離岸風電海事工程船舶溝通平台會議
Vessel Information Session

船舶及次承包商遴選介紹
Vessel and subcontractor selection processes

Ørsted

CHW01/02
23-05-2019

大彰化離岸風力發電計畫簡介

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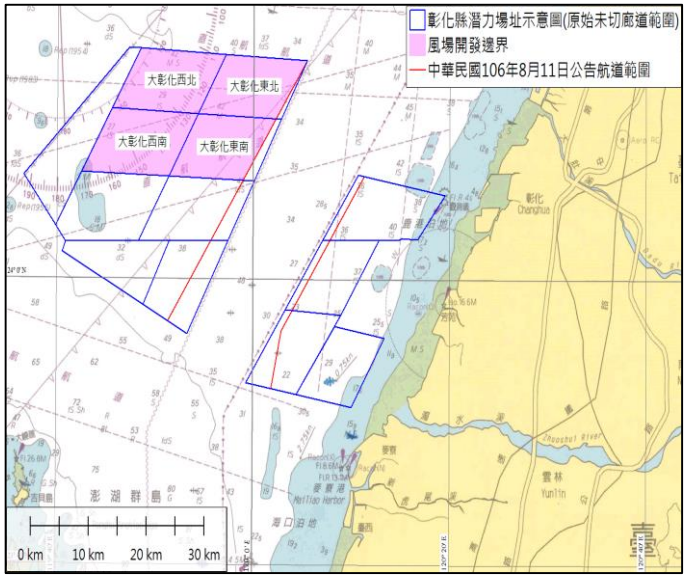
一、計畫範圍

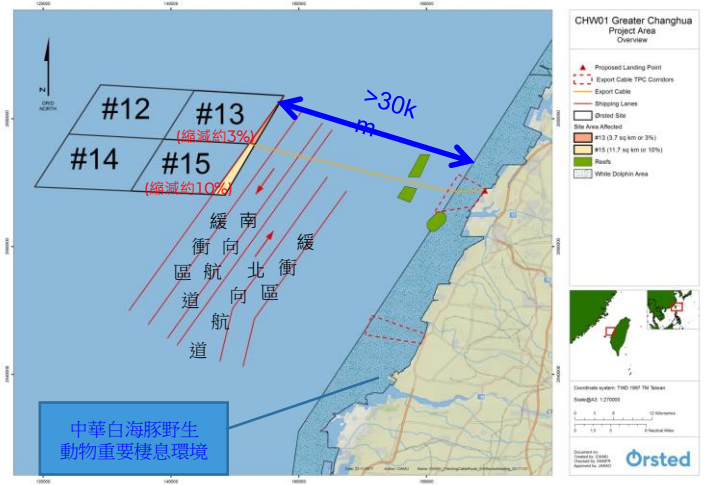


- 依據經濟部能源局民國104年7月2日公告之「離岸風力發電規劃場址申請作業要點」規定，選擇彰化縣外海第12, 13, 14 & 15號潛力場址為離岸風電開發場址風場範圍
- 交通部航港局為保障船舶航行安全及離岸風電業者之風機財產安全並兼顧離岸風電政策推動，於民國106年8月11日提出彰化外海離岸風電潛力場址海域預定航道座標點（航安字第1062010856號），其中場址B13以及B15東側原計畫範圍約3及10%為預定航道範圍而無法開發利用。

一、計畫範圍-風場平面位置

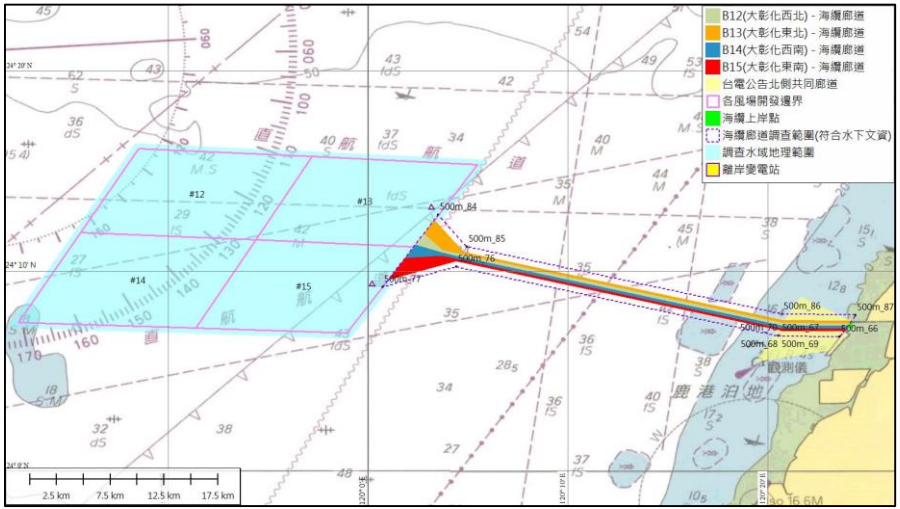
- 風場範圍已依據交通部航港局106年8月11日公告之預定航道座標調整
- 離岸距離遙遠： 37 公里（相當於台北港至基隆港直線距離）~50公里
- 規模: 總面積約460 平方公里，最大裝置容量 2400MW

風場面積	依航道調整後 (km^2)
西北案 (#12風場)	117.4
東北案 (#13風場)	108.2 (縮減約3%)
西南案 (#14風場)	126.3
東南案 (#15風場)	108.7 (縮減約10%)



一、計畫範圍-上岸海纜位置

- 台灣電力公司於106年8月14日公告之「離岸風電海纜上岸共同廊道範圍」，故配合調整上岸海纜規劃路線
- 107年3月12日取得內政部同意進行海底電纜勘測作業

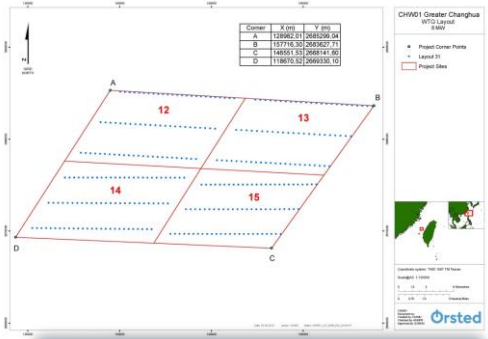


一、計畫範圍-陸域設施位置

- 台灣電力公司於106年8月14日公告之「離岸風電海纜上岸共同廊道範圍」，故配合調整上岸海纜規劃路線

二、風場規劃內容

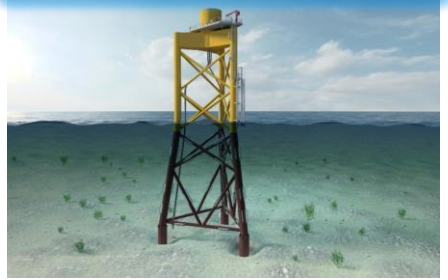
- 選用單機裝置容量8.0~11.0 MW之風機
- 四風場合計，風機最大數量總計301部
- 風機基礎僅選用管架式基樁基礎
- 四風場同一時間僅進行一組風機打樁作業



本計畫風機規劃內容

項目	西北案	東北案	西南案	東南案
	12風場	13風場	14風場	15風場
單機裝置容量 (MW)	8.0~11.0	8.0~11.0	8.0~11.0	8.0~11.0
風機數量 (#)	54~74	51~71	58~80	55~76
最大總裝置容量 (MW)	598	570	642.5	613
轉子直徑(m)	195~210	195~210	195~210	195~210

管架式基樁基礎



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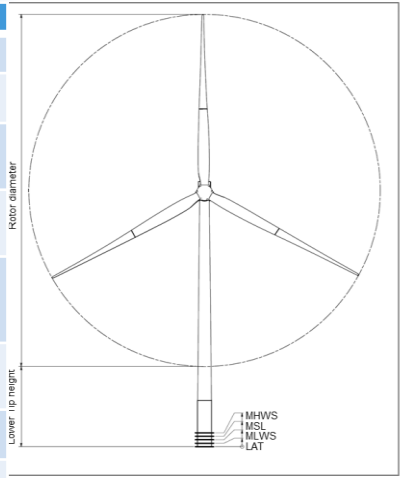
二、風場規劃內容

選用單機裝置容量8.0~11.0 MW之風機

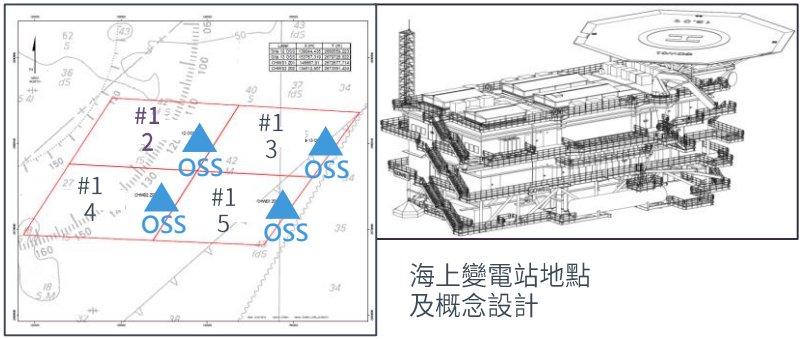
風機高度及技術資料表

元件	最小風機		最大風機	
	最小	最大	最小	最大
風機單機裝置容量 (MW)	8.0		11.0	
轉子直徑 (m) Rotor Diameter	-	195	-	210
(葉片)下部尖端高程，LAT (m) Lower Tip Height	27.9(LAT) 25.0(MSL)	55	27.9(LAT) 25.0(MSL)	55
總高/(葉片)上部尖端高程， LAT (m) Upper Tip Height	-	250	-	265
機艙高度，LAT (m) Hub Height	-	153	-	160
最大轉子旋轉速度(RPM)	-	11	-	8
風機間最小間距(東西向)，W-E，(m)	500~533		710~779	
風機最大間距(南北向)，N-S，(m)	2,925~3,719		4,149~4,320	



二、風場規劃內容

- **海上變電站-**
  風場內設有海上變電站將輸出電壓昇壓至220kV，透過上岸電纜經由共同廊道上岸

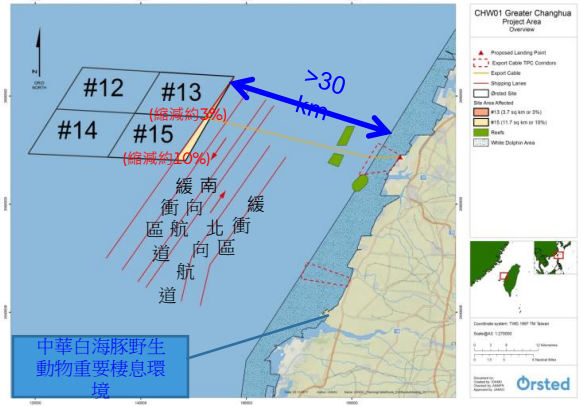


海上變電站地點
及概念設計

Burbo Bank 海上變電站

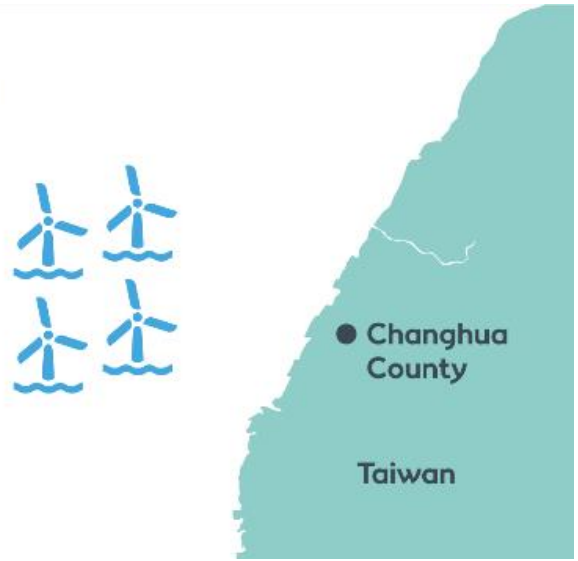
三、計畫進度-環評審查

- 4處潛力場址區域均不包含漁港、濕地、保護礁區、漁業資源保育區、重要野鳥棲地、中華白海豚野生動物重要棲息環境...等限制區
- 計畫場址距離中華白海豚區域30公里以上，且非位於環境敏感區域，對環境影響有限。環保署及環保團體均支持本計畫應優於近岸風場先行開發。
- 民國107年2月9日通過環保署環境影響評估審查委員會第327 次審查會議，審查結論已於3月23 日公告



三、計畫進度-規劃場址容量分配

- 大彰化東南及大彰化西南風電計畫已於民國107年4月30日獲經濟部遴選公告取得電網容量(605.2MW及294.8MW)，將於2021年併入台電彰一甲變電站
- 其餘兩案及大彰化西南風電計劃之未獲配容量目前進入經濟部遴選作業之競價階段，如六月底競價結果取得電網容量，將於2025併入台電彰工變電站。



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Background 背景

– This presentation has been developed to identify and clarify the processes relating to the selection of Main Contractors and their Subcontractors, including vessel suppliers, for the Offshore Installation Works on the CHW Project.

本次簡報主要針對CHW專案的離岸安裝工程，確認及澄清與主承包商及分包商選擇相關的程序，其中也包括船舶供應商。

– The processes described within this presentation and supporting document, have been laid out to ensure a balanced and transparent approach for continued Ørsted´s support for the development of the local supply chain competence and capability, without compromising the safety, quality, technical & commercial aspects of the Project.

透過本次簡報及佐證文件所述之各項程序，沃旭將可於後續協助本地供應鏈發展所需職能與技術能力時，可維持一個均衡與透明之措施，而免於損及專案的安全、品質、技術與商業層面。

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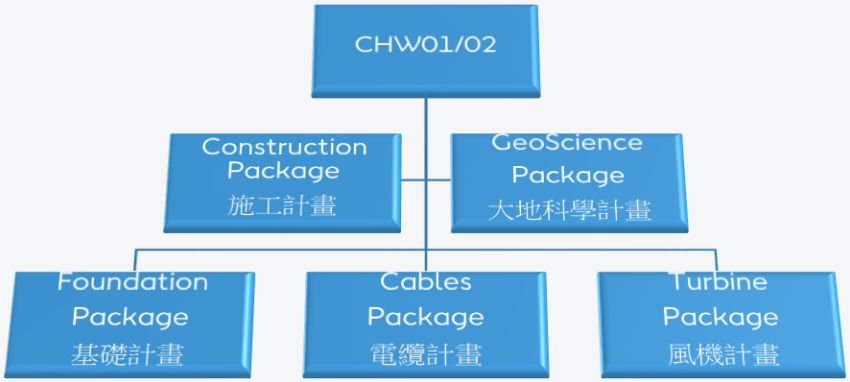
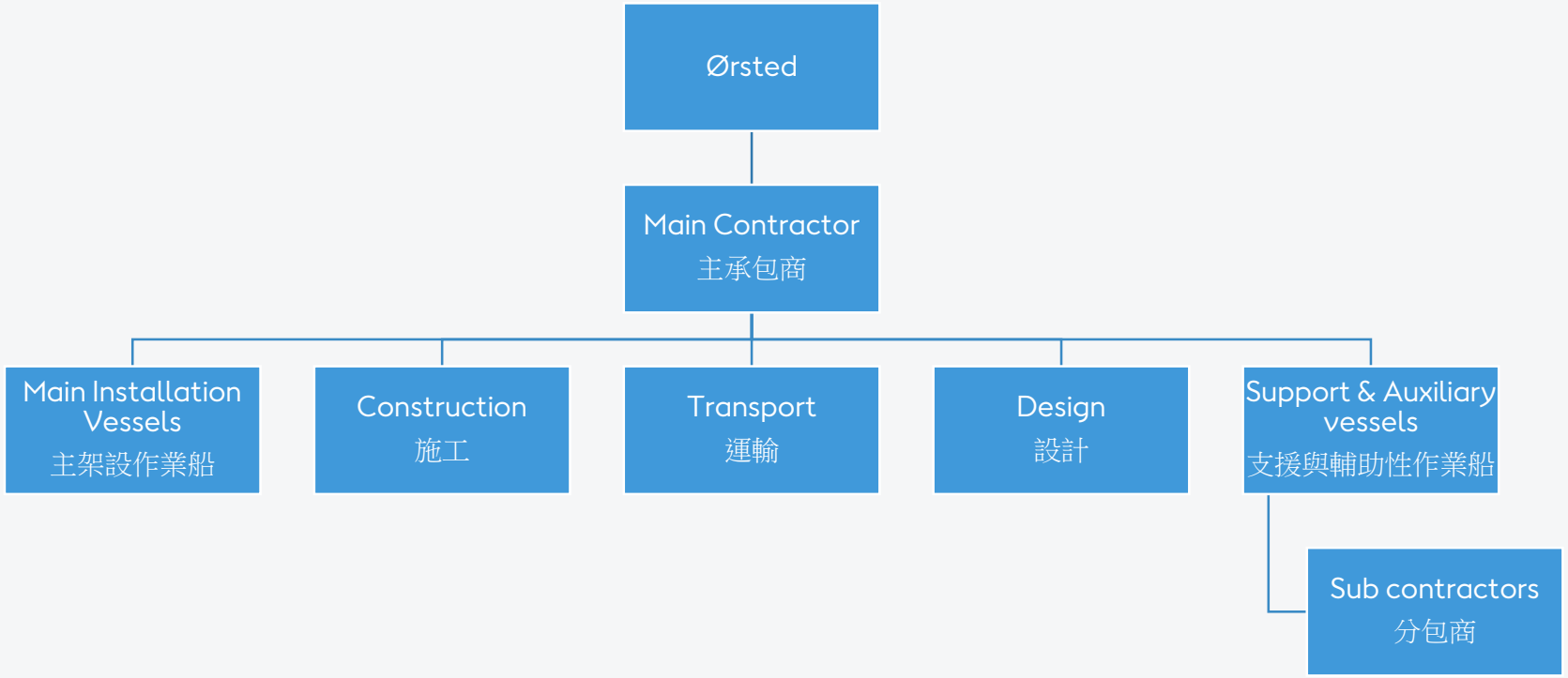
Structure Of Construction Packages 施工計畫之架構



Contracting Process 簽約程序



Process for local vessel owners to pre-qualify for CHW01/02 subcontracts
CHW01/02分包合約本地船舶船主資格審查程序
Page 1 of 2頁次:2之1

Step 1步驟1	**Vessel owners register in the Ørsted/KMCA local vessel database登記於沃旭/KMCA本地船舶資料庫之船舶船主**		
Step 2步驟2	Vessel owners register in the Ørsted subcontractor compliance register 登記於沃旭分包商符合性登記資料庫之船舶船	✓ HSE minimum requirement compliance 安衛環最低需求符合性	✓ Quality minimum requirement compliance 品質最低需求符合性
Step 3步驟3	Sign up for the Ørsted "Vessel days" 簽訂沃旭之[船舶日期]		
Step 4步驟4	Ørsted vessel days are undertaken with participation of Ørsted, Main Contractors and the registered and compliant vessel owners 沃旭之[船舶日期]係由沃旭、主承包商、以及完成登記的合格船舶船主所簽訂。		
Step 5步驟5	Main Contractor assessment process of Subcontractors 主承包商對於分包商之評估程序	✓ Main contractor confirms pre-qualification of vessel owner based on suitability of vessel and minimum vessel requirements ✓ 主承包商根據船舶適用性及最低船舶需求，而於事前確認船舶船主的資格。	
Step 6步驟6	Main contractors invite pre-qualified vessel owners to bid for vessel supply contracts 主承包商邀請符合資格的船舶船主參加船舶供應合約之競標		
Step 7步驟7	Main Contractor shortlists qualified and commercially viable vessel owners 主承包商需列出符合資格以及可用於商業操作 之船舶船主		
Step 8步驟8	Ørsted & Main Contractor undertakes HSE & Q Evaluation of subcontractors 沃旭及主承包商針對分包商執行安衛環及品質評估		
Step 9步驟9	Ørsted undertakes preliminary vessel inspection and provide results of these to vessel owners and Main Contractors 沃旭執行初期目視檢查，並將檢查結果送給船舶船主及主承包商。		

Process for local vessel owners to pre-qualify for CHW01/02 subcontracts
CHW01/02分包合約本地船舶船主資格審查程序

Step 10步驟10	**Main Contractors, <u>without further involvement from Ørsted</u>, finalise vessel selection process based on** **於沃旭未參加情況下，由主承包商根據下列執行最終選擇程序:** ✓ **Vessel suitability & technical requirements 船舶適用性與技術需求** ✓ **Vessel availability for the required period船舶於規定期間之可用性** ✓ **HSE Compliance audits 安衛環符合性稽核** ✓ **Quality Compliance audits品質符合性稽核** ✓ **Vessel inspection results船舶檢查結果** ✓ **Company financial robustness公司財務健全性** ✓ **Competitive price & commercial reservations較佳價格與商業潛能**
Step 11步驟11	Main Contractor signs Contract with vessel owner and notify Ørsted of their selection. 主承包商與船舶船主簽訂合約，並向沃旭告知所作之選擇。
Step 12步驟12	Ørsted undertakes final vessel inspection to approve vessels 沃旭執行最終船舶檢查以核准船舶。

Construction Package
施工計畫

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Main Installation Vessels
主架設船舶

Support & Auxiliary vessels
支援與輔助性船舶

VESSEL & BARGE TYPES USED IN THE OFFSHORE CONSTRUCTION PACKAGE
離岸施工計畫使用之船舶與駁船型式

	VESSEL TYPE 船舶型式	ACRONYM 縮寫名詞	NO. OF VESSELS* 船舶數量	SOURCING RESPONSIBLE 資料來源
Main Installation & Construction Vessels 架設與施工船隻	Service Operations Vessel 運維作業船	SOV	1	Ørsted Construction Package 沃旭施工計畫
Support, Transport & Auxiliary Vessels 支援、運輸與輔助性船舶	Guard Vessel / Offshore Support Vessel / Anchor Handling Tug - Construction Site 戒護船/海上支援船/拋錨作業拖船-施工現場	GV	2 (contract awarded in 2018) (於2018年取得合約)	Ørsted Construction Package 沃旭施工計畫
	Guard Vessel / Offshore Support Vessel / Anchor Handling Tug - Export Cable Route Offshore - 戒護船/海上支援船/拋錨作業拖船-輸出電纜路徑-離岸	GV	2	Ørsted Construction Package 沃旭施工計畫
	Guard Vessel / Support Vessel / Tug - Export Cable Route Nearshore - 戒護船/海上支援船 -輸出電纜路徑-近海	GV	1	Ørsted Construction Package 沃旭施工計畫
	Crew Transfer Vessel 人員運輸船	CTV	2	Ørsted Construction Package 沃旭施工計畫

The number of vessels anticipated in table is subject to several factors, which is subject to further detailed design engineering, which may increase/decrease the no. of vessels required for the specific scope.
表內預定之船舶數量將依後續細部設計工程規畫時的各種因素而定，且船舶數量也可能於特定範圍內增加或減少。

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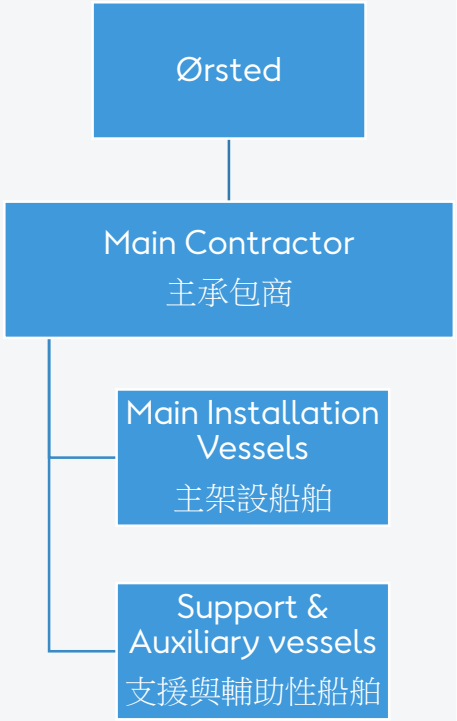
Foundation Package
基礎計畫



VESSEL & BARGE TYPES USED IN THE FOUNDATION & OFFSHORE SUBSTATION INSTALLATION PACKAGE
基礎及海上變電站架設計畫使用之船舶與駁船型式

	VESSEL TYPE 船舶型式	ACRONYM 縮寫名詞	NO. OF VESSELS* 船舶數量	SOURCING RESPONSIBLE 資料來源
Main Installation & Construction Vessels 架設與施工船隻	Heavy Lift Inst. Vessel 重型架設起重船	Main Inst. Vessel 主架設船	1	Main Contractor 主承包商
	Dredging vessel 濬渫船	Hopper Dredger 漏斗式濬渫船	1	Main Contractor 主承包商
	Rock installation 拋石船	Fall Pipe 落管式	1	Main Contractor 主承包商
Support, Transport & Auxiliary Vessels 支援、運輸與輔助性船舶	Crew Transfer vessel 人員運輸船	CTV	3	Main Contractor 主承包商
	Survey vessel supporting dredging vessel 支援濬渫船隻測量船	MSV	1	Main Contractor 主承包商
	Grouting vessel 灌漿船	MSV	2	Main Contractor 主承包商
	Bubble screen vessel 氣幕船	MSV	1	Main Contractor 主承包商
	Pile cleaning - post installation 管線清理-架設後	MSV	1	Main Contractor 主承包商
	Mooring tug 停泊拖船	Tug 拖船	7	Main Contractor 主承包商
	330ft - pile barge 330英尺打樁船	Cargo barge 載貨駁船	5	Main Contractor 主承包商
	400ft - jacket barge #1 400英尺管架架設船	Cargo barge 載貨駁船	2	Main Contractor 主承包商
	Tug for 330ft #1 330英尺拖船#1	Tug 拖船	5	Main Contractor 主承包商
	Tug for 400ft #1 400英尺拖船#1	Tug 拖船	2	Main Contractor 主承包商

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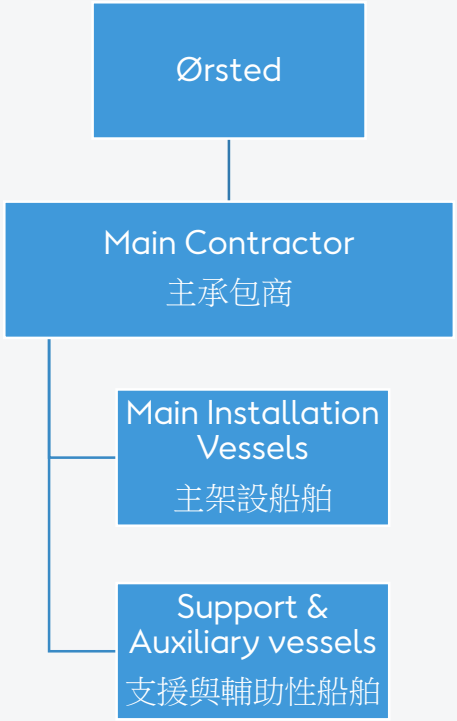
Cables Package
電纜計畫



VESSEL & BARGE TYPES USED IN THE OFFSHORE CABLE INSTALLATION PACKAGE
基礎及海上變電站架設計畫使用之船舶與駁船型式

	VESSEL TYPE 船舶型式	ACRONYM 縮寫名詞	NO. OF VESSELS* 船舶數量	SOURCING RESPONSIBLE 資料來源
Main Installation & Construction Vessels 架設與施工船隻	Cable Lay Vessel 鋪纜拖船	CLV	1-2	Cable installation Contractor 主承包商
	Cable Lay Barge 鋪纜駁船	CLB	1-2	Cable installation Contractor 主承包商
	Trenching Support Vessel 開支援修拖船	TSV	1-2	Cable installation Contractor 主承包商
Support, Transport & Auxiliary Vessels 支援、運輸與輔助性船舶	Nearshore Support Barge 近岸支援修拖船	NSB	1	Cable installation Contractor 主承包商
	Trailing Suction Hopper Dredger 耙吸式挖泥船	TSHD	1	Cable installation Contractor 主承包商
	Crew Transfer Vessel 人員運輸船	CTV	1-2	Cable installation Contractor 主承包商
	Service Offshore Vessel 人員運輸船	SOV	-	Cable installation Contractor 主承包商
	Fall Pipe Vessel 移動式落管船	FPV	1	Cable installation Contractor 主承包商
	Tug 拖船		3-5	Cable installation Contractor 主承包商
	Multicat/Pontoon 多功能拖船		1-3	Cable installation Contractor 主承包商
	Cable transport & Storage vessel/barge 電纜運輸 & 儲備船 / 駁船		1	Cable installation Contractor 主承包商
	Shallow draft support boat 淺水支援船		5-8	Cable installation Contractor 主承包商
	Survey Vessel 測量船		1-2	Cable installation Contractor 主承包商

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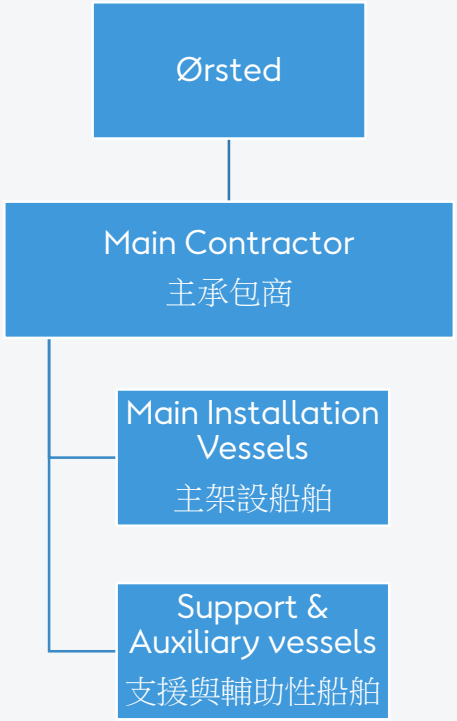
Wind Turbine Generator Package
風機計畫



VESSEL & BARGE TYPES USED IN THE WIND TURBINE GENERATOR PACKAGE
風機計畫使用之船舶與駁船型式

	VESSEL TYPE 船舶型式	ACRONYM 縮寫名詞	NO. OF VESSELS* 船舶數量	SOURCING RESPONSIBLE 資料來源
Main Installation & Construction Vessels 架設與施工船隻	Wind Turbine Installation Vessel 風機施工船	TIV	2	Ørsted WTG Package 沃旭風機計畫
Support, Transport & Auxiliary Vessels 支援、運輸與輔助性船舶	Service Operations Vessel 運維作業船	SOV	1	Main Contractor 主承包商
	Crew Transfer Vessel 人員運輸船	CTV	2-3	Main Contractor 主承包商

The number of vessels anticipated in table is subject to several factors, which is subject to further detailed design engineering, which may increase/decrease the no. of vessels required for the specific scope.
表內預定之船舶數量將依後續細部設計工程規畫時的各種因素而定，且船舶數量也可能於特定範圍內增加或減少。

Timelines 時程表

Logistics後援補給　CTV人員運輸船

4.1.1 Contracts & procurement : From 08-02-2019 to 31-10-2019 合約及採購:從2019年2月8日至2019年10月31日

SOV運維作業船

4.1.1 Contracts & procurement : From 24-09-2018 to 01-04-2020 合約及採購:從2019年9月24日至2019年4月1日

Guard Vessel戒護船

4.1.1 Contracts & procurement : From 01-09-2018 to 08-11-2019 合約及採購:從2018年9月1日至2019年11月8日

Helicopters直升機

4.1.1 Contracts & procurement : From 25-03-2019 to 20-02-2020 合約及採購:從2019年3月25日至2020年2月20日

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Estimated Timelines for Procurement & Construction
採購與施工預估期程表

- **4.3 FOU & OSS Installation Package** **FOU及OSS架設計畫**
- 4.3.1 Contracts & procurement : From 03-04-2018 to 28-06-2019
  合約及採購:從2018年4月3日至2019年6月28日
- 4.3.2 Construction period à From 01-03-2021 to 15-05-2022 : Subject to final award of Contractor
  施工期間:從2021年3月1日至2022年5月15日-依最終合約取得而定
- **4.4 Offshore Cable Installation Package** **海纜鋪設計畫**
- 4.4.1 Contracts & procurement : From 02-10-2017 to 05-09-2019
  合約及採購:從2017年10月2日至2019年9月5日
- 4.4.2 Construction period à From 10-06-2021 to 15-06-2022 : Subject to final award of Contractor
  施工期間:從2021年6月10日至2022年6月15日-依最終合約取得而定
- **4.5 WTG Installation Package** **風機架設計畫**
- 4.5.1 Contracts & procurement : From 01-06-2018 to 01-07-2019
- 合約及採購:從2018年6月1日至2019年7月1日
- 4.5.2 Construction period : From 01-02-2022 to 15-07-2022 : Subject to final award of Contractor
  施工期間:從2022年2月1日至2022年7月15日-依最終合約取得而定

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Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS
供應商與分包商-需求與規範
支援、運輸及輔助性作業船

TECHNICAL REQUIREMENTS 技術需求

CONSTRUCTION PACKAGE 施工計畫

Ørsted

Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

- ***Guard Vessels***
  - *2 x Offshore Guard Vessels for main construction site*

    Contract awarded in December 2018 to Singaporean-Taiwanese joint venture POSH Kerry
  - *3 x Guard Vessel (nearshore and offshore) for export cable route during export cable installation*

- *2 x **Crew Transfer Vessel***
  - *Support OSS Commissioning, Array Cable Termination and Construction Package*
  - *Supply runs between Taichung and Site*
  - *CTVs will remain offshore 24/7 (by default)*

- ***Service Operation Vessel / Construction Support Vessel***
  - *W2W & Accommodation for OSS Commissioning, Array Cable Termination and Construction Package (HV, Techs, HSE)*
  - *Maintenance of OSS until energization (bunker, maintenance)*
  - *Shared use of SOV with O&M upon delivery of O&M's new built vessel*

Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

VESSEL TYPE	ACRONYM	TECHNICAL REQUIREMENTS
Guard Vessel / Offshore Support Vessel / Anchor Handling Tug - Construction Site -	GV	• Safe Vessel Operation in wave heights up to Hs 4.5m • Fast Rescue Boat with launching arrangement. FRC to operate in the whole wind farm in wave heights up to Hs 3m. • Crane for transfer of equipment from shore to vessel • Crew staffing/accommodation and maintenance/spares to allow uninterrupted 24/7 operations throughout the charter period • Able to sail at speed of minimum 12 kn in operational weather conditions • Endurance offshore minimum 30 days between port calls for bunkering and provisions in wave heights up to Hs 4.5m. • Communication language on board: English ; Bridge crew must be capable of English and Chinese

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Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

VESSEL TYPE	ACRONYM	TECHNICAL REQUIREMENTS
Guard Vessel / Offshore Support Vessel / Anchor Handling Tug - Export Cable Route Offshore -	GV	• Safe Vessel Operation in wave heights up to Hs 4.5m • Fast Rescue Boat with launching arrangement. FRC to operate in the whole wind farm in wave heights up to Hs 3m. • Crane for transfer of equipment from shore to vessel • Crew staffing/accommodation and maintenance/spares to allow uninterrupted 24/7 operations throughout the charter period • Able to sail at speed of minimum 12 kn in operational weather conditions • Endurance offshore minimum 30 days between port calls for bunkering and provisions in wave heights up to Hs 4.5m. • Communication language on board: English ; Bridge crew must be capable of English and Chinese

Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

VESSEL TYPE	ACRONYM	TECHNICAL REQUIREMENTS
Guard Vessel / Support Vessel / Tug **- Export Cable Route Nearshore -**	GV	• Safe Vessel Operation in wave heights up to Hs 2.5m • Fast Rescue Boat with launching arrangement. FRC to operate in the whole wind farm in wave heights up to Hs 1.5m. • Crane for transfer of equipment from shore to vessel • Crew staffing/accommodation and maintenance/spares to allow uninterrupted 24/7 operations throughout the charter period • Able to sail at speed of minimum 12 kn in operational weather conditions • Endurance offshore minimum 30 days between port calls for bunkering and provisions • Communication language on board: English ; Bridge crew must be capable of English and Chinese

Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

VESSEL TYPE	ACRONYM	TECHNICAL REQUIREMENTS
Crew Transfer Vessel	CTV	• LOA minimum 32-39 m • Max draft approximate 1.5-1.8m • Endurance offshore approximate 10 days at up to 3m hs • Service speed at hs 3m 12 knots • Safe boatlanding transfers at 1.75m hs • Max speed, minimum 25 kn • Crew accommodation to allow 24/7 operations • Passenger day accommodation for 12 passengers • Deck crane 2 tons @ 10m • Max bollard pull 20 tons • Deck space available at least 4 x 10' or 2x20' container • Deck cargo capacity 20 tons • Offshore Fuel Transfer System (boat to structure, boat to boat) with pumping height up to 30m

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Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS
供應商與分包商-需求與規範
支援、運輸及輔助性作業船

TECHNICAL REQUIREMENTS 技術需求

FOUNDATION INSTALLATION PACKAGE 基礎架設計畫

Ørsted

Typical Main Construction Vessels – Foundation Installation

Ørsted

Typical Support Vessels – Foundation Installation

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Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

VESSEL TYPE	ACRONYM	TECHNICAL REQUIREMENTS
Crew Transfer vessel	CTV	• Loa minimum 18-32 m • Max draft approximate 1.5-1.8m • Endurance offshore approximate 10 days at up to 3m hs • Service speed at hs 3m 12 knots • Safe boatlanding transfers at 1.75m hs • Max speed, minimum 25 kn • Crew accommodation to allow 24/7 operations • Passenger day accommodation for 12 passengers • Deck crane 2 tons @ 10m • Max bollard pull 20 tons • Deck space available at least 4 x 10' or 2x20' container • Deck cargo capacity 20 tons
Survey vessel supporting dredging vessel	MSV	Multi service vessel capable to carry survey and multibeam systems on board and to operate @2.00 Hs
Grouting vessel	MSV	Multi service vessel capable to carry grout systems, a min. of 60m3 and capable to operate @2.00 Hs.

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Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

Bubble screen vessel	MSV	Multi service vessel capable to carry 2 big bubble curtains, compressors and to operate @2.00 Hs
Pile cleaning - post installation	MSV	Multi service vessel capable to carry soil plug removal tools and to operate @2.00 Hs.
Mooring tug	Tug	• Expected bollard pull between 60 and 80t • Anchor handling facilities • Towing winch • Towing hook • Maximum draft of 2,5 metres (for nearshore operations)
330ft - pile barge	Cargo barge	• Heavy ballast cargo barge (Jacket load-out operations without tidal restrictions due to low ballasting capabilities during Ro/Ro operations). • Capable to transit at 4m Hs • Max. 6 m draft • Min. speed 6knots • Compliant with local Taiwanese, Orsted and Marine Warranty Surveyor requirements.

Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

400ft - jacket barge #1	Cargo barge	• Heavy ballast cargo barge (Jacket load-out operations without tidal restrictions due to low ballasting capabilities during Ro/Ro operations). • Capable to transit at 4m Hs • Max. 6 m draft • Min. speed 6knots • Compliant with local Taiwanese, Orsted and Marine Warranty Surveyor requirements.
Tug for 330ft #1	Tug	Standard mooring tug with a min. bollard tug for 330 feet cargo barge.
Tug for 400ft #1	Tug	Standard mooring tug with a min. bollard tug for 400 feet cargo barge.

Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS
供應商與分包商-需求與規範
支援、運輸及輔助性作業船

TECHNICAL REQUIREMENTS 技術需求

CABLE INSTALLATION PACKAGE 電纜鋪設計畫

Ørsted

Typical Main Construction Vessels – Offshore Cable Installation & Cable Burial

Ørsted

Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

VESSEL TYPE	ACRONYM		TECHNICAL REQUIREMENTS
Nearshore Support Barge	NSB	1.	Capacity to maintain position within 1m in currents exceeding 3 knots
		2.	Anchor spread, with 5 point mooring power to maintain installation tolerances to <= +/- 2 m in 2,5 knots cross current
		3.	Self elevating platform or spudlegs required
		4.	Deck equipment configured for maximum bending radius of cable > 5m
		5.	Max draft 3,0 m
		6.	PoB > 20 pax
		7.	Work Class ROV installed onboard
		8.	Touch Down monitoring system installed
		9.	Deck layout for Omega and In-line cable joint installation and deployment
		10.	Working weather criteria for cable laying > 1,5m significant wave height
		11.	Deck strength exceeding 10t/m2, to carry cable and trenching equipment
		12.	Cable survey spread for MBES and cable detection
		13.	Offshore survey data processing facilities
		14.	Available cargo area for minimum 4 pce TEU containers for project parts
Trailing Suction Hopper Dredger	TSHD	1.	Hopper capacity >10.000m3
		2.	Inclined drag head
		3.	Ability to dredge in water depths up till 30-40 meters
		4.	Anti turbidity system to reduce sediment disposal
		5.	DP 0/1 positioning
		6.	Survey spread for MBES
		7.	Offshore survey data processing facilities

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Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

Crew Transfer Vessel	CTV	1. Loa minimum 18-32 m 2. Max draft approximate 1.5-1.8m 3. Endurance offshore approximate 10 days at up to 3m hs 4. Service speed at hs 3m 12 knots 5. Safe boatlanding transfers at 1.75m hs 6. Max speed, minimum 25 kn 7. Crew accommodation to allow 24/7 operations 8. Passenger day accommodation for 12 passengers 9. Deck crane 2 tons @ 10m 10. Max bollard pull 20 tons 11. Deck space available at least 4 x 10' or 2x20' container 12. Deck cargo capacity 20 tons
Fall Pipe Vessel	FPV	1. International trade (loading cargo outside Taiwan) 2. Accuracy of rock positioning <= +/- 0,5m down to a depth of 50m 3. Rock carrying capacity > 15,000 ton 4. Discharge capacity > 1,000 ton/hour 5. Minimum Fall pipe diameter 1,000 mm 6. Fall pipe discharge depth between 15m and 40m 7. Minimum transit speed 12 knots

Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

Tug		1. Expected bollard pull between 60 and 80t 2. Anchor handling facilities 3. Towing winch 4. Towing hook 5. Maximum draft of 2,5 metres (for nearshore operations)
Multicat		1. Expected bollard pull between 60 and 80t 2. Maximum draft of 2,5 metres 3. Anchor handling facilities 4. Offshore duration > 5 days 5. 24hr operations 6. PoB > 10 7. Free deck area > 10m x 15m 8. Deck strength exceeding 6t/m2
Cable transport & Storage vessel		1. International trade (loading cargo outside Taiwan) 2. 3500 ton capacity static cable tank capacity 3. Cable loading/Discharge capacity > 300m//hour

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Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS
供應商與分包商-需求與規範
支援、運輸及輔助性作業船

TECHNICAL REQUIREMENTS 技術需求

TURBINE INSTALLATION PACKAGE
(PENDING)風機架設計畫(尚待確認)

Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

VESSEL TYPE	ACRONYM	TECHNICAL REQUIREMENTS
Service Operations Vessel	SOV	• DP2 Positioning / Propulsion System • LOA approx. 80-130m • Breadth approx. 18-25m • GRT approx. 5.000-9.000 tons • Cargo crane for lifting equipment to structures (jackets, OSS), approx. 2tons @ 25m • Capable of carrying and operating walk-to-work gangway system for access in heights of LAT+25m to LAT+31m in wave heights up to minimum Hs 2.5m • Safe transfer of personnel from vessel to structures via walk-to-work gangway in wave heights up to Hs=2.5m. • Safe vessel operation in wave heights up to Hs 4.5m • Boatlanding with adjustable platform system to transfer personnel between SOV and CTVs • Offshore accommodation for 50-70 offshore technicians in single cabins • Outside deck area for storage of up to 10 x 20' container and other cargo • Endurance offshore minimum 30 days between port calls for bunkering and provisions • Crew required for operating vessel, crane and gangway 24/7 • Crew accommodation to allow 24/7 operation

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Supplier & Subcontractors - Requirements & Specifications
SUPPORT, TRANSPORT & AUXILIARY VESSELS

VESSEL TYPE	ACRONYM	TECHNICAL REQUIREMENTS
Crew Transfer Vessel	CTV	• LOA minimum 32-39 m • Max draft approximate 1.5-1.8m • Endurance offshore approximate 10 days at up to 3m hs • Service speed at hs 3m 12 knots • Safe boatlanding transfers at 1.75m hs • Max speed, minimum 25 kn • Crew accommodation to allow 24/7 operations • Passenger day accommodation for 12 passengers • Deck crane 2 tons @ 10m • Max bollard pull 20 tons • Deck space available at least 4 x 10' or 2x20' container • Deck cargo capacity 20 tons • Offshore Fuel Transfer System (boat to structure, boat to boat) with pumping height up to 30m

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Supplier & Subcontractors - Requirements & Specifications
HSE Requirements
供應商與分包商-需求與規範
安衛環需求

General HSE Minimum requirements
一般安衛環最低需求

Supplier & Subcontractors - Requirements & Specifications
HSE Requirements

The overall HSE objective for this project is to provide a safe, healthy and environmentally conscious workplace for all Workers, and to adopt a zero injury and incident culture.

Supplier & Subcontractors - Requirements & Specifications
HSE Requirements

The Contractor shall make every reasonable effort to utilise the principles of accident and loss prevention in the management of all activities and programmes, and ensure that this line management includes owners, managers and all levels of supervision, and that Workers are responsible for identifying, eliminating and/or controlling known Hazards that can result in personal injury, illness, property damage, fire, any breach of security, environmental impact or other form of controllable loss.

Supplier & Subcontractors - Requirements & Specifications
HSE Requirements

- The Contractor shall develop an HSE plan within its area of activity based on its own requirements and the requirements outlined in this document. The Contractor's HSE plan must be forwarded not later than 3 months prior to expected start of transport and installation;

- The Contractor shall develop and maintain HSE programmes and procedures that meet or exceed statutory laws, regulations, rules and offshore wind standards;

- The Contractor shall ensure a process of pre-qualification, selection and performance management is implemented and maintained for all its Subcontractors; and

- The Contractor shall include the provisions of this document in every contract with its contractors and Subcontractors.

Supplier & Subcontractors - Requirements & Specifications
HSE Requirements - Drugs and Alcohol

The Contractor shall ensure that all Contractor's Personnel performing work at the Site are drug and alcohol free. The Contractor shall have an internal written substance abuse policy. Alcohol may not be consumed during working hours. Reporting to work under the influence of alcohol is prohibited. "Under the influence" is defined as the presence of alcohol in the body which exceeds 0.00‰ (in blood alcohol level). Possession of open containers of alcoholic beverages in or around the worksite, including all vehicles and equipment at the Site, is prohibited.

Supplier & Subcontractors - Requirements & Specifications
HSE Requirements - Legal and other requirements

Environmental protection and reporting

The Contractor shall immediately notify the Employer's HSE Representative and the Engineer of any releases or spills of hazardous substances into the environment. The Contractor shall ensure that all aspects of the environment regulations are complied with, including establishing any required procedures, control systems and carrying out employee training. The Contractor is responsible for the clean-up and reporting of all releases or spills in accordance with environmental regulations, and the Employer's HSE Representative and the Engineer shall be copied in on all reports.

Hazardous waste

The Contractor shall ensure that all hazardous wastes generated by the Contractor at the Site and unused hazardous chemicals are removed, transported and disposed of in accordance with applicable legislation. The Contractor shall be responsible for compliance with all requirements of all applicable hazardous waste disposal legislation for waste they generate at the Site as a result of the construction, or any other, activity. A copy of the necessary documentation (i.e. hazardous waste manifest) shall be supplied to the Employer's HSE Representative.

Impaired Workers

The Contractor shall ensure that any Worker showing signs of impairment (influenced by alcohol, drugs, medication, mental/physical fatigue, or anything that impairs the Worker to the extent of not being able to safely carry out his or her duties), or any person in a supervisory position with respect to such a person or the project who knowingly allows a person showing signs of impairment to work, will be subject to suitable disciplinary action. Such action must at a minimum be in accordance with applicable legislative requirements.

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Supplier & Subcontractors - Requirements & Specifications
HSE Requirements - Legal and other requirements

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Supplier & Subcontractors - Requirements & Specifications
Quality Requirements
供應商與分包商-需求與規範
品質需求

General Quality Minimum requirements
一般品質最低需求

Supplier & Subcontractors - Requirements & Specifications
Quality requirements

Quality Management System

The Contractor shall confirm that the Scope of Works/Services is covered by a quality management system, which complies with the requirements of ISO 9001:2015 or equivalent standard.

By quality management system is understood documented processes and procedures to ensure that the Scope of [Works/Services/Supplies] is properly managed. This includes ensuring legal, statutory and regulatory requirements are met."

Risk management

The Contractor shall demonstrate and manage a systematic and transparent risk management process or procedure covering Design, Processes, QMS and scope of Contract

Control of Documentation

In addition to the general control of documentation as required in accordance with ISO 9001, the Contractor shall ensure all documentation from any of its Subcontractor(s) complies with the requirements in Technical Standards and Regulations and in the Contract between the Employer and the Contractor

Management of Non-conformities

The Contractor shall demonstrate a systematic and transparent Non-conformity process or procedure covering Contractors scope of work as a business.

Ørsted

Supplier & Subcontractors - Requirements & Specifications
Quality Monitoring by Ørsted

Review of documentation

Ørsted has the right to review the Contractor's documentation at any time. This review comprises all the Contractor's documentation as referred to in these requirements.

Audits and Inspections

Ørsted has the right to perform a Full-scale Quality Audit of the Contractor and his Subcontractors and Key Subcontractors.

Audits and inspections may include application of a certification body for 3rd party audits/inspections and Contractor shall support these audits and inspections with all relevant documentation to perform assessment or inspection.

Onsite monitoring activities

Ørsted has the right to establish an onsite monitoring programme at the specific production, installation and service Site(s) of the Contractor and any of its Subcontractors and Key Subcontractors.

Supplier & Subcontractors - Requirements & Specifications
Quality Monitoring by Ørsted

References

The following standards are relevant as a Guidance

ISO 9000:2015 'Quality Management Systems - Fundamentals and vocabulary'

ISO 9001:2015 'Quality Management Systems – Requirements'

ISO 55000:2014 'Asset management – Overview, principles and terminology'

ISO 55001:2014 'Asset management – Management systems – Requirements'

ISO 19011:2012 'Guidelines for auditing management systems'

ISO 10005:2006 'Quality Management Systems - Guidelines for quality plans'

ISO 10006:2003 'Guidelines for Quality Management in projects'

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Supplier & Subcontractors - Requirements & Specifications
Vessel standard requirements
供應商與分包商-需求與規範
船隻標準需求

Ørsted Vessel Inspections
沃旭作業船檢查

CHW01+02 Vessel Inspections　CHW01+02船隻檢查

What are we checking檢查項目

→ **Inspection of a vessel is a Risk Management tool** *(HSE, Quality, Time)船隻檢察署於一種風險管理工具(安衛環、品質、時間)*

What is checked: 檢查項目:

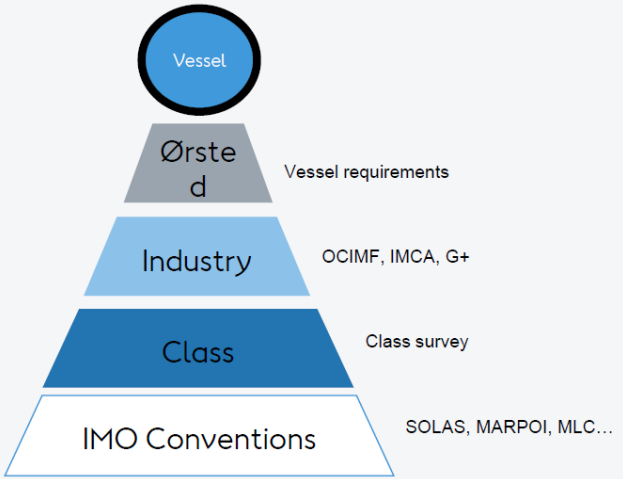
- Check the vessel is safely operated and managed. 檢查船隻是否以安全方式操作及管理
- Check the vessel is compliant with international conventions and codes and local requirements. 檢查船隻是否符合國際公約、法規、以及當地之要求。
- Check vessel is in compliance with industrial best practice and Ørsted vessel requirements. 檢查船隻是否符合最佳工業慣例以及沃旭之船隻需求
- Check safety procedures and discuss Ørsted safety culture. 檢查安全程序以及討論沃旭的安全文化。
- Check crew competencies and safety awareness / behaviour. 檢查船員職能及安全認知度/行為
- Generally check that the vessel can pass a Port State Control. 船舶通過港口國館制之一般性檢查
- Due diligence. 盡職調查

CHW01+02 Vessel Inspections　CHW01+02 船隻檢查

What is the inspection based on. 檢查標準為何?

Applicable field of inspections: 可適用的檢查領域:

- Compliance with IMO Conventions (e.g. SOLAS, MARPO, MLC…) 符合IMO公約(例如SOLAS, MARPO, MLC等)
- Compliance with Class requirements 符合等級之要求
- Compliance with Industry requirements & best practices (e.g. OCIMF, IMCA, G+…) 符合工業要求及最佳慣例(例如OCIMF, IMCA, G+等)
- Compliance with Ørsted vessel & HSE requirements 符合沃旭的船隻及安衛環要求



Differentiation between: 區分下列:

- Convention Vessels (> 500 GT) 傳統性船博(>500總噸)
- Non-Convention Vessels (< 500 GT) 非傳統性船舶(<500總噸)

Ørsted

CHW01+02 Vessel Inspections　CHW01+02 船隻檢查

Vessel Inspection above 500 GT – Agenda / Checklist

500總噸以上船舶之檢查 -檢查程序/查檢表

The In-survey will cover: 內部調查將包括下列:

- Opening meeting with the master and the officers 與船長及幹部之開工會議
- Close-out of latest IMCA report 總結最近的IMCA報告
- In-survey check list:
  - Vessel and crew certificates 船隻與船員證照
  - Site specific manuals 場址專用手冊
  - Safety Management 安全管理
  - Vessels safety 船舶安全性
  - Navigational equipment 導航設備
  - Communication通訊
  - Overall condition of vessel 船隻整體情況
- The vessel's principal dimensions, capacities, crew size, endurance and accommodation capacity should be recorded in this section. 應在本節紀錄船隻的主要尺寸、容量、船員人數、耐用性、以及載運能力。
- Operation of the vessel and drills 船隻操作及演練
- Close-out meeting and list of findings during the In-survey. 總結會議以及內部調查期間的調查結果清單

CHW01+02 Vessel Inspections

Vessel Inspection above 500 GT – Agenda / Checklist

01.00 General requirement	01.00 一般要求
02.00 Vessel construction, structure etc	02.00 船舶構造，結構...等
02.10 Lifesaving appliances	02.10 救生設備
02.20 Safety equipment	02.20 安全設備
02.30 Bridge equipment	02.30 駕駛台設備
02.40 Communication equipment	02.40 通訊設備
02.50 Deck arrangements and equipment	02.50 甲板安排與設備
02.60 Mooring. berthing and personnel transfer	02.60 停泊，靠泊和人員轉移
02.70 Personal protection equipment	02.70 個人防護設備
02.80 People tracking equipment	02.80 人員追蹤設備
03.00 HSE & HSE Management	03.00 氣象預報及職安衛系統 & 氣象預報及職安衛系統管理
03.10 Safety Management System	03.10 安全管理系統
03.20 Protection of the environment	03.20 環境保護
03.30 Safety culture	03.30 安全文化
05.00 Master's responsibilities	05.00 船長責任
06.10 Crew competences	06.10 船員權限
06.20 Crew familiarization and training	06.20 船員熟悉和培訓
06.30 Rest hours	06.30 休息時間

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07.00 Shipboard operation procedures	07.00 船上操作程序
07.10 Bridge procedures	07.10 駕駛台程序
07.20 Engine procedures	07.20 機艙程序
08.00 Emergency preparedness	08.00 緊急應變
08.10 Emergency procedures	08.10 緊急程序
08.20 Emergency training	08.20 緊急訓練
08.30 Fire safety	08.30 消防安全
09.00 Safety records	09.00 安全記錄
10.00 Vessel management and maintenance	10.00 船舶管理及維護
11.00 Certification	11.00 證書
20.00 Dynamic positioning	20.00 動態定位
21.00 Dynamic gangway	21.00 動態舷梯
22.00 Heavy lift crane	22.00 重物起重機
23.00 Helicopter platform	23.00 直升機平台
24.00 Jacking system	24.00 頂舉系統
25.00 Diving capabilities	25.00 潛水能力
26.00 Accommodation of PAX	26.00 居住設備

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Finding Classification of Inspection.

Findings during the inspections will be categorized depending on severity / impact on the vessel and the scope:

H – High Level Severity Finding	Rectification before Ørsted takes the vessel on-hire
M - Medium Level Severity Finding	As per auditor's advice and no later than 3 months after the survey
L - Medium Level Severity Finding	As per auditor's advice with the aim of demonstrating continuous improvement

H	06.10.0200	All crewmembers shall be STCW qualified according to the vessel's Minimum Safe Manning Certificate. 所有船員應具有船舶最低安全配額證書要求之 STCW 資格。
H	06.10.0400	Original certificates of competence must be kept on board. 船上需保存適任證書之正本。

M	06.10.1000	The Owners shall provide a crew matrix to verify the compliance between the competence requirements to each position and the competence of the individual crew member on board. The crew matrix can be a combined document. The Owners are responsible for issuing an updated crew matrix in due time before the vessel or any new crewmember arrive on site. 船東應提供船員職責表以核實每個職位的能力要求與船上個別船員的能力之間的一致性。 船員職責表可以是複合文件。 在船舶或任何新船員到達現場之前，船東需負責發布更新的船員職責表。

M	06.10.0900	The responsibility of the individual must be defined and all operational tasks should be assigned to qualified personnel through a job description for each individual position on board. 必須定義個人責任，並透過職務敘述將所有操作任務分配給合格人員。

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