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GUEST COMMENT

SIMON GARDNER-BOND (CHIEF TECHNICAL OFFICER)

TECHMET

Battery electric vehicles (EVs) have recently surpassed 5% of new car sales in the US. Although meagre at first glance, the milestone is a significant threshold marking the onset of mass EV penetration. The EV market has proved remarkably resilient, despite the broader automotive sector reeling from supply chain disruptions over the past few years.

The widespread adoption of EVs and battery storage systems is paving the way for what TechMet believes will be a new phase of commodity pricing that will continue to separate certain commodities from the rest of the pack. These technology metals have been the best performers of the last five years, and TechMet expects them to continue to outperform the larger commodity complex for the foreseeable future.

Despite this bullish potential, key challenges continue to plague prospects for the energy transition – although some, TechMet believes, should be viewed in a more opportunistic light.

A common misconception is that there will be a technology that is even better than lithium-ion batteries which will emerge as the true winner to provide clean power and mobility solutions. TechMet believes that the chances of this are slim.

The automotive world has essentially chosen its pony and funded it to the tune of over half a trillion dollars (and counting). A completely new technology that is not part of the Li-ion battery ecosystem would have to be not just marginally better, but superior by many factors (i.e. safer, cheaper, using more abundant materials, etc.) to convince automotive OEMs that they should write off their now significant Li-ion investments.

Instead, there will likely be multiple 'winners' employing numerous variations on a theme around Li-ion batteries. Solid state, silicon anodes, flow batteries – these all have their place in the new world of clean energy, and all present their own investment opportunities.

Rather than be fearful of new, less metals-intensive technologies, TechMet is hopeful for their success to ensure that EV adoption maintains its S-curve trajectory.

The current supply outlook from operating mines and viable development projects in most cases is insufficient to meet the consensus metals demand from Li-ion batteries. Further improvements in battery technologies are therefore needed, in order to avoid stalling the energy transition wave.

The mining sector has not escaped the effects of inflation this year. There has been a significant rise in ongoing operating costs and most noticeably the capital costs to expand and build new mines and processing facilities. In effect, this raises the 'base' of the price forecast, such that TechMet does not expect to see prices retreating to their previous trough levels again.

The increased cost of construction and producing these metals means supply curtailments will occur at elevated price levels, and historically high prices will be required for long periods to justify investment in new supply.

This is not to say that the path to sustained higher prices will be a smooth one. TechMet expects greater volatility in a number of these commodities, in part driven by the fact that they are often not easily stored and therefore a stockpile repository is almost impossible. Without the ability to establish an 'LME warehouse equivalent', TechMet expects spot prices to react much more violently to short-term supply-demand dislocations. GMR

MANAGING EDITOR
James Little
james.little@globalminingreview.com

SENIOR EDITOR
Callum O'Reilly
callum.oreilly@globalminingreview.com

EDITOR
Will Owen
will.owen@globalminingreview.com

ASSISTANT EDITOR
Jessica Casey
jessica.casey@globalminingreview.com

SALES DIRECTOR
Rod Hardy
rod.hardy@globalminingreview.com

SALES MANAGER
Ryan Freeman
ryan.freeman@globalminingreview.com

PRODUCTION MANAGER
Kyla Waller
kyla.waller@globalminingreview.com

ADMINISTRATION MANAGER
Laura White
laura.white@globalminingreview.com

EVENTS MANAGER
Louise Cameron
louise.cameron@globalminingreview.com

EVENTS COORDINATOR
Stirling Viljoen
stirling.viljoen@globalminingreview.com

DIGITAL ADMINISTRATOR
Leah Jones
leah.jones@globalminingreview.com

VIDEO CONTENT ASSISTANT
Molly Bryant
molly.bryant@globalminingreview.com

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WORLD NEWS

AUSTRALIA Lynas announces Mt Weld rare earths mine expansion

Lynas Rare Earths Ltd has announced an approximately US$500 million project to expand capacity at the Mt Weld mine and concentration plant, in order to meet accelerating market demand for rare earth materials.

Global demand for rare earth materials and neodymium magnets (NdFeB) continues to accelerate. NdFeB demand is forecast to grow from 130 000 t of NdFeB consumed in 2020 to 265 000 t in 2030, driven by growth in electric vehicles and wind energy.

The Lynas 2025 growth plan (announced 21 May 2019) targeted a 50% increase in neodymium-praseodymium (NdPr) production to 10 500 tpy by 2025, including significant development of the Mt Weld ore body and beneficiation circuit. To meet Lynas' ambition to grow with the market, this previously announced growth plan must be accelerated and increased.

Investment in capacity expansion will be required at every production stage. This starts with increasing feedstock availability, which Lynas is implementing with this project, to substantially expand Mt Weld's feedstock capacity, which builds on the previously announced Lynas 2025 growth plan for Mt Weld. The Mt Weld expansion will target feedstock production capacity of 12 000 tpy NdPr-e in 2024. Further capacity expansion in existing upstream and downstream production, together with growth options for 2025 and beyond, are being developed. This includes two additional stages at Mt Weld, which offer a pathway to an additional 2400 tpy NdPr-e each.

The Mt Weld mine is a high grade long life resource. The significant potential for further development of the ore body was demonstrated by the 1 km deep exploration drill hole completed in 2021, which displayed continuous rare earth mineralisation.

The initial expansion to 12 000 tpy NdPr-e has been fully scoped and the approximately US$500 million investment for this stage of the project is fully funded from cash flow. This project is based on known technology. It includes upscaled processing equipment, efficiency improvements, enhanced sustainability, and will provide a platform for further capacity increases.

BRAZIL Horizonte awards Copa industrial civil works contract at Araguaia Nickel Project

Horizonte Minerals Plc, a nickel development company with assets in Brazil, has awarded the industrial civil works contract for the construction of its 100%-owned Araguaia Nickel Project to Companhia Paranaense de Construção S.A. (Copa).

Copa is a leading Brazilian construction company with extensive experience in mining projects and civil infrastructure. It was also awarded the earthworks services contract at the project earlier this year. Copa has demonstrated a safe and reliable operating performance at the project to date, with a track record of creating employment opportunities for local community members. All its contracted services have been delivered ahead of schedule. Copa's track record is complemented by its extensive experience in delivering civil construction projects for several large mining and industrial clients across Brazil. These projects range from roads, viaducts, hydro-electric power plants, ports, dams, and industrial plants. In total, the company has installed a portfolio of more than 2.5 billion m^3 of concrete throughout Brazil, and all with the requisite quality management certification.

The award of the industrial civil works contract is another important step in the construction of Araguaia. The scope of the contract incorporates the supply and installation of the process plant foundations and related civil works for the supporting infrastructure. The contract scope has been designed to leverage Copa's reduced mobilisation requirements and familiarity with the project. This will assist to accelerate the installation of the foundations for the furnace, allowing commencement of furnace shell installation during 4Q22.

The civils package will also see Copa undertaking the installation of all engineered and concrete structures for the processing facility, including piling, structural foundations, concrete slabs, and bolted connections to enable process equipment to be directly installed. A full progress update on Araguaia will be provided in September 2022.

WORLD NEWS

DIARY DATES

Mines & Money Connect
30 August – 01 September 2022
Online
https://minesandmoney.com/online

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

International Fair EXPO KATOWICE 2022
06 – 09 September 2022
Katowice, Poland
www.expo-katowice.com

Mining Indonesia
14 – 17 September 2022
Jakarta, Indonesia
www.mining-indonesia.com

Discoveries 2022 Mining Conference
04 – 06 October 2022
Hermosillo, Mexico
www.discoveriesconference.com

China Mining Expo 2022
18 – 21 October
Xi'an, China
www.chinaminingexpo.com

International Mining and Resources Conference (IMARC) 2022
02 – 04 November
Sydney, Australia
www.imarcglobal.com

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

To stay informed about upcoming industry events, visit Global Mining Review's events page: www.globalminingreview.com/events

AUSTRALIA Alkemy to build Australia's first lithium sulfate plant at Port Hedland

Alkemy Capital Investments plc has announced that it is set to build a lithium sulfate (LSM) plant at Port Hedland, Australia's largest export port located in the Pilbara region of Western Australia, to feed the Tees Valley Lithium Ltd (TVL) lithium hydroxide plant at the Wilton International Chemicals Park, Teesside, UK.

Train 1 of the Port Hedland LSM plant is set to process spodumene from Australian lithium miners to produce 40 000 tpy of primary LSM, with Trains 2 – 4 adding a further 120 000 tpy primary LSM production in future expansions.

The Port Hedland LSM plant, together with TVL's planned LHM processing facility at the Wilton International Chemicals Park in Teesside, UK, will deliver a low carbon, de-risked lithium supply chain between Western Australian spodumene producers and the burgeoning European lithium battery cell market.

Construction of Train 1 of TVL's LHM processing facility at the Wilton International Chemicals Park in Teesside, UK, the first of four trains planned for the site, is due to commence at the end of this year.

SOUTH AFRICA Rajant deploys BreadCrumb Peregrine with Anglo American

Rajant Corp. has reported the first deployment of its fourth-generation BreadCrumb® Peregrine in South Africa with Anglo American.

After successful implementation, Anglo American confirmed a notable increase in capacity of the Rajant Peregrine within its pit network, which enabled the company to become more innovative by introducing technologies in areas of its operation where it was previously impossible. This has allowed the mine to scale the overall network with the operation's demands quickly, bringing much higher bandwidth closer within areas of its pit production environment.

The Peregrine is Rajant's fourth generation Kinetic Mesh BreadCrumb, which supports a maximum combined data rate of 2.3 Gbps and up to 6x enhanced throughput performance over existing Rajant BreadCrumbs. It offers multiple MIMO radio interfaces, high throughput and enhanced security performance, with up to 256-QAM and 80 MHz channels. The Peregrine is part of Rajant's initiative to develop deeply integrated solutions that securely combine data from connected people, vehicles, machines, and sensors with machine learning.

This data combination unlocks the benefits of process optimisation, digital twins, predictive analytics, condition-based maintenance, augmented reality and virtual reality, while improving worker safety. The Peregrine is interoperable with all BreadCrumb radio nodes to expand market capabilities for industries like mining, rail, shipping ports, public safety, agriculture, and heavy construction. It is fortified with rugged, environmentally sealed enclosures and supports several robust cryptographic options for data and MAC-address encryption and per-hop, per-packet authentication. Scalable to hundreds of mobile, high-bandwidth nodes, the Peregrine enables data, voice, and video applications.

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WORLD NEWS

CANADA Maple Gold mobilises second drill rig at Joutel Project

Maple Gold Mines Ltd has to reported the mobilisation of a second drill rig (while the first drill rig continues Phase II drilling at the 100%-controlled Eagle Project) to commence a 6000 m deep drilling programme at the Joutel Project in Quebec, Canada, held by a 50/50 joint venture (JV) between the company and Agnico Eagle Mines Ltd. This deep drilling programme is expected to include three drill holes in the Telbel mine area beneath and adjacent to the historical underground mine workings, which extend to roughly 1200 m below surface. Past gold production at Telbel focused on a single zone between 500 – 1050 m; however, data digitisation and 3D modelling have identified significant gold intercepts up to approximately 1400 m below surface that remain open for follow-up exploration.

Deep drilling at Telbel will be funded as part of a previously announced CAN$4.8 million supplemental Year Two JV exploration budget. To control potential drillhole deviation, Aziwell Canada Inc. has been contracted to provide directional drilling support on an as-needed basis during the Telbel deep drilling programme.

AUSTRALIA Micromine signs software solution agreement with AngloGold Ashanti

Micromine has entered into a three-year software agreement with AngloGold Ashanti to deliver its mine control and fleet management solution: Micromine Pitram.

Micromine Pitram will be implemented at AngloGold Ashanti's Australian operations, Sunrise Dam and Tropicana, both located in Western Australia's north-eastern goldfields.

Micromine Pitram will help the operations personnel to capture, manage, and optimise its activities by obtaining core operational asset data, such as: equipment, materials, and locations.

The open and scalable technology provides flexibility to incorporate equipment, systems, locations, and network assets as needed. Micromine Pitram provides stakeholders at every level with greater visibility, control, and understanding of operational activities.

As per the agreement, Micromine Pitram will be deployed at Sunrise Dam and Tropicana in August 2022.

RUSSIA Udokan Copper to cut carbon intensity by up to 75% by 2035

Udokan Copper, the developer of Russia's largest new deposit, has outlined scenarios to cut the carbon intensity of its copper production up to 75% by 2035, bringing the company closer to its ultimate goal of climate neutrality in the long run.

The company has published its sustainability report for 2021, which outlines results in terms of the environment, as well as social and corporate governance.

Udokan Copper develops and implements programmes aimed at reducing energy consumption and environmental impact as it prepares for the production launch. The company's plan to decrease carbon emissions involves the possibility of purchasing low-emissions electricity from power sources such as hydro, wind and solar, as well as consider its own power generation from renewable sources. It will also study opportunities to switch from coal to less carbon-intensive fuels for heat generation as well as electrification of its mining fleet.

The company's ongoing mission is to produce copper as the key metal for building a secure and tech-based future, while taking care of its employees and minimising its impact on the environment. Udokan Copper's key priorities are to complete its mining and metallurgical plant on time and within budget and to build a reputation as a responsible producer.

In 2021, Udokan Copper invested US$11.5 million in environmental measures and social programmes, as the company prepared to start production at the copper deposit. Udokan Copper had zero fatalities over the period from 2019 to 2021, while the number of total recordable incidents fell to 14 in 2021 from 23 in 2020, helped by measures introduced by the company, such as employee incentives for safe working conditions and staff safety training.

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GLOBAL CHALLENGES AND THE HOPE FOR A SUSTAINABLE FUTURE

Benedikt Sobotka, Eurasian Resources Group and the Global Battery Alliance, Luxembourg, considers how the commodities sector can adapt responsibly and sustainably to the challenges facing key mineral supply chains.

The world is changing, and the commodity sector is arguably undergoing its largest transformation in years, driven by the energy transition. While some new factors, such as supply chain issues, have been caused by recent events in Ukraine, others, such as the sources of supply or the definition of strategic materials, are fundamental.

This is the new reality and all commodity producers around the world are adjusting to it. Producers can no longer pick the best customer, the most profitable route, or the cheapest available material. Yet, it can be argued that this is the cost of improved long-term sustainability and the impact of global geopolitical uncertainty commodity producers have to adapt to. With the effects brought on by the COVID-19 pandemic, which have been exacerbated by the conflict in Ukraine, one thing is clear: the end of the era of cheap raw materials is being witnessed.

A new era for commodities

International sanctions have contributed to an unprecedented price surge of many raw materials. The prices of wheat, fertilizers, crude oil, natural gas and certain metals, including aluminium and copper, have all reached new highs since the start of 2022. Future larger price volatility is inevitable: many commodities with greater exposure to the crisis are vulnerable to acute shortages and could yet hit new records.

The fading pandemic and the tightening US monetary policy both still have the potential to deliver economic setbacks. However, persistent supply chain challenges, a changing inflation landscape and the energy transition should, overall, create a demand-driven environment for industrial commodities, including battery metals. Logistical costs are also soaring, as many companies are re-routing their cargoes. Midstream and downstream producers have also been impacted. Ukraine, for example, was a sizeable automotive parts supplier, home to more than 20 global automotive companies and more than 30 automotive plants.

The stage is set for cobalt to climb to new highs, as well. Cobalt's 120% price surge through the course of 2021 shows that the market is severely short of the metal, which is so important to long-term global energy plans. Furthermore, there are no signs of any fundamental easing, with prices remaining on an upward trajectory.

Stepping back from material prices, the industry is also at the dawn of a new era in terms of sustainability. Urgent action must be taken to prevent catastrophic climate change, a fact that is now understood across: industries, populations, continents, and demographics. Governments, businesses, non-governmental organisations (NGOs), and citizens around the world are grappling to find ways to ensure that global temperatures do not rise more than 1.5˚C. Yet, if it is to be successful, the integration of sustainable long-term and short-term energy storage solutions into the energy system will be crucial. Energy storage may seem at first glance highly specific, but it is in fact the dynamo that powers the world. Long-term energy storage powers cities and economies, while short-term energy storage provides a guide across the planet and makes every aspect of daily life possible, from computers to cars to the phones in people's hands.

Putting batteries in focus

Much and more has been written about the shift away from unsustainable long-term energy generators and storage; talk of flexible grids powered by wind, solar power, and nuclear power is now de rigueur. The same urgent thought must be given to the key technology of short-term energy storage: the battery. Batteries have the single-handed potential to significantly reduce global carbon emissions. According to a 2019 study by the Global Battery Alliance (GBA), batteries have the potential to enable 30% of the required reductions in carbon emissions in the transport and power sectors by 2030.

Concurrently, the pace of electric vehicle (EV) adoption also shows few signs of losing momentum against the backdrop of the global transition to a greener future. There is a strong case to be made that future EV sales will continue to smash analysts' expectations, empowered by governments' ambitious adoption goals and manufacturers' aggressive sales targets. Making the production of batteries sustainable and scaleable is of particular importance to the EV sector, which is projected to see 120 million vehicles on the road by 2030, according to the Internation Energy Administration (IEA) – EV demand is expected to grow by over 20 – 25 times, according to the IEA's Sustainable Development Scenario. EV sales market penetration should exceed 50% by 2030, above most analysts' expectations of around 30%. This will be driven by governments' ambitious adoption goals and manufacturers' sales targets.

Two concurrent trends emerge from this analysis. First, global trials and tribulations – from the hostilities in Ukraine to the pandemic, to global economic shocks, to scarcity – have created new and unique trends in the supply side for many raw materials. Second, the need, and thus the demand, for sustainable technologies are growing at feverish pace, backed by the knowledge that there is, in the long term, no other option but to embrace these technologies. And so, it quickly becomes clear that there is on the near horizon a fundamental inflection point, both for the industry and for the world.

In fact, batteries could enable nearly a third of the required reductions in carbon emissions in the transport and power sectors, create 10 million sustainable jobs, and provide access to electricity for 600 million people that currently lack access. While this presents an incredible opportunity for the mining and metals industry, with metals such as cobalt and copper forming key components of the lithium-ion batteries in EVs, it must be careful that the sustainability of the sector does not suffer as a result. Shortages of palladium and platinum, in conjunction with high oil prices and energy security concerns in the West, are likely to accelerate the pace of EV adoption, with governments likely to roll out additional incentives for EV buyers, in order to reduce their exposure to Russian oil supplies.

Managing ESG risks

All the while, the production of a rechargeable EV battery poses significant social and environmental risks. At every stage of the process, right the way from the mine to the electric vehicle, issues such as child labour, poor working conditions, and carbon dioxide (CO_2) emissions can significantly impact the overall sustainability of the product.

One of the major difficulties with reducing the environment, social, and governance (ESG) impact of the battery supply chain is a lack of a standardised global reporting framework that covers the entire chain. Without establishing harmonised principles for digital traceability, access and transparency, companies and nations cannot be easily held accountable for their actions, nor can the sustainability of the final product cannot be guaranteed to the end consumer.

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Another difficulty is the significant pressure placed on certain supply chains, leading to higher prices and a shortage of materials. The fact that developing new projects entails a long lead time, and that many untapped mineral deposits are in underdeveloped locations with higher risk profiles, is a challenge for both the supply chain and for customers.

It has the potential for becoming a vicious cycle as well. If a supply chain is pushed too hard, ESG compliance problems will arise – for example, child labour issues associated with cobalt production – because operators start to scale up production too quickly and subsequently stretch the rule book too far. It is very important that the industry takes steps to make sure that this does not happen.

The case for clean cobalt

This brings the discussion back to cobalt. Cobalt is essential for electrification, used in lithium-ion batteries powering EVs and electronic devices. Copper and cobalt are set to experience tighter fundamentals as a result of the conflict in Ukraine, which has undoubtedly added to pre-existing supply pressures in both markets. Other factors supporting cobalt demand include increasing demand for mobile electronics, e-mobility, battery energy storage systems, and other end-use sections. Additionally, demand from traditional cobalt end-use sectors is expected to increase this year, driven by recovery of aerospace sector. In short, cobalt supply will not keep up with demand, given that the development of mining projects takes 10 – 15 years on average. On the other hand, battery production capacity is set to quadruple between 2020 and 2025, according to Benchmark Mineral Intelligence (BMI).

Meanwhile, according to the Cobalt Institute, almost 70% of the world's cobalt is currently produced in the Democratic Republic of the Congo (DRC), a country where artisanal and small scale mining is often linked to child labour; thus, the increased demand, funnelled through political and social urgency, makes the situation all the more finely balanced. Eliminating these issues and creating a long-term, sustainable value chain is essential if the mining industry and its down-stream products, such as batteries, want to be a major part of the solution to climate change.

So, how does the industry achieve that which is a necessary shift and a long-term solution, when there are serious short-term and systemic roadblocks in the path? The solution is cross-organisational frameworks and collaboration. Long strides towards this goal have already been taken. Mitigating these risks is the primary objective of the GBA, which brings together leading international organisations, NGOs, industry actors, academics, and governments to drive systemic change along the entire value chain. It now comprises more than 100 members, including BASF, Tesla, UNICEF, the OECD, and Eurasian Resources Group. If scaled up in a responsible manner, the battery value chain can not only support the fight against climate change, but also create new, safe jobs; add economic value; and safeguard human rights in line with the UN Sustainable Development Goals. For instance, at the GBA, public and private organisations are working together to create a 'Battery Passport' that will act as a quality seal for the industry and increase transparency across the supply chain. The GBA also recently partnered with a German consortium to launch a 'Battery Pass', which will provide a solution for securely sharing information and data across the battery value chain, laying the foundations for a new generation of sustainable batteries in Europe.

Cross-organisational initiatives, such as the GBA's recent Cobalt Action Partnership, are key to joined-up communications and operations across sectors and geographies. The Cobalt Action Partnership conducted activities to mitigate these risks, including through engaging with international stakeholders on responsible cobalt production practices, identifying best practices within artisinal and small scale mining supply chains that could be replicated and scaled, and leveraging funds to address the root causes of child labour and forced labour. The partnership focused on driving investment and engagement toward on-the-ground projects, and facilitated multi-stakeholder dialogue for sharing, learning, and collaboration.

Conclusion

Throughout the entire lifecycle of these products – from raw battery materials, like cobalt and lithium; to production processes, like mass-manufacturing of batteries; to sale and use, such as in electric vehicles – these supply chains have the potential for both harm and good. The battery's value chain is the exemplar of this in microcosm. This includes improving the end-use of batteries by promoting circular design improvements, encouraging the harmonisation of national and international rules to improve lifecycle management, and ensuring stronger market incentives toward circularity.

And policy makers have their role to play, as well. Their role must be to recognise, encourage, and reward compliance with global production standards. All metals need to be established as 'critical' and sustainable mining practices, remining requirements, and land restoration requirements all need to be put in place. Especially given previous scepticism from the public about mining practices, there must be a real focus on rigorous environmental performance requirements, sustainable and ethical production, monitoring of those requirements, and the availability of financial resources to address the impacts of mining and to ensure the recovery of materials during mineral extraction.

These initiatives will take time, effort, patience, and drive. Yet the rewards are vast – and more than vast, they are necessary. Amongst their ranks must be included such concepts as a fairer world, a liveable world, a sustainable economy, a healthy planet, and a just international system. These are worth striving for – in both the mining industry and the world in general. GMR

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