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The Case for Energy Transition Metals and Rare Earths Miners

WisdomTree®

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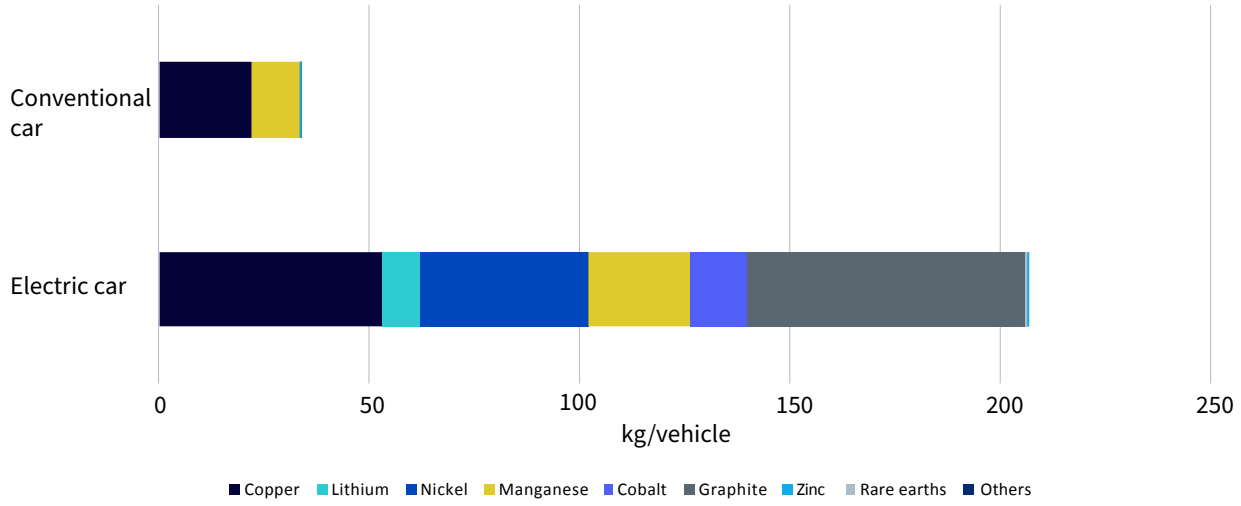
The energy transition from traditional fossil fuels to renewable resources as well as the electrification of several global economic sectors is garnering momentum. Countries must now act quickly to achieve their ambitions by pursuing concrete policies to deliver a just and equitable transition away from fossil fuels, in order to keep pace with the Paris Agreement goal[1] of limiting global warming to 1.5°c.

Rare earths and other critical metals like lithium, copper, nickel are the building blocks of the energy transition. The Rare Earths Elements (REEs) are of a group of 17 chemical elements, several of which are critical for the energy transition. Neodymium, praseodymium, dysprosium, and terbium are key to the production of the permanent magnets used in Electric Vehicles (EVs) and wind turbines. As the world races to decarbonize the power and transportation sectors, the shift to a clean energy system will drive a significant increase in demand for metals and REEs.

Figure 1: Minerals used in electric cars versus conventional cars



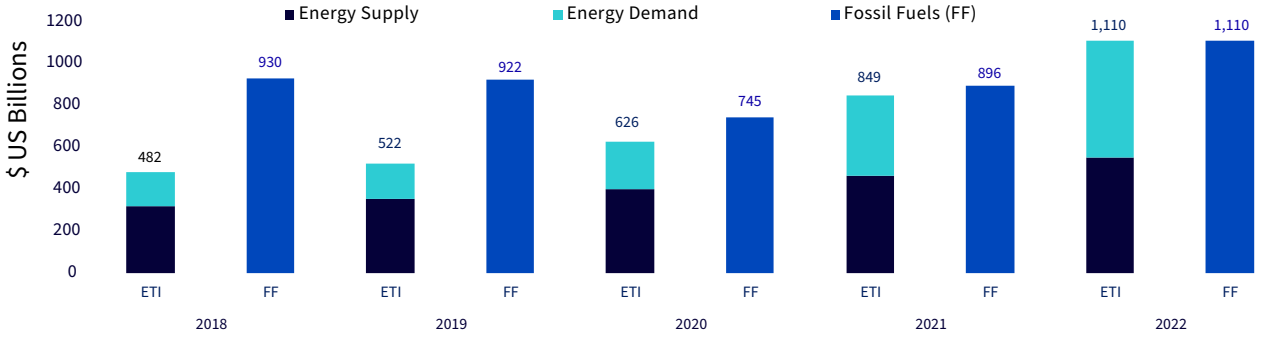
Source: International Energy Agency, WisdomTree as of 31 December 2023.

Investment in energy transition is on the brink of overtaking fossil fuel investment for the first time. In 2022, annual global investment in energy transition technologies exceeded US$1 trillion for the first time, hitting a new record of US$1.11 trillion, marking a 31% annual increase[2].

1 The Paris Agreement is a legally binding international treaty on climate change. Its goal is to limit global warming to well below 2 °C (degrees Celsius), preferably to 1.5, compared to pre-industrial levels.

2 Source: Bloomberg New Energy Finance – Investment Trends 2023

Figure 2: Investment comparison: Energy transition vs fossil fuels



Source: WisdomTree, Bloomberg New Energy Finance (BNEF), IEA. Note: ETI stands for Energy Investment and FF stands for Fossil Fuels. 2018- 21 FF values were derived from the IEA World Energy Investment 2022 report. 2022 fossil fuel investments are BNEF estimates, and include upstream, midstream, downstream sectors and unabated fossil power generation. **Historical performance is not an indication of future performance and any investments may go down in value.**

What are the drivers of growth?

Growth in the energy transition is being propelled by several factors:
Growing policy support and the increasing competitiveness of clean energy technologies are accelerating the energy transition. Major policy initiatives such as the EU's REPowerEU and the US's Inflation Reduction Act (IRA) are significantly backing this transition, each supporting the wider industry's drive towards 2030 and 2050 net-zero targets. China, a major player in the field, spent US$546 billion on energy transition in 2021, nearly half of the world's total[3]. This investment has cemented China's leadership position in renewable energy and electric vehicle sectors.

The COP28 UN climate conference in Dubai also played a critical role in December 2023 by committing to new renewable electrification initiatives and other climate action plans, reinforcing the movement towards a cleaner energy system.

Transport electrification and renewable power generation, core components of the zero-carbon pathway, are inherently metals intensive. There has been a remarkable surge in the manufacturing of electric vehicles since the COP21 Paris agreement eight years ago, now constituting a quarter of new car sales—a substantial increase from less than 1% in 2015. The mass production of Li-ion batteries has evolved from conception to a tangible reality. Concurrently, the global addition of 165 gigawatt (GW) of solar and wind capacity annually since 2015 underscores the expanding footprint of renewable power.

3 Source: Bloomberg New Energy Finance (BNEF)

The macroeconomic picture bodes well for the energy transition miners' theme. Demand for those commodities upon which the energy transition rests will correspondingly be higher as industrial activity grows and, in some cases, supplies will be available at competitive prices that will incentivise higher consumption.

Metal demand into these energy transition-related sectors has soared, and the transition is already driving the fortunes of numerous metals. Over 85% of lithium is now consumed in batteries, up from 45% in 2015[4]. Nickel demand is dominated by stainless steel, but 15% is now consumed in battery precursors – up from 2% in 2015 – and precursors alone will drive over 60% of primary nickel demand to 20404[4].

What are the growth expectations?

To align with global net-zero objectives, investments in energy transition and grid infrastructure need to triple from their 2020 levels. Energy transition and grid investment need to average US$4.55 trillion between 2023 and 2030, triple the amount spent in 2022[5].

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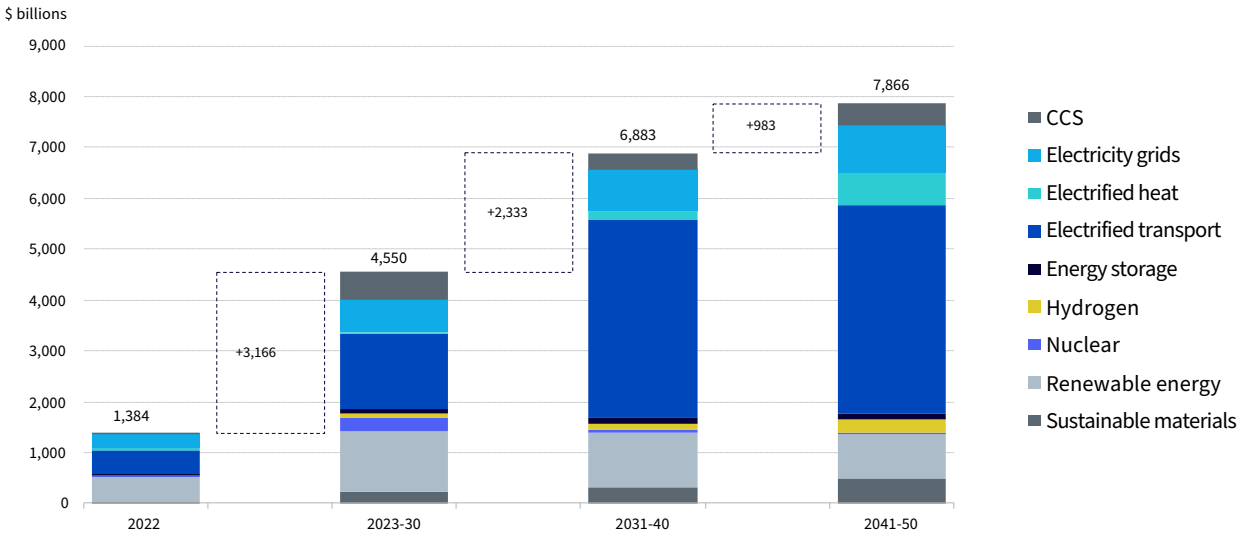
4 Source: International Energy Agency

5 Bloomberg New Energy Finance – Investment Trends 2023.

Figure 3: Annual investment growth in the energy transition



Source: Bloomberg New Energy Finance (BNEF). The future values are from the New Energy Outlook 2022, excluding electrified transport which is from the Electric Vehicle Outlook 2021 Net Zero Scenario. **Forecasts are not an indicator of future performance and any investments are subject to risks and uncertainties.**

Across 2023-30, electrified transport, renewable energy, and grids are anticipated to be the most significant investment opportunities, accounting for 72% of the combined share at US$1.47 trillion, US$1.18 trillion, and US$630 billion per year, respectively. This will require enhanced cooperation between the public and private sectors. In the 2030s, annual investment is expected to rise to US$6.88 trillion, with a substantial portion directed towards electrifying mobility demand.

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Clean energy technologies are expected to see a significant surge by 2030, given the current policy settings. By the end of the decade, the number of electric cars on roads worldwide is set to be nearly ten times higher than present levels. Solar energy is projected to generate more electricity than the entire United States currently does, with renewables nearing 50% of the global electricity mix, up from around 30% today.

Why focus on some specific metals?

The Energy Transition will have broad demand impacts on commodities. The likelihood of persistent demand for future metals due to the energy transition bodes well for market prices. Companies rich in future metals could increasingly benefit from the production and sale of these metals.

Technology is evolving and consequently so are the metal intensities. This is why the backdrop for metals demand is evolving dynamically. As the energy transition unfolds, network operators will need to build **transmission and distribution lines** which are aluminium and copper-intensive respectively. In transmission, overhead lines will likely become more important to connect remote renewable sites. Export cables for renewable projects are also critical, lifting copper intensities especially for offshore sites.

A multitude of **energy storage technologies** exist, including chemical, electrochemical mechanical and thermal. Hydrogen (chemical) and batteries (electrochemical) are gaining traction and should boost platinum/nickel and lithium demand.

Wind turbines have traditionally relied on gearboxes, but direct drive turbines are becoming more popular offshore which is likely to reduce copper intensity but increase rare earths demand. Meanwhile as solar photovoltaic manufacturers seek out efficiency gains, they are likely to increase their silver usage. In nuclear, pressurised water reactors have been the staple relying on steel and copper.

On the power consumption front, the chassis of **electric vehicles** is likely to boost demand for steel and aluminium. Lithium has been the common denominator in batteries, the differentiation has been primarily in the cathode materials. The charging infrastructure includes both slow and fast chargers, with the latter containing up to 25kg of copper per unit[6]. **Fuel cell electric vehicles** are also gaining traction and the platinum-intensive proton exchange membrane technology is key.

The table below illustrates the applications helping to decarbonise the economy, along with the commodities required:

6 BofA Global Research

Figure 4: Sources of demand for metals and rare earths elements across the energy transition value chain

	Generation		Storage Transmission/ distribution		Consumption				Net Zero Scenario	
	Wind	Solar photovoltaic	Energy Storage	Power Infrastructure	Electric Vehicles	Electric Motors	Carbon Capture and Storage	Electrification of economy	Supply constrained in 2030	Deficit of supply in 2030
Aluminium	x	x	x	x	x	x	x	x	Yes	30%
Cobalt	x		x		x		x	x	Yes	45%
Copper	x	x		x	x	x	x	x	Yes	17%
Iridium			x			x		x		
Lithium	x				x			x	Yes	65%
Nickel	x	x	x		x		x	x	Yes	46%
Platinum			x		x			x	Yes	35%
Silver		x			x			x	Yes	125%
Zinc	x	x						x	No	
Tin					x			x		
Rare Earths Elements	x				x	x		x		

Source: World Bank, The Growing Role of Minerals and Metals for a Low Carbon Future, CRU, Wood Mackenzie, WisdomTree.

Why invest?

Rising geopolitical and economic concerns, have the potential to hasten the transition to a more sustainable, cleaner and efficient energy system. Since Russia's invasion of Ukraine, new trade restriction within commodity markets have increased as producers impose curbs on shipments. As countries race to meet their net zero emissions targets, they will need vast supplies of REEs and energy transition metals. REEs and energy transition metals are extremely vulnerable as their global production is extremely concentrated rendering them more vulnerable to trade disruptions. At the same time, mining projects are expensive and long-term in nature. The combination of concentrated supply and weaker reactivity of supply makes REEs and energy transition metals susceptible amidst rising geopolitical risks and trade restrictions.

In conclusion, investing in energy transition metals and rare earth miners is not just a potential market opportunity; it is a crucial step towards a sustainable future. As we navigate these transformative times, the role of metals and miners in the energy transition will be pivotal in decarbonizing the economy and achieving the ambitious goals set by the global community for a cleaner, more sustainable future.

WisdomTree has recognised the growth opportunities and challenges facing countries globally as they seek to achieve their net zero targets. We have identified an equity route for investors to access the evolving mining value chain for 11 key commodities tied to the energy transition metals and REEs.

WisdomTree aims to build innovative investment strategies, designed to directly address today's most pressing and durable investment themes. We have recognised the growth opportunities and challenges facing countries globally as they seek to achieve their net zero targets. Given the evolving nature of the energy transition, we constantly strive to adapt to the ever-changing nature of the energy transition value chain but also position ourselves for an informed view of where the megatrend is headed. Building on our industry leading commodities and thematic ETP expertise, we have identified an equity route for investors to access the mining value chain for key commodities tied to the energy transition metals and REEs. We are proud to introduce a new addition to our energy transition ETP product suite that allows investors to tap into a niche segment of the energy transition value chain via the WisdomTree Energy Transition Metals and Rare Earths Miners strategy.

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