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Discussion-Opinion-Editorial



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Collaborate or Perish: The New Mantra for MOGI Companies in Transition. Survive and Prosper Together, or Fail Alone. Part-1

MOGI: Minerals Oil & Gas Integrated

"We must learn to live together as brothers or we will all perish together as fools" - Martin Luther King, Jr.

Abstract

In the interconnected world, collaboration is the game changer. Agencies and firms, citizens and groups who can collaborate, will thrive in the networked world; those who cannot are doomed to perish. There is considerable evidence to suggest that collaboration is a necessary condition to drive innovation, particularly transformational innovation. The mining industry can harness the potential of collaboration to achieve more than just productivity gains, by focusing on sector-wide efficiency gains and moving over to the newer technology domains by handholding, which will benefit all the participants rather than give anyone a competitive advantage. This article explains the recent examples of collaboration where companies are looking for complementarities to harness growth and prepare for the future.

Keywords: *Collaboration, BHP, Business Model, Minerals, Oil and Gas, Rio Tinto*

1.0 The Background

Like the case of an individual, even a company cannot know every technology, particularly the new ones, all by itself. At the same time, it must appreciate that if no entity will come close to it unless it sees its interests are not protected. Today, no company can remain as a lonely giant in the jungle- it will not merely survive if it does so. The modern companies are facing multiple challenges and some of them are (Figure 1)[1]:

1.1 Capital

Miners continue to face increased scrutiny from investors on how investment is deployed, with a strong focus on capital discipline and returns. Against this backdrop, companies are accelerating growth and amplifying value through mergers and acquisitions (M&A), spinning off noncore assets or high-growth assets

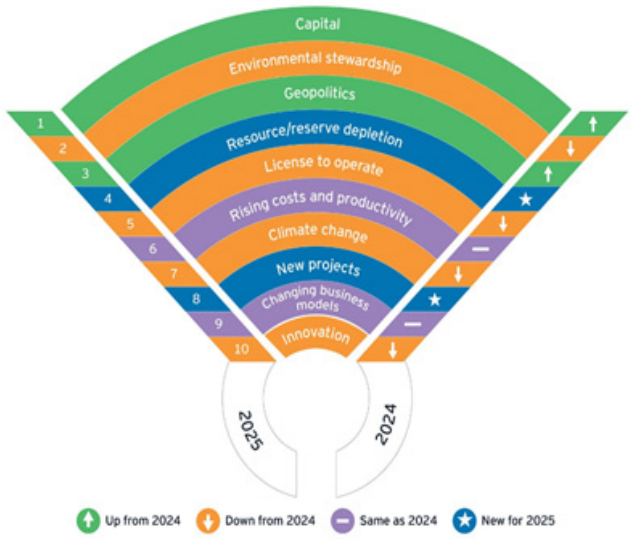


Figure 1. Top 10 mining and metals risks in 2025 | EY – Global.

1.2 Transition to a Net-Zero Economy

The mining industry will need to provide large quantities of raw materials for cleaner technologies. This includes scaling up the availability of certain raw materials, such as copper and nickel, to meet demand growth.

1.3 Falling Commodity Prices and Rising Costs

In 2023, the financial performance of the world's top 40 mining companies was squeezed by falling commodity prices and rising costs. Labor and energy costs remain higher in selected markets. This trend is expected to continue in 2024.

1.4 Geopolitical Risk and Economic Protectionism

Growing resistance to globalization and free trade is affecting the mining industry. This includes local content laws and regulations, and import restrictions on semi-finished products. Resource nationalism continues to rise, impacting tax rules and ownership rights. Encouraging the large-scale projects needed to enable the energy transition will depend on governments balancing current national revenue goals with long-term benefits. Miners may need to consider different approaches to projects in certain geographies. For example, JVs with local companies and licensing can help derisk investment.

1.5 Talent Challenges

Mining companies need to invest in maintaining an up-to-date talent strategy. This includes strategic workforce planning, such as talent requirements for future years. Miners continue to face high costs, particularly around labor and energy. Workforce expenses are exacerbated by skills shortages, impacting productivity and potentially elevating safety risks, as less qualified people take on roles.

1.6 Resource Availability

Mining companies must continue to develop better ways to extract and optimize critical minerals and metals to meet soaring demand, while also protecting our environment. This complicated problem is driven by interwoven factors. Declining ore grades increase the costs of extraction. Exploration budgets are up, but so are costs, and fewer discoveries are being made[2].

The mining and metals industry will need to invest significant capital to build the supply of critical minerals. This includes investing to bridge the copper supply gap and finance the pipeline of lithium production capacity.

1.7 Regulatory Complications

Most agree that the focus on ESG (and pressure to meet growing regulatory obligations) is distracting from productivity. This highlights the benefits of integrating environmental metrics (e.g., carbon intensity) into broader productivity measures, to help mining companies reap wider benefits.

1.8 Demand and Supply Mismatch

Over the next 30 years, the sector will need to mine more mineral ores than humans have mined over the last 70,000 years. Filling the demand gap requires overcoming multiple complex barriers to new projects. Regulatory red tape is lengthening project lead times. High costs make new mines more capital-intensive, and a lack of skilled workers means timely project delivery is difficult.



Figure 2. Mining industry growth remains intact.

"Coming together is a beginning, staying together is progress, and working together is a success."
-Henry Ford

Additionally, the increasing rate of mining royalties and taxes in some markets can be a barrier to new projects. This is in the backdrop of rising mineral demands (Figure 2)

1.9 Changing Business Models

In their quest to capture more value, mining and metals companies are reassessing business models, with many focusing on the opportunities of sustainability. Many are considering how to integrate recycling into operations, which may include making better use of scrap or establishing collection networks. Other companies are exploring integration across the value chain to both accelerate decarbonization and tap into new revenue. For example, investment in smelting gives mining companies greater control over emissions and creates opportunities by offering premium, cleaner products. Local partnerships can also build long-term organizational and societal value.

1.10 Innovation

Sustainable, cost-effective mining at scale will not happen without innovation, particularly as resources deplete, costs rise, talent becomes scarce, and environmental pressures increase. The usual path is to adopt the downstream value additive operations that can be easily accommodated.

2.0 Adopting New Business Models: Large MOGI Companies

2.1 Company A

Company A, now known as A, is a leading global resources company dedicated to extracting and processing minerals, oil, and gas[3,4]. Emphasizing sustainability and innovation, A focuses on producing a diverse range of commodities including iron ore, copper, nickel, and metallurgical coal. A operates across several continents with production operations primarily in Australia and the Americas. The company places a strong emphasis on safety, environmental stewardship, and social responsibility, aspiring to positively impact the communities in which it operates while meeting the growing global demand for

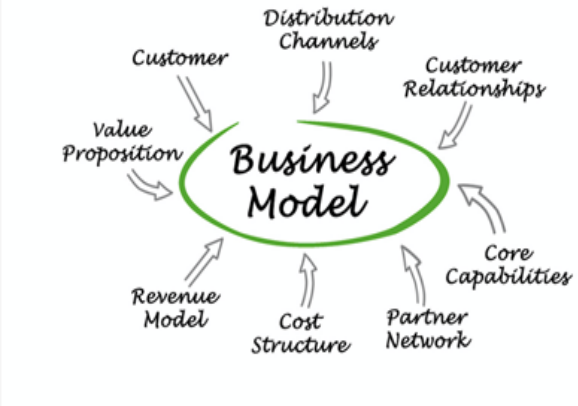


Figure 3. What comprises a business model.

"Great things in business are never done by one person. They're done by a team of people." - Steve Jobs

essential resources. A employs a diversified business model that leverages its extensive portfolio of assets and expertise in resource extraction. By maintaining operations in multiple segments such as Petroleum, Copper, Iron Ore, and Coal, A minimizes risks associated with market volatility and ensures a stable supply of commodities. The company integrates advanced technologies and sustainable practices into its mining and exploration activities to enhance efficiency and reduce environmental impact. Furthermore, A's global logistics chain, including freight and pipeline transportation, facilitates the efficient distribution of resources to markets worldwide, ensuring timely delivery to customers. The revenue model of A is multifaceted, encompassing various streams to ensure financial robustness. The company's primary income is derived from the sale of extracted minerals and petroleum products to diverse global markets. By holding long-term contracts with major industrial clients and entering into spot market transactions, A secures a steady revenue flow. Additionally, the company invests in technology and innovation to optimize production costs and expand its resource base, thereby enhancing profitability. With a strategic approach to investment and resource management, A continues to strengthen its position as a leading player in the global resources industry[5].

2.2 Company B (now to be known B)

B's business model includes[6]:

2.2.1 Production of Raw Materials

B produces raw materials like iron ore, copper, bauxite, diamonds, uranium, and industrial minerals.

2.2.2 Processing

B processes some of the materials it produces, such as bauxite into alumina and aluminum, and iron ore into iron.

2.2.3 By-products

B produces other metals and minerals as by-products from processing its main resources.

2.2.4 Dual Listed Companies (DLC) Structure

B operates under a DLC structure, which manages two same but differently organized companies together.

2.2.5 Partnerships and Investments

B partners with companies like Schneider Electric to develop technologies and solutions to decarbonize the metals and mining supply chain.

Figure.1 Standard mining Business models (Rio Tinto. Standard mining Business models (Rio Tinto :

Courtesy: https://vizologi.com/business -strategy-canvas/rio-tinto-group-business-model-canvas/))

- Rio Tinto Group, a leading global mining and metals corporation, is driven by a mission to discover, mine, and process the Earth's mineral resources in a sustainable and responsible manner. With robust operations across multiple continents, including significant presences in Australia and North America, Rio Tinto is strategically positioned to serve an extensive range of global markets. Their diverse portfolio includes iron ore, aluminum, copper, diamonds, gold, industrial minerals such as borates, titanium dioxide, and salt, as well as uranium. By adopting cutting-edge exploration and extraction technologies, the company ensures high efficiency and minimal environmental impact, aligning with their commitment to sustainable development.
- Uniquely structured to optimize value creation, Rio Tinto's business model emphasizes integration across the minerals and metals value chain, from discovery to final delivery. This holistic approach enables the company to better control the quality and reliability of their output while reducing costs and improving supply chain efficiency. Rio Tinto manages not only the mining but also the refining and marketing of its products, a strategy that strengthens its market position and ensures compliance with rigorous safety and environmental standards. This integrated business model is supported by a strong emphasis on technological innovation and sustainable practices, positioning Rio Tinto as an industry leader in responsible mining.

Figure.2 Standard mining Business models (Rio Tinto : Courtesy: https://vizologi.com/business-strategy-canvas/rio-tinto-group-business-model-canvas/)

- Rio Tinto's revenue model is multifaceted, deriving income from several streams to ensure financial robustness and adaptability. Primarily, the company generates revenue through the sales of bulk commodities such as iron ore and aluminum, which are essential to various industrial applications globally. Additionally, their diversified portfolio includes the sale of high-value minerals like diamonds and specialty products like borates and titanium dioxide. Through long-term supply contracts and spot market sales, Rio Tinto achieves a balanced revenue flow, mitigating the volatility typically associated with commodity markets. This diversified approach not only stabilizes earnings but also allows for sustained investment in new projects and innovations, ensuring long-term growth and competitiveness in the global mining sector.



2.2.6 Corporate Venture Capital

B has corporate venture capital activities that invest in technology startups.

2.2.7 Decarbonization

B is focused on decarbonizing its assets, including switching to renewable power, electrifying processing, and developing products and technologies that help customers decarbonize. B's purpose is to find better ways to provide the materials the world needs.

3.0 How to Prepare to Collaborate

Collaboration is the fuel that drives business success. Beyond weaving successful teams together, it's what makes some of the most novel ideas and innovative solutions around us possible. Effective collaboration is hard-won. But teams that get it right see high levels of productivity, stronger team relationships and successful business outcomes.

3.1 For Successful Company-To-Company Collaboration, You'll Need To

1. Clearly underline own goals, path, and targets and begin to communicate with the likely partners.
2. Establish clear priorities: Define the purpose of the collaboration, the goals and objectives of each party, and the specific activities you'll be working on.
3. Communicate openly: Ensure that everyone has the same understanding of what success means and that communication is open and transparent.
4. Keep flexibility to accommodate each other.
5. Create a collaboration agreement: This should include the purpose, scope, and initiatives of the collaboration, as well as provisions for intellectual property rights.
6. Build trust: Establish a foundation of trust and transparency between the parties involved.
7. Work together for the benefit of each other: Demonstrate mutuality and solidarity.
8. Exchange information: Communicate openly about problems and ways of working.

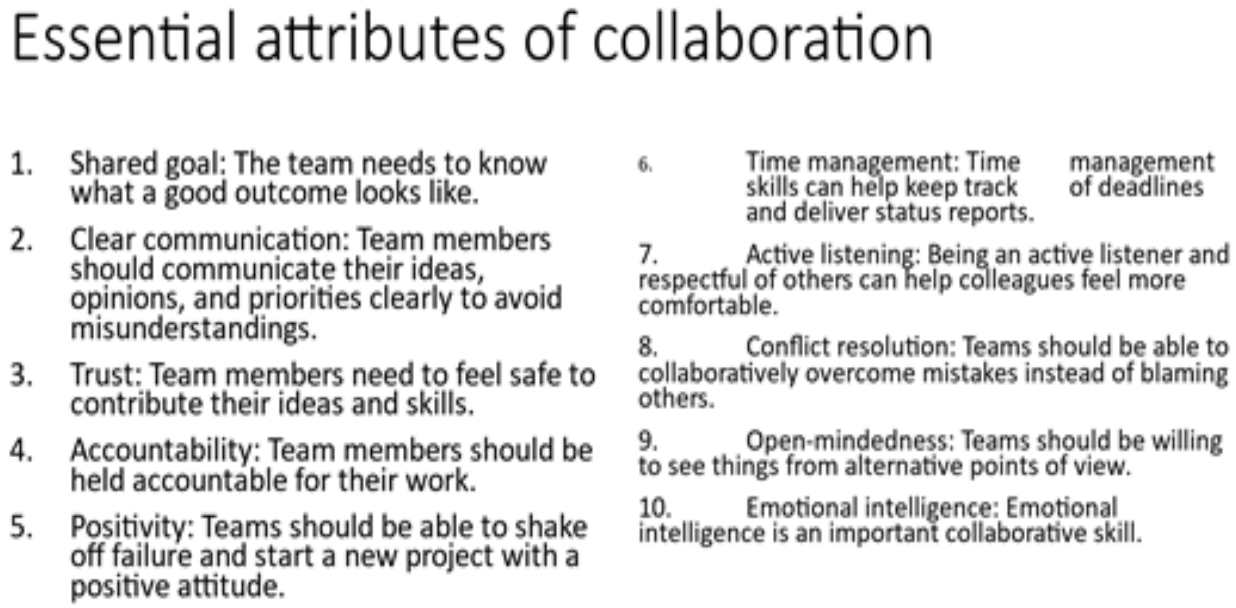


Figure 4. Organizational requirements of collaboration.

"The best teamwork comes from individuals working toward a common goal in ways that respect the individual contributions of each person." - Unknown

9. Keep detailed records: Document the effort you put into the project so you can track it and ensure transparency.
10. Create the joint venture document keeping each other's interest intact.

Also please see the Figure 4 for more insights.

3.2 Collaboration Patterns

3.2.1 Oil and Gas

Oil and gas companies collaborate in a variety of ways, including:

1. Strategic alliances

These can be joint ventures, equity partnerships, or nonequity partnerships. They can involve companies from multiple geographies and can create new legal entities or contractual relationships.

2. Asset-level partnering

This can Involve Indigenous Oil Companies (IOCs) partnering with National Oil Companies (NOCs) for exploration, development, and operations. IOCs can provide technical resources and orchestrate complex projects, while NOCs can take responsibility for local ecosystem development.

3. International cooperation

Indian oil and gas companies, such as ONGC Videsh Ltd (OVL), Indian Oil Corporation Ltd (IOCL), and Oil India Ltd (OIL), have assets in countries such as the UAE, Oman, and Russia.

The pace of new scientific discovery and innovation increases as the speed of legacy ability to share knowledge and information across boundaries expands. The technology that enables operators and service providers to share knowledge and information is in place today; however, the oil and gas industry has traditionally shied away from this level of collaboration due to the perception that sharing data and information is akin to giving away valuable knowledge. Rather, in this new age of accelerated innovation, they must shift their mindset to view collaboration and knowledge sharing as an opportunity to adapt to rapid change, enabling us to identify new exploration opportunities, access reserves more efficiently and increase cash flow from producing assets.

The lifecycle of a hydrocarbon field has traditionally followed a linear, stage-gated approach from discovery, through development and production, to abandonment. In the past, the multiple domain experts required to squeeze the resources out of the rock worked independently in silos, preventing them from taking a wider view of the system.

One of the initial steps in overcoming this siloed way of working was to increase collaboration among the disciplines. For example, combining geophysics, geology and reservoir engineering provided subsurface teams a holistic way to approach their domain. The result was cross-discipline workflows, that now delivered a much-needed integration, and which laid the ground work for seamless interoperability within teams.

However, collaboration among the disciplines was not enough. There was still a disconnect between the planning and operations side-a costly disconnect that reduced efficiency and increased HSE risks. The next step was to bridge this gap, providing a means for the two sides to collaborate. For example, enabling drilling engineers and drillers or geoscientists and field operators to exchange relevant information, so subsurface characterization could extend into drilling and production operations. A continuous learning loop between planning and operations had to be established across the entire E&P life cycle to ensure efficiency and optimal execution.

When all collaborators are united via a holistic environment, plans and models become evergreen, giving a single version of the truth that consumes the most recent field measurements and applies the latest physics engines. The need for lengthy cycles between disciplines is reduced and teams are empowered to make more rapid, informed decisions that boost performance[7].

Collaboration between oil and gas companies can have many benefits, including:

a. Innovation: Collaboration can foster innovation by sharing resources and capabilities.
b. Cost reduction: Collaboration can reduce costs by sharing resources and capabilities.
c. Improved safety: Collaboration can improve the safety of projects by sharing resources and capabilities.
d. Enhanced performance: Collaboration can enhance the performance of projects by sharing resources and capabilities.
e. Improved operability: Collaboration can improve the operability of projects by sharing resources and capabilities.

3.2.2 Minerals

Here are some examples of companies collaborating in the mining industry:

1. Tata Steel and A&B Global Mining Pvt. Ltd.

These companies signed a business cooperation agreement to work together on mine technical services, business development, and more. Tata Steel and A&B Global Mining Pvt. Ltd. (ABGM) signed a business cooperation agreement in April 2023 to work together on mining and metals projects[8]:

- **Services**: ABGM will provide mine planning, engineering, and project management services. Tata Steel will bring its expertise in mining, manufacturing, and selling steel.
- **Goals**: The companies share a focus on sustainability and value creation.
- **Benefits**: The agreement will help the companies develop new business opportunities and provide integrated business solutions to the mining industry. Also, it will enrich the knowledge base of the companies in different geographies.

ABGM is a mining consultancy with offices in India and South Africa. Their services include:

- Mineral resource management.
- Mine optimization.
- Mine planning.
- Open pit and underground mine design and scheduling.
- Ventilation design.
- Geotechnical studies and applications.
- Process modelling.
- Renewable energy for mines.
- Digitalization and AI application.
- Fleet simulations and legal compliance services.

Tata Steel is a public company that operates in more than 100 countries and has over 660,800 employees worldwide. Tata Steel has signed a business cooperation agreement with A&B Global Mining Pvt. Ltd. (ABGM) to harness new business development opportunities and deliver mine technical services in areas such as exploration,

resource evaluation, mine planning and scheduling, due-diligence, investment thesis, digitalisation, clean/hybrid energy solutions, doing pre-feasibility, bankable feasibility studies, owners engineering and project management. ABGM will also collaborate with Tata Steel to deliver competitive integrated business solutions to the global mining industry.

2. World Economic Forum and Seven Mining and Metals Companies

These companies partnered to accelerate responsible sourcing of raw materials. The Mining and Metals Blockchain Initiative was created to build a blockchain platform to address transparency issues, track materials, and more.

3. Rio Tinto and Caterpillar

These companies partnered to supply machinery and autonomous technology for Rio Tinto's operations in Western Australia. Caterpillar integrated data analytics technologies to boost production and safety.

Rio Tinto and Caterpillar have a long-standing partnership that includes[9]:

4. Zero-Emission Mining Trucks

Rio Tinto and Caterpillar developed and deployed a fleet of zero-emission mining trucks at a Rio Tinto mine in Western Australia (Figure 5). The trucks are part of an agreement to help Rio Tinto achieve its goal of net-zero carbon emissions by 2050.



Figure 5. The BHP -Caterpillar collaboration.

- **Battery-Electric Haul Truck Trials**

Rio Tinto and BHP are collaborating with Caterpillar and Komatsu to test battery-electric haul trucks in the Pilbara region. The trials are part of an effort to develop sustainable solutions for mining operations.

- **Autonomous Water Trucks**

Rio Tinto and Caterpillar introduced the world's first fully autonomous water trucks at the Gudai-Darri mine in Western Australia. The trucks are part of a larger effort to introduce mining automation.

Rio Tinto and Caterpillar's partnership has been ongoing for over 50 years. Caterpillar is a leading manufacturer of construction and mining equipment, including diesel and natural gas engines, gas turbines, and diesel-electric locomotives.

4.0 Strategic Collaboration Between Modern Chemicals Company and Orica Digital Solutions

Modern Chemicals Company (MCC) has announced a significant collaboration agreement with Orica Digital Solutions in alignment with Saudi Arabia's Vision 2030 to meet the growing demand for mining services[10]. This agreement aims to introduce advanced digital technologies and solutions designed to enhance productivity, safety, and sustainability in the Kingdom of Saudi Arabia's rapidly expanding mining sector. Together, the two companies will introduce cutting-edge digital solutions that will empower the Saudi mining sector with enhanced data-driven insights and optimized decision-making across the entire value chain. These technologies enable companies to extract resources more efficiently, manage environmental impact, and achieve greater operational predictability. By integrating physical and digital workflows, Orica's platforms help mining companies improve safety, reduce energy and water usage, minimize emissions, and comply with regulatory requirements. These solutions also offer real-time insights, allowing for better decision-making, enhancing productivity, and driving sustainable outcomes.

4.1 How to Sustain Company-to-Company Collaboration

In most cases, the collaboration does not achieve the desired results largely because the economics do not play out as par expectations, or the teams and their leaders change. What's needed is a *psychological* approach. Sustained collaborations in a wide range of industries, are marked by common mental attitudes: widespread respect for colleagues' contributions, openness to experimenting with others' ideas, and sensitivity to how one's actions may affect both colleagues' work and the mission's outcome. Yet these attitudes are rare. Instead, most people display the opposite mentality, distrusting others and obsessing about their own status. The task for leaders is to encourage an outward focus in everyone, challenging the tendency we all have to fixate on ourselves- what we'd like to say and achieve- instead of what we can learn from others or pass it off as someone else's responsibility. Some of the pointers for collaboration success are[11]:

1. Set clear goals: Set precise goals that everyone can understand. This helps everyone understand the project's purpose and vision. Have the goals with a timeline to complete.
2. See the money on the table for all. This is important otherwise the interest is bound to dry after some points.
3. Communicate easily: Do not go for the hyperboles and keep the communication direct and simple, one at a time.
4. Build trust among team members: Trust is the foundation for healthy relationships, which are essential for successful business ventures. The credits and rewards for work should not overlook the worthy candidates.
5. Ask for feedback: Regular feedback helps both businesses and customers benefit from the partnership.
6. Encourage collaboration: Make collaboration a value, and encourage open communication.
7. Foster relationship building: Build time for team bonding, and highlight successful teamwork.
8. Make the right hires from the start and in continuance: Hire people who will help create a collaborative culture.
9. Encourage innovative ideas: Capitalize on individual strengths, and encourage innovative ideas.
10. Do not crowd the current collaboration with new and newer goals.
11. See that both parties have something worthwhile to gain and one should not suffer at the expense of the other.

"Unity is strength; collaboration is power". Annonymous

5.0 Climate Responsibility Leads Ways of Collaboration

5.1 Vale and POSCO Collaboration

On November 3-4, 2021, Vale and POSCO signed a Memorandum of Understanding (MOU). The MoU will support Vale's 2035 goal of reducing 15% of Scope 3 emissions, and POSCO's 2050 aim to achieve carbon neutrality. The firms have signed a Memorandum of Understanding (MoU) in this regard, agreeing to work alongside to reduce fossil fuel consumption using Vale's offerings. These offerings include high-grade iron ore products such as pellets, fines and briquettes .This move is expected to help realise Vale's 2035 target set for reducing 15% of net Scope 3 emissions and POSCO's aim to become carbon neutral for integrated steel production by 2050.Vale iron ore executive vice-president Marcello Spinelli said: "The decarbonisation pathway definition will be critical to set how the industry will meet Paris Agreement's targets and deliver an important legacy to society and our planet. Vale is well-positioned to lead the industry with our high-quality and world-class portfolio and with innovative technologies." POSCO steel business unit head Hagdong Kim highlighted that Vale and POSCO have set a 2050 target to reach the carbon net-zero objective.

By 2030, Vale has pledged to cut its absolute Scope 1 and 2 emissions by 33%. In addition, POSCO intends to reduce greenhouse gas emissions by 20% by 2030, 50% by 2040, and become carbon neutral by 2050.Similarly, Australian mining firm BHP and POSCO agreed to jointly explore technologies to reduce greenhouse gas emissions in integrated steelmaking. They will conduct

pilot and plant trials, exploring ways to optimise coke quality, and evaluating options for carbon capture storage and utilisation.

5.2 Vale and Green Energy Park Partnership

October 24: Brazilian metals and mining company Vale and European integrated hydrogen company Green Energy Park (GEP) will collaborate on a green hydrogen production facility in Brazil aimed at manufacturing low-carbon steel products. The joint initiative aims to construct a 'Mega Hub' industrial complex in Brazil for international steel companies to source and produce Hot-Briquetted Iron (HBI).



Figure 6. The joint project has support from the EU's Global Gateway programme. Credit: Vale/GEP.

Vale expects to produce iron ore, which will serve as an input for HBI with renewable hydrogen as the reducing agent. For every tonne of steel produced in blast furnaces, two tonnes of CO_2 equivalent are released into the atmosphere. According to Vale and GEP, when supplied to electric arc furnaces and produced with green hydrogen, HBI reduces carbon emissions by 80%.

Vale and GEP, supported by the EU's Global Gateway programme, will also collaborate on various aspects of the hydrogen value chain including the deployment of electrolysers and the design of industrial plants for green hydrogen and its derivates.

Vale director of energy and decarbonisation Ludmila Nascimento commented: "We are leveraging Brazil's high-quality iron ore and abundant renewable energy to develop green hydrogen supply, which will enable the offer of a 'green' HBI to European steelmakers. Meanwhile, we are fostering Brazil's new industrialisation based on the low-carbon economy."

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