

To: Pre-qualified bidders Kriegers Flak Offshore Wind Farm

Tonne Kjærvej 65
7000 Fredericia
Tel. +45 70 10 22 44
Fax +45 76 24 51 80

info@energinet.dk
www.energinet.dk
cvr-nr. 28 98 06 71

Kriegers Flak Wind Farm - Q&A during information meeting 2 February 2016

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SEK/SEK

Questions and answers given during the information meeting on 2nd February 2016 held at Energinet.dk have been edited and compiled in this document and made available for all prequalified companies. The aim is to provide a transparent and well-informed basis for the wind farm bid.

The specifications and conditions stated in the tender material submitted by the Danish Energy Agency will always take precedence over this document.

For the most recent and valid version of the regulations referred to in this document, please consult Energinet.dk's webpage www.energinet.dk.

The bidders are encouraged to send clarifying question to the Danish Energy Agency who will address the questions and issue the questions and answers.

| Question | Question/Answer |
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| | OSS |
| 1 | Q: What is the elevation level for the resting platform? A: Approx. 5.6 m above L.A.T. Primary rescue is by helideck. |
| 2 | Q: Can more than 12 persons be on the platform at the same time? A: Energinet.dk guarantees a platform equipped with lifesaving equipment for 12 persons. A written dispensation can allow for 18 persons on the platform. There are only life boats for 12 persons, so additional equipment and a stand-by boat must be present if 18 persons are on the platform. |
| 3 | Q: Can the WFO access the platform during operation? A: Yes, Energinet.dk needs to be informed when the WFO accesses the platform, but other than that, there are no restrictions. See sample collaboration agreement in Tender Appendix 6.1.1 – 6.1.3. |
| 4 | Q: Are there any requirements before accessing the platform? A: Persons accessing the platform must have a full GWO. Please refer to Tender Appendix 6.1 for examples of agreements for access. |
| 5 | Q: Are there any restrictions for which rooms the WFO has access to on the platform? In case we need to have access to the low-voltage room for example. A: In agreement with the WFO we will make sure the WFO has access to the rooms which contain the WFO's equipment. |
| 6 | Q: Will the platform be energized during the WFO's cable pull-in? A: Yes, the platform will be energized as per installation either by local diesel generator or by HV export cables. |
| 7 | Q: In the case of an emergency, is it then possible to stay overnight at the platform? A: Yes, in an emergency situation, people can stay overnight in the day room. |
| 8 | Q: Why will Energinet.dk not provide back-up power for the WFO? A: It is Energinet.dk's company policy not to provide back-up power for the WFO, in relation to risk split etc. |
| 9 | Q: As an agreement with 50Hertz regarding the interconnector will be made, will it be possible for the WFO to utilize power from Germany in case of power outages in Denmark? A: In the event of separation from the Danish mainland, emergency power supply for the wind turbines will be made available via the interconnector. Energinet.dk will make the emergency power supply available for the Kriegers Flak offshore substations in cooperation with 50Hertz Transmission. |
| 10 | Q: Does the high-voltage switch gear include a single bus bar? A: Yes. |
| 11 | Q: How many J-tubes will be available on each substation? A: We plan for 6 J-tubes and 1 spare on KFA and 12 J-tubes and 1 spare on KFB all suitable for 33 kV cables. |
| 12 | Q: Does Energinet.dk have a preferred supplier for MV switch gear? A: Energinet.dk does not have a preferred supplier for MV switch gear. |
| 13 | Q: In case of installing more than 200 MW turbines in the western |

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| | <p>area, and therefore the need to connect some wind turbines in the western area to the platform in the eastern area (according to the tender document), there could be an issue with the orientation of the J-tubes as the WFO is not allowed to cross the export cables and interconnector. What is Energinet.dk's solution to this?</p> <p>A: Energinet.dk will investigate this matter further and reassess J-tube layout.</p> |
| 14 | <p>Q: Where will the fabrication yard be located?</p> <p>A: The platform fabrication yard will be located in the northwestern part of Europe.</p> |
| 15 | <p>Q: Why must the medium voltage switchgear be fabricated in advance?</p> <p>A: Following WFO's procurement of switch gears, Energinet.dk would like to give the WFO the opportunity to install the switch gears at the yard instead of offshore for optimizing costs, test and HSE issues.</p> |
| 16 | <p>Q: Will the WFO be able to have access to the platform at the fabrication yard?</p> <p>A: Yes, the WFO will have access to the platform construction site, as well as office facilities at the fabrication yard.</p> |
| 17 | <p>Q: The application of switch gear included in the detailed design, does this leave room for a variety of potential suppliers?</p> <p>A: Yes, we have made room for a variety of switch gear suppliers.</p> |
| 18 | <p>Q: Is the Neutral Earthing Resistor an Energinet.dk delivery?</p> <p>A: No, Neutral Earthing Resistor is in the scope of the WFO.</p> |
| 19 | <p>Q: The time schedule for installation of turbines seems very tight.</p> <p>A: No, this is not the case. According to the wind farm tender there is a 3-year construction window for the WFO.</p> |
| 20 | <p>Q: Do you have any further details regarding the cable pull-in; dimension, bell mouth, strong points, etc.?</p> <p>A: Energinet.dk will provide the existing details when these are ready. Energinet.dk will submit the details to DEA for further distribution.</p> |
| 21 | <p>Q: We are concerned about the short-circuit level of 27.73 kA. This is a problem for the switch gears and the turbines. How does Energinet.dk plan to handle this issue?</p> <p>A: Energinet.dk proposes an Ad-Hoc group with the potential WFOs in order to discuss this.</p> |
| | Market conditions |
| 22 | <p>Q: How often is the available capacity calculated?</p> <p>A: On a daily basis. Energinet.dk calculates their own forecast; these forecasts are not available to external parties. The wind farm has priority access to grid capacity.</p> |
| 23 | <p>Q: Can both platforms provide power to and from Germany in case of power outages in Denmark?</p> <p>A: Yes, the platforms are interconnected and the power can thus flow back and forth - subject to capacity in the German grid. All transactions towards Germany will be settled between Energinet.dk and the German TSO.</p> |
| 24 | <p>Q: Does 50Hertz do the calculation/forecasts for the German part?</p> |

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| | A: Yes. |
| 25 | Q: What does the term interconnector refer to? A: The interconnector refers to the cable between Denmark and Germany. |
| 26 | Q: What is the capacity of each of the export cables to Denmark? A: The cables are identical; 300 MW each. |
| 27 | Q: In case of constraints in the Danish grid, will we be able to utilize the German grid? A: In the event of constraints in the Danish grid, Energinet.dk will make available power and capacity for the Kriegers Flak offshore substations in cooperation with 50Hertz Transmission. All settlement in these situations will be via Energinet.dk. |
| 28 | Q: Who handles the rescue offshore in case of a ship wreck or similar, is this handled by a governmental emergency agency, or will a private company be contracted to handle this? A: In case of an emergency nearby vessels assisted by the Danish Defence Command will take action. Salvage of e.g. wrecks will be an issue for the owner/insurance company. |
| 29 | Q: Is there a rental fee for using the rooms on the substation? A: No, there is no fee for using rooms on the platform. |
| 30 | Q: Can WFO be provided with documentation of the available strongpoints for cable pull in? A: Documentation of the available strongpoints is not ready yet. The bidder is encouraged to send clarifying question to the Danish Energy Agency and Energinet.dk will revert when documentation is available. |
| 31 | Q: Can WFO be provided with drawings of the topsides? A: The drawing material is quite elaborate and it is likely that only specific room sizes and details are of special interest. WFO is encouraged to supply a list of rooms or decks of special interest to DEA who will ask Energinet.dk to supply the documents. |
| | Round table sessions |
| | Market conditions |
| 30 | Q: Is the WFO affected in case of a less power production in Germany? A: No, there is a clear line between the Danish and the German power grid. Please visit www.energinet.dk Market Regulation E. |
| 31 | Q: Why does Energinet.dk operate with a 5 minute production plan? A: The 5 minute resolution helps Energinet.dk to reduce system imbalances in the Danish power system and is a requirement in Regulation C3. |
| 32 | Q: Will the WFO trade electricity? A: WFO must trade his production to obtain the spot price. Price supplements will be calculated according to the wind farm tender. The regulations for becoming a trader and Balance Responsible Party in Denmark are found in Market Regulation C1. |

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| 33 | <p>Q: What commercial significance will the interconnector have for the WFO?</p> <p>A: The WFO will have a higher degree of operational security. It will not affect the operational regulations for the wind turbines.</p> |
| 34 | <p>Q: Figure displayed on posters in the meeting room show lines illustrating two possible connections to Sweden. Are these also planned grid connections?</p> <p>A: No, this is only to illustrate possible future connections.</p> |
| | Platform (fabrication, installation, commissioning) |
| 35 | <p>Q: What is the capacity of the crane on the roof deck?</p> <p>A: The two OSS are both equipped with an offshore crane with a capacity of 3.5 tons. No reduction in capacity is needed due to offshore conditions.</p> |
| 36 | <p>Q: Who handles the switch gear?</p> <p>A: Following WFO's procurement of the MV switch gear, the switch gear will be mechanical handled on the yard by the fabrication contractor; however the hook-up and commissioning will be the responsibility of the WFO.</p> |
| 37 | <p>Q: How is use of the Helideck regulated?</p> <p>A: Requirements for utilization of the Helideck will be according to Danish regulations in BL 3-5.</p> |
| 38 | <p>Q: Can the array cables be connected via junction box?</p> <p>A: Connection of 33kV subsea cables on the OSS via a junction box solution, can be implemented if allowed by the time schedule, all expenses will be addressed to the WFO.</p> |
| 39 | <p>Q: Is the type of foundation locked?</p> <p>A: The substructure design of the offshore platforms is locked in relation to the use of a gravity based foundation.</p> |
| 40 | <p>Q: Who supplies the HV export cables?</p> <p>A: The HV export cables are supplied by ABB.</p> |
| 41 | <p>Q: What is the deadline for delivery of the 33 kV switch gear?</p> <p>A: Deadline for timely delivery of 33 kV switch gear to the fabrication yard, shall be according to the tender material provided by the Danish Energy Agency (currently December 1st 2017). Early delivery is encouraged for the WFO to be able to install and test the 33 kV switch gear at the yard. Please note that load-out of topsides are planned early March 2018.</p> |
| | General Grid Connection |
| 42 | <p>Q: Can the concession be extended beyond 25 years.</p> <p>A: An extension can be negotiated with DEA according to tender wording. Attention should be paid to Wind Turbine type tests that apply for either 20 or 25 years.</p> |
| 43 | <p>Q: How is the area for the wind farm fixed?</p> <p>A: An area of 132 km² is allowed. The area shape can be optimized. The DEA is considering implementation.</p> |
| 44 | <p>Q: Can availability figures be given for different component types and repair times? Outage of the grid connection is critical for the wind turbine gearbox, blades and electrical equipment as well as warning lights etc.</p> <p>A: In general it is difficult to give exact numbers on availability and</p> |

repair times as both of these are dependent on several different variables among these offshore access due to weather conditions. The numbers below are Energinet.dk's best guess for offshore equipment.

Transformers (applicable for both 400/220 kV and 220/33 kV transformers):

| Error type | Fault probability | Repair time |
|--|-------------------|-------------|
| Lesser errors | 20 year/fault | 4 days |
| Large errors – with reserve transformer | 500 year/fault | 42 days |
| Large errors – without reserve transformer | 500 year/fault | Over 1 year |

The offshore transformers are maintenance free. However heavy use of the tap changers might result in need for maintenance (in the time frame of hours). Maintenance will be planned for low wind periods.

For the offshore 220/33 kV transformers, one reserve transformer will be available onshore. A spare auxiliary transformer (Earthing transformer) is also available.

In the case of a 400/220 kV transformer error it is possible to load the remaining 400/220 kV transformer in either Bjæverskov or Ishøj and the 220 kV land cables up to 650 MVA up to 40 hours.

Busbars (applicable for 33 kV, 220 kV and 400 kV levels):

| Error type | Fault probability | Repair time |
|---------------|-----------------------|-------------|
| Lesser errors | 70 year/fault/bus bar | 4 days |

Operation experience indicated that larger bus bar fault does not occur or occurs so rarely that general numbers on fault probability are uncertain.

Breakers (applicable for 33 kV, 220 kV and 400 kV levels):

| Error type | Fault probability | Repair time |
|---------------|------------------------|-------------|
| Lesser errors | 200 year/fault/breaker | 4 days |

Land cables (applicable for 220 kV):

| Error type | Fault probability | Repair time |
|--------------------------|---------------------------|-------------|
| Internal/external faults | 0,00088 faults/km/year | 7 days |
| Joints faults | 0,00007 faults/joint/year | 7 days |

Sea cables (applicable for 220 kV):

| Error type | Fault probability | Repair time |
|-----------------|-------------------|-------------|
| Internal faults | 0,00073 | 41 days |

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| | | faults/km/year | |
| | External faults | 0,0333 faults/year | 41 days |
| | Joints faults | 0,00007 faults/joint/year | 41 days |
| | For external faults one fault per 30 years for the sea cable from Tolstrup Gårde to KFA and KFB is considered likely. External faults on the cable KFA to KFB are not considered likely. | | |
| 45 | <p>Q: Does Energinet.dk look into mitigations for short circuit currents above 25 kA? Design changes to wind turbines are costly and time consuming because of recertification etc.</p> <p>A: Energinet.dk proposes DEA to establish an ad-hoc group with participation of concessionaires to discuss mitigations. The organization and format for such a group will be looked into.</p> | | |
| 46 | <p>Q: Wind turbine technology is developing while the grid connection concept seems to be developing at a slower pace.</p> <p>A: The grid design has to take into account a variety of different wind turbine makes and is hard to get information on upcoming technologies.</p> | | |
| 47 | <p>Q: How is lost production compensated?</p> <p>A: When Energinet.dk is unable to handle the wind farm production a capacity limitation or even an outage is possible. Energinet.dk will compensate the concessionaire according to the appendix to Market Regulation E.</p> | | |
| | Platform (electrical, mechanical, auxiliaries) | | |
| 48 | <p>Q: Please explain the delivery of the switch gear?</p> <p>A: Delivery date (1 December 2017) of the WFO switch gear is set in order for the fabricator to finish the switch gear rooms in time.</p> | | |
| 49 | <p>Q: When should the additional WFO equipment be delivered?</p> <p>A: Delivery of the additional WFO equipment to the yard should be finalized by the same date as 33 kV switch gear in order to allow the WFO time for onshore installation</p> | | |
| 50 | <p>Q: Can the export cables be overloaded?</p> <p>A: The export cables can be overloaded in unusual situations. Temperatures are continuously monitored along the cables.</p> | | |
| 51 | <p>Q: What is the overload capacity of the main transformers?</p> <p>A: Overload capacity of the 220 MVA main transformers is 290 MVA for 30 minutes.</p> | | |
| 52 | <p>Q: Where are the interfaces of the fiber optic?</p> <p>A: Fiber Junction Box on cable deck is WFO scope. Fiber cable from Junction Box to WFO SCADA is WFO scope.</p> | | |
| 53 | <p>Q: Where is the interface of the 33 kV cables?</p> <p>A: Regarding the 33 kV cable: Junction Box on cable deck is WFO scope, if WFO wishes to preinstall 33kV in yard.</p> | | |
| 54 | <p>Q: Will there be CCTV overlooking the wind farm from the roof deck?</p> <p>A: Regarding CCTV: If cameras directed at the wind farm is requested, this is WFO scope.</p> | | |
| 55 | <p>Q: Can wind turbines (WTGs) from the Western part be connected to the Eastern platform?</p> <p>A: WTGs from the Western part of the wind farm can be connected</p> | | |

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| | <p>to the Eastern part of the wind farm using the WFO array cables observing restrictions on crossing export cables. However there are no dedicated J-tubes for this purpose.</p> <p>Energinet.dk will consider the arrangement of J-tubes (order and direction).</p> |
| 56 | <p>Q: Who has the scope of the surge arrestors?</p> <p>A: The surge arrestors mounted on the 33 kV bushings of the main transformers are part of Energinet.dk scope. Additional 33 kV surge arrestors is WFO scope.</p> |