J.P.Morgan

# PolySandra: 2026 Eye on the Market midyear energy update

**Michael Cembalest**
Chairman of Market and Investment Strategy
J.P. Morgan Asset and Wealth Management

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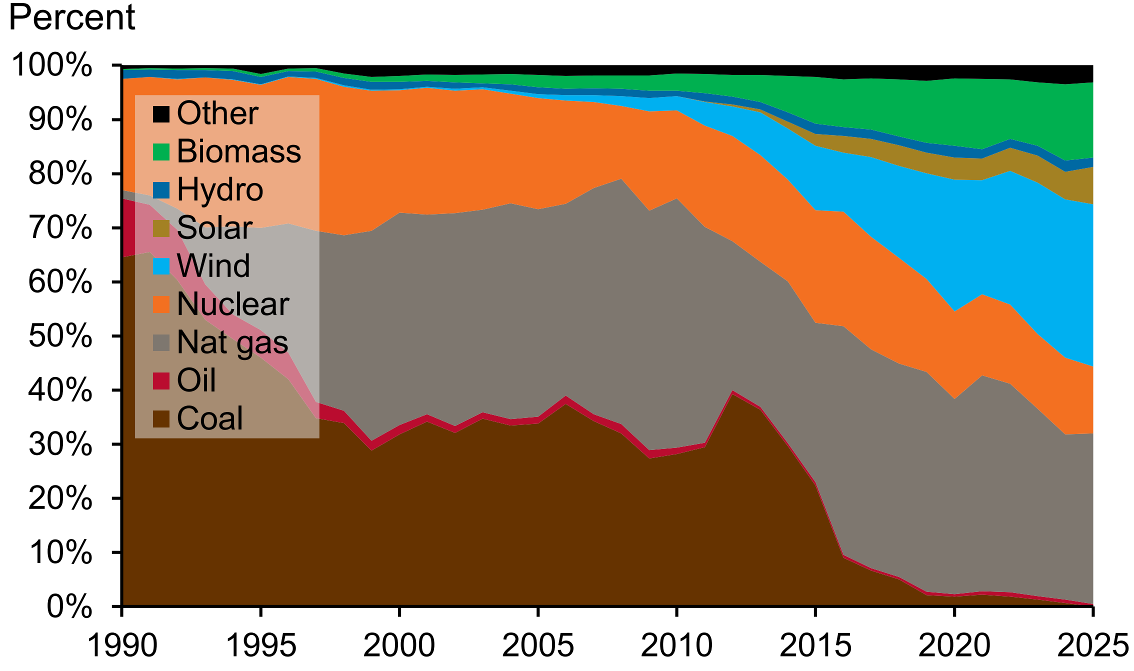
# Mid year update

- Polyanna and Cassandra represent the extremes of the energy debate.  Polyanna only focuses on what's working in the energy transition while Cassandra only focuses on what isn't, with both excluding facts or figures which contradict their narratives.  Actual data helps establish a more reliable baseline for where things stand

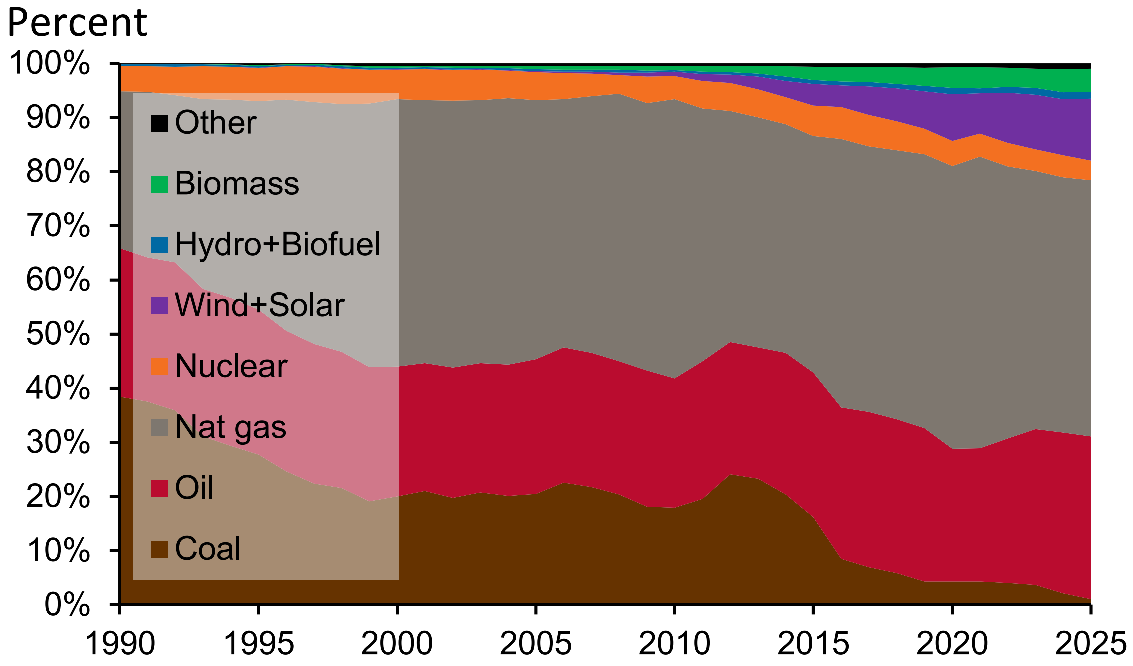
# One example: the UK transition from coal to renewables has been rapid, which you will hear about from Polyanna…

**United Kingdom share of electricity generation by source**




Source: Energy Institute, JPMAM, 2025

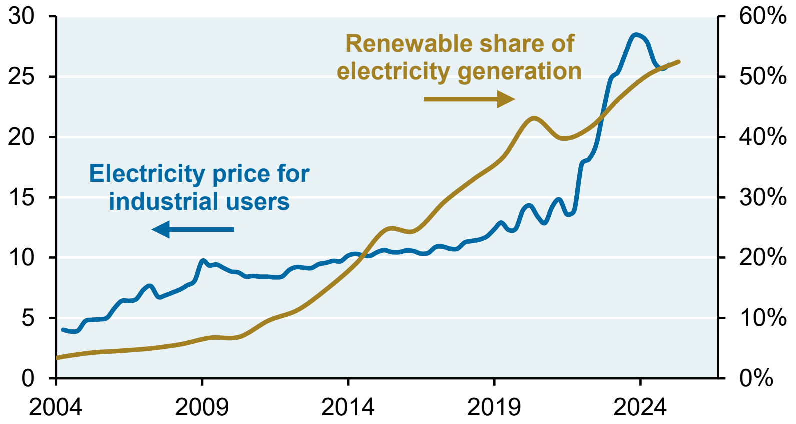
**United Kingdom share of useful final energy by source**




Source: Energy Institute, IEA, JPMAM, 2025

# …while Cassandra will highlight soaring UK industrial electricity and gas prices, deindustrialization of energy intensive manufacturing and rising costs to taxpayers

**United Kingdom electricity prices for industrial users**
Pence per kWh

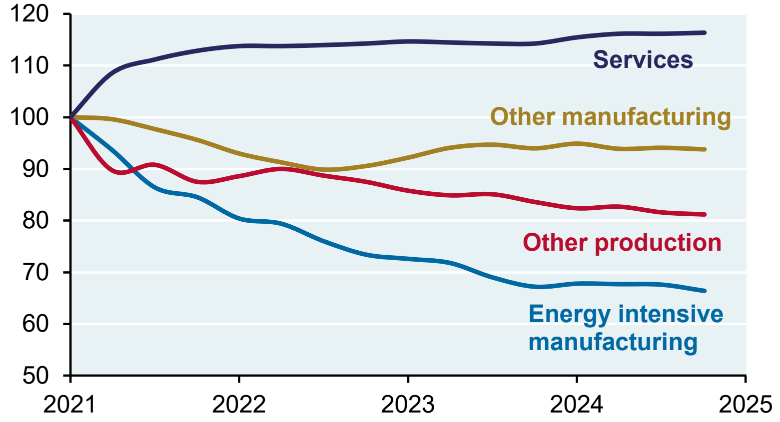



Source: UK Office for National Statistics, Q4 2024

**United Kingdom gas prices for industrial users**
Pence per kWh

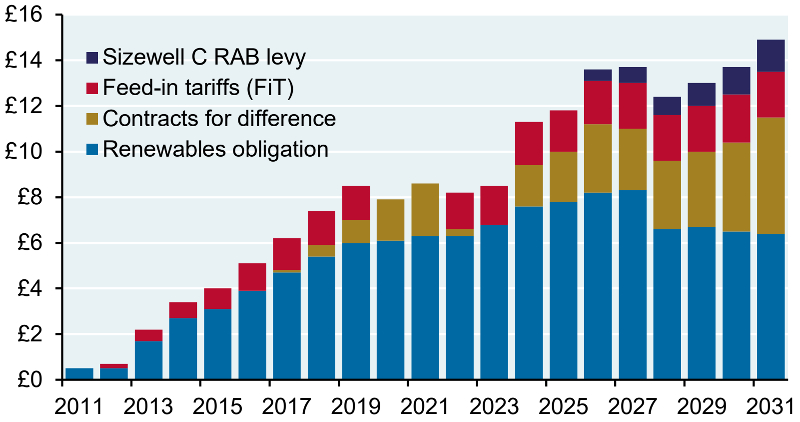

Source: UK Office for National Statistics, Q4 2024

**Gross value added in United Kingdom industries**
Index (100 = Q1 2021)




Source: UK Office for National Statistics, Q4 2024

**Electricity subsidy costs in the United Kingdom**
Pounds, billions




Source: Prosperity Institute, July 29, 2026

# The latest climate measures continue to deteriorate…

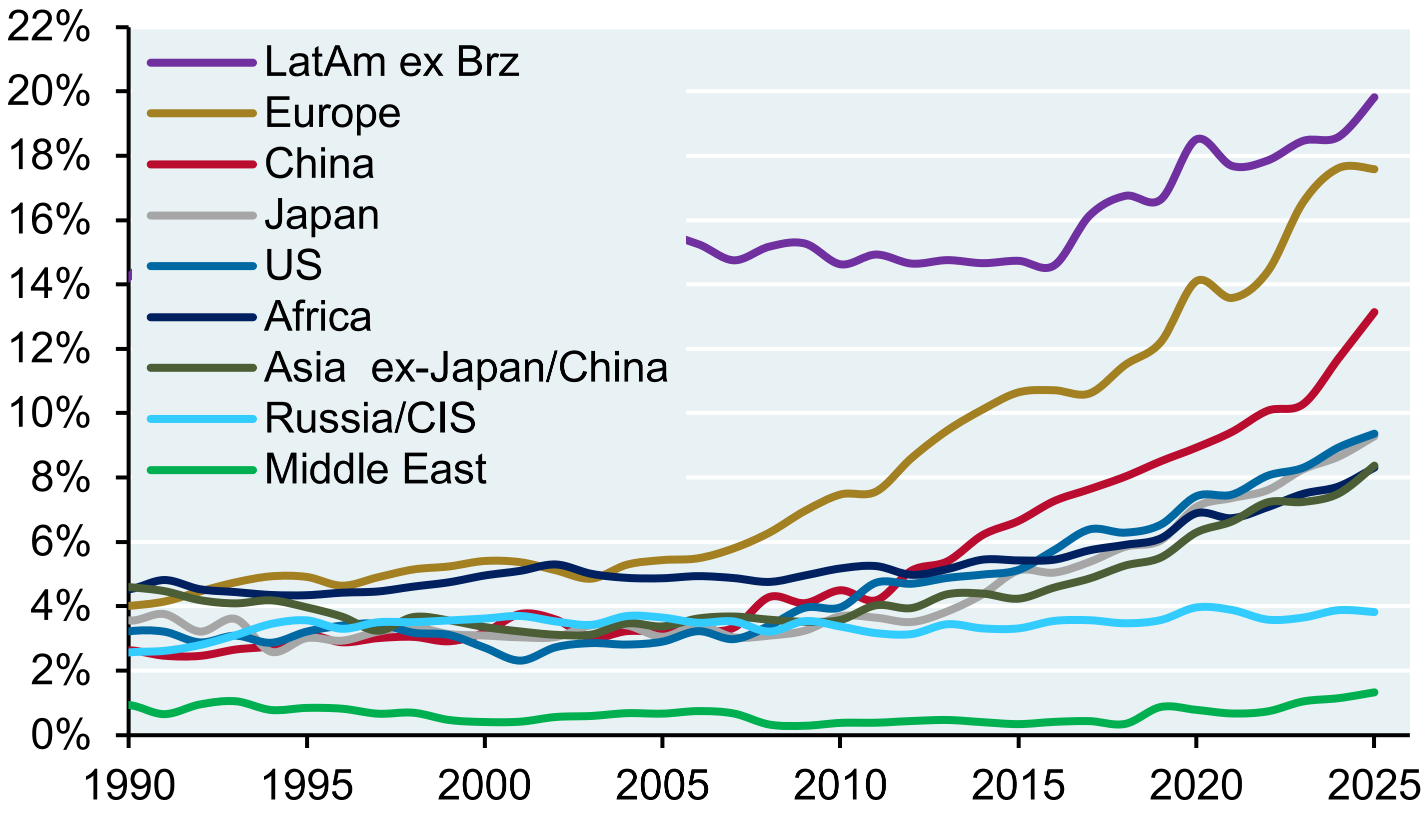
**Rising global temperatures:** May 2026 was the second warmest May on record globally, with global average surface air temperatures 1.42°C above the pre-industrial average. Almost half of Europe's 850 largest cities are currently enduring the most severe heat-wave on record, with Germany, Poland, Czech Republic and other countries/cities hitting all-time record temperatures. So far, 2026 is on track to be among the four hottest years on record globally

**Ocean warming:** Global ocean heat content increased for the ninth consecutive year, with 16% of the ocean reaching an all-time high temperature, continually reducing marine ecosystems' ability to naturally sequester manmade carbon

**Ice coverage:** Global sea ice coverage hit a record low in 2026 relative to its 48-year observational history

# …which is why we closely track the speed of decarbonization

**Decarbonization has been a mostly linear industrial transition since 2010,** Renewable share of useful final energy



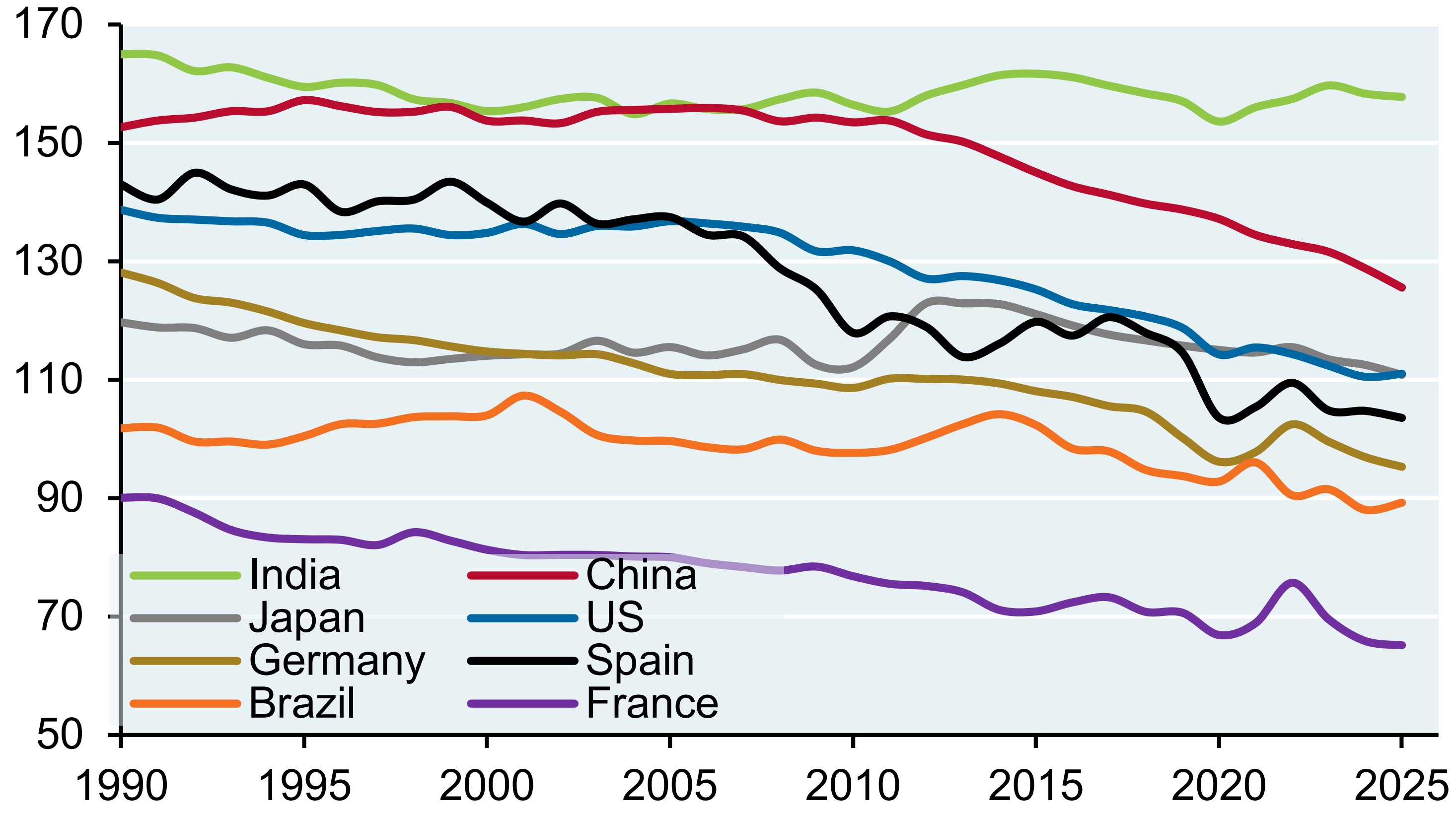

Source: Energy Institute, IEA, JPMAM, 2025

- Decarbonization is proceeding at 0.4% - 0.7% per year
- China accelerating while European progress slowed in 2025
- US pace similar to Japan, Africa and the rest of Asia
- Note: Useful final energy consumption is net of fossil fuel combustion losses in power generation, transport and thermal heat generation (see our 2026 energy paper for more details on our methodology)

# While the emissions *intensity* of energy consumption continues to fall in most large countries…

## Tonnes of $CO_2$ emissions per EJ of useful final energy

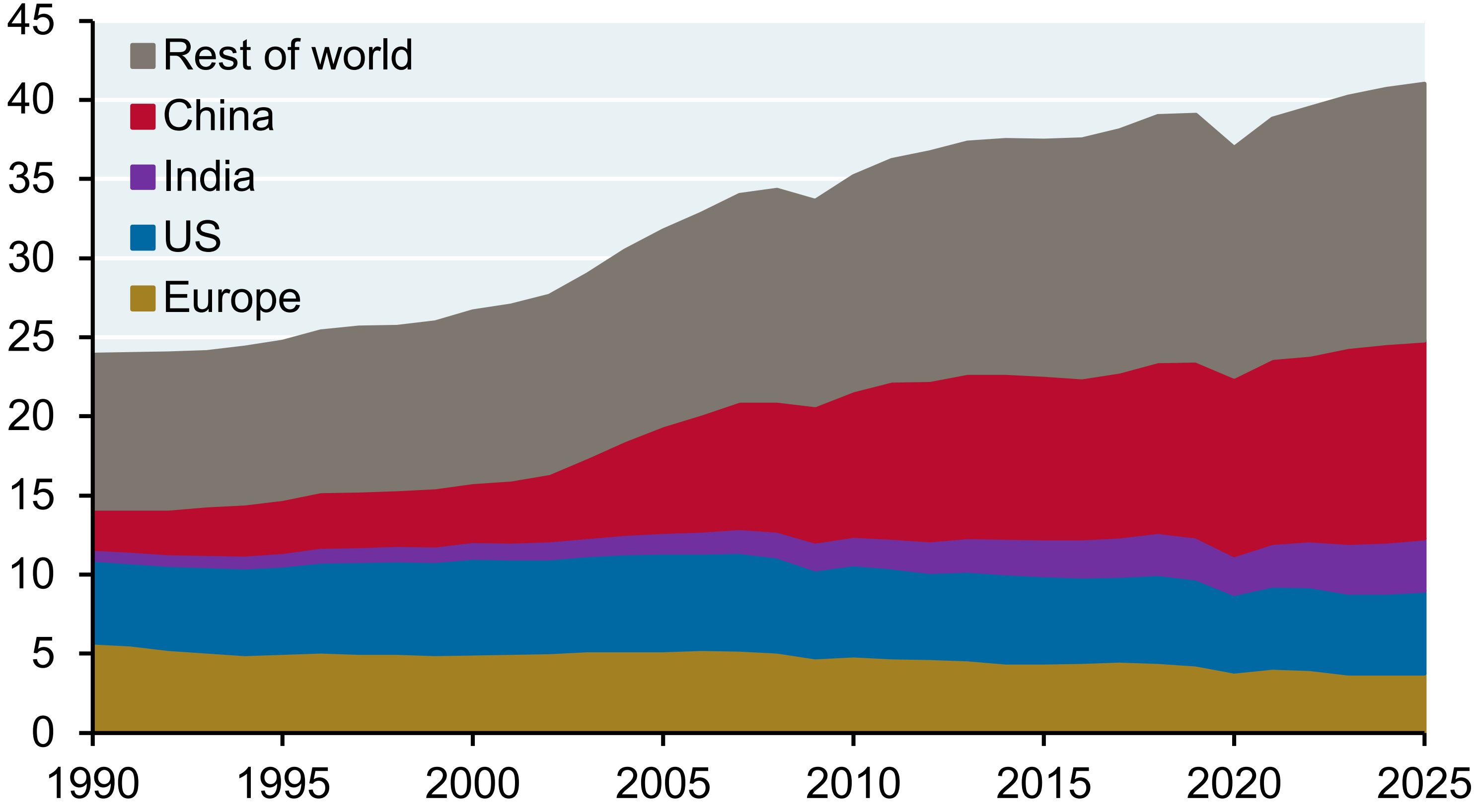
Tonnes per exajoule




Source: Energy Institute, IEA, JPMAM, 2025

# …the absolute *level* of global emissions continues to rise…

**Global $CO_2$ equivalent emissions from energy, process emissions, methane & flaring,** Billion tons

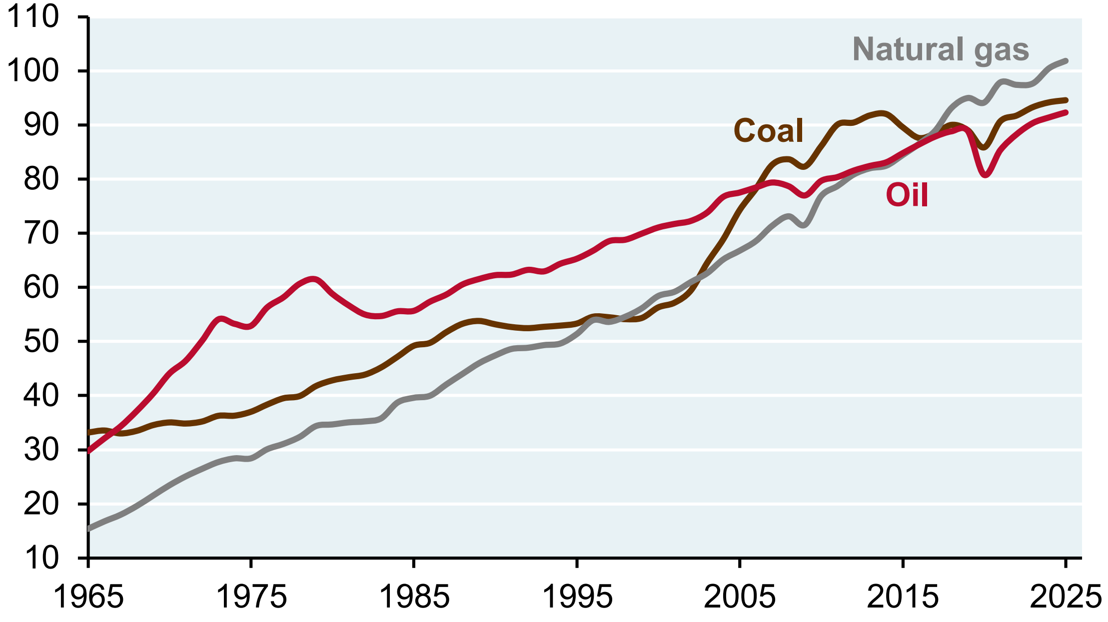



Source: Energy Institute, Global Carbon Project, JPMAM, 2025

# …due to fossil fuel use which is still rising at 1.5% per year, which matches the average since 2005…

**Global fossil fuel consumption**

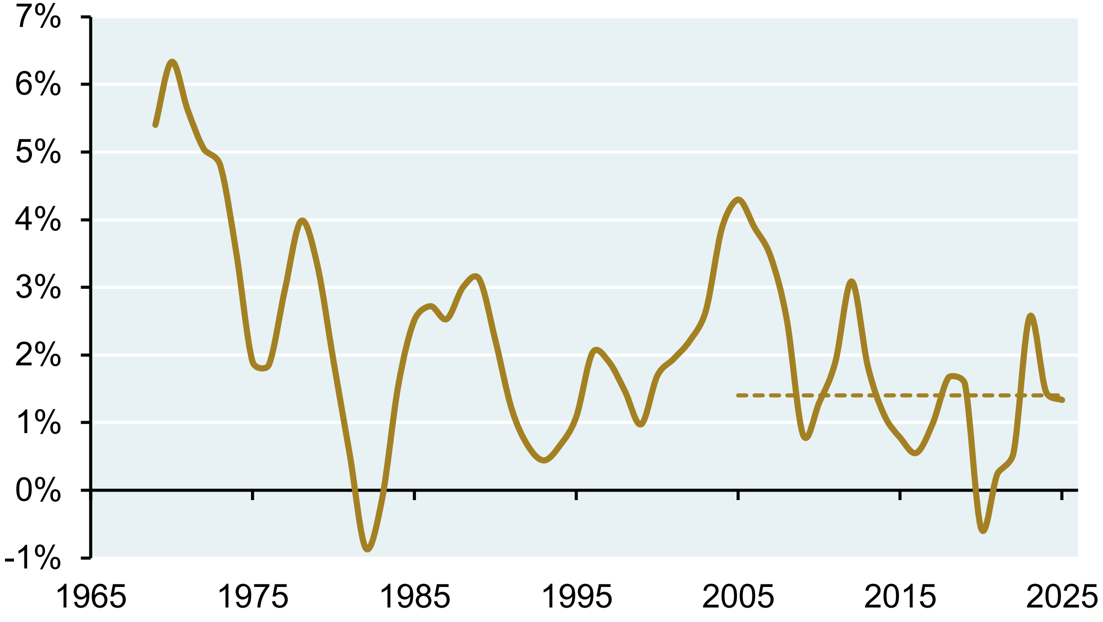
Exajoules of useful final energy




Source: Energy Institute, IEA, JPMAM, 2025

**Global fossil fuel consumption**

Trailing three year growth rate of fossil fuel EJ

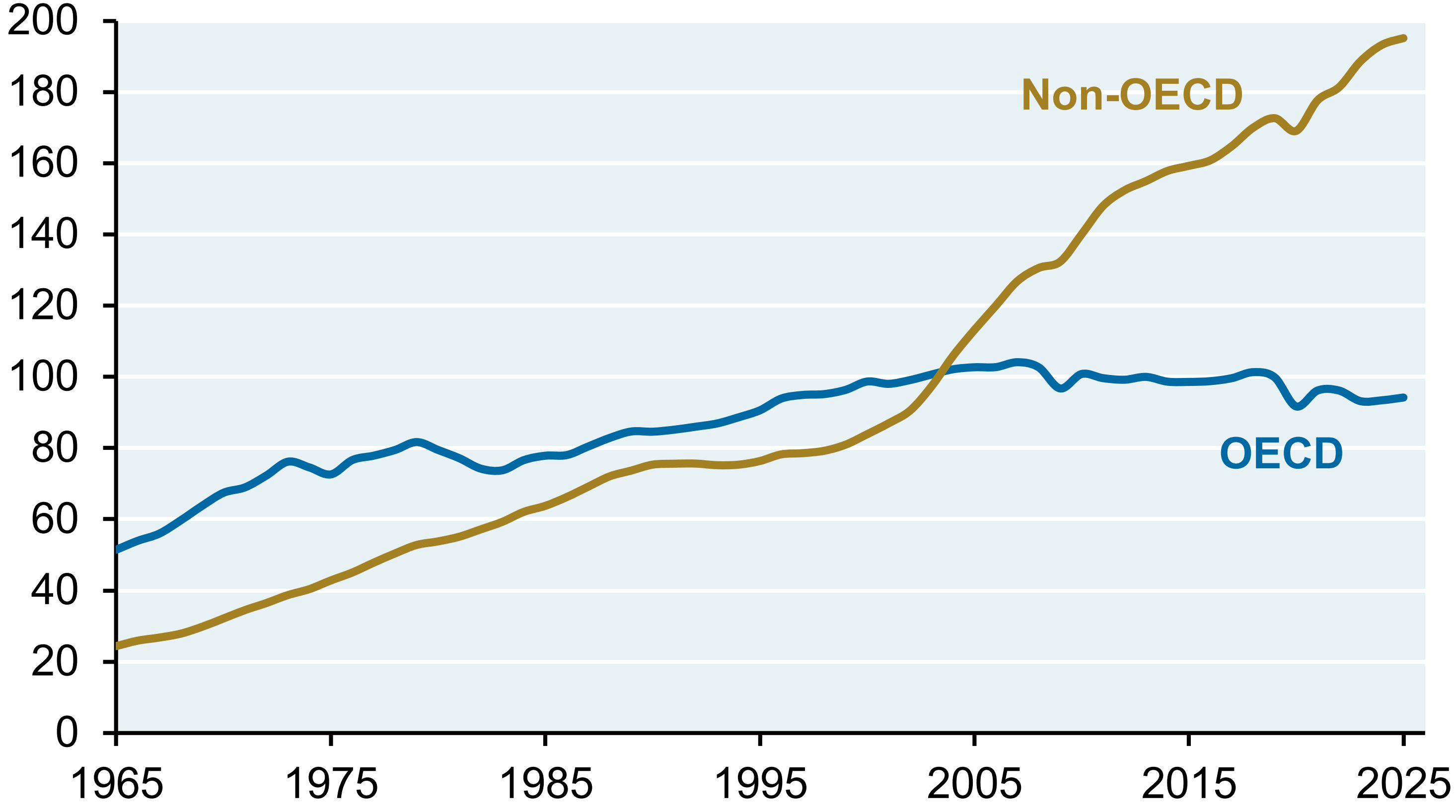



Source: Energy Institute, IEA, JPMAM, 2025

…and which is mostly a function of developing world fossil fuel demand, something which has been the case for over 20 years

## Global fossil fuel consumption

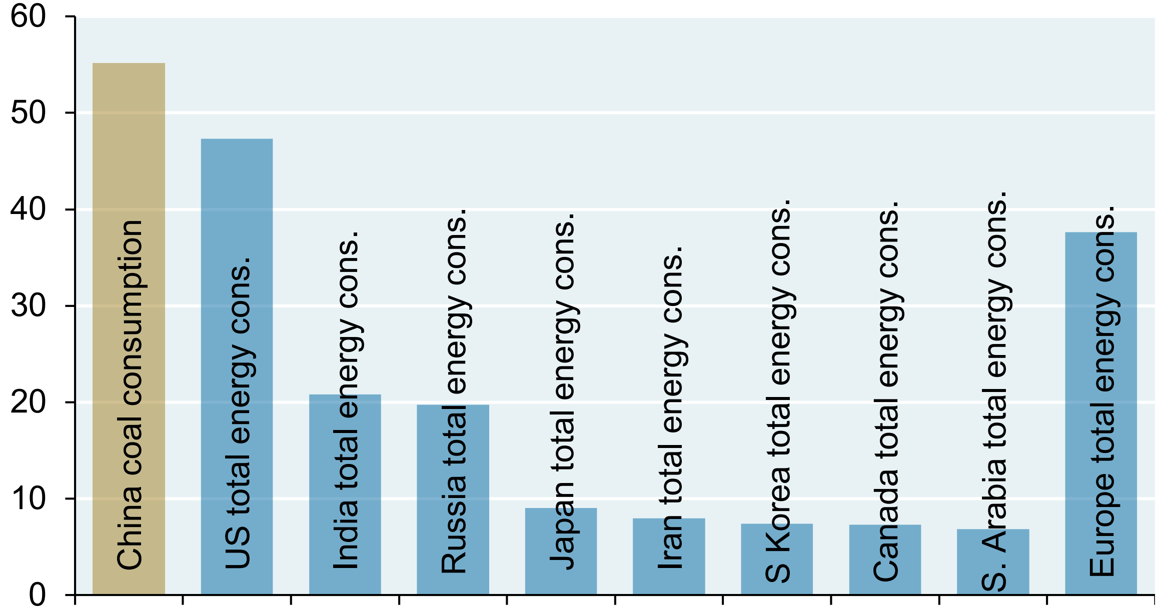
Exajoules of useful final energy




Source: Energy Institute, IEA, JPMAM, 2025

# Case in point: China coal consumption still exceeds the **TOTAL** energy consumption of all other countries/regions shown in the first chart

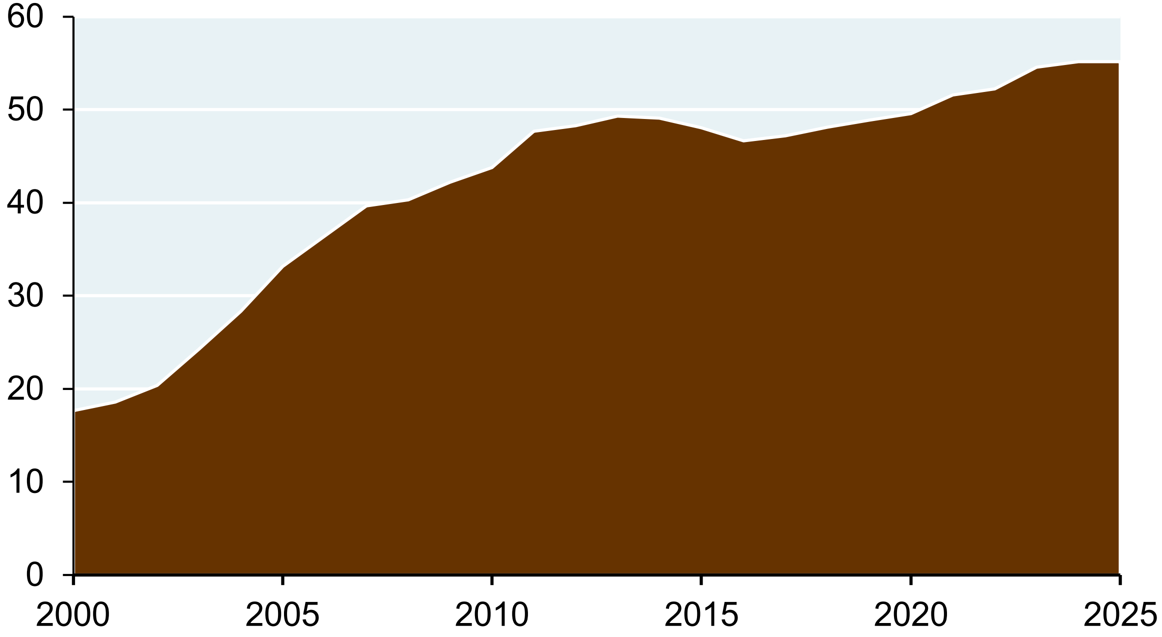
**China COAL consumption exceeds TOTAL energy consumption of any other country,** EJ of useful final energy




Source: Energy Institute, JPMAM, 2025

**China coal consumption**

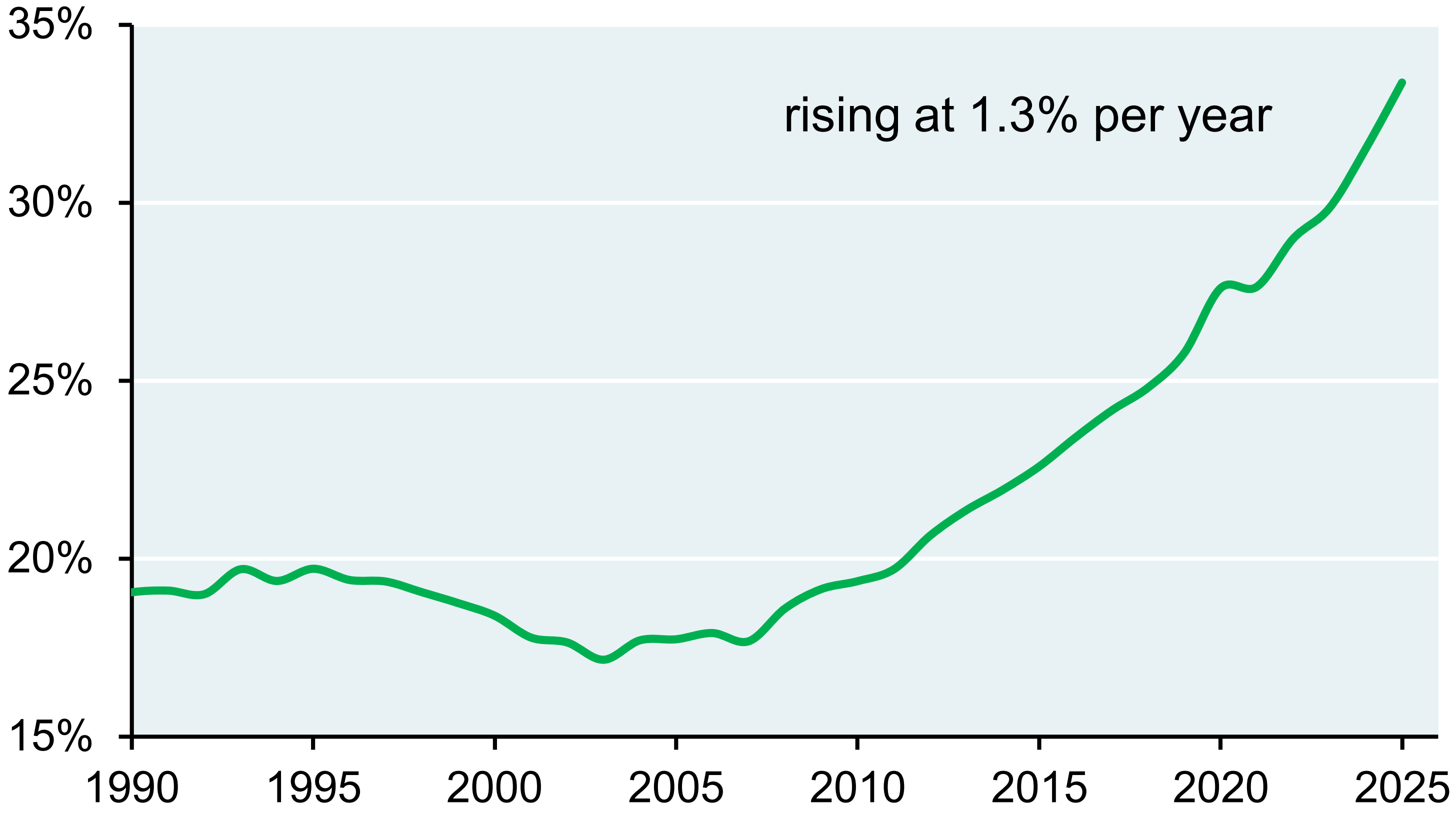
Exajoules of useful final energy




Source: Energy Institute, JPMAM, 2025

# The grid is being decarbonized at a steady pace…

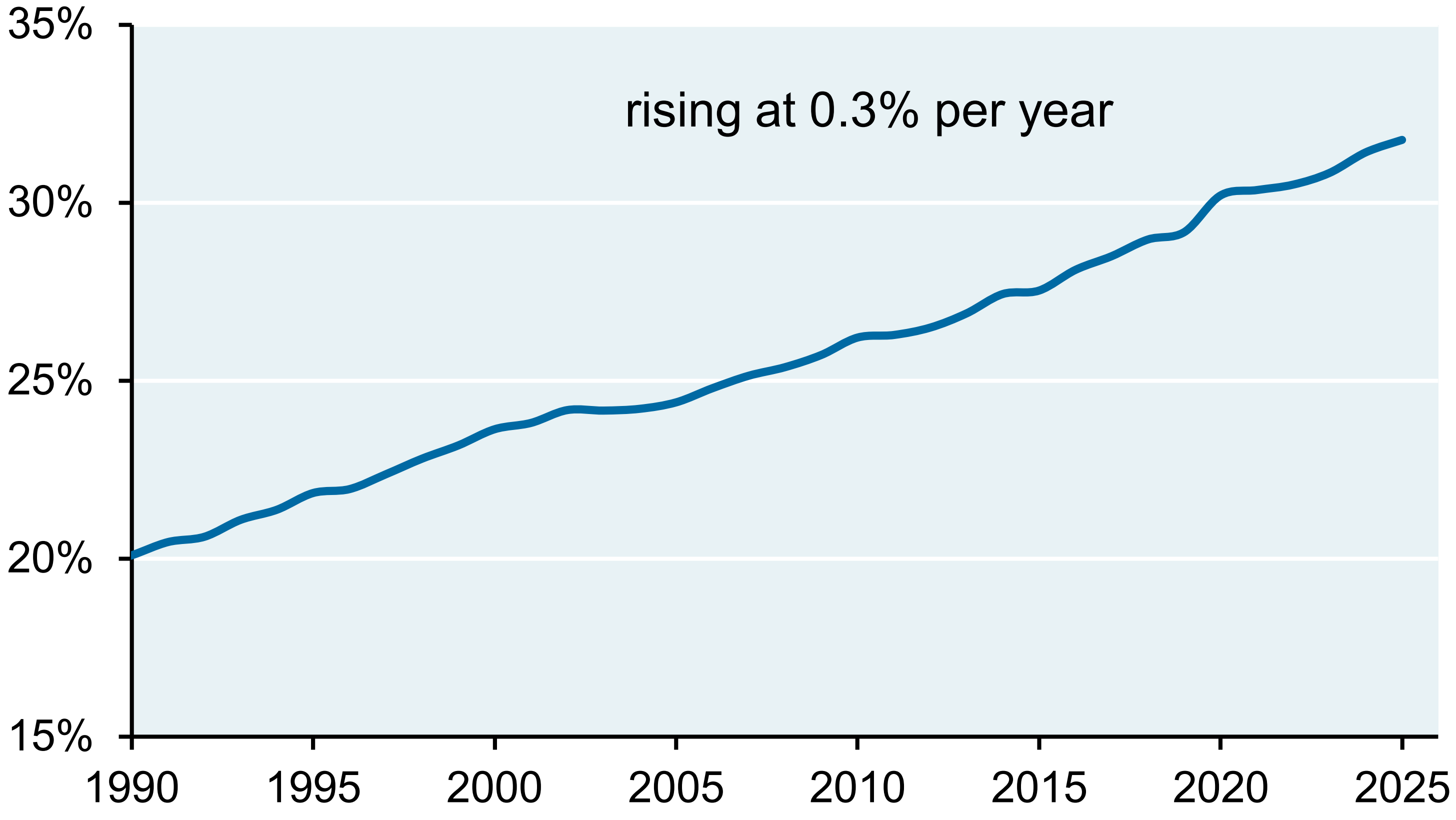
**Renewable share of electricity generation, global**
Percent




Source: Energy Institute, IEA, JPMAM, 2025

# …but there is still too much focus on power which only represents one third of global final energy consumption

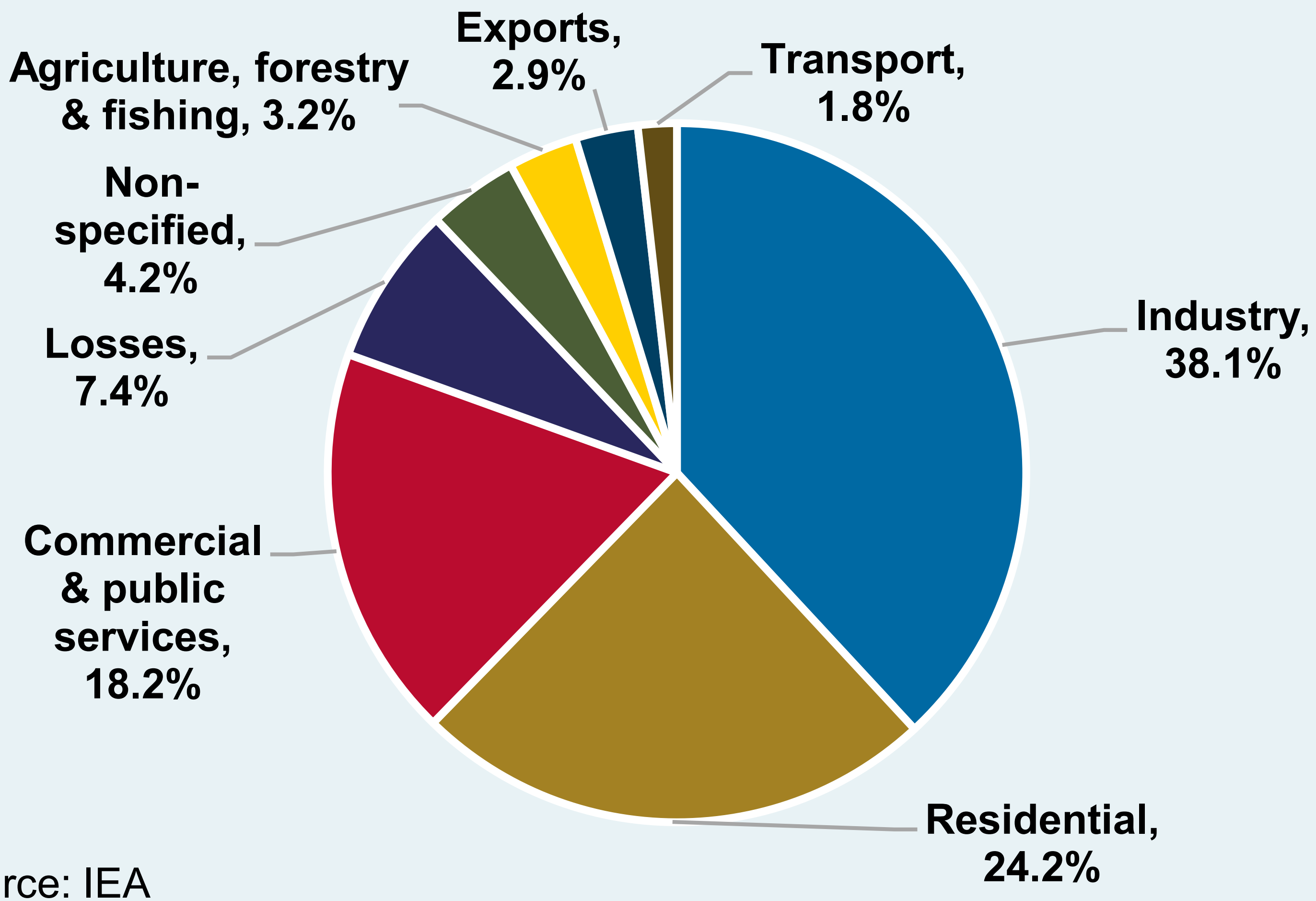
**Electricity share of useful final energy, global**
Percent




Source: Energy Institute, IEA, JPMAM, 2025

# The following electricity uses are being decarbonized…

**Global electricity consumption by sector,** Percent

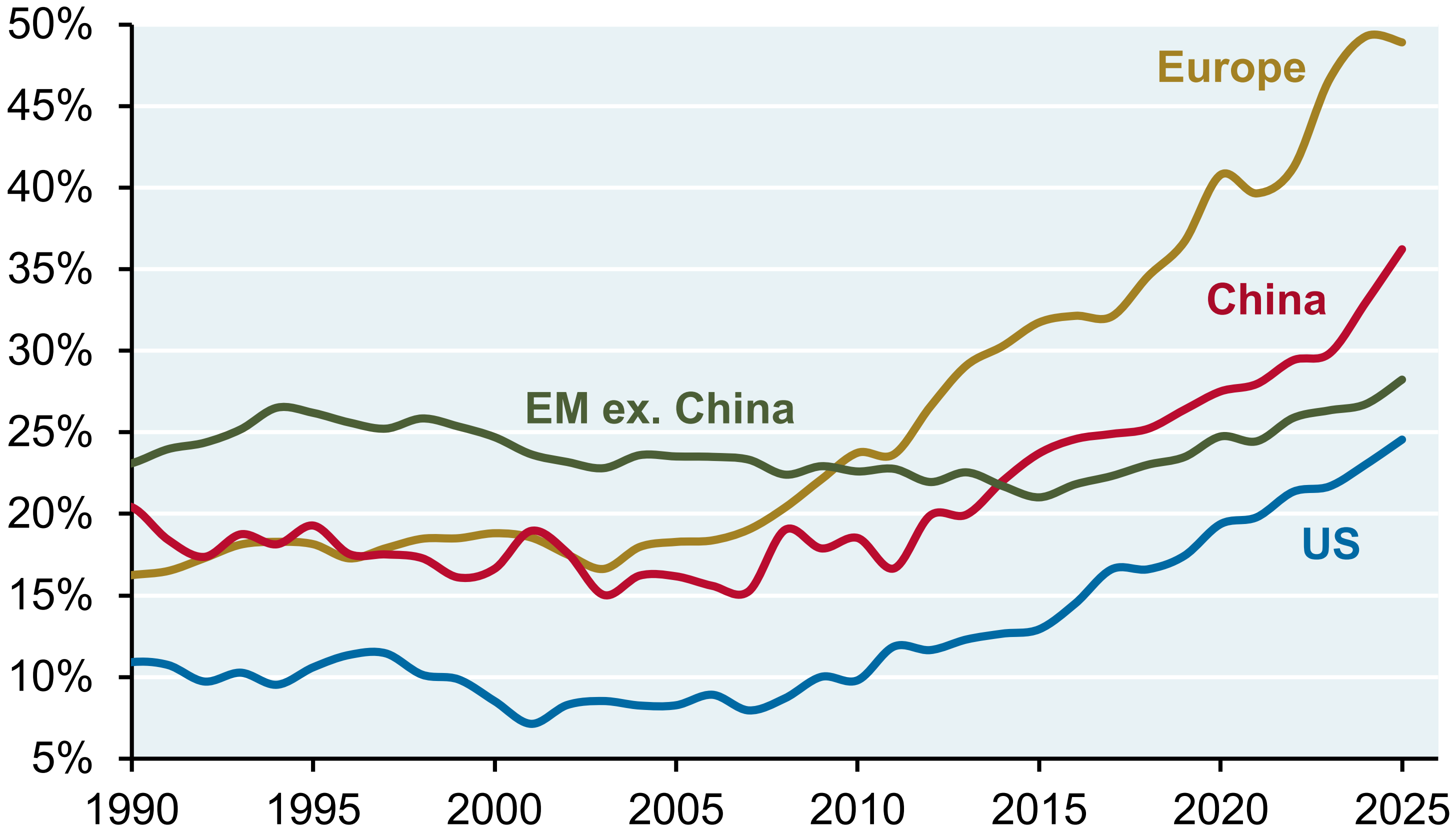



Source: IEA

# …as the renewable share of power continues to rise in most regions…

**Renewable share of electricity consumption**

Percent

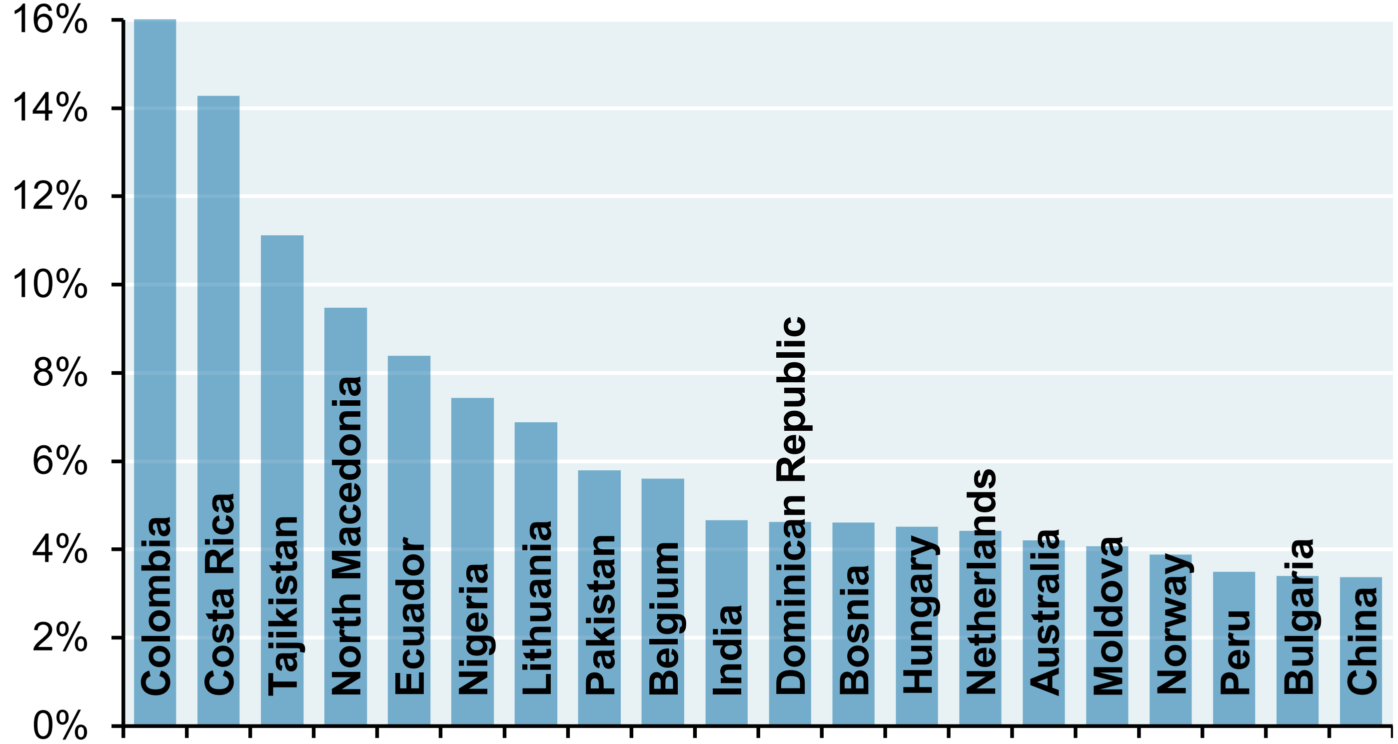



Source: Energy Institute, JPMAM, 2025

# …with the largest increases in the renewable share of electricity generation taking place in the developing world…

**Annual change in renewable share of electricity generation**

Percent increase from 2024 to 2025

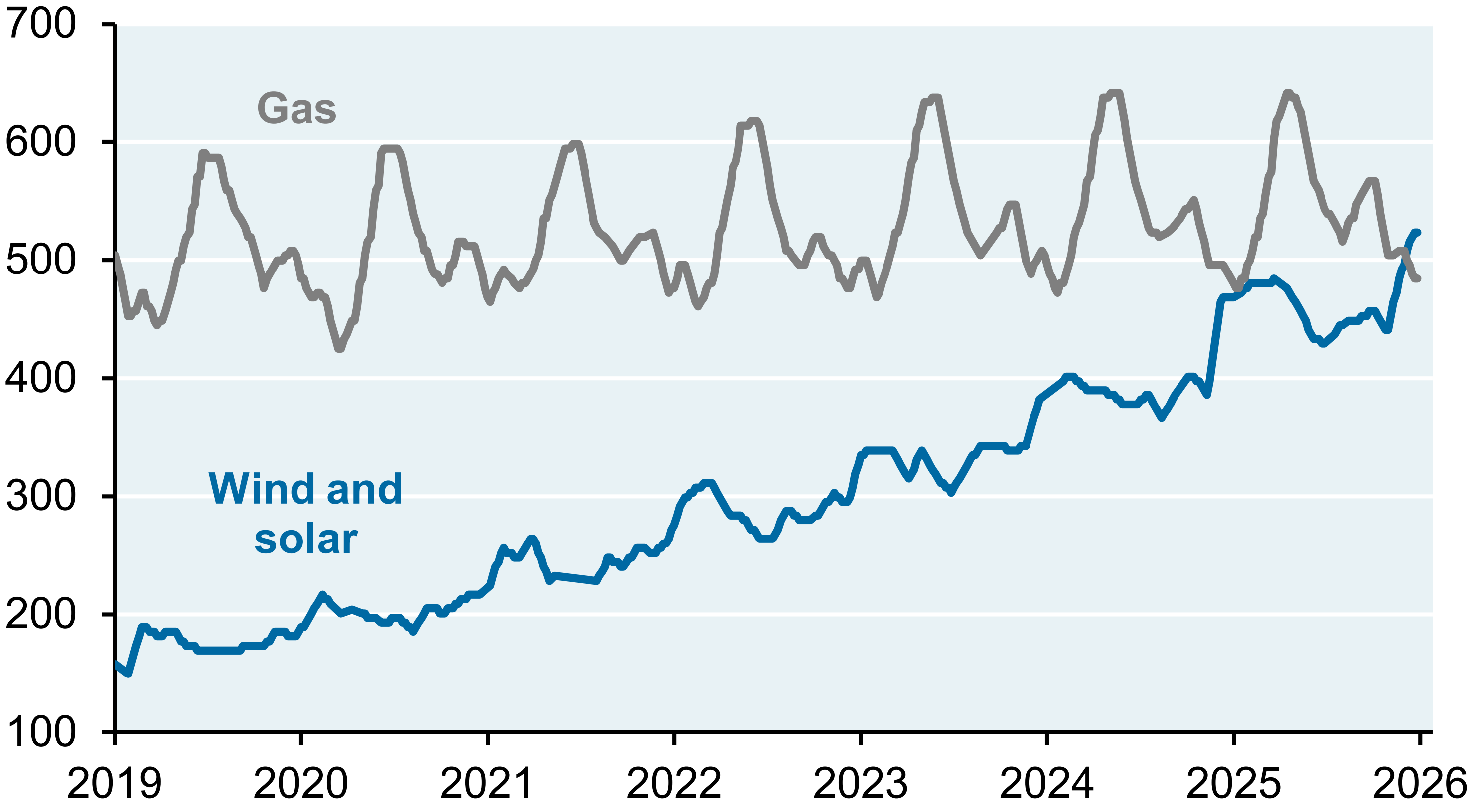



Source: EMBER, JPMAM, 2025

# …as wind plus solar now surpasses gas generation for the first time…

## Global wind and solar vs gas electricity generation

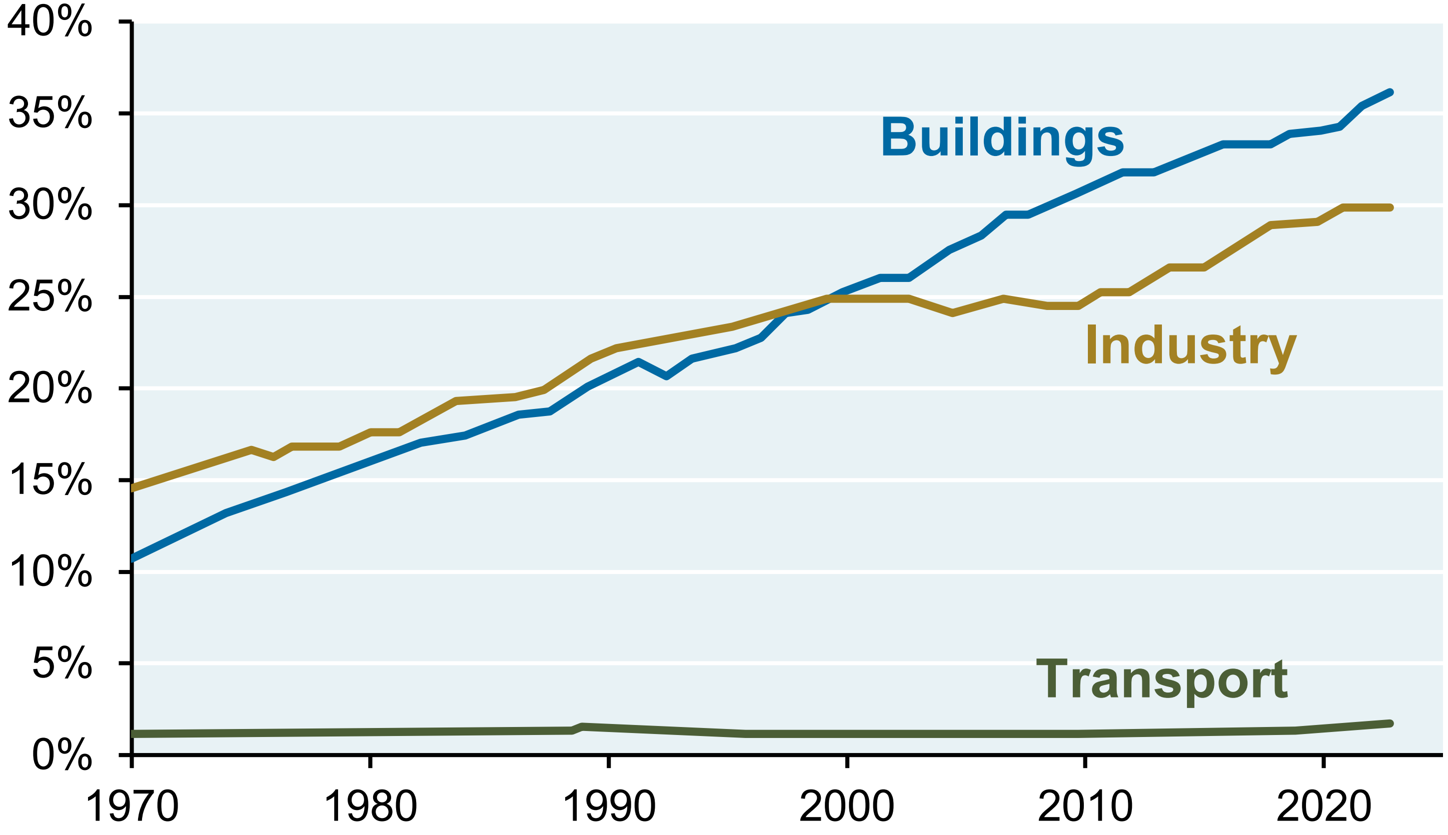
TWh




Source: EMBER, May 21, 2026

# …but the pace of electrification/decarbonization in buildings, industry and transport is still a slow process…

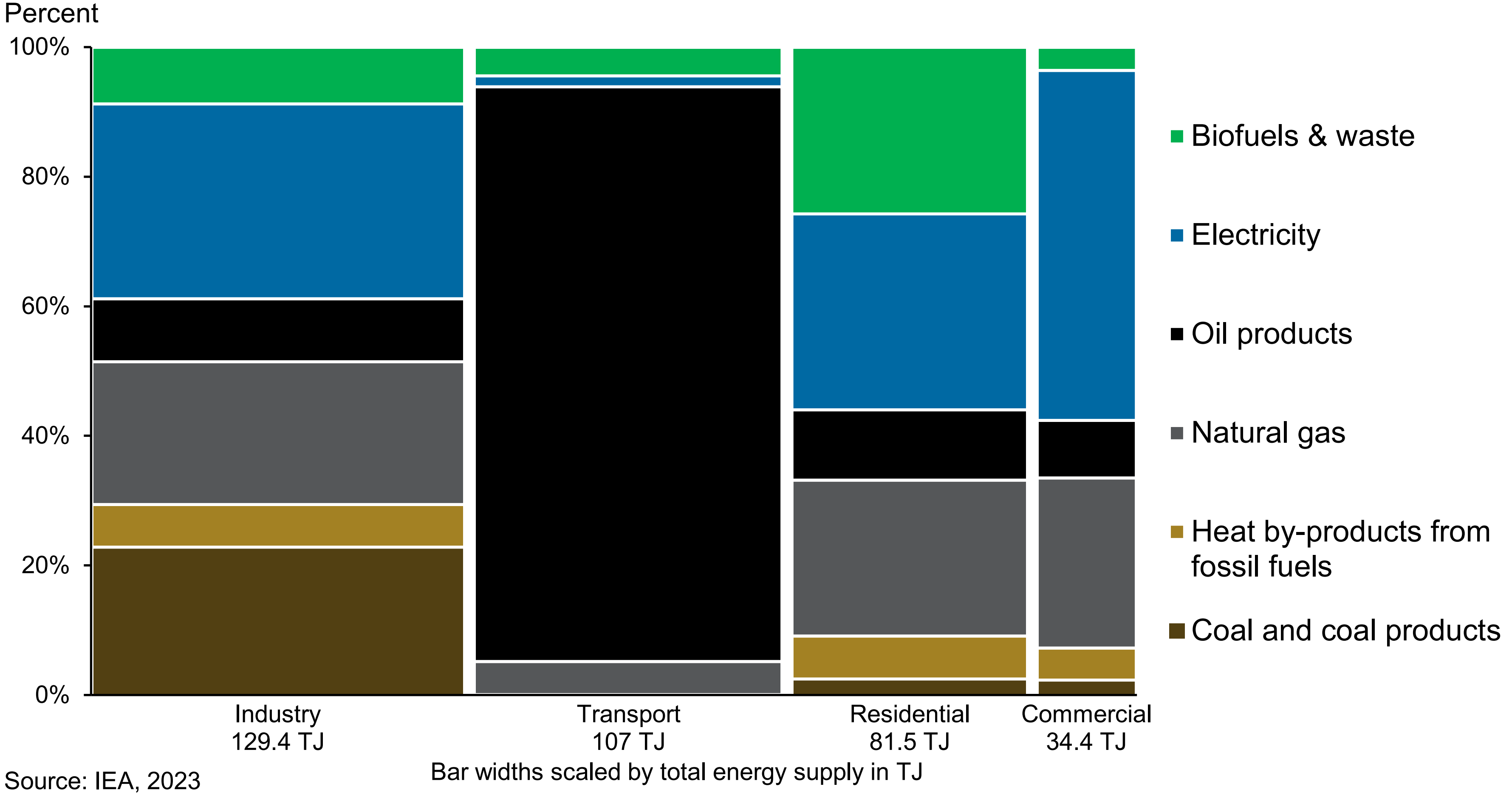
**Global electricity share of final energy consumption**
Percent




Source: IEA World Energy Balances, 2024

# …given the real-world difficulty of electrifying certain machines, engines, furnaces, boilers and other devices

**Global energy consumption by sector and type**



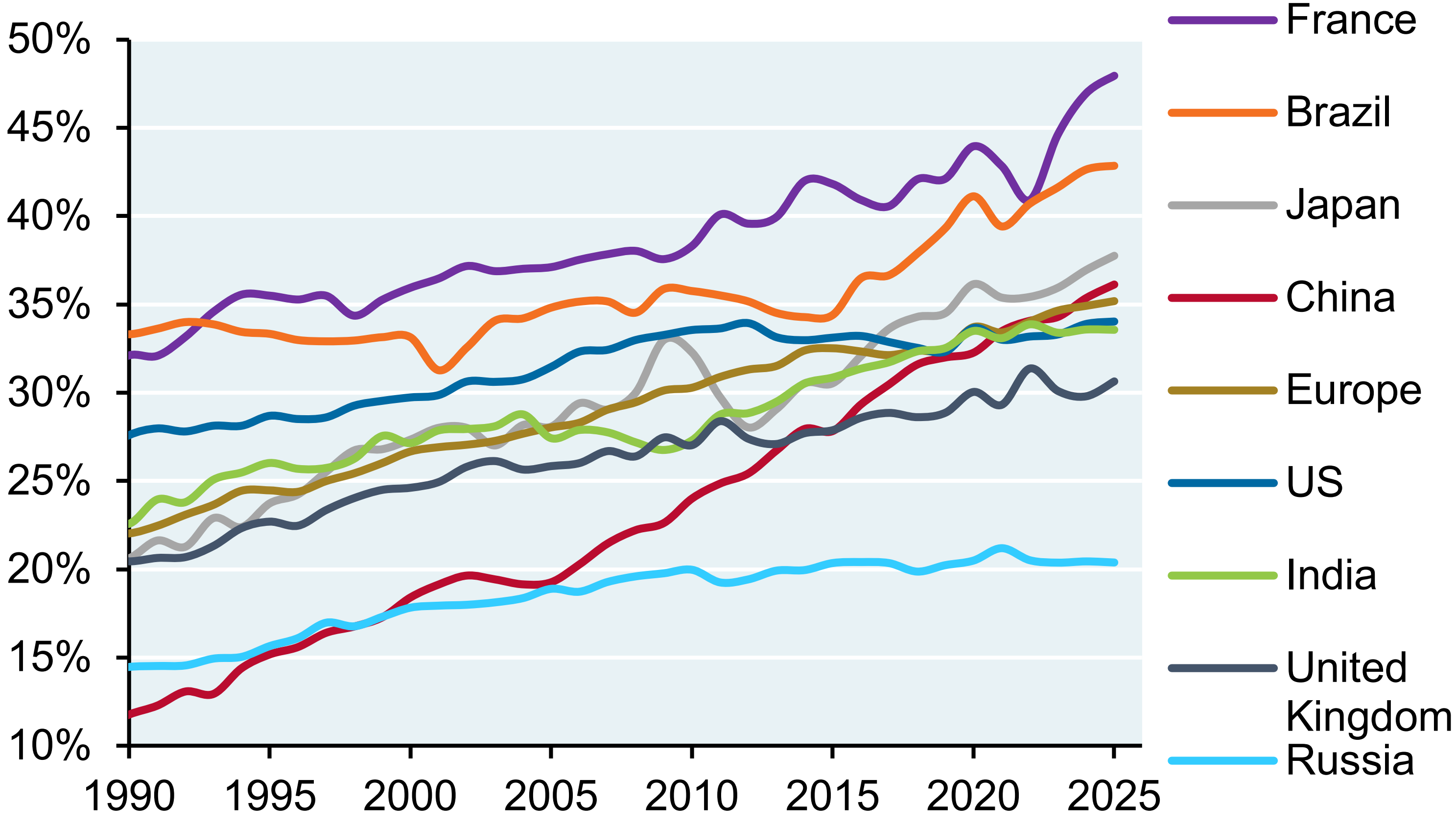

Source: IEA, 2023

**Note on residential biofuels.** Around 50% of residential bioenergy is consumed in developing countries for cooking and heating using open fires or cookstoves with considerable negative impact on health (smoke pollution) and the environment (deforestation). The remainder represents modern bioenergy used for heat, and smaller amounts used for transportation and electricity.

# China, France, Brazil and Japan are the pace-setters on electrification

## Major countries: electricity share of useful final energy

Percent

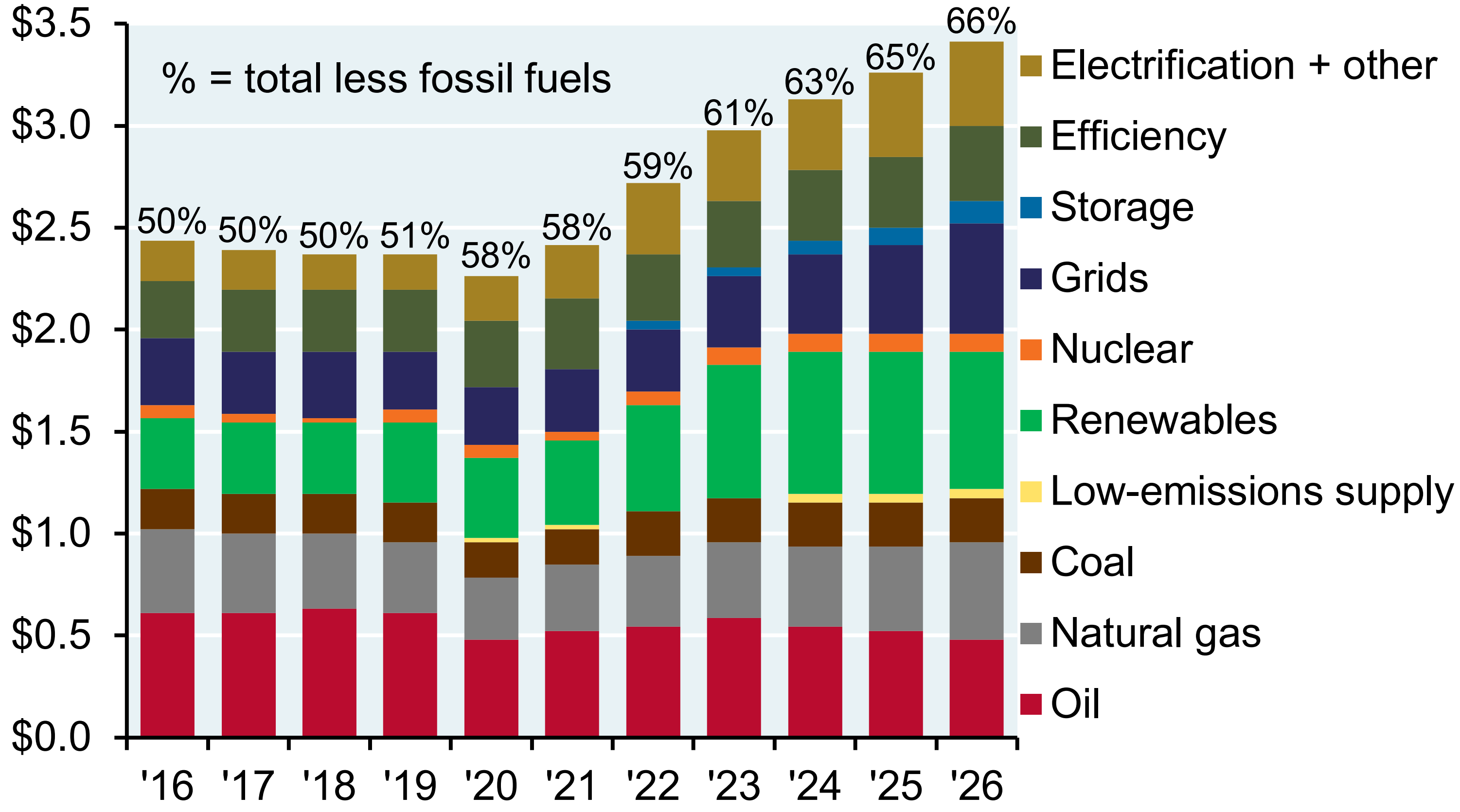



Source: Energy Institute, IEA, JPMAM, 2025

# Where to from here? Renewables, grids, energy storage and electrification are on track to capture 2/3 of global energy investment in 2026

## Global investment in energy

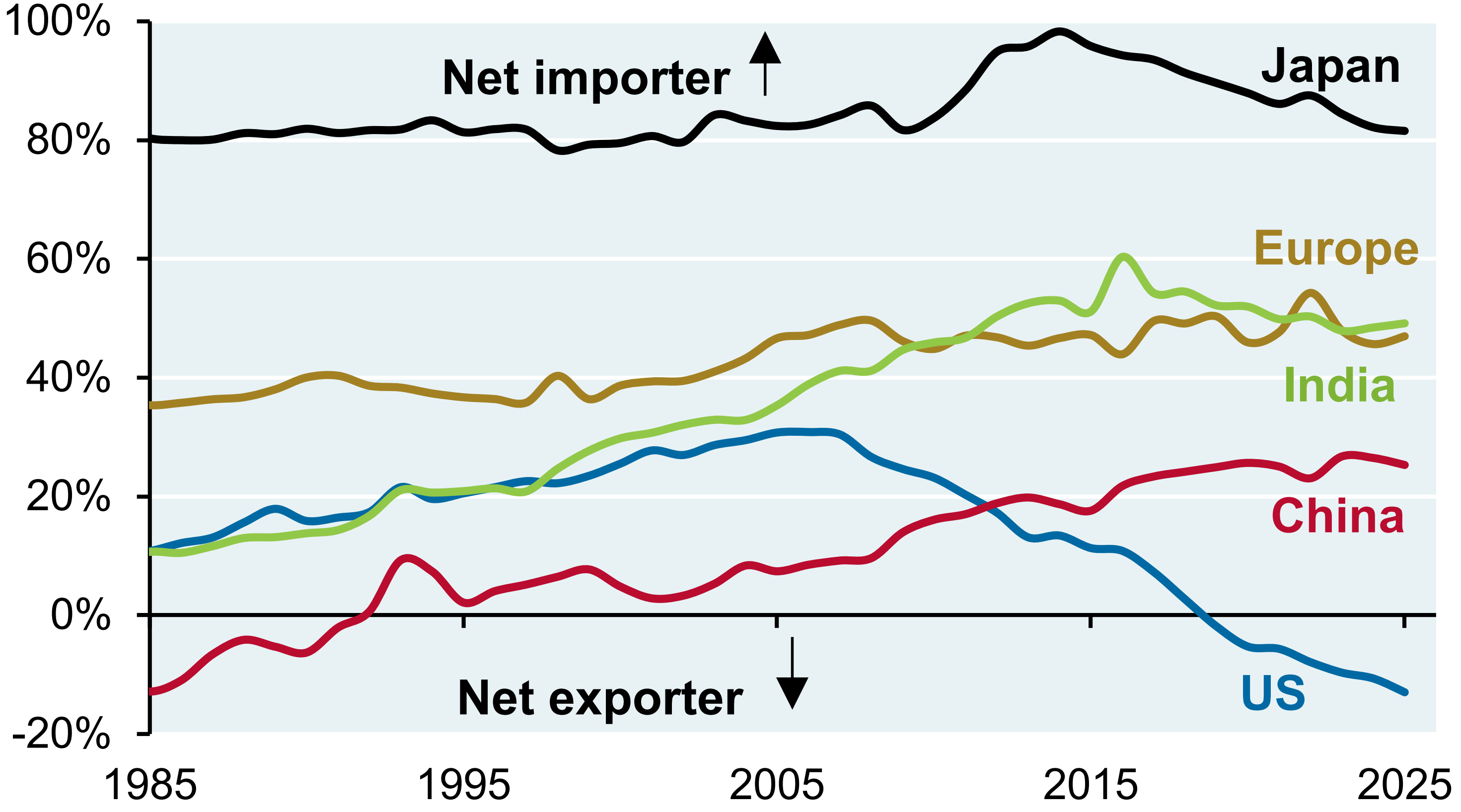
US$, trillions




Source: IEA, April 20, 2026

# Will the Iran War and related commodity price spike increase the pace further? Most regions are exposed to fossil fuel prices since they are large net importers

**Net imports of fossil fuels as a percent of primary energy consumption,** Percent

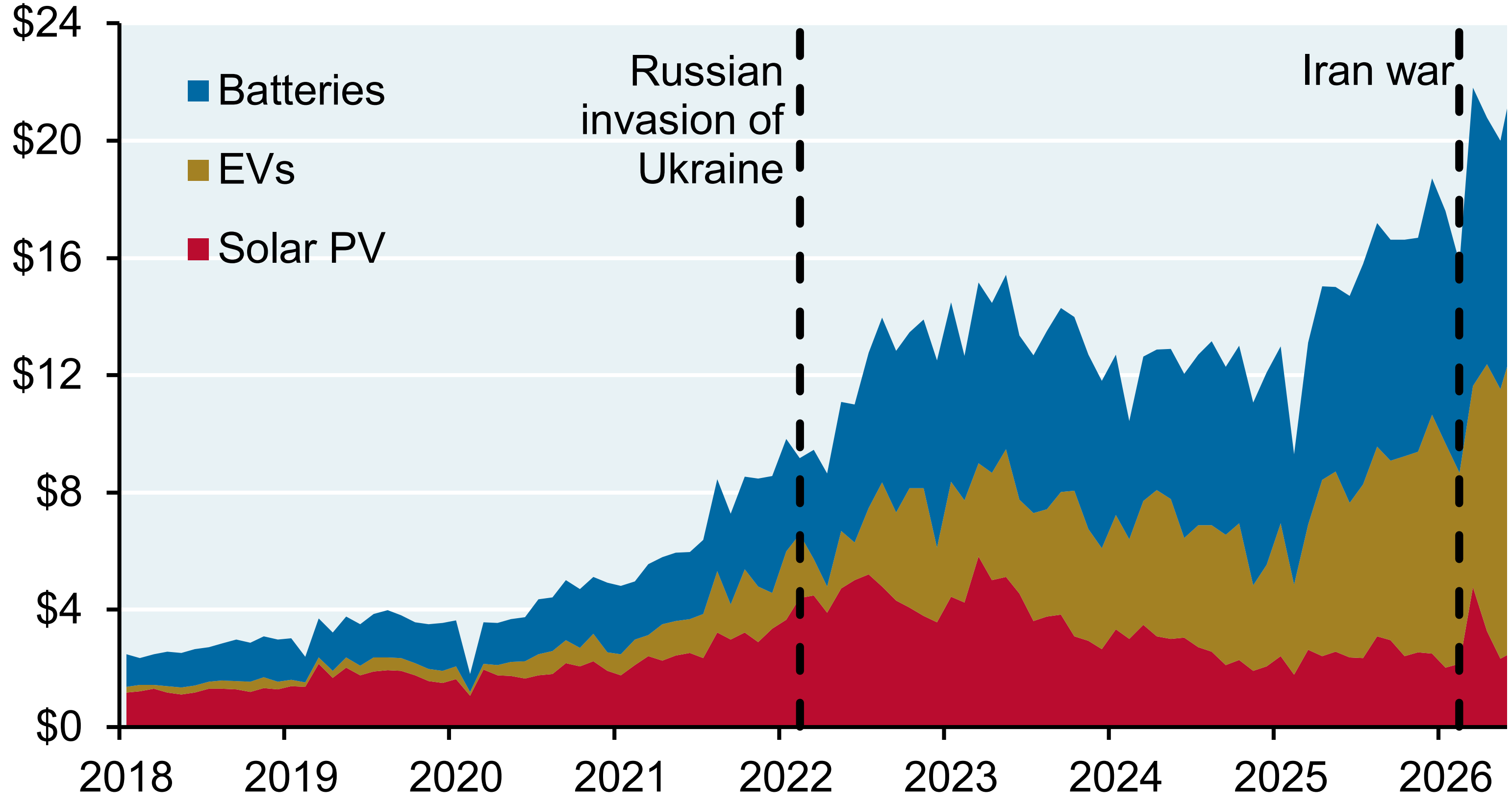



Source: Energy Institute, JPMAM, 2025

# China clean tech exports spiked after the Iran war, just as they did after Russia's invasion of Ukraine

## China clean technology exports: batteries, EVs & solar PV

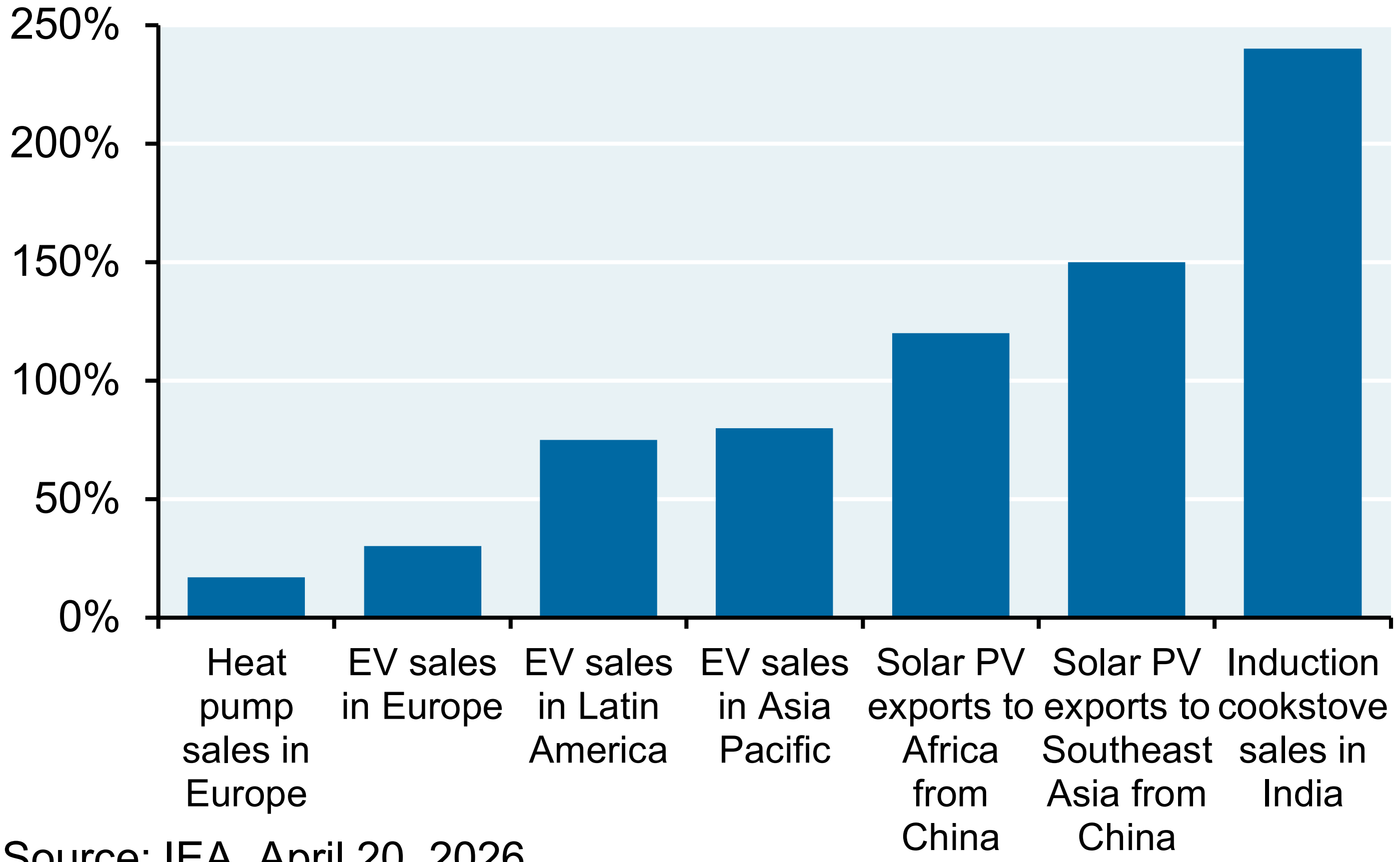
US$, billions




Source: EMBER, JPMAM, June 2026

# More evidence of a shift: electrification investment spiked in Q1

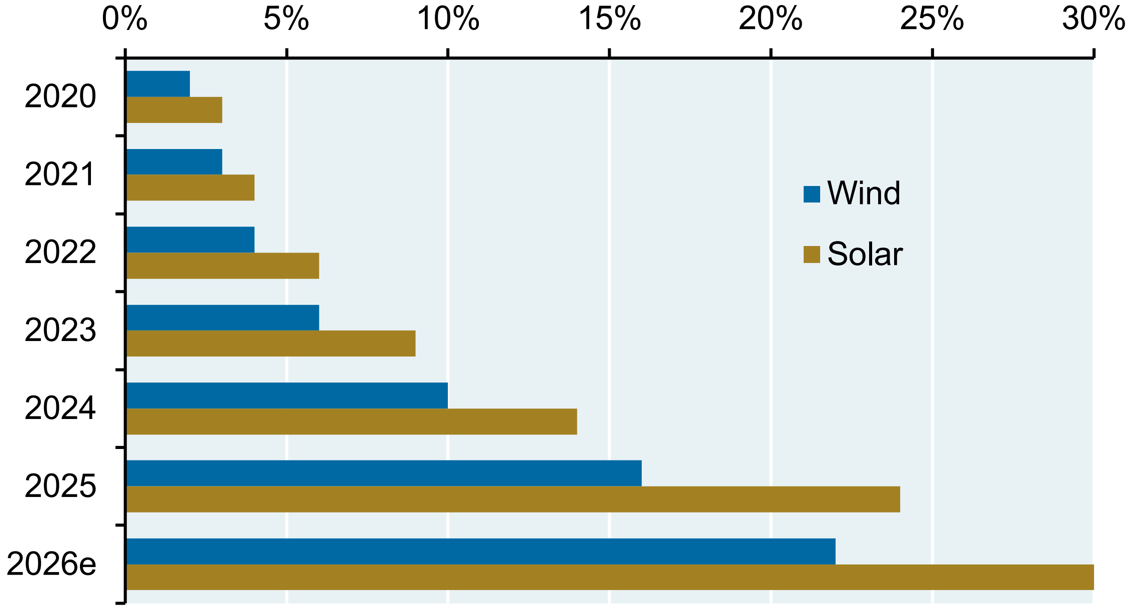
**YoY sales growth of electrification related goods, Q1 2025 - Q1 2026,** Percent




Source: IEA, April 20, 2026

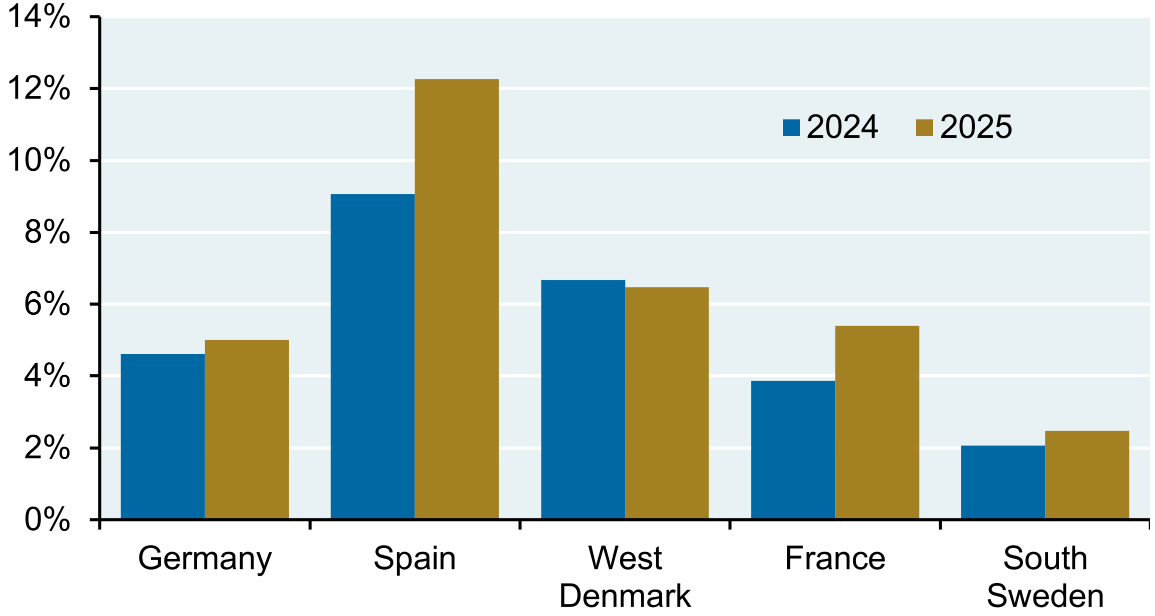
# One of the next hurdles to clear: more grid investment to reduce rising solar/wind curtailment

**Brazil clean energy curtailment**
Curtailment rate, percent




Source: Adapt Amazonia (Simon Burnett), June 2026

**Europe wind energy curtailment**
Curtailment rate, percent

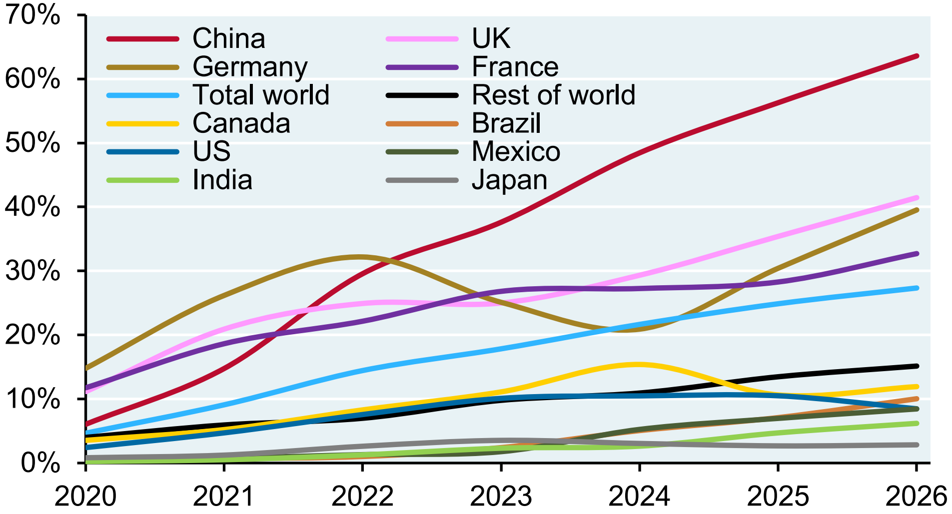



Source: Bloomberg, October 8, 2025

# EV adoption is in the eye of the beholder: % of sales vs % of fleet
# China, the UK and Germany lead among large car markets

**EV share of passenger vehicle SALES, largest car markets**

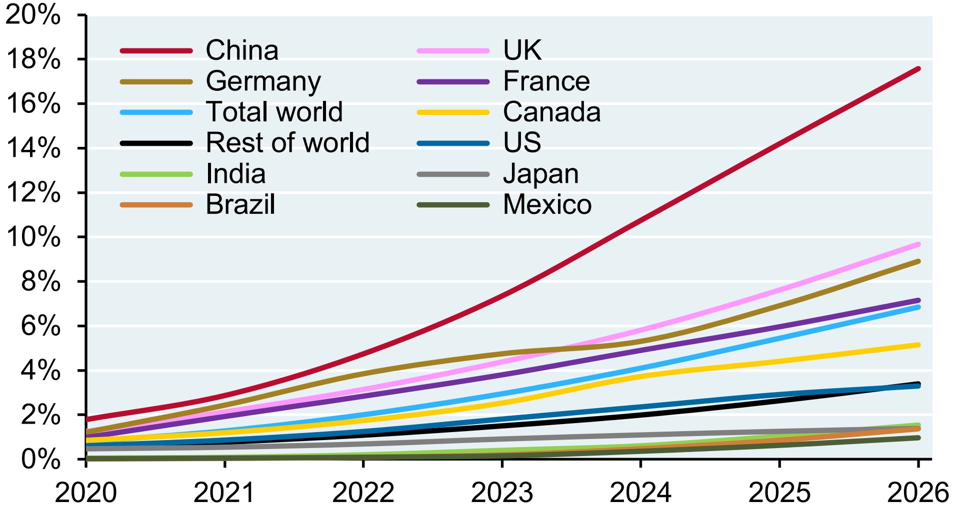
Percent, BEV + PHEV + EREV




Source: BloombergNEF, JPMAM, June 2026. The top 10 countries above make up ~70% of global passenger vehicle sales

**EV share of passenger vehicle FLEET, largest car markets**

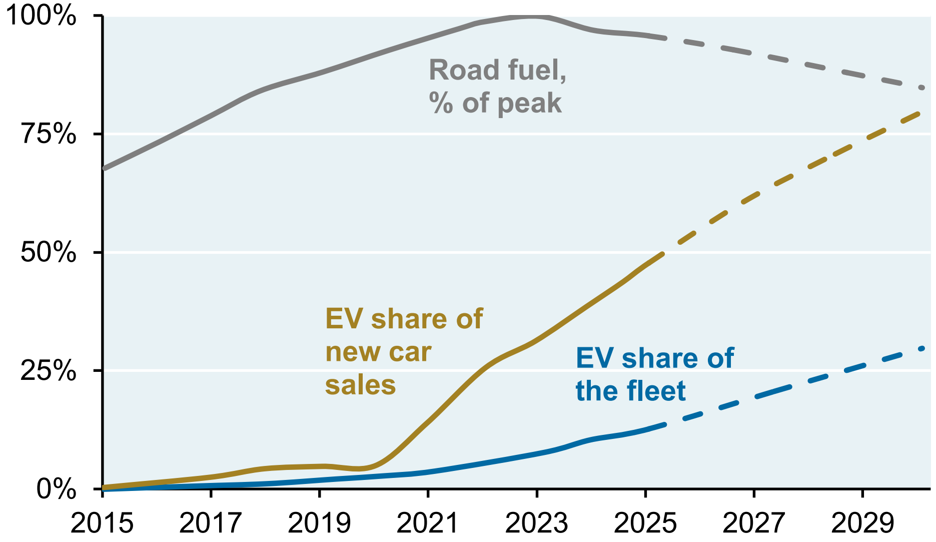
Percent, BEV + PHEV + EREV




Source: BloombergNEF, JPMAM, June 2026. The top 10 countries above make up ~70% of global passenger vehicle sales

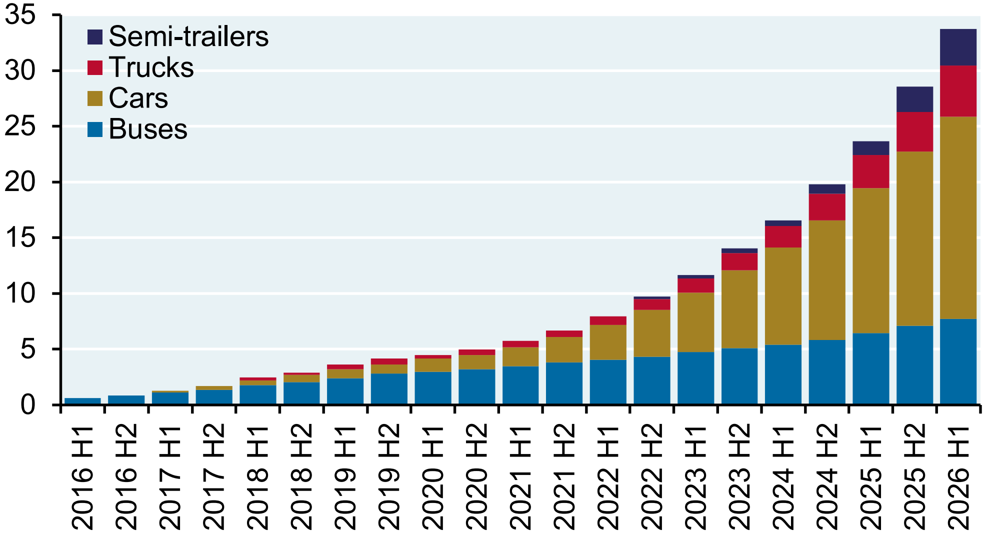
# Some evidence regarding the impact of EV adoption on road fuel consumption: China

**China EV share of sales vs fleet & road fuel from peak**
Percent




Source: OFV, SSB, CAAM, IEA, TheCitiesPod, June 13, 2026

**Chinese oil demand displaced by EVs**
Million tonnes of oil equivalent

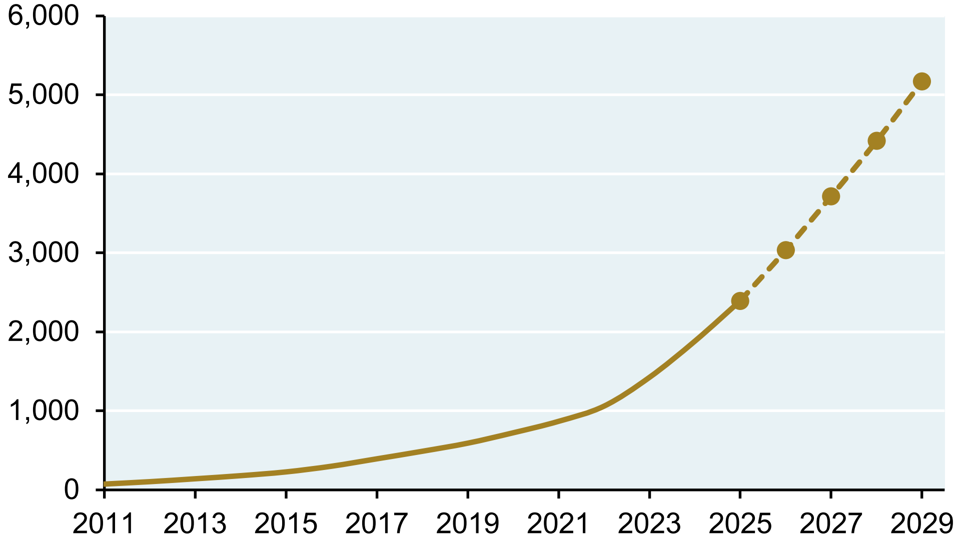



Source: Center for Research on Energy and Clean Air, July 2026

The amount of oil displaced by China's electric vehicles reached nearly 34 million tonnes in the first half of 2026, roughly triple the level from just three years ago. That converts to around 1.35 million barrels per day, which is more than 1% of total global oil demand

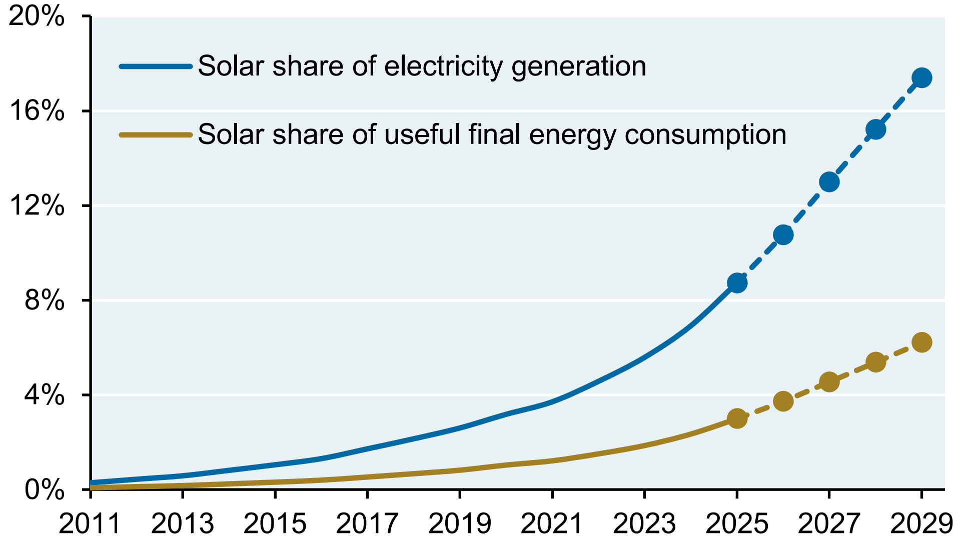
# Solar power continues its ascent with China a primary driver; Declining battery costs create options for synthetic baseload power

**Global solar capacity**
GW




Source: Energy Institute, BloombergNEF, JPMAM, 2025

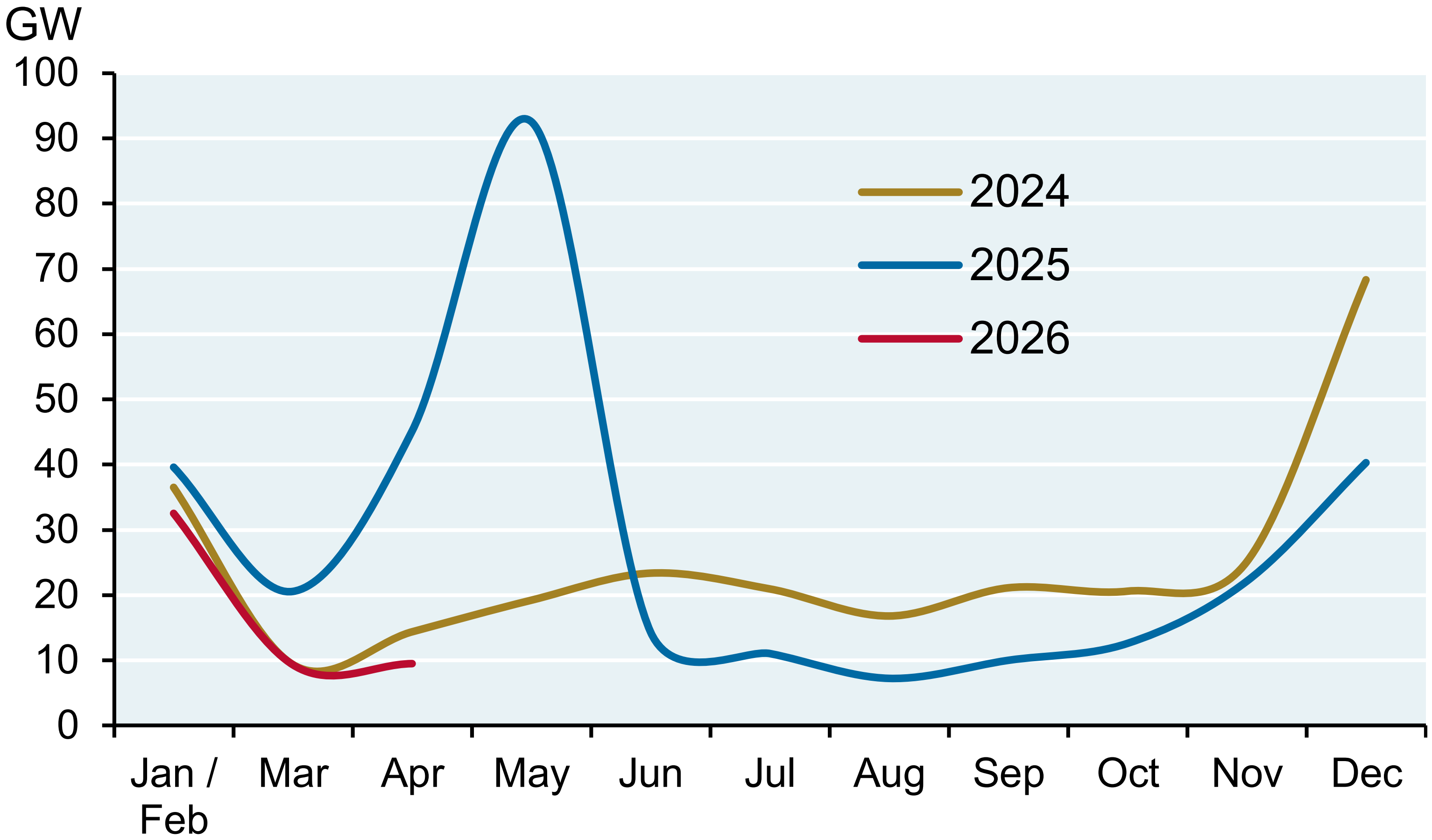
**Solar shares of global electricity and useful final energy**
Percent




Source: Energy Institute, IEA, BloombergNEF, JPMAM, 2025

# While 2025 was a banner year for solar in China, subsidy reductions are already having an impact in 2026

## China new monthly solar capacity additions



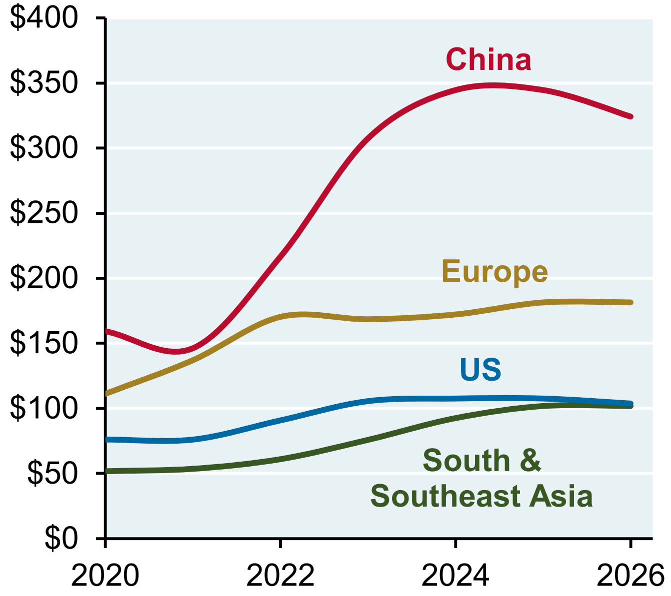

Source: National Energy Administration, Carbon Brief, June 6, 2026

- For solar projects financed after June 2025, the government will buy electricity from producers at a lower fixed strike price than before
- Only a fixed amount of projects would receive this government price, forcing companies to sell electricity directly to the open market
- Developers will have to finance and build projects without policy-backed revenue guarantees
- This is a shift to market-driven pricing for renewables

# Focus on the US: an outlier in the energy transition

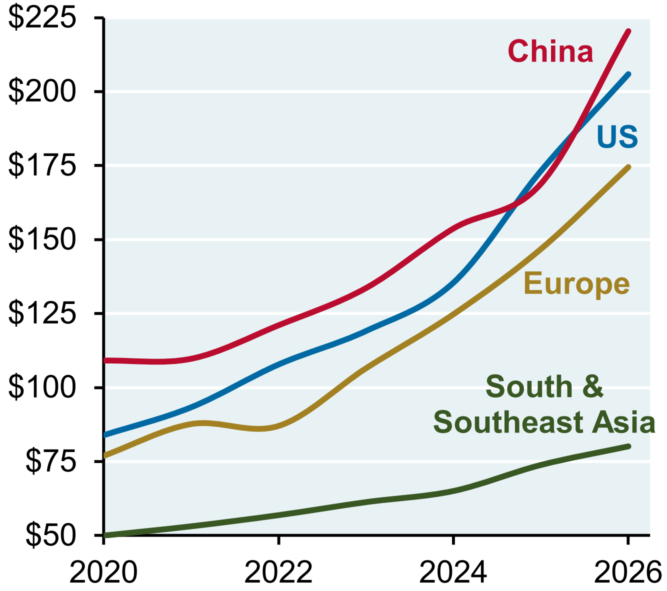
# The US still spends on renewables, batteries and grids but notice the spike in US gas-fired power investment…

**Renewables & nuclear investment**
Billion US$, annual, with 2026 estimate



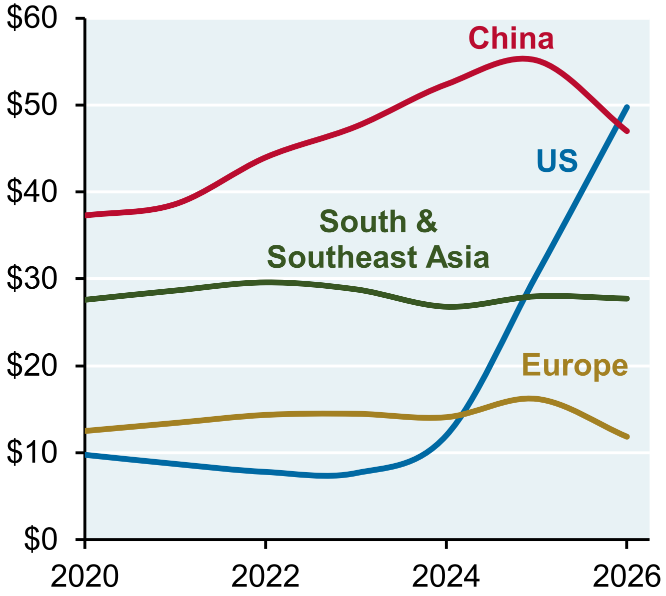

Source: IEA, May 28, 2026

**Grids & battery storage investment**
Billion US$, annual, with 2026 estimate




Source: IEA, May 28, 2026

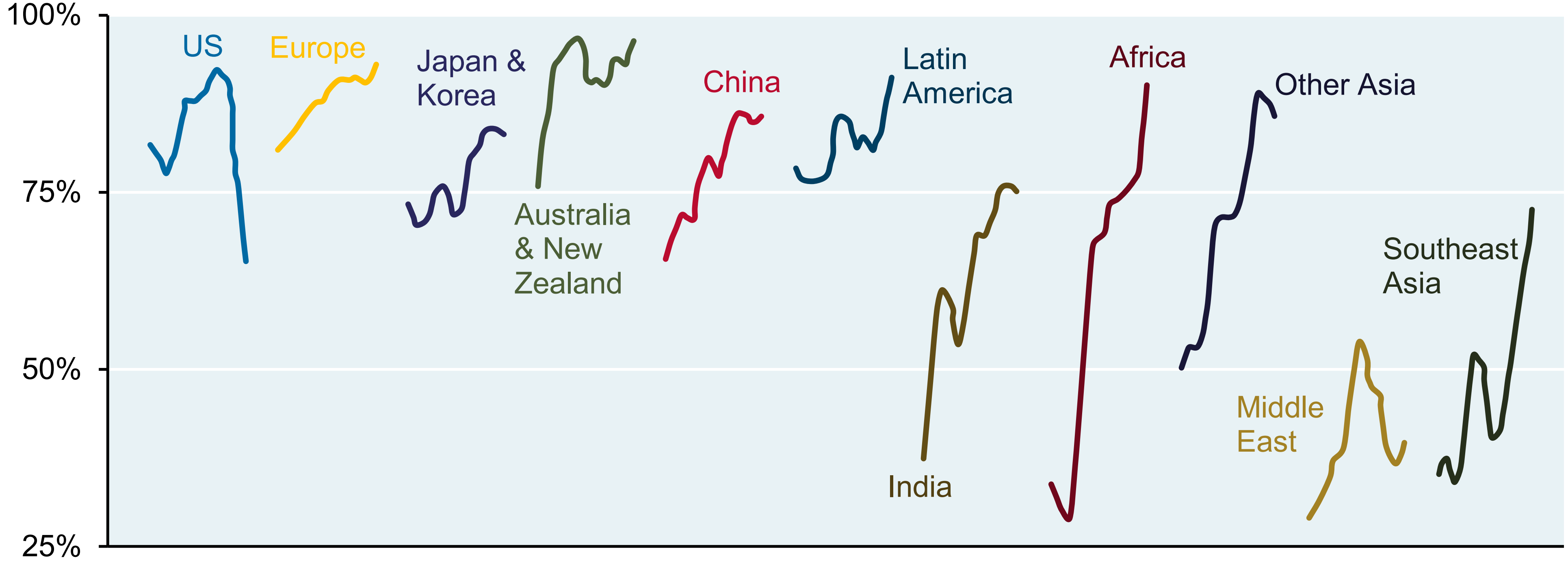
**Coal & gas-fired power investment**
Billion US$, annual, with 2026 estimate




Source: IEA, May 28, 2026

# Another look at the US anomaly: generation investment in low emissions sources

**Share of total electricity generation investment from low-emissions sources, 2015-2026**
Percent

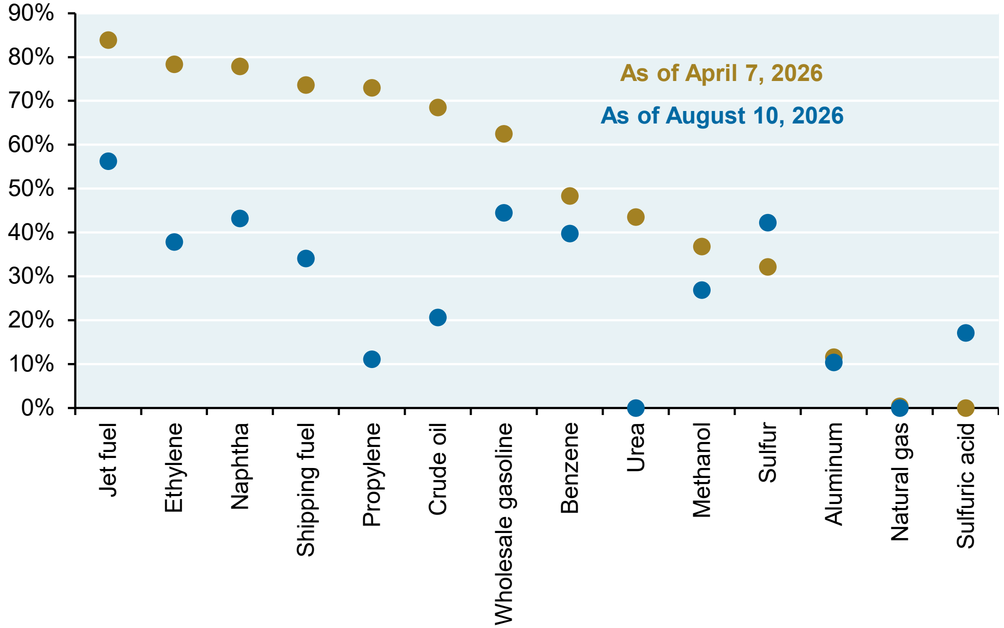



Source: IEA, JPMAM, 2026

# While the US is a net fossil fuel *exporter*, its commodity prices still rose sharply during the Iran War

**US commodity price change since the start of the Iran War**

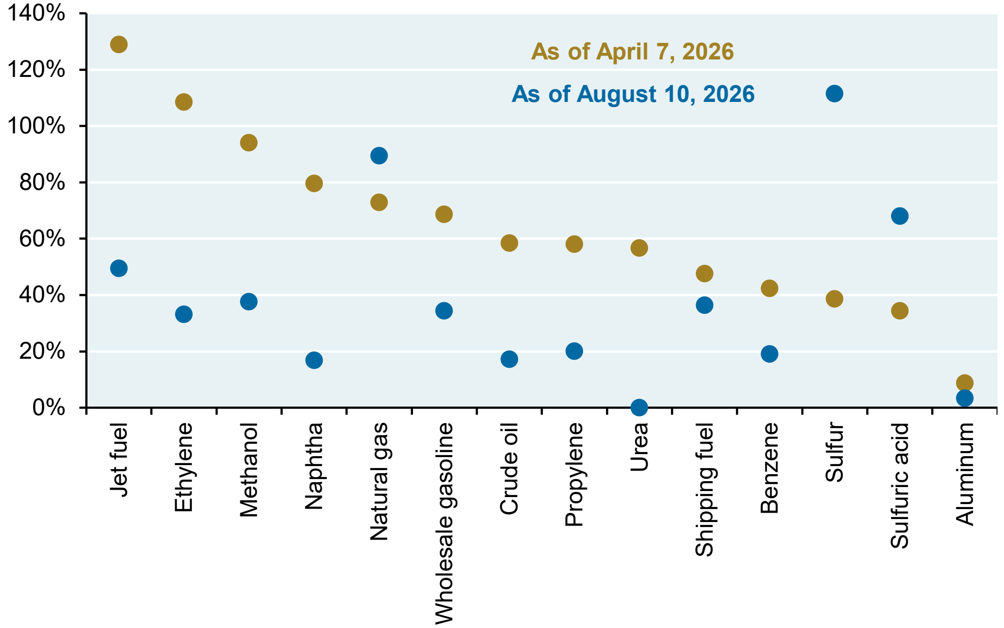
% price change




Source: Bloomberg, JPMAM, August 10, 2026. Price change from close of last business day before Iran War (Feb 27, 2026)

**Global ex-US commodity price change since the start of the Iran War**

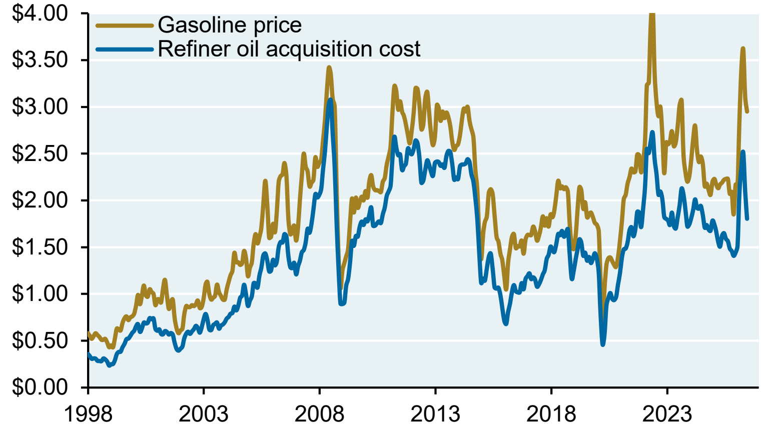
% price change




Source: Bloomberg, JPMAM, August 10, 2026. Price change from close of last business day before Iran War (Feb 27, 2026)

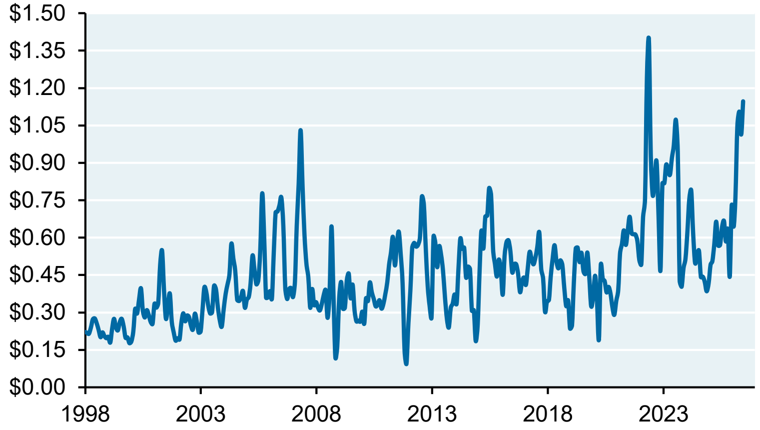
# High refinery utilization rates and declining refining capacity contributing to high crack spreads and higher gasoline prices

**Crude oil vs gasoline prices**
US$ per gallon



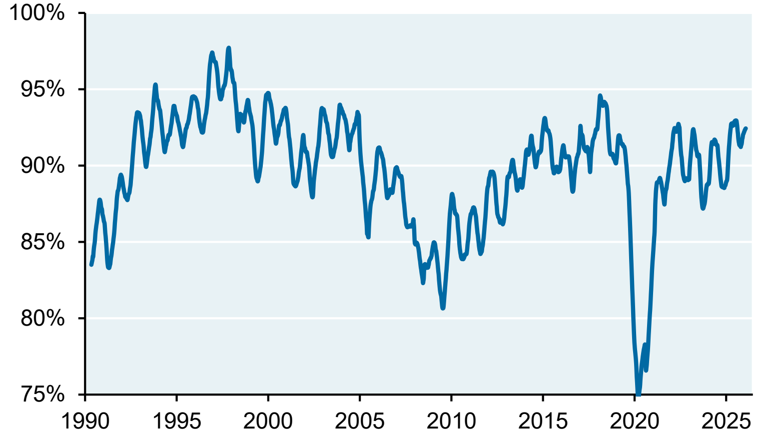

Source: EIA, JPMAM, July 2026

**US crack spread (refined product prices less refiner oil acquisition cost),** US$ per gallon



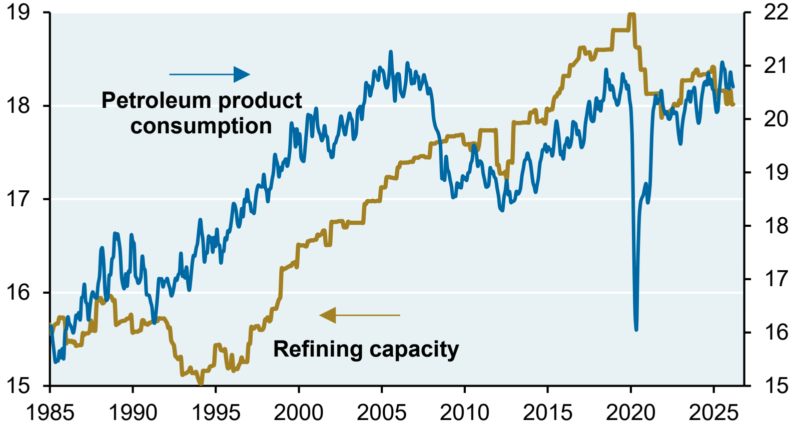

Source: EIA, JPMAM, July 2026

**Utilization rate of US refineries**
Percent




Source: EIA, July 17, 2026, Note: 6 month rolling average

**US refining capacity vs petroleum product consumption**
Million barrels per day
Million barrels per day, 3 month avg

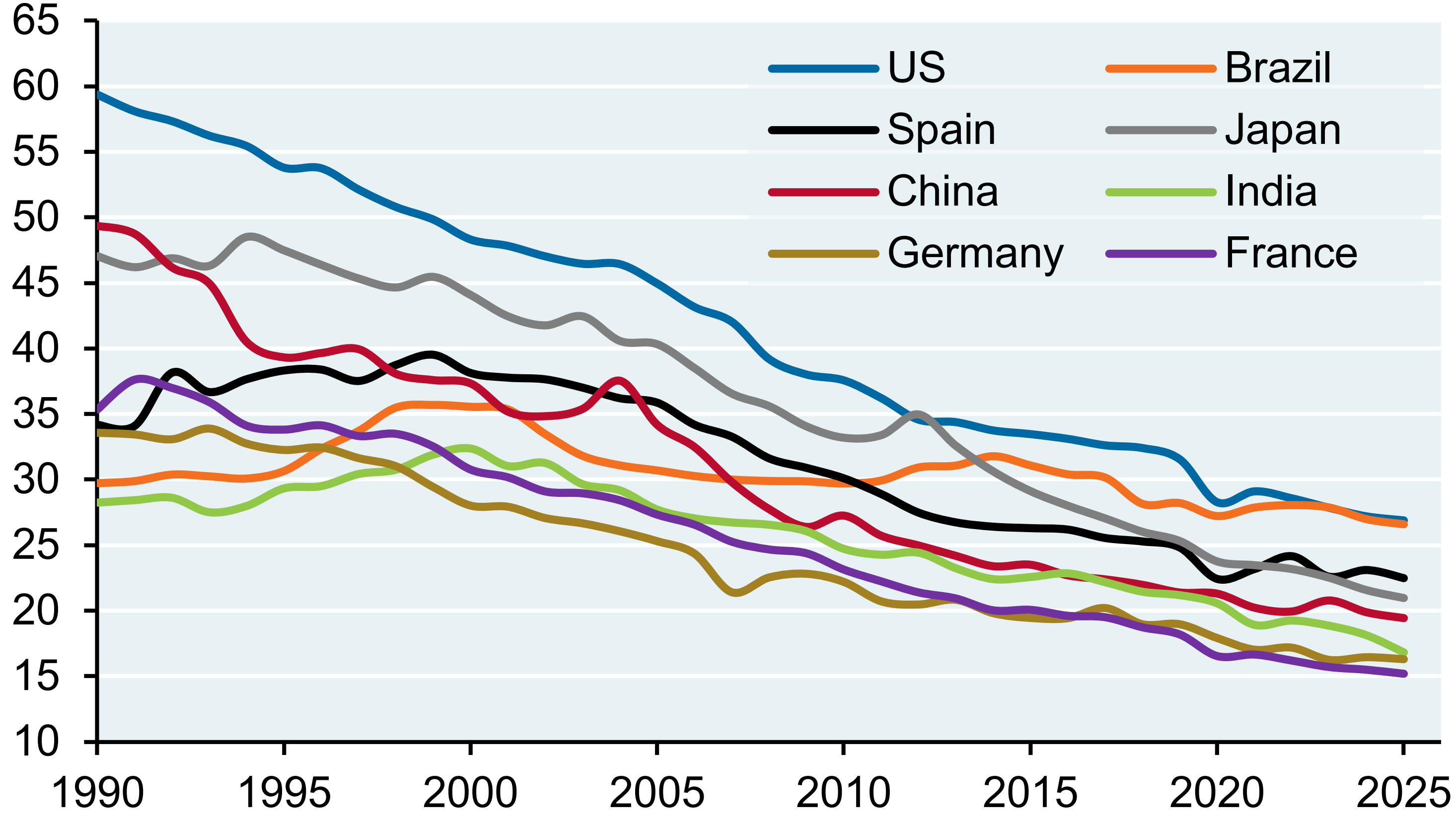



Source: EIA, April 2026

# US oil intensity of growth still higher than other major countries, but falling levels across the board are partially cushioning the Iran War shock

## Oil intensity of GDP

Tonnes of oil consumption / $2025 real GDP, trillions

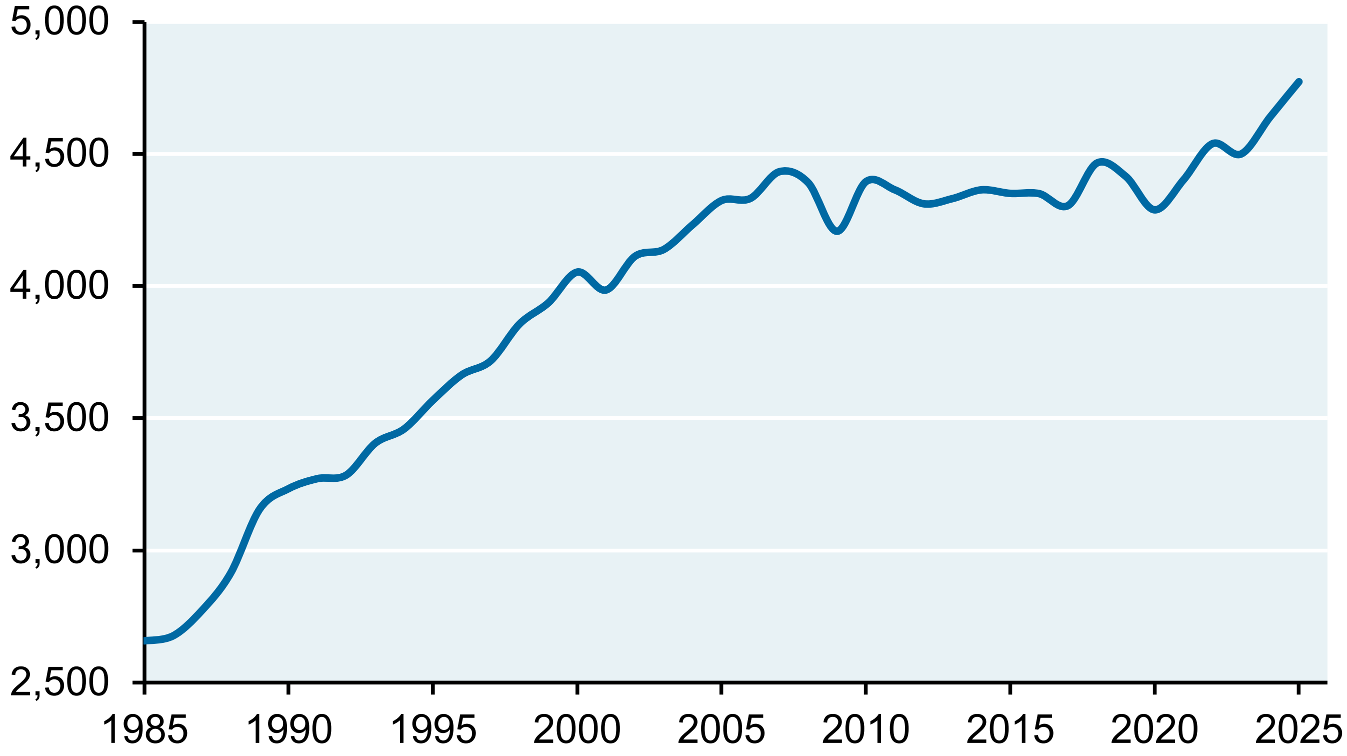



Source: Energy Institute, IEA, JPMAM, 2025

# US electricity generation is on the rise for the first time since the early 2000's

**US electricity generation**

TWh

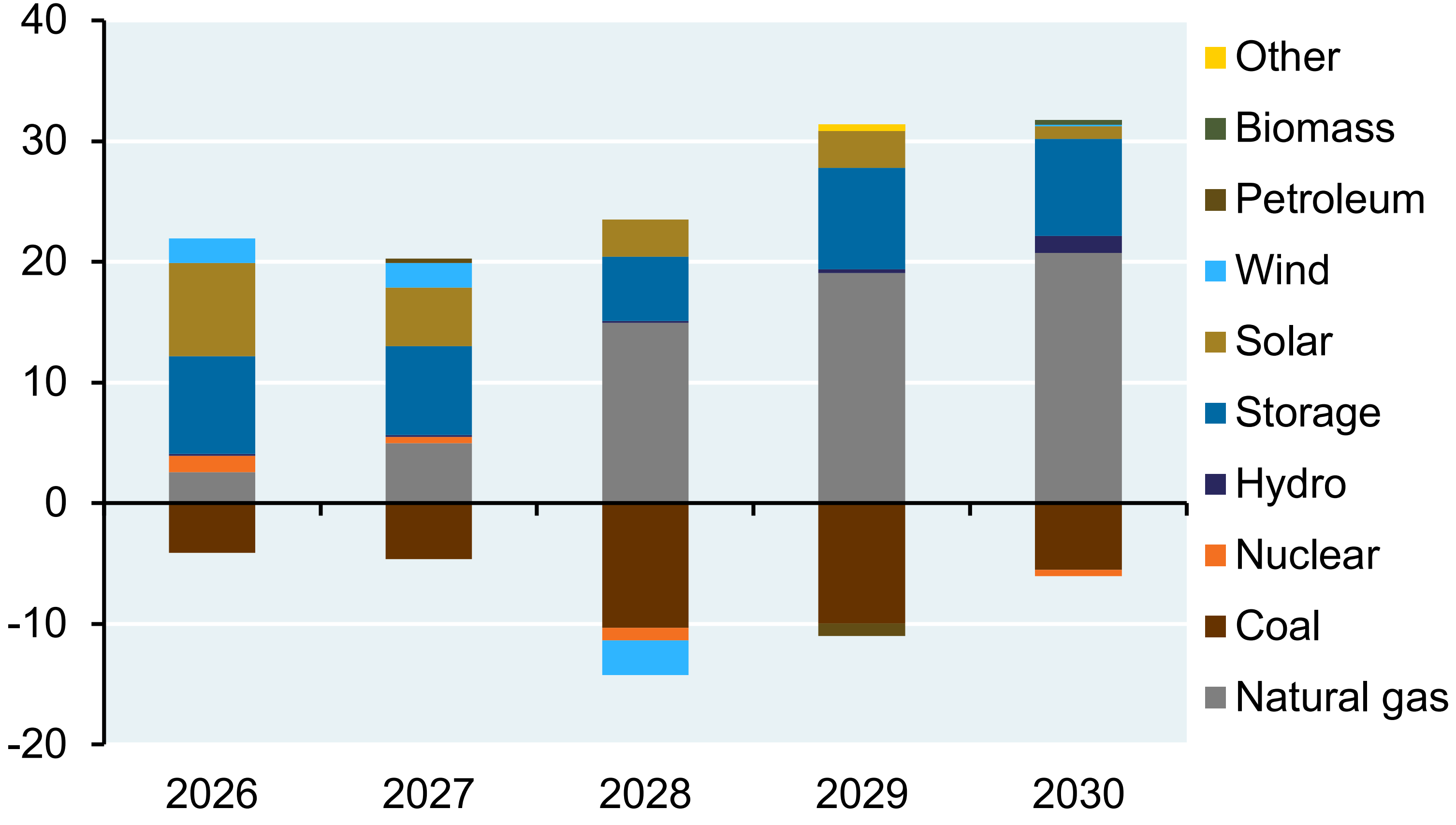



Source: Energy Institute, JPMAM, 2025

# While gas turbines entail long wait times, gas is projected to meet a large share of data center power demand by 2030 as turbine manufacturers ramp up production…

## US grid net additions by fuel

GW

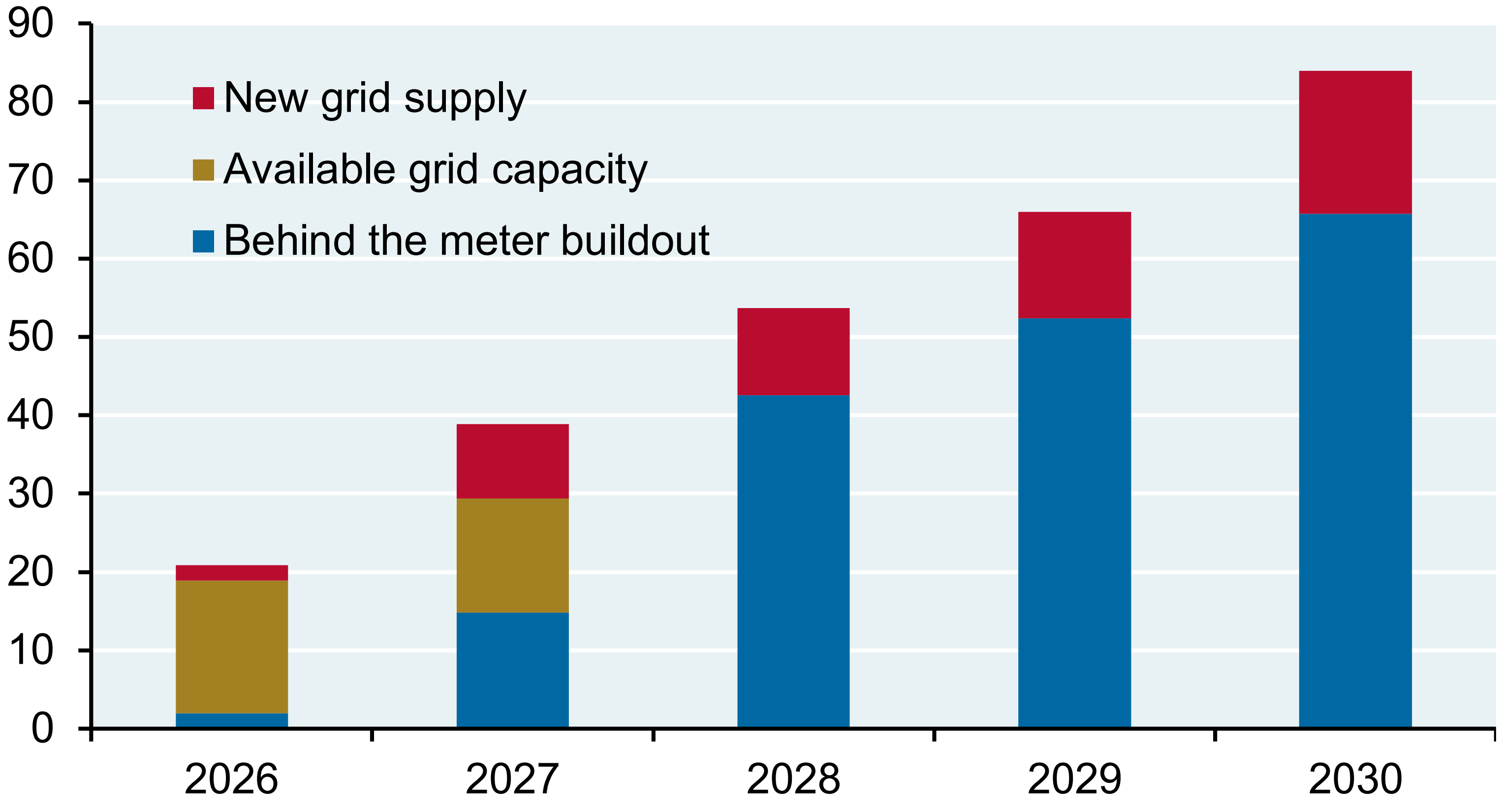



Source: SemiAnalysis, June 25, 2026

# …for both grid-based power and behind the meter generation

## US data center capacity net additions by power source

GW



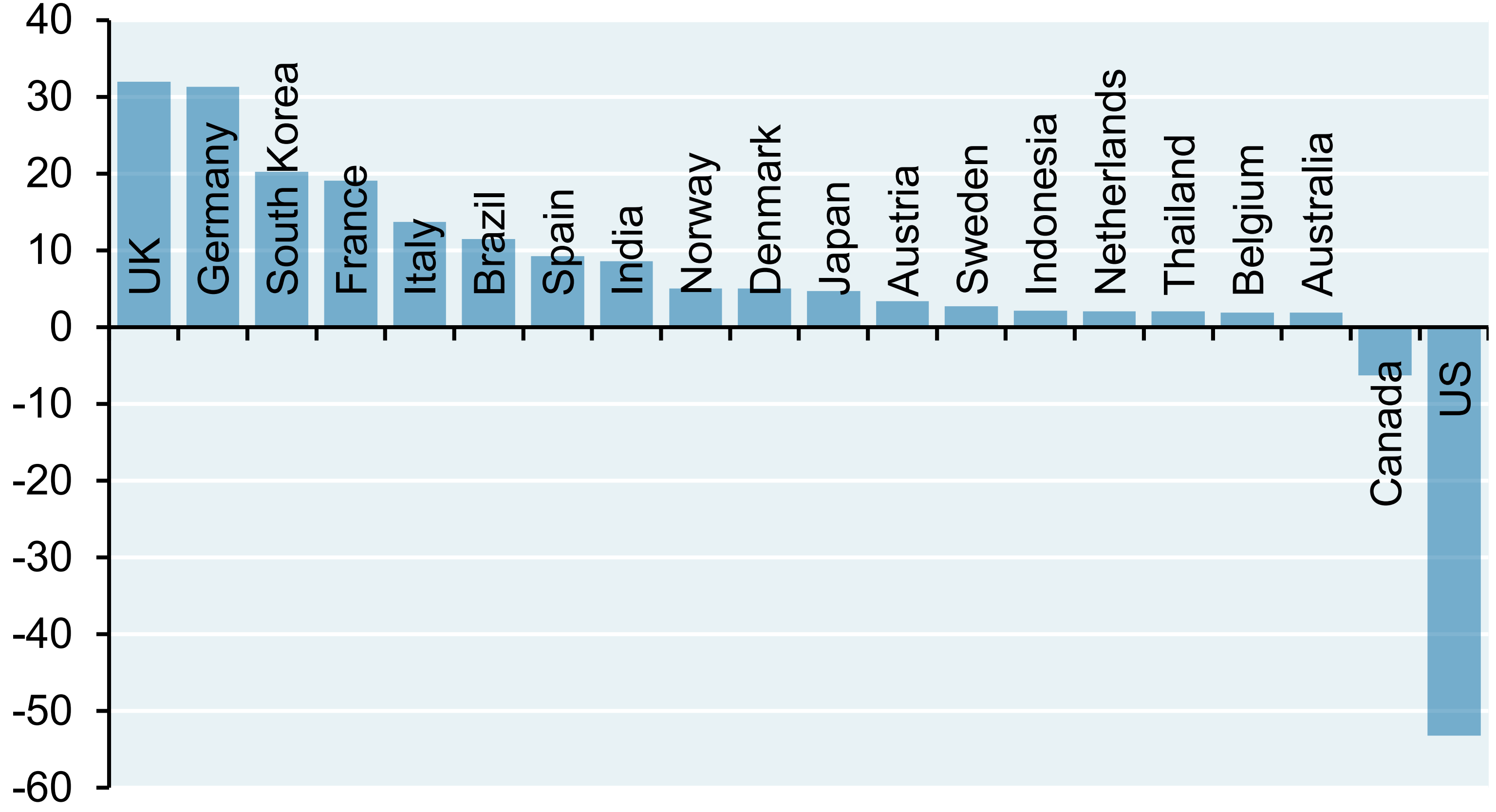

Source: SemiAnalysis, June 25, 2026

- Sign of the times: Meta was removed from the RE100 corporate green power list after turning to gas for data centers
- Its Hyperion Data center in Louisiana is reported as incorporating 10 power plants for a total of 7.5 GW and generate 3x as much emissions as the entire company currently generates from electricity use

# The US is a major outlier on EVs as the rest of the world forges ahead

## YoY change in EV sales, March 2025 - March 2026

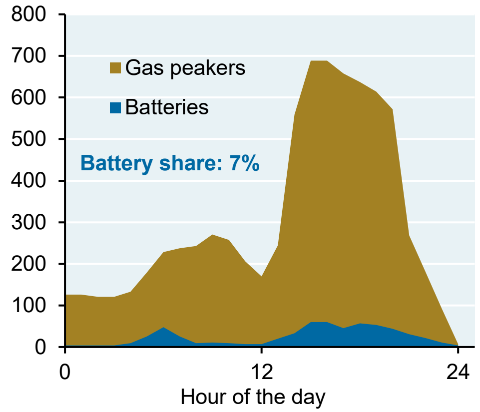
EV units sold, thousands




Source: Bloomberg, JPMAM, June 2026

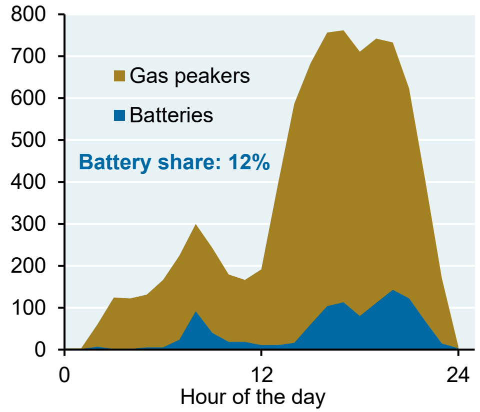
# Some positive news on the margin: in Texas, batteries are taking share from peaker plants on the grid

**Batteries vs. gas peakers,Texas 2022**
Average generation by hour of day, MWh



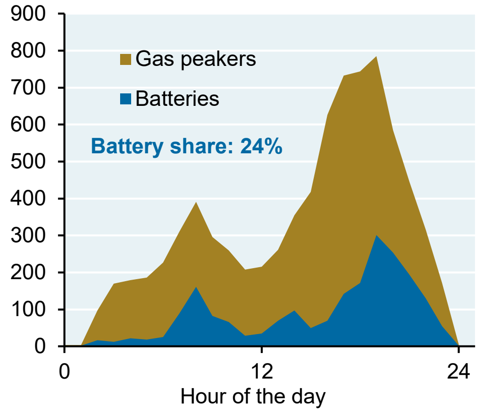

Source: Orennia, May 28, 2026

**Batteries vs. gas peakers,Texas 2023**
Average generation by hour of day, MWh



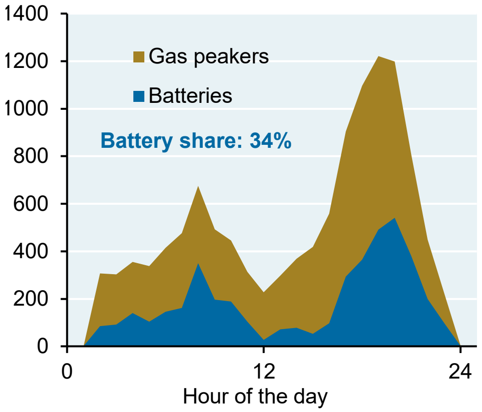

Source: Orennia, May 28, 2026

**Batteries vs. gas peakers,Texas 2024**
Average generation by hour of day, MWh




Source: Orennia, May 28, 2026

**Batteries vs. gas peakers,Texas 2025**
Average generation by hour of day, MWh



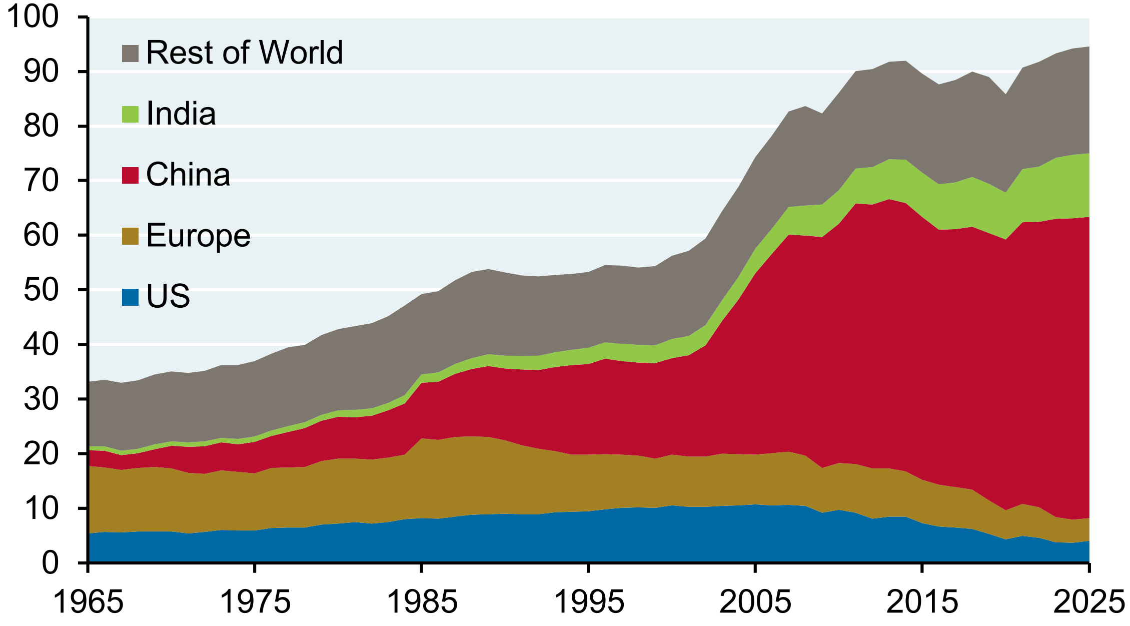

Source: Orennia, May 28, 2026

# Appendix slides: coal, hydropower, green hydrogen, CCS and SAF

# The latest on coal

## Coal useful final energy by country

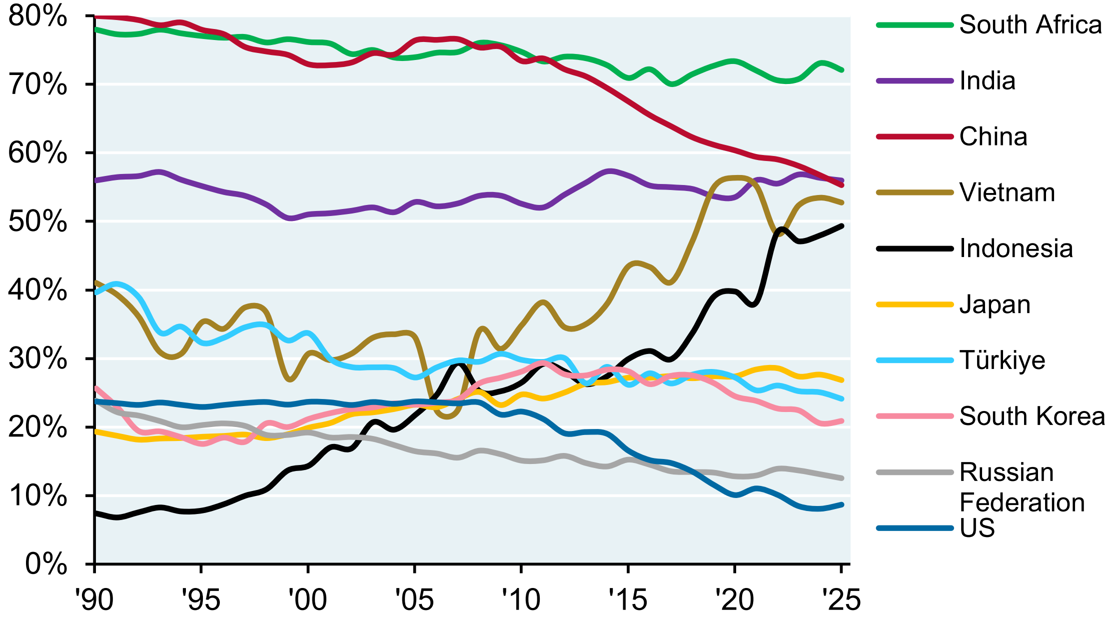
Exajoules




Source: Energy Institute, IEA, JPMAM, 2025

## Top Ten consumers of coal by energy content

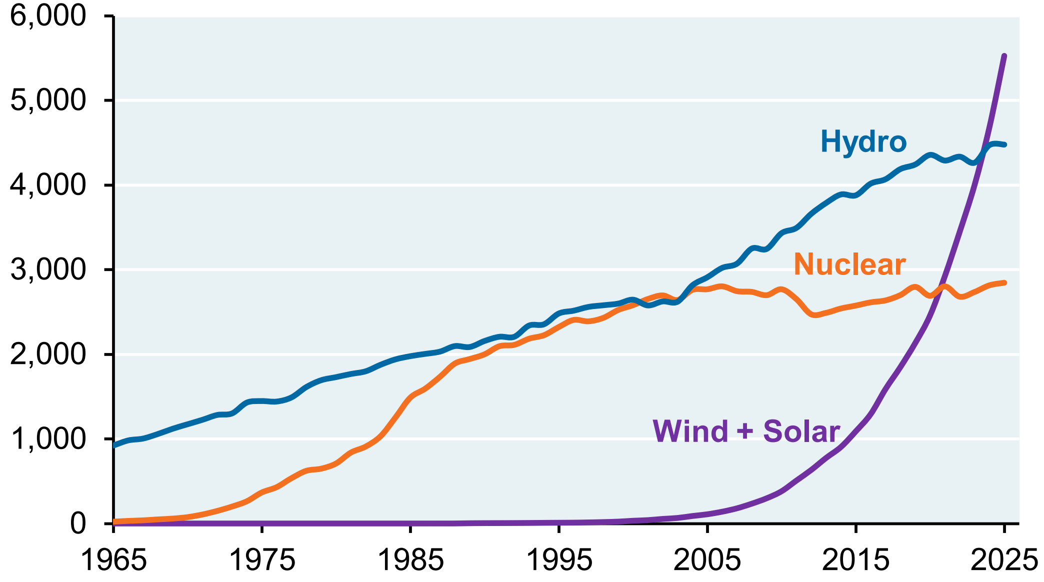
%, Coal share of final energy consumption




Source: EI Statistical Review of World Energy, JPMAM, 2025

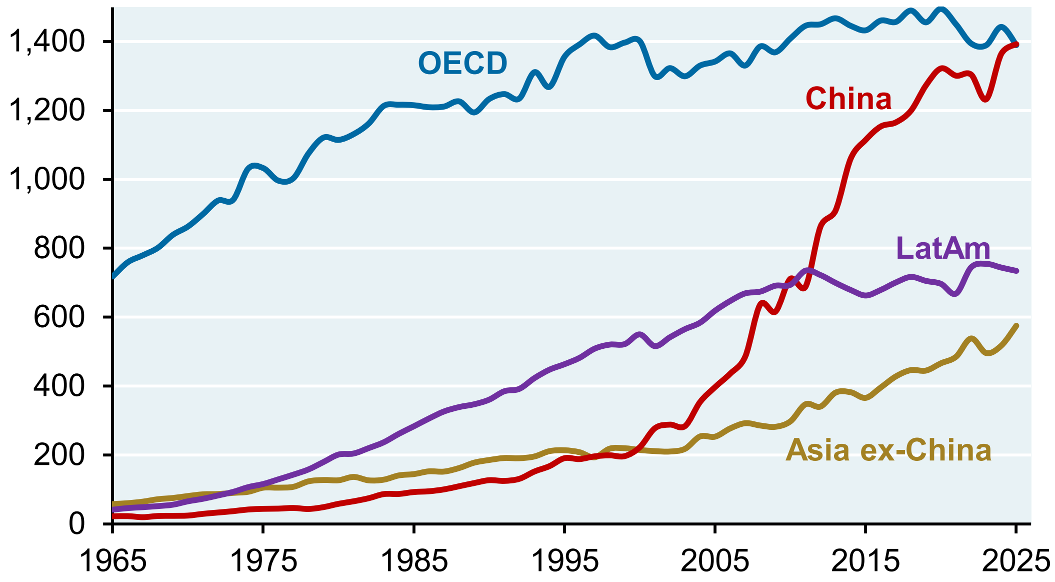
# The latest on hydropower

**Global electricity generation**
Terawatt-hours




Source: Energy Institute, JPMAM, 2025

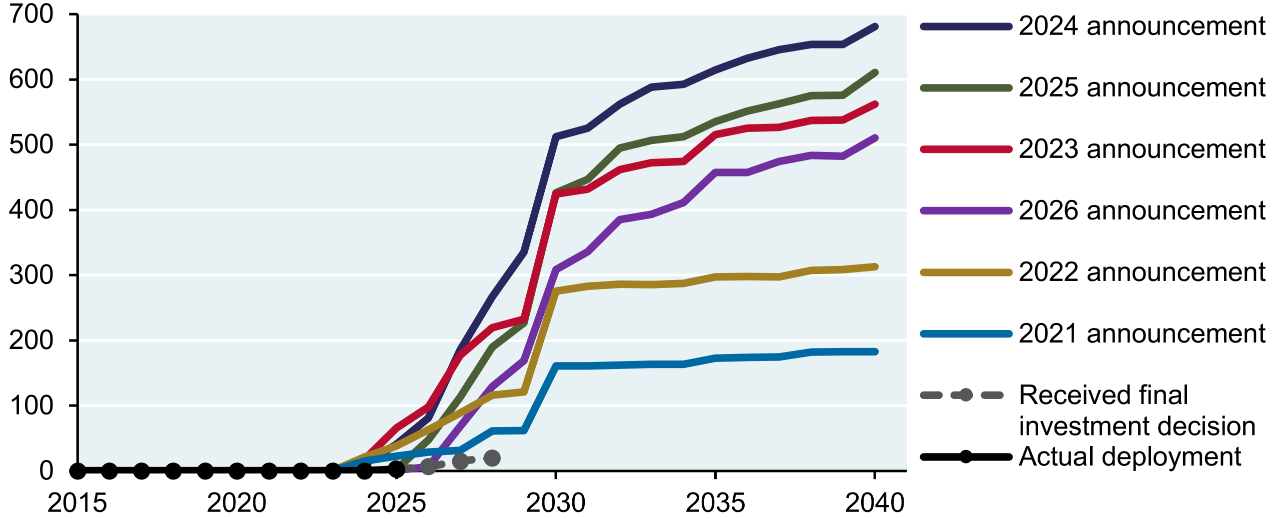
**China accounts for 60% of global hydropower growth since 1995 while OECD is flat,** Terawatt hours




Source: Energy Institute, JPMAM, 2025

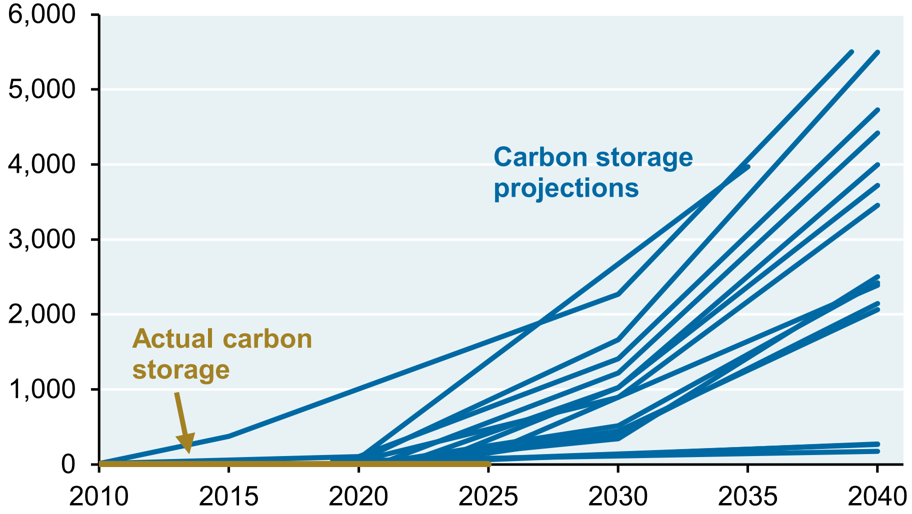
# Green hydrogen and Carbon Capture: going nowhere fast

**Green hydrogen announcements vs actual deployment**
Installed electrolysis capacity, GW




Source: Potsdam Institute Energy Transition Lab, July 2026

**Carbon storage projections vs actual deployment**
Megatons

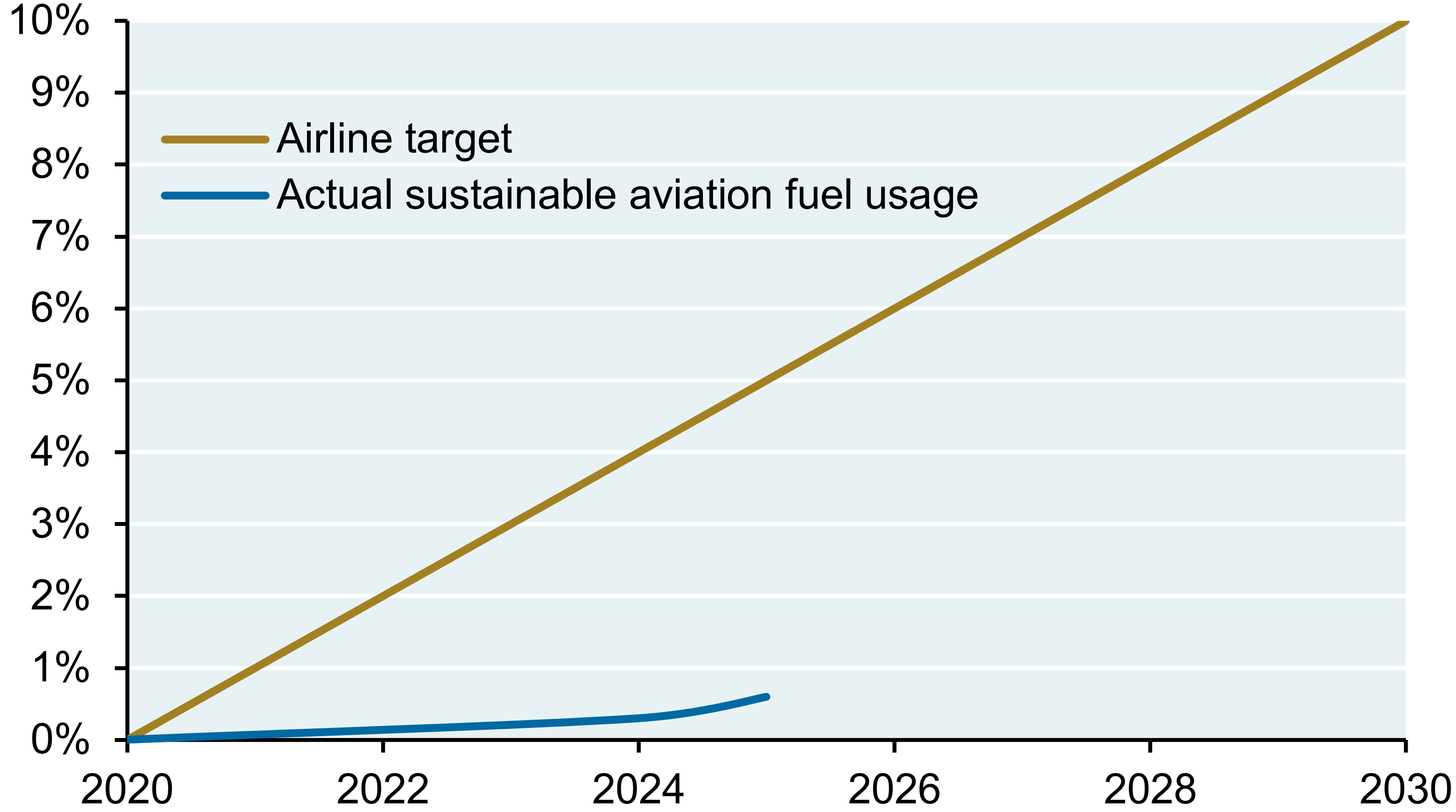



Source: ProPublica, June 25, 2026

# Same for Sustainable Aviation Fuel

## Global sustainable aviation fuel usage

Sustainable fuel as a % of commercial aviation fuel consumption




Source: International Air Transport Association, Bloomberg, December 2025

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