

STAKE HOLDER CONSULTATION PROCESS OFFSHORE GRID NL	
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## 1. Consultation feedback

The topic of the standardised voltage level of infield cables connecting to the offshore TenneT platform has been discussed with stakeholders on numerous occasions. It was a topic of discussion of the first two Expert Meetings (27.11.2014 and 29.01.2015) and several bi-lateral meetings with potential bidders for the offshore wind subsidy. Substantiated with the external DNV-GL report and the TenneT position paper on the topic it has been discussed again during the Expert Meeting of 18.03.2015. In addition, market feedback on the topic has been collected through the stakeholder engagement website of TenneT. The feedback on the topic can be summarised as follows (see the public feedback report for details on the collected feedback):

- **Concern.** As 66 kV is a new technique in the offshore wind industry, there is a concern with respect to the availability and lack of competition among wind turbine and cable suppliers, that can provide 66 kV *best and final offers* (BAFO) to bidding parties, with adequate guarantees. A limitation of suppliers (in comparison to 33 kV) may result in a cost increase of turbines and/or infield cables, especially for the first tender (Borssele Alpha).
  - Mitigation/Follow-up: To address this concern TenneT has requested DNV-GL to investigate the following questions:
    1. How many cable suppliers currently state that they are able to supply and guarantee - under 33 kV market conform conditions and substantiated in the ability to quote BAFOs to bidding parties - 66 kV sub-sea cables for the bid of December 2015 (for Borssele, Site 1&2)?
    2. Please also indicate how many cable suppliers confirm certification to be ready before financial close for the project developer.
    3. Given the fact that the current top-5 offshore wind turbine suppliers consist of (Siemens, Vestas, ...), how many of these currently state that they are able to supply and guarantee - under 33 kV market conform conditions and substantiated in the ability to quote BAFOs to bidding parties - 66 kV turbines for the bid of December 2015 (Borssele, Site 1&2)?
    4. Please also indicate how many suppliers confirm certification to be ready before financial close for the project developer and what the minimum capacity turbine in their portfolio can be supplied at 66 kV.
- **Concern.** Specific layout constraints in the designated area could lower the 30% reduction of cable length taken into account as savings due to switching to 66 kV. Also, specific infield redundancy schemes could result in a lower reduction in infield cable length.
  - Mitigation/Follow-up: To address this concern TenneT has requested:
    5. Ecofys: Please evaluate if the constraints (pipeline etc.) in the area of Borssele Alpha (and future areas Borssele Beta, Hollandse Kust Zuid-Holland and Hollandse Kust Noord-Holland) give reason to believe that additional strings and/or change in relative reduction of cable length in 66 kV relative to 33 are required (more than 7 per 350 MW) due to unfavourable layouting constraints.
    6. DNV-GL: Please provide information on which percentage (in terms of operational capacity)

of the currently operational wind farms, infield redundancy schemes (i.e. looping of in-field cables, with less than the maximum number of turbines per string) have been applied in practice today.

- **Concern.** Due to the higher bending radius of 66 kV cables, relative to 33 kV, there may be installation specific constraints for 66 KV and, consequently, limited availability, and therefore increased cost, of appropriate installation vessels.
  - Mitigation/Follow-up: No follow-up action considered necessary with respect to 66 kV installation, as it is considered to be treated sufficiently in the current DNV-GL white paper.
- **Request.** TenneT/DNV-GL is requested to provide ranges in the LCOE impact numbers and a quantitative indication for the currently given qualitative trends.
  - Mitigation/Follow-up: TenneT has requested DNV-GL is to provide cost ranges. TenneT will add ranges and quantitative estimates to the cost impact overview.
- **Mixed opinion.** While some developers have concerns about the cost impact of standardisation on 66 kV, others welcome such a position from the offshore grid TSO.
  - Mitigation/Follow-up: N/A.
- **Consensus.** There is a general consensus that the application of 66 kV as the medium voltage level for the infield cables is technically feasible, both with respect to the electrical equipment and with respect to the potential impact on turbine structure, foundation and cable installation.
  - Mitigation/Follow-up: N/A.
- **Consensus.** There is a general consensus that a timely decision on the standardised voltage level is of higher importance than the actual choice of the voltage level.
  - Mitigation/Follow-up: N/A.

## 2. Feedback follow-up and next steps

Based on the internal evaluation, external reports and collected feedback during the stakeholder engagement process the follow next steps have been defined:

- The topic **T.1 Voltage Level** is on the agenda for the next Expert Meeting (15-16.04.2015) for a final consultation discussion.
- TenneT has undertaken all mitigation/follow-up actions as defined above.
- A cost sensitivity analysis will be added to the expected impact on LCOE based on quantitative market information. Also an expectation range for the impact of the more qualitative cost impact items will added.
- An updated TenneT position paper based, including all follow-up actions will be presented in the next Expert Meeting.