

STAKEHOLDER CONSULTATION PROCESS OFFSHORE GRID NL

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QUALITY CONTROL

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(Please note that the below is not a literal transcription of the comments made, but rather represents the overall tone and context of the discussion)

0. Welcome

Rob van der Hage opens the meeting and welcomes all attendees.

NWEA offshore wind group mentions that agreement does not have to be ready by Dec 1st 2015. This could also be Jan 1st. Preference is to have more time to discuss topics (like jacket ready, cable pull in). December 1st is too early since scenario consultation will not be finished by then. In total ~6 parties agreed on this statement which could be provided in writing as well.

Notice is made by TenneT to emphasise to provide written feedback up to and including Oct 27th 2015. TenneT will also consider adding an additional day of consultation during which both legal and technical experts are invited to provide feedback. TenneT believes that a sufficient and adequate process prior to December 1st is still the goal and its planning has not changed.

1. T.13 Installation interface management

[Discussion]

Feedback from the meeting attendees

What will be the diameter of the J-tubes? -> please refer to Position Paper T.02

Is it correctly understood that TenneT reserves the right to disapprove the layout of WPO (reference to interface matrix 66 cable route from platform safety zone)? TenneT: Responsibility lays with the WPO and approval is needed from TenneT.

Who decides what the position and the angle of J-tubes will be? TenneT has fixed positions for the J-tubes. Detailed design (and therefore the angle) will be decided upon a later stage.

The design of cable crossings is missing in this overview. TenneT: for all crossings TenneT and WPO need to find a common understanding of how to deal with cable crossing but by TenneT this is perceived to be common practise.

Does the responsibility for execution of cable pull in for array cables lay with the WPO?

Scouring and seabed movement around platform should be included somewhere in the overview. TenneT: responsibility for scouring of platform is TenneT's responsibility and effect on cables is WPO's responsibility.

And who is responsible for scouring around J-tubes? TenneT: J-tubes are part of platform and jacket and therefore responsibility of TenneT.

Post meeting note: WPO is responsible for scouring around the J-tubes.

In the overview the following is stated "Construction installation of WPO equipment on other locations" -> other location could be anywhere? TenneT: correct.

Will there be a timeslot available for installation of equipment on the platform onshore? TenneT: this is taken into account in planning paper but WPO's input is needed for this as well. Please provide your feedback.

An indication for installation of equipment (LiDAR, data etc) on the offshore platform is ~2weeks.

Will TenneT design the string protection? -> TenneT: please refer to PP T06.

Wasn't it decided that the availability of junction boxes would be reconsidered? TenneT: we have discussed this but the outcome was as it is stated in the position paper right now.

WPO is asking for this since the availability of junction box makes WPO's contracts more flexible. If this is unavailable the WPO needs to cover more risk and therefore price will go up. TenneT: this discussion has already taken place in a previous meeting.

WPO has a concern on timing of cable pull in and connection without a junction box. There is a high risk if the topside is delayed.

When will the cable deck layout be available? TenneT: the basic design is finished by the end of November. After it is finished TenneT can share this with WPO.

In order to manage expectations TenneT will provide a list with items/information to deliver including a timeline with what to expect when.

2. T.02 Number of bays, T.11 Overplanting , T.12 Redundancy

[Information]

Feedback from the meeting attendees

T02: Diameter of J-tube is indicated

T12: Position paper will be updated with notification information

T11: Position paper will be updated with notification information

Will the algorithm TenneT is using for cable loading be shared? TenneT will provide basic information in order for the WPO to do its own calculations (such as assumption on cable design, soil data, wind data used).

Will the WPO receive the conditions under which curtailment needs to take place? TenneT: in principle this will take place base on cable temperature but TenneT always reserves the right to curtail the wind farm (e.g. for grid stability reasons).

Can we include, in Annex, the possibility of overplanting as a best effort from TenneT?

How will TenneT indicate curtailment is needed? TenneT: WPO will receive signal from TenneT. Please refer to position paper T11 [ONL_15-083-T11_Overplanting_PP_v2].

3. T.14 O&M interface management

[Discussion]

Feedback from the meeting attendees

Will these procedures also be copied in Annex 6? TenneT: this will be discussed this afternoon.

WPO appreciates the standard procedure for curtailment of TenneT – is this sufficient for this kind of curtailment. There is no statement from TenneT where the overplanting is stated/guaranteed. WPO would appreciate a best effort statement. WPO understand that this cannot be guaranteed under all circumstances. TenneT will consider if and how to phrase a 'best effort statement'.

OWF still needs to assess which overplanting is possible – but there are no guarantees on the quality of the data.

Please check wording in 2.3.4: is the metering statement with regards to one common party for all offshore activities correct?

How much time does TenneT expect to be offline during (metering) maintenance? And is this included in the 5 day non-availability? TenneT: the 5 day non-availability includes both planned and unplanned maintenance.

4. T.18 Shared data acquisition system

For information during the topic introduction

EZ is considering to install a LiDAR on each platform and will make the data available for OWF.

[Discussion]

Feedback from the meeting attendees

WPO would prefer to have control over the (LiDAR) measurements. WPO would prefer to keep the possibility to install measurement equipment. WPO could potentially use EZ-LiDAR but this needs to be decided whether the data is sufficient.

Is TenneT measuring wind speeds as well? TenneT: Other parties have shared interest in adding measuring equipment to the platform and the intention is to share as much as possible.

What does TenneT consider sharing with regards to bird/bat radar? TenneT: RWS provides data and OWF can use the data. WPO: Will this be free of charge and who will ensure the quality of the data?

WPO requests the necessity to be able to move and control its (own) CCTV. Please adjust in the table in the position paper. TenneT: that is correct and the table in the position paper should be adjusted.

Ship radar could be useful for WPO since the discussion on ships sailing through the wind farm are ongoing. In case WPO wants to monitor, radar is necessary. This would also be beneficial for maintenance works.

If the decision is made that ships are allowed to sail through, EZ intends to install a radar system in order to monitor and enforce regulations.

Is WPO directly connected to TenneT's measurement device for power quality measurements or does this go via a TenneT system. WPO prefers to have direct connection for executing root cause analysis during/after failure. TenneT will have to investigate the consequences of direct connection in relation to other restricted parts of the system (security reasons).

5. T.17 Compliance testing

[Discussion]

Feedback from the meeting attendees

Will the SOC paper be updated or does this need to be read with this position paper. TenneT: most probably the SOC paper will have to be changed after RfG agreement.

Is the +/- 10% a requirement to the equipment or operation? TenneT: it is a difference between guaranteed grid voltages and actual grid voltages.

How do you test fault ride through requirements? TenneT: please refer to the position paper [ONL-TTB-03069_T17_Compliance_testing_PP_V1] and its attachment.

TenneT will provide a separate document with short circuit levels and voltage levels.

6. T.15 Harmonic emission limits

[Discussion]

Feedback from the meeting attendees

Will TenneT measure these limits or is it calculated in advance? TenneT will do both.

But then measured data is a combination between OWF and transport cable. How will TenneT distinguish both? TenneT: the harmonics emitted by the WTGs will be measured at the current transformers of each string.

How will the balancing between two OWF be directed? TenneT: the limits for 66kV are the same for both WPO. WPO has to comply to the requirements. TenneT clarifies that the required harmonic levels which are stated are at 66kV at busbar.

Will the OWF place the compensation filters onshore or offshore? Onshore is amplification of existing harmonics of total system. Offshore it could/might be possible to install filters.

If WPO cannot comply with limits at point of common coupling does TenneT provide space for filters? TenneT: the common agreement should be that WPO is responsible in order to take care of matching the compensation and TenneT should agree upon providing space/opportunity to install filters.

Is it possible for the OWF to install filters offshore? TenneT: this should be possible when using active filters connected to the 400 volt system

Why does TenneT chooses to follow the IEC standard guidelines similar to onshore? This is a conservative approach. TenneT will get back with an answer on this.

Can we deviate from this guideline if OWF shows that e.g. on the busbar it is 3% and on the string it is 0.3%?

Will there be the approach to measure and after that deviate from the conservative approach? (e.g. measurements are within limits but calculations are not-> what will be the position of TenneT?)

7. P.01 Planning

[Discussion]

Feedback from the meeting attendees

What is the definition of 'delivered' on Aug 31st? Current drafting in Annex is too much alike as onshore delivery which is not suitable for offshore situation.

The conditions, definitions and approach with regards to 'platform ready' should be drafted and agreed upon.

Will TenneT inform the WPO on timeline/planning of execution of construction? TenneT: Yes quarterly reports and updates

Will TenneT also be obliged to report to government. No provision in any agreement but common practise is to keep in close contact with EZ. Ministry will also monitor TenneT's work and TenneT has reporting obligation to shareholder which is the government.

Is there a financial incentive for TenneT to reach the planning?

It is very important to know when cable pull in is possible. Appreciate the fact that a fixed date is not possible right now but could TenneT commit to a date on which TenneT will announce its date (for cable pull in). TenneT: will have quarterly reporting events with winning WPO – delays and accelerations on original planning will be discussed during these meetings.

During the detailed design phase of interfacing elements, quarterly meetings might not be sufficient. TenneT: coordination of interfaces etc will be a separate process with another frequency of meetings if requested.

The previous planning position paper held a date for jacket ready while the updated version does not have this date noted anymore – does this mean there is no effort anymore? TenneT: the internal planning within TenneT did not change and the effort is still to be ready march 2019.

Who will coordinate the possible situation that both OWF want to pull in from the first date possible - how does TenneT treat both OWF and who will have priority?

8. Technical Annex to the agreement

[Discussion]

Feedback from the meeting attendees

Could TenneT clarify the difference between point of common coupling and connection point or are they the same? If so please use one term in the annexes

Secondary and tertiary connection point is not defined. TenneT: secondary is defined and tertiary is part of detailed engineering. Would the OWF prefer to include an interface panel which takes care of the interfaces with regards to interconnection points? Yes that would be preferred by OWF.

Would it be possible to include the connection point in the single line diagram.

With regards to SCADA & optic fibre cabling it is stated that the patch panel is installed and spliced by TenneT. Could TenneT elaborate on why this is chosen? TenneT: the internal platform cabling will be done by TenneT and WPO needs to be able to execute the patching itself.

With regards to Annex 3 it seems that the position of TenneT is copied but the rest of the position papers is lost.

It has been decided by TenneT to separate back ground information and what has been agreed upon. In case the WPO sees missing items in Annex please indicate and provide feedback.

The purpose of the position paper is to facilitate the discussion and the purpose of the annex is to support the contract. The intention of this part of the expert meeting is to facilitate a discussion which results in agreements as written down in the Annex.

There is a lot of detail in the position paper which will be lost and/or translated in non-binding items for TenneT.

As mentioned the OWF is requested to give feedback on the already filled in parts of the Annexes. When will the OWF have time to give feedback on the parts which are currently still missing? TenneT will come back to this. There will be an additional session on Nov 9 and there will be room for feedback in that week.

The consultation process is very much appreciated and there is a lot of money involved and technical issues are difficult to translate into legal documents especially without having the position papers as a backbone of the intention etc.

OWF would prefer to give feedback after having taken a look at the annex, the scenario, compensation agreement since now it all comes together.

TenneT needs clear feedback before the planning will be changed. If OWF indicates items which are holding back the progress please do signal these to TenneT.

OWF and TenneT has a common interest in lowering the LCoE of offshore wind and therefore more time is needed to make decisions.

How today's PP will be entered in to technical annex

T.14:

With regards to the operations of grid connection the procedures of overplanting and reactive power should be included in the annex or agreed somewhere else.

Also the way of work for adhering to the setpoint should be defined and agreed upon.

Could TenneT clarify which models are expected from the WPO (with regards to all simulations).

T.15:

Will there be an economic justification/discussion of how necessary the active filters will be?

How will the OWF know the THD design criterion? When does WPO get this criterion? TenneT: will not be available before bid date.

But OWF needs to know grid impedance before the bid. TenneT: correct you need these levels before the bid. OWF understands that levels will most probably be slightly different in the future. At that point OWF expects some flexibility from TenneT in order to solve together and connect OWF.

T.18:

Table will be copied (including bird and bat)

Could radar be included as being conditional? TenneT will reflect on statement: "if it will be decided that ships will be allowed to pass through the offshore wind farm TenneT will facilitate the possibility of installation radar on platform".

General Q's on Annex:

OWF is missing the planning in the realisation agreement.

TenneT: it is mentioned that this information will be exchanged between the parties after OWF's are selected.

Will this planning then be part of the agreement? Potentially after the OWF has been selected? TenneT: will get back to OWF on this.

What is the status of the planning position paper? What is the legal status of the position paper? TenneT: the position paper does not have a legal status. The mentioned date is Aug 31st 2019. The attached schedule is TenneT's internal planning and its firm intention and will not be binding. Detailed cooperation will have to be sought with selected OWF.

What do the single line diagrams of the annexes (2) indicate? TenneT: the single line diagrams are stated as examples but these will only differ in minor details. They are very accurate 'examples'.

Page 10/27: signals are stated – could OWF also add in their preference of signals? TenneT: yes common practise for connection to TenneT grid – OWF can request additional signals and when available OWF may use this.

What is the status of the blue print? TenneT: this has the same status as the position papers: it is a summary of the work over the last year and will feed into Scenario and/or Annex.

This consultation process would be agreed by GEN – how are they still involved? TenneT: this is only for the RfG part.

TenneT: The agreement clause mentions what is agreed background documents are for information purposes only. If OWF requests additional parts of the position paper in to the Annex – please state so. Preference is to add more parts to the annex instead of referring to the position paper.

Could TenneT indicate what will be the agenda for November 9th and what will be the expectations and requested preparations? TenneT: details will be provided tomorrow. In any case there will be no page turning of the agreements (the focus will be on specific feedback). Page turning will be done for the technical annexes.

9. Closure

10. List of attendees

Company	Name
TenneT	R. Harrewijn
Nuon/Vattenfall	M. Wiseman
Nuon/Vattenfall	A. Pennink
Nuon/Vattenfall/ NWEA	M. Ars
Eneco	J. Jacobs
Van Oord	R. de Bruijn
EnBW	S. Sherrington
TenneT	S. Jaarsma
Min EZ	J. Vermeulen
RWE Innogy	B. Burger
RWE Innogy	J. Runge
Parkwind	D. Vandercammen
Statoil	Ø Bergvoll
DONG	G. Pedersen
DNVGL on behalf of E.ON	P. Kozian
DELTA	J. Maas
TenneT	R. van der Hage
TenneT	F. Wester
Ecofys	M. Müller
TenneT	D. Vree
Ecofys	A. Ritzen
De Brauw Blackstone Westbroek	A. Kleinhout