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INVESTMENT MANAGEMENT

The Emerging Market Energy Landscape: Pathways, Pitfalls & the Importance of Resource Efficiency

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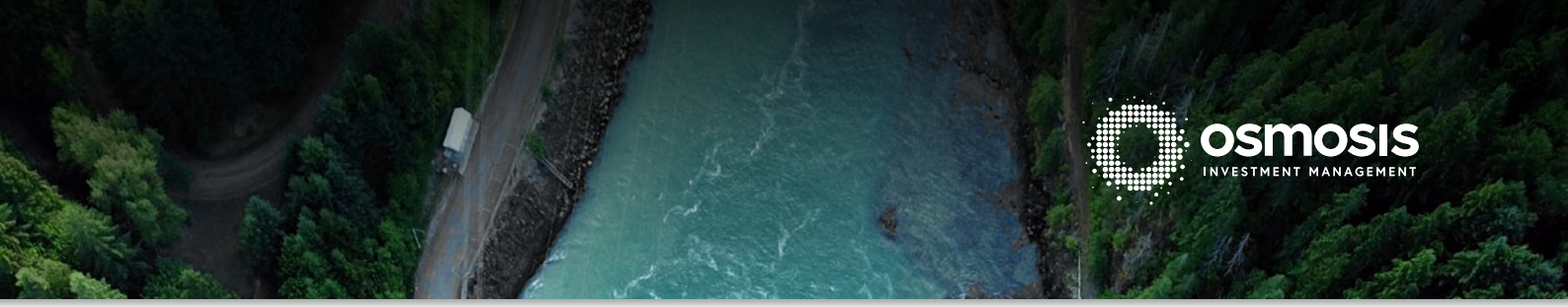


The Emerging Market Energy Landscape: Pathways, Pitfalls and the Importance of Resource Efficiency

Key takeaways

- Global emissions continue to rise, largely driven by the power sector's combustion of coal.
- We see heterogeneity in the 'dirtiness' of electricity grids across the Emerging Markets (EM). Asia-Pacific (APAC) is comparatively more coal dependent, Latin America (LATAM) is generally a lot cleaner, and Europe, the Middle East and Africa (EMEA) sits in the middle.
- China is central to global decarbonisation. It is still the largest coal consumer in absolute terms, but is rapidly expanding its renewable generation capacity.
- The carbon intensity of grid electricity directly impacts corporates through their Scope 2 carbon emissions. The dirtier the energy, the greater the importance of using it efficiently.

The emerging market energy landscape

Electricity grids worldwide vary significantly in their energy mix, with EM typically relying more heavily on dirty, high-emission energy sources. Osmosis finds that within the EM energy landscape APAC stands out as the region that has the 'dirtiest' electricity generation, followed by EMEA, while LATAM demonstrates the 'cleanest' electricity generation. Looking beyond the broad regional patterns however, some countries have managed a swift uptake in renewables, whilst some are still highly reliant on 'dirtier' fuel types for power generation.

Coal is largely responsible for driving grid emissions in many EM countries. Coal, as the most carbon-intensive fossil fuel, remains the largest contributor to global emissions, emitting more than oil, gas or any other petroleum product. Increasing coal consumption accounted for ~80% of the global increase in emissions in 2023, mostly from electricity generation. Whilst some EM countries are making strides towards phasing out coal, particularly in LATAM, large economies like China and India are still heavily reliant on it.

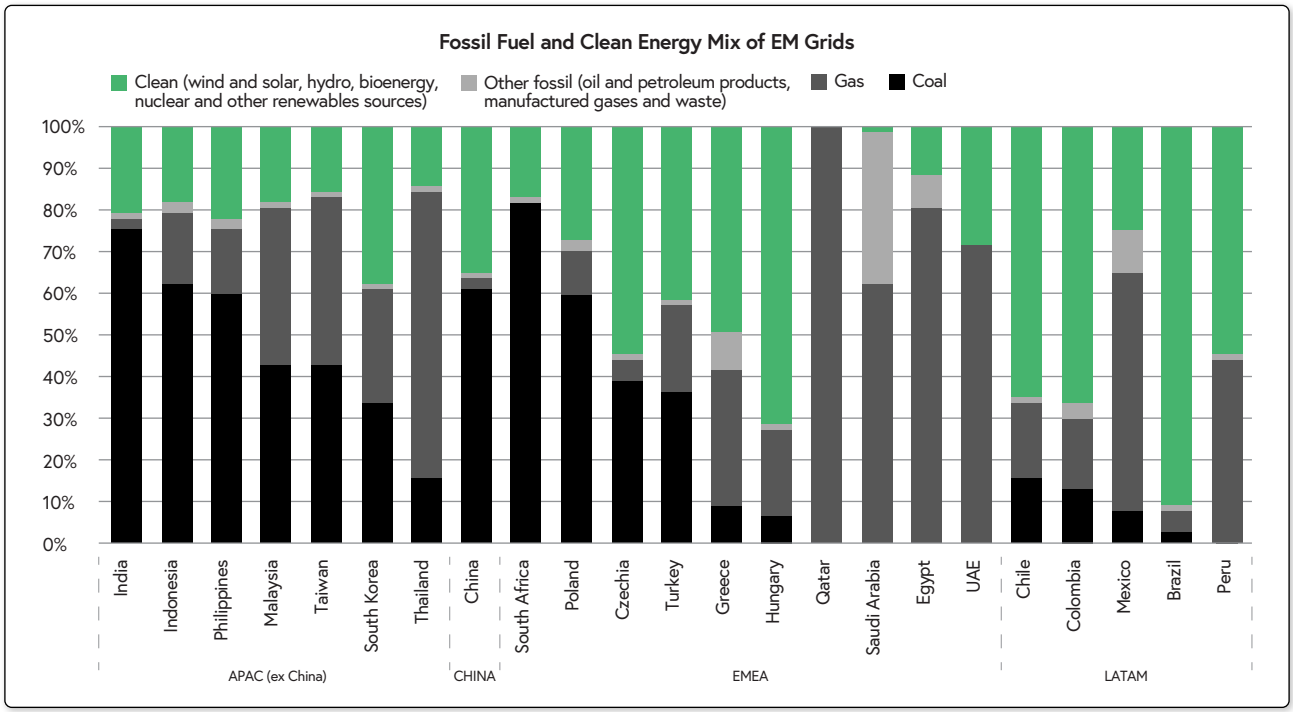
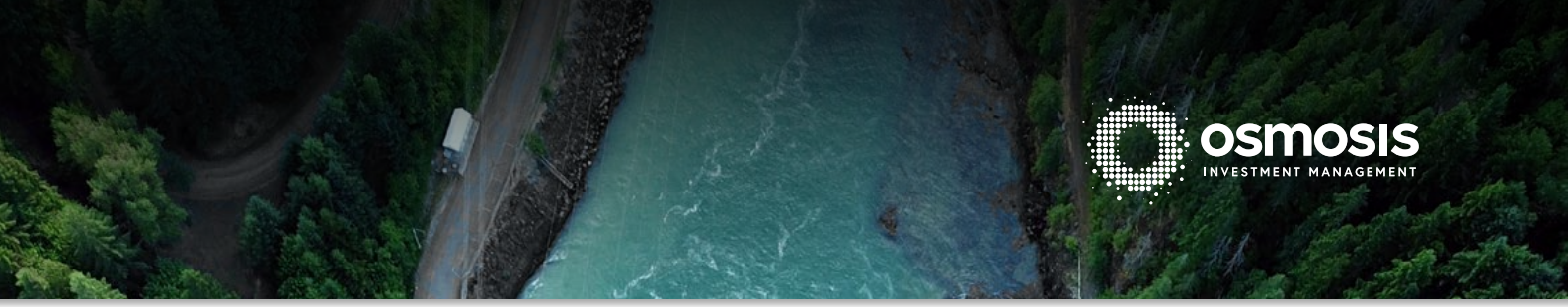


Figure 1: Ember, 2023



Latin America continues to be a renewable energy leader

LATAM's notable success is fuelled by its use of clean electricity, with the region holding the highest global share of renewables in its energy mix. This is led by Brazil, which has the least carbon-intensive electricity mix in the EM. The country shaped its electricity mix with hydropower sources that now supply ~60% of the national electricity generation. However, the impacts of climate change and reliance on hydropower have posed major challenges to their electricity generation and transmission, with dry spells leading to issues such as blackouts and electricity consumption regulations, among other government interventions to curb electricity demand.

As a result, Brazil is quickly diversifying its electricity mix to include other renewable sources. The country's share of electricity generated from hydropower decreased from 87% in 2000 to 60% in 2023, due to a rise in biofuel use and the expansion of wind and solar power generation. Wind and solar energy, in particular, saw significant growth, with their share doubling from 10% in 2019 to 20% in 2023. The share of total clean energy, which includes wind, solar, hydro, bioenergy and other renewables, remained stable at around 90% from 2000 to 2023. The country has already exceeded its 2030 renewable energy share of generation targets, is on track to hit its renewable capacity targets, and is considered a global leader in renewable electricity.

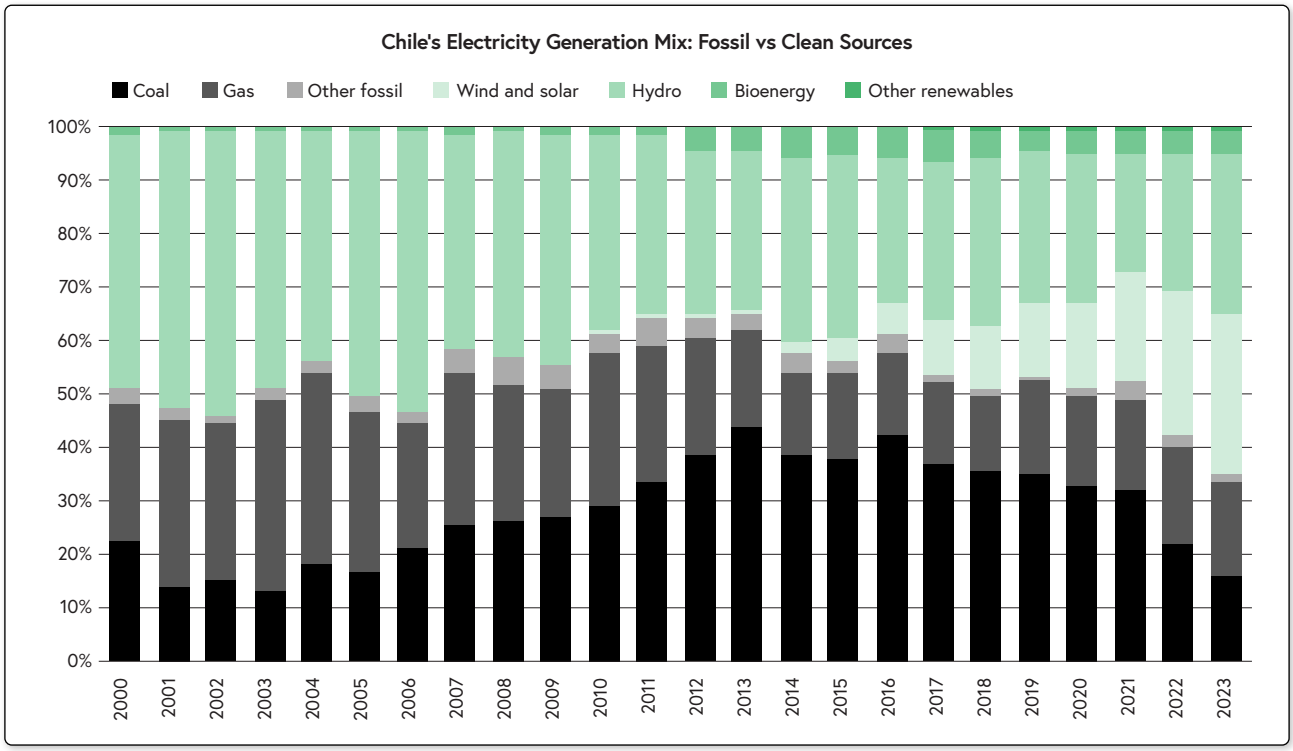
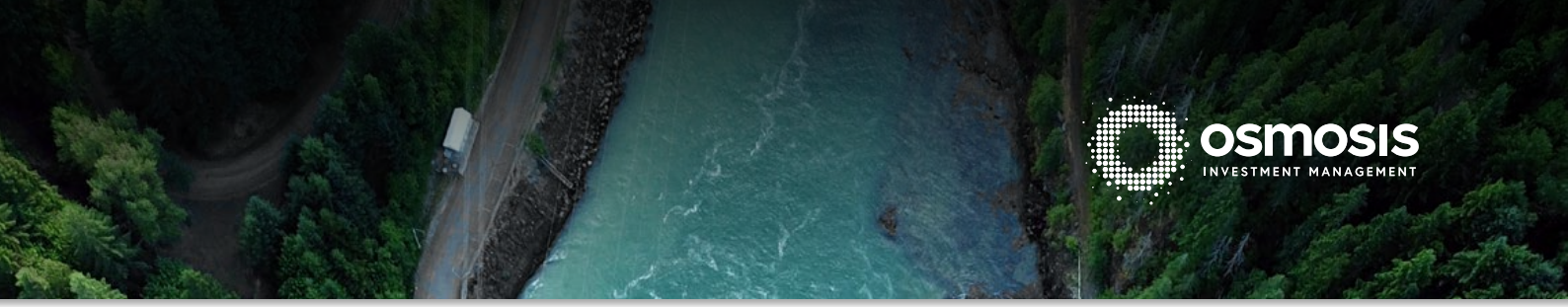


Figure 2: Ember, 2023

Chile is also making strides towards the low-carbon transition. In 2022, for the first time, electricity generation from renewable sources surpassed fossil fuels in Chile. Over the last decade the country has successfully diversified its electricity generation. Fossil fuel use, mainly driven by coal, peaked at 65% of all electricity generation in 2013, but by 2023, 65% was being generated from clean sources.

The path towards decarbonising Chile's electrical grid presents an interesting case, demonstrating how the country has diversified and decarbonised its national electrical system without depending on traditional transition fuels, such as gas and other fossils. The rapid development of wind and solar sources provide a positive outlook for Chile's goal of generating 70% of its electricity from renewable sources by 2050.



China is moving in the right direction, but still has some way to go

Achieving global decarbonisation is essential, and China is at the crux of the transition. China's electricity demand is by far the largest of any EM country – almost five times larger than second place, India – and coal continues to dominate its energy mix. That said, rapid deployment of clean energy has reduced the share of coal in its electricity mix from a peak of 80% in the early 2000s to a record low of 53% in 2024. While coal's share in electricity generation has declined, absolute coal consumption continues to rise, and depending on how quickly the energy transition evolves, is expected to plateau by 2027.

China is rapidly diversifying its power sources and accelerating the installation of renewable energy infrastructure. In 2024, it added 277GW of solar power and 80GW of wind power, a 25% increase from 2023 and hitting 2030 targets of 1,200 GW ahead of schedule. To aid this shift, the country has confirmed that from 2026 onwards, it will move away from controlling energy consumption per unit of GDP and focus on controlling absolute carbon emissions. It is also becoming by far the largest manufacturer and provider of clean technology in the world, with its share of global manufacturing of solar panels at 80% and battery cells at 85%. This is reflective of a shift in focus towards the green 'new three industries' of lithium-ion batteries, photovoltaics and electric vehicles.

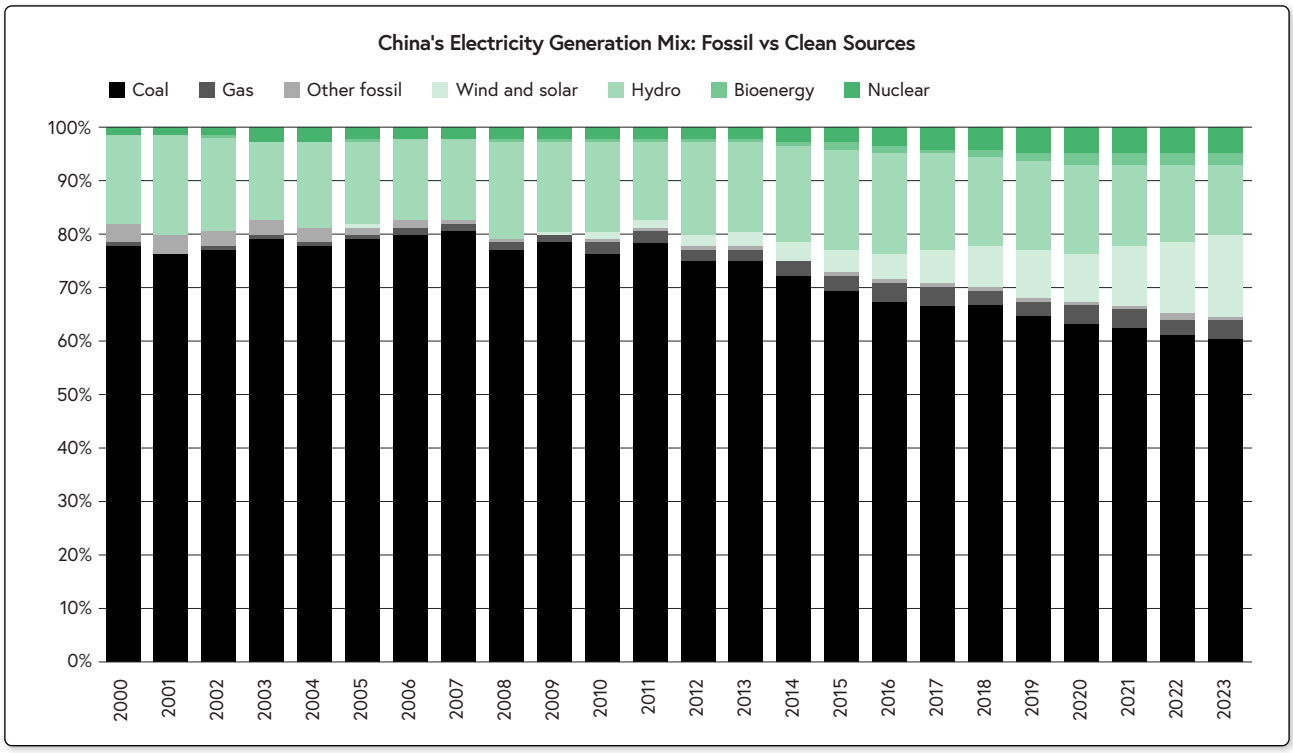


Figure 3: Ember, 2023

China has recently taken a major step towards reorienting its energy policy, introducing a market-oriented energy reform that will allow it to move from a fixed-price system to one in which markets decide clean power prices. All new projects completed after June 2025 will face electricity payments based on market-driven bidding. This shift could bring multiple benefits, from greater technological development, increased clean energy capacity, and boosted efficiency in electricity distribution, to potential investment attraction, cost reduction, and greater stability for renewable energy providers in times of uncertainty.

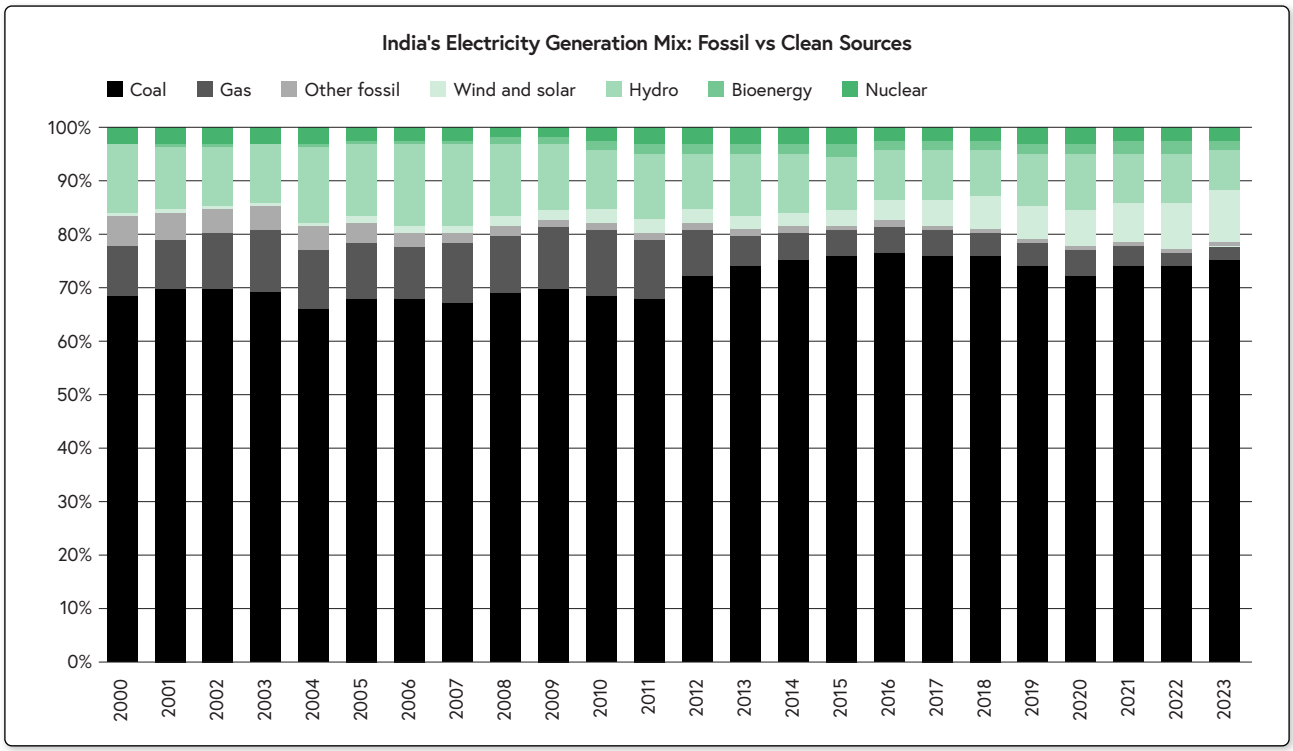


Figure 4: Ember, 2023

Asia ex-China is less proactive in its transition

The addition of renewables in other APAC countries is underway, but not at the necessary pace. After China, India was the EM country that added the most net renewable electricity capacity in 2023 and 2024. Yet, it is the APAC country with the highest share of fossil fuels in its electricity generation mix and still uses considerable amounts of coal. India has slightly increased the share of renewables in its electricity mix, yet overall it remains stable and will likely remain so through 2025. Major efforts are needed to accelerate the decarbonisation of its electricity system for it to achieve its ambitious target of 500GW of non-fossil capacity by 2030.

Given emissions in EM APAC are particularly 'dirty' and strongly driven by coal, rapid change is of vital importance. Indonesia recently pledged to phase out all coal plants and to develop more than 75GW of renewable energy capacity by 2040, but given that in 2023 coal consumption accounted for 62% of its power mix it still has a large hill to climb. Indonesia's energy transition will require massive efforts and reforms in policy, infrastructure, subsidies and global finance to achieve the transition and meet its ambitious climate goals.

The oil and gas powered Middle East

When looking at the total share of fossil fuel energy generation, Middle Eastern countries unsurprisingly stand out as being heavily reliant on oil and gas. Early Organisation of the Petroleum Exporting Countries (OPEC) members Qatar and Saudi Arabia have over 98% of their electricity grid system powered by oil and gas. Furthermore, Saudi Arabia has the highest average rate of fossil fuel subsidies of all EM countries. Subsidies on high-carbon products hinder the decarbonisation of industries, and phasing them out is beneficial to encourage the competitiveness of low-carbon alternatives. The United Arab Emirates (UAE) became the first country in the region to remove fossil fuel subsidies, representing an important step for the reform in oil-rich countries. Saudi Arabia similarly aims to reduce fossil fuel subsidies by 2030.

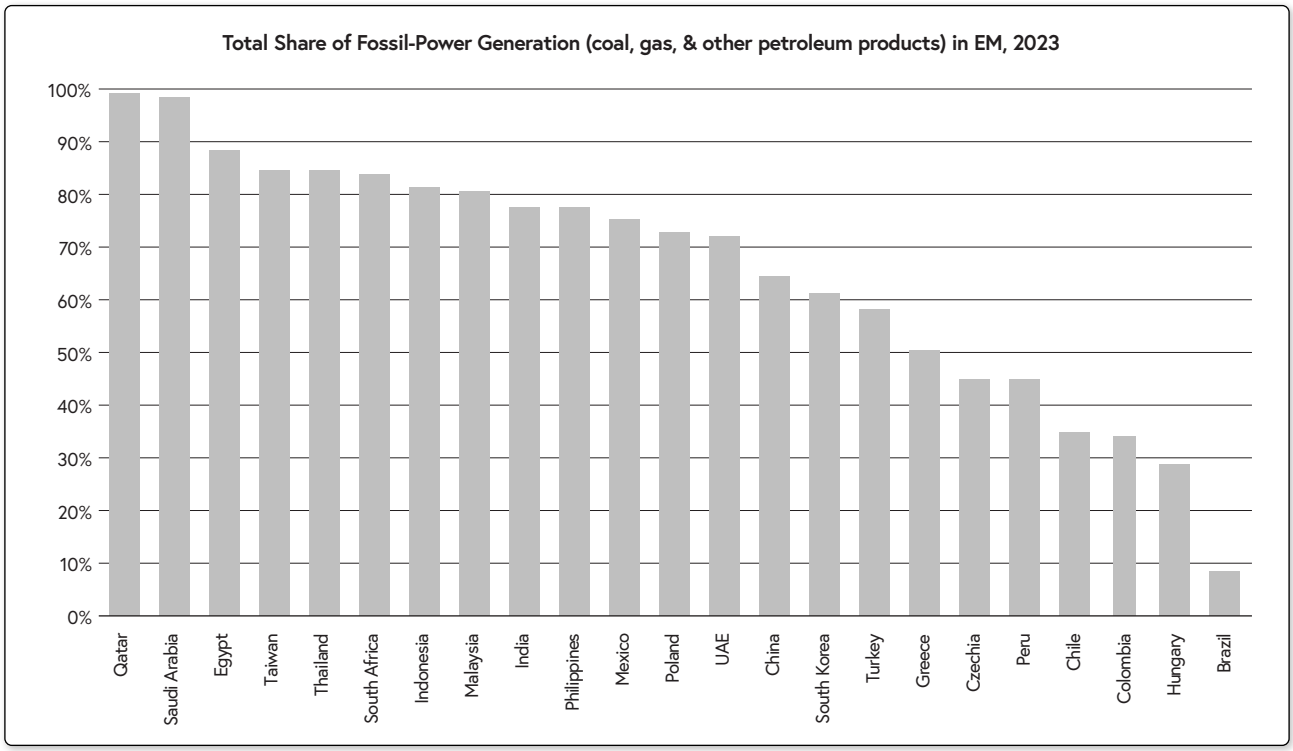


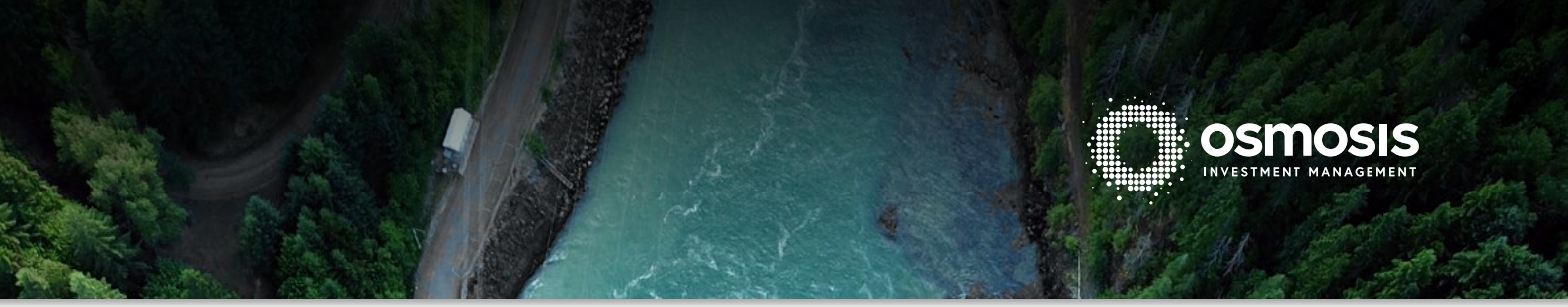
Figure 5: Ember, 2023

Grid electrification will require major structural change, causing knock-on effects across the economy

One of the biggest challenges of global electrification lies in expanding and modernising power grids to incorporate renewable energy. The International Energy Agency (IEA) estimates that by 2040 more than 80 million kilometres of power grids will be needed to meet national climate goals. This will require huge investment efforts, and we observed that financing in power grid infrastructure started to pick up in 2024. Europe, the United States, China, India and some countries in LATAM, such as Brazil, are already taking the lead. China's State Grid, the world's largest state-owned electric utility, is currently building massive ultra-high voltage (UHV) transmission lines to transmit clean electricity over long distances from renewable sources, although the share of wind and solar power transferred by them is still minimal.

Integrating new renewable capacity into grids and electricity systems is a global problem. Copper demand is expected to double by 2040, due to its excellent electrical conductivity and critical role in electricity grids. This will be significantly influenced by China due to the scale of national electricity demand and sheer volume of grid improvements. LATAM dominates the mining of copper, with Chile and Peru as the biggest players, whilst China leads the smelting and refining of this critical mineral. The copper scrap supply has been cited by some as an opportunity for the energy transition, and Osmosis highlights the importance of Resource Efficiency in the processes: reducing the use of raw materials would generate fewer emissions and less waste.

Scaling up clean energy investments remains essential while bridging the gap. Global investments in clean energy are now more than twice as large as in fossil fuels, although regional imbalances persist. China is a leader in this space and, by the end of 2024, Chinese clean energy investment accounted for more than double that made by the rest of EM ex China – and more than that seen in 'advanced economies' from 2022 onwards, according to the IEA.



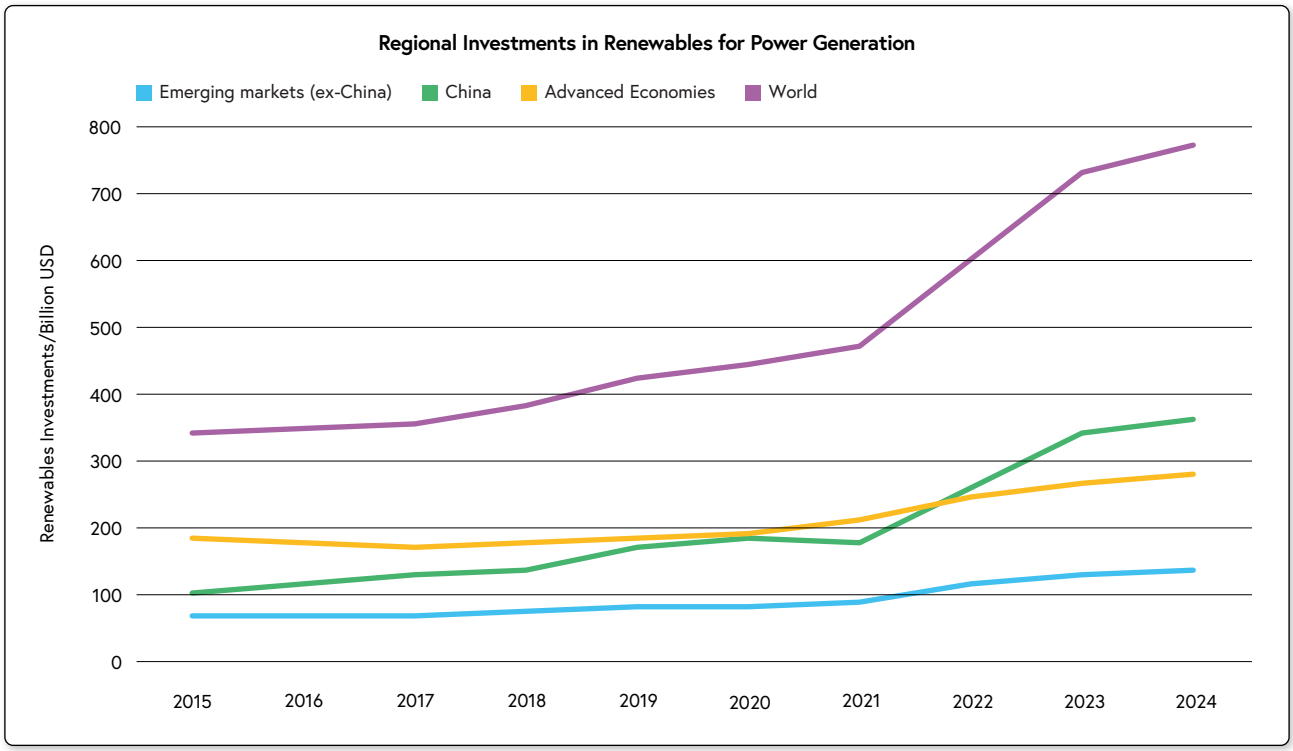
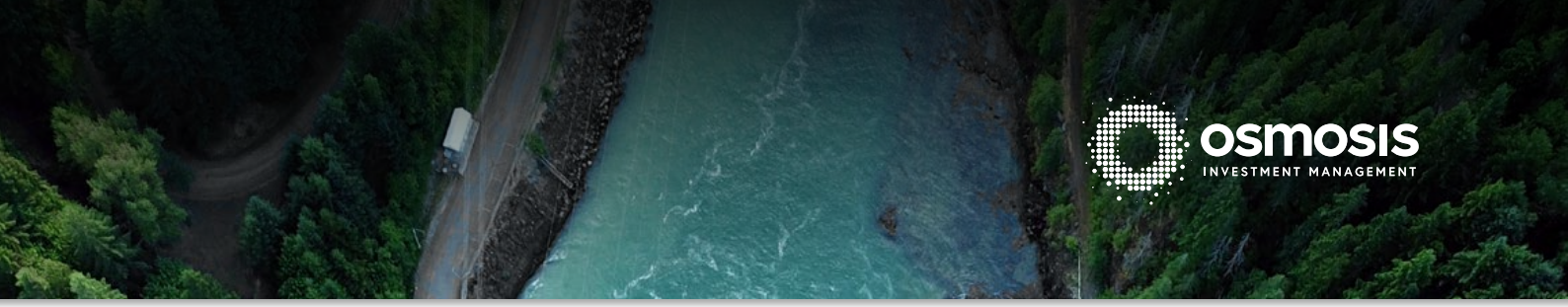


Figure 6: IEA World Energy Investment, 2024

Corporate emission management is particularly important in fossil fuel-heavy grids

For corporations, the efficient use of energy becomes more important when the grid is dirtier. Companies in the EM will buy electricity from their local grid unless they are in the unusual scenario whereby they generate all of their own power. 'Scope 2' emissions are defined as 'indirect' emissions that arise primarily from the purchase of electricity. As such, the dirtier the electricity grids, the higher the Scope 2 emissions attributable to companies. In the developed markets (DM), it is easier for companies to decarbonise their Scope 2 emissions by buying renewable energy certificates, but with less renewable energy flowing into the grids, this is more difficult in the EM. The dirtier the unit of energy being consumed, the more important it is that a company is using this scarce resource efficiently.



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