

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
Consultation website April	WS02
Consultation website July	WS05
Expert meeting 12&13.05.2015	EM05
Expert meeting 02.07.2015	EM06

## 2. Feedback and action

Feedback	Feedback moment	Action
<p>As we understand TenneT intends to use:</p> <ul style="list-style-type: none"> <li>- export cable and transformers with 2 x 50%</li> <li>- 66kV-busbars shall be possible to couple via CBs</li> <li>- On HV-side no busbar couplers are foreseen</li> <li>- Available rated current of switch gears (2.500 A) are limiting the size of transformers</li> </ul> <p>With a 2.500 A busbar, up to 81% (285MVA) can be transmitted. Therefore a higher rating than 2 x 50% needs to be considered to reduce feed in losses in case of a transformer or switchgear failure. Considering a safety-factor for the busbar 2 x 70% is recommended. Also a HV-coupling on the platform is needed to make use of the transformer redundancy's.</p>	WS02	<p>The system described (2x70% and HV coupling) is exactly matching the system of OPTION 3. In TenneT calculations OPTION 2 leads to lower LCOE than OPTION 3. Reduction of feed in losses have been taken into account.</p>
<p>The analysis is the right one but without insight in the assumptions we cannot assess whether we can support the outcome. We understand that the detailed price information is classified, however it should be possible to give the aggregated investment costs and real NPV values. Without that we cannot make an assessment on whether we support the outcome.</p> <p>On the base assumptions:</p> <ul style="list-style-type: none"> <li>- As discussed in topic O1, the availability figure might be too optimistic.</li> </ul>	WS05	<ol style="list-style-type: none"> <li>1. Aggregated investment costs and real NPV values will not be supplied.</li> <li>2. Losses have been assessed and not taken into account in the calculations as they have only a minor</li> </ol>

<p>- The additional capex of +6 appears to be too high. (In the meeting was stated that in figure 3 option 3, the onshore transformers are not 100% but 50%, perhaps this is the reason?).</p> <p>Furthermore, we advise to take into account the lower losses for bigger (70%) transformers, to our experience this effect alone can in some cases justify the choice of a bigger transformer.</p>		<p>(negligible) impact on overall figures.</p> <p>3. Additional capex of Option 3 is based on 66 kV coupling, additional 220kV switchgear and larger transformers (2x70% instead of 2x 50%). Costs for these additions are assessed to be 6x times higher than providing 66 kV coupling only.</p> <p>4. On comparison between options 2 and 3, only the relative availability increase is defining (issues raised in O2 do not play a role here). This increase is so small that it does not weigh up to the additional Capex of option 3.</p>
<p>Please provide the reliability study which is the basis for your choice for Option 2.</p>	<p>WS05</p>	<p>The underlying assumptions and information is confidential and cannot be published; the NPV calculations result in the lowest LCOE.</p>
<p>The availability of option 2 could be improved by cross-linking the 66 kV windings of the 220/66/66 kV transformers, and by applying ONAN transformers which can transfer 70% of the total power.</p>	<p>WS05</p>	<p>1. According to TenneT's assessment, crosslinking 66 kV windings do not</p>

		<p>have an impact on availability (all 4 switchgear sections can be switched onto each transformer). 2. 70% transformers have been assessed in option 3 (these are only adding to the availability if a HV coupling is used).</p>
<p>Could we get access to the comparison study? We (TenneT) have looked into two main components: cable and transformer offshore. These are major influence factors and we have compared outage probability and outage time to the non-availability of electricity transmission.</p>	<p>EM05</p>	<p>Answer of TenneT already included in the feedback.</p>
<p>The underlying calculations are not clear.</p>	<p>EM06</p>	<p>The underlying assumptions and information is confidential and cannot be published; the NPV calculations result in the lowest LCOE.</p>
<p>OWF: we confirm these results and conclusions. If we would do these calculations we would come to the same results.</p>	<p>EM06</p>	<p>Noted</p>