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Geopolitics and decarbonization in the mining & metals sector

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The race to decarbonize industrial production, transport and entire economies has brought the politics of mining & metals—the sinews of clean energy—to the fore. Geography as much as geology is driving commercial activity and opportunities for mining & metals firms as decarbonization accelerates, say **Rebecca Campbell**, **David Bond, John Tivey** and **Kamran Ahmad**.

The old adage—credited to J. Paul Getty—goes, "The meek shall inherit the Earth, but not its mineral rights." Countries that have inherited mineral wealth, ceded, or gained control of larger shares of markets for critical industrial inputs and technologies, and otherwise renewed industrial policy have entered a policy bidding war.

Investment into mineral-intensive clean technologies is also reaching a tipping point as markets adapt to new political realities. The IEA estimates that in 2023, clean energy will receive 70 percent more investment than fossil fuels. For the first time ever, solar energy alone may receive more aggregate investment than oil, equivalent to more than US$1 billion a day. Every additional investment requires more minerals to be extracted or recycled and refined. Mining & metals firms also must contend with the reality that decarbonizing metals production, whether with electric arc furnaces or the use of green hydrogen, will be incredibly energy-intensive. The sector is enmeshed in the future of energy, putting it front and center for a wide range of market and geopolitical trends.

70%

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DEALING WITH MARKET CONCENTRATION

Clean energy and forms of transport depend on mineral and metal inputs. Mineral security is now both energy security and industrial policy. The pandemic, the energy shock of 2021 – 2022 and the conflict in Ukraine have forced governments and businesses to forced governments and businesses to diversify supply chains. Excessive market concentration has become a key systemic risk for national security and decarbonization alike.

Market concentration varies at different stages of the mining & metals sector and supply chains, shaping a similar variety of risks and opportunities for sector participants. Mineral wealth is fixed geographically, granting considerable leverage to exporters occupying a large share of their respective markets. Countries reliant on mining tax and export revenues are seizing the chance to increase their control over key resources, change fiscal regimes and otherwise push to capture more of the value chain domestically. Others are looking to expand their production to challenge traditional market leaders and improve their competitive position.

By contrast, China is the world's largest refiner, producer, and consumer of metals. Supply chain bottlenecks for metals facing considerable future supply uncertainty and lacking liquid futures markets or means of

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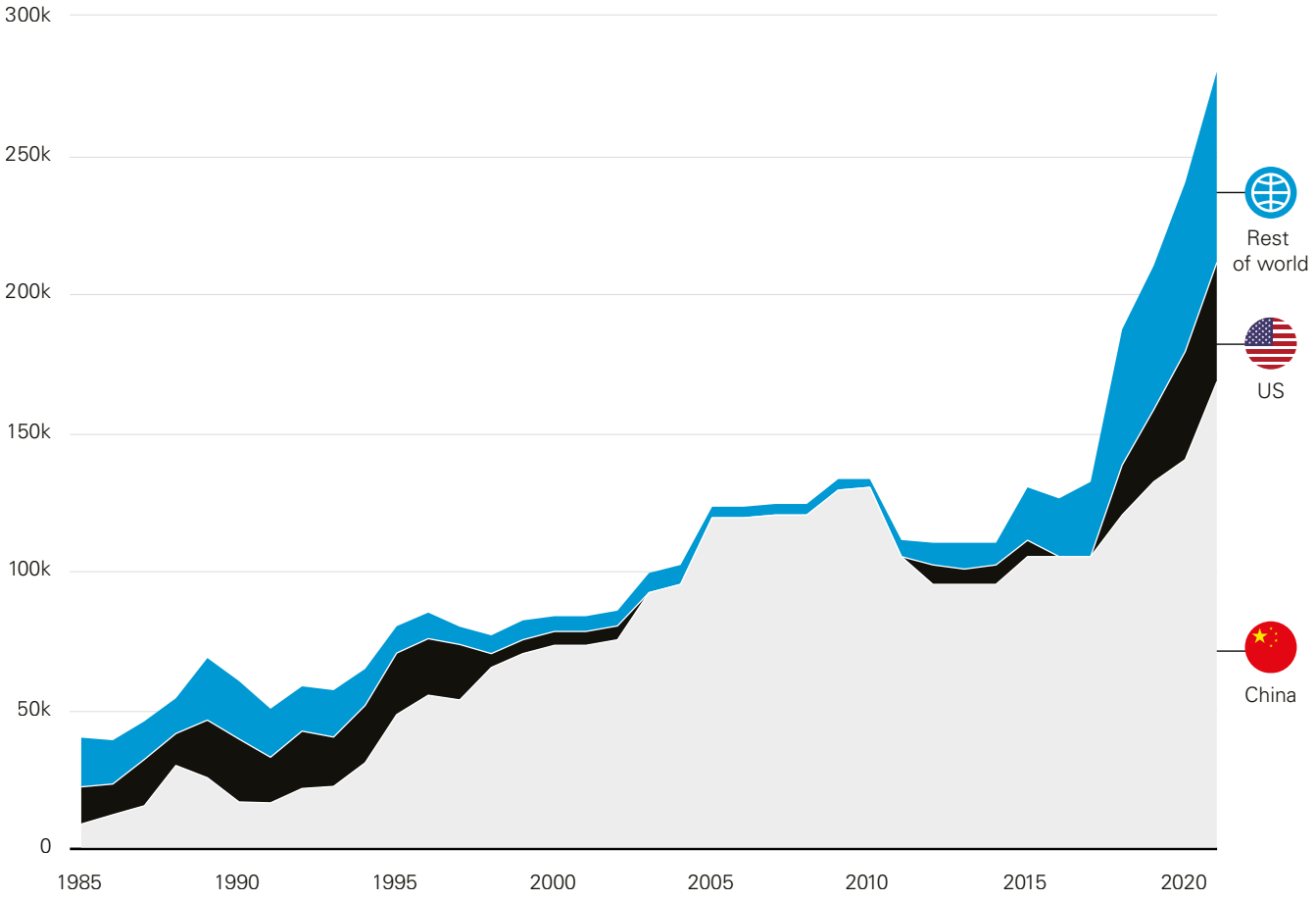
World rare earth mining production

Metric tons (t) of REO-equivalent



Source: Own research, White & Case

hedging price and supply risks are most acute. Though midstream and downstream industries are not subject to the same geographical limitations, concentration can create competitive advantages at scale, especially in cases where local production lowers logistical costs or domestic prices relative to those paid by importers elsewhere. The concentration of refining and production of key industrial inputs such as gallium and germanium compounds used in semiconductors is a useful example. Importers have begun looking at new initiatives to attract investment into domestic processing and refining to ease bottlenecks associated with political risks.

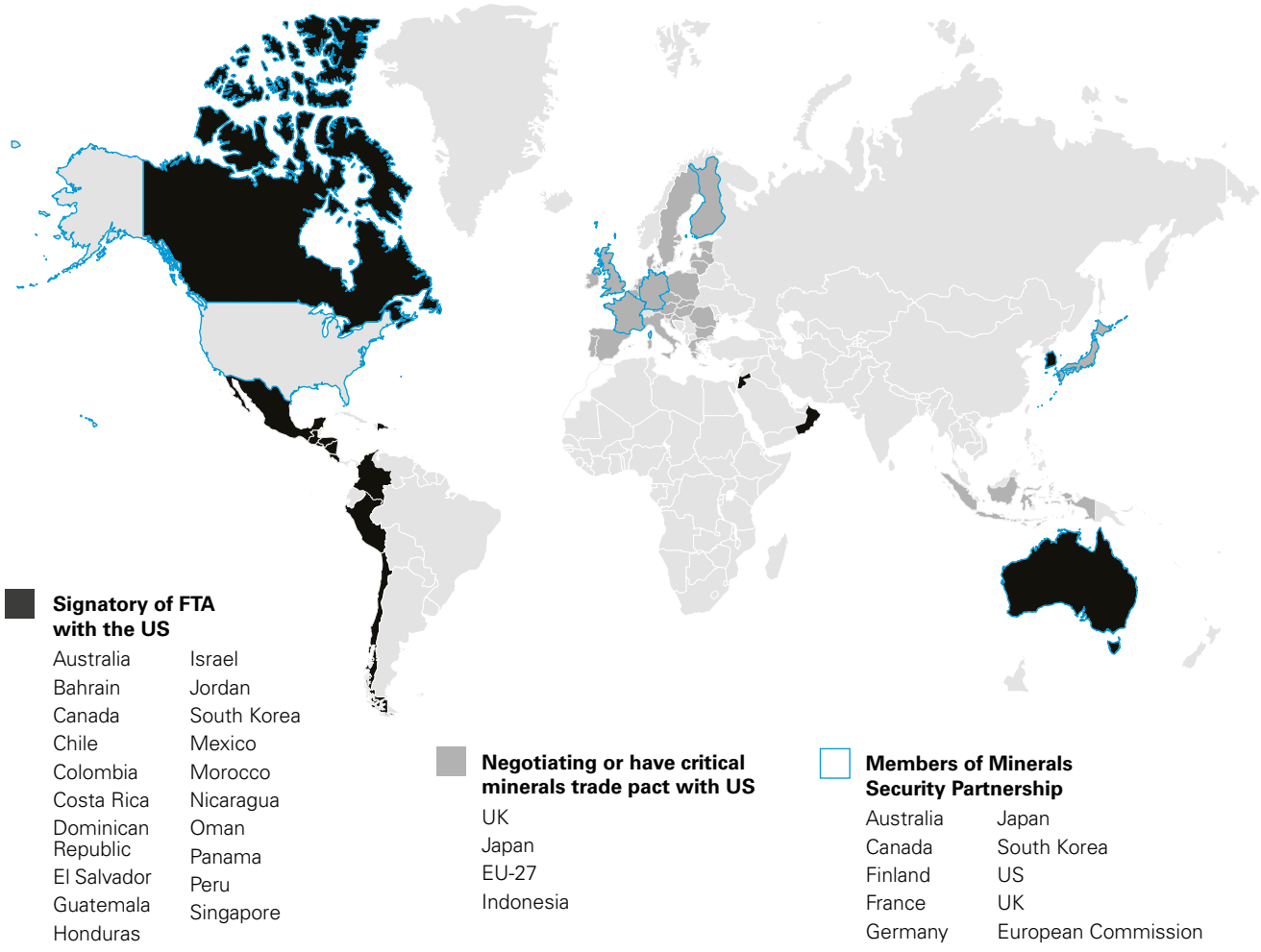
50 kg

of hydrogen is required for the manufacturing of one ton of steel

The Inflation Reduction Act passed in the US, the EU's response, and the still-developing formation of a Critical Raw Materials Club between allies among developed economies seek to mitigate these risks to the extent possible. National subsidy and tax policies boosting investment and demand for EVs, hydrogen projects and clean energy reinforce longer-term changes to trade policy affecting metals—chiefly steel and critical minerals. Since mineral deposits are fixed, this also adds policy pressure to support metals and battery recycling as well as use existing or new trade agreements to prevent competitors from accessing minerals and metals at lower prices

> **National subsidy and tax policies boosting investment and demand for EVs, hydrogen projects and clean energy reinforce longer-term changes to trade policy affecting metals—chiefly steel and critical minerals**

The Inflation Reduction Act's extraterritorial reach



Source: Own research, White & Case

and securing supplies that pose systemic risks in the event of a major supply disruption.

INVESTING IN SECURITY

Increasingly security-conscious trade and industrial policies, evidenced by the growth of inbound and outbound investment screening mechanisms and scrutiny, has forced miners, metals firms, and a wide range of manufacturers and other end-users to rethink the geography of their assets, value chains and core markets. Security is equally imperative for businesses seeking to minimize potential supply chain disruptions from external shocks, whether they're political, climate-related, pandemics or economic crises. De-risking is now central to maintaining or expanding market share across the mining & metals complex and linked to concerns regarding market concentration.

US and European efforts to onshore or "friendshore" supply chains for critical minerals, metals, and clean technology inputs have spurred significant changes in cross-border activity for EV and energy supply chains that are spilling over into the mining & metals sector. The Inflation Reduction Act (IRA) in particular has dramatically recast the competitive landscape for firms seeking to maintain their competitiveness in North American and European markets, as jurisdictions bid for investment and partnerships using subsidies, tax credits, accelerated permitting timelines, and more.

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These developments can have unintended consequences for efforts to mitigate market concentration risks.

Since the start of the year, incumbent battery manufacturers, lithium miners and other critical minerals producers have pursued JVs, strategic partnerships and projects in countries eligible for tax credits under the IRA. European manufacturers and steelmakers are also seriously considering investments into refining and production in the US, leveraging generous tax credits for green hydrogen. Countries with dominant positions for critical minerals markets, such as Chile and Indonesia, are also exploiting the eligibility of their mineral exports for IRA provisions and beginning negotiations for a critical minerals trade agreement with the US respectively.

Manufacturers concerned about potential exclusion from these supportive policies are expanding into eligible markets to make exclusion from access to IRA provisions more difficult to achieve. The drive for security also has unintended consequences for sector participants. Corporate consumers of critical minerals have sought to secure their own mineral supplies in the past three years by directly investing into mining projects, taking equity stakes and providing project financing through offtake prepayments or supply agreements. Doing so helps companies plan amid fast demand growth for EVs and related critical mineral-intensive goods and stabilize their future outlooks and avoid disruptions. But holding equity or similar financial arrangements with miners is high risk. Prices and asset values are volatile, mines are frequently located in jurisdictions end-users are not familiar with, and the market for commodities is highly cyclical. Despite confidence in future demand, supplies for most critical minerals have not been as tight as feared over the last 18 months.

As fears of supply scarcity ebb and change, end-users are reconsidering their exposure to mining projects. Financing and offtake arrangements are likely to continue, but the beginning of a pullback in equity investments is taking place. Junior miners that have benefited in recent years will have to find more funding for early-stage projects from non-traditional sources. Though auto and battery makers may shed equity risks in the future, their investments have set a precedent in the market for others to follow. There may be opportunities for institutional investors in the Anglosphere, Europe, the Middle East and Asia-Pacific to fill that gap, creating yet new avenues for financial regulations and incentives to spur or defer domestic and cross-border investments into mining & metals projects, as FDI screening mechanisms, portfolios and risk appetites change.

CHANGING RISKS

As policies change investment preferences and the location of supply chains, the concentration of market share in individual companies will become more relevant for supply chain diversification. Assessing the success of diversification policies using the geographic origin of refined nickel, battery precursor, or green steel says little about the corporate structure of supply chains.

Rising concerns about the link between access to critical minerals and national security are creating new counterparty risks. Not only is a company's country of origin a potential concern, but so is its relative dependence on the markets of countries seen as geopolitical rivals.

Capital markets are also becoming a flashpoint for political pressure. Where miners, metals firms, and newer partners such as automakers and battery makers choose to list can create political risks for project development, M&A transactions and the ability to raise financing as financial authorities' national security remit expands.

Disclosure and reporting requirements and differing ESG commitments between corporate partners can also generate challenges entering into JVs in new markets. Companies invested in ESG, accessing "green" or sustainability-linked financing, and concerned about reputational risks increasingly expect partners to match their standards, standards that are also influenced by where they are listed, domiciled, and operate.

> **The concentration of market share in individual companies will become more relevant for supply chain diversification**

US$1 billion

For the first time ever, solar energy alone may receive more aggregate investment than oil, equivalent to more than US$1 billion a day

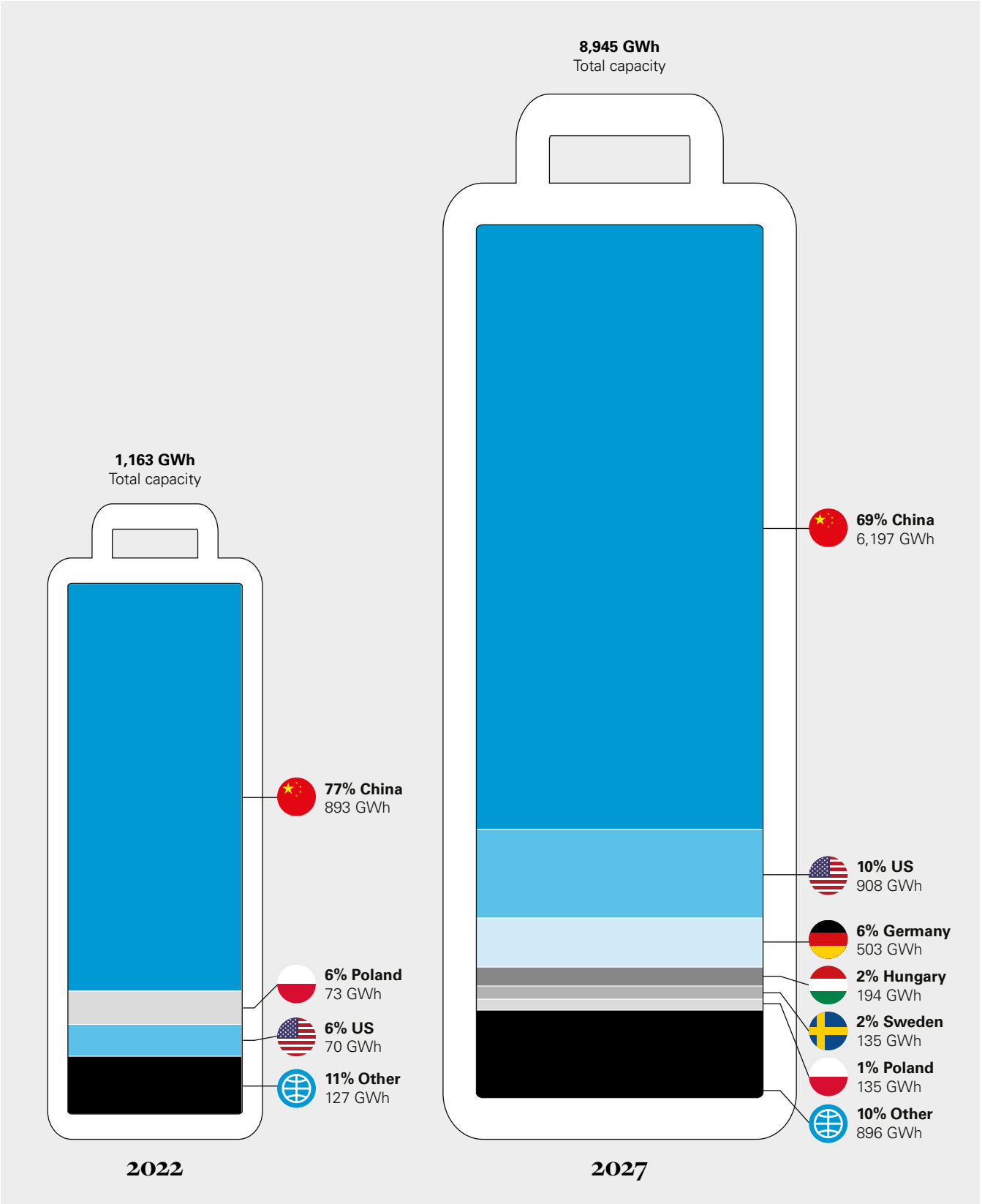
Finally, corporate IP is an area of growing importance for miners, metals firms and companies operating across energy transition supply chains more generally. In recent years, major miners have devoted more attention to venture capital, seeking to internally research and develop or otherwise acquire emerging technologies with a particular focus on minimizing emissions from smelting and refining, improving survey and exploration technology, and hydrogen production and use.

As businesses race against incumbent firms investing more to maintain market share, questions of protecting and licensing IP in cross-border transactions will also become more salient. A single company can potentially create a bottleneck by controlling access to the IP for relevant manufacturing, refining or recycling processes. ASML, a semiconductor manufacturer, is perhaps the most famous case as the world's sole supplier of extreme ultraviolet (EUV) lithography systems used to create the most advanced semiconductors globally. Nothing comparable exists in the mining & metals sector, however the race to enter new stages of the value chains and deepening relationship between the sector and development of the hydrogen economy put a premium on techniques and technology that can dominate specific niches at critical stages of mining, metals, and decarbonization value chains.

(RE)WIRING ENERGY POLITICS

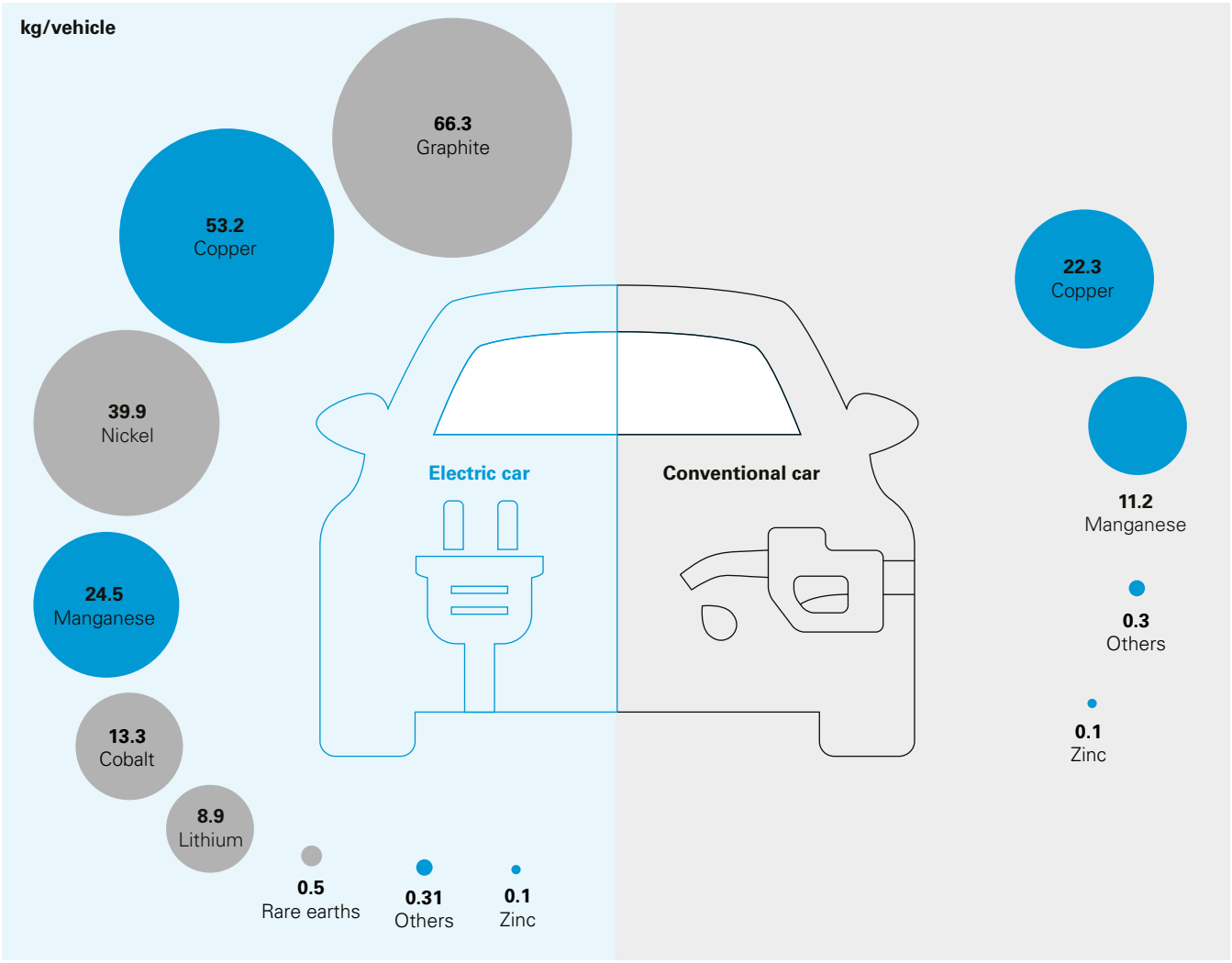
The proliferation of government intervention to secure critical minerals for decarbonization and

Battery manufacturing capacity by country



Sources: BloombergNEF; ELEMENTS.VisualCapitalist.com; Visualizing China's Dominance in Battery Manufacturing (2022 – 2027) (visualcapitalist.com)

Minerals used in electric cars compared to conventional cars



Source: Executive summary – The Role of Critical Minerals in Clean Energy Transitions – Analysis - IEA

boost the hydrogen economy underscore the degree to which the mining & metals sector is becoming part of the energy sector. Where the past 50 years of geopolitical competition over energy security was dominated by oil & gas, the next 50 will most likely be dominated by critical minerals and industrial supply chains. But delivering decarbonization *within* the sector is itself quite energy-intensive, creating different inter- and intra-sector relationships and geographic considerations than for the fossil fuel economy.

Take replacing coking coal in metals production. Green hydrogen, the principal means of decarbonizing metallurgical production using blast furnaces, uses a ton of energy. A typical electrolyser needs 50 KWh of electricity to produce one kg of hydrogen. Manufacturing one ton of steel requires 50 kgs of hydrogen. The math is sobering. As of 2021, the European Parliament estimated that 60 percent of steel production in Europe was suitable for the use of hydrogen, equivalent to an increase in total electricity production of nearly 296 TWh, a sum nearly analogous to Italy's entire electricity demand in 2022. Were all of China's blast furnace production to be converted to production methods using hydrogen, it would require an additional 2,125 TWh of electricity

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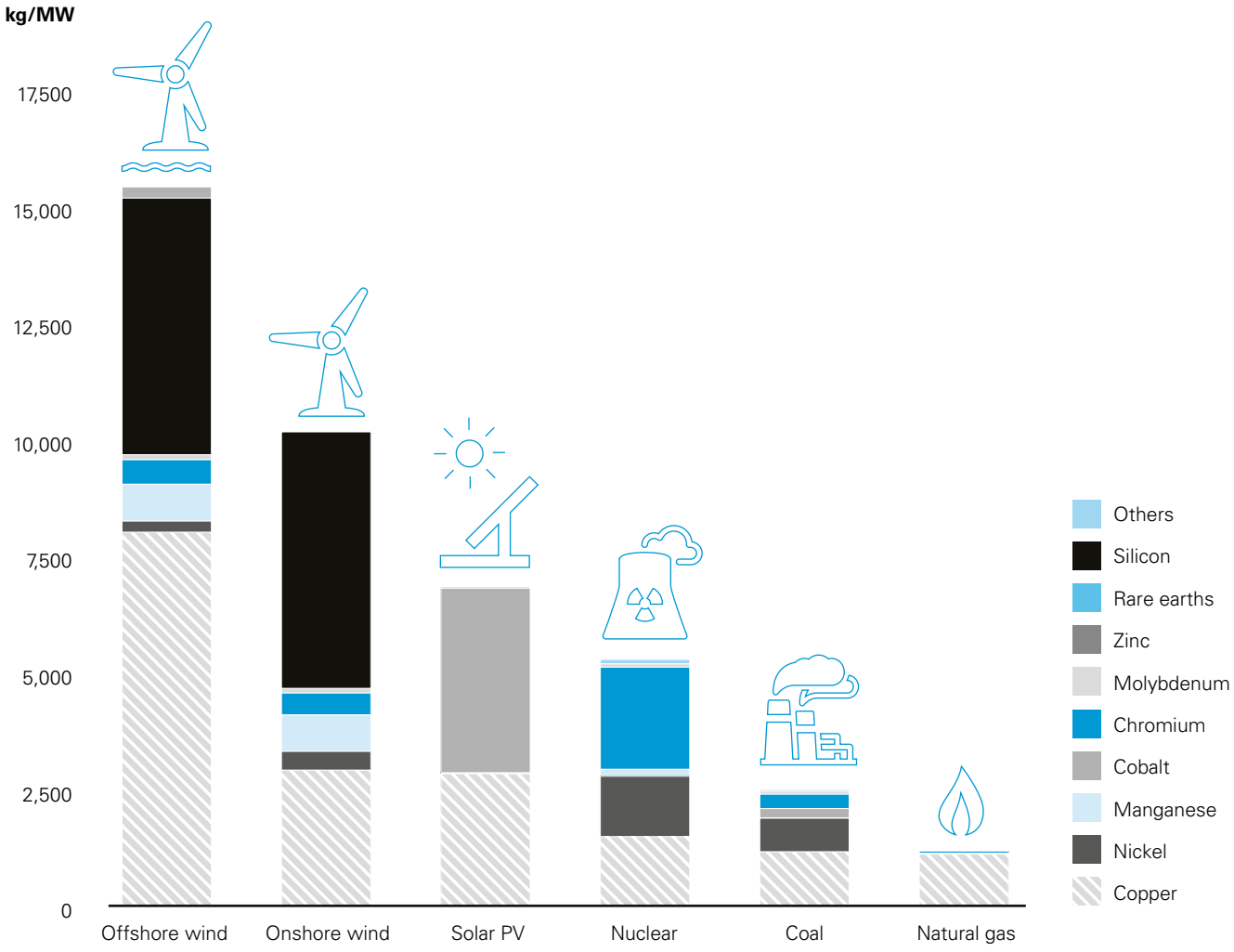
Minerals used in clean energy technologies compared to other power generation sources



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generation, equivalent to a 16 percent increase in electricity consumption globally. The mining & metals sector is now at the forefront of these interlocking challenges, supplying the sinews of decarbonization while achieving it themselves. Minimizing the emissions of operations to meet ESG targets and realize premiums for their products is now core to companies' value proposition to investors. Mining jurisdictions with unreliable power grids have similarly pushed a growing number of miners to build their own power supply onsite. Metals producers face pressure to source higher-quality ores, reducing the amount of energy required to smelt and refine them.

60%

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The effects cascade down the value chain from the point of sale for a product backwards to the mine itself, as governments and investors mobilize capital and mining & metals firms evolve. What emerges are sets of parallel bubbles and bottlenecks affected by political choices shaping returns on investment. Asset values, minerals from specific jurisdictions and projects carry increasingly politicized premiums and discounts. More than any point over the prior half-century, geopolitics are shaping commodity markets. Mining & metals firms are taking advantage.

Special thanks to Nick Trickett, Business Development Manager for the Mining & Metals Industry Group, for his assistance with this article.

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