

APAC Wind Development Updates

Qiao Liming
Global Wind Energy Council



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Introduction: Global Wind Energy Council (GWEC)

GWEC is a non-profit trade association that acts as **the authoritative voice for the global wind energy industry**. Our members represent more than 1,500 companies, organisations and institutions in over 80 countries, including manufacturers, developers, component suppliers, research institutes, national wind and renewables associations, electricity providers, finance and insurance companies. GWEC's Task Forces and activities are listed below:



Intelligence

Market intelligence, policy analysis, technical expertise



Summits & Conferences

Creating business environments to discuss challenges, find solutions and network



Advocacy & Policy

Communicating the benefits of wind power and working on regulatory frameworks



Business Matching

Connecting members to the right people to grow your business



Collaboration

Sharing best practices and connecting stakeholders



Capacity-Building

Establishing strong wind energy associations in emerging wind markets, transferring knowledge to stakeholders

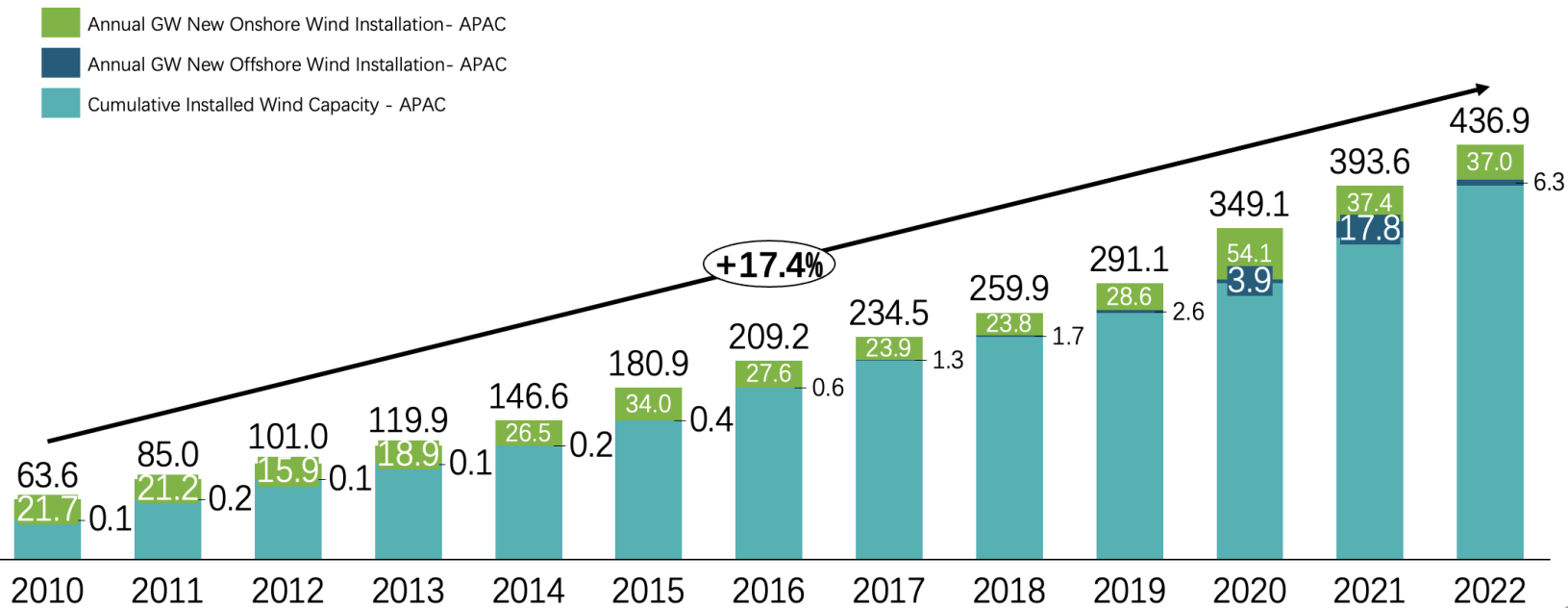


Outline

- APAC Wind Energy Development Status
- Cost Reduction of Wind
- The role of offshore wind in helping meet net zero targets in the region

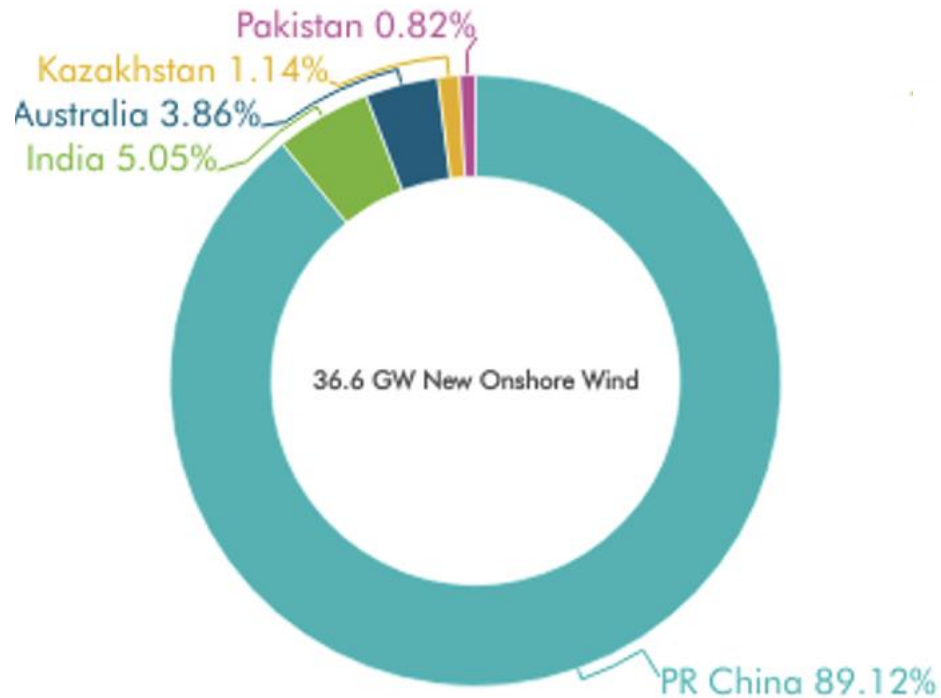
The Global Wind Status, Forecast and APAC Development

Overall APAC installation



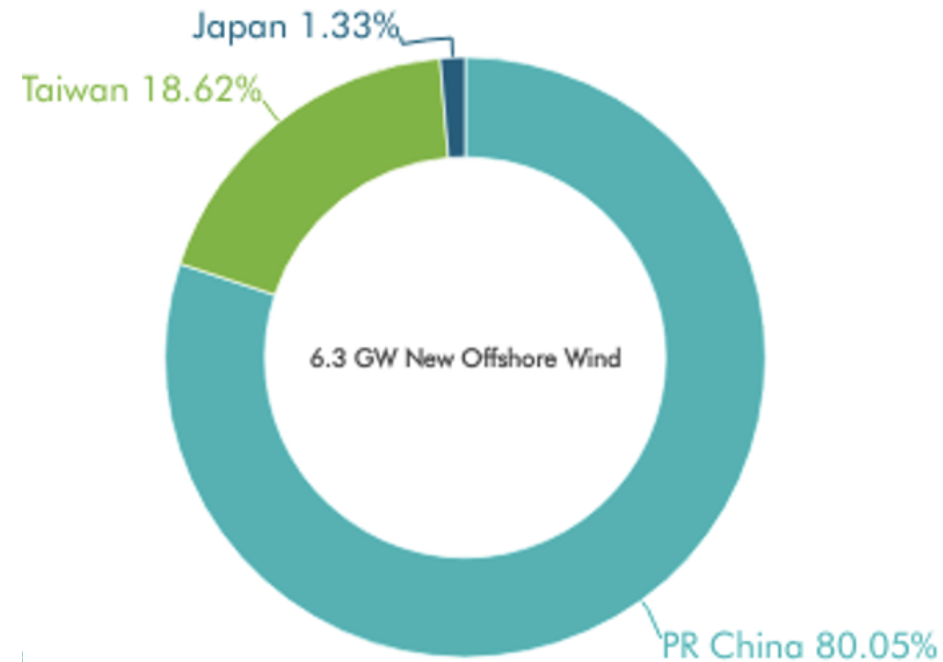
- APAC cumulative installation of wind reached **437GW**, representing **48%** of the global total installation;
- 2022 New Installation reached **43.3 GW**, spreading between **37GW** onshore wind and **6.3 GW** offshore wind;
- CAGR over past decades is **17.4%**, one of the fastest growing industry in the world

Overall APAC installation: Top Markets



Top onshore Markets:

- China: 32,579MW, 89%
- India: 1,847MW, 5%
- Australia: 1,412 MW, 3.8%
- Kazakhstan: 418 MW, 1.14%
- Pakistan: 301MW, 1%



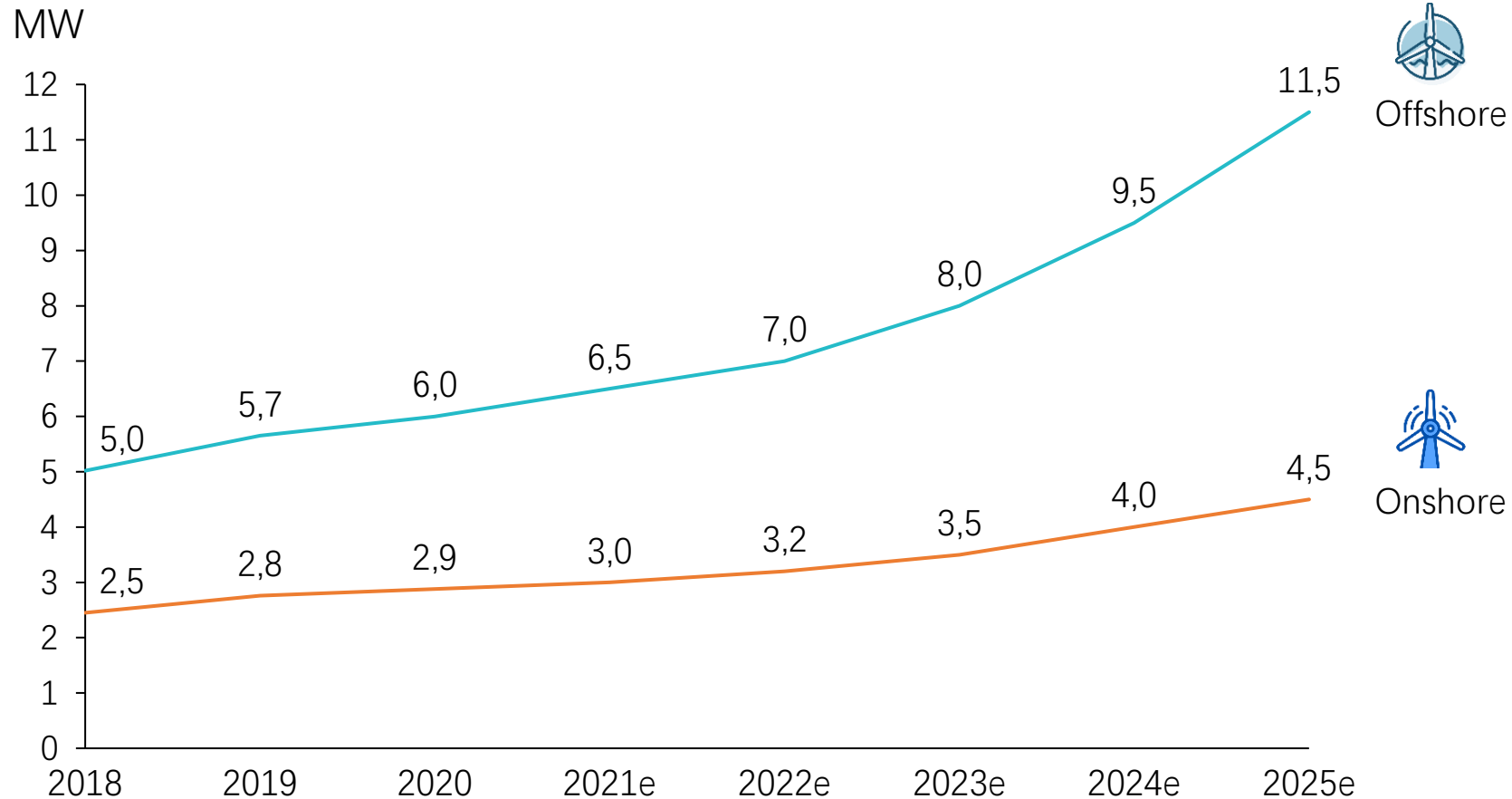
Top offshore Markets:

- China: 5,052 MW, 80%
- Taiwan: 1,175 MW, 18.6%
- Japan: 148.9%, 1.33%

The Technology and its Cost Reduction Pathway



Global Average Turbine Size 2015-2025e

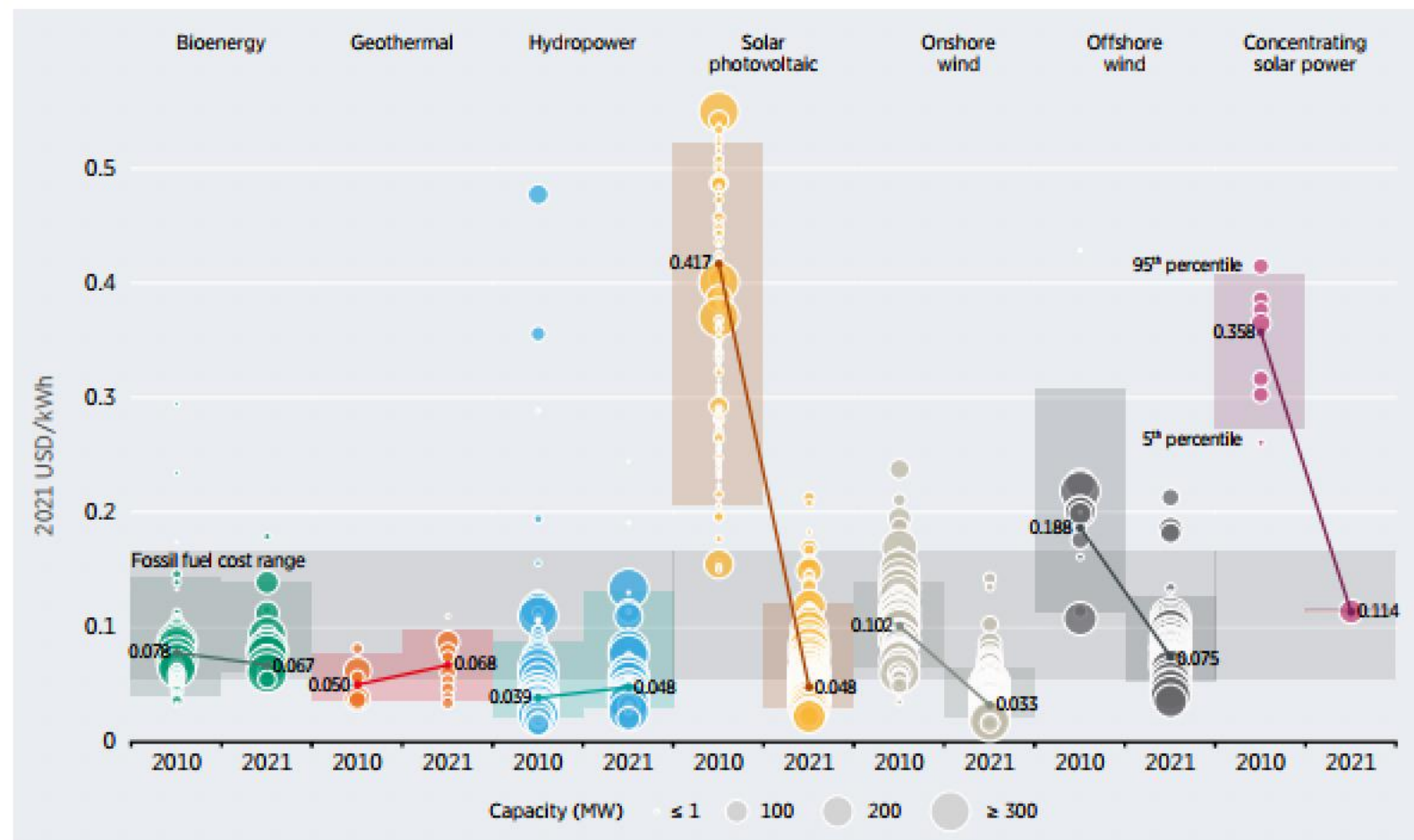


- The **average turbine size grow rapidly** since the auction started launching global **from 2015** and more pressure is on the turbine OEMs when subsidiary free project kicked-in in both onshore wind (China) and offshore wind (Germany and Netherlands).
- **2020** saw the average **offshore wind** turbine size passed the milestone of **6.0MW**, two times as much as **onshore** wind (**2.9MW**)
- Following the technology road map announced by turbine OEMs worldwide, GWEC expected the **average turbine size for onshore and offshore wind** will reach **4.5MW** and **11.5MW** by **2025** respectively.

Source: GWEC Market Intelligence, June 2021

LCOE of Wind Energy

Figure 1.2 Global weighted average LCOEs from newly commissioned, utility-scale renewable power generation technologies, 2010-2021



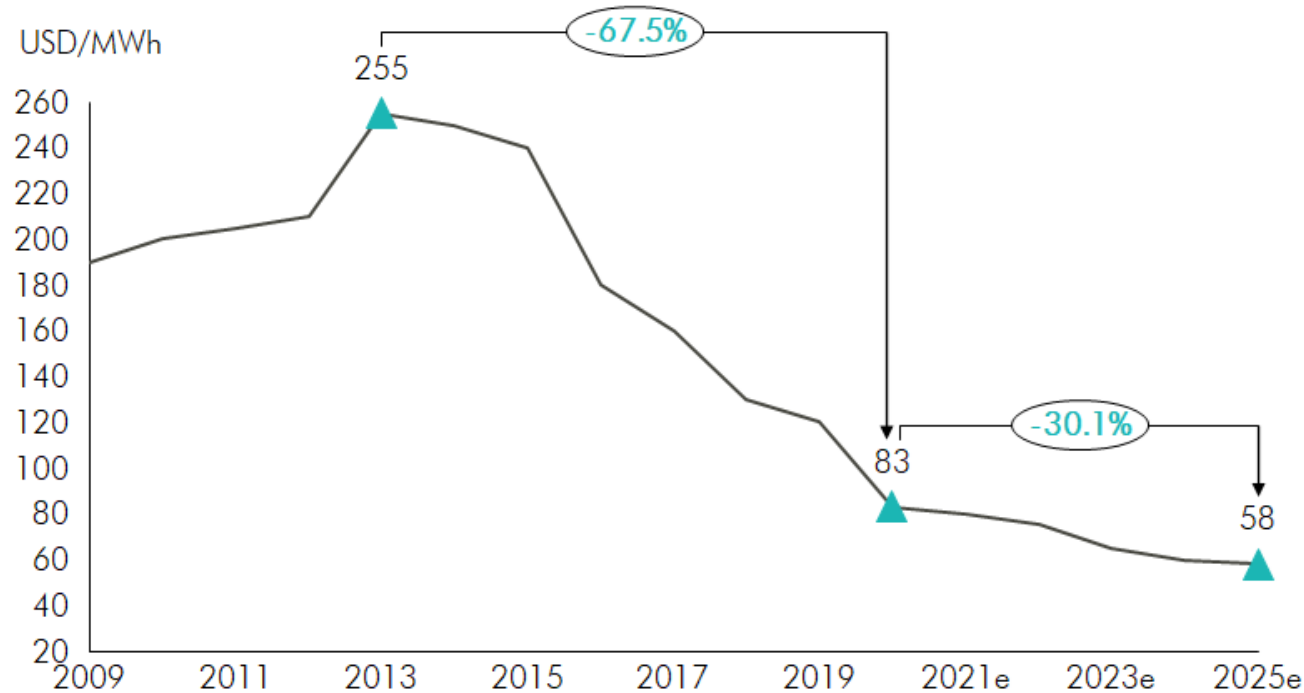
Source: IRENA Renewable Cost Database.

Note: This data is for the year of commissioning. The thick lines are the global weighted average LCOE value derived from the individual plants commissioned in each year. The LCOE is calculated with project-specific installed costs and capacity factors, while the other assumptions are detailed in Annex I. The single band represents the fossil fuel-fired power generation cost range, while the bands for each technology and year represent the 5th and 95th percentile bands for renewable projects.

- LCOE of onshore wind: 33-102 USD/MWh;
- Offshore Wind: 75-188 USD/MWh;

Global Offshore Wind Cost Reduction

LCOE for Offshore Wind Farm Includes Transmission Costs to Onshore Substation, 2009-2025



Source: BNEF LCOE Database Jan 2020, GWEC Market Intelligence

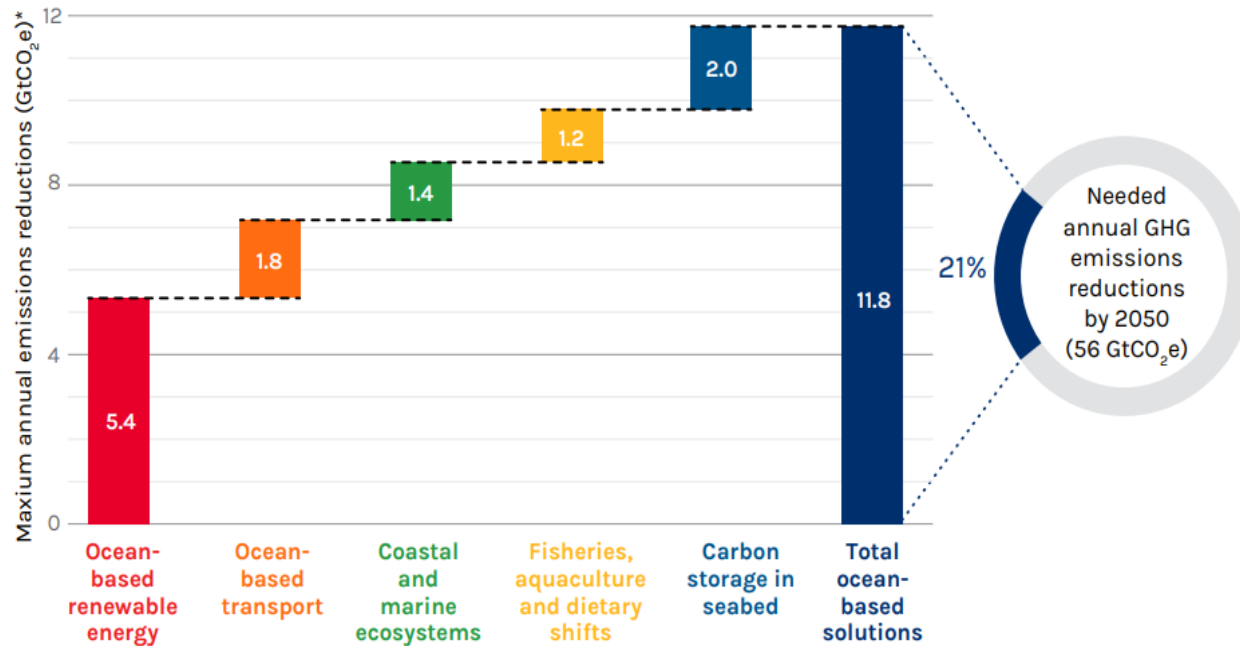
- More than 67% cost reduction achieved globally for offshore wind in 2013-2020;
- Another 30% cost reduction to be achieved in the next 5 years.
- Growth of offshore wind driven by **cost reduction, learning** and **increased policy support**
- LCOE has fallen by two-thirds over the last decade, and will continue declining due to:
 - **Technology improvements**, with larger turbines and better efficiency (20 MW turbines by 2030)
 - **Higher capacity factors** boost energy yields, increasing installation/O&M cost efficiencies and port efficiencies
 - **Developer experience** is shortening installation times (3 to 1 day/MW)
 - **Reduced investor risk** in established markets means lower cost of financing

The Role of Offshore Wind in Meeting Net Zero Goal and its Status in the Region



Offshore wind provides the most carbon mitigation potential...

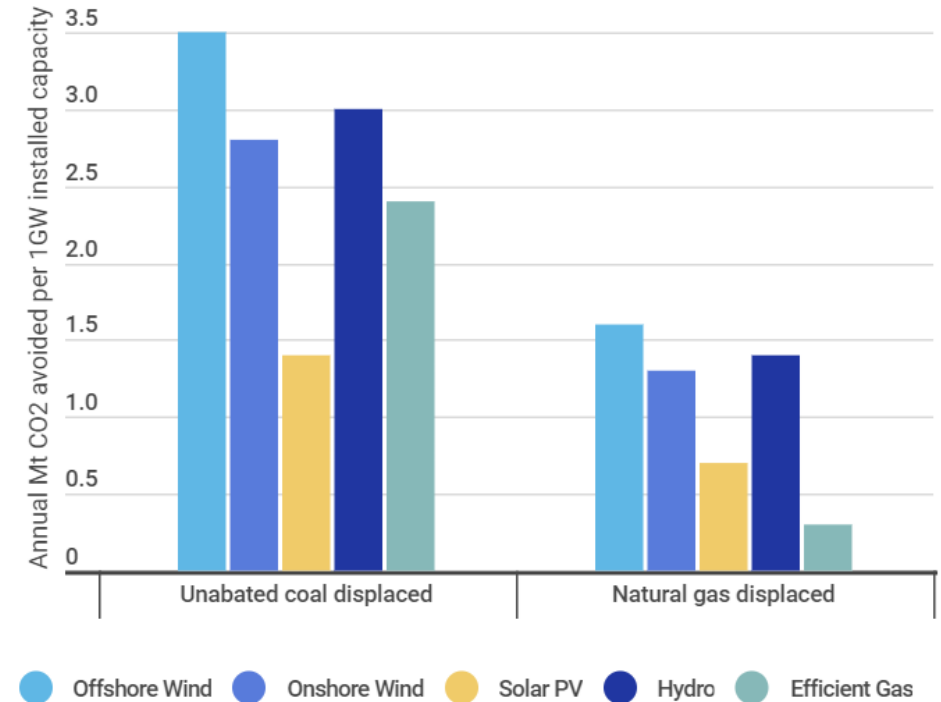
Of all ocean-based solutions to climate change...



Notes: * To stay under a 1.5°C change relative to pre-industrial levels

Source: Hoegh-Guldberg, O., et al. 2019. "The Ocean as a Solution to Climate Change: Five Opportunities for Action." Report. Washington, DC: World Resources Institute. Available online at <http://www.oceanpanel.org/climate>.

and all fossil fuel displacement technologies.

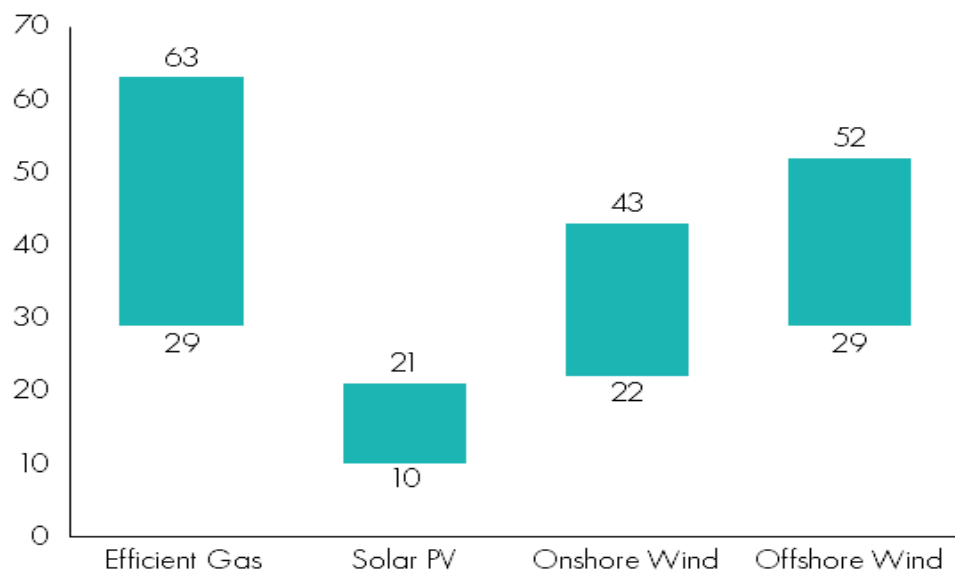


Source: IEA (2020), Sustainable Recovery, IEA, Paris, <https://www.iea.org/reports/sustainable-recovery>.

Offshore Wind is the ONLY Baseload Renewable Energy Power Generation Technology – International Energy Agency

- Offshore wind can displace fossil fuels baseload generation offering **lower variability, greater stability and greater predictability** compared to other VRE – clean generation while supporting energy security
- Offshore wind has the **highest capacity factors of any VRE** (~50%), on par with the most efficient gas-fired power plants

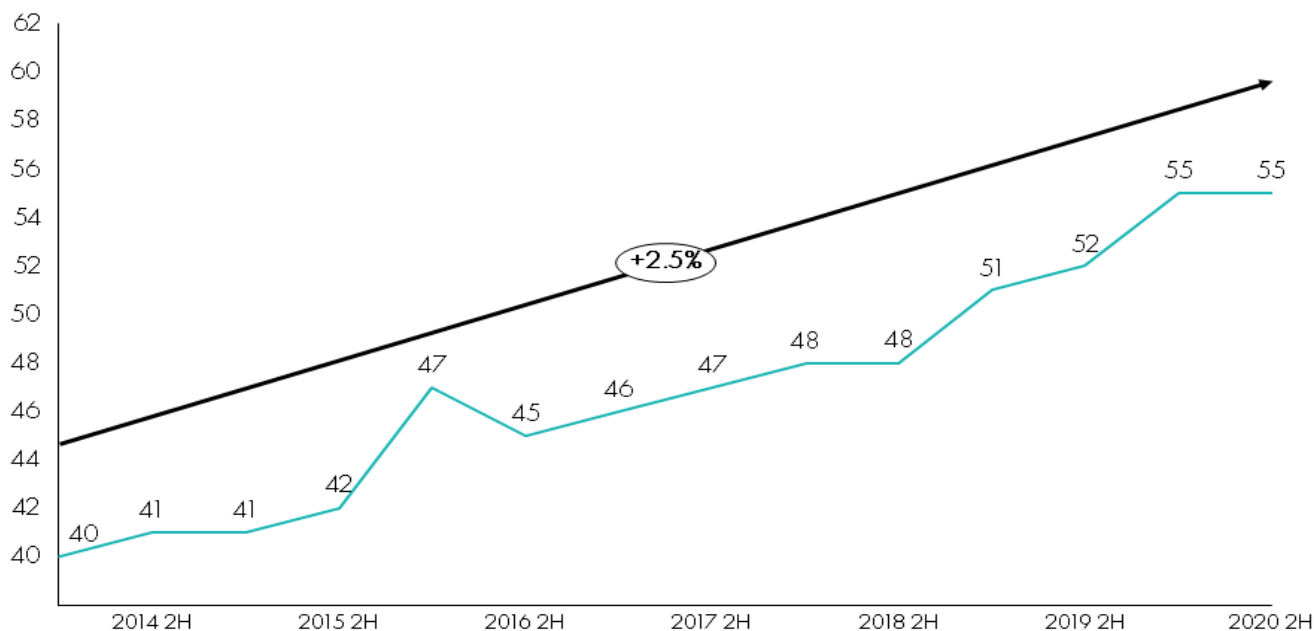
Average Annual Capacity Factor (%) by Technology in Year 2018



Source: KPMC (2019), IEA

More stable generation can increase system flexibility by **coupling with storage solutions** like hydro, pumped storage, batteries and green hydrogen for fuel

Offshore Wind Capacity Factor, UK (2014-2020)



Source: BNEF

Different stage of development in Asia and Common Challenge for the Region

Segmentation of the Asian offshore wind market into different stages of development:

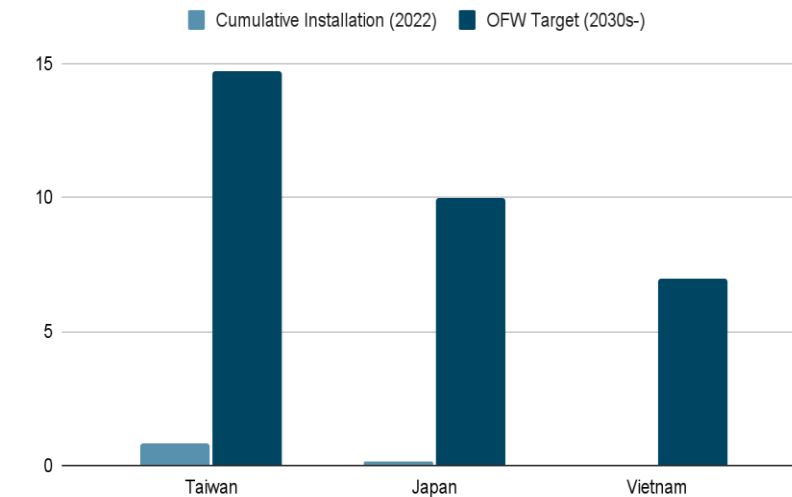
- **East Asia Markets (Japan, Taiwan and Korea)**

- More mature market with basic policy framework that enables the initial deployment of offshore wind farm but still lack clear policy, predictable project pipeline and robust infrastructure for massive scale up.
- On 15 November, Korea procured 375 MW of wind projects but with just one 99 MW of offshore wind project bid. Japan launched 2nd round of tender (1.8 GW) in December 2022 and with results anticipated in March 2024. Taiwan's Phase 3 round 1 auction awarded 3 GW of offshore wind to 6 entitles (9 developers) in the same month
- Government sees offshore wind as a major decarbonisation technology and reliable energy source. They are generally aware of various issues limiting the market growth and keen to learn from international best practices.
- Korea and Japan are still in early stage of development and a "route to market" approach is need to fill all the gaps for meeting the ambitions and this is where an external program can come in and play a significant role to facilitate the process.

- **SEA Markets (Vietnam and Philippines)**

- Emerging offshore wind market with almost no policy framework or clear route to market to develop offshore wind.
- Vietnam's guiding energy industry policy for the next decade, Power Development Plan VIII (PDP8), was originally scheduled for release in 2020 but with recent political reshuffling, it remains in the draft form. The Philippines is planning to launch the second round of Green Energy Auction in June 2023 but no offshore wind energy will be awarded.
- Government started realise the importance of Offshore wind and view it as an important de-carbonization technology.

High ambition, slow progress



Overall, these markets lack cooperation at regional level due to various historical baggage:

- Military and security concerns is also threatening MSP & Lack of coordination on supply chain with every country focusing on its own "localisation" policy.
- Hard to replicate the North Sea success without strong support of intergovernmental bodies or government bodies.
- Most Asian government are driven by economic development and are having strict views on localization of supply chain.

Thank You!

For more information please contact:

Liming Qiao, liming.qiao@gwec.net, Head of Asia, GWEC

51-53 Rue Belliard
1000 Brussels, Belgium
T. +32 490 56 81 39
info@gwec.net
www.gwec.net

