



# Offshore market outlook

# Agenda

**1** The transforming energy system

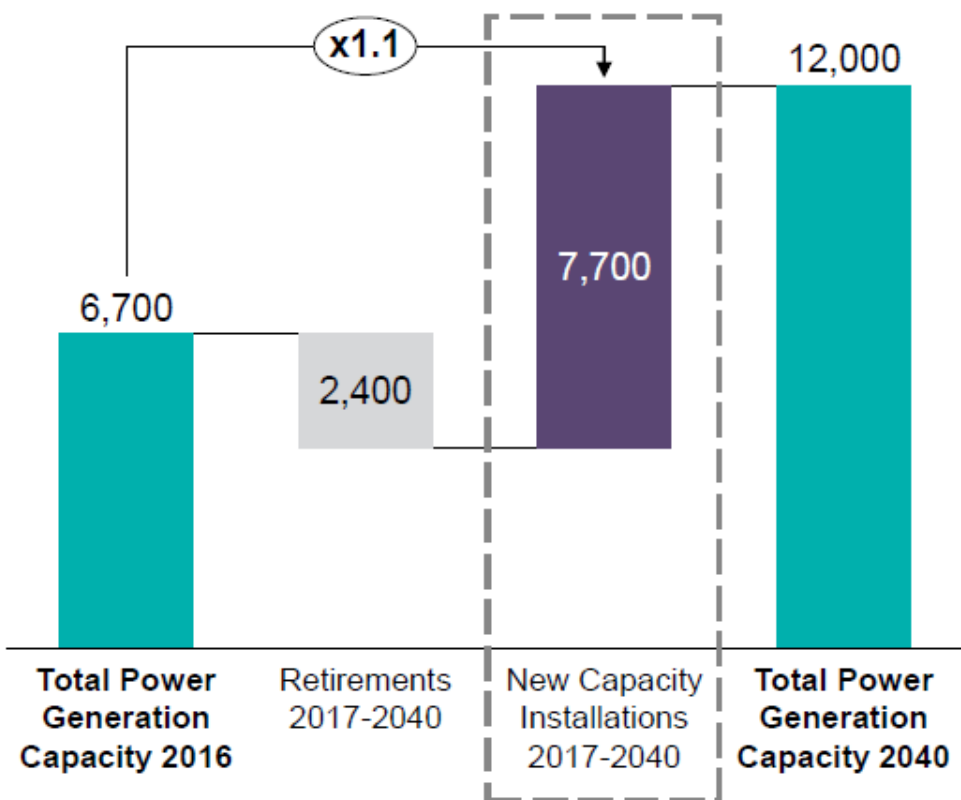
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**2** A fast maturing and globalizing offshore market

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## Global power generation additions until 2040 to exceed total existing installed base

— Global power generation capacity (in GW)<sup>1</sup> —



Fundamentals

**Global population and GDP growth** driving higher energy consumption

**Retirements** of old capacity triggering need of additional new installations

Clear **electrification trends**, e.g. transportation

Implications

New installations to **surpass existing accumulated capacity**

Global investment until 2040: **~10 \$T<sup>2</sup>**

## Competitiveness of renewables triggering investments from main stakeholders

### Government

Strong **commitment** to RE  
of international community



PARIS2015  
UN CLIMATE CHANGE CONFERENCE  
COP21-CMP11

Parliament



35% by 2030

Nations committed  
to accelerate ...

### State/City

100% RE target set



Fukushima City



... cities and states  
are powerful drivers

### Corporate

>19GW of corporate  
PPA for RE signed



Utilities committing



... more companies  
are joining

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**1** The transforming energy system

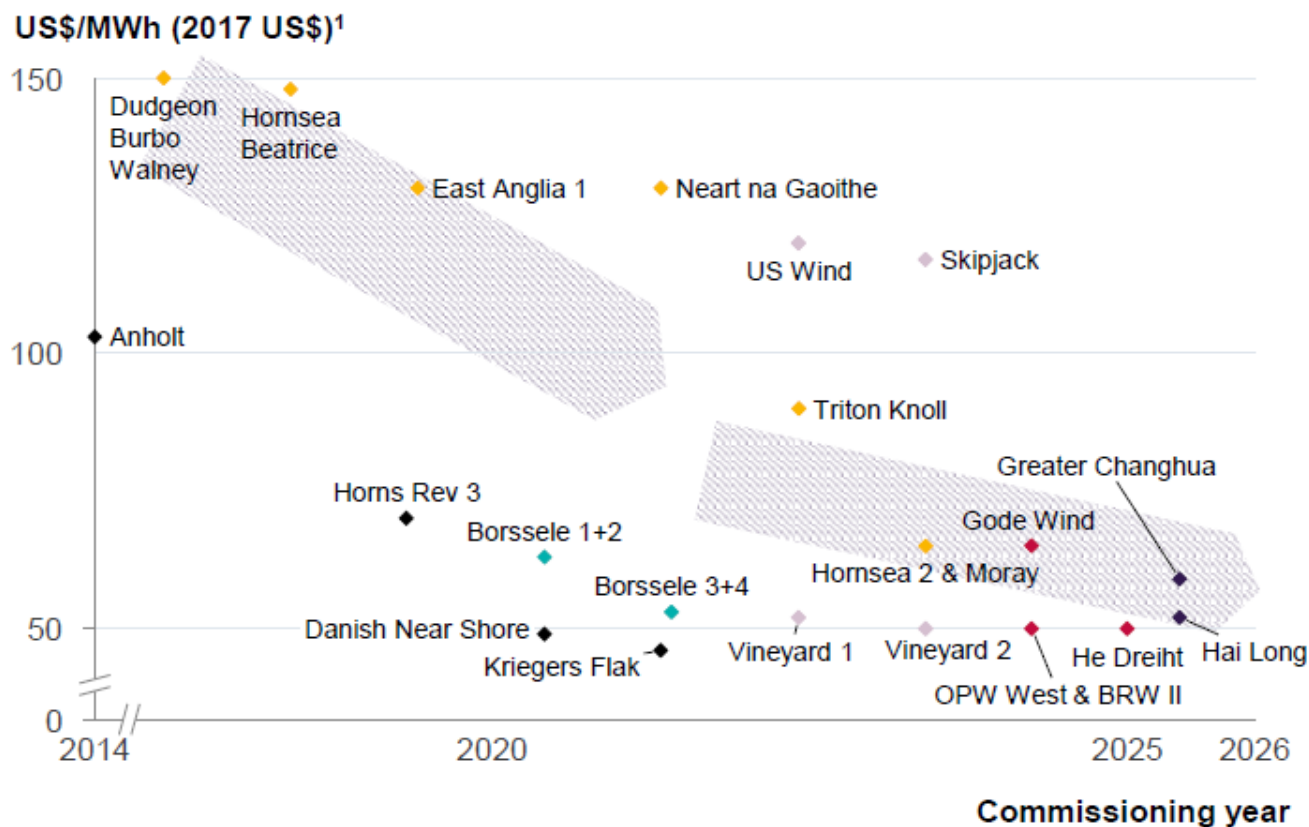
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**2** A fast maturing and globalizing offshore market

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## Record-low auction prices transformed wind into a mainstream energy source – Offshore LCoE achievements is driving the increased global interest

### Levelized offshore wind auction prices



◆ UK projects ◆ DK projects ◆ NL projects ◆ DE projects ◆ TW projects ◆ US projects 1 BNEF 2017

The cost-out is a crucial enabler for further offshore uptake and globalization of the industry



The levelized auction prices puts pressure on the industry to deliver



Substantial subsidy savings have increased interest for offshore wind around the world



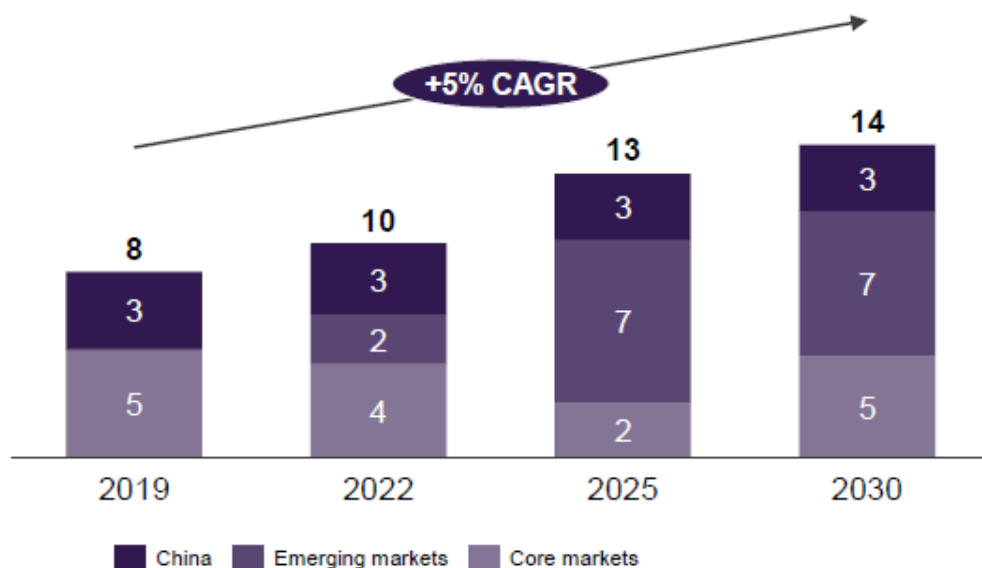
Intense interest from a broad range of new markets to emerge the coming decade



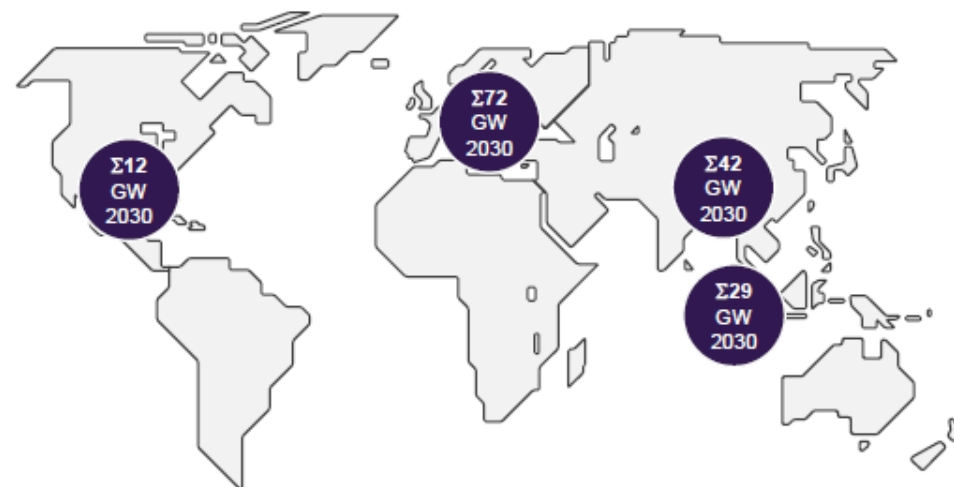
## Great potential for offshore wind with rapid price decreases accelerating growth and new market development – further increasing offshore wind market potential

5% CAGR in global installations until 2030<sup>1</sup>

Annual installations GW



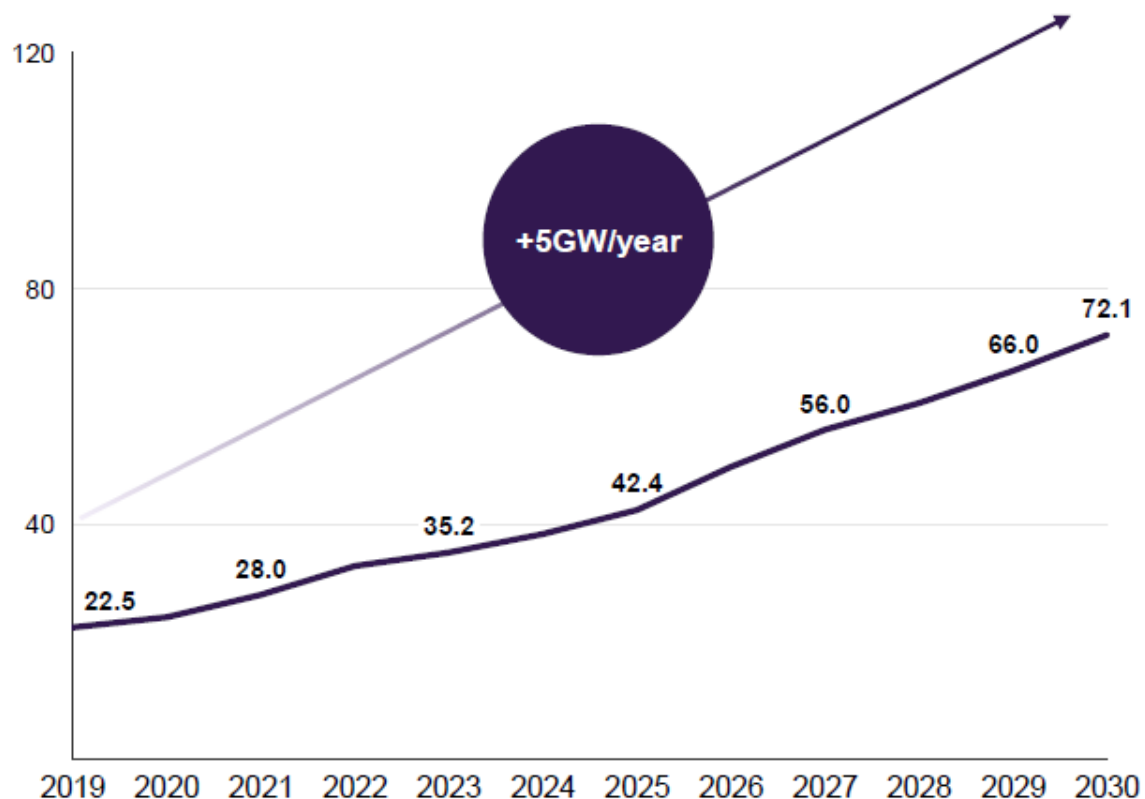
Expected market of +154GW until 2030



## EMEA region primarily driven by UK with increasing activities in ROE and later step-up by Germany

### EMEA Installation

Cumulative GW



### Comments on EMEA

The UK long-term commitment to Offshore reconfirmed, with installation of ~2GW p.a. from 2020 till 2030



From 2025 – 2030 800MW p.a. planned.  
Overall target of 15GW by 2030



Plans to continue build-out after current 5 auctions with another 7GW between 2023 – 2030



Energiforlig 2018 include 2.4GW of offshore wind to be auctioned over 3 auctions in the coming decade



Plans to increase capacity to 2.2GW by 2020 and 4GW by 2030



Positive signals from Poland, with support increasing for Offshore.



Government announced a reinforced development of offshore in France confirming project in planning

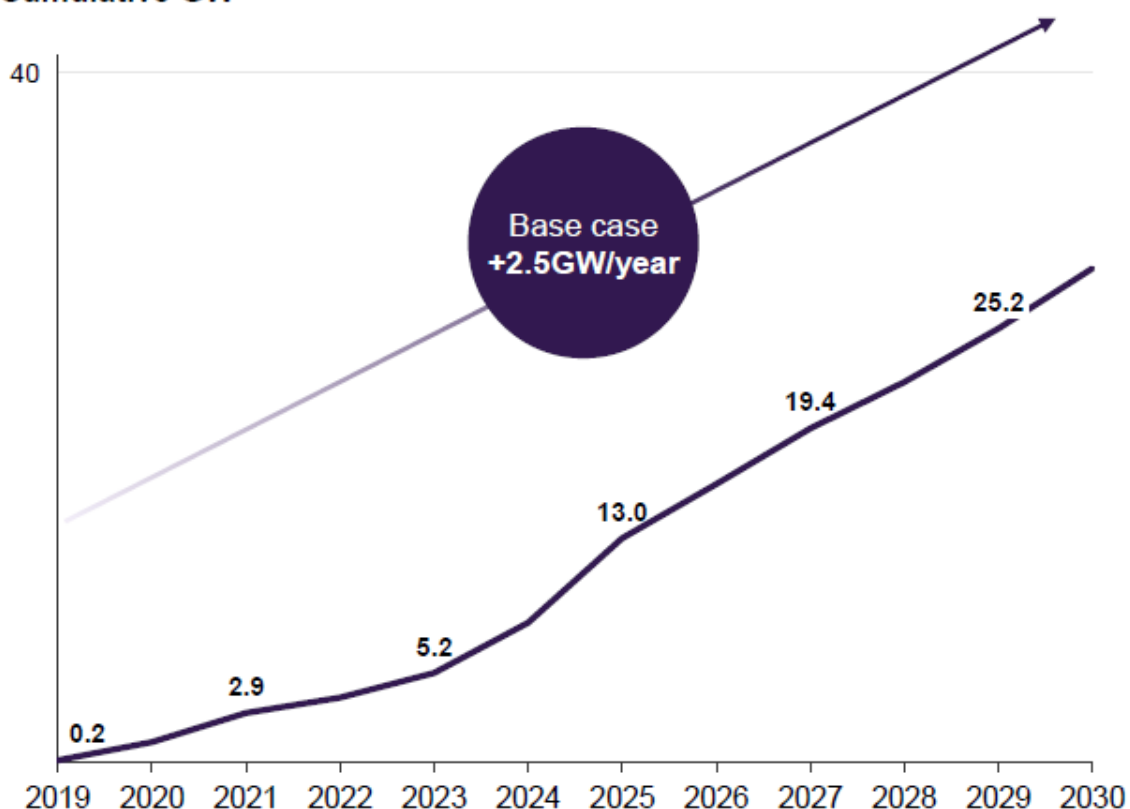




## APAC with Taiwan to be the main driver of near term with Japan thereafter

### APAC Installation

Cumulative GW



### Comments on APAC

First round of the **Grid Allocation** resulted in front-loaded distribution in 2020/21, **increasing short/mid-term certainty for the industry**. Certainty also strengthened by positive movements on FIT issue



**Industry-specific development plan under making**. Bill of law passed review from the Diet → 5 areas to be designated for offshore and bidding system to be defined



**Subsidy level remains main hurdle** for viable OF Business Case



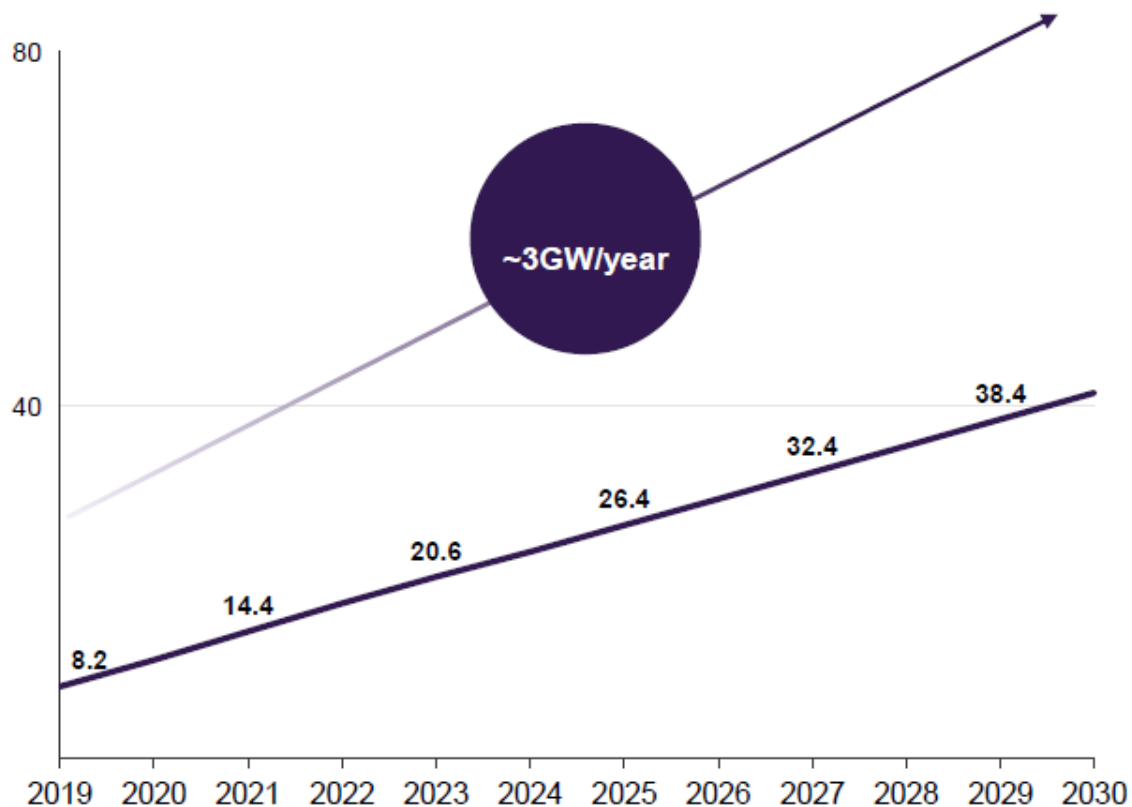
**Several early initiatives for OF in place**; Interest from government and local developers increasing based on high expectations for the local market



## China is rapidly growing offshore sector will reach 10GW installation by 2020

### China Installation

Cumulative GW



### Comments on China

3 phases expected on Chinese market until 2030

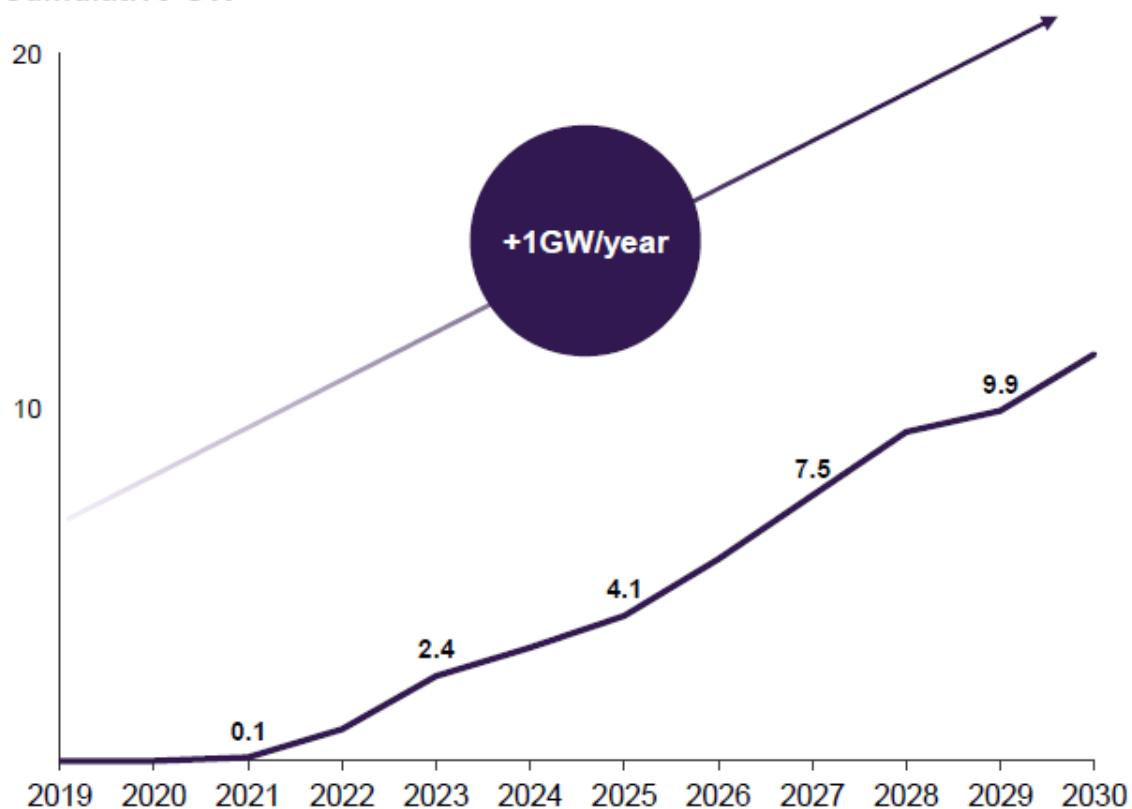


- **Phase 1 CY18 – 21**  
Rapid market growth until 2021 driven by Fujian/Jiangsu/Guangdong provinces
- **Phase 2 CY22 – 25**  
Steady market growth still driven by Jiangsu, Guangdong and Fujian provinces.
- **Phase 3 CY26 – 30**  
Annual installations continue with the first large scale projects in Zhejiang and Shandong provinces, taking an increasing importance on the national level

## AM large potential starts to materialize on US East coast while West coast gaining traction

### AM Installation

Cumulative GW



### Comments on AM

- **American market primarily driven by US East coast** with a forecasted combined capacity of +10GW in 2030 
- **US West coast holds large potential for floating wind** with planning activities ongoing for both demonstrator and commercial projects. Floating perspectives also seen on Hawaii
- **Prospective American markets outside US counts Canada and further out Brazil** with shallow waters and large coastal cities