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### APPENDIX 1: Schematic overview planning grid connection Borssele Alpha (13-10-15)

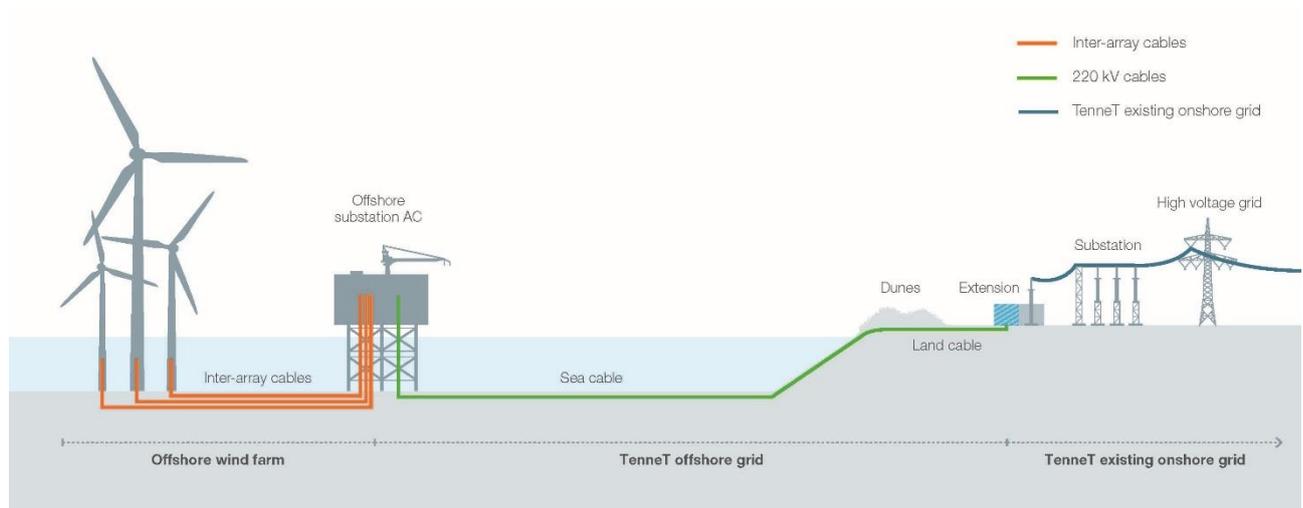
## 1. Background material

Literature used:

- Minutes of Meeting stakeholder consultation of 12&13.05.2015

## 2. Scope and considerations

The figure below shows the connection of an offshore wind farm to the onshore electricity grid. TenneT will supply and install the grid connection up to, and including, the offshore substation. The wind park, including the inter-array cables, up to the offshore Connection Point (the offshore substation of TenneT) is to be supplied and installed by the owner of the Offshore Windfarm (OWF).



*Schematic of the offshore electrical grid. Source: TenneT*

This paper describes how TenneT proposes to deal with the planning of the installation of the grid connection and the interfaces with the installation of the OWF's. The focus will be on the planning of the first grid connection, for the 700 MW of the wind areas Borssele 1 and 2, called Borssele Alpha. The planning of the other grid connections will be considered in a later stage, but will be based on the same principles.

## 2.1 Planning framework Wind op Zee

For the development of the offshore wind parks, in the context of the Wind op Zee programme, a Routekaart is given which together with the Energieakkoord makes the following framework for the planning:

<i>Tender in</i>	<i>Areas Routekaart</i>	<i>Windpower</i>	<i>Operational in</i>
2015	Borssele	700 MW	2019
2016	Borssele	700 MW	2020
2017	Hollandse Kust: Zuid Holland	700 MW	2021
2018	Hollandse Kust: Zuid Holland	700 MW	2022
2019	Hollandse Kust: Noord Holland	700 MW	2023

This shows that the deadline for the first OWF's operational at Borssele, and thereby also for the grid connection Borssele Alpha, is 2019.

Additional to the Energieakkoord and the Routekaart, there has been an agreement with the Ministry of Economic Affairs that the last possible start of the subsidy payment is 5 years after the subsidy tender decision. TenneT will not anticipate on this possible later start date of the operation phase, but the planning can be adjusted if necessary.

## 2.2 Overall planning grid connection Borssele Alpha

A schematic overview of the entire planning of Borssele Alpha is given in appendix 1. The planning consists of two separate phases:

1. The initiation phase, resulting in a Final Investment Decision (FID). The FID for Borssele Alpha is planned on 1-1-'17 and is dependent on the following conditions:
  - irrevocable permits
  - all necessary land acquisitions and crossing agreements
  - finished tenders
  - the subsidy tender decision
  - laws "Stroom" and "Wind op zee" in place
2. The realisation phase, resulting in a commissioned and fully tested grid connection. For Borssele Alpha this phase is planned based on experience with delivered connections of TenneT in Germany.

Taking into account the time necessary for commissioning and testing (without OWF's), the grid connection will be operational on 31 August 2019. Given the restrictions due to weather conditions it is not realistic to foresee installation of the top side earlier than after the storm season of 2018-2019. Thus it is not expected that the grid connection will be operational significantly before August 2019.

## 2.3 Planning key interaction points between grid connection and OWF

As mentioned in the Realisation Agreement (draft version 13-10-2015) TenneT shall realise the Connection on or before the date set in the Scenario (31 August 2019) and TenneT and the OWF will as soon practicable jointly prepare a planning. The planning will include the following milestones:

- a) the period in which the Connected Party may install equipment on the Platform when it is under construction onshore;
  - b) the date as from which the Connected Party's inter-array cables may be hung to the Platform when it is under construction offshore;
  - c) the physical connection of each respective inter-array cable from the Installation to the Connection;
  - d) the energisation of the first inter-array cable;
  - e) the testing of the respective connected inter-array cables; and
  - f) the commissioning of each connected inter-array cable,
- or such other milestones as TenneT and the OWF agree are necessary.

TenneT has the intention to investigate and agree on an optimal planning for the realisation phase ahead of 31-8-2019 for both the activities of TenneT and the OWFs.

## 2.4 Planning uncertainties grid connection

For the project Borssele Alpha an analysis of the uncertainties and the sensitivity of the planning has taken place, based on the lessons learned in German offshore projects. This has led to a risk inventory of the initiation and the realisation phase which is now subject to a risk management process of mitigation.

The most important planning uncertainties and their mitigation measures are given below:

<i>Uncertainty</i>	<i>Mitigation</i>
Public resistance	Stakeholder management and analysis
Unexpected conditions (soil, UXO, archaeology)	Extensive soil investigation
Bad weather	<ul style="list-style-type: none"> <li>• Introduce weather window in planning</li> <li>• Determine tender criteria for dealing with weather windows</li> <li>• Analysis of historical weather data</li> </ul>
Restrictions flora and fauna	Early consultation of responsible authorities
Production slots lead to longer lead times	Check possible throughput time with suppliers in market consultation
Vessels, equipment and yards not available	Check possible availability in market consultation
Problems at internal and external interfaces	Interface management

## 2.5 Fixation and alignment planning appointments

The mentioned planning dates in this memo will be fixed within the legal framework for Wind op Zee which is currently under construction.

During the preparation and installation by TenneT and the OWF-developers it is important to have a tight cooperation to predict possible delays or accelerations and to anticipate on their effects.

## 3. Position TenneT

These considerations lead TenneT to the following position:

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- TenneT will have the grid connection for Borssele Alpha ready 31 August 2019. TenneT and the OWF will as soon as practicable jointly prepare a planning. TenneT has the intention to investigate and agree on an optimal planning for the realisation phase ahead of 31-8-2019 for both the activities of TenneT and the OWFs
  - TenneT will not anticipate on a possible later start date of the operation phase, according to the agreement that the last possible start of the subsidy payment is 5 years after the subsidy tender decision.
  - A tight cooperation with the OWF-developers will be pursued to mitigate and anticipate possible delays or accelerations.
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## 4. Topic consultation

The expert meetings of July and September 2015 have given TenneT the opportunity to get feedback from developers on their position regarding "Planning". The main goal of this meetings was to assess whether TenneT's views as documented within this position paper, and background data above, are shared by the industry. The results are processed in the final version of this paper.