

# Policy of Offshore Wind in Taiwan 台灣離岸風電政策

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## **Energy Reform in Taiwan**

### Guidelines on Energy Development

A stable, affordable and low-risk supplydemand system for energy.

**04** Facilitate energy transition and energy market reform.



02

Innovative green technology to foster employment and economic growth

03

A clean energy system and healthy living environment.





#### **Total Energy Supply (2017)**





### **Power Mix**

#### **Total Electricity Generation (2017)**



Source: BOE (2018), Energy Statistics.



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### Renewable Energy Targets

• Renewable energy development in Taiwan is toward increasing renewable energy supply and raising renewable energy target to achieve 20% renewable electricity generation by 2025.

		<b>Power Capacity (MW)</b>			<b>Electricity Generation (TWh)</b>		
		2017	<b>2020(f)</b>	<b>2025(f)</b>	2017	<b>2020(f)</b>	<b>2025(f)</b>
Solar PV		1,768	6,500	20,000	1.7	8.1	25.6
Wind	onshore	684	814	1,200	1.7	1.9	2.8
	offshore	8	976	5,738	0.2	3.5	20.7
Geothermal		-	150	200	-	1.0	1.3
Biomass		727	768	813	3.5	3.8	4.3
Hydro Power		2,089	2,100	2,150	5.4	4.9	5.1
Fuel Cell		-	22.5	60	-	0.2	0.5
Total		5,276	11,331	30,161	12.4	23.4	60.2



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## **Targets of Wind Development**





## **Onshore Wind Development**

### By the end of Jan 2019:

- **State-owned:** 169 WTs / 294 MW
- **Private:** 183 WTs / 402 MW
- Total: 352 WTs / 696 MW (11.0 % of all RE)
- **2018 Production:** ≈ 1,679 GWh (13.2 % of all RE)





### **Taiwan Offshore Wind Potential**



**Depth:** 5-20 m

Area: 1,779.2 km<sup>2</sup> Potential: 9 GW

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**Shallow Water** 

**Depth:** 20-50 m **Area:** 6,547 km<sup>2</sup> **Potential:** 48 GW



Feasible: 1.2 GW



**Depth:** > 50 m **Potential:** 90 GW





Ref. "Wind Resource Assessment Handbook," ITRI, 2011





# **Strategies for Offshore Wind**

DIP

ZAP

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- Offshore Demonstration Incentive Program (示範獎勵辦法)
  - Incentives for Pioneers
  - Subsidy for 2 Wind Farms by 2020

- Directions of Zone Application for Planning (場址作業要點)
  - Transition Period
  - 36 Zones of Potential

- Offshore Zonal Development (區塊開發)
  - Self-sustaining Industry
  - Strategic Environmental Assessment (SEA)



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### **Formosa Demonstration Turbines commissioned**

- 2 Siemens 4-MW turbines were installed on 27th October 2016.
- Fully <u>commissioned on 28<sup>th</sup> April 2017</u>.
- Demonstration wind farm (total 128 MW) to be commissioned by 2020.



Courtesy: Formosa 1 Wind Power Co. Ltd



### Grid Allocation Scheme (GAS) for ZAP

- Announced on 18<sup>th</sup> January 2018
- Qualification: registered ZAP developers with EIA consent by the end of 2017



- 1. To commission by 2020: Applicants compete by the application progress of the Preparation Permit, technical capability, and financial capability.
- 2. To commission between 2021-2025: Applicants compete by the technical capability and financial capability. Localization commitment is also required.
- **3.** Applicants with higher points will be granted with priority of grid connection.
  - a) Eligibility: Scored above 60 points but not selected in the Selection stage.
  - b) Ranking: Based on the bidding price of FIT.



Selection: 3,836 MW in total for commissioning between 2020 to 2024
Auction: 1,664 MW in total for commissioning in 2025

Туре	Year of Commission	Project	Developer	
ection	2020	Formosa II	Swancor + Macquarie	
		Yun-Neng (Yunlin)	wpd	
		Yun-Neng (Yunlin)	wpd	
		Li-Wei (Guanyin)	wpd	
	2021	<b>Greater Changhua SE</b>	Ørsted	
		Greater Changhua SW	Ørsted	
ele		Chang-Fang	CIP	
$\mathbf{\Sigma}$	2023	Chang-Fang	CIP	
		Chung-Neng	CSC	
	2024	Xi-Dao	CIP	
	2024	Taipower Phase II	TPC	
		Hai-Long 2	NPI + Yushan	
Auction		Hai-Long 2	NPI + Yushan	
	2025	Hai-Long 3	NPI + Yushan	
	2023	Greater Changhua SW	Ørsted	
		Greater Changhua NW	Ørsted	



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## **Phase 3: Zonal Development**

### Purpose

- Marine Spatial Planning
- Optimal Resource Utilization
- Domestic Industry Development

### Development

- Zones will be released <u>in stages</u> after 2026
- Targeting at area of <u>50 m water depth</u> or above & <u>4.5 GW remainders</u> of Zones of Potential
- <u>Benefit to the domestic industry</u> will be taken into consideration while selecting developers







## **Phase 3: Zonal Development**

### Zonal Development (draft)

- Increase 1 GW/year from 2026 to 2030.
- EIA consented yet unallocated ZAP projects add up to 4.5 GW.
- Localization will be incorporated to establish self-sustaining market and domestic supply chain.
- Public consultation scheduled in 2019.





## **Infrastructure for Offshore Wind**

#### Assembly quayside

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- Quay 5A & 5B of <u>Taichung Harbor</u> will be constructed in 2018 & 2020.
- Quay 36 will be reserved for future flexibility.

#### **O&M** quayside

Changhua County Government will construct O&M quays in <u>Changhua Fishery Port</u> (in the vicinity of Changhua Industrial Park).

#### Foundation quayside

- Exclusive quays for R&D and manufacture of foundations will be constructed in the "Industrial Innovation Park of Marine Technology" of <u>Hsinda Harbor</u>.
- $\succ$  Scheduled to be completed by 2020.

Ports & Grids

#### **Grid enhancement**

- Short-term (~2020): To use existing onshore substations.
- Mid-term (~2025): Taipower will provide 10.7 GW by 2025.
- Common Corridors: Taipower has announced the coordinates of "Common Corridors for Offshore Wind Cables in Changhua".



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### **Outlook of 2025**



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In 2025, the domestic output value of <u>marine construction</u> (including geological survey & cable laying) is estimated to exceed NTD 77.3 Billion (€2.2 Billion).

The accumulated number of new job creation is estimated to exceed 20,000.

The foreign and domestic investment is estimated to exceed NTD 1 Trillion (€28.6 Billion).

# Thank you for

# your attention

OLC