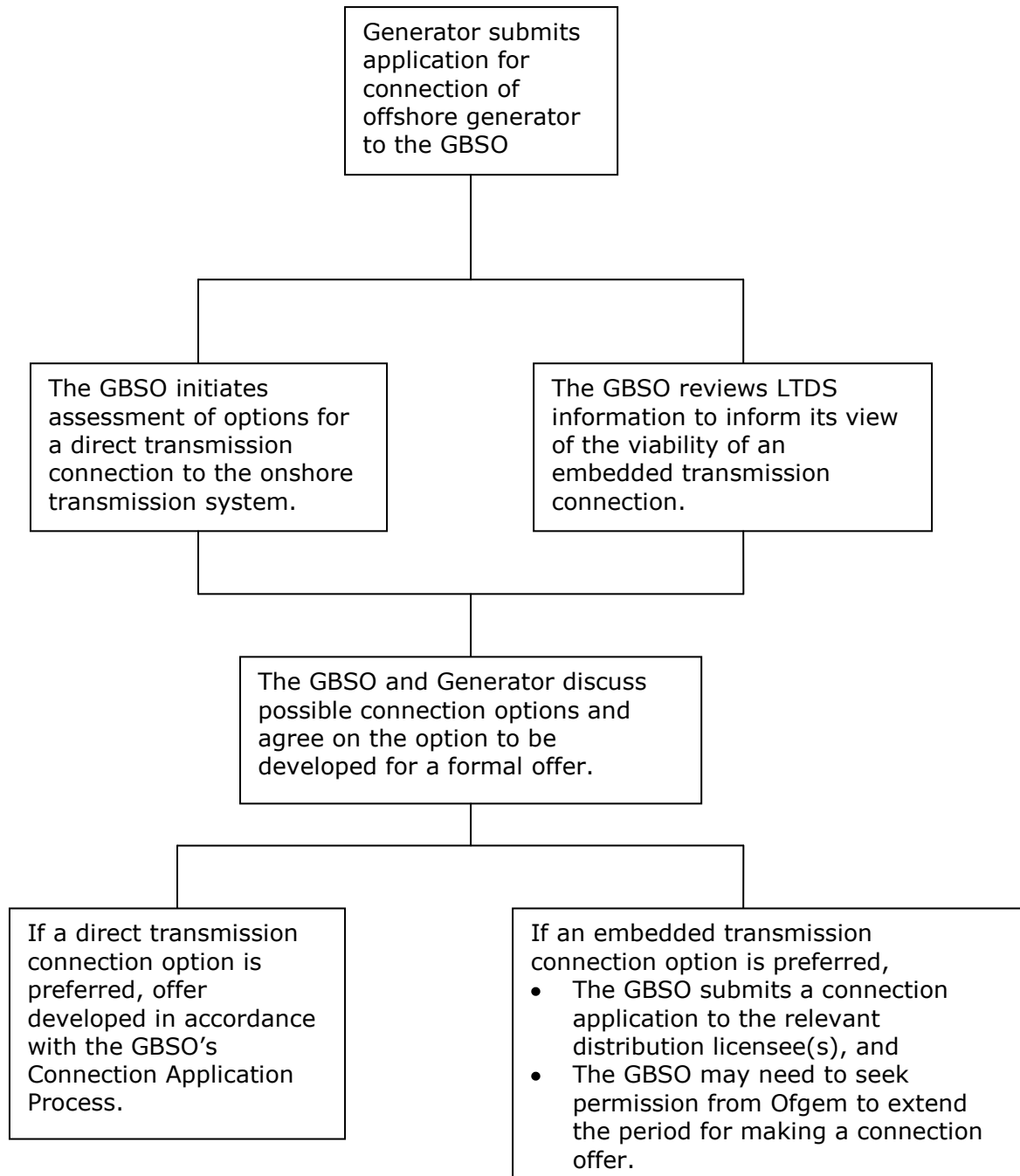
- 6.2.9. Arrangements based on the option of notifying all parties (GBSO, OFTO and the generator) of voltage requirements at the point of connection, relevant networks and associated access restrictions are developed.
- 6.2.10. Existing Grid Code OC2 arrangements are extended to enable coordination of offshore generator outage plans with relevant transmission and distribution system outages
- 6.2.11. CUSC and Grid Code arrangements should be reviewed to maintain the exclusion of distribution system constraints from the GBSO administered compensation arrangements.
- 6.2.12. The basis of a distribution licensee offer should be changed if distribution licensees are required to make an offer to the GBSO at the initial offer stage.

Appendix 1 - Process Options for Identifying Embedded Transmission Connection Options as part of the Initial Stage of the Transmission Connection Application Process

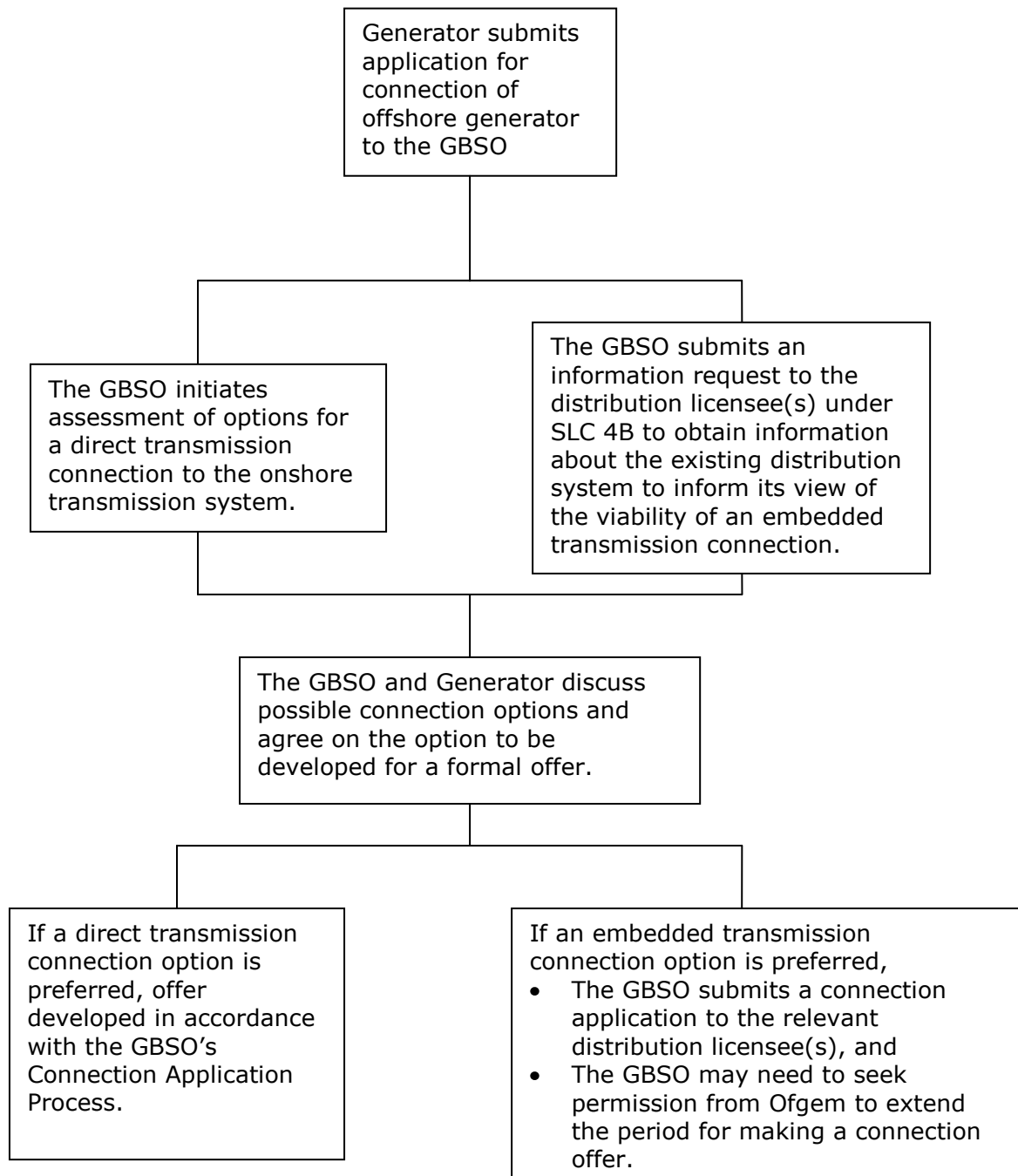
Note:

None of the options preclude optional pre-application and/or feasibility studies. For simplicity, each of the options is shown from the point of a formal connection application to the GBSO from the generator.

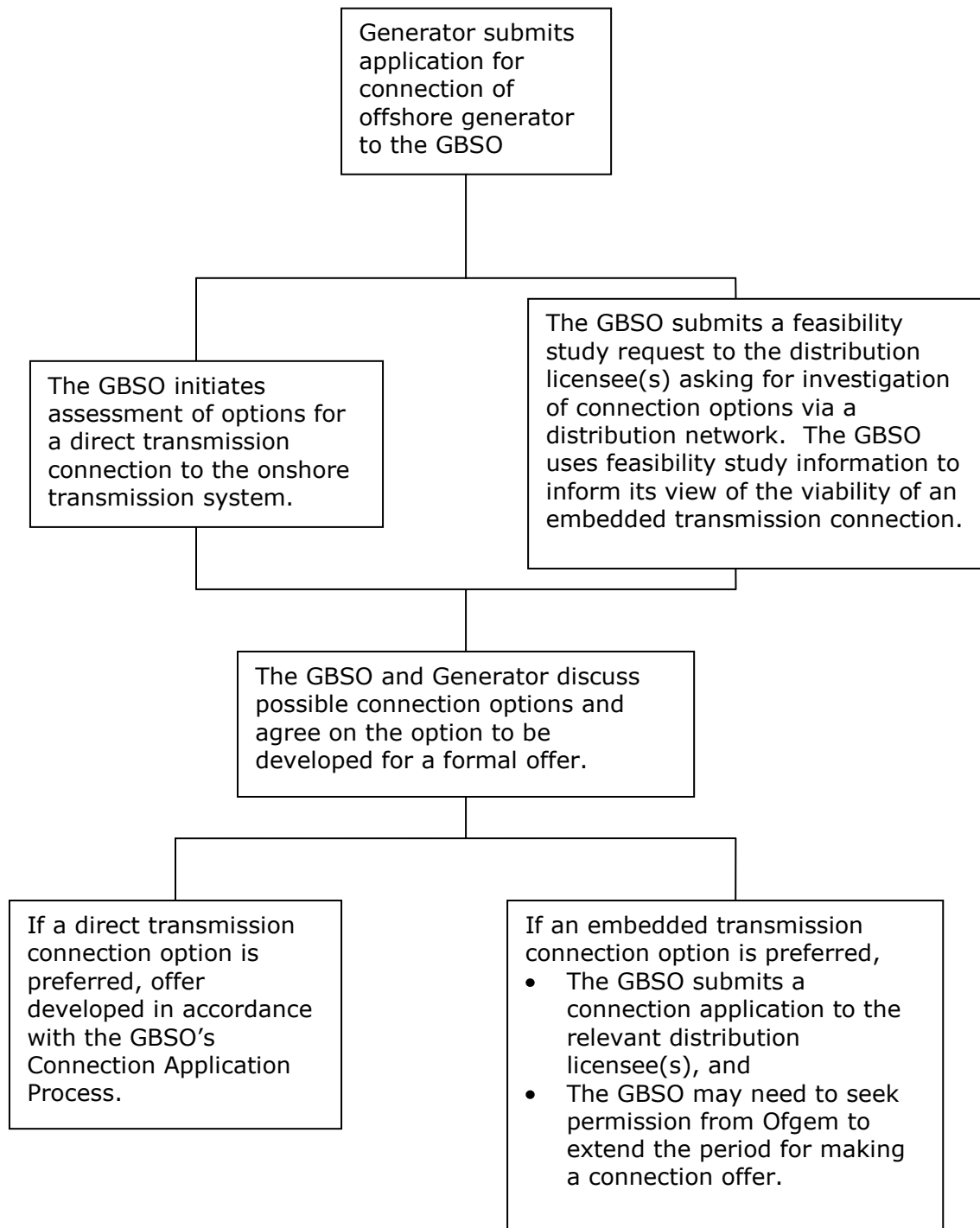
Option 1a



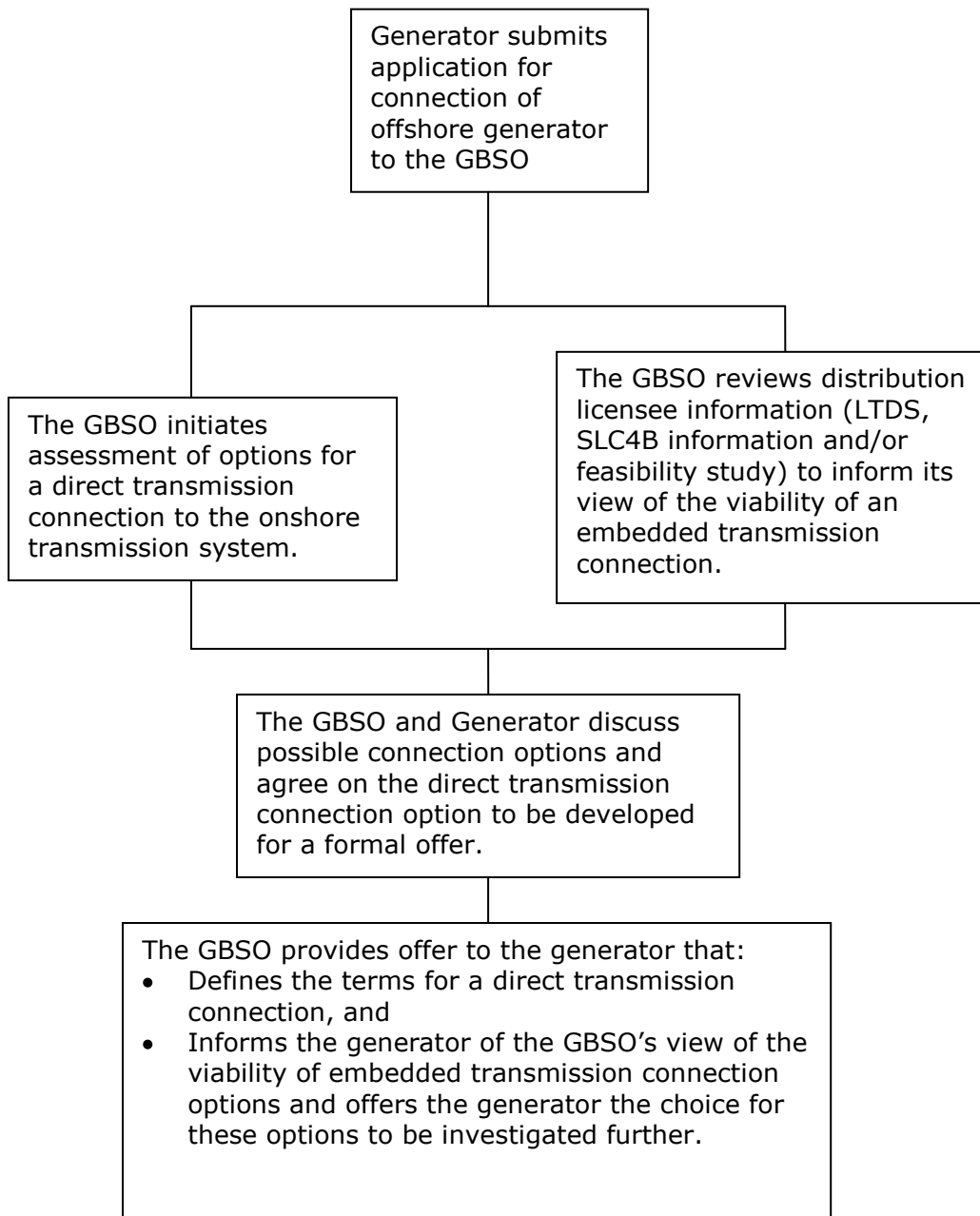
Option 1b



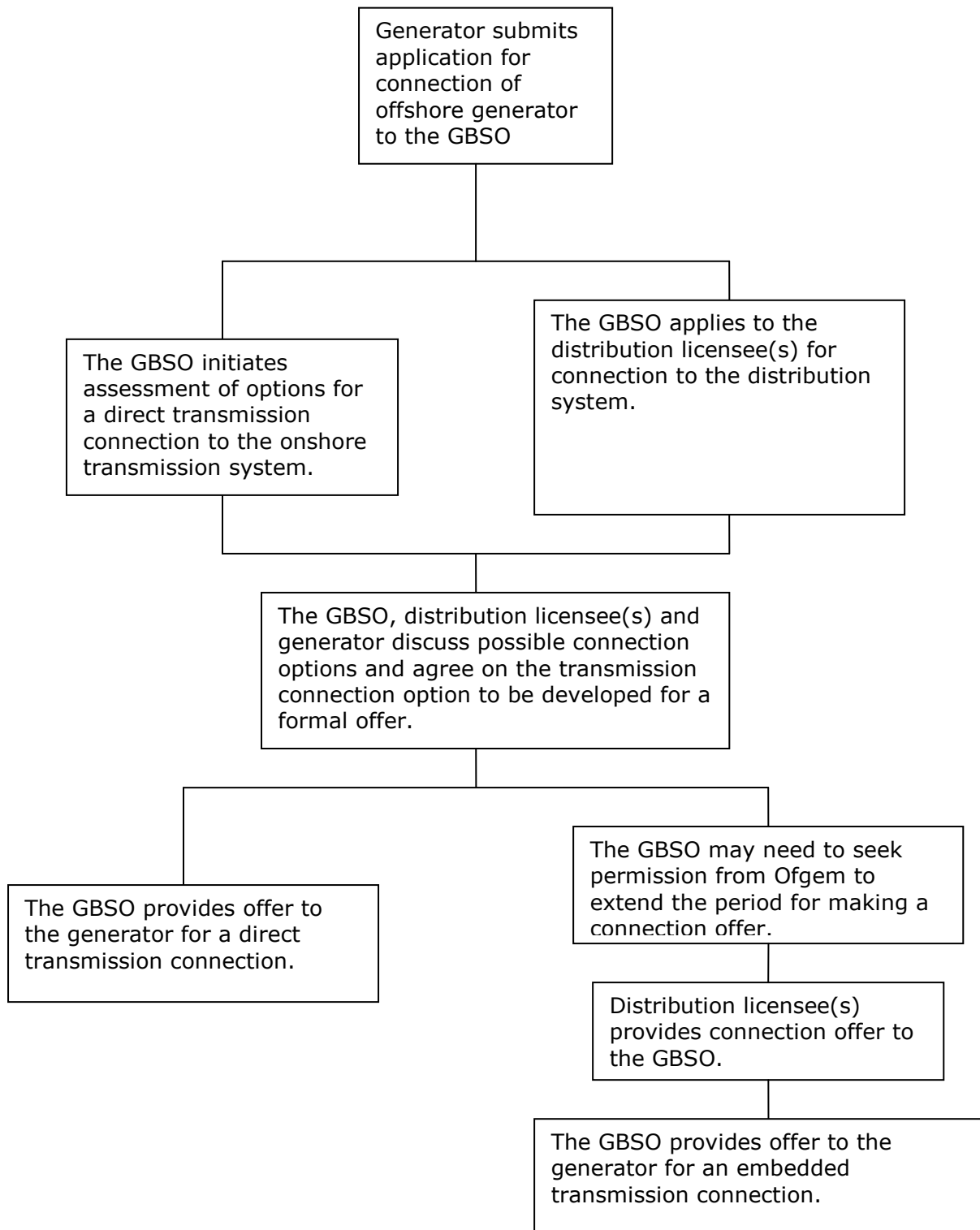
Option 1c



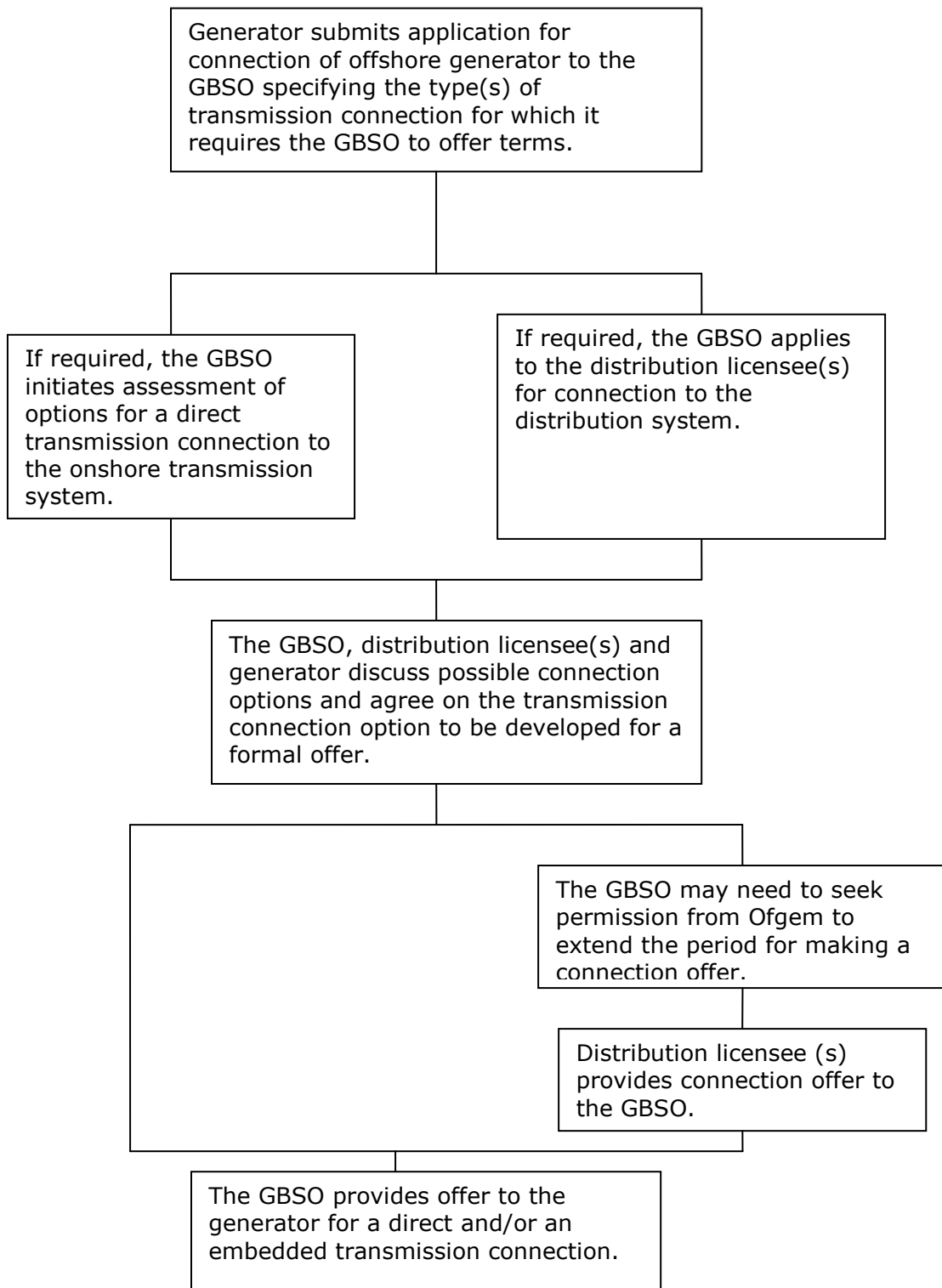
Option 2



Option 3



Option 4



Appendix 2 – Assessment of Process Options

Option 1a	
Pros	Cons
<ul style="list-style-type: none"> • Simple process. • Generator included in decision making process. • Avoids the need to prepare 2 formal offers. • Lack of direct contact with any distribution licensee at the initial stage does not provide any possible distribution service provider with a competitive advantage. 	<ul style="list-style-type: none"> • Lack of direct communication with distribution licensee by GBSO. • The LTDS data in isolation is probably insufficient to judge the feasibility of embedded transmission connection options. • Appears to ignore any earlier feasibility work (pre-application). • Possible competition issues if the GBSO only approaches a limited number of possible distribution service providers.
Option 1b	
<ul style="list-style-type: none"> • Generator included in decision making process. • Avoids the need to prepare 2 formal offers. • Information may be more up to date than given in last LTDS. • Information would be provided by the distribution licensee within 28 days. 	<ul style="list-style-type: none"> • Potentially insufficient information for the GBSO or the generator to judge the feasibility of an embedded transmission connection option. • Appears to ignore any earlier feasibility work (pre-application). • Possible competition issues if the GBSO only approaches a limited number of possible distribution service providers.
Option 1c	
<ul style="list-style-type: none"> • Generator included in decision making process. • Feasibility study results will help define if an embedded connection is feasible. • Promotes discussion between GBSO, distribution licensee and generator before formal offer is prepared. 	<ul style="list-style-type: none"> • No defined timescales for a feasibility study. • No minimum scope is defined for a feasibility study. • If developer prefers a direct transmission connection, the feasibility study is wasted. • Confidentiality issues associated with any requirement for the GBSO to disclose offshore generator before the offer has been accepted. • Appears to ignore any earlier feasibility work (pre-application). • Possible competition issues if the GBSO only approaches a limited number of possible distribution service providers.
Option 2	
<ul style="list-style-type: none"> • Generator included in decision making process. • the GBSO should be able to make formal offer within 3 month timescales. • Confidentiality maintained. 	<ul style="list-style-type: none"> • Inefficient flow of information about embedded transmission connection option. • Lack of distribution licensee involvement at initial stage may not lead to most efficient solution. • Direct transmission offer always made, even if not the most viable

	<p>option.</p> <ul style="list-style-type: none"> • No formal distribution licensee connection application made could delay offer of connection to the offshore generator by a further 3 months. • Appears to ignore any earlier feasibility work (pre-application).
Option 3	
<ul style="list-style-type: none"> • Generator included in decision making process. • Distribution licensee directly involved in process. • Information about each type of transmission connection option available at an earlier stage. • The GBSO and distribution licensee working in parallel increases likelihood of offers for both types of transmission connection being made within or close to 3 months. 	<ul style="list-style-type: none"> • Embedded transmission offer always requested even if not viable. • Procurement rules could be an issue. • Ability to extend offer period may mean missing tender windows. • Confidentiality issues associated with any requirement for the GBSO to disclose offshore generator before the offer has been accepted. • Appears to ignore any earlier feasibility work (pre-application). • Possible competition issues if the GBSO only approaches a limited number of possible distribution service providers.
Option 4	
<ul style="list-style-type: none"> • Generator more in control of the options for which formal offers are provided. • Encourages generator to carry out pre-application work. 	<ul style="list-style-type: none"> • Forces choice of connection option at an early stage which may lead to a sub-optimal decision. • Restricts options available to the GBSO (and/or other transmission or distribution licensees).