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# Supporting energy transition with green aluminium

Aluminium is one of the most carbon-intensive industrial metals, accounting for 11% of industrial metal related emission. Global average aluminium carbon intensity is around 13 tonnes per tonne of the metal produced, but this can vary considerably: from under five tonnes using renewables or up to around 20 tonnes using coal.

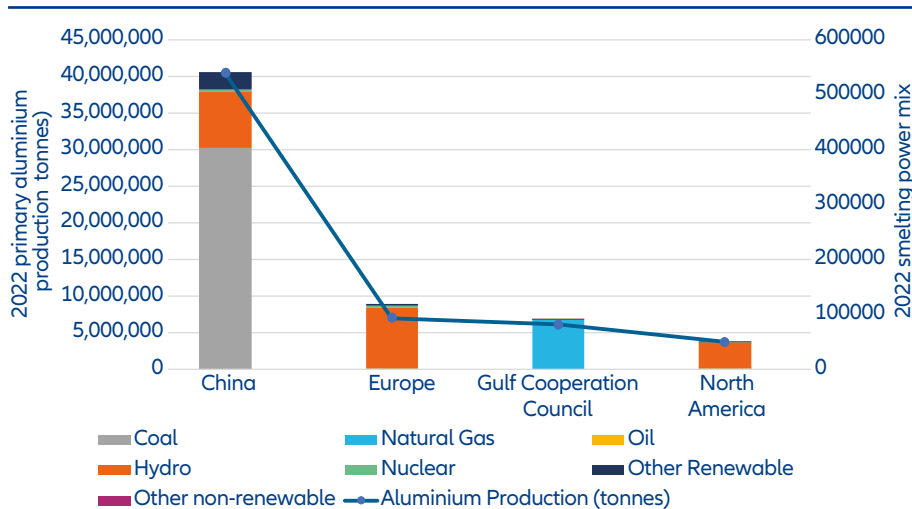
Today, most coal-powered smelting capacity is located in China, while the major listed EMEA and US aluminium producers mainly use hydropower. Although most capacity additions since 2010 are using fossil fuels – coal in China, gas in the Middle East – we expect this to change as China moves to include aluminium to its emissions trading scheme (ETS) and thus creates greater barriers to new coal-fired capacity.



**Giles Money**  
CIO, Global Sustainable Equity



**Alex Bibani**  
Senior Portfolio Manager

**Figure 1: Aluminium production in 2022 by smelting power mix**

Source: <https://international-aluminium.org/statistics/primary-aluminium-production/>

Aluminium is a key enabler in the transition to a low carbon economy, with demand forecast to grow from 86.2 Mt to 119.5 Mt by 2030. Yet it is worth noting that while aluminium production is energy intensive, the metal itself is very recyclable – 75% of all aluminium ever produced is still in use. So while we expect to see increased aluminium demand due to the energy transition, the growth rate will be lower than for other key metals such as than copper, nickel and lithium.

A significant contributor to this increase will be the transportation sector. The shift electric vehicles (EVs), which contain a higher aluminium content compared to traditional vehicles, is a main driver. The power production and distribution sectors also represents another substantial opportunity for the aluminium industry as power grids are expanded to deal with the demands of decarbonization. Indeed, forecasts suggest more than 90% of renewable energy capacity

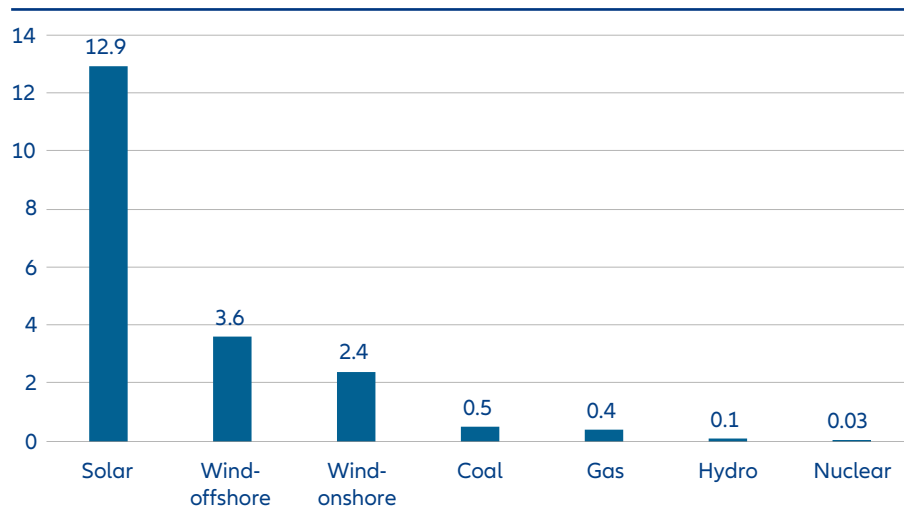
additions will come from solar or wind – both of which require large volumes of aluminium.

### Investment implications

In 2023, primary aluminium production reached more than 70,000 tonnes with China accounting for around 60% of global output and, as shown above, China's coal-powered smelters are particularly carbon intensive. In this context, Norsk Hydro – a Norwegian leader in aluminium and renewable energy production – is emerging as a structural winner given its position as the world's lowest-cost aluminium producer, in terms of both total production and carbon costs, thanks to its vertical integration and ownership of hydro-electric powered smelters.

As China transitions to implementing carbon pricing for aluminium producers and the cost curve steepens for Chinese producers, this will be significant for the global market and for more efficient producers such as Norsk Hydro. Indeed, growing demand coupled with restrictions on carbon-based smelting are likely to exert significant upward price pressure in the coming years, and we estimate that a USD 400/tonne increase in the price of aluminium is likely to impact Norsk Hydro's EBITDA by around 15%.

For investors, aluminium provides an example of how extant megatrends such as decarbonization are shaping both the supply and demand of key materials, providing opportunities for well positioned corporates – and presenting risks for those that do not adapt in good time.

**Figure 2: Aluminium intensity of different energy sources, t/MW**

Source: CRU

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