Value Creation in Mining 2021: Emerging from a Rocky Decade

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2020 was a tough year for the mining industry—and the past decade has been even worse. But better days lie ahead. Companies in the sector are expressing renewed confidence, fueled by high commodity prices, fewer concerns about overcapacity, and a clear electrification trend worldwide.

It will not be smooth sailing, however. Most mining companies are less prepared for future broad economic shocks today than they were during the global financial crisis and many prior crises. The long-term effects of the COVID-19 pandemic are unknown, and
much about the future remains highly uncertain, especially in terms of geopolitical instability and climate change.

More than most industry executives, mining executives understand the power that external forces can exert on their business. In the first place, they don’t have the luxury of choosing a site of operations: the ore is where it is. Moreover, mining is especially sensitive to the vicissitudes of the global market, local markets, government administrations, political activism, environmental pressures, and shifting investor sentiment.

And then came the COVID-19 pandemic, presenting entirely new challenges to a sector already reeling from structural problems. In the first quarter of the year, widespread lockdowns hammered the S&P index by 30% and lowered commodity prices by double digits, eroding total shareholder return (TSR).

That picture is changing markedly as 2021 unfolds, however. In the early months of this year, stock prices have rebounded and commodity prices have increased even more strongly than they did last fall. Copper prices have surged higher than they were before COVID-19 (up by 29% in 2020) and reached all-time highs in early May 2021. Gold is enjoying its biggest rally since 2012. Most mining companies have made a full recovery, and the industry finished 2020 with an impressive one-year median TSR of 26%. This rebound has placed the mining industry in the top echelon for five-year TSR, according to BCG’s recent 2021 Value Creators Rankings. And the rollout of vaccines to counter the pandemic is helping generate optimism among consumers and businesses alike.

Viewed over a longer time horizon, though, the picture looks less rosy. Although most mining companies had a great year in 2020, relatively few of them came out ahead over the past decade. Since 2010, the industry has averaged negative median returns, failing to generate value for its investors. The average annual TSR for the S&P 500 over that same period was 14%.

Nevertheless, companies in the sector have reason for optimism, thanks to high prices for commodities from iron ore to copper. Concerns about overcapacity in the industry have abated because capital investment has been calm for more than five years. The enormous
momentum toward electrification—particularly in connection with electric vehicles and storage systems of all types—has positive implications for copper, nickel, cobalt, lithium, and more.

In this report, we examine the long-term performance of 91 mining companies, each with a market value of more than $5 billion. We look at how companies may be able to take advantage of recent price hikes to improve their position for the future. And we explore what they can learn not only from the industry’s winners but also from its laggards. We begin with a review the ups and downs of the year when COVID-19 struck, and then we revisit the challenges of the last decade.

A Look Back at a Frightening but Surprising Year

Over the past 40 years, mining companies have weathered four crises: Black Monday (1987), the 2000–2003 economic crisis sparked by the tech bubble and September 11, the global financial crisis (2008–2009), and the European debt crisis of 2015. The S&P 500 index fell during all four crises, but only the last two slowed the growth of global gross domestic product (GDP), China’s GDP, and commodity prices—all factors that, in turn, hurt mining companies’ performance.

The COVID-19 crisis forced commodity prices down by between 10% and 20% during its initial stages, but most commodities subsequently bounced back and achieved net growth during 2020. Bad though 2020 was, its price swings were far less daunting than those seen during the global financial crisis. (See Exhibit 1.)
Here are a few snapshots. Iron ore prices rebounded by 62% over the rest of 2020 after a double-digit dip in the year’s first quarter; it was the best-performing bulk commodity in 2020. The price of aluminum was hit hard in 2020 but ended the year up by 14%. Gold, traditionally a safe haven, climbed by 19% during 2020. Even coal prices have seen a recovery toward early 2019 levels.

TSRs suffered early in 2020, too. Some larger mining companies saw their TSR fall by 25% to 50% by the end of March 2020, as governments imposed the first lockdowns. The valuations of some diversified companies dropped by as much as 50% in those early months. (See part 1 of the Appendix for a description of how BCG calculates TSR.) But TSRs for the mining industry as a whole recovered fully by year’s end, yielding a median return of 26% for 2020.

At the onset of the COVID-19 crisis, most mining companies were more vulnerable to economic shocks than they had been when the global financial crisis struck 12 years earlier. (See Exhibit 2.) This time, however, commodity prices showed greater resilience...
and rebounded more quickly. Price performance has helped companies avert potentially bigger problems.

Exhibit 2 - The Industry Was Economically More Vulnerable When COVID-19 Hit Than It Was on the Eve of the Financial Crisis

Before 2020, mining companies (except gold producers) had higher debt-leverage ratios and thinner EBITDA margins, even with 33% growth in revenues in the last decade. (See Exhibit 3.) During the decade, their debt doubled, and by 2019 their median interest-coverage ratio was one-third what it was in 2007, despite the prevailing lower interest rates. By the end of 2020, as they began emerging from the pandemic crisis, companies were able to sustain revenue growth and achieve modest increases in margins compared with 2019, even though prices did not recover to precrisis levels until the third or fourth quarter of 2020. Those boosts are strengthening balance sheets and bolstering resilience going into the next decade.
A Longer Look at a List of Challenges

A review of how the sector has fared over the long haul reveals a less triumphant picture of success against economic adversity. COVID-19 struck at a time when the mining industry was already grappling with multiple problems: lackluster financial performance; structural weakness; heightened uncertainty about the industry cycle; and growing pressure from investors, governments, and communities over environmental, social, and governance (ESG) practices. Certainly, there were some bright spots over the past ten years; for instance, lithium prices registered a positive 5% CAGR during that time. But overall, it has been a decade of difficulties.

Profits have been pounded. Mining has struggled to deliver long-term profitability and growth while striving to offer an attractive return on capital. The median TSR over the past ten years for the 91 companies in our sample was negative. (See Exhibit 4.)
Not surprisingly, investors’ expectations have declined, lowering typical valuation multiples such as EV/EBITDA by more than one-third from 2010 to 2020. One reason for the drop may be that the markets, having seen commodity prices rise rapidly after the global financial crisis and peak in 2010-2011, were anticipating that pricing would remain high and EBITDA numbers would grow.

By contrast, technology companies’ valuations have soared during this period. Few mining companies have the safety of a defensible economic moat. Clearly, having the best deposits or world-class resources is not enough. Furthermore, stock prices in the sector have been among the most volatile during the past decade of the 32 industries we track, second only to tech.

**Markets are increasingly fragmented.** The industry has become more fragmented since 2011, most recognizably in copper, nickel, and gold (a subsector that was already very broken up). Almost half of the production of nickel and gold comes from smaller entities. Larger companies are finding it difficult to hold onto market share, let alone increase it; the smaller miners are outgrowing them. Smaller companies are also successfully
challenging larger incumbents, as exemplified by the meteoric growth of Northern Star Resources and Saracen Mineral Holdings, whose merger (completed in February 2021) has created a new entrant among the ten largest gold companies in the world.

**It’s hard to discern the shape of the industry cycle.** Are we seeing the start of a new positive cycle? It’s hard to say, despite the recent increase in commodity prices. The lack of clarity about where we are in the industry cycle complicates companies’ decision making about exploration and M&A. Historically, investments in those activities have closely followed rising commodity prices. Of course, adopting a pro-cyclical approach can lead to suboptimal outcomes. But while countercyclical moves can yield outsize returns, few companies operate in that manner.

Uncertainty is a given, and invariably leaders must make decisions on the basis of imperfect information. The degree of uncertainty in the current environment is especially high because demand in the immediate post-COVID-19 era and volatile trade policies have compounded uncertainty about the industry cycle. Rigor in economic evaluations and discipline in investment strategy are crucial.

**The devaluation or divestment of anything “ungreen.”** Increasingly, investors, governments, and communities are voting with their feet in response to companies’ ESG. Investment funds are pressuring companies to demonstrate a commitment to climate change; many—including such mainstream investors as CA Amundi (Europe’s largest asset manager, with €1.6 trillion under management), the Norwegian Sovereign Wealth Fund, Allianz ($1 trillion in assets), and AXA—are divesting from coal producers and from power companies that use coal. Carbon intensity has a measurable effect on company valuation. Among mining companies, those in the lowest quintile for emissions have a 12% greater valuation than the average emitters, and those in the highest quintile for emissions are valued as much as 10% lower than the median emitters.²

**What the Top Value Creators Are Doing Right**

As a whole, the period from 2010 to the end of 2020 was a challenging time for most mining companies. The median TSR from 2009 through 2019 was −3.8%, and few
companies in the industry outperformed the S&P 500. Although performance rebounded during the past five years to a median TSR of 20.9%, the first five years saw a drastic reduction of value, to –20.3% TSR.

Success over the past decade was not strictly a matter of being in the right commodity. Every commodity sector had strong performers and weak performers. (See Exhibit 5.) But some patterns are evident in the sector-wide numbers.

Diversified players, which tend to be larger companies, produced a median TSR of –1%, the second best of any commodity category. Coal, on the other hand, turned in the worst performance overall; nearly every producer in our sample had a negative TSR for the decade. Although battery metals companies represent a relatively small portion of our survey sample, they had the largest proportion of strong performers, generating a median TSR of 14%. But a gold producer created the most exceptional value for its shareholders. Northern Star Resources topped the ranking for the entire sector, generating outsize
returns with an average annual TSR of well over 40%. Northern Star started as a relatively small company with a market cap of $120 million; it would be difficult for larger companies to replicate such success.

What can we learn from the decade’s top ten performers among mining companies with $5 billion or more in market capitalization?

The top ten value creators represent a mix of geographies and strategies. Sales growth and dividend yield were the two biggest contributors to TSR growth. (See Exhibit 6.) Skillful M&A, carried out countercyclically, was part of the reason for Northern Star Resources’ success. The company bought multiple assets at opportune times and then worked hard to add value to them—building a leading gold company and generating spectacular returns in the process. China Molybdenum and Zijin Mining Group—which ranked eighth and ninth, respectively, for the decade—achieved impressive revenue growth by skillful M&A, buying significant assets in the past two years.
A couple of vertically integrated players from China—Ganfeng Lithium and Tianqi Lithium—finished second and third, respectively, on the list. They took advantage of the 5% CAGR price increase for lithium over the past ten years, increasing their production to become two of the world’s three largest producers of the metal. Ganfeng added more value by integrating downstream—producing and recycling batteries. At the end of 2020, both companies were trading at the highest EV/EBITDA multiples in our sample, but they justified those figures with a track record of strong growth and bright expectations in terms of production and commodity price.

New business models explain the success of some other top-ten performers. Mineral Resources has combined its mining service business with exploitation of its own sites, achieving high growth while paying high dividends. Franco-Nevada is a pioneer in providing streaming transactions and royalties as alternate sources of mine financing; the
company was among the very few that grew rapidly and profitably during the past decade to become a major industry player. (See the sidebar, “Streaming as a Way to Add Value and Lower Risk.”)

**STREAMING AS A WAY TO ADD VALUE AND LOWER RISK**

Streaming companies provide cash financing to mining companies in exchange for physical metal, which they obtain at a preset discount price. The metal may be a byproduct of the primary ore being mined, such as silver or gold from a copper mine. The streaming company can then hold or sell the metal, as it chooses.

Streaming is a variation on royalties. With royalties, the royalty owner provides cash financing, which the recipient repays in cash (typically as a percentage of revenue). With streaming, the mining company obtains nondilutive financing and gains value either from sources other than its core assets or by locking in a predictable revenue stream. The streaming company gains access to precious metals profits without taking on the risks of operating a mine. It further diversifies risk by investing simultaneously in multiple mines at different life stages. The mining company enjoys price-hedged leverage, and the streaming company sees an increased upside compared to the relatively great price exposure of typical financing.

Franco-Nevada and Wheaton Precious Metals are leading proponents of the streaming model, although the original developer of the model in the early 1990s was Royal Gold. Gradually, other commodities producers have adopted the practice, too.

A focus on cash flow contributed significantly to other companies’ results. Fortescue Metals (the fourth-ranking company in the top ten) and Polyus (ranked fifth) expanded sales and margins, generating strong cash flow to use in paying dividends and reducing debt. Likewise, Norilsk Nickel (number ten on the list) also increased its sales and paid substantial dividends.
In some cases, leadership talent and capabilities, particularly new blood, played an important role in the value creation leaders’ success. The top executives at Northern Star and the gold companies that pursued new business models came from outside the industry. Some had contracting backgrounds, and others were from financial or entrepreneurial backgrounds. All brought fresh perspectives and a willingness to break with convention.

Another success factor involves digital transformation, which has been a priority in the past decade. Several top performers have emphasized hiring and training digital talent.

One example of a significant digital initiative involves Fortescue Metals, which started deploying autonomous haulage in 2013. As of late 2019, according to BCG’s numbers, Fortescue operated the world’s second-largest installed fleet of automated haulers. Today, as it continues its automation program, the company is also decarbonizing its fleet of haulage vehicles. Fortescue has also established an integrated operations center (IOC) to improve decision-making through data collection and analysis, following the examples of BHP and Rio Tinto, two early IOC pioneers. IOCs enlist employees from a range of functional areas as well as external parties, including suppliers such as Ford and Hyundai.) In the top companies, digitization goes beyond mining operations and planning. Norilsk Nickel, for instance, is developing digital transaction solutions to optimize supply chain efficiency and transparency.

At the lower end of last decade’s performance ladder are producers of coal, fertilizers, and gold. Coal and fertilizer producers have battled pricing headwinds that cut their margins and, coupled with increases in their net debt, hurt their average TSR. Despite gold’s strong price performance since 2010, two gold producers landed in the bottom ten—a situation due mostly to changes in valuation multiples in companies that were highly valued a decade ago.

Most underperformers fell victim to investors’ loss of confidence in the aftermath of the 2006–2012 supercycle. Investors also demonstrated less faith in these businesses’ ability to achieve better financial results. As a result, although revenue growth at most companies
was positive, many saw EBITDA fall and in response had to issue equity and debt. Typically, these companies either oversold or failed to manage expectations.

Being in the wrong commodity at a time of heightened ESG awareness has contributed to some companies’ underperformance. Four of the ten bottom performers for the decade are coal companies, several of which are directly exposed to commodity price and ESG pressures. Beyond that subsector, challenges with local governments over regulations and licensing led to some laggards’ TSR underperformance.

While external factors certainly played a role, some companies’ poor performance was largely a result of their own strategic missteps: high costs, over-dependency on a single market, excessively large or risky capital projects, or excessive leverage during the boom.

Setting a Course for Success in the Next Decade

The future is always uncertain, but a crisis unleashed by a global pandemic is truly unknown territory, especially in a highly connected global economy. To thrive in the 2020s, mining companies must expand their vision and transform in many ways. They must master the new logic of competition, accelerate digital capabilities to become organizations of the future, embrace workforce diversity as a business imperative, and optimize operations and organizations for social and business value. Each of these topics merits a closer look.

**MASTER THE NEW LOGIC OF COMPETITION**

Despite the fact that most of the industry has recovered from the initial shock, great uncertainty remains about the macroeconomic outlook and about COVID-19’s longer-term impact. The enormous changes that have occurred in the past year in consumer behavior, supply chains, and ways of working require constant vigilance, swift responses, and the ability and willingness to learn and adapt rapidly. And when an industry recovers, businesses do not simply revert to their previous positions within it.

Companies can take several actions to enhance their resilience and outperform through the cycle:
• **Be disciplined about capital management and M&A.** In both of those arenas, procyclical investing can lead to subpar outcomes. Rigorous capital discipline to ensure robust cash flows generally produces the best results. At the same time, countercyclical M&A can produce outsize returns, as many of the past decade’s top performers proved. Three players in the top ten were truly capital disciplined, returning the value created from increased revenues and margins by distributing high-dividend yields.

• **Use scenario planning to hedge strategic bets.** Companies should expect a bumpy ride for a while. They should use scenario planning to anticipate various futures in supply, demand, workforce patterns, regulations, ESG trends, and more. They can also prepare for “smart restarts” by setting guidelines for social distancing, encouraging digital and virtual interactions, and otherwise protecting workers, customers, vendors, and other stakeholders while COVID-19 persists.

• **Seek structural advantage.** Preparing for the future means establishing structural advantage. In the mining industry, that may entail replenishing the production portfolio with capital-efficient, low-cost projects that can withstand market cycles. Another crucial move is to make step-change and continuous improvements to lower operations costs, at least to the extent of offsetting declines in ore grades and the rising cost of extraction as mines age.

• **Pursue M&A opportunities.** Reorganizing to act countercyclically and with discipline can help a company ready itself for the next challenge. This involves adopting such measures as setting a historically accurate cost of capital, applying rigor and realism to project management, maintaining a healthy balance sheet when times improve, and deploying those funds aggressively during downturns to jump on acquisition opportunities. In general, M&A offers a way to diversify commodity exposure and to assess where the company should be in the next ten years. Conversely, companies that are potential acquirees should identify preferred suitors and focus on improving their performance so they will be in a stronger position to command a good price.
ACCELERATE DIGITAL CAPABILITIES TO BECOME ORGANIZATIONS OF THE FUTURE

Although advanced digitization is just getting underway in the mining industry, major players have it on their agenda. They recognize that it’s no longer an option; it’s a matter of competitive advantage. As South 32 CEO Graham Kerr noted several years ago, “Bringing the world[s] of operational technology and information technology together to monitor equipment and systems remotely and predict future behavior is a game changer.”

Companies need to regard the transformation of information technology (IT) and operational technology (OT) in an integrated way rather than relegating IT to second-class status relative to OT. Uniting these technologies can boost safety, efficiency, and sustainability. The successful company of the future, regardless of industry, will be “bionic”—seamlessly combining the capabilities of humans and machines.

Mining company leaders can shape their companies for a digital future in several ways.

Fortify data analytics and machine learning capabilities. Data analytics and machine learning, in combination with new and emergent technologies such as augmented reality and the Internet of Things, can help advance modeling and generate insights. Proficiency in advanced analytics and artificial intelligence offers smaller companies a huge leg up. The technologies are readily available, and companies can implement them on a small scale.

Analytics and machine learning are not exclusively about deploying algorithms or gathering massive amounts of data to glean insights. They can help realize the value of the “bionic” company by bringing operational excellence to new levels, providing decision augmentation, improving mine- and plant-operating decisions, and helping operators identify patterns and optimal operating conditions. Collectively, such efforts can boost throughput by 5% to 10% and yields by 2% to 5%.

Companies can apply these technologies throughout the value chain, from exploration and construction to marketing. Companies can use them in the near term to help navigate through turbulent conditions and in the middle term to accelerate large-scale implementation to build resilience and find advantage. For example, applied in tandem
with demand forecasts, advanced analytics can optimize production planning, the supply chain, and operations.

**Push digital transformation further.** Top performers have demonstrated that digitization and automation can expand margins by increasing productivity and efficiency. For example, Rio Tinto has implemented a mine automation system that includes a 3D visualization tool, as well as automated drilling systems and autonomous haulage trucks and long-distance rail. Similarly, BHP has launched a pilot project in autonomous shipping and deployed drones to increase onsite safety. To tap the power of digitization and automation, companies can focus on automating their operations and support functions, establishing new goals for productivity, safety, and efficiency. Beyond those applications, digital can lead to new business models.

**Adopt new ways of working.** The COVID-19 crisis moved videoconferencing and remote working from occasional use to the default standard. More companies have adopted agile practices such as sprints for problem solving. Expanding new ways of working means tapping into technologies and winning the support of human resources to apply those tools to achieve multiple goals, including protecting resources from cyber attacks, supporting more permanent remote and mobile work arrangements, providing training in agile methods, and managing workforce flexibility.

**EMBRACE WORKFORCE DIVERSITY AS A BUSINESS IMPERATIVE**

Research shows that workforce diversity bolsters a company’s ability to innovate. Diversity has served many top performers well over the past decade. Bringing together people with different backgrounds, attitudes, and skills fuels creativity and encourages different approaches to problem solving—and these factors have helped foster new business models and countercyclical moves leading to stellar performance. Clients, suppliers, and other partners that are themselves striving for diversity are reassured to see a mix of talent from different backgrounds.

One way for mining companies to achieve greater workforce balance is by taking a cue from the COVID-19 crisis, which has proved that that the workforce can accomplish many types of work in the sector while working remotely, and in some cases offsite.
Recognizing that diversity is not only a moral imperative but also a business necessity is a fundamental step. Companies can create a diversity and inclusion agenda that establishes clear targets and initiatives. Promoting diversity also means seeking talent with backgrounds in different industries. To unlock the full potential of diversity, companies must implement retention mechanisms and foster an environment that welcomes new ideas, open communication, and participative leadership.

**OPTIMIZE OPERATIONS AND ORGANIZATIONS FOR SOCIAL AND BUSINESS VALUE**

In the past decade, the greening of investment portfolios has gone mainstream, as more and more traditional investors divest from carbon-related businesses. At the same time, regulatory compliance and licensing have become more transparent to stakeholders.

Although many mining companies—including 11 of the 30 largest—have declared net-zero targets, they must become more responsive to stakeholders’ and the public’s concerns if they are to avoid incurring financial penalties or disruptions to operations. Responsiveness goes beyond abatement. It means whole-hearted adoption of a sustainability mindset—including keeping pace with evolving emissions standards and their effect on demand, and innovating in processes and products that help reduce negative environmental impacts. Many large mining companies have set net-zero targets for Scope 1 Scope 2 emissions. Substantially fewer have gone beyond those targets—but one example is Glencore, which has set a Scope 3 net-zero goal.

Responsive companies are already seeing rewards: Rio Tinto gained an additional $6 million in EBITDA in 2015, the year it launched its “green” aluminum initiative. Rusal, which is also using renewable hydropower energy for its aluminum smelter, is reportedly earning 2% to 3% above average London Metal Exchange (LME) prices as a result. LME has announced that this year it will launch LMEpassport, a digital registry of sustainability credentials, with an initial focus on aluminum producers.

Influential consumer giants such as Apple, Nike, Patagonia, Honda, and Starbucks are stepping up their adherence to sustainable practices, committing to renewable energy in their operations, buying recycled materials, practicing end-of-life recycling, and
undertaking a host of other ecologically aware initiatives. As such practices become more widespread, demand for newly mined ores and materials and conventional energy sources will dampen. Concurrent development of new, environmentally sensitive systems and approaches in power generation, transportation, construction, and other sectors will affect every commodity differently. The decarbonization trend will benefit copper and nickel most. Coal, already languishing, will face even greater headwinds. (See Exhibit 7.)

**Exhibit 7 - Copper May Be the Commodity That Has Benefited the Most from Decarbonization**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Solutions</th>
<th>Bauxite/ aluminum</th>
<th>Cobalt</th>
<th>Copper</th>
<th>Iron ore</th>
<th>Lithium</th>
<th>Metallurgical coal</th>
<th>Nickel</th>
<th>Palladium</th>
<th>Silver</th>
<th>Thermal coal</th>
<th>Zinc</th>
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<td><strong>Power</strong></td>
<td>Runof river (especially wind and solar)</td>
<td>Green 1</td>
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<td>Coal-to-gas switch</td>
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<td>Grid expansion</td>
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<td>Storage (batteries, power to x, …)</td>
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<td><strong>Transport</strong></td>
<td>Modal shift (more rail, shipping)</td>
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<td>ICE efficiency improvements</td>
<td>Green 1</td>
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<td>Battery cars</td>
<td>Green 1</td>
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<td>Fuel cell, trucks, cars</td>
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<td><strong>Buildings</strong></td>
<td>Building efficiency, automation</td>
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<td>Efficient appliances</td>
<td>Green 1</td>
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<td>Electric heating (heat pumps, …)</td>
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<td>District heating</td>
<td>Green 1</td>
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<td><strong>Industry</strong></td>
<td>Energy, process efficiency</td>
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<td>Gas, biomass, PHT for heat and steam</td>
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<td>Shift to electric steel (EAF, DRI)</td>
<td>Green 1</td>
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<td>Material substitution</td>
<td>Green 1</td>
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<td>Impact of decarbonization: Strongly negative</td>
<td>Green 1</td>
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Sources: BCG report “The Economic Case for Combating Climate Change”; BCG analysis.

Note: DRI = direct reduced iron; EAF = electric arc furnace; ICE = internal combustion engine; PHT = power to heat.

*Power to x* includes various forms of electricity conversion and energy storage that allow the use of surplus electric power (for example, power to heat and power to gas).

Wherever consumers exert a “green” push, companies can differentiate themselves through certification (to seal trust), compliance with emerging regulations, and political will (to ensure the secure supply of critical minerals, for example). For downstream intermediaries, the incentives for branding may be minimal, but consumer-facing companies have much to gain.

Social value and business value can go hand in hand. Mining companies that wish to advance their [total societal impact](https://www.bcg.com) need to master the art of corporate statesmanship,
proactively shaping the critical social issues that will increasingly influence the industry’s future.

Although the mining industry has endured a rather rough decade and the future isn’t guaranteed to be rosy, companies have a lot to be optimistic about. Actions taken by the industry’s top value creators offer useful lessons for others in the industry on how to chart a path to success despite the many uncertainties that lie ahead. By planning for different scenarios and considering what it will take to outperform through the cycle—in competitive strategy, digital advancement, and internal transformation, and in how they shape their futures societally and environmentally—industry players can maximize their chances of being in the top tier of the value creators a decade from now.

APPENDIX

This appendix consists of two parts: a description of the components of total shareholder return (TSR), and a presentation of data on the 91 mining companies analyzed for this report.

1. The Components of TSR

TSR is the product of multiple factors. BCG uses a straightforward methodology to quantify the relative contributions of the various sources of TSR. (See the exhibit.) The methodology treats a combination of revenue growth and change in margins as an indicator of a company’s improvement in fundamental value. It then uses the change in the company’s valuation multiple to determine the impact of investor expectations on TSR. Together, these two factors determine the change in a company’s enterprise value. Finally, to determine the contribution of free-cash-flow payouts to a company’s TSR, the model tracks the distribution of free cash flow to investors and debt holders in the form of dividends, share repurchases, or repayments of debt.
All of these factors interact—sometimes in unexpected ways. A company may grow its earnings per share through an acquisition and yet not create any TSR because the new acquisition erodes the company’s margins. And some forms of cash contribution (for example, dividends) may affect a company’s valuation multiple more positively than others (for example, share buybacks). Because of these interactions, we advise companies to take a holistic approach to value creation strategy.

2. Companies Analyzed

We analyzed 91 mining companies for this year’s report. The first exhibit lists the names of the companies; the second divides the companies by region, based on the location of their primary listings around the world, and by the primary minerals that they produce.
The Study Sample Consists of 91 Mining Companies

- Adaro Energy
- African Rainbow Minerals
- Agnico Eagle Mines
- Anglo American
- Anglo American Platinum
- AngloGold Ashanti
- Antofagasta
- B2Gold
- BHP Group
- Boliden
- Bumi Asam
- Bumi Resources
- Cameco
- China Coal Energy
- China Molybdenum
- China Northern Rare Earth
- China Shenhua Energy
- CNX Resources
- Coal India
- Eldorado Gold
- ERAMEX
- Evolution Mining
- Exxon Resources
- First Quantum Minerals
- Fortescue Metals Group
- Franco-Nevada
- Freeport-McMoRan
- Fresnillo
- Ganfeng Lithium
- Gold Fields Limited
- Grupo México
- Guizhou Pasijiang Refined Coal
- Harmony Gold Mining
- IAMGOLD
- ICL Group
- Imerys
- Impala Platinum Holdings
- Indo Tambangraya Megah
- Indiasa Permadani
- Inner Mongolia Xilitai Coal
- Janggol Copper
- Jiangxi Holding Shandong Coal
- Jixingsh Energy Resources
- K+S Aktiengesellschaft
- KAZ Minerals
- KGHM Polska Miedz
- Kinross Gold
- Lundin Mining
- Minas Buenaventura
- Mineral Resources
- Newcrest Mining
- Newmont
- NMDC
- Norilsk Nickel
- Northern Platinum
- Northern Star Resources
- Nutrien
- OZ Minerals
- Pan American Silver
- Pingdingshan Tianan Coal Mining
- Polyus
- Qinghai Salt Lake Industry
- Rio Tinto Group
- Royal Gold
- Saudi Arabian (Ma’aden)
- Shandong Gold Mining
- Shanxi Coking Coal Energy Group
- Shanxi Huayang Group New Energy
- Shandong Lu’an Environmental Energy
- Shenhua Zhongjin Lingnan Nonferrous
- Sociedad Química y Minera de Chile
- Sumitomo Metal Mining
- Teck Resources
- The Mosaic
- Tianqi Lithium
- Tongling Nonferrous Metals Group
- Turquoise Hill Resources
- Vale
- Vedanta
- Washington H. Soul Pattison
- Western Mining
- Wheaton Precious Metals
- Yamana Gold
- Yanzhou Coal Mining
- Yara International
- Yunnan Copper
- Zhaodin Mining
- Zhongjin Gold
- Zijin Mining Group

Sources: Public companies with a valuation exceeding $5 billion in 2010 or 2020; BCG analysis.

The Companies in the Sample Cover All Major Regions and Commodities

Location of primary listing

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia-Pacific</td>
<td>43</td>
</tr>
<tr>
<td>North America</td>
<td>24</td>
</tr>
<tr>
<td>Europe</td>
<td>11</td>
</tr>
<tr>
<td>Middle East and Africa</td>
<td>10</td>
</tr>
<tr>
<td>South America</td>
<td>3</td>
</tr>
</tbody>
</table>

Primary mineral or commodity produced

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Number of companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold</td>
<td>22</td>
</tr>
<tr>
<td>Coal</td>
<td>19</td>
</tr>
<tr>
<td>Diversified</td>
<td>13</td>
</tr>
<tr>
<td>Copper</td>
<td>12</td>
</tr>
<tr>
<td>Fertilizer and industrial minerals</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>18</td>
</tr>
</tbody>
</table>

Sources: S&P Capital IQ; BCG analysis.
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1 At year’s end 2020 and/or year’s end 2010; see part 2 of the Appendix for the full list.
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