



WHEN TRUST MATTERS

Offshore Wind Energy Outlook 2023

A global and regional forecast to 2050

05.06.2024

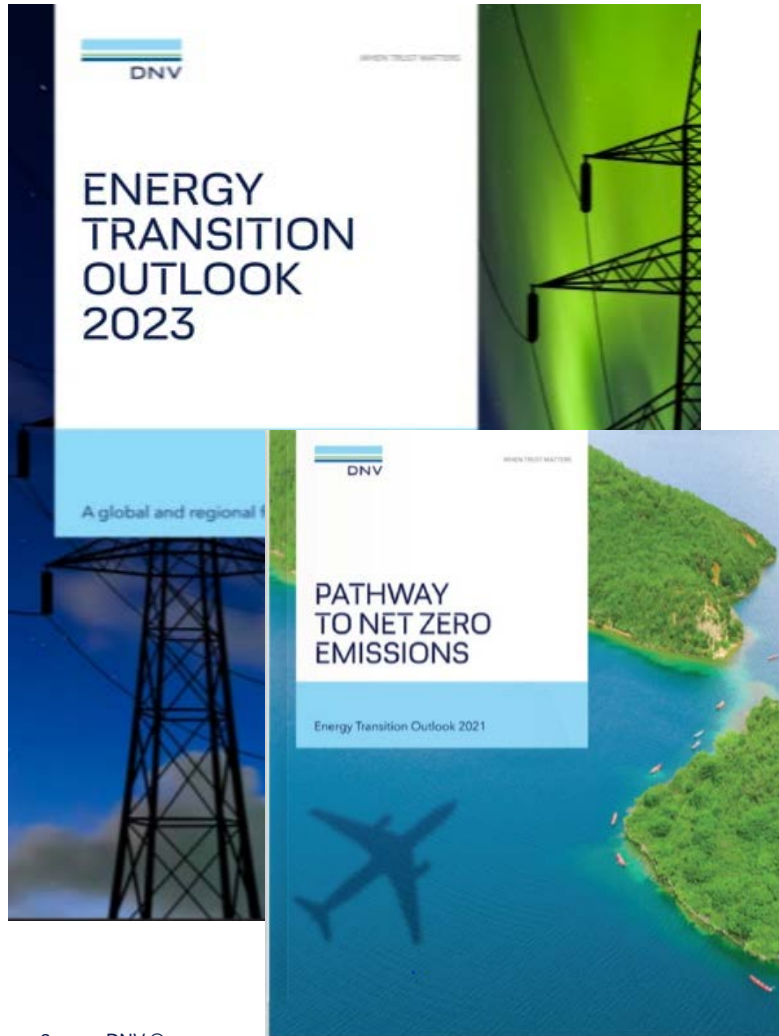
Floating Energy Research (FER) JIP week

Mahnaz Hadizadeh
Principal Researcher, ETO, DNV



DNV has been forecasting the energy transition since 2017

Main publication



Regional reports



Sector reports



DNV presents a forecast, not a range of scenarios

Most likely developments:

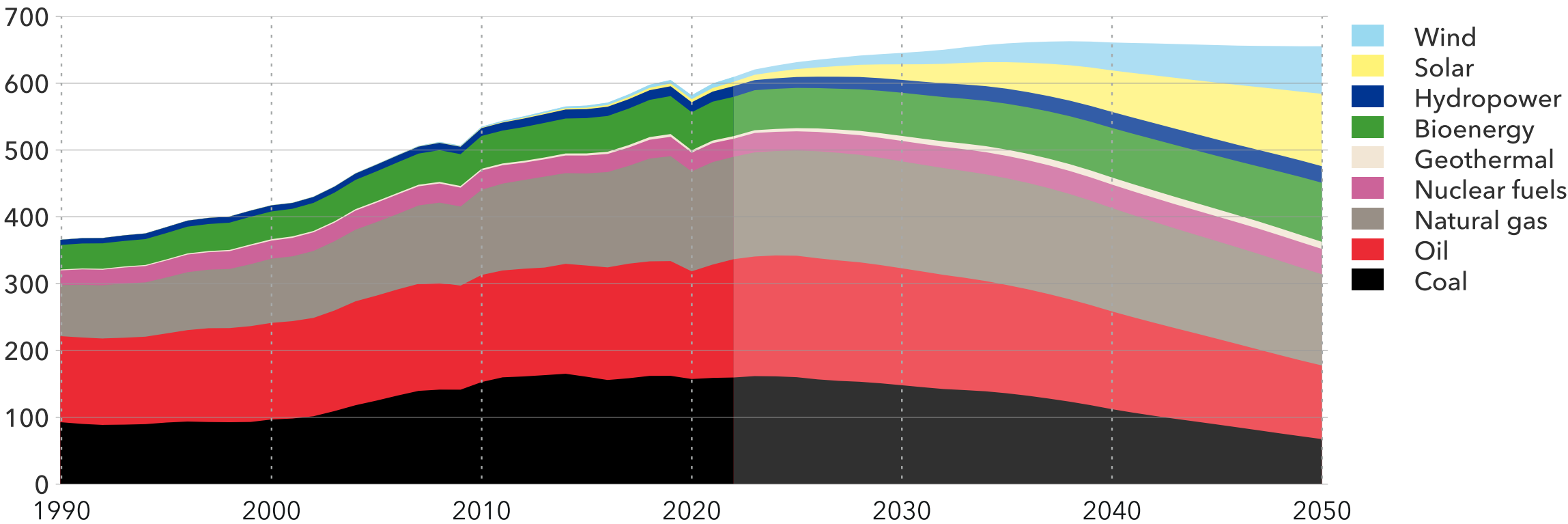
- Policy
- Technology
- Economy
- Behavioural change



Share of wind in primary energy supply increases from current 1.3% to 11% in 2050

World primary energy supply by source

Units: EJ/yr

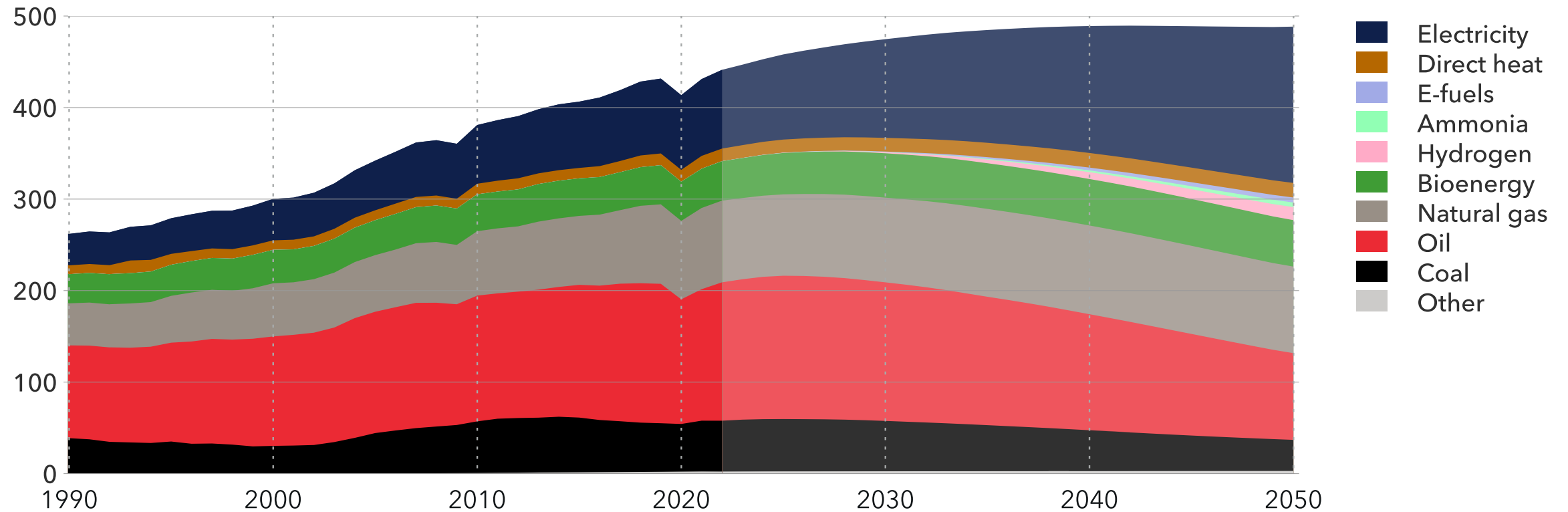


Historical data source: IEA WEB (2023)

The share of electricity in the final energy demand mix increase from 19% to 35%

World final energy demand by carrier

Units: EJ/yr

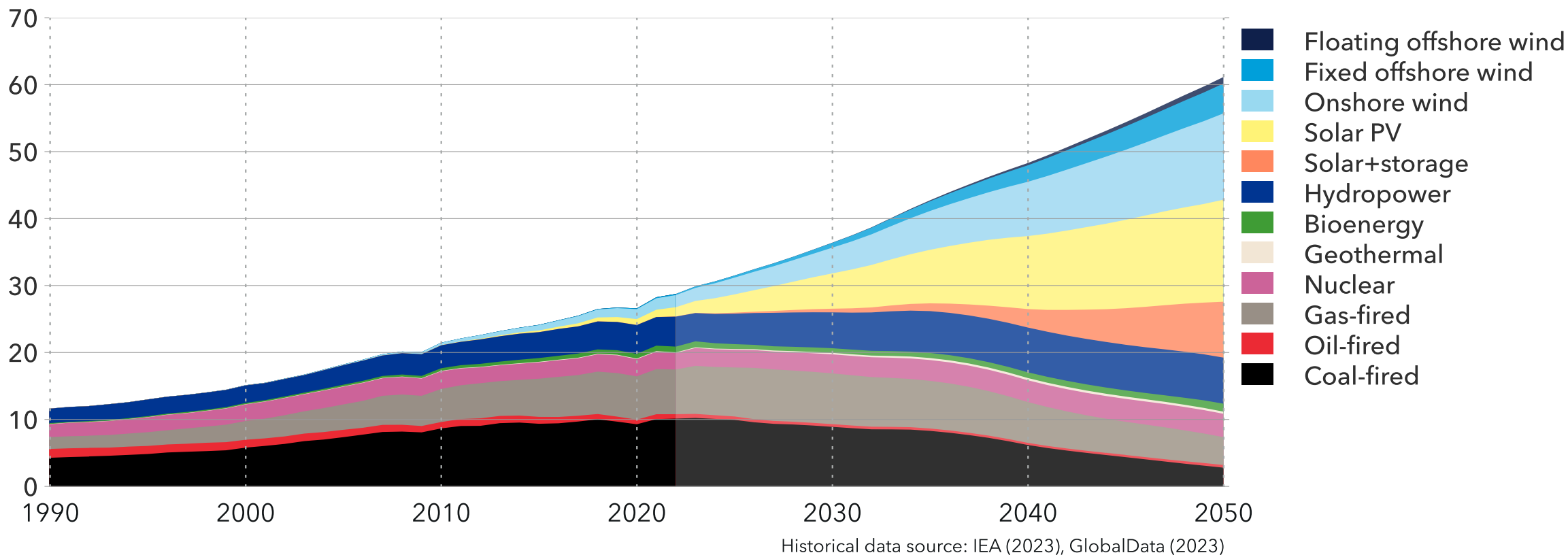


Historical data source: IEA WEB (2023)

30% of electricity will come from wind in 2050

World grid-connected electricity generation by power station type

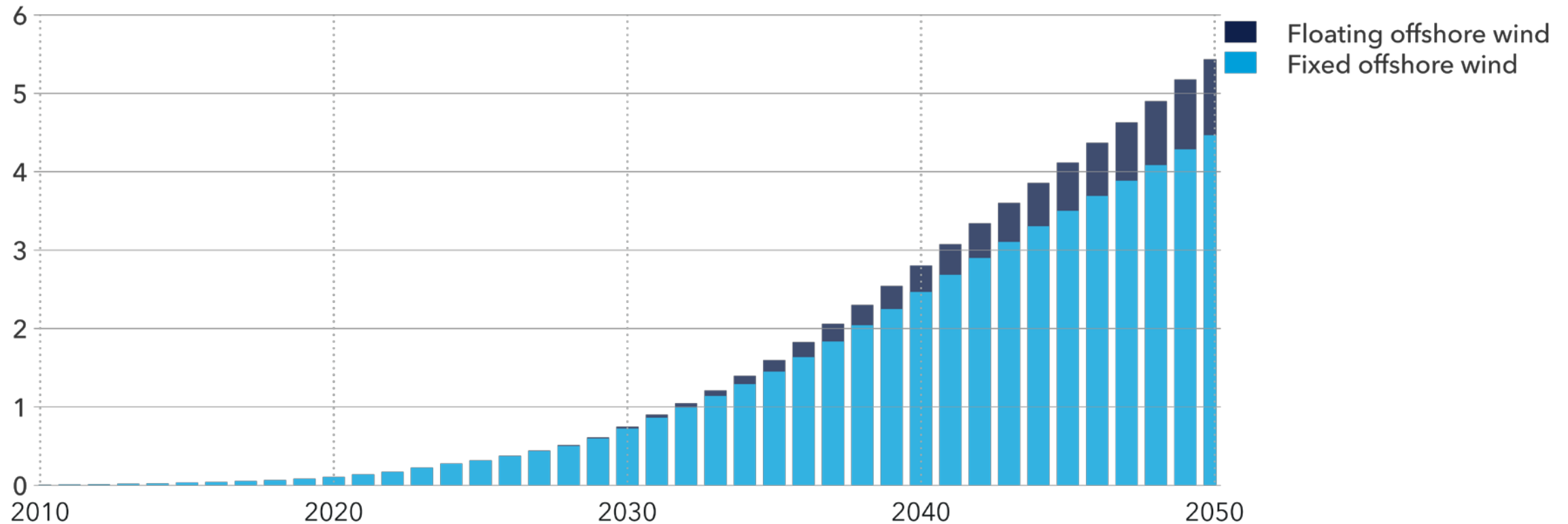
Units: PWh/yr



9% of electricity will come from offshore wind in 2050

World grid-connected electricity generation by power station type

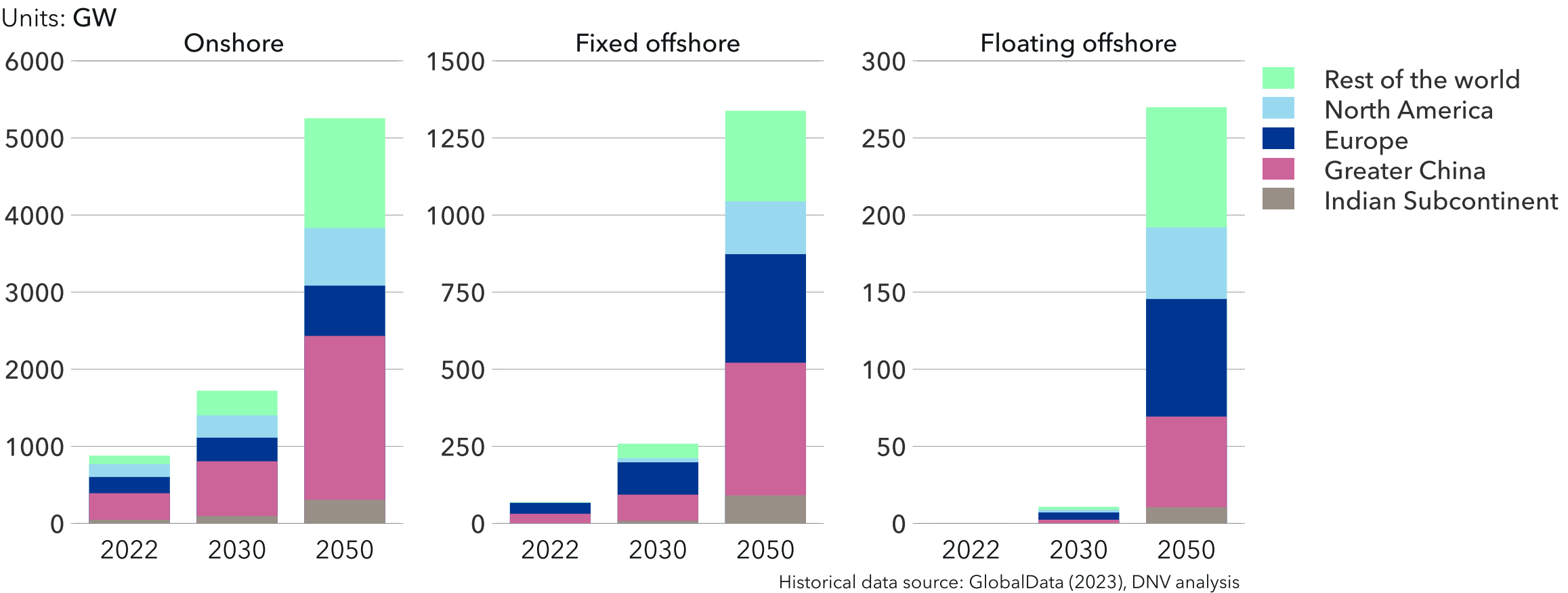
Units: PWh/yr



Historical data source: IEA (2023), GlobalData (2023)

Floating offshore installed capacity increases from almost 0 to 270 GW

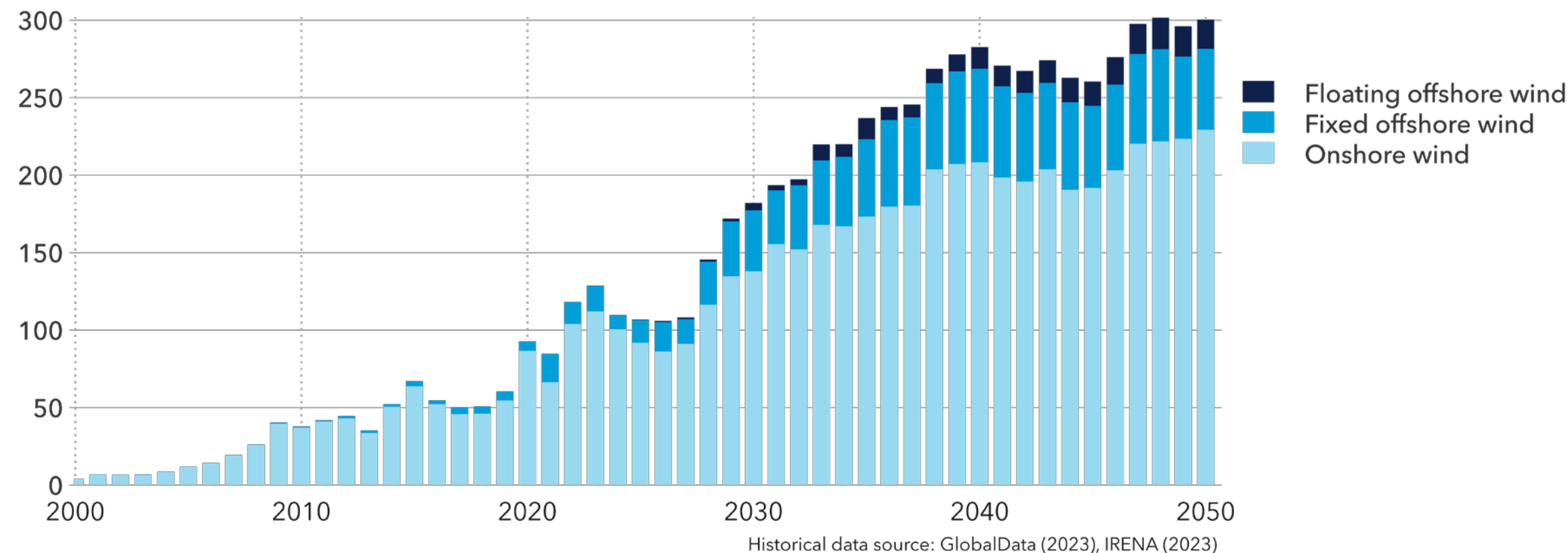
World installed wind capacity by region



Wind capacity additions GW/yr

World wind capacity additions

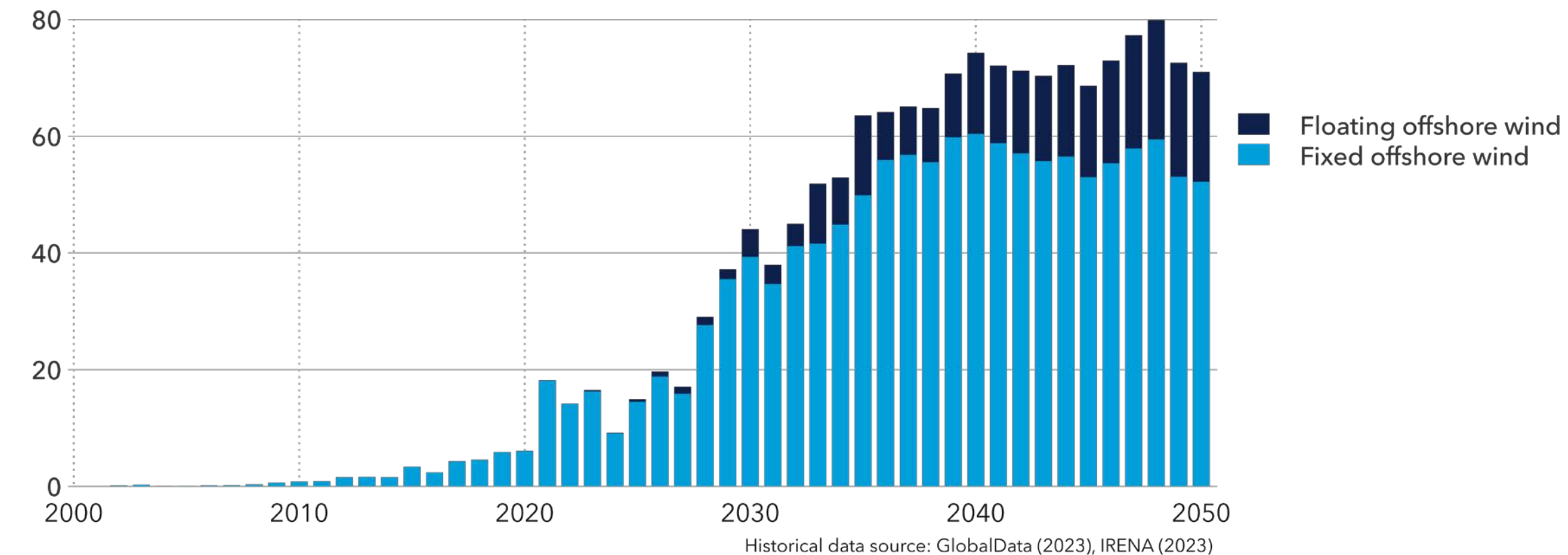
Units: GW/yr



Offshore wind capacity additions GW/yr

World wind capacity additions

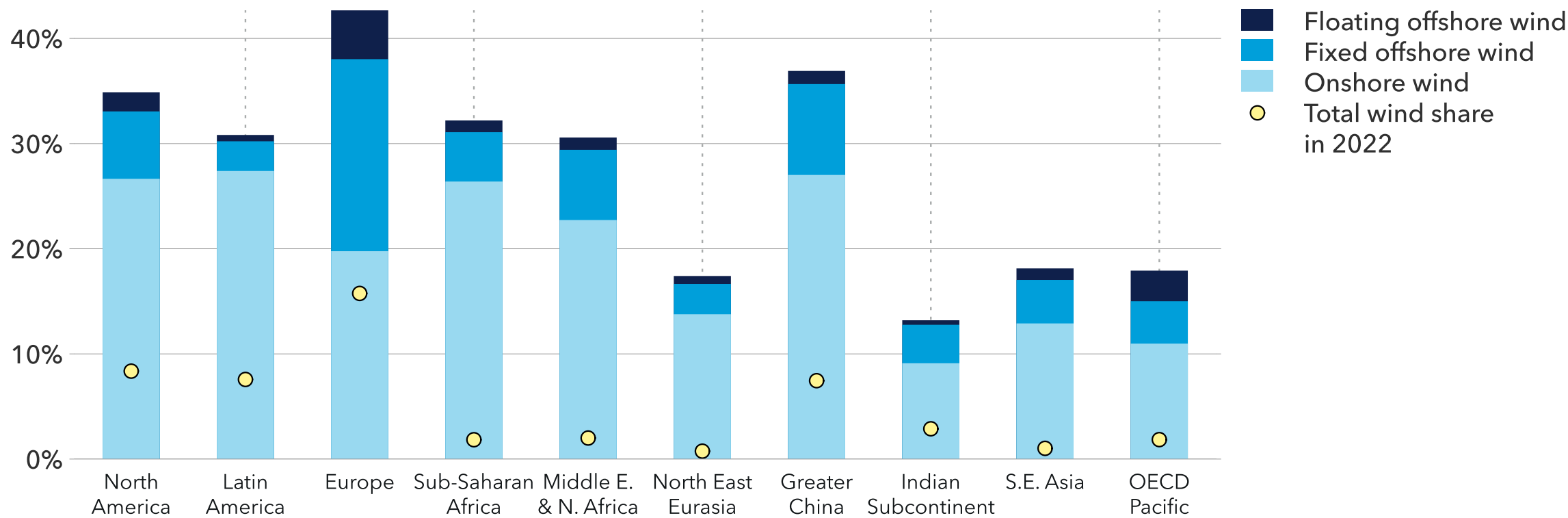
Units: GW/yr



Europe has the highest share of floating offshore wind in 2050

Share of wind in electricity generation in 2050 by region

Units: Percentages

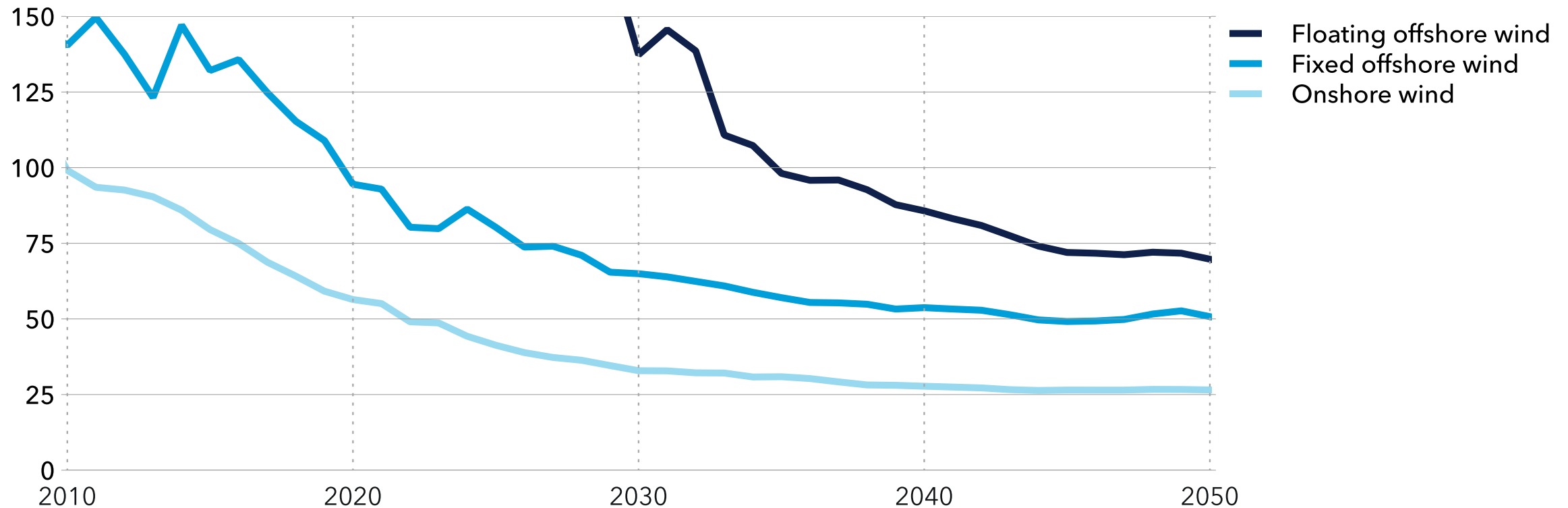


Historical data source: IEA WEB (2023) GlobalData (2023)

Even though LCOE for Floating drops significantly, but still 1.5 times more than Fixed

World average levelized cost of wind energy

Units: USD/MWh



What is hitting offshore wind investment on short term



Why are we still optimistic for offshore wind potential?

These short-term challenges elaborated are not show-stoppers for wind, despite serving as a small speed-bump in the near future, for the following reasons:



Expected capacity factor increases in the future, especially for offshore wind, and extension of lifetime with repowering possibilities push the cost calculus considerably towards an investment decision.



Unlike solar, wind has less daytime variability, and thus serves as a complementary generation option in many regional grids with high share of solar generation, such as North America.



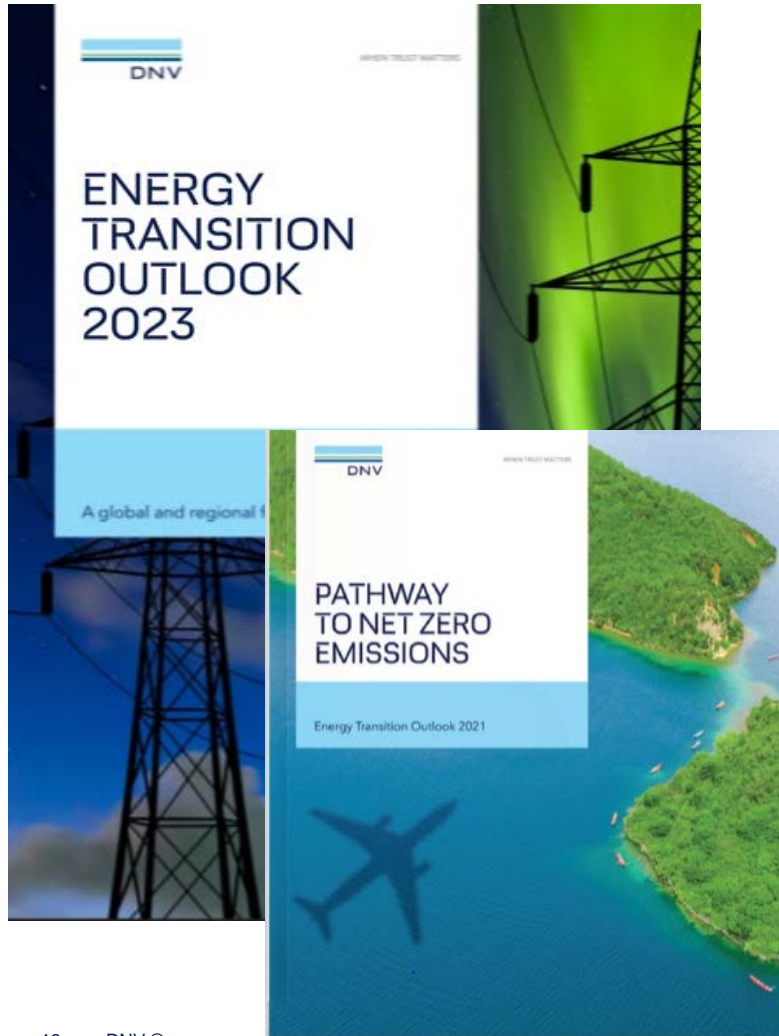
National and sometimes sub-national decarbonization goals mean contract for difference and premium payments, thus stimulating the market.

Capacity factors- detailed

Capacity factor of new additions	Onshore wind			Fixed offshore wind			Floating offshore wind			Solar			Hydropower		
	2022	2030	2050	2022	2030	2050	2022	2030	2050	2022	2030	2050	2022	2030	2050
North America	41%	43%	43%	41%	43%	47%	39%	42%	47%	27%	28%	30%		42%	
Latin America	43%	45%	45%	44%	47%	52%	44%	48%	53%	29%	30%	31%		42%	
Europe	32%	34%	34%	46%	48%	50%	47%	49%	51%	17%	18%	19%		27%	
Sub-Saharan Africa	35%	37%	40%	36%	39%	43%	37%	40%	44%	22%	22%	23%		43%	
Middle East and North Africa	38%	41%	43%	36%	39%	43%	37%	40%	44%	24%	28%	30%		25%	
North East Eurasia	33%	35%	38%	46%	50%	55%	47%	51%	56%	15%	16%	17%		40%	
Greater China	24%	26%	30%	36%	39%	43%	37%	40%	44%	15%	16%	17%		40%	
Indian Subcontinent	30%	33%	33%	36%	39%	43%	37%	40%	44%	20%	22%	23%		37%	
South East Asia	25%	27%	30%	36%	39%	43%	37%	40%	44%	20%	21%	22%		39%	
OECD Pacific	30%	32%	33%	39%	42%	46%	39%	43%	47%	21%	23%	24%		20%	

DNV has been forecasting the energy transition since 2017

Main publication



Regional reports



Sector reports

