

GLOBAL MINING REVIEW

APRIL 2022
VOLUME 5 ISSUE 3





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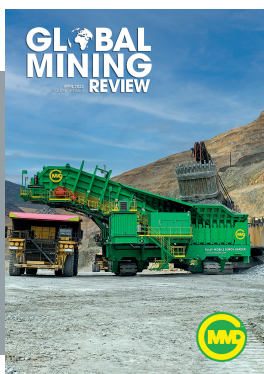
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ON THE COVER

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GUEST COMMENT

**BERNHARD MAIER
(COUNSEL),
PIETRO GRASSI (ASSOCIATE)
& GAVIN COLLINS
(PARALEGAL)**
SIGNATURE LITIGATION



In the first two months of 2022, the mining industry was faced with relatively linear macro trends, such as a push for supply chain transparency and accompanying threats of ESG-related litigation, exponentially growing global demand for strategic minerals across many industries, and the

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GLOBAL MINING REVIEW (ISSN No: 2515-2777) is published by Palladian Publications Ltd.

Annual subscription (nine issues) \$50 UK including postage, \$60 overseas (airmail). Claims for non-receipt must be made within four months of publication of the issue or they will not be honoured without charge.

government-mandated electrification of the automotive sector.

Russia's invasion of Ukraine on 24 February 2022 has since completely upended the legal and commercial landscape for the mining industry, and will have serious knock-on and long-term effects across the entire mining supply chain.

The complexity of, and practical challenges inherent in, the disentangling of existing legal and commercial relationships cannot be overstated. While some of the short-term effects are becoming apparent, attempting to predict the medium and long-term legal implications would be akin to crystal ball gazing. However, some trends for the mining industry are becoming discernible.

In addition to unprecedented geopolitical instability, the mining sector is now also faced with exponentially rising energy prices. This has already led to the suspension of the production of mission-critical chemicals; sodium cyanide, for example, such as in the case of Czech producer, Draslovka.

The short and medium-term price volatility will almost certainly lead to the need or desire to reconsider or even breach (intentionally or unintentionally) contractual terms, including so as to recalibrate supply chains as a result of a fundamentally changed commercial landscape. The proper interpretation of force majeure, war, and insurance coverage clauses is almost guaranteed to take centre stage in commercial negotiations and legal disputes alike, whether before national courts or international tribunals.

As a result of the wide-reaching sanctions regimes around the world, raising funds may become increasingly challenging or even impossible for investors in the mining sector – a significant number of IPOs and transactions have already been derailed. Following a wave of resignations in boardrooms around the world, shareholder disputes are also likely to ensue.

Only recently, there was a risk that certain assets would be considered 'stranded' as a result of the concerted push for decarbonisation. Today, mining assets may quickly become physically 'stranded', leaving mining investors with little or no prospects of repatriating their assets, let alone recouping their sunk costs.

To the extent that the actions of the Russian government have caused foreign investors in the mining sector financial losses, some of these losses may be recoverable by relying on the 60 or so bilateral investment treaties in force between Russia and the home State of the relevant investor. Foreign investors may be able to rely on substantive protection provisions, such as the prohibition of unlawful expropriation, a duty to accord fair and equitable treatment, the obligation to adhere to contractual undertakings, the requirement to offer full protection and security to local operations, and strict rules in relation to the repatriation of foreign capital. By the same token, existing claims pursued by Russian investors against other countries – such as the recently initiated UNCITRAL claim against France – will also likely be affected. Given the abrupt rupture of existing diplomatic channels, enforcement issues will also arise. **GMR**

Forward together – Neles is now part of Valmet



Neles was merged into Valmet on April 1, 2022 and is now Valmet's Flow Control business line. Valmet now offers an extensive flow control portfolio of industry-leading valves, valve automation solutions and related services, including the renowned Neles, Neles Easyflow, Jamesbury, Stonel, Valvcon and Flowrox solutions.

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WORLD NEWS

CHILE Great Southern Copper commences 2022 Especularita exploration campaign

Great Southern Copper plc, a company focused on copper-gold exploration in Chile, has commenced systematic on-ground exploration at its Especularita copper-gold (Cu-Au) project, located in the coastal metallogenic belt of northern Chile.

The Especularita project comprises 19 076 ha. of exploration and mining concessions, both granted and in the process of being granted, and the company holds option rights to acquire a 100% interest in the project.

The company's exploration programmes at Especularita, targeting porphyry-epithermal style Cu-Au mineralisation, will comprise regional to prospect-scale mapping, sampling (rock, soil, stream) and geophysics work, designed to identify prospects for targeted drilling campaigns.

Previous reconnaissance exploration by Great Southern Copper has identified porphyry to epithermal style Cu-Au mineralisation associated with an extensive advanced argillic litho-cap, centrally

located at the intersection of major structures and the contact of a large granodiorite intrusion with overlying volcanic rocks. Such litho-cap alteration is characteristic of the tops of porphyry copper systems, including Teck's 50 000 tpy Carmen de Andacollo copper mine, located along trend from Especularita.

Small scale artisanal workings and mines, targeting high-grade Cu-Au mineralised structures, are prominent around the base of the litho-cap alteration zone. Historical processing plants and tailings dumps provide further evidence in the district of a once active mining culture, which has not benefited from significant modern-style exploration.

At the company's San Lorenzo project, exploration continues on the Phase III trenching programme in conjunction with detailed mapping and sampling of monzonite intrusions. This work is progressing toward defining potential targets for drilling proposed to start in May/June 2022, subject to rig availability and permitting approvals.

EUROPE ABB and Savannah Resources to explore automation and electrification solutions

ABB and Savannah Resources plc have signed a memorandum of understanding to explore industrial automation and smart electrification solutions for the development of Savannah's Barroso Lithium Project in northern Portugal.

Under the early-stage agreement, ABB will apply its technical expertise to outline production control and process solutions for lithium concentrate production and integrated spodumene mining operations, in line with Savannah's target of zero emission operations by 2030.

The Barroso Lithium Project is located 143 km north-east of Porto and is Europe's largest known resource of hardrock spodumene lithium. Savannah's objective is to develop an operation producing premium, carbon-neutral lithium concentrate as a strategic raw material in Europe's EV battery supply chain. Local electricity, produced mainly from hydro, solar and wind energy with zero carbon emissions, would be used to provide power to the project. ABB's technology solutions would maximise the use of the renewable energy and electrification to move the project towards carbon neutral production.

European lithium battery manufacturing is set for rapid growth and accelerating demand for lithium chemical production. This is driven by European Commission targets to make the EU carbon neutral and to reduce EU transport emissions by 90% by 2050.

Savannah is focused on responsible development of the Barroso Lithium Project by using 238 individual measures to eliminate or mitigate environmental impacts. These measures will be included in the definitive feasibility study on the project, which Savannah is currently completing. This will also incorporate the actions from the current project decarbonisation study, which supports Savannah's commitment to target a zero-emission operation by 2030 or earlier. Savannah also places great emphasis on its social responsibilities and a comprehensive set of programmes have been designed to share benefits and opportunities with local communities.

ABB will also work towards binding agreements with Savannah in relation to the electrification, automation, and digital solutions in the future.



WORLD NEWS

DIARY DATES

CIMBC22 – CIM Annual Convention
01 – 04 May 2022
Vancouver, Canada
<https://convention.cim.org>

Mines and Money Connect – May 2022
04 – 05 May 2022
London, UK
<https://minesandmoney.com/connect>

Investing in African Mining Indaba 2022
09 – 12 May 2022
Cape Town, South Africa
<https://miningindaba.com>

PDAC 2022 Convention
13 – 15 & 28 – 29 June 2022
Toronto, Canada & Online
www.pdac.ca/convention

Euro Mine Expo 2022
14 – 16 June 2022
Skellefteå, Sweden
www.euromineexpo.com

Electra Mining Africa
05 – 09 September 2022
Johannesburg, South Africa
www.electramining.co.za

CONEXPO-CON/AGG 2023
14 – 18 March 2023
Las Vegas, USA
www.conexpoconagg.com/conexpo-conagg-construction-trade-show

To stay informed about the status of industry events and any potential cancellations of events due to COVID-19, visit Global Mining Review's events page: www.globalminingreview.com/events

AUSTRALIA BHP signs LOI for Australia-East Asia iron ore 'green corridor'

A consortium, led by the Global Maritime Forum and consisting of BHP, Rio Tinto, Oldendorff Carriers and Star Bulk Carriers Corp., have signed a letter of intent (LOI) to assess the development of an iron ore 'green corridor' between Australia and East Asia.

To mobilise demand for green shipping and to scale zero or near-zero greenhouse gas emission shipping, governments and industry decision-makers are increasingly looking to enable and simplify the task of decarbonising the maritime sector by establishing green corridors: specific shipping routes where the economics, infrastructure, and logistics of zero or near-zero emission shipping are more feasible and rapid deployment can be supported by targeted policy and industry action.

In 2021, the Getting to Zero Coalition report 'The Next Wave' demonstrated how green corridors can be conceived, prioritised, and designed with a pre-feasibility study for an iron ore route between Australia and East Asia. The study suggested that green ammonia is the likely fuel choice for this corridor based on favourable production conditions, an enabling regulatory environment and willing stakeholders.

Taking the study further, the parties in the consortium intend to jointly assess green ammonia supply, bunkering and first mover support mechanisms, necessary for their participation in a viable Australia to East Asia iron ore green corridor.

Through the work in the consortium and with inputs from the wider supply chain, the partners aim to develop a framework as a preparatory step towards real-world implementation of a green iron ore shipping value chain.

The new consortium will facilitate a robust public-private dialogue to investigate conditions that need to be in place to mobilise demand and to feasibly scale zero or near-zero-greenhouse gas emission shipping on the corridor.

MEXICO Mexus Gold US pursues qualified mining company for Santa Elena JV

Mexus Gold US is pursuing a qualified mining company to joint venture (JV) with at its Santa Elena mine in Caborca, Mexico. To assist with this endeavour, the company is seeking a CEO with the right experience to help manage and bring Mexus' three properties into production. In addition, Mexus will look to bring on a five-person Board of Directors to assist with this process and general decision making going forward.

Over the last six months, Mexus has completed an opencast test heap leach gold recovery process that produced 277.97 oz of gold from six test pits at the Santa Elena property. This test, along with the 100's of assay samples, ground geophysics, mapping and geological evaluations, points to the property being a major gold target within the Mojave Mega Shear zone.

Mexus believes that the property contains a 1 million + oz resource, which can be proven with a qualified JV partner. The company is also open to partnering with a company on the Ures gold, copper, and silver property. Across the company's three properties, Mexus has over 16 000 acres and 26 different concessions all located in Northern Sonoran State, Mexico.



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CrusherMetrics™

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WORLD NEWS

AUSTRALIA BHP Nickel West secures wind power for Southern nickel operations

BHP has secured enough renewable energy to cover 100% of the power requirements of three of its major nickel operations in Western Australia, following the signing of a new power purchase agreement (PPA) with Enel Green Power.

The PPA between BHP and Enel Green Power will underpin construction of stage 1 of the Flat Rocks Wind Farm near the Great Southern town of Kojonup.

Stage 1 is expected to create 120 jobs during construction and up to 10 locally based roles once operational. Construction is due to begin in July 2022, and first power is expected in October 2023.

The new wind farm will comprise the 18 tallest wind turbines in Western Australia and is expected to produce 315 GWh per year.

Under the renewable PPA with Enel Green Power, the Flat Rocks Wind Farm will generate the equivalent of 100% of the current power requirements for Nickel West's Kalgoorlie Nickel Smelter and Kambalda Nickel Concentrator from 2024.

Renewable energy from the Flat Rocks Wind Farm is expected to reduce Nickel West's market-based Scope 2 greenhouse gas emissions by just under one-third against FY2020 baseline levels from 2024, based on current forecast demand.

ARGENTINA Rio Tinto completes acquisition of Rincon lithium project

Rio Tinto has completed the acquisition of the Rincon lithium project in Argentina for AUS\$825 million, following approval from Australia's Foreign Investment Review Board.

A binding agreement to purchase the project from Rincon Mining, a company owned by funds managed by the private equity group Sentient Equity Partners, was announced in December 2021.

Rincon is a large undeveloped lithium brine project located in the heart of the lithium triangle in the Salta Province of Argentina, an emerging hub for greenfield projects. The project is a long life, scaleable resource capable of producing battery grade

lithium carbonate. It has the potential to have one of the lowest carbon footprints in the industry.

The direct lithium extraction technology proposed for the project has the potential to significantly increase lithium recoveries as compared to solar evaporation ponds. A pilot plant is currently running at the site and further work will focus on continuing to optimise the process and recoveries.

The market fundamentals for battery grade lithium carbonate are strong, with lithium demand forecast to grow 25 – 35% per year over the next 10 years, with a significant supply demand deficit expected from the second half of this decade.

USA Keras increases ownership of Diamond Creek Phosphate Mine to 100%

Keras Resources plc now owns 100% of Falcon Isle Resources LLC and Falcon Isle Holdings LLC (collectively Falcon Isle), having acquired the outstanding 49% minority interests of Falcon Isle from the Helda Living Trust (HLT). Falcon Isle owns the high-grade Diamond Creek organic phosphate lease and mine, and the Spanish Fork processing facility in Utah, USA. Keras has now assumed full management of Falcon Isle and production has recommenced operations at the processing facility.

Keras had been looking to resolve the funding shortfall at Falcon Isle and engaged local US legal representatives to enforce its rights of the terms of the transaction agreed in June 2020, under which Keras secured a 51% stake in Falcon Isle effective

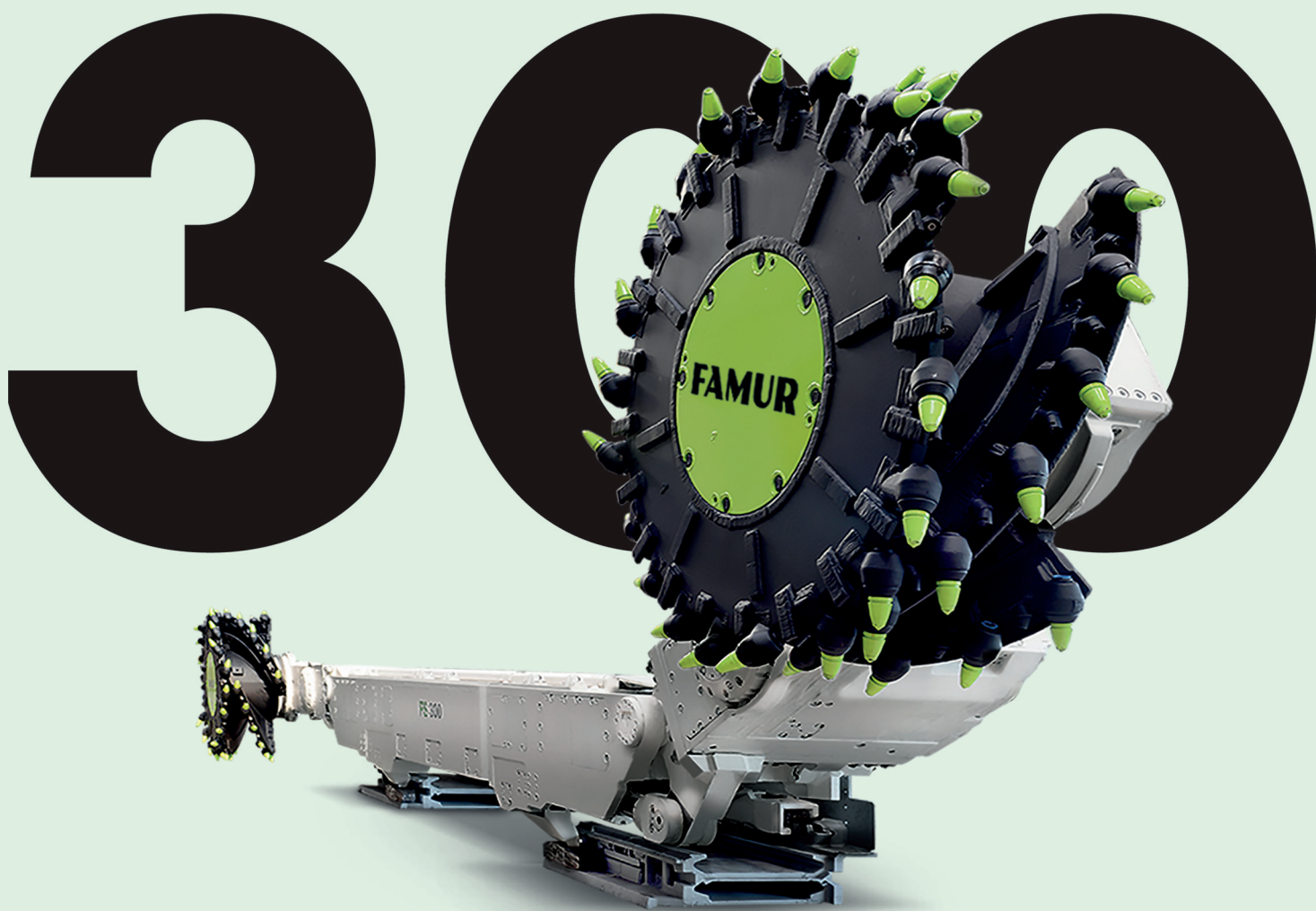
29 December 2020. Further to these discussions, agreement has been reached whereby Keras has purchased the outstanding 49% equity interest in Falcon Isle for a total consideration of US\$3.2 million including loans repaid to the vendor of Falcon Isle of US\$1 816 527. To preserve cashflow for developing the project, this will be paid in four annual instalments of US\$800 000 commencing on 1 July 2022, with the final payment on 1 July 2025. Importantly, concluding this agreement has ensured that the company avoids a lengthy and costly litigation process in the US and allows Falcon Isle to recommence operations to meet demand in the key spring season.

The losses in the financial year ended 31 December 2021 attributable to the 49% interest in Falcon Isle acquired were US\$24 187.

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PRODUCT NEWS

TERELION Drilling tools for surface mining

Terelion LLC is a leading manufacturer and global supplier of premium quality drilling tools and service solutions for surface mining and industrial applications, headquartered in Dallas, Texas, USA. The company specialises in challenges posed by blasthole drilling in surface mining, and is constantly exploring new designs, new materials, new manufacturing methods, and new engineering tools aimed at making the most hard-wearing, efficient, and cost-effective drilling products available.

The drill bit series, Ridgeback™, introduced the first generation of advanced features to improve hole cleaning and extend bit life, especially in hard rock mining. It features longer life bearings, improved cutting structures, and a patented shirttail concept to assist in rapid cuttings evacuation. Vented cones (9 in. dia. and up) provide for additional bearing cleaning and heat reduction. The patented High Energy Tumbling™ (HET) carbide treatment method produces a unique cutting structure and surface toughness that extends bit life and increases drilling rate.

The Rotary Percussion System (RPS) combines the best advantages of rotary drilling and percussive drilling. RPS can drill efficiently in a wide variety of formations, which leads to higher rate of penetration, straighter holes, smoother drilling operation, and less tendency to bend drill steel. This means that customers get increased drilling efficiency and reduced operating costs compared to industry standards. RPS is also a sustainable choice thanks to increased drilling rates, reducing overall fuel consumption.

Avenger™ drill bits, a sealed bearing drill bit series, delivers extended bit life and lower total drilling cost. The Avenger sealed bearing drill bits are designed for high-performance blasthole drilling and available in versions with roller (AVL) or journal (AV)

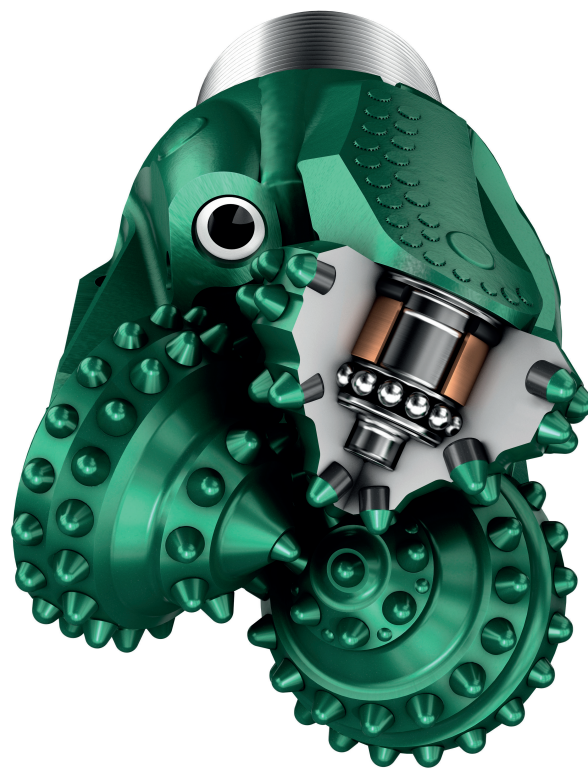


Figure 1. Cut-open Avenger.

bearings to provide longer bearing life. The sealed AV is designed for moderate to ultra-high pull-down applications where extended bearing life is required, while the sealed AVL is designed for lower to medium pull-down applications where the ground conditions limit the bearing life of standard open bearing bits. With the help of its premium features, Avenger bits can live longer and require fewer bit changes, compared to industry standard bits, improving both customers' safety and productivity in the process.

In 2020, Terelion entered the down the hole (DTH) drilling tools market with the Warrior DTH product line. Warrior comprises both hammers and a full range of bits. Today, the offering has 4 in. through 8 in. hammers, built to be reliable workhorses – combining high performance and efficiency with a robust piston, easy to service design, and an optimised air cycle. A wide selection of bits including several face profiles and carbide shapes are offered.

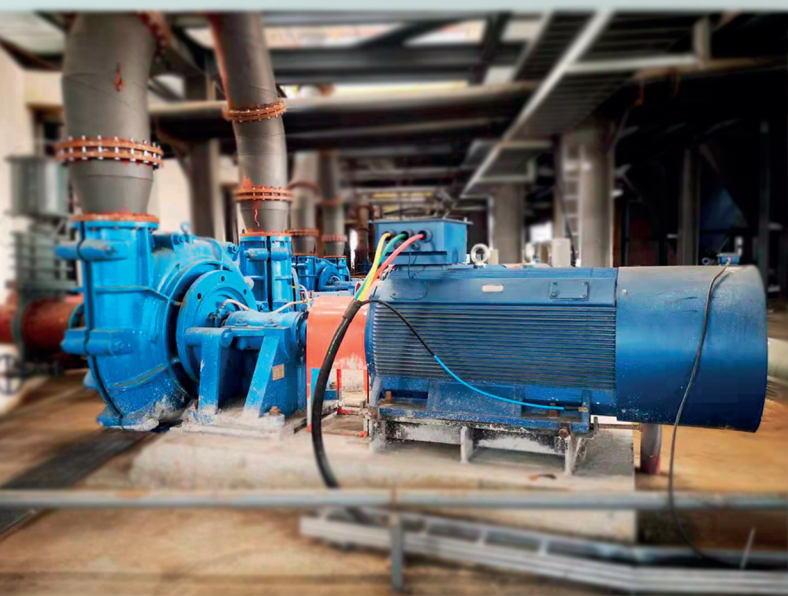


Figure 2. Warrior DTH hammer.



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APPLICATIONS

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- Dredging
- Mineral processing
- Solids handling

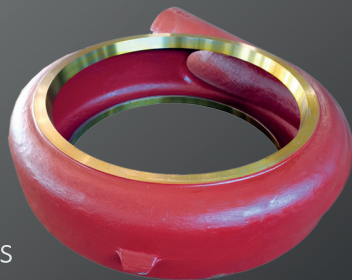
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Eastern Europe's green transition

Aidan Chivers, Fitch Solutions, UK, discusses the outlook for Eastern Europe's mining sector.



Fitch Solutions' analysis suggests that the green transition will have far-reaching impacts on the composition and dynamics of Eastern Europe's mining sector over the coming decade. While the growing importance of strong environmental credentials will have implications for all mining in the region (including gold and iron ore), the greatest changes will affect those sectors most exposed to the shift towards decarbonisation: lithium and coal.

Fitch Solutions highlights two divergent stories linked to the green transition. First, a new and globally significant lithium mining industry is set to develop in Eastern Europe, with companies looking increasingly to the region's resources as global demand accelerates. Second, and by contrast, coal will continue its long-term decline in production across most of the region, impacted by a shift in power generation sources and heightened difficulties in financing new projects. The most notable exception will be Poland, which is likely to maintain modest coal production growth.

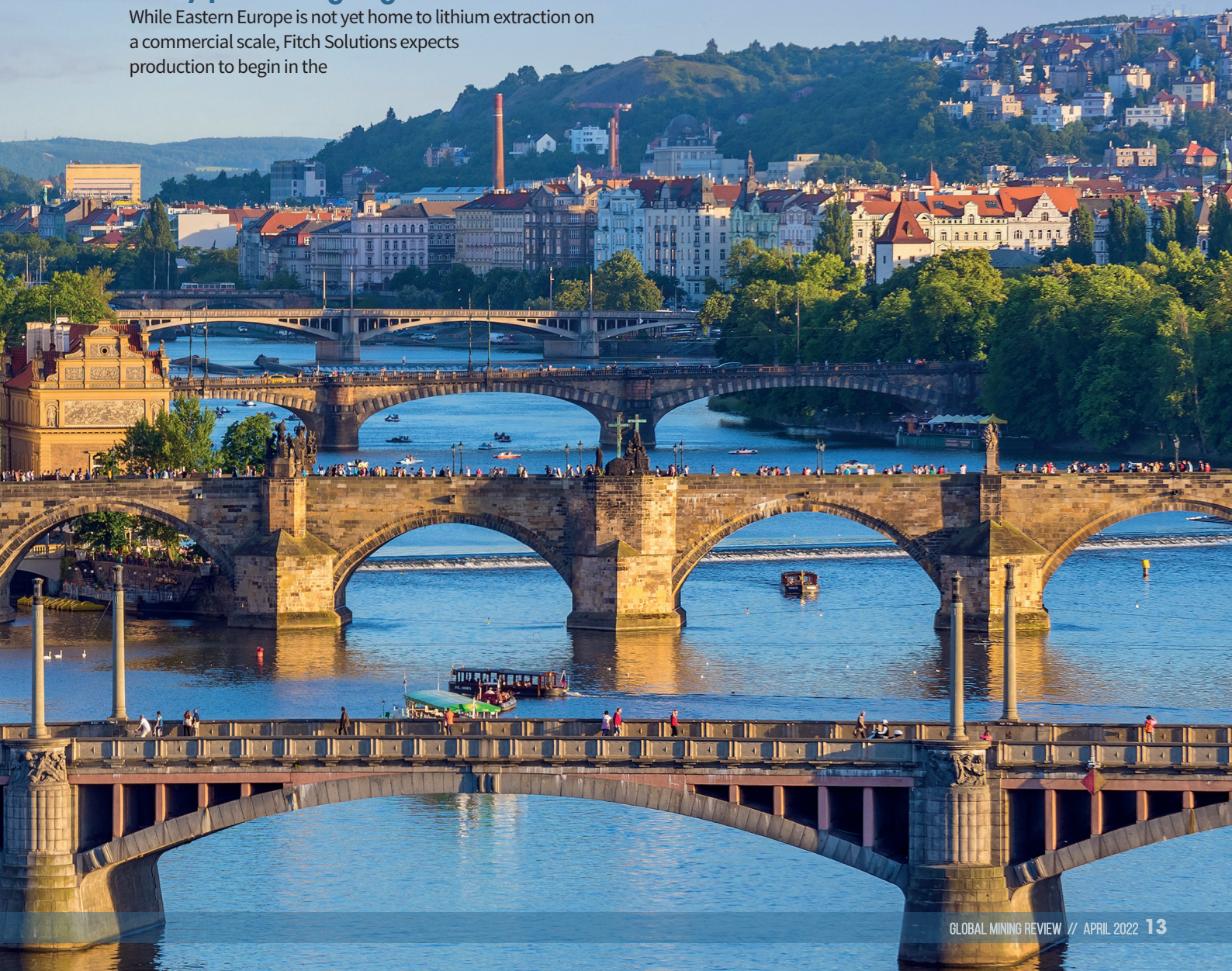
The following analysis is limited to countries located between Russia's European borders and those to the east of Germany, and draws on Fitch Solutions' long-term production and consumption forecasts. Russia is excluded from this analysis, given its scale and geographical diversity relative to the rest of Eastern Europe.

Lithium: Eastern Europe to emerge as a key producing region

While Eastern Europe is not yet home to lithium extraction on a commercial scale, Fitch Solutions expects production to begin in the

Czech Republic, and possibly in Serbia, over the next decade. Companies will look to capitalise on these countries' substantial deposits, strong anticipated demand growth from nearby electric vehicle manufacturing, and a European policy framework which will support domestic and regional lithium production. The EU aims to boost its electric vehicle (EV) supply chain to reduce greenhouse gas emissions, and is seeking ways to reduce its battery supply chain vulnerabilities. Companies will increasingly seek to establish vertically integrated operations, including lithium mine development and downstream processing, with opportunities for strong ties with battery manufacturers as Europe emerges as a new regional hub for the entire battery value chain.

A strong global price outlook will incentivise the development of upstream lithium projects. While lithium is not expected to maintain the highs of over US\$50 000/t lithium carbonate (99.5%) which were reached in 1Q22, prices are likely to trend higher than the 2021 average of US\$18 938/t, and remain well above the lows of 2H20. These sustained prices will be driven by a surge in demand from the upcoming boom in energy storage. Fitch Solutions' Autos team forecasts that annual EV sales will grow from 5.5 million units to 26.7 million units over 2021 – 2030, which would imply at least a four-fold expansion of global lithium demand over the decade. There will be strong upward pressures on prices as more EV manufacturers tie in prices in opaque offtake agreements, leading to tighter supply on the



open market. Battery manufacturing location will drive the geographical demand for lithium, and Fitch Solutions expects Eastern Europe to develop into a hub for investment in the EV supply chain. In particular, battery manufacturing capacity is likely to develop in Hungary, as well as in other new entrants such as Germany, Poland, Sweden, and the UK.

Czech Republic

The Czech Republic is home to the region's most advanced major project, European Metals' Cinovec asset. Cinovec is reportedly the world's fourth largest non-brine lithium deposit and the largest hard-rock lithium project in Europe, with indicated and inferred resources of 7.2 million t of lithium carbonate equivalent (LCE) and potential for annual output of 22 500 t of LCE over 20 years (which represents 5.2% of global output in 2020). Cinovec aims to become Europe's first vertically integrated battery metal producer by constructing a refining plant associated with the mine. With downstream chemical processing currently heavily concentrated in China, this combination of mining and refining will make it an attractive source of lithium for battery manufacturers concerned about potential geopolitical risks or supply chain issues. Fitch Solutions anticipates that commercial production will begin at the site in 2024.

Government support for lithium extraction is likely to play an important role as policymakers become increasingly concerned about future lithium supply, especially given the importance to the Czech economy of car manufacturing,

which is worth approximately 9% of the country's GDP. The Cinovec project has been supported with public funds, with Czech majority state-owned company, ČEZ, taking a 51% stake in March 2020. In July 2020, European Metals announced that it had entered into a financing agreement with EIT InnoEnergy, a company partly funded by the EU. While there are no other lithium projects in the country as advanced as Cinovec, Czech ministers have hinted at the potential for further public investments in the lithium and battery sector, and more proposals are expected to receive government support in the coming years. Beyond mining, in July 2021, the Czech government approved a state intervention package to help attract a factory for EV battery manufacturing, which may be the source of future offtake agreements and incentivise further lithium exploration and development upstream.

In the short-to-medium term, the country will benefit from the suitability of its lithium reserves for extraction through hard-rock mining. This well-established process has a lower environmental impact than the evaporation ponds currently used to extract from lithium brine deposits in Latin America and China, which have been known to put stress on local water tables. Nevertheless, as the technology for extraction from brine deposits improves, the environmental, social, and governance credentials of hard-rock lithium mining may ultimately suffer, since carbon dioxide emissions tend to be around three times higher per tonne of product than for lithium extracted from brine.

Serbia

As with the Czech Republic, Serbia's substantial lithium deposits give the country potential for the development of a lithium sector. Nevertheless, its prospects were severely hit in January 2022 when the Serbian government revoked exploration licences for the US\$2.4 billion Jadar project, wholly owned by Australian miner, Rio Tinto.

The project had been the country's most important lithium development, set for production of 58 000 tpy LCE by 2029. The revocation followed significant disruption from protests in both nearby Loznica and the capital Belgrade, related to its potential environmental and social impact, as well as a perceived lack of benefit to Serbian citizens. The extent of the demonstrations has raised questions about the future of large scale projects in the country, and Rio Tinto's sobering experience with the Jadar project will limit appetite for major investments from global mining companies.

The revocation marks a striking shift in government policy in the face of mounting public criticism. Until now, the government had offered considerable support to the project, including the signing of a memorandum of understanding in 2017, the creation of a joint working group, and even the construction of some infrastructure which would have supported operations. As pressure mounted, ministers had at different points suggested a referendum on the development, or postponing a decision until after the April 2022 elections, before deciding in effect to pull the plug on the project.

Serbia's Jadar project is unusual in that it is owned by a large, diversified mining firm. Despite some recent consolidation in the sector, globally most lithium projects are owned by junior exploration miners. Rio Tinto's financial strength may help it endure this setback, and the company

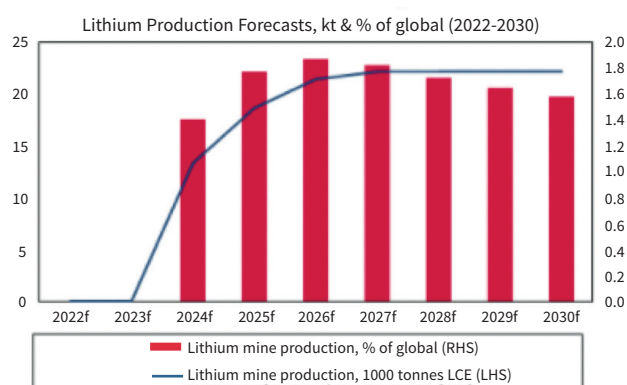


Figure 1. Czech Republic to begin production in 2024. f = forecast.

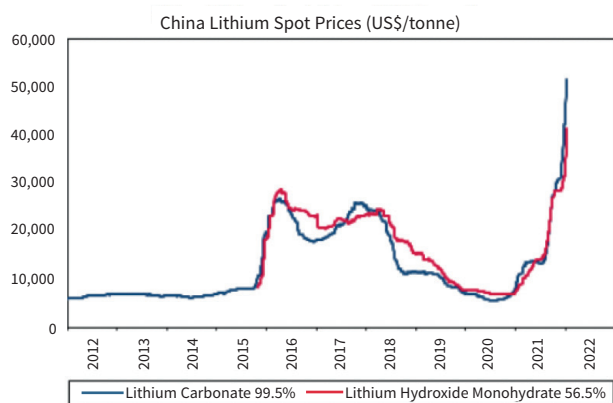


Figure 2. Sharp rise in lithium prices to incentivise investment. Source: Bloomberg, Fitch Solutions.



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is currently considering a legal challenge, amongst other options. According to a recent statement, Rio Tinto has not abandoned the project and it may seek to reduce community opposition through greater development spending in local areas.

Nevertheless, public antipathy towards the company is substantial, and environmental activists are pushing for guarantees that the project will not be relaunched. Tensions around the proposed mine have also been compounded by recent political frictions between Serbia and Australia following the deportation of Serbian tennis player Novak Djokovic, who has himself publicly opposed the mine. In addition, Rio Tinto continues to be affected by reputational damage following the destruction in 2020 of sites in Western Australia which were sacred to indigenous communities.

Despite the significant risks of community opposition in the country, Fitch Solutions does expect other mining companies to show interest in Serbia for lithium over the coming decade, given its substantial resources and the very strong demand outlook for the metal. Any new developments are, however, likely to be on a much smaller scale than Rio Tinto's plans in the Jadar valley. The size of Rio Tinto's proposed site was a major factor in the protests, with areas at risk of subsidence stretching to over 850 ha. The sector may end up dominated by much smaller projects in more remote areas. For now, though, Serbia has been removed from Fitch Solutions' lithium production forecasts, and such possible developments are left as upside risk.

Other major lithium players

Elsewhere in Europe, Germany is set to become a major lithium player. The country hosts the largest identified resources of lithium in Europe (14.4 million t LCE) and Fitch Solutions anticipates it will start production in 2024. Other smaller players include, or will include, Portugal, Spain, Finland, and Austria.

Coal mining: A sector in decline across most of Eastern Europe

Unlike the positive outlook for lithium production in the region, the coal mining sector is set for considerable decline as the pace of the green transition accelerates. Fitch Solutions expects production to fall in most countries across Eastern Europe, driven by a shift in power generation sources, growing difficulties financing fossil fuel projects, and an already thin pipeline of new projects. However, Poland will be the major outlier,

with consistent growth forecast for both thermal and metallurgical coal production over the decade.

EU environmental targets will be a major factor in the decline of Eastern European coal mining. The European Emissions Trading Scheme (ETS) has helped to drive down regional coal consumption, with the price of carbon dioxide emissions for power stations in the bloc rising from approximately €6/t in 2016 to highs of over €90/t in February 2022. In support of its emissions goals, the European Commission (EC) introduced the Just Transition Mechanism in January 2020, which will provide financial support to help coal-producing regions move away from their dependency on the sector. The EU's efforts to reduce the production of coal are not limited to member states. The EC has identified 17 regions for possible inclusion in its Initiative for Coal Regions in Transition in the Western Balkans and Ukraine, launched in December 2020 to support a 'just transition' for coal-dependent regions outside the bloc.

Rapidly increasing problems in securing financing for new coal mining operations will also hinder the sector over the coming decade. Since the beginning of the COVID-19 pandemic, there has been a sharp acceleration in the move away from the financing of coal projects, both by governments and the private sector. In particular, the COP26 conference in November 2021 saw a wide range of pledges to end financing for the fossil fuel sector. As a result, coal mining in Eastern Europe is likely to be increasingly dominated by state-owned companies, such as Societatea Națională a Lignitului Oltenia in Romania and Elektroprivreda Srbije in Serbia, as well as much smaller private companies.

The consequent decline of the sector is likely to be substantial. Fitch Solutions expects coal production to fall significantly in Romania (24% reduction in thermal coal output in 2030 compared with 2020), the Czech Republic (10.5%), and Bulgaria (9.1%). This decline is set against Fitch Solutions' expectations for a broad rise in global coal production (annual output is forecast to be 14.8% higher in 2030 than in 2020), with growth concentrated in major coal producers such as China, India, and Mongolia.

Poland

Poland is the major exception and is set to resist this overall trend, posting consistent growth over the decade. Fitch Solutions forecasts that Polish thermal coal production

Table 1. Classification of lithium sources and impact

Lithium sources/extraction technique	Stage of development	Example of countries where it is used (or will be used)	Emission of CO ₂ (kg/t of lithium hydroxide)	Use of water (m ³ /t of lithium hydroxide)	Use of land (m ² /t of lithium hydroxide)	Production cost (US\$/t of lithium hydroxide)
Hard rock mining	In use, with plenty of new projects in the pipeline	Australia, Brazil, China, Canada, Czech Republic	15 000	170	464	6855
Lithium brine deposits: continental (evaporation ponds)	In use, with some new/expansion projects in the pipeline	Argentina, Chile, China	5000	469	3124	5872
Lithium brine deposits (geothermal)	In development	Germany, UK, US	0 *	80 *	6 *	3140
Sedimentary (clay) deposits	In development	US, Serbia	n/a	n/a	n/a	n/a

Note: Example countries are not exhaustive lists. Classification has been simplified to some extent for clarity. * Data is from assessment of Vulcan Zero Carbon lithium project in Germany only. Source: Minviro Life Cycle Analysis 2020, Fitch Solutions.

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will increase by 22% to 129 million tpy by 2030, and that metallurgical coal production will grow by 53% to 17 million tpy over the same period. This anticipated growth exceeds the global production forecasts, and Fitch Solutions thus expects Poland to increase its global share of the market slightly by 2030, from 1.6% to 1.7% for thermal and from 1% to 1.4% for metallurgical coal.

A solid pipeline of new coal projects in Poland will support this growth. Fitch Solutions expects several new mines to begin operations in the coming years, including at two important assets of Australia-based Balamara Resources. Of the projects likely to progress to production in the next decade, indicated and inferred resources total over 1000 million t, giving Poland the potential for growth even in excess of these forecasts.

In the short-to-medium term, high levels of coal consumption from Poland's power generation will continue to support the mining industry. In Poland, coal represents the largest proportion of total power generation of any country in Europe, with over 70% of its electricity generation coming from coal in 2020. By 2030, however, Fitch Solutions' Power team forecasts that this figure will have fallen to 54%, a downtrend which will push a greater share of Poland's output into the export market. Destinations for Polish thermal coal are currently highly concentrated in Europe, but Fitch Solutions expects that thermal coal will follow its metallurgical counterpart in being shipped further afield as European

demand wanes. Thermal coal production is likely to be supported over the decade by exports to growing economies in Southeast Asia in particular, where electricity from coal-fired power is set to increase in the medium term.

These higher growth forecasts for metallurgical than for thermal coal are largely based on expectations of greater output at a number of mines owned by Jastrzębska Spółka Węglowa (JSW), which is primarily a producer of metallurgical coal. In 2020, JSW began exports to China and in smaller quantities to Vietnam and Malaysia, driving seaborne exports of metallurgical coke from Poland to more than 2.8 million t, a 40% y/y increase. In addition, Fitch Solutions notes strategic pivots from companies such as Balamara, in order to prioritise higher-value metallurgical coal in mines which have a range of grades of coal.

Metallurgical coal has a more positive long-term outlook than thermal, as a large share of steel's global capacity will remain reliant on it as an input in the coming years, while European countries make efforts to reduce coal's role in their energy mix.

A key issue over the coming decade will be the extent to which Polish energy and mining policy puts it at odds with European regulations and targets. An early flashpoint highlighting the potential for tensions arose in May 2021 when Poland's government defied a European Court of Justice injunction ordering the closure of a major brown coal mine in Turów, with Polish ministers citing concerns over jobs and energy security. The possibility of greater conflict between EU climate goals and Polish economic priorities poses a downside risk to Fitch Solutions' production forecasts, especially if the EC takes more robust enforcement action in support of its environmental ambitions.

Conclusion

The green transition is set to have a profound effect on the Eastern European mining sector over the coming decade, as both supply and demand dynamics are disrupted by the shift towards decarbonisation. Companies will be forced to adapt as ESG criteria become more integrated into financing and purchasing decisions. The vastly different outlooks for lithium and coal mining give some indication of the wide range in opportunities and risks prompted by these changes, but the impact will be felt across all the region's mining sectors. Close research of these trends will be integral to Fitch Solutions' analysis of the mining industry in Eastern Europe and beyond. **GMR**

Note

This article was written before the Russian invasion of Ukraine on 24 February and the start of the ongoing war. While most of the themes analysed in this article are long-term trends which Fitch Solutions still expects to play out, the region's mining sector will be subject to considerable disruption in the coming months. This is most clearly the case in Ukraine, as part of the devastation of the country's civilian and industrial infrastructure, but also across Eastern Europe, due to heightened geopolitical tensions along with elevated, and volatile, energy prices. Additionally, regional thermal coal production is likely to expand in the short term in response to these higher prices, as European power stations look to diversify from Russian natural gas.

Top European Countries - Lithium Reserves, mnt LCE

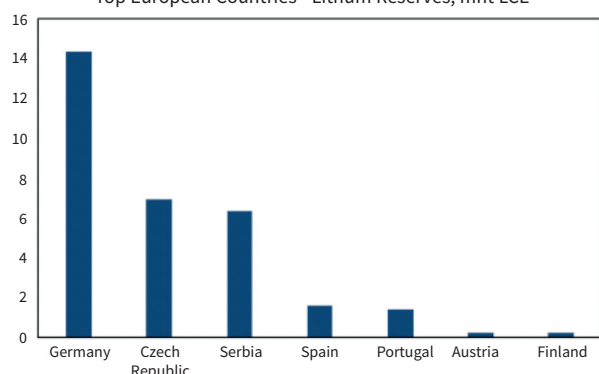


Figure 3. Substantial lithium potential in Eastern Europe. Source: USGS, Fitch Solutions.

Poland & Rest Of Eastern Europe - Coal Mine Production (2015-2030)

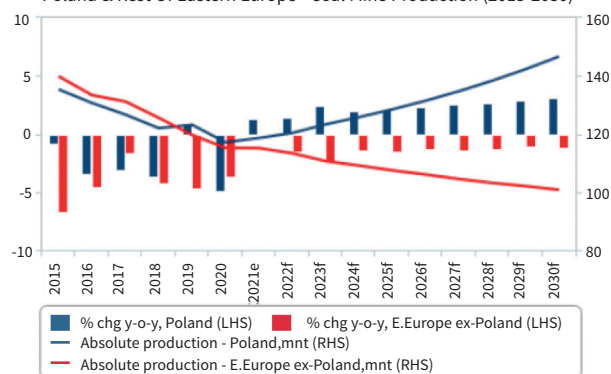


Figure 4. Poland to resist trend of regional decline. Note: Includes Ukraine, Czech Republic, Bulgaria, Romania, and Slovakia. Source: EIA, Fitch Solutions.



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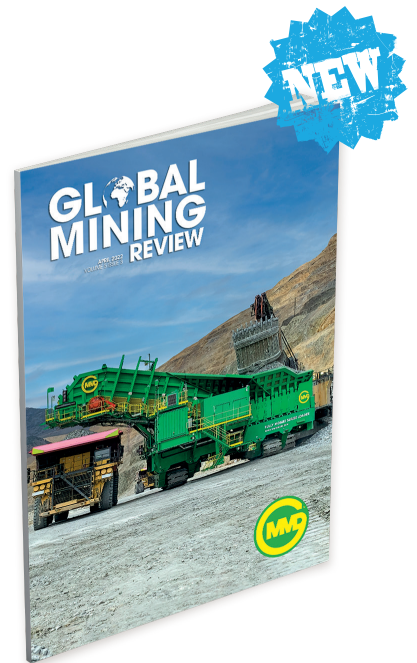
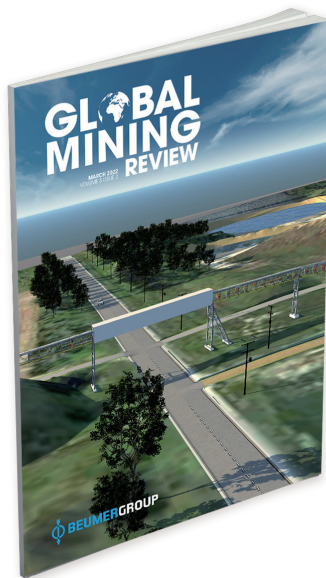
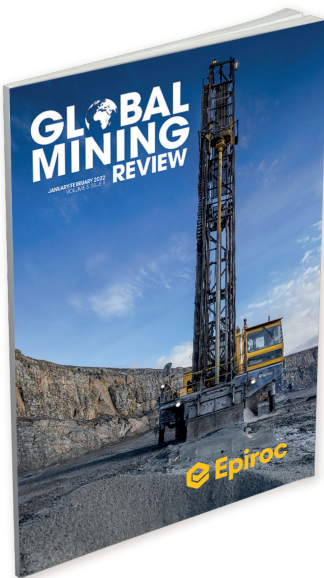
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