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The Crucial Role of Resources in the Great Energy Transition Debate

INSIGHTS

It is becoming increasingly clear that to improve the chances of achieving Net Zero by 2050, natural resources companies are a key part of the solution—not the problem.

- We need to rethink how to achieve the energy transition
- Energy resilience is now as important as the energy transition
- Raw material constraints are a headwind that still needs to be solved
- Natural resources are part of the solution to climate change, not the problem

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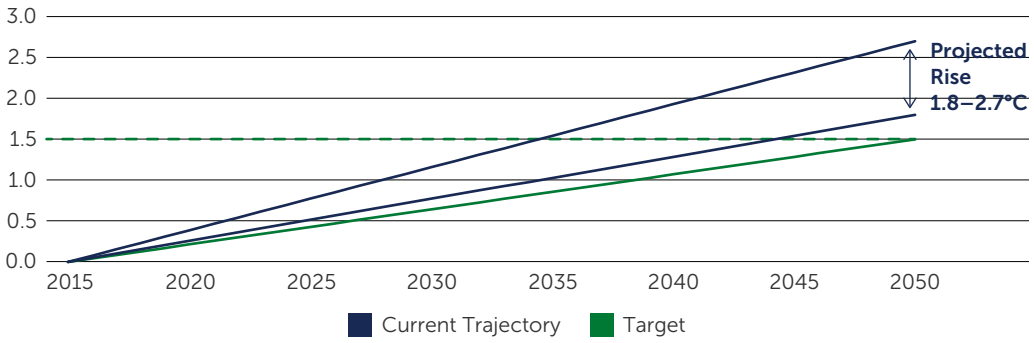
Rethinking the Energy Transition

"Climate change is the defining issue of our time, and we are at a defining moment."

UNITED NATIONS

For an organization renowned for its diplomatic language, this is a strong statement. However, underlying this statement and a leading takeaway from the COP27 conference held in Sharm-El-Sheikh, Egypt in November 2022, is that the 1.5°C target, as set by the Paris Agreement, would be increasingly challenging to meet. In fact, despite the various Net Zero commitments from countries around the world, we are on a trajectory to see global temperatures increase by 1.8–2.7°C by 2050 **(Figure 1)**. This has led us to rethink the energy transition, factoring in our improved understanding of the constraints facing the raw materials that are required to build the necessary infrastructure, as well as the growing necessity to consider in detail the world's need for energy resilience.

Figure 1: Global Temperatures Forecast to Rise by More Than 1.5°C by 2050



Source: Climate Action Tracker. As of November 2022.

It is well understood that to achieve Net Zero emissions by 2050 and limit temperature rises globally by no more than 1.5°C above pre-industrial levels, we need to transition the energy matrix, both static and mobile, from one that is fossil fuel-based to one that relies heavily on renewable energy. This will require substantial investments in solar and wind generation capacity in order to carry the load of a clean energy future. Investments of this scale will require mining and processing significantly higher amounts of raw materials—namely copper, aluminum, nickel, platinum group metals, and rare earths, often referred to as 'green metals'—than we have in the last 30 years. What is less well understood is the impact that this transition will have on the materials used in everyday construction such as steel and cement. Also pressing, and arguably more contentious, is the amount of energy that will be required to drive the transition. Based on our projections, and perhaps somewhat counterintuitively, natural gas and oil will need to remain a critical component.

Far-Reaching Implications

The cost of not undertaking this transition is significant. According to reinsurance company Swiss Re, 2022 saw the highest costs to insurance companies stemming from weather-related damage on record, with an estimated US$115 billion of damage caused by hurricanes, wildfires and other naturally occurring events.[1] To put this into perspective, the average insurable damage caused by weather events over the last 10 years was roughly US$81 billion per year.[1]

In order to limit global warming to no more than 1.5°C by 2050, all 197 countries need to build significant amounts of renewable energy capacity.[2] This will be principally solar and wind, but in order to support this transformation, other energy forms will need to be utilized as well—including transition fuels, such as natural gas. Estimates for the cost of this transition vary wildly. According to some, the cost of the transition to Net Zero could be as high as US$275 trillion, representing more than 2.75x the size of the global economy in 2022.[3]

The Crucial Role of Raw Materials

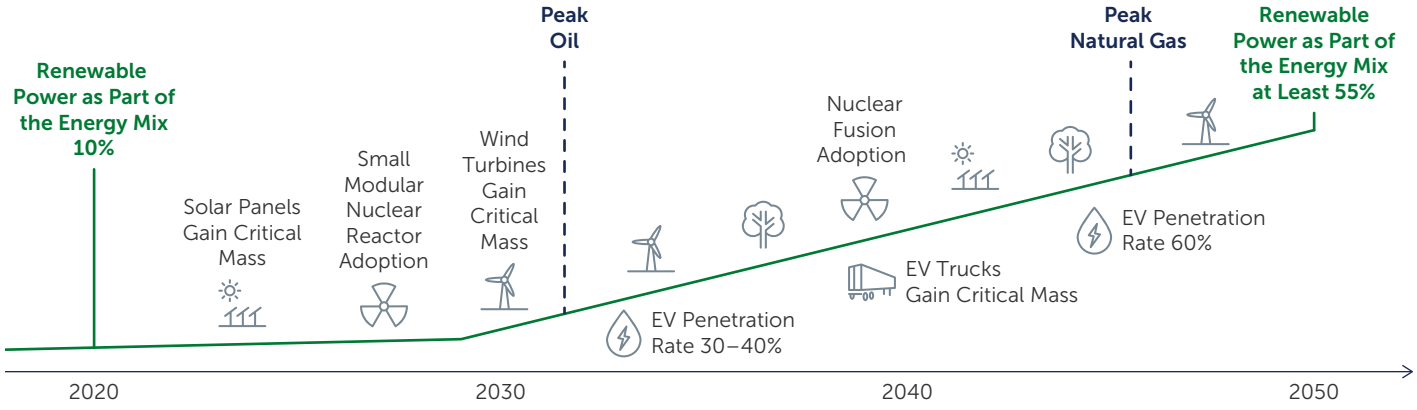
Herein lies the problem. We know that global warming must be limited to prevent the damaging impacts of temperature rises, and we know how to do it—increase the amount of renewable energy and decrease the amount of fossil fuels being burned. However, the scale and capital costs are substantial, most notably in developing nations. As a result, there is an argument to be made that we must rethink the financing around this transition, which was a central discussion point at COP27.

Some of the key questions to ask going forward include:

- Can we accept that some carbon emissions in the short term are necessary to aid the transition?
- Are we prepared to embrace **all forms** of power generation, renewable and fossil, to achieve Net Zero?
- Are we prepared to accept the cost that this could entail, and the impact this could have, on company returns and investment profiles?

Our own estimates show that to achieve Net Zero emissions by 2050, we will need to transition somewhere between 55–70% of the global power grid to run on renewable plus transition energy (natural gas and nuclear power), which means that 30–45% of our power supply will still come from what are termed fossil fuels (oil and thermal coal). To put this in context, approximately 85% of our energy today comes from fossil fuels with the remaining balance coming from various renewable energy sources.[4]

Figure 2: The Supply of Resources is Critical to the Success of the Energy Transition



Source: Barings (based on a Safety4Sea diagram). As of April 2022.

1. Source: Swiss RE. As of December 2022.
2. This includes 193 full U.N. member countries, two observers in the Holy See and State of Palestine, and Taiwan and Kosovo.
3. Source: McKinsey. As of January 2022.
4. Source: Barings. As of December 2022.

This means that as investors, we will be required to balance the potential benefits to companies of investing in new energy sources against the potential costs that companies will incur if they chose not to invest in these areas. At Barings, one way we have sought to do this is by enhancing our established ESG process to add a 'cost of carbon' to the Cost of Equity (COE) calculation that we use to derive our investment price targets. Through this, we are able to assess the cost of carbon to a company. We then combine this assessment with our understanding of the investments that the company will need to make to reduce its own carbon emissions as part of the effort to reduce global emissions. Ultimately, this allows us to form a holistic and informed view of the **economic impact carbon will have on our investments.**

GENERATORS OF THE ENERGY TRANSITION

The perceived thinking around investing in the climate transition often focuses investors toward renewable energy companies, mainly wind and solar, which will be the key beneficiaries of the energy transition. But we would argue that these companies—which we classify as **generators**—account for only half of the energy transition debate. To bring this argument to the forefront, 2022 showed that while this sector offered attractive long-term opportunities, in the near term, it did not necessarily generate a healthy return for investors. This was largely due to the headwinds facing the sectors, not only from rising inflation and raw material prices, but also from lower levels of wind, which reduced turbine generation and therefore revenue for the operators.

These challenges highlight that while wind and solar have tremendous long-term potential, it is also prudent to consider other forms of energy. Often omitted within the renewable category are hydrogen and biofuels, for example. Focusing on hydrogen specifically, the gold standard is the production of green hydrogen using renewable power or, to lesser extent, blue hydrogen utilizing less carbon intensive forms of energy such as natural gas combined with carbon capture. That said, while harnessing these forms of hydrogen will play a crucial role in decarbonizing many resource-intensive industries, such as steel, chemicals and cement, scalability is a headwind for mass adoption.

Looking at fossil fuels, natural gas is an obvious area of investment as a transition fuel, owing to its lower carbon intensity—it is also one that, based on our projections, will be utilized well into the 2040s. The argument for investment in oil is much less straightforward. While there is a strong case to be made that coal as a fuel source should be phased out, there are still applications for oil.

For example: A wind turbine needs two barrels of oil, synthesized into a lubricant, each year to keep its turbine spinning.[5] According to some forecasts, for a city of one million people to be powered exclusively by renewable energy, roughly 500 wind turbines will be needed—which equates to around 1,000 barrels of oil demand per year. Today, there are currently 571 cities with populations over one million.[6] This suggests as much as three to five million barrels of oil per year would be required to simply keep the turbines spinning.

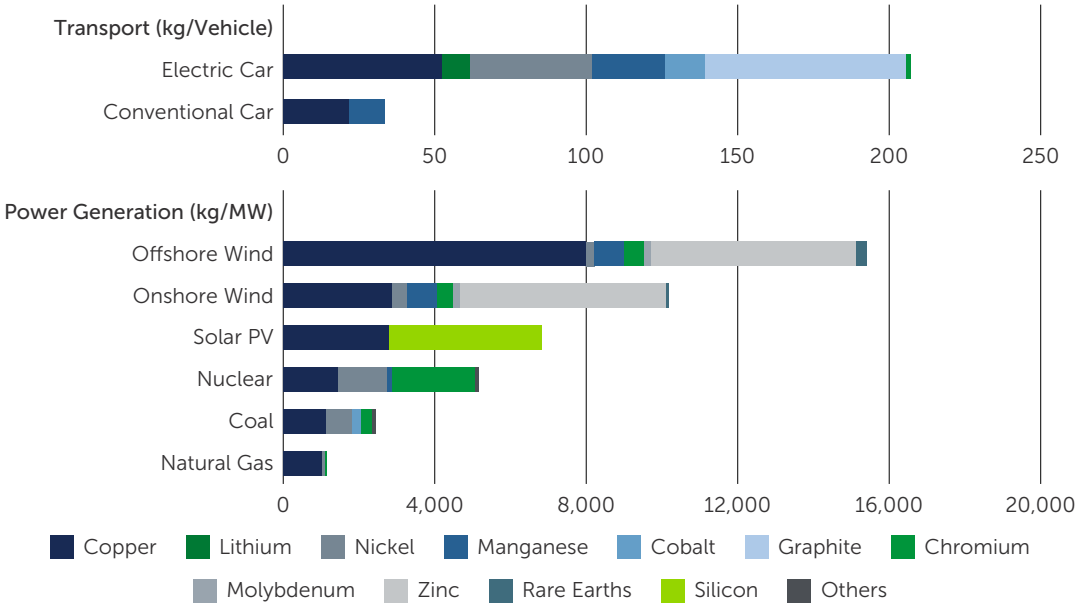
While this is a unique example, it highlights how the success of the energy transition will hinge, at least initially, on the usage of a wide variety of commodities.

5. Source: Barings' estimates. As of January 2023.
6. Source: World Population Review, United Nations. As of January 2023.

ENABLERS OF THE ENERGY TRANSITION

Indeed, alongside the energy generators, there are companies that **enable** the transition and thus remain crucial to its success. In our view, this category includes mining companies, steel producers, chemical processors and construction raw materials producers—because the reality is, without a significant increase in the production of steel, copper, aluminum, cement, lithium, and rare earths, it will be almost impossible to achieve Net Zero by 2050. To add context and put the scale of this challenge into perspective, a thermal coal power plant requires around one ton per MW of copper, whereas an offshore wind turbine requires eight to 10 times that amount.[7]

Figure 3: Rapid Deployment of Clean Energy Technologies Suggests a Significant Increase in Demand for Minerals

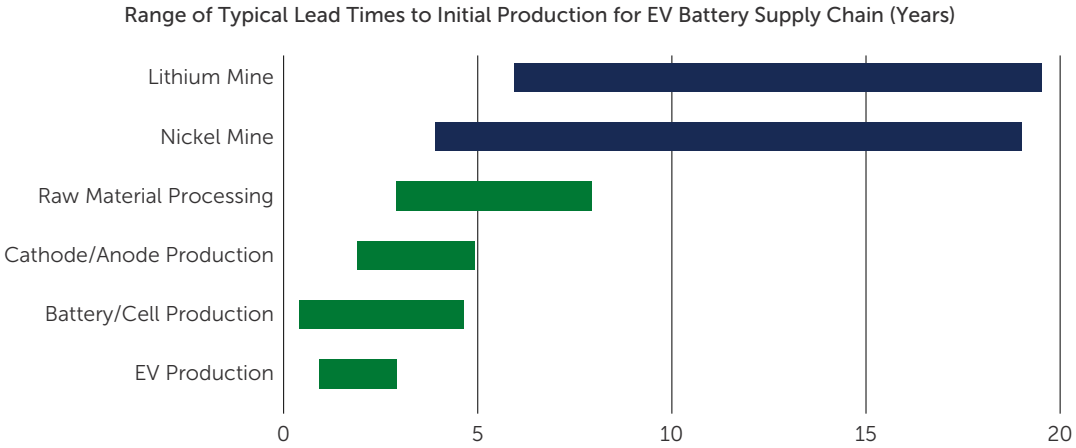


Source: IEA report. As of May 2021.

While some investors have been historically reticent to commit capital to what they view—for now—as a carbon-intensive industry, there is a growing understanding of the role these companies will play in the energy transition. Many of the companies themselves have become better at explaining the importance of the products they produce to the energy transition. At the same time, they are decarbonizing their own production chains, and increasing (at the margin) their attractiveness to investors who in the past may have shunned them. With annual supply-demand deficits in key commodities such as copper and aluminum growing larger and larger, and limited investment in new mines because of the time, cost, and regulatory burden to build them, the imperative to expand capacity through commissioning new mines is increasing by the year. Compounding this challenge, it can take over 12–14 years to find the deposit, secure permits, construct and, finally, commission a new nickel mine.[8]

7. Source: IEA. As of March 2022.
8. Sources: IEA analysis based on Heijlenet al.; Benchmark Mineral Intelligence; S&P Global. As of 2021.

Figure 4: Critical Investment in Mining is Needed Today



Sources: IEA analysis based on Heijlenet al. As of 2021. Benchmark Mineral Intelligence; S&P Global. Lead times for mines are calculated from completion of the preliminary feasibility study to the start of production. For other elements, lead times are calculated from investment decision to production.

All of this is to say that without commodities such as copper, there cannot be an energy transition, or energy resilience. The resulting demand for these commodities, combined with their scarcity, will, in our view, eventually drive commodity prices higher in order to incentivize new supply—ultimately benefitting the enablers of the energy transition and creating attractive investment opportunities in this space.

A Formidable, But Surmountable, Challenge

Carbon is the largest greenhouse gas emitted into the atmosphere, making carbon reduction—and the achievement of net zero by 2050—a crucial component of limiting global warming to 1.5°C above pre-industrial levels. Of course, there is no simple, easy, or inexpensive way to achieve this based on the viability of technologies available today. This suggests that compromises will be a necessary and critical part of the journey toward achieving this target. In summary:

- Somewhat counterintuitively, more carbon may need to be produced in the short term to enable a decline in carbon production from the 2030s onward
- Industries such as steel and mining are critical to the energy transition, and there are reasons they should no longer be viewed as pariah sectors for investors
- While renewables are set to overtake fossil fuels as the main proponent of the energy matrix, fuels such as oil still have an important role to play

By embracing all of the components of the energy matrix, including the raw materials sectors that have fallen out of favor among many investors, the goal of reducing carbon emissions to Net Zero by 2050 seems achievable. Ultimately, the journey will require effort, time and money. But one premise that is becoming increasingly clear is that when it comes to mitigating the impacts of climate change, natural resources companies are a crucial part of the solution, not the problem.

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**As of December 31, 2022*

23-2767278