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Renewable Energy
CONSULTANCY

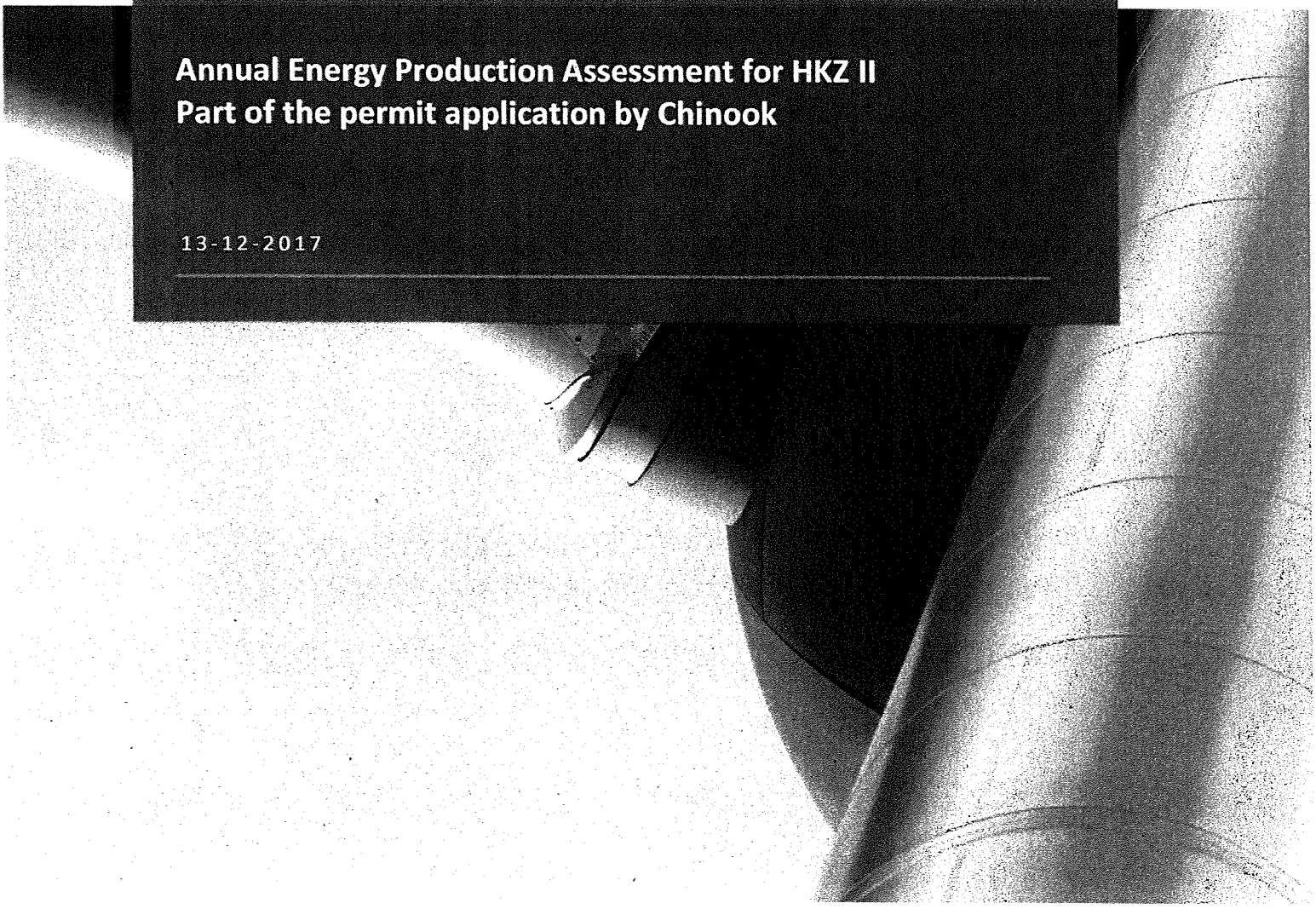
AEP ASSESSMENT

Hollandse Kust Zuid II

The Netherlands

Annual Energy Production Assessment for HKZ II
Part of the permit application by Chinook

13-12-2017



1 Summary

The annual energy production of the Hollandse Kust Zuid II (HKZ II) wind farm has been calculated for the purpose of permit application by Chinook, hereafter referred to as 'The Client'. This calculation and the related report was performed and drafted in line with the requirements as stated in the 'Regeling vergunningverlening windenergie op zee kavels I en II Hollandse Kust (zuid)' (Article 3.1.a & 3.2): [A].

- the location data of the wind farm (coordinates provided per wind turbine): Layout of [redacted] turbines is provided by Client, see an overview in Appendix D.
- the make, type and technical specifications of the intended wind turbines (including hub height, rotor diameter and capacity curve (power curve [from supplier]): turbine type and related information is provided by Client, see in Chapter 3.4 and Appendix B.
- the local wind data for the wind farm: see also the below description, details in Chapters 5.
- calculation of the P50-value for the net electricity production on an annual basis for the wind farm including availability, wake effects, electricity losses, and curtailment losses [redacted] resulting production after expected losses are presented in table 1. See details in Chapters 7 and 8.
- In the calculation of the P50 value for offshore wind projects only the wind farm concerned and the Luchterduinen wind farm should be taken into account (to determine wake effects).

This report will furthermore go into the aspects as mentioned on the application form under 'Annex 2' (Regeling Art 3.1.a):

- Used calculation model: The AEP is calculated using a time domain methodology that uses a long time series, developed for the location of the turbine, directly on the power curve. Wake losses are calculated using a deep array version of the N.O. Jensen model. The models and methodologies are implemented in WindPRO 3.1 from EMD, see Chapter 4 and 6.
- Used Environmental model, wind modesl & wind charts: The wind model is adopted from the Ecofys wind study provided by RVO. Time series for five locations inside HKZ are provided by Ecofys as based on off-site measurements (WRA1) and on-site LIDAR measurements (WRA2). The two time series are weighted as prescribed by Ecofys and extrapolated to hub height using provided shear. The time series are then moved across the site using a combination of interpolation and WAsP in order to calculate the wind climate for each turbine and to faithfully apply the gradient found by Ecofys. See details in Chapters 5 and 6.
- Information about the Luchterduinen wind farm - used to determine its impact on the net P50 value for the wind farm in the HKZ Zone - is derived from the information as provided on RVO.nl's website, see Appendix A, as suggested in the Q&A of Nov 17 [J].
- As stated in the Q&A of Nov 17 [J], the restrictions with respect to bird migration, bats and repairs to nearby cables as set out by The Wind Farm Site Decision are not taken into account - given the fact that the subsequent standstill loss is relatively small.

Uncertainties were not in the scope of this report.
All heights in this report are Above Mean Sea Level (AMSL).
EMD has not visited the site.

Table 1. Net AEP result.

WIND FARM	TURBINE TYPE	HUB HEIGHT, M	GROSS AEP, MWH/Y	WAKE LOSS	OTHER LOSS	NET P50, MWH/Y
HKZ II	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

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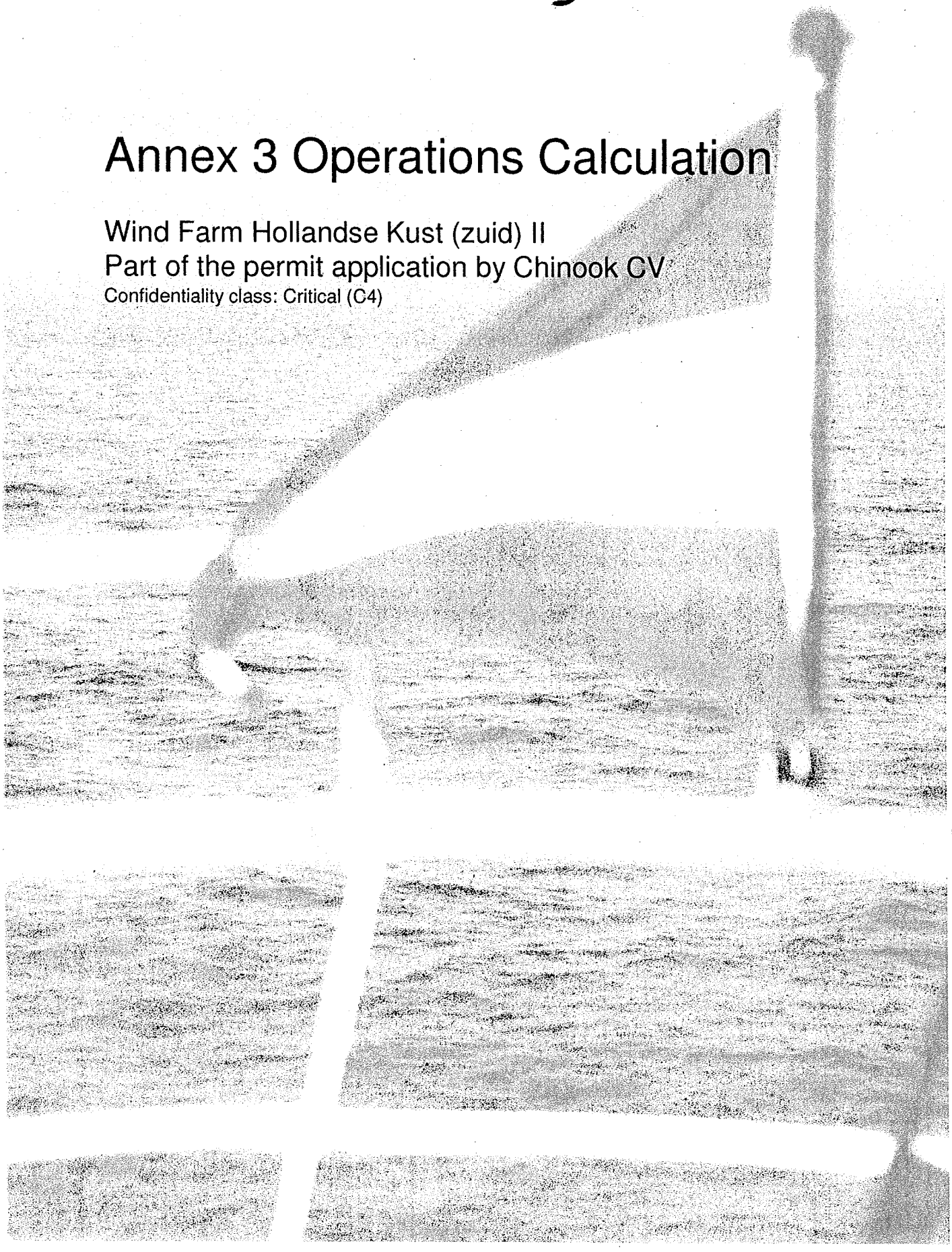
Annex 3 Operations Calculation

Wind Farm Hollandse Kust (zuid) II
Part of the permit application by Chinook CV

Confidentiality class: Critical (C4)



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Operations Calculation

This annex contains the print-outs of the sheets of RVO calculation model:

- Input data
- Investment costs
- OPEX Table
- Calculations
- Results

Brief explanation of operational cost categories:

Operational cost category	
Service WTG	All costs related to the service contract with the WTG supplier
BoP & Grid	All costs related to the maintenance of the foundations, transition pieces and electrical works
Site Facilities	All cost related to the onshore facilities including harbour costs
Personnel Costs	All costs related to personnel
Regulatory	All costs related to permit execution, legal checks etc.
IT/ Coms	All costs related to the SCADA system, link to the surveillance centre, communication systems, etc.
Logistics & Offshore O&M	All costs related to the crew transfer from the O&M harbour to the site
Other Opex costs	Currently only includes some expected costs related to accounting
Maintenance Investments	All costs for the replacement of main components
Other	Mainly insurance costs
Bank Guarantee	Cost related to the bank guarantee for dismantling
Decommissioning	The cost of decommissioning the windfarm after operations
[redacted]	[redacted]

Brief explanation of investment categories:

Operational cost category	
Turbine supply (WTGs)	Supply of the turbine, see annex A1
Installation Vessel (WIV)	Wind turbine installation including the vessel and equipment, see annex A1
Foundation design (CID)	Civil Engineering of the foundations incl. detailed design, see annex A1
Foundations supply (CIM)	Manufacturing of foundations (Monopiles and TPs), see annex A1
Foundations installation (CII)	Transport and installation of foundations incl. vessels, see annex A1
Array cable supply (IACM)	Inter array cable manufacturing, see annex A1
Array cable installation (IACI)	Inter array cable transport and installation incl. vessels, see annex A1
CAR	Contractors all risk insurance for the construction phase
O&M Capex	Costs related to spare parts (e.g. foundations)
Bank Guarantee	Costs related to the bank guarantee originating from the execution agreement
PM costs	Project management costs related to the design and construction phase
Contingency	[redacted]

Brief explanation of market price and GoO

Revenue category	
Power price	[redacted] available to the project [redacted] price [redacted] followed by [redacted] See Annex 10 and Annex 4
GoO	GoO price available to the project. [redacted]

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The prices as used in the model are based on [redacted]
Further explanation on [redacted] can be find in Annex 10 and Annex A4.

[redacted]

Windenergie Op Zee
Model Exploitatieberekening

Hollandse kust (zuid) enkele kavel , versie 06-12-2017

Waarvoor?

U dient bij de vergunning aanvraag een exploitatieberekening aan te leveren, die minimaal bestaat uit:
1 een specificatie van de investeringskosten per component van de productie-installatie
2 een overzicht van alle kosten en baten van de productie-installatie
3 een berekening van het projectrendement over de subsidielooptijd
Met dit door RVO.nl beschikbaar gestelde rekenmodel berekent u het projectrendement, rendement op eigen vermogen en de DSCR. Het geeft inzicht in de financieel economische haalbaarheid van het project. Dit RVO.nl rekenmodel dient u volledig in te vullen en de afdrukken met de aanvraag mee te sturen als verplichte bijlage.
Naast het verplichte RVO.nl model mag u ook een berekening volgens uw eigen rekenmodel meesturen met de aanvraag. U dient dan wel uit te leggen hoe u het projectrendement, het rendement op eigen vermogen

Technische invulinstructies

Lees eerst alle instructies in dit tabblad en lees vooral de toelichting exploitatieberekening die bij het aanvraagformulier zit. Print deze instructies en hou ze bij de hand tijdens het invullen. Verzamel ook alle relevante gegevens alvorens te beginnen met invullen.
U kunt alleen de blauw gekleurde velden invullen in de blauwe tabbladen. Wanneer een veld een gele achtergrond kleur met rode tekst krijgt, zijn ergens onjuiste gegevens of nog niet alle gegevens ingevuld.
De tabbladen voor berekeningen en resultaten zijn wit.

Inhoudelijke invulinstructies

RVO.nl zal beoordelen of de invoerdata aannemelijke waarden hebben en ook relevant zijn voor het project. Ontbreken van relevante invoerdata of onaannemelijke waarden resulteren in onbetrouwbare of onaannemelijke resultaten. Wijken invoerdata af van wat in de markt gebruikelijk is, dan vraagt RVO.nl u de afwijking toe te lichten en te onderbouwen.

Verplichte bijlage

Een exploitatieberekening is een verplichte bijlage bij de aanvraag. U dient te voldoen aan deze verplichting door het invullen van het RVO.nl model en het meesturen van afdrukken van de tabbladen Invoerparameters, Investeringskosten, OPEXtabel, Berekeningen en Resultaten.

Vragen

Dit rekenmodel is met de grootste zorg ontwikkeld en samengesteld. Het geeft inzicht in het projectrendement op basis van investeringskosten, operationele kosten, financieringslasten en baten. Het is input voor de analyse van de financiële en economische haalbaarheid van uw project. Mocht u vragen of opmerkingen hebben over het model dan kunt u zich tot één week voor sluiting van de tender tot RVO.nl wenden via het e-mailadres: woz@rvo.nl. Ook kunt u via dit e-mailadres een afspraak maken voor een mondelinge toelichting bij het rekenmodel en het aanvraagformulier in Zwolle.

Beschrijving tabbladen

Het rekenmodel kent tabbladen voor invoer van gegevens en tabbladen voor berekeningen en resultaten. Die worden hier stuk voor stuk besproken.

Tabblad: Invoer Parameters

Dit tabblad gebruikt u om alle relevante gegevens en keuzes in te voeren. U moet hierbij denken aan gegevens over: aanvrager, energieproductie, investeringkosten, energietarieven, financieringskeuzes, enz.

Tabblad: Investeringskosten

U vult hier per component de kosten in. U dient de aannemelijkheid van de kosten te onderbouwen vooral wanneer de waardes afwijken van wat in de markt gebruikelijk is.

Tabblad: OPEX

Hier vult u u per operationele kostenpost per jaar de kosten in.
Let op: in deze tabel de operationele kosten invoeren gedurende de looptijd van het project.

Tabblad: MP en GVO

Hier vult u de marktprijs van de verkochte MWh's in en de GvO's gedurende de looptijd. U mag de verwachting van de NEV2017 voor de marktpijs gebruiken. Deze is opgenomen in deze tabel en kunt u als invulwaarde overnemen. U mag in plaats van de NEV ook een eigen marktprijs verwachting gebruiken. Geef dan aan de bron aan van die verwachting en een onderbouwing.
Let op: in deze tabel de marktprijs en de waarde van GvO's invoeren gedurende de looptijd van het project.

Tabblad: Berekeningen

Dit tabblad toont alle relevante (tussen) resultaten van de berekeningen op basis van door u ingevoerde gegevens.
De volgende (tussen) resultaten worden getoond:

- Energieproductie in MWh
- Opbrengsten in k€ uit de energieproductie (verkoop MWh en GvO's)
- Totale operationele kosten
- Financieringslasten
- Afschrijvingen
- Belasting
- Netto Winst
- Project rendement
- Rendement op eigen vermogen
- DSCR

Tabblad: Resultaten

Dit tabblad toont alleen de belangrijkste resultaten van de berekening, het is een uittreksel uit het tabblad berekeningen. Het is leesbaar te printen op A3.

Toelichting tabblad Invoer Parameters

Algemene gegevens:
Hier vult u in:
- Projectnaam: een door u zelf gekozen naam voor het project
- Naam aanvrager: naam zoals is ingevuld op het aanvraagformulier
- Geïnstalleerd vermogen windpark: waarde volgens aanvraagformulier en windrapport
- Netto P50 jaarproductie: waarde in MWh volgens het windrapport en aanvraagformulier
- Exploitatie looptijd: aantal jaren dat het windparkelektriciteit produceert

Projectfinanciering:
U kunt er voor kiezen een percentage van de totale investeringskosten te financieren uit eigen middelen (EM). U moet hiervoor een percentage kiezen in het bereik van 0 t/m 100%. Het resterende percentage tot 100 % wordt met vreemd vermogen gefinancierd. Voor het leendeel kunt u kiezen uit de aflosvormen lineair of annuïteit. Ook vult u hier het rentepercentage in voor de lening.

Investeringsschema:
U kunt uw investering uitsmeren over maximaal vijf jaar. Per jaar kunt u kiezen welk deel u uit eigen middelen financiert en welk deel u leent (het leendeel).
Ook kiest u wanneer u start met aflossen van het leendeel en rente betalen. Het vroegst mogelijke jaar dat u start met rente betalen en aflossen is het jaar direct nadat u de lening bent aangegegaan. Wanneer u een later jaar kiest voor aflossen, loopt uw leendeel op met de bouwrente.
Voorbeeld 1: u investeert in het jaar 2017 en start met aflossen begin 2018. U bent geen bouwrente verschuldigd.
Voorbeeld 2: u investeert in het jaar 2017 en start met aflossen begin 2019. U bent een jaar bouwrente verschuldigd.
De financieringslasten dienen uit het bruto resultaat betaald te kunnen worden. Waneer het bruto resultaat in een jaar niet voldoende is, kiest u een later jaar om te beginnen met het betalen van de financieringslasten.
Het eerste jaar dat u investeert vult u in in de regel met symbool Inv1. Verder vult u voor elk jaar dat u investeert in:
- het percentage van het totale investeringsbedrag dat u investeert in dit jaar. De percentages bij elkaar opgeteld moet 100% zijn.
- het jaar dat u start met het aflossen van het leendeel. Dit jaar moet na het investeringsjaar liggen.
- percentage uit de eigen middelen (EM) dat u in dit jaar investeert. Het is mogelijk hier een percentage te kiezen dat in een negatief leendeel resulteert. In dat geval moet u een kleiner percentage kiezen. De percentages bij elkaar opgeteld moeten 100% bedragen. Behalve wanneer u geen eigen middelen inzet, dan

Opstartschema elektriciteitsproductie:
In het rekenmodel kunt u het opstarten van het windpark uitsmeren over twee achtereenvolgende jaren. U geeft op hoeveel procent van de jaarproductie MWh u in het eerste jaar verwacht te produceren. Het resterende deel van de jaarproductie volgt automatisch in het volgende jaar.

Invoer Parameters

Hollandse kust (zuid) enkele kavel , versie 06-12-2017

Invoervelden zijn blauw

Alle blauwe tabbladen bevatten invulvelden. Wanneer u de muis op een veld met een rood driehoekje houdt, wordt een toelichting zichtbaar.

Wanneer een resultaatcel een gele achtergrond met rode waarde krijgt, hebben een of meer invoervelden onjuiste waarden

Belangrijkste resultaten	
Projectrentabiliteit over exploitatie	[redacted]
Rendement EV tot over exploitatie	
DSCR totaal	n.v.t.

	Algemene gegevens		
	Afgifte jaar vergunning	[redacted]	
	Laatste jaar vergunning		
	Projectnaam	Wind op zee HKZ II	
	Naam aanvragende organisatie	CHINOOK CV	
	Exploitatie looptijd		jaar
	Kavel		
	Geinstalleerd vermogen windpark		MW
	Netto P50 jaarproductie		MWh
	Netto P50 vollasturen		h
	Investeringskosten		
TIK	Totale investeringskosten beide kavels		k€
	Afschrijvingsperiode		jaar
	Project financiering		
	Uit eigen middelen		
	Percentage eigen uit eigen middelen		
EM	Eigen Middelen		k€
	Uit vreemd vermogen		
	Percentage		
LD	Leendeel		k€
	Aflossingsvorm		
	Aflosperiode		
	Rente		

	Investeringsschema		**k€**		**%**	**k€**	**k€**	**k€**	**k€**
	Investeringsjaar	Percentage van totale investering. Som moet gelijk zijn aan 100%	Investerings-bedrag	Start af-lossing	Percentage van EM	Bedrag EM	Leendeel	bouw-rente	VV + bouw-rente
Inv1	[redacted]								
Inv2									
Inv3									
Inv4									
Inv5									

	Opstartschema E-productie	**Toename MWh productie in % van P50**		
	Kavel		MW	Eindjaar exploitatie
Q1	[redacted]			
Q2				

Laatste exploitatie jaar	[redacted]

Investeringskosten

Hollandse kust (zuid) enkele kavel , versie 06-12-2017

Invoervelden zijn blauw

	k€
Totaal investeringskosten	[redacted]

Investeringspost	**Bedrag (k€)**
Development	[redacted]
WTG	[redacted]
Civils - Generic	[redacted]
WF Electrical	[redacted]
Management - Construction Phase	[redacted]
Pre Take Over O&M	[redacted]
Installation and Logisitcs	[redacted]
CapEx - Other	[redacted]
CAR	[redacted]
Contingency	[redacted]

OPEX Tabel

start 2021 eind 2045

Hollandse kust (zuid) enkele kavel , versie 06-12-2017

Invoervelden zijn blauw

Totaal operationele kosten →	k€
Omschrijving operationele kostenpost	
Service WTG	k€
Balance of Plant & Grid Maintenance	k€
Site Facilities	k€
Personnel Costs	k€
Regulatory	k€
IT & Communications	k€
Logistics & Offshore	k€
Other OPEX	k€
Maintenance Investments	k€
Insurance and Other OPEX	k€
Decommissioning	k€
PPA COST	k€
	k€
	k€
	k€
	k€
	k€
	k€
	k€
	k€

k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€	k€
0																												
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Marktprijzen en GvO's

Hollandse kust (zuid) enkele kavel , versie 06-12-2017

Jaar [redacted]

Jaarnr.

MP Marktprijs gespecificeerd per jaar €/MWh

GVO GVO gespecificeerd per jaar €/MWh

In de blauwe regels vult u voor elk jaar gedurende de exploitatie looptijd de verwachte marktprijs en de waardes van de GvO's in.
U mag voor de marktprijs de waardes volgens de NEV2017 voor windenergie op zee gebruiken zoals hieronder aangegeven. Voorbij 2035 kunt u extrapoleren.
U mag ook zelf een andere verwachting gebruiken. Geef dan aan wat de bron van die verwachting is en waar die is in te zien.

Bedragen volgens de NEV 2017																				
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
bedragen netto contant 2016	€/MWh		26,748	25,855	24,694	26,088	28,283	32,341	35	37,007	39,9	39,824	38,761	37,14	35,543	33,98	34,335	34,689	35,043	35,398	35,752
Indexatie	1,015		1,015	1,0302	1,0457	1,0614	1,0773	1,0934	1,1098	1,1265	1,1434	1,1605	1,1779	1,1956	1,2136	1,2318	1,2502	1,269	1,288	1,3073	1,327
nominale bedragen	€/MWh		27,149	26,637	25,822	27,689	30,469	35,363	38,844	41,689	45,621	46,218	45,659	44,406	43,134	41,855	42,926	44,02	45,137	46,277	47,442

Berekeningen

Hollandse Kust (zuid) gehele kavel, versie [illegible]-12-2017

Jaar

Jaarnr.

Symbool Formule	Omschrijving	eenheid	sommatie over jaren
Q1	Elektriciteitsproductie deel 1	MWh	
Q2	Elektriciteitsproductie deel 2	MWh	
Qtot	Totale elektriciteitsproductie	MWh	
MP	Marktprijs elektriciteit	€/MWh	
MIE	Markt inkomsten Elektriciteit (Qtot*MP)	k€	
	Garanties van oorsprong	€/MWh	
IGVO	Inkomsten van oorsprong	k€	
TIE = MIE + IGVO	Totale inkomsten Elektriciteitsproductie	k€	
TOK	Totale Operationele Kosten	k€	
BR = TIE - TOK	Bruto Resultaat = TIE - TOK	k€	
	Investering k€ →	k€	
Ah1	Afschrijving investering 1	k€	
Ah2	Afschrijving investering 2	k€	
Ah3	Afschrijving investering 3	k€	
Ah4	Afschrijving investering 4	k€	
Ah5	Afschrijving investering 5	k€	
TAfs	Totale Afschrijvingen	k€	
Afl1	Aflossing VV investering 1 Lineair	k€	
Afl2	Aflossing VV investering 2 Lineair	k€	
Afl3	Aflossing VV investering 3 Lineair	k€	
Afl4	Aflossing VV investering 4 Lineair	k€	
Afl5	Aflossing VV investering 5 Lineair	k€	
TAfl	Totale aflossing	k€	
Re1	Rente VV investering 1 Lineair	k€	
Re2	Rente VV investering 2 Lineair	k€	
Re3	Rente VV investering 3 Lineair	k€	
Re4	Rente VV investering 4 Lineair	k€	
Re5	Rente VV investering 5 Lineair	k€	
TRe	Totale rente over VV investering	k€	
FL	Financieringslasten = Rente + Aflossing	k€	
BR-FL	Bruto Resultaat - Financieringslasten	k€	
TIE	Totale inkomsten elektriciteitsproductie	k€	
TK = TOK + TAfs + TRe	Totale kosten	k€	
WvB	Winst voor belasting	k€	
Verlies	Verliezen uit verleden	k€	
BI = WvB - Verlies	Belastbaar inkomen	k€	
VpB	Vennootschapsbelasting [illegible]	k€	
NW = WvB - VpB	Netto Winst	k€	
	Investering k€ →	k€	
BCF = WnB + TAfs + TRe	Bruto cashflow na belasting exclusief rentelasten	k€	
	Projectrentabiliteit over exploitatie	%	
	Eigen Vermogen Inbreng k€ →		
NCF = WnB + TAfs - TAfl	Netto cashflow voor eigen vermogen verschaffer na belasting en na financieringslasten	k€	
	Rendement EV tot over exploitatie	%	
DSCR = BCF/FL	DSCR per jaar		
	DSCR totaal		

[redacted]

Resultaten Exploitatieberekening

Hollandse kust (zuid) enkele kavel , versie 06-12-2017

Invoer Parameter	Waarde	
Projectnaam	Wind op zee HKZ II	
Naam aanvragende organisatie	CHINOOK CV	
Exploitatiekoopbijd	[redacted]	jaar
Kavel		
Gerealiseerd vermogen windpark		MW
Netto P50 jaarproductie		MWh

Resultaten

Symbool	Formule	Omschrijving	eenheid	Jaar Jaarnr. sommatie over jaren
MIE		Markt inkomsten Elektriciteit (Qtot*MP	k€	
GVO		Garanties van oorsprong	k€	
TIE	= MIE + GVO	Totale inkomsten Elektriciteitsproductie	k€	
TOK		Totale Operationele Kosten	k€	
TAfs		Totale Afschrijving k€	k€	
TRe		Totale rente over VV investering	k€	
TK	= TOK + TAfs + TRe	Totale kosten	k€	
WVB		Winst voor belasting	k€	
Varies		Verliezen uit verleden	k€	
BI	= WvB + Varies	Belastbaar inkomen	k€	
Vpll		Vennootschapsbelasting (=WvB*belastingtarief)	k€	
NW	= BI-Vpll	Netto Winst	k€	
BCF	= WnB + TAfs + Tre	Bruto-cashflow na belasting exclusief rentelasten	k€	
		Projectrendabiliteit over exploitatie		
NCF	= WnB + TAfs - TAfl	Netto cashflow voor eigen vermogen verschaffer na belasting en na financieringslasten	k€	
		Rendement EV tot over exploitatie		
DSCR	= BCF/FL	DSCR per jaar		
		DSCR totaal		

[redacted]

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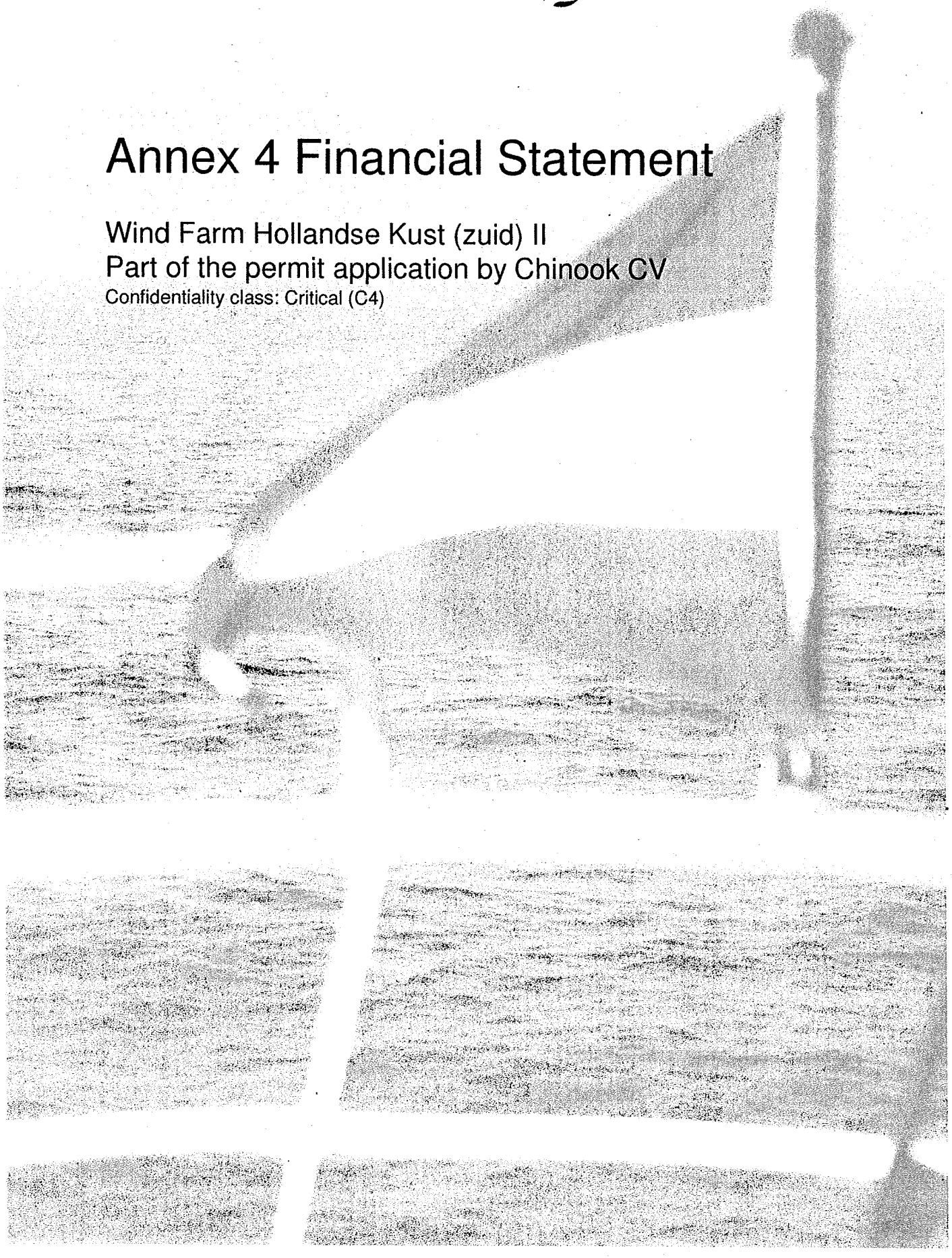
Annex 4 Financial Statement

Wind Farm Hollandse Kust (zuid) II
Part of the permit application by Chinook CV

Confidentiality class: Critical (C4)



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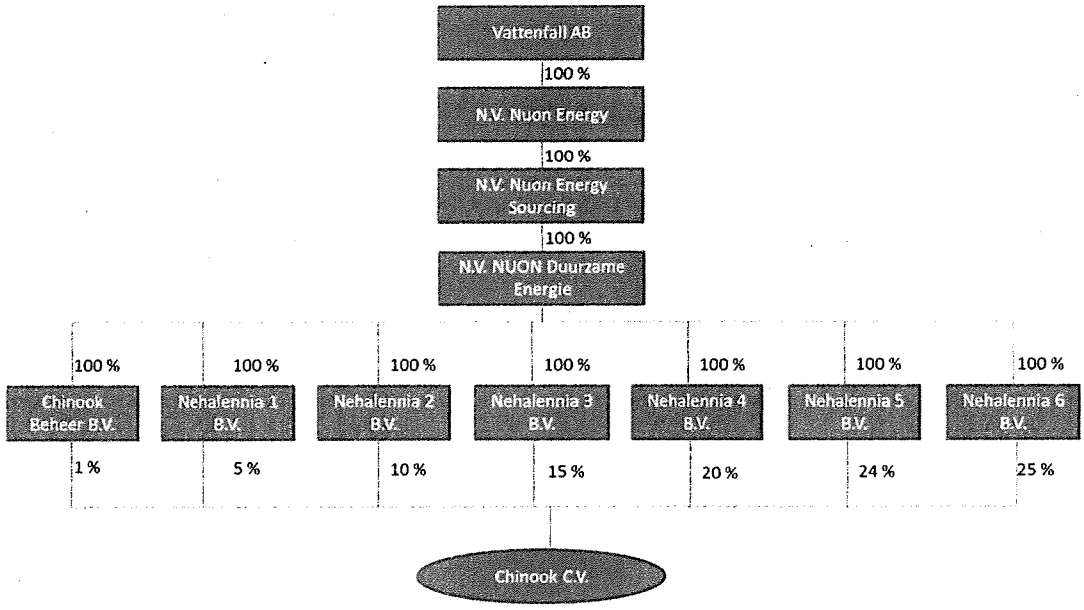
Financial Statement

This annex contains the Annual Report 2016 and the parent company statement of Vattenfall AB (both attached). The company's equity is stated on page 92 of this report: 68272 MSEK, 6,848 M€*.

As stated on the application form, this equity covers for [redacted]% of the project investments, based on the [redacted]M€ required for two stand-alone projects (without synergies), as specified under 5.1 and 5.2 of the application form. This amount is higher than [redacted]M€, the investment amount of the two sites with synergies (as specified under 5.3 of the application form). Hereby the requirement as stated in article 4 'Regeling vergunningverlening windenergie op zee kavels I en II Hollandse Kust (zuid)' is fulfilled.

Further details on the financing of the project are included in Annex 5 of the application.

The figure below indicates the structure of the applying legal entity and its relation with Vattenfall AB.



* Calculated against the day exchange rate dd 18/12/2017 1 SEK = 0.1003 €, http://www.wisselkoers.nl/geldkoersen

72b

STATEMENT PARENT COMPANY

(WIND FARM HOLLANDSE KUST (ZUID) I & II)

Vattenfall AB, a company incorporated under the laws of Sweden, registered at the Swedish Companies Registration Office under number 556036-2138 (**Parent Company**)

HEREBY

agrees that Chinook C.V. may use the other own assets of Parent Company to determine the level of its own assets as referred to in article 4, paragraph 3, part b and article 4, paragraph 4 of the Ministerial Order for permitting offshore wind energy permits for Hollandse Kust (zuid) Wind Farm Sites I and II (*Regeling vergunningverlening windenergie op zee kavels I en II Hollandse Kust (zuid)*).

Vattenfall AB

[redacted]

Date: 18 December 2017

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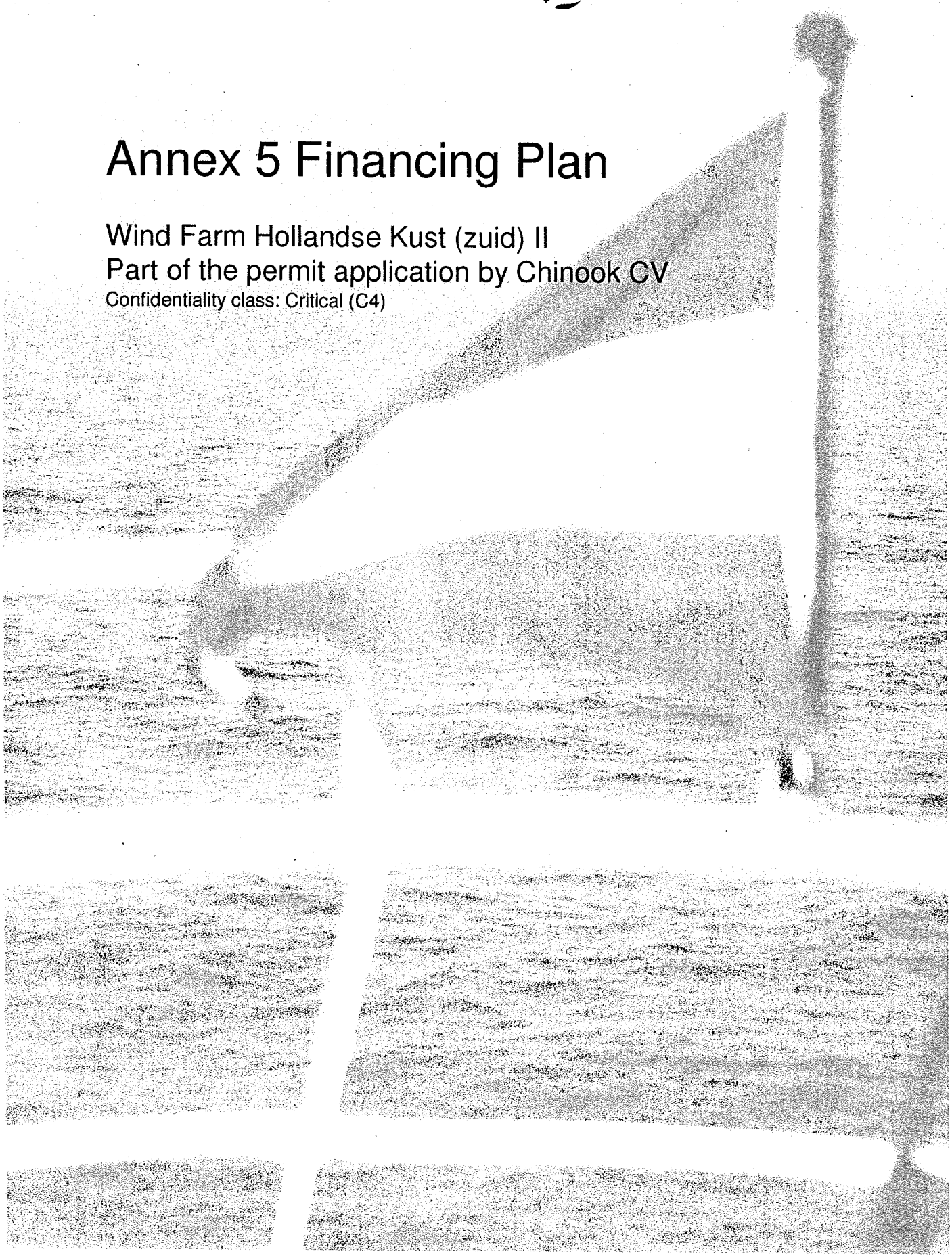
Annex 5 Financing Plan

Wind Farm Hollandse Kust (zuid) II
Part of the permit application by Chinook CV

Confidentiality class: Critical (C4)



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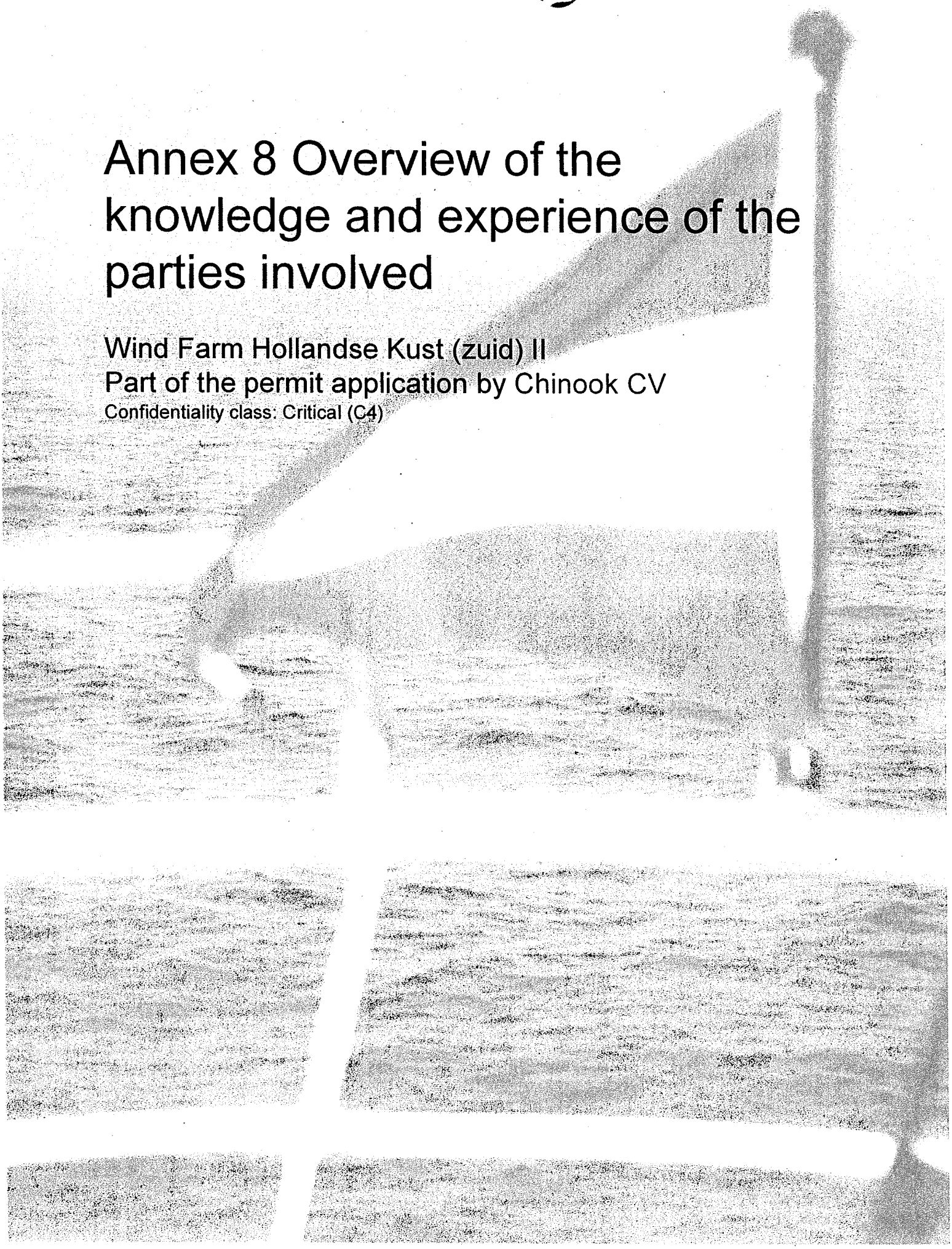
Annex 8 Overview of the knowledge and experience of the parties involved

Wind Farm Hollandse Kust (zuid) II
Part of the permit application by Chinook CV

Confidentiality class: Critical (C4)



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Preface

The applicant Chinook C.V. is a 100% subsidiary of NV Nuon Energy. NV Nuon Energy is fully owned by Vattenfall AB, which is fully owned by the Swedish State. Throughout this document and any documents attached thereto, the applicant may also be referred to as Nuon/Vattenfall. Nuon/Vattenfall is a leading European utility with extensive experience in the construction, commissioning and operation of wind farms both onshore and offshore.

Where Nuon/Vattenfall is indicated in this document as the service providing party, the relevant service shall be provided by the business unit of Nuon/Vattenfall that this task has been attributed to within the Nuon/Vattenfall Group. The knowledge and experience set out herein with regards to those services should therefore be understood as knowledge and experience of the relevant business unit.

This annex sets out the knowledge and experience of all parties involved as referred to in section 24(2)(a) of the Offshore Wind Act.

Contents

1 The knowledge and experience of the parties responsible for project management

Criterion 1: The knowledge and experience of the parties responsible for project management - These parties have been responsible for the project management of offshore windfarms – These windfarms have a joint capacity of 25MW or more.

- The party that shall be responsible in the HKZ project for project management shall be Nuon/Vattenfall. Nuon/Vattenfall has 1.6 GW of joint installed offshore wind capacity. This by far exceeds the assessment criterion of having knowledge and experience with responsibility for project management of offshore wind farms that have a joint capacity of 25 MW or more. Our offshore wind capacity and project management experience will increase to ~3.0 GW and 12 windfarms respectively by the time we expect to build HKZ.

Figure 1 below sets out the total wind capacity in operation of Nuon/Vattenfall. The below projects have all been built and commissioned with Nuon/Vattenfall providing the project management.

Figure 1: Nuon/Vattenfall's BA Wind capacity

	Onshore[2]	Offshore	Total
United Kingdom	396	590	986
Denmark	245	158	403
The Netherlands	241	108	349
Sweden	255	121	376
Germany	19	636	655
Total (MW[1])	**1,156**	**1,613**	**2,769**

Onshore
Offshore
% Vattenfall ownership

1) Capacity in operation: total capacity of the wind farms that Vattenfall has an ownership in. Minority shares included as 100%
2) 5 MW Solar
3) Kulle (1 MW), Stenkyrka (1 MW), Ruuthsbo (1 MW)

United Kingdom – ROC scheme	
Thanet	300
Ormonde (51%)	150
Kentish Flats	90
Kentish Flats Extension	50
Pen Y Cymoedd	228
Ray	54
Edinbane	41
Clashindarroch	37
Swinford	22
Parc Cynog incl. Solar[2]	9
Pendine	5
Installed capacity (MW[1])	**986**

Sweden – certificate scheme	
Lillgrund	111
Utgrunden	10
Stor-Rotliden	78
Högabjär-Kårsås (50%)	38
Höge Väg (50%)	38
Hjuleberg (50%)	36
Juktan (50%)	29
Östra Herrestad	16
Näsudden	11
Hedeskoga	6
Other assets[3]	3
Installed capacity (MW[1])	**376**

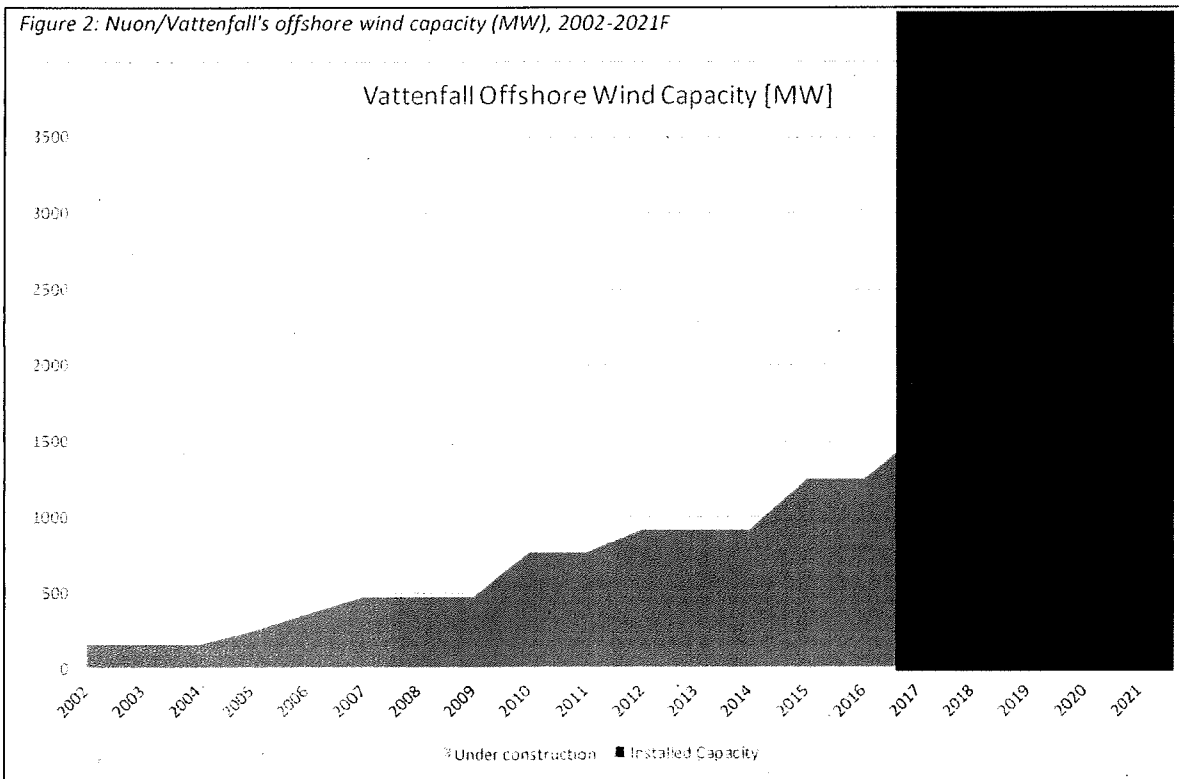
Denmark – FIT scheme	
Horns Rev 1 (60%)	158
Klim (98%)	67
Nørrekær Enge 1 (99%)	30
Rejsby Hede	23
Hagesholm	23
Nørre Økse Sø	17
Tjæreborg Enge	17
Hollandsbjerg	17
Bajlum (89%)	15
DræbyFed	9
Ryå	8
Ejsing (97%)	7
Nordjyllandsværket	6
Lyngmose	5
Vellingmærsk	1
Installed capacity (MW[1])	**403**

Germany – EEG scheme	
DanTysk (51%)	288
Sandbank (51%)	288
alpha ventus (26%)	60
Jänschwalde	12
Westküste (20%)	7
Installed capacity (MW[1])	**655**

The Netherlands – MEP/SDE(+)	
NoordzeeWind (50%)	108
Prinses Alexia	122
Eemmeerdijk	17
Irene Vorrink	17
Jaap Rodenburg	17
Windpoort (40%)	13
Hoofdplaatpolder (70%)	10
Reyndersweg (50%)	9
Echteld	8
De Bjirmen	6
Oom Kees (12%)	6
Oudendijk	5
Mariapolder	5
Hiddum Houw	4
Enkhuizen	2
Installed capacity (MW[1])	**349**

Nuon/Vattenfall is highly engaged in the industry-wide efforts to reduce the costs of offshore projects, and the commitment has been underlined by recent big wins. Through Nuon/Vattenfall's success in the Horns Rev 3 (407 MW), Danish Nearshore (344 MW) and Danish Kriegers Flak (605 MW) offshore wind tenders and the investment into the European Offshore Wind Deployment Centre in Scotland (Aberdeen OWF, 92.4 MW) we will increase our total capacity to 3 GW in 2021. The ambition is to operate 7 GW in 2025. The four new windfarms will increase Nuon/Vattenfall's project management experience even further ahead of the HKZ project.

Figure 2: Nuon/Vattenfall's offshore wind capacity (MW), 2002-2021F

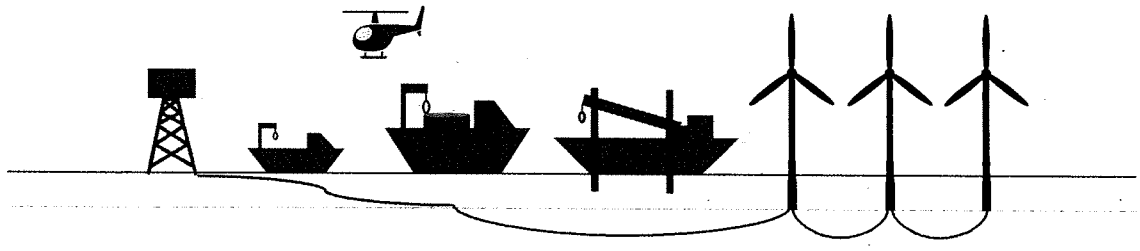


Additional offshore projects confirmed in the pipeline:

Country	Windfarm Project	Capacity	Commissioning
United Kingdom	Aberdeen		
Denmark	Horns Rev 3		
Denmark	Vesterhav North and South		
Denmark	Danish Kriegers Flak		

Building on its significant commercial and technical experience, Nuon/Vattenfall is able to deliver a zero subsidy bid for HKZ with minimal risk. The HKZ design is based on [redacted] that will be further optimised towards contracting and construction of the project. Thus, the design is building on the 'building blocks' [redacted] under contracting and construction.

Figure 3: Windfarm Design for HKZ across building blocks



Component	Building block
WTG	[redacted]
Foundation	
Array Cables	
Heavy Lift installation (WTG and Foundation)	
Cable Installation	
O&M	

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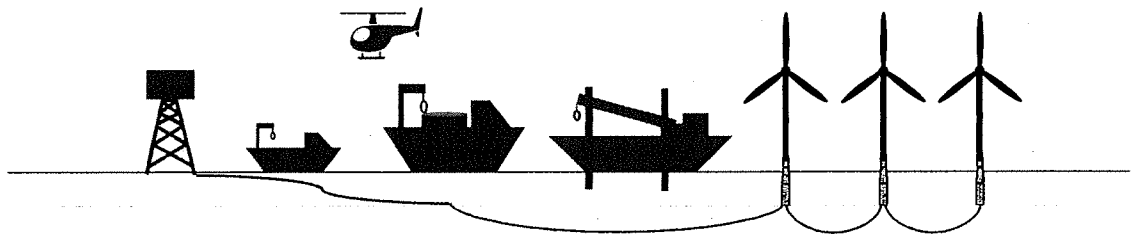
2 The knowledge and experience of suppliers of the foundations

*Criterion 2: The knowledge and experience of suppliers of the foundations - These parties have **supplied foundations** for offshore windfarms - Ten or more foundations have been supplied.*

- The party that shall be responsible in the HKZ project for supply of foundations shall [redacted] foundations for offshore wind farms. This by far exceeds the assessment criterion of having supplied ten or more foundations for offshore wind farms. The foregoing is demonstrated by the enclosed 'Confirmation of knowledge, experience and availability' signed by [redacted]

Figure 4: Foundation building block



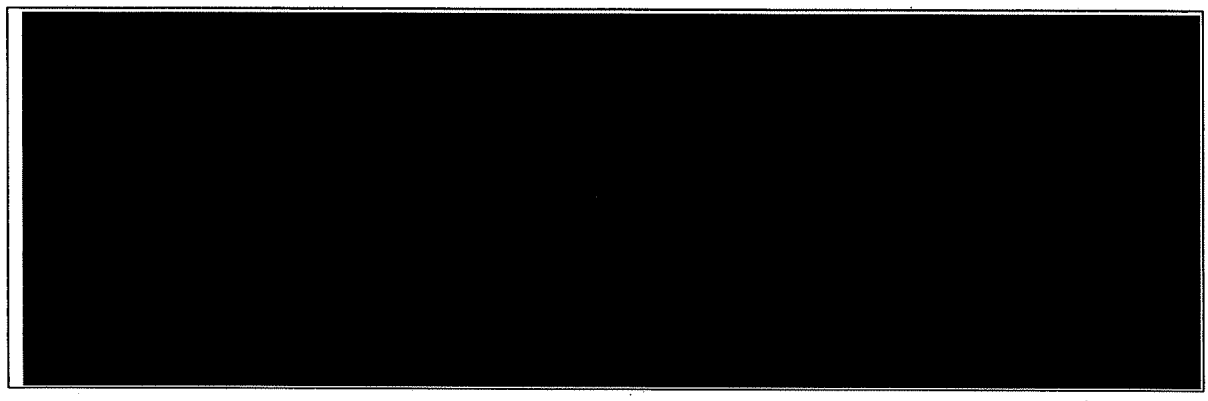
Foundation	
Monopile (MP):	[redacted]
Transition Piece (TP):	
Connection:	

In addition to the above, Nuon/Vattenfall has extensive experience with in-house design of all of our foundations and a high technical understanding of the monopile (MP) and transition piece (TP) concept. Based on this, we have invested in our key supplier relationships where close cooperation is paramount to ensuring competitive solutions, achieving the lowest possible Levelised Cost of Energy (LCoE) so that we can deliver to our high Quality and Safety requirements. With our extensive experience we have deep insights into the risks associated with the supply chain and how best to manage them. We keep improving our MP/TP solution through both technical and commercial optimisation.

In the following table, an overview of our experience in relation to knowledge and experience with foundations for offshore wind farms is outlined.

Figure 5: Nuon/Vattenfall's foundation experience

Offshore reference project	Commissioning	No. And foundation type	Foundation manufacturer
[redacted]			



Nuon/Vattenfall's elaborated tender engineering works confirms the use of MP/TP foundations with weights of approx. [redacted] for the MPs and [redacted] for the TPs. There are a number of experienced and well established suppliers in the market that could be used to source the foundations, an overview of these suppliers is outlined below. Nuon/Vattenfall confirms that the listed suppliers have a track record of having supplied more than 10 foundations with similar or larger dimensions than those required for the HKZ project.

Figure 6: Suppliers' foundation experience

Potential MP suppliers

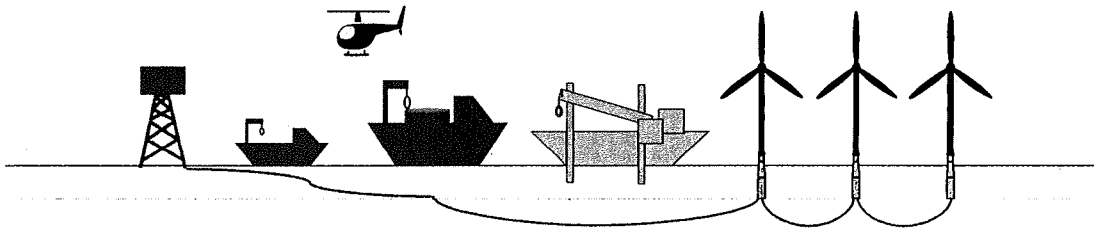
Supplier name	Foundation type	No. of units the supplier has manufactured *	Reference projects (extract only)
[redacted]			

3 The knowledge and experience of installers of the foundations

*Criterion 3: The knowledge and experience of installers of the foundations - These parties have **installed foundations** for offshore windfarms - Ten or more foundations have been installed.*

- The party that shall be responsible in the HKZ project for installation of the foundations shall be [redacted] has installed more than [redacted] foundations for offshore wind farms. This by far exceeds the assessment criterion of having installed ten or more foundations for offshore wind farms. The foregoing is demonstrated by the enclosed 'Confirmation of knowledge, experience and availability', signed by [redacted]

Figure 7: Foundation installation building block



Jack-up installation

[redacted]

In addition to the above, there are a number of experienced and well-established installation contractors in the market suitable for the HKZ project. A list of these installers and their experience is outlined below. Nuon/Vattenfall confirms that the listed installers have a track record of having installed more than 10 foundations with similar or larger dimensions as those required for the HKZ project.

Figure 8: Potential MP/TP foundation installers

Installer name	Foundation type	No. of units the installer has installed	Reference projects (extract only)
[redacted]			

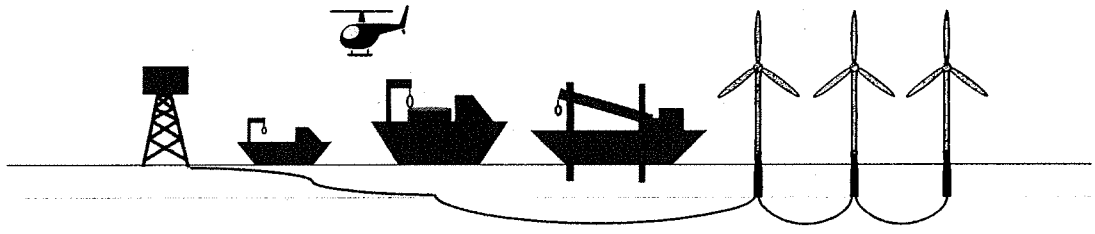
[redacted]

4 The knowledge and experience of suppliers of the wind turbines

*Criterion 4: The knowledge and experience of suppliers of the wind turbines - These parties have **supplied wind turbines (WTGs)** for offshore windfarms - Ten or more wind turbines have been supplied.*

- The party that shall be responsible in the HKZ project for supply of the wind turbines shall be [redacted] has supplied more than [redacted] wind turbines for offshore wind farms. This by far exceeds the assessment criterion of having supplied 10 or more wind turbines for offshore wind farms. The foregoing is demonstrated by the enclosed 'Confirmation of knowledge, experience and availability', signed by [redacted]

Figure 9: WTG building block



WTG platform

[redacted]

Nuon/Vattenfall is basing the HKZ project on the [redacted] Another turbine type that could be considered for this project is the [redacted] Along with [redacted] also [redacted] could supply turbines to HKZ. In addition to the turbine, the suppliers are normally also providing the installation and commissioning tool and crew. The overview of the suppliers is outlined below. Nuon/Vattenfall confirms that the listed suppliers have a track record of having supplied more than 10 wind turbines of the specification required for the HKZ project.

Figure 10: Nuon/Vattenfall's experience with WTG suppliers until 2021

Supplier name	WTG type	No. of units the supplier has delivered	Reference projects (extract only)
[redacted]			

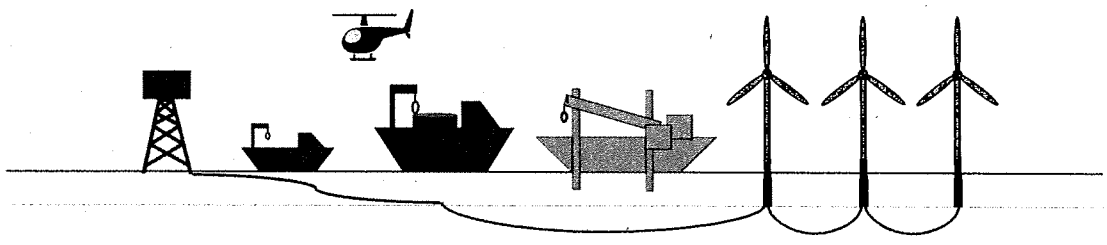
We also have experience working with other suppliers, [redacted] however we do not believe they have adequate technology to make the HKZ business case feasible and thus have excluded them from the above table.

5 The knowledge and experience of wind turbine installers

*Criterion 5: The knowledge and experience of wind turbine installers - These parties have **installed wind turbines** for offshore windfarms - Ten or more wind turbines have been installed.*

- The party that shall be responsible in the HKZ project for installation of the wind turbines shall be [redacted] has installed more than 10 wind turbines for offshore windfarms. This by far exceeds the assessment criterion of having installed ten or more wind turbines for offshore wind farms. The foregoing is demonstrated by the enclosed 'Confirmation of knowledge, experience and availability', signed by [redacted]

Figure 11: WTG installation building block



Jack-up installation

[redacted]

In addition to the above, there are a number of experienced and well-established installation contractors in the market that are suitable for the HKZ project. A list of these installers and their experience is outlined below. It is important to note that the split between the WTG supplier and the vessel owners and operators is that the WTG suppliers are delivering the installation and commissioning activities including crew whereas the installers listed here deliver the installation vessel with crew operating the vessel and the crane. Nuon/Vattenfall confirms that the listed installers have a track record of having installed more than 10 wind turbines of the specification required for the HKZ project.

Figure 12: Potential WTG installers

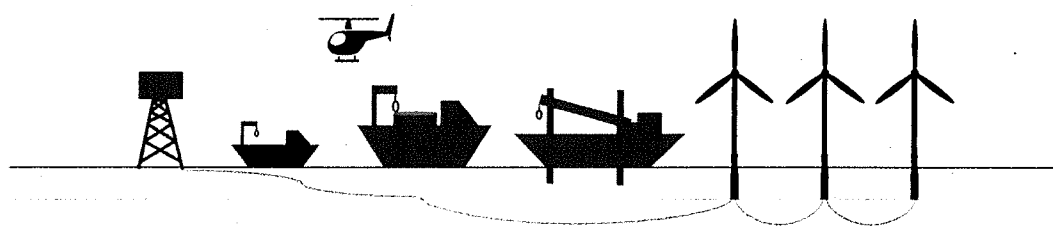
Installer name	WTG type	No. of units the installer has installed	Reference projects (extract only)
[redacted]			

6 The knowledge and experience of supplier of the cables which connect the individual wind turbines and link them to the platform

*Criterion 6: The knowledge and experience of supplier of the cables which connect the individual wind turbines and link them to the platform – further called array cables. These parties have **supplied cables** which connect individual wind turbines and link them to an offshore platform – Cables supplied for the connection of 10 or more wind turbines to a platform.*

- The party that shall be responsible in the HKZ project for supply of cables which connect individual wind turbines and link them to the offshore platform shall be [redacted] has supplied more than 10 connections of turbines to platforms. The foregoing is demonstrated by the enclosed 'Confirmation of knowledge, experience and availability', signed by [redacted]

Figure 13: Array cable building block



Array cable

[redacted]

In addition to the above, Nuon/Vattenfall has worked with a range of cable suppliers for the manufacturing of the array cables for its recent offshore windfarms: [redacted] The scope does also include commissioning and testing of the cables after installation. The step to 66 kV was long discussed and supported by Nuon/Vattenfall and made possible by Tennet's decision to use 66 kV for the Dutch projects. By selecting 66 kV for our [redacted] we have secured our position at the forefront of the commercial deployment of 66 kV cables in offshore wind – as we are thereby constructing one of the first three offshore windfarms to have a 66 kV cable.

There are a number of experienced and well established suppliers in the market that have type tested their 66 kV cable design according to IEC and Cigre for both [redacted] cable up to [redacted] please refer to the table below for a list of these contractors and an overview of their experience. Nuon/Vattenfall confirms that the listed installers have manufactured more than 10 cables for the application of connecting an offshore platform and a turbine.

Figure 14: Potential cable suppliers

Supplier name	Cable type	Type tested	No. of cables the supplier has delivered to offshore wind	Reference projects (extract only)
[redacted]				

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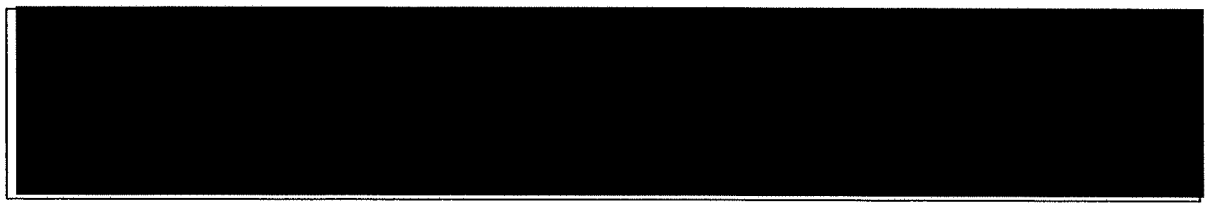
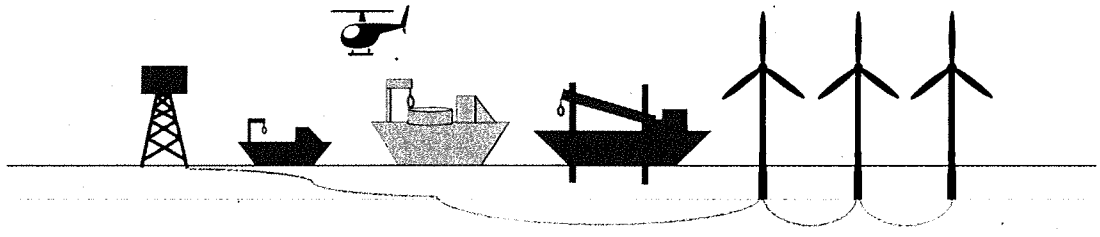


7 The knowledge and experience of installers of the cables which connect the individual wind turbines and link them to the platform

*Criterion 7: The knowledge and experience of **installers of the cables** which connect the individual wind turbines and link them to the platform — further called array cables. These parties have installed cables which connect individual wind turbines and link them to an offshore platform - Cables installed for the connection of 10 or more wind turbines to a platform.*

- The party that shall be responsible in the HKZ project for the installation of cables which connect individual wind turbines and link them to the offshore platform shall be [redacted] has installed cables which connect turbines to the offshore platform for more than [redacted] wind turbines, using 33kV and 66kV cables in the dimensions needed for HKZ. This by far exceeds the assessment criterion of having installed cables for the connection of 10 or more wind turbines to a platform. The foregoing is demonstrated by the enclosed 'Confirmation of knowledge, experience and availability', signed by [redacted]

Figure 15: Cable installation



Cable installation

[redacted]

In addition to the above, Nuon/Vattenfall needs to install [redacted] of 66 kV cables for HKZ. There are a number of experienced and well established installers in the market that have installed array cables. All the installers have confirmed that it is the same skills needed to install 66 kV or 33 kV and [redacted] up to approximately [redacted] mm^2; please refer to the list of contractors as indicated below and an overview of their experience. Nuon/Vattenfall herewith confirms that the listed installers have a track record of having installed more than 10 cables between the offshore platform and a turbine.

Figure 16: Potential cable contractors

Installer name	Cable type	No. of units (array cable connection) the installer has installed	Reference projects (extract only)
[redacted]			

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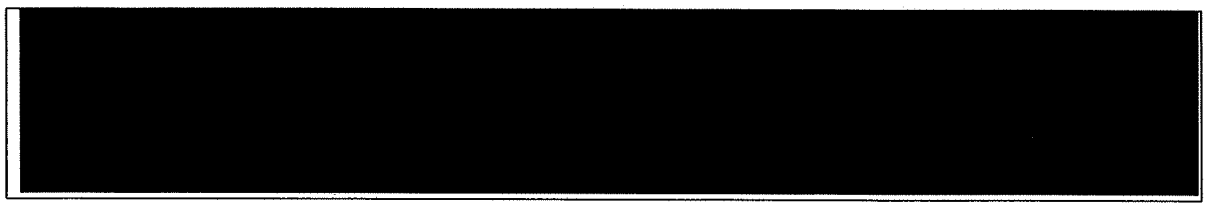
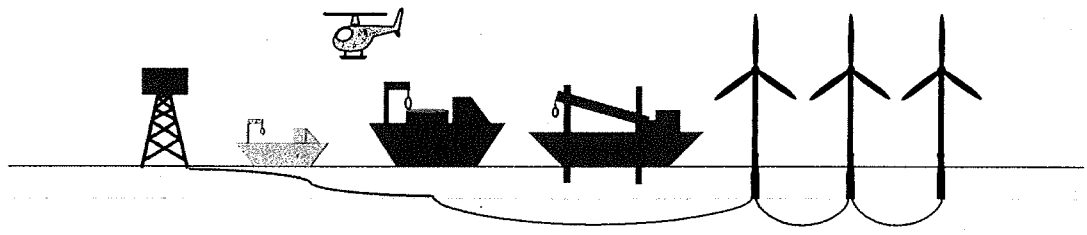


8 The knowledge and experience of the parties responsible for maintenance and operation of the wind farm

Criterion 8: The knowledge and experience of the parties responsible for maintenance and operation of the windfarm - These parties have been responsible for ***the maintenance and operation of offshore windfarms*** *- Experience of maintaining and operating offshore windfarms with a joint capacity of 25 MW or more.*

- The party that shall be responsible in the HKZ project for project management shall be [redacted] today has knowledge and experience in the maintenance and operation of offshore wind farms with a joint capacity of ove[redacted] MW. This by far exceeds the assessment criterion of knowledge and experience in the maintenance and operation of offshore wind farms with a joint capacity of 25 MW or more.

Figure 17: Operation and maintenance setup

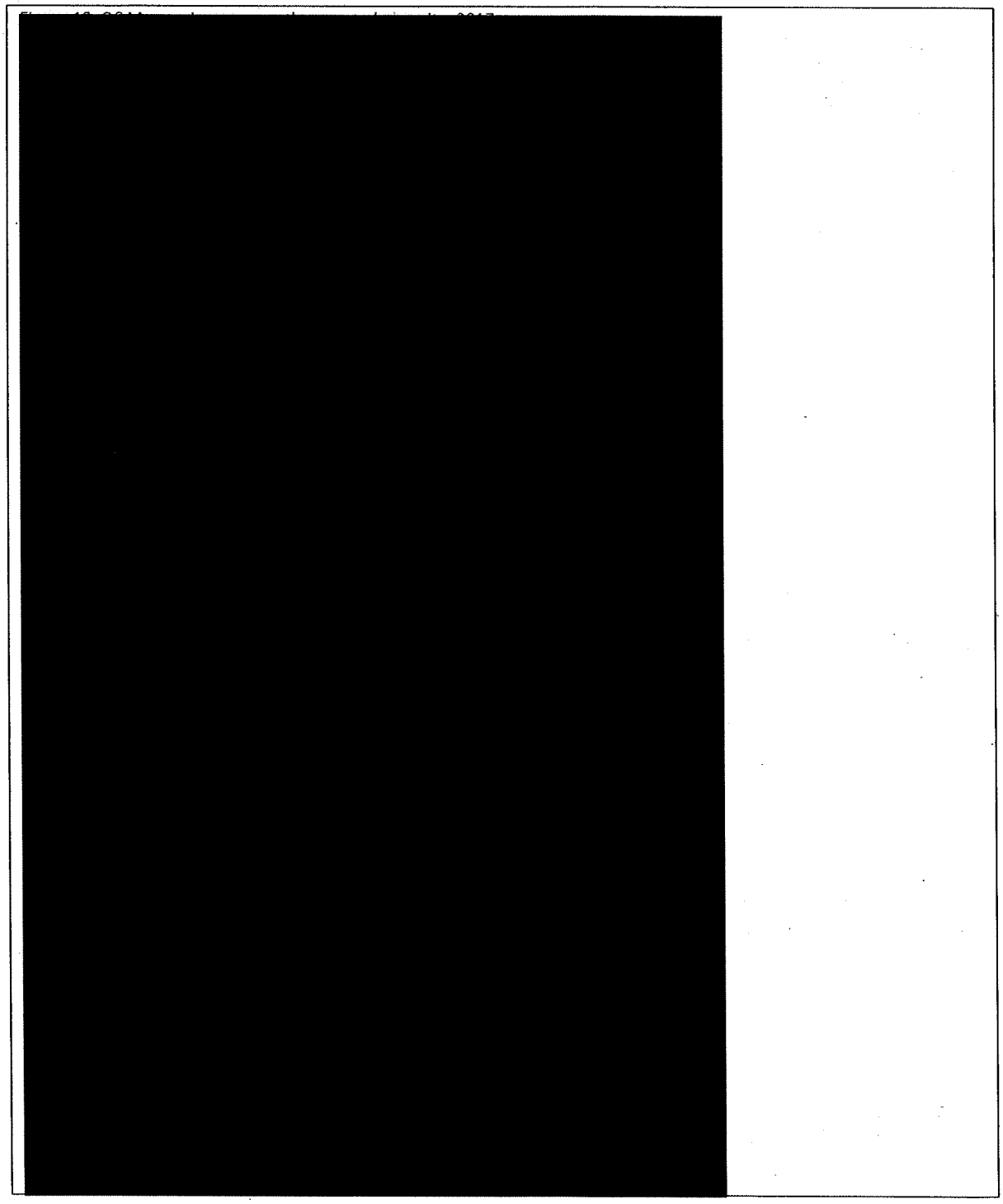


O&M setup

[redacted]

Nuon/Vattenfall has gained substantial operation and maintenance (O&M) knowledge and experience from its offshore fleet, which is equivalent to [redacted] GW years – a number that is expected to grow to [redacted] GW years by the time that HKZ is commissioned and grow even further [redacted]

Nuon/Vattenfall's significant O&M experience allows us to be flexible in the O&M strategy we select for a given site. For example, even on sites where we have OEMs delivering the O&M works whilst equipment is under warranty, we will still use our own site managers and integrate our workers into the OEM's team to ensure an optimal handover process. Given, the approach we take to working in parallel with OEMs through the warranty period, we actually have experience that extends to more than what is depicted below.



Nuon/Vattenfall's experience in offshore wind is reflected in the ability to operate windfarms safely, whilst driving availability levels above industry average and achieving best-in-class OPEX levels. This is why our approach is to take over the operation of the windfarm before the industry standard of the five year defect notification period (DNP),

allowing significant cost savings to be achieved. We typically shorten the DNP to just [redacted] years, during which time there is an availability guarantee on the turbines from the OEM (and they will operate the windfarm). Given this, both the OEMs and Nuon/Vattenfall's experience is relevant for addressing the criteria.

The OEMs we are considering to operate HKZ during the first [redacted] year service agreement (defect notification period), [redacted] have extensive experience. [redacted] has more than [redacted] MW currently under maintenance and operation worldwide[3]; [redacted] currently has [redacted] MW of installed capacity they are operating and maintaining under service contract.

Nuon/Vattenfall ourselves are currently operating [redacted] MW of offshore wind capacity, as shown in figure 18.

Given the above, Nuon/Vattenfall confirms that both Nuon/Vattenfall, as well as the OEMs we may utilize to operate and maintain the project in the first [redacted] years of operations, all individually have experience operating and maintaining multiple windfarms with a joint capacity of 25 MW or more.

[3] According to http://www.siemensgamesa.com/en/products-and-services/services/om-product-and-services/om-services.html as of December 14, 2017

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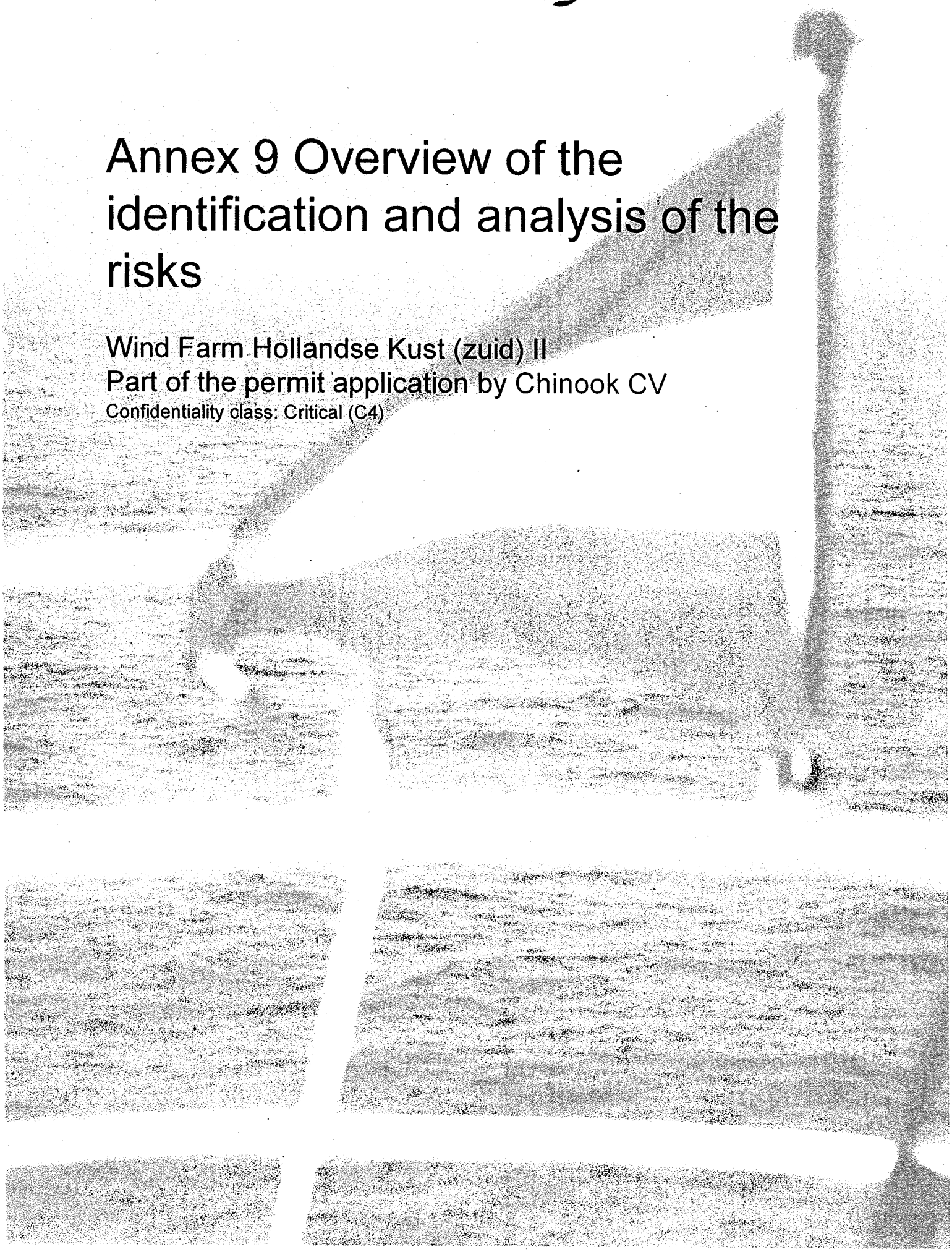
Annex 9 Overview of the identification and analysis of the risks

Wind Farm Hollandse Kust (zuid) II
Part of the permit application by Chinook CV

Confidentiality class: Critical (C4)



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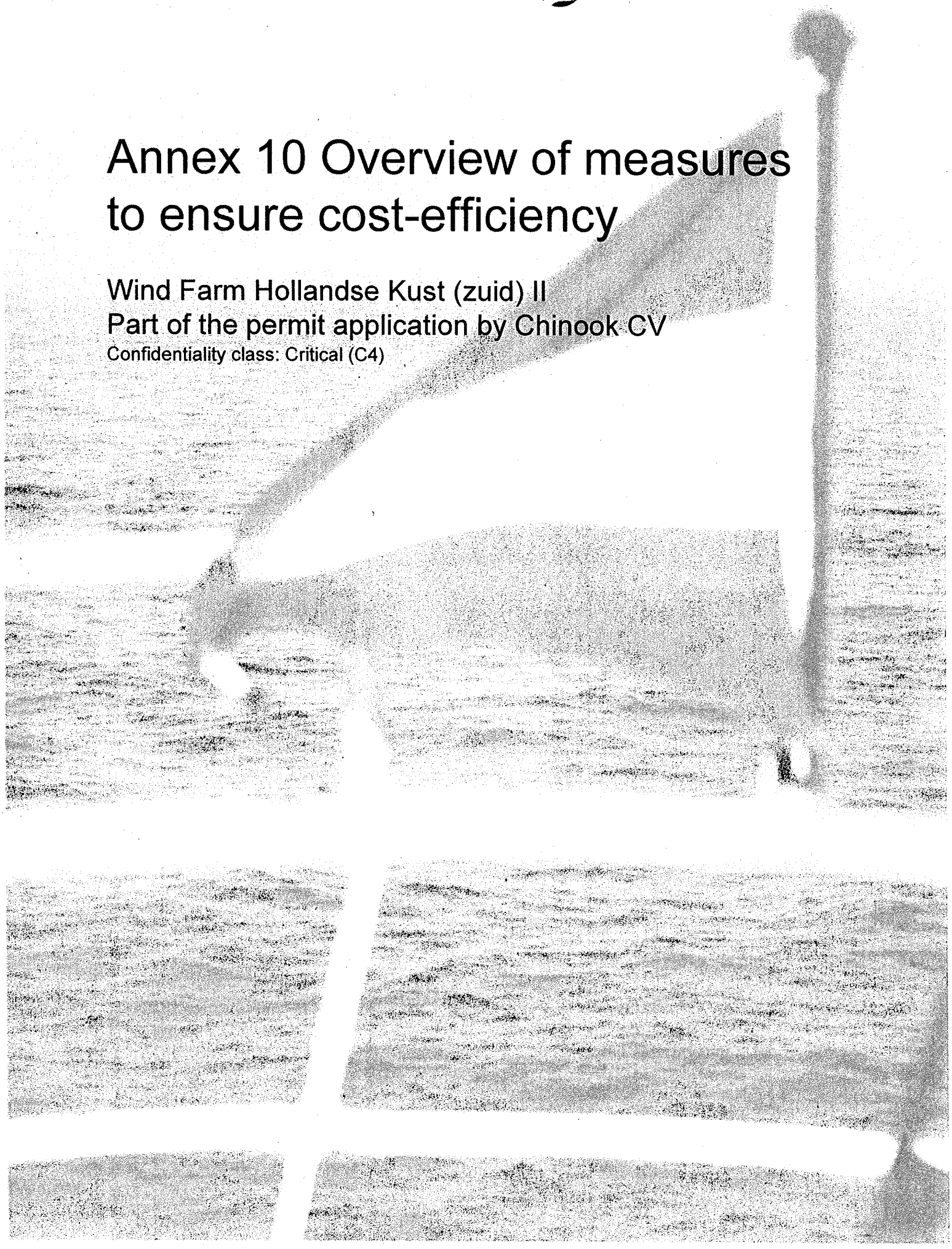
Annex 10 Overview of measures to ensure cost-efficiency

Wind Farm Hollandse Kust (zuid) II
Part of the permit application by Chinook CV

Confidentiality class: Critical (C4)



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Annex A1 Project Plan

Wind farm Hollandse Kust (zuid) I and II
Part of the permit application by Chinook CV

Confidentiality class: Critical (C4)

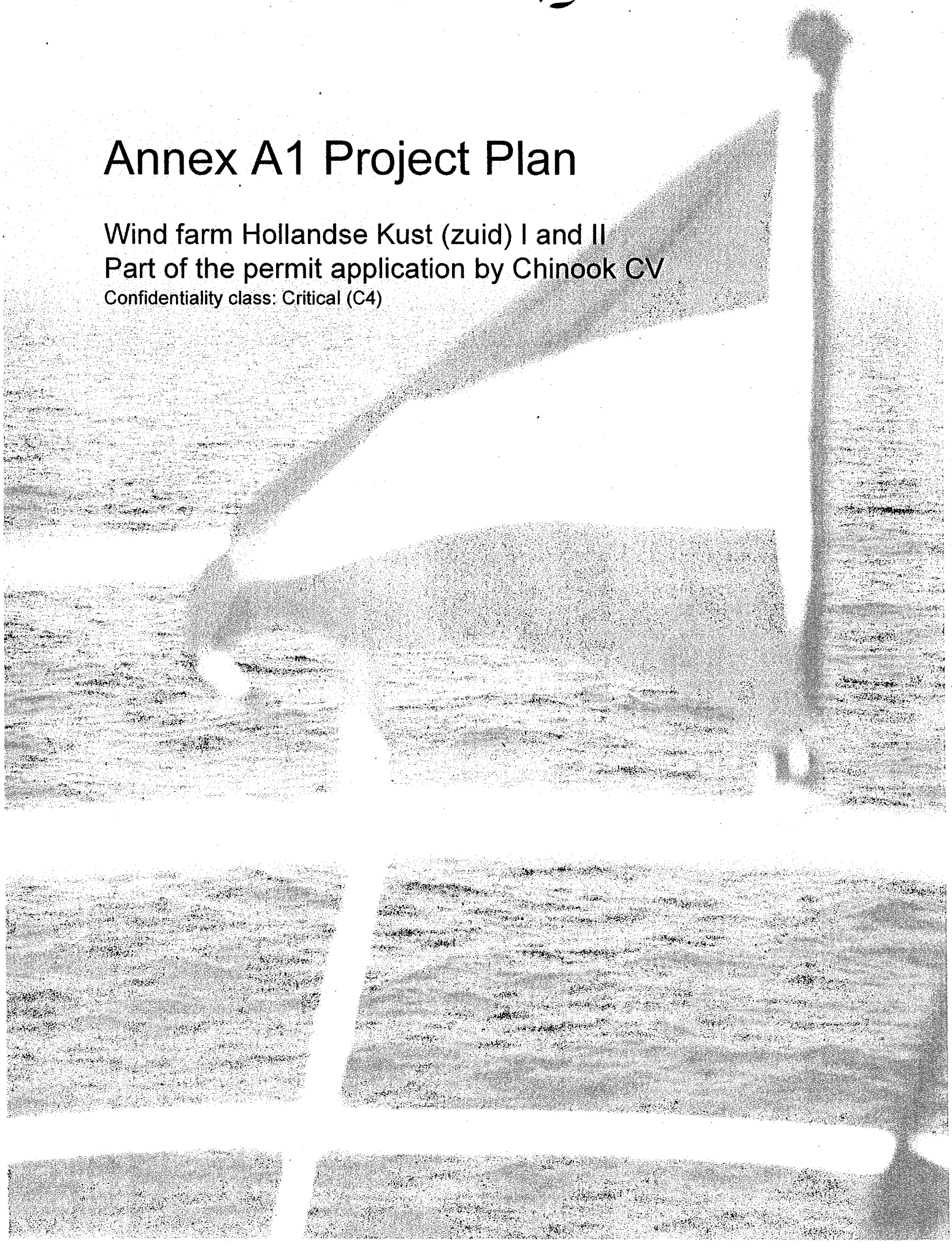

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Table of Contents

Preface

The applicant Chinook C.V. is a 100% subsidiary of NV Nuon Energy. NV Nuon Energy is fully owned by Vattenfall AB, which is fully owned by the Swedish State. Throughout this application and any documents attached thereto, references to *Chinook*, *Nuon/Vattenfall, Nuon, Vattenfall*, the *SPV*, etc. should be read as references to or relating to the applicant. Chinook C.V. will also be the company that shall build, own and operate the wind farm if the permits are awarded to it.

During the development, construction, exploitation and decommissioning phase Nuon/Vattenfall will ensure to fulfil all relevant requirements as laid down in the regulations, among others those that follow from the Wind Farm Site Decision ("Kavelbesluit I windenergiegebied Hollandse Kust (zuid)" & "Kavelbesluit II windenergiegebied Hollandse Kust (zuid)"), the Water Decree ("Waterbesluit") and the Ministerial Order for Permitting Offshore Wind Energy HKZWFS I and II ("Regeling vergunningverlening windenergie op zee kavels I en II Hollandse Kust (zuid)") and the Working and working hours Regulations at the North Sea (Arbo- en Arbeidstijdenwetgeving op de Noordzee). In the procurement of the wind farm, suppliers and contractors shall be required to adhere to the obligations arising from these regulations.

Please note that Nuon/Vattenfall presents in this application and project plan the design, lay-out, timeline and suppliers for Hollandse Kust (zuid) I & II available as best alternative at this moment in time. Nuon/Vattenfall might request for alterations of this part of the application in conformity with the Policy Rule with respect to changes of the permit ("Beleidsregel inzake de wijziging van vergunningen windenergie op zee voor de kavels I en II Hollandse Kust (zuid)"). Nuon/Vattenfall does not intend to pre-determine with this permit application who the contracts are going to be awarded to.

1. Project Description

The following sections contain a description of how Nuon/Vattenfall will design, construct, operate and decommission Hollandse Kust (zuid) I and II (HKZ) combined, based on currently available information. In order to allow for optimization and incorporate further detailing, final decisions on the design and suppliers will be made after permit award.

1.1. Nuon/Vattenfall's organization & experience

Nuon/Vattenfall has a wide experience in developing, constructing and operating offshore wind farms in northern Europe. Within Nuon/Vattenfall, all wind energy related activities (e.g. development, constructions & operations) are centralized within one Business Area Wind (BA Wind). In this way, the company can maximize the learnings between projects, where the same people work on certain aspects of different projects in different countries.

Since September 2013, Nuon/Vattenfall has been involved in the consultation processes for the development of the new legal framework for offshore wind energy in the Netherlands. The past year, the company has been involved specifically in the consultations for the HKZ sites and tender. Experts from different required knowledge fields (eg from the ecology expert team, the permitting team, the civil & electrical engineering teams, the legal team, the regulatory affairs team) were involved.

Furthermore, Nuon/Vattenfall has detailed knowledge of the HKZ area since we developed the Beaufort project in the western area of HKZ, for which an irrevocable permit was received.

The below table outlines Nuon/Vattenfall's track record in the development, construction, operation and de-commissioning of offshore wind farms in Europe.

Country	Project	Capacity	Status
Denmark	Horns Rev 1	158 MW	In operation
Denmark	Horns Rev 3	407 MW	Under construction
Denmark	Vesterhav Syd & Nord	348 MW	Tender won & concession signed
Denmark	Danish Kriegers Flak	600 MW	Tender won & concession signed
UK	Kentish Flats	90 MW	In operation
UK	Kentish Flats Extension	50 MW	In operation
UK	Thanet	300 MW	In operation
UK	Ormonde	150 MW	In operation
UK	Norfolk	3600 MW	In development
UK	Aberdeen	92 MW	Under construction
UK	Thanet Extension	340 MW	In development
Netherlands	Egmond aan Zee	108 MW	In operation
Netherlands	Hollandse Kust (zuid) I & II	760MW	In development
Sweden	Lillgrund	110 MW	In operation
Sweden	Utgrunden	11 MW	In operation
Sweden	Yttre Stengrund	10 MW	Decommissioned
Sweden	Trolleboda	150 MW	In development
Sweden	Taggen	300 MW	In development
Sweden	Swedish Kriegers Flak	640 MW	In development
Germany	Alpha Ventus	60MW	In operation
Germany	DanTysk	288 MW	In operation
Germany	Sandbank	288 MW	In operation
Germany	Sandbank 2	<250MW	In development
Germany	Global Tech 2	400-500MW	In development

Table 1 Nuon/Vattenfall's offshore wind portfolio (wholly or partly Nuon/Vattenfall-owned) dd 27 October 2017

1.2. Nuon/Vattenfall's Category Roadmaps and Procurement Approach

Category Roadmaps
In Nuon/Vattenfall, we have introduced the concept of a standard, optimized windfarm, where we simply see our projects as a basic template to which we can apply our standard set of building blocks per component and concept category. Together all the building blocks make up a full wind farm design that can be deployed to a project for site specific adjustments. The building blocks are being constantly improved – and new ones introduced – through a combination of both commercial and technical levers. In this way and due to our strong pipeline, we can focus our efforts on constantly building on top of existing solutions and we can invest, long-term, in levers that cannot pay themselves back on single projects and levers with long implementation horizons.

To work with the building blocks we have introduced a "Wind Farm Design" department, which sits at the heart of the organisation. It owns the Category Roadmaps, which develop and refine the building blocks of our standard windfarm. To do so, it brings together our experts from functions such as Engineering, System Design, Procurement, Construction and O&M in small, efficient, cross-functional teams (the figure below shows this new approach to working). Furthermore, System Design models and analyses the entire design across roadmaps to ensure no sub-optimization is ongoing. Park Design is responsible for tweaking the standardized design to site specific constraints and opportunities.

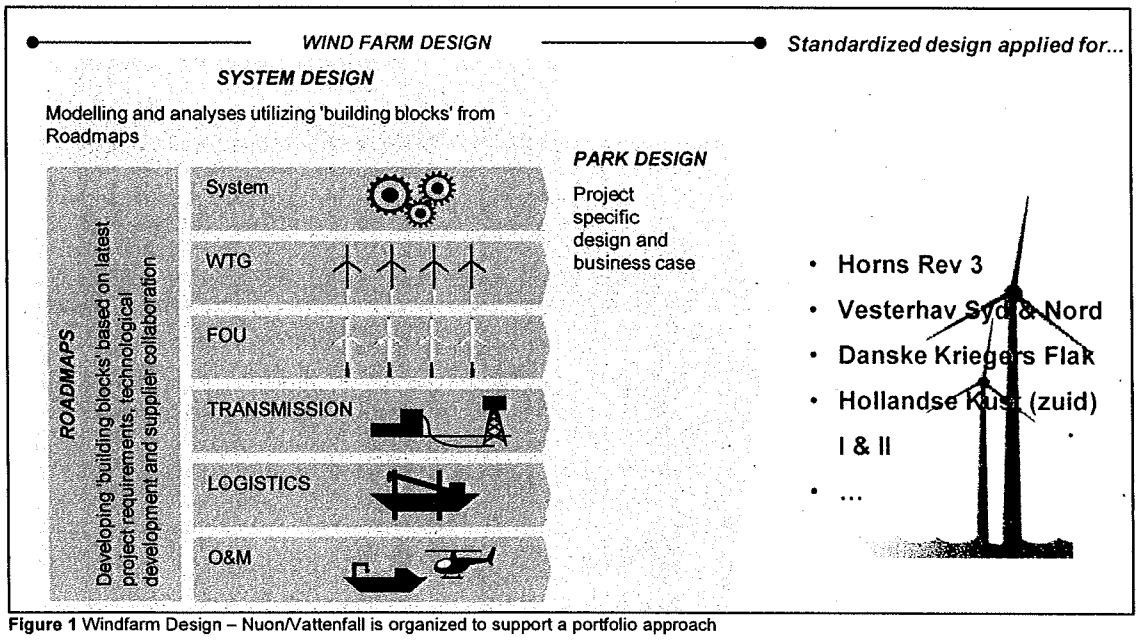

Figure 1 Windfarm Design – Nuon/Vattenfall is organized to support a portfolio approach

Selected technology for HKZ
For HKZ, the selected technology [redacted] and the building blocks are outlined the following figure:

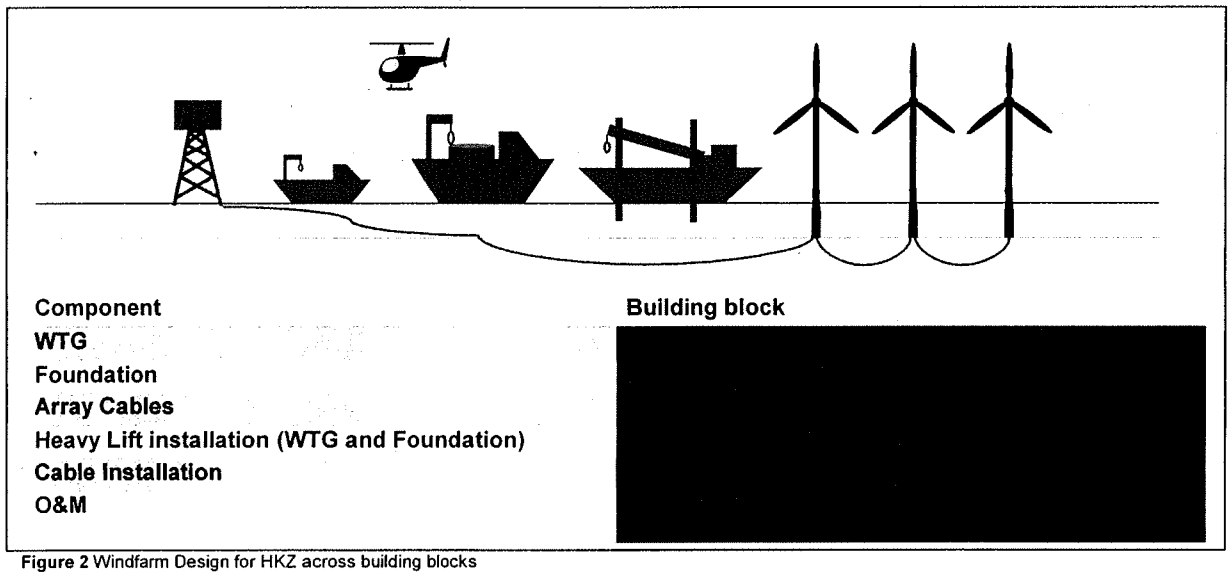

Figure 2 Windfarm Design for HKZ across building blocks

Procurement Approach

To deliver a complete design we work through the Wind Farm Design and Category Roadmaps as introduced in the section above. An important participant in this work is the Procurement team who is taking part in the Category Roadmaps. The procurement approach is briefly elaborated below to provide further understanding behind these processes in relation to the Project Plan.

The procurement function operates a 'House of Procurement', which is an entry point to the procurement management system describing relevant information about procurement policy, processes, guidelines and results – all of which is built-upon the depth and breadth of past project performance and allows Nuon/Vattenfall to continually measure and improve performance. Nuon/Vattenfall works with standardized terms and conditions, Employer Requirements and general supporting documents for a tender process (or Invitation to Tender (ITT)). The House of Procurement ensures Nuon/Vattenfall is efficient in how we work, that work is repeatable, has strong and clear governance and sets-out clearly what we need from our suppliers.

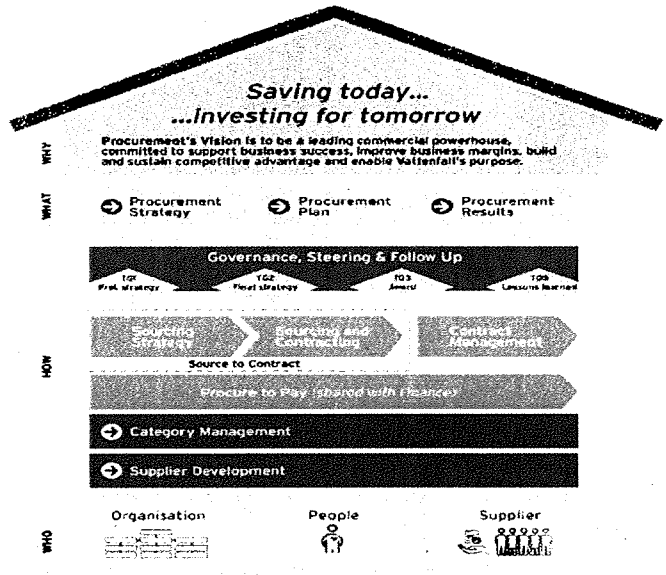

Figure 3 Nuon/Vattenfall's 'House of Procurement'

Offshore Wind Procurement
In Annex A3 and A4 it is described that Nuon/Vattenfall has the means (technically and commercially) to de-risk the commissioning of the HKZ project in [redacted] – evidenced further with supplementary evidence from the suppliers (in the form of Letters of Commitment for all categories). Nuon/Vattenfall's approach of working with the supply-chain will continue before (to ensure we have the best pool of suppliers to select from) and after we issue any HKZ specific tender to the market (to ensure these suppliers continue to match our expectations in-terms of supplier performance).

From a procurement perspective two of the most important levers we have at our disposal are competition and volume synergies (or bundling) – levers we feel comfortable in using based on: (i) our experience; (ii) knowing there is an abundant supply of the required products and vessels available in the specific period for the project; and (iii) that we have the same design and technology as to be deployed on Horns Rev 3, Vesterhav Syd & Nord and Danish Krieger's Flak.

At the same time as having confidence in the future, Nuon/Vattenfall's procurement strategy choses to remain somewhat flexible to cater for subtle variations in market size, supplier business models, competitors' moves or macroeconomics etc. Therefore Nuon/Vattenfall prefers not to overly invest in long-term contracts with only one supplier (as can be the case with Framework Agreements).

For these reasons, and as mentioned in Annex A3 and A4, Nuon/Vattenfall chooses to adopt a multi-lot contract strategy for the large investment packages. Nuon/Vattenfall prefers to find potential for exploiting economies of scale through the use of multi-lot arrangements where an individual supplier can take the risk of winning more than one project into its own pricing policy that best fits with its own business at the time of tendering.

This strategy has most recently been successful in the turbine scope for the Danish projects (where volumes are combined for Danish Vesterhav & Danish Kriegers Flak) and is being deployed for all remaining packages. Nuon/Vattenfall will be active in its procurement processes for offshore for circa [redacted] of capacity in the event that Nuon/Vattenfall is awarded the permit for HKZ.

Pre-qualification phase
As explained in Annex A3 and A4, Nuon/Vattenfall (as a consequence of its close working relationship with the supply-chain) has tiered its suppliers to establish a differentiated approach to supplier management. This means we have well established processes for managing our relations with tier 1 suppliers and know exactly how to mitigate the risks emerging from newer, unknown or untested suppliers.

Where we know a supplier and its products and/or services (despite site-specific requirements) we are faster to the market [redacted] as most suppliers have typically been assessed on a number of the tender criteria already.

The tender criteria are used on an ongoing basis for our suppliers, especially in the pre-qualification phase – so not only new ones are assessed. The assessment entails the following performance :

- **Product portfolio:** Do they have a relevant product portfolio that is attractive to Nuon/Vattenfall's project portfolio?
- **HSE:** Do they have adequate health, safety and environment processes in place, and do they have the track record to prove they deliver on them (LTIs etc.)?
- **LCoE:** Do they share the same ambition as Nuon/Vattenfall to reduce LCoE?
- **Quality performance:** Do they deliver according to the agreed quality plans in current projects and do they invest in improvement quality?
- **Technical proficiency:** Do they have the right level of technical competency to ensure technical improvements and cost-out, deliver the project, and comply with the relevant quality standards and safety regulations as well as internal processes for innovations?
- **Commercial agreements:** Are they willing to agree to a balanced standard terms and conditions (payment terms, minimum warranties, serial defect provision, etc.) that optimises LCoE?
- **Risk:** Are they willing to share risk with Nuon/Vattenfall without adding an unbalanced risk premium?
- **Operations collaboration:** Are they willing to provide full personnel training, spare parts access through entire windfarm lifetime and access to operations data (SCADA)?
- **Financial stability:** What is their risk of defaulting or running into cash flow issues while delivering our projects?

The outcome of the pre-qualification phase ensures we have suppliers 'ready-to-go' prior to the issuance of any given tender that are best able to support the HKZ project.

Tender phase
As mentioned, Nuon/Vattenfall's multi-lot contracting strategy, directly tendering components and key sub component packages, allows direct access and full control over all critical contracted parties helping to mitigate risks (particularly compared to other alternative solutions, such as EPCI contracts):

i. Foundation Design;
ii. Foundation Fabrication (split into MP and TP if deemed beneficial);
iii. Foundation Installation;
iv. Array Cable Supply;
v. Array Cable Installation;
vi. Turbine Supply, Installation, Commissioning and 3-years' service (operational aspects are treated in a separate chapter);
vii. Wind Turbine Installation Vessel
viii. Ports and logistics during O&M; and eventually
ix. Full-life (out-of-warranty) operation (operational aspects are treated in a separate chapter).

At the same time balanced with a belief that risks should also be owned by those best able to manage them – Nuon/Vattenfall prefers to trust the suppliers with matters that are core to their business and where they have a proven successful track-record. In this arrangement each party bears liability for its own performance/delays, subject to caps and exclusions. Nuon/Vattenfall therefore chooses not to continually split contracts (i.e. to sub-contractor level) and prefers to reach [redacted]

For smaller contracts, e.g. Unexploded Ordnance Surveys, Nuon/Vattenfall has a policy to use framework agreements. These works are performed routinely and continually across our portfolio and help reduce the transaction costs for what we consider to be normal course of business.

Overall, it is our experience that the procurement process for recent projects has led to a sufficient level of competition in all contracts. The received bids – in conjunction with price information from other recent EU tenders (the recent Danish projects) – allow for a robust but also competitive CAPEX estimate for this permit application. Accordingly, if Nuon/Vattenfall is awarded the permit, project-specific ITT's will be issued leading to "best and final offers" (BAFOs) in time for a preliminary award decision to be taken prior to planned FID. Nuon/Vattenfall will assess BAFOs against the award criteria that have been defined for all contracts in the ITT before making an award decision. Nuon/Vattenfall does not intend to pre-determine with this permit application who the contracts are going to be awarded to.

It should be noted that further to Nuon/Vattenfall's application we succeeded in our exemption request from the EU procurement directives in the Netherlands when awarding contracts relating to the project. Whilst this provides Nuon/Vattenfall with greater degrees of freedom in its commercial dealings, Nuon/Vattenfall still intends to run its processes towards the supply-chain in an open, fair and transparent way in the interests of strengthening competition.

1.3. Design and Construction

This section provides an overview of the building blocks presented in section 1.2 and their deployment to HKZ.

For the specific HKZ design, intensive engineering works during the tender preparation allows Nuon/Vattenfall to present technical solutions for all major packages (i.e. foundations, turbines and cables) under consideration of the following criteria:

- Consideration of site specific constraints and environmental conditions (e.g. soil, wind, waves, etc.)
- Confirmation of technical feasibility
- Availability of proposed technology on industrial scale
- Highly cost-effective technology

The entire tender design process incorporated the following site specific engineering works:

- Analysis of geo- and metocean information (i.e. soil, wind, waves, etc.)
- Development of most valuable layout for specific turbine types under investigation
- Site specific foundation design, manufacturing and installation strategy
- Site specific cable design, manufacturing and installation strategy
- Site specific turbine design, manufacturing and installation strategy

Furthermore, for each of the major packages, a description of the manufacturing, transport, installation and commissioning is included in this section.

1.3.1. Foundations

Nuon/Vattenfall's experts choose steel monopile (MP) foundations as the optimal foundation solution for the HKZ project's water depth, soil conditions and turbine type.

Within the next phase of the project, a location specific foundation design will be established to determine the most cost effective dimensions for each location. Generally, if final soil investigations indicate that specific areas of the site will not allow for a standard solution (not expected at the moment), either micro-siting of turbine locations (i.e. shifting to better area) or the development of a location specific special-purpose solution can be performed. The latter is currently [redacted] by Nuon/Vattenfall based on available information so far.

The foundation building block for HKZ is primarily based on Nuon/Vattenfall's [redacted] which is successfully in operation [redacted] The [redacted] MP/TP (transition piece) foundation design has been further developed by improvements of individual parts (e.g. [redacted] for the [redacted] Further foundation design optimizations (e.g. [redacted] etc.) are currently ongoing for the [redacted] projects which will form a valuable basis for the detailed foundation design of HKZ. Therefore, the foundation design will have a well-established track record of at least [redacted] projects with a capacity of more than [redacted] is continuously improved by incorporating operational experience and is therefore considered to be a robust and highly competitive foundation concept.

MP/TP Design

The design is characterized as follows (see the figure below):

- specific MP designs for each offshore location will be performed during the detailed design phase
- standardized TP design (clustering) incl. concrete platform
- entire design by in-house engineering competences
- micro-siting (if required)
- location specific special-purpose solution experience (e.g. suction bucket) available in-house (if required)
- location specific scour protection by rocks

Nuon/Vattenfall's tender engineering works (as mentioned above in the cross-functional site specific engineering works) resulted in MP/TP foundations with reasonable dimensions of approx. [redacted] (including flange) for bottom diameters between [redacted] for the MPs and approximately [redacted] (including secondary steel, concrete platform, internals, davit crane, etc.) for the TPs. Clustering of the site according to geotechnical

characteristics and water depth variation allowed the Vattenfall experts to elaborate the variation of foundation dimensions in the field.

The transition piece will be equipped with all [redacted] and [redacted] for easy crew transfer vessels (CTV) access.

Please note that the design of specific items, such as [redacted] type of corrosion protection system, etc. have been standardized within Nuon/Vattenfall which brings significant benefits in manufacturing and installation processes.

In the further process the design of the foundations will be more detailed especially after incorporation of the results of the detailed soil investigations (planned [redacted] The intensive load iteration process together with the turbine supplier will be done in a [redacted] approach. The details of this process will be agreed upon together with the foundation designer, the turbine supplier and the certifying body.

With the use of monopiles, the condition 2 (12) of the Wind Farm Site Decision will be fulfilled.

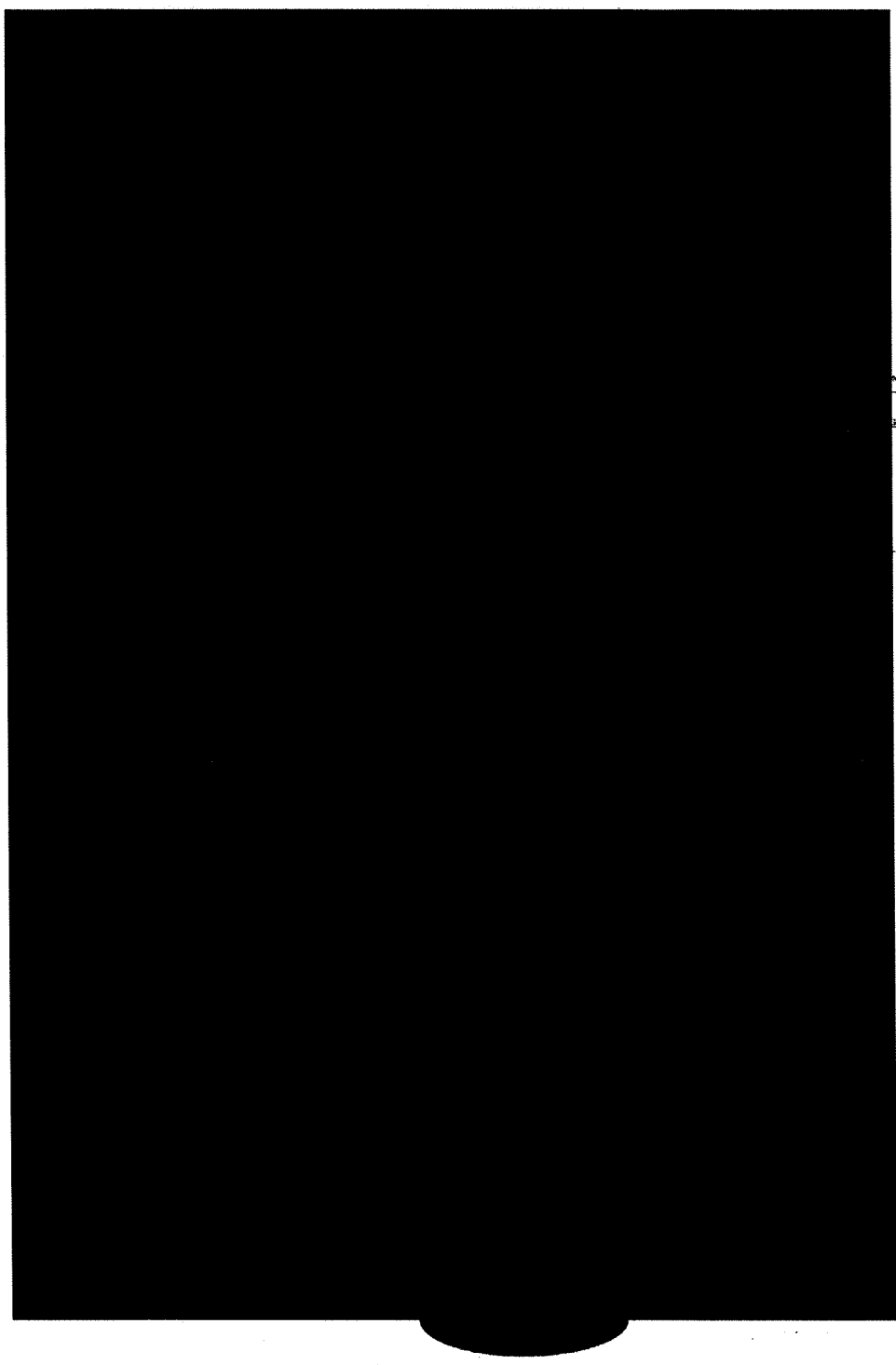

Figure 4 Exemplary MP/TP foundation [redacted]

MP/TP Supply

The last details of the foundation design with regard to e.g. welding, can sections, plate weights, etc. will be developed in close cooperation with the MP and TP supplier. The fabrication of the MPs and TPs will be based on the outcome of the detailed foundation design calculations with regard to diameter, wall thickness and welding dimensions. The finalization of the transition pieces will require special attention, as detailed work will be needed regarding electrical internal outfitting, coating, etc.

The monopiles and transition pieces will be provided at the [redacted]

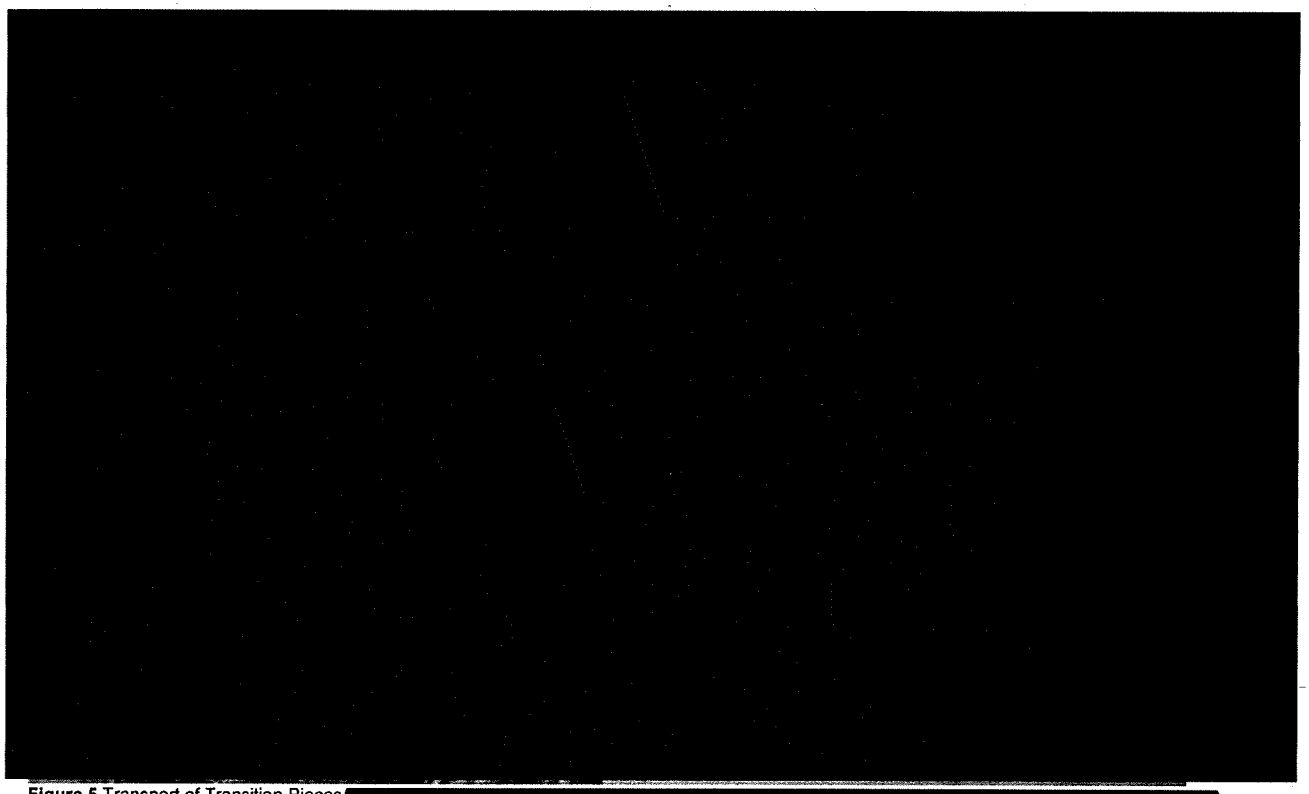

Figure 5 Transport of Transition Pieces [redacted]

MP/TP Transport & Installation

As MP dimensions are in the order of [redacted] for bottom diameters between [redacted] and TP weights are approx. [redacted] various offshore installation vessels (jack-ups) are available for offshore installation. At the same time vessels which do floating offshore installation either anchored or on DP2 (Dynamic Positioning) either self-loading or feedered at the offshore location are technically feasible solutions and have been confirmed during technical tender preparation.

During technical tender preparation Nuon/Vattenfall has developed a highly competitive (in terms of costs and time schedule) foundation transport and installation methodology under consideration of foundation manufacturing capacities in Europe. Various scenarios considering different suppliers in Europe and different installation methodologies have been evaluated which finally led to the most promising scenario as indicated in the figure below.

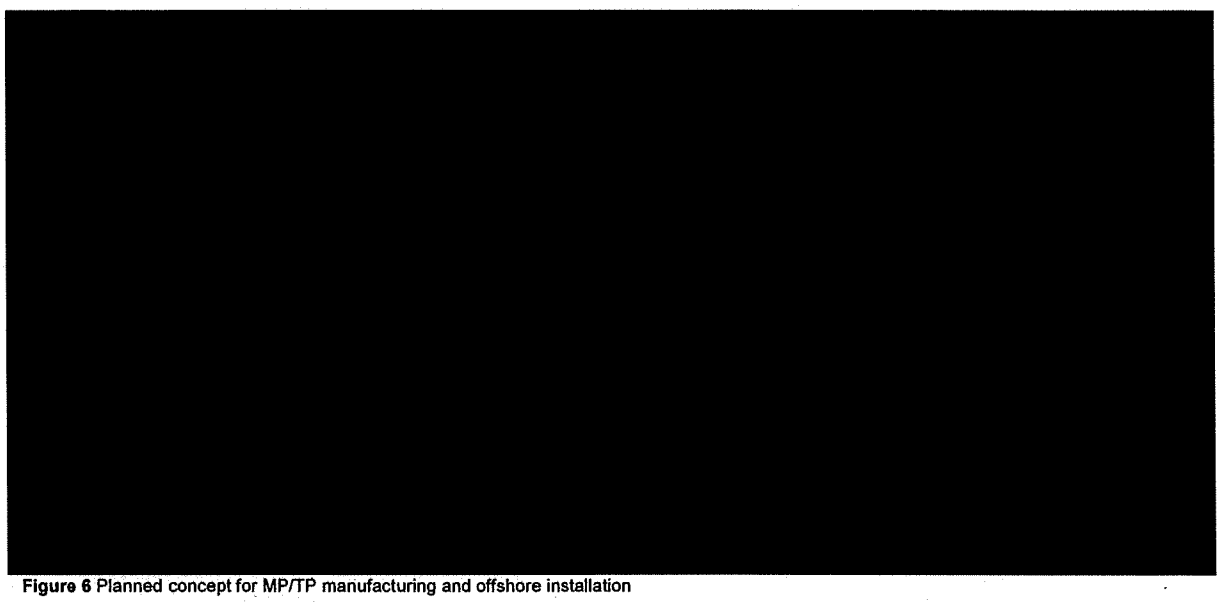

Figure 6 Planned concept for MP/TP manufacturing and offshore installation

The installation concept makes use of the operation of [redacted]

[redacted] of MPs and TPs will be loaded directly onto the offshore installation jack-up vessel [redacted] for subsequent offshore installation. The sailing distance to the HKZ site is [redacted] allowing a transit from the base harbor to the offshore site in [redacted] All equipment necessary for offshore installation [redacted] will be installed on the installation vessel.

Preliminary pile drivability analysis shows adequate pile driving conditions by using [redacted] pile driving technology [redacted].

Preliminary site specific assessments for jack-up operations show reasonable leg penetrations [redacted] at most of the locations for various types of jack-up vessels) and excellent operability of jack-up vessels in the field as well as adequate adverse weather exposure.

Preliminary noise mitigation analysis show excellent noise mitigation measures available on the market for compliance with existing noise limitations for pile driving operations [redacted]

To avoid scouring around the bottom of the monopile, scour protection (rocks) will be installed at the location of the piles on the seabed in a separate prior offshore campaign. Special attention will be paid to the seabed mobility in terms of sand waves, erosion- and sedimentation zones etc.

The sequence of MP Installation is as follows:

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

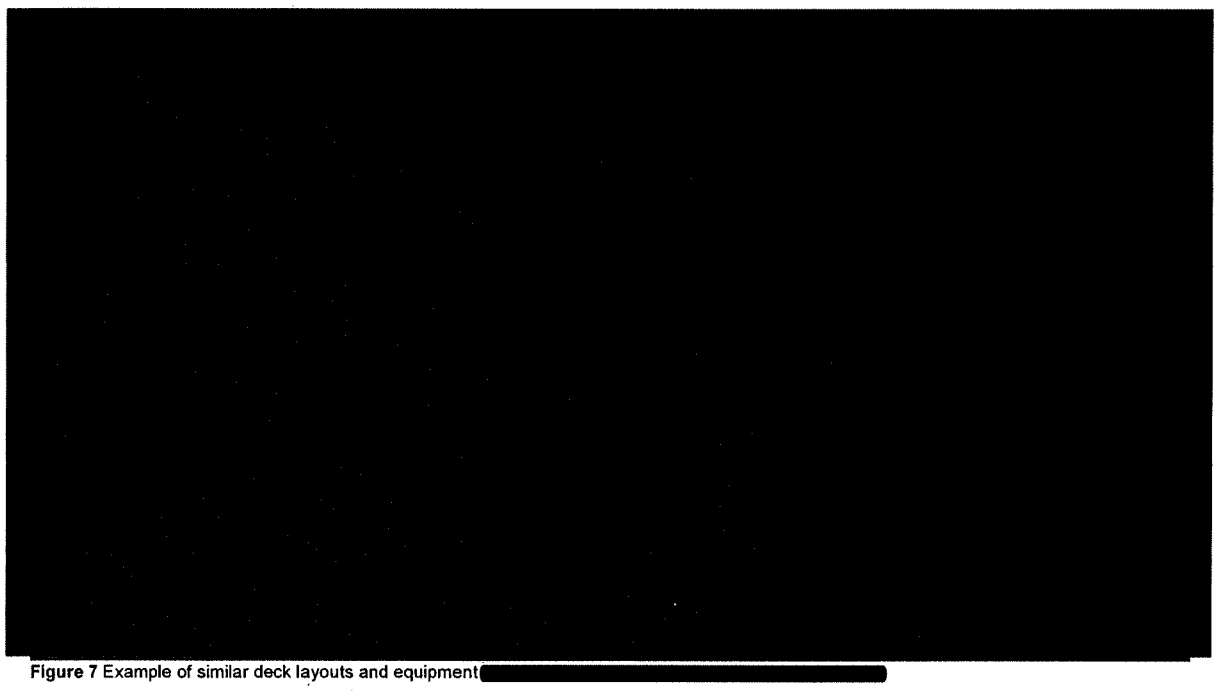

Figure 7 Example of similar deck layouts and equipment [redacted]

Wind turbine generator

Based on the site specific conditions of the project Nuon/Vattenfall chooses the [redacted] as best suitable and highly competitive technology for the HKZ project. Due to its origin in the well proven [redacted] it can be stated that it will be a [redacted] technology.

Figure 8 [redacted]

Turbine characteristics				
Nominal power	Rotor diameter	Hub height	Tip depth	Tip height
[redacted]				

Table 2 Turbine characteristics

- [redacted]
- The turbine is designed for at least 25 years life time

Further information of the [redacted]

Given this turbine, the conditions 2(7), 2(9) and 2(10) of the Wind Farm Site Decision will be fulfilled.

Pre-Assembly
The transport and installation strategy for the WTG has been adopted from previous Nuon/Vattenfall projects and reflects industry standard. Turbine components will be shipped from manufacturing sites to a pre-assembly site in the base harbor.

At the pre-assembly site the turbine components will be pre-assembled and pre-commissioned for offshore installation. The single tower sections will be bolted together and tower internals will be completed and commissioned to the extent possible (e.g. lift, ladders, cables). Nuon/Vattenfall will prepare [redacted] the installation vessel's capacity for [redacted] Nacelles and hubs will be mounted together, tested and pre-commissioned before load-out. All components will be quality inspected before load-out.

Load-out and offshore Transport
In preparation of the load-out designs for quayside lay-out and a vessel deck-layout as well as lift plans will be developed by all contractors involved. 3-D-Lifting analysis has been a proven quality check for the design and lift plans. Project specific sea fastening for the towers (tower foundations) and blades (blade rack) will be designed and manufactured in advance and fixed to the vessel's deck during mobilization.

Figure 9 Example deck-layout

At load-out the components will be lifted on board the installation vessel with the vessel's onboard crane and secured to the sea fastening and vessel deck. After the vessel's crane is secured the vessel will sail out and transit to the offshore site (transit time is expected to be approx.

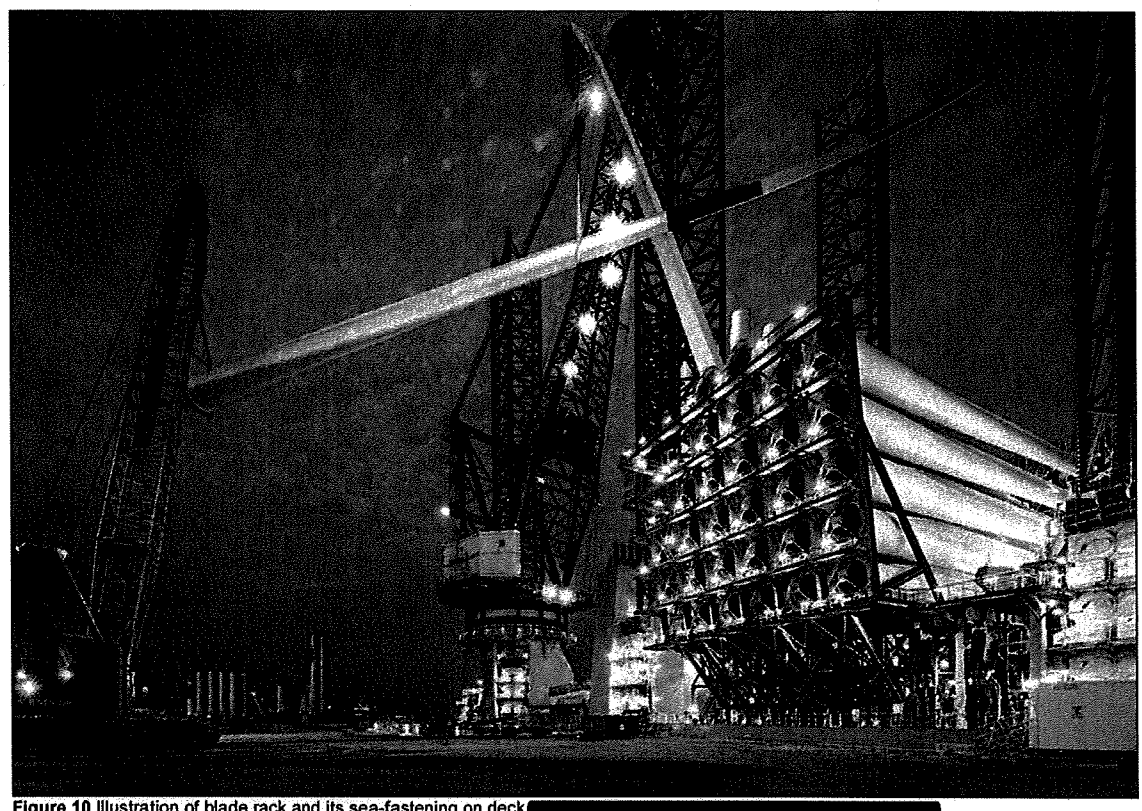

Figure 10 Illustration of blade rack and its sea-fastening on deck [redacted]

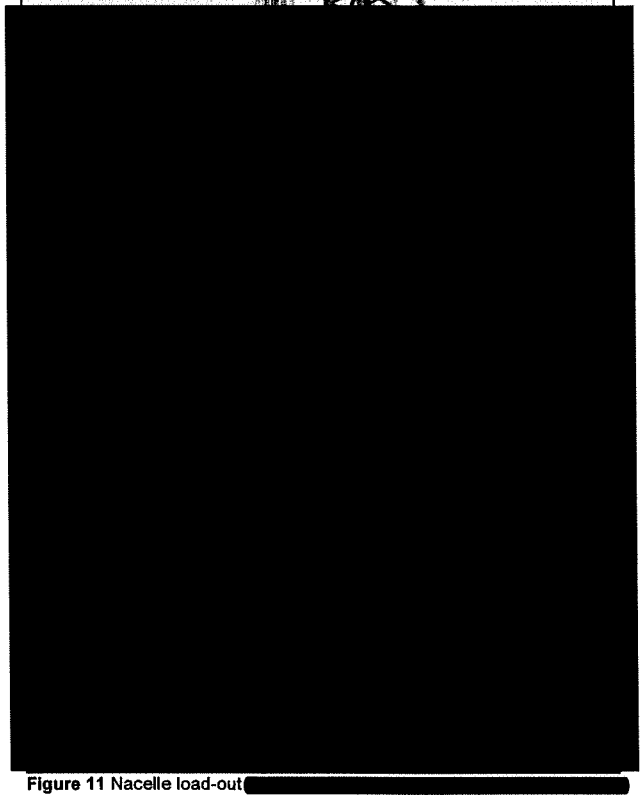

Figure 11 Nacelle load-out [redacted]

Offshore Installation
At the offshore location the vessel will jack out of the water to establish a safe working platform and deploy a fixed gangway to the foundation transition piece. Lifting preparation of vessel crane, turbine components, and preparation of the foundation (removal of weather protection cover) will be conducted in parallel. Turbine installation will commence with full tower lift. Once landed on the foundation flange and secured by bolts the cable connection works between turbine and switchgear in the foundation will start immediately and run in parallel to the further lifting works being the nacelle including hub and the blades. In total [redacted] lifts will be necessary which is today's industry standard and provides the best utilization of the WTG installation vessel's deck. Depending on the finally selected vessel between [redacted] complete WTGs can be transported per round trip. After installation of the last turbine, the vessel will sail back to the base harbor and conduct the loadout of the next set of turbines.

The jack up vessel will also be able to withstand adverse weather at the site. By this, unnecessary transits to port can be avoided and the utilization of available weather windows will be maximized.

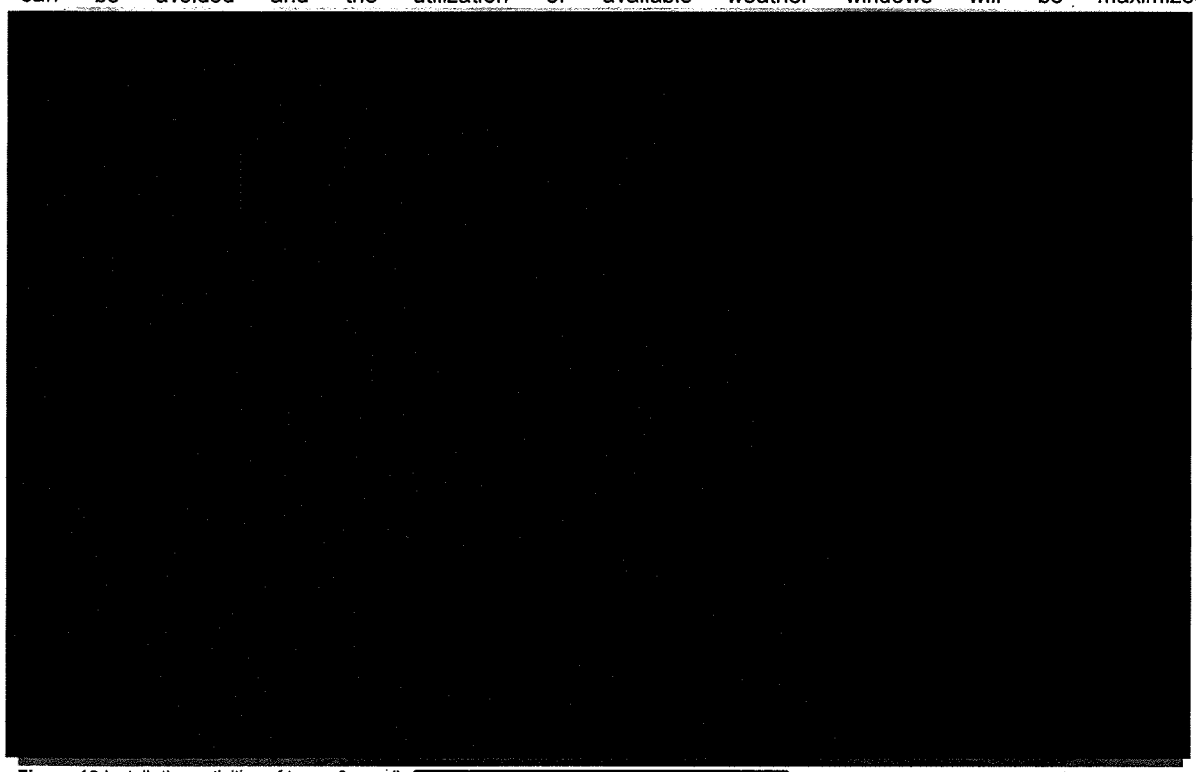

Figure 12 Installation activities of tower & nacelle [redacted]

Turbine Commissioning
After installation the turbines will not be connected to the grid before 30/06/2021 (availability date of Alpha Platform). [redacted] For commissioning, the teams will be transferred by crew transfer vessels (CTV) to put each WTG into operation. After commissioning the turbine will be proven in a test run before taking over.

Please refer to section 1.3.3 for a layout of the turbines.

1.3.2. Cable

This section describes the design, supply and installation of the inter-array cables for HKZ.

Cable design

The inter array cables are based on 66kV technology with [redacted]
The turbines will be connected via [redacted] strings to the Offshore Substation. Each string will have [redacted] of cross sections. Finally, the cables will have either [redacted] as conductor material and [redacted] based on the final design and supplier negotiations. These technical specifications are currently under investigation.

A principle sketch of the layout of the cables and turbines is displayed below.

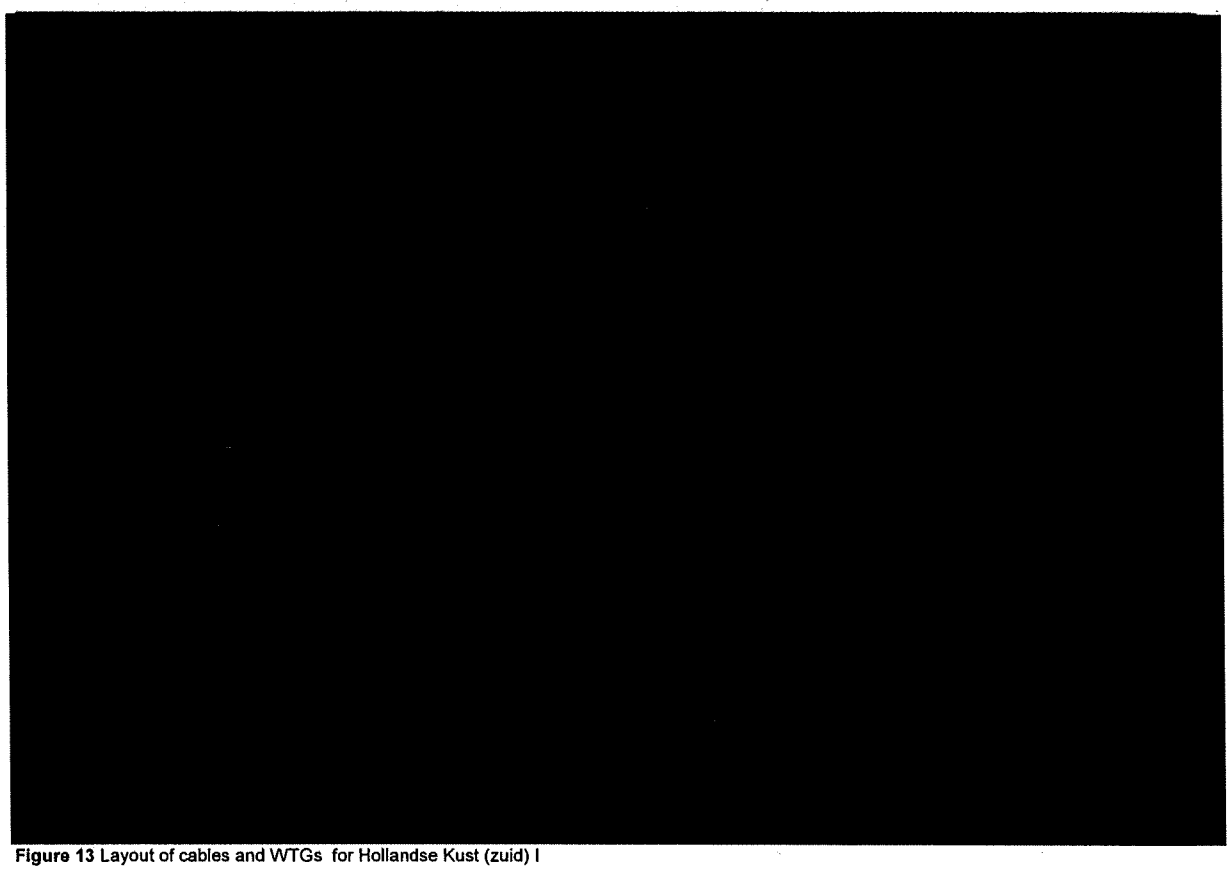

Figure 13 Layout of cables and WTGs for Hollandse Kust (zuid) I

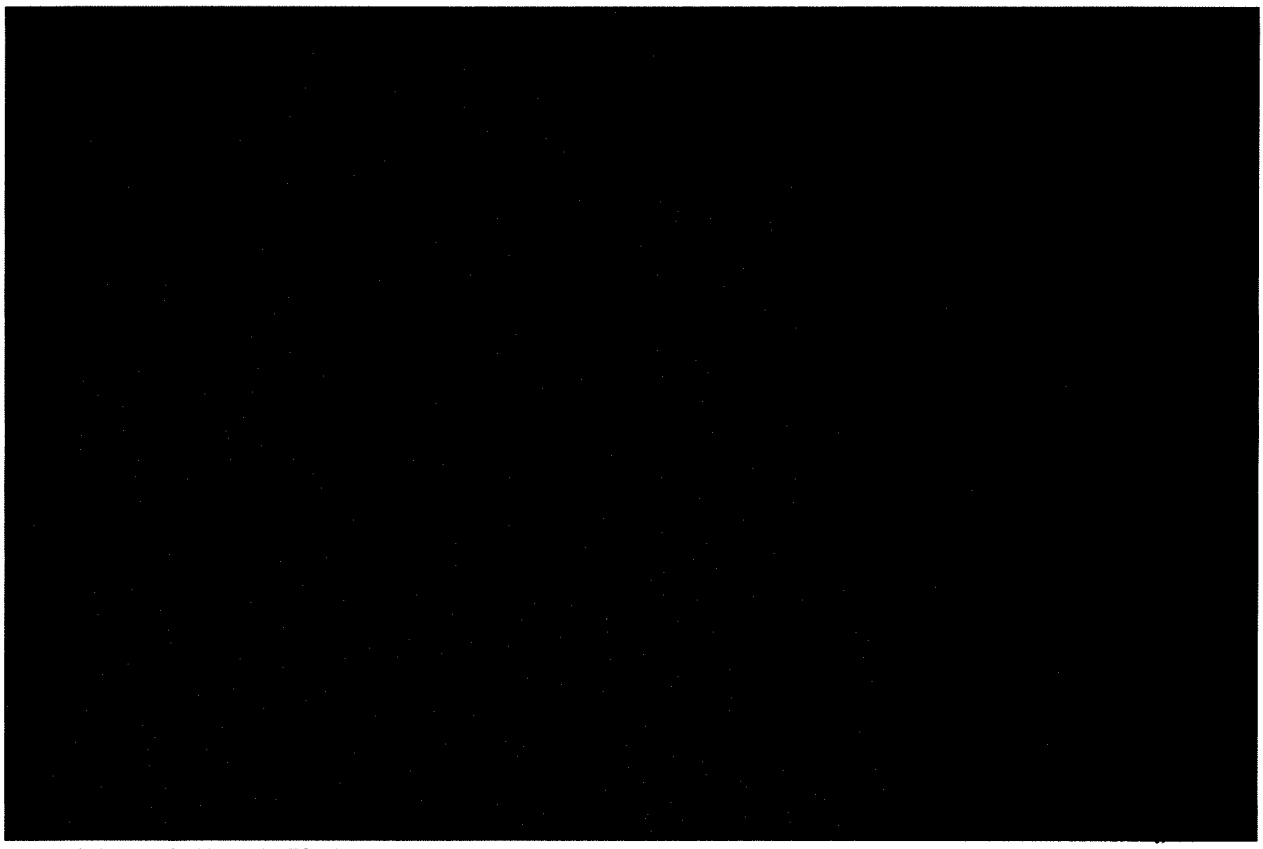

Figure 14 Layout of cables and WTGs for Hollandse Kust (zuid) II

Figures 13 and 14 are purely illustrative and meant as a preview of the layout – Annexes 6 & 7 are leading. Please note that the blue circles are not rotor diameter but 4xD separation; swept area is indicated by the green areas.

Given these layouts, the conditions 2(1), 2(2), 2(3), 2(4), 2(5), 2(6), 2(8), 2(11) of the Wind Farm Site Decision will be fulfilled.

Cable supply

There are a number of experienced and well established suppliers in the market that have type tested their 66kV cable design according IEC and Cigre for [redacted] cable up to [redacted] The basis of our proposal is the selection of [redacted] as cable supplier for HKZ. Cables will be loaded at the manufacturing harbour and directly transported to site for offshore installation.

Cable installation

The contractor's scope of works are to route engineer, load out, transport, surface lay, bury and terminate the 66kV submarine array cables and to provide spares and ancillary items associated with the project (including all associated installation engineering and design). The basis of our proposal is the installation [redacted]

Route engineering will be done taking appropriate regards to any potential objects located on or in the seabed.
Load-out of the array cables will be performed with full focus on safe operations as well as to ensure the integrity of the array cable. The installation vessel will transport the array cable to site and install the array cable between two WTG's or substation and WTG as applicable. Cable surface laying will be performed by unloading the cable to seabed by using [redacted] with full focus on safe operation as well as ensuring integrity of the array cable.

The cable burial will follow in all cases the best industry practice. The method intended to be used is the [redacted] ensuring the cable will be buried below sea floor. Expected depth of burial will be approx. [redacted]

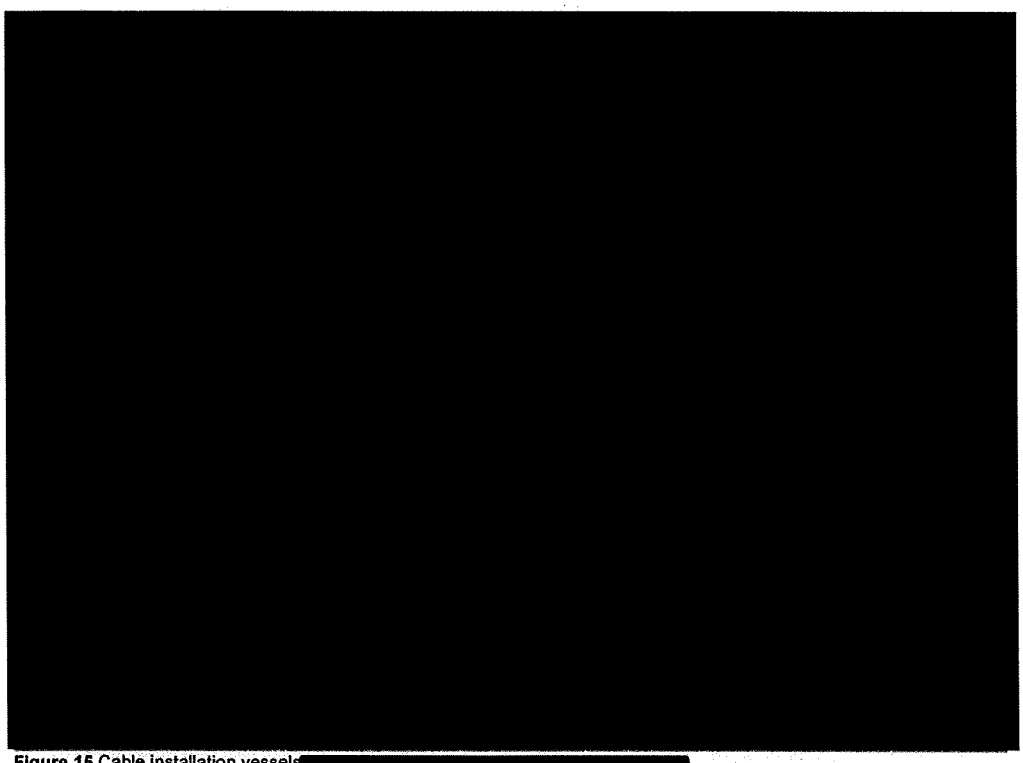

Figure 15 Cable installation vessels [redacted]

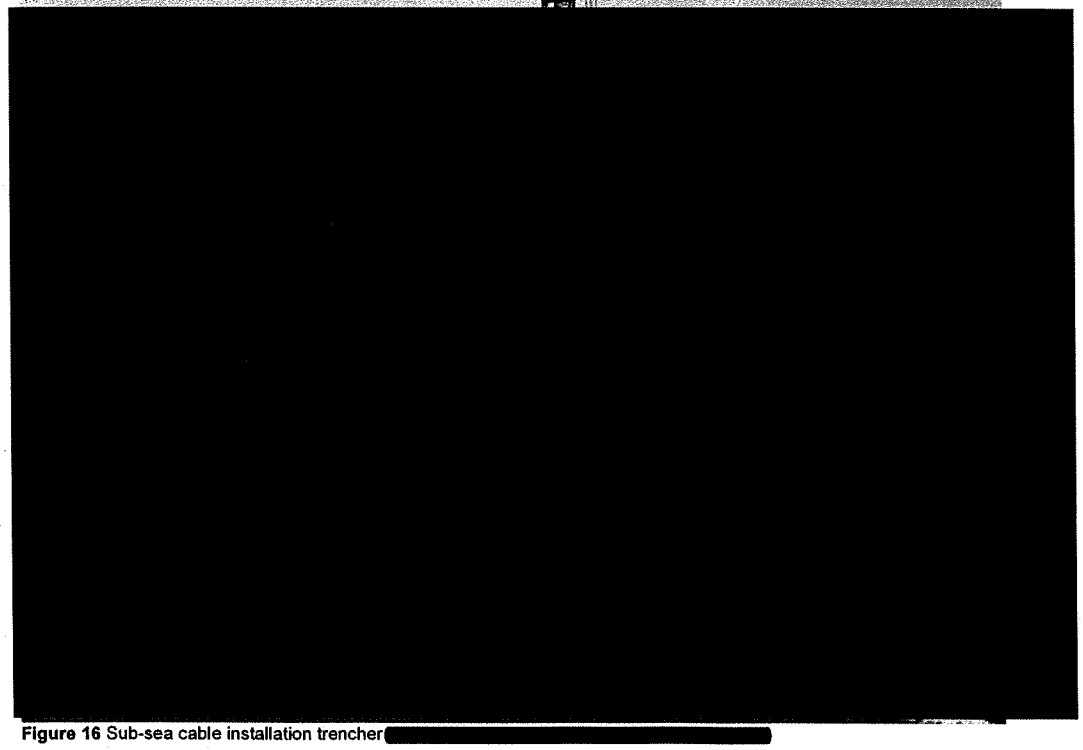

Figure 16 Sub-sea cable installation trencher [redacted]

2. Realization Plan

2.1. Milestones

The table below indicates all major milestones from "Intention to build" until "End of decommissioning" for the realization of the HKZ project. These milestones comply with the timeframes and deadlines as set in the regulations. The exact timing of the realization phase for HKZ is the result of an investigation to find the most economical attractive execution programme, balancing out risks and costs.

Milestone	
Permit issued	[redacted]
Permit irrevocable	
Signing grid agreement of Tennet	
Order to build	
First foundation installed	
First WTG installed	
Grid availability	
Start of electricity production	
Start of full operations	
End of electricity production	
Start of decommissioning	
End of decommissioning	

Table 3 Project timeline

Please see the overview schedule as attached to this project plan for a more detailed overview of the project planning.

In the project planning time is allocated for all aspects of the development, e.g. time is reserved for arranging the cable crossings (by contract), archeological research, detailed site investigation, cable burial protection risk assessment, UXO clearance campaign etc. In general, the installation and commissioning durations and timing for the single packages (WTGs, foundations & cables) are reflecting Nuon/Vattenfall's and the industry's best practice.

Given the above, condition 3 of the Wind Farm Site Decision will be fulfilled.

2.2. Site Decision requirements during realization

As already stated in chapter 1, the Conditions of Contract and the Employer Requirements of all contracts that are being tendered include obligations for the contractors to fulfil all requirements following from the current regulations, including the requirements and obligations that follow from the Wind Farm Site Decision conditions. The paragraphs below address the fulfillment of the Wind Farm Site Decision conditions during realization phase.

2.2.1. Anodes

As indicated on the application form, no sacrificial anodes as cathodic protection will be used.
The tender design of the corrosion protection concept for MP/TP's is the same as for latest other comparable Nuon/Vattenfall North Sea Projects as e.g. the Horns Rev 3 project, i.e. fully coated splash zone, ICCP (Impressed Current Cathodic Protection) and stripe coating in- and outside on the circumferential MP welds from bottom of splash zone down to -2m below the mud line. Further information on the ICCP system can be found on e.g. http://www.corrosion.nl/iccp-offshore-wind/

Given the above, condition 2(13) of the Wind Farm Site Decision will be fulfilled.

2.2.2. Sailing movements

During the construction phase, the construction team of Nuon/Vattenfall will ensure that the vessels deployed take account of the presence of seals in shallow waters/sandbank areas and designated rest areas and take into account present bird concentrations. This requirement is in line with Nuon/Vattenfall's environmental policy which aims at preventing any nuisance and environmental damage. During a risk workshop for HKZ the environmental lead of the Business Area Wind (BA Wind) of Nuon/Vattenfall pointed out the importance of this and other environmental regulations and provided suggestions on how to meet these requirements.
The vessel routes chosen will be in line with official regulations, Nuon/Vattenfall has gained valuable experience and knowledge of Dutch waters with the construction and operation of the Egmond aan Zee wind farm.

Given the above, condition 2(14) of the Wind Farm Site Decision will be fulfilled.

2.2.3. The sea's ecosystem

The Environment and Sustainability Unit within the BA Wind has implemented clear processes, roles and responsibilities regarding environmental management and is continuously improving its approach to achieve the best results. For example, the ecologists and environmental team of the BA Wind are involved in several R&D projects on environmental effects of wind energy and are continuously monitoring the latest research. Furthermore, Nuon/Vattenfall demands an extensive environmental management system from its suppliers and is monitoring the execution of the contractual agreements including hazardous substances management, waste management, life cycle data assessment and lessons learned.

Nuon/Vattenfall will make demonstrable efforts to design and build the wind farm in such a way that it actively enhances the sea's ecosystem, helping to foster conservation efforts and goals relating to sustainable use of species and habitats that occur naturally in the Netherlands. A plan of action will be prepared and submitted to the Minister of Economic Affairs no later than eight weeks before the commencement of the construction. The work will be carried out according to this plan.

Given the above, condition 2(15) of the Wind Farm Site Decision will be fulfilled.

2.2.4. Regional economy

In past projects, Nuon/Vattenfall has been in close contact with the regional economy to take benefit from their local knowledge, short supply chain and fast reaction time in case of unforeseen failures or issues in the wind farm. It has turned out in the past during execution and operation of Nuon/Vattenfall's wind farms in UK, Germany, Denmark & the Netherlands, that it is key for the operator of the wind farm to be in close cooperation with the regional economy to shorten downtime periods of the wind farm and to ensure all different types of support being available on short notice and without long lead times. This can only be ensured by the regional economy with its wide local network.

Also for HKZ, Nuon/Vattenfall will make demonstrable efforts, while taking into account the prevailing legislation, to design, construct and operate the wind farm in such a way that it actively contributes to the local and regional economy. For example, Nuon/Vattenfall plans to use the [redacted] as [redacted] base for the [redacted]

Nuon/Vattenfall will draw up a plan of action and submit this to the Minister of Economic Affairs no later than eight weeks before the commencement of the construction. The work will be carried out according to this plan.

Given the above, condition 2(16) of the Wind Farm Site Decision will be fulfilled.

2.2.5. Pile driving activities

Nuon/Vattenfall assures that it will make use of one or several 'state of the art' acoustic deterrent devices to prevent permanent physical effects on harbor porpoises, seals and fish mortality. Nuon/Vattenfall will make sure to be in continuous dialogue with the Dutch authorities to implement the latest findings on ecological effects.

Any pile driving activities will begin with a soft start (also known as low pile-driving energy). The aim of the soft start is to give harbor porpoises the opportunity to swim to a safe location. The duration and intensity of the soft start will be elaborated further in the pile driving plan.

The planning of the monopile installation is based on the use of [redacted] (see picture below) which has been proven to reduce the noise emissions significantly and on a reliable basis in previous offshore wind projects. To reduce the noise emissions even further the reduction of the piling energy to the minimum necessary will be considered. To reduce the driving time [redacted]

[redacted]

Figure 17 [redacted]

[redacted] This leads to a reduced piling time and reduces further the risk of disruptions during piling and ensures that the piles can be driven in a consecutive period that is as short as possible.

More detailed information is available for example on [redacted]

[redacted]

The final decision on pile driving and noise mitigation strategy will be taken after a detailed assessment of all available tools in the market. The selected noise mitigation system(s) will ensure that the underwater sound level during pile-driving will not exceed the sound emission standard stated in the site decision.

Nuon/Vattenfall will draw up a pile driving plan which will go into the above mentioned aspects and submit this to the Minister of Economic Affairs no later than eight weeks before the commencement of construction. The pile driving and related activities will be carried out according to the plan.

Given the above, conditions 4(1) and 4(2) of the Wind Farm Site Decision will be fulfilled.

2.2.6. Protection of archaeological and cultural history

Nuon/Vattenfall has experience with underwater objects in other projects, where for example the set-up of the project was altered and where locations were excluded. In the detailed project time schedule, Nuon/Vattenfall has reserved time for arranging archeological research.

Given the above, condition 4(5) of the Wind Farm Site Decision will be fulfilled.

2.2.7. Financial security

Nuon/Vattenfall will guarantee the removal of the wind farm by means of a bank guarantee as stated in the regulations.

Given the above, condition 7 of the Wind Farm Site Decision will be fulfilled.

3. Exploitation Plan

As already stated in chapter 1, the Conditions of Contract and the Employer Requirements of all contracts that are being tendered include obligations for the contractors to fulfil all requirements following from the current regulations, including the requirements and obligations that follow from the Wind Farm Site Decision conditions. The paragraphs below address the fulfillment of the Wind Farm Site Decision conditions during exploitation phase.

3.1. General Approach

The operations of HKZ will start as indicated in the milestones overview above when the project shall be handed over to the O&M (Operations & Maintenance) Delivery within Nuon/Vattenfall that will be responsible during the operational phase. The operational lifetime of the project is [redacted] years according to the schedule as lined out in section 2.1.

A dedicated service hub will be set up in [redacted] from which the daily operations and maintenance of the site will be managed. This is the [redacted]

During the [redacted] we will have a [redacted]

[redacted] To maximize the workable hours at the wind farm, the maintenance crew will work in shifts. [redacted]

3.2. Site Decision requirements during operations

3.2.1. Sailing movements

During the operational phase the marine coordinators together with the boat captains will ensure that the vessels deployed take account of the presence of seals in shallow waters/sandbank areas and designated rest areas and take into account present bird concentrations. This is in line with Nuon/Vattenfall's environmental policy which aims at preventing any nuisance and environmental damage.

As environmental conditions are an important part of our internal HSSE framework we have a continuous risk management cycle in which the environmental lead of BA Wind from Nuon/Vattenfall pointed out the importance of this and other environmental regulations and provided suggestions in how to meet these obligations towards HKZ.

The vessel routes chosen will be in line with official regulations. Nuon/Vattenfall has gained valuable experience and knowledge with both construction and, still until this current moment, operating the wind farm Egmond aan Zee (OWEZ) in Dutch waters.

Given the above, condition 2(14) of the Wind Farm Site Decision will be fulfilled.

3.2.2. The sea's ecosystem

Nuon/Vattenfall will make demonstrable efforts to operate the wind farm in such a way that it actively enhances the sea's ecosystem, helping to foster conservation efforts and goals relating to sustainable use of species and habitats that occur naturally in the Netherlands. [redacted] BA Wind has implemented clear processes, roles and responsibilities regarding environmental management and is continuously improving its approach to achieve the best results. For example, the ecologists and environmental team of the BA Wind are involved in several R&D projects on environmental effects of wind energy and are continuously monitoring the latest research. Furthermore, Nuon/Vattenfall demands an extensive environmental management system from its suppliers and is monitoring the execution of the contractual agreements including a waste management system, management of hazardous substances and collection of life cycle data.

Given the above, condition 2(15) of the Wind Farm Site Decision will be fulfilled.

3.2.3. Regional economy

Nuon/Vattenfall will make demonstrable efforts, while taking into account the prevailing legislation, to operate the wind farm in such a way that it actively contributes to the local and regional economy. For example, Nuon/Vattenfall plans to use [redacted] as a base for operations & maintenance of HKZ. [redacted]

Given the above, condition 2(16) of the Wind Farm Site Decision will be fulfilled.

3.2.4. Operations during cable repair and maintenance

The operational control of the HKZ wind farm will be performed by the European Operational Control Centre of Nuon/Vattenfall located in Esbjerg, Denmark. This Control Centre already operates over 1000 turbines within the fleet of Nuon/Vattenfall by taking care of the surveillance and alarm handling 24/7. Also the condition monitoring and data analysis are performed here. The Operational Control Centre will support the local site organization in meeting all the mitigation measures that originate from the site decision requirements, 24 hours/7 days.

More specifically this means that all notifications of potential repairs and maintenance of telecommunication cables are gathered in the Operational Control Centre. The Control Centre will then ensure that during the works, the number of rotations of the wind turbines that are present within a radius of 1,000 meters of the repair and maintenance location will be reduced to less than 1 per minute.

Given the above, condition 2(17) of the Wind Farm Site Decision will be fulfilled.

3.2.5. Monitoring and evaluation programme (MEP)

Regarding the MEP, Nuon/Vattenfall values that the government is setting up a monitoring and evaluation programme to gain more knowledge on some fields. A broad knowledge on such a programme exists as Nuon/Vattenfall was managing the MEP for OWEZ. Nuon/Vattenfall will cooperate in this respect and take all measures that Nuon/Vattenfall bears responsibility for.

Given the above, condition 5 of the Wind Farm Site Decision will be fulfilled.

3.2.6. Obstacle lighting

Nuon/Vattenfall has experience with several lighting set-ups within its wind farm portfolio. The requirements as set in the site decision are among common industry practice.

Given the above, condition 4(6) of the Wind Farm Site Decision will be fulfilled.

3.2.7. Maritime safety

Nuon/Vattenfall will cooperate on the installment of a system that can observe maritime traffic in and around the HKZ wind farm.

Given the above, condition 4(7) of the Wind Farm Site Decision will be fulfilled.

3.2.8. Mitigation measures

To limit collision victims among birds at rotor heights Nuon/Vattenfall will make sure that during mass bird migration events the number of rotations per minute per wind turbine will be reduced to less than 1. Nuon/Vattenfall will cooperate on the instalment of the mass bird detection system. It will be possible to couple this system to the surveillance systems in the Operational Control Centre of Nuon/Vattenfall. Whenever the system detects a mass bird migration, the Operational Control Centre will make sure that the rotations of the wind turbines are reduced to less than 1 per minute. A plan will be prepared which describes to which relevant transect bird density will be determined and how the link between the detecting and the surveillance systems will be executed. This plan will be submitted to the Minister of Economic Affairs no later than eight weeks before the commencement of the construction.

Also, to prevent victims of collision amongst bats at rotor level the Control Centre will check if the rotations of the turbines are reduced to 1 rotation per minute whenever the wind speed falls below 5m/s during the period from 15th of August till 30th of September one hour after sunset until two hours before sunrise. [redacted]

Furthermore, Nuon/Vattenfall will report on how these requirements to limit collision victims among birds during mass bird migration and bats at rotor height are met.

Given the above, Conditions 4(3) and 4(4) of the Wind Farm Site Decision will be fulfilled.

4. Decommissioning Plan

As stated in the operational timeline in section 2.1, decommissioning will start as soon as the wind farm is taken out of operation and will be finished before the permit expires.

Given the above, condition (6) of the Wind Farm Site Decision will be fulfilled.

The decommissioning will be executed in one big campaign where Nuon/Vattenfall will make use of [redacted] to remove all the turbines, foundations and the cable infrastructure. The decommissioning project will be managed by Nuon/Vattenfall, but executed most likely by a typical offshore installation company. Since decommissioning is a relatively new field of expertise in offshore wind, a lot of developments in decommissioning are to be expected over the next years. In Spring 2016 Nuon/Vattenfall successfully decommissioned the Yttre Stengrund offshore wind farm in Sweden, the first offshore decommissioning project in the history and hence started building up our experience. Furthermore, in 2017 we decommissioned the Lely Windfarm, a project in shallow waters in the Netherlands.

In general the decommissioning process is divided in three steps: wind turbine decommissioning, foundation decommissioning and infrastructure decommissioning.

4.1. Wind Turbine Decommissioning

The wind turbine decommissioning process is the reversed process from the installation the turbines. After being shut down, each WTG is disconnected from its inter-array cable and hazardous fluids and material from the nacelle are removed. The cable is removed from the WTG and reverse installation of the blades, hub, nacelle and tower takes place. Components are lifted on barges to be transported back to the decommissioning port. All components/materials will be reused/recycled except for the fiberglass blades.

Decommissioning of the turbine is expected to be executed quicker than installation as components can be handled less delicately, however no compromises on safety during handling of the turbine components are made.

4.2. Foundation Decommissioning

The transition piece is disconnected from the monopile and lifted off. Divers or an ROV (Remote Operated Vehicle) are deployed from a CTV to inspect each pile footing and reinstate lifting attachments if necessary.

Also during the decommissioning of the foundation, Nuon/Vattenfall aims to have as little environmental impact as possible and will align closely with the Dutch authorities on the details of the approach.

4.3. Infrastructure Decommissioning

The inter array cables will be disconnected and pulled from the J-tubes. The cables are then reeled in after having them freed from the seabed. Possible techniques include water-jetting, peel-out (with a grapnel) or using an under runner (push). This procedure is pending the environmental impact of the cable removal..

Also during the decommissioning phase of the project, Nuon/Vattenfall will ensure that the applicable requirements will be met. The approach regarding environmental/ecological impact Nuon/Vattenfall will take is similar as during the construction and operational phase which are described above.

4.4. Future Developments

Since the first decommissioning of an offshore windfarm has taken place only in 2016, there is not much experience or specialized techniques available. However, with the fast growing pace of offshore wind and the number of windfarms being constructed, it is only a matter of time that the amount of Windfarms that are being decommissioned will increase. The larger the number of decommissioned Windfarms, the larger the experience. This drives the techniques on decommissioning to develop and improve and hence the cost level to decrease.
Nuon/Vattenfall will be actively involved in all developments on decommissioning techniques given its portfolio of running assets that also will be decommissioned over the next coming years.

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Hollandse Kust Zuid OWF Project

Print Date & Time: 18-Dec-17 12:35

Activity Name	Start	Finish
RVO Milestones		
Permit issued		
Irrevocable permit available		
Deadline: start of electricity production		
Deadline: OWF fully commissioned (95%)		
Procurement (Pre-Qual, ITT, Bids, Evaluation, Negotiation, Contract Signing)		
Procurement of contractor for Site Investigation		
Procurement of suppliers for WTG		
Procurement of contractors for Foundation Installation		
Procurement of suppliers for IAC Design & Manufacturing		
Procurement of contractors for IAC Installation		
Procurement of contractors for WTG Installation		
Procurement of suppliers for Foundation Manufacturing		
Site Investigation		
Pre-construction survey		
Raw data pre-construction survey available		
Final pre-construction survey report available		
Investigation of unidentified objects in seabed		
UXO dismantling campaign		
Foundations		
MP and TP design (load iterations with WTG) incl. AFC drawings available		
Steel order to start of manufacturing		
Manufacturing MPs to 1st MP ready for loadout		
Manufacturing TPs to 1st TP ready for loadout		
Manufacturing 1st of [redacted] MPs until last MP ready for load-out		
Manufacturing 1st of [redacted] TPs until last TP ready for load-out		
Installation scour protection		
Installation foundation (incl. P50 weather)		
1st foundation installed		
Cables		
Cable design		
Manufacturing cable		
Manufacturing cable protection system		
Installation cables incl. termination and testing (incl. P50 weather)		
WTG		
WTG design (load iterations with foundations)		
Supply chain WTG		
Manufacturing WTG		
Pre-assembly WTG @ harbor		
Installation WTGs (incl. P50 weather)		
1st WTG installed		
Cold Commissioning WTG (incl. P50 weather)		
Hot Commissioning WTG (incl. P50 weather)		
1st WTG ready for 240h test - start of energy production		
Taking Over Certificate WTG		

[redacted]

2018					2019				2020				2021				2022				2023			
Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4

Procurement | Offshore Works
Design | Commissioning
Manufacturing ◇ | ◇ Milestone

Indicative Overall Programme Schedule - P50 - [redacted] Locations

Page 1 of 1

Date	Revision	Checked	Approved
11-Dec-17	Rev. 0	Mi	Fi
14-Dec-17	Rev. 1	Mi	Fi
18-Dec-17	Rev. 2	Mi	Fi

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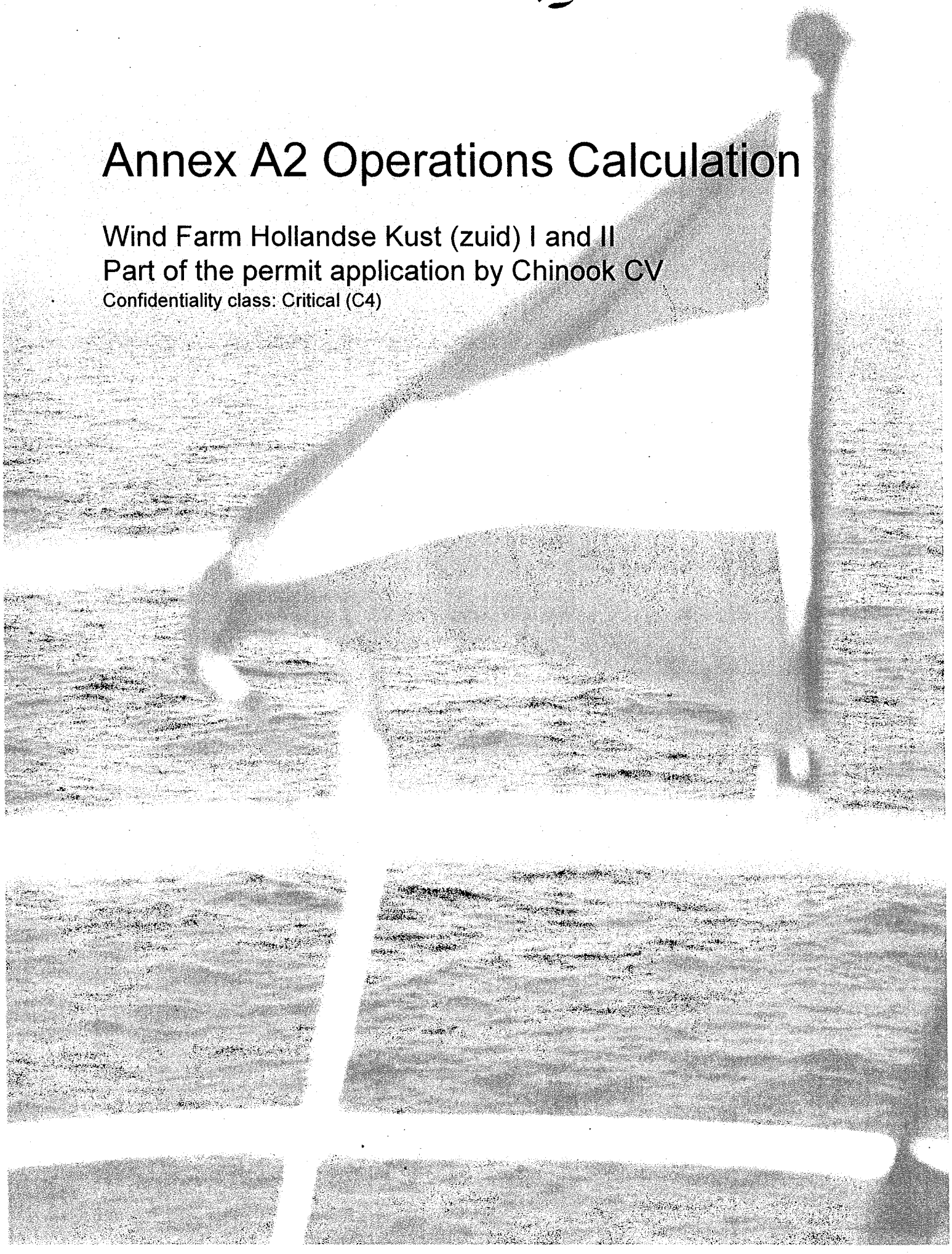
Annex A2 Operations Calculation

Wind Farm Hollandse Kust (zuid) I and II
Part of the permit application by Chinook CV

Confidentiality class: Critical (C4)



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Operations Calculation

This annex contains the print-outs of the sheets of RVO calculation model:

- Input data
- Investment costs
- OPEX Table
- Calculations
- Results

Brief explanation of operational cost categories:

Operational cost category	
Service WTG	All costs related to the service contract with the WTG supplier
BoP & Grid	All costs related to the maintenance of the foundations, transition pieces and electrical works
Site Facilities	All cost related to the onshore facilities including harbour costs
Personnel Costs	All costs related to personnel
Regulatory	All costs related to permit execution, legal checks etc.
IT/ Coms	All costs related to the SCADA system, link to the surveillance centre, communication systems, etc.
Logistics & Offshore O&M	All costs related to the crew transfer from the O&M harbour to the site
Other Opex costs	Currently only includes some expected costs related to accounting
Maintenance Investments	All costs for the replacement of main components
Other	Mainly insurance costs
Bank Guarantee	Cost related to the bank guarantee for dismantling
Decommissioning	The cost of decommissioning the windfarm after operations
[redacted]	[redacted]

Brief explanation of investment categories:

Operational cost category	
Turbine supply (WTGs)	Supply of the turbine, see annex A1
Installation Vessel (WIV)	Wind turbine installation including the vessel and equipment, see annex A1
Foundation design (CID)	Civil Engineering of the foundations incl. detailed design, see annex A1
Foundations supply (CIM)	Manufacturing of foundations (Monopiles and TPs), see annex A1
Foundations installation (CII)	Transport and installation of foundations incl. vessels, see annex A1
Array cable supply (IACM)	Inter array cable manufacturing, see annex A1
Array cable installation (IACI)	Inter array cable transport and installation incl. vessels, see annex A1
CAR	Contractors all risk insurance for the construction phase
O&M Capex	Costs related to spare parts (e.g. foundations)
Bank Guarantee	Costs related to the bank guarantee originating from the execution agreement
PM costs	Project management costs related to the design and construction phase
Contingency	[redacted]

Brief explanation of market price and GoO

Revenue category	
Power price	[redacted] available to the project. [redacted] price [redacted] followed by [redacted] See Annex 10 and Annex 4
GoO	GoO price available to the project. [redacted]

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The prices as used in the model are based on the [redacted]
Further explanation on the [redacted] can be find in Annex 10 and Annex A4.

[redacted]

[redacted]

[redacted]

[redacted]

Windenergie Op Zee
Model Exploitatieberekening

Hollandse kust (zuid) kavel I en II met schaalvoordeel, versie 06-12-2017

Waarvoor?

U dient bij de vergunning aanvraag een exploitatieberekening aan te leveren, die minimaal bestaat uit:
1 een specificatie van de investeringskosten per component van de productie-installatie
2 een overzicht van alle kosten en baten van de productie-installatie
3 een berekening van het projectrendement over de subsidielooptijd
Met dit door RVO.nl beschikbaar gestelde rekenmodel berekent u het projectrendement, rendement op eigen vermogen en de DSCR. Het geeft inzicht in de financieel economische haalbaarheid van het project. Dit RVO.nl rekenmodel dient u volledig in te vullen en de afdrukken met de aanvraag mee te sturen als verplichte bijlage.
Naast het verplichte RVO.nl model mag u ook een berekening volgens uw eigen rekenmodel meesturen met de aanvraag. U dient dan wel uit te leggen hoe u het projectrendement, het rendement op eigen vermogen

Technische invulinstructies

Lees eerst alle instructies in dit tabblad en lees vooral de toelichting exploitatieberekening die bij het aanvraagformulier zit. Print deze instructies en hou ze bij de hand tijdens het invullen. Verzamel ook alle relevante gegevens alvorens te beginnen met invullen.
U kunt alleen de blauw gekleurde velden invullen in de blauwe tabbladen. Wanneer een veld een gele achtergrond kleur met rode tekst krijgt, zijn ergens onjuiste gegevens of nog niet alle gegevens ingevuld.
De tabbladen voor berekeningen en resultaten zijn wit.

Inhoudelijke invulinstructies

RVO.nl zal beoordelen of de invoerdata aannemelijke waarden hebben en ook relevant zijn voor het project. Ontbreken van relevante invoerdata of onaannemelijke waarden resulteren in onbetrouwbare of onaannemelijke resultaten. Wijken invoerdata af van wat in de markt gebruikelijk is, dan vraagt RVO.nl u de afwijking toe te lichten en te onderbouwen.

Verplichte bijlage

Een exploitatieberekening is een verplichte bijlage bij de aanvraag. U dient te voldoen aan deze verplichting door het invullen van het RVO.nl model en het meesturen van afdrukken van de tabbladen Invoerparameters, Investeringskosten, OPEXtabel, Berekeningen en Resultaten.

Vragen

Dit rekenmodel is met de grootste zorg ontwikkeld en samengesteld. Het geeft inzicht in het projectrendement op basis van investeringskosten, operationele kosten, financieringslasten en baten. Het is input voor de analyse van de financiële en economische haalbaarheid van uw project. Mocht u vragen of opmerkingen hebben over het model dan kunt u zich tot één week voor sluiting van de tender tot RVO.nl wenden via het e-mailadres: woz@rvo.nl. Ook kunt u via dit e-mailadres een afspraak maken voor een mondelinge toelichting bij het rekenmodel en het aanvraagformulier in Zwolle.

Beschrijving tabbladen

Het rekenmodel kent tabbladen voor invoer van gegevens en tabbladen voor berekeningen en resultaten. Die worden hier stuk voor stuk besproken.

Tabblad: Invoer Parameters

Dit tabblad gebruikt u om alle relevante gegevens en keuzes in te voeren. U moet hierbij denken aan gegevens over: aanvrager, energieproductie, investeringkosten, energietarieven, financieringskeuzes, enz.

Tabblad: Investeringskosten

U vult hier per component de kosten in. U dient de aannemelijkheid van de kosten te onderbouwen vooral wanneer de waardes afwijken van wat in de markt gebruikelijk is.

Tabblad: OPEX

Hier vult u u per operationele kostenpost per jaar de kosten in.
Let op: in deze tabel de operationele kosten invoeren gedurende de looptijd van het project.

Tabblad: MP en GVO

Hier vult u de marktprijs van de verkochte MWh's in en de GvO's gedurende de looptijd. U mag de verwachting van de NEV2017 voor de marktpijs gebruiken. Deze is opgenomen in deze tabel en kunt u als invulwaarde overnemen. U mag in plaats van de NEV ook een eigen marktprijs verwachting gebruiken. Geef dan aan de bron aan van die verwachting en een onderbouwing.
Let op: in deze tabel de marktprijs en de waarde van GvO's invoeren gedurende de looptijd van het project.

Tabblad: Berekeningen

Dit tabblad toont alle relevante (tussen) resultaten van de berekeningen op basis van door u ingevoerde gegevens.
De volgende (tussen) resultaten worden getoond:

- Energieproductie in MWh
- Opbrengsten in k€ uit de energieproductie (verkoop MWh en GvO's)
- Totale operationele kosten
- Financieringslasten
- Afschrijvingen
- Belasting
- Netto Winst
- Project rendement
- Rendement op eigen vermogen
- DSCR

Tabblad: Resultaten

Dit tabblad toont alleen de belangrijkste resultaten van de berekening, het is een uittreksel uit het tabblad berekeningen. Het is leesbaar te printen op A3.

Toelichting tabblad Invoer Parameters

Algemene gegevens:
Hier vult u in:
- Projectnaam: een door u zelf gekozen naam voor het project
- Naam aanvrager: naam zoals is ingevuld op het aanvraagformulier
- Geïnstalleerd vermogen windpark: waarde volgens aanvraagformulier en windrapport
- Netto P50 jaarproductie: waarde in MWh volgens het windrapport en aanvraagformulier
- Exploitatie looptijd: aantal jaren dat het windparkelektriciteit produceert

Projectfinanciering:
U kunt er voor kiezen een percentage van de totale investeringskosten te financieren uit eigen middelen (EM). U moet hiervoor een percentage kiezen in het bereik van 0 t/m 100%. Het resterende percentage tot 100 % wordt met vreemd vermogen gefinancierd. Voor het leendeel kunt u kiezen uit de aflosvormen lineair of annuïteit. Ook vult u hier het rentepercentage in voor de lening.

Investeringsschema:
U kunt uw investering uitsmeren over maximaal vijf jaar. Per jaar kunt u kiezen welk deel u uit eigen middelen financiert en welk deel u leent (het leendeel).
Ook kiest u wanneer u start met aflossen van het leendeel en rente betalen. Het vroegst mogelijke jaar dat u start met rente betalen en aflossen is het jaar direct nadat u de lening bent aangegegaan. Wanneer u een later jaar kiest voor aflossen, loopt uw leendeel op met de bouwrente.
Voorbeeld 1: u investeert in het jaar 2017 en start met aflossen begin 2018. U bent geen bouwrente verschuldigd.
Voorbeeld 2: u investeert in het jaar 2017 en start met aflossen begin 2019. U bent een jaar bouwrente verschuldigd.
De financieringslasten dienen uit het bruto resultaat betaald te kunnen worden. Waneer het bruto resultaat in een jaar niet voldoende is, kiest u een later jaar om te beginnen met het betalen van de financieringslasten.
Het eerste jaar dat u investeert vult u in in de regel met symbool Inv1. Verder vult u voor elk jaar dat u investeert in:
- het percentage van het totale investeringsbedrag dat u investeert in dit jaar. De percentages bij elkaar opgeteld moet 100% zijn.
- het jaar dat u start met het aflossen van het leendeel. Dit jaar moet na het investeringsjaar liggen.
- percentage uit de eigen middelen (EM) dat u in dit jaar investeert. Het is mogelijk hier een percentage te kiezen dat in een negatief leendeel resulteert. In dat geval moet u een kleiner percentage kiezen. De percentages bij elkaar opgeteld moeten 100% bedragen. Behalve wanneer u geen eigen middelen inzet, dan

Opstartschema elektriciteitsproductie:
In het rekenmodel kunt u het opstarten van het windpark uitsmeren over twee achtereenvolgende jaren. U geeft op hoeveel procent van de jaarproductie MWh u in het eerste jaar verwacht te produceren. Het resterende deel van de jaarproductie volgt automatisch in het volgende jaar.

Invoer Parameters

Hollandse kust (zuid) kavel I en II met schaalvoordeel, versie 06-12-2017

Invoervelden zijn blauw

Alle blauwe tabbladen bevatten invulvelden. Wanneer u de muis op een veld met een rood driehoekje houdt, wordt een toelichting zichtbaar.

Wanneer een resultaatcel een gele achtergrond met rode waarde krijgt, hebben een of meer invoervelden onjuiste waarden

Belangrijkste resultaten	[redacted]
Projectrentabiliteit over exploitatie	
Rendement EV tot over exploitatie	
DSCR totaal	

	Algemene gegevens		
	Afgifte jaar vergunning	[redacted]	
	Laatste jaar vergunning		
	Projectnaam	Wind op zee HKZ I en II	
	Naam aanvragende organisatie	CHINOOK CV	
	Exploitatie looptijd		jaar
	Kavel I		
	Geïnstalleerd vermogen windpark		MW
	Netto P50 jaarproductie		MWh
	Netto P50 vollasturen		h
	Kavel II		
	Geïnstalleerd vermogen windpark		MW
	Netto P50 jaarproductie		MWh
	Netto P50 vollasturen		h
	Investeringskosten		
TIK	Totale investeringskosten beide kavels		k€
	Afschrijvingsperiode		jaar
	Project financiering		
	Uit eigen middelen		
	Percentage eigen uit eigen middelen		
EM	Eigen Middelen		k€
	Uit vreemd vermogen		
	Percentage		
LD	Leendeel		k€
	Aflossingsvorm		
	Aflosperiode		jaar
	Rente		

2022

	Investeringsschema		**k€**		**%**	**k€**	**k€**	**k€**	**k€**
	Investeringsjaar	**Percentage van totale investering. Som moet gelijk zijn aan 100%**	**Investerings-bedrag**	**Start af-lossing**	**Percentage van EM**	**Bedrag EM**	**Leendeel**	**bouw-rente**	**VV + bouw-rente**
Inv1	[redacted]								
Inv2									
Inv3									
Inv4									
Inv5									

	Opstartschema E-productie	**Toename MWh productie in % van P50**		
	Kavel I		**MW**	**Eindjaar exploitatie**
Q1	[redacted]			
Q2				
	Kavel II			
Q3				
Q4				

Laatste exploitatie jaar	[redacted]

Investeringskosten

Hollandse kust (zuid) kavel I en II met schaalvoordeel, versie 06-12-2017

Invoervelden zijn blauw

	k€
Totaal investeringskosten	[redacted]

Investeringspost	Bedrag (k€)
Development	[redacted]
WTG	
Civils - Generic	
WF Electrical	
Management - Construction Phase	
Pre Take Over O&M	
Installation and Logisitcs	
CapEx - Other	
CAR	
Contingency	

OPEX Tabel

Hollandse kust (zuid) kavel I en II met schaalvoordeel, versie 06-12-2017

Invoervelden zijn blauw

start 2021 eind 2046

LET OP: in deze tabel alleen voor de groen gemarkeerde jaren waardes invoeren. Dit zijn de exploitatie jaren.

Jaar →
Jaarnr. →

[redacted]

Totaal operationele kosten → k€ [redacted]

Omschrijving operationele kostenpost		
Service WTG	k€	[redacted]
BoP & Grid Maint	k€	[redacted]
Site Facilities	k€	[redacted]
Personnel Costs	k€	[redacted]
Regulatory	k€	[redacted]
IT/ Coms	k€	[redacted]
Logistics & Offshore	k€	[redacted]
OR Other OPEX	k€	[redacted]
Maintenance Investments	k€	[redacted]
Insurance and Other OPEX	k€	[redacted]
Decommissioning	k€	[redacted]
PPA Cost	k€	[redacted]
	k€	[redacted]
	k€	0
	k€	0
	k€	0
	k€	0
	k€	0
	k€	0
	k€	0

Marktprijzen en GvO's

Hollandse kust (zuid) kavel I en II met schaalvoordeel, versie 06-12-2017

Jaar

Jaarnr.

[redacted]

MP Marktprijs gespecificeerd per jaar €/MWh

GVO GVO gespecificeerd per jaar €/MWh

In de blauwe regels vult u voor elk jaar gedurende de exploitatie looptijd de verwachte marktprijs en de waardes van de GvO's in.
U mag voor de marktprijs de waardes volgens de NEV2017 voor windenergie op zee gebruiken zoals hieronder aangegeven. Voorbij 2035 kunt u extrapoleren.
U mag ook zelf een andere verwachting gebruiken. Geef dan aan wat de bron van die verwachting is en waar die is in te zien.

Bedragen volgens de NEV 2017																				
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
bedragen netto contant 2016	€/MWh		26,748	25,855	24,694	26,088	28,283	32,341	35	37,007	39,9	39,824	38,761	37,14	35,543	33,98	34,335	34,689	35,043	35,398	35,752
indexatie	1,015		1,015	1,0302	1,0457	1,0614	1,0773	1,0934	1,1098	1,1265	1,1434	1,1605	1,1779	1,1956	1,2136	1,2318	1,2502	1,269	1,288	1,3073	1,327
nominale bedragen	€/MWh		27,149	26,637	25,822	27,689	30,469	35,363	38,844	41,689	45,621	46,218	45,659	44,406	43,134	41,855	42,926	44,02	45,137	46,277	47,442

Berekeningen

Hollandse kust (zuid) kavel I en II met schaalvoordeel, versie 00-12-2017

Symbool Formule	Omschrijving	eenheid
Q1	Elektriciteitsproductie deel 1	MWh
Q2	Elektriciteitsproductie deel 2	MWh
Q3	Elektriciteitsproductie deel 3	MWh
Q4	Elektriciteitsproductie deel 4	MWh
Qtot	Totale elektriciteitproductie	MWh
MP	Marktprijs elektriciteit	€/MWh
[redacted]	[redacted]	M€
	Garanties van oorsprong	€/MWh
[redacted]	[redacted]	M€
[redacted]	[redacted]	M€
[redacted]	[redacted]	M€
[redacted]	[redacted]	M€
	Investering M€ →	M€
Afs1	Afschrijving investering 1	M€
Afs2	Afschrijving investering 2	M€
Afs3	Afschrijving investering 3	M€
Afs4	Afschrijving investering 4	M€
Afs5	Afschrijving investering 5	M€
TAfs	[redacted]	M€
Afl1	Aflossing VV investering 1 Annuiteit	M€
Afl2	Aflossing VV investering 2 Annuiteit	M€
Afl3	Aflossing VV investering 3 Annuiteit	M€
Afl4	Aflossing VV investering 4 Annuiteit	M€
Afl5	Aflossing VV investering 5 Annuiteit	M€
TAfl	[redacted]	M€
Re1	Rente VV investering 1 Annuiteit	M€
Re2	Rente VV investering 2 Annuiteit	M€
Re3	Rente VV investering 3 Annuiteit	M€
Re4	Rente VV investering 4 Annuiteit	M€
Re5	Rente VV investering 5 Annuiteit	M€
TRe	[redacted]	M€
[redacted]	[redacted]	M€
[redacted]	[redacted]	M€
TIE	Totale inkomsten elektriciteitsproductie	M€
TIE = TOK + TAfs + TRe	Totale kosten	M€
VVW = [redacted]	Winst voor belasting	M€
[redacted]	[redacted]	M€
[redacted]	[redacted]	M€
[redacted]	[redacted]	M€
[redacted]	[redacted]	M€
	Investering M€ →	M€
BCF = VWB + TAfs + TAfl	Bruto cashflow na belasting exclusief herinlasten	M€
	Projectrentabiliteit voor overheids	%
	Eigen Vermogen inbreng M€ →	
BCF = VWB + TAfs - TAfl	Netto cashflow voor eigen vermogen verschaffer na belasting en na financieringskosten	M€
	Rendement EV tot over exploitatie	%
[redacted]	DSCR per jaar	
	DSCR totaal	

[redacted]

Resultaten Exploitatieberekening

Hollandse kust (zuid) kavel I en II met schaalvoordeel, versie 06-12-2017

Invoer Parameter	Waarde		
Projectnaam	Wind op zee HKZ I en II		
Naam aanvragende organisatie	CHINOOK CV		
Exploitatielooptijd		[redacted]	jaar
Kavel I			
Geïnstalleerd vermogen windpark			MW
Netto P50 jaarproductie			MWh
Kavel II			
Geïnstalleerd vermogen windpark			MW
Netto P50 jaarproductie			MWh

Resultaten

	Symbool Formule	Omschrijving	eenheid	jaar / jaarnr. / sommatie over jaren
	MIE	Markt inkomsten Elektriciteit (Qtot*MP)	k€	[redacted]
x	GVO	Garanties van oorsprong	k€	
	TIE = MIE + GVO	Totale inkomsten Elektriciteitsproductie	k€	
	TOK	Totale Operationele Kosten	k€	
	TAfs	Totale Afschrijving k€	k€	
	TRe	Totale rente over VV investering	k€	
	TK = TOK + TAfs + TRe	Totale kosten	k€	
	WvB	Winst voor belasting	k€	
	Verlies	Verliezen uit verleden	k€	
	BI = WvB – Verlies	Belastbaar inkomen	k€	
	VpB	Vennootschapsbelasting (=WvB*belastingtarief)	k€	
	NW=BI-VpB	Netto Winst	k€	
	BCF = WnB + TAfs + Tre	Bruto cashflow na belasting exclusief rentelasten	k€	
		Projectrentabiliteit over exploitatie		
	NCF = WnB + TAfs - TAfl	Netto cashflow voor eigen vermogen verschaffer na belasting en na financieringslasten	k€	
		Rendement EV tot over exploitatie		
	DCSR = BCF/FL	DSCR per jaar		
		DSCR totaal		

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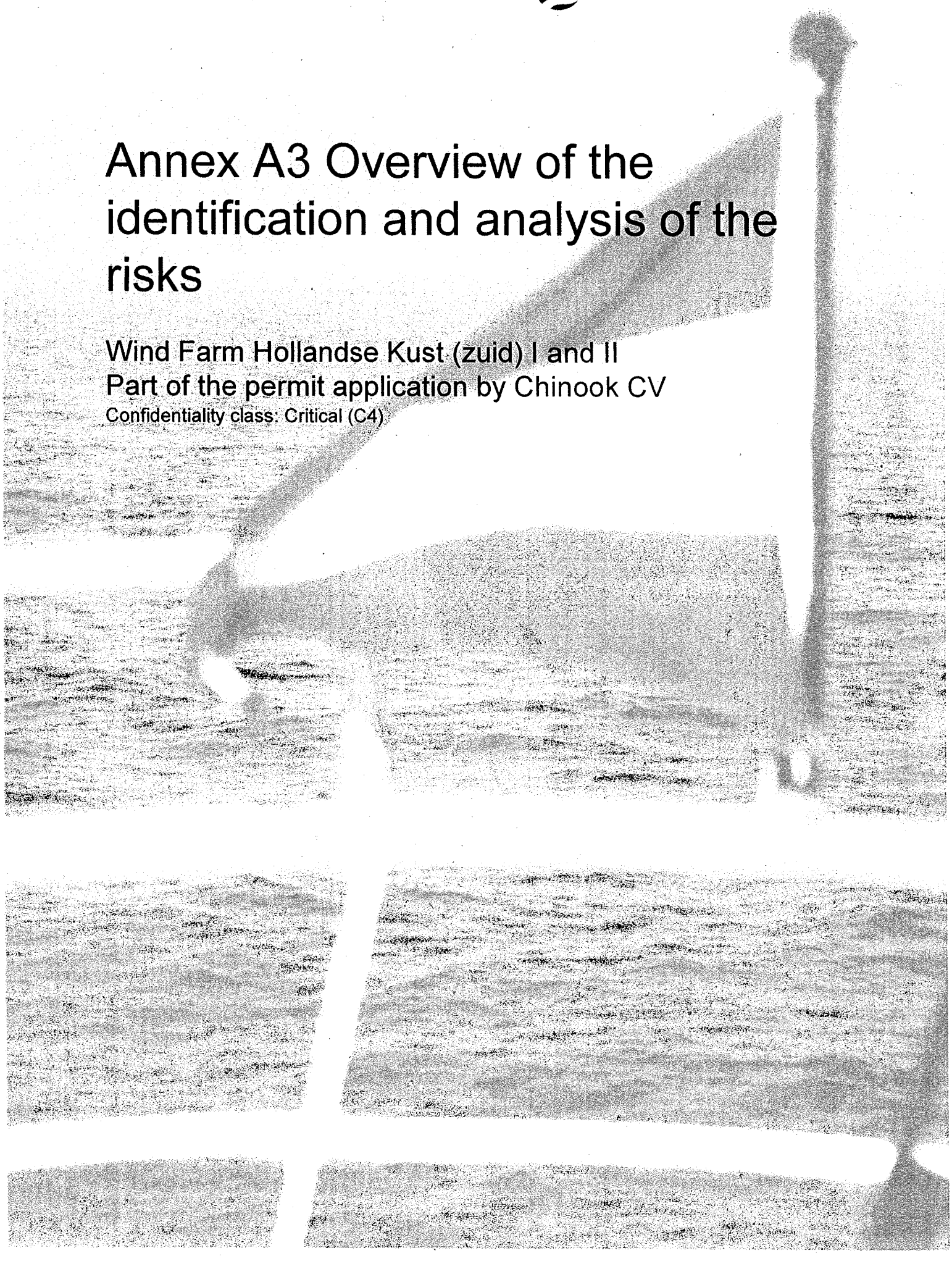
Annex A3 Overview of the identification and analysis of the risks

Wind Farm Hollandse Kust (zuid) I and II
Part of the permit application by Chinook CV

Confidentiality class: Critical (C4)



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Annex A4 Overview of measures to ensure cost-efficiency

Wind Farm Hollandse Kust (zuid) I and II
Part of the permit application by Chinook CV

Confidentiality class: Critical (C4)

Hollandse Kust (zuid) Sites I & II

Implementation Agreement

Appendix B- Form of Bank Guarantee

TAKING INTO CONSIDERATION THAT:

A. Chinook C.V., a limited partnership established in Amsterdam (hereinafter referred to as the Company) and the STATE of the NETHERLANDS, (hereinafter referred to as: the State), of which the registered office is established in Zwolle, Hanzelaan 310, 8017 JK, have entered into the '*Implementation agreement for certainty of timely performance of obligations under the offshore Wind permit for Hollandse Kust (zuid) Wind Farm Zone; Wind Farm Sites I & II between the State and permit holder*' (the '**Implementation Agreement**')

B. The Company according to Article 2 of the Implementation Agreement is required to provide financial security totalling [redacted] within four weeks after the date of the Implementation Agreement and to maintain that security for the benefit of the State, which should be provided to the State by way of a bank guarantee issued by a bank in accordance with the model that is attached as an Appendix to the Implementation Agreement;

C. The Bank is prepared to provide the relevant bank guarantee for the benefit of the State under conditions set out below;

DECLARE AS FOLLOWS

1. The Bank hereby provides a guarantee as independent obligation irrevocably and unconditionally in respect of the State for all that the State can claim from the Company on grounds of the Implementation Agreement up to a maximum amount of [redacted]

2. This bank guarantee is an abstract standby guarantee. Under no circumstances does the Bank have any claim to the underlying legal relationship between the State and the Company as expressed in the Implementation Agreement.

3. At the first request from the State, without requiring the provision of reasons or requesting further evidence other than:

    a. proof of the Permit having been awarded to the Company, AND
    b. a copy of the signed Implementation Agreement between the State and the Company, AND
    c. a copy of the administrative enforcement decision imposed on the Company, AND
    d. a statement by the State that such administrative enforcement decision is imposed for reason of the Company not having complied obligations under the Permits as set out under Article 1 of the Implementation Agreement; AND
    e. a statement by the State that the compliance period of that decision has expired,

the Bank will go ahead with payment of all that the Company, according to the statement from the State, owes under the Implementation Agreement.

4. This bank guarantee will no longer be valid only after written notification from the State to the Bank stating that the obligation has lapsed wholly or in part.

5. The Minister of Economic Affairs will return the bank guarantee to the Bank as soon as possible after this has lapsed completely.

6. Dutch law applies to this bank guarantee. All differences that may arise concerning or in relation to this bank guarantee will be resolved by the competent court in The Hague.

7. If this bank guarantee should be returned, then that will take place by sending it to the following address: [*the Bank*]

Signed in
on
The Bank.

Power of Attorney

The Undersigned:

Chinook C.V. (the 'Company'), a limited partnership under the laws of the Netherlands, with its statutory seat in Amsterdam, which is represented by its general partner Chinook Beheer B.V, which is represented by N.V. Nuon Energy, which is duly represented by its [redacted]

HEREBY authorizes and grants:

[redacted] at Vattenfall (the 'Attorney – in – Fact'), with the power of attorney and the right of substitution, on behalf of the undersigned,

To act at his sole discretion on behalf of the Company to:

(i) represent, sign and bind the Company and submit an application in the tender organized by the Dutch government for Wind Farm Zone Hollandse Kust (zuid) Sites I & II for an offshore wind energy permit to construct and operate an offshore wind farm;

(ii) enter into, sign and execute any and all agreements in relation to the application for the above permit, the construction and operation of the of the above wind farm and the sale its electricity, and;

(iii) to sign and execute all such other documents and do all such further acts and things as the Attorney – in – Fact may deem necessary or appropriate to give legal effect to the above.

The Company unconditionally undertake to indemnify the Attorney – in – Fact against any and all actions, proceedings, claims, costs, expenses and liabilities of every description resulting from performing any actions pursuant to and in compliance with this Power of Attorney.

This Power of Attorney shall be governed by and construed in accordance with the laws of the Netherlands.
This Power of Attorney continues to be effective and valid until [redacted]

[redacted]

Chinook C.V., for this,
Chinook Beheer BV, for this

[redacted]

By :
Title:
Date: 14 December 2017

***

VATTENFALL

PARENT COMPANY GUARANTEE
No: 2017-149

This parent company guarantee (this "**Guarantee**") is made on 19 December 2017 by Vattenfall AB (publ) (Reg. No. 556036-2138) (the "**Guarantor**"), a company incorporated in Sweden, whose registered office is SE-1692 92 Stockholm, Sweden, in favour of the State of the Netherlands (the "**Beneficiary**"), who for the purpose of this Guarantee chooses address at the offices of the Netherlands Enterprise Agency, which forms part of the Ministry of Economic Affairs, Hanzelaan 310, 8017 JK Zwolle.

1. Background

1.1 Chinook C.V. (Reg. No. 65938275) (the "**Obligor**"), a company incorporated in the Netherlands whose registered office is at Hoekenrode 8, 1102 BR Amsterdam Zuidoost, has applied for offshore wind energy permits (the "**Permits**") to construct and operate an offshore wind farm at Sites I and II of the Wind Farm Zone Hollandse Kust (zuid) (the "**Wind Farm**"), in a tender for such permits organized by the Dutch government.

1.2 The Guarantor will directly or indirectly benefit from the Permits.

1.3 To support the Obligor to meet its obligations and commitments towards the Beneficiary during the construction and commissioning phase of the Wind Farm, the Guarantor has signed and delivered to the Beneficiary this Guarantee in favor of the Beneficiary as continuing security for the Obligations as defined below.

2. Guarantee

2.1 Subject to the conditions precedent of the Permits having been awarded to the Obligor and these Permits having become irrevocable, and furthermore subject to the terms and conditions contained herein, the Guarantor hereby irrevocably guarantees the due and punctual performance of Obligor's obligations under the Permits to realize the Wind Farm and start full operations within 5 years after irrevocability of the Permits (the '**Obligations**').

2.2 Any demands made by the Beneficiary under this Guarantee can be contested by the Guarantor with the same objections as claimed by the Obligor or which the Obligor could have claimed towards the Beneficiary.

2.3 Upon the failure by the Obligor to perform any of the Obligations when due, the Beneficiary may demand performance from the Guarantor. Such demand shall be in writing and shall state the Obligations that the Obligor has failed to perform, and give a brief explanation of why such performance is due, with a specific statement that the Beneficiary is calling upon the Guarantor to pay and/or perform under this Guarantee. If the Obligation concerns payment of an amount, the statement shall state such amount in EUR.

2.4 This Guarantee is a continuing security and shall remain in full force and effect from the date hereof until the earlier of: (a) the date of start of full operations the Wind Farm, or (b) [redacted]

2.5 In the event that the Obligor has not complied with its Obligations as set out under Clause 2.1 on the date falling 6 months prior to the expiry date of this Guarantee as set out under Clause 2.4 (b), the Guarantor shall, upon written demand by the Beneficiary, substitute this Guarantee with a guarantee of substantially the same terms, including this Clause 2.5.

3. Miscellaneous

3.1 Notices and other communications must be in writing in the English or Dutch language and shall be deemed to have been received by a party where:

(a) sent by post, unless actually received earlier, on the third business day (*ie* a day when banks are open for general banking business in both of the parties' jurisdictions) after posting, if posted within Sweden, or the fifth business day, if posted to or from a place outside Sweden;

(b) sent by courier, on the day of delivery; and

(c) sent by e-mail, on receipt by the receiving party in readable form,

and if received on a non-working day or after business hours in the place of receipt it will only be deemed to be given on the next working day in that place. Any demands under this Guarantee must be sent by courier.

Notices and communications shall be addressed as set out below

If to the Beneficiary:
Netherlands Enterprise Agency
address: Hanzelaan 310, 8017 JK, Zwolle, the Netherlands
in each case marked for the attention of [ ].

if to the Guarantor:
Mail address: Vattenfall AB, SE-169 92 Stockholm, Sweden;
Courier address: Evenemangsgatan 13C, SE-169 79 Solna, Sweden;
email: treasury@vattenfall.com
in each case marked for the attention of Group Treasurer.

or as the parties hereto may from time to time notify each other in accordance with this section.

3.2 This Guarantee shall inure to the benefit of the Beneficiary, its permitted successors and assignees, and can be amended only by a written instrument signed by the Beneficiary and the Guarantor. The Guarantor may not transfer this Guarantee or its obligations hereunder without the prior written consent of the Beneficiary, which consent shall not be unreasonably withheld or delayed.

3.3 This Guarantee is governed by the laws of the Netherlands.

3.4 All disputes arising out of or in connection with the present guarantee shall be finally settled by the Court of The Hague, the Netherlands.

3.5 Upon (i) award of the Permits to another party than the Obligor, or (ii) expiry as set out in Section 2.4 above, the Beneficiary shall immediately return this Guarantee, which shall be null and void whether returned to the Guarantor or not.

This Guarantee has been executed as of the date set out above.

VATTENFALL AB (publ)

[redacted]

Signatu[redacted]

Name: [redacted]

Title [redacted]

Signatu[redacted]

Name: [redacted]

Title [redacted]

EMBASSY OF SWEDEN

The Hague, 19 December 2017

Dhr Eric D. Wiebes
Minister of Economic Affairs and Climate
Kingdom of The Netherlands

Vattenfall/Nuon in Hollandse Kust Zuid I&II

Excellency,

Please allow me to present in this letter my warm recommendation and our support for the proposal submitted by Vattenfall/ Nuon in your offshore wind tender Hollandse Kust Zuid – I & II.

With the Swedish state as their shareholder, the commitment of Vattenfall to power the energy transition is focused on making the energy supply climate neutral and fossil free.

Vattenfall's strategic direction is aimed at Power Climate Smarter Living. To build and operate the offshore wind farm Hollandse Kust Zuid - I & II would be an important milestone to enrich the wide-spread North-West European offshore wind portfolio of Vattenfall.

Their strong track record in offshore wind and wide-spread experience in merchandising renewable energy, together with the good reputation of both the brands Vattenfall as Nuon, will ensure that this organization will build and operate this offshore wind farm without subsidy for the next decades to come.

I wish you an effective review process and, most of all, a successful outcome in reaching this important corner stone in renewable energy development: the first non-subsidized offshore wind farm in the world.

Yours sincerely,

[redacted]

Ambassador

Postal Address:
P O Box 85601
2508 CH Den Haag

Visitors' address:
Jan Willem Frisolaan 3

Telephone:
+31-70-412 02 00

Fax:
+31-70-412 02 11

E-mail:
ambassaden.haag@gov.se

Website:
www.swedenabroad.com/thehague

Implementation agreement between the State and permit holder Hollandse Kust (zuid) Wind Farm Zone; Sites I & II

1. **The State of the Netherlands** (hereinafter also referred to as '**the State**'), legally represented in this matter by the Minister of Economic Affairs;

and

2. **Chinook C.V.**, a limited partnership established in Amsterdam, trade registry no. 65938275 (hereinafter also referred to as 'the **Company**');

(hereinafter also jointly referred to as '**the Parties**');

WHEREAS:

A. The Minister of Economic Affairs has awarded to the Company permits as referred to in Article 12 of the Wet Windenergie op Zee, enclosed with this Implementation Agreement as Appendix A (the '**Permits**'), which Permits entitle and oblige the Company to construct and operate an offshore wind farm at Sites I and II of the Wind Farm Zone Hollandse Kust (zuid) (the '**Wind Farm**');

B. By means of this agreement (the '**Implementation Agreement**'), the Company seeks to ensure to the State that the Company will realize the Wind Farm and start full operations within 5 years after irrevocability of the Permits;

C. The Company seeks to provide a financial security in favor of the State to ensure that the Company meets its obligations as set out under Article 1.

D. The Company acknowledges that this Implementation Agreement is not prejudicial to the State's enforcement powers in relation to the Permits and shall not be construed in any way as a limitation of the Company's obligations or liabilities under the Permits.

Article 1. Putting the Wind Farm into operation

The Company shall realize the Wind Farm and start full operations within 5 years after irrevocability of the Permits.

Article 2. Bank Guarantee

2.1 To ensure payment on first demand of administrative enforcement decisions imposed by the State for the Company's non-compliance with the obligation as set out under Article 1 and incorporated in the Permits, the Company shall provide and maintain financial security for the benefit of the State for an amount of € [redacted] euros) within 4 weeks of the date this Implementation Agreement is signed by both Parties, by means of issuance of a bank guarantee (issued by a bank established within the European Union) to the State that has been drawn up using the model included in the Appendix to this Implementation Agreement (the '**Bank Guarantee**').

2.2 The Company hereby irrevocably authorizes the State to collect the amount or amounts stated in the administrative enforcement decision(s) as set out under 2.1 by invoking the Bank Guarantee in the following event: an administrative enforcement decision to impose administrative penalties for non-compliance is imposed to Chinook CV regarding the obligations under the Permits as set out under Article 1 and the compliance period of that decision has expired.

2.3 If, after the State having invoked the Bank Guarantee, it is established that no liability of the Company for such payment existed and/or the decision to impose administrative penalty under payments did not become irrevocable and/or no recovery decision was taken and became irrevocable, the State shall return the amount demanded under the Bank Guarantee to the Company.

2.4 If the Company has not provided the Bank Guarantee as set out under 2.1 timely, then the State may at its discretion start enforcement measures as it sees fit.

Article 3. No prejudice to State's powers under administrative law, no liability cap

It is acknowledged by the Company that nothing in this Implementation Agreement shall be prejudicial to the State exercising any of its statutory authorities and duties including enforcement powers at its sole discretion. Furthermore, this Implementation Agreement shall be not construed as a limitation of the obligation of the Company to comply with the Permits.

Article 4. Commencement, end and termination of the Implementation Agreement

4.1 This Implementation Agreement is entered into between the Parties under the condition precedent of the Company having been awarded the Permits.

4.2 This Implementation Agreement will end by operation of law at the earlier of:

a. when the obligation under Article 1 of this Implementation Agreement is no longer an obligation that can be enforced by administrative enforcement decisions, e.g. because the Company has complied with its obligation under Article 1 or because the Wind permits are withdrawn or altered at this point;

b. when the cumulative total amount of administrative enforcement decisions imposed by the State on the Company as set out under 2.1 has reached [redacted]

Article 2.3 shall survive termination of this Implementation Agreement and shall remain in force between Parties.

4.3 In the events of article 4.2, the obligation to maintain the bank guarantee as referred to in article 2.1 will no longer apply and the State shall issue a written statement to the Bank confirming that the obligation to maintain the bank guarantee has lapsed. The Company will receive a copy of the statement concerning the lapse and the State will return the bank guarantee to the Bank.

Article 5. Choice of an address for service and notification

5.1 As choice of address for service for the implementation of this Implementation Agreement, the State chooses the offices of the Netherlands Enterprise Agency, which forms part of the Ministry of Economic Affairs, Hanzelaan 310, 8017 JK Zwolle.

5.2 Without prejudice to the provisions set out in the Code of Civil Procedure, all announcements, notices, requests, permissions and other messages under this Implementation Agreement must be provided in writing.

5.3 Announcements, notices, requests, permissions and other messages that are not provided in accordance with the second paragraph will have no legal effect.

Article 6. Choice of law

6.1 This Implementation Agreement is exclusively governed by Dutch law.

6.2 Any and all disputes in connection with this Implementation Agreement or with associated agreements will be resolved by the competent court in The Hague.

Article 7. Short title

This Implementation Agreement will be cited between the Parties as 'Implementation Agreement'.

Agreed and signed in duplicate in .....

[*signatures on next page*]

Chinook C.V

Date: 19/12/2017

Place: Hamburg

[redacted]

Signature

Name: **Chinook Beheer B.V.**

[redacted]

The State

Date:

Place:

_____

Signature

The Minister of Economic Affairs

***

VATTENFALL

Vattenfall AB
Evenemangsgatan 13
SE-169 79 Solna, Sweden

Stockholm, 19 December 2017

To his Excellence the Minister of Economic Affairs and Climate
Sir E.D. Wiebes

VATTENFALL'S APPLICATION FOR A SUBSIDY FREE OFFSHORE WINDFARM HOLLANDSE KUST ZUID (HKZ)

Your Excellence,

Our congratulations on running the world's first subsidy free offshore wind tender. It is a well-deserved reward for the visionary commitment made by the Dutch government back in 2013 to have 4,450 MW of operational offshore wind by the end of 2023 and for the recent commitment to add another 7,000 MW by 2030.

Naturally, the prospect of having a zero subsidy offshore windfarm at HKZ brings with it huge benefits for the Dutch state in terms of avoided subsidies. In return however, it puts increased demands on the developer of HKZ, who has to build and run an offshore windfarm at a record low cost while taking on and managing the electricity price risk for decades.

Given the risk profile of the project and the investments and commitments made by the Dutch state into offshore wind and HKZ, we acknowledge that this tender is about finding the most reliable partner who can guarantee to have it fully operational no later than the beginning of 2023 and operate it successfully throughout the following [redacted] years.

We believe that Vattenfall is the company best positioned to be that reliable partner. Below we list the four main reasons why we believe this is the case:

1. A RELIABLE AND COMMITTED COMPANY TO WHOM A SUCCESSFUL HKZ IS JUST AS IMPORTANT AS IT IS TO THE DUTCH STATE
2. AN HKZ SHIELDED AGAINST MARKET RISK AND AN OWNER WHO CAN ACTIVELY USE HKZ TO HELP DUTCH ENERGY CONSUMERS TRANSITION TO RENEWABLE ENERGY
3. A PROVEN ABILITY TO BUILD AND OPERATE A WINDFARM LIKE HKZ AT THE COST LEVEL REQUIRED TO MAKE IT PROFITABLE
4. A ROBUST PLAN AND STRONG COMMITMENT TO HAVE HKZ FULLY COMMISIONED BY THE BEGINNING OF 2023, AT THE LATEST

Allow us to elaborate on why these four reasons form an excellent solution for HKZ with added value.

1. A SUCCESSFUL HKZ IS JUST AS IMPORTANT TO VATTENFALL AS IT IS TO THE DUTCH STATE

There are several reasons to why Vattenfall is a highly committed partner for HKZ.

Firstly, Vattenfall is firmly committed to power the energy transition of Europe, aiming to invest more than [redacted] over the next five years. Offshore wind plays a central role in this. For offshore wind, our belief is that we need a continuous flow of projects to keep driving down cost, to attract experts and to remain an attractive partner for leading suppliers. We have been successful in growing our pipeline by almost 1.5 GW through our successes in recent tenders. However, our pipeline still has room for more projects in the early 2020s. As most tenders have already been awarded for this period, HKZ represents a rare opportunity for Vattenfall to fill our pipeline with a strong and de-risked project thanks to the pre-development efforts of the Dutch state and TenneT.

Secondly, as a Swedish state-owned utility we care greatly about our reputation. Hence, this application is not only a bid. It is a board level commitment to the Dutch state that we can successfully build and operate HKZ. A commitment rooted in a detailed assessment of the project, its business case, its risks and mitigations.

Thirdly, when we commit, we deliver. This means that in Vattenfall, the Dutch state has a partner that has never let a subsidiary go bankrupt; a partner who through Nuon is deeply invested in the Netherlands with a brand exposure that we would not put at risk and a partner who both through Nuon and through a direct guarantee, fully supports the project being delivered on time (see point 4).

2. AN HKZ SHIELDED AGAINST MARKET RISK AND AN OWNER WHO CAN ACTIVELY USE HKZ TO HELP DUTCH ENERGY CONSUMERS TRANSITION TO RENEWABLE ENERGY

As HKZ will become the first subsidy free offshore windfarm in the world, the Dutch state rightly puts a lot of emphasis on the market price risk in this tender. We are not new to this challenge as we have already developed six (onshore and offshore) windfarms in the Swedish market price based regime. For HKZ, we believe that we are best positioned to manage this risk through our ownership of Nuon and our strong trading division as this gives us, the HKZ project and the Dutch energy consumers a series of unique advantages.

Firstly, we will shield HKZ from all market risk fo[redacted] with[redacted]. In addition to shielding the project from market risk, this paves the way for two other unique advantages:

- [redacted] This amounts to more than[redacted] portfolio of gas, wind, coal and hydro plants. Due to size and mix, this portfolio creates a natural hedge against the price exposure of HKZ. In fact, our assessment is that the revenue volatility of[redacted] if we add HKZ.
- [redacted] which is one of the largest electricity traders in Europe.[redacted] is a preferred choice in offshore wind, as they are the trading partner for [redacted], but also other offshore wind developers. Having such a [redacted] allows us to have the lowest trading costs and a financially strong buyer that can weather all short-term market price related volatilities.

On top of this, we are experiencing [redacted] Therefore HKZ represents a unique opportunity to create added value to our business case while fuelling the renewable energy transition of the Dutch society. We see that we can do this in two segments. Our B2B customers express [redacted] in renewable energy. This has among other things led to our recent [redacted] which will be operationa[redacted]. In addition, we are in promising dialogues with potential partners like [redacted] related to HKZ. Our B2C customers also [redacted] green electricity – either for conventional usage or for innovative products like e-mobility where [redacted] in the Netherlands.

3. A PROVEN ABILITY TO BUILD AND OPERATE AT THE REQUIRED COST LEVEL

In addition to managing market risk, the right developer of HKZ should also be able to build and operate it at the lowest cost of energy. As it is critical that the windfarm is built on time and runs effectively for 25 years, this needs to be done with an eye on keeping cost and risk under control – both during manufacturing, construction and operations.

Through our three successful tenders over the last two years, we have indisputably proven that we are a cost leader in offshore wind. The key to success has been to channel all the knowledge and experience we have gained from building and operating offshore windfarms for more than 15 years, into developing a standardised windfarm. A little more than a year ago this led to a record low bid of <50 EUR/MWh at Danish Kriegers Flak (DKF). Since then:

- We have closed the turbine and service agreement [redacted] to further reduce our cost levels.
- We have kept optimising our proven solution together with our suppliers by for example boosting the [redacted] reducing cost on our in-house designed [redacted] foundations and [redacted] the array cables ([redacted]).
- We have expanded our lead when it comes to operations and maintenance where benchmarks show that we outperform turbine suppliers and competitors on both availability and cost.
- As just announced, [redacted] which in return makes us more cost competitive

As HKZ is highly comparable to the site characteristics at DKF and we have synergies with our Egmond Aan Zee windfarm (OWEZ), we are able to build and operate an advanced version of our standard windfarm at the cost level required to make HKZ profitable. The advantage of this solution is [redacted] from our three Danish projects by the time HKZ is due to commence construction.

4. A ROBUST PLAN AND STRONG COMMITMENT TO HAVE HKZ FULLY COMMISIONED BY THE BEGINNING OF 2023, AT THE LATEST

We acknowledge that having HKZ in full operation by 2023 is required in order for the Dutch state to meet its 4,450 MW offshore wind target and thereby also the 18% renewable energy target. This is why, Vattenfall has a strong focus on ensuring that our application for HKZ provides sufficient guarantee to the Dutch state that we will meet this deadline. Therefore, on top of the proven concept and installation plans we make use of at HKZ, we have created the following security in our solution:

- We have a robust time-plan that allows for [redacted], thereby leaving [redacted]
- We have written confirmation from multiple leading suppliers – [redacted] – in each category that they can guarantee us the required production and vessel capacity for HKZ in the needed time period.
- We acknowledge that the Dutch state is banned from imposing the penalties applied in the Borssele auctions. In light of this, we put in place a bank guarantee of EUR [redacted] to cover for a penalty if we fail to have HKZ operational by the beginning of 2023 (i.e. within five years after irrevocability of the permit). [redacted] and we hope that this provides the Dutch state with additional comfort on our dedication and ability.
- Our project company Chinook C.V. is fully embedded within the Nuon/Vattenfall group of companies. Vattenfall has guaranteed the obligation to deliver the windfarm and NV Nuon Energy has accepted joint and several liability for both Chinook and VET NL.

In conclusion, we believe our application represents the best proposition to meet the needs of the Dutch government with respect to HKZ. We combine a strong track record in building and operating windfarms at the lowest cost of electricity with an ability to handle market price risk and sell the green electricity from HKZ to our Dutch customers.

In addition, awarding this tender to Vattenfall would help the Dutch government enable stronger competition for future offshore wind tenders by ensuring the continued presence of multiple developers in the Netherlands and thereby helping to secure a competitive future for offshore wind in the Netherlands.

We hope to get the chance to support the Netherlands in leading the world into a subsidy free and stable future for offshore wind.

Yours sincerely,

[redacted]

Chinook C.V. (Nuon/Vattenfall)

KvK-nummer: 65938275

Het eigen vermogen dient tenminste 20% van de totale investeringskosten te bedragen. (EV/investeringskosten).

Aanvraag:

Kavel I zonder schaalvoordeel:
Investeringskosten: €[redacted]

Kavel II zonder schaalvoordeel:
Investeringskosten: €[redacted]

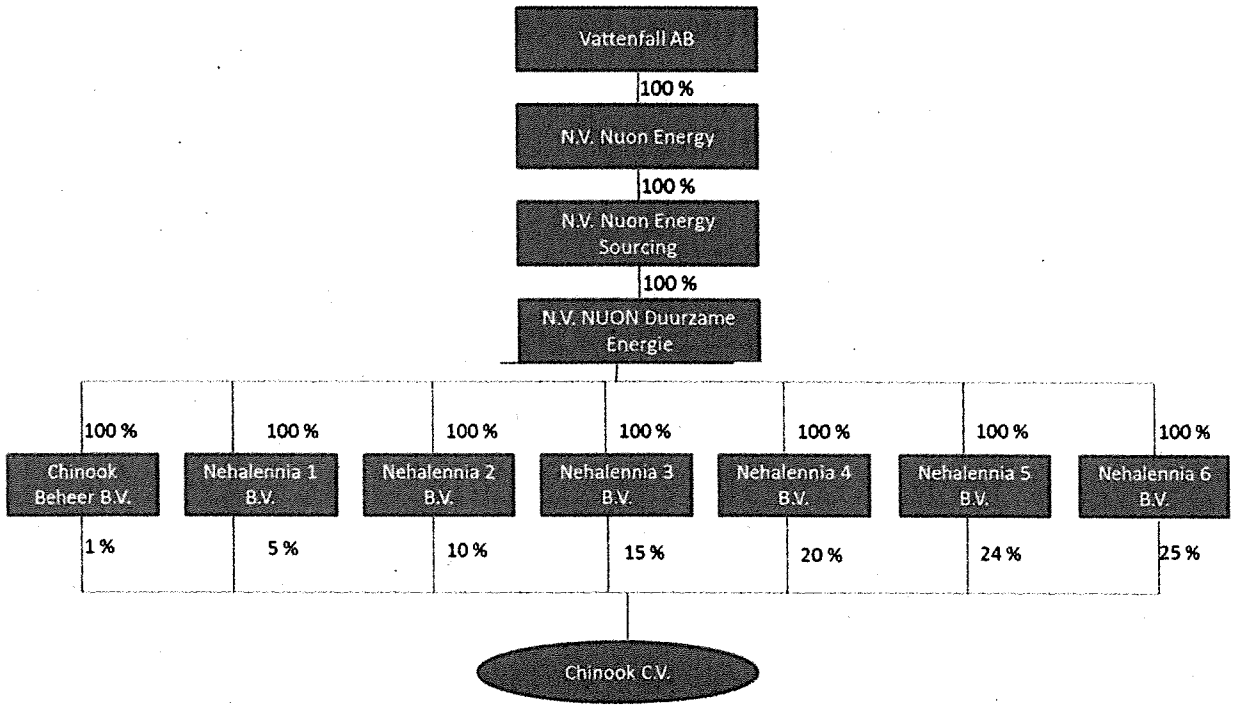
Kavels I en II met schaalvoordeel:
Investeringskosten: €[redacted]

Eigen vermogen aanvullen: Ja
Totale eigen vermogen: € 6.847.681.600

EV/investeringskosten * 100% = € 6.847.681.600 / €[redacted] * 100% = [redacted]%

Financiële gegevens in de aanvraag:

In the Financial Statement is een organogram gevoegd:



Jaarverslag:

Het jaarverslag 2016 van Vattenfall is bijgevoegd.
Volgens de aanvrager is het EV van Vattenfall SEK 68.272.000.000 (pag. 92 van het jaarverslag). Dit staat op pagina 89 van het jaarverslag, onder 'Total equity attributable to owners of the Parent Company'. Ook op pagina 92 staat dit bedrag vermeld onder 'Balance carried forward 2016'.

Het eigen vermogen van Vattenfall is dus SEK 68.272.000.000. 1 SEK is € 0,10218421. Het EV in euro's is SEK 68.272.000.000 * € 0,10218421 = € 6.976.320.385. In de 'financial statement' gaat Vattenfall uit van een koers van € 0,1003, koers op 18-12-2017 en dan kom je inderdaad op € 6.847.000.000. Dit komt overeen met het bedrag dat in de aanvraag staat.

KvK-gegevens:
Chinook C.V.: 65938275
Chinook Beheer B.V.: 65913035
N.V. NUON Duurzame Energie: 09103293
N.V. Nuon Energy Sourcing: 09066021
N.V. Nuon Energy: 33292246
Vattenfall AB: 34129248

Volgens de KvK is Chinook Beheer B.V. de enige vennoot in Chinook C.V.
N.V. NUON Duurzame Energie is enig aandeelhouder en bestuurder van Chinook C.V.
N.V. Nuon Energy Sourcing is enig aandeelhouder en bestuurder van N.V. NUON Duurzame Energie.
N.V. Nuon Energy is enig aandeelhouder en bestuurder van N.V. Nuon Energy Sourcing.
Vattenfall AB is enig aandeelhouder van N.V. Nuon Energy. Vattenfall AB is ingeschreven in Zweden.

Conclusie:
Gelet op de KvK is Vattenfall AB inderdaad de moeder van Chinook C.V. Het eigen vermogen van Vattenfall AB kan derhalve meegenomen worden.

Het eigen vermogen van Vattenfall AB: € 6.847.000.000
Investeringskosten voor beide kavels zijn: €[redacted]
% eigen vermogen/investering is € 6.847.000.000 / €[redacted] = [redacted]%

Dit is meer dan 20%, dus akkoord.

Volledigheidstoets Vergunningsaanvraag WOZ 2017

Referentienummer	VERWZ17032
Naam aanvrager	Chinook C.V.
Intermediair	Chinook C.V.
Datum ingediend	21-12-2017
Adviseur	[redacted]
2e adviseur	[redacted]
Thema	SDE WOZ Hollandse Kust Zuid K 1 +2
Kies kavel die van toepassing is op deze aanvraag: Hollandse Kust (zuid), kavel	II

Twee PA's controleren gezamenlijk of de aanvraag aan de indieningsvereisten voldoet en volledig is. Indien nodig JZ en of OL inschakelen.

Nr.	Controle aanvraag op volledigheid	Nee	Ja/ n.v.t.
1	Is het voorgeschreven formulier gebruikt?		Ja
2	Zijn alle verplichte velden in het formulier correct ingevuld en leesbaar ingevuld? Verplichte velden bevatten gegevens die van invloed zijn op het oordeel.		Ja
	Bijlagen: Controleer of de verplichte bijlagen aanwezig zijn en of ze inderdaad betrekking hebben op de aanvraag en het te ontwikkelen windpark. Bijlagen 11, 12 en 13 zijn verplicht onder voorwaarden. Bijlagen A1 t/m A4 zijn verplicht indien vraag 8.1 van het Aanvraagformulier met 'Ja' is beantwoord. Vul bij de controle Nee in indien een bijlage die verplicht is ontbreekt, onjuist of onvolledig is. In alle andere gevallen Ja/n.v.t. invullen. Indien Nee, vul dan in de volgende tabel de bevinding in.		
3	**Bijlage 1** Samenvattende beschrijving		Ja
4	**Bijlage 2** Windrapport		Ja
5	**Bijlage 3** Exploitatieberekening volgens RVO model		Ja
6	**Bijlage 4** Jaarrekening + eventuele instemming moeder		Ja
7	**Bijlage 5** Financieringsplan		Ja
8	**Bijlage 6** Tabel windturbinegegevens en -locaties		Ja
9	**Bijlage 7** Tabel kabeltracé-gegevens		Ja
10	**Bijlage 8** Overzicht van de kennis en ervaring van de betrokken partijen		Ja
11	**Bijlage 9** Overzicht van de inventarisatie en analyse van de risico's		Ja
12	**Bijlage 10** Beschrijving van de maatregelen ter borging van de kostenefficiëntie		Ja
13	**Bijlage 11** Overzicht samenwerkingsverband met ondertekening door elke deelnemer		n.v.t.
14	**Bijlage 12** Verklaring voor bij de aanvraag genoemde niet gecertificeerde turbines		[redacted]
15	**Bijlage 13** Milieueffecten fundatie		n.v.t.
	Bijlagen met aanvullende informatie voor het schaalvoordeel dat ontstaat als aanvrager ook voor de andere kavel heeft aangevraagd en vraag 8.1 met 'ja' is beantwoord.		
16	**Bijlage A1** Samenvattende beschrijving met schaalvoordeel		Ja
17	**Bijlage A2** Exploitatieberekening volgens RVO model met schaalvoordeel		Ja
18	**Bijlage A3** Overzicht van de inventarisatie en analyse van de risico's met schaalvoordeel		Ja
19	**Bijlage A4** Beschrijving van de maatregelen ter borging van de kostenefficiëntie met schaalvoordeel		Ja

20	Check of de papieren bijlagen dezelfde zijn als de bijlagen op de USB-stick. Wanneer een bijlage op de USB-stick ontbreekt of verschilt, is de papieren bijlage de geldige versie.		Ja

Opmerkingen en bevindingen van de controles
Beschrijf opmerkingen en bevindingen in de onderstaande tabel onder verwijzing naar Nr. uit de lijst. Betrek JZ indien een bevinding kan leiden tot een afwijzing en overleg met JZ of er een mogelijkheid tot herstel is. Is de conclusie dat een aanvraag moet worden afgewezen, formuleer dan in overleg met JZ een afwijzingstekst.

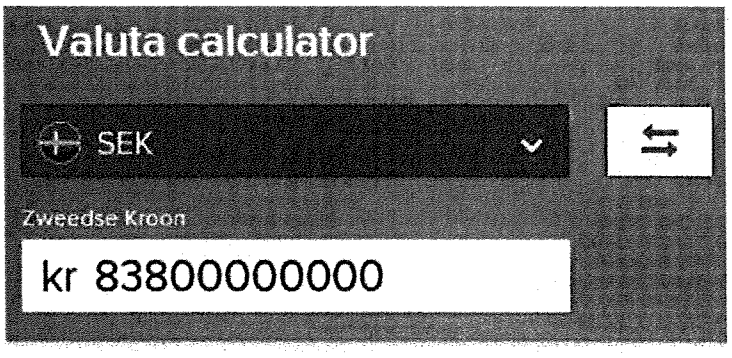
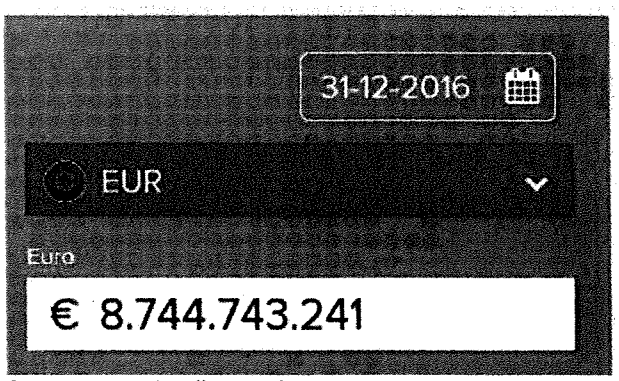
Nr.	Opmerking/bevinding

Eindconclusies controles aanvraag op volledigheid **Zijn alle controle vragen met Ja/n.v.t. beantwoord?**	
JA. Ga verder met inhoudelijke toets	Ja
NEE. De aanvraag voldoet niet. Wijs de aanvraag af. Formuleer hieronder in overleg met JZ de afwijstekst.	

Concept afwijstekst

Financiële toets Vergunningaanvraag 2017 WOZ

Referentienummer Naam aanvrager	VERWZ17032
Financieel expert	[redacted]
Thema	2017 windenergie op zee
Hollandse Kust (zuid) kavel	II

FT Nr.	Financiële toets door financieel expert van RVO	Nee	Ja/ n.v.t.
1	Zijn de **jaarrekeningen** van • de aanvrager of • de moederonderneming(en) (schriftelijke instemming van de moeder moet zijn meegestuurd met de aanvraag) of • de deelnemers aan het samenwerkingsverband? (Regeling artikel 3, lid 10.d en artikel 4 lid 3)		Ja
2	Zijn de meest recent vastgestelde **jaarrekeningen** als bijlage meegestuurd en dateren die van 2014 of later? (Regeling artikel 3, lid 10.d)		Ja
3	De financieel expert heeft aan de hand van de jaarrekeningen het totale **eigen vermogen** gecontroleerd (som EV's van de jaarrekeningen). Het eigen vermogen op basis van de analyse van de jaarrekeningen door de financieel expert is: € 8.744.743.241,00   *Bron : www.wisselkoers.nl*		

FT Nr.	Financiële toets door financieel expert van RVO	Nee	Ja/ n.v.t.
	Het geconsolideerde EV in de Jaarrekening 2016 van Vattenfall AB wordt weergegeven in SEK en bedraagt per datum 31-12-2016 SEK 83.800 mio. Omgerekend per 31-12-2016 *(dit is de slotkoers van vrijdag 30 december 2016)* naar Euro : € 8.744.743.241,00. 1 Euro = SEK 9,5829 Is het eigen vermogen volgens het aanvraagformulier bij vraag 5.5 gelijk aan de som van de eigen vermogens uit de jaarrekening(en)? Op het aanvraagformulier wordt het eigen vermogen in € weergegeven (€ 6.847.681.600,00). Het betreft hier het eigen vermogen van de Parent Company Vattenfall AB per omrekendatum 18 december 2017, excl. het eigen vermogen dat is toe te schrijven aan minderheidsdeelnemingen.	Nee	
4	Is het eigen vermogen als percentage van de hoogte van de investering (o.b.v. aanvraagformulier) ≥ **20%**. (Regeling artikel 4, lid 2)? **Let op**: • wanneer de aanvrager voor kavel I en II heeft aangevraagd, moet bij de berekening de som van de investeringen gebruikt worden. (Regeling artikel 4, lid 5) Eigen vermogen: € 8.744.743.241,00 Investering o.b.v. aanvraagformulier: €[redacted] Percentage:[redacted]% **EV in€ Investering in€ EV als % van de investering** [redacted]		Ja
5	Biedt het **financieringsplan** inzicht in de financiering van het windpark, inclusief de beoogde financiers en het beoogde aandeel dat zij zouden dragen ? (Regeling artikel 3 lid 10.b) [redacted]		Ja

Opmerkingen en bevindingen van de controles en herstel.

Beschrijf opmerkingen en bevindingen in de onderstaande tabel onder verwijzing naar Toetsingslijst Nr. Betrek JZ indien een bevinding kan leiden tot een afwijzing en overleg met JZ of er een mogelijkheid tot herstel is. Herstel is alleen mogelijk als bepaalde informatie niet duidelijk is. In dat geval mag in overleg met JZ een gesloten geformuleerde (ja/nee) verhelderingsvraag gesteld worden. Is de conclusie dat een aanvraag moet worden afgewezen, formuleer dan in overleg met JZ een afwijzingstekst.

Nr.	Opmerking/bevinding

127

Toetsing kavelbesluiten I en II en Waterbesluit 6.16d
Windenergiegebied Hollandse Kust Zuid
Regeling windenergie op zee 2017

Referentienummer	VERWZ17032
Aanvrager	Chinook CV
Thema	2017 windenergie op zee
Hollandse Kust Zuid kavel	II

RVO levert de relevante gegevens aan RWS die nodig zijn om RWS te laten controleren of aan de voorschriften van het kavelbesluit en waterbesluit is voldaan.

RWS stelt een rapport op waarin per lid staat hoe ze de controle hebben uitgevoerd en wat het resultaat is van de controle. De conclusies uit dit rapport neemt RWS over in de onderstaande toetsingslijst. RWS voegt dit rapport toe als bijlage achter de toetsingslijsten.

Lid nr.	Controle op voorschrift 2 lid 1 t/m 13 uit kavelbesluiten windenergiegebied Hollandse Kust Zuid	Nee	Ja/ n.v.t.
1	Bevindt het windpark zich volledig binnen de contour volgens de coördinaten van lid 1?		Ja
2	Ligt het kabeltracé naar het platform binnen de contour volgens de coördinaten van lid 2?		Ja
3	Bevindt zich geen enkele windturbine in de onderhoudszones van lid 3?		Ja
4	Blijven de rotorbladen van de windturbines volledig binnen de in lid 1 genoemde contour en volledig buiten de in lid 3 genoemde contour?		Ja
5	Is het aantal op te richten turbines kleiner of gelijk aan 63?		Ja [redacted]
6	Is het maximale totale rotoroppervlak kleiner of gelijk aan 1.461.542 m^2?		Ja [redacted]
7	Hebben de op te richten windturbines per stuk een vermogen dat minimaal 6 bedraagt?		Ja [redacted]
8	Bedraagt de minimale afstand tussen de windturbines 4 maal de rotordiameter?		Ja
9	Is de minimale tiplaagte groter of gelijk aan 25 meter boven zeeniveau (MSL)?		Ja [redacted]
10	Is de maximale tiphoogte kleiner of gelijk aan 251 meter boven zeeniveau (MSL)?		Ja [redacted]
11	Worden de kabels vanaf de windturbines aangesloten op platform Alpha?		Ja

12	Zijn de funderingen van het type monopile, tripod, jacket, gravity based of suction bucket? Of als geen van deze funderingen wordt toegepast, overschrijden de milieueffecten van de fundering niet de grenzen van het kavelbesluit	Ja (MP)
13	Als opofferingsanodes gebruikt worden, bestaan deze dan uit legeringen van aluminium of magnesium met minder dan 5 gewicht % andere metalen?	Geen anodes, maar ICCP
14	**Eindconclusie controles kavelbesluit.** Is het voldoende aannemelijk dat aan alle voorwaarden uit het kavel besluit zal worden voldaan	Ja

Controle op Waterbesluit 6.16d, lid 1 onderdeel c

[redacted]

Bijlagen: voeg hier de beoordelingsrapporten toe waaruit blijkt waarom welke antwoorden gegeven zijn in de bovenstaande toetsingslijsten

VERWZ17032[redacted]

Resumé GIS checks	**Controle op voorschrift 2 lid 1 t/m 13 uit kavelbesluiten windenergiegebied Hollandse Kust Zuid**
	Bevindt het windpark zich volledig binnen de contour volgens de coördinaten van lid 1? Ja
	Ligt het kabeltracé naar het platform Alpha binnen de contour volgens de coördinaten van lid 2? Ja
	Bevindt zich geen enkele windturbine in de onderhoudszones? Ja
	Blijven de rotorbladen van de windturbines volledig binnen de in lid 1 genoemde contour en buiten de in lid 3 genoemde contour? Ja
	Bedraagt de minimale afstand tussen de windturbines 4 maal de rotordiameter? Ja
Artikel 4.3.2 situering en oppervlakte kavel I	Worden de kabels vanaf de windturbines aangesloten op platform Alpha conform lid 2? Ja

[redacted]

DEUTSCHE
WINDGUARD

Review of a Tender for the Offshore Wind Farm Hollandse Kust Zuid I and II

Bid No.: **VERWZ17031 and VERWZ17032**

Applicant: **Chinook C.V.**

Contracted by

Ministry of Economic Affairs
Hanzelaan 310
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Project No.: PP18001
Report No.: PP18007.A0
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Review of a Tender for the Offshore Wind Farm Hollandse Kust Zuid I and II

Bid No.: **VERWZ17031 and VERWZ17032**
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Revision History

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Note: The last revision replaces all previous versions of the report.

Contents

Disclaimer:

We hereby state, that the results in this report are based upon generally acknowledged and state-of-the-art methods and have been neutrally conducted to the best of our knowledge and belief. No guarantee, however, is given and no responsibility is accepted by the contractors for the correctness of the derived results. Any partial duplication of this report is allowed only with written permission of the contractors. The results of the following report refer to the investigated object only.

This report covers 34 pages.

1 Introduction

The Ministry of Economic Affairs has tasked the contractors with providing expert evaluation of portions of the tenders filed for the Hollandse Kust Zuid (HKZ) offshore wind projects. The contractors were specifically tasked to examine the expected long-term yield assumptions (P50), the capital budget necessary to build the proposed project (CAPEX), the operating budget during the subsidy period (OPEX), and the likelihood of future certification for wind turbines (WTs) which have not yet been certified.

The scope for such due diligence was to provide a reasonableness test for the build-out of the tenders, that the project annual production was within reasonable bounds, and that both the capital investment and the operating budget conformed to industry standard costs and procedures to ensure safe and efficient planning, construction and operation of the project.

The contractors, without seeing the entire tender filed for a project, have reviewed the wind reports and other data accompanying the tender, as well as the Project Plan section of the tender, and the CAPEX and OPEX budget sheets. Additionally, in a few cases accompanying operational calculations were also reviewed where provided by the bidder.

The contractors were not tasked to provide a detailed technical due diligence of the WTs, nor were they asked to evaluate the accompanying layout of the WT positioning onsite.

2 Methodology

2.1 Analysis of Wind Report

The yield evaluation was enabled using best available methods refined over the development of the industry, including evaluating the third party analyses provided by the bidders.

The different technical steps involved in the wind resource assessment as supplied by the applicant have been checked in detail on the following items:

- Appropriateness of the technical approaches and assumptions
- Compliance to industry standard methods as given in the MEASNET site assessment procedure [1] and the German Technical Guideline 6 [2].

Where deemed being needed, cross calculations have been performed.

Some key results have also been checked across different wind resource assessments as available from different applicants for the same HKZ wind farm site (HKZS) and against a wind resource assessment evaluated by ECOFYS for the Netherlands Enterprise Agency (RVO) [3].

2.2 Project Costs Analysis

To enable an opinion by the contractors on each of the tender sections, the data were evaluated according to three best practice due diligence measures, which taken as a whole undergird the conclusions. Tenders were evaluated for:

- the provision of sufficient project description including construction and operations plans, CAPEX costs, and OPEX costs (against itself);
- were evaluated statistically in comparison with other tenders (the tender bandwidth based on the small set of actual cost data covered by the tenders);
- and were evaluated statistically against both industry general practice (standard) and historical costs, and industry state-of-the-art (best procedures) including cost projections from both industry and analysts.

The methodology used by the contractors followed industry procedures to model and statistically compare costs and data. CAPEX costs, whose groupings varied amongst the bidders, were compiled into standard general categories which allowed for more relevant direct comparison. The contractors used their industry experience to define categories, although in most cases the groupings remain simple and standard.

The main categories of WTs, Foundations and Inter Array Cabling (IAC) were divided into only supply and installation sub-categories. For example, all subsea structural costs were compiled with the Foundation category, and further divided into supply or installation costs. Direct costs related to the purchase of wind turbine hardware were compiled as WT costs (direct supply of the turbines, or TSA Costs: Turbine Supply Agreement, including warranties), and costs related to installation of the WTs were separated. Planning and Administration including Contingency was defined as a category, with contingency costs as provided by the Bidder also broken out separately. Financing and Insurance costs were also statistically reviewed, as were the projected Decommissioning costs.

As the Bidders wanted to tender only grouped sites I and II together, the contractors considered whether potential economies of scale were addressed by bidders, as opposed to the individual site costs, which were not evaluated.

OPEX costs were compiled as operations and maintenance (O&M) for the wind turbines, O&M for the balance of plant (foundations and IAC cables, BoP), Decommissioning cost and business categories: Management, Insurance and Other for the few instances where such costs as Offtake Agreements, Market/Electricity Sales, or Own Power (power consumption from the grid) were broken out by the bidder.

For the further evaluation of tender CAPEX and OPEX costs against past, current and state-of-the-art costs, the contractors used publically available project costs to use as proxies against which the tenders were measured.

In addition to review of the standard categories, the evaluation of the total CAPEX was given priority. The contractors framed the review by asking if the Bidders took all relevant costs into account and evaluated the reasonableness of such totals.

Finally, the contractors note that CAPEX and OPEX comparisons are driven in a large measure simply by the number of WTs installed in a project. For this reason, the contractors have converted CAPEX and OPEX figures into both capacity and yield-based measures (i.e. per MW, per MW/a or per MWh) to allow for viewing costs from differing perspectives. Other views of the given data categories, such as cost segment per WT, allowed even deeper comparisons.

3 Review of Wind Reports

The expected annual energy productions (AEPs) as provided by the applicant are based on independent assessments from EMD International A/S (EMD) [4], [5]. EMD has a long track record in wind resource assessments and is the developer and provider of the software package WindPro, which is widely used for wind farm wind resource assessments and wind farm planning tasks throughout the industry. EMD's assessments are based on the wind resource assessment performed by ECOFYS for the Netherlands Enterprise Agency (RVO) for the sites HKZS I and HKZS II [3]. EMD's assessments, together with the underlying study from ECOFYS, follow state-of-the art methods as defined by MEASNET [1] and by the German Technical Guideline 6 [2] where relevant. The most important findings of our review of EMD's wind resource assessments are discussed in the following sub chapters.

3.1 Wind Data

The underlying wind resource assessment from ECOFYS [3] is based on the following two high quality offshore wind measurements:

- Measurements from a meteorological mast at a height of 70 m MSL at the wind farm site Egmond aan Zee (OWEZ) from the period July 2005 to June 2006. The measurement is located about 40 km north-north-east of the HKZ at a distance of about 15 km to shore, i.e. about 11 km closer to shore than the centre of the HKZ.
- Measurements within the site HKZS II with a floating LiDAR over a one-year period from June 2016 to June 2017 at the so-called position HKZB conducted by the company Fugro under contract of RVO

Both wind measurements are deemed being of sufficient quality for wind resource assessments.

It is positively acknowledged that Ecofys did perform an own detailed analysis of both measurements.

3.2 Long-Term Correlation

As the wind resource is subject to significant inter-annual variations, the measurement data used for wind resource assessments must be correlated to a long-year period with an external long-term wind data source.

The long-term correlation of the met mast measurement data conduced at the OWEZ and of the LiDAR measurements within the HKZ as performed by Ecofys [3] follow state-of-the-art methods and all requirements defined by MEASNET [1] and by the German Technical Guideline 6 [2].

End product of the long-term correlation are wind speed and wind direction time series at the site OWEZ for the periods January 2000 to December 2015 and at the position of the measurement HKZB for the period June 2003 to June 2017. Different reference periods result for the two wind speed measurements, because Ecofys has selected different long-term data sources for the two long-term correlations. This has been done to keep the wind measurements, including their long-term correlations as independent from each other as possible, which leads to a reduced uncertainty when the wind resources as calculated on the basis of both datasets are combined by averaging (see chapter 3.4).

3.3 Extrapolation to Hub Height

The long-term correlated wind speed time series resulting from the met mast at the site OWEZ and from the LiDAR measurements at the OWEZ have been extra-/interpolated to various height levels by Ecofys on the basis of empirically determined wind shear exponents per wind direction sector and per hour of the day.

EMD [4], [5] has then interpolated the time series data provided by Ecofys for the heights 100 m and 125 m to the hub height of the projected type of turbine of [redacted] m MSL by wind shear exponents fitted to the data per wind direction sector, season and time of day.

These methods applied for the vertical height extrapolation of the measured wind speeds represents good industry practice.

3.4 Transfer of Wind Conditions from Location of Wind Measurement to HKZS I and HKZS II

Wind measurements for wind resource assessments are usually performed directly at or close to the projected wind farm site, because the application of flow models to predict the difference of wind conditions over large distances is often linked to high uncertainties. Ecofys [3] has performed a detailed verification of 4 different meso-scale flow models in the region covering the HKZ and different measurements in the region. Large discrepancies of the different models have been identified in terms of their capability to reproduce the measured spatial distribution of wind speeds within the region, while two of the wind maps have shown a good performance, namely the EMD-ConWx model and the KMNI KNV model. Ecofys has finally chosen the EMD-ConWx model as its data is available up to date. This model has been implemented by Ecofys to correct the measurement data from the site OWEZ to the HKZ. Furthermore, the EMD-ConWx model has been used to calculate the wind speed differences within the site HKZ. By these procedures, two wind speed time series have been derived by Ecofys for 5 reference points within the HKZ, one originating from the wind measurement at the site OWEZ and the second one from the measurements with the floating LiDAR at the position HKZB within HKZS II.

A remarkable result is seen in the fact that the mean wind speeds as derived for the centre of the HKZ from the two wind measurements deviate only by 0,5 %. This is much lower than can be expected under view of the independency of the two measurements and the underlying data processing and under view of the fact that the uncertainty of each time series is much higher than 0,5 %.

Finally, Ecofys has derived one result in terms of the wind resource from the two measurements by weighting the single results on the basis of a detailed survey of uncertainties with the aim to minimise the uncertainty of the weighted result.

The entire approach followed by Ecofys is deemed being appropriate by the contractors. It certainly represents advanced industry practice.

EMD [4], [5] has [redacted] This provides the advantage of an appropriate modelling of wind conditions also at the neighbouring wind farm Luchterduinen, which had to be considered in terms of its wake effects on the WTs planned at the sites HKZS I and HKZS II.

3.5 Wake Modelling

EMD did calculate the wind speed reduction caused by WT wake effects with an industry standard model, which has been adjusted to large offshore wind farms. This approach is deemed being appropriate.

EMD [4], [5] did consider wake effects from the existing wind farm Luchterduinen, which is located directly adjacent to the HKZS I, and wake effects of the planned WTs of HKZS I or HKZS II. Wakes of further planned nearby wind farms have not been taken into account as suggested in the tender law [6]. Furthermore, wake effects of the WTs of HKZS I on HKZS II and vice versa have also not been considered, which is also compliant to the tender law.

The calculation of the wake losses requires assumptions on the thrust coefficient of the WTs as function of the wind speed, the so-called c_t-curve. The c_t-curve assumed by EMD for the planned WT [redacted]

The c_t-curves assumed by EMD for the WTs of the neighbouring wind farm Luchterduinen is turbine type specific, which represents good industry practice.

3.6 Calculation of Energy Production

EMD [redacted] EMD could be successfully verified within this review by means of a classical calculation in the frequency domain according to IEC 61400-12-1 [9].

An air density correction of the power curve to the mean air density at the wind farm site is not necessary as the power curve has already been supplied for the mean site specific air density by [redacted] The assumed mean air density at the HKZ sites at hub height is plausible.

3.7 Consideration of Technical Production Losses Other than Wake Losses

EMD has assumed a number of technical losses other than wake losses with proper explanations. The single loss calculations and assumptions are deemed being realistic and complete in terms of the specifications given in the tender law [6], the related questionnaires [10] and in terms of the grid curtailment conditions specified by TenneT [11], [redacted]

- [redacted]

3.8 Suggested Adjustments of the P50 AEPs

[redacted]

feature	correction factor	adjusted P50 AEP
[-]	[redacted]	[MWh]
WT availability		
grid curtailment		
total		[redacted]

Table 1: suggested adjustments of the P50 AEP for HKZS I

feature	correction factor	adjusted P50 AEP
[-]	[redacted]	[MWh]
WT availability		
grid curtailment		
total		[redacted]

Table 2: suggested adjustments of the P50 AEP for HKZS II

4 Review of Tender Project Costs

4.1 Summary

The contractors have reviewed both the project CAPEX and OPEX for all tenders as part of the due diligence and evaluation process. During the review period, it became apparent that a general trend could be perceived; projected CAPEX and OPEX costs had once again decreased measurably against both ongoing auction strike prices (winning bids) and current industry indices for future projects. The evaluation of any individual tender must be placed within the context of tender CAPEX/OPEX having reached levels previously only projected within cost reduction strategies or predicted in studies by industry analysts who are not privy to company internal cost data. In fact, the reduction in both CAPEX and OPEX has far exceeded that projected by key studies and industry experts.

The further sinking of both CAPEX and OPEX levels from the initial Borssele tenders for BWFS I and II, to the 2nd generation Borssele tenders for BWFS III and IV, over a period of only four months, strained credibility and tested the limits of a standard of reasonability. That we now see CAPEX/OPEX from the tenders for HKZ sites I&II again drop significantly, *further underscores the increasing disconnection between strike prices (in this case zero) and actual (or rather, "projected actual") costs.*

Conversely, wind turbine prices are continuing to fall to some degree, along with even more significant decreases in foundation and installation costs. The accompanying decrease in manufacturing margins has prompted statements of serious concern by CEOs and other industry leaders as to the sustainability of the current course of auction-based tenders. The lowering stock market prices of the major OEMs at the time of this report (not just offshore) reflect this disconnection. Additionally, margins across the industry continue to be highly strained, not just for the OEM, but throughout the supply chain. There are companies within the recent supply chain which now no longer exist, or whose future remain questionable.

There are of course positive gains in the acceptance of offshore wind power by the conventional energy world as a result of the strong and quick lowering of CAPEX/OPEX prices reflected by the decreasing tender prices. Political pressure to increase the level of offshore annual capacity is one concrete step for the industry as a direct result of significant cost reductions in CAPEX and OPEX. The industry can also document that both technical and engineering advancements, as well as more effective installation methods and supply chain management do lower costs and increase project efficiency, in some cases significantly.

But the question of the sustainability of current industry price trends is of major concern within industry leaders, and the subject of many current debates and conversations. It is within this uncertain state of the industry that the consultants must review the tenders for HKZS I & II, and find justifications for their opinions. This begins with a historical review of offshore projects using publically available costs and studies.

4.1.1 CAPEX Background

Figure 1 represents 11.745 MW of offshore capacity and shows a historical increase in costs (2016 USD) as projects moved farther offshore and into deeper waters as reported by NREL in [12]. Those higher costs tended to be balanced by decreases in cost per/MW for the WTs and significant increases in efficiency for other project categories, particularly in construction and installation methods, or the use of purpose-built vessels for

both installation and long-term operations, as well as other advances. Higher capacity factors for more recent projects, with future projects benefiting even more, should also be taken into account, leading to lowering of LCOE. Prices below have been adjusted to account for differences in offshore substation/power export schemes in different countries, as well as whether site development costs such as geotechnical surveys and metocean condition studies were included in bidder responsibility or not.

The German prices have not yet been adjusted to include the entire export system and will increase following adjustment. NREL also assumed a uniform contract length of 15 years, at one time a standard within the industry, but which is now moving toward less time for OEM service involvement and earlier operational responsibility from the owner/operator's side. But the prices shown in the graph are absolutely representative of the state of the industry at any particular point in time.

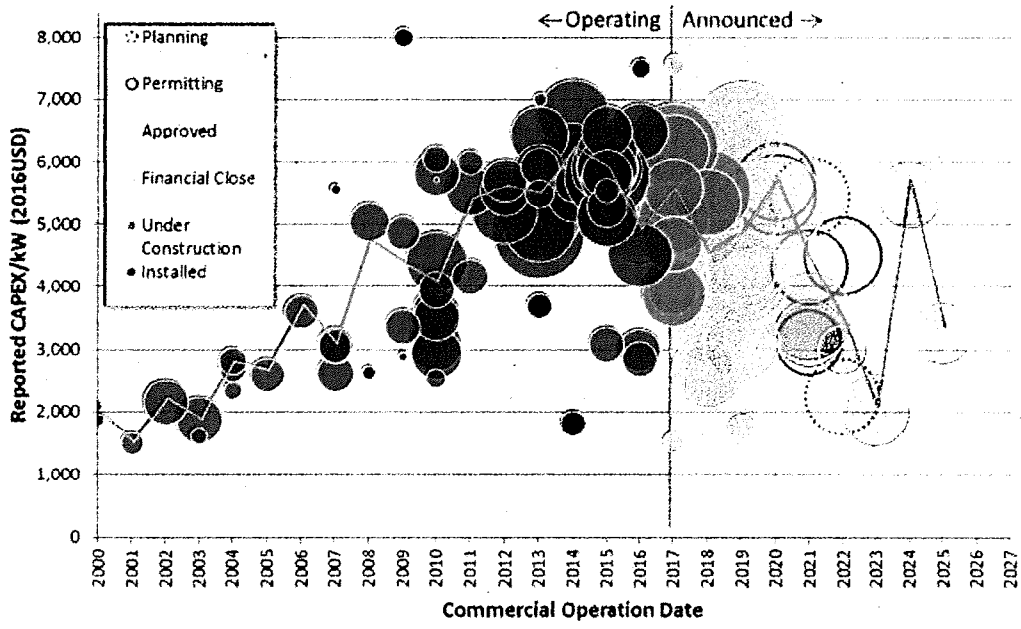


Figure 1: weighted average CAPEX cost trends for 11.745MW of Offshore Projects [12]

In Figure 1 we also see CAPEX trends peaked a few years ago, as more projects moved farther from shore and into deeper waters. But the past few years have seen the average capacity-weighted CAPEX drop (even including some higher outliers based upon differing tariff levels, such as in Belgium), and projections from expected future projects see CAPEX drop even more. Whether the recent and projected CAPEX levels have dropped enough to justify the current levels of tender strike prices is at best strongly debated within the industry. The contractors continue to find that there remains a significant disconnect between the reduction in CAPEX and the greater reduction in strike prices.

In Figure 2 we see the increase in CAPEX as projects moved farther offshore and into deeper waters. At the same time, cost reductions in most markets are becoming apparent, and significant near-term cost reductions are beginning to be seen. Denmark as outlier can be explained by the realisation that the 2012 Anholt project is the last data point. The next project there will be Vattenfall's Horns Rev 3, and the cost data reveals a further reduction. It is noted that Vattenfall's winning bid is lower than the feed-in tariff provided for Anholt, thereby only realisable through decreased CAPEX and OPEX. Strike

prices announced since this graph (such as those in Denmark, UK and the Netherlands, discussed later) only strengthen the trends shown.

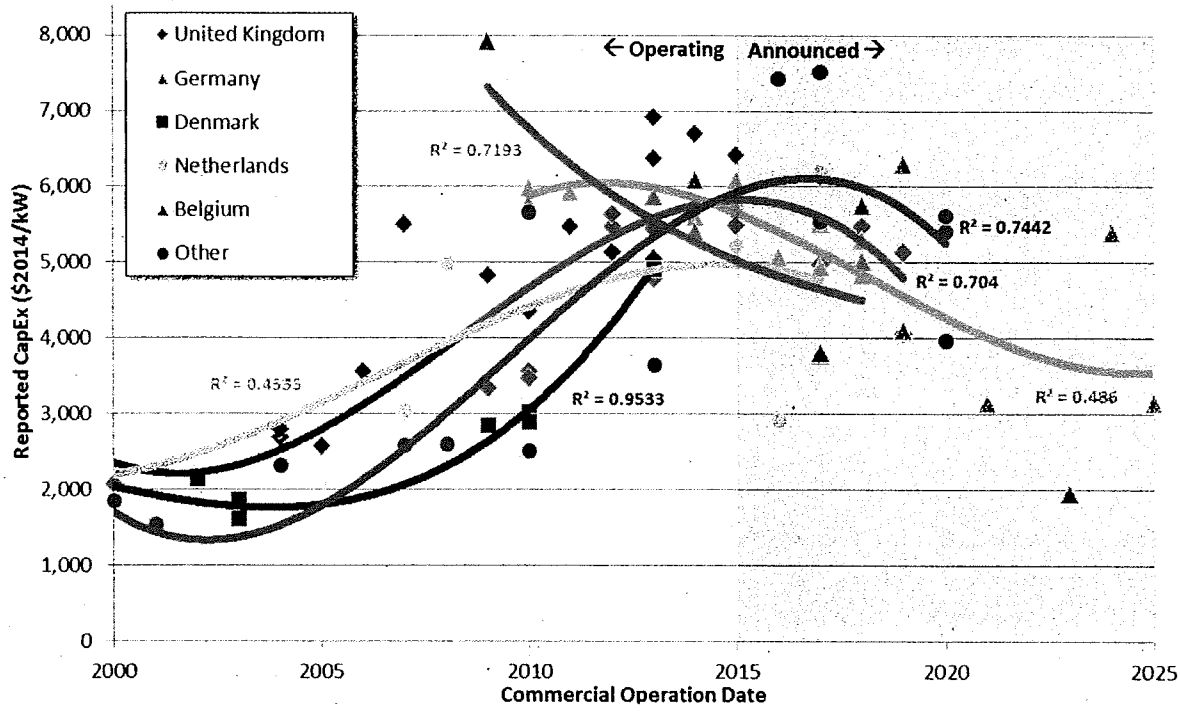


Figure 2: Project CAPEX trends by country [13]

Table 3 reveals estimated wind turbine costs for some previous projects as reported by NREL in [12]. It shows the spread found within the industry, partly because it represents only a small sample of actual TSA costs. The chart also does not reflect that the previous Borssele and current HKZ tenders are all using current state of the art WTs 8 MW and greater not truly represented by this sample. The most comparable are the Siemens SWT 6.0-154, which has since been upgraded twice to 7,0 MW and now 8,0 MW (and which currently includes a Power Boost upgrade allowing a maximum of 8,4 MW), and the Adwen and Senvion 5 MW and 6 MW turbines. Adwen had also developed an 8 MW turbine with the largest rotor available at 180 m, which had won several large French tenders ([redacted]), but since the takeover by Gamesa and later SGRE is no longer commercially available. It is reported that Senvion has a larger turbine in development, though its future may also be in question. The contractors have not discovered any publically available cost data for the MHI-Vestas 164 series.

It is also not known to what degree any longer-term warranty, ongoing service and/or installation costs are included in this snapshot of recent TSA prices. It is clear however, that WT prices from the Borssele tenders delineate a significant cost reduction from this sample, while the WT CAPEX reductions of the HKZ tenders continue the trend.

Project Name	Country	COD	Order Size (MW)	OEM	Turbine Model	Turbine Rating (MW)	Number of Turbines	Cost ($2016/kW)
Dudgeon	United Kingdom	2017	402	Siemens	SWT-6.0-154	6.0	67	2,141
Gemini	Netherlands	2017	600	Siemens	SWT-4.0-130	4.0	150	3,363
Nordsee One	Germany	2017	332	Senvion	6M	6.15	54	2,026
North Sea	Various	Various	1,800	Siemens	Siemens SWT-3.6	3.6	500	1,740
Various	Germany	Various	1,494	Senvion	5M and 6M	5.0 & 6.0	250	2,080
Wikinger	Germany	2017	350	Adwen	M5000-135	5.0	70	1,699

Table 3: WT costs from turbine supply agreements as publically available [12]

Detailed analysis of the reasons the tenders have reached costs levels previously only predicted, and even beyond, is outside the scope of the contractors' due diligence. The contractors note the several publically available studies which describe site, technical, engineering and business/financial reasons for both the actual and projected reduction in CAPEX costs, including the proxy study used by the contractors as a component of comparative analysis. The contractors also note that transformer station, export cable costs and project development costs are born by other parties and are not included within tender project CAPEX. Further noted (as just one example of legitimate cost reduction) is that monopile foundations are now being designed and constructed which were not deemed possible at this scale in the past, and are seen within the tenders, replacing the other, more expensive foundation designs (such as jackets) that were standard for large diameter rotors and/or deeper waters. Further, grouted transition pieces (TPs) are no longer a standard, replaced by flanged and bolted TPs. [redacted]

4.1.1.1 Current Costs

In the industry there is a large sphere of publically available (but generally unverifiable) CAPEX data, usually much higher than seen since the change to auction-based systems. The contractors are well aware of the cross-section of publically available project costs, but no longer see a justification for comparing CAPEX from previous tariff schemes with the current auction-based results. Comparing strike prices from more recent auctions with the current rounds document the move toward "zero subsidy" tenders; or to tenders with limited "top-up" subsidies. The contractors believe NREL [12] has produced one of the most accurate adjusted summaries to date, reproduced here as Figure 3. (the observer must convert 2016 USD to 2016 EUR; contractors have used $1=€0,92).

This graph shows decisively the downward trend in strike prices. It also shows just how significant the drop from the auctions of just a few years ago are to those of the present, which can be seen clearly in the graph.

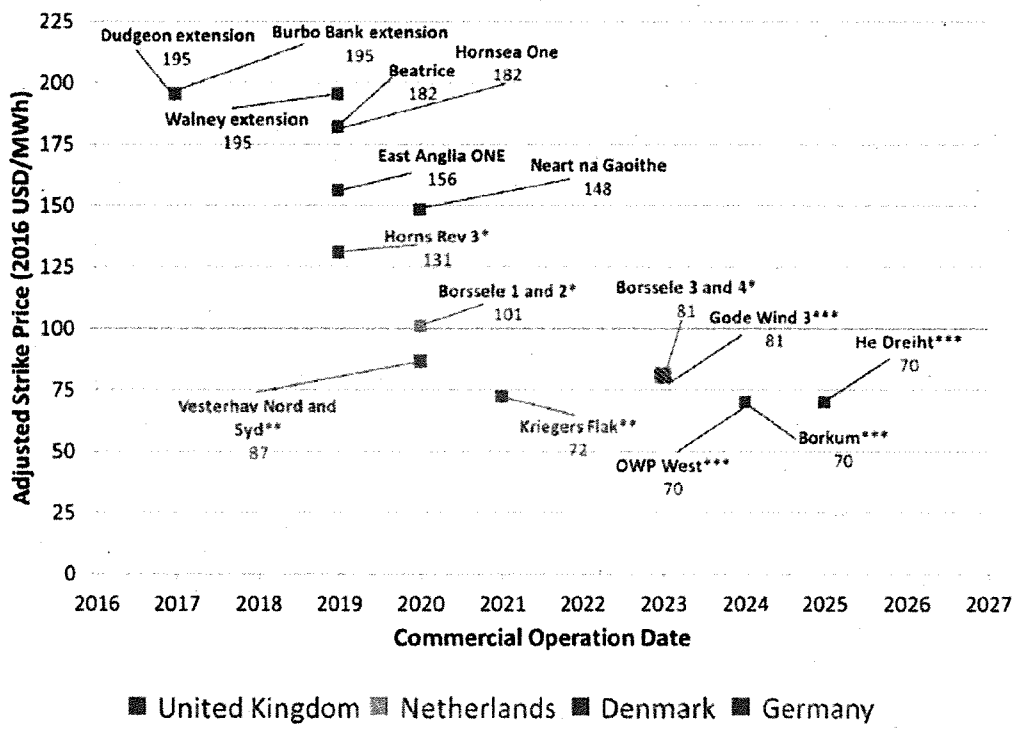


Figure 3: Adjusted strike prices from European offshore wind auctions [13]

Significant lowering of CAPEX also occurs as a result of increases in project capacity factor. Stronger winds, higher generator rating, larger rotors, more advanced technology, and more optimised operation and maintenance strategies, such as the growing use of WT condition monitoring and more optimised control algorithms, all contribute to gains in productivity, and thus lowering costs. NREL [12] has calculated the increase in capacity factor over the growth of the offshore wind sector (Figure 4).

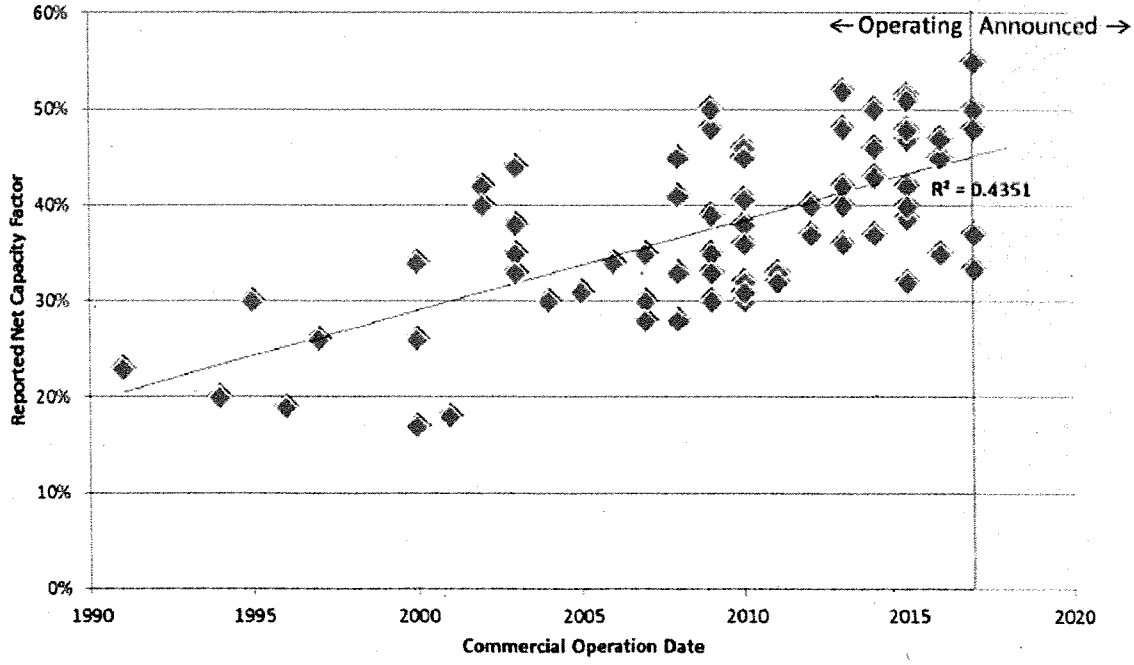


Figure 4: Net capacity factor for selected European offshore wind projects [12]

In addition to capacity factor gains, advancements in WT technology have seen optimisation of the stronger offshore wind resource gained partly by using larger, higher rated WTs, and partially by going farther offshore into stronger and more reliable winds. Fraunhofer in Germany originally estimated key parameters used in the industry in 2013. They have now updated their previous study in late 2017 [14]. In Table 4 the right hand column is the 2013 study, and the left hand column is the current study. The rows are number of full load hours annually, annual hours of WTs in operation, days per year of some power production and the percent of the frequency of variances in power output of less than 10%, indicating manageable regional output for the grid operators. The contractors note a drop in full load hours, but a correspondingly significant increase in the number of annual hours of operation and the number of days with some production of electricity all of which increases the functionality and viability of harnessing offshore wind as a power plant.

	Vorliegende Studie	Vorgängerstudie [IWES 2013]
Offshore-Volllaststunden [h]	4.660	4.800
Betriebsstunden [h]	8.700	8.000
Tage mit Stromproduktion [d]	363	340
Häufigkeit der Leistungsänderung kleiner 10 Prozent [%]	90	70

Table 4: Advances of offshore wind farm energy production from 2013 to 2017 according to [14]

The literature is full of studies attempting to codify potential cost reductions through various technological advancements, whether in hardware and materials, software and controls, manufacturing or supply chain efficiencies, and other learning curve developments. One of the most recent is a late 2017 update of a base case first performed in 2014; "Future renewable energy costs: offshore wind," by BVG associates for KIC Innogy based in the Netherlands [15]. Figure 5 shows an example of such recent attempts at quantifying potential cost reduction scenarios.

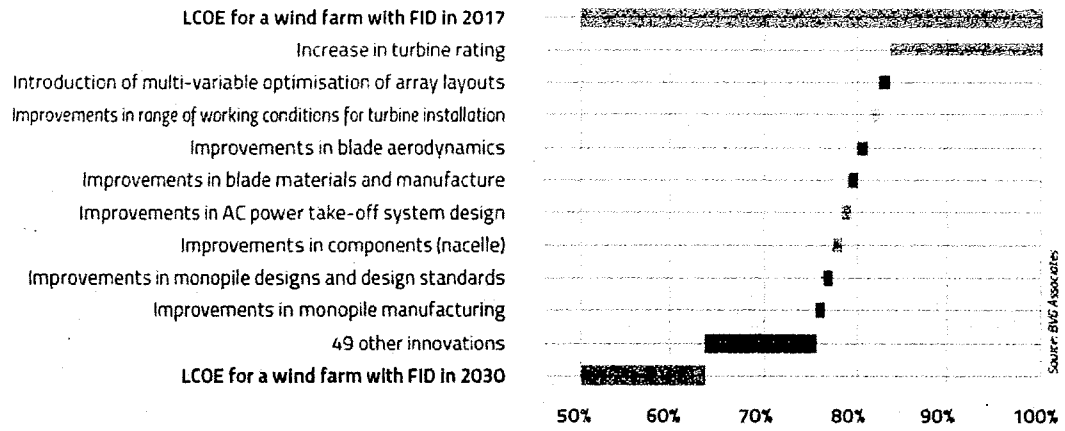


Figure 5: Anticipated impact of technology innovations for a deep water, far offshore wind park using 10 MW WTs with financial investment decision (FID) in 2030 compared with an FID 2017 offshore park using 6MW WTs [15]

The BVG Associates study [15] attempts to quantify the impact of more than 50 documented innovations, and translate their results into the effect on the four basic economic drivers for offshore wind parks: CAPEX, OPEX, AEP and LCOE. Their findings are shown in Figure 6 taken from their 2017 update below. In this figure, Site A can be considered a 500 MW near shore project, while Site D represents a 500 MW wind farm sited 125 km from shore in water depth of 35 m, with an annual wind speed of 10,0 m/s.

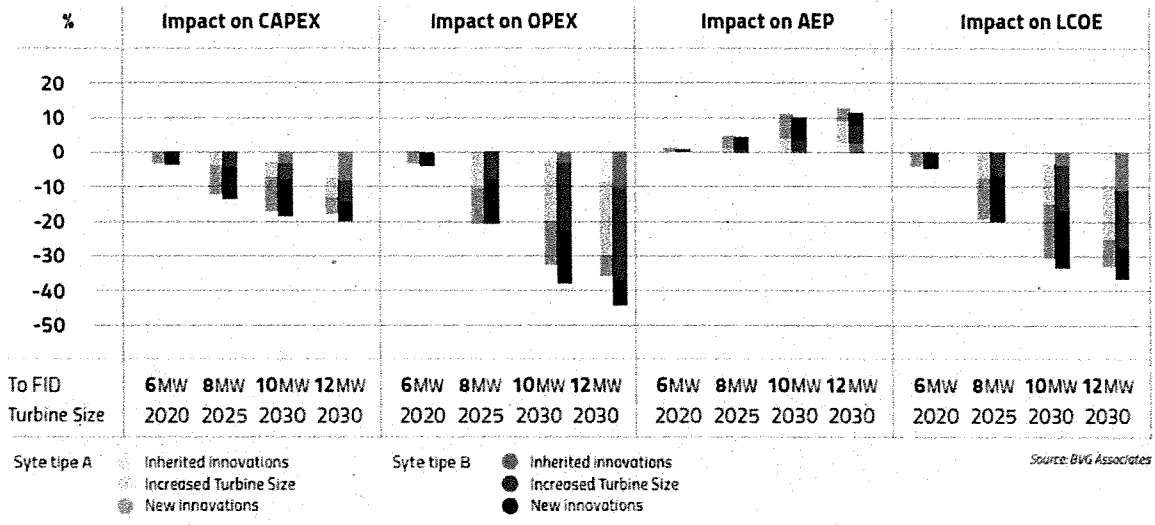


Figure 6: Anticipated impact of all (57) innovations by WT size and site type over the periods shown [15]

It is important to note that this impact study does not take into consideration that some projected cost reductions are already in effect when used to justify low auction bids. Further, the study does not take into account that the past Borssele and Danish near-shore tenders, as well as the current HKZ tender, are already bid using 8 MW or greater wind turbines. The earliest projects using this scale of WT are already in commercial operation. But the vast majority of cost savings remain at this time just projections.

The contractors had previously used as a proxy reference a cost reduction study from Prognos [16]; which was designed to model cost reductions for future state-of-the-art projects, but is now considered outdated, or at least no longer relevant for comparison to the HKZ tenders. The contractors also examined and collected comparable data from studies performed by NREL in the US (examining offshore wind in Europe) [12], Fraunhofer in Germany [14], Mott McDonald and Green Giraffe [17], IRENA [18], WindEurope [19] and others to provide a compendium of sources used to validate and justify contractor findings.

The chosen proxy scenario 10-A-20 of the InnoEnergy – BVG Associates study [15] is reasonably compliant with the HKZ site parameters. The scenario envisions 10 MW WTs at a relatively near shore site similar to HKZ, when compared with a deeper water far shore site. The proxy project reaches FID 2020, similar to the HKZ tenders. The wind farm size of HKZS I&II is greater than the proxy project, and the wind speeds are higher at HKZ as well. However, the contractors find the similarities of HKZ to the proxy site to outweigh the discrepancies. The proxy site configuration is shown in Table 5.

Parameter	Site Type A'
Distance from shore (km)	40
Water depth (m)	25
Wind speed at 100m (m/s)	9.0
Farm size (MW)	500

Table 5: main parameters of the chosen scenario 10-A-20 from [15]

Fraunhofer [14] considers the Inno-BVG study [15] to be the most optimistic of many future cost estimations, and the contractors agree with this assessment, even including some studies not shown by Fraunhofer below. The contractors have taken the optimism built into the proxy study into account in their findings. Fraunhofer charts the projected development of LCOE against the projected LCOE of some key studies, including the optimistic proxy used by the contractors (Figure 7).

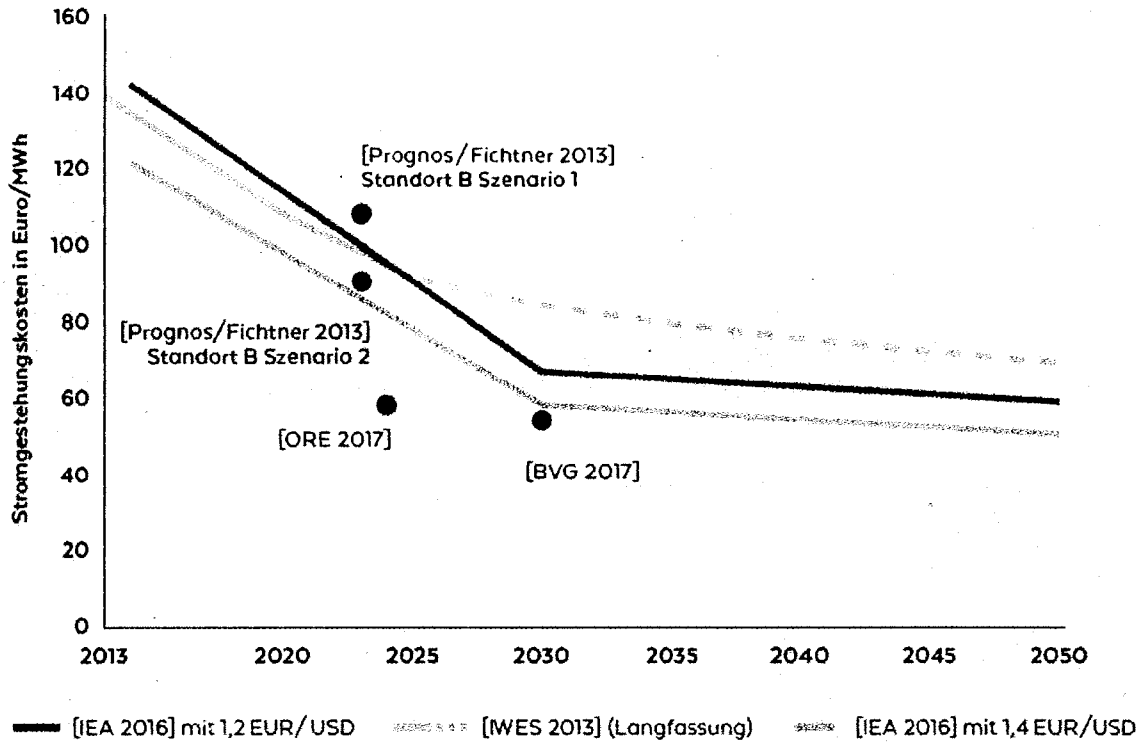


Figure 7: Expected LCOE in dependency of FID from different cost studies as summarised in [14]

Contractors note that cost advantages are built into the HKZ projects when use [redacted]

The potential variations in present and future steel prices were not considered in this due diligence because a) steel prices represent only a fraction of the CAPEX, b) all tenders will be affected similarly by any changes and c) some tenders are based on actual offers from fabrication suppliers, or at least ongoing discussions with the major steel or foundation suppliers.

Finally, many of the studies focus upon LCOE as the primary financial marker for a project, while the current due diligence effort specifically examines CAPEX (and OPEX). Inno-BVG has graphed estimated LCOE for winning tenders, which provide a reference point between the two markers (Figure 8).

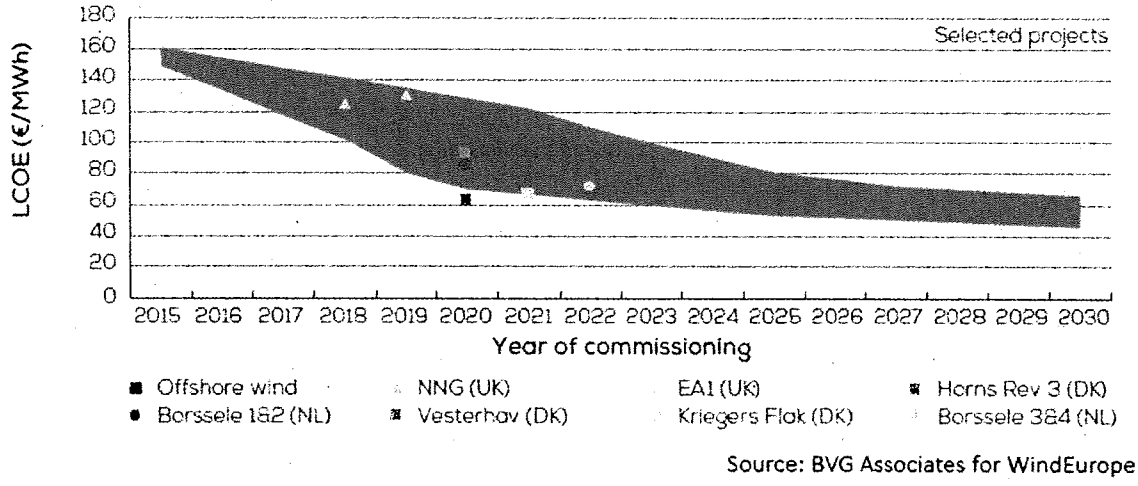


Figure 8: Expected LCOE range of offshore wind farms as function of FID according to [15]

4.1.1.2 Realistic CAPEX

The cited studies and much real world experience have shown that significant cost reductions in CAPEX are not only possible, but some have already occurred. Conversely, there is almost no real world data showing actual CAPEX for projects which approximate the expected costs to be incurred at HKZ. The contractors assume that the major players such as WT OEMs, cable and foundation fabricators, construction and installation contractors, all have enough data with which to make reasonable estimates of their contribution to total CAPEX. Whether these estimates are accurately reflected within the tender framework remains open to question.

Public sources documented that many in the industry were surprised that DONG won the Borssele I&II tender with a strike price of € 72,3/MWh, at a time when the industry goals had been to get under € 100/MWh prior to 2020. (Remember that development costs, plus estimated € 14-16/MWh for interconnection costs, must be added to the Borssele bids.) For Borssele III&IV, it was apparent that a winning bid had to be below the benchmark set by DONG. Only a few months later, the Shell consortium won the bid with such significantly lower strike price, at € 54,5/MWh, that it began to be apparent that other factors than actual estimations of CAPEX (and OPEX) had to be taken into account. (The contractors had written that project CAPEX "strained credibility".)

With the addition of strike price data from the recent contract for differences (CfD) auction in the UK, and the prices achieved in the April 2017 first auction in Germany (with the greatest proportion of strike prices going to zero), it was now clear that other factors

than actual costs played a huge role in tender bid design. Coupled with the decreasing margins, industry leaders began to mark the non-sustainability of the current course of prices.

The contractors point out that a significantly lowered CAPEX (and OPEX) is not the sole driver for the move to such low tender bids. Competitive tender offers also must include significant strategic price components. Long-term business plans focused around maintaining or enhancing project pipelines; strategies to have significant effect upon a firm's competitors and/or competition in general; the potential future option value of holding a permit or "license," and other non-project but potentially valuable factors enter into a particular tender's bid design. Whether potential penalties for not building a project are high enough to deter speculation is outside the scope of this due diligence; the risk to society of not seeing a power plant built remains.

The contractors have earlier stated that the bidders for HKZ all have experience enough with suppliers, fabricators and installers that their CAPEX projections are likely to be accurate and reflect ongoing discussions on contract prices with the key players. That the prices are accurate is one marker, whether the prices are at all sustainable is the serious question, which is not answered by current strike prices. Contractors do note that previous tenders often include what the bidders considered binding contracts, while in this tender there is little to no discussion of binding contract conditions. Contractors further note that a binding contract usually contains significant conditions necessary to be met before the contract actually becomes binding, which must be analysed to ascertain what "binding" precisely means.

Total CAPEX for the mean bids of HKZ is [redacted] But the largest markers separating this tender from previous tenders are displayed to an even greater extent when comparing the derived HKZ means to the means from the previous round of Borssele III&IV.

The mean bid total CAPEX is [redacted]

For another perspective, the winning bid's CAPEX from the second Borssele round is already [redacted]% lower than the mean for that auction (Borssele III&IV) per MW, and [redacted]

category	mean of bids		standard deviation of bids	BVG study		deviation mean of bids to BVG study	Borssele III & IV		deviation mean of bids to Borssele III & IV
[-]	[k€/MW]	[% of CAPEX]	[% of mean]	[k€/MW]	[% of CAPEX]	[% of BVG's value]	[k€/MW]	[% of CAPEX]	[% of Borssele's value]
WT total									
WT supply									
WT installation									
foundations total									
foundation supply									
foundation installation									
cable total									
cable supply									
cable installation									
planning and administration									
contingency									
financing									
insurance									
total CAPEX									

Table 6: comparison of mean CAPEX of the HKZS I&II tenders to the scenario 10-A-20 of the BVG study [15] and the mean CAPEX of the Borssele III&IV bids

Perhaps the most telling data point in a discussion of the disconnect between strike price and CAPEX: a review of the list of industry players who did not bid for HKZS I&II.

4.1.2 OPEX

Previous analysis for Borssele I-IV was only conducted over the subsidy period of the bid award (15-16 years). The Operational Expenditures period being analysed for HKZ is the planned lifetime of the project, roughly 25 years. Thus significantly more emphasis has been placed upon the analysis of project OPEX for HKZ.

Project owner/operators do not release OPEX, and little is publicly known about operational costs for the wind turbines themselves, much less the projected BoP for monopiles or jacket foundations, or sub-sea cables. OEMs certainly know their own costs in detail, whether during the warranty period (Notice of Defect) or during a later service-oriented period. OEMs also know what costs are necessary to reach a certain level of availability. Owners know what is paid for a warranty, as well as for an extended service package. As more and more of the owners tend toward using their own in-house O&M teams, they are also beginning to accumulate cost data on operating their projects, though with this scale of technology cost accumulation is only just now beginning.

MAKE [20] attempted to quantify offshore O&M costs for Europe in an October 2016 presentation; estimated for 2015 (Figure 9).

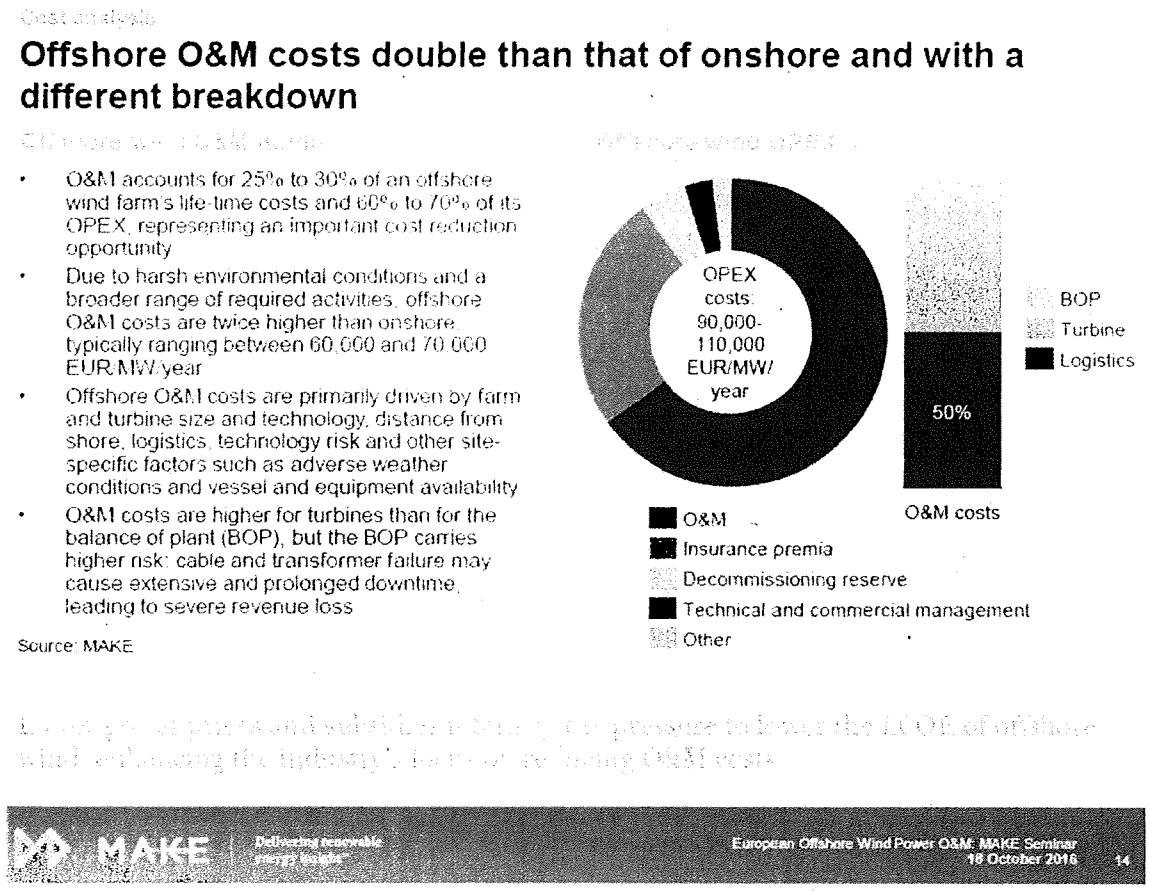


Figure 9: 2015 offshore wind farm OPEX according to [20]

As this chart likely reflects a reasonable (but optimistic) estimate for 2015's total OPEX, the HKZ discussion now has at least some points upon which to base the OPEX analysis. First, MAKE states that offshore OPEX is twice the cost of onshore, which the contractors, based upon their experience, have used (roughly) on previous evaluations. Second-

ly, MAKE gives a range of € 90.000/MW/a to €110.000/MW/a as an estimate. The contractors have seen similar costs in the real world.

An earlier study for the Crown Estate in the UK by BVG Associates (Offshore Wind Cost Reduction Pathways: Technology Workstream – 2012) was reported in an ORE Catapult study from 2015 [21]. The BVG study analysed then current and future projected projects using WTs in the range of 4 to 10 MW. Unscheduled maintenance for the WTs was found to be the cost driver at some 65 % of WT costs. Such levels would not be expected to be found in an O&M strategy within a mature industry, and it would be expected that more mature WT designs would indeed lower such costs.

The ORE study [21] listed industry priorities to reduce OPEX: improvements in asset management strategies and tools; more efficient logistics methods; enhanced component reliability; and even standardization and sharing of knowledge. The contractors recognize that the industry has made strong progress in addressing these issues, leading of course to justifiable cost reductions without sacrificing output.

Bloomberg New Energy Finance [22] has produced a breakdown of offshore O&M cost components. While the breakdown here does not entirely match the categories chosen by the contractors, the graph remains a reasonable data point on which to evaluate OPEX. Contractors note the breakdown will also change depending on financing (i.e., balance sheet or project finance) as well as changes in technology or foundations.

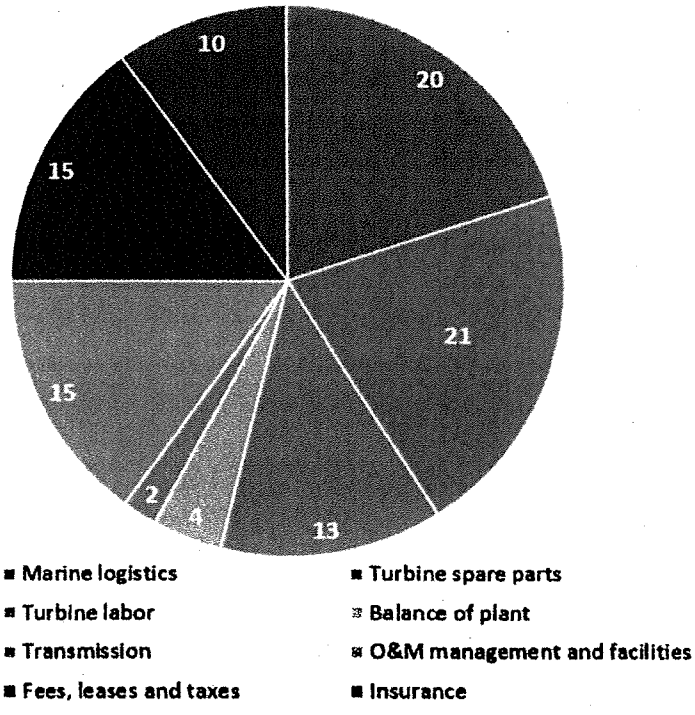


Figure 10: offshore wind O&M costs by segment (%) according to [22]

ORE Catapult [21] does list estimated costs at similar high levels to the MAKE study from 2016 [20] (Figure 9); but also point out the unavailability of actual cost data upon which to rely. MAKE released a further study of offshore wind O&M in September 2017 [23]. Contractors note that while this study does address O&M issues of relevance to evaluating OPEX cost reductions, the study contains no cost data upon which to use for tender evaluation. This latest MAKE report calls the situation "challenging."

The proxy Inno-BVG study [15] used for CAPEX addresses innovations in OPEX which would lead to cost reductions. However, the study states that the greatest opportunities for reductions in OPEX remain with larger WTs in far shore projects, and thus the relevance for the OPEX section is more limited in the case of HKZ.

While it is noted that OPEX costs for state of the art wind turbines and projected foundations and cable arrays will certainly be reduced from the various studies reviewed by the contractors, and even from actual operational data, it is not apparent to the contractors that the reductions proposed would allow the exceptionally low tender levels of OPEX for HKZ to be realised.

Finally, the OPEX for the Borssele tenders was far lower than that presented in the most optimistic of O&M studies, and the reductions exceeded the limits of what the contractors deem reasonable. But OPEX for HKZ is [redacted] than Borssele III&IV, even including some [redacted] in decommissioning costs (Table 7). The very significant [redacted] can be devalued, playing a relatively small role in the overall OPEX. [redacted]

In fact, in the key sector of wind turbine O&M, the WT OPEX for Borssele III&IV was generally considered by the contractors as not reasonable. The mean of the Borssele bids was €[redacted]k/MW/a; (this price was somewhat skewed by one bid being nearly [redacted]% higher than the Borssele mean, though also offset by two bids at unreasonably low estimates, resulting in the mean being meaningful).

Still, the HKZ mean for WT O&M stands now at roughly € [redacted]

category	mean of bids		standard deviation of bids	BVG study		deviation mean of bids to BVG study	Borssele III & IV		deviation mean of bids to Borssele III & IV
[-]	[k€/MW/a]	[% of OPEX]	[% of mean]	[k€/MW/a]	[% of OPEX]	[% of BVG's value]	[k€/MW/a]	[% of OPEX]	[% of Borssele's value]
WT O&M	[redacted]								
BoP O&M									
management									
other									
insurance									
decommissioning									
total OPEX									

Table 7: comparison of mean OPEX of the HKZS I&II tenders to the scenario 10-A-20 of the BVG study [15] and the mean OPEX of the Borssele III&IV bids

[redacted]

Further analysis of OPEX was done over the project lifetime on an annual basis; where variances in O&M strategy may be discerned. The contractors have graphed each tender as well as the mean, according to yearly hard costs (Figure 11). Due to the variance in recognizing decommissioning costs, such costs were eliminated (contractors note there will likely be significant changes to decommissioning costs 25 years into the future). The tenders will be discussed within the individual reports, but the degree of variance in O&M strategies is apparent.

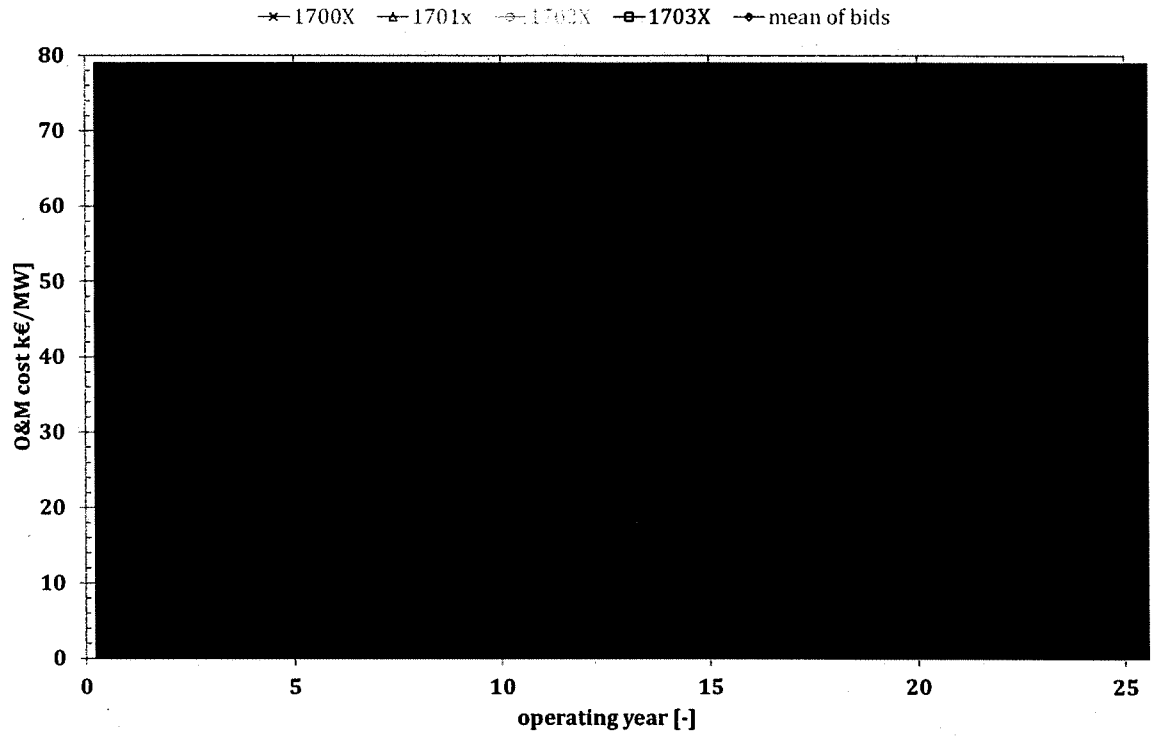
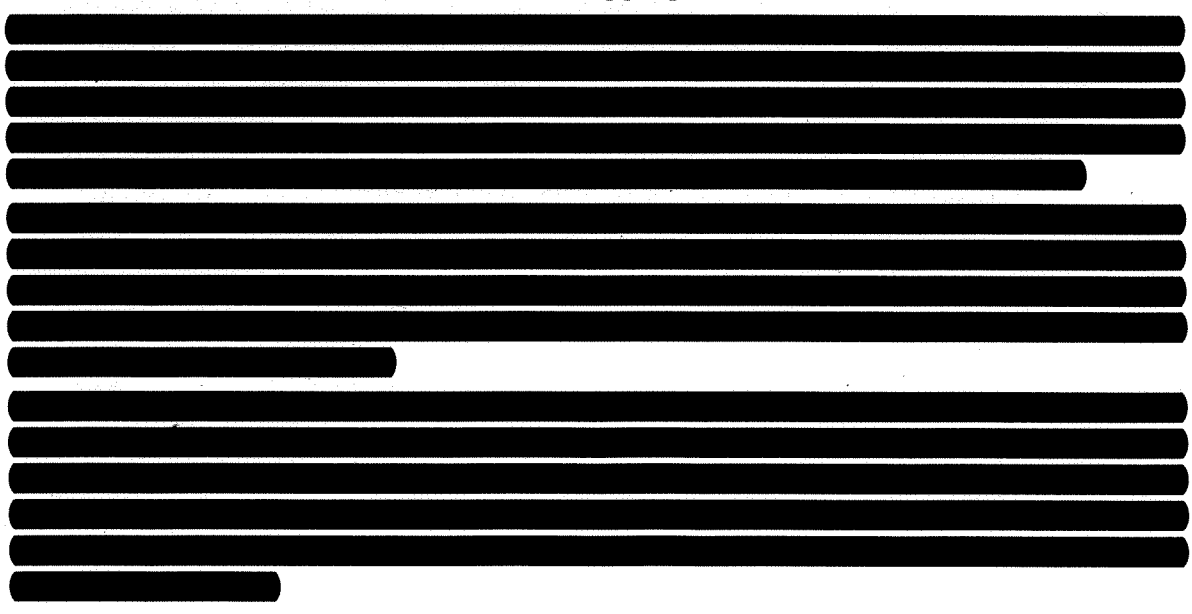


Figure 11: annual O&M cost of the 4 tenders without decommissioning cost

4.2 CAPEX of Project VERWZ1703X

The CAPEX data and statistical evaluation are provided in Table 8 below.

The project costs provided by VERWZ1703X were evaluated both as a whole and by their categories. Contractors analysed the bids from various perspectives or views: by actual hard costs, by yield perspective in MWh and MWh/a, and by capacity-based views per MW, per MW/a, and per WT. It should be noted the tender sample size is small and the comparison among bids to the mean is subject even more to the limited sample size. Outliers and anomalies will be noted where appropriate.



[redacted]

category	bid VERWZ1703X		mean of bids	standard deviation of bids	deviation VERWZ1703X to mean of bids	BVG study		deviation VERWZ1703X to BVG study
[-]	[k€/MW]	[% of CAPEX]	[k€/MW]	[% of mean]	[% of mean]	[k€/MW]	[% of CAPEX]	[% of BVG's value]
WT total	[redacted]							
WT supply								
WT installation								
foundations total								
foundation supply								
foundation installation								
cable total								
cable supply								
cable installation								
planning and administration								
contingency								
financing								
insurance								
total CAPEX								

Table 8: bid CAPEX by k€/MW in standardised categories compared to the mean cost of all bids and to scenario 10-A-20 of the Inno-BVG study [15]

4.3 OPEX of Project VERWZ1703X

The OPEX provided by VERWZ1703X were evaluated both as a whole and by their categories. The contractors note that WT O&M costs depend greatly upon the length of the warranty from the OEM, and particularly the degree of service and parts provided. It should also be noted the tender sample size is small and the comparison among bids to the mean, particularly within OPEX categories, is subject to significant deviation.

[redacted]

[redacted]

category	bid VERWZ1703X		mean of bids	standard deviation of bids	deviation VERWZ1703X to mean of bids	BVG study		deviation VERWZ1703X to BVG study
[-]	[k€/MW/a]	[% of OPEX]	[k€/MW/a]	[% of mean]	[% of mean]	[k€/MW/a]	[% of OPEX]	[% of BVG's value]
WT O&M	[redacted]							
BoP O&M								
management								
other								
insurance								
decommissioning								
total OPEX								

category	bid VERWZ1703X		mean of bids	standard deviation of bids	deviation VERWZ1703X to mean of bids	BVG study		deviation VERWZ1703X to BVG study
[-]	[€/MWh]	[% of OPEX]	[€/MWh]	[% of mean]	[% of mean]	[€/MWh]	[% of OPEX]	[% of BVG value]
WT O&M	[redacted]							
BoP O&M								
management								
other								
insurance								
decommissioning								
total OPEX								

Table 9: OPEX of the bid by k€/MW and €/MWh in standardised categories and comparison to the mean cost of all bids and to scenario 10-A-20 of the Inno-BVG study [15]

[redacted]

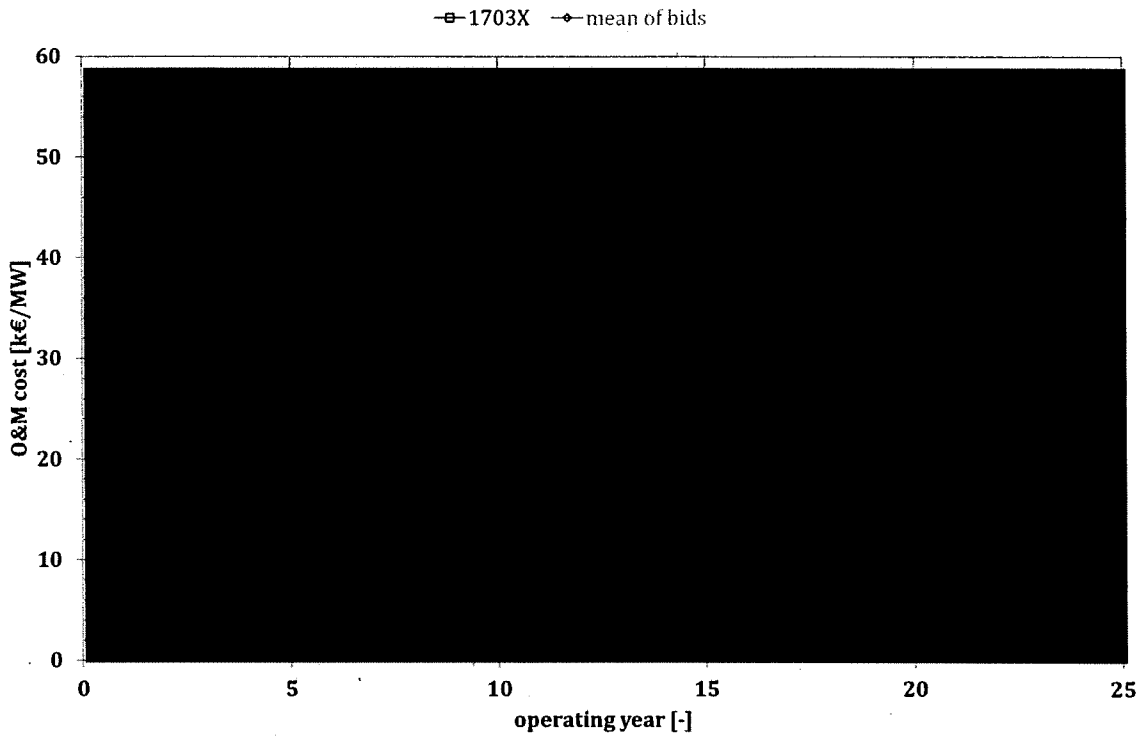


Figure 12: annual O&M cost (without decommissioning cost) of VERWZ1703X compared to the mean of all 4 bids

5 Conclusions

The wind reports supplied by the applicant from EMD [4], [5] are considered as being compliant to industry standard methods. [redacted]

As a part of the review of CAPEX and OPEX, the contractors also reviewed the Project Plan provided in the tender. The project plan is complete and conforms to reasonable industry standards and no critical items were identified.

An overview on the analysis to fulfil the tender requirements on the three main categories of due diligence is provided in Table 10.

	check point	result
	wind report	
1	Is the wind energy yield calculation prepared by an independent organisation with expertise in the field of wind energy yield calculations?	yes
2	Have reputable calculation models, environmental models, wind models and wind maps been used?	yes
3	Does the wind report contain the location data?	yes
4	Does the wind report contain the make, type of the wind turbine?	yes
5	Does the wind report contain the technical specifications, including hub height, rotor diameter and capacity curve of the wind turbine?	yes
6	Does the wind report contain the local wind data for the wind farm?	yes
7	Does the wind report contain the calculation of the P50 value for the net electricity production of the wind farm?	yes
8	Does the P50 calculation include: availability, wake effects, electricity losses and curtailment losses?	yes
9	Does the P50 calculation for the wake effect only take into account the wind farm itself and the Luchterduinen wind farm?	yes
	CAPEX	
1	Is a specification of the investment costs per main component available?	yes
2	Is this specification sufficiently complete?	yes
3	Is the level of these cost items within reasonable limits and can abnormal values be explained?	no
4	Is the grand total of the CAPEX plausible?	no
	OPEX	
1	Is a specification of the cost items during operation available?	yes
2	Is this specification sufficiently complete?	yes
3	Is the level of these cost items within reasonable limits and can abnormal values be explained?	no
4	Is the grand total of the OPEX plausible?	no

Table 10: check list of fulfilment of criteria of the tender requirements

6 References

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[3] Hollandse Kust (zuid) Offshore Wind Farm Zone, Combined Wind Resource Assessment, Project number: ESWT17659, ECOFYS, 2017-09-18

[4] AEP Assessment Hollandse Kust Zuid II The Netherlands, Annual Energy Production Assessment for HKZ II Part of the permit application by Chinook, EMD International A/S, 2017-12-13

[5] Wind Resource and Yield Assessment Report Hollandse Kust (zuid) Wind Farm Site II, ECN, Report No.:ECN-X--17-135, December 2017

[6] Ministerial Order for permitting offshore wind energy permits for the Hollandse Kust (zuid) Wind Farm Sites I and II, No. WJZ / 17122295, The Netherlands Minister of Economic Affairs, 2017-10-13

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[18] The Power to Change, Solar and Wind Cost Reduction Potential to 2025, ISBN 978-92-95-111-97-4, IRENA, June 2016

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[21] Operations and maintenance in offshore wind: key issues for 2015/16, document TLI-/-KI-00001, CATAPULT Offshore Renewable Energy, September 2015

[22] Bloomberg New Energy Update, 2018-01-31

[23] Changing Conditions and Implications for Offshore Wind O&M in Europe, MAKE research note, 2017-09-22

Overzicht rangschikkingspunten Hollandse Kust Zuid I en II

Oranje WP		Witwind		Redhotpoker		Chinook	
I	II	I	II	I	II	I	II
ptn	ptn	ptn	ptn	ptn	ptn	ptn	ptn

24a	1	projectmanagement	[redacted]
	2	leveranciers funderingen	
	3	installateurs funderingen	
	4	leveranciers windturbines	
	5	installateurs windturbines	
	6	leveranciers kabel	
	7	installateurs kabel	
	8	onderhoud	
24b		termijn overeenkomst met TenneT	
24c		capaciteit	
24d		net efficiency	
24e	1	risico's opbrengst	
	2	risico's bouw	
	3	risico's exploitatie	
24f	1	mitigatie risico's opbrengst	
	2	mitigatie risico's bouw	
	3	mitigatie risico's exploitatie	
		Totaal punten	

Oranje Wind Power, VERWZ17001 en VERWZ002

Criterium A: De kennis en ervaring van de betrokken partijen.

[redacted]

Criterium B: De kwaliteit van het ontwerp voor het windpark.

[redacted]

Criterium C: De capaciteit van het windpark

[redacted]

Criterium D: De maatschappelijke kosten

[redacted]

[redacted]

Criterium E: De kwaliteit van de inventarisatie en analyse van de risico's

[redacted]

Criterium F: De kwaliteit van de maatregelen ter borging van kostenefficiëntie

[redacted]

Totale rangschikkingsscore voor Oranje Wind Power

[redacted]

Witwind, VERWZ17011 en VERWZ17012

Criterium A: De kennis en ervaring van de betrokken partijen.

[redacted]

Criterium B: De kwaliteit van het ontwerp voor het windpark.

[redacted]

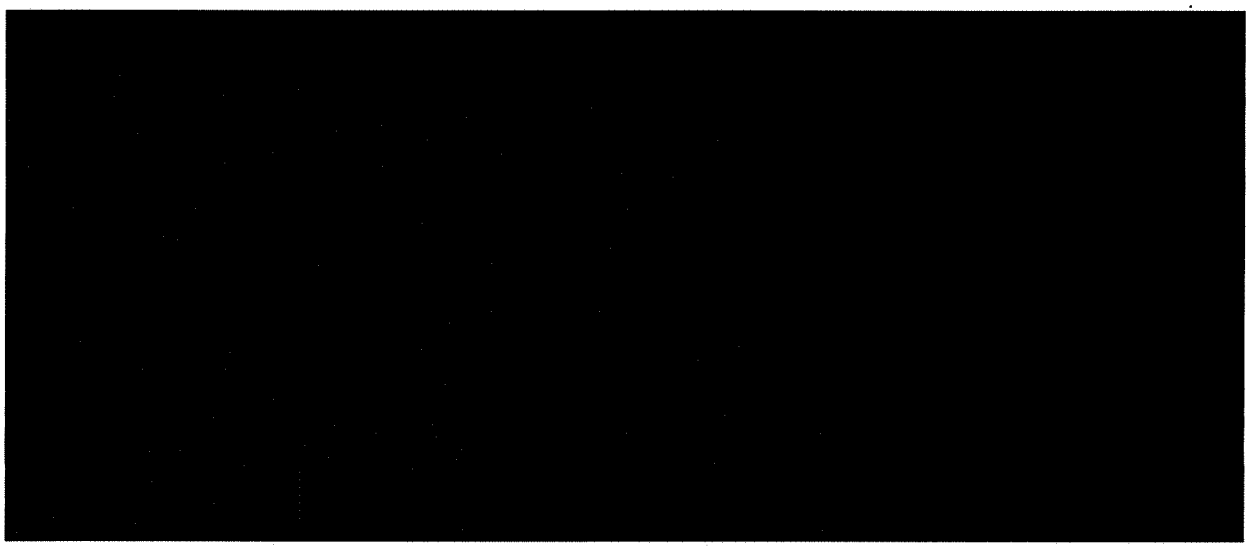
Criterium C: De capaciteit van het windpark

[redacted]

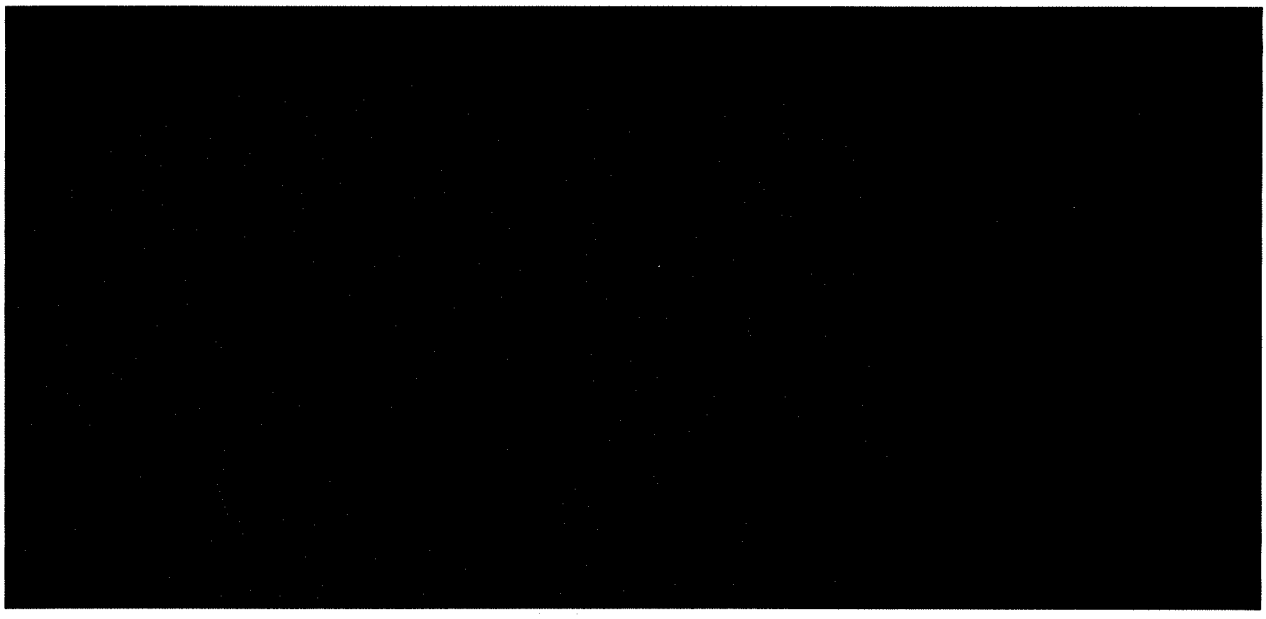
Criterium D: De maatschappelijke kosten

[redacted]

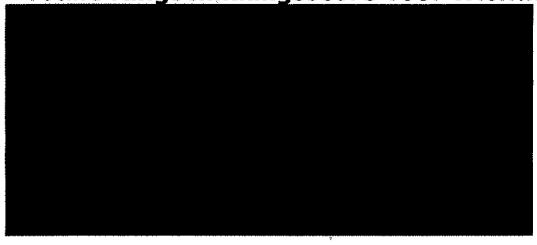
Criterium E: De kwaliteit van de inventarisatie en analyse van de risico's



Criterium F: De kwaliteit van de maatregelen ter borging van kostenefficiëntie



Totale rangschikkingsscore voor Witwind



Redhotpoker, VERWZ17021 en VERWZ17022

Criterium A: De kennis en ervaring van de betrokken partijen.

[redacted]

Criterium B: De kwaliteit van het ontwerp voor het windpark.

[redacted]

Criterium C: De capaciteit van het windpark

[redacted]

Criterium D: De maatschappelijke kosten

[redacted]

[redacted]

Criterium E: De kwaliteit van de inventarisatie en analyse van de risico's

[redacted]

Criterium F: De kwaliteit van de maatregelen ter borging van kostenefficiëntie

[redacted]

Totale rangschikkingsscore voor Redhotpoker

[redacted]

Chinook, VERWZ17031 en VERWZ17032

Criterium A: De kennis en ervaring van de betrokken partijen.

[redacted]

Criterium B: De kwaliteit van het ontwerp voor het windpark.

[redacted]

Criterium C: De capaciteit van het windpark

[redacted]

Criterium D: De maatschappelijke kosten

[redacted]

[redacted]

Criterium E: De kwaliteit van de inventarisatie en analyse van de risico's

[redacted]

Criterium F: De kwaliteit van de maatregelen ter borging van kostenefficiëntie

[redacted]

Totale rangschikkingsscore voor Chinook

[redacted]

	Criteria							
Aanvrager	**E1**	**E2**	**E3**	**Totaal E**	**F1**	**F2**	**F3**	**Totaal F**
Max aantal punten	**10**	**5**	**5**	**20**	**20**	**10**	**10**	**40**
Chinook (Vattenfall) VERWZ17031, VERWZ17032	[redacted]							
punten								
percentage								
Witwind VERWZ17011, VERWZ17012								
punten								
percentage								
Oranje Wind Power (Innogy) VERWZ17001, VERWZ17002								
punten								
percentage								
Redhotpoker (Statoil) VERWZ17021, VERWZ17022								
punten								
percentage								

indicatieve tussenwaardes op een continuschaal

Uitstekend, met toegevoegde waarde	100%
Zeer goed, met enige toegevoegde waarde	80%
Goed	60%
Ruim voldoende	40%
Voldoende	20%
Matig	0%

Inhoudelijke toetsing vergunning 2017 WOZ

Referentienummer	VERWZ17032
Naam aanvrager	Chinook C.V.
Datum ingediend	21-12-2017
Adviseur	[redacted]
2e adviseur	[redacted]

Thema	Vergunning WOZ Hollandse Kust Zuid
Hollandse Kust (zuid) kavel	I+II

Twee PA's toetsen de aanvraag inhoudelijk.

In geval van een mogelijk Nee als antwoord eerst overleggen met JZ.

Na een positief oordeel op de indieningsvereisten (Tvol) wordt de aanvraag inhoudelijk getoetst aan de hand van deze toetsingslijst.

De inhoudelijke toets bestaat uit de volgende toetsingslijsten:
1. Aanvraagformulier (RVO)
2. Due dilligence (externe expert)
3. Financiële toets (RVO)
4. Windrapport (externe expert)
5. Exploitatieberekening (RVO)
6. Kavelbesluit voorschrift 2 lid 1 t/m 13 (RWS)
7. Waterbesluit artikel 6.16d, lid 1, onderdeel c (RWS)
8. Samenwerkingsverband (RVO)
9. Rangschikkingscriteria (RVO)

De aanvrager heeft in het aanvraagformulier aangegeven dat hij alleen voor de vergunningen van beide kavels tezamen in aanmerking wil komen. Deze toetsingslijst heeft daarom betrekking op beide kavels.

AF Nr.	Aanvraagformulier	Nee	Ja/ n.v.t.
1	Komen de **ontwerpgegevens voor het windpark** in het aanvraagformulier sectie 3 overeen met de gegevens in: • het windrapport (bijlage 2) • de tabel windturbine gegevens en locaties (bijlage 6) • de exploitatieberekening (bijlage 3) Bespreek in geval van verschil. De ontwerpgegevens volgens aanvraag formulier zijn: • P50-waarde: [redacted] MWh/jr kavel I • P50-waarde: [redacted] MWh/jr kavel II • Geïnstalleerd vermogen: [redacted] MW per kavel • Niet gecertificeerde turbines • Windturbine: o Merk [redacted] o Type o Vermogen per turbine [redacted] MW o Aantal [redacted] per kavel Antwoord: alle gegevens komen overeen		**JA**
2	Is het **opgesteld vermogen** voor minimaal 342 MW tot maximaal 380 MW? (Kavelbesluit I of II Windenergiegebied HKZ, I Besluit) Het opgesteld vermogen is [redacted] MW per kavel		**JA**
3	Is het op basis van het **tijdschema voor bouw en exploitatie** voldoende aannemelijk dat de bouw en exploitatie van het windpark binnen 4 jaar na onherroepelijk worden van de vergunning gestart kan worden (Wet windenergie op zee, artikel 14, lid 1d en Regeling, artikel 4, lid 5). Verwachte afgifte vergunning voorjaar 2018, geplande start levering elektriciteit [redacted]		**JA**
4	Komt de **hoogte van de investering** in het aanvraagformulier bij vraag 5 overeen met die uit de exploitatieberekening (bijlage 3) en het financieringsplan (bijlage 5). Investering bedraagt voor beide kavels samen: € [redacted] Is gelijk in alle documenten (Bij verschil tussen aanvraagformulier en de bijlage(n),overleg met JZ over de gevolgen van het verschil)		**JA**

DD Nr.	Due Dilligence: Capex (Investering) en Opex (externe adviseur)	Nee	Ja/ n.v.t.
	Een advies van een externe adviseur wordt op de volgende aspecten getoetst (Zie advies Landsadvocaat dd. 25 mei 2016):		
A	Is het advies van de expert schriftelijk uitgebracht		**JA**
B	Zijn in dit advies alle relevante feiten en gegevens betrokken		**JA**
C	Blijkt uit het advies voldoende gedetailleerd welke procedurele stappen zijn gezet bij de beoordeling van de elementen uit de aanvraag		**JA**
D	Is de in het advies gevolgde gedachtegang duidelijk, begrijpelijk en voldoende controleerbaar? Herhaling van het onderzoek door andere experts moet mogelijk zijn.		**JA**

E	Zijn de conclusies begrijpelijk en liggen ze in het verlengde van het door de expert verrichte onderzoek		**JA**
1	Advies van de due dilligence expert betreffende de CAPEX (investering): De expert vindt de CAPEX duidelijk te laag en niet redelijk Wat zijn de gevolgen van dit advies op de exploitatie? De BVG studie die door de expert als referentie is gebruikt en wel als redelijk kan worden beschouwd, gaat uit van [redacted] k€/MW voor de CAPEX. Deze referentie waarde is gebruikt in een herberekening van het projectrendement. Zie EB voor effect hiervan tezamen met andere factoren. De gevolgen van een eventuele (marginale) bijstelling van de CAPEX op de exploitatieberekening in te toetsingslijst EB verwerken.		
2	Advies van de due dilligence expert betreffende de OPEX: Wat zijn de gevolgen van dit advies voor de exploitatie? De BVG studie die door de expert als referentie is gebruikt en wel als redelijk kan worden beschouwd, gaat uit van [redacted] k€/MW/a voor de OPEX. Deze referentie waarde is gebruikt in een herberekening van het projectrendement. Zie EB voor effect hiervan tezamen met andere factoren. Gevolgen van een eventuele (marginale) bijstelling van de OPEX op exploitatieberekening in de toetsingslijst EB verwerken.		

FT Nr.	**Financiële toets**	**Nee**	**Ja/ n.v.t.**
	Is het voldoende aannemelijk dat de bouw en exploitatie **financieel haalbaar** is? (wanneer de bouw en exploitatie niet financieel haalbaar is, resulteert dit een afwijzing op grond van Wet WOZ, artikel 14, lid 1.c) Zie financiele toets en moeder dochter document		**JA**

WR Nr.	**Windrapport** (externe adviseur)	**Nee**	**Ja/ n.v.t.**
	Een advies van een externe adviseur wordt op de volgende aspecten getoetst (Zie advies Landsadvocaat dd. 25 mei 2016):		
A	Is het advies van de expert schriftelijk uitgebracht		**JA**
B	Zijn in dit advies alle relevante feiten en gegevens betrokken		**JA**
C	Blijkt uit het advies voldoende gedetailleerd welke procedurele stappen zijn gezet bij de beoordeling van de elementen uit de aanvraag		**JA**
D	Is de in het advies gevolgde gedachtegang duidelijk, begrijpelijk en voldoende controleerbaar? Herhaling van het onderzoek door andere experts moet mogelijk zijn.		**JA**
E	Zijn de conclusies begrijpelijk en liggen ze in het verlengde van het door de expert verrichte onderzoek		**JA**
	Neem hieronder de conclusies uit het advies de externe windexpert over.		**JA**
1	Is het windrapport opgesteld door een **onafhankelijke organisatie** met expertise op het gebied van windenergie opbrengstberekeningen? (Regeling artikel 3, lid 1a)		**JA**

WR Nr.	Windrapport (externe adviseur)	Nee	Ja/ n.v.t.
2	Is gebruik gemaakt van **gerenommeerde** rekenmodellen, omgevingsmodellen, windmodellen en windkaarten? (Regeling artikel 3, lid 1a)		**JA**
3	Bevat het windrapport de **locatiegegevens** van de windturbines? (Regeling artikel 3, lid 1a)		**JA**
4	Bevat het windrapport merk, type? (Regeling artikel 3, lid 1a)		**JA**
5	Bevat het windrapport de **technische gegevens**: ashoogte, rotordiameter en de vermogenscurve? (Regeling artikel 3, lid 1a)		**JA**
6	Bevat het windrapport de **lokale windgegevens** zoals bijvoorbeeld: gem. windsnelheid, windroos, luchtdichtheid, Weibull, windatlas? (Regeling artikel 3, lid 1a)		**JA**
7	Bevat het windrapport een **berekening van P50-waarde** voor de netto elektriciteitsproductie op jaarbasis van het windpark? (Regeling artikel 3, lid 1a)		**JA**
8	Is in de berekening van de netto P50 opgenomen: de beschikbaarheid, zogeffecten, en terugregelverliezen? En is bij de berekening van de P50-waarde voor het zogeffect, uitsluitend rekening gehouden met de productie-installatie zelf en met het windpark Luchterduinen? (Regeling artikel 3, lid 2)		**JA**
9	Advies van de expert betreffende het windrapport: [redacted] Kavel II: Netto [redacted] productie. [redacted] Kavel I: Netto [redacted] productie. [redacted] Ook is P50 aangepast voor verwachte verliezen als gevolg van het zog van complete HKZ + Luchterduinen. Wat zijn de gevolgen (technisch, economisch) van dit advies voor het project? Zie EB voor effect hiervan tezamen met andere factoren. Gevolgen van een eventuele (marginale) bijstelling van de P50 op exploitatieberekening in de toetsingslijst EB verwerken. En met JZ bespreken.		

EB Nr.	Exploitatieberekening	Nee	Ja/ n.v.t.
	De resultaten van de exploitatieberekening worden bepaald door aannames omtrent de invoerparameters.		
1	Is de **P50** voldoende aannemelijk? (zie WR 9) Ook na eventuele (marginale) bijstelling.		**JA**
2	Is een **specificatie** van de **investeringskosten** (CAPEX) per component aanwezig?		**JA**

EB Nr.	Exploitatieberekening	Nee	Ja/ n.v.t.
	(Regeling, artikel 3 lid 4.a)		
3	Zijn de **investeringskosten** voldoende aannemelijk? (zie DD 1) Ook na eventuele (marginale) bijstelling. De investeringskosten zijn bijgesteld naar referentiewaarde. Zie DD		**JA**
4	Zijn alle relevante **exploitatiekosten** gespecificeerd? (Regeling, artikel 3 lid 4.b)		**JA**
5	Zijn de **exploitatiekosten** voldoende aannemelijk? (zie DD 2) Ook na eventuele (marginale) bijstelling. De exploitatiekosten zijn bijgesteld naar referentiewaarde. Zie DD		**JA**
6	Zijn alle relevante **inkomsten** gespecificeerd. Inkomsten in het rekenmodel worden bepaald door de marktprijs en de GVO's. (Regeling, artikel 3 lid 4.b)		**JA**
7	Zijn de **inkomsten** zoals in het rekenmodel gespecificeerd voldoende aannemelijk? (Stem eventueel af met expert) Ook na eventuele (marginale) bijstelling. [redacted] Deze wordt als voldoende aannemelijk beschouwd.		**JA**
8	Is de **rente** op vreemd vermogen voldoende aannemelijk? Overleg met financieel expert. Indien alles uit eigen vermogen wordt gefinancierd dan n.v.t. invullen. [redacted]		[redacted]
9	Is het **investeringsschema** voldoende consistent met andere delen van het plan, bijvoorbeeld het financieringsplan en projectplan? Volgens de exploitatieberekening loopt de investering van [redacted] In het aanvraagformulier staat beoogde opdrachtverstrekking [redacted] en start levering 1e elektriciteit [redacted]. In het projectplan staat opdracht bouw [redacted] en start operationele fase [redacted]		**JA**
10	Is het **opstartschema** voldoende consistent met andere delen van het plan, bijvoorbeeld het investeringsschema en projectplan? [redacted]		**JA**
11	Is er een berekening van het **projectrendement** over de looptijd van het project? (Doordat het rekenmodel van RVO is voorgeschreven, wordt automatisch hier aan voldaan als het rekenmodel als bijlage is ingediend bij de aanvraag) Het rekenmodel van RVO is gebruikt (Regeling, artikel 3, lid 4.c)		**JA**
12	Is het voldoende aannemelijk dat de bouw en exploitatie **economisch haalbaar** is? De CAPEX, OPEX en de P50 zijn bijgesteld naar meer [redacted] referentiewaarden. Na herberekening is het projectrendement nog steeds positief (niet economisch haalbaar, dan afwijzing op grond van Wet WOZ, artikel 14, lid 1.e)		**JA**

KB Nr.	**Kavelbesluit** (externe adviseur, RWS)	Nee	Ja/ n.v.t.
	Een advies van een externe adviseur, waarbij binnen RVO onvoldoende expertise is, wordt op de volgende aspecten getoetst (Zie advies Landsadvocaat dd. 25 mei 2016):		
A	Is het advies van de expert schriftelijk uitgebracht		**JA**
B	Zijn in dit advies alle relevante feiten en gegevens betrokken		**JA**
C	Blijkt uit het advies voldoende gedetailleerd welke procedurele stappen zijn gezet bij de beoordeling van de elementen uit de aanvraag		**JA**
D	Is de in het advies gevolgde gedachtegang duidelijk, begrijpelijk en voldoende controleerbaar? Herhaling van het onderzoek door andere experts moet mogelijk zijn.		**JA**
E	Zijn de conclusies begrijpelijk en liggen ze in het verlengde van het door de expert verrichte onderzoek		**JA**
	Neem in deze toetsingslijst de conclusies uit het rapport van de externe expert over.		
1	Is voldoende aannemelijk gemaakt dat aan het Kavelbesluit zal worden voldaan? (Wet WOZ, artikel 14, lid 1.f en Regeling, artikel 3, lid 1.b)		**JA**

WB Nr.	**Waterbesluit artikel 6.16d, lid1, onderdeel c** (externe adviseur, RWS)	Nee	Ja/ n.v.t.
	Een advies van een externe adviseur, waarbij binnen RVO onvoldoende expertise is, wordt op de volgende aspecten getoetst (Zie advies Landsadvocaat dd. 25 mei 2016):		
A	Is het advies van de expert schriftelijk uitgebracht		**JA**
B	Zijn in dit advies alle relevante feiten en gegevens betrokken		**JA**
C	Blijkt uit het advies voldoende gedetailleerd welke procedurele stappen zijn gezet bij de beoordeling van de elementen uit de aanvraag		**JA**
D	Is de in het advies gevolgde gedachtegang duidelijk, begrijpelijk en voldoende controleerbaar? Herhaling van het onderzoek door andere experts moet mogelijk zijn.		**JA**
E	Zijn de conclusies begrijpelijk en liggen ze in het verlengde van het door de expert verrichte onderzoek		**JA**
	Neem in deze toetsingslijst de conclusies uit het rapport van de externe expert over.		
1	Heeft de aanvrager, indien hij niet gecertificeerde turbines in het aanvraagformulier heeft vermeld, voldoende aannemelijk gemaakt tijdig te voldoen aan het Waterbesluit artikel 6.16d, lid 1, onderdeel c?		[redacted]

SV Nr.	**Samenwerkingsverband**	Nee	Ja/ n.v.t.
1	Als er geen samenwerkingsverband is, dan is bijlage 9 niet verplicht, kies dan n.v.t. Als er wel sprake is van een samenwerkingsverband en de bijlage 9 is toegevoegd en correct, kies dan Ja, anders kies Nee.		**n.v.t**

SV Nr.	Samenwerkingsverband	Nee	Ja/ n.v.t.
	(Regeling, artikel 3, lid 10.c)		

23 Nr.	Toets op Wet WOZ, artikel 23 lid2: d, e, f, g, h,	Nee	Ja/ n.v.t.
1	In de raming van de **maatschappelijke kosten** bedoeld in artikel 23, tweede lid, **onderdeel d**, van de wet, wordt ten minste aandacht besteed aan de bezetting van het net van de netbeheerder van het net op zee uitgedrukt in het aantal MWh per jaar. (Regeling, artikel 3, lid 5) Is in de aanvraag het aantal MWh per jaar (P50) benoemd? Er is een Windrapport met P50 berekening toegevoegd.		**JA**
2	Omvat de **inventarisatie en analyse van de risico's**, bedoeld in artikel 23, tweede lid, **onderdeel e**, van de wet, ten minste: a) de risico's bij de bouw van het windpark; b) het risico van fluctuerende elektriciteitsprijzen en de waarde van garanties van oorsprong; c) de risico's bij de exploitatie van het windpark?		**JA** **JA** **JA**
3	Omvat de **omschrijving van de maatregelen ter borging van de kostenefficiëntie**, bedoeld in artikel 23, tweede lid, **onderdeel f**, van de wet ten minste a) de methodes van risicobeheersing, b) de wijze waarop risico's in het verleden zijn geborgd en bij thans lopende projecten voor windenergie op zee worden geborgd, c) alsmede de voorgenomen mitigerende maatregelen ten aanzien van de in het zesde lid bedoelde risico's.		**JA** **JA** **JA**
4	Bevat de aanvraag de onderstaande bij de bouw en exploitatie van het windpark **betrokken partijen**, bedoeld in artikel 23, tweede lid, **onderdeel g**, van de wet: a) de aanvrager en indien de aanvrager een samenwerkingsverband betreft, elke deelnemer aan het samenwerkingsverband; b) de verantwoordelijke partij voor het projectmanagement; c) de leverancier van de windturbines; d) de installateur van de windturbines; e) de leverancier van de funderingen; f) de installateur van de funderingen; g) de leverancier van de parkbekabeling; h) de installateur van de parkbekabeling; i) de verantwoordelijke voor het onderhoud en de bediening van het windpark.		**JA** **JA** **JA** **JA** **JA** **JA** **JA** **JA** **JA**
5	Omvat de **beschrijving van de kennis en ervaring** van de betrokken partijen, bedoeld in artikel 23, tweede lid, **onderdeel h**, van de wet, de kennis en ervaring bij windparken op zee: a) het geïnstalleerd vermogen van de windparken waarvoor door de verantwoordelijke partij voor het projectmanagement tijdens de bouw het projectmanagement is gedaan; b) het aantal door de leverancier geleverde windturbines; c) het aantal door de installateur geïnstalleerde windturbines;		**JA** **JA** **JA**

23 Nr.	Toets op Wet WOZ, artikel 23 lid2: d, e, f, g, h,	Nee	Ja/ n.v.t.
	d) het aantal door de leverancier geproduceerde funderingen;		**JA**
	e) het aantal door de installateur geïnstalleerde funderingen;		**JA**
	f) het aantal windturbines waarvoor door de leverancier parkbekabeling is geleverd;		**JA**
	g) het aantal windturbines dat door de installateur van de parkbekabeling is aangesloten;		**JA**
	h) het geïnstalleerd vermogen van de windparken dat de verantwoordelijke voor het onderhoud en de bediening in onderhoud heeft en bedient.		**JA**

Opmerkingen en bevindingen van de controles en herstel.

Beschrijf opmerkingen en bevindingen in de onderstaande tabel onder verwijzing naar Toetsingslijst Nr. Betrek JZ indien een bevinding kan leiden tot een afwijzing en overleg met JZ of er een mogelijkheid tot herstel is. Herstel is alleen mogelijk als bepaalde informatie niet duidelijk is. In dat geval mag in overleg met JZ een gesloten geformuleerde (ja/nee) verhelderingsvraag gesteld worden. Is de conclusie dat een aanvraag moet worden afgewezen, formuleer dan in overleg met JZ een afwijzingstekst.

TL	Nr.	Opmerking/bevinding
		Geen opmerkingen

Eindconclusie inhoudelijke beoordeling

De eindconclusie van de inhoudelijke beoordeling is gebaseerd op de hiervoor ingevulde toetsingslijsten.

Rangschikken Ja of Nee?	
De aanvraag voldoet aan de indieningsvereisten (TVol) en alle inhoudelijke toetsingscriteria in de toetsingslijsten zijn met Ja of n.v.t. beantwoord. **Ja** deze aanvraag wordt opgenomen op in de rangschikking.	**JA**
De aanvraag voldoet niet. Wijs de aanvraag af op een relevante wettelijke grondslag. Formuleer hieronder in overleg met JZ de afwijstekst en ga verder met het afwijsproces. **Nee** deze aanvraag wordt niet opgenomen in de rangschikking.	

Concept afwijstekst:

Invoer Parameters

Hollandse kust (zuid) kavel I en II met schaalvoordeel, versie 06-12-2017

Invoervelden zijn blauw

Alle blauwe tabbladen bevatten invulvelden. Wanneer u de muis op een veld met een rood driehoekje houdt, wordt een toelichting zichtbaar.
Wanneer een resultaatcel een gele achtergrond met rode waarde krijgt, hebben een of meer invoervelden onjuiste waarden

Belangrijkste resultaten	[redacted]
Projectrentabiliteit over exploitatie	
Rendement EV tot over exploitatie	
DSCR totaal	

	Algemene gegevens		
	Afgifte jaar vergunning	2018	
	Laatste jaar vergunning	2048	
	Projectnaam	Wind op zee HKZ I en II	
	Naam aanvragende organisatie	CHINOOK CV	
	Exploitatie looptijd	[redacted]	
	Kavel I		
	Geïnstalleerd vermogen windpark		
	Netto P50 jaarproductie		
	Netto P50 vollasturen		
	Kavel II		
	Geïnstalleerd vermogen windpark		
	Netto P50 jaarproductie		
	Netto P50 vollasturen		
	Investeringskosten		
TIK	Totale investeringskosten beide kavels		
	Afschrijvingsperiode		
	Project financiering		
	Uit eigen middelen		
	Percentage eigen uit eigen middelen		
EM	Eigen Middelen		
	Uit vreemd vermogen		
	Percentage		
LD	Leendeel		
	Aflossingsvorm		
	Aflosperiode		
	Rente		
	Investeringsschema		
	Investeringsjaar		
Inv1			
Inv2			
Inv3			
Inv4			
Inv5			
	Sommatie→		
	Opstartschema E-productie		
	Kavel I		
Q1			
Q2			
	Kavel II		
Q3			
Q4			
	Laatste exploitatie jaar		

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Rijksdienst voor Ondernemend Nederland

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Projectnummer
VERWZ17032

Kenmerk
VERWZ17032/1.6.7b

Bijlage(n)
1

Datum 19 maart 2018
Betreft Toezending vergunning voor bouw, exploitatie en verwijdering windpark op zee windenergiegebied Hollandse Kust (zuid) kavel II

Geachte heer [redacted]

Hierbij ontvangt u de vergunning voor het bouwen en exploiteren van een windpark op zee op grond van de Wet windenergie op zee. In de vergunning staan de vereisten waaraan u moet voldoen.

Ten overvloede wijs ik u erop dat u zich onder meer dient te houden aan de algemene regels voor windparken op zee (paragraaf 6a van hoofdstuk 6 van het Waterbesluit), de voorschriften uit het kavelbesluit en de Arbo- en arbeidstijdenwetgeving op de Noordzee.

Voor het verwijderen van het windpark dient u een bankgarantie aan de Staat te overleggen. De Rijksdienst voor Ondernemend Nederland zal tijdig een voorgeschreven model voor de bankgarantie aan u beschikbaar stellen.

Meer informatie
Bevoegd gezag vergunningverlening en aanleveren bankgarantie ter verwijdering windpark: de Rijksdienst voor Ondernemend Nederland.

Bevoegd gezag met betrekking tot toezicht en handhaving:
Rijkswaterstaat Zee en Delta
Afdeling Handhaving
Postadres: Postbus 556, 3000 AN Rotterdam
Bezoekadres: Lange Kleiweg 34, 2288 GK Rijswijk
Email: handhavingnoordzee@rws.nl

De Minister van Economische Zaken en Klimaat,

Eric Wiebes

Rijksdienst voor Ondernemend Nederland

Vergunning voor bouw, exploitatie en verwijdering van een windpark voor kavel II van windenergiegebied Hollandse Kust (zuid), VERWZ17032

Naam:	Chinook C.V.
Adres:	Postbus 41920
Postcode en plaats:	1009 DC Amsterdam

Procesverloop

U hebt op 21 december 2017 een aanvraag ingediend op grond van artikel 23 van de Wet windenergie op zee voor een vergunning met betrekking tot de bouw en exploitatie van een windpark op kavel II van windenergiegebied Hollandse Kust (zuid).

Gelet op

- De artikelen 12, 13, 14, 15, 22, 23, 24, 27 en 28 van de Wet windenergie op zee (Staatsblad 2015, nr. 261), verder naar verwezen als de Wet.
- Kavelbesluit II van windenergiegebied Hollandse Kust (zuid) (Staatscourant, 16 december 2016, nr. 67120) verder naar verwezen als het Kavelbesluit.
- Regeling vergunningverlening windenergie op zee kavels I en II Hollandse Kust (zuid) (Staatscourant, 17 oktober 2017, nr. 59835), verder naar verwezen als de Regeling.
- Beleidsregel wijziging van vergunningen windenergie op zee voor de kavels I en II Hollandse Kust (zuid) (Staatscourant, 12 december 2017, nr. 71209), verder naar verwezen als de Beleidsregel.

Overwegende dat

- voldoende aannemelijk is dat de bouw en exploitatie van het windpark:
  - uitvoerbaar is (artikel 14, eerste lid, onderdeel a, van de Wet);
  - technisch haalbaar is (artikel 14, eerste lid, onderdeel b, van de Wet);
  - financieel haalbaar is (artikel 14, eerste lid, onderdeel c, van de Wet);
  - gestart kan worden binnen vier jaar na de datum waarop de vergunning onherroepelijk is geworden (artikel 14, eerste lid, onderdeel d, van de Wet);
  - economisch haalbaar is binnen het in de vergunning bepaalde tijdvak (artikel 14, eerste lid, onderdeel e, van de Wet);
  - voldoet aan het Kavelbesluit (artikel 14, eerste lid, onderdeel f van de Wet).
- uw aanvraag het hoogst is gerangschikt (artikel 22 en 24 van de Wet) op basis van de volgende punten toekenning:

Criterium	**Punten**
a: de kennis en ervaring van de betrokken partijen	[redacted]
b: de kwaliteit van het ontwerp voor het windpark	
c: de capaciteit van het windpark	
d: de maatschappelijke kosten	
e: de kwaliteit van de inventarisatie en analyse van de risico's	
f: de kwaliteit van de maatregelen ter borging van de kostenefficiëntie	
Totaal	

Rijksdienst voor Ondernemend Nederland

- Toelichting score criteria
  - [redacted]
  -
  -

Besluit

aan Chinook C.V. (hierna: vergunninghouder) een vergunning te verlenen voor het bouwen, exploiteren en het verwijderen van een windpark in de Nederlandse territoriale zee of de Nederlandse exclusieve economische zone (artikel 12 van de Wet) onder de onderstaande voorwaarden en voorschriften.

Voorschrift 1
De vergunning geldt met ingang van het moment van afgifte voor de duur van 30 jaar (artikel 15, lid 1, onderdeel a van de Wet en voorschrift 3 van het Kavelbesluit).

Voorschrift 2
De vergunning geldt voor kavel II van het windenergiegebied Hollandse Kust (zuid) (artikel 15, lid 1, onderdeel b van de Wet en voorschrift 2 van het Kavelbesluit).

Voorschrift 3
De hieronder genoemde activiteiten dienen binnen de aangegeven tijdvakken te worden verricht, nadat de vergunning onherroepelijk is geworden (artikel 15, lid 1, onderdeel c van de Wet):

- Realisatie: voor de realisatie van het windpark wordt uitgegaan van een termijn van maximaal 5 jaar vanaf het moment van onherroepelijk worden van de vergunning (paragraaf 4.4.1 in de toelichting in deel II van het Kavelbesluit);
- Exploitatie: de exploitatietermijn kan starten vanaf jaar 3 en kan duren tot en met jaar 29 (paragraaf 4.4.1 in de toelichting in deel II van het Kavelbesluit);
- Verwijdering: de verwijderingstermijn kan starten vanaf jaar 25 en kan duren tot en met jaar 30 (paragraaf 4.4.1 in de toelichting in deel II van het Kavelbesluit). De verwijdering start uiterlijk binnen twee jaar nadat de exploitatie is gestaakt en is uiterlijk binnen de looptijd van de vergunning afgerond (voorschrift 6 van het kavelbesluit).

Voorschrift 4
De vergunninghouder is verplicht het project uit te voeren conform de gegevens zoals ingediend bij de aanvraag. Een aanvraag om wijziging van dit voorschrift dient conform de Beleidsregel voorafgaand aan de wijziging ingediend te worden bij de Rijksdienst voor Ondernemend Nederland via sde@rvo.nl (artikel 17, lid 4, van de Wet en artikel 4:81, lid 1, van de Algemene wet bestuursrecht.).

Voorschrift 5
De vergunninghouder rapporteert jaarlijks aan de Rijksdienst voor Ondernemend Nederland over de voortgang van de realisatie van de productie-installatie tot het moment van ingebruikname van de productie-installatie. De Rijksdienst voor Ondernemend Nederland stuurt hiervoor een herinnering naar de vergunninghouder.

Voorschrift 6
De vergunning mag enkel met schriftelijke toestemming van de Rijksdienst voor Ondernemend Nederland aan een ander worden overgedragen (artikel 16, lid 1, van de Wet).

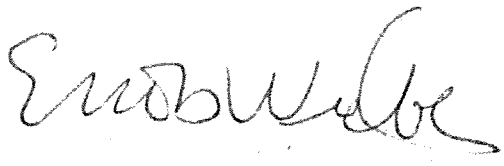
Voorschrift 7
De vergunninghouder doet onverwijld mededeling aan de Rijksdienst voor Ondernemend Nederland van indiening bij de rechtbank van een verzoek tot verlening van surseance van betaling of tot faillietverklaring.

Rijksdienst voor Ondernemend
Nederland

Voorschrift 8
Uiterlijk op het moment dat de Rijksdienst voor Ondernemend Nederland bewijs heeft ontvangen dat er Garanties van oorsprong zijn afgegeven over de geleverde stroom, stelt de vergunninghouder zich garant door middel van een bankgarantie aan de Staat ten bate van de verwijdering van het windpark (Voorschrift 7 van het Kavelbesluit). Voor de bankgarantie dient de vergunninghouder gebruik te maken van een voorgeschreven model. De Rijksdienst voor Ondernemend Nederland zal dit model tijdig aan de vergunninghouder beschikbaar stellen.

Schiedam, 19 maart 2018

De Minister van Economische Zaken en Klimaat



Eric Wiebes

Bezwaar
Heeft u vragen en/of opmerkingen over dit besluit, dan kunt u telefonisch contact opnemen met de Rijksdienst voor Ondernemend Nederland via telefoonnummer 088 602 32 25. Bent u het, eventueel na een telefonische toelichting, niet eens met dit besluit, dan kunt u binnen zes weken na de bovenvermelde verzenddatum bezwaar aantekenen bij: Rijksdienst voor Ondernemend Nederland, afdeling Juridische Zaken, Postbus 40219, 8004 DE Zwolle, onder vermelding van "bezwaar" op de enveloppe en op het bezwaarschrift. Uw aanvraag is bij Rijksdienst voor Ondernemend Nederland bekend onder projectnummer VERWZ17032. U kunt dit nummer vermelden bij verdere correspondentie.