

S&P Global Platts Insight

May 2018



S&P GLOBAL PLATTS
GLOBAL METALS AWARDS

Can sustainability
coexist with Africa's
battery metals rush?

Steel micro
mills: When
less is more

European secondary
aluminum faces
oversupply

Triumphs and
turnarounds: 2018 Global
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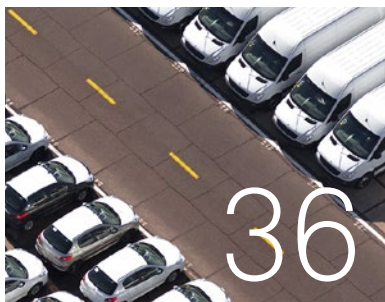
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* The Government of China through the State Bureau of Material Reserves' acquired the largest strategic cobalt stockpile in excess of 5,000 Mt, in 2015-2016.

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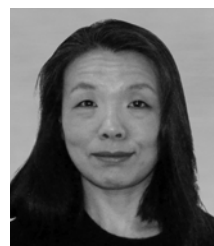
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Letter from the Editor

By Anthony Poole

President Donald Trump, arguably the most unconventional president the country has ever had, continues to command the attention of the world with every policy shift and unscripted Tweet.

Anthony Poole

Editor-in-Chief
Platts Metals Daily

In the metals space, the introduction of controversial tariffs on steel and aluminum imports in the name of national security in March sparked fears of a trade war, wiped trillions of dollars off the value of equities around the world and rang alarm bells among producers of these commodities, as well as downstream manufacturers within the US.

At his state of the union speech in January, Trump repeated his desire to launch a \$1 trillion infrastructure renewal program in the US, which could bring about huge rewards for steel and aluminum producers in the country, as well as provide a boost to copper, zinc and a whole range of other industrial metals. Trump's vision is a gigantic public/private finance initiative that has yet to get off the ground. But there are examples of how

infrastructure projects, using existing state and federal funding programs, can benefit US industry.

Industrial metals are also seeing huge benefits from the so-called electric vehicle revolution. Given electric vehicles still represent a very small percentage of the car market, it may not appear to be much of a revolution at all. But Volvo has made a commitment to be all electric starting in 2019.

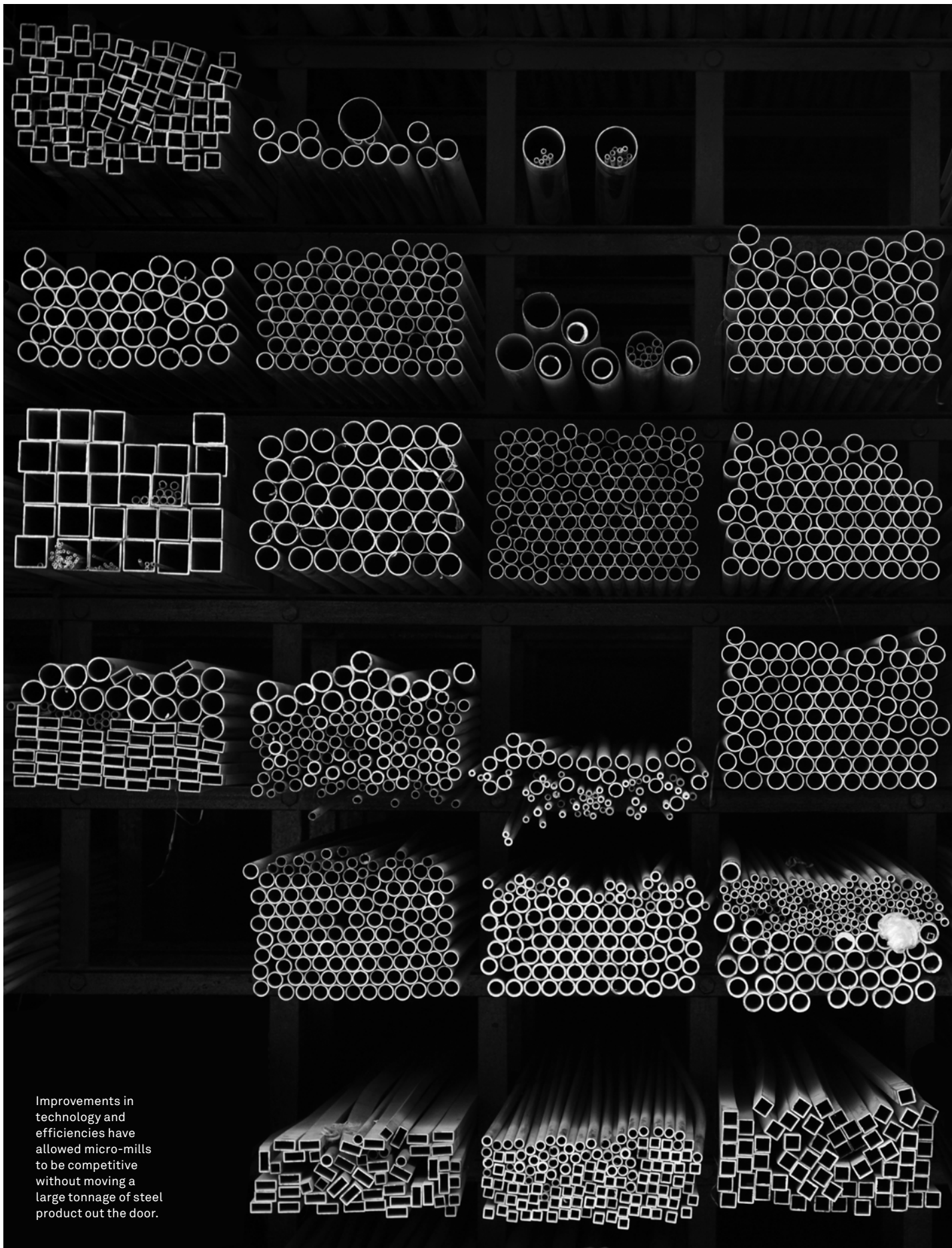
Even before Trump took office, Ford announced on January 3 last year that it was abandoning plans for a new \$1.6 billion automotive plant in Mexico and would, instead, invest \$700 million in upgrading and expanding its Flat Rock, Michigan plant and equip it to build a new generation of electric vehicles as part of a multi-billion EV program the company is developing.

General Motors plans to introduce 20 new all-electric vehicles by 2020. It may seem like a long way off, but the UK has committed

to banning the sale of cars with internal combustion engines from 2040—gasoline and diesel.

As the automotive industry has embraced the electric vehicle at the expense of the hydrogen fuel cell, these vehicles will need cobalt, lithium, manganese, copper, aluminum, lead, steel and zinc. In the case of cobalt, it will be in quantities scarcely imaginable today.

Many of tonight's finalists and winners are already at the cutting edge of innovation enabling the industry to meet such future levels of demand. In the recent past, many have faced challenges of survival in a low-priced, over-supplied environment. Now they face more positive challenges in meeting the demands of the EV revolution and infrastructure programs. ■



Improvements in technology and efficiencies have allowed micro-mills to be competitive without moving a large tonnage of steel product out the door.

Steel micro mills: When less is more

By Nicholas Tolomeo

First there was the Bessemer Process, supplanted by open-hearth furnaces, followed by integrated mills, and then there were mini mills. And now there are micro mills. Some US steelmakers are getting bigger by getting smaller.

The US is scheduled to have four micro mills operating by the end of this decade.

Commercial Metals Company built the US' first micro mill in Mesa, Arizona, a 280,000 st/year facility that began operations in 2009. Others were slow to catch on, but the growth of micro mills has ramped up recently, and it all began before any Section 232 measures were implemented in the US.

CMC plans to commission a 350,000 st/year micro mill in Durant, Oklahoma in 2018.

In November 2017 Nucor chose Sedalia, Missouri for a \$250 million micro mill. Four months later in March, Nucor announced a second rebar micro mill, to be built in Frostproof, Florida, with a \$240 million investment. Both Nucor micro mills will have an estimated annual capacity of 350,000 st/year.

The Missouri facility is expected to start producing in 2019 and the Florida mill in 2020.

"We are building this rebar micro mill in a great and growing market where demand is strong and there is currently an abundant supply of scrap, a good portion of which is handled by our scrap business, The David J. Joseph Company," Nucor CEO John Ferriola said.

Ferriola laid out the essential ingredients needed for a micro-mill, local scrap and local rebar demand.

The other piece of the micro-mill puzzle is technology. Improvements in technology and efficiencies have allowed micro-mills to be competitive without moving a large tonnage of steel product out the door.

Danieli, the Italian-based steel technology giant, calls a micro-mill "a mini-mill based on ultra-compact design



Freight considerations could benefit the micro mill concept on both legs, bringing in scrap and shipping out rebar.

...the micro-mill technology could be a fit for the future in certain markets that generate scrap, but source their rebar from outside of the region.

and extremely low transformation costs.” According to Danieli, it is now possible to produce 250,000-300,000 mt/year of long products with an overall cost per ton typical of those of a much larger 1.0-1.5 million mt/year mini-mill.

A micro mill typically has a nameplate capacity of around 350,000 st/year compared with mini mills that generally are only as small as 600,000 st/year.

Once Nucor’s first micro-mill begins operations in 2019, it will be one of 10 Danieli micro-mills operating, or in the works, around the world.

“I spot a trend,” one Midwest scrap supplier said. “Freight and shipping costs are obviously at play here. Those costs will never get any cheaper. It all makes sense. Maybe one day we’ll look at the mini mills like we look at the old integrated.”

Nobody seems willing to write off mini mills, especially light flat-rolled producing operations that have a capacity of over 1 million st/year, but the micro-mill technology could be a fit for the future in certain markets that generate scrap, but source their rebar from outside of the region.

Micro-mill technology not entirely new

“The success of other [micro-mill] facilities makes it easier to make an investment in something relatively new,” Dave Sumoski, Executive Vice President of Merchant and Rebar Products for Nucor told S&P Global Platts. “We feel a lot better about the technology having some success already out there.”

In 2008, the late John Correnti proposed an ambitious plan under Steel Development Co to build four micro mills in the US. The logistics that Correnti had envisioned were for a mill that could source scrap from a 200-mile radius and ship finished product to a 300-mile radius. The plans ultimately fell through.

“An EAF’s biggest cost is scrap,” said Chuck Bradford of Bradford Research. “It is very expensive to move raw materials. You do not want to move scrap from thousands of miles away.”

Nucor has the scrap supply around Missouri and Florida through DJJ and one of its wholly-owned ventures, Advantage Metals Recycling. AMR is the largest recycler in the region with 11 locations in Kansas and Missouri.

Currently, a significant amount of scrap around Kansas City is springboarded out of the region with mills paying extra freight for it and it is a similar situation in Central Florida where some of the scrap even moves to export markets.

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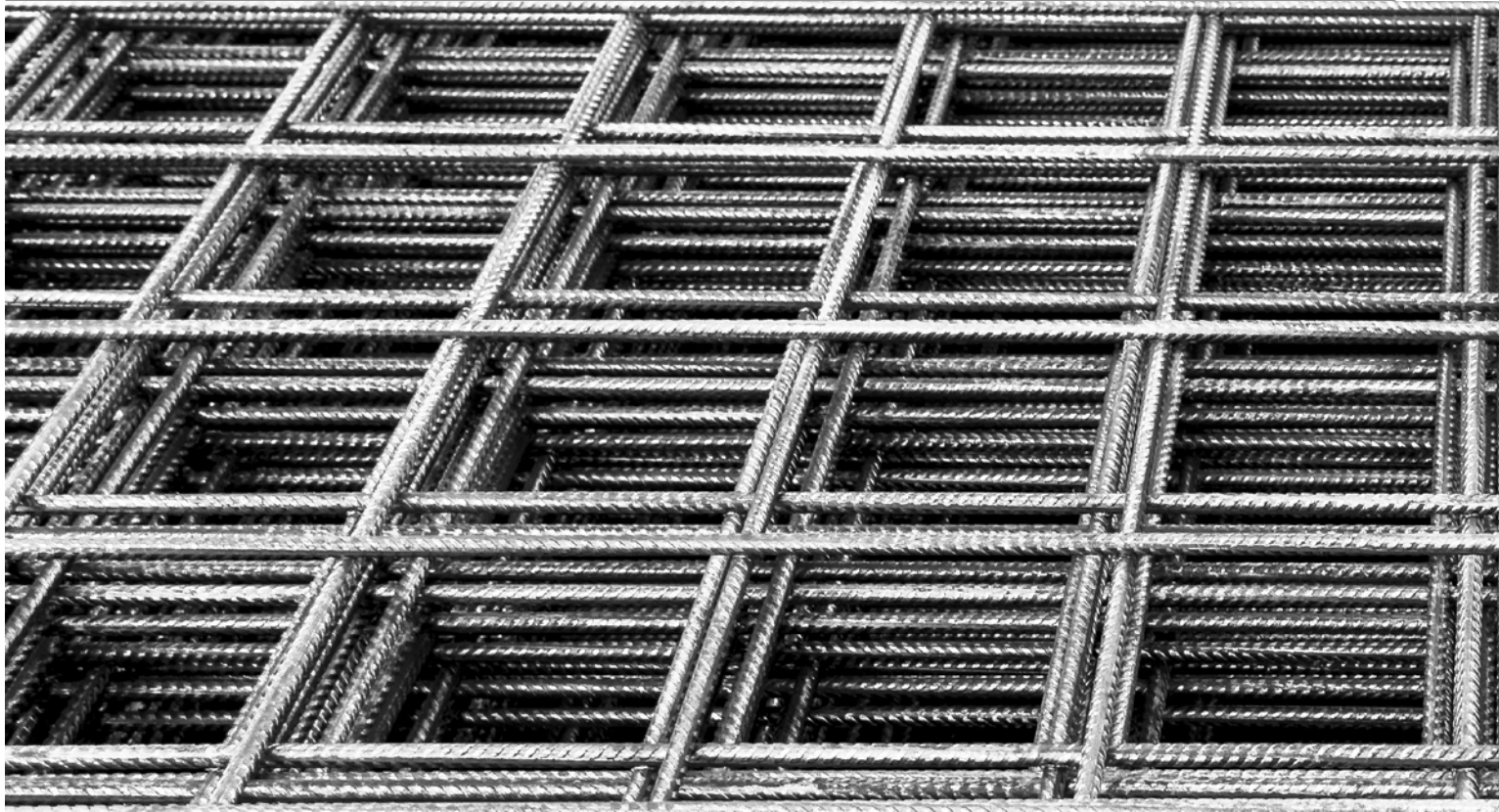
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The Kansas City market provided Nucor with an area that lacked an existing mill, but has local scrap that can be melted and processed into rebar for the local market.

“If you have a micro mill in your region, the word springboard goes out the window,” another scrap dealer said. “If you locate it in an area where there is no other mill and plenty of scrap, you don’t have to reach for scrap.”

Freight considerations could benefit the micro mill concept on both legs, bringing in scrap and shipping out rebar.

“Trucking is currently operating at approximately 98% capacity; in less than two years it will be over capacity,” another scrap dealer said. “Between rules and regulations drivers are not available. Micro mills are not a new business model. However, I see it being incorporated more in the future.”

Bradford noted the success of mini mills was the result of improvements in technology and electric furnace transformers allowing mini mills to grow from 600,000 st/year to over 1 million st/year. “There are a lot of markets in the US that are a lot smaller than that. Micro mill technology allows mills to target those markets.”

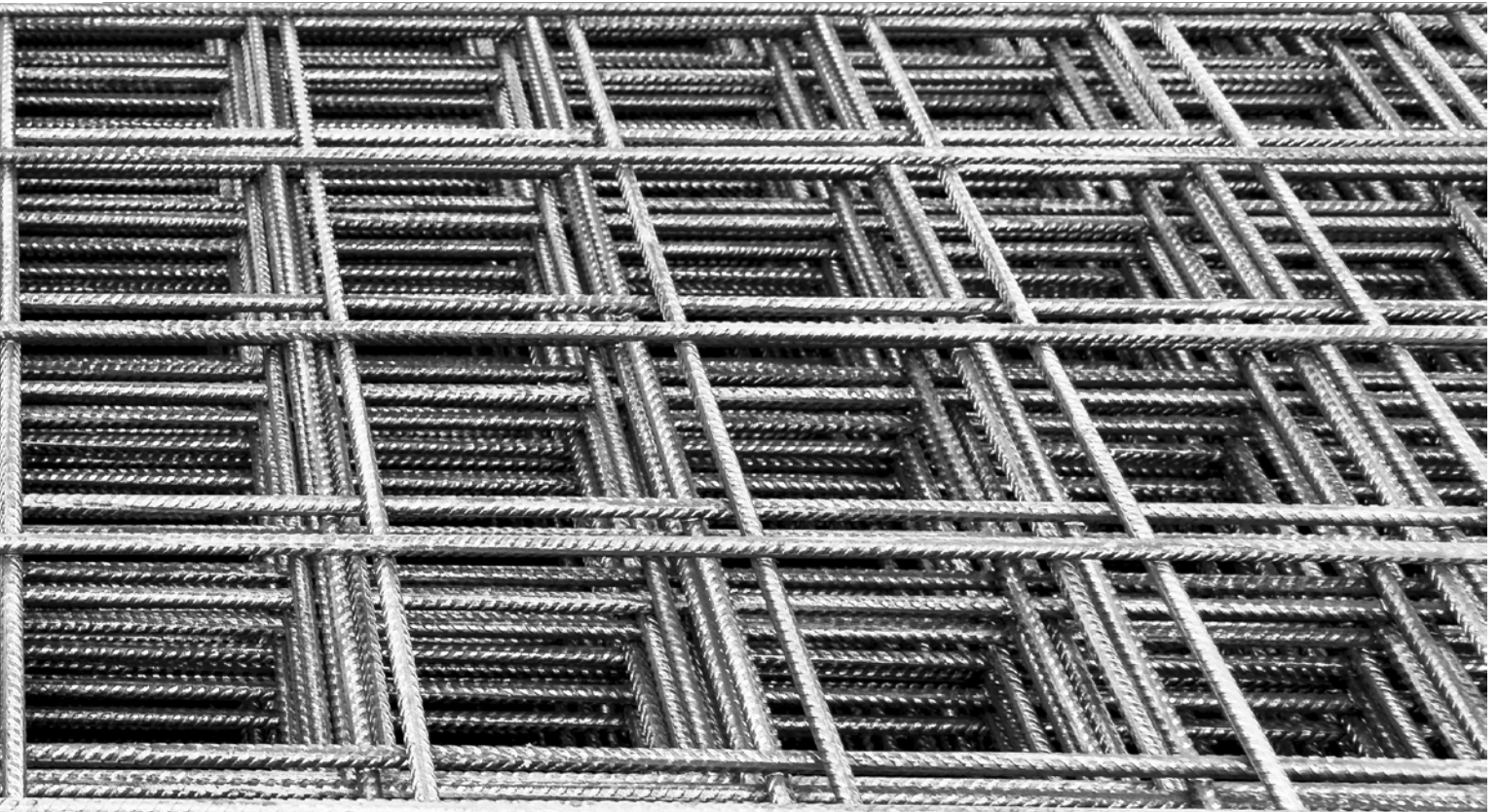
Nucor’s first micro mill commitment in the Kansas City region is an area that checks all the boxes when it comes to making a micro mill make sense.

“That is very important for us,” Sumoski said of the scrap assets in the region. “Some of our scrap locations are not aligned with our steelmaking locations. This micro mill technology gives us the ability to align our assets.”

He added, “We have a lot of scrap under control, and we think that the Florida/Georgia market is big and growing. We have a lot of scrap in Florida and we don’t typically ship it overseas.”

The Kansas City market provided Nucor with an area that lacked an existing mill, but has local scrap that can be melted and processed into rebar for the local market.

“We identified that Kansas City region as a place that is being serviced from outside of the region with rebar and there is a lot of scrap in



Bradford noted the success of mini mills was the result of improvements in technology and electric furnace transformers allowing mini mills to grow from 600,000 st/year to over 1 million st/year.

the Kansas City market,” Sumoski said. “And we have a lot of that scrap under control.”

While the Missouri micro mill will have a capacity around 350,000 st/year, Sumoski said the market would dictate how much the mill would produce.

The Sedalia, Missouri micro mill will be the third in the US market after Commercial Metals Company’s two micro mills in Arizona and Oklahoma with annualized capacities of 280,000 st and 350,000 st respectively. And Nucor’s Frostfree, Florida, micro mill will be the fourth.

When Correnti was laying out his plans for four micro mills, he was prepared to commit to the first two and noted that “the third and fourth depend on the success of the first two. Nothing sells better than a winning track record.”

So, while four micro mills are set to be operating in the US by the end of this decade, it appears any potential planning for a fifth or sixth will depend on the success of the first four. ■





Nickel supply energized by electric vehicles

By Adam Webb

The recent buzz in the commodities sector around lithium-ion batteries and their use in the growing electric vehicle market has centered around relatively minor commodities, such as lithium, cobalt, vanadium and graphite. However, there are also implications for major commodities, and it seems likely—based on current technology—that nickel will play an important part in this story.

Lithium-ion batteries used by many of the major electric vehicle manufacturers use a cathode that is primarily composed of nickel. However, not all nickel supply is suitable for manufacturing battery cathodes. Only 49% of 2017 nickel supply, from sulfide and limonite deposits, is suitable for this purpose, and extracting nickel from the latter deposits is less attractive as costs are generally higher than from sulfide deposits.

Discoveries of new nickel deposits, particularly sulfides, are rare. Although there are a number of existing projects that could help meet increasing demand

for nickel in lithium-ion batteries, it remains to be seen whether potential future output from these projects will be sufficient to meet the demand.

Tesla co-founder and CEO Elon Musk was quoted in 2016 as saying, "Our cells should be called Nickel-Graphite, because primarily the cathode is nickel and the anode side is graphite with silicon oxide ... [there is] a little bit of lithium in there, but it's like the salt on the salad." Neither Tesla nor Panasonic, which manufactures the batteries used by Tesla, report the composition of the batteries used in their

products. However, it is widely reported that Tesla uses a lithium-ion battery with a cathode primarily composed of nickel, cobalt and aluminum. These batteries typically have a cathode composition of 85% nickel, 10% cobalt and 5% aluminum.

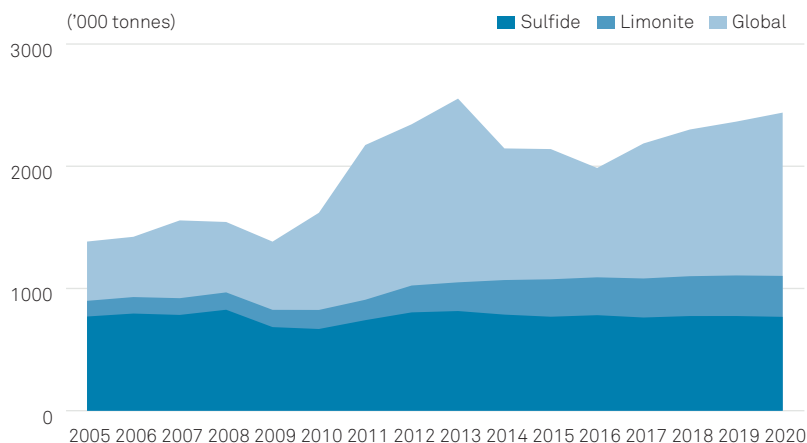
Another widely used lithium-ion battery in current electric vehicles is the nickel, manganese and cobalt battery, which are used in electric vehicles produced by Chevrolet and Nissan. This battery has a cathode that is typically made up of 60% nickel, 20% manganese and 20% cobalt. However, many manufacturers of this battery are now working toward producing batteries with cathodes containing 80% nickel. This is because higher nickel content in these batteries increases energy density and extends vehicle range. This comes alongside efforts to minimize exposure to cobalt, which is primarily sourced from the Democratic Republic of the Congo, and because of the sharply higher cost of the metal; the cobalt price rose 129% in 2017 and has continued to rise rapidly in the first quarter of 2018.

Other battery technologies are either already available or under development that use less or no nickel. However, given that the major electric vehicle producers are favoring batteries with significant nickel content, we believe it likely that nickel will continue to be an important commodity in the manufacture of lithium-ion batteries for use in electric vehicles. Consequently, demand for nickel for this end use will increase along with the burgeoning use of electric vehicles.

Despite this important new source of demand for nickel, the metal's primary use is in the production of stainless steel, and this will continue to be the case for the foreseeable future. Complicating the various supply-demand scenarios is the fact that not all forms of nickel-containing products from mining operations are suitable for use in batteries.

Nickel sulfate is the key nickel-bearing product used by battery manufacturers. This is why BHP Billiton committed US\$43.2 million to facilitate nickel sulfate production at its Kwinana refinery at the Nickel West operation in Western Australia.

GLOBAL MINED NICKEL SUPPLY 2005-2020



Source: S&P Global Market Intelligence

Nickel sulfate can only be produced economically from class 1 nickel products, which are defined as products with a nickel content of 99% or more, with the cost of converting ferronickel and nickel pig iron to nickel sulfate not being economically viable. This effectively rules out the supply of nickel for lithium-ion batteries from all ferronickel and nickel pig iron operations. In 2017, these operations produced 51% of global mined nickel supply, meaning a significant proportion of global nickel supply cannot be used in the production of lithium-ion batteries. We estimate that mined nickel supply will grow 12% from 2017 to 2020. However, we forecast that mined supply suitable for battery manufacture will only grow 2% over this period.

Suitable nickel supply can be found from two sources: nickel sulfide deposits and nickel limonite deposits, the latter being a type of laterite. Nickel sulfide deposits, such as those exploited by PJSC Norilsk Nickel Co. and in Voisey's Bay and Ontario Division, are exploited using open pit or underground mining. The ore is processed using conventional crushing, grinding and flotation to produce a nickel concentrate, which undergoes smelting and refining to produce finished class 1 nickel products. These deposits benefit from the presence of valuable byproduct metals such as copper, cobalt, gold, silver and platinum group metals. On average, these operations are lower-cost, on a



co-product basis, than nickel-mining operations exploiting limonite or saprolite deposits due to production costs being spread out over the multiple commodities as well as the processing techniques being relatively simple and well established.

The largest cost components at these operations are treatment and refining charges and shipment charges. The latter incorporates the cost of transporting nickel concentrates produced at the mine to smelting and refining facilities, while the former includes the cost of converting the material to finished nickel products. In 2017, these two costs made up 44% of the total cash costs of these operations.

Labor costs are also relatively significant at operations exploiting sulfide ores, compared with those at operations exploiting laterite deposits. Labor costs made up 26% of total costs at sulfide operations in 2017, compared with an average of 15% across limonite and saprolite operations. This is a result of sulfide operations—which exploit hardrock deposits, sometimes at significant depth—using more complicated mining techniques, which require a greater number of employees compared with laterite deposits. The latter occur close to the surface and are extracted exclusively using open pit mining techniques and sometimes not even requiring

blasting. In addition, a significant proportion of laterite mining operations are in countries with lower wage rates, such as Indonesia, the Philippines and Cuba.

The complicated part of exploiting limonite deposits, such as those at Murrin Murrin, Ambatovy and Goro, is in the processing stage. High-pressure acid leach, or HPAL, the most common process for extracting nickel from these deposits, involves treating the ore with an acidic solution, usually sulfuric acid, in a pressurized autoclave at high temperatures. This process liberates both nickel and cobalt held in the ore, with the end product usually being mixed nickel and cobalt hydroxides or sulfides, which can then be refined to finished class 1 nickel products.

This process was pioneered at Moa Bay in Cuba in the 1960s and has been used increasingly in recent years. However, the HPAL process presents inherent challenges because of its use of high pressures and temperatures combined with corrosive substances. This has led to several well-documented problems at major HPAL projects, including Murrin Murrin, where significant delays were encountered in the design, construction and commissioning of the processing plant, and at Goro, which was originally designed to produce 60,000 mt/year of nickel but has yet to reach near this level, despite

Suitable nickel supply can be found from two sources: nickel sulfide deposits and nickel limonite deposits, the latter being a type of laterite.



Despite the recent lack of new discoveries, several projects will be able to add to the supply of nickel suitable for use in the lithium-ion battery sector should the demand materialize.

first production being achieved in 2011, due to technical difficulties with the processing plant.

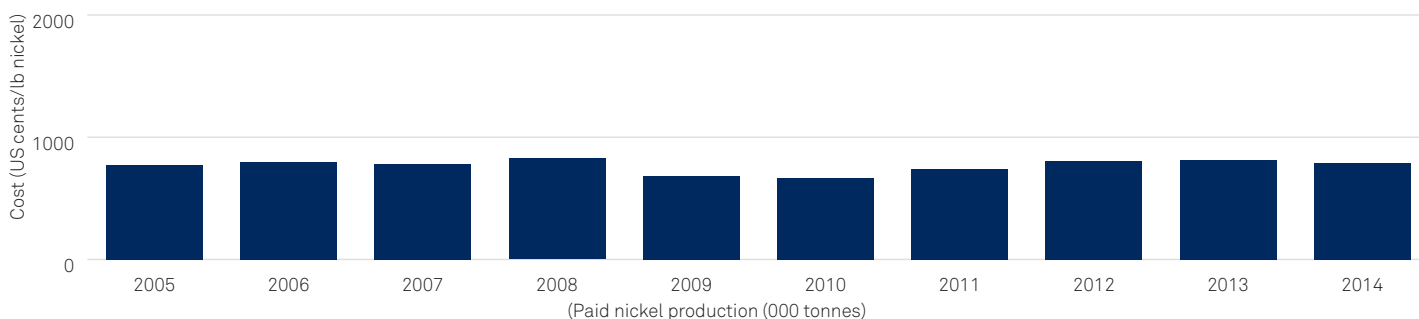
Extracting nickel from limonite deposits via HPAL is generally more expensive than extracting it from sulfide deposits. The biggest cost component at these operations is the reagent, including acid, which accounted for 35% of total cash costs at HPAL operations in 2017, compared with just 4% at sulfide operations. Another noticeable difference is energy costs. At HPAL operations, energy made up 12% of total cash costs in 2017, compared with 6% at sulfide operations. HPAL operations require more power to operate their autoclaves at high pressures and temperatures, compared with conventional crushing, grinding and flotation circuits used at sulfide operations.

The technical difficulties and high costs combined with the low nickel price in recent years have led to problems at several of these operations. Ravensthorpe, operated by First Quantum Minerals, was put into care and maintenance in August 2017, Vale SA is reviewing the Goro operation, and Sherritt International Corp. wrote down C\$1,723 million of its Ambatovy asset in 2015.

Sulfide operations will continue to have an advantage over limonite operations, due to the factors already mentioned. However, an increase

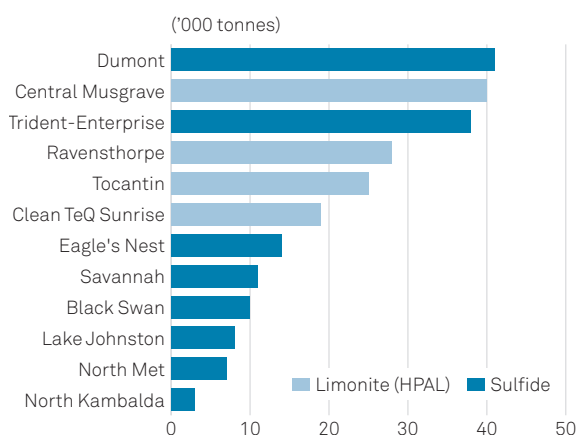
2017 NICKEL CO-PRODUCT LABOR COST CURVE

(by deposit type and processing technique)



Source: S&P Global Market Intelligence

ANNUAL PRODUCTION OF 12 NICKEL PROJECTS



Source: S&P Global Market Intelligence

\$5.84/lb

Average nickel price in 2020 forecast in the latest Nickel Commodity Briefing Service

Despite the recent lack of new discoveries, several projects will be able to add to the supply of nickel suitable for use in the lithium-ion battery sector should the demand materialize. S&P Global Market Intelligence has identified nine projects with nickel reserves. In addition, three operations that are on care and maintenance could be restarted should nickel prices improve: Ravensthorpe, Tocantim and Savannah. These 12 projects have the potential to add a combined 243,000 mt to annual nickel production: 112,000 mt from limonite deposits and 131,000 mt from sulfide deposits.

Black Swan, NorthMet and Lake Johnston are already included in our projection of 2020 nickel supply. Excluding these three projects, the remaining nine have the ability to add 20% to our projected 2020 supply of mined nickel that is suitable for use in the lithium-ion battery sector. It is very unlikely that all of these projects will go ahead at the same time and, even if they are given approval, construction times would likely mean new supply would not come online until after 2020.

in nickel demand suitable for use in lithium-ion battery production may provide some respite to HPAL operations that have struggled in recent years.

Major nickel discoveries, particularly sulfides, are relatively rare, with only one sulfide deposit discovered within the past decade, Nova-Bollinger, now in production. Exploration budgets for nickel have also been slashed since the highs of 2008, following the precipitous fall in the nickel price from a high of US\$24.50/lb in May 2007 to a recent low of US\$3.43/lb in February 2016—a drop of 86%.

Nickel prices have since recovered, and we expect them to continue to do so. In the latest Nickel Commodity Briefing Service, we forecast an average nickel price in 2020 of US\$5.84/lb. Exploration budgets tend to follow the nickel price, so it can be expected that exploration budgets dedicated to the metal will also rise. Nevertheless, the falling exploration budgets since 2008 would suggest that new nickel discoveries suitable for the lithium-ion battery market will continue to be elusive.

These figures give an indication of supply that could be available to replace mines that may close due to reserve depletion and to add new supply for the lithium-ion battery market without the need for new discoveries. Should demand for nickel, particularly in the lithium-ion battery sector, increase sufficiently, the owners of some of these projects may be incentivized to give them the go-ahead in the near future.

The other factor to consider in this potential additional supply is the longevity of these projects. Black Swan, Lake Johnston and North Kambalda all have current reserves below 5 million mt of ore and despite being relatively high-grade, are unlikely to be able continually to supply nickel for use in the battery sector over the long term. However, five of the projects—Central Musgrave, Clean TeQ Sunrise, Dumont, NorthMet and Ravensthorpe—have last reported ore reserves totaling over 100 million mt,

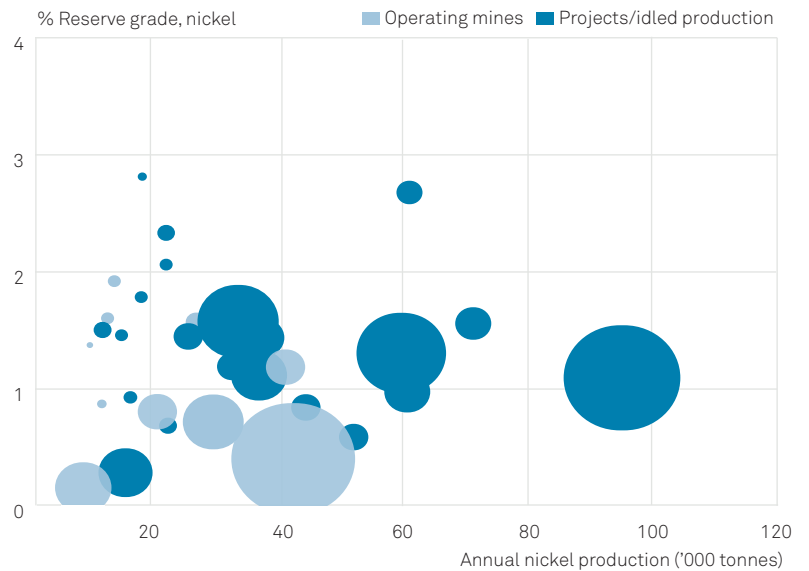
which would enable them to continue to produce at their annual average production rate for over 20 years, despite relatively low grades at Dumont and NorthMet. These five projects have the potential to provide 135,000 mt/year of nickel suitable for use in the lithium-ion battery sector over the long term, which represents a 12% increase to our estimated 2020 nickel supply that is suitable for this sector.

Whether existing nickel supply and these potential additions will be sufficient to supply the long-term demand for nickel in the production of lithium-ion batteries remains to be seen. A lot will depend on how quickly electric vehicles displace internal combustion engine vehicles. If there is a shortfall, then it may lead to increases in the nickel price that could allow previously uneconomic projects to become viable and incentivize greater exploration spending on battery nickel.

The fact that only certain nickel products are suitable for use in lithium-ion batteries may lead to differing supply and demand fundamentals in the wider nickel market. Should the demand for nickel in lithium-ion batteries increase sufficiently, it could lead to a different pricing structure for class 1 nickel products, which are suitable for this use, compared with those which are only usable in stainless steel production: ferronickel and nickel pig iron.

These influences can already be seen to a degree, with nickel sulfate regularly fetching a premium over London Metal Exchange nickel prices. If the trend continues, priority will be given to bringing projects that can produce nickel products suitable for lithium-ion battery use into production over those that can only produce products suitable for use in stainless steel manufacturing. ■

MOST RECENT REPORTED RESERVES OF OPERATING MINES AND PROJECTS



Source: S&P Global Market Intelligence



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One step forward, two steps back: Is steel overcapacity a runaway train?

By Paul Bartholomew


China remains the *bête noire* of the global steel industry by dint of its enormous production capacity that threatens to swamp international markets with lower-priced steel, whenever domestic demand falters.

But while China is taking measured steps to address its overcapacity situation, other countries, such as India, Iran and Vietnam have expansion programs in place that could exacerbate an already big global problem.

China produces half of the world's steel and hosts installed capacity of close to 1 billion metric tons/year. Apparent consumption in 2017 was around 750 million mt, and it is this vast capacity overhang that keeps international steel players awake at night. Fortunately, China's domestic steel market has been surprisingly robust over the past 18 months or so, sending steel prices to record highs and helping steelmakers report bumper profits for 2017.

Last year, China's economy performed more strongly than expected. There was plenty of liquidity in the system, the housing market shrugged off attempts to take the heat out of the sector and manufacturing continued to grow.

While all this helped to support steel demand and prices from the end-user side, there was also a major contributor on the supply side of the equation. Without any warning, the Chinese government suddenly and quickly closed down 140 million mt/year of unlicensed induction furnace capacity. These were low quality producers of construction steel, such as rebar, whose output did not register in official steel production



China produces
50%
of the world's
steel



statistics. The move opened up domestic market opportunities for legitimate producers to fill, and largely reduced the need for China to export rebar. China exported around 75 million mt of finished steel in 2017. While it was still an enormous amount of steel, it marked a significant decline on the two previous years when the country exported more than 100 million mt.

Separate to the induction furnace closures, China has been cutting legitimate capacity and is expected to have removed some 150 million mt/year between 2016 and the end of this year, as part of its supply-side reform agenda.

Since coming to power in 2013, President Xi Jinping has focused on containing financial risks within China, and ensuring economic growth is measured and sustainable, rather than debt-fueled and ridden with bad assets. Slower economic growth was called the “new normal” a few years ago, but this phrase has since been superseded by “quality over quantity.” The expression echoes the “value over volume” strategy espoused by major iron ore producers Vale, Rio Tinto and BHP. The age of excess and expansion has been confined to the past, it seems.

China's domestic steel market has been surprisingly robust over the past 18 months or so, sending steel prices to record highs and helping steelmakers report bumper profits for 2017.

In the case of steel, China is trying to lift the overall quality of steelmaking with a view to improving the environment. Beijing has clamped down hard on steelmakers that do not meet their environmental targets and now regularly sends out teams of inspectors to monitor steel companies. The country's steel sector is undergoing a structural shift, with higher quality facilities requiring higher quality raw materials inputs to reduce emissions. It is also slowly shifting more of its steelmaking from blast furnace production (that requires iron ore and coking coal) to electric-arc furnace production (that is largely fed by ferrous scrap), again for environmental reasons. China is much more stringent about allowing any new steelmaking capacity, and new facilities must largely replace dismantled ones. There does, however, appear to be slightly more flexibility around the regulations when it comes to building new EAF capacity.

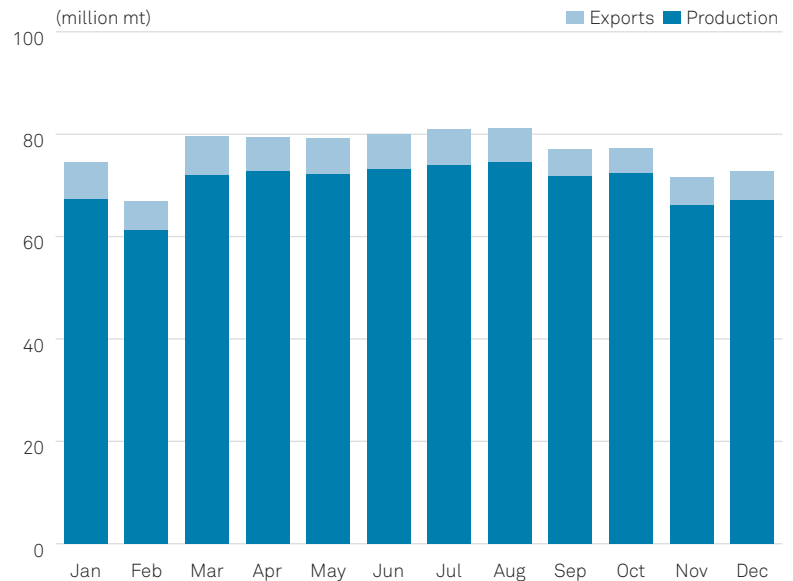
As ever, when it comes to turning around an enormous vessel, it will take time. But there is no doubt the Chinese leadership is extremely focused on improving the quality of the country's steel industry. The general view in China is that steel consumption peaked in 2014 and will continue to slow as the economy transitions into a more consumer-driven one. For the time being, the overcapacity issue continues to hang over the global steel industry but China is serious about reducing its production capacity and export levels.

India has big steel capacity aspirations

Just as China is trying to apply the handbrake on its industrial production, other countries are moving through the gears. India is the most notable example and is on the brink of overtaking Japan to become the world's second-largest steel producer.

India produced 101.4 million mt of crude steel in 2017, up 6.2% from 2016. New Delhi wants the country to reach steelmaking capacity of 300 million mt/year by 2030 to achieve self-sufficiency, support the "Make in India" agenda and to help lift manufacturing's contribution to GDP. India's steel

CHINA'S CRUDE STEEL PRODUCTION AND EXPORTS



Source: CISA, China Customs

secretary Dr Aruna Sharma told the S&P Global Platts Steel Markets Asia conference in Mumbai last November that stronger steel demand, along with wider application of steel as a material, would drive consumption per capita from around 65 kg to 130 kg, and support the capacity ramp-up.

Outside of government officials, however, few believe India is capable of hitting such an ambitious target. While many of the country's steelmakers are playing their part in bringing on new capacity, domestic demand is not growing quickly enough to absorb the additional steel. Citigroup analysts noted in March that Indian steel production grew almost 8% over the past two years, but underlying demand grew just 4.4%. This meant that India was obliged to turn to export markets and—withstanding the volumes are considerably smaller—the country exported a greater proportion of its steel production than China did in 2017. Recapitalization of the country's banks, and infrastructure and housing projects being pulled forward ahead of next year's general election, should ensure strong steel demand growth

this year. Beyond that, however, India needs to keep up the domestic demand momentum to ensure it does not have to rely on export markets and add more supply pressure to global steel prices.

In Southeast Asia, the most dynamic country in steel terms currently is Vietnam. Fueled by a low wage economy and a rapidly expanding manufacturing base, Vietnam plans to lift its domestic steel production capacity significantly, and has a number of new blast furnace projects underway. The flagship operation is Formosa Ha Tinh Steel, the country's sole hot-rolled coil producer, which could soon double its existing 2.4 million mt/year capacity and has ultimate aspirations to produce more than 20 million mt/year.

Vietnam is China's second-biggest market for steel exports after South Korea. If Vietnam does become self-sufficient in flat steel, while also potentially exporting some material into the region, it would mean a sizeable portion of Chinese exports would have to find a new home. This scenario has been given added impetus by the United States' decision to impose a 25% tariff on steel imports.

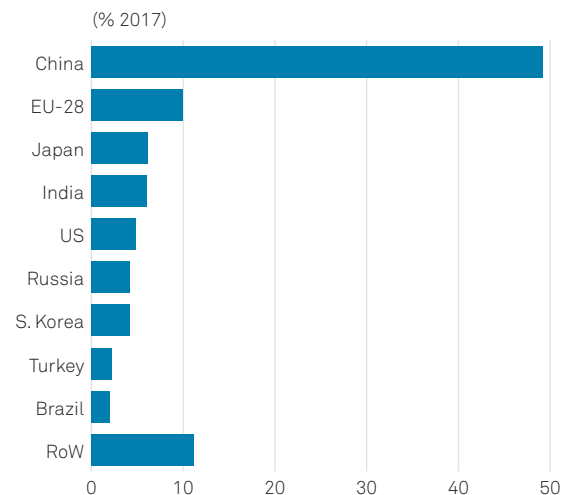
South Korea and Japan comprise 10% and 5% respectively of US steel imports, according to US Department of Commerce figures, although South Korea looks to be getting at least partial exemption. If much of that steel is redirected into Asian markets, bumping up against steel from China, India, Taiwan and Vietnam, among others, it could precipitate an excess supply shock that will be felt in other global steel markets.

The other country with plans to develop a far larger domestic steel industry is Iran. The country's strategic steel development plan envisages production capacity rising to 55 million mt/year by 2025. Some 21.4 million mt of crude steel was produced in 2017, up around 19% compared with 2016. According to the Iranian Steel Producers' Association, Iran's crude steel output is expected to reach 30 million mt in the next fiscal year, ending March 2019.

In some respects, Iran is a smaller version of India, with new capacity running ahead of domestic demand. Like India, Iran has also turned to export markets, exporting close to 6 million mt in the previous financial year. The country's Industry, Mines & Trade Ministry is looking to lift exports to 15 million mt/year within three years.

In terms of addressing the world's steel overcapacity problem, it appears to be one step forward and two steps back. All countries have their own individual arguments, policies and good reasons for expanding their steel production. In emerging nations, the policy is generally tied into growing a country's manufacturing base, ensuring supply security and boosting employment. It makes some sense if domestic demand justifies new steel capacity. But if a sizeable chunk of new capacity ends up in other markets, then it just adds to the global steel overcapacity dilemma. ■

SHARE OF WORLD CRUDE STEEL PRODUCTION



Source: Worldsteel



Metals in the Xi Era: Supply-side reform and the shift to quality

By Paul Bartholomew

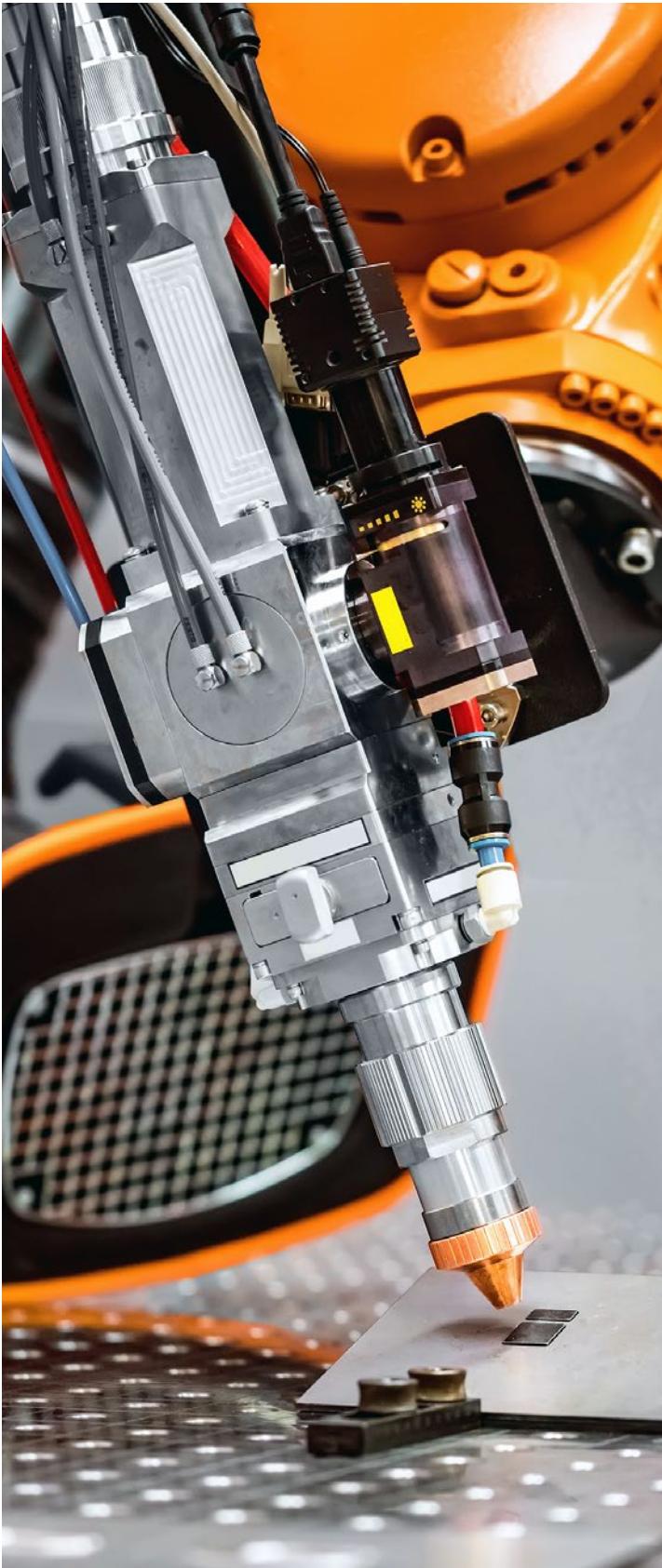
The removal of China's two-term limit on presidential tenures during the National People's Congress in March this year was well signposted. No evident successor to President Xi Jinping had been anointed at the 19th Party Congress the previous October, where party cadres gathered to endorse him for another five years. New members elected to the Community Party's inner sanctum—the seven-person Politburo Standing Committee—were widely viewed as Xi supporters.

What it means is that Xi's vision for China and his economic policies are unlikely to be altered by a new leader or leadership team in five years' time—and possibly well beyond. President Xi is in for the long haul, along with his policies, and companies dealing with China or competing in international energy and resources markets need to understand the implications.

Chief among these policies is the Chinese government's supply-side reform agenda. This has seen Beijing removing systemic risk, cutting excess capacity and deleveraging polluting industries—notably steel, coal, aluminum, petrochemicals

and cement—that grew bloated on the shoulders of China's rapid economic development and urbanization over the past couple of decades.

In Xi's 3.5 hour speech at the 19th Party Congress, 'Furthering supply-side structural reform' was point number one in the section on China's ongoing economic development. "We will continue efforts to cut overcapacity, reduce excess inventory, deleverage, lower costs and strengthen areas of weakness, and work to achieve a dynamic balance between supply and demand by improving the allocation of available resources and increasing high-quality supply," he told party members.



Since taking over in late 2012, the current leadership's economic focus has been on unwinding the excesses of this period and putting the country back on a more even and sustainable keel.

In terms of overcapacity, steel has been a major culprit. Crude steel production increased from 495 million metric tons in 2007 to 832 million mt a decade later. To put this into context, the 337 million additional tons of production added over the period is more than the combined output of Japan, India and the United States, the second, third and fourth largest global producers respectively. Much of the new steel capacity was poor quality, destined for the tens of millions of no-frills apartments China was quickly building. The previous Chinese administration's stimulus programs—particularly the huge cash injections during the global financial crisis of 2008-2009—pulled forward the pipeline of infrastructure projects, put cheap credit into the hands of property developers, and incentivized new and established steelmakers and associated industries to build capacity.

Since taking over in late 2012, the current leadership's economic focus has been on unwinding the excesses of this period and putting the country back on a more even and sustainable keel. Over the next five years, global markets can expect this policy to be pursued with gusto.

Quality over quantity

In many respects, the supply-side reform agenda can be viewed as a clearing of the decks, a readying of the foundations for the next stage of China's economic development. Earlier in the Xi tenure, the government spoke of the "new normal" of slower, steadier and sustainable economic growth. Setting ambitious GDP targets was no longer so relevant and many economists outside of China questioned them anyhow. Now, the phrase often heard is "quality over quantity." China believes it has taken enormous strides in its industrial de-capacity program. The focus now is on lifting the overall quality of industrial output, and enabling the country to compete on an even footing with international competitors such as Japan and the US.

"We will work faster to build China into a manufacturer of quality. ... We will support traditional industries in upgrading themselves. ... We will move Chinese industries up to the medium-high end of the global value chain," President Xi told the Congress last October.

Under the supply-side reform agenda, China pledged to remove 100 million-150 million mt/year of crude steel capacity during the current 13th Five-Year Plan period of 2016-2020. Over the same period, the country planned to close some 500 million mt of coal production capacity, which had grown to more than 2 billion mt/year. In the case of steel, the mandated closures equate to roughly one-tenth of China's overall capacity. China is likely to achieve the upper end of the target this year.

Further, an additional 140 million mt/year of unlicensed, low quality induction furnace capacity was surprisingly and quickly closed down last year. This provided market share opportunities for domestic steelmakers, resulted in a marked reduction in exports, and helped support global steel and raw materials prices.

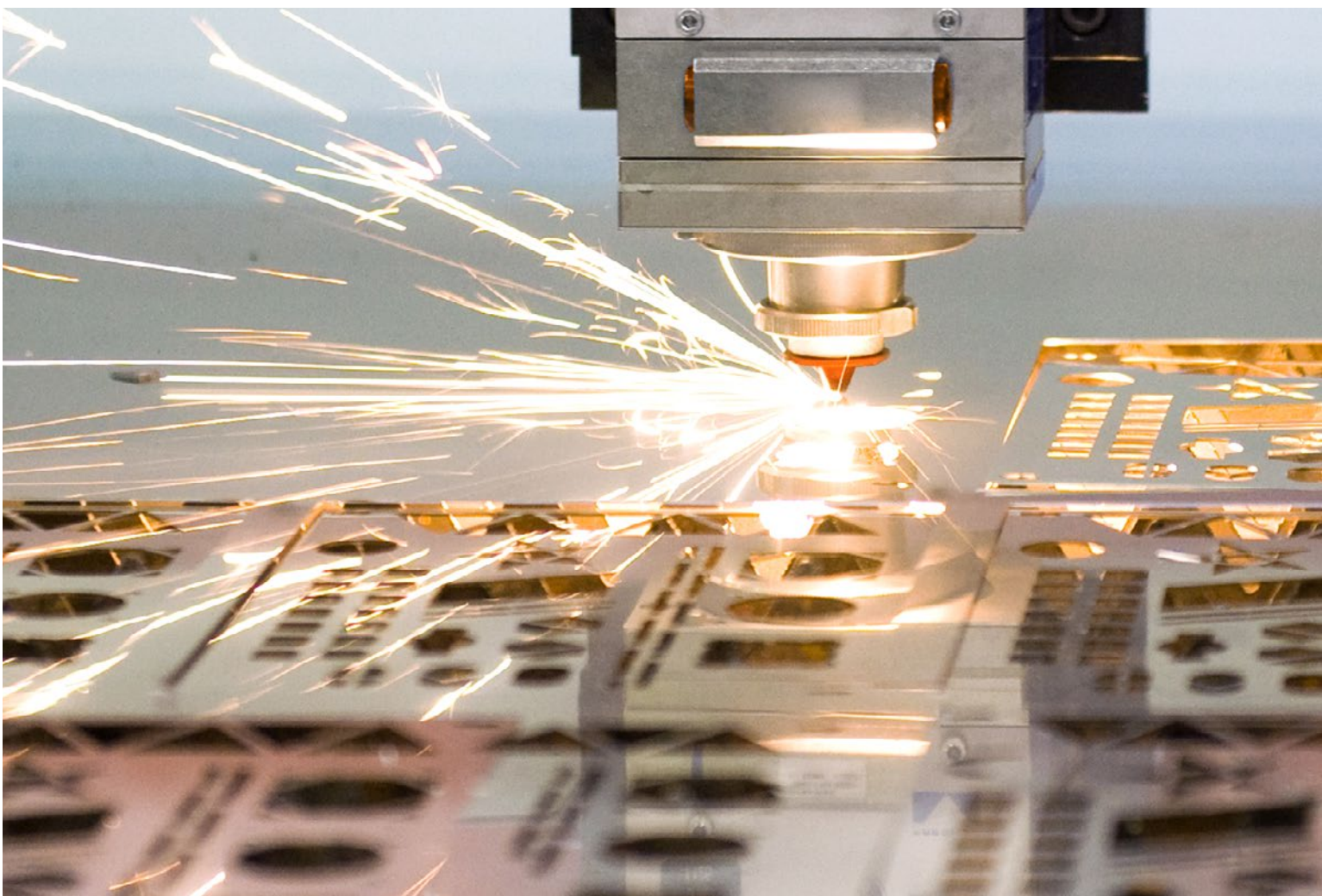
Though a big chunk of capacity has been removed, steel and aluminum production increased last year as more efficient producers lifted their operating rates. Aluminum production for 2017 rose 1.6% on year to 32.27 million mt, while crude steel output increased by 5.7% to 831.7 million mt.

Ongoing monitoring

But there was more to come. In an attempt to meet stringent environmental targets, the government ordered steelmakers in the most polluting provinces and cities in northeastern China to lower their utilization rates—and therefore emissions—to an average of 50% during the winter heating season of mid-November to mid-March. In some cases, restricted output has been extended beyond the March deadline, and is effectively in place for the full year.

As part of the winter heating season cuts, major aluminum producers China Hongqiao Group and Xinfu Group were told to cut their production by 2 million mt and 2.6 million mt, respectively, over the

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Constantly monitoring and adjusting utilization rates and production levels to ensure environmental targets are being met appears to be a policy that is here to stay.

period. Question marks remain over the efficacy of the winter curtailments as the net impact was not as pronounced as expected. Further, in the case of aluminum output, new smelting capacities brought on in 2017—such as Aluminum Corp of China’s new facility in Inner Mongolia—exceeded the cuts. Steel, too, is seeing an upswing in new electric-arc furnace capacity, which is deemed to be less polluting than traditional iron ore and coal fed blast furnaces.

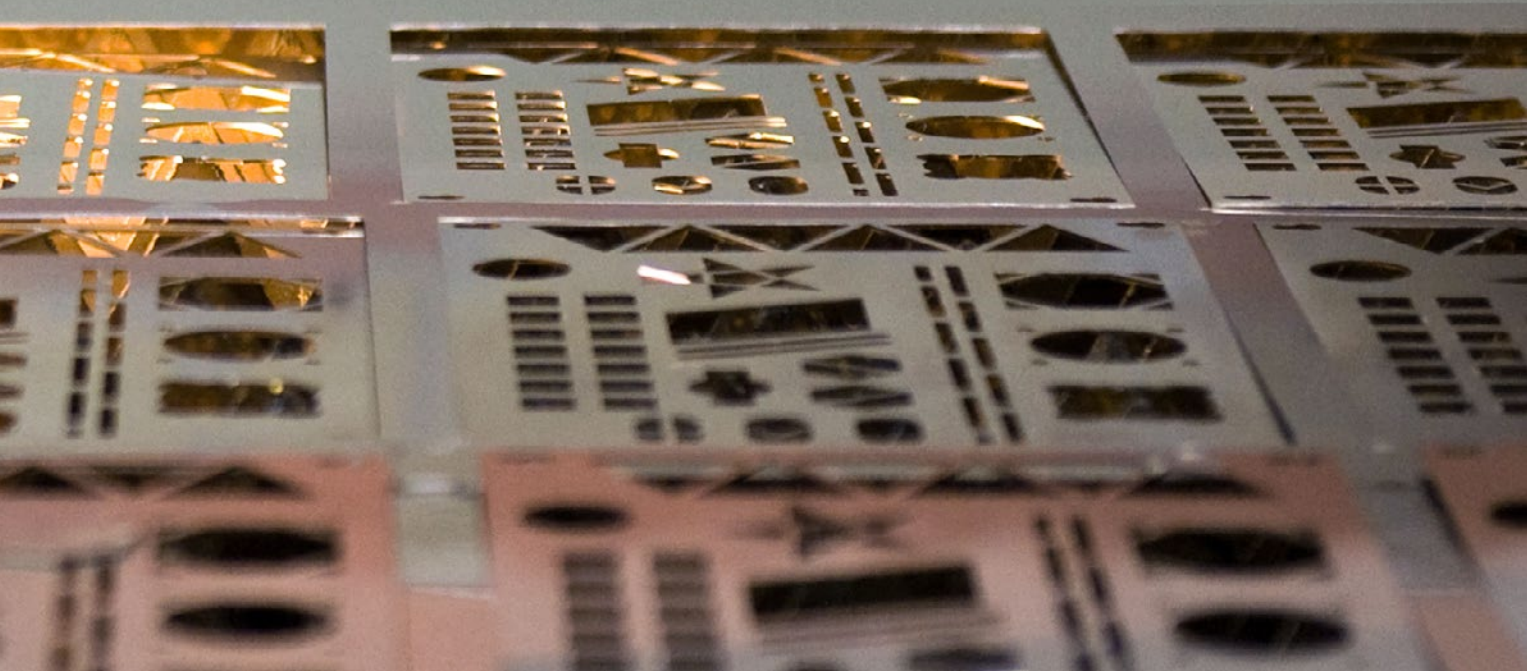
Constantly monitoring and adjusting utilization rates and production levels to ensure environmental targets are being met appears to be a policy that is here to stay. It is something that wider markets will need to be mindful of; and it also makes forecasting production more challenging. Often the moves can

be sudden and create enormous ripples—both beneficial and negative—in international markets, impacting prices in a big way. This was clearly seen in 2016 when the number of working days at China’s coal mines was reduced to 276 from 330.

Suddenly, international buyers of coal feared China would lift imports, leaving less available material for them. The production scale-back was the major contributor to export prices of high quality Australian metallurgical coal soaring beyond \$300/mt FOB, while thermal coal export prices reached \$89/mt FOB by the end of 2016. Met coal exporters were happy, but the higher prices put tremendous pressure on steelmaker margins. Some Indian producers were forced to temporarily halt operations at some of their facilities

“The move to higher quality output means China will increasingly require higher quality inputs.”

Paul Bartholomew



until the steelmaking spreads were more conducive. So while China is trying to remove risk from its industrial landscape, that risk can be passed on, most notably in the form of price volatility. It is one of the reasons that commodity price hedging through derivatives has been a major growth area in recent years.

The move to higher quality output means China will increasingly require higher quality inputs. In the case of iron ore, the spread between low- and high-grade material has blown out with 58% Fe material receiving discounts of up to 40% against the S&P Global Platts 62% Fe benchmark.

What has become clear is that the days of paying lip-service to improving the environment in China

are over. Previously, the environment came a distant second to economic growth, and provincial governments were often more concerned about achieving their revenue targets than providing clean air for their inhabitants. This scenario was a major contributor to the excess capacity and waste seen across so many industries. Further, provinces did not always heed the missives and instructions coming out of Beijing. Now, however, they are being put under pressure to meet PM2.5 targets, and industrial activity, such as steel production, is being wound back until these targets are met. Steel mills and aluminum smelters are now subject to regular environmental inspections, and simply turning equipment back on the moment the inspectors have departed the premises is less of an option. ■



Africa is a source of great reserves—both tapped and untapped—of metals used for batteries for EVs.

Africa's battery metals rush—what hope of sustainable development?

By Diana Kinch

The electric vehicles revolution has been disruptive for the metals industry, bringing challenges and benefits for miners, traders, financiers, carmakers and consumers. In the longer run it should benefit the environment. But is it good for Africa?

Africa is a source of great reserves—both tapped and untapped—of metals used for batteries for EVs. The Democratic Republic of Congo provides more than 60% of the world's cobalt supplies of which Glencore is the biggest producer. Zambia and the DRC are home to some of the world's richest copper reserves in the African Copper Belt, being exploited also by Glencore and Ivanhoe Mines among others. Copper is used in EV charging infrastructure, as well as in the EVs, and will thus be subject to high demand growth whatever changes occur in battery chemistries in future in a move to trim costs. Zimbabwe has significant reserves of lithium and, according to government sources, also has "almost all the battery minerals". Projects are being developed by local companies including Bikita Minerals and Zulu Lithium. Burundi

has what is possibly the world's richest reserves of rare earths—used to make the strong magnets used in EVs—and a major project is under development by Guernsey-based Rainbow Rare Earths.

Africa's battery mineral-rich economies are now, in the main, growing faster than many elsewhere in Africa with the exception of Ghana, which has recently been leading the region's growth and may notch up 8% growth this year. The World Bank has said it expects the DRC's economy to average 5% growth in 2017-2018, compared with 2.7% in 2016, thanks in part to stronger commodity prices and a growing services sector, although other sources have put economic growth as high as 15%, propped up by cobalt prices, which more than doubled last year. Zambia's GDP



“It’s not really helping so much because most of the money is going to the corporate world.”

growth is estimated at 4.5% this year and Zimbabwe’s at between 4.5% and 6%. This has led miners to suggest that Africa is already benefiting from the battery metals boom. But the extent to which this will really bring socio-economic benefits is still unclear, particularly as steep rises in the prices of metals produced locally is also inflationary. The economy in Burundi is nonetheless expected to contract this year as its farmers face export restrictions on tea and coffee and the benefits from the new-age minerals have not yet set in. Rainbow Rare Earths’ Gakara mine now ramping up is the sole non-artisanal mine currently operating in the east African country.

Not Africa’s first minerals boom

Observers point out that this is not Africa’s first minerals boom, and if the ample iron ore, gold, platinum and palladium reserves exploited in recent decades haven’t yet sorted Africa’s economic problems, why should battery metals?

“It’s not really helping so much because most of the money is going to the corporate world”, said Stanley and Tonella Nsofwa of Hapa Development Zambia Ltd, an organization which helps miners partner with local companies in Zambia, at the recent Global Mining Finance conference in London. Admittedly, international miners, including ArcelorMittal and Ivanhoe, have taken important initiatives to protect local African populations, including their own workers, from ebola and malaria. But mining still essentially yields a single harvest, so unless important recycling initiatives are also set up in African nations, such as Eurasian Resources Group’s cobalt tailings project in the DRC, it is unlikely that the benefits will be sustainable in the longer-term.



Some African nations are taking important steps to turn the battery minerals boom to their advantage. DRC president Joseph Kabila's government is thrashing out with miners, including Glencore, Ivanhoe and China Molybdenum Corporation, the details of a new mining code expected to come into force by June. "This will increase royalties on export sales of most minerals from 3% currently to 5%," says Freddy Shamwana, a chamber of mines member and executive director of African Environmental & Sustainability Consulting. "In addition, the government plans to increase a mandatory shareholding in all mineral extraction companies from the current 5% to 10% from the time they start production: this equity stake will not be paid for by the government," he said, noting that foreign miners still need to team up with a local partner or subsidiary.

In Zimbabwe, the mining investment climate has changed for the better since former president Robert Mugabe resigned from office late last year after 37 years in power. "The indigenization law changed in

March, except for in platinum and diamonds," Donald Charumbira, Zimbabwe ambassador in London, told S&P Global Platts, noting that 100% foreign ownership is now permitted in projects in other mineral areas, as opposed to the obligatory 51% local ownership previously. "Investors are willing to take meetings now... delegations are coming from all over the world; there is tangible interest," Charumbira said.

Zambia, which aims to produce 1 million metric tons of copper this year, is, meanwhile, considered to be a tough environment for junior miners to get mining permits: they are reportedly also shying away from Tanzania which has upped its royalties and local ownership rules.

In Burundi, Rainbow Rare Earths reports that it is obliged to reinvest all its export sales revenue into the country, under an accord set up with the government in 2015. "The Company is therefore exposed to the risk that access to its funds may be restricted either as a result of currency shortages,

Zambia aims to produce 1 million metric tons of copper this year.

“It takes 8 or 9 years to prepare a mine to come on stream; you can have a regime change in that time,” says mining asset manager Farzad Moshfeghi.

governmental policy changes, or international banking restrictions imposed on Burundi by banks or governmental bodies,” said CEO Martin Eales in the company’s most recent financial statement.

In this case, the quality of the deposits to which Rainbow has rights make this kind of arrangement worthwhile. Still, for many companies, mineral investment in Africa is only attractive to shareholders if there is a guaranteed return, remembering that the lack of infrastructure, political risk and rising cash costs on the continent generally make for a lower return on investment than mining projects in safer jurisdictions. “It takes 8 or 9 years to prepare a mine to come on stream; you can have a regime change in that time,” says mining asset manager Farzad Moshfeghi of London-based Finity Asset. Which means that much of that African cobalt, lithium and copper may still be untouched underground for many years to come. ■

Cobalt Points

Cobalt is mostly a byproduct of copper and nickel mining and only about 1% of the world’s cobalt supply comes from primary cobalt mines, making new supply almost entirely dependent on new nickel and copper projects, according to the website of Cobalt 27 Corporation.

Electric vehicles will require 314,000 mt of cobalt by 2030, representing 314% of global 2016 supply, Ivan Glasenberg, CEO of Glencore, told investors in a conference call last December, quoting a study his company commissioned from CRU.

“It is clear electric vehicles will be a disruptive force to the world,” Glasenberg said. But he also said the world would not be able to rely on the DRC to provide that quantity of cobalt, meaning recycling would have to play a much bigger role than today.

The same study Glasenberg quoted from said EVs would need 4.1 million mt of copper, representing 18% of 2016 global supply for use in generation, grid infrastructure, grid storage and EV charging infrastructure.

Glencore’s Katanga Mining subsidiary in DRC is expected to produce 150,000 mt of copper cathode in 2018 and 11,000 mt of cobalt, rising to 300,000 mt of copper in 2019 and 34,000 mt of cobalt.

In March, Chinese battery recycler GEM said it had agreed to buy 42,800 mt of contained cobalt in hydroxide over 2018-2020, taking a substantial quantity of cobalt units out of the market over the next two years, which helped trigger further price increases of cobalt metal on the spot market.

China Molybdenum and EGA also have substantial mining interests in the Katanga mining district of DRC. China Molybdenum is the largest Chinese investor in the DRC cobalt space, operating in the Tenke Fungurume mining area of Katanga province.



Booming demand for smartphones was the single biggest contributor to cobalt's price increases according to some studies. In a report published last December, BMO Capital Markets said, "Smartphone batteries are still the main end use market for cobalt."

Canadian investment vehicle Cobalt 27 Capital hoarded nearly 3,000 mt of cobalt metal during the course of 2017, a stock it still holds. This also contributed to cobalt's price gains, and in December alone, Cobalt 27 added 822 mt to its holding, funding the purchase with an issue of shares.

In February, Cobalt 27 announced it had acquired a 1.75% net smelter return royalty on all future production over all metals from Royal Nickel's Dumont Nickel-Cobalt Project, one of the largest undeveloped nickel/cobalt resources in the world, located in Quebec in Canada.

In 2017, the price of physical high-grade cobalt cathode rose by nearly 138% to \$36.50/lb at the end of December from \$15.35/lb at the beginning of the year, according to S&P Global Platts assessments. In the period from the beginning of 2018 to the end of March this year, cobalt prices rose by nearly 190%. In the first three months of 2018, cobalt prices rose by 22% to \$44.50/lb, the highest spot price seen since the middle of June 2008.

Batteries—for smartphones, as well as EVs—are competing for cobalt units with a strong aerospace industry, where aircraft engine manufacturers have multi-year order backlogs. Cobalt is used in jet engines and also in industrial gas turbines. Lower grades of cobalt are also used in cutting tools and high-speed steels, where demand is on the increase because of increased mining and exploration activity. ■

Cobalt is mostly a byproduct of copper and nickel mining and only about 1% of the world's cobalt supply comes from primary mines.

European secondary aluminum prices set to shift lower as oversupply bites

By Suzie Skipper in London and Tina Allagh in Washington

Secondary aluminum prices in Europe, after gaining €70/mt (\$86) since the start of 2018, have pulled back by a similar amount toward the end of the first-quarter, and look set to shift lower throughout the balance of the year as overcapacity weighs on the market.

US DOLLAR/EURO EXCHANGE RATE



Source: London Metal Exchange

Commodity-grade 226 aluminum alloy, as reported by S&P Global Platts, spurred on by strong demand in the fourth quarter of 2016 and predicted consumption levels for the first quarter of this year, moved up from a low of €1,690-€1,740/mt delivered at the start of October 2017, reaching a high of €1,830-€1,880/mt delivered in mid-February 2018. But in March, 226 prices have shifted steadily lower to €1,750-€1,850/mt delivered by the end of the month.

Europe's recycled aluminum market has simply not had the export outlets, notably into Asia and the US which, more often than not, help to balance European supply.



One of the main reasons for the lack of exports has been the strength of the euro against the US dollar, which in Q1 has remained strong since the start of the year at between \$1.19-\$1.24.

The strong euro, in addition to the higher prices in Europe during Q1, has meant that export volumes to Asia and the US have been much reduced, leaving excess capacity in Europe. Secondary aluminum exports during Q1 were estimated at 500-1,000 mt/month, much reduced from an average 3,000-4,000 mt/month and considerably lower than the peak level of 8,000-10,000 mt/month.

Most European market players predict that the pressure seen on 226 market prices during Q1 is likely to continue, at least for the

short term, with the metal likely to oscillate between €1,700-€1,750/mt for the balance of the year.

“Once 226 prices reach €1,700/mt then we will see Asian buying interest emerge and exports will be a possibility...and this will help firm up European prices,” said a Spanish producer. This scenario is also dependent on both the euro/dollar and the Yen/dollar rates being favorable.

Others expected to see much more pressure on prices going into the second-half of the year with market prices, perhaps slipping below the €1,700/mt delivered level.

“Given the market situation I think prices are too high and we will see more pressure on prices later in the year,” predicted a

European diecaster, citing high melting capacities in Europe and good scrap availability.

Uncertainty surrounding US import duties on aluminum (10%) and steel (25%) has also had a destabilizing effect on the European market. While the European Union won at least temporary exemption, European market players have been concerned over the possible impact.

“Some of our customers working for US car makers, such as GM in Europe, may be forced to put the price up of their casted parts by 10%,” said a southern European producer, adding that perhaps the price of secondary aluminum and casted parts would slide lower so that the European market can continue to trade with the US.

The strong euro, in addition to the higher prices in Europe during Q1, has meant that export volumes to Asia and the US have been much reduced, leaving excess capacity in Europe.

European demand to stay strong

Demand in 2018 was predicted to remain equal to 2017, or even exceed it, and in reality not much has changed to these forecasts. The European automotive industry, the main consumer of 226, 231 and other grades of recycled aluminum, remained strong during Q1.

Aluminum alloy consumption in Europe is estimated to increase by a further 2%-3% in 2018 with some areas of growth higher than others.

“Demand this year should be similar to last year, we perhaps may even see an increase,” said an Italian producer.

Alloy suppliers have noted that the reduction in demand for diesel cars after the Volkswagen emissions scandal has begun to have an impact in the French market, particularly for PSA and Renault during Q1.

The latest statistics for Europe show that demand for passenger cars in the European Union grew significantly in February 2018, rising by 4.3% to 1,125,397 units compared with February 2017, according to the European Automobile Manufacturers Association (ACEA).

In volume terms, these were the best February results since 2008. Nearly all major EU markets posted growth, except for the UK (-2.8%)—where car sales declined for the 11th consecutive month—and Italy (-1.4%). Spain (+13.0%) recorded the strongest gains, followed by Germany (+7.4%) and France (+4.3%).

From January to February 2018, demand for new cars increased by 5.8% in the European Union, counting 2,378,965 units in total. Momentum is starting to slow down in certain markets, especially in the

UK (-5.1%). However, passenger car registrations continued to grow in Spain (+16.4%), Germany (+9.5%) and France (+3.4%) during the first two months of 2018.

European demand for secondary aluminum is expected to move higher once again in 2018 by some 2%-3%, propelled by the European automotive market, albeit at a slightly slower rate than in 2017.

Prices are predicted to stay within a narrow corridor of between €1,650 and €1,750/mt delivered for the balance of the year. If European supply is squeezed by exports to Asia or the US later in the year, or the market experiences supply difficulties, we could see prices in this highly volatile market move up towards €1,800/mt delivered but any sudden and unexpected increase would most certainly be capped at €1,900/mt delivered.

US market sees similar demand scenario

Meanwhile, in the US alloy market, the demand scenario was quite similar, with demand expected to be flat from last year, but with a more bullish pricing scenario going forward, due to higher input costs.

According to the North American Die Casting Association, aluminum diecasters are

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expected to see demand at flat to a slight increase of less than 1%, according to a survey of diecasters. Overall shipments in 2017 versus 2016 were up 2.4%.

One Midwestern diecaster, who supplies the truck and RV markets, said he saw very healthy demand, “but I am not sure how long it will stay that way. The casting business is a cycle. Business can be booming, but there is too much competition coming in. Business can be good, but our profits are down.”

The diecaster said he did not expect to see much slowdown in the market through July, with maybe a slight dip in the summer. “Everyone is pretty optimistic,” he said.

Some of the bright spots in the market demand surprisingly are the ATV market as well as heavy trucks. “Those are up big time,” he said, adding that overall he expected a “very good” 2018, after coming off of the “best year we ever had” in 2015.

A second diecaster said he expected to be “a little lighter on demand through the end of the year. We are typically softer during the summer since we have a fair amount of lawn and garden work, and we are wrapping up some projects that are moving to China for the local market there.”



He said he was expecting some increased volume in 2019 from awarded projects that will be ramping up next year. “I can’t say I have good sense for where pricing is going, but I am hearing from more broker types looking to find a home for 380-type RSI and other non-spec material, perhaps dampening pricing for spec material.”

“New technologies have been developed and others are in development for the diecasting industry,” said Stephen Udvardy,

president of NADCA, during his State of the Industry address at the end of last year. “These will assist in keeping the industry strong and able to compete globally and with other processes through improved operational efficiencies and improved cast part performance.”

According to NADCA, major markets have been fairly steady. “However, softening of the automotive market is forecast for 2018 and may result in diecasting shipments declining a few percentage points unless the

Aluminum diecasters are expected to see demand at flat to a slight increase of less than 1%, according to a survey of diecasters.



A secondary alloy producer said he expected alloy pricing to remain strong through the summer and into the third quarter, although there are a “few factors at play for lower prices.”

growth in structural die castings for the automotive industry and growth in non-automotive industries offset the automotive market softening.”

Jeff Schuster, senior vice president of forecasting at LMC Automotive, said in a forecast at the beginning of the year that “on the heels of a strong close in 2017 to 17.2 million units, optimism for a solid 2018 seems to be growing. Most variables are aligned favorably, with the majority of that positive weight being carried by an expected boost in the economy.” LMC’s forecast for 2018 total light vehicle sales is just under 17 million units, a decrease of 1.4% from 2017.

A secondary alloy producer said he expected alloy pricing to remain strong through the summer and into the third quarter, although there are a “few factors at play for lower prices,” namely a potential for softer LME NASAAC prices. “I am leaning toward slightly higher prices in September than today,” he said. “I do not think demand will drop off enough over the summer to cause a dip in prices. I think things will stay flat to up.”

The producer said he found that the OEMs were “moving quickly to move jobs back to the US” as Section 232 comes to the forefront. “It’s a big initiative to

move jobs back instead of having parts manufactured in China,” he said. However, he said this could backfire if the Chinese decide to fully assemble those products in China and ship them to the US, thus creating more competition.

Another producer said he expected “secondary alloy prices to continue to rise into June and then maybe settle downward through the summer. But with demand remaining high into Q3, prices will begin to rise again.”

Factors expected to support alloy prices this year are higher silicon, copper and transportation costs.



A couple of producers said their silicon costs alone increased by 30 cents/lb on annual contracts in January 2018 from 2017 levels.

A producer said he expected the Platts benchmark A380 alloy price to inch up sometime this year to \$1.03-\$1.05/lb, delivered Midwest, from 97.5-100 cents as of March 22. The Platts assessment had not seen \$1.00 on the high end since April 2015.

However, the producer said while he was “pretty confident” on the automotive market—as his transplant customers were adding units—he noted that the wildcard

in the market was the bankruptcy by industry giant Real Alloy.

Said a trader: “Real Alloy throws a wrench in all of our forecasts. The question is how long can they operate, and are they making any money? And will their plants run or will they shut down?”

Real—which has 27 facilities in six countries across North America and Europe—filed for Chapter 11 bankruptcy protection in November 2017. In late March the Bankruptcy Court for the District of Delaware approved the sale of the company to a group of noteholders. Under the terms of

the sale, the noteholder group, led by DDJ Capital Management, is buying Real Alloy Holding.

Real Alloy president Terry Hogan said at the time he foresaw no major changes to the operations of the company. ■

Indian steel embarks on a growth path with consolidation

By Charlotte Rao and Elizabeth Low

India is edging closer to becoming the second largest steel producer in the world, as consolidation provides impetus to ailing domestic mills in the country. Major local and foreign steel makers have stepped in to bid for the takeover of heavily indebted steel mills in the country.

In February, India overtook Japan as the second largest crude steel producer with overall output at 8.4 million metric tons, increasing by 3.4% year on year. This was higher than Japan's 8.3 million mt, produced during the same month, at a declining rate of 0.5% year on year, according to data published by World Steel Association.

In 2018, India's overall steel production is expected to increase with new capacity ramping up and the consolidation of indebted mills operating at low capacity utilization. Steel consumption in the financial year ending 2019 is likely to continue unchanged at an estimated 4%-5% over the previous year, according to a survey conducted of mill officials and traders by S&P Global Platts. During April-February, India's overall crude steel output

increased by 4.4% year on year to 93.11 million mt, according to India's Joint Plant Committee.

In June last year, several steelmakers were referred by their lenders to an insolvency committee under India's Insolvency & Bankruptcy Code. However, these proceedings did not deter these mills from raising steel output.

The process of consolidation will infuse fresh funds into these stressed mills, helping them to raise capacity utilization, analysts believe. "Consolidation will benefit large steel players with economies of scale and better bargaining power on sourcing [raw materials]," said a recent report published by Mumbai-based India Ratings.

During April-February, India's overall crude steel output increased by 4.4% year on year to 93.11 million mt, according to India's Joint Plant Committee.





India's Crude Steel Output during April 2017-February 2018:

	April-February 2017-2018	April-February 2016-2017	Change YOY
Steel Authority of India Limited	13,622,000	13,222,000	3%
Rashtriya Ispat Nigam Limited	4,259,000	3,581,000	18.90%
Tata Steel Limited	11,327,000	10,548,000	7.40%
Essar Steel	5,534,000	4,896,000	13.00%
Jsw Steel	15,492,000	14,977,000	3.40%
Jindal Steel & Power Limited	3,572,000	3,156,000	13.20%
Others	39,305,000	38,792,000	1.30%
Total	93,111,000	89,172,000	4.40%

Unit: Metric tons. Source: Joint Point Committee

A year of consolidation

The process of consolidation began with lenders approving Tata Steel as the most eligible bidder to take over the 5 million mt/year Bhushan Steel Limited (BSL) on March 23. Tata Steel will also be liable for BSL's existing debts of an estimated INR 450 billion (\$6.9 billion). The acquisition will raise Tata Steel's overall steelmaking capacity to 18 million mt/year.

This was followed by the selection of Vedanta as the highest bidder for acquisition of the 2.5 million mt/year Electrosteel Steels. Vedanta is likely to utilize iron ore from its mines in Karnataka for steelmaking through the acquired unit.

Proceedings are also underway for acquisition of the 10 million mt/year Essar Steel. While bids have been placed, lenders have yet to approve the eligibility of these bids. Bids have been placed for Essar Steel by global players, such as Nippon Steel & Sumitomo Metal Corp, together with ArcelorMittal and Russia's VTB Bank promoted Numetal Mauritius.

Similarly, JSW Steel has emerged as the sole bidder for the acquisition of the 1.5 million mt/year Monnet Ispat & Energy. However, the company has not yet received any official communication from the resolution professional overseeing investigations of Monnet Ispat, company officials said.

JSW Steel is in the process of expanding its reach in other regions. On March 30, JSW Steel announced the buying of USA-based Acero Junction's Ohio sheet mill for \$80.85 million. JSW Steel is also reported to be in the running to acquire Italy's largest steel company—the 10 million mt/year Ilva in a joint bid with Acciai Italia.

Consolidation of assets is likely to increase India's overall capacity utilization to 80% during the 2018-2019 financial year (April 1-March 31). However, some

Estimated debts of Indian steel companies

	Rupees (in billion)	Capacity metric tons/year
Essar Steel Limited	370 (\$5.6 billion)	10 million
Bhushan Steel Limited	450 (\$6.9 billion)	5.6 million
Bhushan Power & Steel	370 (\$5.6 billion)	2.3 million
Electrosteel Steels	114 (\$1.8 billion)	2.5 million
Monnet Ispat & Energy	120 (\$1.8 billion)	1.5 million

Source: S&P Global Platts compilation

of the stressed assets may take 12-18 months to ramp up utilization to optimum levels, analysts have said. While capacity utilization at major integrated mills is currently about 70%-75% of capacity, the mills awaiting resolution of their debts are currently operating at about 50% of their capacity.

Infrastructure push to spur steel demand

A turnaround in these stressed assets, along with new capacity rampups could more or less meet India's incremental demand increase, the report says. India's finished steel demand during April-February, increased by 7.6% year on year to 81.95 million mt, according to the latest JPC data.

This anticipated increase in steel demand is spurred by the launch of numerous infrastructure projects announced by Prime Minister Narendra Modi's government for 2018. The implementation of these projects is expected to pick up speed before the country goes to the polls in 2019, market participants said.

On October 25, the Indian government approved the Bharatmala project, which includes the building of

about 34,800 km of roads. Phase 1 comprising 24,800 km of roads is scheduled to be completed in 2022. This is in addition to other road construction projects comprising 48,877 km planned by the National Highways Authority of India over the next five years.

Steel consumption for housing construction is also likely to rise due to Modi's Housing for All by 2022 movement aimed at providing slum dwellers with affordable housing by building 12 million units in urban areas.

Besides, Indian steel is also gaining favor in export markets. The country's overall steel exports jumped by 34% year on year to 8.9 million mt during April-February, the JPC data shows. Export demand is providing an additional drive push to local steelmakers to increase output.

Raw material demand on the rise

Raw material suppliers to India are equally enthused by the anticipated rise in India's steel output. Considering an estimated 4% year on year increase as predicted by sources, India's overall steel output is likely to rise to an estimated 105 million mt, during 2018-2019.

With India's dependence on imports for coking coal, seller sources report an expectation for coking coal demand to rise significantly. India imported 54 million mt of coking coal in 2017, with the figures set to rise to 60 million mt in 2018, according to a recent Goldman Sachs report.

One coking coal miner said that as most of the smaller mills sort out their credit issues and consolidate, he expects coking coal demand to increase significantly. He added that he had already been approached by a customer set to increase its tonnages by close to 2.5 million mt over the next five years. ■

India's Finished Steel output and demand during April 2017-February 2018

	April-February 2017-2018	April-February 2016-2017	Change YOY
Production	95.32	92.67	2.80%
Imports	7	6.6	5.60%
Exports	8.91	6.6	34.60%
Consumption	81.95	76.15	7.60%

Unit: Metric tons. Source: Joint Point Committee



New York state paves the way for big infrastructure

By Anthony Poole

More than a year into Donald Trump's presidency and not a single infrastructure project has been approved as a result of any efforts by him and his administration.

It is all talk, so far, even though it was a cornerstone of Trump's campaign and also that of his Democratic rival Hillary Clinton and mentioned again in this year's State of the Union address to Congress in January.

During the election campaign, both candidates painted pictures of the entire country being completely starved of infrastructure spending and, while it is true that much of the US' infrastructure is crumbling, renewal is taking place, just not on the scale of Trump's much-hyped \$1 trillion infrastructure spending plan.

Nevertheless, some significant projects started long before Trump took office. One such example can be found in New York's Hudson Valley, about 14 miles north of New York City.

The \$4.2 billion new Tappan Zee Bridge, just north of the crossing it is replacing, is nearing completion and is

opened to traffic last autumn and should be fully open on both spans sometime in the second half of this year.

The project was at least 10 years in the making, stuck fast in a quagmire of political ineptitude, before Governor Andrew Cuomo finally got things moving and contracts were signed and construction began in 2013.

Construction of the 3.1-mile, two-span, cable-stayed bridge, linking Westchester and Rockland counties at one of the widest points on the Hudson will have used nearly 100,000 mt of US-made steel and 270 cu m of concrete when complete, New NY Bridge Project, the formal name of the replacement bridge, said on its website.

The construction has employed around 6,300 people on or off-site, including subcontractors, according to Khurram Saeed, a New NY Bridge Project spokesman.





The new Tappan Zee will feature emergency hard shoulders and a 12-ft-wide shared bike and pedestrian lane, both absent on the old bridge.

Tappan Zee Constructors, a consortium of four companies, Flour Enterprises, American Bridge, Traylor Bros and Granite Construction Northeast, has combined local, national and international experience to design and build the bridge.

The new bridge will have a life expectancy of about 100 years, according to New NY Bridge. It will replace the old cantilever structure, opened in 1955 with a planned lifespan of 50 years and designed to carry considerably less than the 137,000 (2011 estimate) vehicles/day it now carries. Unlike the old bridge, the new structure will have dedicated bus lanes, giving commuters in Rockland County on the west side of the river access to an overcrowded Metro-North commuter railroad in Westchester, on the east side, potentially

cutting commute times to New York City considerably. The new bridge will also feature emergency hard shoulders and a 12-ft-wide shared bike and pedestrian lane, both absent on the old bridge.

To fund the new bridge, its owner, the New York Thruway Authority, in December 2013, closed on a \$1.6 billion, long-term, low-interest soft loan through the 1998 Transportation Infrastructure Financing and Innovation Act (TIFIA) program, administered by the US Department of Transportation, which explains the large US steel component. It was the largest loan in the history of the program at the time, according to the New NY Bridge Project on its website. A further \$2 billion in bank settlement funds have been committed to support Thruway capital improvements over the last



two years, including helping pay for the bridge. The remainder of the funding is from Thruway Authority bonds. Thruway tolls are frozen until at least 2020.

While 100,000 mt of US-made steel in a single project may not seem like much in the grand scheme, if a fraction of the nation's dilapidated bridges and railways are repaired or replaced during the lifetime of the Trump administration, that 100,000 mt figure would multiply quickly and significantly, especially if funded through programs like TIFIA.

New York state is also home to other large bridge project, including the replacement of the partly opened \$1.5 billion Goethals Bridge, replacing an older one between New Jersey and the New

York City borough of Staten Island, also involving TIFIA funding. This bridge is now fully open.

Use of existing legislation, such as TIFIA, has done more to get US infrastructure moving than any new law or initiative since Trump took office. A look at the TIFIA project map on the US DOT's website shows several projects funded using program loans, including no less than six in close proximity to Washington. These projects are concentrated primarily along the East, West and Gulf coasts.

It is in the power of the administration and Congress to continue to support and fund programs like TIFIA, or come up with something bigger. But actions speak louder than words. ■



How an iconic cartoon character revolutionized Japanese beer consumption

By Mayumi Watanabe

This is a story of how new ways of marketing made magic in Japan. Once upon a time, there lived a penguin in Japan who pushed aluminum consumption for beer cans. His name was Papipu. He has a website, <http://www.papipu.jp/>.

He spent time with the Japanese beer industry from 1983 to 1988, and worked for a filmmaker, a local electric utility and other industries.

Papipu is a fictional cartoon penguin character created by illustrators Norio Hikone and Seiji Toda. They are best known for TV commercials of canned beer with their pictures, made by Suntory, one of Japan's leading brewer and whisky distiller.

Japan imported its first beer in 1613 and commercialized the first domestic beer in 1869, and aluminum canned beer a hundred or so years later in the early 1970's, according to Kirin Brewery. Kirin estimates that in 1989, canned beer had a 29% market share in Japan. The aluminum can share has

since grown considerably and in 2017, it was 48%, according to the Brewers Association of Japan.

The 1980s was an exciting time as Western mass consumer culture was setting into Japanese lifestyles and aluminum canned beer too. It was the time of the so-called "packaging war" for the breweries. In search of new frontiers, breweries were reaching out to women drinkers. Beer containers became a testing ground for creative ideas, coming in various sizes, shapes and colors.

Suntory marketed its first beer-in-plastic bottle, shaped like barrels, in 1982. In 1983, Papipu penguin TV commercial set the scene. In a chic bar, a handsome penguin is quietly drinking a can



The Suntory penguin beer itself was short lived, and did not even last more than five years, but its marketing story is retold many times over in the industry.

of beer. His eyes are focused on a female penguin singer, singing a ballade, and slowly tears fill his eyes. One hears a man saying, "This beer makes you cry, doesn't it? Suntory Canned Beer."

The voice of the singing penguin was that of Seiko Matsuda, the queen of J-Pop, singing an English song, *Sweet Memories*. But Matsuda was nowhere to be seen. There was no hint it might be her, given the song's lyrics were entirely in English.

The Papipu penguin grabbed the public's eyes. And people loved the song too and started to ask, who the singer was.

Months after the commercial's release, the Japanese public was stunned to learn, the English voice was Matsuda's. At the time, she was not known for singing in foreign languages.

Matsuda fans say this is exactly how Matsuda had started her career. Wikipedia reports that Matsuda's first job was in a cosmetics commercial. But, rather than smiling in front of the camera, she was singing offscreen. But it did not matter, because her voice alone propelled her to stardom.

"Penguin changed Suntory's history. Beer was not a large part of Suntory's business back then, in fact, we [canmakers] were thinking they could possibly engage with this market less. Then they became keen on beer," said a second canmaker official.

Matsuda sang *Sweet Memories* again for Suntory 22 years later for its steel canned coffee commercial. This time, Matsuda appeared in front of the camera and sang the song in Japanese.

The Suntory penguin beer itself was short lived, and did not even last more than five years, but its marketing story is retold many times over in the industry.

“At the time, Japan had only one type of beer—draft beer,” said the second canmaker official.

That was before 1987, before Asahi Breweries’ release of Asahi Dry, crispy beer with lower malt and higher alcoholic content. Asahi changed the way people bought beer.

Before Asahi Dry, people went to bars and said, “Beer.”

After Asahi Beer, people needed to specify, “Nama (draft), or dry.”

Asahi’s competitors became fully engaged with “dry beer” too, leading to marketing competition dubbed as the “Dry War.”

In 2000, low-malt cheaper beer, called “Category 3” came into the market and the competition was about how cheap beer could be.

Said the first canmaker official: “Beer wars all these years were about beer. And now we have come to the end of this cycle and the focus will shift to cans. In the last few decades, cans have become a little thinner and shapes more standardized, but that is about it. The canmaking industry consists of almost the same companies, the same people. We have to start thinking about making cans lighter and thinner. Canmakers and can sheet makers need to work together to achieve technology breakthroughs.”

In 2017, aluminum beer can demand was 9.8 billion cans, or around 430,000 mt of aluminum, down 2% from 2016. And in 2018, it is forecast to fall by another 2%, according to the Japan Aluminum Can Recycling Association and the Japan Aluminum Association.

But Japanese beer drinkers say they are loyal to aluminum because the beer from such cans

tastes better than beer from steel, paper or PET (polyethylene terephthalate) containers.

And aluminum does not just satisfy the pallets of Japanese beer drinkers, Jim Beam, the world’s biggest-selling US bourbon whiskey, is sold mostly in cans in Japan.

While US beer production continues to grow amid the popularity of craft beer, Japan’s beer market is actually shrinking.

Japan’s domestic beer production fell 1.9% in 2016 and a further 2.9% in 2017, and its per capita consumption was a lowly 54th globally in 2016, the latest data showed.

Its aluminum beverage can market is also shrinking overall. Demand was 10.3 billion cans in 2012, but had fallen 7% to 9.57 billion cans by 2017. A further 2% decline is forecast for 2018, to 9.38 billion cans, according to the Japan Aluminum Can Recycling Association.

But in the non-beer alcoholic drink segment, there is a glimmer of hope: Consumption from aluminum cans surged 12% in 2016 and a further 10% in 2017 to 3.54 billion cans.

For the moment, the decrease in demand from beer makers is being covered by the increase from whiskey.

And the Japanese aluminum industry will undoubtedly not cede ground in the beverage market without a fight—beverages account for 20% of rolled and extruded aluminum consumption in Japan, which is more than the automotive sector. ■

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Craig Bouchard
Chairman and CEO

Revolutionizing the Metals Industry

Braidy Industries is revolutionizing the world of materials science. At our location in Ashland, Kentucky, we are building the first greenfield aluminum rolling mill in the United States in over 40 years. The advantages of greenfield are many; including the lowest energy, human resource legacy, environmental, logistics, land, SG&A and maintenance costs in our industry. We will produce common alloy, as well as series 6000x and 7000x aluminum sheet in a production environment that is fully-optimized for our aerospace and automotive customers. The mill was 180% reserved of our 2020 Phase 1 capacity prior to recent implementation of Sections 232, 301 and trade actions regarding Russia. These events accelerated Braidy's commercial efforts as the only full scale rolling mill in the world opening, or on the drawing board, at this time.

Our recent acquisition of MIT-incubated Veloxint, a 2018 Bronze Edison Award winning company for Space Technology, allows us to develop and manufacture nanocrystalline alloys that are the strongest metals ever produced.

We were founded by a visionary CEO with the purpose of leading the materials industries in technology, innovation and an unyielding commitment to quality, safety and return to shareholders.

The Lowest-Cost North American Aluminum Mill

Braidy Industries' inaugural project is the greenfield construction of a best-in-class technologically-advanced aluminum rolling mill in Ashland, Kentucky. The project site, at the EastPark Industrial Center, allows for the co-location of supporting and complimentary services and companies, forming the foundation of an advanced-manufacturing cluster in the heart of the United States' Appalachian region. The Commonwealth of Kentucky legislated a significant foundational investment through an unprecedented unanimous vote of the state legislature, creating extremely favorable conditions at all levels of government. Coupled with an eager, skilled and readily available workforce, Braidy Industries is optimally positioned for exponential growth as an industry leader in production and cost efficiency.

Veloxint: Producing the Strongest Metals Ever Made

Veloxint has patented the science allowing efficiently scalable production of bulk nanocrystalline metal alloys. With strength and hardness performance 2-5x that of existing metals, corrosion resistance, and thermal stability, Veloxint alloys exhibit extraordinary properties not previously achievable at bulk scale or with 3D printing within the metals industry. Applications span across multiple lightweighting markets in industries such as automotive, aerospace, defense, mining, robotics, and consumer goods. Since the company's founding in 2015, it has entered into commercialization and development agreements with government agencies and industry leaders such as Stanley Black & Decker and DesktopMetal to bring products to market starting in 2019.

World Class Team – Over 200 Years of Executive Leadership Experience

The team at Braidy Industries represents over 200 years of executive leadership in the metals industry, and is led by an outstanding board of directors:

Craig T. Bouchard – Chairman and CEO, founder, largest shareholder, entrepreneur, and New York Times bestselling author

Dr. Chris Schuh – Head of the Materials Science Department at MIT and co-founder of Veloxint

Dr. Michael Porter – Harvard Business School Professor, Head of Harvard University's Institute for Strategy and Competitiveness and author of global bestseller *Competitive Advantage*

Ret. General Norty Schwartz – Served as the 19th Chief of Staff of the United States Air Force and a member of the Joint Chiefs of Staff

John Preston – Former Director of Technology Development (and Licensing) at MIT, whose tenure developed companies currently worth an estimated \$150 Billion in public market capitalization

Charles Price – Acclaimed entrepreneur and CEO of Kentucky-based Charah, Inc. with over 35 years of experience in the industrial and construction industries.



Mr. Ahmed Ezz

Founder and President of Ezz Steel

Ezz Steel Egypt's Visionary Steelmaker

Ezz Steel is one of the fastest growing and most technically advanced steel producers in the world. It is the largest independent steel producer in the Middle East and North Africa, exporting high-quality steel products to many countries on four continents around the world. It has become established as a technological leader in the steel industry, having invested more than \$4 billion in the most advanced steelmaking technology.

The Ezz Steel brand is synonymous with quality. High-grade raw materials, highly automated processes and continuous monitoring deliver steel quality that is second to none. Ezz Steel products meet or exceed steel industry benchmarks and comply with the most stringent international and customer standards.

The company's four purpose-built, state-of-the-art plants are strategically located close to major road links and international ports. Together, they have the capacity to produce 5.8 million tons of steel per year, with 3.5 million tons of long products capacity, 1 million tons of hot-rolled coil (HRC) capacity, and 1.3 million tons flexible capacity to produce either long products or HRC. These products are manufactured in more than 300 grades with precisely controlled properties to meet the demands of many challenging applications in the construction, manufacturing, engineering and transport sectors.

Ezz Steel rolling mills can produce up to 4.5 million tons of long products per year, including rebar and wire rod. The company produces both plain and deformed rebar, used in the construction of large-scale masonry and concrete structures, from tunnels and bridges to high-rise buildings and industrial plants. Its wire rod products are used in applications such as high-tensile cables, automotive components, springs, fasteners and fixings, and range from low-carbon steel grades with exceptional welding characteristics through to high-quality steel grades for enhanced drawing performance.

The company's hot strip mills can produce up to 2.3 million tons of hot-rolled coil (HRC) per year. Its advanced thin-slab continuous casting technology can produce flat steel with thicknesses as low as 1mm. HRC is produced

in more than 250 grades, to meet the demands of diverse applications, including household goods, earthmoving equipment, infrastructure for nuclear projects, pipes and a host of automotive and shipbuilding components.

A skilled workforce of more than 8,000 people puts the Ezz Steel stamp of quality on every product. A spirit of excellence and continuous improvement pervades the Ezz Steel culture, embodied by its founder and president Mr. Ahmed Ezz and upheld by the company's highly qualified professionals.

Sustainability is at the heart of Ezz Steel. The company prides itself on balancing its continuous growth with minimizing its impact on the planet. Its environmental management system is certified to the ISO 14001 standard and its plants meet internationally recognized occupational health and safety standards. The company has invested heavily in environmental protection at all plants, maintaining strict controls over its gaseous emissions, liquid effluents, solid waste recycling and noise levels.

Expansion and development never cease at Ezz Steel. Its recent \$550 million investment in a new Direct Reduced Iron (DRI) mega module at Suez is a significant contribution to the company's vertical integration. Such an investment in upstream operations increases the efficiency and profitability of Ezz Steel, and consequently enhances its competitiveness, both regionally and internationally. With this addition, Ezz Steel has become the second largest DRI producer in the world, with a capacity of 5.1 million tons per year.

The primary focus for Ezz Steel in the coming years is to continue its expansion to keep pace with growing demand. At the same time, the company remains devoted to investing in sustainable operations and technologies, upholding its position as a modern, efficient and forward-looking steel producer.



Sanjeev Gupta
Executive Chairman
GFG Alliance

GFG Alliance: Champions of Sustainable Industry

GFG Alliance is an international group of businesses, founded and owned by the British Gupta Family. It combines some of the world's leading industrial, natural and financial resources, working together towards the delivery of a common industrial strategy. The Alliance operates across more than 30 countries globally and currently employs in excess of 12,500 people.

With capabilities spanning commodities trading, recycling, energy, mining, steel and aluminium manufacture, advanced engineering, as well as financial and property services, the GFG Alliance members are individually owned and managed but collectively offer decades of expertise that delivers a strong competitive edge across the value chain.

Re-establishing metals manufacturing and engineering is at the core of GFG Alliance's vision. Through its forward-looking GREENSTEEL and GREENALUMINIUM strategies, the Alliance aims to trigger the revival and regrowth of industry in the countries in which it operates in. Its main focus is sustainability – both economic and environmental – as a means of delivering long-term solutions to cyclical industries and a foundation for a stronger and more prosperous society. Delivered on a regional and national basis, this vision also binds together the GFG Alliance's businesses that globally strive to bring about a brighter tomorrow for industry.

GREENSTEEL aims to recycle and upcycle the growing mountain of scrap steel, using electric arc furnaces powered by renewable energy. Raw materials and resources are secured locally to make world-class products that sell both nationally and globally. High grade engineered steel and alloys from the process feed engineering operations that make advanced components for demanding sectors such as automotive, aerospace, marine, off-road and defense. GREENSTEEL provides a more flexible and customer focused solution while also reducing carbon footprint of manufacture, shortening the supply chain, retaining and upgrading skills, stimulating new technologies and engendering a sustainable and globally competitive metal manufacturing sector. The GFG Alliance has also recently extended its GREENSTEEL approach to aluminium production where it is currently using the same principles to transform this sector through its GREENALUMINIUM strategy.

Statistics

12,500 employees globally

Presence across 30+ countries

Over 200 global locations

Trading with 60+ countries

2017 Turnover of \$13.1 bn

Trades 10m tonnes of steel annually

UK and Australia recycle 3m tonnes of steel annually

GFG Alliance has a collaborative and innovative approach which is transforming businesses, communities and the wider economy. Commercialization of new technologies and the regeneration of manufacturing and engineering skills are also cornerstones of GFG's plan to deliver a step change for manufacturing.



Ohjoon Kwon

Representative Director & CEO
POSCO

POSCO

50 years of commitment and dedication

As the largest integrated steel company in Korea, POSCO has been committed to offering an extensive portfolio of quality steel to our customers for the past 50 years. POSCO also stands as the world's fifth largest producer based on crude steel production in 2016 according to worldsteel, and the third largest in terms of market capitalization thanks to the robust performance of 2017. Such outstanding business achievements have been rewarded by being designated as the world's most competitive steel company for eight consecutive years by World Steel Dynamics as of 2017. Furthermore, POSCO has always been dedicated to local community engagement and building a sustainable future for all. Our continued efforts in relevant fields made POSCO one of the world's most sustainable companies in DJSI annual review by RobecoSAM for 13 consecutive years as of 2017.

Born with a special mission

The fact that POSCO's success story has been thoroughly aligned with Korea's economic advancement is no coincidence. With the hope of pulling Korea out of the devastations wrought by the Korean War and contributing to its economic development, POSCO built the nation's very first integrated steel mill from nothing but with sheer determination in 1973. We now operate two integrated steel mills, the world's largest and second largest in terms of production capacity respectively. Gwangyang Works with a capacity of 21.7 million tons specializes in automotive steel, and Pohang Works with a capacity of 18 million tons provides a wide-ranging product portfolio including hot and cold rolled coils, wire rods, electrical steel, and stainless steel. Outside Korea, we have two integrated steel mills respectively in Indonesia and Brazil churning out three million tons each. Further expanding our global reach, POSCO has presence in 23 countries with more than 74 entities that are engaged in diverse business activities such as sales and distribution.

Statistics

Foundation	April 1, 1968
Steel Production	37.2 million tons
Business Portfolio	Steel, E&C, Trade, ICT, Energy, Materials
Number of Employees	Approximately 60,000 (including affiliates)
Revenues	\$25 billion (Non-consolidated), \$54.3 billion (Consolidated)
Operating Profits	\$2.5 billion (Non-consolidated), \$4.1 billion (Consolidated)

A new mission for the next 50 years

Celebrating our 50th anniversary, POSCO recently declared a new vision for the next 50 years as "Unlimit the Limit : Steel and Beyond" to meet new challenges presented by the rapidly changing market environment with innovation and creativity, and enable new future growth with portfolio shift and stronger presence in strategic markets. Building on our legacy of creating something great out of nothing, POSCO will strive ahead to offer differentiated value to our customers and build a smart future together.



Marsha Serlin
Chief Executive Officer
United Scrap Metal

United in Purpose for 40 Years

In 1978, as a single mother of two young children, Marsha Serlin began a career voyage by founding a metal recycling business with \$200 and a rental truck. While being a female in a predominantly male metal industry presented significant challenges, her tenacity and unique approach differentiated United Scrap Metal (USM) while driving the ultimate success of the business. In 1989, upon graduation from college, her son Brad entered the business in an operational role where the real education would be gained. Learning the business by transitioning throughout all of the key facets, Brad eventually became President in 2006.

Today, entering their 40th year in business, Marsha, Brad and the USM team continue their growth through pioneering innovative, solutions-driven recycling programs built upon a foundation of ethical and sustainable practices. As a result, the organization and its leadership have earned over 50 Business and Industry related awards from organizations such as the Small Business Administration, Ernst & Young, RSM, Accenture, Exelon, Platt's Global Metals and the American Metal Market, to name a few. Other accolades include achieving Great Place to Work Certification plus recognition as an outstanding supplier from some of the world's largest metal consumers including Alcoa, Aurubis, Luvata and Olin Corp.

With their initial roots in Cicero, Illinois (adjacent to Chicago), the USM team has built a strong presence throughout United States by further expanding its reach in the past five years through opening greenfield regional processing facilities located in Philadelphia, PA; Richmond, VA; Charlotte, NC; St. Louis, MO; and Indianapolis, IN. Each operation services multiple customer segments and industry verticals. ISO 14001 / RIOS certification creates a focused effort on recycling solutions that help customers effectively manage the risks associated with metal and by-product disposition.

With 400+ team members across six locations nationally, the company's culture and dedication to quality and continuous improvement are reflected in a 98%+ retention rate over 5,000+ customers throughout North America. This substantial growth is further supported by strong consumer partnerships, who recognize an unparalleled dedication to

safety, compliance, as well as the consistent delivery of high quality ferrous and non-ferrous commodities. This runs the gamut from aluminum, brass, copper and all other non-ferrous metals. In addition stainless steel, high-temperature alloys and steel grades offers a comprehensive approach. A balanced logistical approach leverages barge, rail and truck delivery to ensure the timely shipment of large volumes of each respective material grade. As a result, the company has been able to develop significant, award winning partnerships with some of the world's largest mills, foundries and specialty consumers.

Equally important to the company's success has been the expansion of their commitment to philanthropy, sustainability, diversity and making a positive impact in the lives of others. This blankets the communities in which USM lives, works and services. As a recycling company, USM not only seeks to be stewards of the environment through sustainable practices, but also looks to enhance the lives for those in our immediate environments and communities through extensive business group, trade association and philanthropic endeavors. Through nationwide recycling awareness and fundraising initiatives, USM has been able to raise millions of dollars for organizations such as Ronald McDonald House Charities, the American Red Cross, Scouting, Make-a-Wish Foundation, multiple Charter Schools and countless others.

The United team is proud to make a difference to its customers, consumers and local communities as it continues to build upon its five core values of trust, commitment, loyalty, passion and performance. The challenge of continuous improvement, innovation and people development are driving the business forward with the same Entrepreneurial Spirit that Marsha possessed upon starting the journey forty-years ago.



ArcelorMittal



Todd Baker
President & CEO

ArcelorMittal Tailored Blanks Americas

ArcelorMittal Tailored Blanks is the company's specialized business unit for tailored blanks, or laser-welded blanks - a manufacturing technology that improves the performance of car parts in a vehicle.

In North America, ArcelorMittal Tailored Blanks employs over 500 individuals across nine facilities, including a state-of-the-art facility that recently opened in Detroit. The company has grown from two facilities as recently as 2010.

Supplying automotive partners worldwide

Our manufacturing technologies improve vehicle component behavior, which can result in enhanced crash performance, weight savings and a reduction in emissions and fuel consumption.

Increasing car safety

Tailored blanks combine different mechanical properties in one component by welding multiple steel sheets together. This leads to better crash performance, as a deformable portion that absorbs energy upon crash impact can be united with a rigid portion that protects people inside the vehicle.

Sustainable solutions

We offer lighter materials that cut fuel consumption and emissions. Reinforcements are no longer needed and parts can be better integrated for maximum efficiency.

Cost savings with laser-welded blanks

An optimal utilization of materials allows for greater cost-efficiency. Assembly costs are reduced as fewer tools and stamping processes are required.

Guaranteed quality

Our global research and development department keeps us at the forefront of innovation in the steel industry. We

work continuously to maintain the highest standards in our products and services. Our plants are fully engaged in world-class manufacturing processes and our production lines are equipped with modern in-line inspection systems.

Globally, ArcelorMittal Tailored Blanks produces 70 million laser welded blanks per year. These blanks are used for door rings, pillars, rails and other critical applications that ensure our automotive customers achieve the optimal balance of cost, weight, and vehicle performance, without compromising safety.



Jared Lazerson

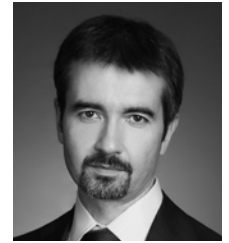
President
CEO and Director

MGX Minerals: Producers of “Fast-tracked Petrolithium”

MGX Minerals’ novel, patented, Katerva Award-nominated technology – dubbed the “petrolithium” process – extracts lithium and other valuable minerals from the brine that accompanies petroleum as it is pumped to the surface. Compared to conventional lithium extraction methods, the petrolithium process is exponentially faster, more cost-effective and more environmentally responsible. At the same time, the process provides full-service water treatment for oil and gas producers, offering significant cost savings and reduced risk of environmental contamination to an industry that produces more than 800 billion gallons of wastewater annually.

With global demand for lithium skyrocketing and supply failing to catch up, lithium consumers are looking for cost-effective, reliable, high quality sources. Meanwhile, oil and gas producers are facing low revenue from production projects and high costs of handling, storing and disposing of wastewater. MGX’s unconventional extraction method can adjust production levels according to demand, effectively increasing and diversifying global lithium supply. In parallel, its proprietary process that offers an affordable, revenue-generating alternative to existing wastewater disposal options available to the oil and gas industry will become more widely available.

Backed by an experienced and technically accomplished team, MGX Minerals is led by President, CEO and Director, Jared Lazerson, who has worked in the mining and technology industries since 1994. MGX’s chairman of the board Marc Bruner, who was previously the Chairman and CEO of Falcon Oil & Gas Ltd. and founding Chairman of Ultra Petroleum, is a practiced and respected executive in the U.S. oil and gas industry. The two are leading the company in talks with global oil and gas majors and lithium off takers who are household names in clean energy sectors.

**Oleg Bagrin**NLMK Group
Russia

NLMK Group

NLMK Group is the largest steelmaker in Russia and one of the most cost-efficient in the world. It produces over 17.1 million tonnes of steel which is converted into high value added steel products that are used in over 70 countries in various industries, from construction and machine building to the manufacturing of power-generation equipment and offshore windmills.

NLMK Group operates over 20 production facilities in Belgium, Denmark, France, Italia, India, Russia and the United States, providing high skills jobs to over 50,000 people.

NLMK sets itself social targets that include achievement of sustainable development goals that are in line with long-term economic interests; as well as contributing to environmental conservation and community welfare.

The Group has invested over \$1.3 billion in environmental initiatives. Despite almost doubling production, the Company was able to significantly reduce its environmental impact by introducing state-of-the-art technology and working hard to upgrade equipment.

NLMK Group companies are involved in charitable initiatives and programmes in their regions of operation, both directly and through charity funds that have been established. In the best traditions of Russian charity efforts, NLMK Group provides ongoing financial support to orphanages, care homes, low-income families, veterans, the retired, people with disabilities, and those in difficulty for more than 15 years.

NLMK's ordinary shares with a 16% free-float are traded on the Moscow Stock Exchange and its global depository shares are traded on the London Stock Exchange.



Joe Klein
Chairman & CEO
Klein Steel Service, Inc.

A Proven Track Record Year Over Year

With a 46-year track record for quality, innovation, performance and customer service, Klein Steel Service is a premier metals supplier and processing center in the Northeast region of the United States. In 2017, it earned a 21% gain in revenues. Performance on that level counts as one reason Klein Steel earned AMM's 2017 Steel Excellence Award for the Service Center of the Year. The willingness to invest – even when the industry is challenged – counts as another distinguishing characteristic.

The fundamental strength of Klein Steel is our people. Their commitment, dedication and talent are driven by a passion that is unmatched in our industry. They're passionate about taking care of one another. They're passionate about taking care of our customers. They're passionate about living our values of accountability, dependability, integrity, teamwork and trust. This defining and driving force is seen everywhere at Klein Steel. From the front offices to the back offices. From the inside sales rep to the outside sales rep. From the skilled technicians operating complex equipment to the driver delivering precious truck-loads of steel. Our team members are living proof – day-in and day-out - that passion is the common denominator in everything we do. And it is the common denominator that creates exceptional results for our customers who deserve nothing less than world-class quality, innovation, flexibility, speed and value.

Klein Steel has invested significantly in the most advanced, intelligent equipment available anywhere in the world to create an environment with increased capacity, efficiency and reliability. The investments we've made in new equipment and technologies have placed Klein Steel on the leading edge of innovation and delivery. Every order is prepared under stringent controls so that what is produced is subject to detailed monitoring, analysis and tracking. Behind all that advanced automation and worldwide standards is a simple belief: there is no such thing as good enough at Klein Steel. And every team member knows it. Every one of our team members from management to production personnel on the floor understands and lives by the total commitment to excellence- achieved only when our products and services consistently deliver superior quality and consistently meet customer needs.

Statistics

Founded 1971

3,500 Customers

7 M Pounds Of Inventory

220 Current Employees

\$8M Expansion in 2016

Facilities Total 375,000 SF

Commitment: Building a Trusting Partnership

Building a trusting partnership is not just a cliché. It is our approach to doing business. We constantly remind ourselves that what we do today sets the stage for where we will be tomorrow. The basic principles by which Klein Steel Services operates were established in their early years: listen to the customer; keep a great inventory; provide quick, dependable, friendly service; treat employees fairly; and promote flexibility, patience and growth. Our commitment as a company is to be constantly new. New in our thinking, new in our methods, new in our service to our customers. We commit every resource for one purpose- to give you what you expect from our products, our team members and our company. That's why you can count on Klein Steel for a long-term, trusting partnership.

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Dave Pratt

Executive Vice President,
Operations and Materials

Jemison Metals

While Jemison is a relatively young company in the metal service industry, it is far from inexperienced. The combination of industry veterans driving a young energetic company has created a high-performance culture.

Jemison is driven to reveal and remove the inefficiencies hidden deeply in their customer's supply chains. Their mission is singular: win bids and develop lasting relationships by revealing waste throughout the supply chain and returning significant and sustainable savings.

Jemison continues to raise expectations, and deliver on them by digging deeper, thinking more creatively, and aggressively pursuing new avenues for their OEM's to secure a lasting competitive advantage.

Jemison is a leading supplier of carbon flat-rolled products. They have 140 people, and 511,000 square feet of warehouse space across facilities in South Carolina, Ohio, Virginia and two in Alabama.

Visit jemisonmetals.com for more.



Andrew Pappas

Managing Director/Team Leader,
Head of ABL Metals Group
BMO Harris Bank N.A.

BMO Harris Bank

BMO Harris Bank, part of BMO Financial Group, is proud to be a finalist for Platts Global Metals Industry Financial Services Provider of the Year award. Established in 1817, BMO Financial Group ("BMO"), is a highly diversified financial services provider based in North America with over \$50 billion in market capitalization. BMO is the eighth largest North American Bank and maintains a global presence in Europe, North and South America, Australia and Asia.

We've been a long standing capital and financial services provider in the Metals space, including steel and aluminum production, service centers, distribution, pipe and tube, scrap and recycling, metal fabrication, precious metals, base metals, importers and trading companies.

Our established Metals lending practices provides both capital (i.e. senior credit facilities, term loans, capex lines, letters of credit), to support acquisitions, leveraged buyouts, recapitalizations, turnarounds, international inventory financing (i.e. inventory "On The Water" or at the "Foreign Port"), and for seasonal or growth working capital needs and other value-added services (treasury, hedging, F/X, credit cards and advisory) to its customers.

Our Asset Based Lending practice is ready to work with you as you look to leverage the value of your assets by providing flexible financing solutions that work. Whatever the need, we're ready to help you achieve your vision. To learn more please contact me at Andrew.Pappas@bmo.com.



David D'Addario

Chairman and Chief Executive Officer

Noranda Bauxite & Alumina

New Day Aluminum is the parent company of Noranda Alumina and Noranda Bauxite, the respective U.S. based alumina refining and Jamaica based bauxite mining assets that were acquired in late 2016, as well as ARC Fused Alumina, the French based specialty alumina assets that were acquired in late 2017.

New Day Aluminum was formed in 2016 as a subsidiary of DADA Holdings, an investment and management company led by David D'Addario and based in Fort Lauderdale, FL. DADA makes control investments and manages companies in basic industries, such as metals and mining.

Noranda Bauxite mines and ships bauxite for metallurgical and non-metallurgical applications globally from its 5.2 million tons per year mining operation, jointly owned with the Government of Jamaica, in Discovery Bay, St Ann, Jamaica. Noranda Alumina produces smelter grade alumina (SGA) for the production of aluminum as well as chemical grade alumina (CGA) which is used in a wide array of industrial applications at its 1.2 million ton per year refinery in Gramercy, Louisiana. ARC Fused Alumina produces specialty alumina products for the ceramics, flooring, abrasives and refractory industries from its facilities located in La Bâthie, France.



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GLOBAL METALS AWARDS**

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Triumphs & Turnarounds

Winners of the 2018 S&P Global Platts
Global Metals Awards



S&P GLOBAL PLATTS
GLOBAL METALS AWARDS

The 2018 S&P Global Platts Global Metals Awards aim to recognize those that motivate the metals industry to new paradigms, embodying excellence in leadership, innovation, safety, integrity and overall performance.

The preceding year was largely a brighter one for the metals industry. Technology played an increasingly pivotal role for this slate of winners, and sustainability emerged throughout the value chain, with environment and efficiencies top of mind.

These leaders displayed both cutting-edge innovations and compelling turnaround stories. They represent a broad range of personalities, from dynamic negotiators to community-conscious champions. S&P Global Platts honors these companies and individuals for the strengths of their recent performance alongside their future ambitions.

The 2018 program was narrowed to a list of 84 finalists representing 16 countries. Winners were selected in 15 categories including Metals Company of the Year. Thoughtful evaluation was conducted by an impartial panel of independent judges, who recused themselves from scoring any entry which presented a potential conflict of concentration: **Alberto Hassan, Former President & CEO, Orinoco Iron; David King, Former CEO and Director, LME; Jim Lennon, Former Chairman of Commodities, Macquarie; Rana Som, Former Chairman, NMDC and Hindustan Copper; and Michael Setterdahl, Former Managing Director of Nucor Trading.** Awards were presented at a black-tie gala on May 17 in London.

Judging Panel

2018 S&P Global Platts
Global Metals Awards



Alberto Hassan

Former President & CEO,
Orinoco Iron



David King

Former CEO & Director,
LME



Jim Lennon

Former Chairman of Commodities,
Macquarie



Rana Som

Former Chairman,
NMDC & Hindustan Copper



Michael Setterdahl

Former Managing Director,
Nucor Trading

posco

Metals Company of the Year

POSCO

South Korea

Judges select the Metals Company of the Year from the entire list of Global Metals Awards finalists, honoring one firm that exemplifies leadership and innovation. This year's unanimous winner, POSCO, also received the Industry Leadership Award for Steel. Judges praised it as an "efficient, effective" organization exhibiting "fantastic discipline" and "impeccable execution."

Founded in 1968, Korea's largest integrated steel company is the world's fifth largest steelmaker, with a market capitalization of \$29.4 billion as of early 2018. The company impressed judges with its ability to "excel in a competitive environment and consistently produce world-class products." The company has an unerring "eye for optimization and efficiency" at every level of production.

In 2017, POSCO posted a record high operating profit, thanks in part to three major programs. The company developed value-added products applicable across a range of industries including automotive and construction; implemented innovative and eco-friendly steelmaking techniques; and heightened both efficiency and safety through smart factories employing advanced technologies.

POSCO operates two integrated steel mills in its home country and boasts a vast global network, with operations in 23 countries. By leveraging its broad geographic presence and deep knowledge base, the company plans expansion into business areas including electric vehicle materials and smart cities that incorporate information technology.

Judges noted that POSCO's proximity to China helps boost its outlook, due to recent cuts in the country's steel capacity. Building on "a half decade of being one of the world's top steelmakers," our winner is acclaimed by the judging panel for "continued advancements and improvements" that earned it Metals Company of the Year status.



CEO of the Year



Oleg Bagrin
NLMK Group
Russia

Asked for his recipe for steel sector success, NLMK Group's former CEO Oleg Bagrin replied, "There's no such thing... There are complex, multidimensional strategies that underpin a company's success." As the architect of the remarkable turnaround at Russia's largest steelmaker, Bagrin knows these strategies better than most, and he applied them at a "critical time," earning "impressive results."

Bagrin was appointed president at NLMK in 2012, when the company aimed for a reduction in debt and an increase in profit margins, following its efforts to expand production capacity. Bagrin and his team began their tenure by developing Strategy 2017, which aimed to improve efficiency, increase profitability and drive shareholder returns.

"He delivered on his five-year strategy despite challenging market conditions," stated one judge. Bagrin's "impressive achievements" by the end of 2017 included achieving a record level of steel output while reaching his goal of \$1 billion annual EBITDA gains, increasing operational efficiency, and improving sustainability and safety.

Judges commend Bagrin for his "clarity of vision;" he understood that in a volatile market, improving operational efficiency across the global production chain would be a key driver of the company's turnaround. The company estimates that over 70% of the \$1 billion net gains came about through the group's structural transformation, a joint effort by its 55,000 employees.

With his goals accomplished and NLMK set up for long-term success, Bagrin stepped down in early 2018. The judges value his leadership and eagerly anticipate this remarkable architect's next project.

RioTinto

Industry Leadership Award—Aluminum

Rio Tinto Aluminium

Canada

Judges know this global giant well; it is often named as a player in metals industry mega-deals. This year, Rio Tinto Aluminium takes the sector's top prize for "innovation that aligns to sustainable practices."

Rio Tinto is a global leader in aluminum, operating for more than 110 years. The company produces high-quality aluminum for industries including automotive, construction and packaging. It is the largest supplier of the metal to the United States from its revolutionary low-carbon operations in Canada, where it runs an alumina refinery, a network of hydroelectric plants, and aluminum smelters with some of the lowest carbon footprints in the world.

Further demonstrating industry leadership, Rio Tinto Aluminium is active in the Aluminium Stewardship Initiative, a nonprofit uniting over 60 organizations in pursuit of a clean aluminum sector. It is the first company in the world to achieve ASI certification. Beyond its own industry, judges remarked on the company's "customer-centric business plan," incorporating a corporate mine-to-market initiative designed to better understand its customers and suppliers' businesses.

By combining facility upgrades and production efficiency with low-carbon power in its operations, the company effectively "transformed an underperforming asset into a key asset," appreciated a judge, helping Rio Tinto Aluminium to post solid financial results despite higher raw material costs in 2017. The judges honor Rio Tinto Aluminium for focusing on responsible production, a move that benefits its own company and customers, as well as the entire industry.



Industry Leadership Award— Base & Specialty Metals

MGX Minerals Inc.

Canada

MGX Minerals notched finalist status in two Global Metals Awards categories this year: Industry Leadership and Breakthrough Solution of the Year. Judges hailed the company's "innovation in both concept and technology" as well as its two-pronged business model; by combining lithium extraction with wastewater treatment, MGX has risen to the lead of the Specialty Metals pack.

"Technology is core to the business environment" at MGX Minerals. Its patented petrolium process concentrates lithium and other minerals from the plentiful wastewater that accompanies oil and gas production. Rather than storing this wastewater brine or injecting it underground, MGX cleans the brine and separates out the valuable minerals using nanotechnology. Judges admired the company's "sustainable production practices," which the company claims are faster, more cost-effective and more environmentally responsible than conventional lithium extraction methods such as solar evaporation.

Judges liked the company's "ability to thrive without much upfront capital." MGX partners with oil and gas companies, using their existing infrastructure for access to brine and establishing a cash flow from wastewater handling services. The arrangement enables oil and gas producers to monetize brine; as MGX puts it, "old energy participates in the new energy economy."

The company is approaching commercial production at a time when lithium is in high demand at high prices. With its "environmentally friendly approach," and unique business model, judges felt that MGX Minerals is "leading the industry to search for new solutions to mining base metals from untraditional sources."



Industry Leadership Award— Precious Metals

Polyus

Russia

Russia's largest gold miner attracted judges' attention with its noteworthy ability to "hit its target and exceed goals consistently." Polyus is headquartered in Moscow and holds one of the world's largest gold reserves, with assets in Siberia and the Russian Far East, and is a top 10 producer globally. The company captivated judges and bested its competitors through a combination of impressive production and technological innovation delivered with carefully controlled costs; Polyus boasts one of the industry's lowest cost profiles.

Last year was a strong year for Polyus, as the company's gold output surpassed production guidance for the fourth consecutive year and delivered double-digit growth in revenue and EBITDA. This impressive output was accomplished with zero fatalities for the year, a result of the company's proactive safety program.

Judges also saluted Polyus' "environmentally friendly approach to treatment." To process ore mined from Olimpiada, the company's largest operation, it employs BIONORD, a proprietary bio-oxidation technology that reduces ore treatment time significantly. This "sustainable and innovative" process claims 93% gold recovery from flotation concentrate, in contrast to the 30-40% recovery yielded by traditional methods.

Despite challenging market and political conditions, judges expect Polyus' production to keep climbing as a result of its 2017 acquisition of Sukhoi Log in Siberia, one of the largest untapped gold fields in the world and the biggest greenfield project in Russia. Judges feel that Polyus' "impressive scale and low-cost production" are extraordinary achievements that will continue to serve the company well.

HANCOCK PROSPECTING PTY LTD

Industry Leadership Award— Raw Materials & Mining

Hancock Prospecting Pty Ltd

Australia

“The impressive story continues,” observed a judge. Hancock Prospecting operates major mining projects in Western Australia and Queensland. Its Roy Hill project, an iron ore mining, rail and port operation in the Pilbara region, received last year’s Rising Star award, and company chairman Georgina Rinehart took home a Lifetime Achievement Award. Now this “substantial organization” and “big producer” has come of age, with Roy Hill solidly on track to be Australia’s single largest iron ore mine.

Work at Roy Hill, the company’s flagship endeavor, began in 2012 and shipped its first product in 2015. It ranks as one of the fastest construction start-ups of any major greenfield resource project in Australia. In 2014, the \$10 billion development received \$7.2 billion in funding, at the time the largest loan on record for a mining project.

After orchestrating the venture’s powerful debut, Hancock deftly managed it through a series of inevitable growing pains. Roy Hill launched with a production target of 55 million tons a year, but it encountered harder-than-expected ore, causing wear to the system and a corresponding series of delays. The company rallied with a new jaw-crushing system and met its target in late 2017. Judges lauded its “quick financial turnaround” and “swift execution” as the company improved its revenue stream “in record time.”

Hancock “overcame diversity and delivered quickly,” reflected a judge. The panel concurred that Roy Hill is another enthralling chapter in Hancock’s larger story of “successful projects with consistent increase in production.”



Industry Leadership Award— Scrap & Recycling

United Scrap Metal

United States

Judges were unanimously inspired by the “solid submission” and “good story” presented by United Scrap Metal. Launched by Marsha Serlin in 1978 with just \$200 and a rented truck, United Scrap has grown into one of the largest industrial recycling companies in the US, handling more than 650 million lb (295,000 mt)/year of material for more than 2,500 customers worldwide. The company boasts “consistent growth in every facet of operations,” observed a judge.

As United Scrap grows, the company is “innovating solutions on a broad scale.” In addition to its customers in manufacturing, demolition and construction, United Scrap’s recent growth includes development of one of the industry’s largest lines dedicated to recycling of utility products. The program serves some of the nation’s largest utilities including Exelon, which calls the company “an invaluable partner” in its efforts to proactively manage precious metals scrap.

A former Platts CEO of the Year winner, Serlin wants her company to make a positive impact in the lives of others, with a focus on professionalism and customer service. As a result, United Scrap is “recognized by a significant customer base” and has grown steadily into an estimated \$300 million company.

Judges feel that United Scrap leads through exhibiting “true organic revenue growth in a fragmented industry.” The panel expects continued success from this Industry Leader; as Serlin has said, “I’m very fortunate to have a company like this and to have grown to be so big—and it’s going to get bigger.”



Industry Leadership Award— Steel

POSCO
South Korea

Every day when employees of POSCO's Pohang Steelworks arrive at work, they are greeted by a sign on the main gate: "Resources are Limited; Creativity is Unlimited." This mantra exemplifies this Metals Company of the Year's "philosophical approach to business growth" and dedication to innovation that fuel its "consistently excellent performance."

Judges felt POSCO's creativity is apparent in its "impressive plants" that boast a total production capacity of more than 35 million metric tonnes. These state-of-the-art facilities "do not compromise on safety." Technology is embedded into the machinery, including the use of IoT sensors to monitor production at rolling mills, and inspections conducted with the help of artificial intelligence. The company's Smart Safety initiative also incorporates wearable devices that monitor for potentially harmful conditions and alert workers to take action.

As POSCO continues to demonstrate its dominance in steel, it is also focused on development of differentiated products. POSCO plans to apply its "robust and diverse international presence" towards expanding into new business arenas over its next half-century. The company is active in numerous non-steel sectors including trading, infrastructure, chemicals, energy and information technology, with notable efforts in lithium and biopharmaceuticals.

With reliable leadership that navigated the company through difficult issues of oversupply and trade protectionism, judges believe POSCO possesses a unique ability to "overcome obstacles and succeed in a challenging environment." Inside this Industry Leader's thriving business, "the systems, operations and overall management are excellent across the board."



Lifetime Achievement



Thomas A. Danjczek
Headwall Partners
United States

Known as an articulate and aggressive advocate for the steel industry with a down-home style, Tom Danjczek boasts a "remarkable track record" spanning four decades. Judges felt that Danjczek clearly demonstrates the honesty, integrity, leadership and strategic vision that are the hallmarks of this honor.

Danjczek "has held impressive leadership positions throughout the steel industry." He began his career in 1968 on the mill floor at Bethlehem Steel and retired in 2014 after 15 years as president of the Steel Manufacturers Association (SMA). At SMA, Danjczek represented the industry on a broad range of matters related to trade, the environment, operations, raw materials, power, antitrust and labor. Perhaps his most notable achievement was his leadership of a nationwide fatality prevention effort that improved safety programs and saved countless lives.

Prior to his tenure at SMA, Danjczek held senior positions at Wheeling-Pittsburgh and Kaiser Steel. He also has extensive experience as a board member at both public and private companies. His many industry honors include Hall of Fame recognition from the US Department of Energy's Industries of the Future Program.

Judges respect Danjczek as "strong, opinionated and ambitious while managing stakeholders throughout his career." He is known for engendering similar respect on both sides on many issues, trusted by mill owners and union leaders alike. Danjczek's metals industry colleagues join the judging panel in saluting this voice of steel as a Lifetime Achievement honoree.



Breakthrough Solution of the Year

Veloxint Corporation

United States

Founded in 2015, Veloxint aims to become the lighter and stronger standard for the metals industry. Judges were transfixed by this materials startup, incubated at the prestigious Massachusetts Institute of Technology. The company has developed the world's first efficiently scalable production of bulk nanocrystalline metal alloys, a product with "immense potential in multiple industries" that has made definitive strides towards commercial production in 2019.

Veloxint's "revolutionary" new nanocrystalline metal alloys are designed from the atomic level up for thermodynamic stability, enabling long-term stable operation even at high temperatures. The technology combines traditional powder metallurgy process techniques with proprietary metal powder. The resulting alloys are two to five times stronger than traditional alloys made from the same input metals without adding weight, and offer unrivaled corrosion resistance. Veloxint reports that these alloys require less time, temperature and pressure to create compared with traditional processes, and produce products that use more than 95 percent of starting raw materials.

The company's highly scalable process has applications throughout a range of industries, including automotive, military, high-performance tooling, aerospace, oil and gas, construction, and 3D printing. It has attracted commercial partners including industrial toolmaker Stanley Black & Decker; the company announced its acquisition by another finalist this year, aluminum company Braid Industries, in early 2018.

Judges felt that Veloxint is a "convincing winner with tremendous potential" for its "technology that will find numerous applications across multiple sectors." As one judge agreed, "this is a big win."

Corporate Social Responsibility

NMDC Limited

India

The CSR award honors a company that exerts a profound positive influence on surrounding communities during difficult times. This year, judges felt the most compelling CSR stories involved "programs in emerging economies that faced regional obstacles." NMDC, India's largest iron ore miner, wins for its "large-scale program with impressive impact" that has "set new standards in the region."

With operations spanning the country, NMDC envisions an empowered and prosperous India. The daily reality often proves more challenging; as one judge observed, "they operate in difficult areas." Most of the company's CSR beneficiaries are from tribal regions with high poverty levels and little external support. NMDC representatives, braving difficult jungle conditions as well as bullets and threats from area militants, were among the few willing to operate in such areas.

Undeterred, "NMDC delivered great benefits" to communities that needed help most. Education efforts in 2017, included providing 18,000 scholarships for secondary education; operating schools for nursing, engineering and technical education; and serving lunch to more than 8,000 school children per day. Health efforts in 2017 included treatment of more than 150,000 patients at project hospitals and operations of mobile medical units serving more than 20,000 patients. NMDC's wide-ranging efforts also include comprehensive programs in women's empowerment, job training and agriculture.

The judging panel salutes NMDC for its culture of caring and integrity. Said one, "Following NMDC's lead, we hope that more companies make similar commitments to their communities."



Deal of the Year

Bedrock Industries

United States

Deal of the Year, always a competitive category, often features massive global transactions. This year's winner, Bedrock Industries, presented a smaller-scale, yet irresistible story detailing its acquisition of venerable Canadian steel producer Stelco in June 2017. Through "clever negotiation and impeccable timing," Bedrock won judges over by "rescuing a bankrupt company" and coordinating "a substantial turnaround from loss-making to money making."

Starting in 1910 as The Steel Company of Canada, integrated steel producer Stelco had a long history of successful operations but fell on difficult times in the last two decades. In September 2014, the company was placed under creditor protection for the second time, weighed down by over \$4 billion in liabilities. The company also struggled with significant environmental liabilities and poor labor relations.

Then Bedrock entered the picture. Bedrock is an industrial company focused on owning and operating metals, mining and natural resource assets. The company is known as a turnaround specialist, aiming to establish an active and collaborative partnership with key constituents. As part of its Stelco acquisition, Bedrock negotiated a full environmental release, removed all legacy liabilities from its balance sheet, and deftly negotiated three union labor agreements.

Moving forward, Bedrock's plans for Stelco include increasing production, focusing on higher-margin products and winning back lost clients. Judges feel that Bedrock has executed "a deal with exciting potential" and commend the company for its secure relationships with Stelco's workers and its talent for integration.



Financial Metals Service Provider of the Year

BMO Harris Bank N.A.

United States

With roots dating back to the 1800s, BMO Harris Bank has a long history of providing capital and industry knowledge throughout the US. Judges chose this "standout" organization for going "back to basics," applying its historic strengths of providing financial services tailored specifically to metals customers.

BMO Harris' Steel & Metals Groups provide relationship-focused commercial and investment banking services across all major market segments, including steel and aluminum production and processing, steel distribution, pipe and tube, base and precious metals, scrap and trading, among others. As one of the largest and most diversified companies in North America with a global presence, the group serves customers throughout the metals supply chain including steel mills, service centers, metal importers, trading firms, aluminum fabricators and scrap recyclers.

Capital ranging from \$10 million to \$1 billion has been provided for various customers' expansion needs, recapitalizations and restructurings, and M&A activity. Impressively, the groups maintain a near-perfect client retention rate, except for an occasional company sale.

Judges admired that BMO Harris is "aggressive and innovative" on behalf of its clients. The groups are "actively seeking opportunities" to provide exactly what metals companies require at critical points in their evolution. This approach is working; according to one judge, "They're growing, and they're doing good deals."

Judges applaud BMO Harris for "providing a service to companies that need more liquidity in order to grow." By helping metals industry clients succeed despite harsh competition, the company has proven itself as "a true and worthy service provider."



Physical Metals Service Provider of the Year

Klein Steel Service

United States

The judges last met Klein Steel Service in 2015, when the company received Metals Distributor of the Year honors for its “compelling statistics and satisfied customers.” Klein Steel prevails again as a “consistently strong performer” that moved forward with state-of-the-art equipment and technology, while maintaining its inspiring customer focus.

Klein Steel was founded in 1971 and is a nationwide distributor and processor of metals, carrying over 3,500 lines of inventory and offering a full range of value-added processing services. It operates four Upstate New York warehouses, including a new \$8 million facility. This service center features an intelligent steel production system that performs multiple production sequences automatically, monitored by employees to ensure maximum efficiency. The facility helps Klein Steel “optimize its business” while supporting a “nearly spotless safety record.” The company was recognized by the New York State Department of Labor for its exemplary safety and health program.

While Klein Steel’s operations continue to evolve, judges appreciate that the company’s “customer-oriented business mindset” remains intact. The company is known for providing just-in-time delivery of products tailored to exact specifications, as well finding solutions to any challenge along the metals supply chain.

Klein Steel’s dedication “paid off with an increased customer base,” and the company claims record revenue growth of 21% in 2017. Judges feel that as the company expands, its investment in optimization and customer-centric focus will uphold its substantial competitive advantage.



Rising Star

GFG Alliance

United Kingdom

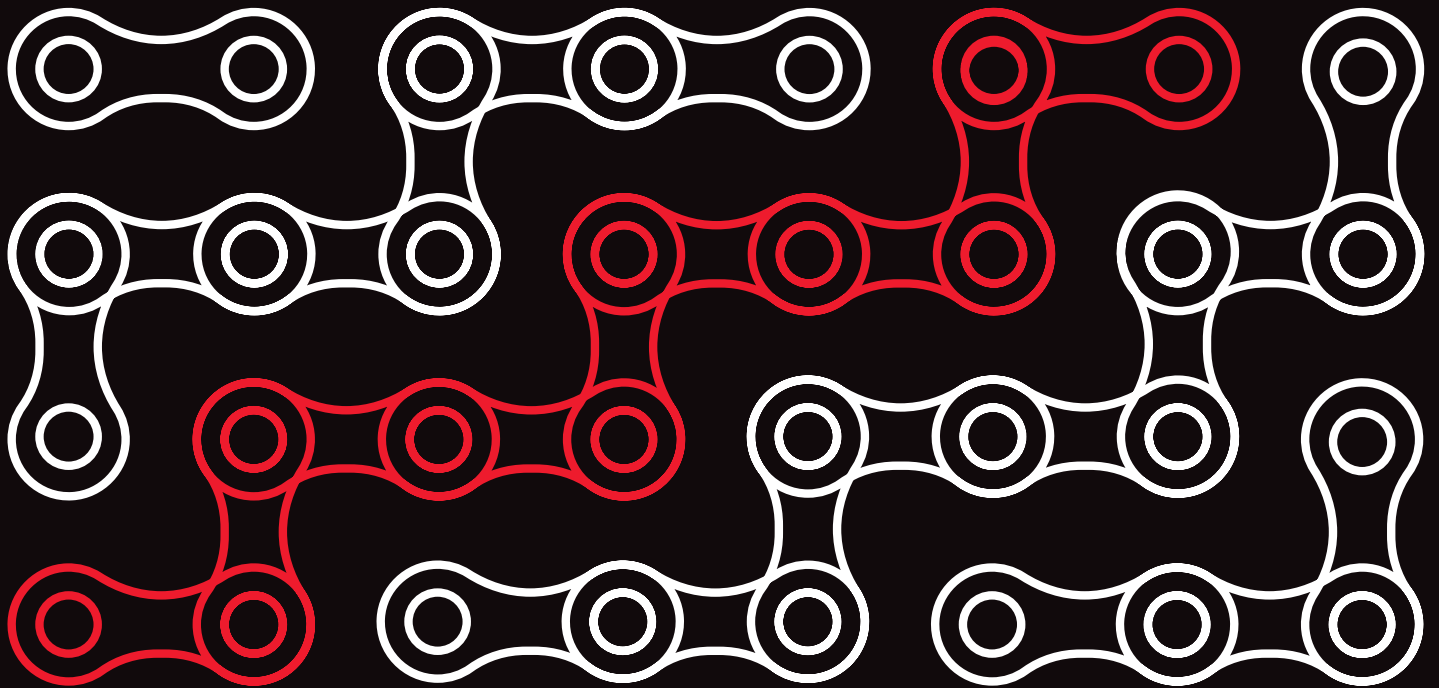
The international GFG Alliance, with interests in mining, energy generation, metals and engineering, displayed an “incredible entrance” into the global metals industry. Founded and owned by the British Gupta family, GFG is chaired by Sanjeev Gupta, honored as last year’s top CEO for his work with GFG company Liberty House. Since then, GFG has “acquired many assets that assist its remarkable growth.” “They came from nothing to become a significant player,” marveled one judge, “and they won’t stop now.”

GFG displayed an “impressive trajectory” over the past two years that rendered it a formidable competitor this year, in multiple Global Metals Awards categories. In 2016, the company strengthened its industrial footprint in the U.K.: it purchased plate mills from Tata, launched Liberty Metals Recycling and secured the future of a Rio Tinto smelter.

In 2017, the business continued its U.K. growth by securing major upstream and downstream assets and acquiring Australia’s integrated mining, recycling and steel company Arrium, more than doubling the size of its global workforce. It also purchased a majority holding in ZEN Energy, Australia’s leading renewable energy development business.

GFG now has a presence in more than 30 countries on five continents, with group revenue nearing \$10 billion. Judges applaud its “outstanding, well-financed acquisitions” executed with “perfect timing,” as well as its admirable focus on sustainability - both economic and environmental - as a means of delivering long-term solutions to cyclical industries. Praised one judge, “They are the very definition of a Rising Star.”

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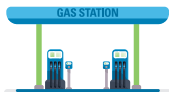
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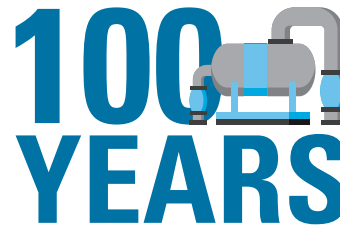
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