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ESO process for Offshore Wider Works

Foreword

- 5.1 This section contains National Grid ESO's proposed processes for Offshore Wider System Works in the following two areas:
- 5.2 **Offshore Wider Works – Developer Associated** describes the process for investment in transmission capacity to provide wider network benefit, which is led by developers (whether generator builds or OFTO build). It includes investment in offshore transmission assets or capacity that goes beyond that needed by a single developer and is for the purpose of supporting the reinforcement of the GB transmission network (the wider network). This could include investment providing for, or creating the potential for, increased boundary transfers between different zones of the wider network via offshore links.
- 5.3 **Offshore Wider Works – Non Developer Associated** describes the process for investment that would support reinforcement of the wider transmission network, but where developers are unwilling or unable to take forward the offshore wider works. Offshore Wider Works Non Developer associated Needs Case is in many cases a substitute for onshore wider works.

Offshore Wider Works – Developer Associated overview

- 5.4 Current offshore transmission assets have been developed as standalone connections to shore known as radial connections. However, the Round 3 offshore wind projects are larger, more complex and at a greater distance from shore than those that have been developed so far. As a result there is likely to be the potential for efficiencies from greater coordination of offshore transmission infrastructure. This could include coordination between connections, and coordination of the strategic development of the wider network through offshore reinforcement projects.
- 5.5 Developer Associated Offshore Wider Works is investment in transmission capacity to provide wider network benefit, which is led by developers (whether generator builds or OFTO builds). It includes investment in offshore transmission assets or capacity that goes beyond that needed by a single developer and is for the purpose of supporting the reinforcement of the GB transmission network (the wider network). This could include investment providing for, or creating the potential for, increased boundary transfers between different zones of the wider network via offshore links.
- 5.6 The offshore connection offer process has a key role in the development of a coordinated offshore transmission network. Where it is economic and efficient, Offshore Wider Works may form part of a developer's connection offer and subsequent bilateral connection agreement (BCA)¹⁹.
- 5.7 In the December 2013 consultation, Ofgem proposed high level roles and responsibilities to support a gateway assessment process for Offshore Wider Works. In responding to the Ofgem proposals, stakeholders broadly agreed that the ESO should support the Needs Case for Developer Associated Offshore Wider Works at the gateway assessments. Ofgem maintains the position that the developer should lead in triggering and making submissions to the voluntary gateway assessments, and that the ESO (drawing on relevant Transmission Owners (TOs) as necessary) should assist with developing the Needs Case for the Offshore Wider Works for any Ofgem gateway assessments. Further, both parties will have a role in monitoring the Needs Case for the Offshore Wider Works, with the developer reviewing their design where this is an appropriate response to a change in the Needs Case.
- 5.8 Ofgem at this stage, consider that offshore developers should retain the choice to undertake preliminary Offshore Wider Works for the development of coordinated offshore transmission assets under a Developer Associated Needs Case.

¹⁹ In planning and developing offshore transmission assets under the generator build option, developers are required under the Grid Code (Planning Code) to take into account reasonable requests from the NETSO where it is reasonable and practicable to do so (PC.8.3)

Offshore Wider Works – Developer Associated: the ESO's role

- 5.9 Based on the consultation document from December 2013 a majority of the respondents agreed that the ESO should support the Needs Case for Developer Associated Offshore Wider Works. It was also very clear from the consultation that affected TO and offshore developer's contribution and cooperation would be also required. The following text is explaining each point of the ESO process for Developer Associated Offshore Wider Works.
- 5.10 Step 1: Identification of System Need. The Offshore Wider Works can be identified in two ways:
- a. The ESO assess the system need through the annual Electricity Ten Year Statement (ETYS) process. Some of the system reinforcement options will be Offshore Wider Works options and will be subsequently included in the NOA document.
 - b. Offshore Wind Farms Connection offers will also identify the investment need for the Offshore Wider Works.
- 5.11 Step 2: Offshore Wind Farm Connection Application and CION
- a. As part of the connection offer process, the ESO is required to provide details to the developer of the preliminary identification and consideration of the connection options available. This includes the preliminary costs used in assessing such options and the offshore works assumptions, including the assumed interface point identified. The ESO fulfils these requirements by the production of the Connections Infrastructure Options Note (CION). The CION sets out the offshore works assumptions and consideration of options available and is provided to the developer during the connection offer process.
- 5.12 Step 3 & Step 4: The ESO and offshore developer are working together on development of the Offshore Wider Works Options
- a. In collaboration with the offshore developer, the ESO develops the Offshore Wider Works options.
 - b. In developing Offshore Wider Works, the ESO will take into consideration two major transmission system design criteria: network capacity availability of the local boundary and shortfall of the wider system boundaries.
 - c. According to Chapter 2 of the NETS SQSS – Generation Connection design, the transmission system is designed to accommodate 100% of the transmission entry capacity at the connection point within a local boundary (e.g. for a 1GW wind farm connection, the onshore system is designed to accommodate the complete 1GW generation and the offshore assets are sized to provide this full transmission entry capacity.)
 - d. In planning the Main Interconnected Transmission System (MITS) however, different scaling factors are applied to different types of generating. In the case of wind, this implies that the assets are not assumed to be 100% utilised by the wind generated. Taking into account all these scaling factors, the offshore infrastructure is allowing some spare capacity in the assets. It is this 'spare' capacity that provides the opportunity for offshore wider works to be utilised as one of the options to provide boundary capability. In providing the Offshore Wider Works design it is crucial the ESO and offshore developer work together and agree on the generation background, scenarios and sensitivities which will be used as a basis for the Offshore Wider Works Design. In this stage the ESO will inform Ofgem on the agreed background and scenario between ESO and offshore developer.
 - e. The benefits of the Offshore Wider Works will also be assessed by utilising a combination of operational actions to maximise the capability across the boundaries (e.g. actions included QB optimisation and redirection of flows in HVDC links).
 - f. Once the ESO and the offshore developer agree on Offshore Wider Works options, the agreed Offshore Wider Works options are progressed into the cost-benefit analysis.
- 5.13 Step 5: Cost-benefit analysis. The ESO, supported with information from the offshore developer, perform the cost-benefit analysis on the agreed Offshore Wider Works options from Step 3 & 4. The rationale behind the Cost-benefit analysis is explained in the following text:

- g. The key economic objectives for cost-benefit analysis for Offshore Wider Works are:
 - vi. Ensure value for money for the consumers by delivering cost effective reinforcements to ensure economically efficient design and operation of the network.
 - vii. Timely delivery of necessary reinforcement(s) to minimise any cost exposure for consumers to either early investment or delayed implementation.
 - h. The objectives for Offshore Wider Works cost-benefit analysis are:
 - i. To be consistent with Licence obligations and National Electricity Transmission System (NETS) Security and Quality of Supply Standards (SQSS); the analysis promotes economic and efficient investment.
 - ii. To present economic justification for the preferred Offshore Wider Works designs and an explanation of how they compare with the alternative counterfactual case.
 - iii. To present evidence on expected long-term value for money for consumers considering a range of sensitivities
 - iv. To present evidence on optimal timing of the preferred reinforcement option.
 - i. Driven by these objectives the scope of the cost-benefit analysis is:
 - i. To establish the reference case position in terms of constraint costs forecasts associated with the 'do minimum' network state, across different generation background scenarios.
 - ii. To model the economic impact, measured as constraint cost savings, for a range of designs, across a range of scenarios.
 - j. To undertake a cost-benefit analysis by:
 - i. Appraising the economic case of the options by adopting the Spackman²⁰ approach and determining respective Net Present Values (NPVs) across the studied generation scenarios and sensitivities.
 - ii. Establishing worst regrets associated with each design/technology appraised.
 - iii. Identifying the Least Worst Regret option overall
 - iv. Assessing the impact of key sensitivities: increase in capital expenditure, and delays in delivery timeframes.
 - v. Make recommendations for the preferred option i.e. the Least Worst Regret solution, taking into consideration the impact of sensitivities.
- 5.14 Step 6: The ESO discusses the preferred Offshore Wider Works option from cost-benefit analysis (Step 5) with the offshore developer and affected TO
- 5.15 Step 7: Offshore Wider Works Needs Case submission through the voluntary gateway process
- a. The ESO makes a recommendation on preferred option for Developer Associated Offshore Wider Works. The ESO supports the offshore developer in its submission of the Offshore Wider Works Needs Case to Ofgem via voluntary gateway process
 - b. Based on the last consultation in December 2013 offshore developers will have the option to go through one or two Ofgem gateway assessments, timed broadly ahead of the commencement of preliminary works and ahead of construction works. Where a developer is comfortable that it can support its decision to develop the Offshore Wider Works as part of a cost assessment during a tender exercise, the developer can choose not to go through one, or both, of the gateway assessments. In general, Ofgem is expecting that two voluntary gateway assessments would be sufficient. However, if a developer considers that there are substantial benefits to passing through more than two gateway assessments in a particular case (for example in the case of particularly large,

²⁰ The Joint Regulators Group on behalf of UK's economic and competition regulators recommend a discounting approach that discounts all costs (including financing costs as calculated based on a Weighted Average Cost of Capital or WACC) and benefits at the Social Time Preference Rate (STPR). This is known as the Spackman approach. Further details of our assumptions regarding WACC and STPR are presented later in this document.

complex projects) Ofgem would look to engage with the developer to understand these benefits and consider the best way forward.

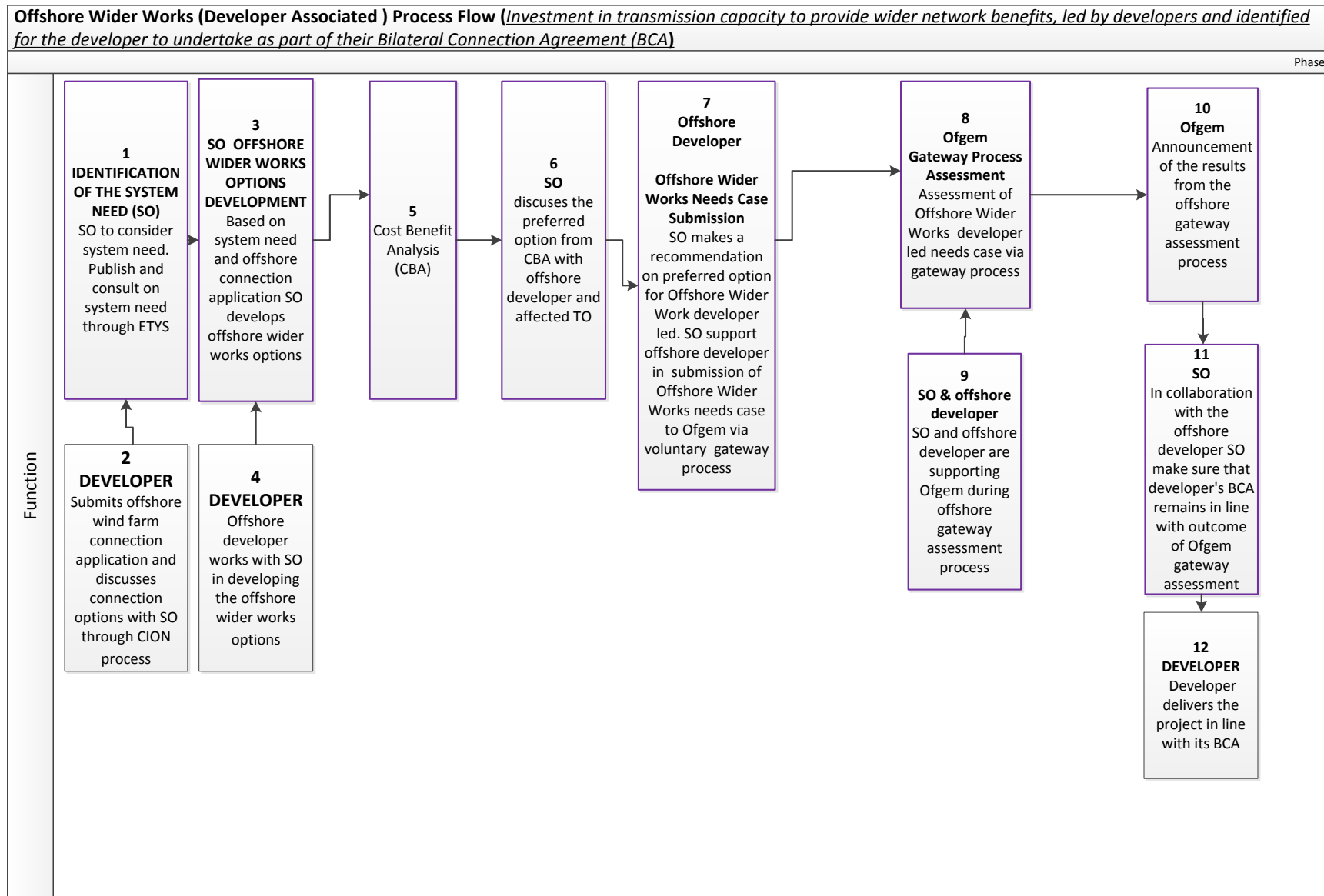
- c. At the first gateway assessment, Ofgem will review the rationale for including the Offshore Wider Works in a developer's design solution at the preliminary works stage. This is the case for developers following both the generator build and OFTO build option. Where Ofgem is convinced by the developer's rationale for undertaking certain preliminary works associated with the Offshore Wider Works, Ofgem would not reassess this rationale during the tender exercise.
- d. At the second gateway Ofgem will review the rationale for constructing the Offshore Wider Works. Where the developer chooses the generator build option, the Ofgem assessment at the second gateway will inform the cost assessment process undertaken during the subsequent tender exercise. Where Ofgem is convinced by the developer's rationale for including specific additional, or oversized, transmission assets associated with the Offshore Wider Works, Ofgem would commit to not reassessing this rationale during the tender exercise. Where a developer is following the OFTO build option, the Ofgem assessment will help to inform the scope of the OFTO build tender exercise.
- e. Any Ofgem commitment regarding not re-assessing the rationale for the Offshore Wider Works at the first or second gateway, would be conditional on the ESO and the offshore developer continuing to engage and monitor the Needs Case for the Offshore Wider Works. Where the Needs Case changes, Ofgem expects these parties to review the design of the offshore assets and make any necessary changes where this would be economic and efficient. Ofgem is expecting that this process would take into account both the needs of the wider network and the impact of any changes on the cost and timing of an offshore developer's connection. In some instances, a change in the Needs Case for the Offshore Wider Works may mean that the Offshore Wider Works is no longer taken forward.
- f. All the costs incurred in connection with development and construction of the agreed scope of the transmission assets, including the Offshore Wider Works elements, would remain subject to the economic and efficient test as part of Ofgem's cost assessment.

5.16 Step 8: Voluntary Gateway Process Assessment

- a. 1st gateway assessment (preliminary works): The developer, supported by the ESO, may submit a Needs Case for the Offshore Wider Works to Ofgem. Where a robust Needs Case is submitted, Ofgem makes commitments on approach to cost assessment on the rationale for Offshore Wider Works preliminary works.
- b. 2nd gateway process: The developer, supported by the ESO, may submit a Needs Case to Ofgem. Where a robust Needs Case is submitted, Ofgem make commitments on approach to cost assessment on the rationale for Offshore Wider Works construction works.
- c. Tender Exercise: The developer triggers a tender exercise Ofgem conducts a cost estimate and assessment, taking into account commitments at the 1st and 2nd gateway assessments.
- d. In the 2013 December consultation Ofgem proposed a number of high level criteria that would be used to evaluate gateway assessment submissions. These criteria included:
 - i. the (economic) Needs Case for investment
 - ii. the timing and scope of the project and its technical readiness
 - iii. proposals for ongoing ESO-developer engagement
- e. Gateway assessments will, in general, be expected to take place before a tender exercise has commenced. As the purpose of the gateway assessment is to inform a resulting tender exercise cost assessment, Ofgem expect the developer to be able to show their commitment to triggering a tender exercise for those assets before Ofgem undertake a gateway assessment.
- f. Timing of the Gateway process

- iv. In 2013 consultation Ofgem proposed providing flexibility in the timing of gateway assessments, driven by the needs of individual projects. The identified flexibility applied to the point at which the developer would trigger the gateway assessment, based on the developer's ability to provide sufficient information to enable Ofgem to conduct an informed assessment. Ofgem expect that early engagement between developers and Ofgem would inform the point at which the gateway assessment would be triggered.
 - v. Developers and the ESO will need to undertake analysis to provide an evidence of the feasibility and Needs Case for taking forward the Offshore Wider Works before considering triggering the first gateway assessment. Ofgem is considering that developers will generally only be able to satisfy the assessment criteria for the first gateway assessment after they have signed a BCA. Ofgem expect that in most cases there may need to be significant further engagement on connection optioneering between the developer and the ESO in order to inform a Needs Case submission. Ofgem also expect early engagement between developers and Ofgem will help inform when the gateway assessment should be triggered.
 - vi. Similarly, for the second gateway assessment, developers will be able to trigger the gateway assessment when they have sufficient information to enable Ofgem to conduct an informed assessment. Under the generator build option, Ofgem expect the timing of this gateway assessment to be as late as possible, to help ensure that the evidence provided in an offshore developer's submission remains up to date at the point at which significant final procurement decisions for the Offshore Wider Works are made.
- 5.17 Step 9: The ESO and offshore developers are providing support to Ofgem in the Gateway Assessment Process
- i. Ofgem will be working with the ESO and offshore developer to further develop what information for the gateway assessment process is required. The criteria and Needs Case requirements will be applicable to all projects, ensuring transparency of approach. However, given the unique technical requirements of offshore transmission and variation between projects, early engagement with developers ahead of a gateway assessment submission will provide an opportunity for Ofgem to provide further details on what information will need to be contained within an individual gateway assessment submission
- 5.18 Step 10: Ofgem approves the Developer Associated Offshore Wider Works project
- 5.19 Step 11: In collaboration with the offshore developer, the ESO makes sure that the developer's BCA remains in line with the outcome of Ofgem's gateway assessment process
- 5.20 Step 12: The Offshore developer delivers the project in line with the BCA.

Offshore Wider Works – Developer Associated process flow diagram



This diagram shows the overall Offshore Wider Works process. The text in each box corresponds to the descriptions of the stages explained in general process above. The numbers correspond to the step numbering in the text.

Offshore Wider Works – Non Developer Associated overview

- 5.21 Current offshore transmission assets have been developed as standalone connections to shore known as radial connections. However, the Round 3 offshore wind projects are larger, more complex and at a greater distance from shore than those that have been developed so far. As a result there is likely to be the potential for efficiencies from greater coordination and integration of offshore transmission infrastructure. This could include coordination between offshore connections, and coordination of the strategic development of the wider network through offshore reinforcement projects.
- 5.22 Existing offshore transmission assets are designed as a radial links to allow the transfer of the power from the offshore generator to the onshore network, and are therefore the offshore asset rating is equal to the size of the wind farm. The Non Developer Associated Offshore Wider Works is investment that would support reinforcement of the wider transmission network, but where developers are unwilling or unable to take forward the offshore wider works. An Offshore Wider Works Non Developer associated Needs Case is in many cases a substitute for onshore wider works, and therefore is some way very similar to onshore wider works investment.

The regulatory route for Offshore Wider Works to be taken forward depends on the nature of the works to be carried out but could involve an OFTO build tender²¹ run by Ofgem to identify an OFTO responsible for taking forward the works. Any development of a Needs Case for Offshore Wider Works should include discussion with Ofgem on the proposed nature of the works and the regulatory route for progressing those works.

²¹ <https://www.ofgem.gov.uk/publications-and-updates/epc-contract-principles-of-to-build-tenders>

Offshore Wider Works – Non Developer Associated process

- 5.23 The coordination of offshore transmission assets could reduce the costs of the onshore system reinforcement requirements and potentially reduce the costs for the end consumers.
- 5.24 A Non Developer Associated wider network benefit investment for Offshore Wider Works supports coordination of the development of offshore transmission assets and wider GB transmission network reinforcement. Offshore Wider Works Non Developer associated is not limited to a specific connection offer and is the case where offshore generators are unwilling or unable to take forward the offshore wider works.
- 5.25 The following text describe the steps of the ESO process for the Offshore Wider Works Non Developer Associated Needs Case.
- 5.26 Step 1: Identification of system need. The need for Non Developer Associated Offshore Wider Works will be identified by the ESO and the relevant TO. The system need for the Offshore Wider Works can be identified in the following ways:
- a. The ESO assesses the system need through the annual Electricity Ten Year Statement (ETYS) process, which subsequently informs the NOA Report.
 - b. The ESO and TOs regularly discuss and review network capacity issues and the need for network reinforcement in a particular TO's area at Joint Planning Committee (JPC) meetings. Based on that information a TO will consider Offshore Wider Options as an option to reinforce the network.
- 5.27 Step 2: ESO and relevant TO identify the Offshore Wider Works Options
- a. In collaboration with the relevant TO, the ESO develops the Offshore Wider Works options.
 - b. In developing Offshore Wider Works, the ESO will take into account two major transmission system design criteria: network capacity availability of local boundary and shortfall of the wider system boundaries.
 - c. According to Chapter 2 of the NETS SQSS – Generation Connection design, the transmission system is designed to accommodate 100% of the transmission entry capacity at the connection point within a local boundary (e.g. for 1GW wind farm connection, the onshore system is designed to accommodate the complete 1GW generation and the offshore assets are sized to provide this full transmission entry capacity.)
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 - e. In providing the Offshore Wider Works design it is crucial the ESO and affected TO work together and agree on the generation background, scenarios, and sensitivities which will be used as a basis for the Offshore Wider Works designs. In this stage, the ESO will inform Ofgem on the agreed background and scenario which will form the basis for the Offshore Wider Works designs.
 - f. The benefits of the Offshore Wider Works will be also assessed by utilising a combination of operational actions to maximise the capability across the boundaries (e.g. actions included QB optimisation and redirection of flows in HVDC links).
 - g. Once the ESO and the affected TO agree on the Offshore Wider Works options, the agreed Offshore Wider Works options are progressed into the cost-benefit analysis.
- 5.28 Step 3: Cost-benefit analysis. The ESO will perform the cost-benefit analysis on the agreed Offshore Wider Works options from Step 2. The ESO will lead the cost-benefit analysis.
- 5.29 The Cost-benefit analysis will be performed by the ESO and the objectives and scope of the cost-benefit analysis is explained below:

- a. The key economic objectives for cost-benefit analysis for Offshore Wider Works are:
 - i. Ensure value for money for the consumers by delivering cost effective reinforcements to ensure economically efficient design and operation of the network.
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