Metals of the future: Commodities making the energy transition happen (Part two)

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Key Takeaways

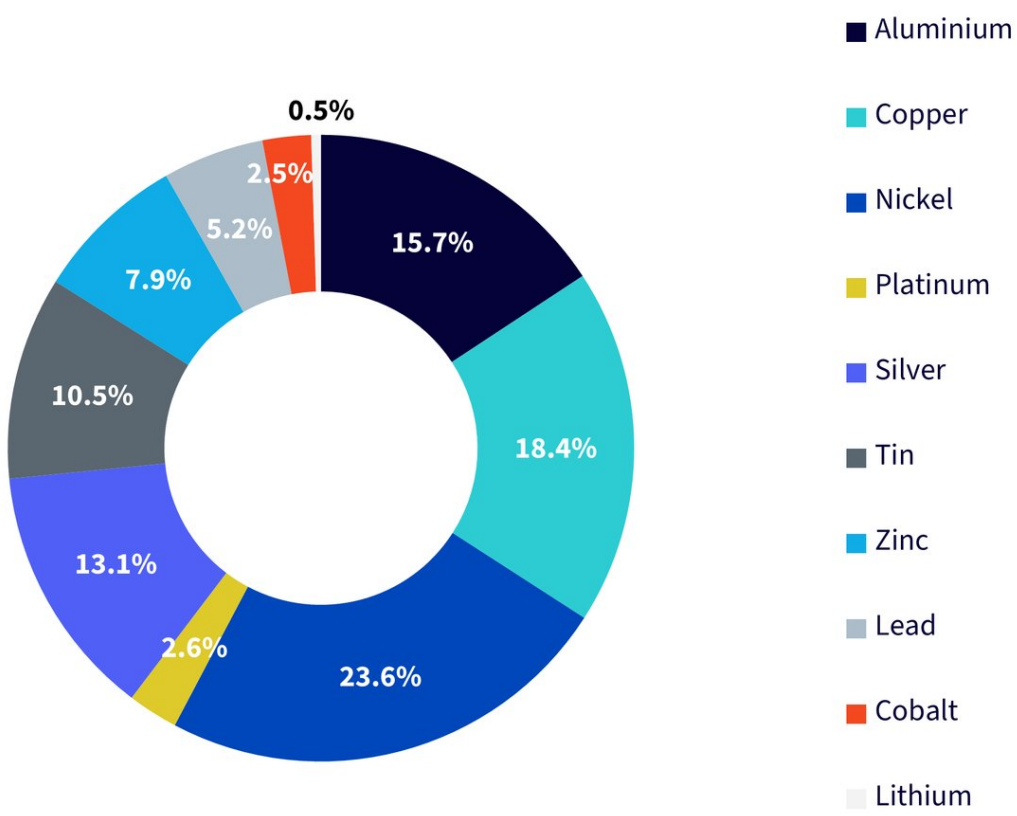
- Zinc is used to galvanise steel making it very important in wind power.
- Lead has a role to play across wind, solar, and battery technology.
- Platinum's catalytic properties make it essential in the rapidly growing space of green hydrogen.
- Cobalt improves the energy density of batteries making it key for energy storage and electric vehicles.
- Lithium-ion batteries are named after the metal given its indispensability.

In this two-part blog series, we highlight ten key commodities that make the energy transition possible. Part one covered copper, nickel, aluminium, silver, and tin. Part two will discuss zinc, lead, platinum, cobalt, and lithium. The blogs will offer a whistle-stop tour of why these metals are important in the energy transition, with the aim of inspiring readers to further explore the fascinating world of energy transition metals.

How investors can access the opportunity

WisdomTree Energy Transition Metals is a fully collateralised, UCITS-eligible Exchange Traded Commodity (ETC) designed to provide investors with a total return exposure to a basket of 10 Energy Transition Metals futures contracts. The ETC is built in partnership with industry experts, Wood Mackenzie, and answers two key questions for investors: which commodities to pick and how to weight them. The metal selection and weighting are informed by a forward-looking view on how important each metal is in the energy transition subject to its investability.

Figure 1: WisdomTree Energy Transition Metals (WENT) 2024 target weights



Source: WisdomTree, Wood Mackenzie, target weights as of the latest annual rebalance in January 2024.

6. Zinc

Zinc's primary industrial use is in galvanising steel for protection from corrosion in everything from buildings and bridges to transmission towers and wind turbines[1]. According to the US Geological Survey[2], between 66% and 79% of a wind turbine's total mass is made of steel. Therefore, each turbine depends heavily on zinc for its long-term endurance. This is especially true in offshore wind, where turbines are even more vulnerable to damage from the elements.

According to the International Energy Agency (IEA), generating one megawatt (MW) of power from wind requires 5,500 kilograms (kg) of zinc. In contrast, almost no zinc is required to produce power from coal or natural gas. With world leaders having pledged to triple global renewable energy capacity by 2030 (at the latest United Nations Climate Change Conference COP28), the long-term prospects for zinc demand growth appear strong.

Zinc also has a promising role to play in batteries. Zinc bromine flow batteries are rechargeable batteries that use zinc and bromine in electrolytes to store and release electrical energy. The relatively high energy density and long lifespan make them an ideal choice for grid scale energy storage applications[3].

7. Lead

Lead has multiple applications across the energy transition. In solar power, lead helps bolster panel durability by mitigating thermal stress. Lead-coated copper ribbons in panels reduce soldering[4] temperatures, thereby extending the panel's lifespan. In wind energy, offshore wind farms rely on lead-sheathed cables for efficient energy transmission. These cables, lasting up to 50 years, resist corrosion, which is vital for the durability of wind power.

Lead also has an important role in battery technology. Lead batteries are increasingly crucial for energy storage, offering affordability, sustainability, and reliability. With a long life that can span over 15 years and 5000 charge cycles, they're ideal for storing renewable energy[5].

8. Platinum

Platinum is one of the rarest metals in the world and, therefore, is rightly classified as precious. Nonetheless, its unique catalytic properties make it very valuable in the energy transition.

Today, the largest source of platinum demand is from the automotive sector. Platinum is central to reducing emissions from internal combustion engine vehicles and higher loadings of the metal are required to meet increasingly strict emissions standards around the world. But platinum's role as a catalyst in the hydrogen economy is what makes it an exciting energy transition metal.

Platinum is used as a catalyst in electrolysers, which produce hydrogen from water, and fuel cells, which use hydrogen as a fuel source in emerging applications like fuel cell electric vehicles. According to the IEA, the world saw a 360% increase in electrolyser capacity in 2023. Although a small market, the rates of growth in this sector are promising. Electrolysers enable the production of green (or clean) hydrogen, which complements wind and solar power to provide long-term energy storage. According to the World Platinum Investment Council, platinum demand from electrolysers and fuel cell electric vehicles is expected to become a meaningful component of total demand for the metal by 2030 and potentially the largest segment by 2040[6].

9. Cobalt

Cobalt emerges as a linchpin in the ongoing energy transition, pivotal in the shift towards clean mobility and sustainable power generation. Recognised as a critical raw material by both the European Union and the United States, cobalt's significance lies in its energy storage capacity, and resilience to high temperatures. Cobalt's role in enhancing energy density and ensuring stability in lithium-ion batteries is indisputable. These batteries rely on the movement of lithium ions (Li+) between the anode and the cobalt-containing cathode. Cobalt serves multiple vital functions, including enhanced energy density when combined with nickel, contributing to longer driving ranges and improved performance for electric vehicles. Additionally, cobalt-based cathodes are renowned for their stability and long cycle life, allowing EV batteries to undergo numerous charge and discharge cycles before experiencing significant capacity degradation.

Moreover, cobalt-containing batteries maintain stable voltage output throughout their lifespan, which is crucial for the consistent and reliable performance of electric vehicles. Furthermore, these batteries can handle high charging rates, enabling rapid charging and reducing the time required to replenish an EV's

battery. As the demand for rechargeable batteries skyrockets in the pursuit of zero emissions, cobalt's presence in lithium-ion batteries, particularly in cathodes, is indispensable. According to the IEA, each electric vehicle requires 13.3kg of cobalt compared to almost nothing for an internal combustion engine vehicle.

10. Lithium

Lithium serves as the crucial component in lithium-ion batteries, acting as the electrode material in both the anode and the cathode. During discharge, lithium ions move from the anode to the cathode through the electrolyte, creating an electric current. In recharge, these ions reverse direction. Lithium's high electrochemical potential and low atomic weight contribute to the battery's high energy density and lightweight characteristics, making it a cornerstone for efficient energy storage in various applications, from smartphones to electric vehicles.

According to the IEA, each EV requires 8.9kg of lithium compared to practically nothing in an internal combustion engine (ICE) car. Equally, lithium-ion batteries are still the preferred technology for grid-scale energy storage. The IEA states that after their deployment in the power sector more than doubled last year, batteries need to lead a sixfold increase in global energy storage to enable the world to meet 2030 targets[7].

Closing word…

Our energy needs are constantly on the rise. Technologies like artificial intelligence, cloud computing, and blockchain are very energy intensive. Thus, not only is the world transitioning from fossil fuels towards renewable sources of energy, but rapid growth in these new technologies is also required to sustain our planet and technological progress. And metals are the raw materials that will power this revolution. At WisdomTree, we believe this thematic narrative of metals powering growth in the 21st century is not reflected in markets yet, which still view metals as cyclical assets. This creates an exciting opportunity for investors seeking long-term growth.

Sources

[1] Feeco International.

[2] US Geological Survey is the name of the Organisation. Source can be: US Geological Survey, 2024.

[3] Rana M, Alghamdi N, Peng X, Huang Y, Wang B, Wang L, Gentle IR, Hickey S, Luo B. Scientific issues of zinc-bromine flow batteries and mitigation strategies. Exploration (Beijing). 2023 Jul 20;3(6):20220073. doi: 10.1002/EXP.20220073. PMID: 38264684; PMCID: PMC10742200.

[4] Soldering is a joining process used to join different types of metals together.

[5] Lead Matters, May 2024.

[6] World Platinum Investment Council, 2024.

[7] IEA, April 2024.

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