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Dear Giedre

Offshore Electricity Transmission: Consultation on tender exercises under the enduring regime (178/11)

Thank you for the opportunity to respond to Ofgem's consultation published on 16 December. SSE Renewables' response to the specific questions posed can be found in the Annex to this letter. In addition to this response, I would also like to set out SSE Renewables' general thoughts on the Enduring Regime with the hope that this will help inform the development of Ofgem's approach.

Background to SSE Renewables' Offshore Generation Business

SSE Renewables is presently represented in the development of five major offshore wind projects under the enduring regime (Galloper, Firth of Forth, Dogger Bank, Beatrice and Islay). Four of the projects have signed Connection Agreements and the Connection Application was submitted recently for the remaining offshore wind project. SSE Renewables has informed National Grid of its preference to build the OFTO assets. The preference to go 'generator build' is strongly driven by the following;

- SSE Renewables' established position in the industry, which has enabled us to develop communication channels with relevant stakeholders;
- We have already carried out the ground work with key shareholders associated with licensing, permissions and legal documentation;
- We are best placed to manage the risks associated with the programme, planning consents and over all project finance;
- We have already developed a working relationship with key equipment manufacturers, project delivery and installation providers; and
- The generator build option allows for a single point of control of the complete project, which allows for consistency and efficiency in developing the project.
- If the OFTO is building the assets then this adds significant interface risk into a project that is already very complex, e.g. from a project management perspective.

Practical Challenges

We have set out in Annex 2 our practical experience in developing a project, which we hope will assist in setting an overall context to our response. The information in Annex 2 summarises some of the challenges that developers face in practice and we hope that this will underline the need for the Enduring Regime to be designed and implemented in a way that reflects practical reality. Clearly, there is much work still to be done on the design of the Enduring Regime. We welcome Ofgem's recent commitment made to stakeholders during the stakeholder event held on 9th February that working groups will be established to support this ongoing process.

Tendering and Alliancing

A number of government reports such as Latham (1995) and Egan (1998) have been produced in response to the poor delivery outcomes on a number of major construction and engineering projects. These reports have criticised the adversarial nature of the industry, and emphasize the benefits of partnering in major construction and engineering projects, through early design collaboration, reduced waste and standardisation. Although partners will usually be chosen after a due diligence exercise, this will not always be a formal tendering process. SSE has considered the recommendations of the aforementioned reports which have informed their choice of "alliance contracting strategy" in their initial offshore wind projects. Accordingly, SSE feel strongly that they should be in no way penalised on the grounds of "efficiency and value for money" where their choice of partner has not been through a formal tender exercise. We consider that alliance partnerships embrace "best practice" and provide greater scope for innovative approaches[1].

Economic and Efficient Build

The key issue

Cost recovery is a key issue for developers. The possibility that Ofgem will not agree with the assessment of the economic and efficient design of the offshore transmission assets is a significant risk. We appreciate that Ofgem is already anticipating further work on this issue, however we feel that it is important to emphasis its importance.

Removal of the 75% RAB estimate

In the transitional regime, developers were guaranteed the greater of: (i) 75% of Ofgem's RAB estimate or, (ii) 100% of the efficient economic cost actually incurred. Under the enduring regime, the certainty given to developers that, at the very least they would recover 75% of the RAB value has been removed. Instead, cost recovery is achieved only with reference to what Ofgem considers is economic and efficient. In practice, projects proceeding under the enduring regime carry more risk than those under the transitional regime due to their size and the additional complexities faced by developers, such as the challenges of integrated network connections which are currently being considered under the Offshore Transmission Coordination Project. Ofgem itself has noted this in the summary to the consultation, where it is stated that they "recognise that enduring projects are larger and more complex". Therefore, going forward, it is vitally important for

[1] see also our answer to question 3.8

developers to achieve greater certainty regarding what Ofgem will consider as economic and efficient.

Need for guidance

The ex-post nature of Ofgem's assessment presents particular difficulties. For example, of real concern is the possibility that early engineering assumptions on issues such as losses or reliability could be argued (with the benefit of hindsight) to be overly weighted towards or against additional redundancy in the design. Further, as explained in more detail in Annex 2, project timelines are demanding and there is the possibility of "missed opportunities" – there is a risk that Ofgem will consider that we should have taken these opportunities as the more economic and efficient option. For example, if a project reduces its capacity significantly then the best overall design may end up being a different connection point from the one originally chosen. In that scenario, it is more likely than not to be too late to change the system design to an alternative connection point as the onshore reinforcements have been consented and the equipment has already been ordered. It is currently not clear how Ofgem will approach these issues. We therefore urge Ofgem to produce some clear guidance on this issue to help alleviate the risk and uncertainty currently faced by the industry.

It is also worth re-iterating Redpoint's assessment of this issue, which was discussed in their report for Ofgem into coordination in offshore transmission in the context of anticipatory investments:

More broadly, generators have no certainty on cost recovery for anticipatory investment since they will be subject to ex-post regulation by Ofgem who will consider whether the costs are economically and efficiently incurred when carrying out the cost assessment process. As part of this, Ofgem could deem anticipatory investment to be economic and efficient but in the absence of ex ante clearance or better guidance, generators might not be willing to take the risk that Ofgem will not include it in the transfer value.

The move towards a more integrated approach to offshore networks adds an additional layer of complexity, and there is currently a great deal of uncertainty in the industry, particularly in the area of anticipatory investments, as discussed by Redpoint. We will look forward to seeing the outputs from the Coordination Project, which was promised early this year.

I hope this response is helpful. If you would like to discuss our comments in more detail then please contact me.

Yours sincerely

Lesley M Gray

Lesley Gray
Regulation

ANNEX 1
Response to Consultation Questions[2]

Chapter 2: The Enduring Regulatory Regime for Offshore Electricity Transmission

#	Question	Our Response
Chapter 2: The Enduring Regulatory Regime		
Q2.1	Do you have any views on the approach outlined in paragraph 2.8, namely to focus on a single OFTO build option and not to develop the early OFTO build option further at this stage?	The approach is acceptable over the next 1-2 years in light of the present structure of the Grid Connection Offers and the speed at which the industry is moving. However, in the longer term, an early OFTO option might become necessary as the industry moves towards a more co-ordinated approach to building offshore networks. It is therefore important to keep the regulatory framework under review in order to allow for the development of an early OFTO- build option in the future.
Chapter 3: OFTO Build Option		
Q3.1	What are your views on the proposed arrangement for triggering a tender exercise?	We think that there is insufficient design certainty at this stage of the project to guarantee a transmission design requirement. Leaving this aside, if a 'late OFTO' option is selected then early and regular engagement between the developer and Ofgem would be desirable. This will allow the developer and Ofgem to plan for the appropriate point to trigger a tender exercise, rather than waiting until 3 months prior to planning consent application. Adopting a more flexible approach to the timing will leave open the opportunity for OFTOs to engage earlier in the process, e.g. the OFTO could make recommendations regarding the design envelope being submitted in the planning application. Under the present IPC process in England & Wales, modification and amendments of the planning application are not accommodated. There is a significant risk that, by not involving the OFTO early enough, that a new planning application would be required later on in the process.
Q3.2	What are your views on whether our proposal on generator security will ensure the appropriate level of commitment from a generator?	We consider the proposals are adequate to secure commitment.
Q3.3	Do you agree with our proposed approach to the tender specification	Yes

[2] Certain questions cover areas where we have not yet developed a view, we have therefore not included a response to those questions.

	for an OFTO build tender exercise?	
Q3.4	Are the proposed arrangements for pre-construction works the most appropriate for investors and generators?	Yes
Q3.5	What other information, if any, in addition to that referred to within the tender specification and pre-construction works sections, would be needed within the data room for the project?	Other information that would be needed includes: • documentation indicating the interface boundaries onshore and offshore; • the associated access agreements; and • rights to communication pathways
Q3.6	What do you think would be the best approach to ensuring bidders have access to and confidence in a seabed survey undertaken by the generator?	We would suggest a standard minimum survey specification including the collection and editing of data. The quantity and quality of data is important to ensure a usable format which enables subsequent investigation, analysis and future evaluation with subsequent surveys.
Q3.7	With reference to the approach to seabed surveys outline within paragraph 3.22, what might be the best approach to developing an independent generic survey specification that would be acceptable to both generators and potential bidders?	It is important to ascertain from potential OFTOs how they wish to view and use the survey information. It is very important to have an agreed minimum standard as this will dictate the survey requirements.
Q3.8	Do you agree that ensuring procurement is undertaken by the OFTO through the tender process would be the most economic and efficient approach?	In practice, the supply chain constraints that are faced (discussed in our answer to Q3.9 below) will present a significant barrier and we question whether any increased competition that may potentially be introduced by OFTO bidders is likely to result in a more efficient procurement than that which could have been achieved through a generator-build approach. At this stage, we fail to see how increased opportunities for innovation in procurement could be created in practice considering that the issues that will be faced by OFTOs are identical to those faced by generators. In reality, we consider that generators are likely to achieve – and, indeed, are currently achieving- better innovation in this area through, for example, alliancing arrangements with producers. However, to assist, we would highlight that additional

		design work will happen during the planning consent application phase, which will allow the generator to determine the actual capacity of the project. Additionally, it is likely to take up to 18 months from the grant of planning permission in order to finalise the purchase of the wind turbine generators. As both the capacity and wind turbine generator selection uncertainty impacts on the depth of design of the transmission assets, this would have to be reflected and managed in the OFTO procurement of equipment if undertaken at the tendering stage.
Q3.9	What are your views on whether there are supply chain constraints associated with the manufacture and delivery of some key offshore transmission assets? If there are constraints, do these vary significantly in relation to project design?	There are significant supply chain constraints. Transmission submarine cables, transformers destined for the offshore platforms and HVDC equipment are all long-lead items, due to a very limited number of parties able to supply this equipment. The bespoke requirements of each project can present a further challenge. For example, connections over a certain voltage will require mass impregnated designs. This places an even greater limitation on supply chain not to mention the size of these could require bigger vessels to install which again will have a knock-on effect on the timescales. With regards to the submarine cable, advanced booking of a factory slot is vital to secure delivery. Early confirmation of an order will also provide greater advantages with the purchase of raw materials from world markets. There is more flexibility later on, with the fine detail design of a submarine cable, i.e the same kit is used to produce different types and voltages of submarine cable via altering the settings. The design of the project, for instance a reduction in MW size, could trigger the transmission design to go from 3 submarine cables to 2. This would reduce the necessary duration of the factory slot, but it is vital that the production commencement date is maintained. With regards to the transformers, advanced booking will allow raw material to be purchased at favourable prices and factory time allotted. The standardising of transformers is foreseen as the preferred option, to allow cost effective spare coverage. This would lead to limited alterative in the design after initial purchase agreement. The design of the project, for instance a reduction in MW size, could trigger the transmission design to go from 5 transformers to 4. This would reduce the necessary quantity of transformers, in turn the duration of the factory time, but again it would be vital that the production commencement date is maintained. With regards to the HVDC equipment, there are a vast

		number of small components that have to be placed together to form larger systems, these need to be designed specifically on a project specific bases. The HVDC design has to be finalised at the early stages prior to the factory build, alterations in the project design may well have significant impact of the HVDC equipment production.
Q3.10	What are your views on the examples of alternative approaches for supply chain engagement under OFTO build outlined in this chapter?	As mentioned previously, there is a very limited number of suppliers for the equipment mentioned above. This problem remains regardless of the approach taken.
Q3.11	Are there any other approaches we should consider under OFTO build to enable the supply chain to be engaged in time to ensure project delivery timescales are met, whilst maximising opportunities for competition through the tender process?	Clearly, wider issue of supply chain investment is key. We have no specific suggestions at present.
Q3.12	Should there be any restrictions on interactions between parties, either before or during a tender exercise in order to ensure fair and effective competition and best value for consumers?	We consider that guidance would be desirable to establish the party roles, design quality information and quantity uncertainties or consenting envelopes for parties would be ensure and help with the direction of any communications.
Q3.13	Do you agree that the current 20 year revenue stream provides the best value to consumers under the enduring regime (OFTO build or Generator build)? If not, what alternatives should we consider?	Generally speaking, generation assets have a life expectancy of 20 years, therefore a 20 year revenue stream presently is acceptable. It is recognised that re-powering the generation site, if possible, should entail the reuse of the initial OFTO assets but there are no guarantees this will happen- this makes it difficult to realign revenue stream for a longer duration.
Q3.14	What are your views on our proposed treatment of risk relating to: - Delay to licence grant?	At a fundamental level there is a major flaw, as there is a significant risk that the generation design will change and this will in turn impact on the OFTO design, therefore making it very difficult to fix a TRS price. Delay to licence grant – acceptable.

	- Weather delay?	Weather delay – there potentially needs to be a more complex method to include factors such as: location, activity, duration of activity, selected time for installation and the weighted value on the item being installed.
Q3.15	Are there other areas of risk which would be more efficiently managed (for consumers) through a risk sharing mechanism rather then factored into bidders' TRS bids? If so, can you suggest how these risks might be shared?	There is significant risk associated with the generator turbine selection - changes in MW capacity will significantly alter the OFTO design. For example, the generator's requirements could change from 3 cables to 2 cables. The proposed process assumes that the generator's design is fixed, however at this stage in the development process there could be significant design changes. This could change the economics of the OFTO project such that the TRS bid is no longer appropriate for what needs to be built in practice. One approach might be to require one or more alternative TRS bids to cover off possible changes in design. However, ultimately, this issue needs to be explored in grater detail at industry level.
Q3.19	Do you have any preference from amongst the options outlines for how the PQ stage should operate?	In the short term (1-2years) the approach to running the Generic PQ Stage will have to be a selection of the options 2 and 3. In the longer term (+2years) as the industry changes and offshore generators start to work in a co-ordinated fashion, a hybrid of options 1 and 2 designed to satisfies all the parties' requirements will be necessary.
Q3.20	Are there any other ways that a PQ stage might operate in order to meet the objectives set out at the start of the 'Tender stages and timings' section?	It is the expectation that the PQ stage process will change as the industry changes, 2011 projects recommended a stronger co-ordination approach to the building of the OFTO assets. The industry will start to make the necessary changes to promote co-ordination and the PQ stage presently requires flexibility until the rest of the industry catches up. We think that it would be best not to force change now, but rather to continue with the three options ensure better tailoring to match the industry changes.
Q3.21	Do you have any preferences from the options outlines for how the ITT stage might operate?	It is vital to emphasise again that present consent applications are being worked up as 'envelopes' i.e. they represent both minimum and maximum values - as key decisions that will drive the design will follow at a later date. This practice revolves around the timing associated with the financing of the generation project which normally occurs 12-18 months after consent/planning application granting. This is the trigger to enable the turbine contracts to be signed and the key elements to the generation design tied down. Upon which, the actual design of the transmission (OFTO) assets can be worked up.

		The granting of the OFTO consents is not necessarily the right trigger around which the single ITT stage should be associated with, as there are uncertainty associated with the generator design. There needs to be flexibility to allow consideration of several OFTO designs with reciprocal TRS bids and an indication of associated changes in costs given the risk of generator design changes. It is of greater importance to select the preferred OFTO as soon as possible, given the associated supply chain issues are greatest with the OFTO assets, on this basis Option 2 selects the OFTO the quickest.
Q3.22	Are there any other ways that the ITT stage might operate to ensure it's efficiency and effectiveness?	There are very limited options for Round 3, however serious consideration should be given to the subsequent Rounds. As the OFTO assets presently take longest to procure and manufacture and the goal is to develop the most economical OFTO assets. It is suggested that going forwards the tendering of the OFTO assets in a particular zone is tendered first of all. Once a network and OFTO are selected with a time scale then the associate seabed development is tendered to the generators.
Q3.23	What are your views on the proposals for involving generators in evaluation of bids? In particular, what key technical aspects of bids would be most important for generators to evaluate?	The opportunity as a generator to participate in the bid evaluation is important. The key technical aspects of importance are as follows; • All the foreseen interface points between the generator and OFTO; • Grid Code compliance • The programme of works; • Demonstration of associated key issues, milestones and decision points during the works; • High level technical preference for the OFTO assets; • Clear indication of the commissioning strategy, including management; and • Maintenance strategies both schedules and un-scheduled, minimum levels of service agreements to aid maintenance plans, equipment spares strategy and guaranteed level of system investment over the 20 year revenue period. The generator is well placed to provide input on these

		issues. We have recently encountered this through one of our projects where we were OFTO build by default but have since opted to proceed under the generator build option. We have had to correct a number of incorrect assumptions made by NGET on the offshore design.
Q3.24	What are your views on the proposals for involving NESTO in evaluation of bids? In particular, what key technical aspects of bids are most important for NESTO to evaluate?	NESTO presently the way in which the process is governed is regarded as the initial OFTO designer therefore justifying their need to be involved in the process. NESTO role should be to: • evaluate the different OFTO designs to ensure compliance with the various documentation; • investigating design deviations from documentation and working with the OFTO bidder to correct or supporting quest to deviate; and • Assessing the impacted of any planned onshore reactive compensation schemes.
Q3.25	Are there areas in which you think allowing variant bids under OFTO build would add values to the process and to consumers?	Working within the regulatory documentation there is not a lot of room for transmission design innovation. The significant design alterations come when there is a stepped generation mw change, as an example reducing the design from 3 to 2 export circuits. As highlighted before due to the uncertainties associated with the generation project the consent application is an 'envelope' explaining the minimum and maximum buildable parameters. Therefore the OFTO bid needs to reflect this indicating if applicable the different designs and the trigger points between designs or the positive points associated with maintaining a level of over design.
Q3.26	What are your views on generators recovering efficiently incurred pre-construction costs at the point at which the transmission construction works are completed?	The presently proposed point of generation remuneration internally manages the associated interest payments on the initial expenditure, as opposed to the alternative.
Q3.27	Do you have any early views on the appropriateness of design incentives for transmission asset lifecycle design, eg transmission	There is already very clear guidance as to how transmission infrastructure can be built to ensure the most economical solution. Therefore presently the ability to incentives transmission asset lifecycle design is limited. There is a significant change if the industry moves towards a co-ordinated approach, more opportunities is foreseen with transmission design.

	availability, quality of installation and transmission losses?	Ofgem should take into consideration a full cost benefit analysis that includes redundancy and lost energy calculations.
Q3.28	What are your views on whether the current approach to indexation, and in particular the proportion of the TRS subject to indexation, provides the best value to consumers? How might any alternative approaches be managed?	The majority of the OFTO schemes will have two or more subsea connections to shore. It will be possible to start generation offshore 3-6 months after the first subsea connection has been installed, it could take a subsequent 24 months before the final subsea connection is installed and operating. If this is the case it is foreseen the OFTO would require a mechanism to be paid if the TRS is applied at a later date. The TRS might require staggering to reflect the commencement of generation through the OFTO assets. If this occurred then it would need to be reflected initially in the indexation process. However, inflating there after yearly is regarded as appropriate.
Q3.29	Do you agree that additional delivery incentives for OFTOs are not necessary?	It is important to remember that the cost of lost revenue to the generator will be significant and the delay and risk to the stranded assets will also pose a major risk to the project. Further incentives are therefore required- for example, we would expect to see provision for liquidated damages payable to the generator.
Q3.30	What are your views on what approach to decommissioning of assets would provide best ongoing value to consumers?	The standard to which the decommissioning will occur 20 years from full commencement of TRS should be clearly stated with an assumed cost and a strategy to secure the necessary money. If necessary, the decommissioning strategy should also include additional costs to ensure compliance with possible future changes in law that would require an increase to the original decommissioning standards. This should enable visibility to the decommissioning process for the first 20 years and ensure the finances for decommissioning to be undertaken from that point on.
Chapter 4: Generator Build		
Q4.1	What are your views on whether there are benefits under Generator Build to the generator undertaking the seabed survey against a comprehensive generic survey specification agreed by the industry?	As long as the generic survey specification reflects a minimum expectation tailored to the end user, then it will be acceptable
Q4.2	Do you agree with the approach that Ofgem continues to run tender rounds for groups of projects, not necessarily	We agree that the tender rounds shouldn't be limited to an arbitrary date in the diary. However, we would question why each project could not trigger its own tender round rather than wait to be included in a group? If Ofgem expects this grouping will help develop

	limited to one per year, or would you recommend an alternative approach?	holistic/coordinated approaches then please recall that, under the generator-build option, it will be too late to alter the design in order to achieve such objectives. Section 4.13 of the consultation paper states that the data room will be populated with "broadly the same type and level of information required for the transitional tender exercises". However this assumption is incorrect - the assets will have been built at this point so there will be a much greater level of information. We expect that the information will also be of a different type i.e. rather than opioneering documents, it will be FEED and detailed study results.
Q4.3	Do you think there are further efficiencies we could make to the tender process and the transaction procedures for Generation Build which would increase their efficiency and provide greater certainty to bidders and funders?	Not presently
Q4.4	Are there any changes to the information supplied in the data room which would improve the efficiency of the process for Generator build?	Asset transfer to an OFTO should take place when the transmission assets are at a stage where they are fully commissioned and tested. In order to manage a due diligence process, it would be efficient that full due diligence takes place at this time (i.e. when the assets are fully complete). We consider that it would be more effective for both the buyer and seller if disclosure of documentation to the data takes place at one point in time rather than on a stop / start basis during the construction period. There would then be a clearly defined period of time for due diligence to take place. The data room IT solution (Bravo) currently provided by Ofgem suffers a major drawback in that the maximum file size that can be uploaded is limited to 50 MB. Technical documents that are in excess of this size cannot be loaded into the data due to this restriction. An improved virtual data room could rectify this problem.
Q4.5	What are your views on the benefits of involving generators in evaluation of bids as outlines in this section?	We think that its essential for the generators to be involved with evaluating bids as we will give a more accurate input into issues such as O&M. Indeed, if the particular windfarm is externally funded (not off balance sheet), it will probably be a requirement of the funder that the developer is involved in this process, together with the funder's Technical Adviser.
Q4.6	Do you have any suggestions on	We require more information on cost assessment (paragraphs 19-22). This is a key issue for developers.

	amendments which would improve the efficiency of the process for finalisation of transfer documentation and which would maximise value to consumers?	
Q4.7	What do you consider might be the implications of a share sale approach as opposed to a transfer of assets as has been seen to date?	We are doing an asset sale Greater Gabbard as this was easier rather than trying to hive the assets into an SPV before selling the shares. However, in some respects it's quicker and easier to hold all the OFTO assets in a separate company and then just sale the shares. This does require more upfront work e.g. 2 parties to many of the contracts/ separate contracts to be negotiated, ensuring the consents are split between the generation and transmission asset companies from the outset. Ultimately, we think having the flexibility in this area is important.
Chapter 5: Phased or Staged Construction of Transmission Assets		
Q5.1	Are you satisfied with the practical relevance of our definition of the terms 'phase' and 'stage'?	Yes
Q5.2	What are your views on the measures we propose to determine whether a stage or phase within a site/zone qualifies for a single tender exercise?	They appear reasonable. However, we would be interested to hear from Ofgem regarding how this will interact with TNUoS. A wider question that needs to be considered is how will TNUoS be calculated should OFGEM split the site into multiple OFTO zones. Would there be multiple TNUoS calculations? Also, how would interconnection between zones affect these calculations?
Q5.3	What are your views on whether running a separate tender exercise for each phase within a site/zone would best meet the objectives of the enduring regulatory regime?	Separate tenders might not achieve the best competitive, economic and least disruptive solutions due to the export cable routings, onshore location of the connection assets and maintenance bases, a single OFTO in a particular area might actually work better.

ANNEX 2
Our practical experience of developing a Project

The Grid Connection

The NGET Grid Connection Application asks for confirmation of the Developers intention not to build the OFTO Assets. Presently the response to this question determines the information, which in turn, defines the type of the Offer that is returned. Once in possession of an Offer it is clearly either a 'generator build' or 'OFTO build' agreement, due to appendices. The 'Offer' remains valid for a period of 90 days.

Once the Developer of an offshore wind project signs the Connection Agreement the details associated with the project will be placed on the NGET TEC Register which is in the public domain.

The earliest an offshore wind farm project could notify Ofgem as to their build preference associated with the OFTO Assets would be on signing the Connection Agreement. Until this point, it is our view that the project would be entitled to switch to the OFTO build option

The Planning Application

Due to the large financial sums associated with building offshore wind projects, any significant spend would not be made until 12-18 months after planning permission is granted. In practice, there is a significant amount of design uncertainty built into the application for planning permission in principle (PPP). In other words, an equipment window or "envelope" is stated with the environmental impact evaluated on the most onerous scenario.

The application for PPP is normally based on the upper capacity limits, i.e. MW size, as agreed through the seabed lease with The Crown Estate. At this stage, a huge amount of data has been accumulated regarding the intended project, through the Environmental Impact Assessment.

Met Mast data gathering

1. In the background, running concurrently with the planning application, is the detailed technical evaluation of the data, from energy yield to the geophysics make-up of the sea bed. The gathering and verification of this necessary data continues after the submission of the Application for PPP. The energy yield calculations presently influence the speed at which the detailed design (to finalise the turbine layout and capacity), can be undertaken. As a minimum, two years worth of actual wind data (taken from a temporary Met Mast) is required to achieve this. In addition, a further 6 months needs to be factored in to allow for verification and extrapolation of energy data.

Presently, permission for a temporary Met Mast is applied for 2 years prior to the Project's application for PPP, enabling installation a minimum of 12 months prior to submission. It is anticipated that the application for PPP will be granted 12-18 months after submission, around the same time the verified energy yield calculations will be available. These calculations will inform the detailed analysis that requires to be undertaken - e.g. the layouts of different turbine types, associated equipment costs and installation assumptions.

Turbine Design Freeze

The different turbine layouts can only be fully evaluated in detail once the verified energy yield data is available. Therefore "design freeze" of the turbine design is only likely to occur 6-12 months after the granting of PPP.
It is only with this "design freeze" of the generation assets that the detailed design of the associated transmission assets can be determined. The turbine design freeze is anticipated to have the following effects;

- In extreme cases:- it may change the assumed transmission medium (DC to AC);
- In most cases:- the volume of capacity required (and therefore type/size of the transmission assets required) will be altered. For example, it could result in the reduction of export cables from 3 to 2, therefore requiring one less offshore platform transformer and reciprocal export cable; and
- In all cases:- the transformer and cable material parameters will change from the original assumptions.

Summary

Through this high level exploration of the processes faced by a developer, SSE Renewables hope to have highlighted the following to Ofgem;

- the planning application is based on the upper available capacity as set out in the Crown Estate lease;
- the verified energy yield data is only available 0-6 months after PPP is granted;
- "design freeze" of the turbine type and location is anticipated to occur 6-12 months after PPP is granted.
- it is only upon Turbine Design Freeze that the detailed design of the associated transmission assets can be made; and
- financial close on a selected turbine type based on the most favourable economic layout, happens 12-18 months after PPP is granted.