

| STAKE HOLDER CONSULTATION PROCESS OFFSHORE GRID NL |  |
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| QUALITY CONTROL |                |            |
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*Please note that the intention of this feedback report is to illustrate the overall discussion and results. The text should be placed in the greater context of transparency about TenneT 's consultation process. This text is not legally binding and could be modified during the stakeholder consultation process.*

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## 1. Moments of feedback

| Feedback                     | Abbreviation |
|------------------------------|--------------|
| Expert meeting 15&16.04.2015 | EM04         |
| Expert meeting 12&13.05.2015 | EM05         |
| Expert meeting 02.07.2015    | EM06         |
| Consultation website March   | WS01         |
| Consultation website April   | WS02         |
| Consultation website May     | WS03         |
| Consultation website June    | WS04         |
| Consultation website July    | WS05         |
| Bi-lateral meetings          | BL01         |

## 2. Feedback and action

| Feedback   | Feedback moment | Action   |
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| You are missing out on the possibility of using the platform for O&M purposes of the WF. In Denmark the helideck is also used for O&M service for WF.  | EM04            | Noted  |
| This will be a challenge - last winter 87% of the time the platform was not available due to CTV limitation and no helicopter platform.  | EM04            | Noted  |
| I don't see how you can manage and maintain a platform without helideck.   | EM04            | Noted  |
| We have wind farms at 20km offshore and 40km offshore without helideck. They have different O&M arrangements and are still looking for the optimum O&M strategy. We would like to maintain flexibility and would therefore opt for a helideck. | EM04            | Noted  |
| Helideck is only 2 million. So why are we having this discussion.  | EM04            | Noted  |
| We have a windfarm at 50 km offshore and no helideck. But the size of the wind farm is smaller.  | EM04            | Noted  |
| Why is the position on access to platform different with TenneT Germany? [by helicopter only and not CTV].   | EM04            | The crew transfer policy of TenneT is the result from an economic and risk evaluation. The situation |

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|  |             | <p>in GE and NL is different leading to different outcomes.</p> <p>Main differences are:</p> <ul style="list-style-type: none"> <li>The Dutch platforms are nearshore limiting transfer time.</li> </ul> <p>The Dutch platforms make use of AC. AC substations have a higher reliability and availability and require less maintenance.</p> |
| <p>What is your availability objective for the platform? [TenneT]:<br/>~98%</p>  | <p>EM04</p> | <p>~98%</p>   |
| <p>TenneT requests to provide numbers on accessibility and results on influence and prices of helideck to support input of current study?<br/>Does this mean that if we can provide numbers on why a helideck would be beneficial to the cost of the wind farm would this be reflected upon?</p>                                   | <p>EM04</p> | <p>Yes please provide numbers and arguments</p>   |
| <p>If you lose the platform you do not only lose production but also you also cannot provide electricity to the WTG. Therefore damage to the WTG will occur. Who is taken that risk? Please check with your colleagues because there has been a platform from TenneT which has had a total black out during the commissioning.</p> | <p>EM04</p> | <p>The risk is covered in the position paper: O2 Stranded asset mitigation [ONL 15-217 O2_Stranded asset mitigation_PP_v1]</p> <p>The risk of the loss of the complete grid connection (no electricity supply to WTG) is taken into account in the evaluation of the access method but does not influence the conclusion.</p>               |
| <p>In Denmark we have full access to the platform. We have to inform the TSO and follow the agreed safety rules and after that can access the platform. This works well.<br/>In Germany it is the other way around. Platform is owned by WF operator and TenneT only has access while being accompanied by</p>                     | <p>EM04</p> | <p>Noted</p>  |

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| WF Operator.  |      |  |
| We need to have access and will have to agree on how we adopt your safety rules. In the UK we have an interface agreement with TSO in order to access platform.<br>Does this also takes into account subcontractors?  | EM04 | Yes they sign and comply with the same rules   |
| The good news is there is access and in which way this is organised is a formality. Good that access can be granted.  | EM04 | Noted  |
| How do we arrange access to rooms we (OWF and TenneT) should both have access to?   | EM05 | 'other areas' will have to be accessed under accompany of TenneT                           |
| Will there be separate rooms if the two connected WF are from separate owners? OWF would prefer separate rooms with separate access.  | EM05 | Yes there will be separate rooms for each OWF owner.                                       |
| Will there be room for DTS communication and would that be the same room?   | EM05 | TenneT makes one room available and the OWF has to let TenneT know what is needed in space |
| Good; specs will be provided by OWF. Plus some topside room is needed as well (for meteo station, cameras, LIDAR etc) is that also relevant for this paper? No you can access this from the outside. OWF: but TenneT will have to provide some sort of access to the topside  | EM05 | Noted  |
| What happens if OWF has to service cable measurements or has an event on equipment which is not inside our room? [TenneT] then the visit has to be combined. [OWF] this could be on short notice and within short reaction time e.g. tree days. Could you agree on reaction time? We will have to look into this and will have to arrange for that. Emergency crew also needs to be available for TenneT and is also available for OWF. Response time will be included in the connection agreement. Please provide your (OWF) general response time. OWF will investigate internally and will get back on this during next expert meeting.<br>Is the heli-hoist the only way and/or primary way of accessing platform or do we use the heli-hoist is an emergency access. | EM05 | Response time will be included in the connection agreement                                 |
| We also use the heli-hoist is for (medical) emergencies only.   | EM05 | Noted  |
| Is access by CTV possible as well?  | EM05 | Yes  |
| TenneT is currently executing a study on the helideck. Amongst platforms within 30km offshore 75% don't have a helideck.  | EM05 | Noted  |
| Principal access method is CTV not heli.  | EM05 | Noted  |
| The bigger the WF the bigger the financial effect of downtime of platform. According to my colleagues there was no question on why not to install a helideck with this size of WF at this location.   | EM05 | Noted  |

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| <p>Heli-hoist can be used in case of an emergency. OWF: yes but a medical emergency is something else than a technical emergency. For non-medical emergencies hoisting is seen as a non-preferable way of access.</p>      | EM05 | Noted  |
| <p>We would suggest to make a cost benefit analyse.</p>  | EM05 | <p>TenneT has made a comparison and the investment of a helideck will add to the redundancy but will not pay off.</p>  |
| <p>This does not only concern the primary system on platform but also your ancillary system. For instance-HVAC, fire detector. If this is not working we need to shut down or have people out there 24/7.</p>              | EM05 | Noted  |
| <p>Is the study also looking into improvement of HSE. Helideck also has large HSE risks, landing a helicopter is one of the most dangerous actions offshore. Please also assess negative effects in your study.</p>        | EM05 | <p>Included in the second version of the position paper. [ONL 15-184-T4_Access to platform_PP_v2].</p>   |
| <p>Two OWF would never develop this platform without helideck.</p>   | EM05 | Noted  |
| <p>Have you also taken into account the fact that many more things go wrong offshore compared to onshore?<br/>You should also calculate what extra availability you gain if you add a heli-deck to CTV and heli-hoist?</p> | EM05 | <p>Failure rates of offshore projects have been used in the RAM study.</p> <p>The additional accessibility gained with the use of a helicopter is very limited. The influence on the availability is considered to be negligible. In the RAM study offshore transfer times are incorporated.</p> |
| <p>What is the definition of an emergency? Is unplanned maintenance an emergency or only medical/dangerous cases and emergency?</p>  | EM05 | <p>According the offshore standards an emergency is a medical/dangerous case.</p> <p>TenneT aims to use helicopter hoisting also for unplanned maintenance</p>   |

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|   |      | (in case the grid connection is down). This is under discussion with the authorities and certifier. |
| Who is making the decision heli-deck or not? Is it TenneT or is it a social capital issue (with regards to financial compensation)? Is it free for TenneT to decide or the ministry?  | EM05 | It is the ministry of Economic Affairs  |
| We don't agree on the rationalities behind TenneT position, the safety aspects of the OWF/PPM using the TenneT platform helipads for set-down of maintenance crew, and the availability of SCADA rooms for the generators systems on the platforms. Both issues will lead to extra costs and potentially to lower safety, and the potential need for placing SCADA systems on land and distributed in WTGs will mean that new technical solutions will have to be developed.  | WS02 | Noted   |
| It doesn't seem that allocating a room to Generator in the OSP can disrupt the standardization of the platform. But if TenneT wants to keep this new way of operation, then a new design in SCADA has to be developed. See further comments to T8 SCADA.  | WS02 | Noted   |
| The Danish set-up is different. As we understand the Dutch government has chosen what they call the 'Danish model' for offshore wind this may serve as good reference. In Danish projects the PPM first of all does own equipment on the platform such as: <ul style="list-style-type: none"> <li>• Earthing resistors for the MV system</li> <li>• MV switchgear and array cable systems</li> <li>• Communication and SCADA</li> <li>• Aux. supply panels etc.</li> <li>• Specific rooms are allocated to PPM equipment.</li> <li>• The PPM has unlimited access to the platform 24/7 to the complete platform. The TSO control room need to be advised at arrival.</li> <li>• Helideck can be utilized for transport of personnel.</li> </ul> | WS02 | Noted   |
| All the above is governed by an Operation Agreement which also regulates safety procedures, coordination, responsibilities, etc. etc. and works well.   | WS02 | Noted   |
| Access to the platform must be possible, e.g. to operate & maintain SCADA, communication and failure diagnostic on cables etc. Availability via CTV is not sufficient. Eg. for German project, during last winter we have seen up to 90% WoW. Helideck is   | WS02 | To the opinion of TenneT the WPO has enough options to ensure the                                   |

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| <p>needed to ensure fast reaction in case of failures. E.g. one day outage can cause feed in losses far above the costs for a helideck.</p>  |             | <p>availability of the WPO equipment.</p> <p>TenneT will allow WPO to access the platform.</p>   |
| <p>It's important to have well defined response time to expect from TenneT both for planned maintenance and in case of faults. In case of faults a response time no longer than 8 hours is preferred.</p> <p>Also if TenneT must be present at all times during developers access to the platform, it is important that TenneT have enough manpower to attend a situation that arise with short notice and that could extend to an offshore operation that could last 36 hours continuously.</p>   | <p>WS03</p> | <p>Noted</p>   |
| <p>In the abstract of the CAP437 (Standards for Offshore Landing Areas, <a href="http://www.caa.co.uk">www.caa.co.uk</a>); Chapter 11 winching (hoist) operations is clearly stated that a hoisting area is not a normal method of transfer.</p> <p>We propose to use a helicopter landing area (deck) for the transfer operation.</p>   | <p>WS03</p> | <p>TenneT is aware of the CAP437 regulation. Taken into account in the position.</p>   |
| <p>For the decision on whether or not to install a heliplatform [We] advise to do a cost benefit analysis and share it with the market. Space and access to that space is needed for the equipment described below in the feedback on topic T8. Response time needs to be agreed upon.</p>   | <p>WS04</p> | <p>A cost benefit analysis is made. Results are published in the position paper.</p> <p>The complete cost-benefit analysis cannot be disclosed due to confidentiality.</p> <p>With regards to space, access and response time see below.</p> |
| <p>Other spaces (such as 66 kV infield spaces) are only accessible under supervision of TenneT. A response time for TenneT should be agreed on. What response time for TenneT is found reasonable by OWF?</p> <p>Eight hours is considered as long if the response time is the time between the occurrence of the failure and the presence on the OHVS, especially when the complete wind farm is down. If a Heli Hoist is considered a shorter response time seems possible and desirable.</p> <p>This issue can also be solved by appointing people in the OWF organisation that are allowed to access and enter the spaces under consideration without the supervision of TenneT.</p> | <p>WS04</p> | <p>Will have to be agreed upon. Is part of the O&amp;M interface position paper.</p>   |

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| <p>Third parties on land (provided they are sufficiently qualified and educated) also have access to TenneT stations.<br/>This requires a working permit and a reporting requirement.</p>   |      |   |
| <p>Are there any specific HSE topics requiring special attention in this phase?<br/>OWF proposes to refer to the 'Arbocatalogus Windenergiebedrijven' when establishing HSE requirements. The basic safety rules for working in offshore wind farms are already included in there. Possible additional rules can be added later when TenneT also becomes a member of the working group.<br/>Additional important points of attention are:<br/>-Adequate fire extinguishing system, preferably without a choking agent but with a water spray.<br/>-Rapid evacuation of multiple persons in case of fire e.g. by using a chute.<br/>-AED and First AID equipment present on the platform, to prevent that the CTV has to take this along every time.<br/>-Adequate coordination between the works of different teams.</p>  | WS04 | Noted   |
| <p>What is the opinion of OWF on the discussion on access to platform with a CTV and emergency access through a heli hoist.<br/>OWF thinks that an important breakdown is an emergency. Therefore a Heli hoist should be possible in such situations when CTV access is not possible.<br/>The platform is a heliport when heli-access to the platform is possible with a Heli deck. In that case also the required space that one is prepared to reserve is important (concrete: obstacle free zones throughout the wind farms). No high expectations should exist given the limited space within the areas.<br/>With regard to CAP 437 it is important that TenneT discusses timely with the 'Inspectie Leefomgeving and Transport (V&amp;W) to determine under which regime the flight paths to and away from the platform will be assessed. After all, it concerns new heliports. The OHVS of our WF1 WF2 is accessible through winching out of a helicopter. The space requirements of a winch area is less and a lot less demanding than a landing spot. Then the it is also not a heliport, so no flight paths to and away from the platforms have to be determined.<br/>High expectations should not exist of this, there is just one helicopter which can perform this type of hoists. In case of high winds this heli is largely used for depositing sea pilots. It could be possible that an expansion of the helicopter fleet is considered when the activities of Wind op Zee are expanded.</p> | WS04 | Noted   |
| <p>Which requirements does OWF have with respect to communication with shore?<br/>OWF proposes to provide IP-telephones in every space which will be connected with the public telephone network on land. In this</p>   | WS04 | TenneT will place IP telephones in applicable rooms (but for sure all WPO rooms). TenneT will |



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| <p>way it will always be possible to call someone onshore from the platform.<br/>Additionally, UMTS within the wind park is very practical since the O&amp;M crew can just use their cell phones.<br/>Additionally with respect to maintenance, it is very desirable to have WIFI in every space the platform. Maintenance personnel is increasingly making use of e.g. tablets to check online drawings etc.</p>  |      | <p>provide internet access in applicable rooms, Wi-Fi is an option otherwise RJ-45 outlets. Further; discussions are ongoing at this moment with mobile operators to explore the possibilities.</p>  |
| <p>It is assumed that the OSP location is fixed. TenneT should clarify if this is the case and provide detailed rationale for choice of location to potential bidders.</p>   | B01  | <p>Correct (see "ONL 15-360_T16_physical coordinates_PP_v1")</p>   |
| <p>Irrespective of the final ownership boundary at the OSP the developer should be provided access to the OSP. Even with the proposed ownership boundary suggested by TenneT (array cable sealing ends) the wind farm owner will require access to their equipment (even if just cable sealing ends). For example, if a failure occurs at a cable sealing end it is not credible that the wind farm owner is unable to inspect their damaged asset. Placement of an O&amp;M contract with TenneT for wind farm owned assets on an OSP, if agreed upon, does not remove the assets owner's requirement for access.</p>  | B01  | <p>Noted; has to be agreed upon</p>  |
| <p>It is noted that TenneT require and have access to developers' OSPs in Germany. Similarly, in the UK developers' have access to the TSOs' a.c. OSPs.</p>  | B01  | <p>Noted</p>   |
| <p>Access also presents HSE&amp;S benefits, e.g. safe haven.</p>   | B01  | <p>Noted</p>   |
| <p>As discussed in the expert meeting, space and access is required for additional equipment on the substation. Space for the following items is required:</p> <ul style="list-style-type: none"> <li>- Lidar/sodar,</li> <li>- visibility measurements,</li> <li>- CCTV (outdoor camera's)</li> <li>- wave measurements/other meteo,</li> <li>- DTS on the intra array cables.</li> <li>- Ability to install power meters ourselves,</li> <li>- Junction box (power cores) fibre optic patch panel</li> </ul> <p>Furthermore, it should be considered that only 3 persons per flight can be transported by hoisting, instead of 9 with landing on a helideck. We recommend to redo the analysis with these altered assumptions.</p> | WS05 | <p>With regards to space for equipment, reference is made to " ONL 15-185-T8_SCADA communication interface and data links_PP_v2"</p> <p>The number of people transported by helicopter does not influence the analysis and conclusion.</p> |
| <p>Functional specification<br/>In order to start our procurement process and prepare a bid, the functional specification of the platform is needed including the installation capabilities. Because of the tight timeline this</p>  | WS05 | <p>Installation interface is described in "ONL 15-xxx-</p>   |

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| <p>information is needed on short notice.<br/>This functional specification should include:</p> <ul style="list-style-type: none"> <li>- J-tube design</li> <li>- All relevant installation capabilities. E.g. including description of the winches on jackets including availability for the WF developer</li> <li>- Clarification on the installation space for the intra array cabling (sufficient space is needed to ensure that the bending radius of the cable can be met.</li> </ul> |      | <p>T13_Installation interface management_PP_v1"</p> <p>With regards to technical capabilities: information sessions on basic design of the platform will be held during expert meetings of September and October</p>                                     |
| <p>During commissioning TenneT personnel should be available on the platform 24/7.</p>  | WS05 | Noted  |
| <p>Special attention should be paid to cable pulling. This should be coordinated between WPO and TenneT very careful, to prevent damage.</p>  | WS05 | Noted  |
| <p>For the connection of the cables we have a solution based on a hang-off construction to fix the cables and an intermediate cable piece between this hang-off and the cable end sealing on the switchgear installation.</p>   | WS05 | <p>From standardisation point of view, inter-array cabling installation is based on direct termination on the 66 kV GIS (no joint or junction box on platform / cable deck). This subject is open for discussion in the expert meeting of September.</p> |
| <p>Please give more information about the pulling forces. Your estimation of the 66 kV cable diameter of 160 mm seems to be too narrow. We agree with a diameter of the J-tube of at least 2,5 times the diameter of the cable, but this should be based on real diameters of 66 kV cables (630 or 800 m2 Al).</p>  | WS05 | <p>Estimate of the 66 kV cable diameter will be adjusted (increased) and based on 1000mm2 Al cable.</p>  |
| <p>Please provide the safety and operational regulations from TenneT for unaccompanied access to the platform, as well as the evacuation procedures.</p>  | WS05 | <p>These are currently under development. Will be part of the grid connection agreement (ATO and REA).</p>   |
| <p>What are the criteria for safe boat landing on the platform with CTV?</p>  | WS05 | t.b.a. in next feedback report   |
| <p>The assumptions in the study show a mismatch with our experience. Based on German experience: Numbers of Ampelmann (2 meters) are optimistic while numbers for helicopter deck (25 m/s) are pessimistic. Maintenance days are too optimistic. Offshore installations require more maintenance.</p>   | EM06 | <p>Helicopter wind speeds does not influence the calculations.</p> <p>Numbers from W2W solutions and</p>   |

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| OWF will send additional information via the website.  |      | maintenance days have been extensively crosschecked.  |
| Other parties confirm they would not install a heli-deck and access by CTV is business as usual.                                     | EM06 | Noted   |
| We assume that TenneT staff will be available during the installation phase.   | EM06 | Correct   |
| Could we have more information on the design of J-tubes and possibilities of pulling. E.g. will there be shared or individual wings. | EM06 | Suggestion to provide an information session on basic design of the platform in September and October |
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