

STAKE HOLDER CONSULTATION PROCESS OFFSHORE GRID NL

Type:	Blue Print
Work stream	Technical
Filename	ONL 15-200 Blue Print - Technical_v1
Version	1 - Public Release
Pages	8

QUALITY CONTROL

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Release	Public	

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Preface

This blue print summarises the result of the consultation process of each technical topic. Based on the feedback received in the Expert Meetings, in bi-lateral meeting and feedback received via the dedicated website, TenneT has come to a final position on the topic, which has been presented for decision making by the appropriate body.

1. T.1 Voltage Level

Decision date	23.04.2015
Decision by	Minister of Economic Affairs (part of scenario)
Position	The connection voltage level of the inter-array systems to the TenneT offshore transformer platform will be standardised at 66 kV for all five platforms to be realised by TenneT up to 2023.
Documents	ONL 15-058-T1_Voltage level_PP_v2 15-0896-v2 66kV Additional answers 20150421 113799-UKBR-R-01-A2_201500224v2 ONL 15-128 T1_Voltage level_FBRe_v4 ONL 15-153 T1_Voltage level_FFU_v2

2. T.2 Number of J-tubes and bays

Decision date	16.07.2015
Decision by	Minister of Economic Affairs (part of scenario)
Position	<p>With 66 kV inter-array cables (based on a conservative 64 MW per cable), a standard platform shall be equipped with 18 J-tubes for the inter array system:</p> <ul style="list-style-type: none"> ○ 2x 8 J-tubes for offshore PPM ○ 1 J-tube installed for possible test purposes ○ 1 J-tube installed for the connection to the neighbouring platform. <p>TenneT states that with the 66 kV inter-array cables, six 66kV bays will be available per PPM. Per wind farm this results in 4 bays four "one string-one bay" and 2 "two strings-one bay" solution In the case of two strings this will be done with two separate cable disconnectors.</p>
Documents	ONL 15-060-T2_J tubes_bays_PP_v3.1 ONL 15-129 T2_J tubes_bays_FBRe_v4 ONL 15-154 T2_J tubes_bays_FFU_v2

3. T.3 Point of Common Coupling

Decision date	23.04.2015
Decision by	TenneT
Position	The connection point (CP) between the offshore power park module (PPM) and TenneT is specified at the cable termination of the inter-array cables and the switchgear installation on the platform.
Documents	ONL15-061-T3_Connection Point_PP_v1 ONL 15-155 T3_Connection Point_FFU_v1 ONL 15-130 T3_Connection Point_FBRe_v3

4. T.4 Access to Platform

Decision date	16.07.2015
Decision by	Minister of Economic Affairs (part of scenario)
Position	Due to low failure rate (platform outage), average distances to shore and limited additional availability of helicopter transport, TenneT concludes that boat landing and W2W solutions are the standard access method. Helicopter hoisting will be used for emergency response (if allowed by authorities). Therefore, TenneT will not integrate a helicopter platform in the design of the 700MW AC Offshore Platform. Above position is applicable to all five platforms to be realised by TenneT up to 2023.
Documents	ONL 15-184-T4_Access to platform_PP_v2 ONL 15-131 T4_Access to platform_FBRe_v3

Decision date	16.07.2015
Decision by	TenneT
Position	TenneT will allow access for WPO's representative(s) to the offshore platform without accompaniment. However, only specific rooms (WPO equipment room(s) and general room) will be accessible. This will be done under safety and operational regulations and requirements, as (to be) determined by TenneT. If WPO's representative(s) needs to access other areas (e.g. switchgear rooms where inter array cables are connected), accompaniment by (a) TenneT representative(s) is required. TenneT and WPO's will make operational agreements regarding response time of accompanying staff. Above position is applicable to all five platforms to be realised by TenneT up to 2023.

5. T.5 Operation of Bays

Decision date	23.04.2015
Decision by	TenneT
Position	The operation of bays for the offshore platform is standardised, in the same manner as current practice for the operation of switchgear onshore for the connected parties, where the switchgear installation with connections to the offshore PPM is fully operated by TenneT, as the owner of the switchgear.
Documents	ONL 15-079-T5_Operation of Bays_PP_v1 ONL 15-132 T5_Operation of bays_FBRe_v3 ONL 15-179 T5_Operation of bays_FFU_v1

6. T.6 Protection

Decision date	19.05.2015
Decision by	TenneT
Position	TenneT will standardise the protection equipment on the platform of the offshore PPM inter-array cable strings to the TenneT offshore transformer platform, by implementing a standard protection system, aligned with the connected party, owned, operated and maintained by TenneT for all five platforms to be realised by TenneT up to 2023. TenneT will decide post award of bid, in consensus with selected project developer, on details of protection system.
Documents	ONL 15-080-T6_Protection_PP_v2 ONL 15-133 T6_Protection_FBRe_v3 ONL 15-180 T6_Protection_FFU_v1

7. T.7 Reactive power compensation

Decision date	16.07.2015
Decision by	Minister of Economic Affairs (part of scenario)
Position	TenneT is inclined to have the reactive power of the infield grid compensated by the PPM, in order to regulate the reactive power of the offshore grid. The reactive power intended to be compensated only making use of the WTG reactive power capabilities. If a specific WTG type cannot compensate the reactive power, the component set-up will be adjusted by TenneT accordingly.
Documents	ONL 15-081-T7_Reactive power compensation_PP_v1.1 ONL 15-134 T7_Reactive power comensation_FBRe_v3

8. T.8 SCADA, communication interface and data links

Decision date	19.05.2015
Decision by	TenneT
Position	<p>For the PPM SCADA and communication system (owned by the WPO), TenneT will make available on the five offshore platforms to be realised by TenneT up to 2023:</p> <ul style="list-style-type: none"> • A telecommunication room of ~20m² for each WPO to install WPO owned cabinets with following services supplied by TenneT: sufficient CT/VT connections, HVAC (Heat, ventilation, air conditioning), a redundant and uninterruptable power supply, fire detection and extinguishing; • A room on the TenneT onshore substation of ~48 m² (~6x~8) with following services supplied by TenneT: HVAC, a redundant and uninterruptable power supply, fire detection (no fire extinguishing); • Sufficient patch panels to connect the fibres of all array cable strings (maximum amount to be determined, but patch panel capacity will be at least sufficient for 24 fibres per string). If required patch panels for array cable fibre optic cables may be installed in the WPO room • Sufficient optical fibre pairs in both export cables to connect the main switches to the onshore communication interface point. Exact amount to be determined, but as an indication in each export cable 24 fibres will be available for each WPO (48 fibres in total per WPO).
Documents	<p>ONL 15-185-T8_SCADA communication interface and data links_PP_v2 ONL 15-135 T8_SCADA_FBRe_v4</p>

9. T.9 Metering

Decision date	19.05.2015
Decision by	Minister of Economic Affairs (part of scenario)
Position	<p>TenneT will centralise the organisation of the accountable metering requirements via one certified party, contracted by TenneT, responsible for the installation, commissioning and maintenance of the metering equipment. The responsibilities of the PPMs as connected party should be dealt with in a connection agreement.</p>
Documents	<p>ONL 15-185-T9_Metering_PP_v1 ONL 15-136 T9_Metering_FBRe_v3</p>

10. T.11 Overplanting

Decision date	23.04.2015
Decision by	Minister of Economic Affairs (part of scenario)

Position	The PPM is allowed to transmit 10% above its rated power (350MW), which is 35MW extra, with the requirement for the PPM to curtail its produced power, in case the 220 kV export cables reach their maximum allowable temperature limits . Details on curtailment of the PPMs will be addressed to in the 'Customer Connection Agreements (ATO)'.
Documents	ONL 15-083-T11_Overplanting_PP_v1 ONL 15-138 T11_Overplanting_FBRe_v3 ONL 15-181 T11_Overplanting_FFU_v1

11. T.12 Redundancy/availability

Decision date	16.07.2015
Decision by	Minister of Economic Affairs (part of scenario)
Position	TenneT will select the topology "option 2: 66kV coupling, as a basis of design for the offshore grid infrastructure, with a coupling of the wind farms at 66 kV level.
Documents	ONL 15-216-T12_Redudancy_availability_PP_v1 ONL 15-139 T12_Redundancy_availability_FBRe_v2

12. T.13 Installation interface management

[Under consultation]

13. T.14 O&M interface management

[Under consultation]

14. T.15 Harmonics & transients study

[Under consultation]

15. T.16 Location

Decision date	16.07.2015
Decision by	TenneT
Position	Location platform Alpha: 503919, 5727665 (in ETRS_1989_UTM_Zone_31N)
Documents	ONL 15-360_T16_physical coordinates_PP_v1 ONL 15-150 T16_Physical coordinates_FBRe_v1

16. T.17 Compliance testing

[Under consultation]

17. O.2 Stranded asset mitigation

Decision date	16.07.2015
Decision by	TenneT
Position	TenneT is (i) not installing, nor making provisions for, a (diesel engine powered) back-up generator plant on the offshore platform to provide auxiliary power for the WTGs; and (ii) is only installing a wireless communication interface (emergency facility) between the offshore platform and onshore substation, in case of a firm and significant delay in realisation of such communication through the export cable fibres.
Documents	ONL 15-217 O2_Stranded asset mitigation_PP_v1 ONL 15-136 O2_Stranded asset mitigation_FBRe_v2