

FAREWELL TO ILLUSIONS

Global energy in a Thucydides trap

Igor Sechin, Chief Executive Officer of Rosneft



Karl Bryullov.
The Last Day of Pompeii,
1833.

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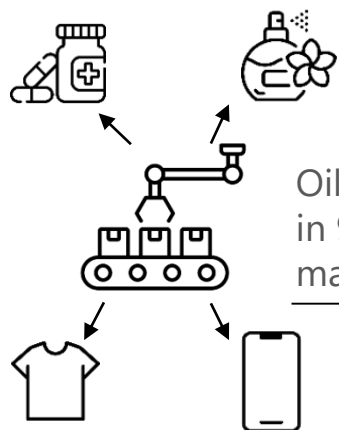
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Global energy system is at the heart of modern life



1,5 bn vehicles



Oil & gas contained
in 95% of all
manufactured goods



800 kg of oil
equivalent per
capita annually



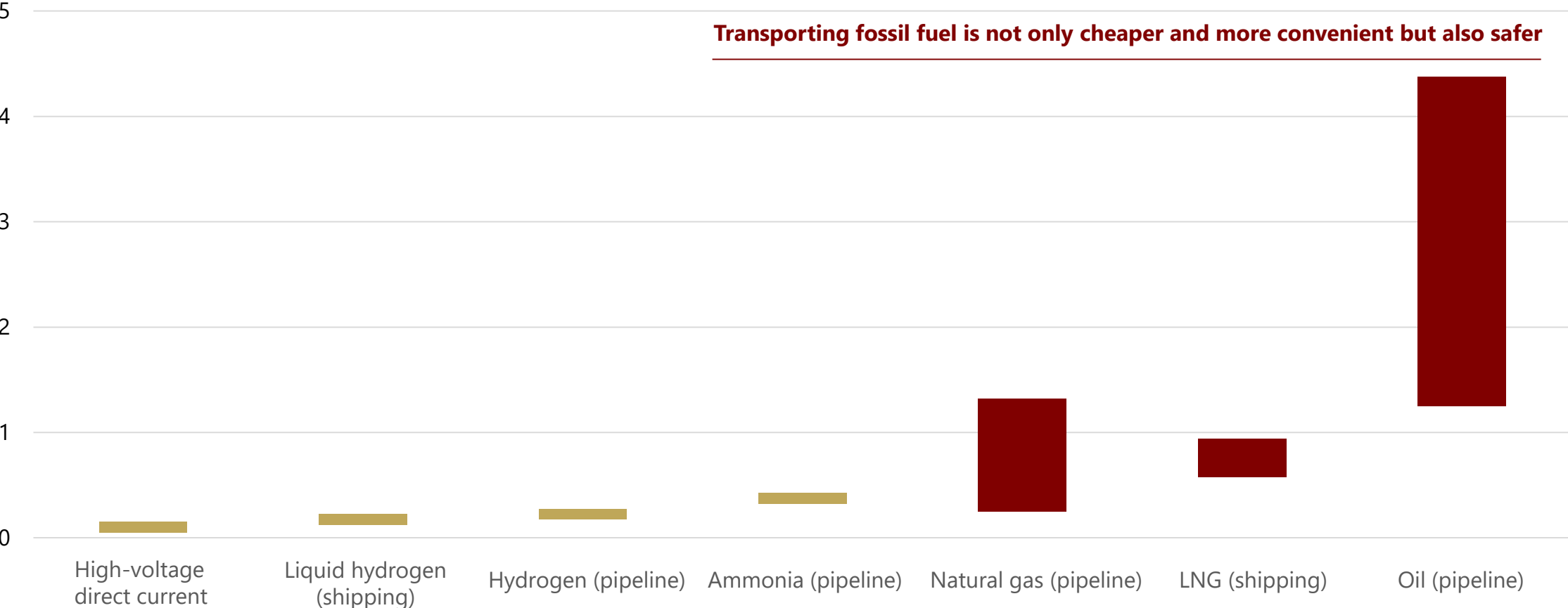
More than 60 000
power plants...



... provide electricity to
more than 6 bn people

New energy sources will require the emergence of new technologies, infrastructure and markets

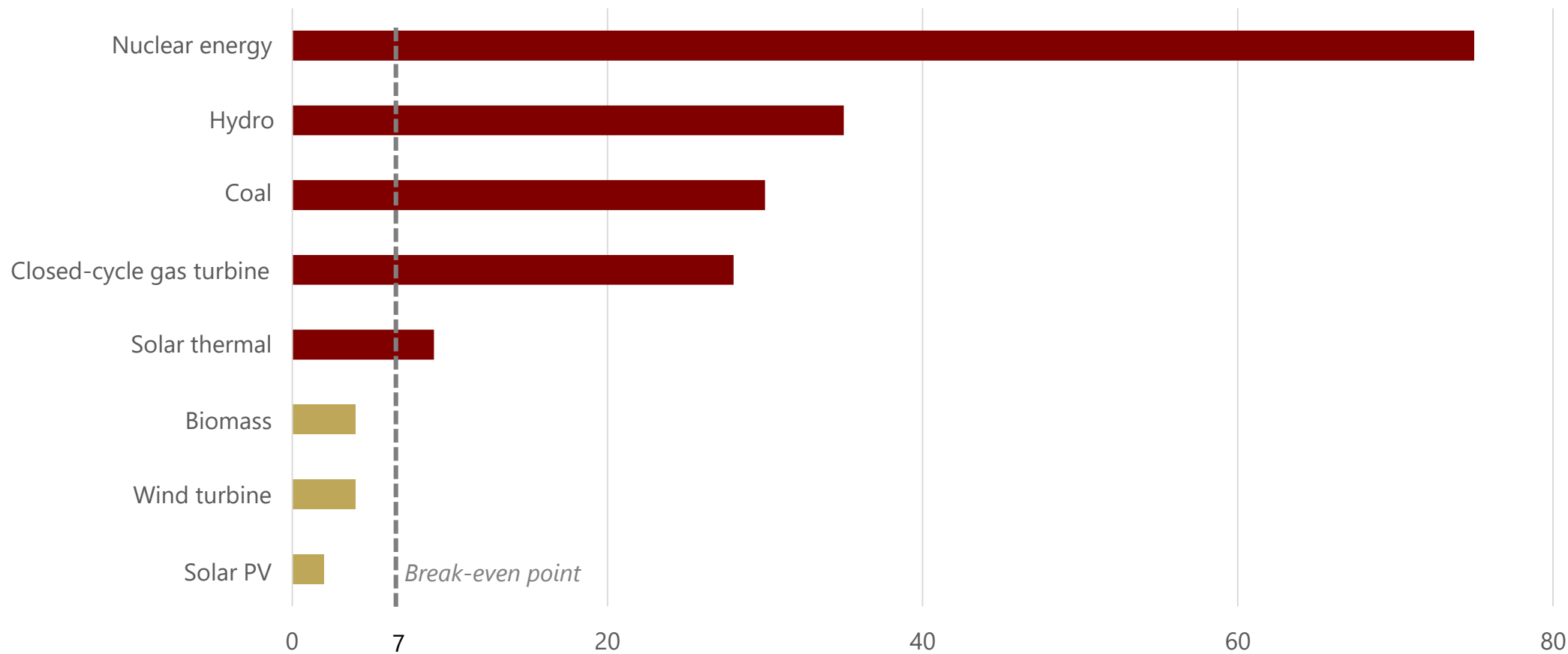
Energy transportability
(MWh moved per 1 US\$ of transport cost over 1000 miles)



Source: McKinsey Global Institute. Note: transportation expenses include operating expenses and amortization of capital expenses on the construction of new lines.

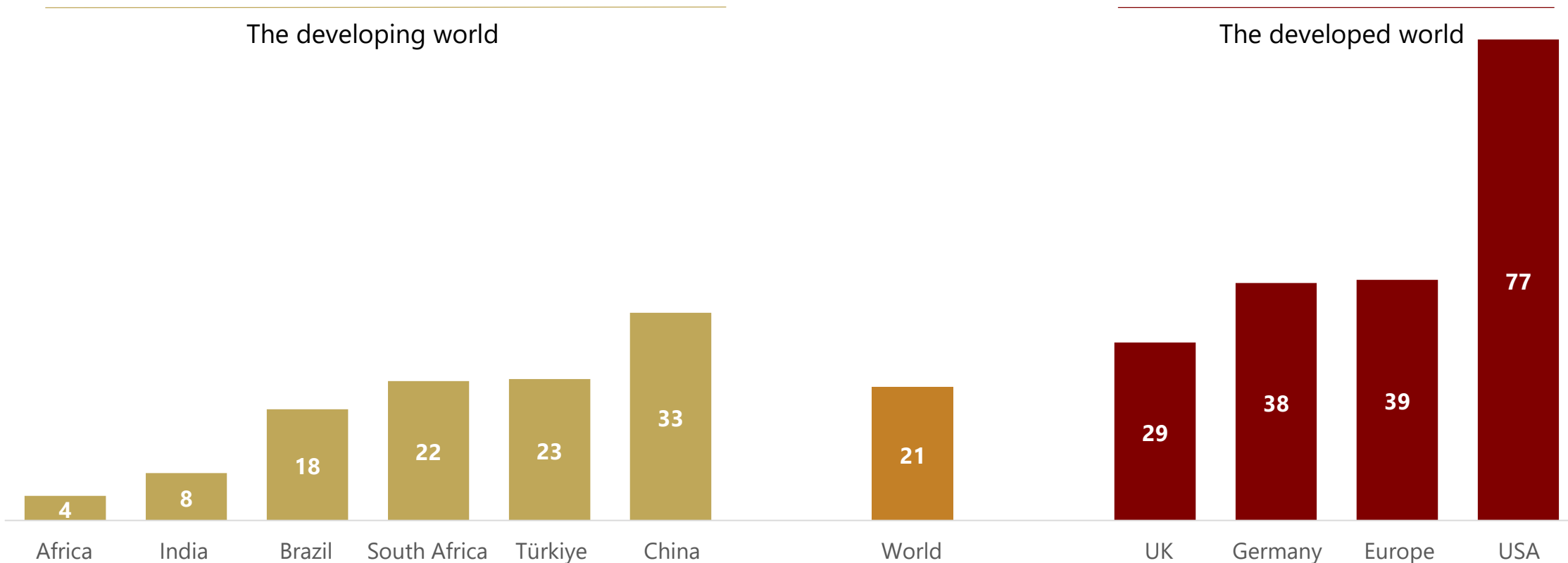
Energy efficiency of fossil fuel investments outpaces that of renewables

Energy return on investments



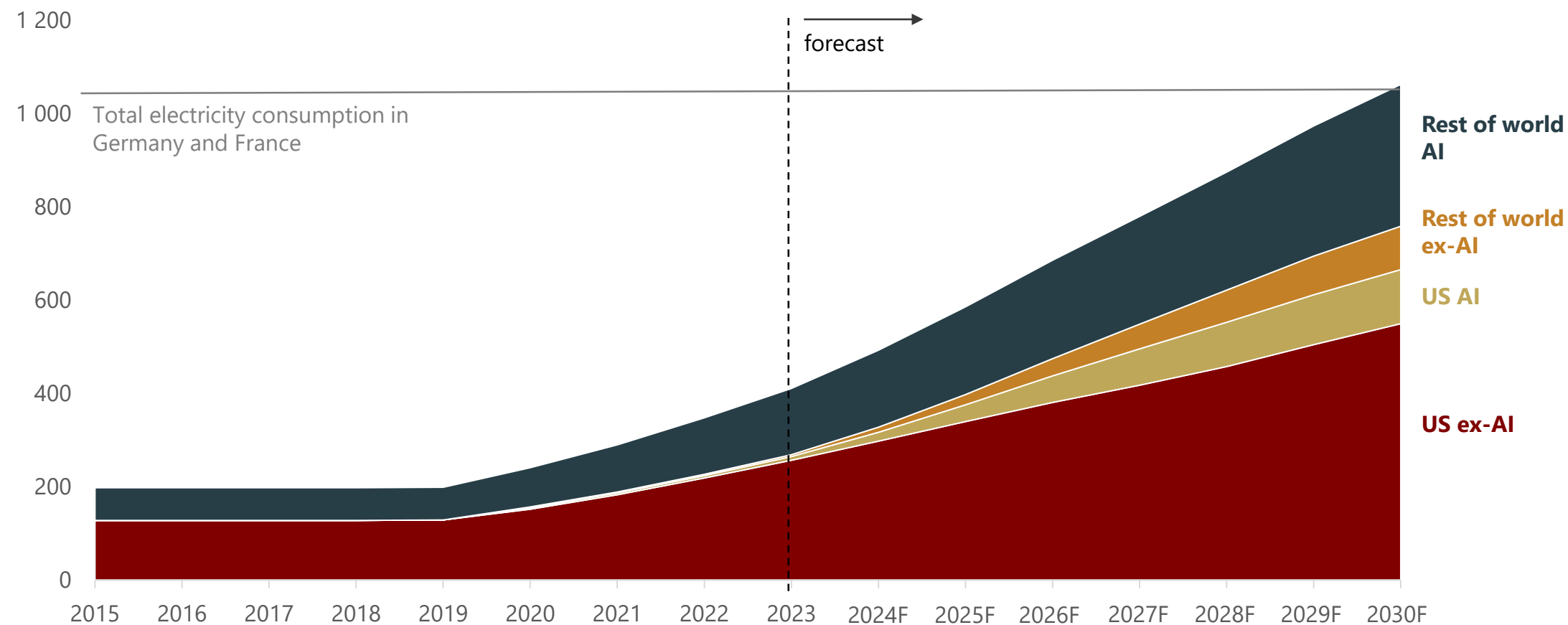
Energy consumption in developed countries is times higher compared to the developing world

Primary energy consumption per capita in 2023
(MWh)



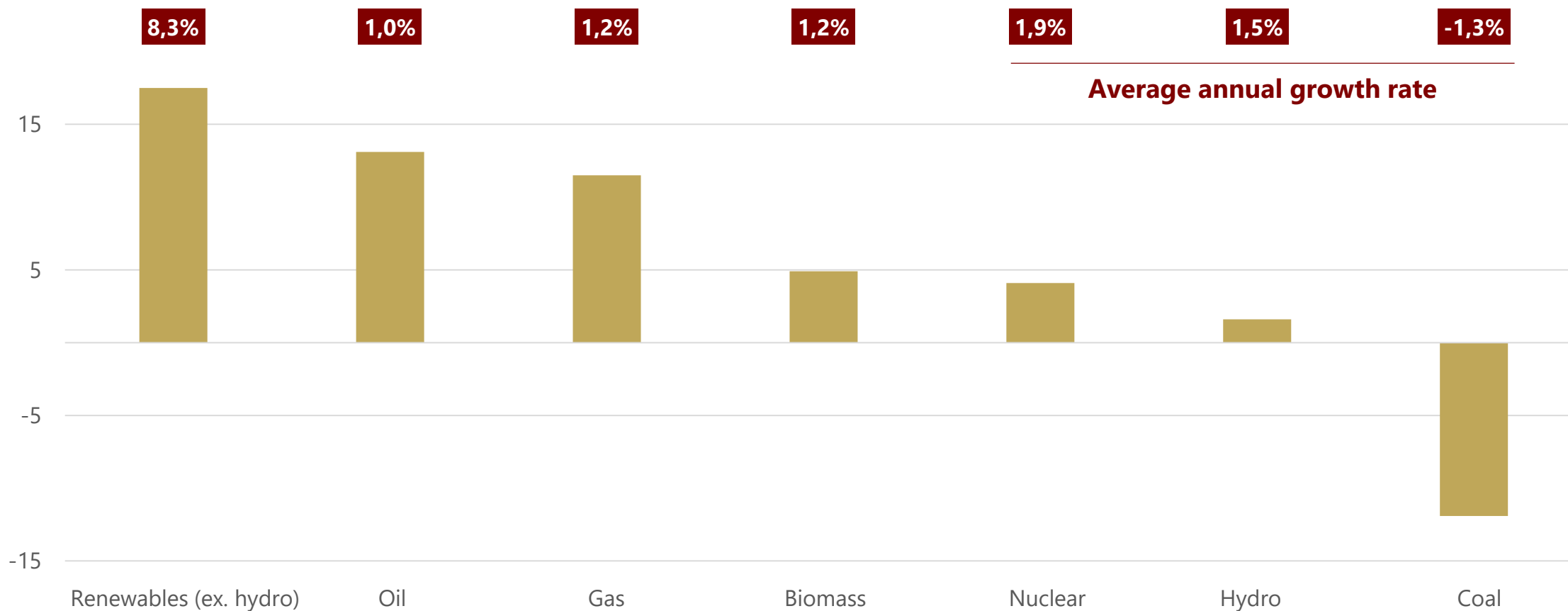
New technologies – a powerful driver of energy consumption

Data center power demand
(TWh)



Oil and gas will remain a cornerstone of global energy mix

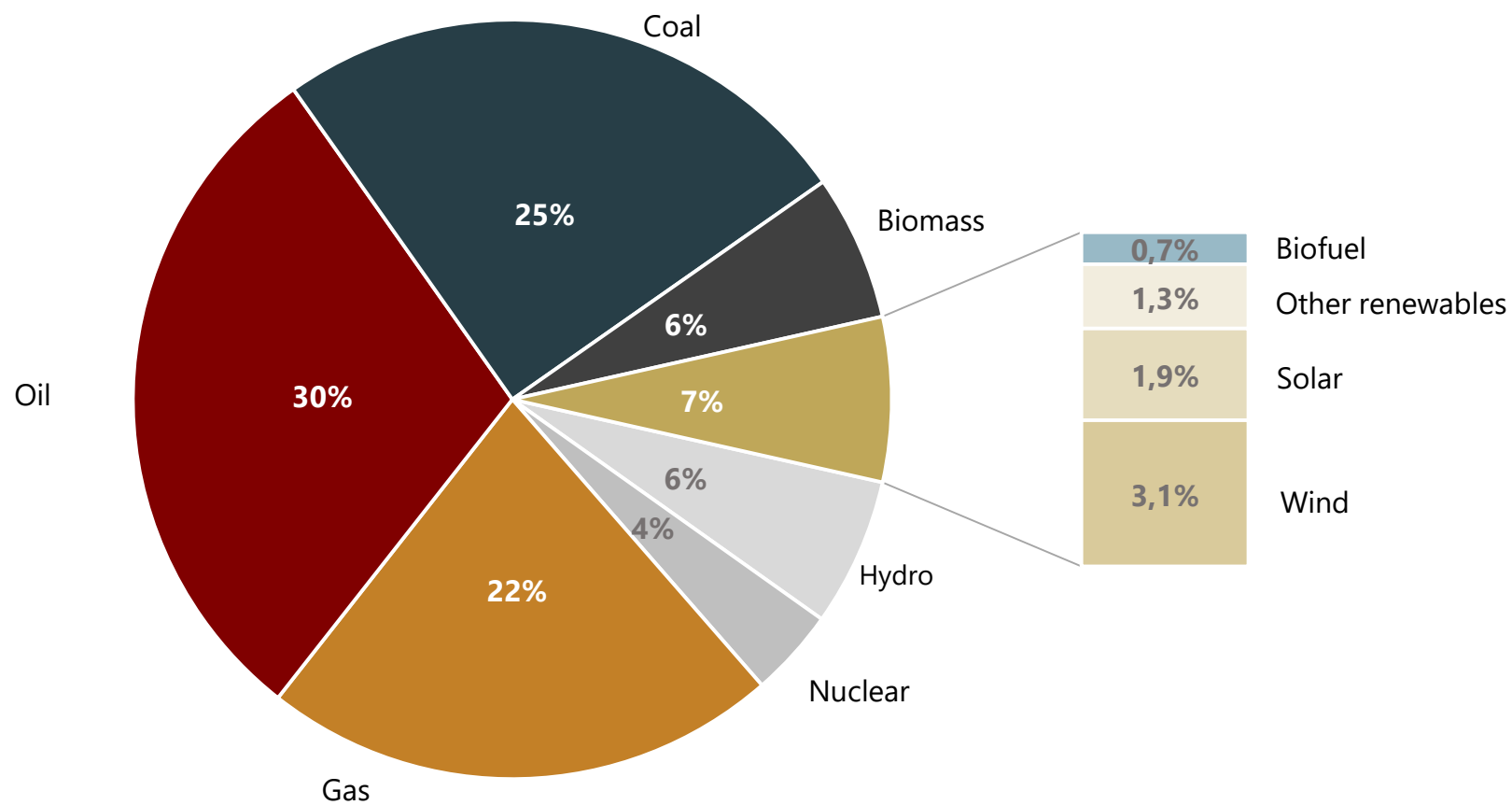
Energy demand growth by fuel source from 2023 to 2050
(mn boe/d)



Source: OPEC. Note: CAGR is used for average annual growth rate

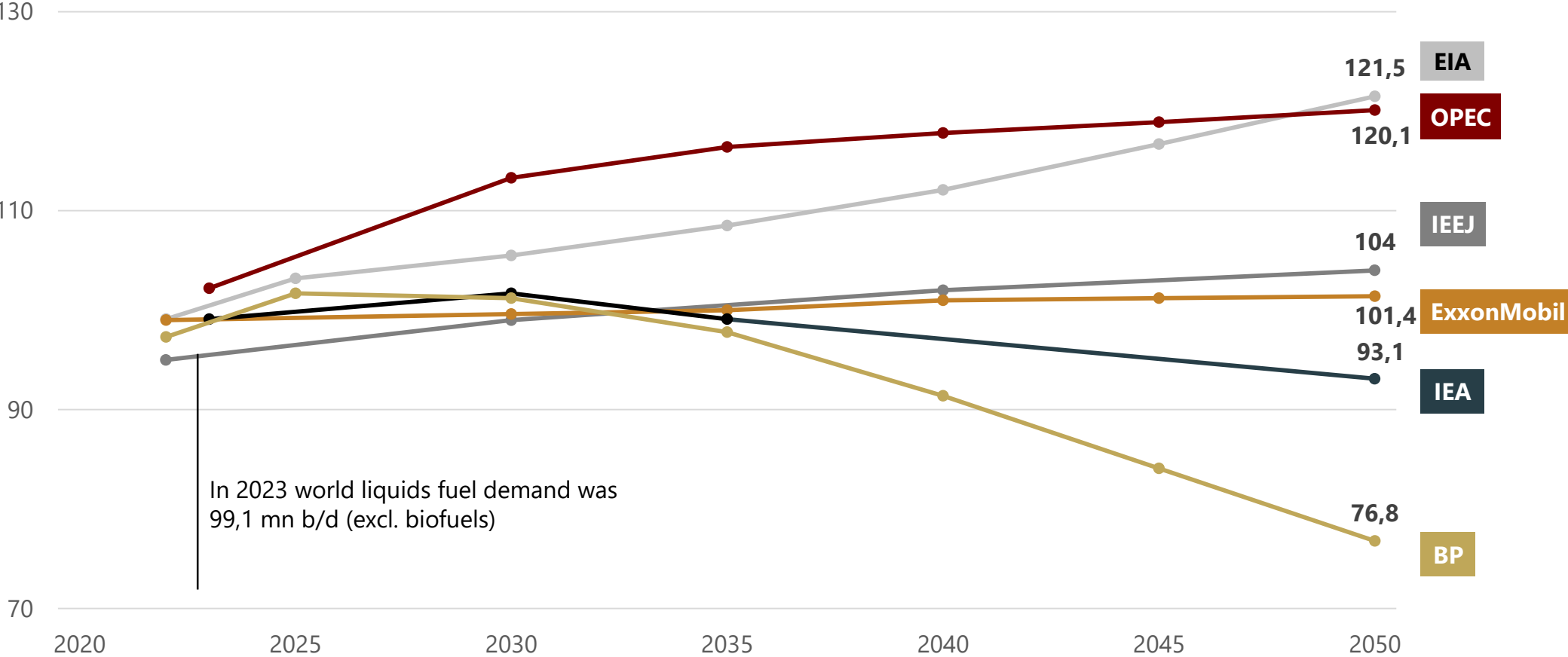
Fossil fuels provide around 80% of energy consumption

World energy consumption structure, by source



Oil consumption forecasts depend on views on the green agenda

Oil demand forecast
(mn b/d)

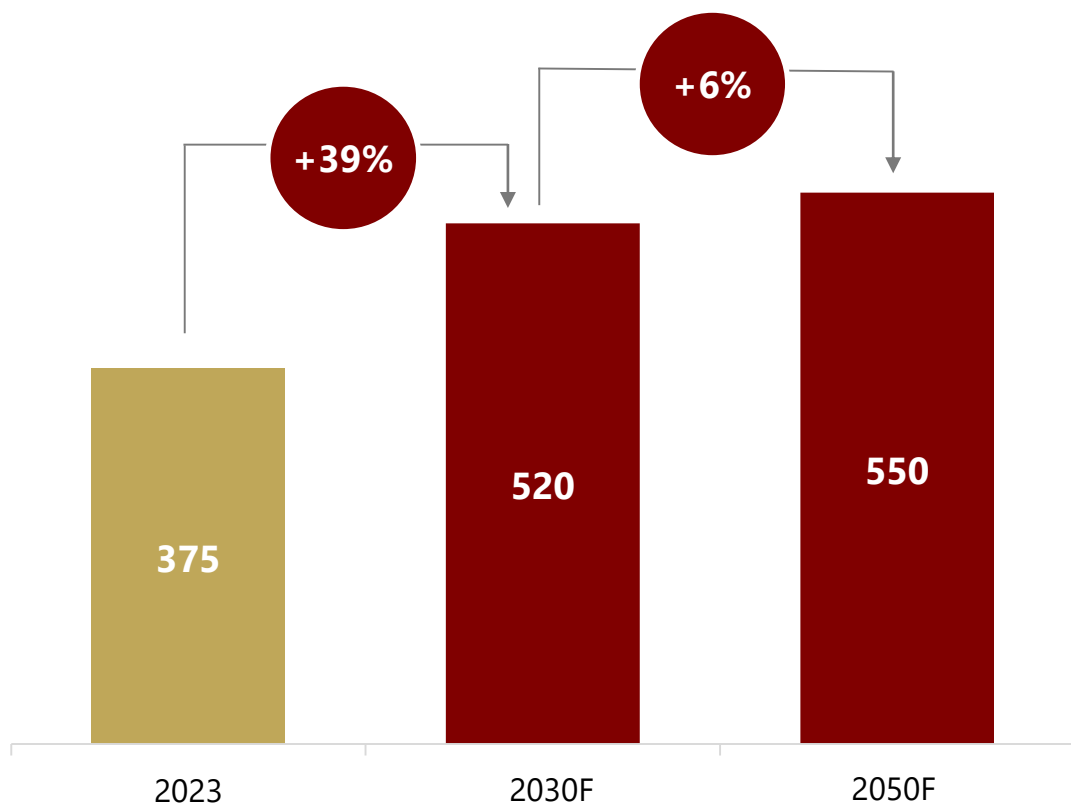


In 2023 world liquids fuel demand was 99,1 mn b/d (excl. biofuels)

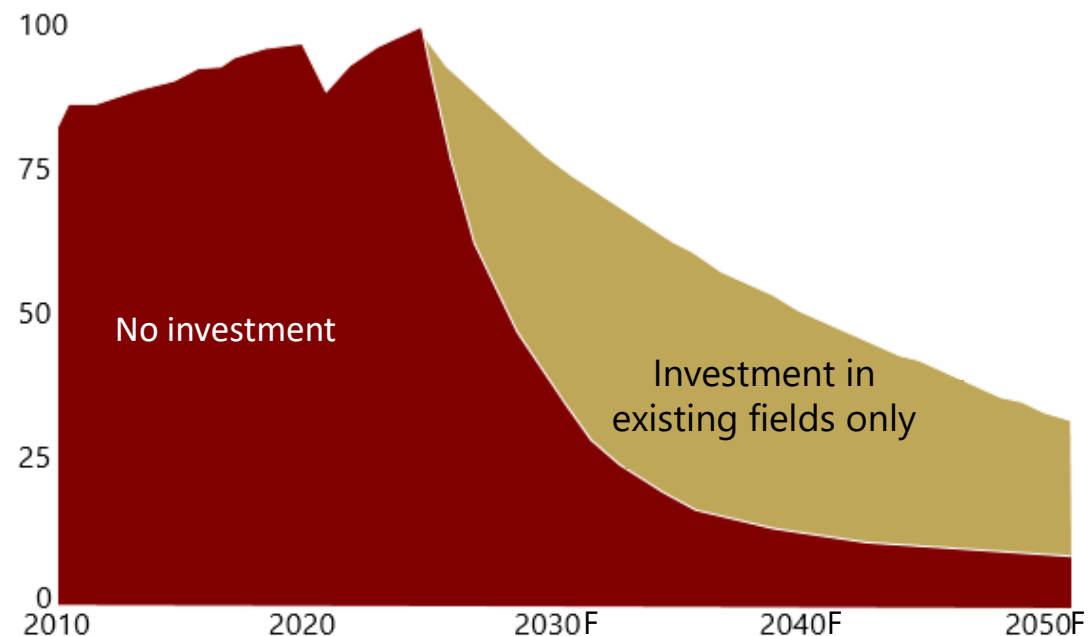
Sources: OPEC, EIA, IEA, ExxonMobil, BP, Institute of Energy Economics, Japan (IEEJ)

Oil sector needs investments until 2050

Annual upstream investments requirements
(2024 US\$bn)

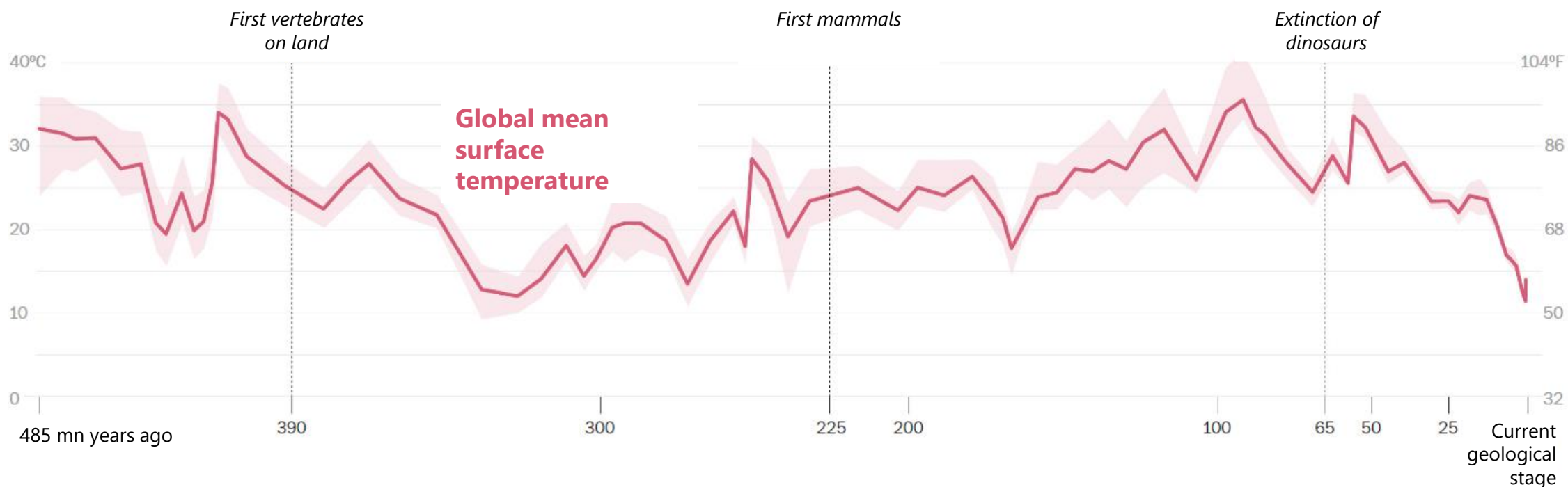


Oil supply profile under different investment scenarios
(mn b/d)



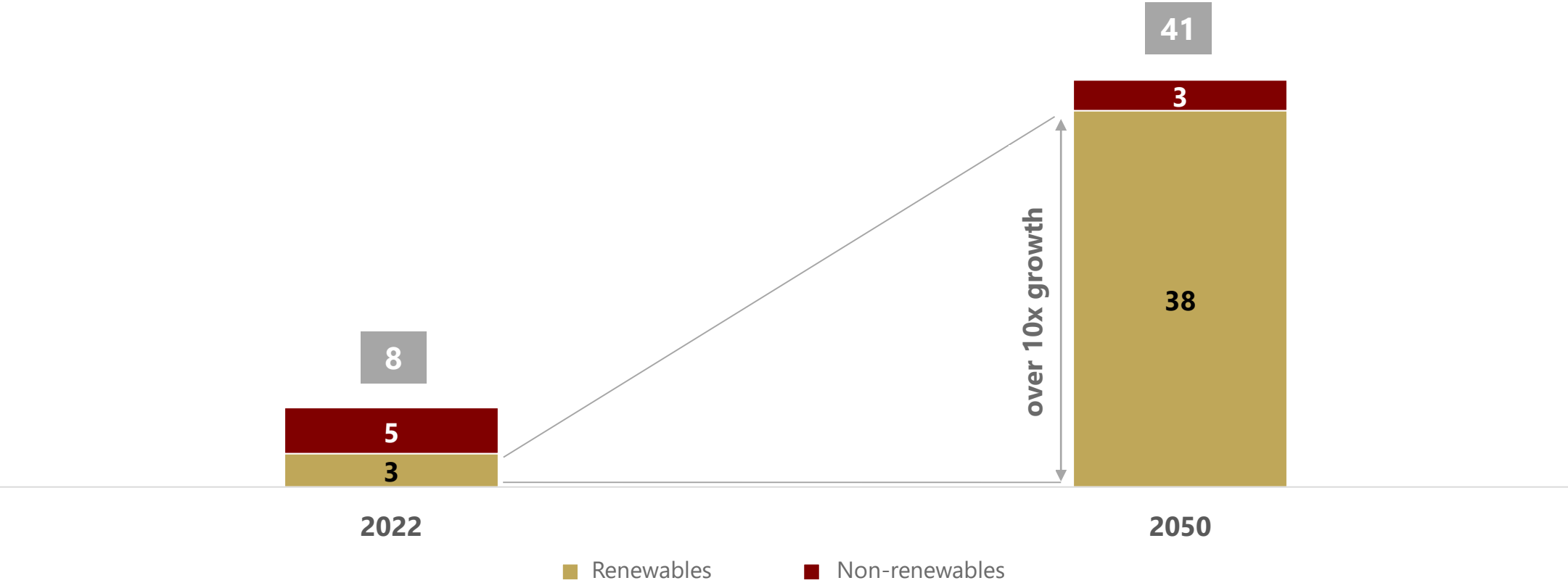
Earth's surface temperature is at a natural level

Earth's surface average temperature over the past 485 mn years



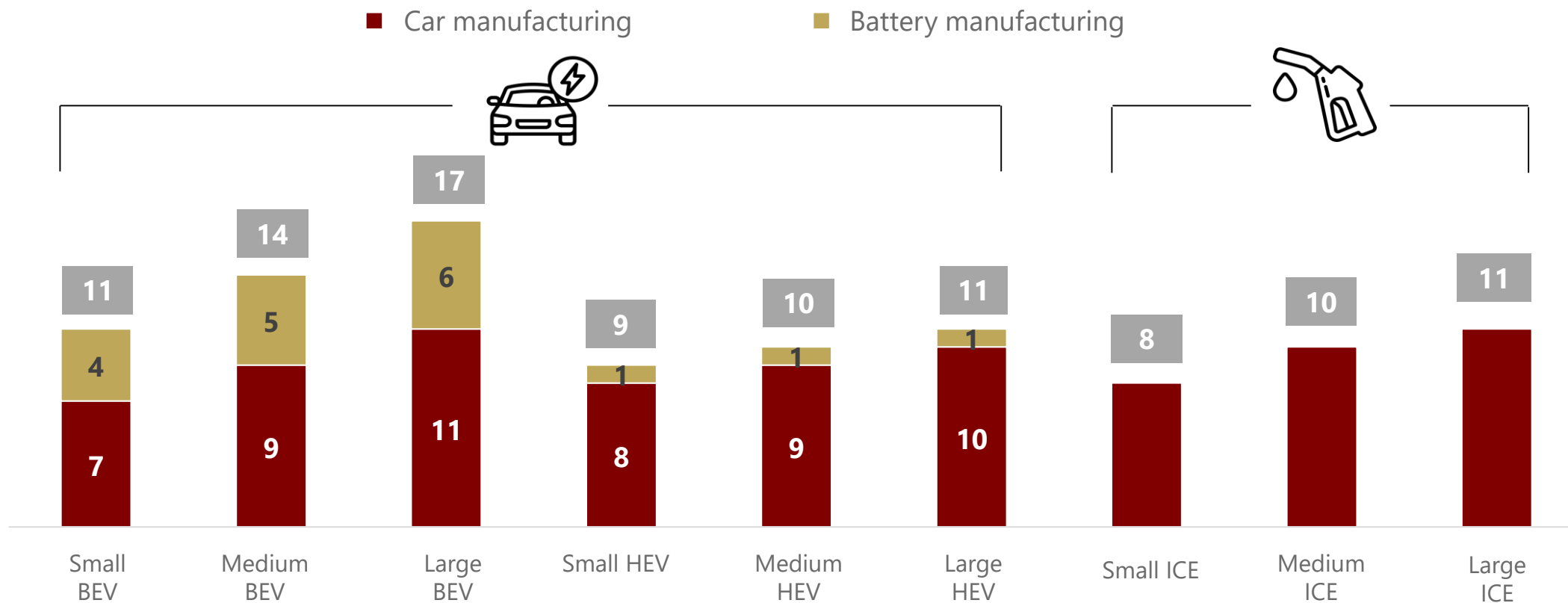
To achieve Net Zero by 2050, renewable capacity has to grow by 10x. Is this feasible?

Required installed capacity of electricity generation by 2050 in order to meet climate targets (TWh)



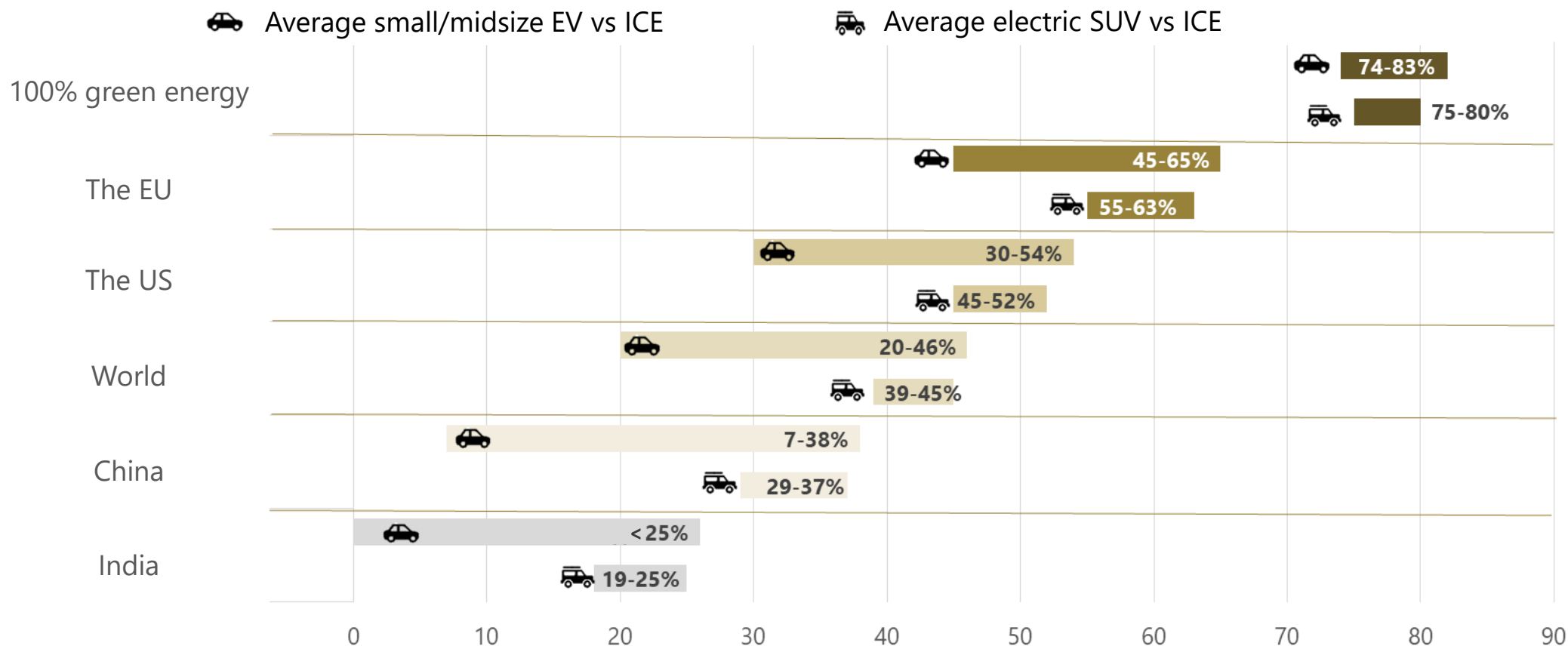
Released emissions from electric car production 35-50% higher compared to ICE car production

Released emissions from car production, by car type
(tCO₂e)



Only substantial mileage allows for emissions savings

Lifetime emissions saved at 200 000 km for an EV in comparison with an ICE car (%)



Buyers are disappointed in EVs

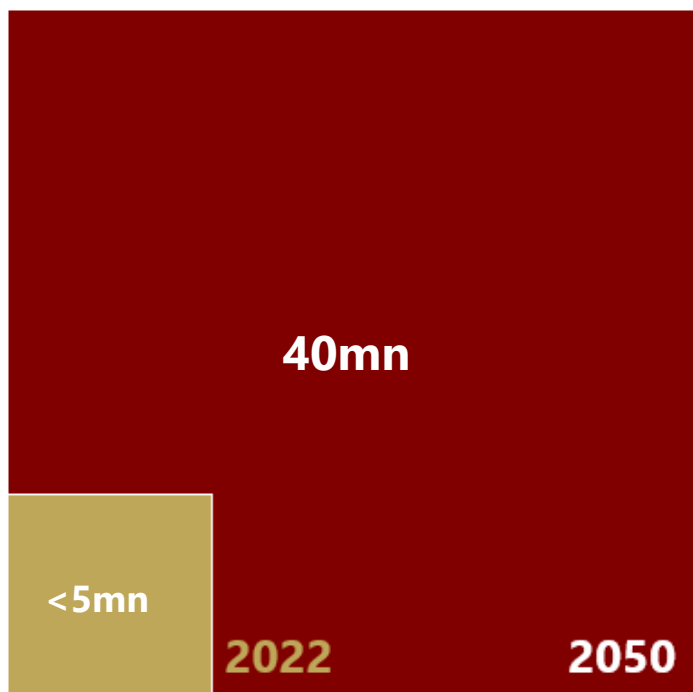
Average sales price of used vehicles in the US by engine type (US\$)



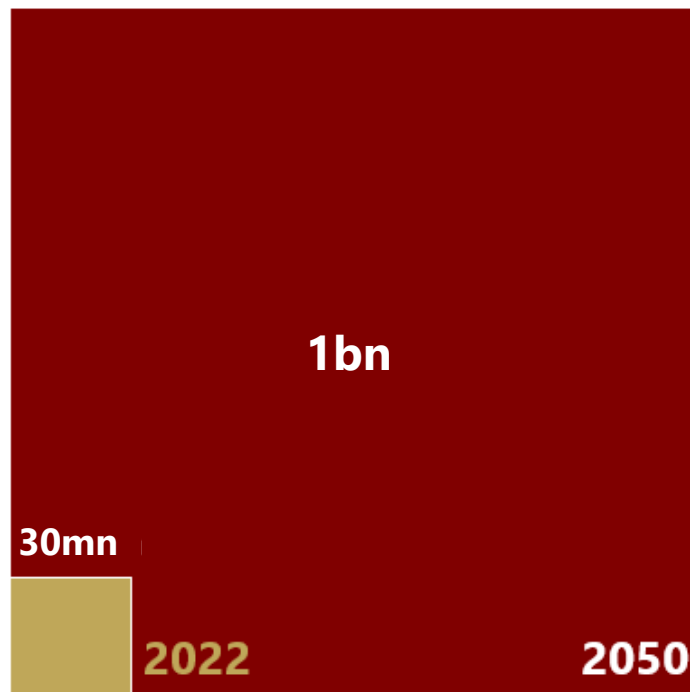
Source: Wall Street Journal. Note: three-year-old vehicles are considered.

Electrification of heavy-duty vehicles has not even started

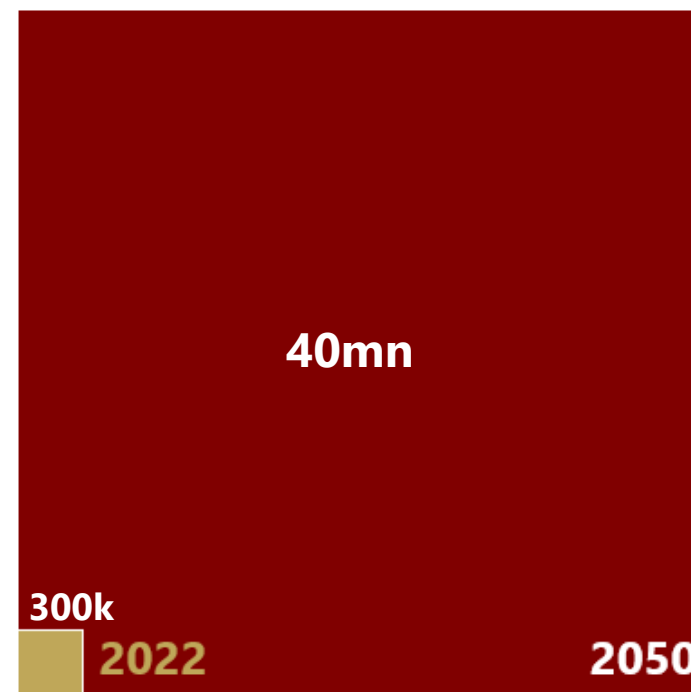
Public charging points



BEVs and FCEVs on the road

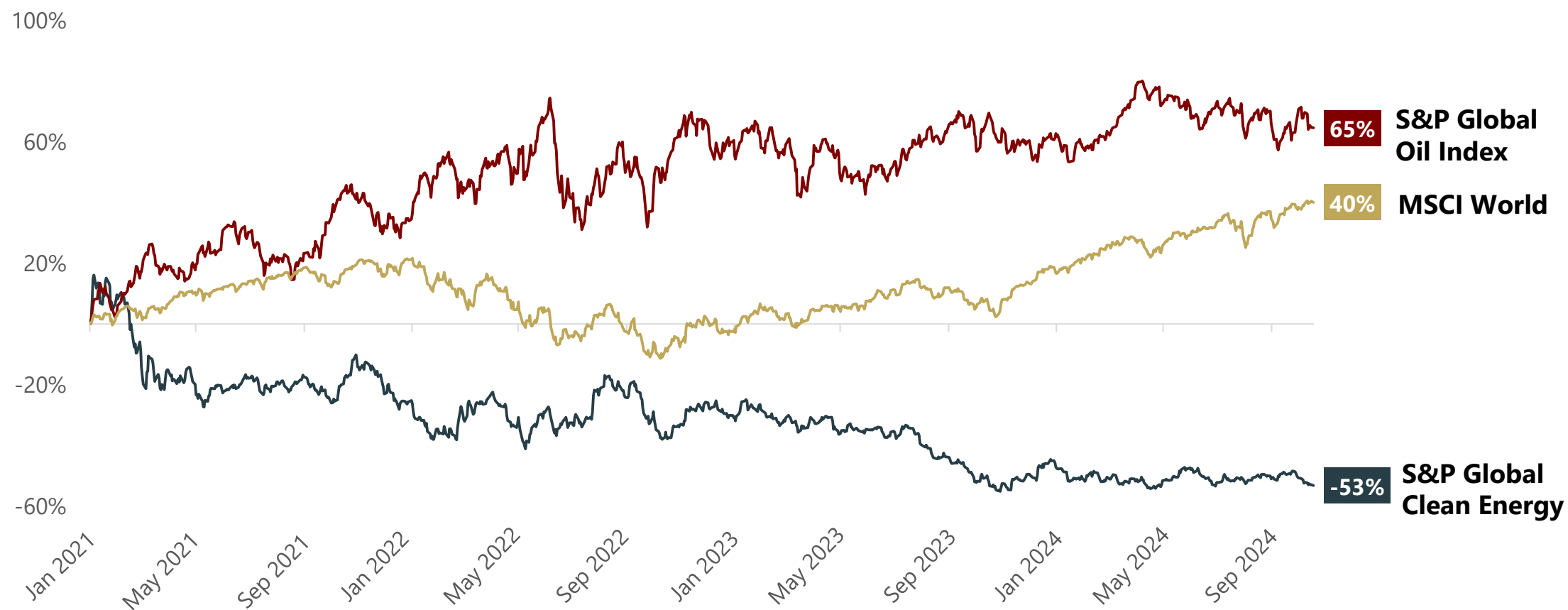


Battery and fuel cell electric trucks on the road



Investors flee from green agenda

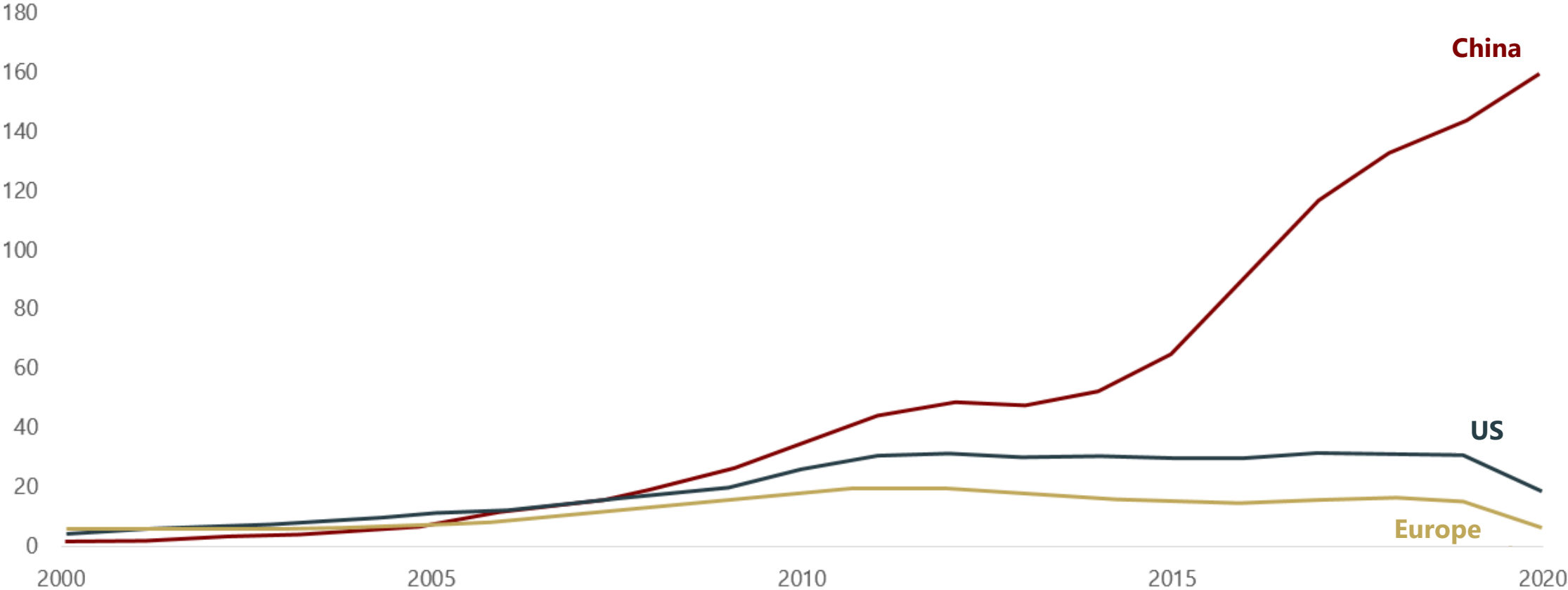
Performance of renewable energy, oil and gas and global market stock indices
(%, from the beginning of 2021)



Source: Investing.com. Note: dividends are not factored in

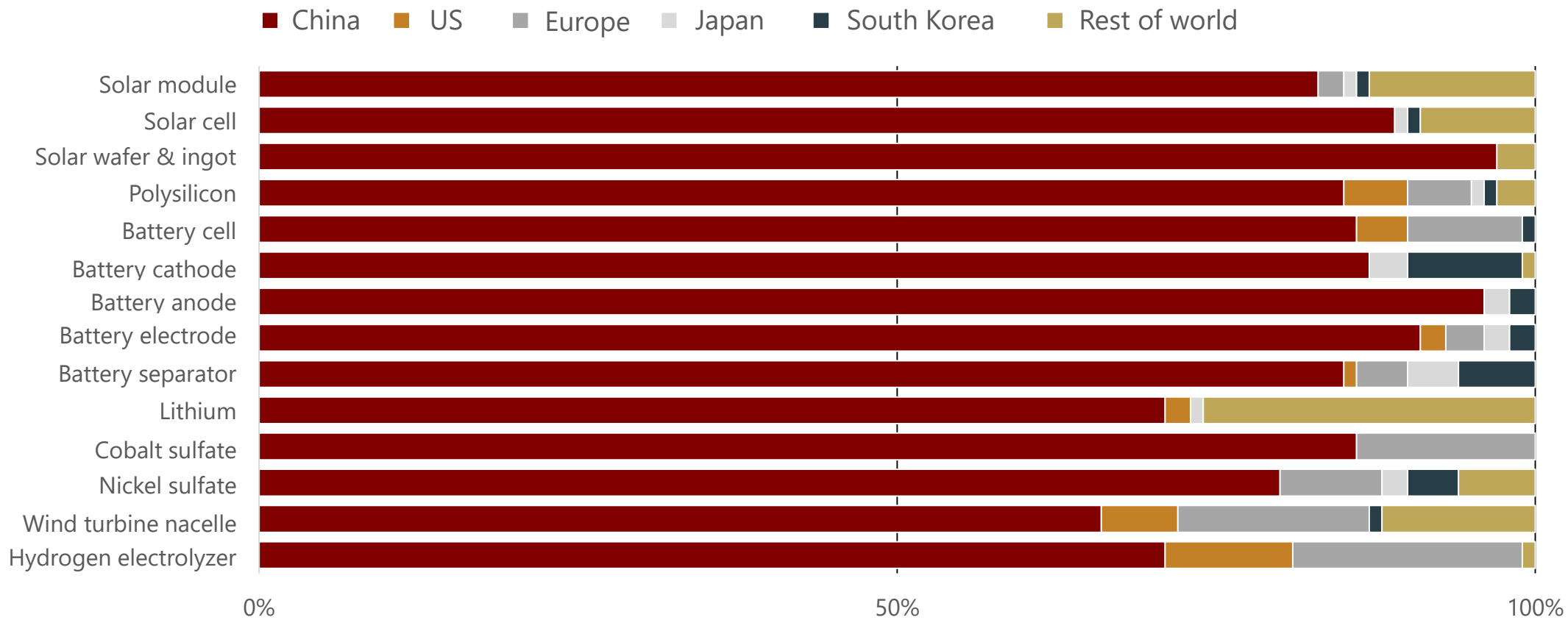
The US lags behind in clean energy research

The number of clean energy patents by country



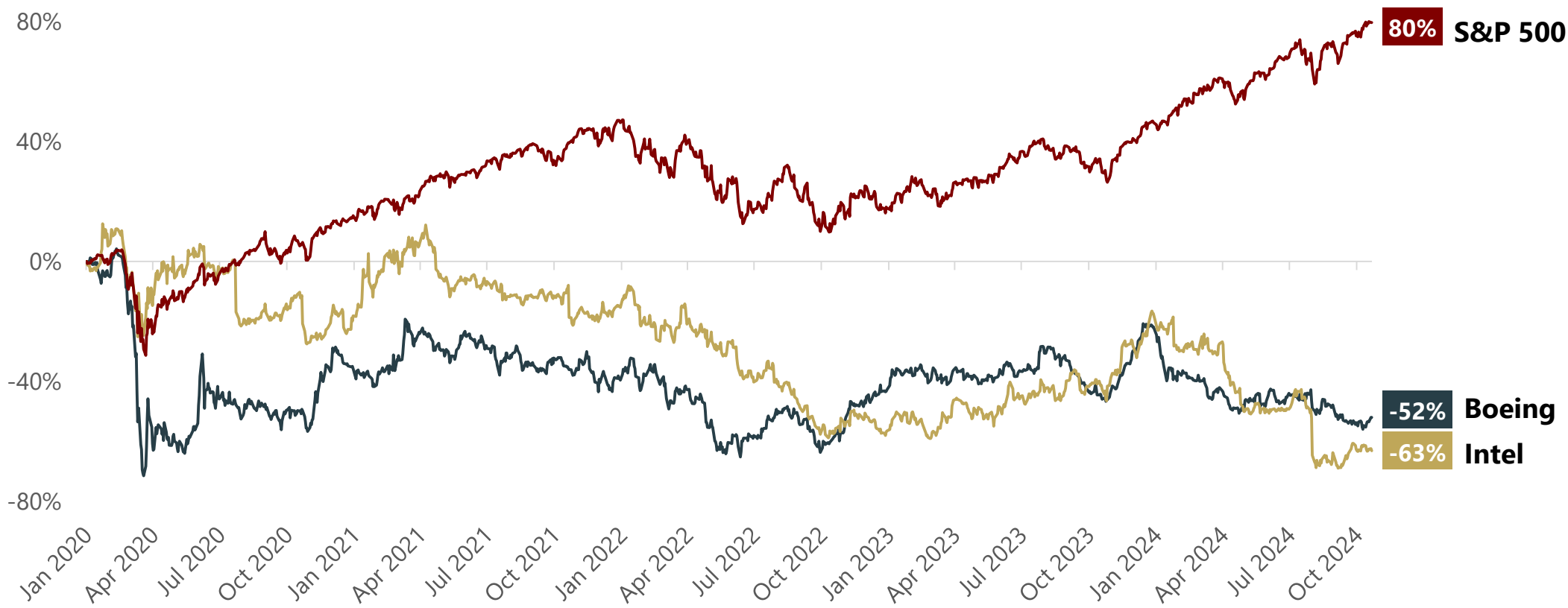
70% of global "green" capacity is located in China

Share in "green" economy equipment production capacity by country



Boeing and Intel are in free fall

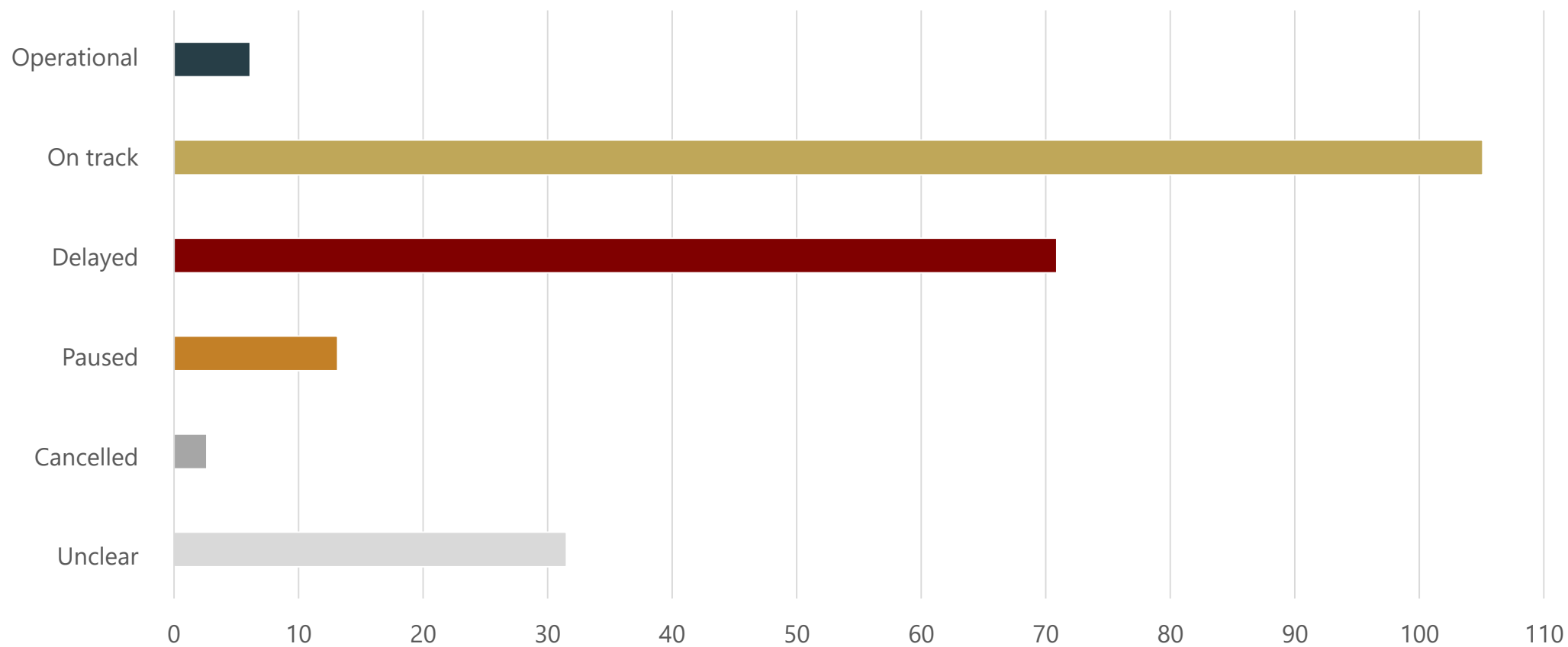
Stock performance of Boeing, Intel and the S&P 500 Index
(%, from the beginning of 2020)



Source: Investing.com. Note: stock and index returns are presented excluding dividends

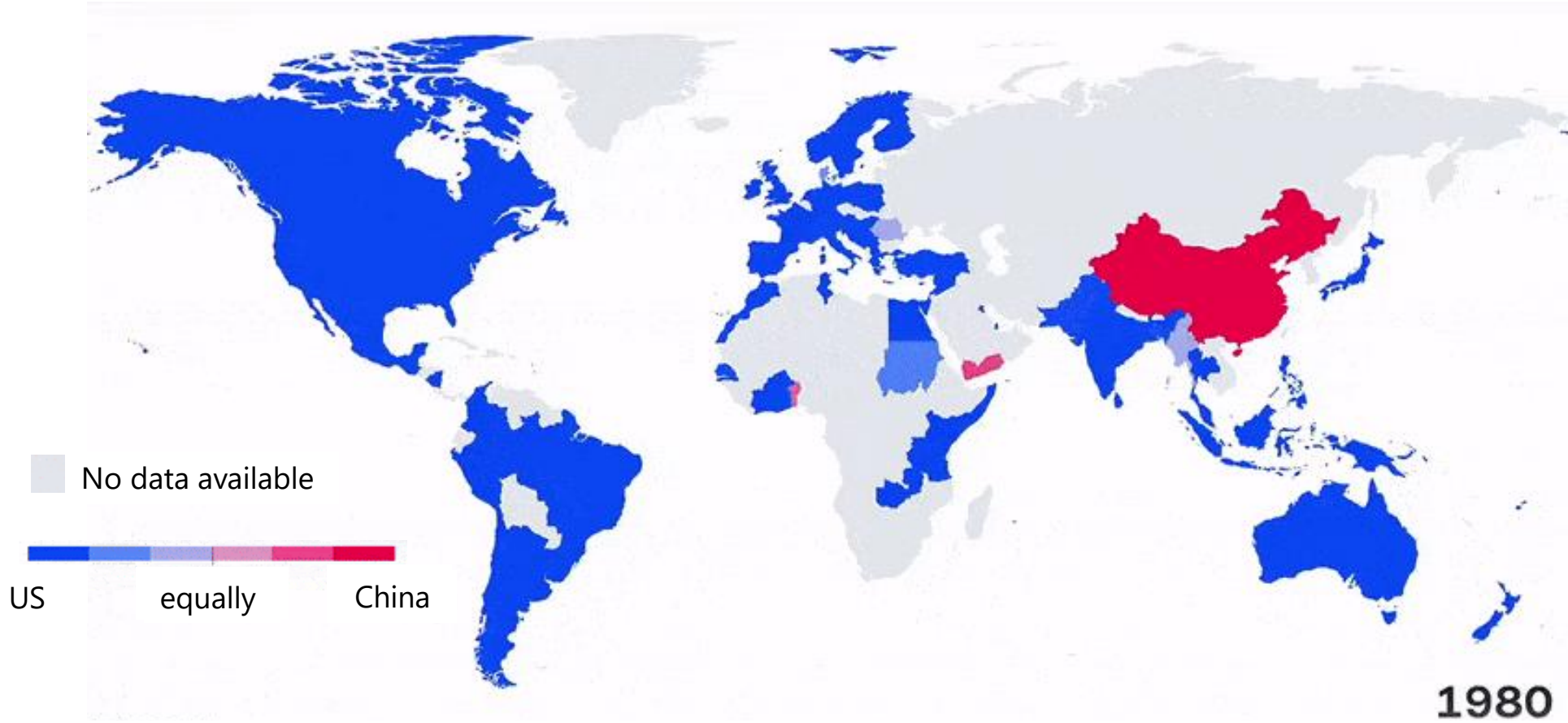
40% of new US “green” projects have been paused or canceled

Total investment by status for announced projects under the US Inflation Reduction Act (US\$bn)



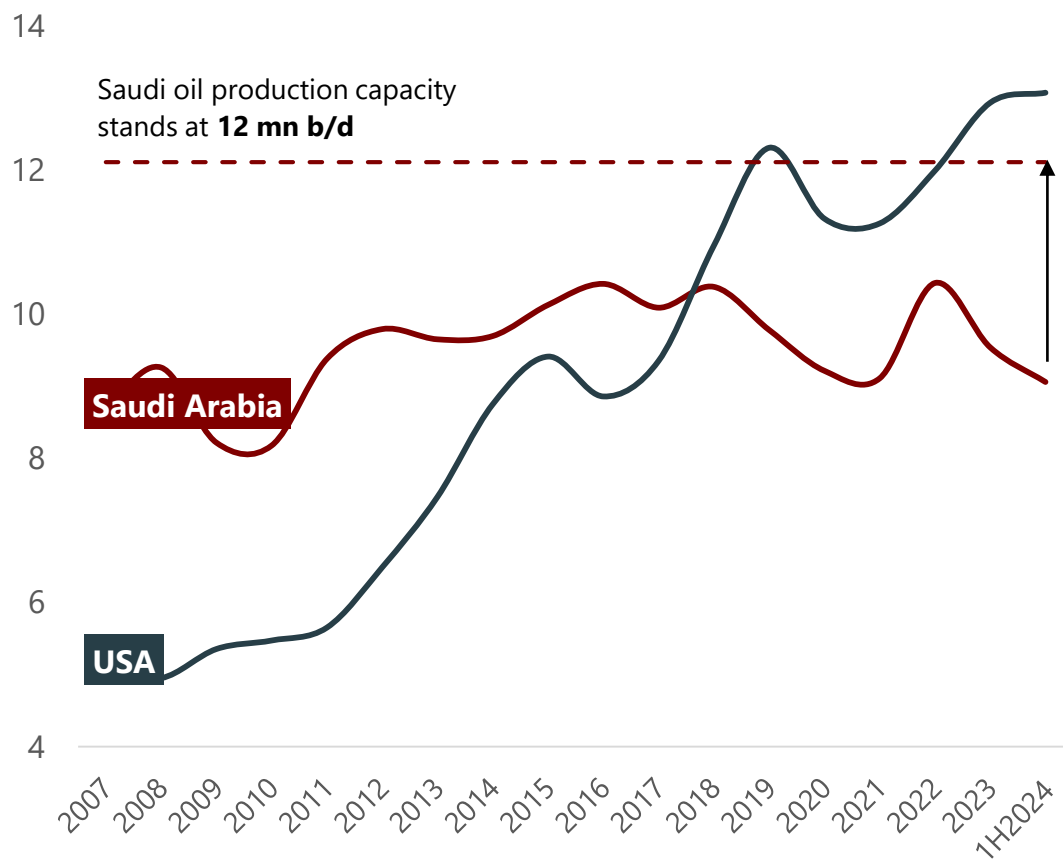
The US has lost its leadership in global trade

US-China rivalry in international trade



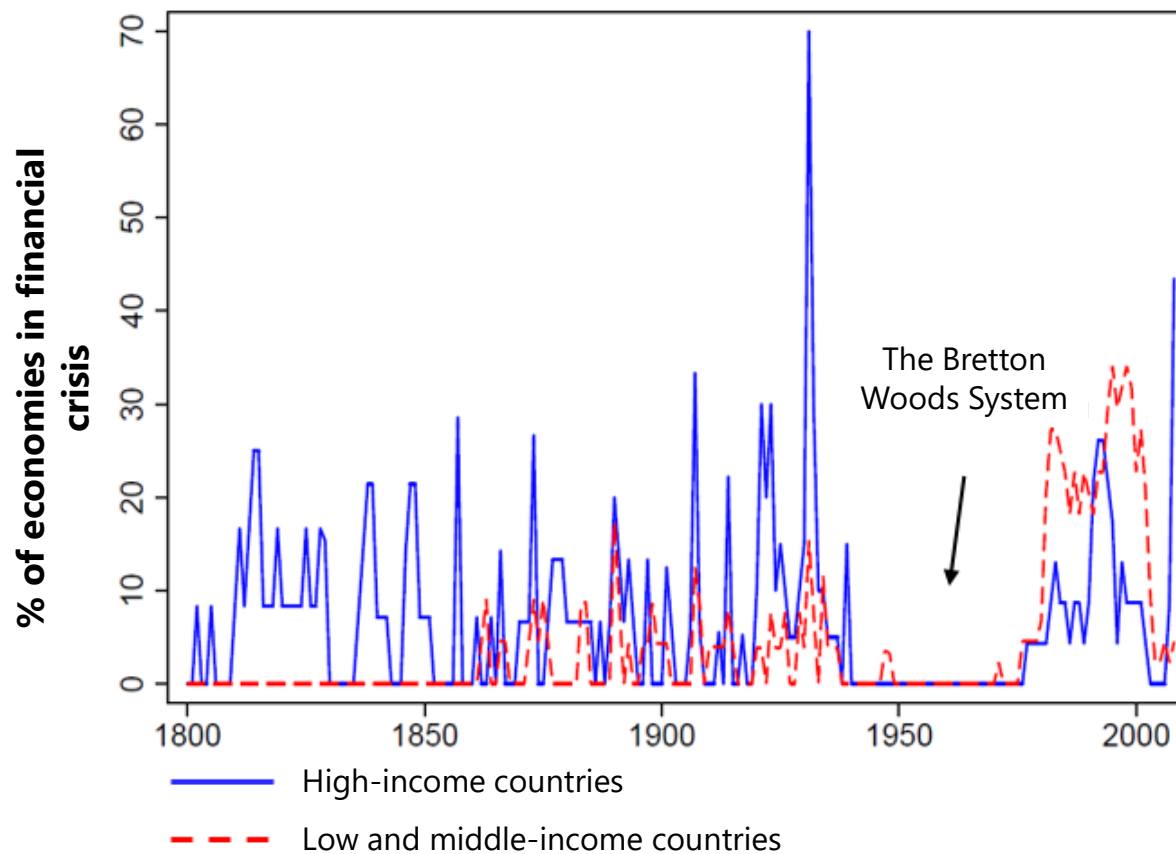
Citius, Altius, Fortius!

US and Saudi oil production
(mn b/d)



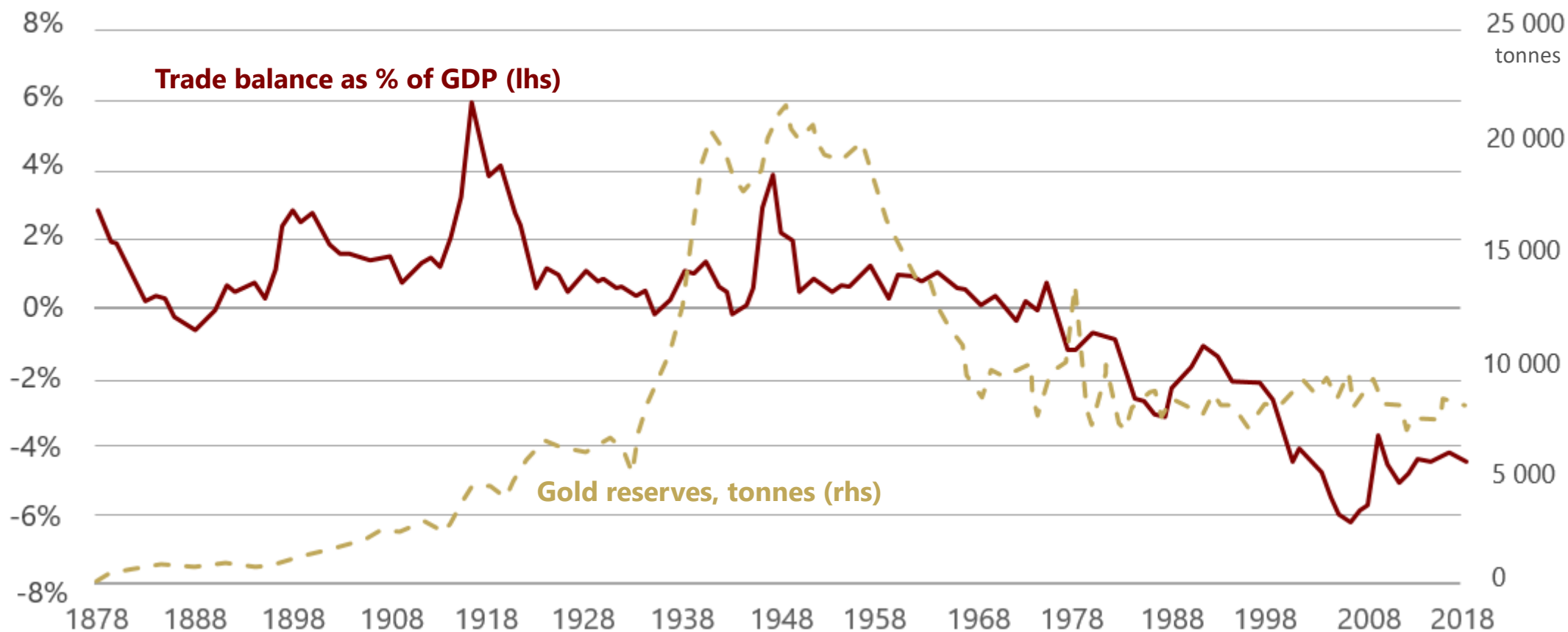
The gold currency exchange standard supported financial stability

The history of world banking crises since 1800



Weakening trade balance caused gold outflow from the US

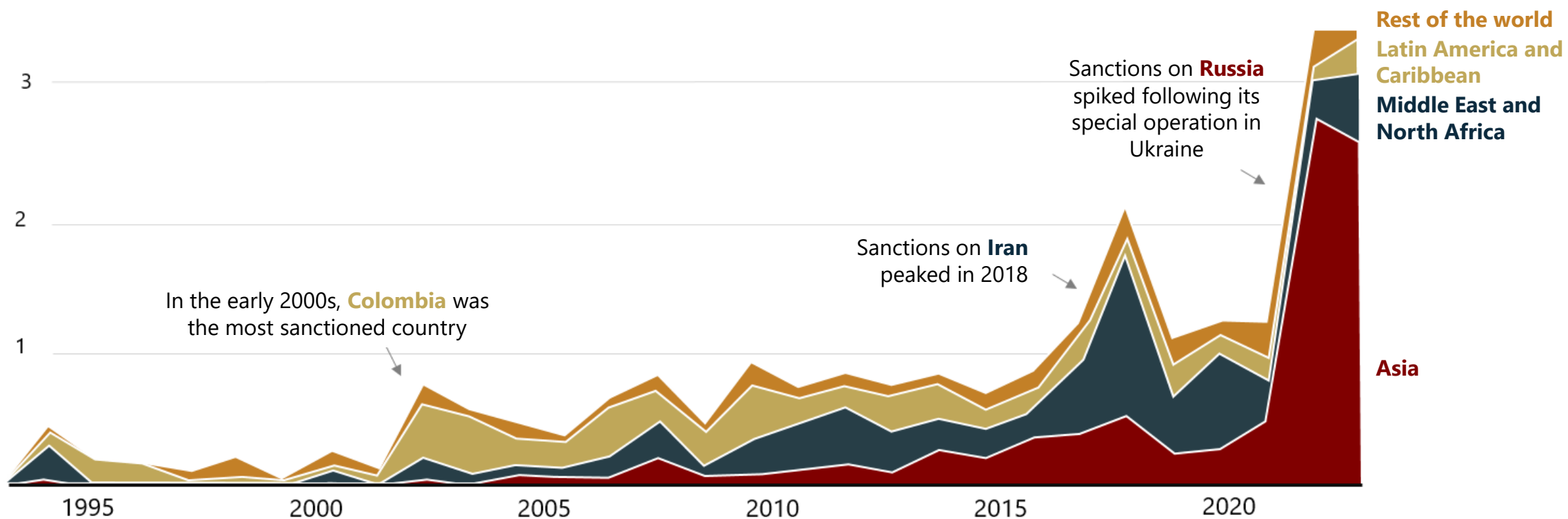
US gold reserves and trade balance



Source: Federal Reserve Bank of St. Louis, the USA

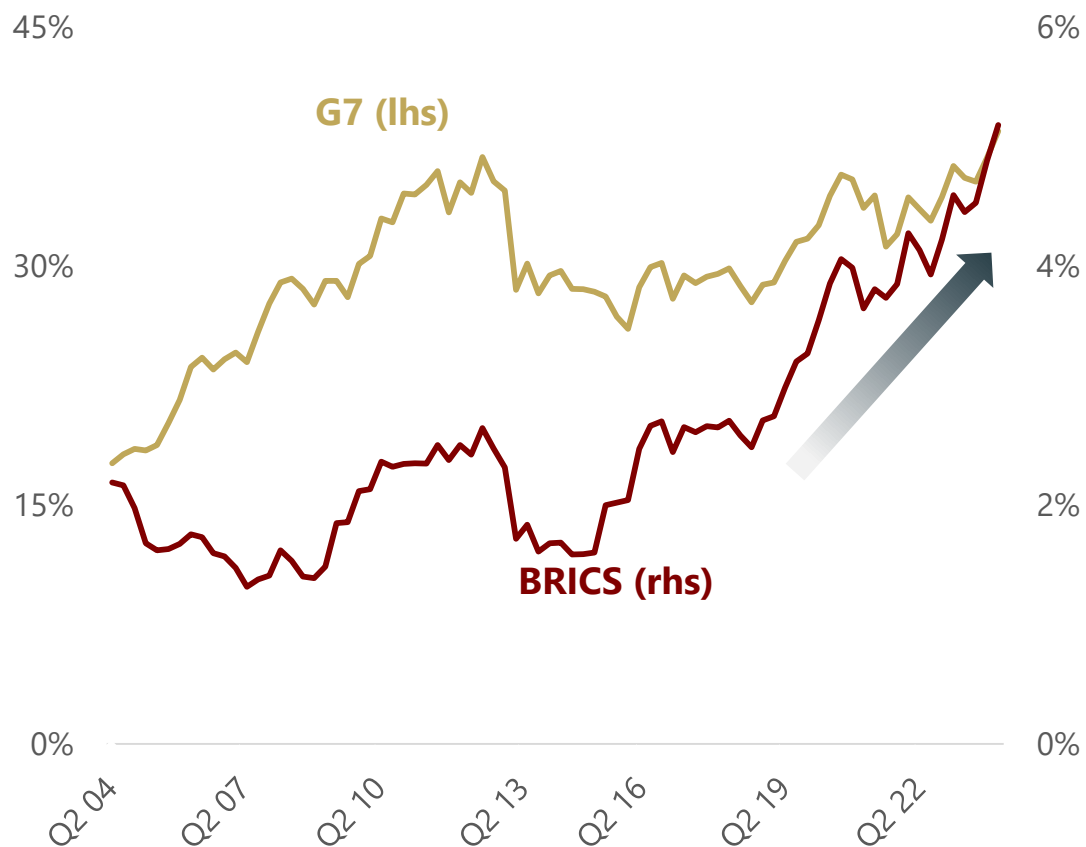
US sanctions undermine confidence in USD

Number of US sanctions imposed, by world region
(k)

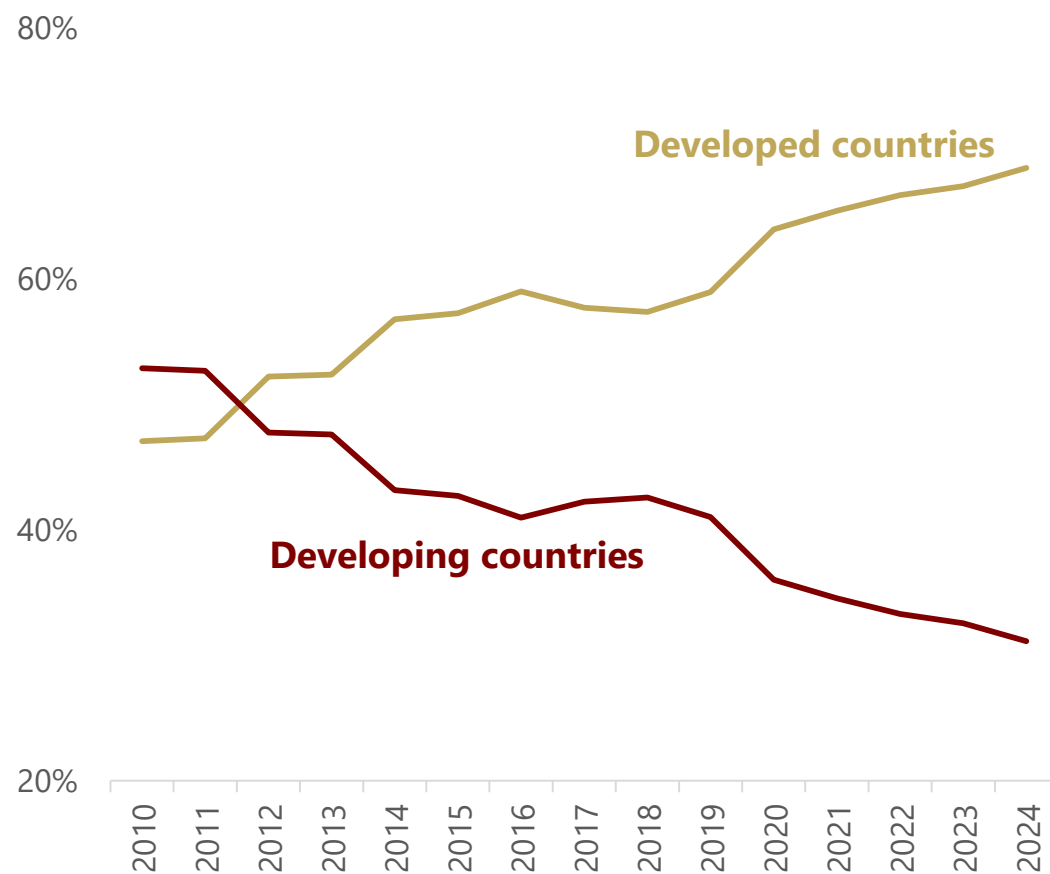


Is the dollar's status at risk?

Share of gold in foreign exchange reserves

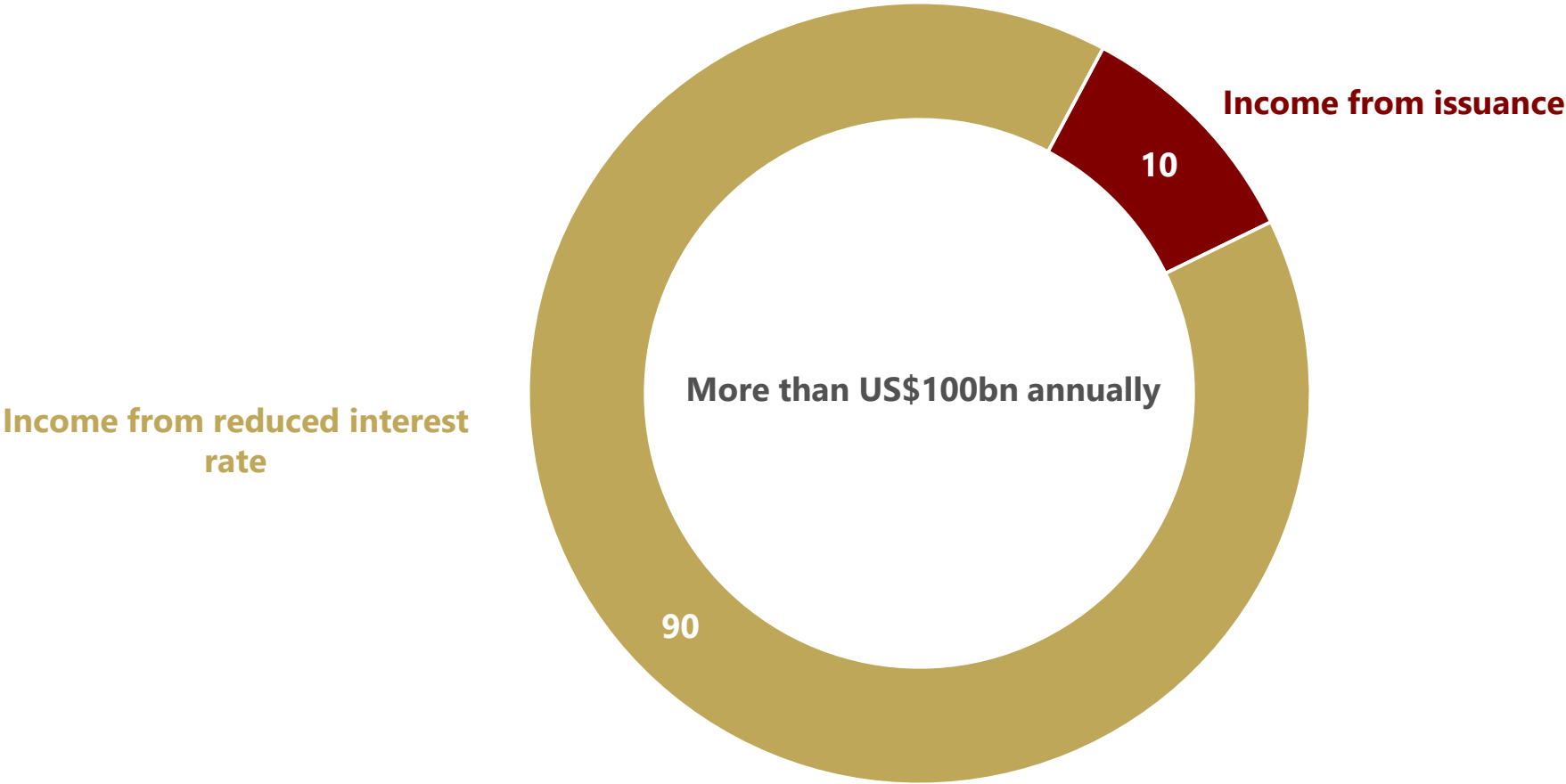


Distribution of foreign holders of US Treasuries



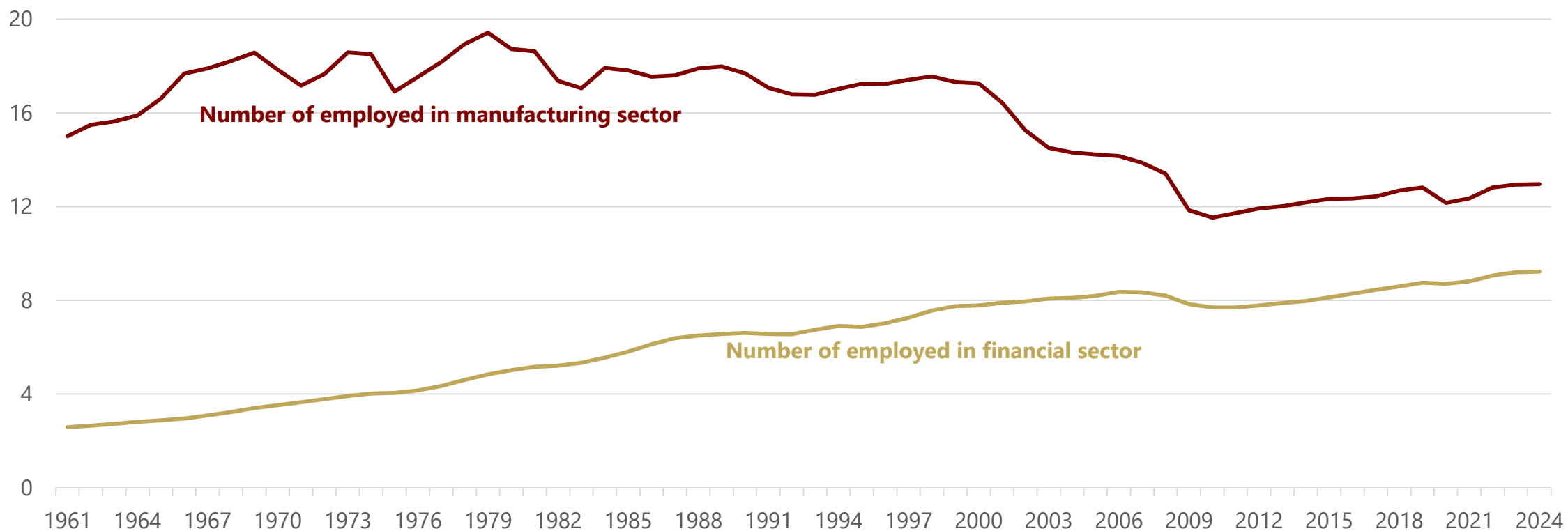
The US benefits from the dollar's status

US gains from the dollar's status as a reserve currency
(US\$bn)



US financial sector dominance expands as share of manufacturing declines

Employment in US manufacturing and financial sectors
(mn, seasonally adjusted)



Source: US Bureau of Labor Statistics. Note: annual averages are given

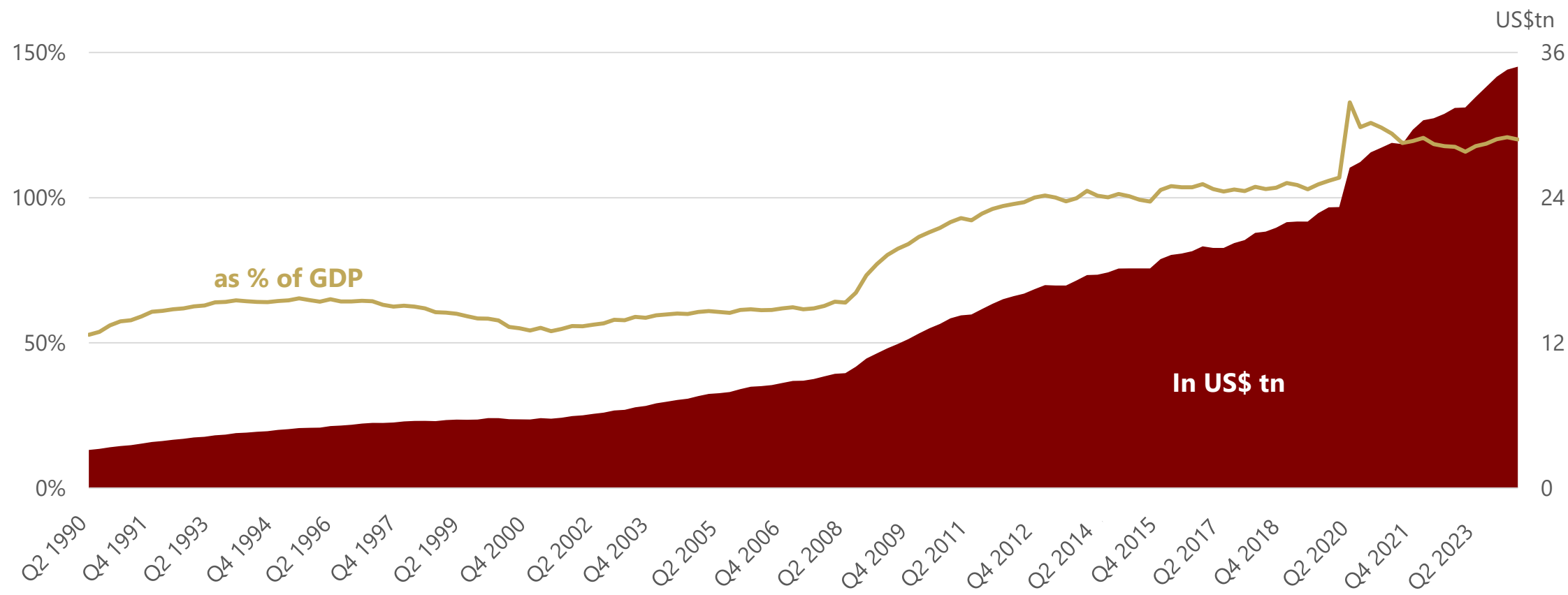
US liquidity bubble is growing

US private sector financial assets to GDP ratio



US national debt is spiraling out of control

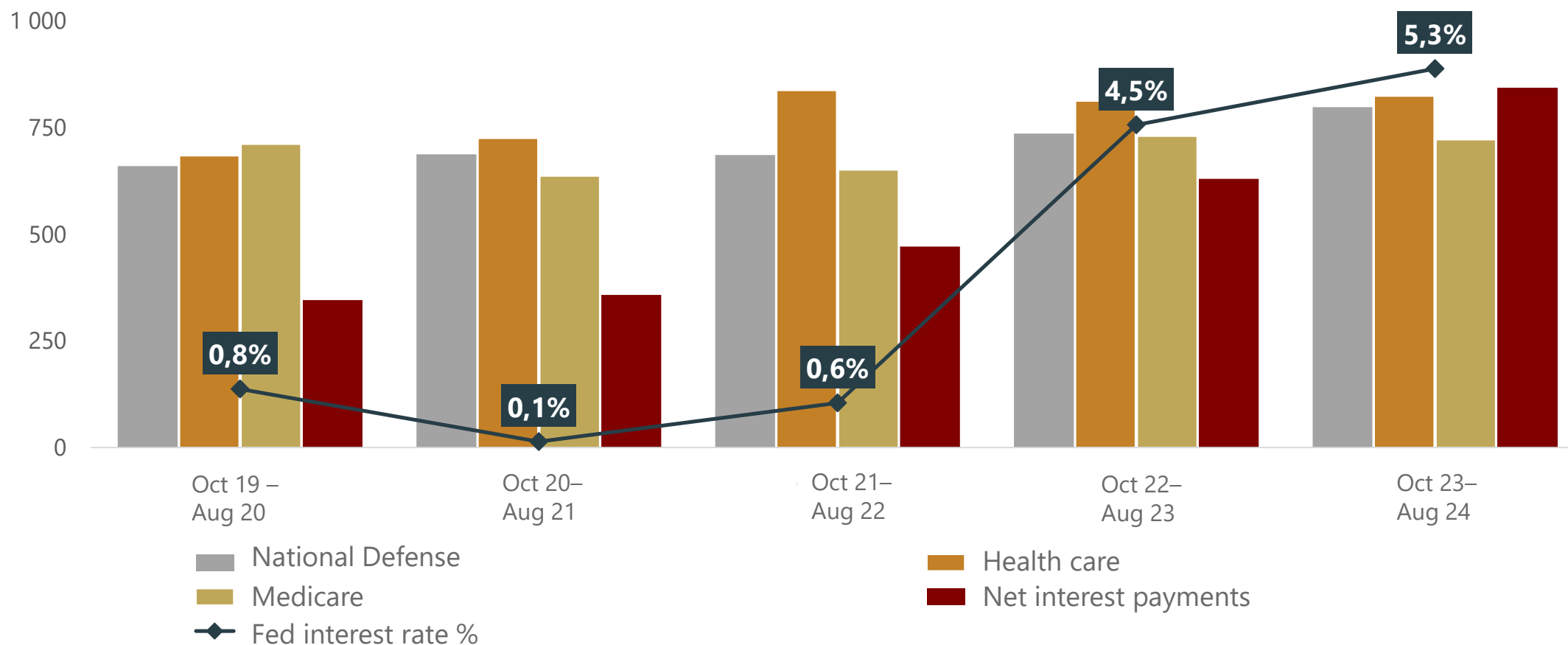
US gross federal debt



Source: Federal Reserve Bank of St. Louis. Note: (*) Total debt, including intergovernmental loans.

US government debt spending is skyrocketing

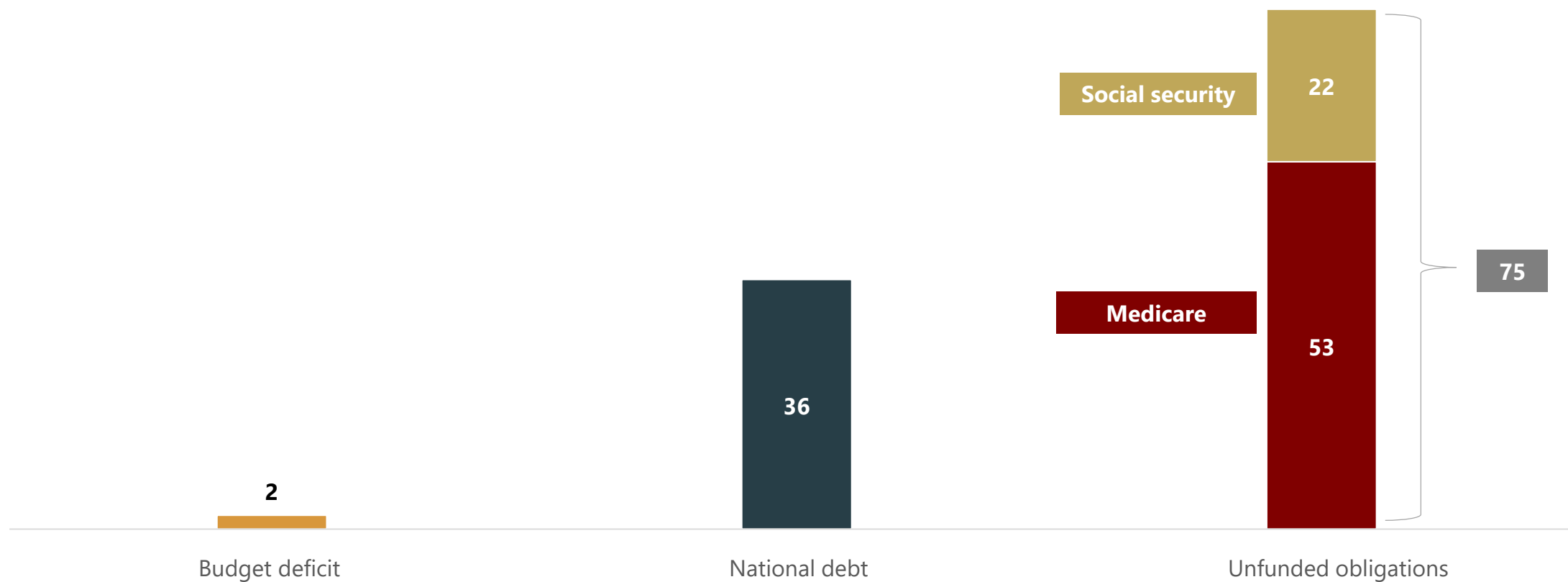
US budget expenditures on net interest payments, defense, health care and Medicare (US\$bn)



Source: Bureau of the Fiscal Services, US Department of the Treasury. Note: The US fiscal year is calculated from October 1 to September 30

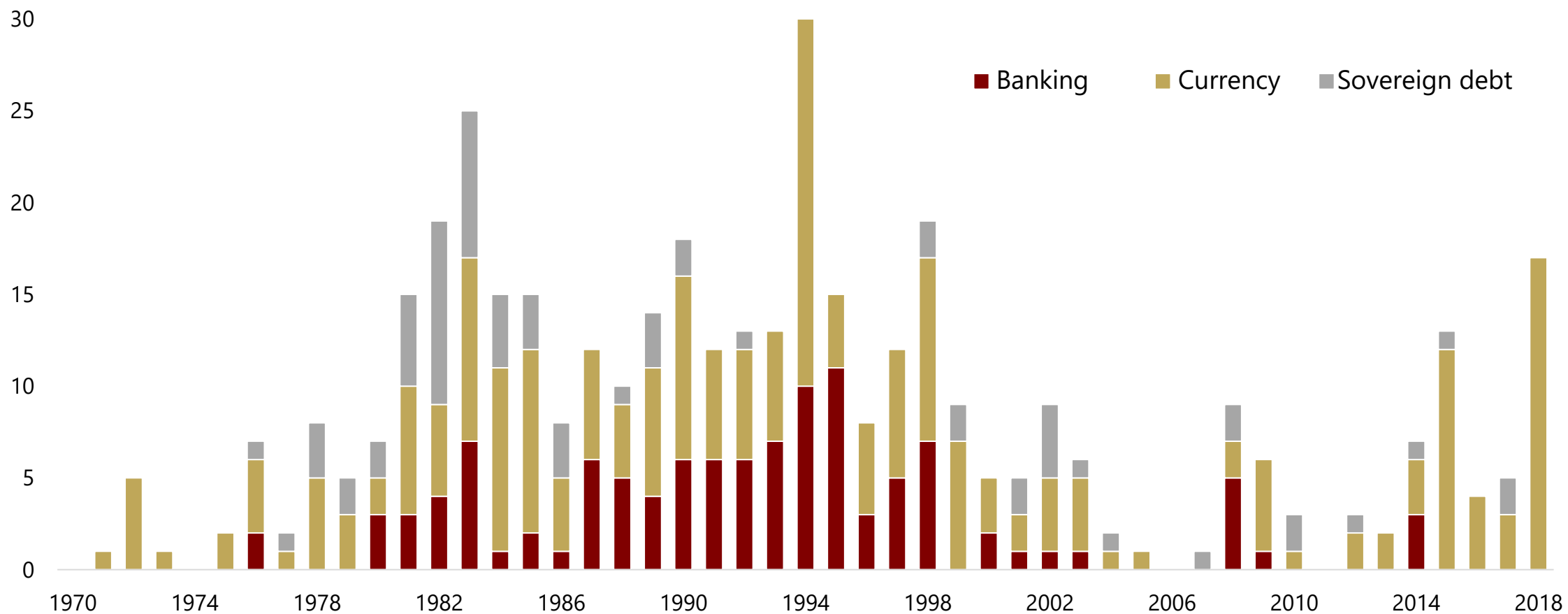
US unfunded social obligations reach \$75 trillion

Three layers of US government debt
(US\$tn)



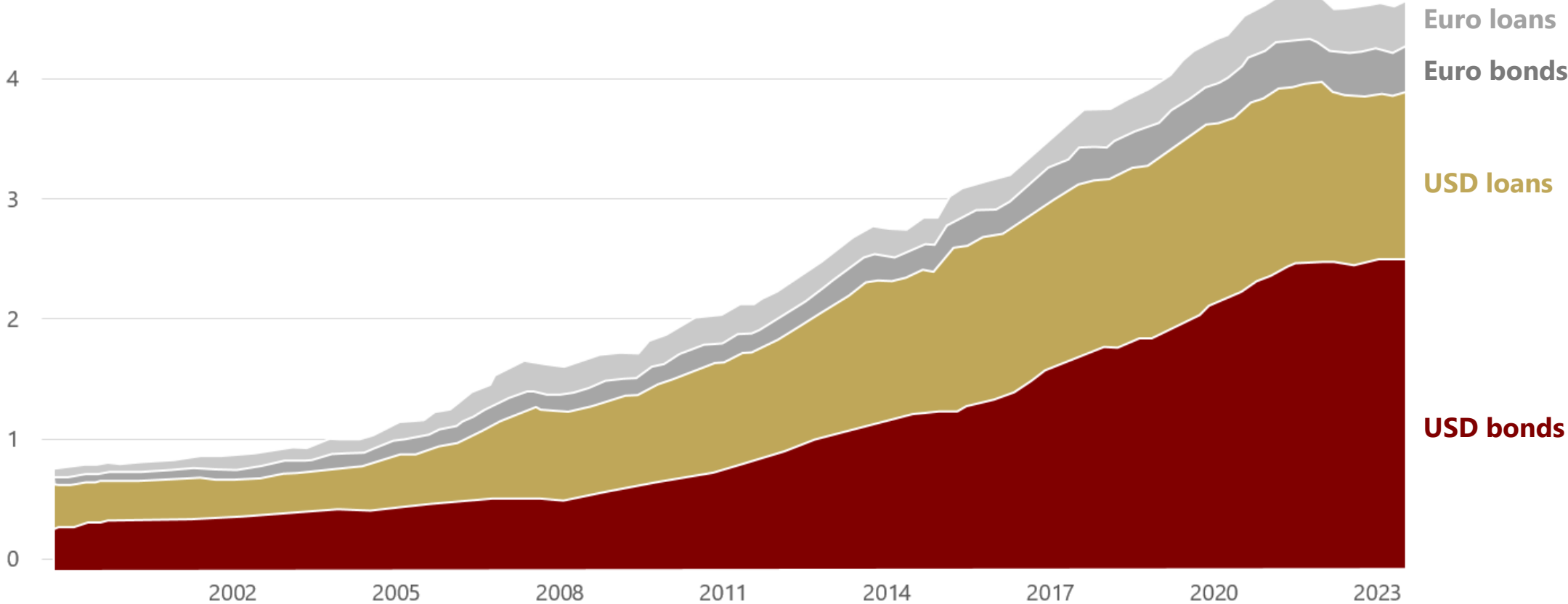
Developing countries fall victim of US dollar dominance

Number of financial crises in developing countries



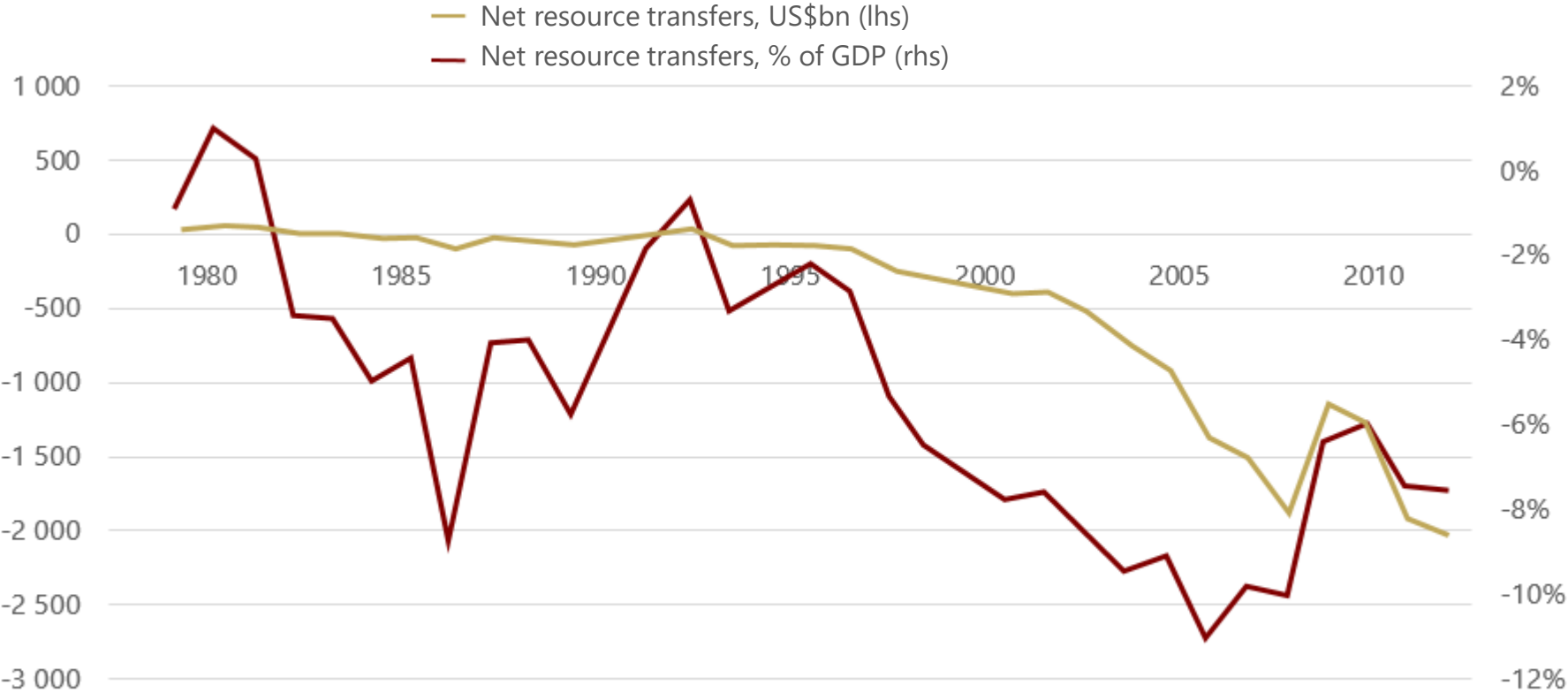
The “Washington consensus” leads to USD debt explosion

USD and Euro debt of developing countries (US\$tn)



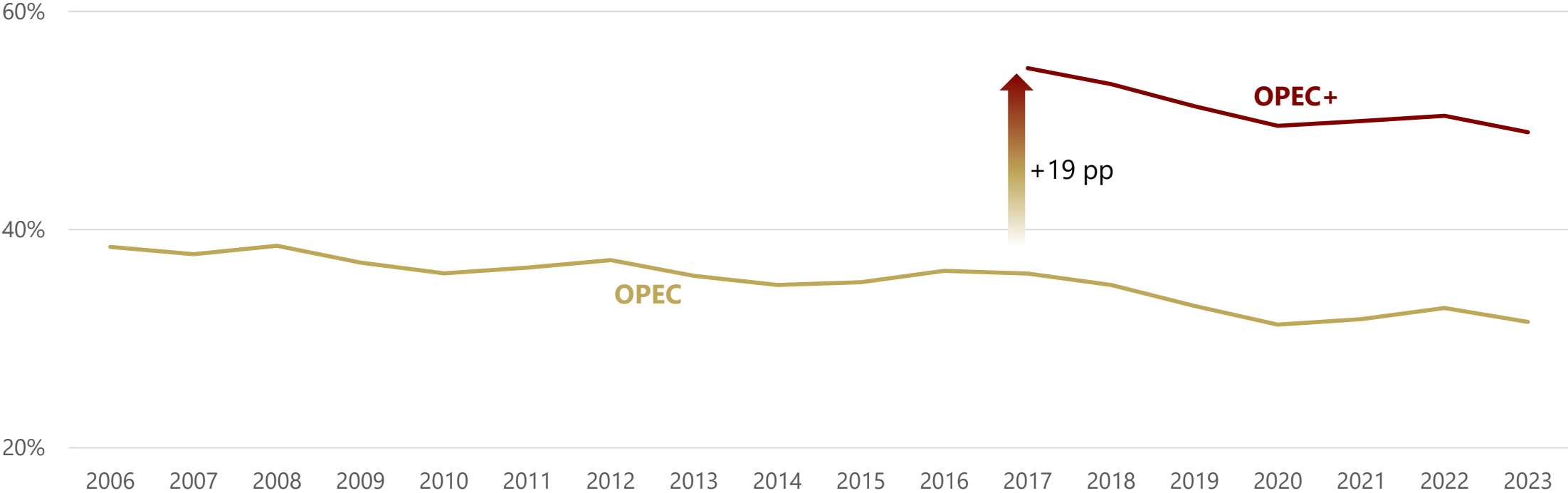
Wealth drained from developing countries

Wealth transfer from developing to developed countries



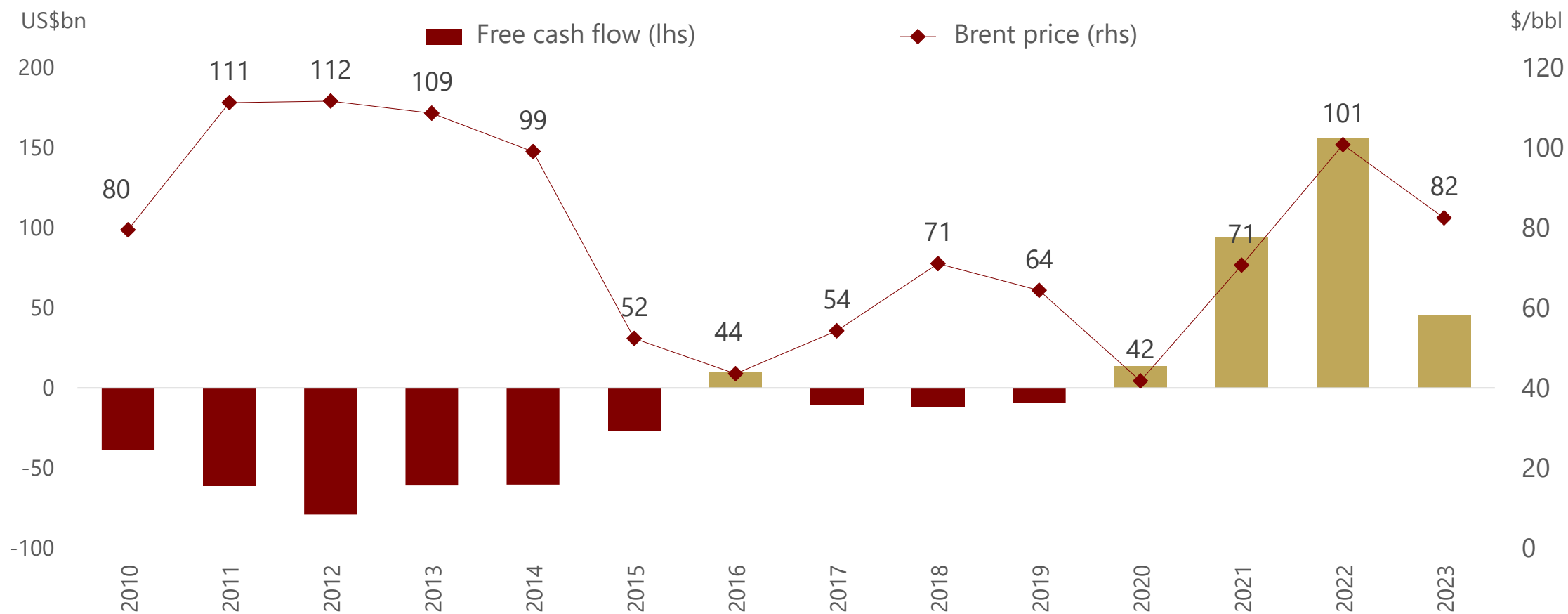
OPEC+ protected interests of producers due to its market share

World oil market share of OPEC and OPEC+ (%)



OPEC+ agreement supported US shale industry

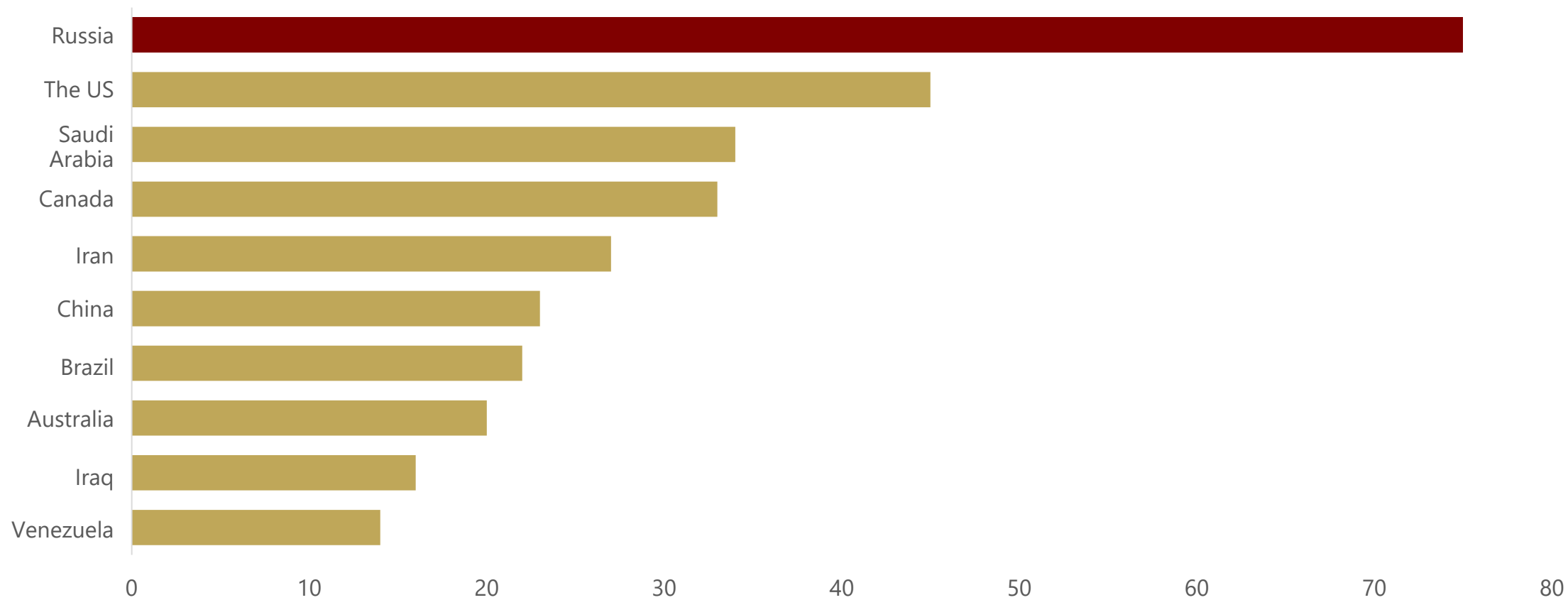
Total FCF from US shale industry



Source: Rystad Energy, EIA. Note: FCF from US shale oil & gas fields

Russia possesses a unique resource base

Value of natural resources
(US\$tn)





Karl Bryullov.
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