

Wind Power Market Outlook



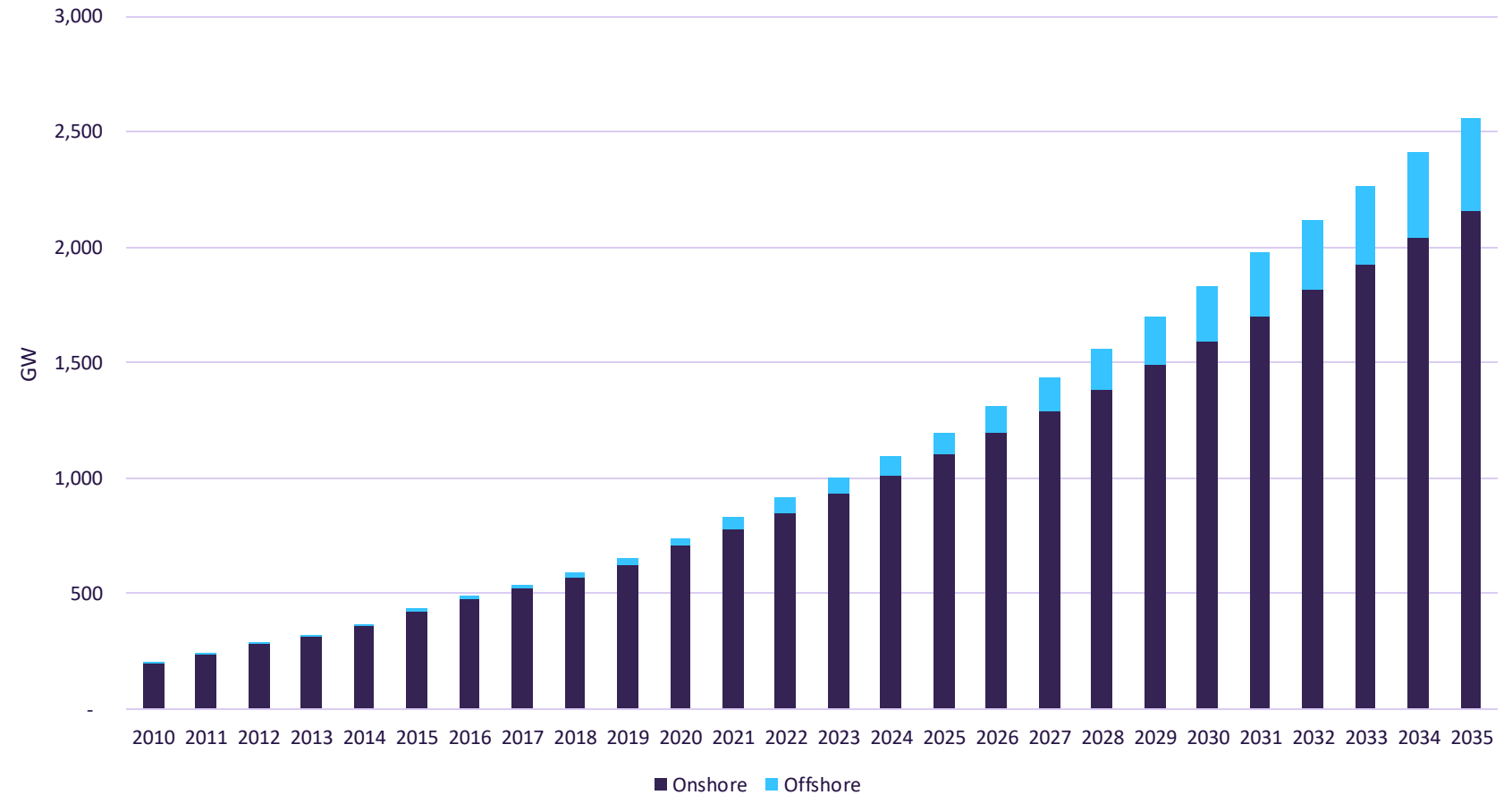
POWER



Wind Energy Capacity Growth

- Wind power market cumulative capacity stood at 830 GW as of end-2021.
- Most of this (775 GW) was onshore while 55 GW was offshore.
- The capacity has grown at a CAGR of 14% between 2010 and 2021.
- The installed capacity is expected to grow at a CAGR of 8.4% till 2035 to reach more than 2,500 GW.
- Offshore wind is expected to show a higher CAGR of 15% while the more mature onshore wind would grow at a CAGR of 7.6%

Wind Energy Cumulative Capacity, 2010 - 2035

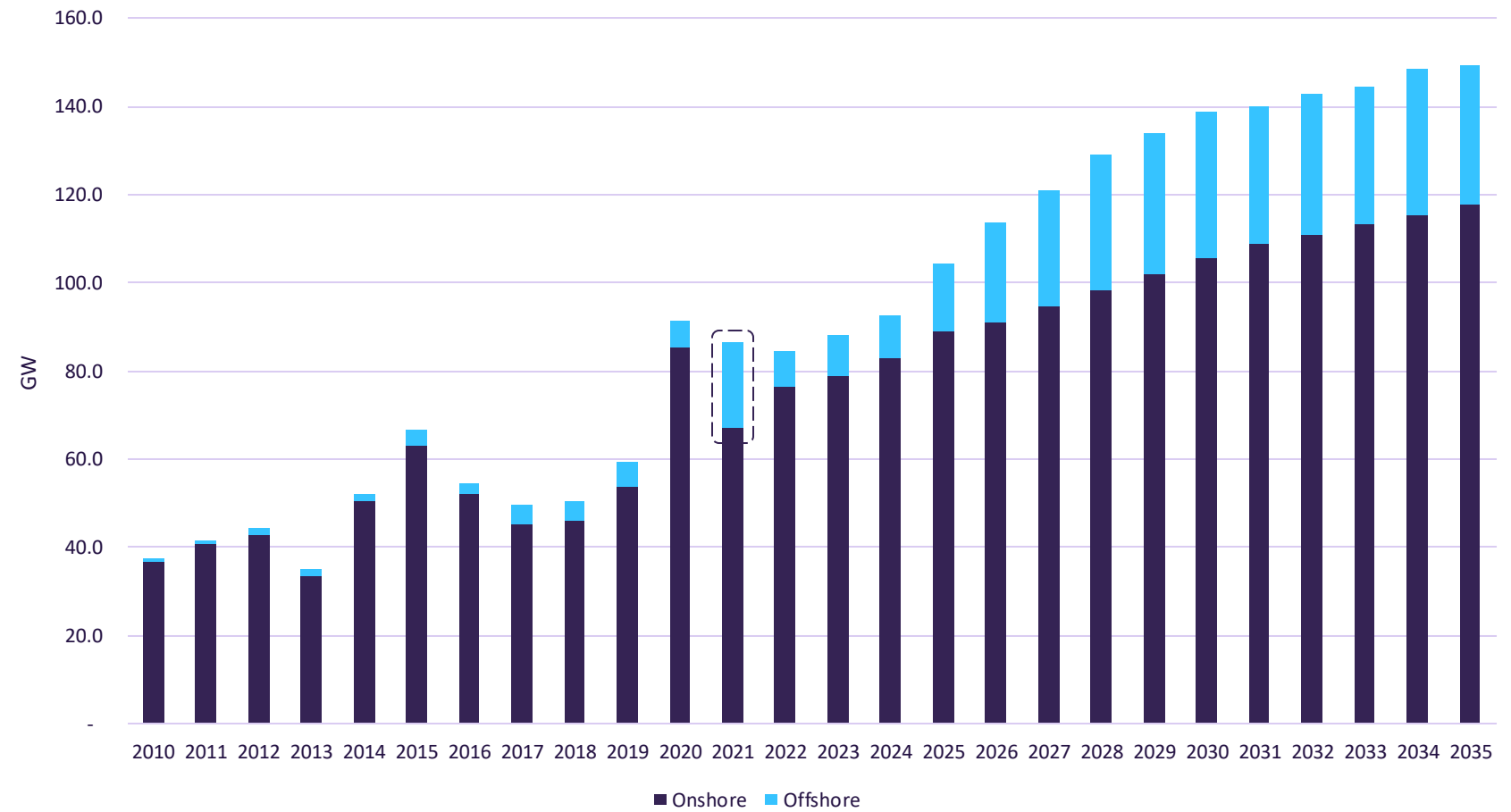




Annual Capacity Addition Trends

- The year 2020 was a record year for wind capacity addition, with more than 91 GW capacity being added.
- Most of this was onshore (85.5 GW) and around 6 GW was offshore.
- In 2021, significant amount of offshore wind capacity (19.6 GW) is estimated to be added.
- The same year saw the addition of 67 GW of onshore wind capacity.
- By 2030, total annual wind power capacity is expected to grow to 139 GW, of which, 33 GW will be offshore.

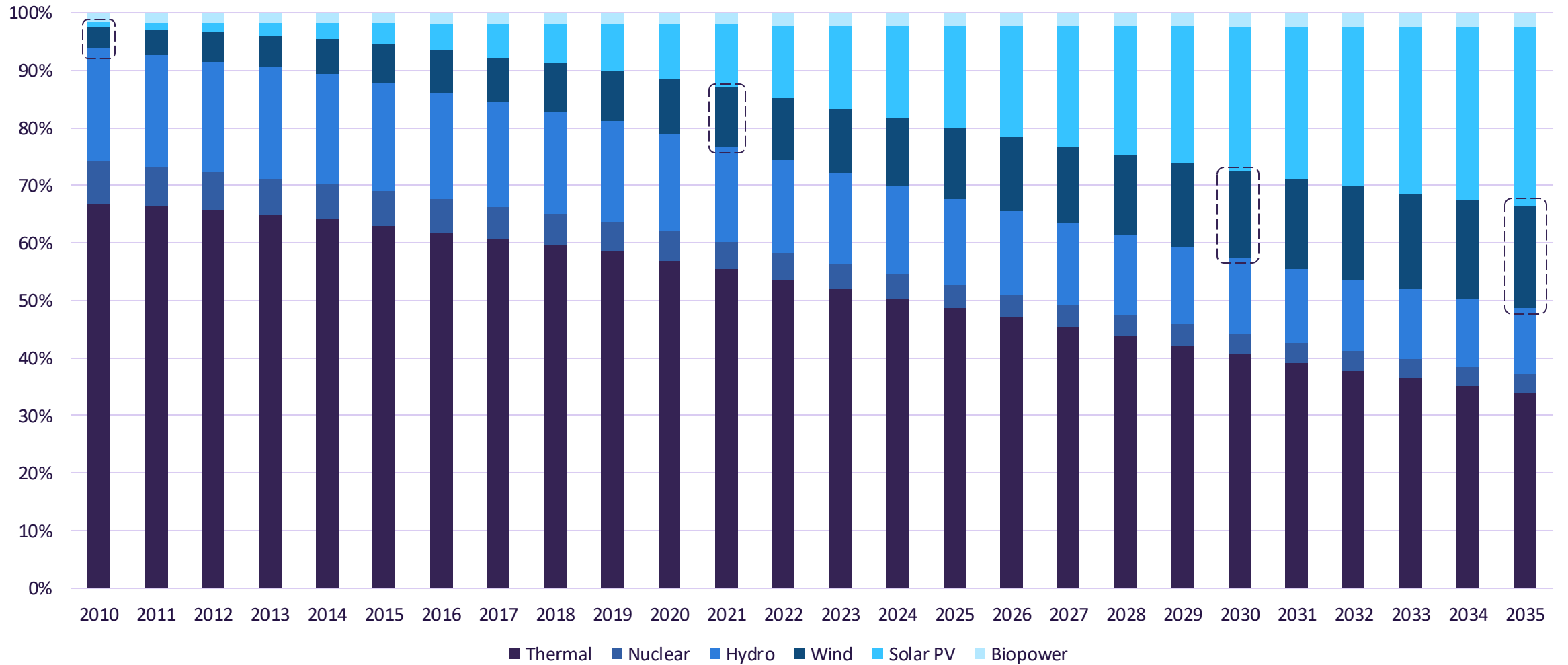
Wind Energy Cumulative Capacity, 2010 - 2035



Share of Wind in Global Cumulative Power Capacity (2010 – 2035)



Share of wind expected to increase from present 10% to 15% by 2030 and further to 17.6% by 2035

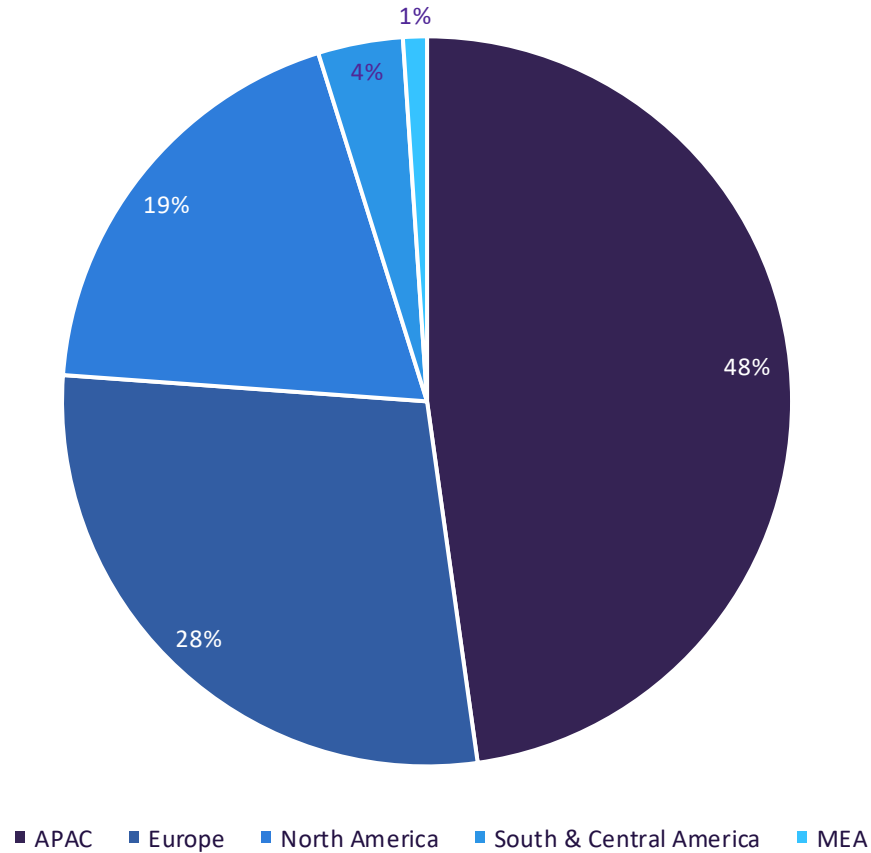


Wind Power Capacity by Region



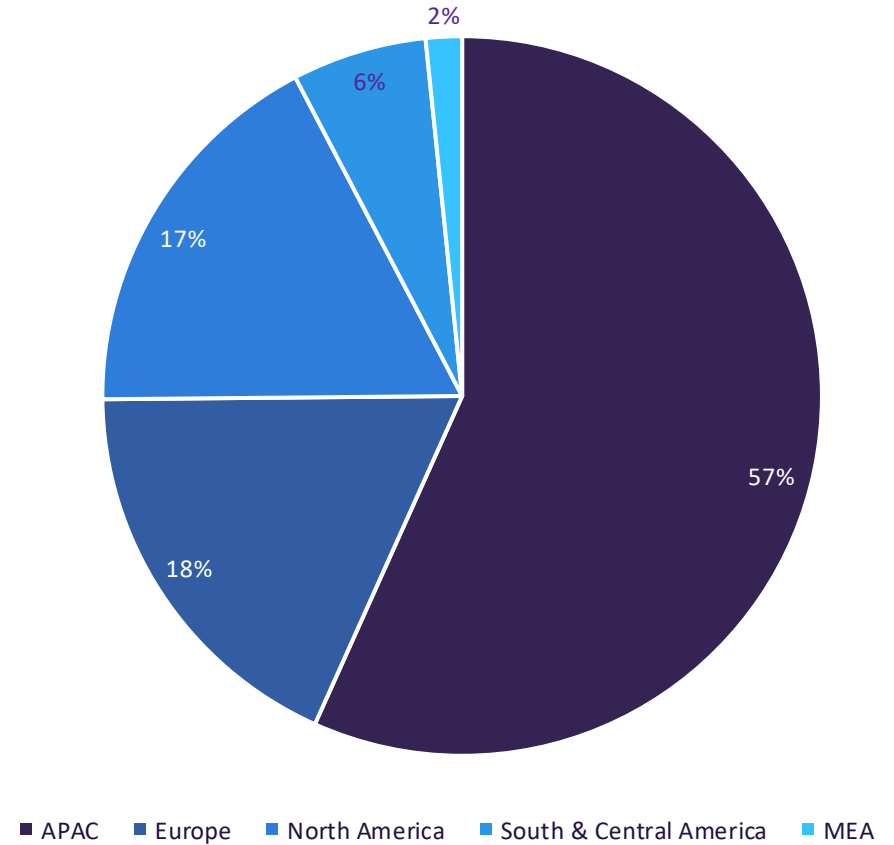
Cumulative Wind Power Capacity by Region, 2021

APAC contributes close to half the total installed wind power capacity



Annual Wind Power Capacity Addition by Region, 2021

In terms of capacity addition, APAC has an even higher share of 57%

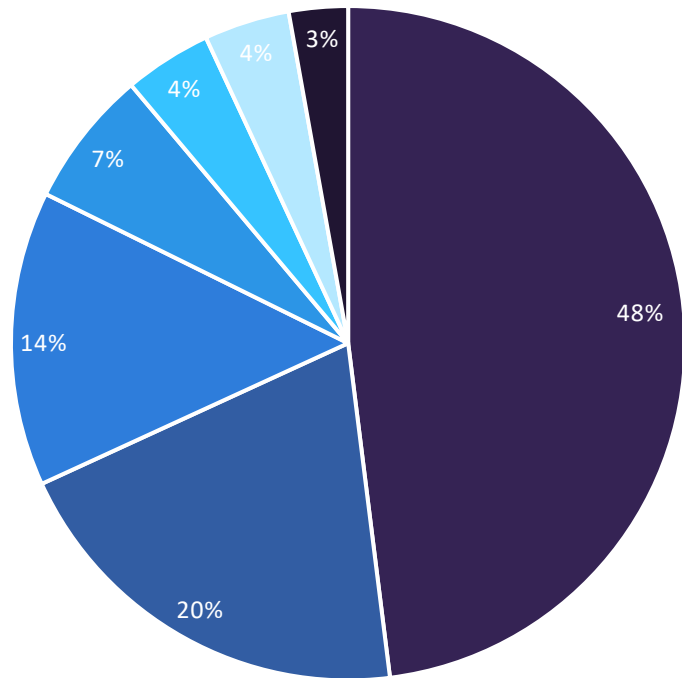


Offshore Wind Capacity



Offshore Wind Capacity Share, 2021, %

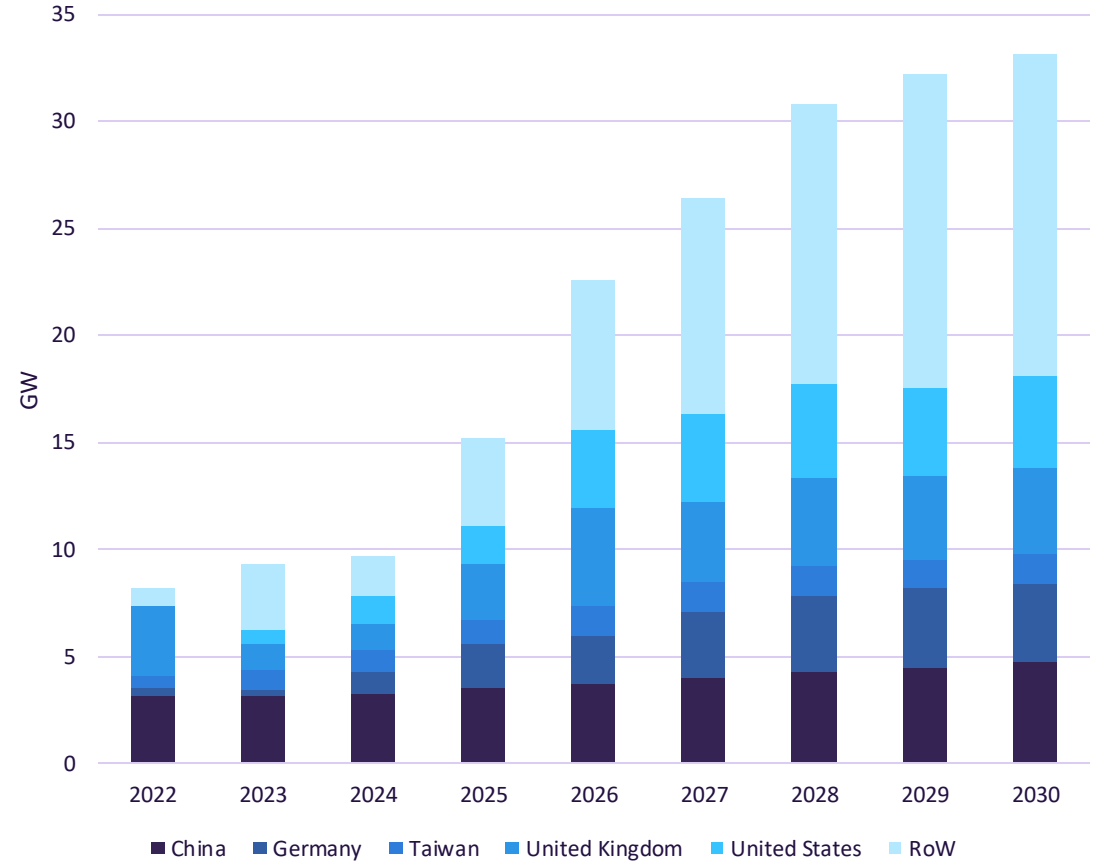
Top 6 countries account for 97% of capacity



■ China ■ United Kingdom ■ Germany ■ Netherlands ■ Denmark ■ Belgium ■ RoW

Capacity Addition 2022 - 2030

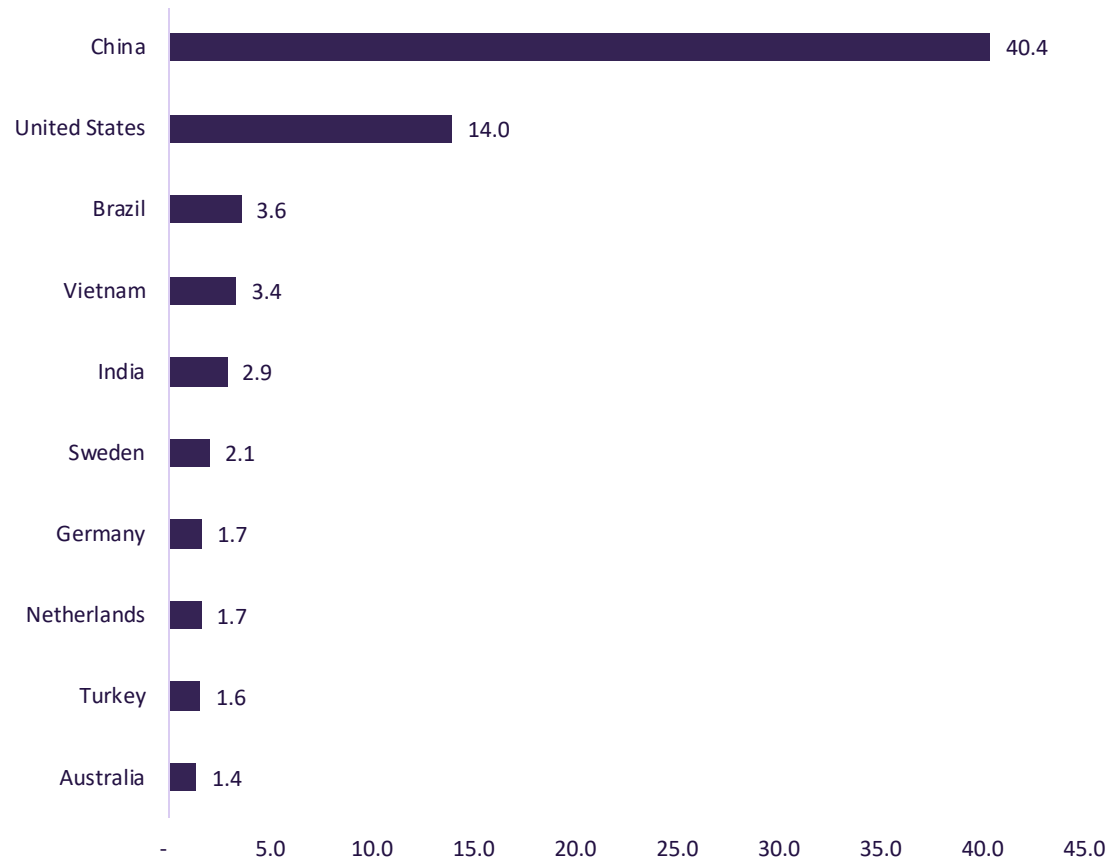
Top 5 countries will account for majority of capacity addition till 2025



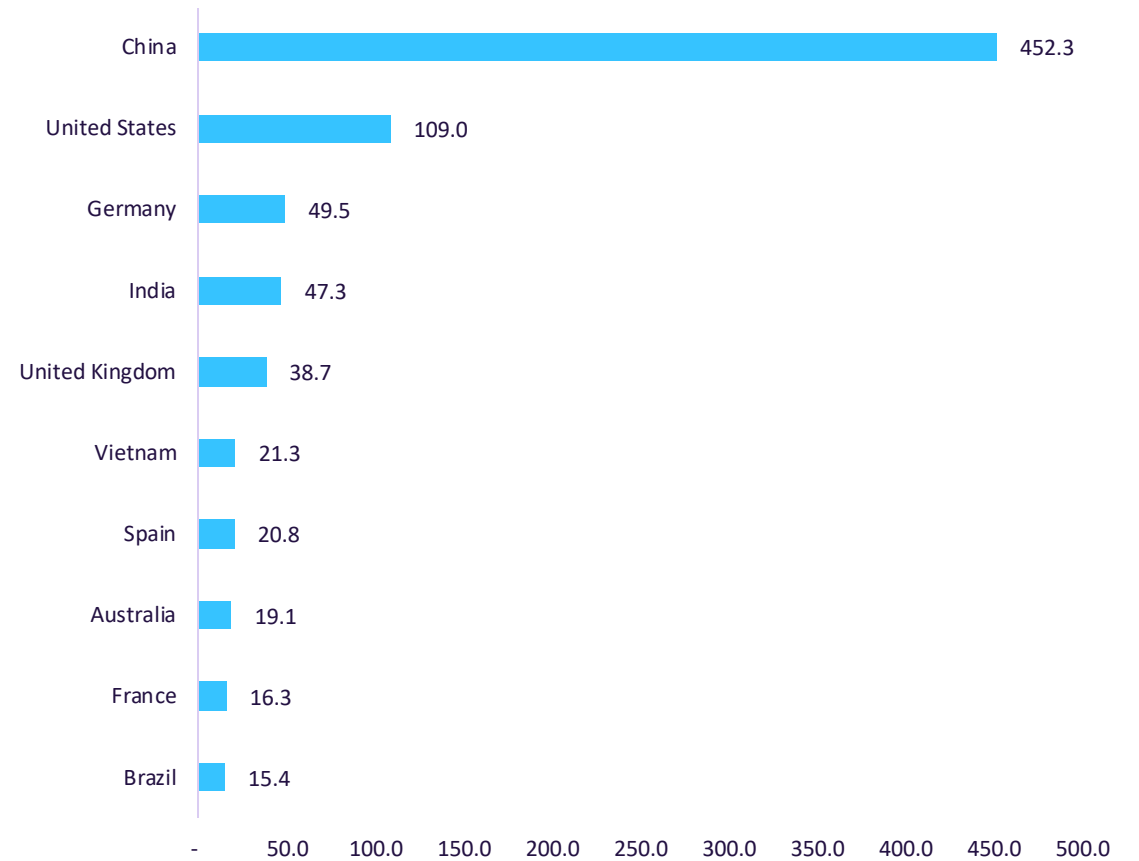
Top 10 Countries by Wind Power Capacity Addition



Top 10 Countries by Wind Power Capacity Addition, 2021



Top 10 Countries by Wind Power Capacity Addition, 2022 - 2030



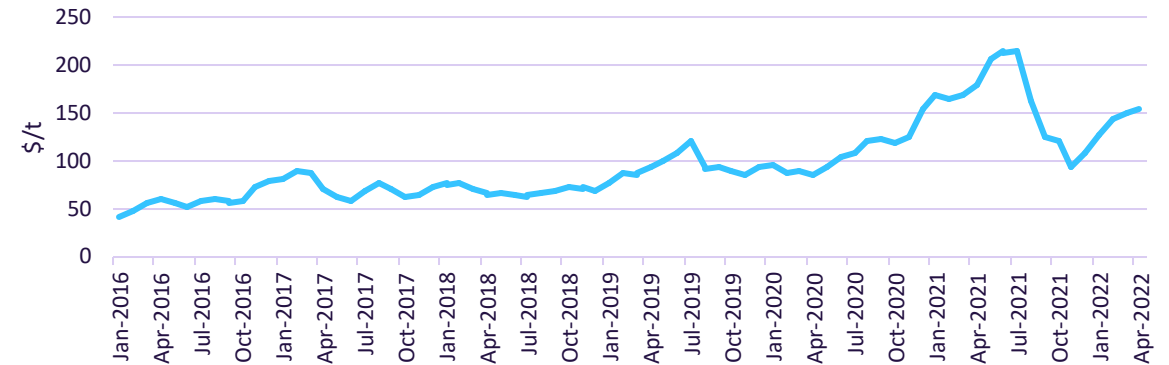


Impact of Commodity Price Rise

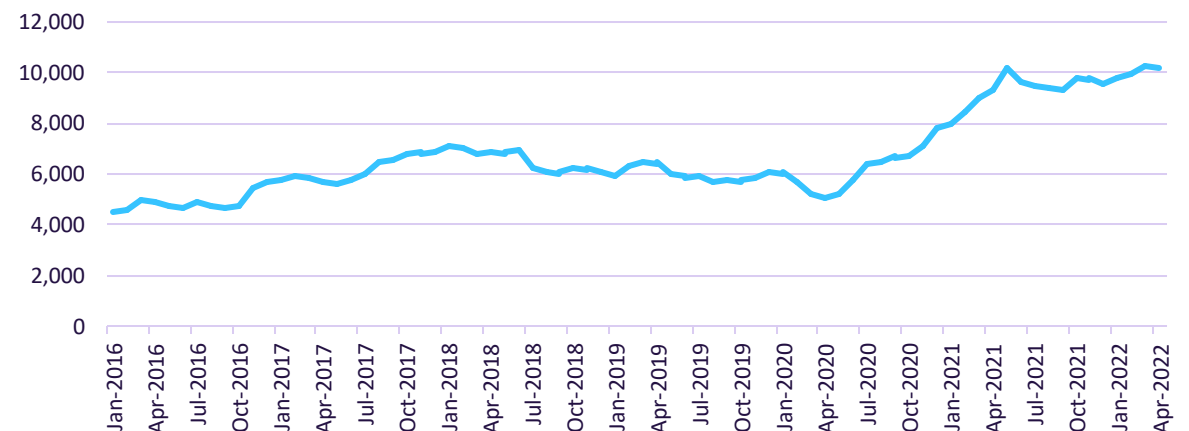
Commodity price increase has increased the risk for project developers as well as turbine manufacturers

- Fierce competition in different industries for raw material due to the sudden recovery of global production following the pandemic shock.
- Bottleneck in manufacturing capacity and transport logistics.
- Procurement and freight for raw materials and commodities of wind turbines steel, concrete, copper, nickel, and rare earth elements (small share in volume terms but high in value terms) and their manufacturing into components accounts for the major chunk of the project capex.
- This makes the wind supply chain highly sensitive to upstream cost inflation.
- Price increase over last 2 years (Jan 2020 – Dec 2021):
 - Steel: 50%
 - Copper: 60%
 - Rare earth metals: 3x
- Since turbine prices are negotiated much in advance, this exposes the OEMs to price volatility risk.
- Further, the wind industry competes with sectors such as electric vehicles for high value rare earth elements.
- Despite the price volatility in the wholesale market, Iberdrola SA, the Spanish utility, has announced that it is freezing the price of its current fixed-price contracts with its customers.

Iron Ore Prices, Jan 2016 – Apr 2022



Copper Prices, Jan 2016 – Apr 2022



Summing Up

The wind power sector is poised to grow significantly in future

- The wind power sector has grown significantly over the past decade and is on a steep growth trajectory on the future as well.
- There have been some hiccups due to supply chain disruptions owing to the pandemic. However, the sector has been resilient and saw record capacity addition in 2021.
- The global commodity price increase is having an impact on the wind sector as well as key raw material used for turbine manufacturing gets expensive. This is leading to a price risk for manufacturers as well as project developers.
- Increase in project development costs will lead to an increase in the tariffs for wind power, impacting its competitiveness.
- The ongoing Russia-Ukraine crisis is also having an impact on the generation mix, with certain countries looking to slow down their transition from coal to reduce dependence on Russian gas.
- On the other hand, certain countries are also looking to speed up the energy transition to reduce the fossil fuel dependence.
- The growth of sectors such as Green Hydrogen is also creating new opportunities for renewable energy including wind.
- Offshore wind is gaining importance and its share is expected to increase significantly.
- China, US, Germany, India and UK are expected to add the majority of the wind power capacity till 2030. Smaller countries like Brazil and Vietnam are also witnessing high capacity addition.
- For offshore, the key markets which will see maximum capacity addition till 2030 will be China, UK, US, Germany and Taiwan.
- Climate change commitments and growing energy security concerns will drive the wind power market over the next few years.

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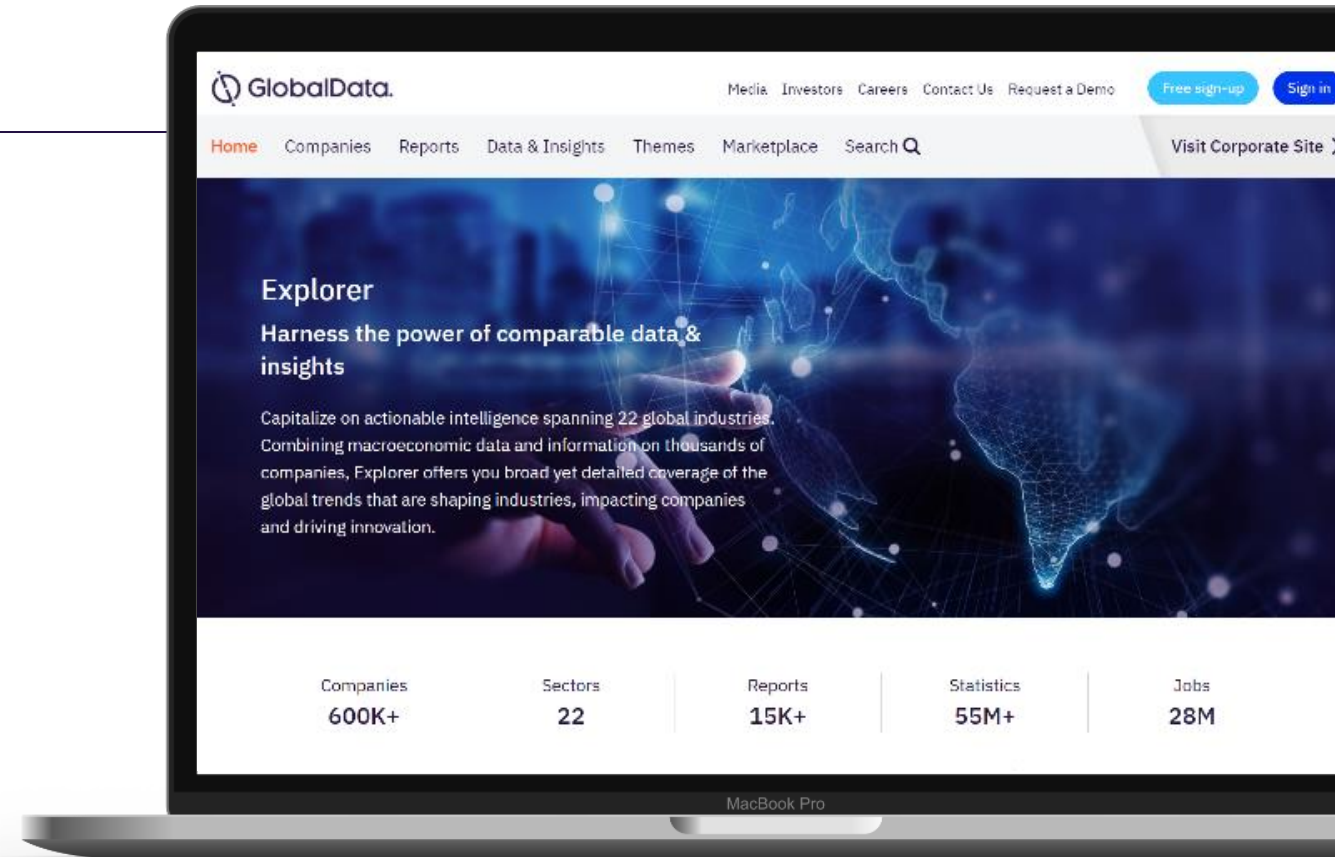
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