International Energy Agency

Electricity 2025 &

The Path to a New Era for Nuclear Energy

Key findings presentation

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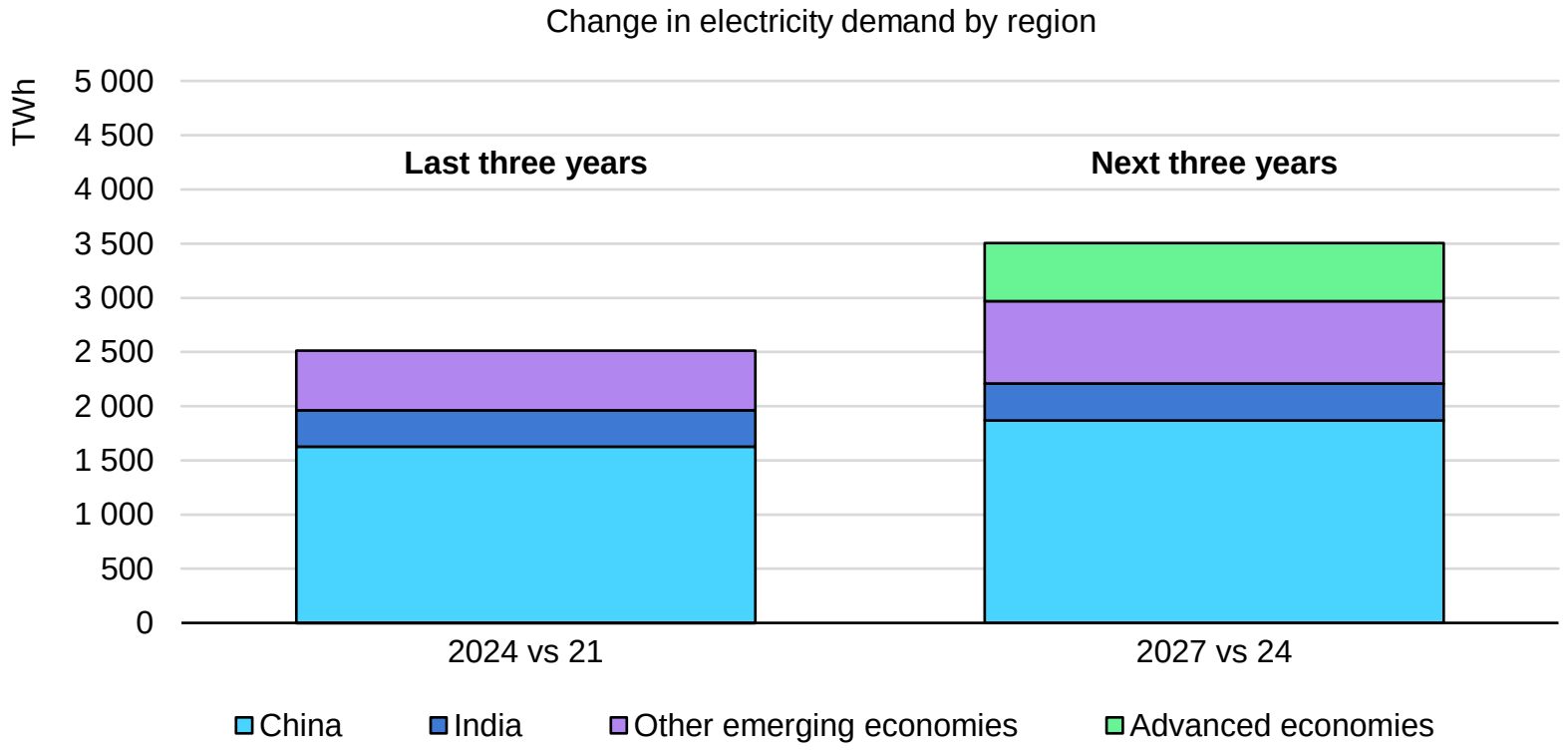
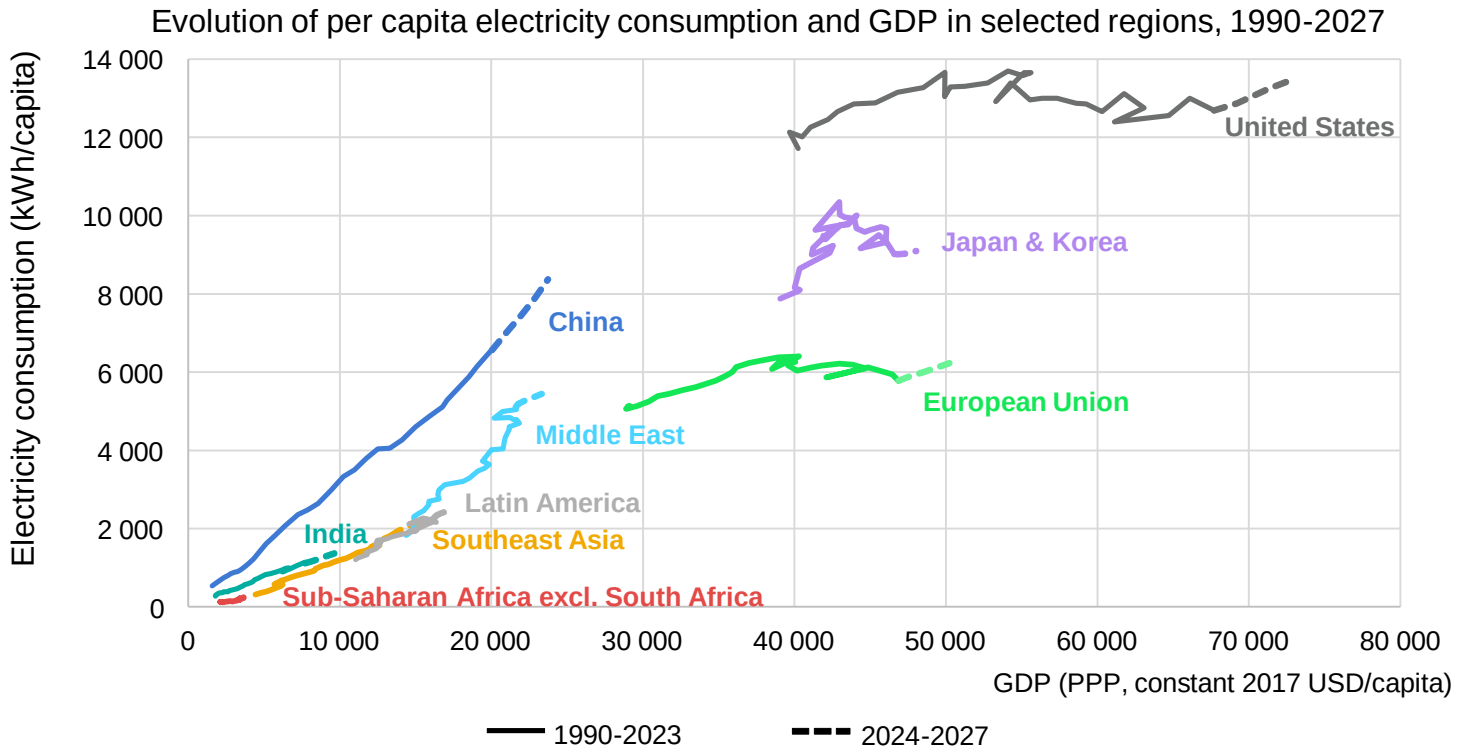
Strong growth in electricity demand is heralding a new Age of Electricity



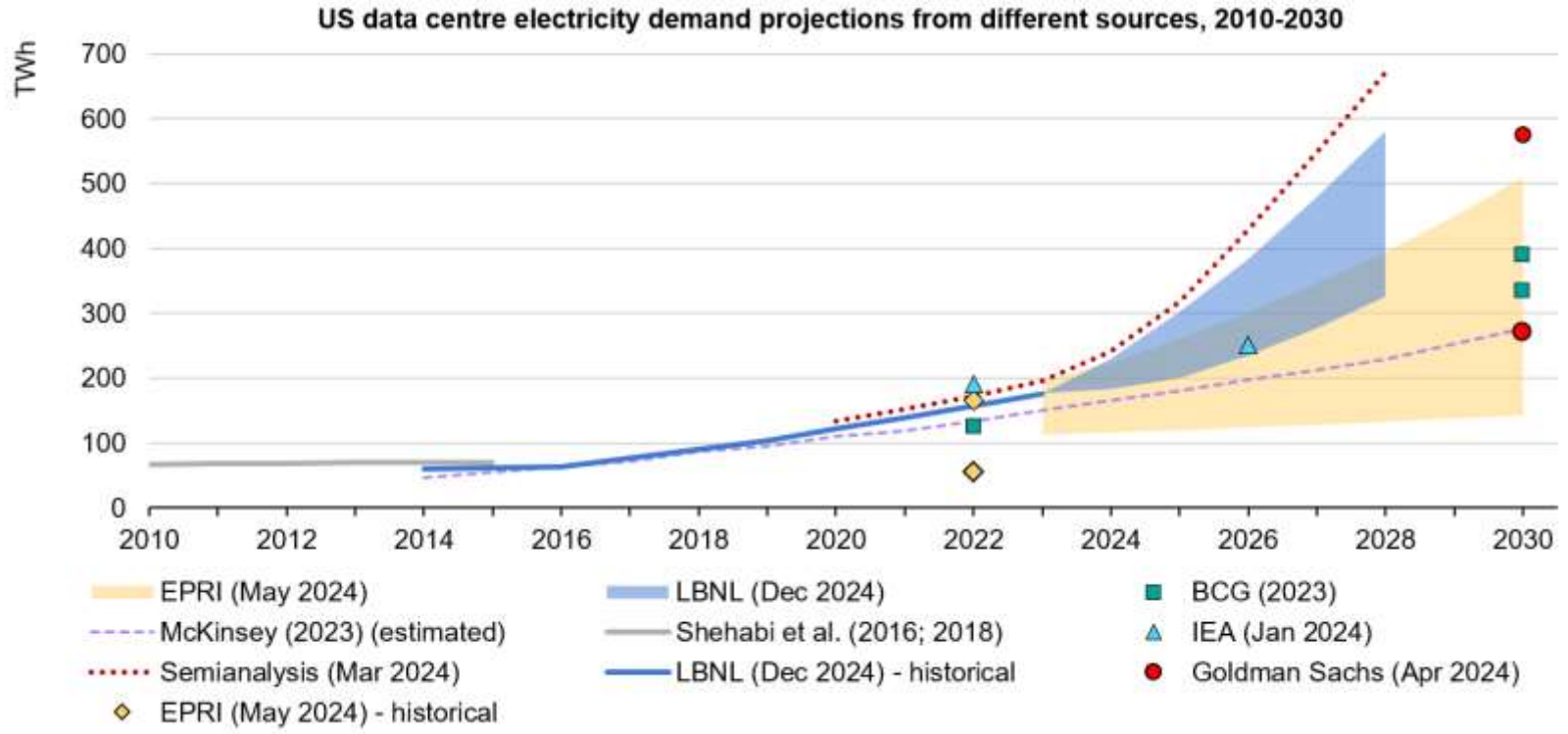
Electricity demand is set to rise at its fastest pace in recent years, growing at close to 4% annually through 2027. Emerging economies make up 85% of the increase, but demand in advanced economies is picking up again.

Demand in advanced economies is rising, reversing a 15-year trend



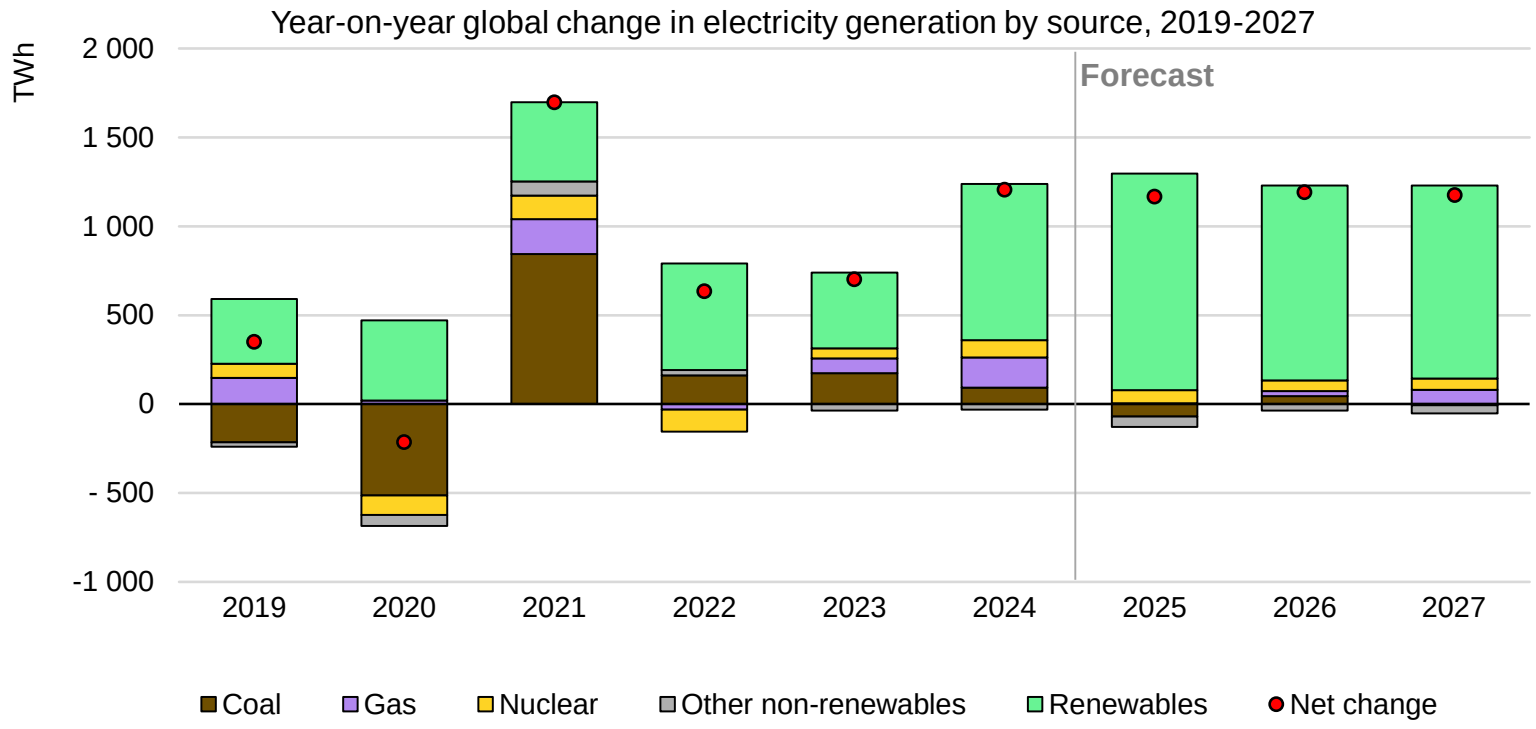
Africa is lagging behind due to the insufficient pace of growth in its energy supply.
Over the last 30 years, electricity use per capita in sub-Saharan Africa has been effectively flat.

Electricity demand projections of data centres show a wide range



Uncertainties around demand, technological advancements, and efficiency improvements, in addition to AI deployment, make it challenging to project the future energy consumption of data centres.

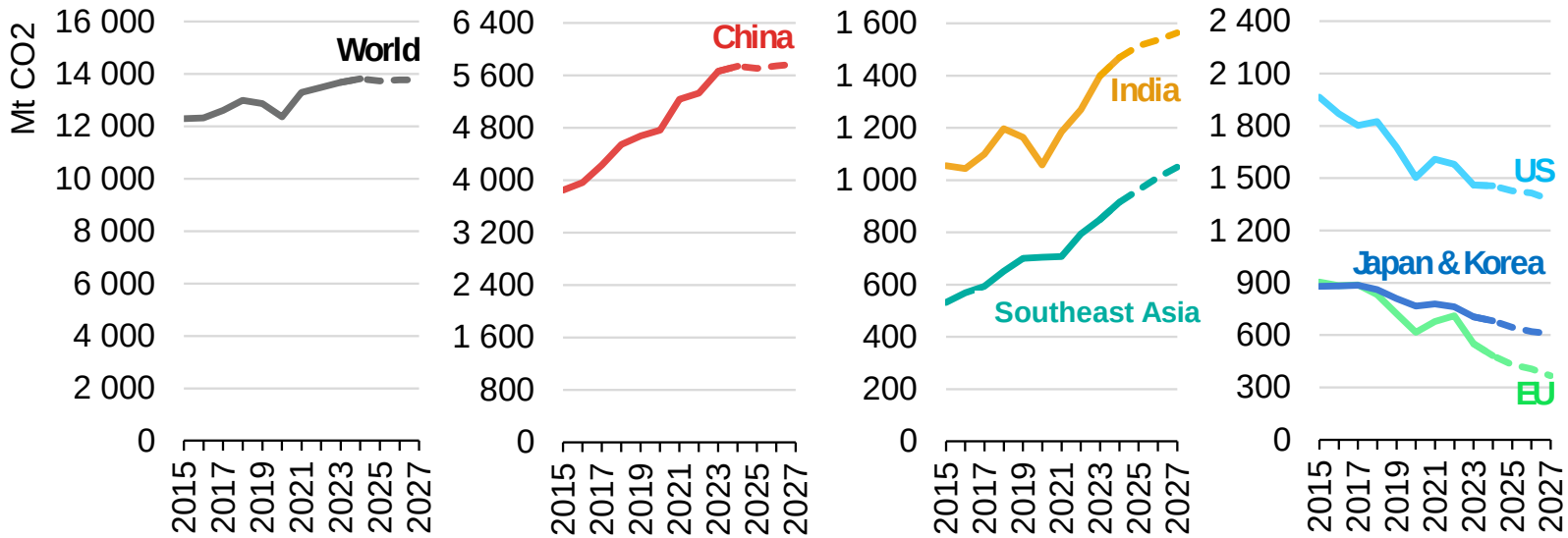
Low-emissions electricity supply set to meet all additional growth out to 2027



The rapid expansion of ever cheaper solar PV is expected to meet half of global electricity demand growth to 2027, up from 40% in 2024. Nuclear power generation will reach a record every year over the forecast period.

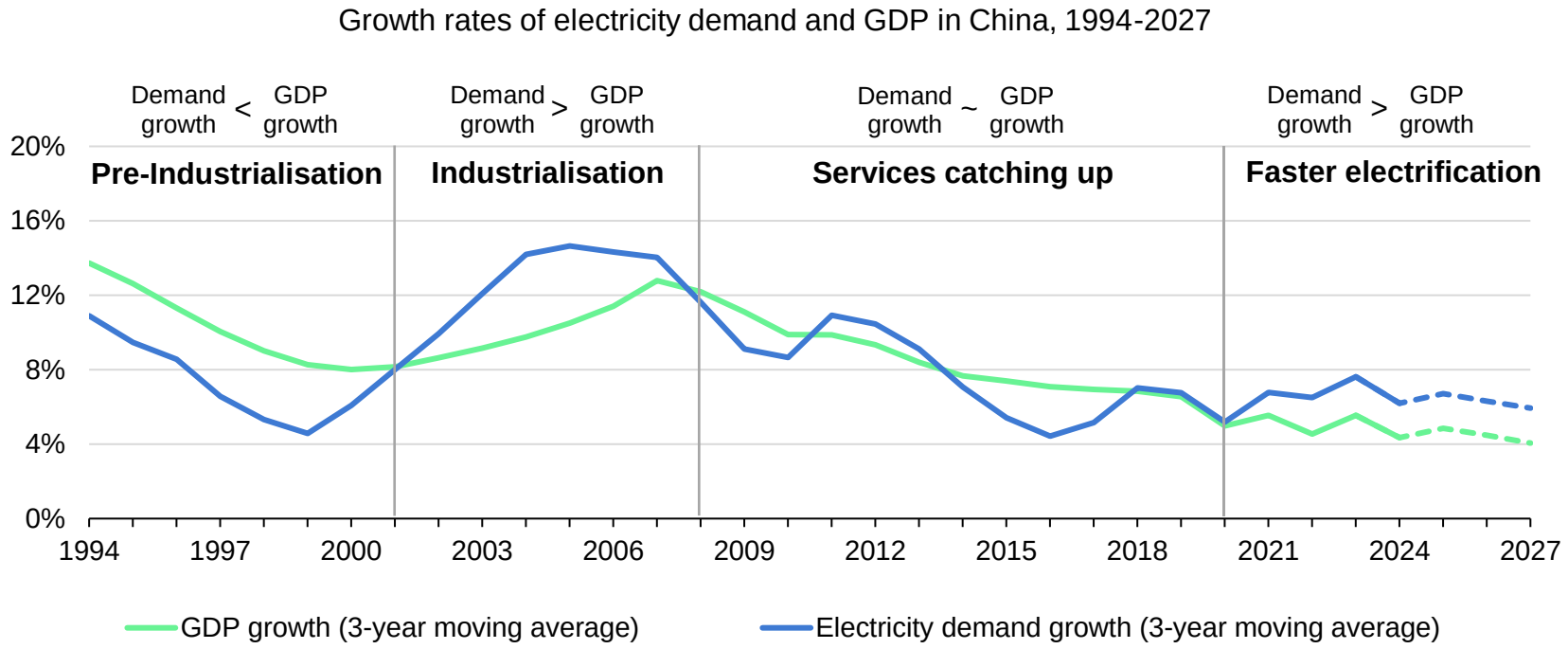
Emissions from electricity generation are entering a plateau

CO2 emissions from electricity generation in selected regions, 2015-2027



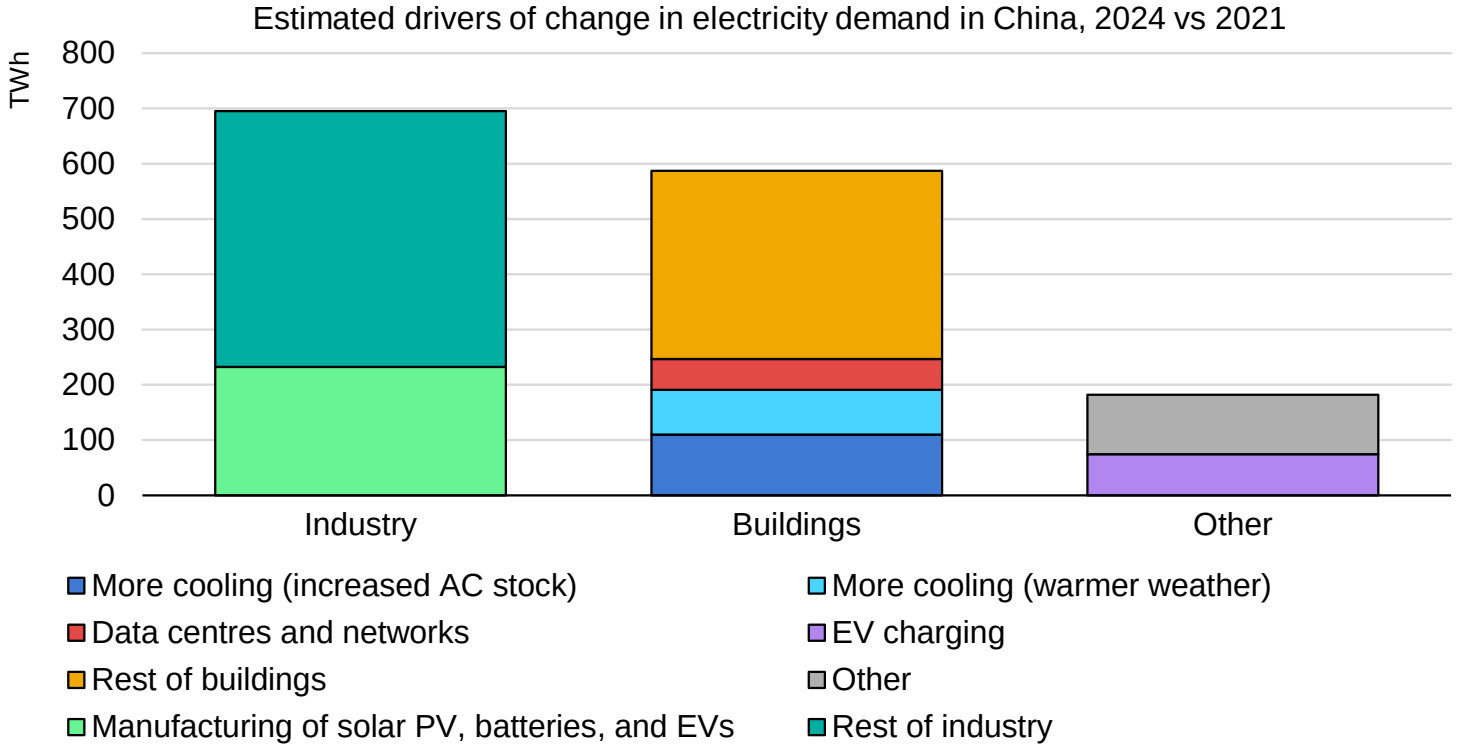
Over the 2025-2027 forecast period, global emissions from electricity generation are expected to plateau, after increasing by 1.1% in 2024. This is a slowdown compared to the rise of 1.4% in 2023.

Electrification in China is progressing rapidly



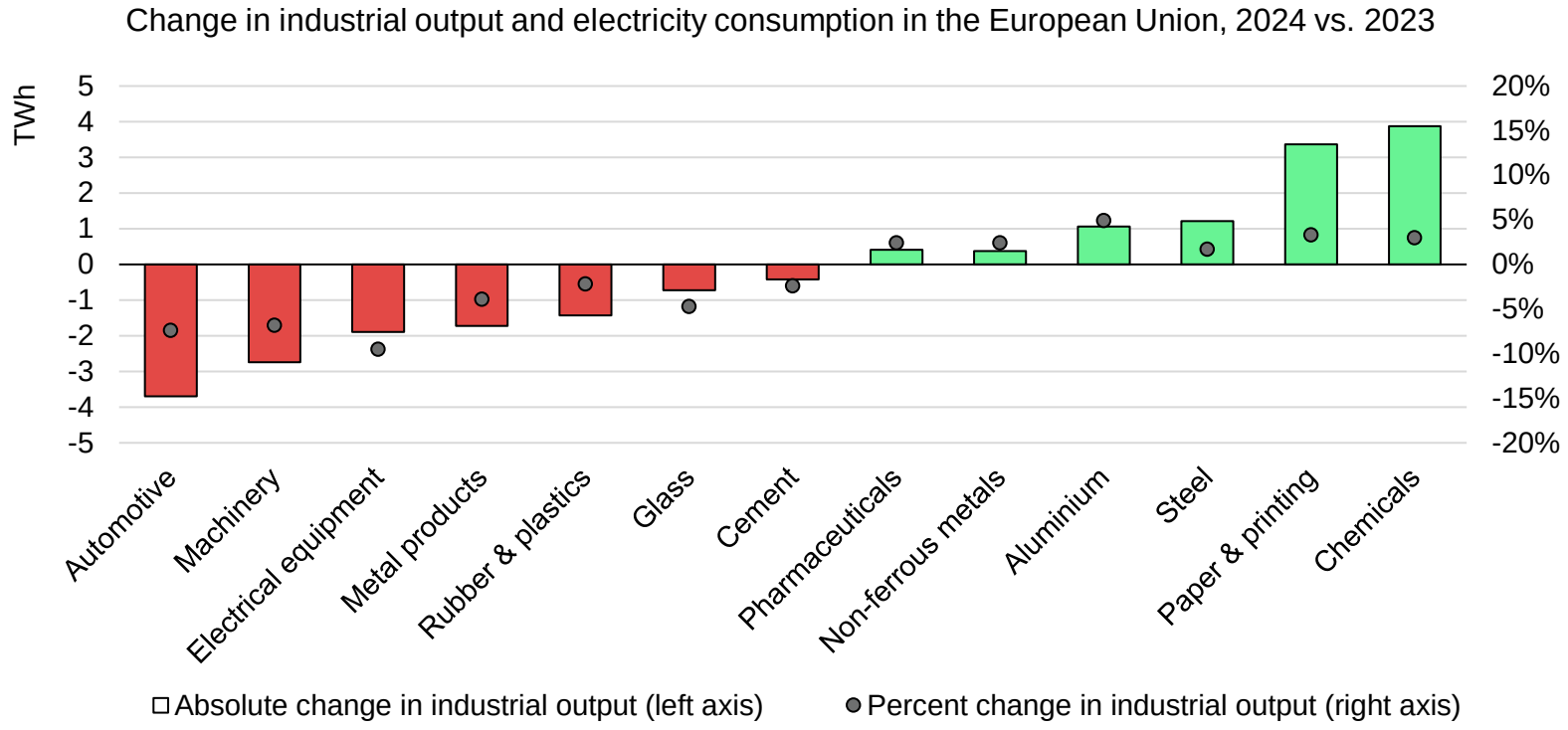
China's electricity consumption has been growing faster than its economy since 2020. The share of electricity in final consumption (28%) is much higher than the United States (22%) or the European Union (21%).

China’s electricity demand is driven by multitude of factors



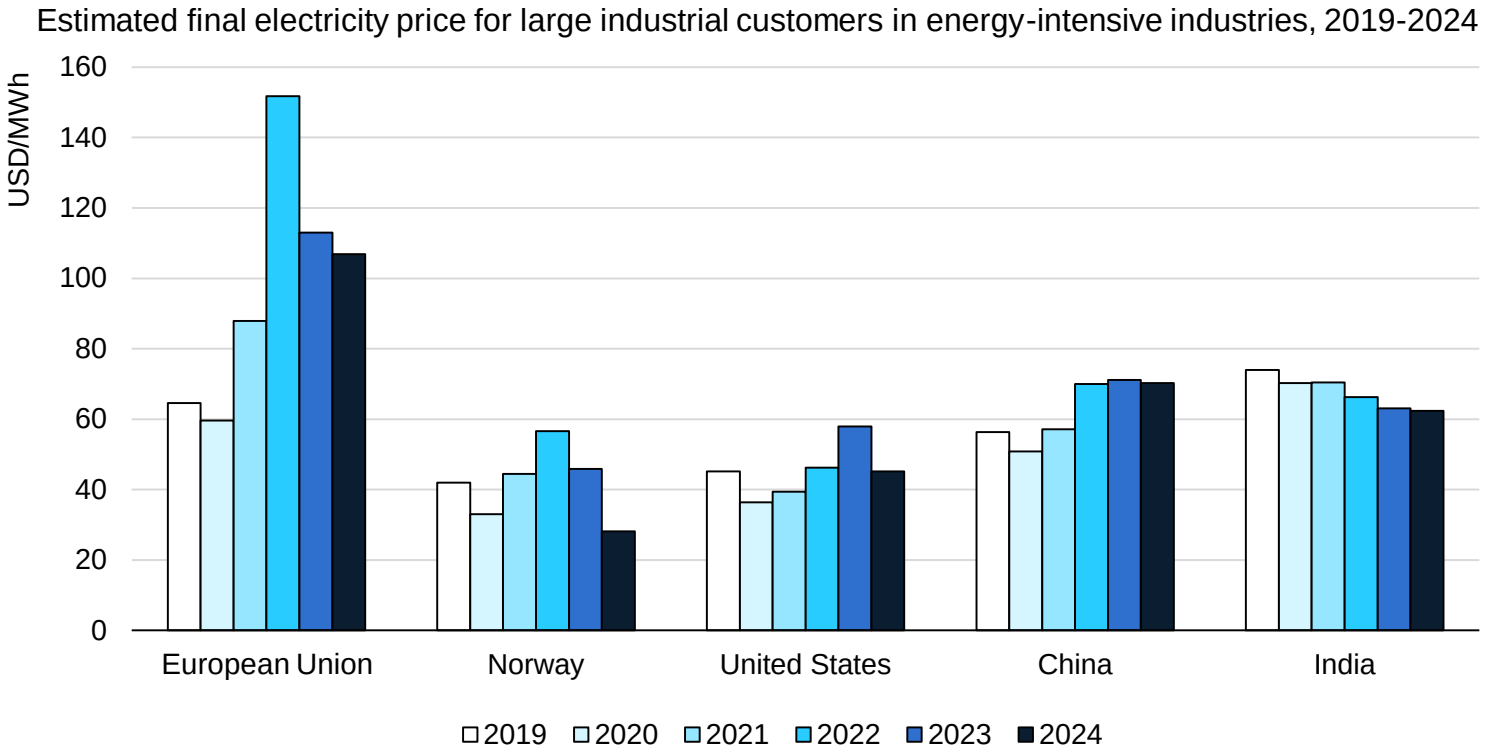
Similar to past three years, industry will make up 50% of the future demand growth through 2027. Alongside traditional industries, electricity-intensive manufacturing of solar PV, batteries and EVs will play an important role.

EU electricity demand is recovering but the pace was slow in 2024



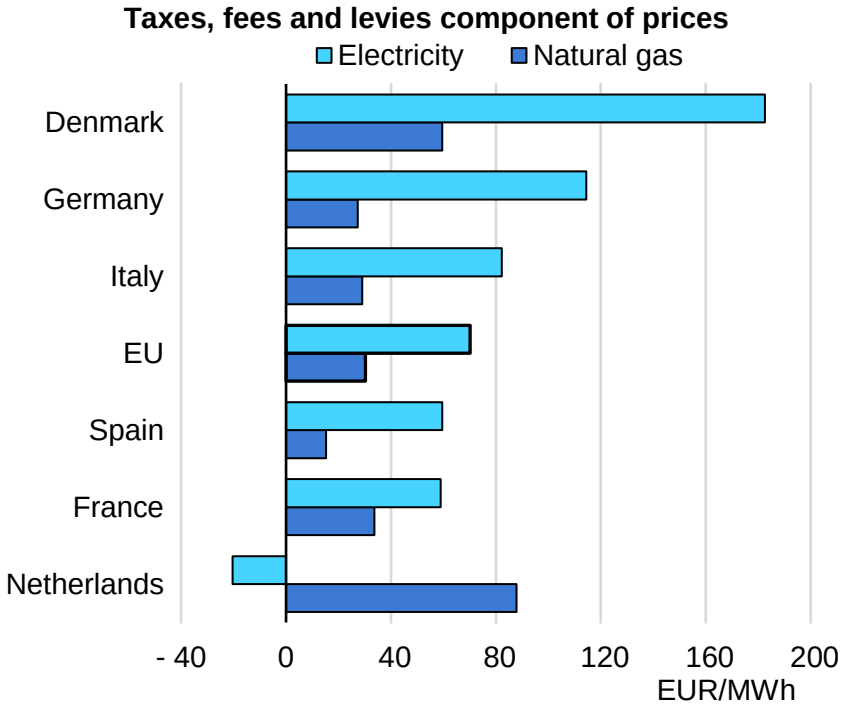
In 2024, electricity consumption in the EU increased by 1.4% yoy, but industrial demand was relatively flat. Total EU electricity demand is not expected to get back to 2021 levels before 2027.

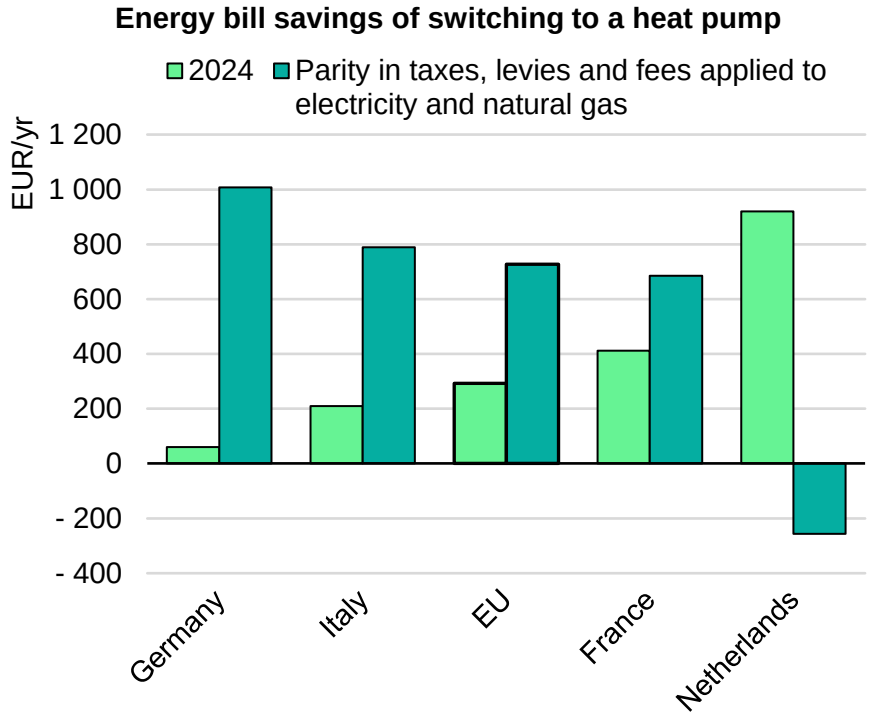
High electricity prices continue to undermine competitiveness



Electricity prices for energy-intensive industries in the EU in 2024 were well below the record highs seen in 2022 and slightly lower than in 2023. But they were still double those in the US and 50% higher than in China.

EU households face electrification barriers from various taxation policies

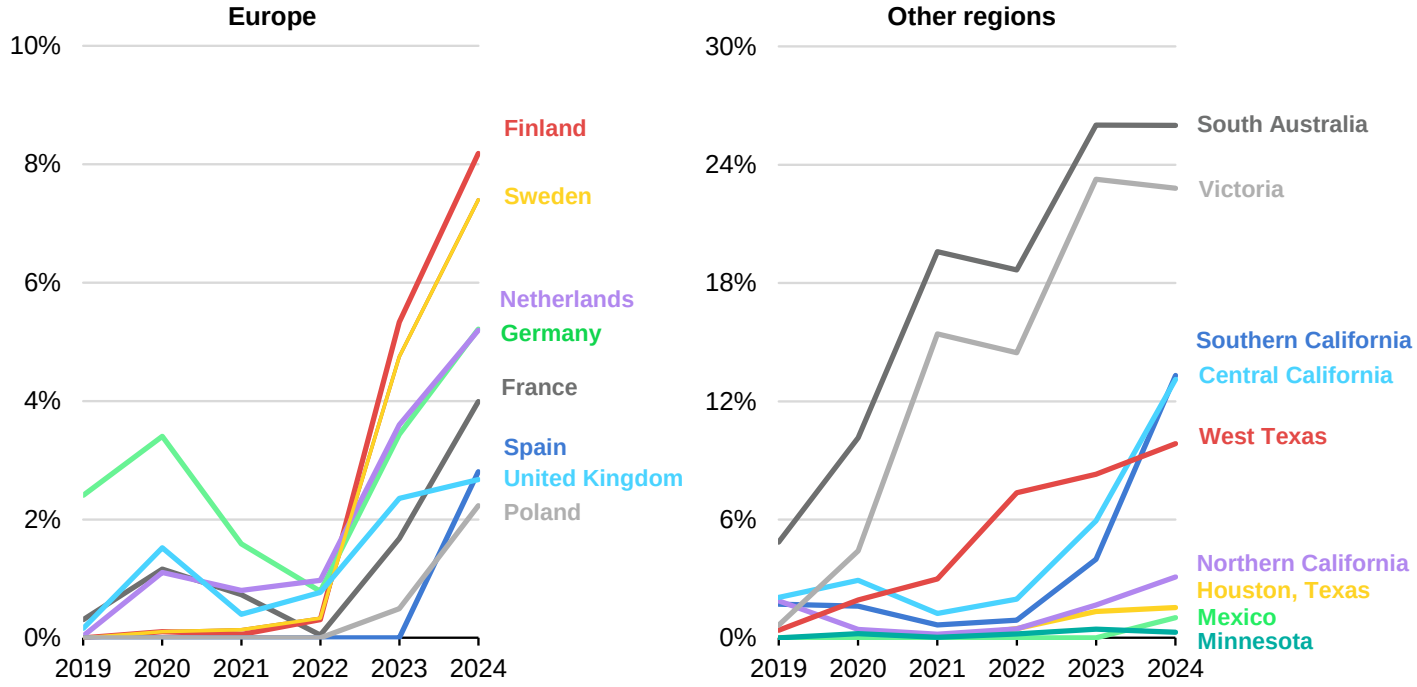




Heat pumps can reduce energy bills by 60-90%, but they can also lead to higher bills in countries where electricity prices are 3-4 times higher than gas. Changes in taxation levels can contribute to their competitiveness.

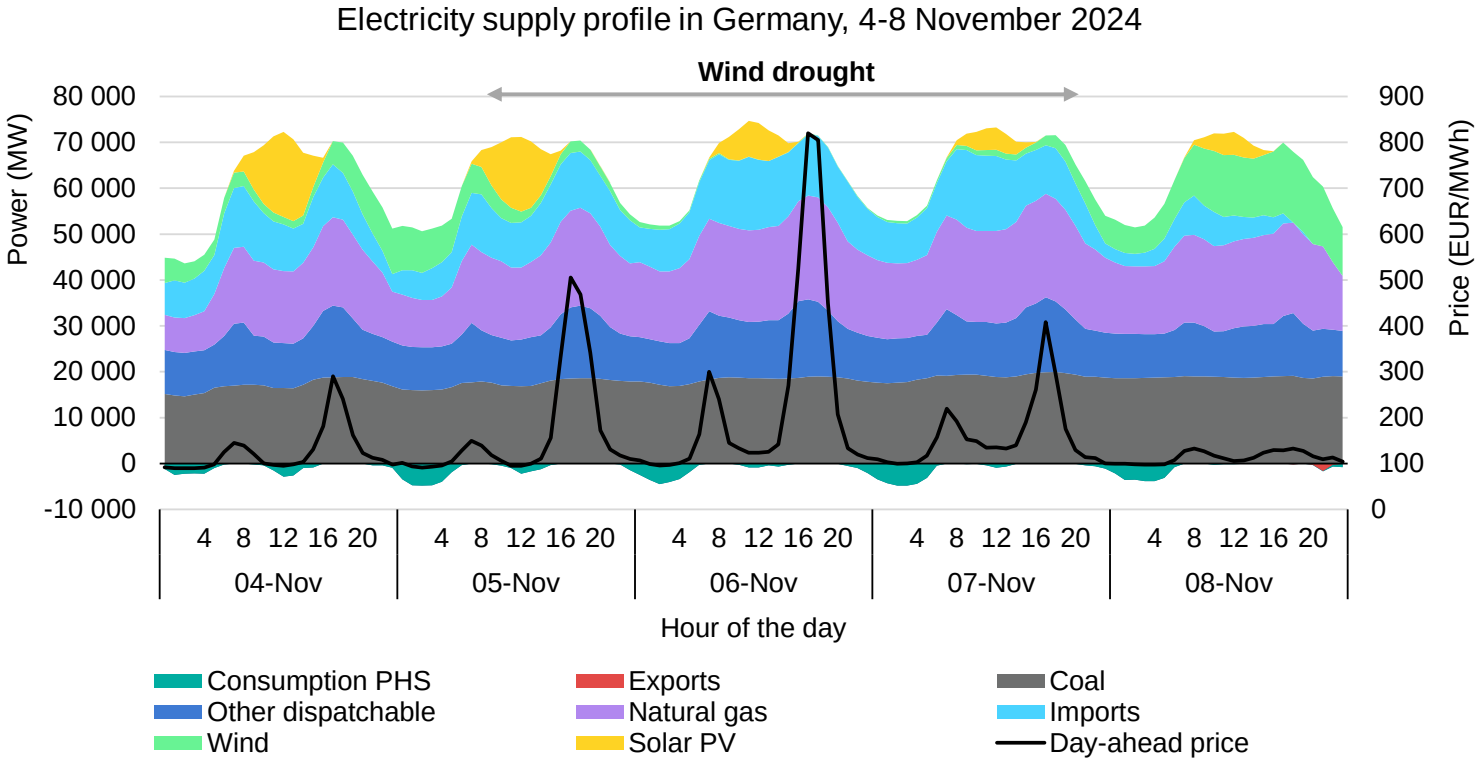
Too much supply at certain times (?)
Negative electricity prices highlight the need for more flexibility

Fraction of negative hourly wholesale electricity prices in selected regions, 2019-2024



Though still relatively uncommon in many power markets on a global basis, some regions are seeing an increase in the occurrence of negative wholesale electricity prices in recent years.

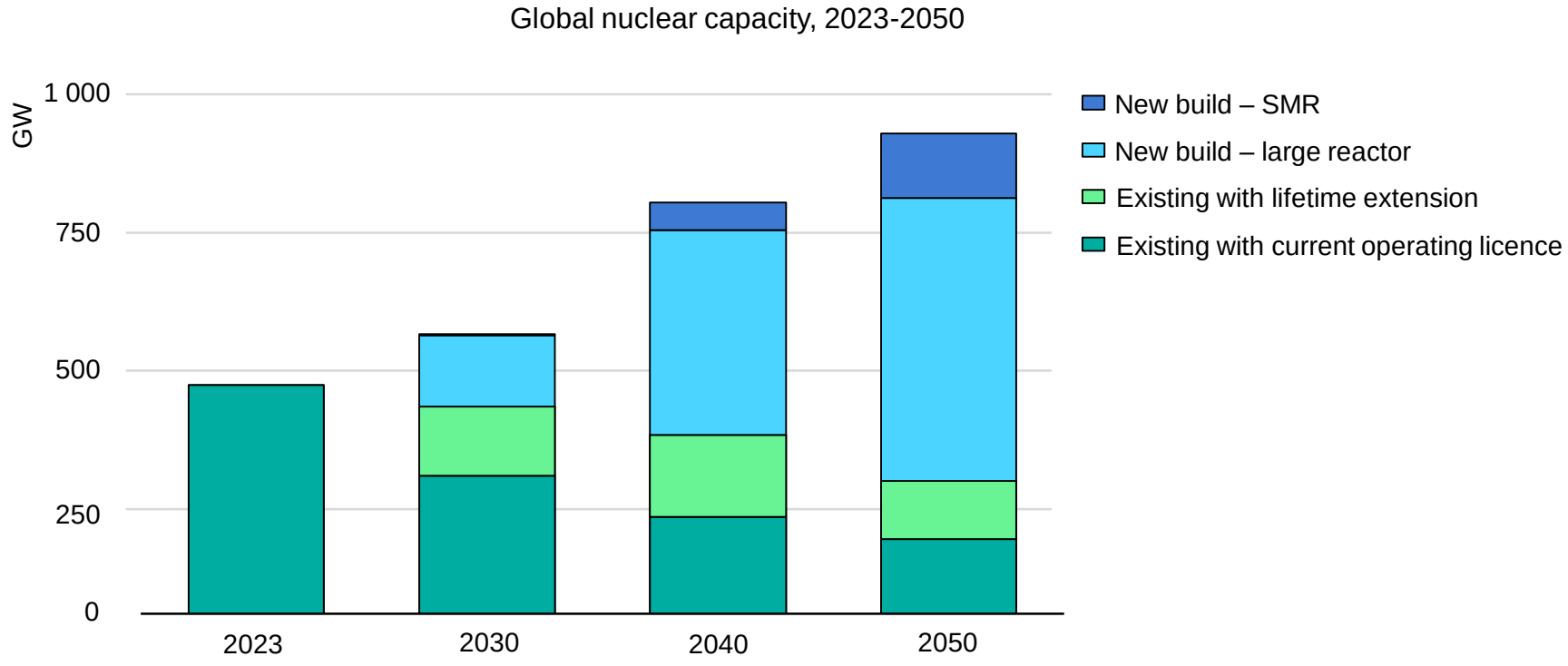
Too little supply at certain times (?)
Recent *Dunkelflaute* events in Northern Europe were managed successfully



As both electricity supply and demand become more weather dependent, having sufficient dispatchable capacity and storage, demand-side response and interconnections will be essential for enhancing electricity security.

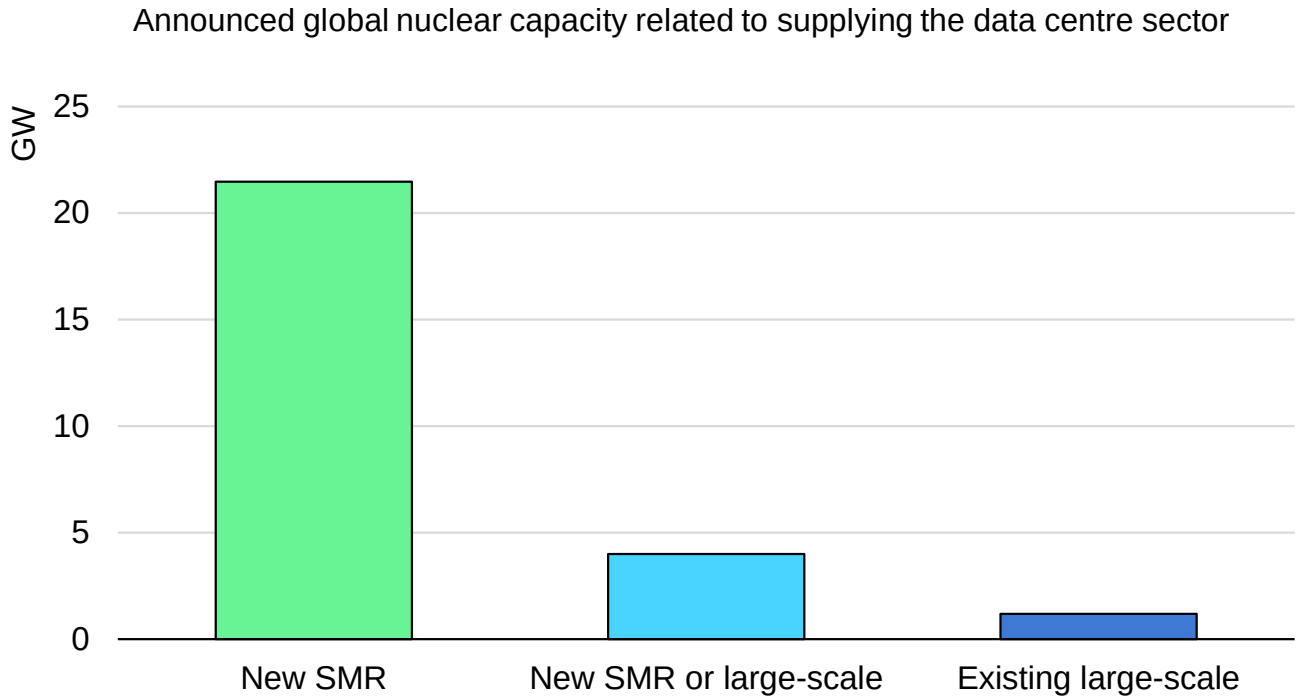
The Path to a New Era for Nuclear Energy

Nuclear energy is set for growth



With plans to expand the role of nuclear in over 40 countries, global nuclear capacity is set to double to 2050. Most growth comes from China and developing economies, and large reactors remain the majority of the fleet.

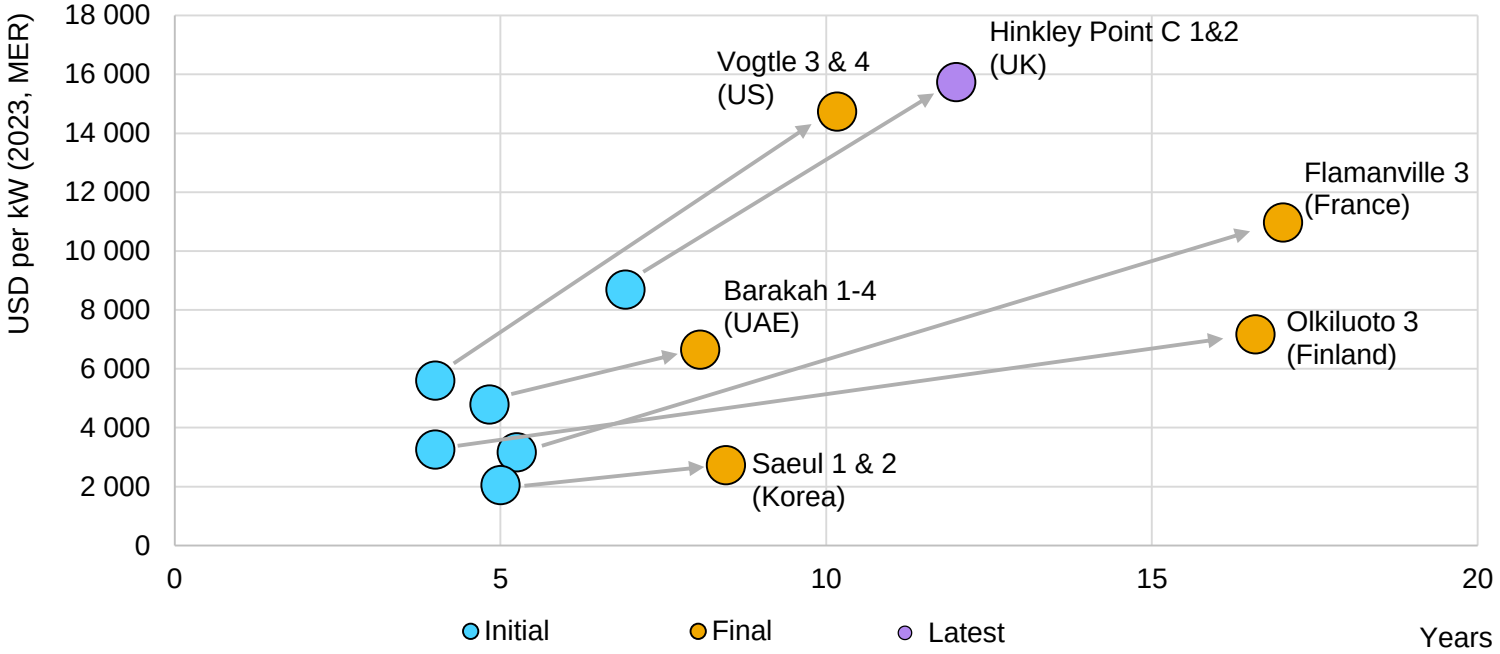
Data centres are emerging as a new dedicated market for SMRs



The appetite for SMRs is strong in the rapidly expanding data centre sector to meet their clean power needs. Up to 25 GW of SMR capacity for powering data centres have been announced – almost all in the United States.

Nuclear reactors are taking longer to build in advanced economies

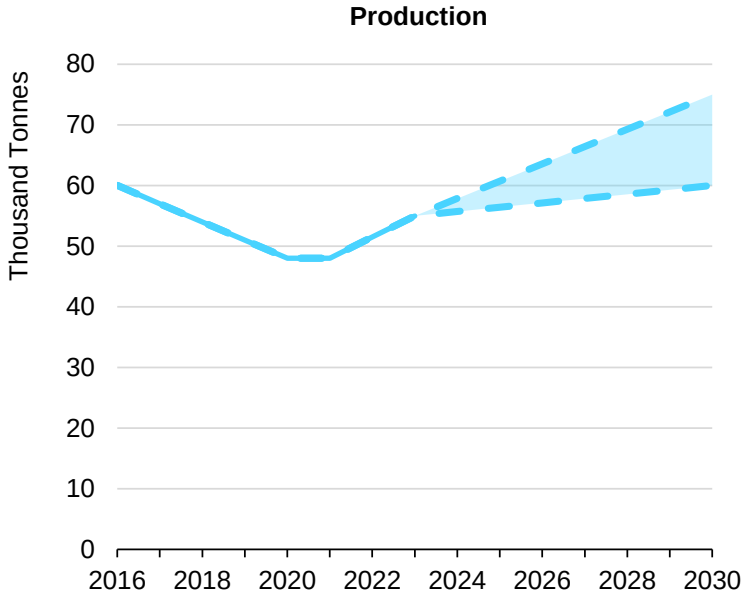
Initial and latest capital cost estimates and construction time for selected recent nuclear projects

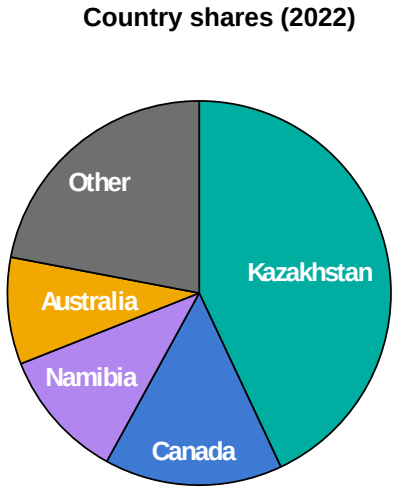


Recent projects in the US and Europe have had on average 8 years of delay and cost 2.5 times the initial cost.

Greater diversity of uranium supply and enrichment services is essential

Global uranium production from mines, 2016-2030





- **Uranium production is highly concentrated in four countries, which jointly account for more than three-quarters of global uranium production from mines.**
- **Enrichment capacity is also highly concentrated, with more than 99% of the enrichment capacity in four suppliers, with Russia accounting for 40% of global enrichment capacity.**

Thank you!