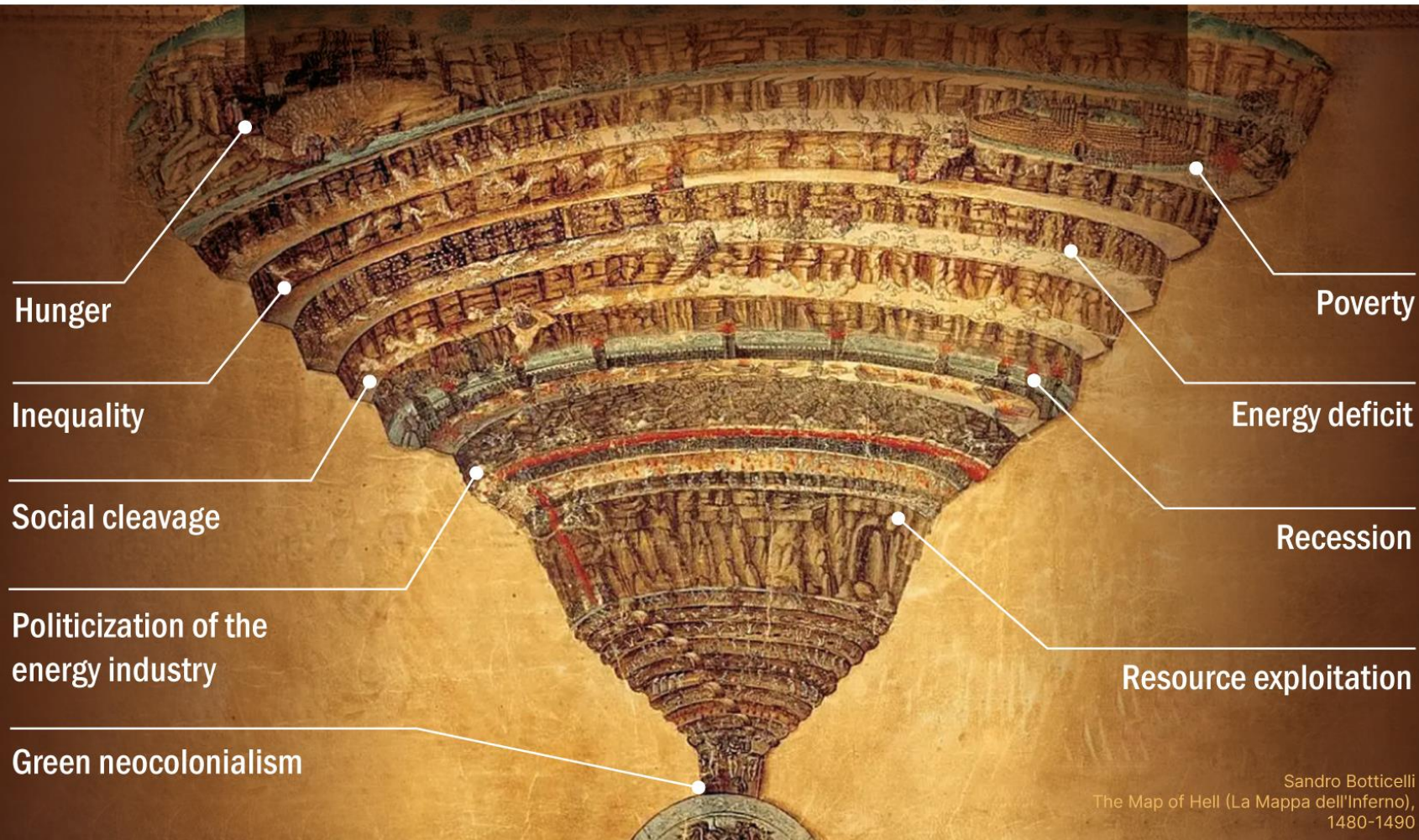


9 circles of green energy transition



Energy transition and phantom barrels:

Abandon Hope All Ye Who Enter Here

Not everyone will be taken to the bright future of the global energy!

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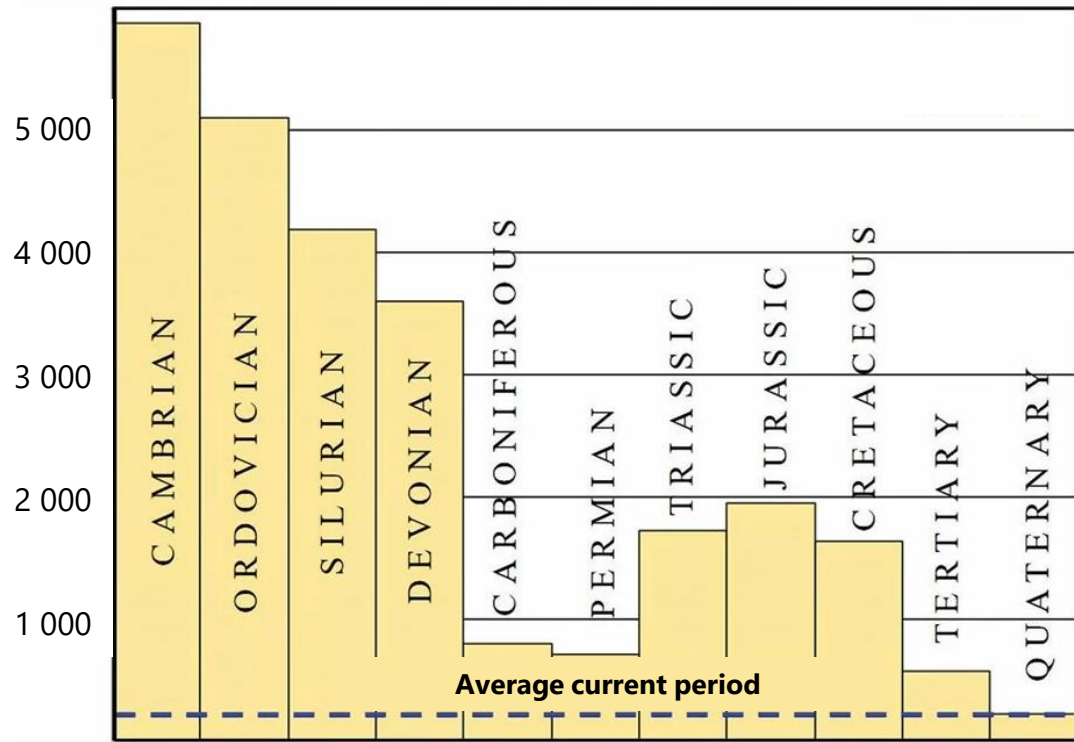
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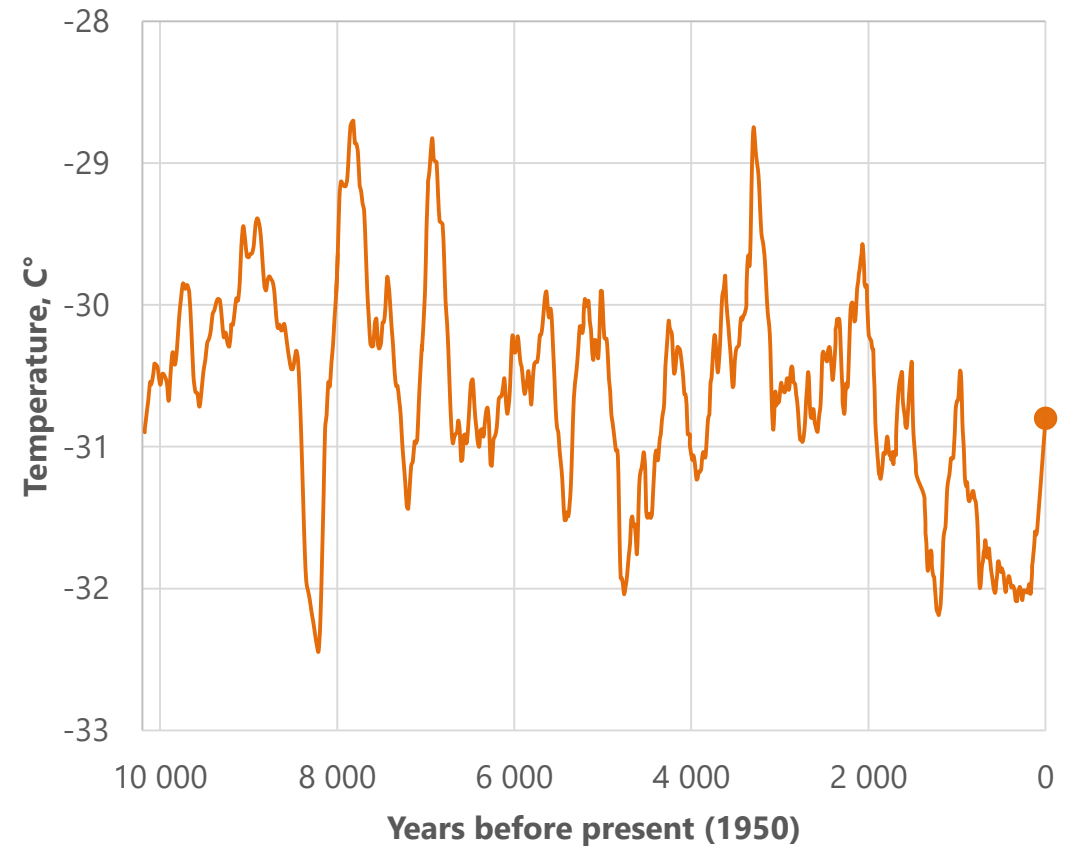
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Emissions impact on climate change is not proved

Mean CO2 concentration by geologic period (ppm)

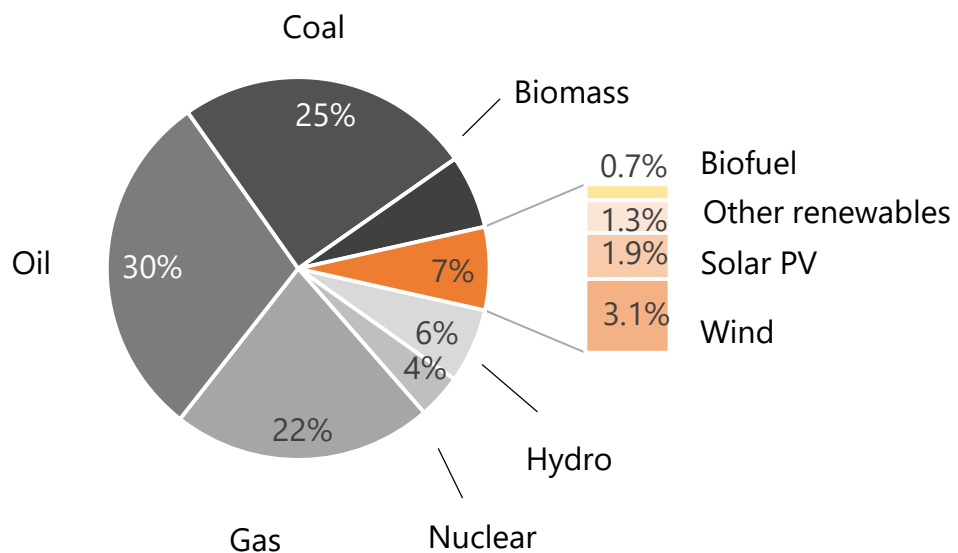


Average annual temperature on ice core in Greenland over 10,000 years

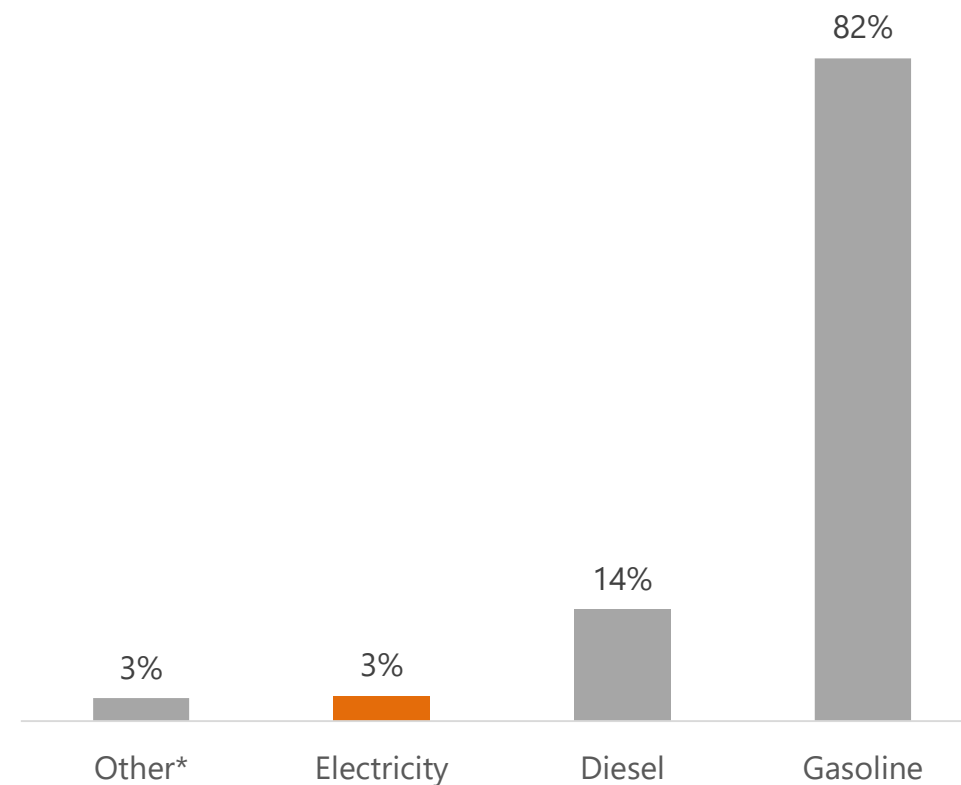


Share of renewables in the global energy mix is still low

Global energy mix

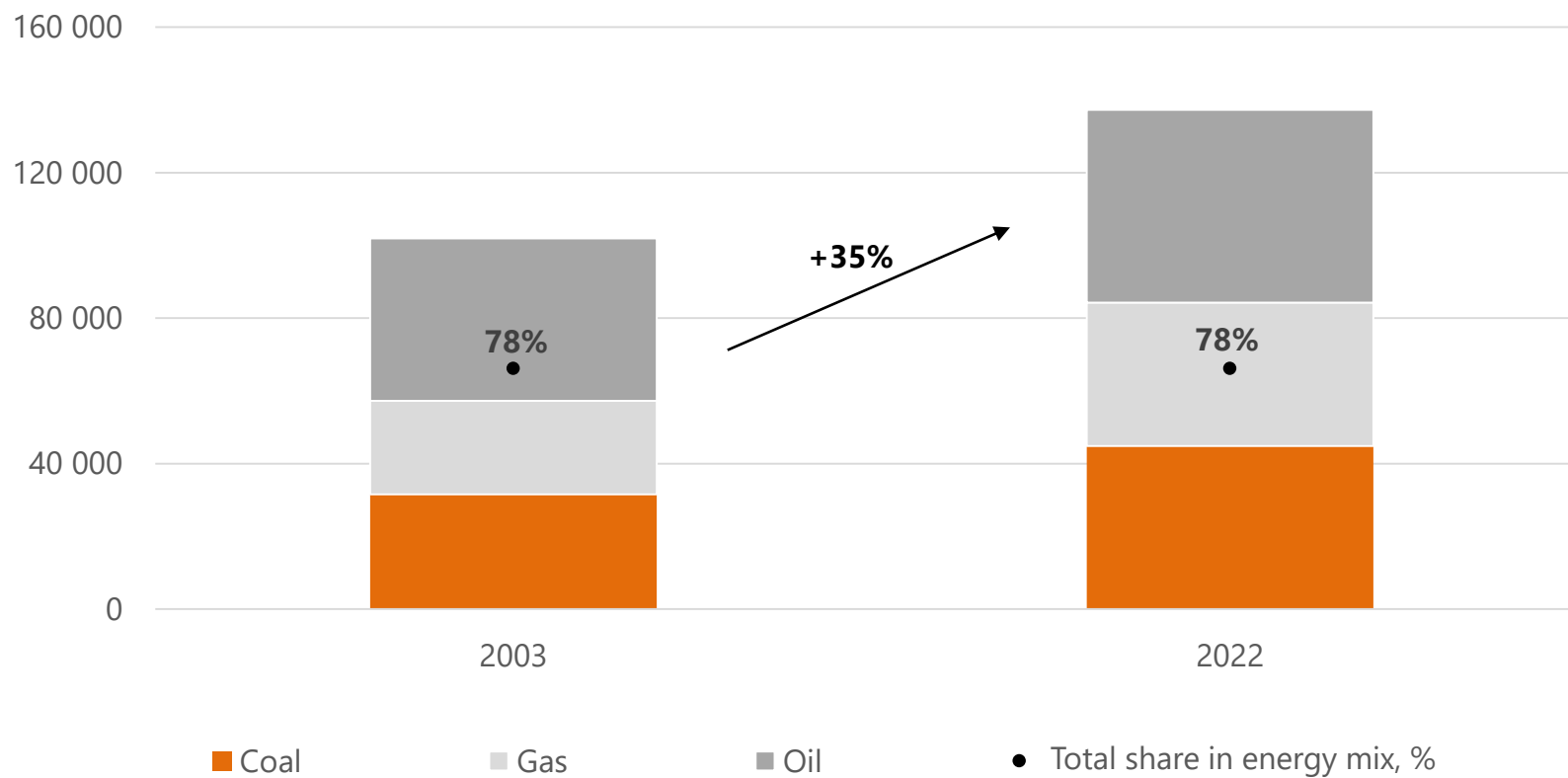


Global light-duty vehicle fleet by fuel type



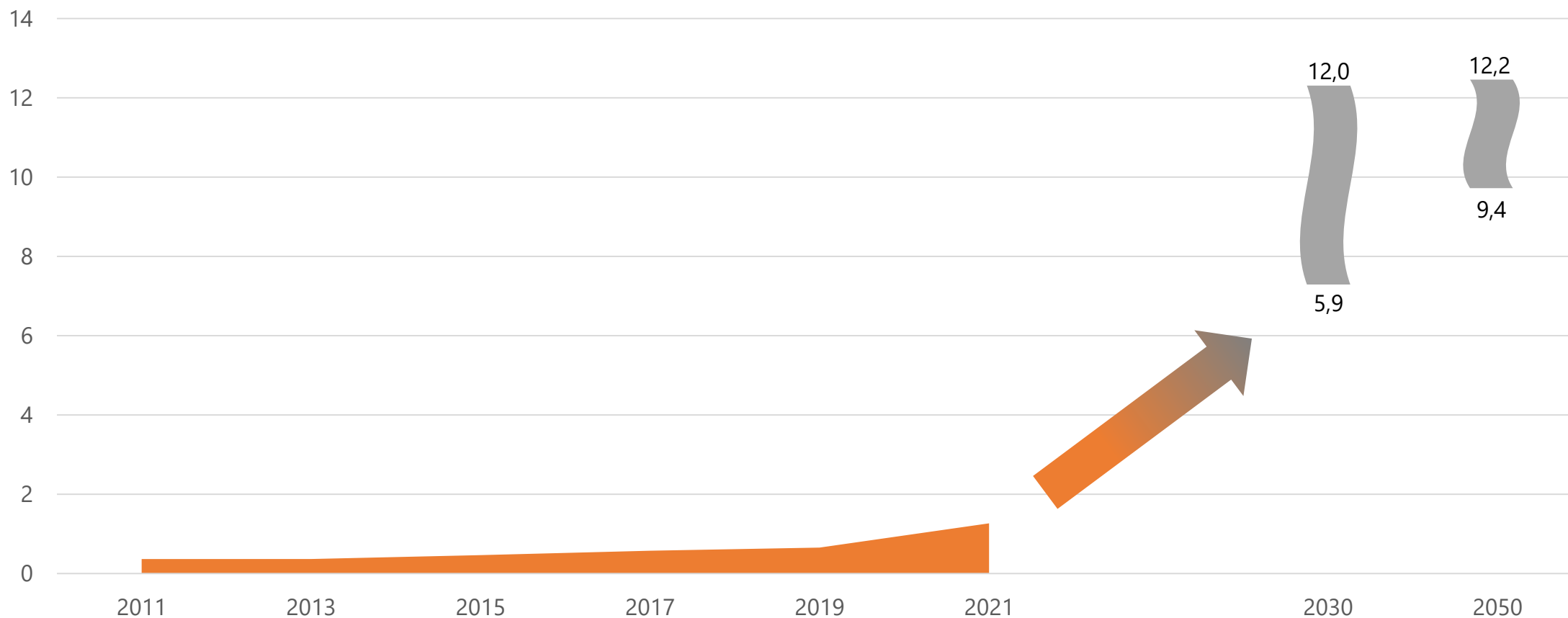
Fossil fuel consumption keeps growing

Global consumption of fossil fuels (TWh)

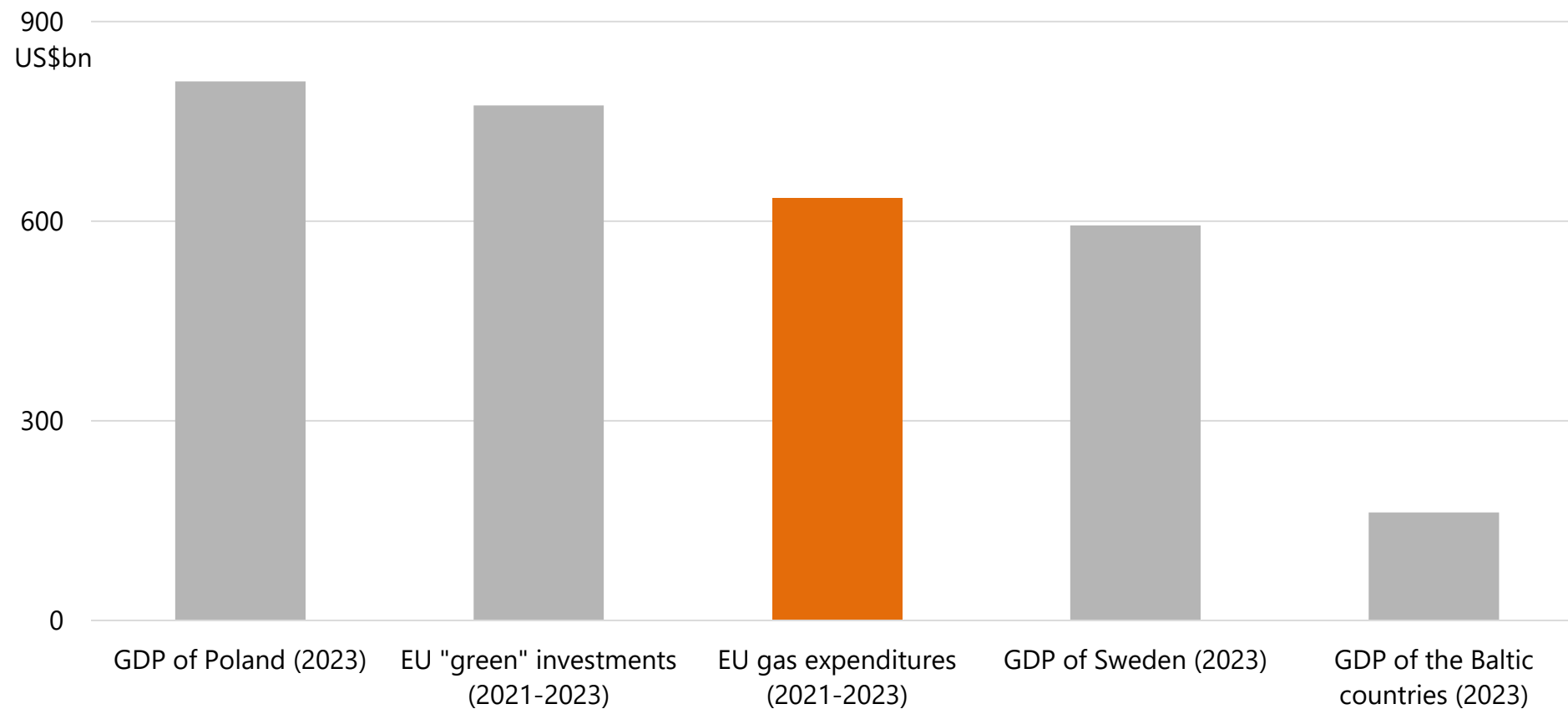


Cost of energy transition to total over 270tn US\$

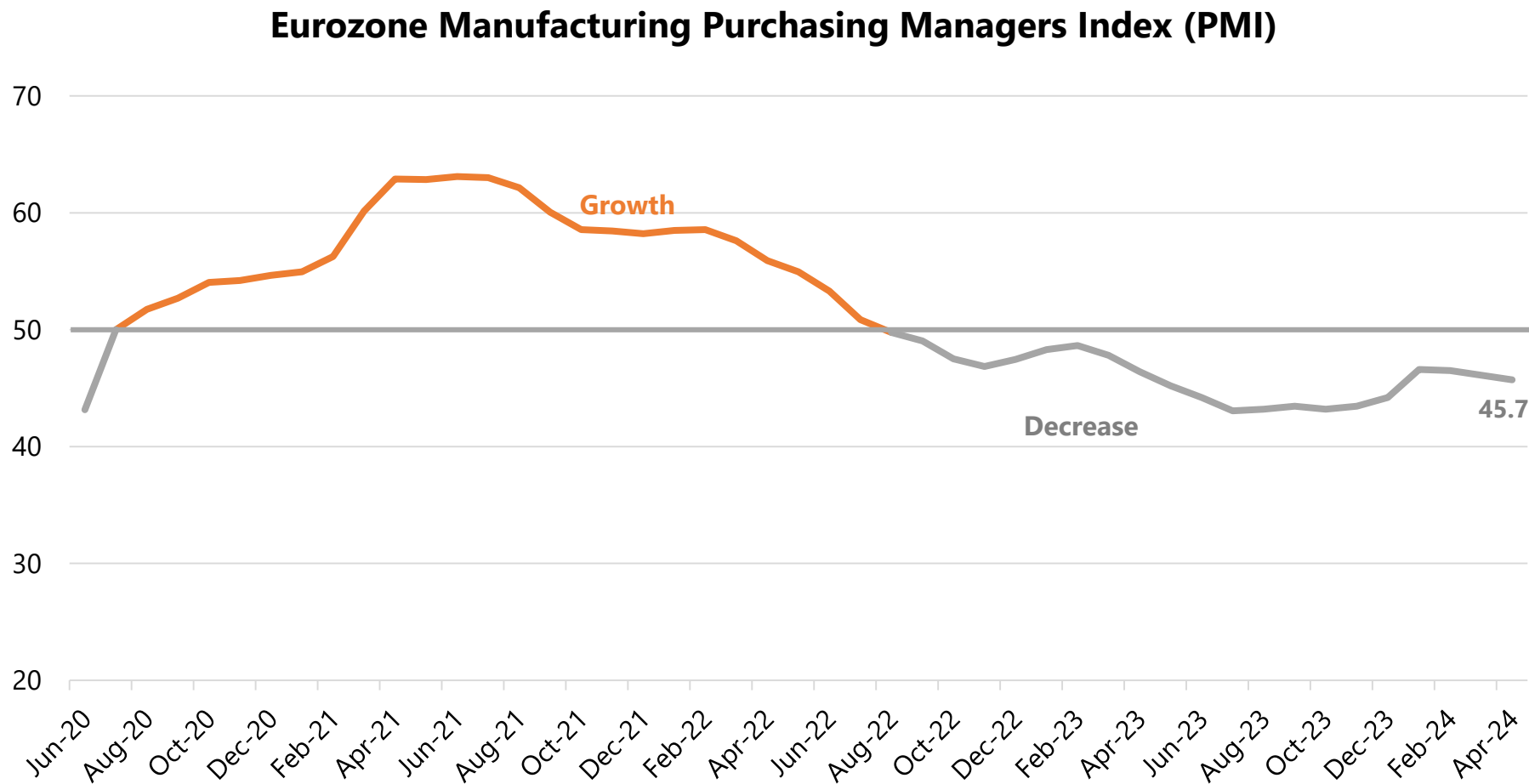
Global tracked climate finance investments and average estimated annual needs through 2050 (US\$tn)



European gas bill exceeded 600bn US\$

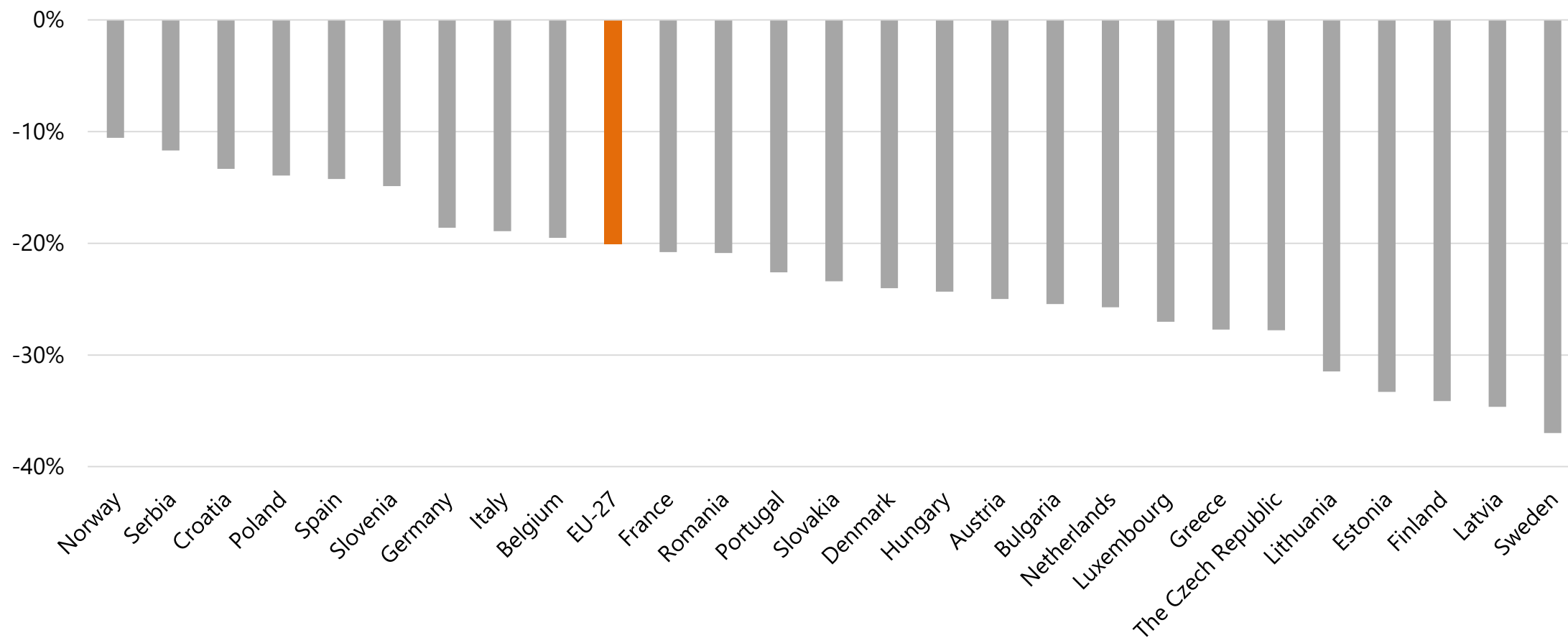


EU's challenges: Deindustrialization



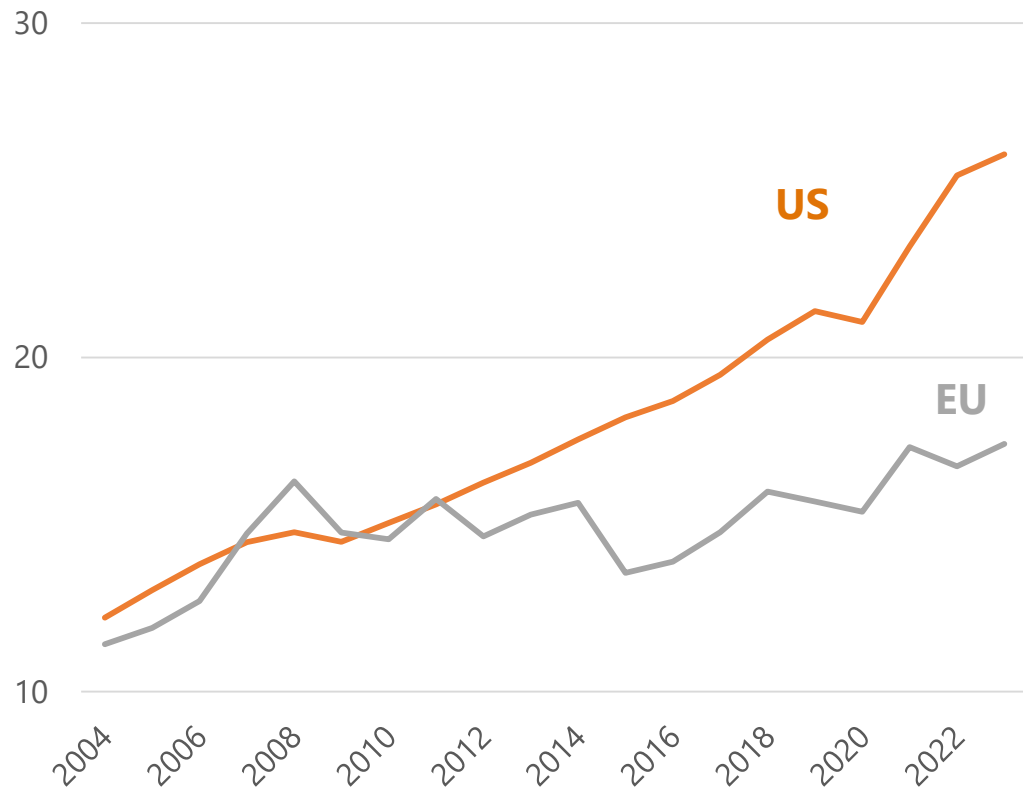
European gas consumption is down by 20%

Change in European gas demand in 2023 vs 2021

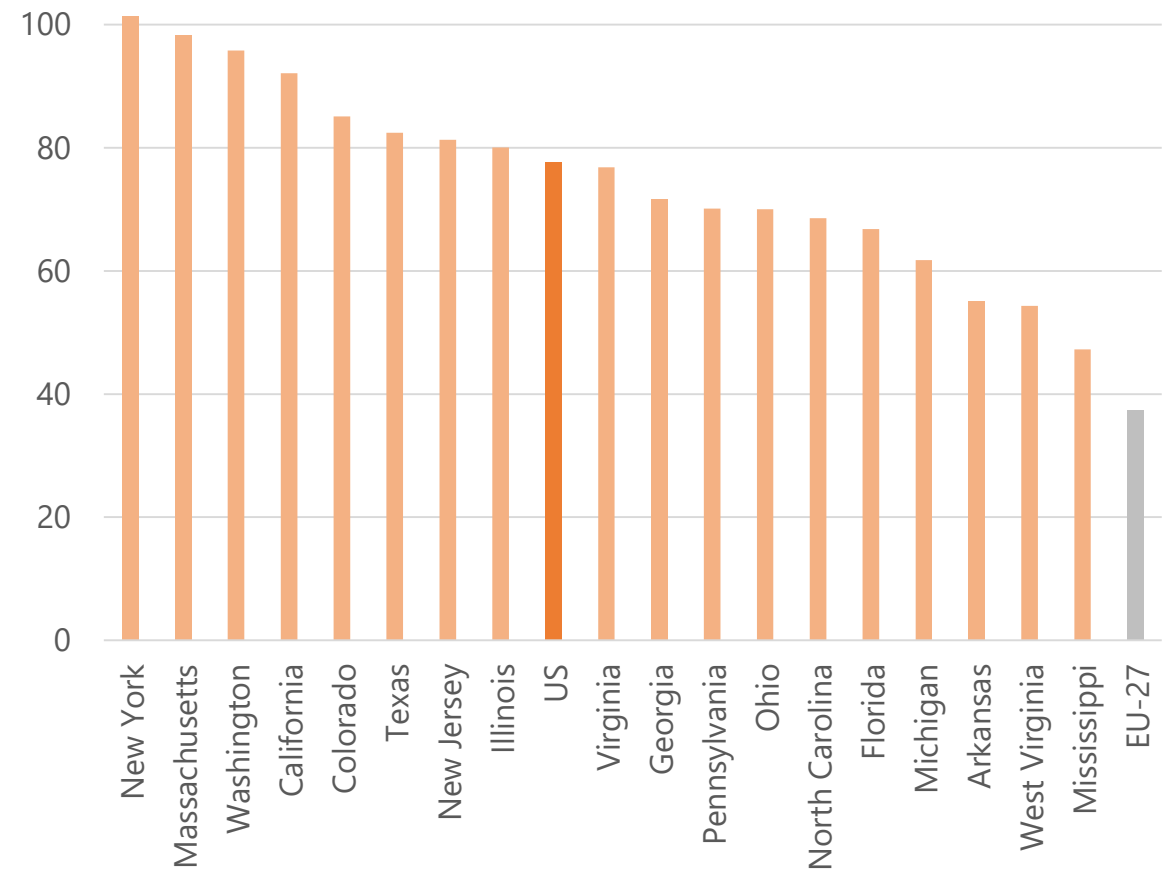


EU's challenges: Lagging behind the U.S.

GDP (US\$th in current prices)

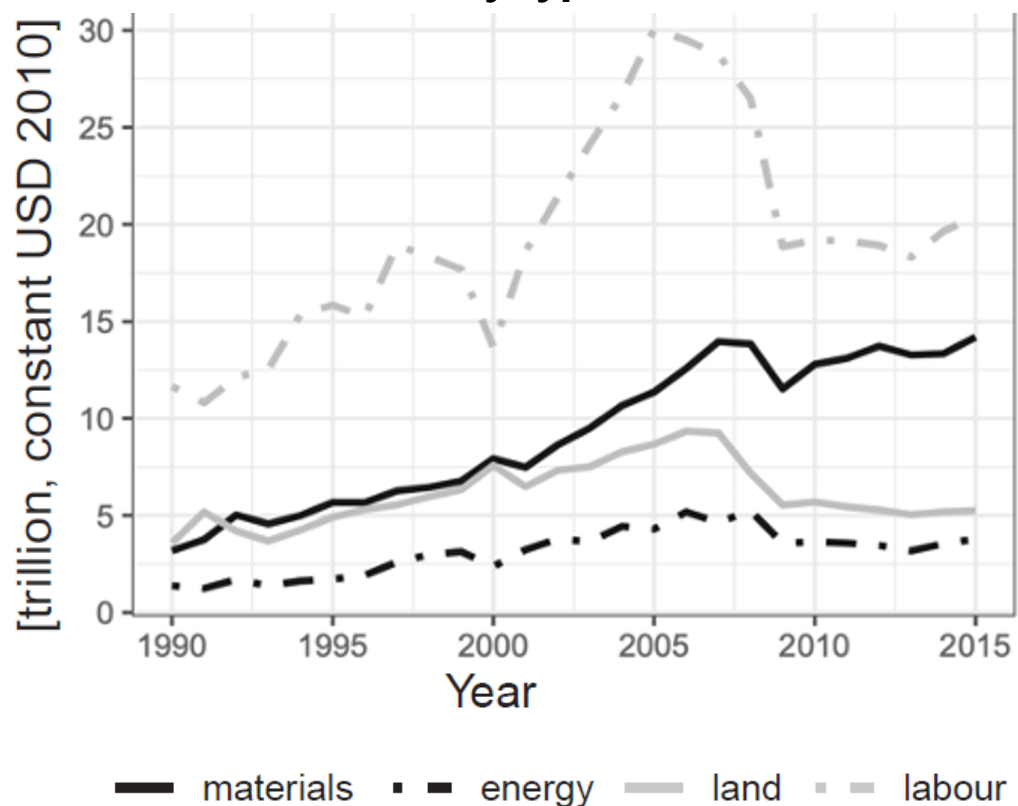


EU and the U.S. states' GDP per capita (US\$th, in current prices)

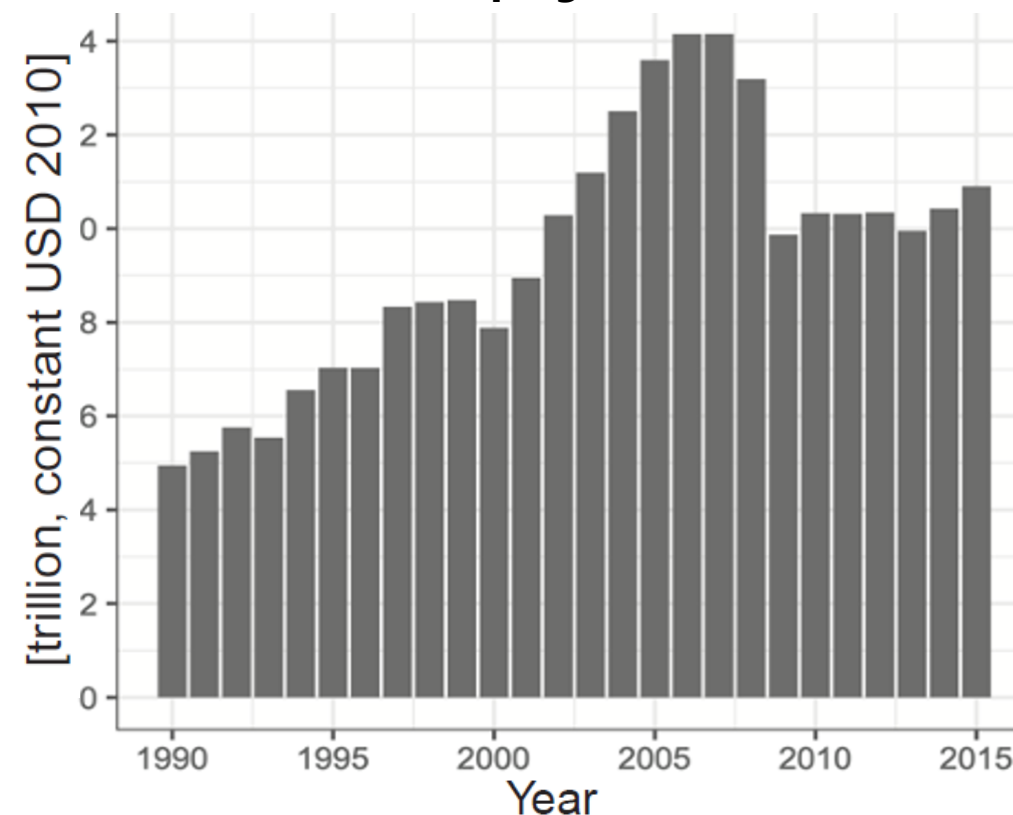


Resource drain from the developing countries

Resource drain from the developing countries by type

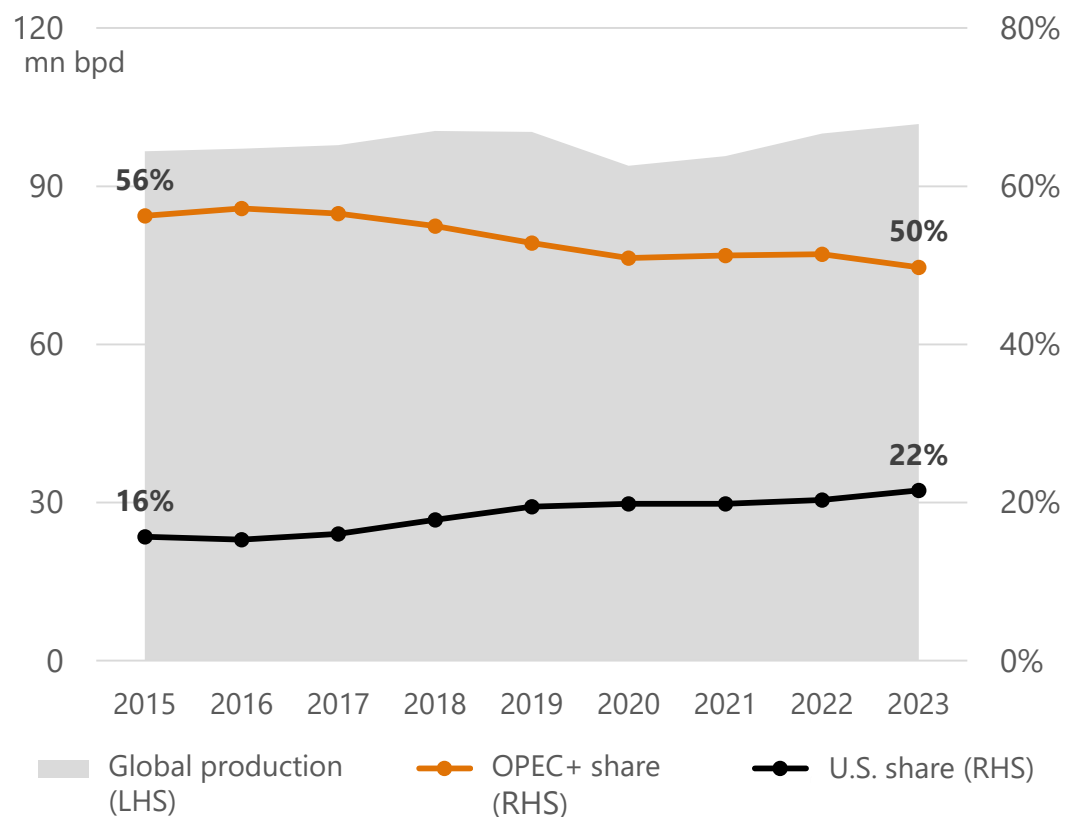


Average resource drain from the the developing countries

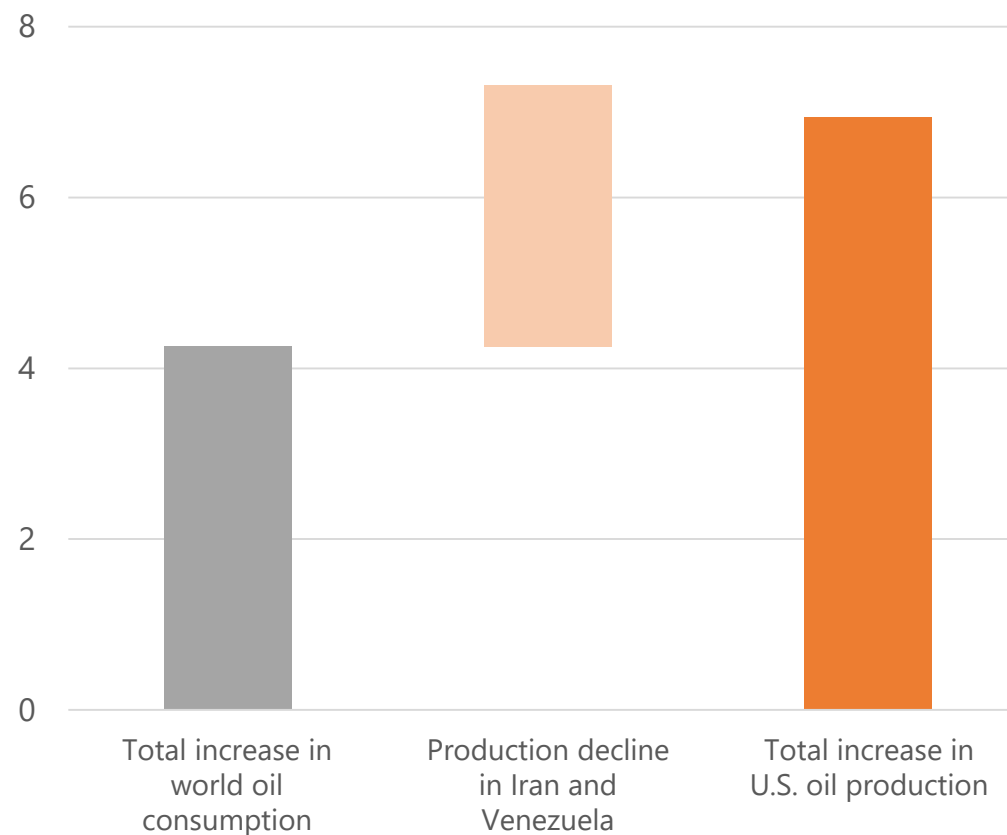


The U.S. resorts to sanctions fighting for energy markets

The U.S. and OPEC+ shares in global oil supply

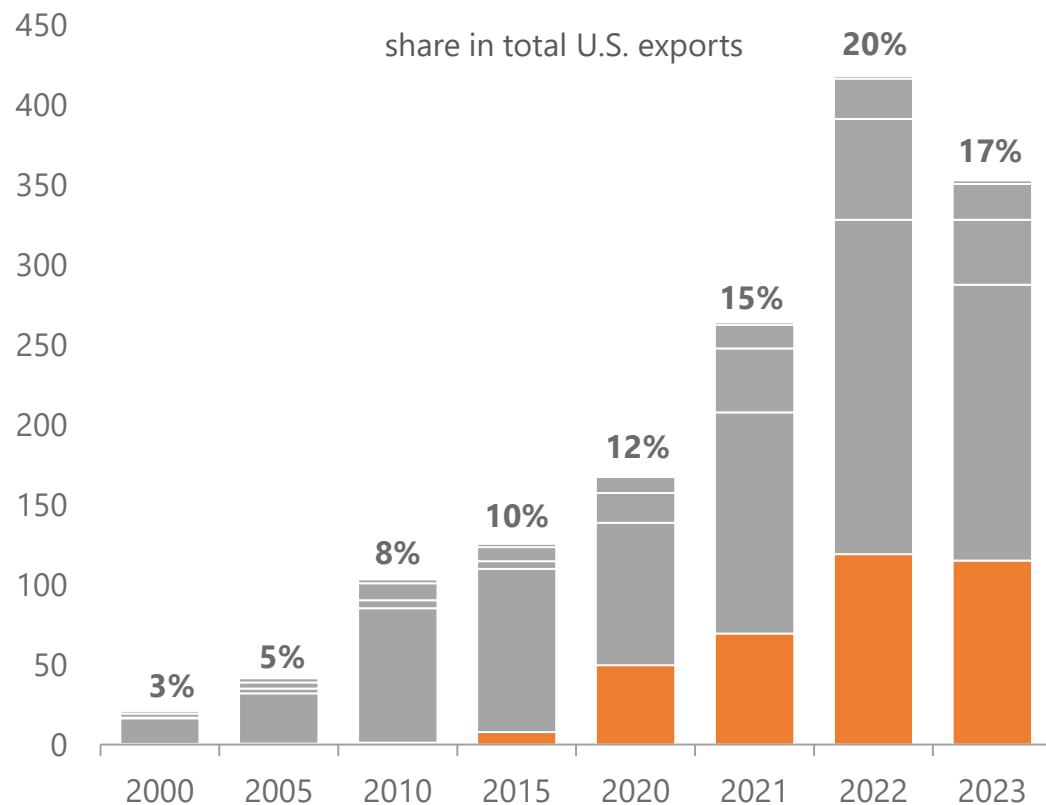


Change in oil demand and supply between 2016 and 2023 (mn b/d)

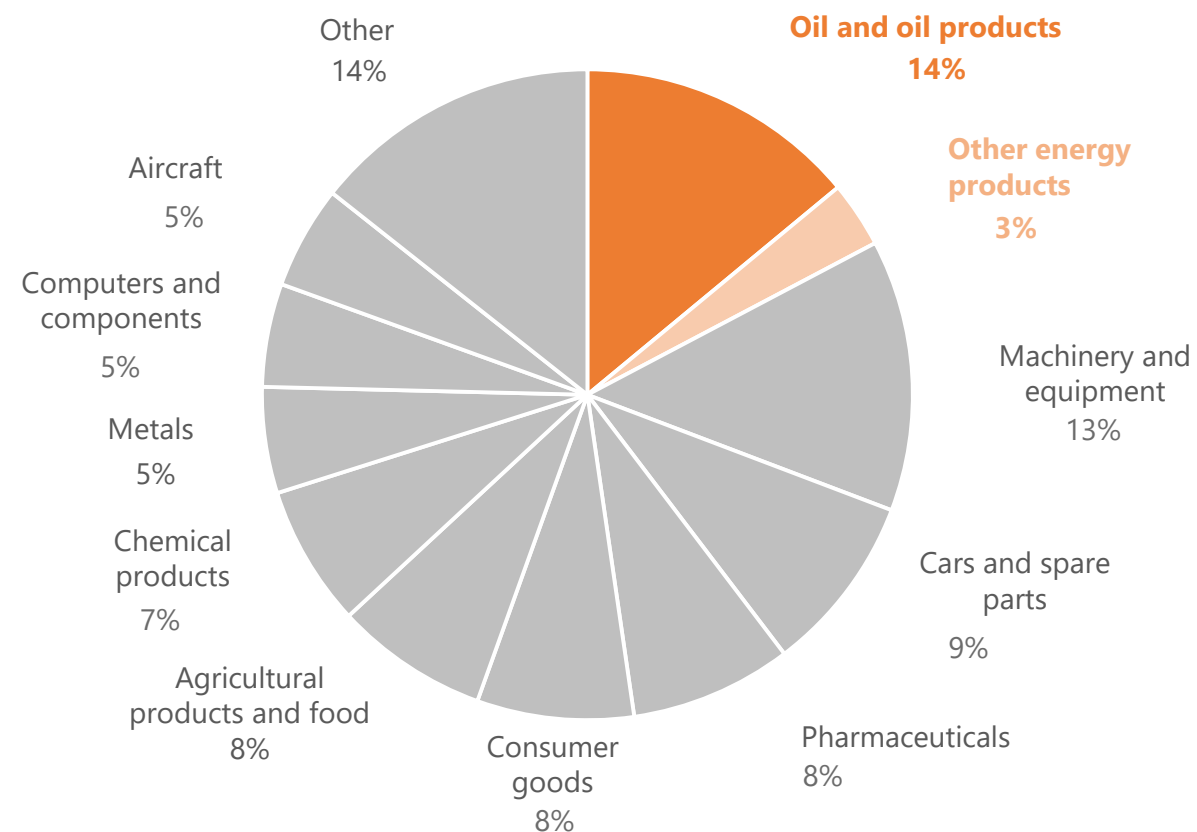


Share of energy resources in U.S. exports

U.S. total energy exports (US\$bn)



Breakdown of U.S. total exports (% , 9M2023)



The White House unveils plans to reduce Russia's oil revenues

FINANCIAL TIMES

1 December 2023

WORLD BUSINESS NEWSPAPER

US aims to halve Russia's energy revenues by 2030, says official

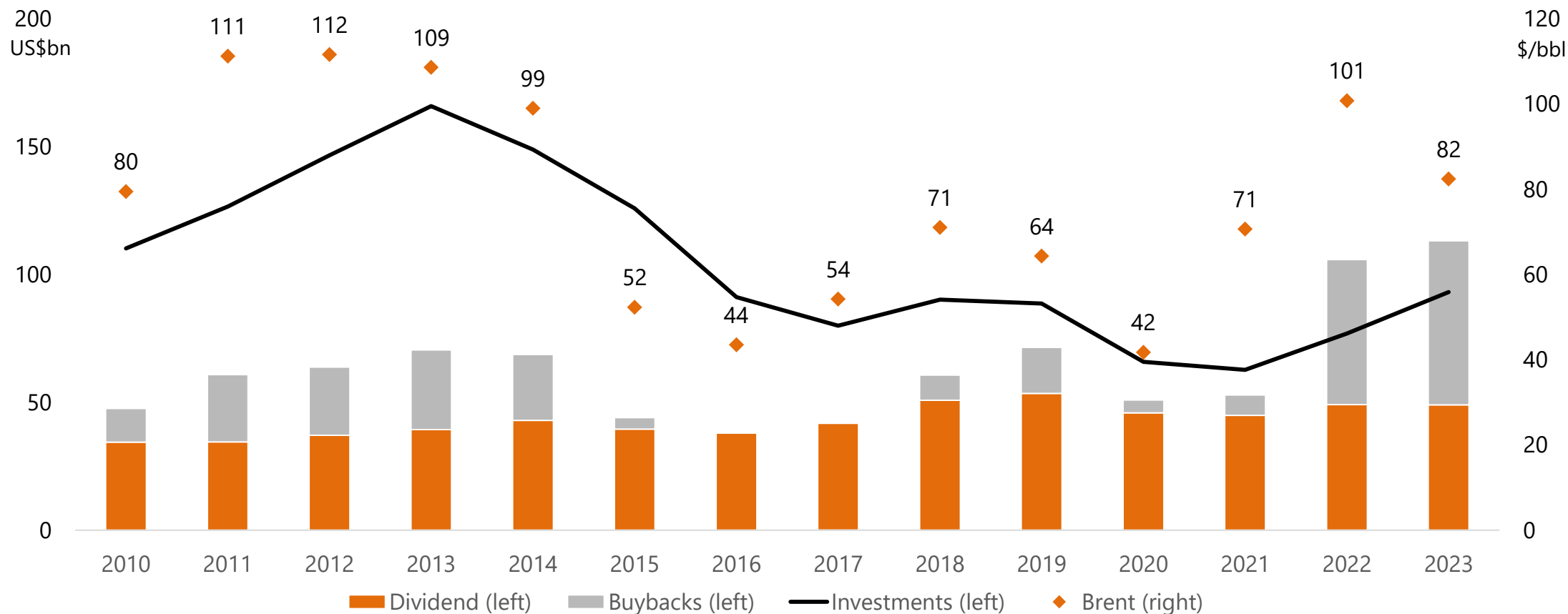
Washington is aiming to halve Russia's oil and gas revenues by the end of this decade, a senior US diplomat has said, arguing western sanctions on Moscow will need to be maintained "for years to come".

Russia has continued to export large volumes of oil since its full-scale invasion of Ukraine in February 2022. However, the International Energy Agency has forecast that its oil and gas exports could fall by at least 40-50 per cent by 2030 if western sanctions on Russia's energy industry are maintained.

"We're going to do everything we can to help make that true," said Geoffrey Pyatt, US assistant secretary of state for energy resources.

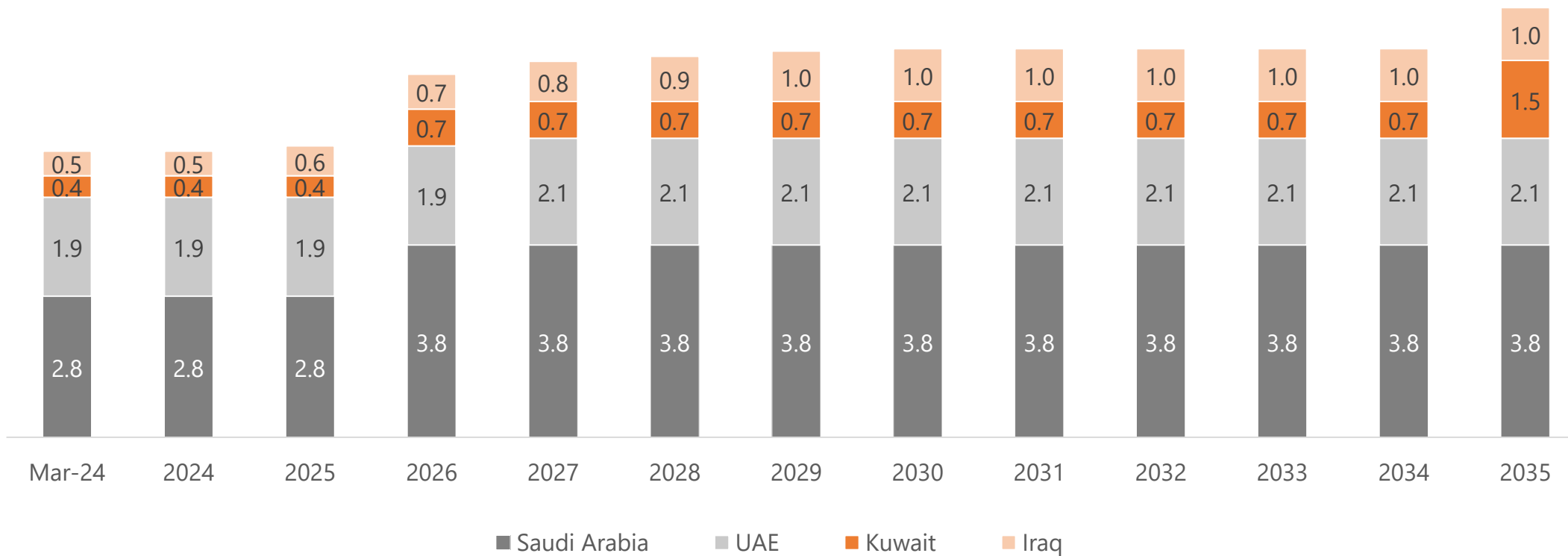
Oil majors ramp up shareholders payouts

Dividend payments, buybacks and investments of Oil Majors*



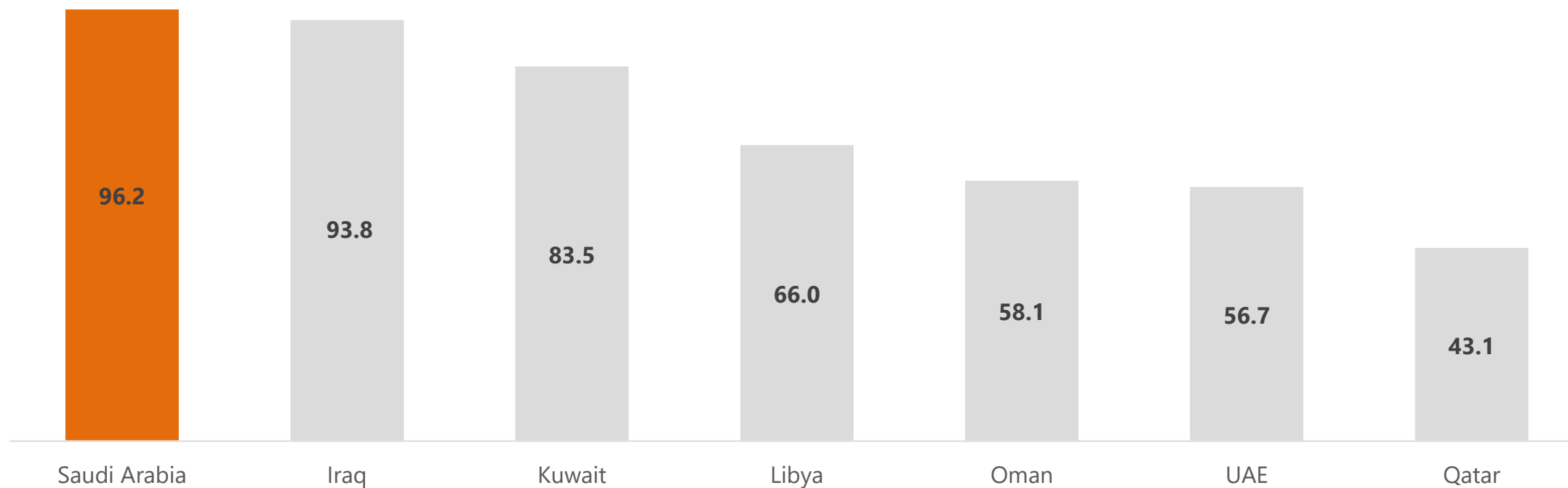
The Gulf Arab states expand oil production capacity

Persian Gulf countries' spare capacity growth (mn b/d)



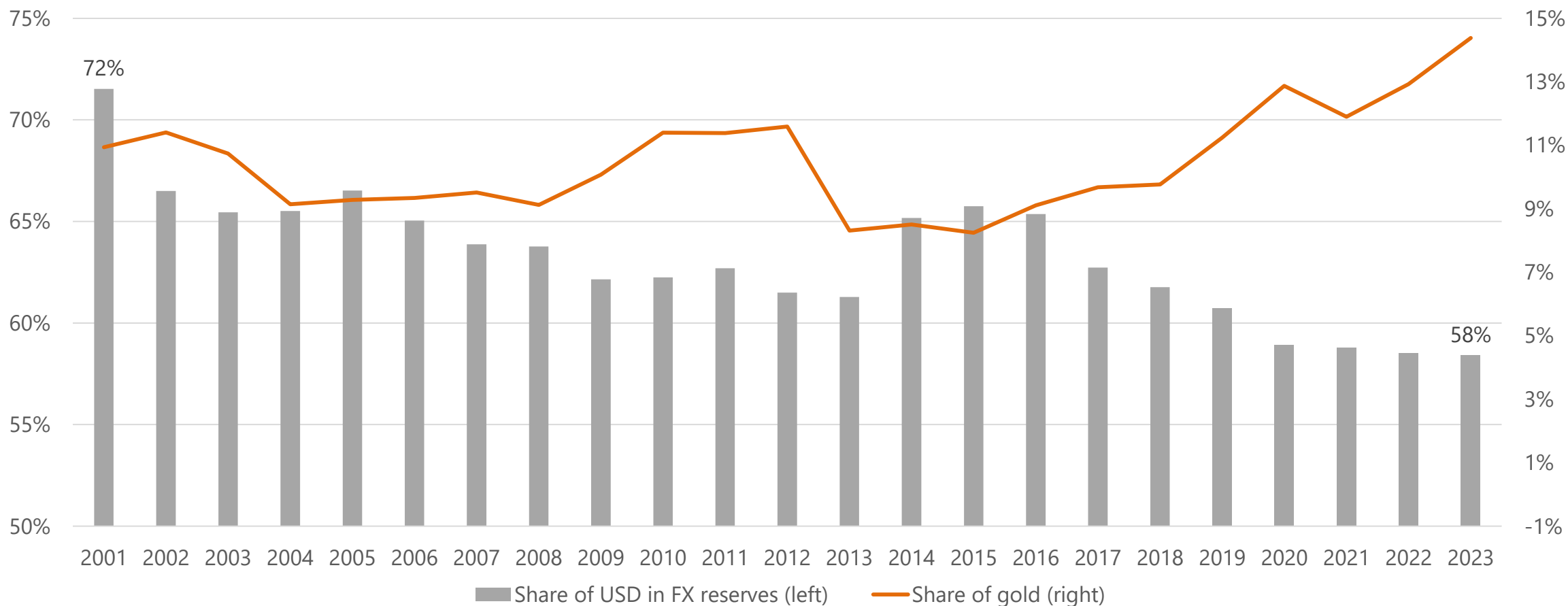
Budgets of OPEC countries resilient to oil price pressure

Breakeven oil price in OPEC countries in 2024 (\$/bbl)



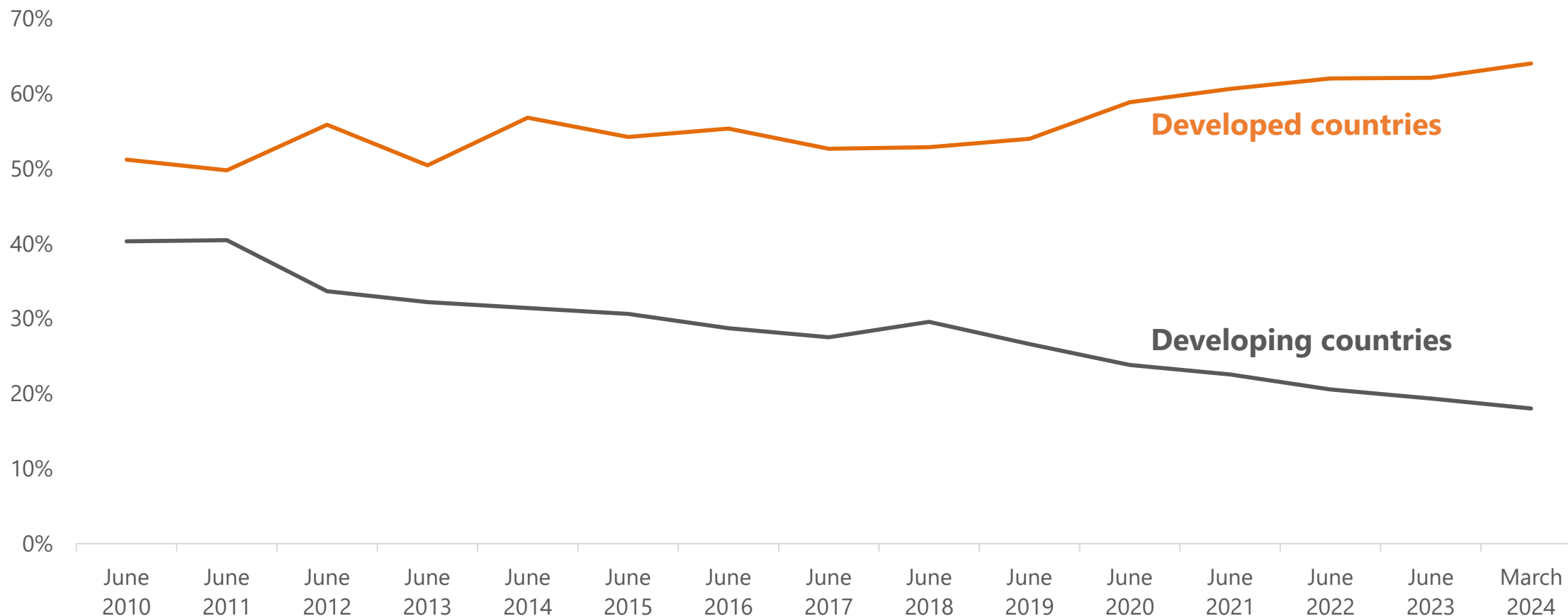
Global central banks diversify their FX reserves

Share of USD and gold in global FX reserves



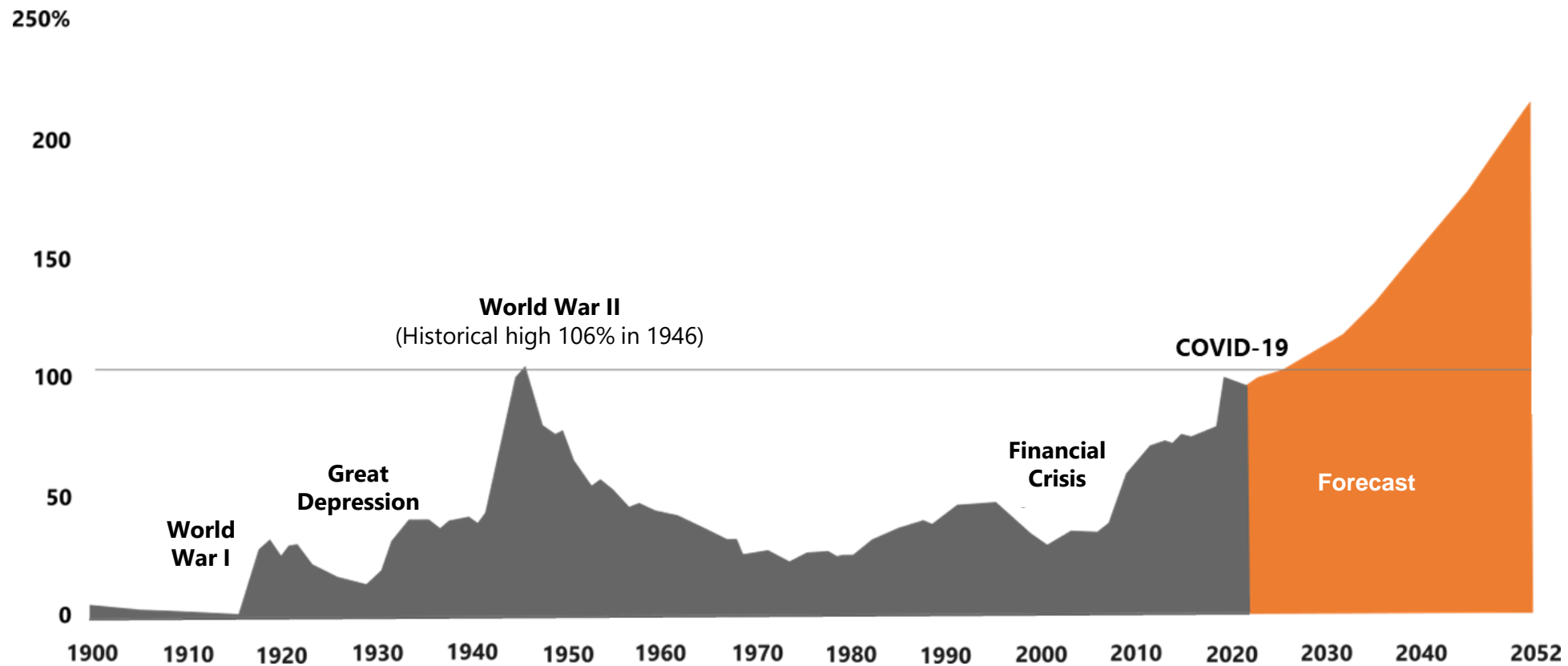
Developing countries are reducing holdings of U.S. Treasury bonds

Share of top-20 foreign holders of US Treasury bonds



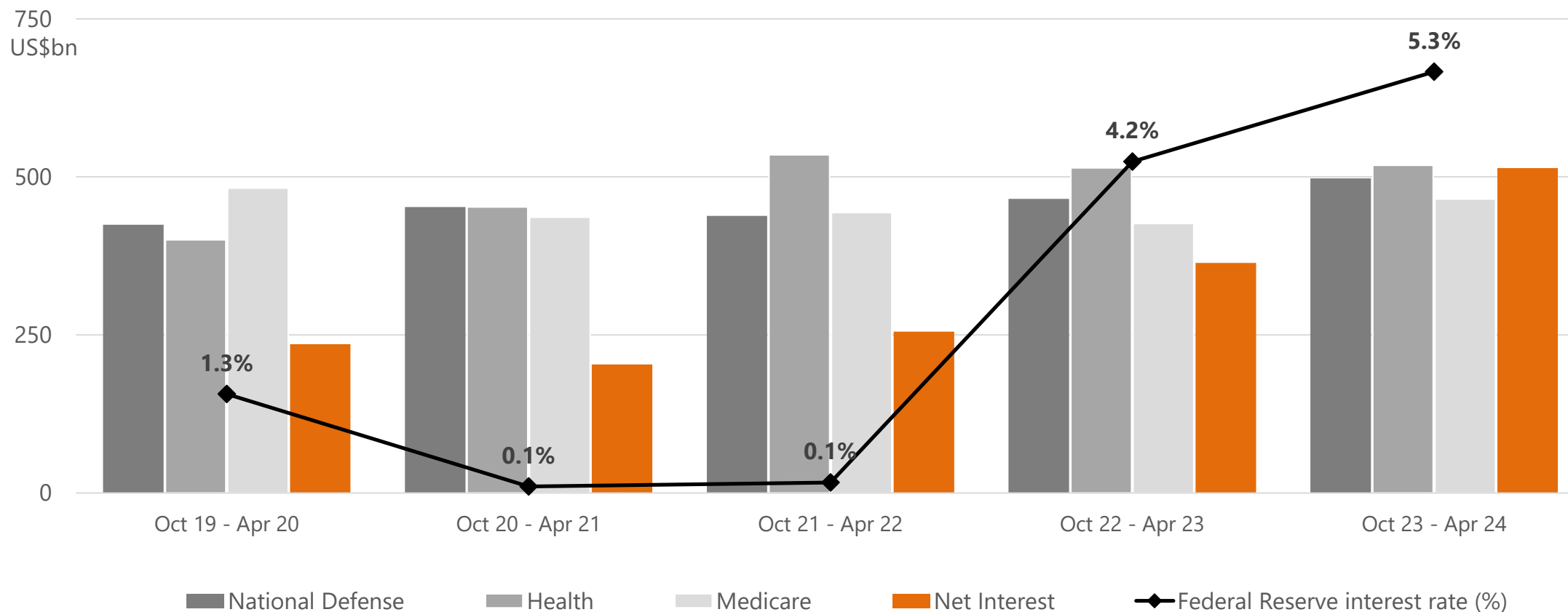
Unrestrained growth of U.S. government debt

U.S. federal debt held by the public (% of GDP)



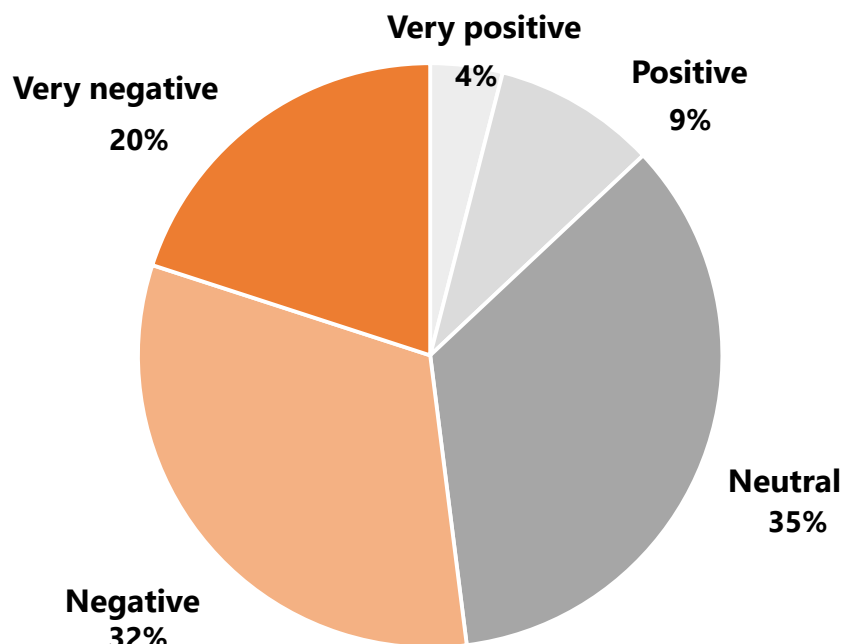
US national debt interest exceeds defense and healthcare spending

State expenditure on interest payments, national defense, health and Medicare

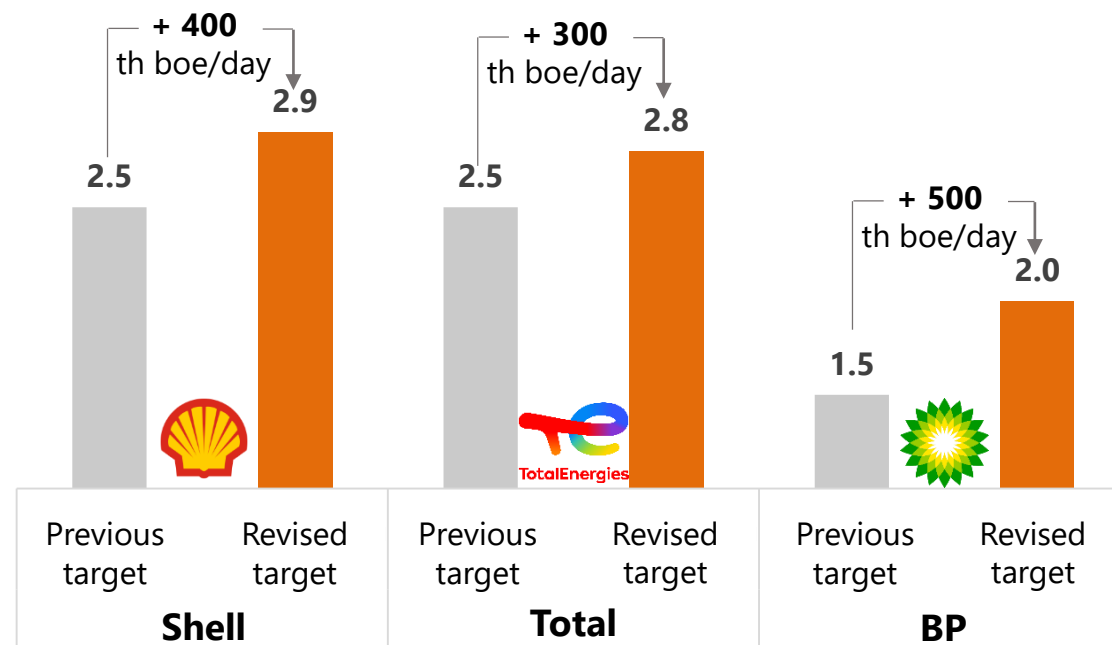


Revising energy transition targets

German industrial companies' view on the energy transition

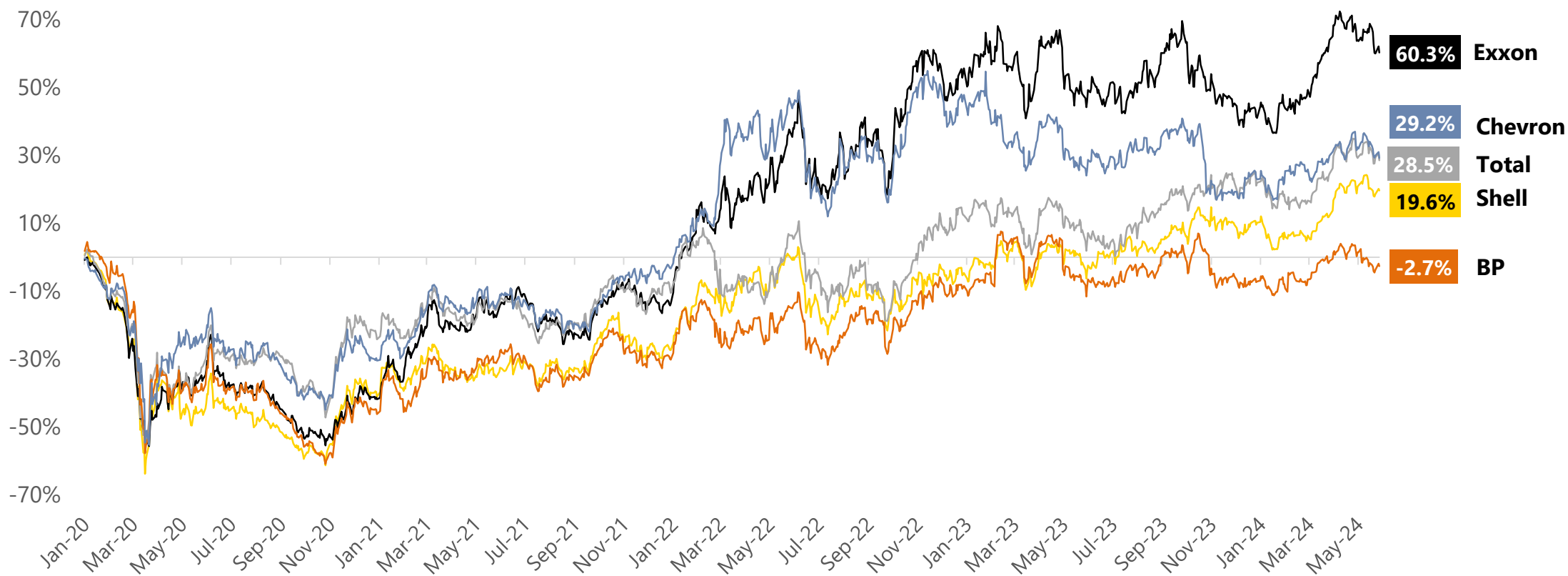


Previous and revised oil and gas production targets (mn boe/d)



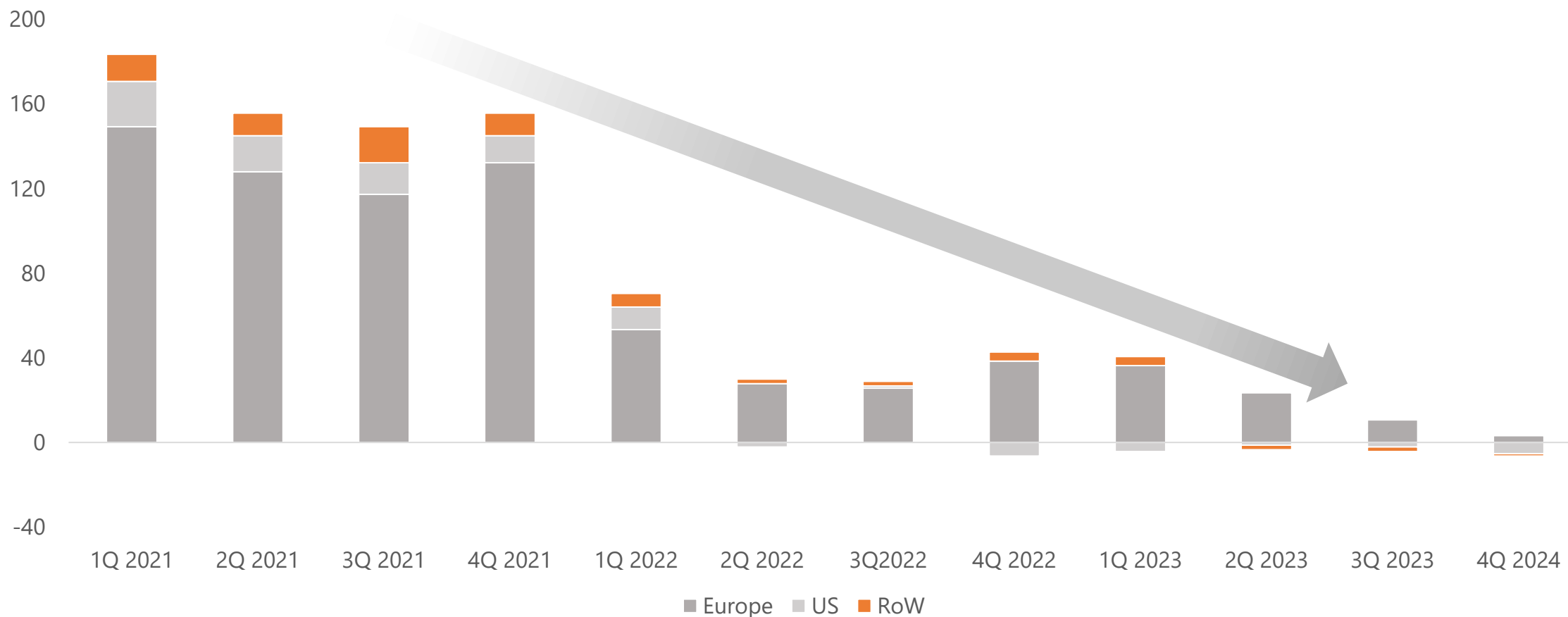
BP's green ambitions disappointed investors

Share price performance of Oil Majors from the beginning of 2020



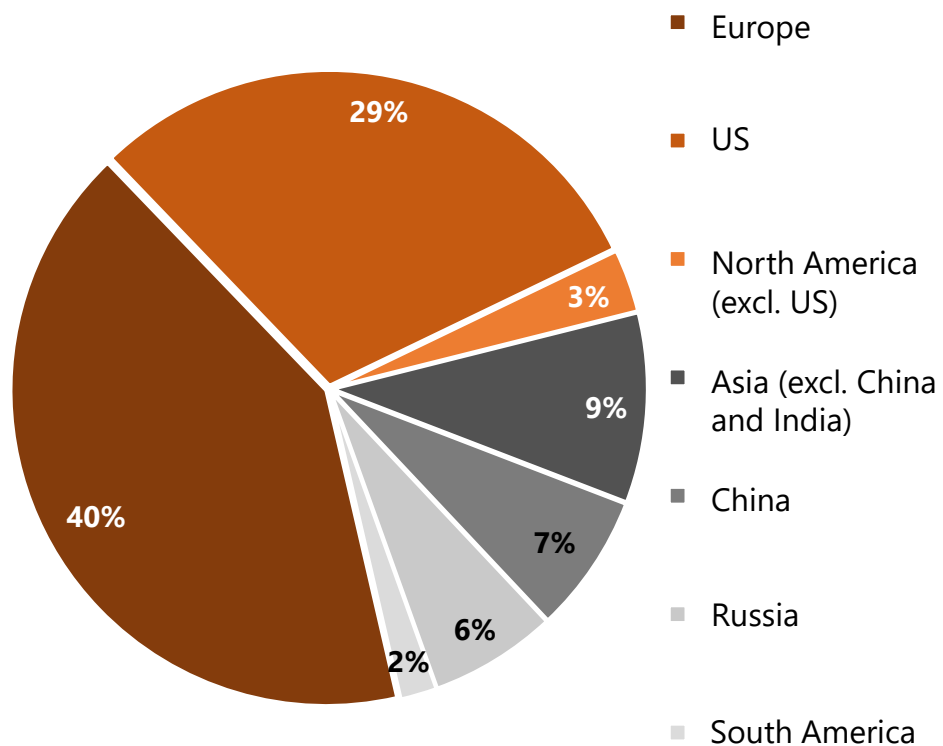
Global ESG funds hit with outflows

Global ESG fund flows (US\$bn)

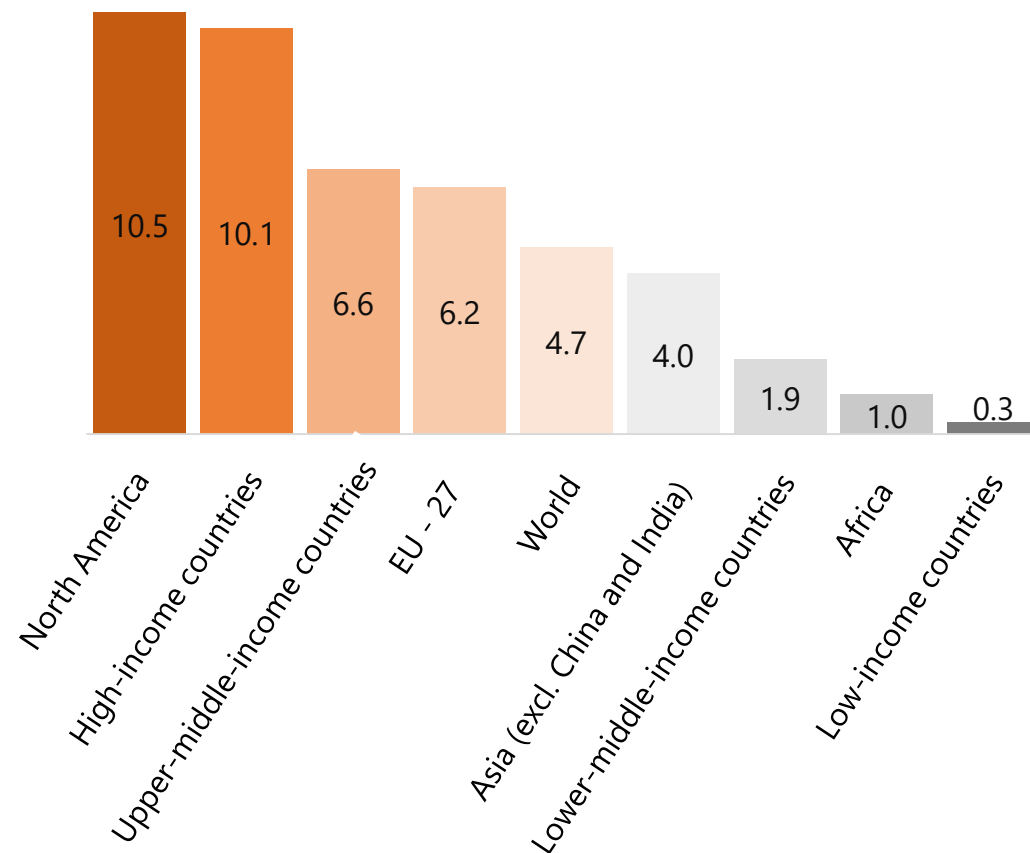


Developed countries are responsible for emissions reduction

Cumulative CO2 emissions over 200 years

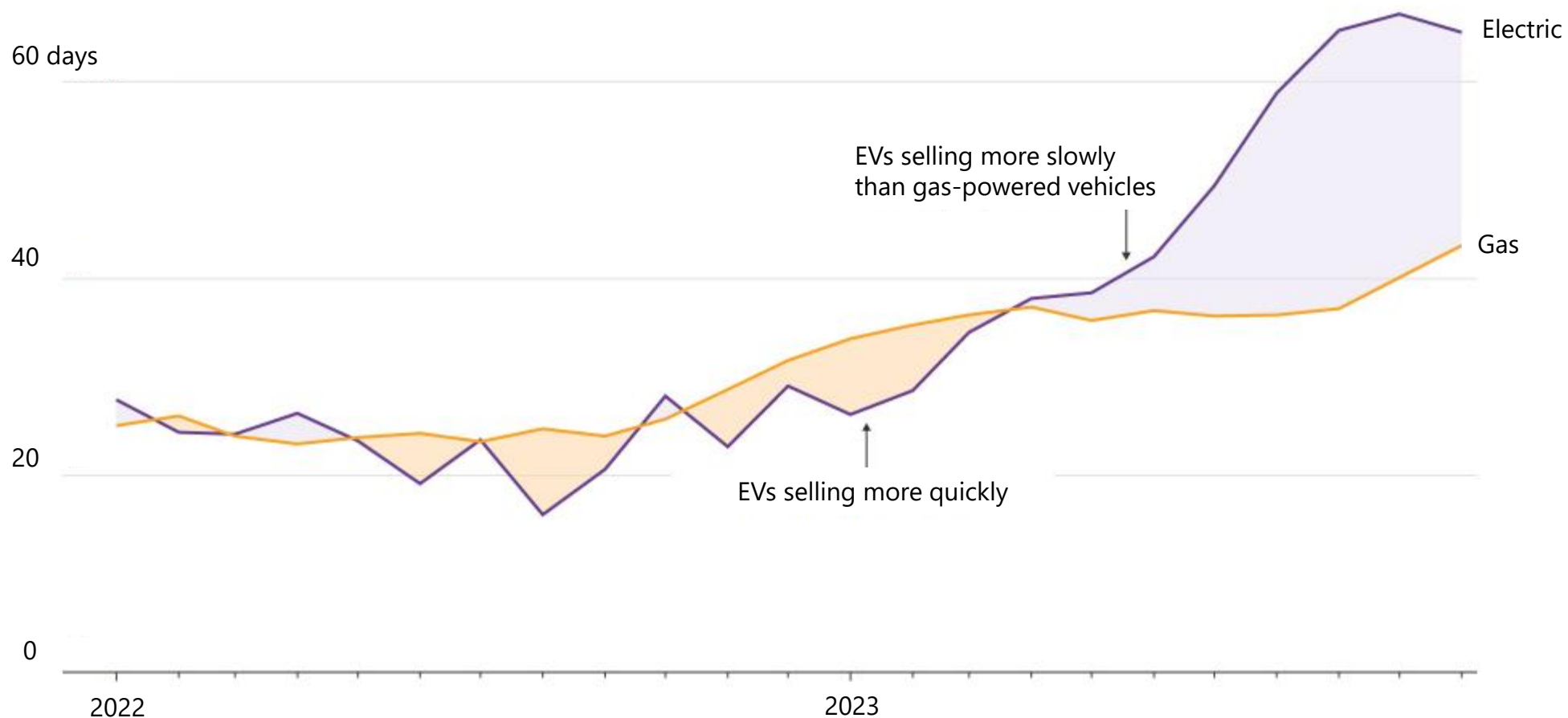


CO2 emissions per capita (tonnes)



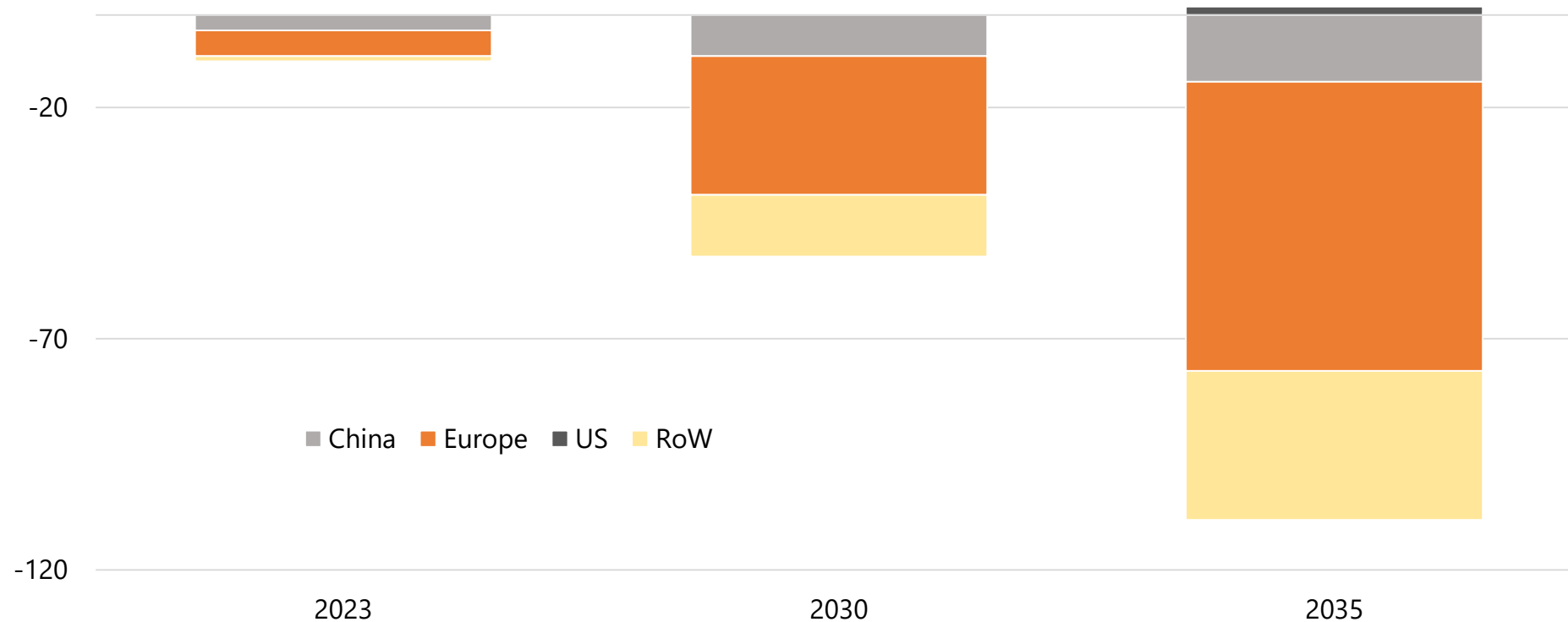
Softening demand for EVs in the U.S.

Average days on market before sale for cars in the U.S.



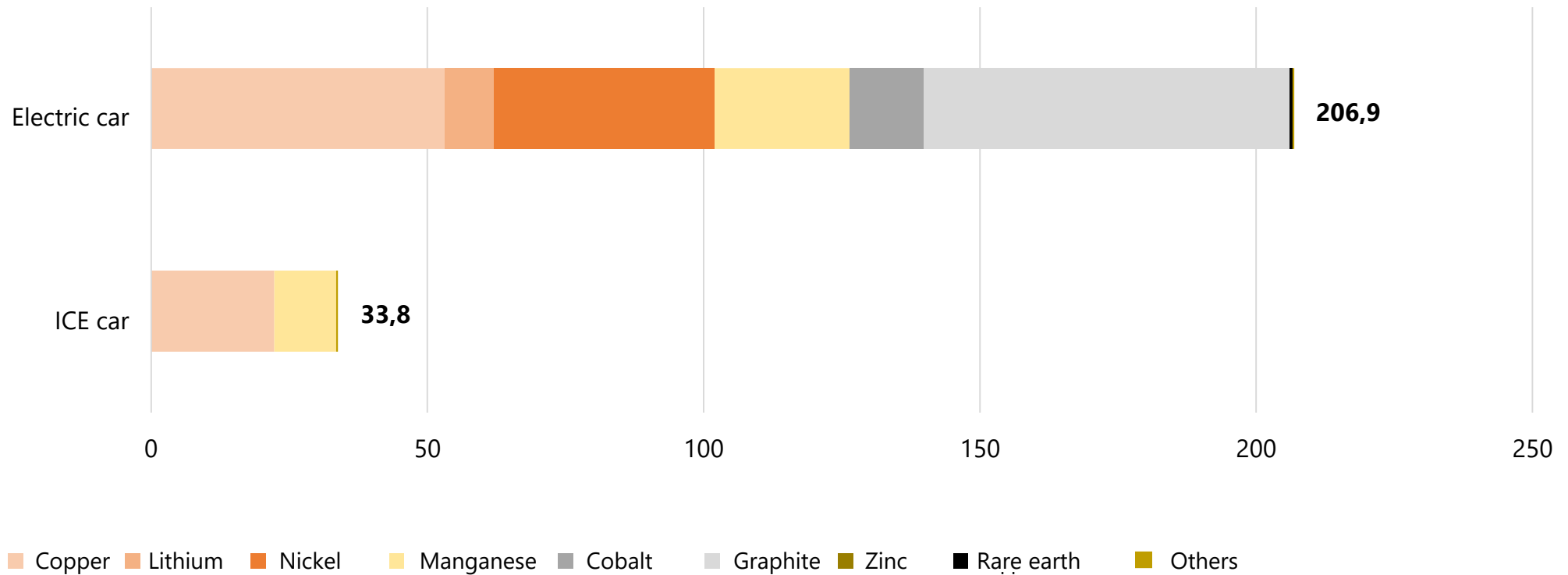
Fuel tax loss may exceed 110bn US\$ by 2035

Estimated fuel tax loss per year due to growing EV penetration (US\$bn)

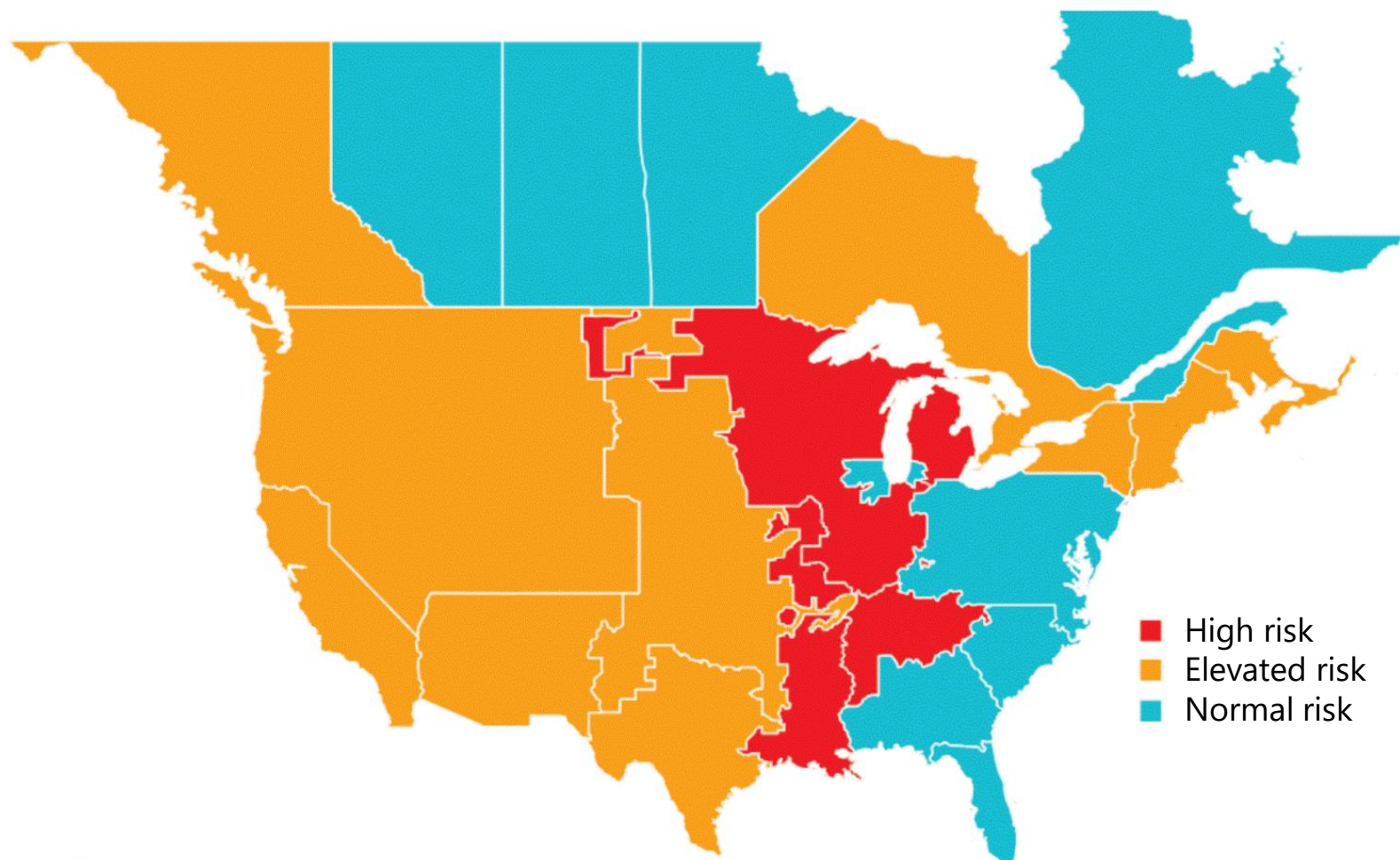


EVs use 6.2 times more minerals

Typical use of minerals in cars (kg/car)



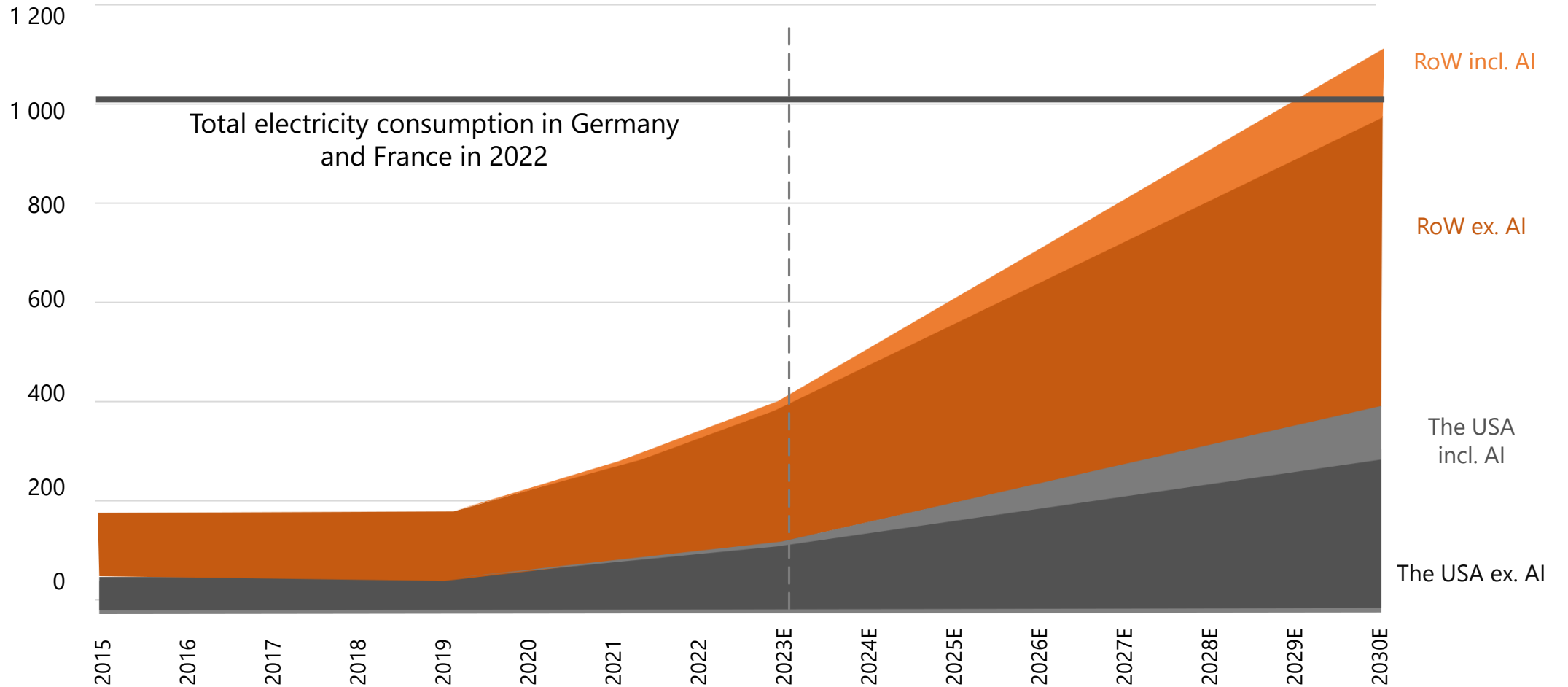
Risks of electricity shortfalls in the U.S. and Canada



High risk: shortfalls may occur at normal peak conditions
Elevated risk: shortfalls may occur in extreme conditions
Normal risk: low likelihood of electricity supply shortfalls

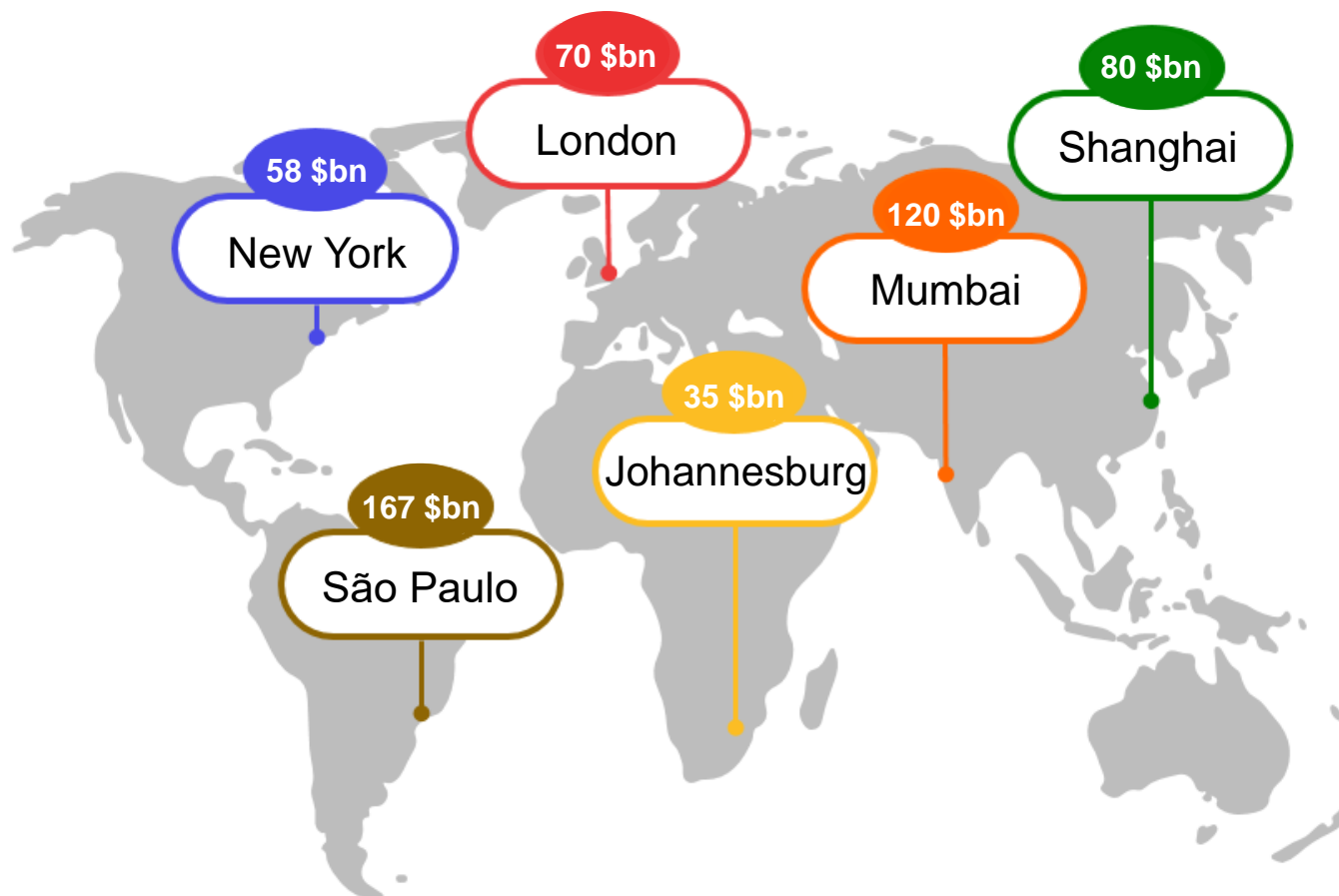
Electricity demand from data centers skyrockets

Global electricity consumption by data centers (TWh)



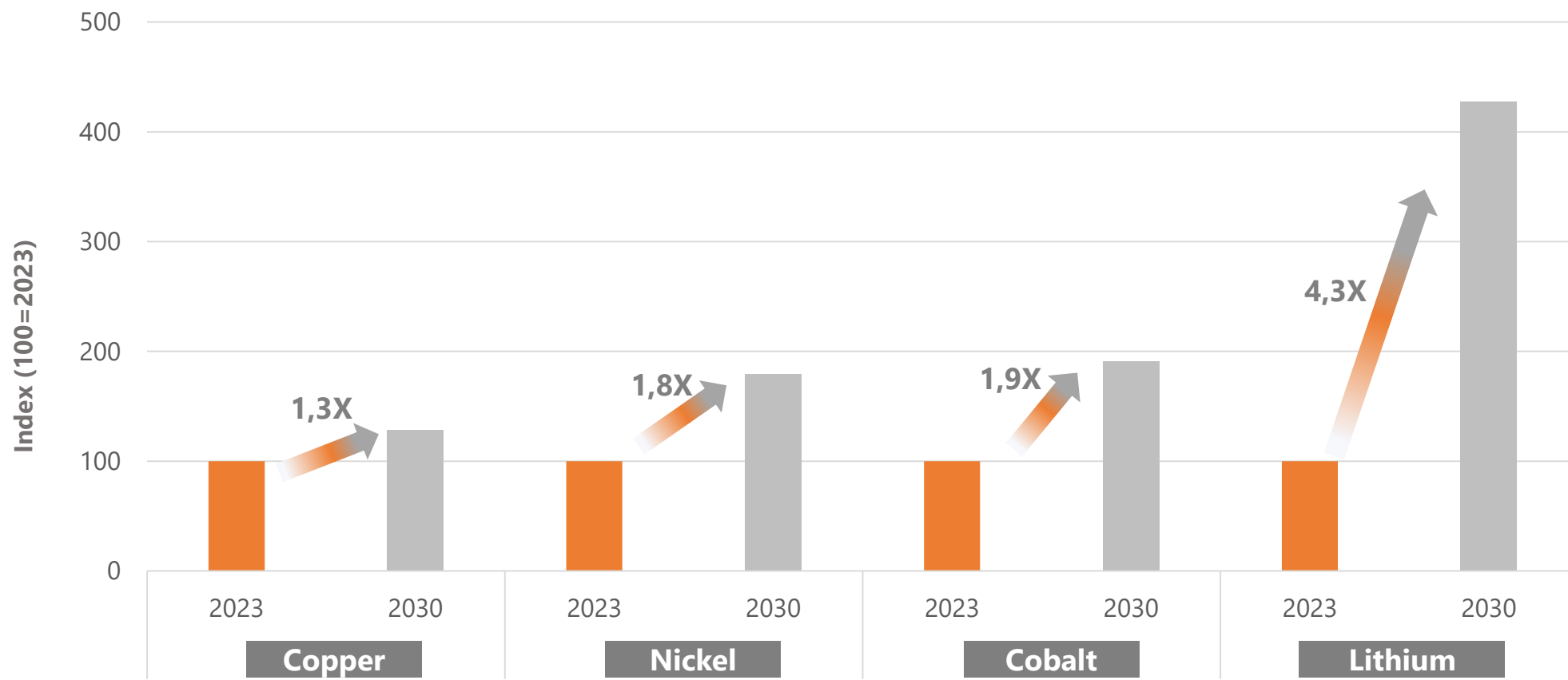
The shift to EVs will cost the world's largest cities tens billions dollars

Potential costs to electrify passenger transport by 2030



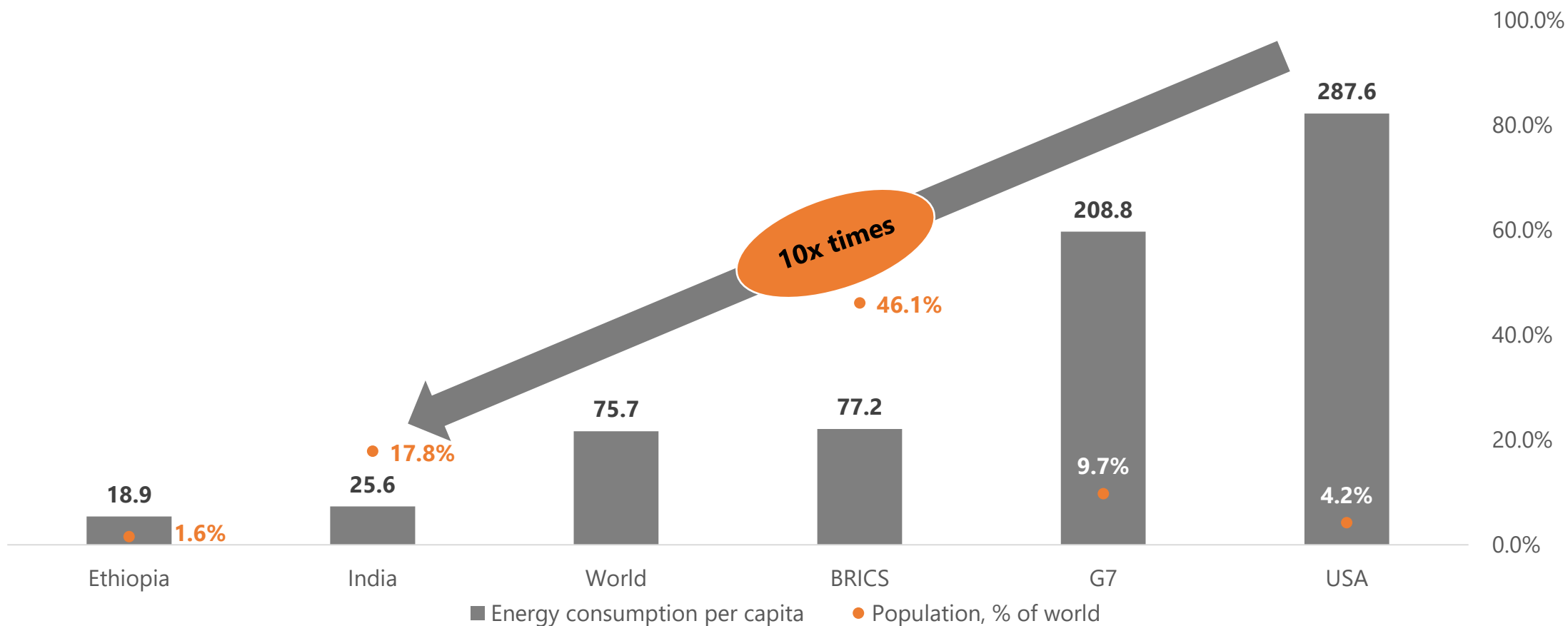
Demand for critical minerals to grow many-fold by 2030

Projected demand growth for key energy transition minerals



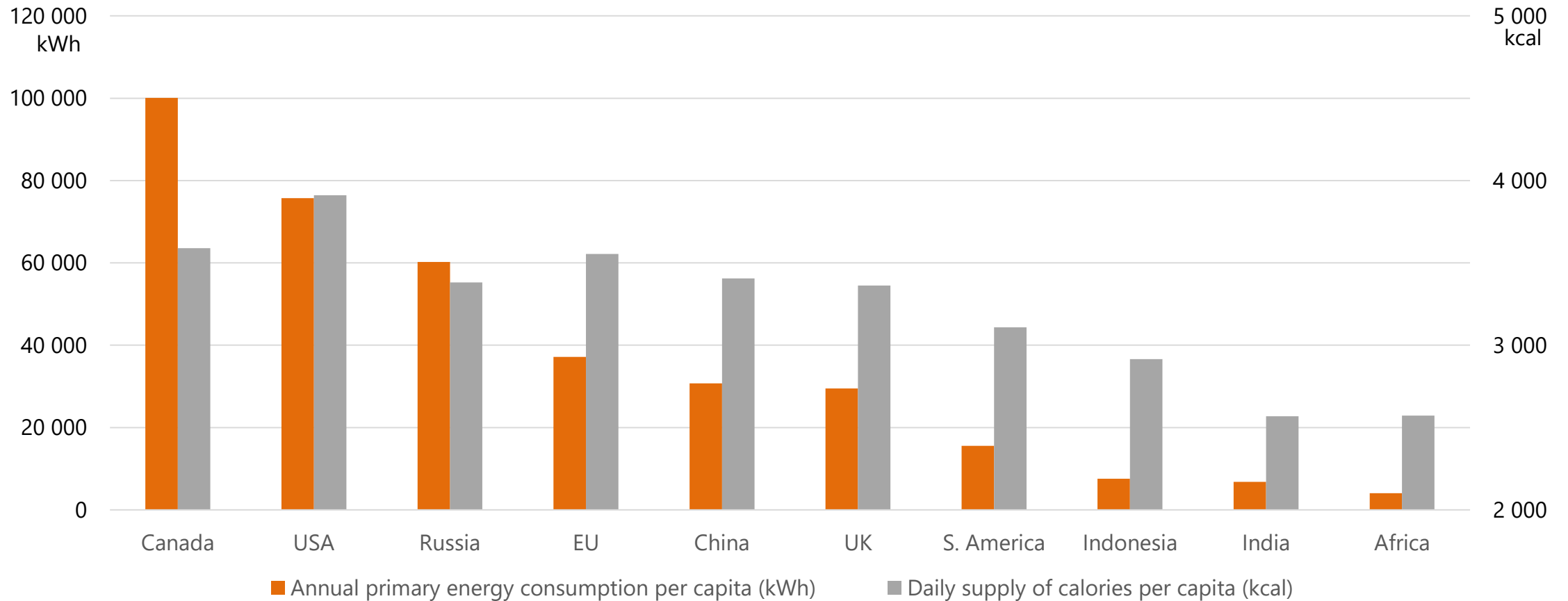
Energy transition will have to account for inequality

Primary energy consumption per capita (GJ)



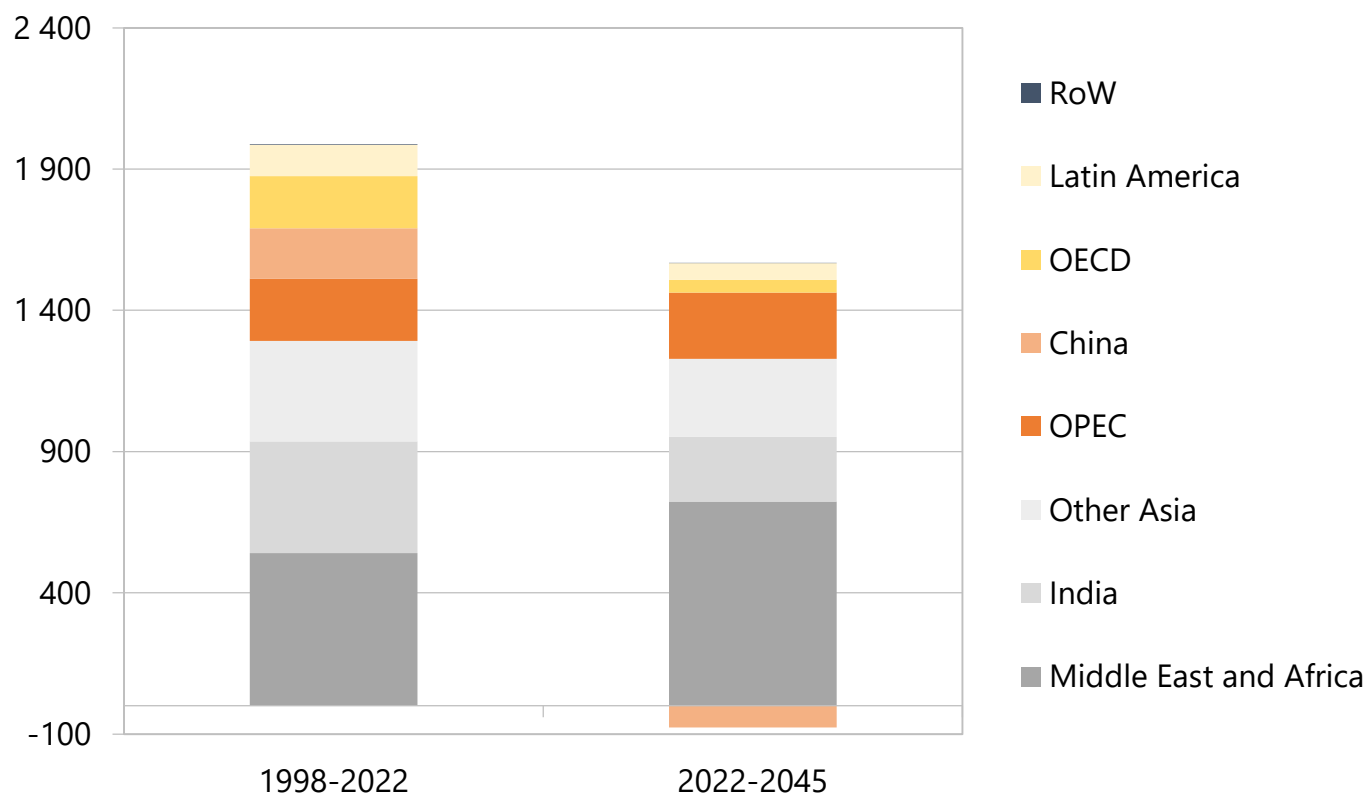
Correlation between nutrition and energy consumption

Primary energy and kcal consumption per capita



Oil consumption as a means of combating poverty

World population growth (millions of people)

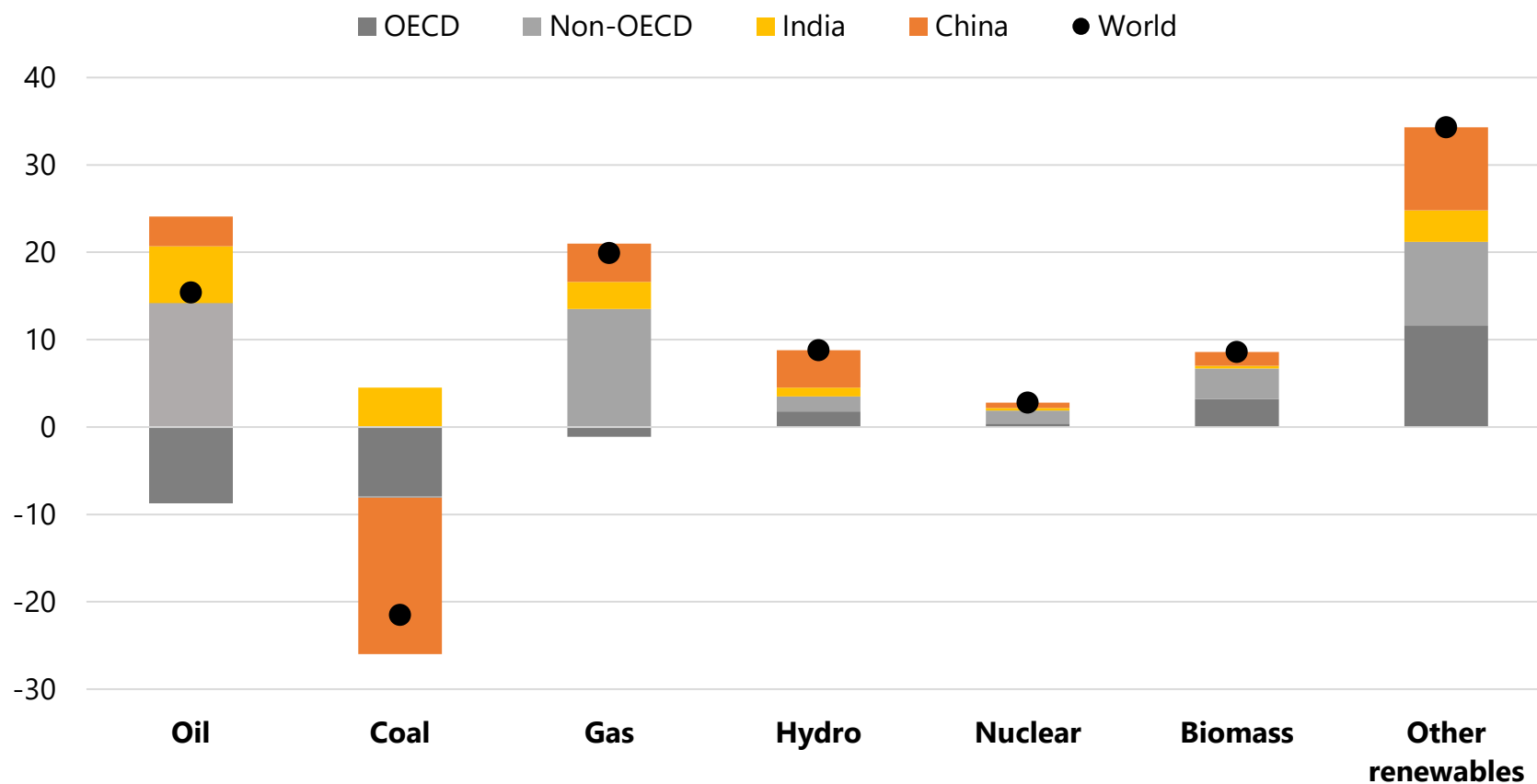


Consumer goods produced from petroleum:

- Hygiene supplies
- Computers
- Cameras
- Upholstery for furniture
- Tableware
- Contact lenses
- Medical prostheses
- Medications
- Solar panels
- *And much more*

World oil demand is set to grow by 2045

Growth in primary energy demand by fuel type in 2023-2045 (mn boe/d)

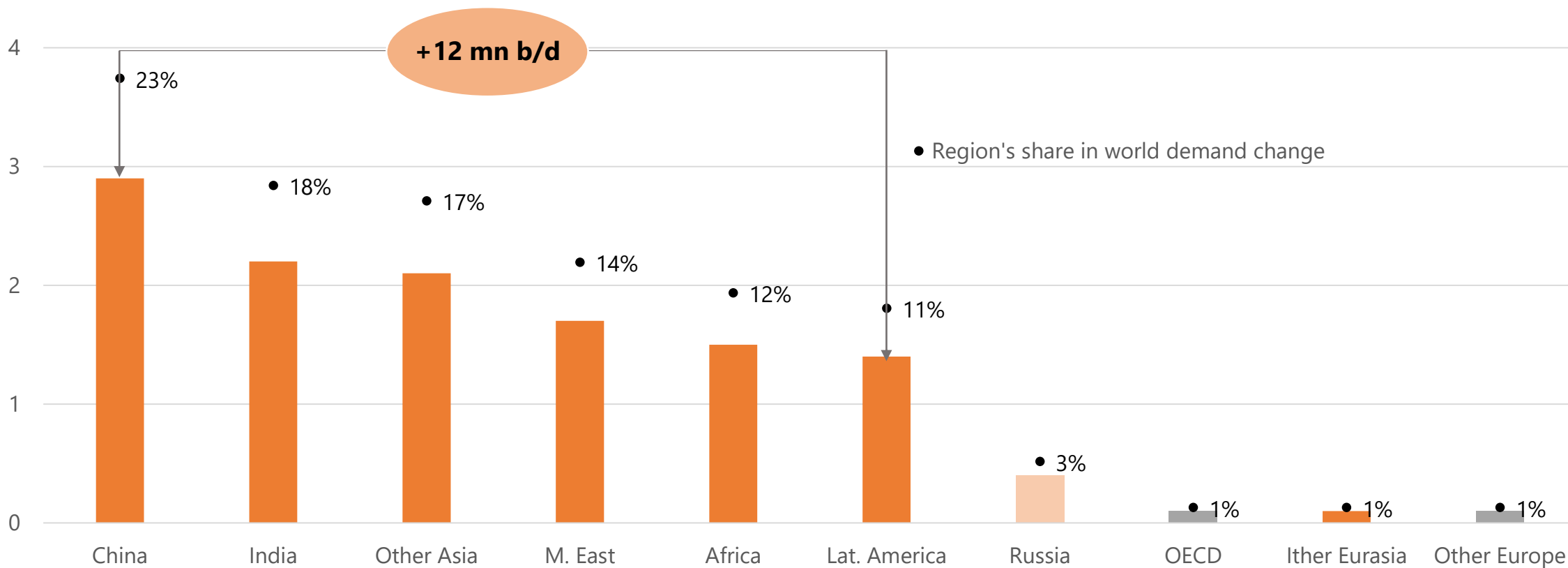


OPEC Forecast:

- Oil primary demand is set to reach **116 mn boe/d** (up by 16 mn boe/d) by 2045
- Oil will account for around **30%** in global energy mix

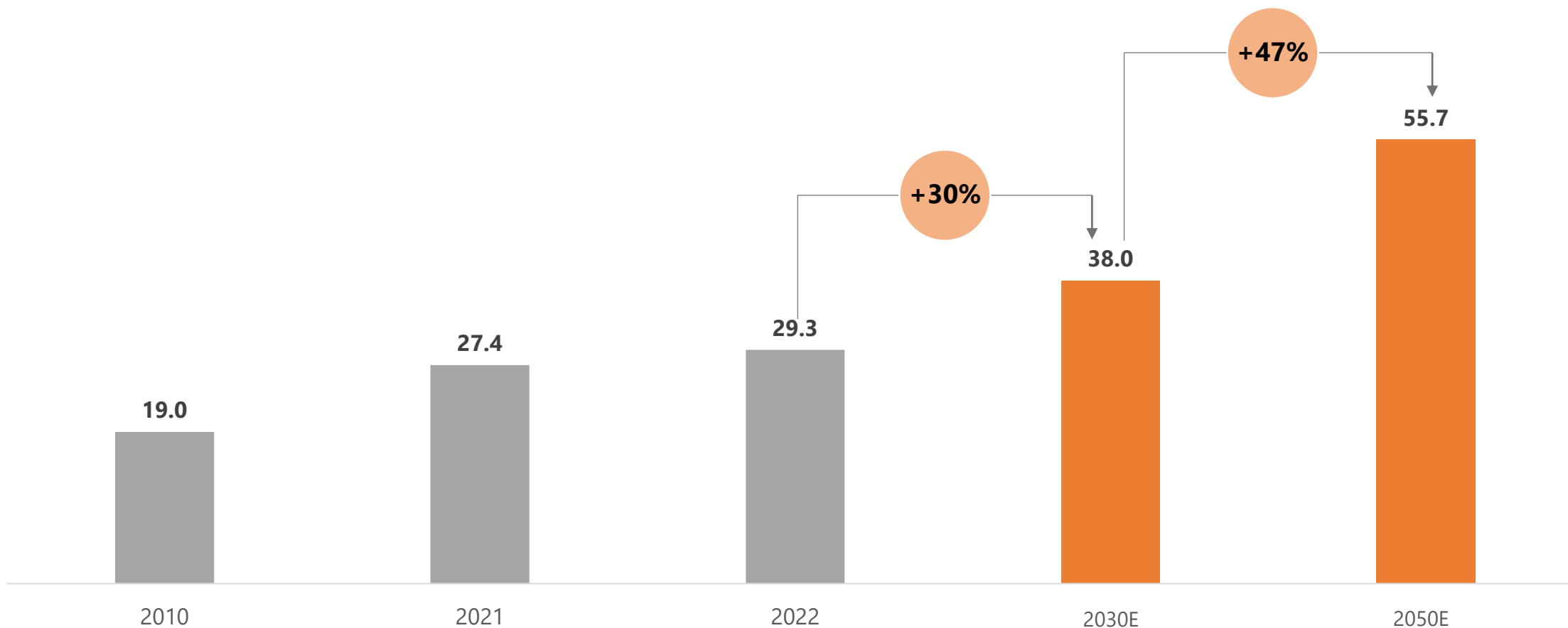
Developing countries to drive world oil consumption

Growth in primary energy demand by region over 2023-30 (mn b/d)



Energy consumption in India to soar by 90% by 2050

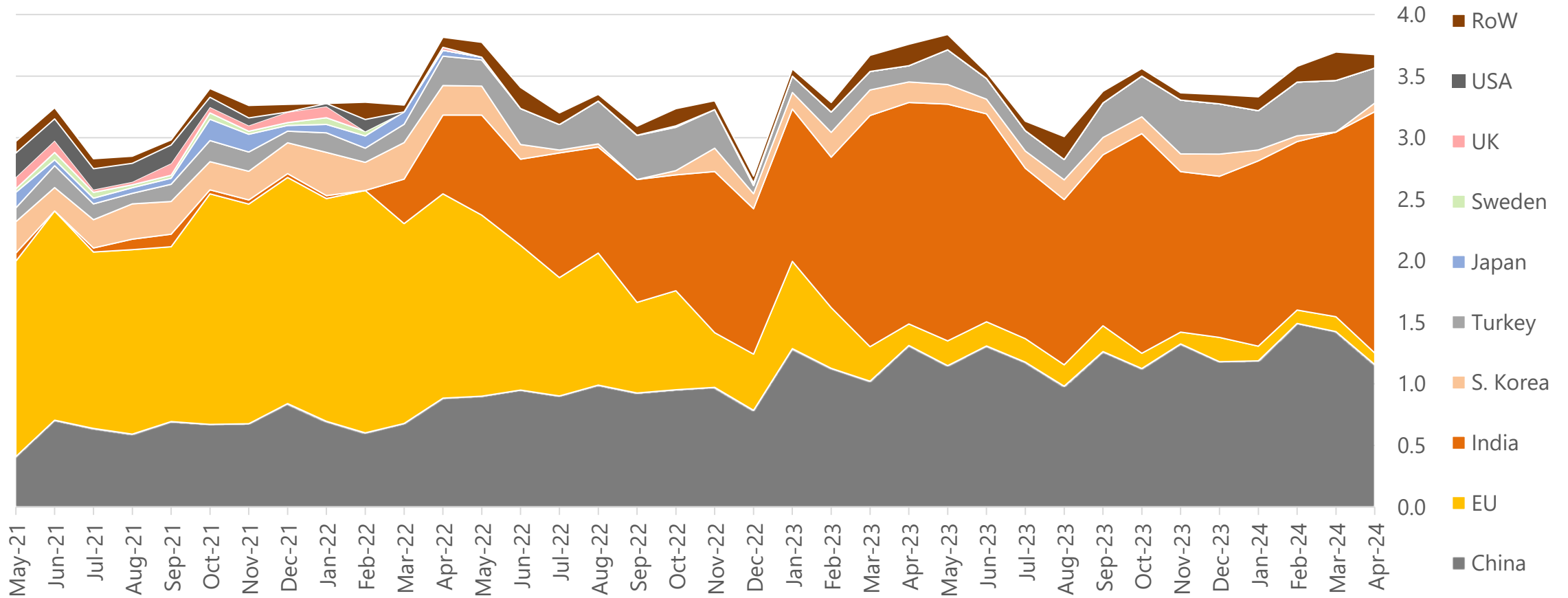
Final energy consumption in India (EJ)



Russian exports are shifting towards Asia Pacific

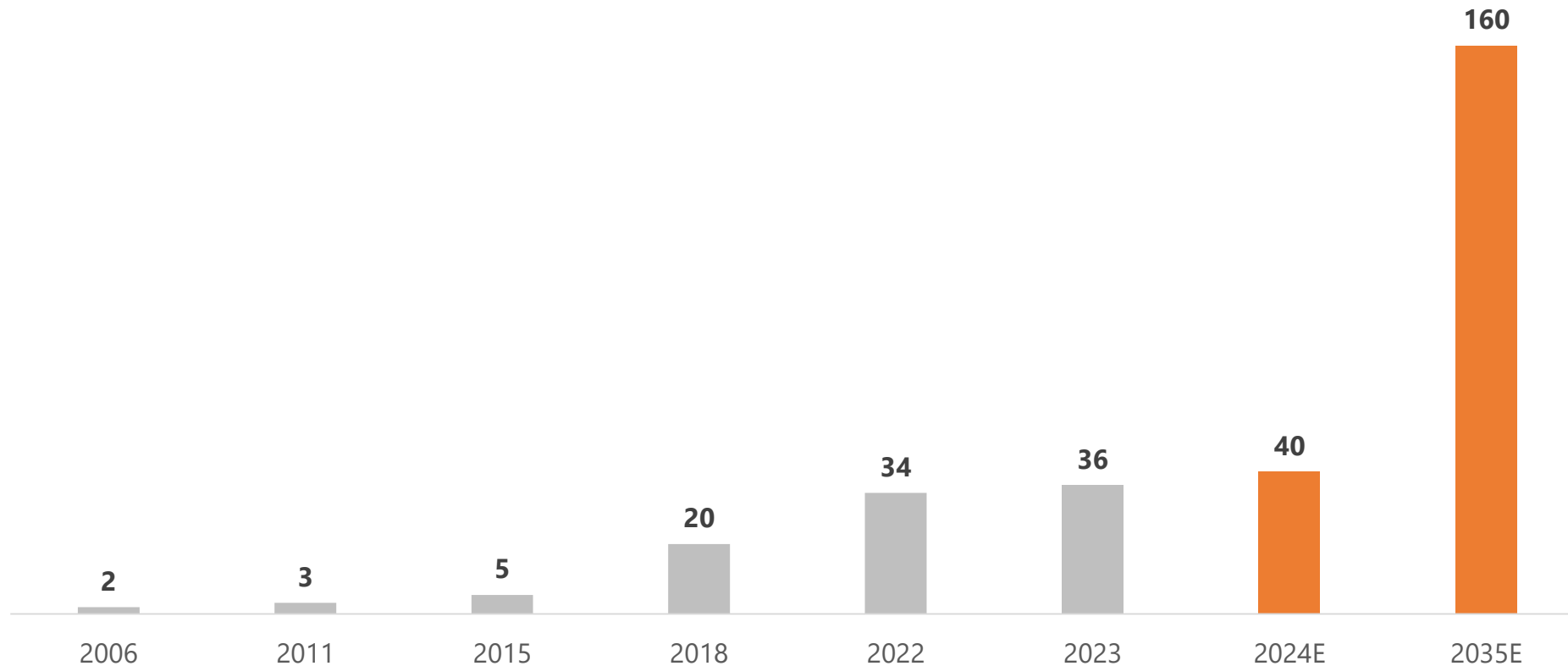


Seaborne Russian oil exports by country of destination (mn b/d)



The Northern Sea Route as a new Eurasian shipping route

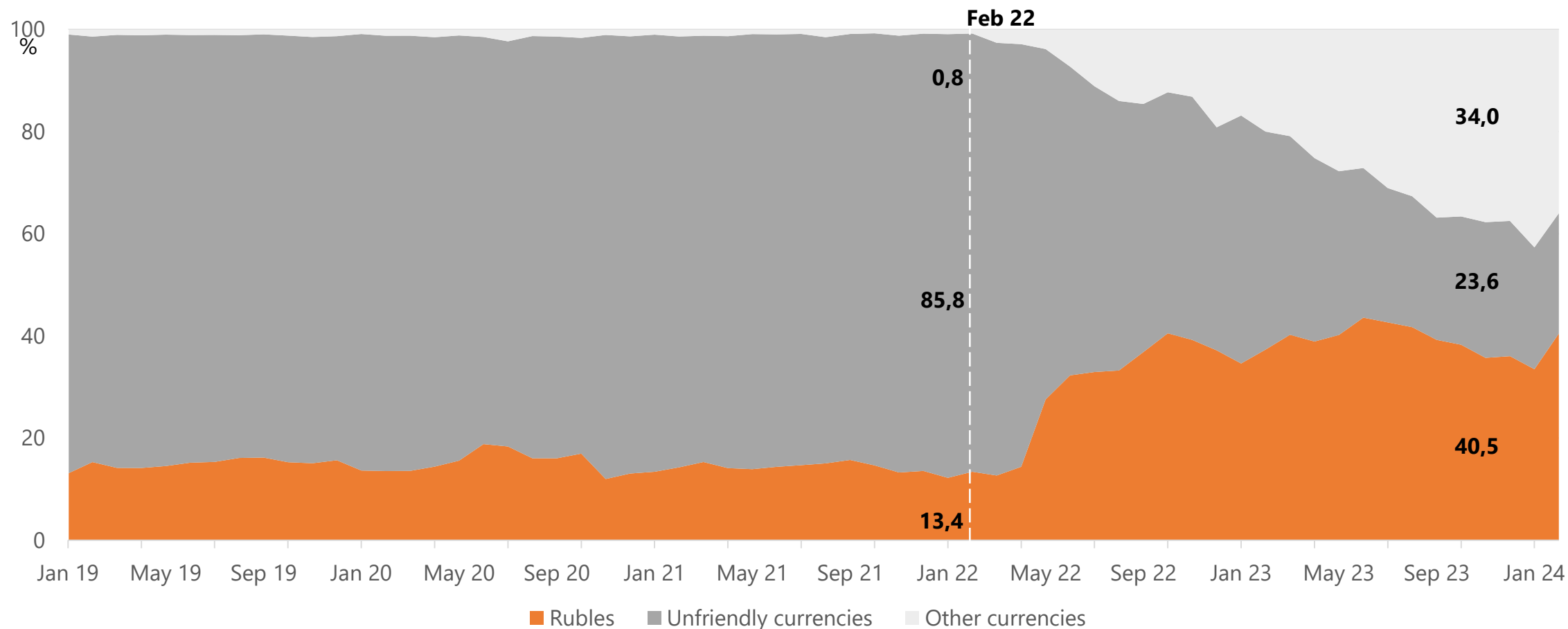
Freight volume via the Northern Sea Route (mn tonnes)



The share of ruble in international settlements is increasing

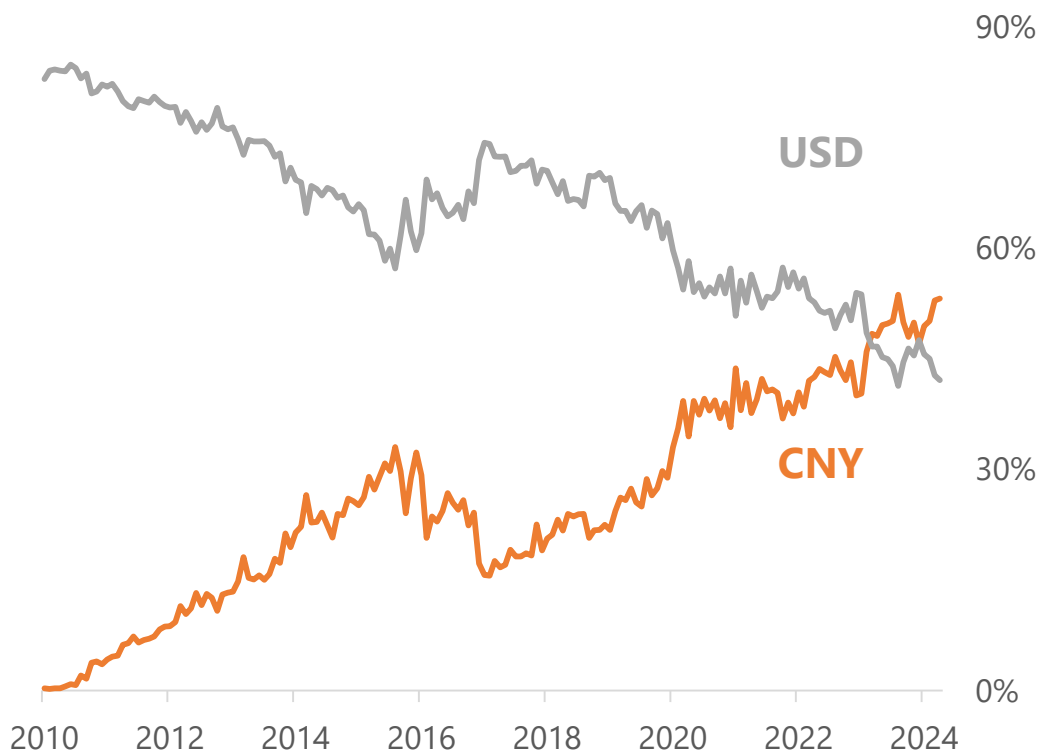


Share of ruble and other currencies in Russian exports payments

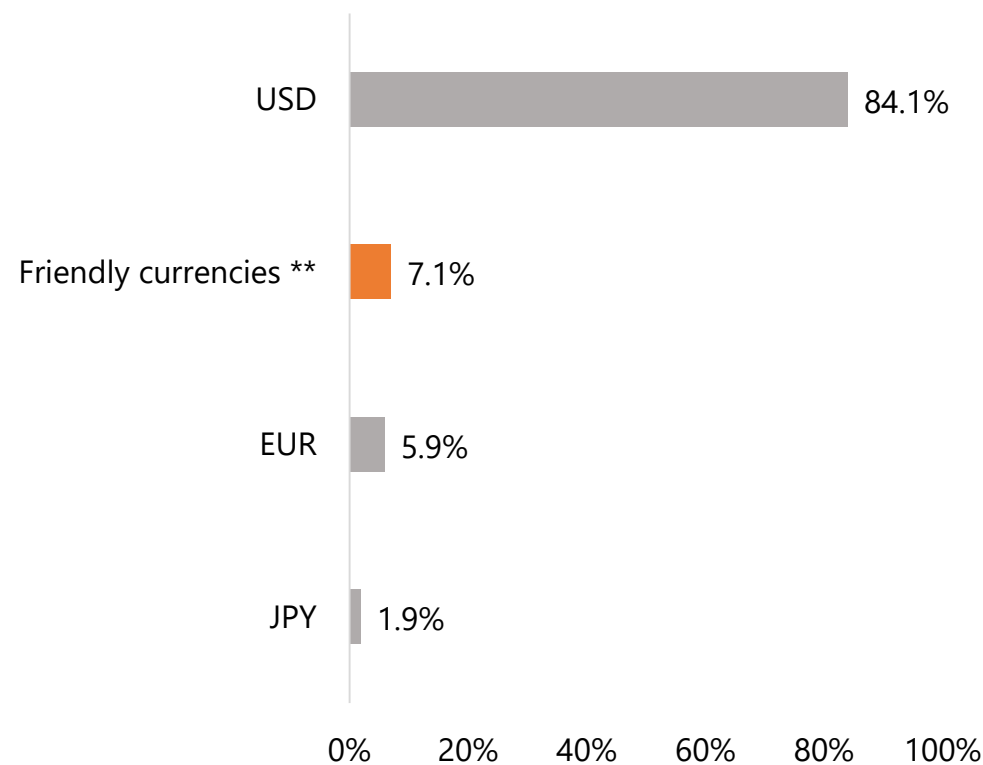


Friendly currencies play a bigger role in international trade

Share of USD and CNY in China's international settlements*



Shares of top-10 currencies in international settlements via SWIFT





AND... HERE WE ARE

I went out of woods, – winter frost was severe! –
And saw a horse sleigh slowly climbing a hill,
It was full of firewood; I came to it nearer
To find out by whom it was piloted, still
There was just a very small boy on the road,
Who led by the bridle his obedient horse;
In very large boots and too big sheep-skin coat –
In spite that a pocket-sized child he was.
– Hello, big bloke! – “Pass by in the clear!”
– Oh! You are so frightful and strong I would say!
From where’s the firewood? – “From woods, cannot hear?
My father is chopping – I’m taking away”.
(A woodcutter’s axing was heard in the forest.)

*A passage from poem “Peasants Children”
Nikolay Nekrasov, 1861*