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Mining in Western Australia

Green Shoots of Recovery Visible in the Outback

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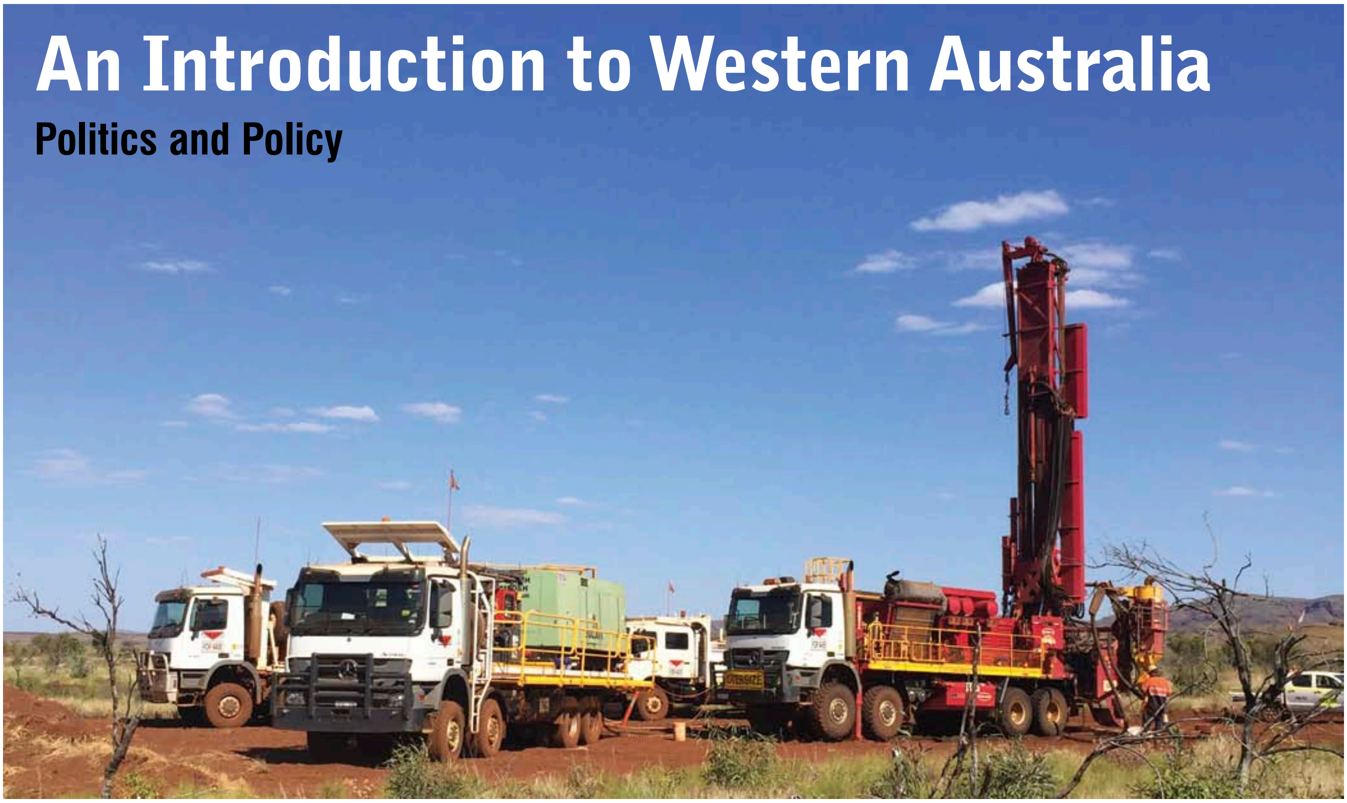
An Introduction to Western Australia

Politics and Policy



Reverse circulation drilling for iron ore in the Pilbara region. Photo courtesy of Foraco.

The low commodity prices of the past five years have contributed to Western Australia's (WA) total public sector debt reaching almost A$40 billion. This years state election, held in March, saw WA put the Australian Labor Party back at the helm of the state parliament for the first time in nearly a decade. Given that the region's economic health is intimately tied to the state of the mining sector, the industry will undoubtedly play a significant role in the government's strategy to tackle this challenging fiscal environment. A controversial mining tax proposal sparked unease in the industry during the election, and Reg Howard-Smith, chief executive of the Chamber of Minerals and Energy of Western Australia (CME), explained that the tax had raised concerns both nationally and internationally. "We are regarded as a low-risk location when it comes to the protection of investment funds, but if we make a unilateral change, which is not by agreement, this creates a major issue within the sector," he said.

The CME led an aggressive A$2 million media campaign countering the proposal that seems to have resonated with the electorate, and the newly-elected Labor leadership has indicated that it will not consider implementing the tax. Instead, the new Minister for Mines and Petroleum, Hon Bill Johnston MLA, reassured that job creation will be a key objective by supporting a strong investment environment for the mining sector. "WA is a well-established investment destination, so we are looking to strengthen the approvals procedures," he said.

The Fraser Institute's annual assessment of 104 mining districts around the world consistently ranks WA as a top destination and the state took third in the 2016 survey after Saskatchewan and Manitoba, respectively. In comparison to other Australian states and territories, WA's permitting and environmental approvals processes continually garner praise from the industry. Weighing his experiences operating in Australia and other stable jurisdictions worldwide, Mark Bennett, CEO at S2 Resources, commended the efficiency of the WA government. "As a mining state, the government apparatus and all its agencies truly understand what needs to be done in the permitting process," he said.

Reg Howard-Smith, chief executive, The Chamber of Minerals and Energy of Western Australia (CME).

With a recent change of government and a new mining minister, WA holds a slight level of uncertainty, and the state was undoubtedly shaken by the global mining downturn of the past years. Nonetheless, new investments are re-appearing and a general shift towards equilibrium can be felt as new projects across a diverse range of commodities begin to emerge and the services sector prepares to meet growing demand. In particular, the global interest in new commodities, such as lithium, graphite and cobalt, has taken hold in WA as it positions itself to become a leader that will serve the advent of the lithium battery. As a hub of global innovation, big data has begun to play a serious role in adding value to WA operations, and always ready to face new challenges, WA companies are continuing a long tradition of exploring new frontiers, largely within the African continent. With a solid regulatory framework, strong infrastructure and highly trained professionals, WA remains a great place to invest in for the mining sector.

Creating a leading diversified mining company

Diversified Production

TROPICANA (Gold)
Nova (Nickel - Copper - Cobalt)
LONG (Nickel)
JAGUAR (Zinc - Copper)

Empowering People

Unlocking Value

An Australian $1 coin gives reference to the free gold recovered from a bulk sample from the Beatons Creek trial pit, 2016. Photo courtesy of Novo Resources.

After the discovery of the Nova nickel-deposit by Sirius Resources, now S2 Resources as of late 2015, the junior segment is endeavoring to discover WA's next Tier 1 deposit. Though most of the state's focus is placed on brownfield operations, vast areas remain unexplored. The global mining downturn of recent years crippled the capacity of the industry to conduct critical greenfield exploration by injuring the junior sector's ability to raise capital. Jeff Elliott, MD of CSA Global, explained the adverse relationship between equity markets and greenfield projects. "Retail and institutional investors are not rewarding companies for taking long-term risks because they want to see near-term cash flow," he said.

However, investment in majors and producers has begun to trickle down to explorers as an appetite for some level of risk gradually returns. Liam Twigger, CEO at PCF Capital Group, explained that juniors with a defined resource are gaining greater levels of interest in the marketplace. "Being able to demonstrate a clear pathway to production and cash flow will gain the support of the financiers," he said.

Financial entities are on the lookout for projects that have strong assets and display resilience to commodity price fluctuations. It is their recommended strategy to become involved with companies at a DFS stage in order to understand capital requirements and create adequate funding structures.

"The importance of the commercial structure to the financing highlights the need for clients to engage with potential financiers at an early stage to ensure that commercial agreements and technical studies will ultimately meet bankability standards," said Grant Willis, MD at Commonwealth Bank and global head of natural resources.

The WA state government supports greenfield mineral exploration through an initiative of the Department of Mines and Petroleum (DMP) whereby companies may apply to be refunded up to 50% of eligible drilling expenditures. Many investors have also benefited from an Exploration Development Incentive (EDI), which is a tax offset credit made available by the WA government. "The three year allocation to the EDI is A$100m, which represents about A$300 million worth of exploration expenditure and could generate about A$1 billion in economic activity," said Graham Short, national policy manager at the Association of Mining and Exploration Companies (AMEC).

In pursuing a calculable resource, WA has diverging perspectives on what makes a successful exploration strategy. Paul Poli, MD of Matsa Resources, explained the advantage of diversification both geographically speaking and across commodities. "Looking at iron ore versus gold for example, when the economy is doing poorly, gold performs well. When the economy is healthy, iron ore is strong. Having projects at each end of the spectrum means you will always have something of interest," he said.

Middle Island Resources has taken a multifaceted approach that involves systematically acquiring both greenfield and brownfield targets to expand the tenement portfolio of its Sandstone project in WA. "Middle Island Resources owns the only processing plant in the area for 150km and, by virtue of this, there are a number of stranded deposits owned by third parties that we are approaching regarding possible toll milling or production sharing arrangements," elaborated MD Rick Yeates.

Rob Tyson, MD of Peel Mining, has opted for a hybrid approach by consolidating its operations in the Cobar Superbasin, but pursuing multiple commodities. "Our strategy is about building multiple deposits in one jurisdiction to have multiple assets to de-risk us as a company," he said. "If we have multiple assets across multiple commodities, it gives us flexibility and optionality in potential future developments."

The opportunity for partnerships between junior explorers and majors represents another critical path towards assisting discovery. "Newmont invested in the company in September 2013 to become our largest shareholder and currently hold just under 20%" said Dr. Quinton Hennigh, CEO and director of Novo Resources, whose Beaton Creek gold project is slated to generate A$50 million per year. "Through that share purchase, warrants were exercised which brought in more capital that allowed us to continue work through late 2015," he explained.

The cyclical nature of the commodity marketplace has taken its toll on the WA junior sector, which has seen sluggish investment in recent years that has translated to a hiatus in new projects in the region. The industry's survival will inevitably depend on these smaller companies obtaining the necessary capital to conduct indispensable greenfield exploration. However, as green shoots begin to appear in the market, the storied risk-taking spirit of the Australian psyche will undoubtedly recover as well.

Gold

Back in fashion

West Australian sunset and the headframe at IGO's Long Nickel mine. Photo courtesy of IGO.

Resurgence of the price of gold has prompted confidence in the investment opportunities afforded by several projects across WA. The stability of the jurisdiction aids in de-risking WA projects in comparison to other similarly prospective regions such as West Africa. As a result, a reinvigorated push towards greenfield exploration of gold in WA can be discerned by a 14.6% (A$23.2 million) increase in expenditure on drilling during the December 2016 quarter. Bruno Seneque, MD of Tyranna Resources, described how the impact of rising gold prices has translated to opportunities for explorers: "We can see that now it is gold's time to stabilize, produce profitable returns, and attract investors. Importantly, we are starting to see investment interest trickle down from the producers to the explorers."

Larger producers are implementing programs to enhance the value of existing operations. The Tropicana gold mine, owned 70% by AngloGold Ashanti and 30% by IGO, had an initial nameplate capacity of 5.8 million metric tons per annum (mt/y). However, by investing incremental capital into the processing plant and demonstrating that the reserves continue below the existing resource through a drilling campaign, Peter Bradford, MD and CEO at IGO, explained that the project is now running at a rate of 7.5 million mt/y. Dialing up the exploration expenditure in the region represents the company's next objective. "Given that Tropicana represents a new type of gold mineralization in Australia in an unexplored belt, there is significant opportunity to find either the next Tropicana or satellite deposits that can feed into the centralized processing facility," he said.

Many of WA's largest gold production sites sit within under-explored or greenfield belts, providing efficient exploration opportunities through the consolidation of land holdings and joint ventures. The Gruyere gold project, the largest undeveloped gold deposit in Australia with 6.2 million ounces, sits in one such belt. Gold Road Resources sold 50% of the Gruyere asset to Gold Fields in November 2016, and now boasts Australia's largest greenfield exploration budget in 2017, including A$22 million of their own capital and a total spend of A$30 million with contributions from JV partners. Gold Fields intends to geographically concentrate its exploration around the initial discovery of the high-grade system at Central Bore. The company's MD and CEO, Ian Murray, explained the advantage of taking this approach: "We hold 5,000 km^2 of tenements, so the most cost-efficient exploration we can do is on the Yamarna Belt where we also have the best geological knowledge."

While the sustainability of current rates is debatable, many in the industry maintain that fundamental demand for gold remains strong. Mike Dunbar, MD at Gascoyne Resources, outlined why now is an especially exciting time for gold projects: "Five years ago, Australia was seen as a high operating cost destination yet the country has completely turned around. We are now a lower-cost jurisdiction than most and I would go as far as to say that there has never been a better time to develop a gold mine in Australia."

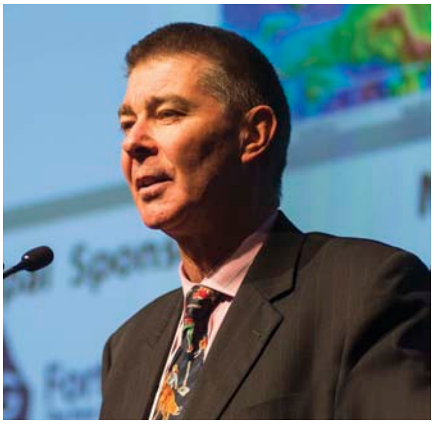
Base Metals & Rare Earths

A longer term strategy required

Musgrave Minerals' RC drilling at the high grade gold Break of Day deposit in Western Australia. Photo courtesy of Musgrave Resources.

The rebound of global GDP and the continued growth of rapidly developing Asia-Pacific economies implies increased world steel consumption, which should bode well for WA's trademark iron ore industry. With China consuming around 80% of Australia's total iron ore seaborne exports, mixed perceptions over the direction of Chinese economic growth leaves the commodity susceptible to further uncertainty in the mid- to long-term. Supply side reform in China will favor Australian companies producing a higher grade product as steelmakers look to improve the efficiency of furnaces.

The nickel market remains volatile, with a recent environmental clampdown in the Philippines that saw 23 mines lose their mining permits and close. Though this presents some optimism for WA's nickel companies, Indonesia's easing of their nickel laterite ore export ban will also have an impact on the market. "Some sources are suggesting that over 6 million mt could be exported within the next 12 months, or 100,000 mt of contained nickel in ore might come back onto the market," said Michael Rodriguez, COO of Poseidon Nickel.



Ian Mulholland, managing director, Rox Resources.

Western Areas accounted for 14% of Australia's total nickel production in 2015-2016, with Nickel West (BHP Billiton) and Minara Resources (Glencore) producing 28% each, and First Quantum accounting for 16%. "Things are looking good for nickel sulfides, but we have to see a contraction in the supply of nickel laterite for the price to improve," said Ian Mulholland, MD of Rox Resources.

Despite the unpredictability of the nickel and base metal landscape, certain projects are leaping forward. Discovered by the former Sirius Resources in 2012, and later acquired by Independence Group (IGO) in 2015, the Nova project was taken into production in October 2016. Over the course of 10 years, the project will produce 26,000 mt/y of nickel, 11,500 mt/y of copper, and about 1,000 mt/y of cobalt. "Globally speaking, there are few projects that go from discovery to production in this kind of timeframe," said Peter Bradford, CEO at IGO. "We are still progressing the development underground, and expect to have it fully ramped up to capacity by September 2017."

Copper discoveries are still being made in WA, but the previous downturn in the industry led to limited exploration globally, which will likely lead to a shortage in the market. "Copper is the bell weather of the commodity cycles — once the copper price is rising, economic activity is increasing. We have seen an uptake in the copper price and there is, or will be, an undersupply given the downturn during which there have been no real exploration advances," said Rob Bills, MD and CEO of Emmerson Resources.

Given WA's position as a leader for the industry worldwide, there is a sentiment that not enough has been done for future projects to emerge and there is a sense that a longer term vision is needed in the industry. "In the Western world, companies are driven by revenue and shorter time horizons," said George Bauk, MD and CEO of Northern Minerals, a company focused on rare earths, particularly dysprosium. Robert Waugh, MD of Musgrave Minerals, echoed this sentiment: "It will probably take another upturn for majors to realize that they will not be able to simply buy junior companies for deposits, because the juniors have not yet found them."

Peter Bradford, managing director and CEO, IGO.

Subsequently, although stagnation in prices persists, base metals present a compelling investment opportunity. Global supply trends suggest an impending shortage, and savvy WA companies are gearing up to meet projected increases in global consumption if the required capital can be secured to finance exploration activities.

Lithium, Graphite and Cobalt

The buzz of batteries

The worldwide buzz around renewable energy has engendered rising enthusiasm for lithium, graphite and cobalt in a WA mining community that is eager to join the race. The state has significant reserves of the resources and is developing exciting projects both at home and abroad. All stages of the value chain have felt the pull towards these commodities, not least testing and metallurgical services. Jon Landau, senior VP at Bureau Veritas, has adapted his strategy to meet a surge in demand for commodity-specific capabilities. "We have achieved this through developing methods to identify and extract lithium, and by using our expertise in graphitic analysis to help with onsite services," he said.

Tom Revy, managing director, BlackEarth Minerals.

WA is home to the world's largest hard rock deposit of lithium at the Greenbushes project held by Talison Lithium Australia that produces spodumene concentrate at a rate of 450,000 mt/y. In addition to exploration and production projects throughout the state, companies such as Tianqi Lithium Australia are realizing the opportunity to add value to the lithium processing supply chain. Tianqi will spend A$400 million on a processing plant in Kwinana in order to service the Greenbushes mine. Currently, Chinese converters introduce a significant bottleneck in delivering the resource to end-users through domination of the necessary chemical conversion process. Lithium Australia's Sileach™ process has received grant money from both the WA and national governments to develop the capacity to process lithium on a commercial scale. "We need to bear in mind that at the moment, Australia produces 40% of the world's lithium out of a single mine that uses very traditional technologies to process material," said Adrian Griffin, MD at Lithium Australia.

Venus Metals is co-funding the project to research solution purification and valuable by-products formation during the production of battery-grade lithium from micas. "Within our lithium tenements, we have encountered lithium mica in recent drilling. The current research will be highly beneficial to progress in our lithium projects," said the company's CEO, Kumar Arunachalam.

Roughly 50% of known worldwide cobalt reserves are located in the Democratic Republic of the Congo (DRC), which currently leads global production. Australia holds the second largest reserves of the resource, occurring mainly in lateritic nickel deposits. However, the nation has yet to fully recognize its production potential, producing only around 4% of the global market in 2016. Ardea Resources owns the seventh largest cobalt deposit in the world and the largest located within a stable jurisdiction. Boasting 386,400 mt of contained cobalt metal, the company's MD, Matt Painter expects the company's Kalgoorlie nickel deposit will prove invaluable in supporting the burgeoning demand for the resource, in no small part because of its location in WA. "Understanding the provenance of material is increasingly important given the ethical issues arising from sourcing cobalt in some underdeveloped countries," he said. "Amnesty International has highlighted some of the problems with child labor and unsafe work practices in the DRC. The only solutions are to clean up the supply lines or for people to source their material somewhere else."

The lithium battery is somewhat of a misnomer given that there are much larger quantities of several different minerals that comprise the end product. A multiplier of six to 10 times more graphite is required in the production process. While there is no shortage of graphite in terms of global supply, the mineralogy and metallurgy of the resource are critical in determining for which market the resource is suitable. "Not all graphites are created equally," said Tom Revy, MD at the newly formed BlackEarth Minerals. "It should not be treated as a single commodity, market, or development process," he added.

Given the flood of interest in lithium, cobalt and graphite, WA is pushing to position itself as a global leader that will service the advent of the lithium battery for the next generation of electric vehicles. However, with the market still in its infancy, demand for these commodities in the mid- to long-term is not yet certain. The race to secure attractive off-take agreements will preoccupy WA companies operating in the battery space, encouraging further developments in the ever evolving trade dynamic between the Australian and Chinese markets.

Potash

From MOP to SOP

Photo courtesy of Kore Potash.

Russia and Canada dominate the international potash market, yet WA is in a position where it could play an important role in the international production of sulphate of potash (SOP) if the large capital expenditures required for the projects to move forward can be overcome. "If all SOP projects in-country get going, Australia will become the largest SOP producing country in the world except for China," said Matt Shackleton, executive chairman of Australian Potash.

The rate at which potassium chloride mines are being developed has increased in an already over-supplied market with a select few entities controlling the supply. "There are people outside the cartel-dominated entities, like the Germans and the Spaniards, who are also developing MOP. This means more will come into the market and the price will either remain or fall," explained Shackleton.

The difference between muriate of potash (MOP) and SOP is important. Whereas MOP contains both potassium and chlorine, SOP contains potassium and sulfate. Certain plants are chlorine intolerant, and therefore benefit from sulfate based fertilizers. "With a middle class estimated to being three billion people in seven years time, the SOP industry in China has gone from zero to being the largest producer of SOP by a factor of three in 15 years," he added.

Additionally, MOP can generally be sourced in deposits with millions of tons and 95% of global production takes place within three countries, whereas SOP occurs in smaller quantities and is difficult to find. Australian Potash's Lake Wells project intends to convert MOP into SOP that, in contrast to the less cost-efficient Mannheim process utilized in Germany, also avoids a hydrochloric acid residue. Given the sulfate present in their brine, they are able to mix MOP with water in the crystallization circuit to generate SOP.

The fluctuating ratio of nitrogen to phosphorus to potassium (N-P- K) allows different fertilizers to be created to serve the particular needs of diverse crops: Nitrogen enhances photosynthesis, phosphorus strengthens the plant, and potassium encourages efficient absorption of nutrients. Demand for potassium is bound to rise given a rapidly increasing global population. "Fertilizer is necessary given that the world's population is forecast to grow 30-40% in the next 30 years," said Patrick McManus, MD of Parkway Minerals.

The company is presently focused on the Dandaragan Trough, for which they are looking for a JV partner to further develop their large resource of phosphate and potash. Accordingly, how much of a role WA plays in upcoming years within this field will be strongly tied to investment opportunities.

Matt Shackleton, executive chairman, Australian Potash.

Innovation in the Industry

The Role and Risks of Big Data

As a globally recognized hub for mining innovation, WA's capital city of Perth is home to much of the most cutting-edge research in the industry. Mike Edwards, MD at Latitude Consolidated, highlighted: "In particular, new modeling techniques and software to outline ore bodies are allowing companies to source more information for data systems."

Accordingly, big data represents an area of huge potential beginning to take form in terms of improving the efficiency of the sector's operations. Several WA consultancies and service providers are at the forefront of capitalizing on those opportunities. AMC Consultants' new Online Mining Intelligence service allows companies to gain a more comprehensive understanding of their operations. "Mining companies collect an incredible amount of data. All of that information can be accumulated and in real-time be used to assess the productivity of activities in order to identify areas of excellence or inefficiencies," said Martin Staples, director at AMC.

Functions ranging from managing back-office financial transactions, to monitoring geoscientific data and enhancing the production capacity of large-scale mines are opportunities for companies to add substantial value to their projects. Software proprietors such as Expedio, acQuire and LandTrack Systems provide packages that address that need. Laura Groves, MD of Expedio, explained the importance of expertly managing and assessing that data. "The reporting standards for data management compliance in Australia and many other countries are becoming more stringent as the industry now recognizes the importance of data veracity," she said.


Justin Eve, mining leader at PwC.

While the opportunities around harnessing data are enormous, there are also risks to be considered that many in the industry believe are currently underplayed. The growing body of web-based applications and digital tools utilized across the value chain implies the increasing relevance of cyber security. "The current understanding of the exposure that this creates is shallow and there is significantly more work to be done to comprehend how that data may be used and accessed and so how it must be protected," said Scott Grimley, Oceania mining & metals leader at EY.

Justin Eve, mining leader at PwC, warns that mid-tier miners should not disregard the increasing role of cyber security to their operations. "The threat to operational technology systems, and therefore to safety and production, is real," he said. "This is not an IT issue; it is a strategic business imperative for miners to secure their assets."

New Frontiers

Miners from Perth all around the world

Perth might be one of the most isolated cities in the world, but many companies choose to operate from WA's capital city because of the ease of doing business. "Perth is in a solid economic zone, so commodity prices hit our Australian screens very early," said John Stockley, technical director of Tanga Resources, which operates in Tanzania. "Another great asset to our operations is the availability of direct flights to Johannesburg from Perth," he added. Furthermore, companies looking to operate in Africa have found lessons learned navigating the vast WA landscape are transferrable to that environment. "The advantage of working out of Perth is that the Australian engineering and construction fraternity has a can-do attitude. We have been working for the last 25 years in logistically challenging and remote areas," said Peter De Leo, MD of Lycopodium.

The Australia-Africa Minerals & Energy Group (AAMEG) seeks to assist Australian companies operating in Africa by facilitating collaboration between industry, governments and community stakeholders. “We believe it is critical to look at the positive impact the resources industry is having in developing countries and at the difference between aid and business,” said CEO Trish O’Reilly.

Perhaps one of the greater obstacles facing companies looking to Africa is the tendency of the market to attach regional challenges to the entire continent. When assessing a project’s risk, several companies have found that perception rather than reality can play a significant role in deterring investment. Nevertheless, in West Africa, the Ebola crisis has represented a very real concern for companies operating in the region during the outbreak between 2014 and 2016. Although the disease has since been contained, Caigen Wang, MD of Tietto Minerals, explained that the company’s projects in Liberia had to be postponed for a year and a half. “We made donations to the Ebola foundation because we believe that by working in the country, we are in partnership with its people and government,” he said. “The government has realized the challenges that investors have in their country. They are making the effort to provide assistance, and it is important to keep in close communication with them.”


Peter De Leo, MD of Lycopodium.

The general sentiment on West Africa, however, has certainly evolved and many Australian companies and investors are turning to the region again. Gold prices have played a strong role in this shift given the area’s historical gold-producing capacity, particularly along the Birimian Greenstone Belt. How the evolving political landscape will impact the industry is yet to be determined. Jeff Quartermaine, executive officer and MD of Perseus Mining, explained: “When operating in West Africa, things can change quickly so we want to maintain a spread of risk, both political and technical. We have been a single mine operation for some time and if something were to happen to that mine, we would encounter problems. A secondary revenue source is therefore vital to achieving a reliable income stream.”

Companies looking at more stable jurisdictions have turned to Europe and the Americas. Service providers such as Byrnecut have started to position themselves within Latin America to be ready to serve the market as more underground mines appear in Peru, Colombia and Ecuador. As the fastest growing region in the world, servicing Asia is also of great importance to WA. A two-way street of Asian companies operating projects within the state, as well as national companies operating in Asia has emerged. It is safe to say that the miners of WA are operating around the globe and will continue to do so.

Conclusion

A New Era in Mining Presents New Labor Challenges

The cyclical nature of the mining industry in WA presents a significant perennial challenge for one of the sector’s most valuable assets: its people. Colin Moorhead, CEO of the Australasian Institute of Mining and Metallurgy (AusIMM) said: “While there are signs that the prospects of the mining industry are beginning to improve, many minerals industry professionals in Australia and WA continue to feel the impact of high unemployment and low commodity prices.”

The global trend towards automation across all industries suggest that machines will continue to take the jobs once performed by human labor and WA’s recent increase in production has not necessarily translated to high employment rates. “Mining did not lead the way in automation. In fact, being a conservative industry, it was slower than many others, but it is surely catching up now, which will cause more jobs to disappear,” said John Downing, MD of the recruitment firm Downing Teal.

Nonetheless, technological advance has also created new voids within the industry that must be filled by individuals attuned to the benefits — and risks — of utilizing new innovations. Despite suffering from dropping enrollment rates, the higher education sector in WA remains a world leader in preparing the next generation for the evolving needs of the industry. Professor Sam Spearing, director of Curtin University’s School of Mines said: “As technology changes, the types of jobs and the necessary skill sets will also evolve.”

There seems to be a shared sense that a degree of dexterity is necessary to navigate both the challenges and opportunities of the 21st century resources sector. Subsequently, ‘nimble’ might be the best buzzword to define the zeitgeist of what is arguably a new era in the WA mining industry — an era that has seen enough booms and busts to maintain a steady strategic head while recognizing the need to forge forward in terms of exploration and innovation.