

CLASSIFICATION C1 - Public Information
DATE June 25, 2020
ENCLOSURE BELONGING TO Q&A wind tender Hollandse Kust (noord)
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Q&A: incoming questions on wind tender Hollandse Kust (noord)

This document contains answers to the questions TenneT has received related to the wind tender Hollandse Kust (noord).

- *Total of questions and answers: 13*
- *Last update: June 25, 2020*

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QUESTION 1

Can TenneT provide more information on electrification of offshore oil and gas platforms in relation to the Hollandse Kust (noord) platform?

- TenneT's Hollandse Kust (noord) (HKN) platform will include two connection points for offshore consumers of electricity. Development of the connection point on the platform, and the realization of the consumer connection (i.e. cable laying and connection works to the platform) will not interfere with the development of the offshore wind farm, whereby the wind farm developer and prospective consumer(s) are invited to align on necessary works in the HKN wind park area.

These webpages of NAM offer more information on the electrification of offshore oil and gas platforms:

- <https://www.nam.nl/gas-en-oliewinning/aardgaswinning-op-zee/schoon-en-efficient-produceren-op-zee.html> (in Dutch only).
- <https://www.nam.nl/techniek-en-innovatie/vereenvoudigen-platforms.html> (in Dutch only).

QUESTION 2

In Hollandse Kust (noord) Wind Farm Site Decision a maximum installed capacity of 760 MW is mentioned while the Connection and Transmission Agreement from TenneT specifies 2 x 380 MW (380 MW per power park module). Does a permit holder need to comply to a total capacity of 760 or 2 x 380 MW (so 380 MW per power park module)? In line with the above, in case the limitation is 380 MW, is limitation required at connection point with TenneT (66kV level) or it is installed capacity (excluding boost)?

- Each platform has two 'main transformers'. Each main transformer can transmit 380 MW as maximum, hence 2 x 380 MW. The platform has 4 sections that are capable of 210 MW per section at maximum. Please refer to Annex 2, the paragraph 'Number of J-tubes and bays':

Number of J-tubes and bays

The platform will accommodate up to 8 (eight) J-tubes (inner diameter 450 mm) for use by the connected party. Each connection of a J-tube will be facilitated with a Primary Connection Point.

Six 66 kV bays will be available per Power Park Module (i.e. the installation of the connected party and any other Power Park Module connected to the platform). This results in four bays "one string – one bay" and two bays "two strings – one bay". In the case of "two strings – one bay", this will be done with two separate cable disconnectors.

| | |
|--|--------|
| Minimum number of 66 kV cables per Power Park Module (350 MW): | 4 |
| Maximum number of 66 kV cables per Power Park Module (350 MW): | 8 |
| Maximum number of 66 kV GIS bays available per Power Park Module (350 MW): | 6 |
| Maximum current (I) per 66 kV GIS bay: | 1250 A |
| Minimum power (P) per 66 kV GIS bay: | 45 MW |

TenneT will define the final layout of the 66 kV switchgear installation and cable routing on the platform in order to ensure a balanced distribution of power per switchgear section. It shall be possible to group all 66kV cables of the connected party into two sections. The maximum active power (P) for each section shall be less than 210 MW.

It is up to the offshore wind park developer how much WTG's are to be installed (within limits of the wind site decision). TenneT makes the following requirements:

- 380 MW per transformer as maximum;
- 210 MW per section as maximum.

A permit holder needs to comply with 2 x 380 MW or 380 MW per power park module. Limitation of 380 MW is at the 66 kV connection point with TenneT.

QUESTION 3

Which innovations are possible on the TenneT platform of Hollandse Kust (noord)?

- On the platform two rooms are available which can be used by the offshore wind farm developer. These rooms can be used for innovation. However, there are restrictions regarding the use of these spaces. TenneT will analyse for each proposed innovation to what extent it can be allowed on the platform. This analysis will take into account applicable laws and regulations, technical impact and safety. For example, based on this analysis, innovations related to hydrogen production cannot be allowed on the platform.

QUESTION 4

Could we have an installed capacity higher than 760 MW (excluding power boost) but limiting the production to 2x380 MW at the connection point (66 kV busbar offshore platform)? For example, could we install 78 WTGs x 10 MW rated capacity (in total 780 MW)?

- It must be noted, that the system is designed for 2 x 350 MW continuously. The 2 x 380 MW is already because of using the possibility of overplanting. Therefore, a production of 2 x 380 MW is indeed the limit which needs to be respected despite the actual installed capacity. Please verify that more capacity installed still complies with the allowed short circuit contribution.

QUESTION 5

Across the CTA there are several reference to the Netcode. Please could you confirm which version of the Netcode shall be used to design HKN wind farm and confirm WTG grid code compliance?

- The latest version is valid: <https://www.acm.nl/nl/onderwerpen/energie/de-energiemarkt/codes-energie/actuele-codes-energie>, select “Netcode elektriciteit”.

QUESTION 6

CTA annex 3 – Section 7: In this section a reference is made to the Netcode, article 3.34. However it is also stated that: “During operation the Connected Party shall absorb or inject reactive power at the Primary Connection Point on demand of TenneT between -0,1 pu and +0,1 pu, with a minimum of 100 MW installed active power at the Primary Connection Point, without any right of financial compensation.” Please could you confirm which are the requirement in terms of reactive power compensation +0,35 – 0,4 pu (Netcode art 3.34) or +- 0,1 pu (CTA Annex 3)?

- Both requirements are valid. If the TSO intends to utilise the 0.35 or 0.40 pu as a continuous operation mode, then a separate contractual agreement will be arranged (e.g. reimbursement of MVar injection/absorption). The continuous utilisation of the 0.1 pu is required within this Connection Agreement.

QUESTION 7

The Netcode article 3.34. point out to article 3.33.3 relative to the U-Q / Pmax profile. Shall the U-Q/Pmax profile (figure below) be fulfilled assuming the voltage reference is at the connection point (66 kV level) or this voltage shall be assumed at high voltage side of the offshore main transformer (220 kV)? In case the voltage reference was at the connection point (66 kV), could be possible to relax the requirements in case a specific WTG would not fulfill this requirement completely but in 85% of the profile?

- All requirements are at Connection Point i.e. at 66 kV busbar level (unless explicitly stated otherwise). TenneT does not see any reason why a WTG would not be able to fulfil this requirement. Since requirement is laid down in Netcode (law), it cannot be lifted or relaxed.

QUESTION 8

“Pmax (1,0 pu) equals the Transportvermogen Invoeden; reference is made to Annex 1 (Feed-in Transmission Capacity)”. Please confirm Pmax is assumed to be 350 MW and the reactive power requirement shall be calculated assuming Pmax (1,0 pu) = 350 MW and not 380 MW.

- Confirmed.

QUESTION 9

It is stated that: “If the reactive power capabilities of a specific WTG cannot comply at very low active power (below 0,1 pu), then TenneT will adjust the component set-up (reactors, capacitors) accordingly”. Please could you confirm developers are allowed to install a WTG model whose reactive power capabilities below 0,1 pu (active power) are not enough to achieve +/-0,1 reactive power at the connection point?

- Not confirmed. All requirements need to be respected.

QUESTION 10

In order to fulfill grid code requirements (e.g. reactive power): taking into account the connection point is specified at the 66kV cable termination of the 66kV inter-array cables in the 66kV switchgear installation on the platform and there is two main transformer/circuits, how the requirements shall be fulfilled? Shall be fulfilled assuming each offshore transformer (220/66 kV) separately or the full wind farm as a whole?

- Fulfilment is per main transformer.

QUESTION 11

What would be the offtake point of the electricity generated by HKN project, i.e. when we could considered TenneT grid “starts”? Our understanding is that offshore TenneT’s platform is already in TenneT’s grid, therefore the offtake point is the offshore platform.

- The Connection Point is at the platform indeed, described in more detail in Annex 2 of the Connection and Transmission, and Realisation agreements (primary, secondary and tertiary connection points).

QUESTION 12

Could you provide detailed characteristics (dimensions, drawings, electrical connections, HVAC specifications, max. weight, etc.) of the space that is available for the wind farm operator on the offshore substation?

- Per 350/380 MW PPM, one Control Room is available for the wind farm developer, hence two rooms per 700 MW platform. This room is designated for the Connected Party ("Connected Party's room") of ~20m² to install cabinets owned by the Connected Party. Following services are supplied by TenneT: CT/VT connections, heating, ventilation, air conditioning (HVAC); a redundant and uninterruptable power supply, fire detection and extinguishing.

Please find below (page 8) an extraction of the Room Book with the available information for the Control Rooms for the offshore wind farm developer.

Please also check the 'Plotplan, Layout WPO Control Room' for more information:
https://offshore-documents.tennet.eu/fileadmin/offshore_document_uploads/Tender_documents/3._Technical_papers/2c_Annex_2-3-ONL-TTB-00216_Layout_WPO_Control_Room.pdf

The addition of equipment on the platform or land station would be subject to a specific approval by TenneT, e.g. a compliancy assessment against the design and interface documents and requirements of TenneT and its contractors.

QUESTION 13

On May 13th 2020, the Dutch Council of State nullified the Integration Plan, the Environmental permit and the Nature permit for the cables and transformer stations required for the grid connection for wind sites Hollandse Kust (noord) and Hollandse Kust (west alpha). However, the legal effects of all decisions remain, allowing TenneT to continue construction of the offshore grid connection. Does this ruling affect the project planning of Hollandse Kust (noord)?

- Due to the ruling of May 2019 on the Nitrogen Approach Program, the Council of State nullified the Integration Plan, the Environmental Permit and the Nature permit, but maintains the legal consequences of the decisions for the grid connection of Hollandse Kust (noord). The ministers and the Executive Board of Beverwijk Municipality do not have to take new decisions. This is because it has been demonstrated with an additional ecological foundation that the project will not affect the natural features of the Natura 2000 area 'North Holland Dune Reserve', due to the temporary and limited increase in nitrogen deposition.

The project planning of Hollandse Kust (noord) is on schedule. Platform and cable contracts were also awarded earlier this year, without further objections.

As soon as the winner of the wind tender is known, TenneT will make further agreements with this party.

Additional information:

- Additional ecological foundation 'Passende Beoordeling' (in Dutch):
<https://www.rvo.nl/onderwerpen/bureau-energieprojecten/lopende-projecten/hoogspanning/net-op-zee-hollandse-kust-noord/fase-1>
- The ruling of the Council of State (in Dutch):
<https://www.raadvanstate.nl/uitspraken/@121070/201904583-1-r1/#highlight=Hollandse%20kust>

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| Deck | Elevation TOS Cable Deck | Room / Area number | Room / Area | DNV Area Classification DNVGL-ST-145 | Equipment | Height [m] | Length [m] | Width [m] | Units | Weight Class | Weight per unit excl. uncertainty [kg] | Total weight excl. uncertainty [kg] | Fire retarder (OB) | Indennate (OB) | Water (OB) | Oil/Water | OH | Ambient conditions | Heat dissipation [kW] | Simultaneity factor | Persons in Room | T max, Planned [°C] | T min, Planned [°C] | T max, Unplanned [°C] |
|--------------|--------------------------|--------------------|--------------------|--------------------------------------|-----------------------|------------|------------|-----------|---------|--------------|--|-------------------------------------|--------------------|----------------|------------|-----------|----|--------------------|-----------------------|---------------------|-----------------|---------------------|---------------------|-----------------------|
| Control Deck | 19000 | 405 | WPO Control Room B | Non-hazardous | | 4,000 | 4,500 | 3,800 | | | | 0 | | | | | | Inside HVAC | 1 b.s. | 1,0 | 4 | 24 | 19 | 35 |
| Control Deck | 19000 | 405 | WPO Control Room B | | Desk + Chair | - | - | - | 1 | C | | | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room B | | Cubicles (*7) | 2,100 | 0,800 | 0,800 | 15 (*7) | C | 1 b.d | 1 b.d | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room B | | DWP interface cabinet | 2,100 | 0,800 | 0,800 | 1 | C | 500 | 500 | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room B | | Fancoil units | | | | 1 b.d | C | | | x | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room B | | Duct heater | | | | 1 | C | | | | | | | | | | | | | | |
| Control Deck | 19000 | 406 | WPO Control Room A | Non-hazardous | | 4,000 | 4,500 | 3,800 | | | | 500 | | | | | | Inside HVAC | 1 b.s. | 1,0 | 4 | 24 | 19 | 35 |
| Control Deck | 19000 | 405 | WPO Control Room A | | Desk + Chair | - | - | - | 1 | C | | | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room A | | Cubicles (*7) | 2,100 | 0,800 | 0,800 | 15 (*7) | C | 1 b.d | 1 b.d | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room A | | DWP interface cabinet | 2,100 | 0,800 | 0,800 | 1 | C | 500 | 500 | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room A | | Fancoil units | | | | 1 b.d | C | | | x | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room A | | Duct heater | | | | 1 | C | | | | | | | | | | | | | | |

| Deck | Elevation TOS Cable Deck | Room / Area number | Room / Area | Heat Sensors | Flame Sensors | Automatic fire fighting | Restricted access | Key plan | Maximum noise total dB(A) (*2) | Camera [PCS] | VoIP telephone [PCS] | PA/GA Microphone station [PCS] | Normal Illumination (minimum average maintained) [LUX] (*1,*9) | Emergency Standby lighting [LUX] (*1,*9) | Emergency Escape Lighting (average/minimum) [LUX] (*1,*9) | 230V socket outlets, Normal supplied [PCS.] (*9,*10) | 230V socket outlets, UPS supplied [PCS.] (*9,*10) | 400V socket outlets [PCS.] (*9,*10) | 63A socket outlets assembly [PCS.] (*9,*10) |
|--------------|--------------------------|--------------------|--------------------|--------------|---------------|-------------------------|-------------------|----------|--------------------------------|--------------|----------------------|--------------------------------|--|--|---|--|---|-------------------------------------|---|
| Control Deck | 19000 | 405 | WPO Control Room B | | | Inert Gas | - | Key #5 | 60 | 1 | 2 | 1 | 300 | 100 | 10/2 | 6 | 4 | - | - |
| Control Deck | 19000 | 405 | WPO Control Room B | | | | | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room B | | | | | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room B | | | | | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room B | | | | | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room B | | | | | | | | | | | | | | | | |
| Control Deck | 19000 | 406 | WPO Control Room A | | | Inert Gas | - | Key #6 | 60 | 1 | 2 | 1 | 300 | 100 | 10/2 | 6 | 4 | - | - |
| Control Deck | 19000 | 405 | WPO Control Room A | | | | | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room A | | | | | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room A | | | | | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room A | | | | | | | | | | | | | | | | |
| Control Deck | 19000 | 405 | WPO Control Room A | | | | | | | | | | | | | | | | |
| Control Deck | 19000 | 407 | Battery room B | | | Inert Gas | - | Key #2 | 85 | 1 | - | - | 200 | 60 | 5/1 | 2 | - | - | - |