

# 離岸風電在地化發展 Localizing Offshore Wind

沃旭能源- 大彰化離岸風電計畫  
Greater Changhua projects



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# DONG Energy is becoming Ørsted

丹能集團將成為沃旭能源

**Create a world that runs entirely on green energy**  
創造一個完全以綠色能源運作的世界

Profound strategic transformation from black to green energy  
and recent divestment of the upstream oil and gas

# We are the Global Leader in Offshore Wind, with more than 25 years of experience 擁有超過25年經驗的全球離岸風電巨擘

- Headquarters in Denmark
- 50.1% owned by the Danish State
- Listed in the Nasdaq OMX: ORSTED
- 5,600 employees
- Revenue in 2016 DKK 61.2 bn (EUR 8.2bn)

1991

**25+ years of experience and track record in offshore wind**

2017

22 offshore wind farms in operation

7 offshore wind farms under construction

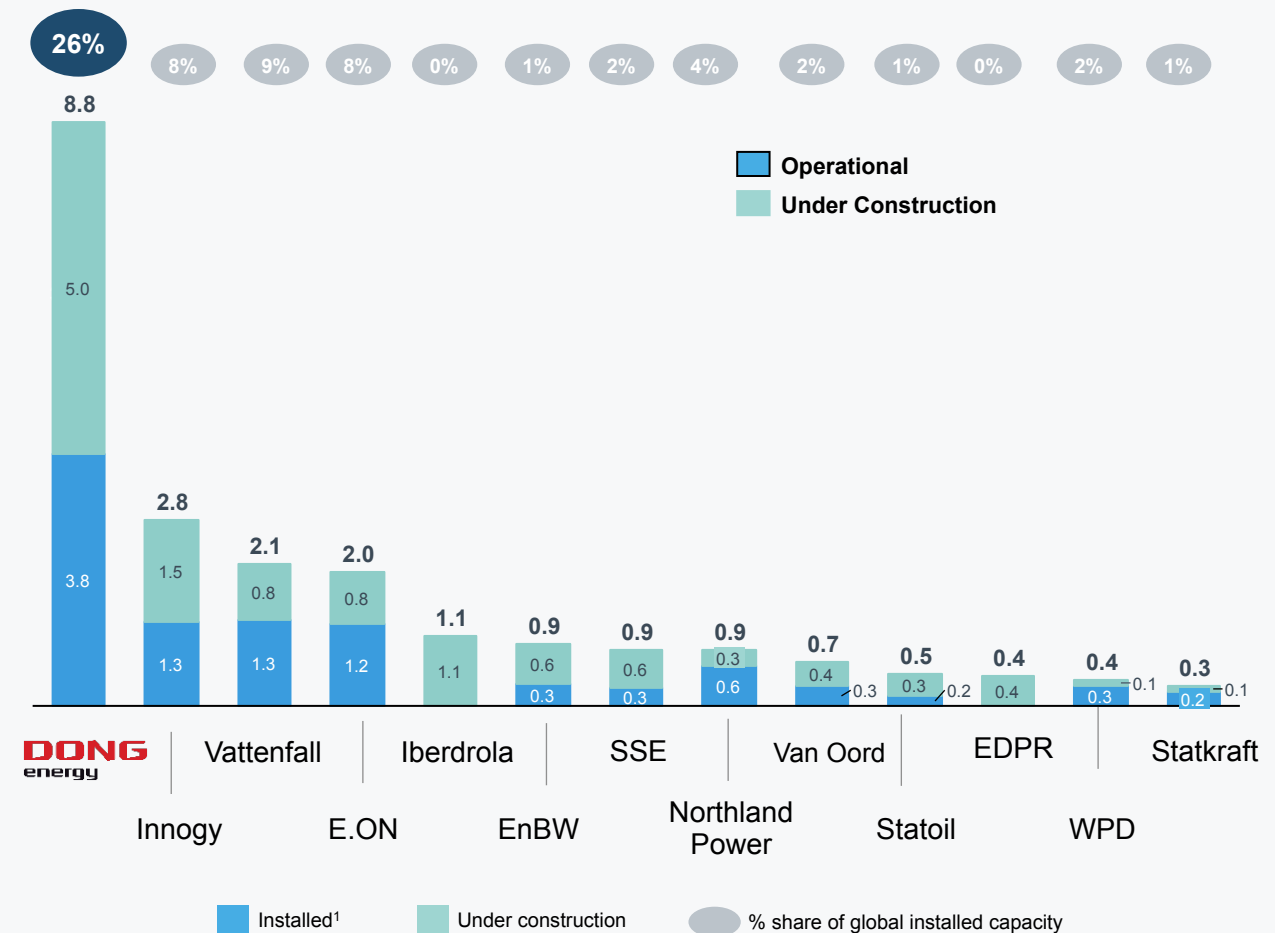
**3.5 GW**  
World's leading operator

**3.8 GW**  
Constructed capacity

**5.0 GW**  
under construction

## Largest offshore wind player globally today

Global offshore wind capacity GW



Source: Bloomberg New Energy Finance, September 2017, DONG Energy analysis

1. If a project is executed on behalf of a lead developer managing the construction, then 100% of capacity is allocated to the lead developer. If construction is executed by an integrated joint venture, capacity is allocated in proportion to the JV share

# We are not just a developer, but an integrated Energy Company 沃旭能源不只是開發商，而是一家整合能源公司

**Strong integrated end-to-end business model 從開發到運維的強大整合商業模式**

Develop

Build

Operate

Own

**25+ years in offshore wind sector 超過25年離岸風電經驗**

**Long-term commitment in Taiwan, we are here to stay!  
長期深耕台灣市場，我們會一直在這裡！**

**Proven track record in developing local long-term  
partnerships 與本地夥伴發展長期合作關係**

**Always built on time, on budget! 總是如期依預算完工**

**A trusted partner & advisor 值得信賴的夥伴和顧問**



# We value developing local partnerships and work with local companies from day 1

沃旭能源重視在地夥伴關係，來台第一天就開始與本地機構和企業合作



Oct 2016  
Business alliance,  
Letter of Intent with  
MOEA

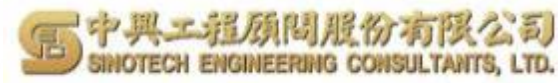


Dec 2016  
MOU with  
Changhua  
County  
Government



Nov 2016 MOU with ITRI

We develop projects together with local companies





# Formosa 1 – We collaborate and transfer knowledge into Taiwan's first offshore wind project

海洋風電 – 沃旭能源透過合資將專業知識轉移給台灣第一座離岸風場

## Ownership structure

Ørsted: 35%

Swancor: 15%

Macquarie: 50%



## Project highlights

- The 1st offshore wind farm in Taiwan (demonstration project)
- Area: 10.3 km<sup>2</sup>
- Distance to shore: 2-6 km
- Capacity: 128 MW

Phase I 8 MW (2 x 4 MW)

Phase II 120 MW

- CoD: Phase I Apr. 2017 / **completed**  
Phase II exp. Dec. 2019 / **on track**
- R&D collaborations with local universities

## Wind farm location



# Formosa 1 – We collaborate and transfer knowledge into Taiwan's first offshore wind project

## 海洋風電 – 沃旭能源透過合資將專業知識轉移給台灣第一座離岸風場

### 股權結構

沃旭: 35%  
上緯: 15%  
麥格理: 50%



### 風場位置



### 風場開發進度

- 第一座台灣離岸風場 (示範風場)
- Area: 10.3 km<sup>2</sup>
- 距離海岸: 2-6 km
- 發電容量: 128 MW

第一階段 8 MW (2 x 4 MW)

第二階段 120 MW

- 運轉發電時程: 第一階段 Apr. 2017 / **completed**  
第二階段 預計 Dec. 2019 / **on track**
- 與國內大學進行 R&D 合作交流

# Our Changhua projects: Large-scale offshore wind power plants for Taiwan's green energy future

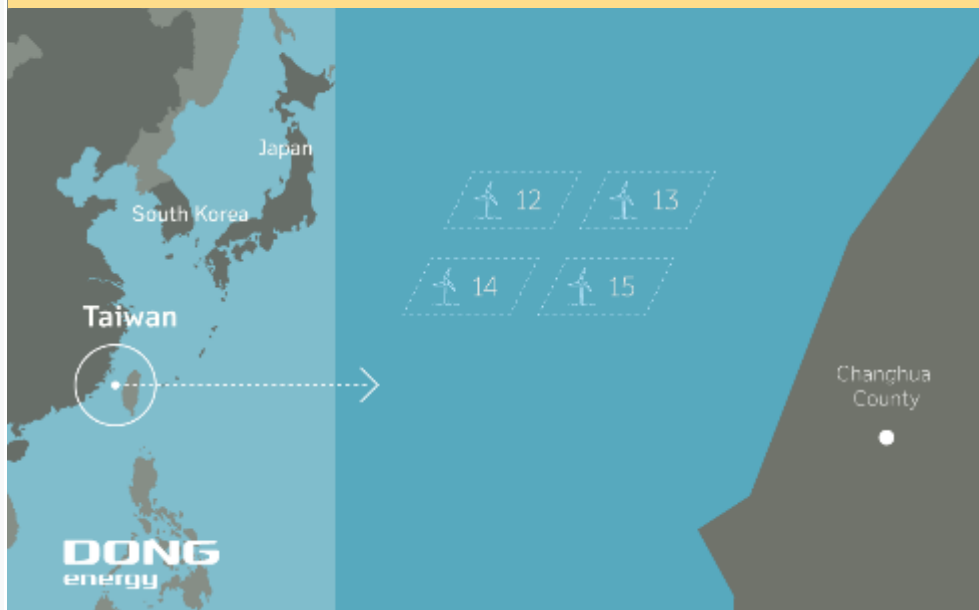
## 大彰化離岸風電計畫 – 大規模離岸風場 加速台灣綠能發展

### Ownership structure

Ørsted: 100%

Local investors and partners to come in post FID

### Wind farm location



Proposed DONG Energy offshore wind development sites (#12, #13, #14, #15)

### Projects highlights

- **Potential ~2.4 GW total capacity**
- **Expected to power 2.3 Million households**
- **Development timeline:**
  - EIA submitted for all four sites and ongoing review
  - Construction work to start 2019
  - First power for each project: 2021+
  - Engineering and design work started and in progress with local consultant support
  - Seabed surveys ongoing in 2017 and detailed survey set up for 2018 with local Taiwan vessel.
  - Wind measurement campaign deployed on site Summer 2017
- **Local supply chain plan under execution**  
(see next slide)



# Our Changhua projects: Large-scale offshore wind power plants for Taiwan's green energy future

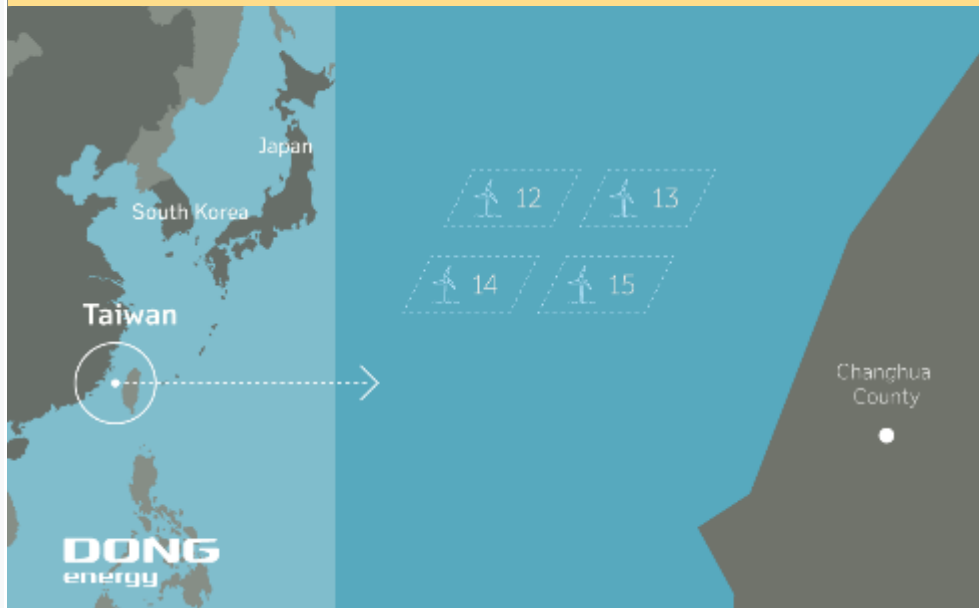
## 大彰化離岸風電計畫 – 大規模離岸風場 加速台灣綠能發展

### Ownership structure

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### Wind farm location



彰化外海預定風場 (development sites (#12, #13, #14, #15))

### Projects highlights

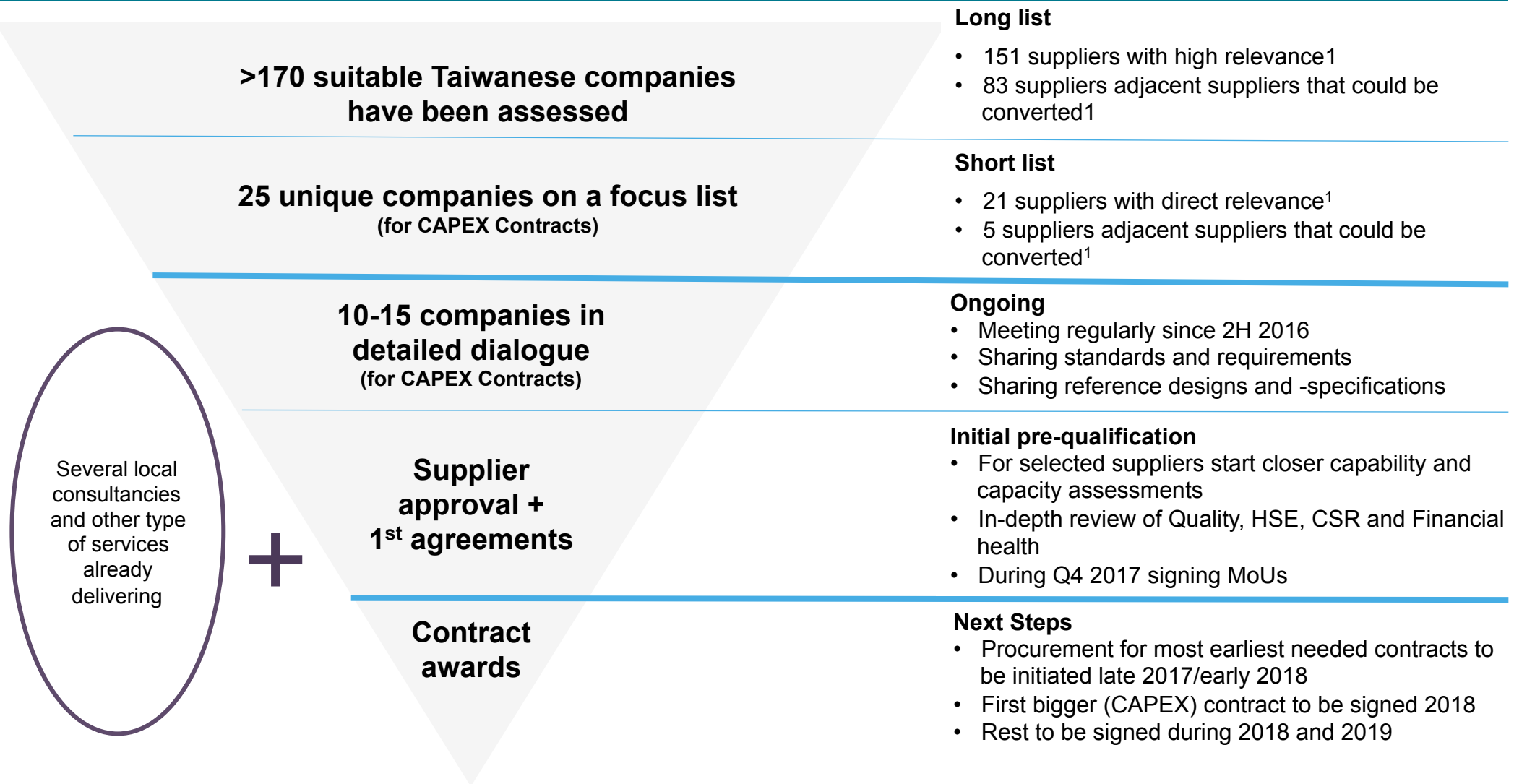
- 預計總裝置發電量 2.4 GW
- 未來可以供電給230萬台灣家庭
- 風場開發時程:
  - 環評審查進行中
  - 岸上建造工程預定於2019開始
  - 第一座風場預定於2021年後開始運轉發電
  - 工程及設計作業正進行中，並和本地顧問公司合作
  - 今年已經進行海床初步探勘調查，明年將採用台灣船隻進行更深入探勘調查
  - 自今年夏天起已經放置風速測量設備，持續紀錄風速數值

本地供應鏈發展計畫進行中

# Localization through early and continuous engagement

## 透過持續雙向溝通及合作，推動離岸風電在地化

A strong local supply chain is possible in Taiwan 台灣有潛力發展出堅強的在地供應鏈



<sup>1</sup> O&M service suppliers not incl. for the moment.

# Changhua will become a green energy hub

## 支持彰化成為台灣離岸風能重鎮

**Create public awareness**  
提升公眾意識

### Short term 短程

#### Events 活動



**Education and training**  
深耕教育訓練

### Seminars 研討會



**Create new business opportunity**  
創造商業新機

### Map business opportunities 媒合事業機會



### Mid term 中程

#### Public installations 公共裝置



### National offshore wind programme 國家離岸風電計畫



### Start Up assistance centre 創業輔助中心



### Long term 長程

#### Exhibition centre / tourism 展覽中心／旅遊業



### Knowledge building 知識建構



### Changhua supplier centre 彰化供應商中心



訓  
大學  
實習



謝謝您的聆聽指教