April 2021

Metal Market Magazine

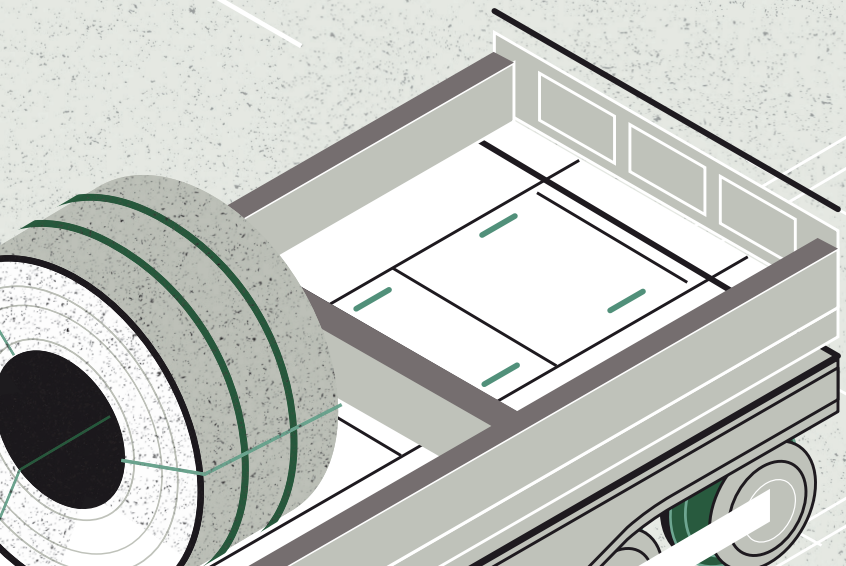
Stephen Montague on DRI and leading Midrex Technologies

Market trends for tin, lead, lithium, graphite and scrap

STEEL IS HARD, SHIPPING IT DOESN'T HAVE TO BE

We design, engineer, test and manufacture to save you time and money while delivering unmatched quality control from start to finish. Our certified testing labs ensure every solution stands up to the rigors of today's shipping environment and with more than 180 facilities across the world, we have the coverage to serve regional, national and global steel-producing companies. Whether it's automation, material science or unique processes and designs, we have the tools, resources and experience to cut costs, raise confidence and make shipping steel a little bit easier.

Learn more at UFPIndustrial.com/Steel
855.435.9359



UFP INDUSTRIAL
A UFP INDUSTRIES COMPANY

April

Features

Scrap

Market spotlights: Tin and lead

Aluminium

Industrial minerals

End-user spotlight: Aerospace

Technology spotlight: DRI

PARTNERSHIPS

DRIVEN BY INNOVATION

As the largest steel producer in North America, we are proud that our steel is being used to build infrastructure that is transforming America's landscape. But we couldn't do it without the incredible customers who partner with us every day to build a stronger, more sustainable future.

Together we are achieving powerful results.

Learn more at Nucor.com

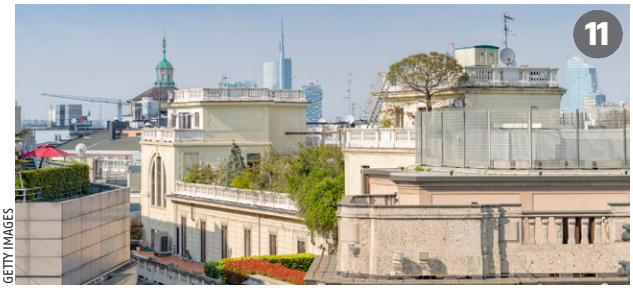
NUCOR®

April

News and analysis

Regulars

GETTY IMAGES



GETTY IMAGES

RIO TINTO

NLMK

Providing white glove treatment.
But with a forklift.

In an industry all about metals, we focus on making things effortless and seamless for our customers.

CUSTOMER SERVICE

TRANSPARENCY

LOGISTICS

SAFETY

LME APPROVED

metro

WE'RE HERE FOR YOU GLOBALLY.

+01.734.721.3334 | www.metroftz.com

A powerful issue

At one level or another, electricity as a theme connects the metals and materials markets covered in this issue of *Metal Market Magazine*. From the ferrous perspective, direct reduced iron, hot briquetted iron, pig iron and scrap are the key ingredients fed into an electric-arc furnace for steelmaking. Our cover profile interview with Midrex Technologies president and CEO Stephen Montague considers the growing importance of DRI and HBI as steelmaking raw materials from the perspective of a leader with over 30 years of experience at a major supplier of technologies for producing them.

A separate feature article covers the fortunes and outlook for both ferrous and non-ferrous scrap markets in a world still reeling from the Covid-19 pandemic, but showing early signs of economic recovery. A complementary piece considers the increasingly important role of ferrous scrap in India.

Widely used in solder, tin has seen particularly volatile markets this year as a result of climbing demand and tight supply. Reviews of the drivers for the metal are provided by two of Fastmarkets' expert staff.

Lithium has become a hot topic given its value in batteries, and in those for electric vehicles in particular. The balance between supply, demand and stocks is a dynamic one, which is considered in an update from Fastmarkets' head of research for base metals and battery materials. Another article looks at how changing preferences for lithium-ion battery chemistries in China have altered prices.

Meanwhile lead continues to play its role in the automotive sector as well as having a promising future for stationary power storage systems – as another feature article outlines.

Our section focusing on industrial minerals also looks at market drivers and trends for graphite, while our end-user spotlight looks at the fascinating ways in which images provided from the latest satellite technologies can be used.

A special bonus feature written by Fastmarkets special correspondent Andrea Hotter catches up with Alf Barrios as he moves from Canada, as chief executive of Rio Tinto Aluminium, to Singapore to become chief commercial officer for the mining major.

Combined with our regular news review pages, expert market analysis from Fastmarkets research and our regular pages on innovations and end-uses of metals, this issue of the magazine has a particularly diverse range of topics.

"Tin has seen particularly volatile markets this year as a result of climbing demand and tight supply"

Find us at: www.metalbulletin.com; www.amm.com; www.indmin.com

Metal Market Magazine

Published by Fastmarkets.
8 Bouverie Street, London EC4Y 8AX.
UK registration number: 00142215
Tel: +44 20 7827 9977
Fax: +44 20 7928 6892 and +44 20 7827 6495
E-mail: editorial@fastmarkets.com
Website: www.fastmarkets.com

Metal Market Magazine:
Editor: Richard Barrett
Associate editor: Seema Chaudhary
Advertising Sales:
Publisher: Mary Connors
Tel: 646 274 6250
E-mail: mconnors@fastmarkets.com
Global senior advertising manager, Europe/Turkey: Arzu Gungor
Tel: +44 20 7827 5268
E-mail: arzu.gungor@fastmarkets.com
Senior sales manager, Midwest, West Coast, North America: Jessica Kelliher
Tel: 312 929 4195
E-mail: jessica.kelliher@fastmarkets.com
Regional sales manager, Middle East/Africa, Asia, UK: Quincy Takyi
Tel: +44 20 7779 8735
E-mail: quincy.takyi@fastmarkets.com
Advertising sales administrator: Eva Cichon
Tel: +44 (0)20 7827 5263
E-mail: ecichon@fastmarkets.com
Production design: Tony Herman, Dany Pena and Raveendra Karanth

Fastmarkets MB:
Group editorial director: Alex Harrison
Global ores, alloys, minor metals and industrial minerals editor: Fleur Ritzema
Industrial minerals editor Europe: Davide Ghilotti
Europe ores, alloys and minor metals editor: Charlotte Radford
Global base metals editor: Juliet Walsh
Europe base metals editor: Archie Hunter
Global steel editor: Andrew Wells
EMEA, CIS, Turkey steel editor: Ross Yeo
Special correspondents: Andrea Hotter, Janie Davies
UK and Europe correspondents and reporters: Cristina Belda, Julia Bolotova, Carrie Bone, Declan Conway, Serife Durmus, Julian Luk, Ewa Manthey, Alice Mason, Vlada Novokreshchenova, Marina Shulga, Jon Stibbs, Maria Tanatar, Cem Turken, Justin Yang, Imogen Dudman, Ana de Liz, Dalila Ouerghi, William Clarke, Michael Greenfield
Latin America reporters: Felipe Peroni, Renato Rostás
Asia non-ferrous editor: Susan Zou
Asia steel editor: Paul Lim
Senior correspondents (Asia): Lee Allen, Alex Theo
Analysts (Asia): Hui Li, Min Li, Ruby Liu, Siyi Liu, Sybil Pan, Carrie Shi, Miranda Song, Sally Zhang, Jessica Zong, Alice Li Jie, Jessica Long, Jiwen Ju, Yingchi Yang, Zihao Yu, Zhao Tianran
Prices manager: Mary Higgins

Fastmarkets AMM
Managing editor, Americas: Thorsten Schier
North America non-ferrous editor: Chris Kavanagh
North American steel editor: Grace Lavigne Asenov
North America scrap editor: Sean Barry
US reporters: Rijuta Dey Bera, Bill Beck, Mark Burgess, Robert England, Lisa Gordon, Amy Hinton, James Lawrence, Michael Roh, Mark Shenk, Orla O'Sullivan, Jenny Stewart, Abby Verret, Dom Yanchunas

Global newsdesk editor: Mark Shaw
US newsdesk leader: Sean Mayer
Senior sub-editors: : Cecil Fung, Sara Kelly, Wei Jun Lau, Renate Foster Mas, Tony Pettengell, Jeff Porter
Sub-editors: Francesca Brindle, Kyle Docherty, Hannah Corwin, Laura Kirk
CEO: Raju Daswani

Offices:
London: Fastmarkets, 8 Bouverie Street, London, EC4Y 8AX, UK. **Tel:** +44 20 7827 9977
New York: Fastmarkets, 1120 Avenue of the Americas, 6th floor, New York, NY 10036, USA. **Tel:** +1 (212) 213 6202. **Toll free:** 1 800 METAL 25, **Fax:** +1 (212) 213 6617
Singapore: One Marina Boulevard, #20-20 Singapore 018989
Shanghai: Fastmarkets, Room 305, 3/F, Azia Center, 1233 Lujiazui Ring Road, Shanghai 200120.
Tel: +86 21 5877 0857. **Fax:** +86 21 5877 0856
São Paulo: WeWork Paulista – Av. Paulista, 2537 – Consolação, São Paulo – SP, 01311-001, Brazil.
Tel: +55 11 3197 8750
Customer services dept:
Tel: +44 (0)20 7779 7390

Subscription enquiries:
Tel: UK: +44 (0)20 7779 8260. USA: (877) 638 2856/(412) 765 3581
Email: sales@fastmarkets.com
Fastmarkets is a part of Euromoney Global Limited: 8 Bouverie Street, London EC4Y 8AX.
Directors: Leslie Van de Walle (chairman), Andrew Rashbass (ceo), Wendy Pallot, Colin Day, Tristan Hillgarth, Imogen Joss, Tim Collier, Kevin Beatty, Jan Babiak, Lorna Tilbian

ISSN 0002-9998.

Fastmarkets

News review: non-ferrous

SA Damm first beverage can company to gain dual ASI certification

SA Damm has become the world's first beverage company to achieve dual Aluminium Stewardship Initiative (ASI) certification.

The company's breweries in Barcelona and Murcia, Spain, have been certified against ASI's performance standard for responsible production, sourcing and stewardship of aluminium, with a focus on material stewardship.

Certification covers packaging and storage of beer in cans, as well as related activities including design of packaging, storage of finished products, waste management and storage, and the recovery of waste, including packaging waste of the product consumed by the end consumer, ASI said.

New Tonkolili iron ore project in Sierra Leone starts operations

The New Tonkolili iron ore project in Sierra Leone has achieved full-scale operations, China's Kingho Investment Co Limited – its operator – said on March 20.

The project, with estimated resources of 13.7 billion tonnes, is the world's single largest magnetite mine, according to China's Ministry of Commerce.

Shandong Iron & Steel Group, a state-backed Chinese steelmaker, bought the mine in 2015 but suspended mining in 2017 amid low iron ore prices.

Century Al smelter to hit 75% capacity by Q4

Century Aluminum has finalized and received approval for a three-year power contract with Santee Cooper at its Mount Holly smelter in South Carolina, which will allow the smelter to ramp up to 75% capacity by the end of the year.

The contract, which will provide a minimum of 290 megawatts of power, will begin on April 1 and will end in December 2023.

The deal will allow the smelter to run at 75% of its 229,000-tonnes-per-year annual production capacity. Restart work is under way and scheduled to be completed by the fourth quarter of 2021.

SA DAMM

SA Damm raises awareness of aluminium recycling in becoming the first beverage company to achieve dual ASI certification

Sweden's Boliden supplying low-carbon copper to Elcowire

Swedish metals and mining company Boliden is supplying low-carbon copper produced at its operations in northern Sweden and Finland to Elcowire, the wire rod producer said.

The copper cathode supplied has a carbon footprint of less than 1.5 kg of carbon-dioxide (CO_2) equivalent emissions per kilogram of copper, compared to an industry average the International Copper Association estimated to be around 4.1 kg.

Boliden's CO_2 calculation includes scope 1, 2 and 3 emissions to take into account the carbon footprint generated by third parties, such as the production of explosives and fuels that are used at its sites.

Matalco to open slab and billet plant in Kentucky

Matalco is investing $53.5 million to open a secondary aluminium slab and extrusion log and billet plant in Franklin, Kentucky, which is expected to start up during the second quarter of 2022.

The 275-million-lb-per-year brownfield remelt facility will initially produce rolling slabs in 3000, 5000 and 6000-series alloys from aluminium scrap, and later can be fitted to produce extrusion log and billet, Matalco said.

For the plant, Matalco will renovate an existing 460,000-square-foot building on a 107-acre property in Franklin.

Nexa Resources restarts open pit at Atacocha unit in Peru

The San Gerardo open-pit zinc-lead mine in Peru, part of the Atacocha plant, has resumed activities after 20 days of downtime because of community demonstrations that were blocking the road to the facilities, Brazilian base metals producer Nexa Resources said on March 23.

The ramp-up to full production was expected to take 3-5 days, the company added. The full effect of the temporary halt was still being assessed for potential changes to the full-year 2021 output guidance, it said.

Luvata slates $37M Wisconsin expansion

Downstream copper manufacturer Luvata is expanding its mill in Appleton, Wisconsin, by 70,000 square feet, investing approximately $37 million in the project.

The new manufacturing space will produce copper-alloy wire and rod, the company said; construction will begin early in the second quarter of 2021, with production expected to commence in the second quarter of 2022.

Luvata Appleton anticipates adding 30-35 employees following the expansion.

Alcoa in supply deal for low- and zero-carbon Al on Audi EV wheels

Alcoa Corp is supplying low-and zero-carbon aluminium for the wheels on carmaker Audi's e-tron GT, which will make it the first vehicle to use metal from Elysis™ technology.

The wheels are being manufactured by Ronal Group using a combination of Alcoa's low-carbon aluminium, EcoLum™, and metal produced using the Elysis zero-carbon emissions smelting technology.

Elysis – a joint venture between the United States aluminium producer and Rio Tinto, and backed by Apple and the governments of Canada and Quebec – uses zero-carbon technology to replace the carbon anode with an advanced conductive material, so it releases oxygen instead of carbon dioxide.

Syrah Resources completes furnace installation at Vidalia

Australia-based graphite miner Syrah Resources has completed the installation of a furnace at its active anode material (AAM) project in the US city of Vidalia, Louisiana, a significant milestone on its path to

becoming a vertically integrated producer of natural graphite AAM outside of China, the company announced on March 22.

Syrah Resources produced and coated purified spherical graphite, which was toll treated to AAM at Vidalia in the fourth quarter of 2020. The currently installed furnace will be used for fully integrated AAM production, the company said.

UMK will stop transporting manganese ore by road

South African manganese miner UMK will stop road transportation of manganese ore due to significant pressure from rising logistical costs, a company spokesperson told Fastmarkets on March 18.

While the miner will honor existing contractual obligations, it will not pursue further road transportation options due to rising freight costs making certain export channels economically unfeasible in today's markets, the spokesperson said.

GETTY IMAGES

Container freight costs for China's seaborne route have remained high

South African miners tend to utilize road transportation, which is significantly more expensive than rail, to maximize exports when prices are high and rail capacity is limited. They tend

News review: non-ferrous

to reduce road transportation when prices fall, or costs rise.

Li-Cycle starts Rochester EV battery recycling production

Battery recycling start-up Li-Cycle sees the commercial production achieved at its Rochester, New York, plant as an important milestone.

The plant, which achieved commercial production last December, has the capacity to process 5,000 tonnes of end-of-life lithium-ion batteries per year, doubling overall intake for the Canadian company, which is the first of its kind to use hydrometallurgy for electric vehicle (EV) battery recycling in North America.

Li-Cycle says its process allows it to recover 95% of elements and materials that make up lithium-ion batteries, compared with the industry average of around 50%.

Logistics hurdles affect China's seaborne routes

High demand for bulk vessel space for mineral raw materials exported from China is driving costs for this transport option higher, with market participants reporting an array of factors that are affecting trading conditions and delivery timelines.

Container freight costs for China's seaborne route have remained high well into March, with ongoing disruptions reported by participants active in metals and minerals trading.

Suppliers have shifted en masse to bulk shipments, where they could, which has led to increased costs for bulk freight, longer lead times and consequential delays.

Mick Davis' VBR invests in vanadium company FAR

Sir Mick Davis' Vision Blue Resources (VBR) has made its second strategic investment in battery materials, this time into vanadium mining and processing company Ferro-Alloy Resources Ltd (FAR).

VBR, which was launched in February this year, has led an investment of as much as $12.6 million in FAR, which is listed on the main market of the Stock Exchange in London and is developing the Balasausqandiq vanadium project in the Kyzylordinskaya oblast of southern Kazakhstan.

Other co-investors in FAR include Tony Trahar, former chief executive officer of Anglo American and a former director of Highveld Steel & Vanadium, which was at one point the world's largest vanadium producer.

Cu in extended high price cycle: Trafigura CEO

The copper industry is entering a new phase of prolonged price highs while the global energy transition combines with a deepening supply deficit, according to the executive chairman and chief executive officer of Trafigura.

Speaking at the virtual Fastmarkets Copper Seminar, Jeremy Weir said that copper has for almost the past two decades been driven by industrialization in China, but now the sector was also seeing an ongoing push to decarbonization plus the rebuilding of infrastructure in the post-Covid-19 world to take the energy transition into account. All of these require copper, he noted.

"Historically we've seen short, sharp spikes in the copper industry, but I really do think this is a prolonged high-price cycle, and we're going to need these high prices to incentivize new production to come onstream," Weir said.

News review: steel

Stiff freight rate hikes expected following Suez Canal blockage

Global freight markets were been plunged into further chaos at the end of March with the blockage of the Suez Canal accompanied by rumors of fresh freight rate hikes around the world, sources told Fastmarkets.

Transit through the pivotal Suez Canal shipping lane had been blocked by the large containership *Ever Given* since late on March 23, creating a traffic jam of hundreds of vessels.

As of 6pm Beijing time on March 25, the ship remained aground and wedged in the bank of the canal. The vessel was eventually released on March 29.

GETTY IMAGES

Suez Canal blockage has been accompanied by concerns over global freight rate hikes

Tenaris ramps up Conroe to shorten supply chain

Tenaris is ramping up heat-treating and finishing operations at its plant in Conroe, Texas, to help bring its seamless mill in Bay City, Texas, to full capacity and shorten its supply chain, according to its top executive in the United States.

The pipe producer started the ramp-up this month and aims to have full heat-treating and finishing operations by April, Tenaris US president Luca Zanotti told Fastmarkets. The facility has welding, heat-treating and finishing capacity of about 250,000 tons, he said, but he declined to specify how much volume it would process for Bay City.

Key targets in China's new 5-year plan

China released its 14th Five-Year Plan (2021-2025) for National Economic and Social Development and the Long-Range Objectives Through the Year 2035 on March 12 following the annual meetings of the National People's Congress (NPC) and the Chinese People's Political Consultative Conference (CPPCC).

To upgrade the core competitiveness of its manufacturing industry, China has determined a need to accelerate breakthroughs in key technologies on the development of new materials, such as high-end rare earth functional materials, high-quality special steel, high-performance alloys, super alloys and high-purity metal materials.

Collapse of Turkish lira leaves market quiet

Turkish steel mills remained absent from the deep-sea scrap import market on March 24, due to the slump in the value of the lira and weak steel demand, market participants told Fastmarkets.

The Turkish lira weakened sharply at the beginning of the week following the surprise decision by president Recep Tayyip Erdogan to sack central bank chief Naci Agbal and appoint a finance specialist, and former deputy leader of Erdogan's own AKP political party, Sahap Kavcioglu, as governor.

Raimondo mistaken on 232, group claims

The Coalition of American Metal Manufacturers and Users (Cammu) claims that United States Commerce Secretary Gina Raimondo was mistaken about the success of the Section 232 steel and aluminium tariffs and reiterated its call for their termination.

While the tariffs might be welcomed by steelmakers, they are detrimental to US manufacturers and the wider economy, Paul Nathanson, the coalition's executive director, said in a letter to the recently confirmed Commerce secretary dated March 15, expressing surprise that Raimondo described the tariffs as effective in a televised interview on March 4.

"The [President Joe] Biden administration said they were going to be pro-manufacturing," Nathanson told Fastmarkets. "If he is going to be pro-manufacturing, the Section 232 tariffs are a problem."

Rogesa to cut emissions with new equipment

Rogesa, a joint subsidiary of German steelmakers Dillinger and Saarstahl, has installed new equipment which will result in reduced carbon emissions and additional energy generation, the company announced on March 17.

The new dedusting system for the circular cooler – a rotating belt on which the sinter cools – has been installed at sinter plant 3 of Rogesa Roheisen gesellschaft Saar in Dillingen, Germany, as part of a €28-million investment.

EPI study supports retention of 232 tariffs

The Economic Policy Institute (EPI) has called on the US government to maintain the Section 232 tariffs on steel imports, arguing that excess global steel capacity threatens the US steel industry and warrants upholding the trade duties.

In a study released on March 24 entitled: *Why Global Steel Surpluses Warrant US Section 232 Import Measures,* the EPI reported that the 25% tariffs and other trade measures curbed US steel imports by 27% by 2019, supporting an industry rebound and widespread restructuring to increase efficiency.

Samarco set to produce 7.5 mln tonnes of iron ore pellet in 2021

Brazilian iron ore pellet producer Samarco expects to produce 7.5 million tonnes of iron ore pellets in 2021, according to Rodrigo Franklin, the company's head of business intelligence.

Franklin was speaking at the Fastmarkets' Global Iron Ore online conference on March 17 when he provided an update on mining operations at the Brazilian mining site. The company's operations resumed in December 2020 and are being gradually restarted after a tailings dam failure in 2015.

Around 35-40% of the 7.5 million tonnes of iron ore pellets produced will be of direct-reduced iron (DRI) grade and the remainder will be blast furnace (BF) pellets, but this ratio will depend on market demand and will probably be adjusted accordingly, Franklin said.

NLMK plans outage at Indiana mill in June

NLMK USA's flat-rolled electric-arc furnace mill in Portage, Indiana, is scheduled to go on maintenance in June, president and chief executive officer Robert D Miller confirmed to Fastmarkets via email on March 17.

The outage will last for one week to conduct "normal routine summer maintenance," he said.

This is the third outage ▶

News review: steel

notice in the industry affecting hot-rolled coil production.

AM/NS Calvert will take a maintenance outage in May and U.S. Steel Corp said that it will take the larger of its two Pittsburgh-based blast furnaces offline for 25 days for maintenance in the same month.

Vale starts filtration plant at Brazil iron ore complex

Vale has gradually started operating a tailings filtration plant at its Vargem Grande iron ore complex, in Brazil's southeastern Minas Gerais state, to reduce the use of dams and allow the resumption of production.

The company plans to invest a total of $2.3 billion between 2020 and 2024 in four filtration plants in Minas Gerais state, it said.

The new filtering plant is part of the company's project to restart 4 million tonnes per year of capacity in the third quarter of 2021, when it plans to also start up its Maravilhas III tailings dam, which is currently under construction.

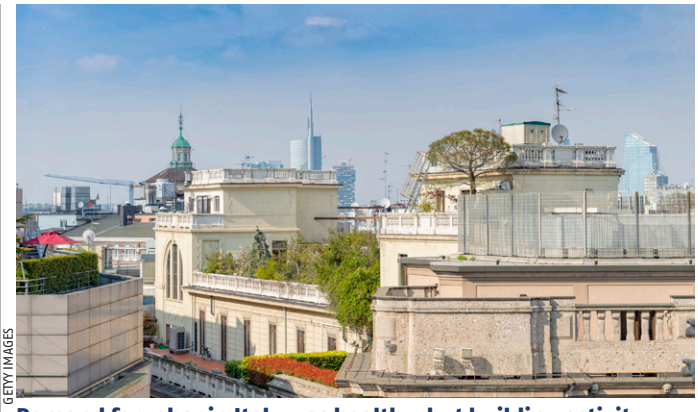
Key role for UK steel in bid to set up world-first green industrial sector

The UK steel industry is a key focus of the British government's £1 billion ($1.4 billion) Industrial Decarbonization Strategy, which is intended to create the world's first low-carbon industrial sector.

The strategy includes a commitment to work with the recently reconstituted Steel Council to consider the implications of a recommendation from the Climate Change Committee and to set targets for ore-based steelmaking to reach near-zero carbon emissions by 2035.

The strategy was announced by UK business & energy secretary Kwasi Kwarteng on March 17 and is intended to create the world's first low-carbon industrial sector by creating new 'green' jobs and by slashing emissions by two-thirds within just 15 years.

It is hoped that the package of measures will put the UK at the forefront of the global green industrial revolution by creating and supporting as many as 80,000 jobs over the next three decades. The latest move builds on a 10-point plan outlined in 2020 for a Green Industrial Revolution.



GETTY IMAGES

Demand for rebar in Italy was healthy, but building activity slowed in the north on rise in Covid-19 cases, says Federacciai

Italy crude steel output up in Feb on higher long steel production

Crude steel production in Italy increased year on year in February on a higher output of long steel products, Italian steel association Federacciai said on March 17.

Italian crude steel production came to 2.07 million tonnes in February 2021, up by 1.6% from 2.04 million tonnes year on year, while long steel output increased by 8.9% year on year to 1.18 million tonnes in February, Federacciai said.

Demand for rebar in Italy was reportedly healthy, although construction activity slowed in the north of Italy due to an increased number of Covid-19 cases in March.

Tougher measures in China could shake ferrous markets

The never-before-seen measures meted out by China's Tangshan provincial government could cut hundreds of thousands of tonnes per day in steel output and hit raw material demand in 2021, market sources told Fastmarkets.

Tangshan's environmental protection office said on March 19 that it is looking to tighten its grip on air pollution in the city, especially after it found that not all steelmakers had abided by production restrictions in the previous round of controls.

It detailed draconian measures to be imposed on errant mills, including requiring seven steel mills to cut production by 50% from March 20 to the end of June and 30% for the rest of the year.

Brazilian apparent steel use up 25% in February – Aço Brasil

Brazilian apparent steel consumption increased 24.5% year on year in February, while crude steel output grew 3.8% in the same comparison, according to figures from national steel association, Aço Brasil.

Apparent steel use reached 2.13 million tonnes last month, up from 1.71 million tonnes a year earlier.

Meanwhile, crude steel production totaled 2.85 million tonnes in February, from 2.74 million tonnes a year earlier.

Metals groups laud Tai's confirmation as USTR

The United States Senate unanimously confirmed Katherine Tai to the office of US Trade Representative (USTR), a selection that had won the support of metals industry associations.

Among the groups applauding the confirmation on March 17 was the American Iron and Steel Institute, which credits Tai with successes in advocating for the dual interests of US manufacturers and their workforce.

"Her experience, dedication and willingness to listen to the concerns of labor and industry will allow her to be a champion for trade policies that advance the interests of American manufacturers and their workers," AISI president and chief executive officer Kevin Dempsey said in a statement.

The Institute of Scrap Recycling Industries (ISRI) said it looks forward to working with Tai in promoting recycling's role in the future of American industry.

Steel use in Russia to rebound Severstal says

Severstal, one of Russia's largest steel producers, expects that apparent steel use in the country will return to pre-Covid-19-pandemic levels in 2021, Maxim Semenovykh, the company's head of corporate strategy, said during its Capital Markets Day.

The company expects steel use in Russia to total 43.8 million tonnes compared with 43.6 million in 2019, before the onset of the pandemic.

Apparent steel use was estimated to have decreased to 42.5 million tonnes in 2020.

"In 2021, we expected a recovery [of steel demand], which already started in the second half of 2020, will continue and will grow by roughly 3.3%," Semenovykh said. "So 2021 will more than offset losses in 2020 in terms of steel consumption."

British Steel earmarks $139 million for manufacturing

British Steel will invest £100 million ($139 million) this year in improving its manufacturing operations and supporting clean growth, the company said on March 17.

The money will help to finance projects including a new billet caster, a scrap pre-heating facility, cranes and a new environmental emission control system.

The steelmaker has returned to profit after being bought out of liquidation by China-based Jingye Group 12 months ago.

"We're committed to building a long-term future for British Steel and thanks to the hard work and diligence of our new colleagues, the business is now on a more sustainable footing," Jingye Group chief executive officer Li Huiming said.

Steel prices to remain strong: Worthington

Worthington Industries expects continued strength in demand for automobiles, construction and agriculture equipment, and therefore steel prices in the United States can remain high for at least the current quarter, the company's top executives said while reporting earnings on March 24.

Columbus, Ohio-based Worthington's steel processing segment posted net sales of $504.48 million in the fiscal third quarter ended February 28, up by 2.72% from $491.14 million in the same period in 2020, the company said in an earnings release.

The business would have earned even more in the quarter if steel suppliers had not initiated so many mill idlings and outages during the Covid-19 pandemic.

Egypt's February rebar consumption decreases by 30.84% year on year

Egypt consumed 471,000 tonnes of reinforcing bar (rebar) in February, down by 30.84% from 681,000 tonnes in the same month last year, according to Ramy Saleh, chief business development officer at Egyptian long steel producer El Marakby Steel.

But Egypt's rebar consumption increased by 52.92% month on month, from 308,000 tonnes in January.

Egypt's rebar consumption has been weak due to the limited number of construction permits in the country, which imposed a ban on most construction activity in May 2020. The rules of the ban were relaxed in September.

US harmed by imports of wire mesh from Mexico, ITC rules

Imports of standard steel welded wire mesh from Mexico have injured the United States' industry, the US International Trade Commission has ruled.

The affirmative determination followed a finding of subsidization by the US Commerce Department, which will now issue a countervailing duty order against imports of the product from Mexico, the ITC said on March 17.

Commerce last month imposed temporary countervailing duties following an anti-dumping and countervailing duty investigation that began on July 20, 2020, stemming from a petition from US producers Insteel Industries, Mid-South Wire, National Wire, Oklahoma Steel & Wire and Wire Mesh Corp.

SDI expects strong Q1, even better Q2

Steel Dynamics Inc (SDI) expects to post a "significantly higher" profit in the first quarter of 2021 versus the prior quarter, predicting that its second quarter will be even better.

Flat-rolled price spread expansions and strong demand are the two main factors behind the positive results, the steelmaker said in its earnings guidance issued on March 17.

Average realized flat-rolled steel product prices are expected to increase substantially during the quarter, more than offsetting higher scrap costs, the company said.

India's JSW gets capacity, rating boost

Indian steelmaker JSW has become the country's largest producer following its recent acquisition of Bhushan Power & Steel Ltd (BPSL).

BPSL is an integrated steelmaker with facilities located in Chandigarh, Kolkata and Odisha. It has a steelmaking capacity of 2.75 million tonnes per year and is mostly engaged in the production of flat steel, including hot-rolled coil.

JSW Steel said on March 26 that it would pay 193.50 billion rupees ($2.64 billion) to BPSL's creditors to complete the deal.

AM/NS Calvert to add equipment for auto steels

AM/NS Calvert has selected Primetals Technologies to install a new Ruhrstahl-Heraeus (RH) degasser, continuous slab casting machine and material handling equipment in Calvert, Alabama, for its new meltshop facility.

The equipment will enable on-site slab production at a capacity of 1.5 million tons per year to facilitate supply of high-quality steel for the automotive industry, Primetals Technologies said on March 30.

"This expansion will give AM/NS Calvert full control of production quality and the flexibility to produce a broad spectrum of high-quality steel grades for the automotive industry," it said.

US slashes deposit rate for wire rod imports from South Korea

The United States Commerce Department has reaffirmed its finding of dumping for imports of South Korean carbon and alloy steel wire rod from Posco but sharply reduced its deposit rates for potential duties, according to a notice in the Federal Register published March 23.

Commerce has slashed the deposit rate to 0.94% for product imported from Posco, according to the notice. That's down from a deposit rate of 41.1% in Commerce's May 21, 2018, anti-dumping duty order.

The agency issued the preliminary dumping finding on July 24, 2020, inviting interested parties to comment. The investigation covered the period from October 31, 2017, through April 30, 2019.

More UK-origin scrap bound for China in 2021, Atlas Commodities says

Atlas Commodities expects more ferrous scrap from the United Kingdom to be sold to China from now on.

"We expect demand for containerized scrap from China to grow significantly in coming months, underpinned by robust steel demand from the economic recovery in China," the commodity brokerage firm's chief executive officer Harry Seale told Fastmarkets on March 18.

During mid-March, Atlas Commodities loaded 1,000 tonnes of plate and structural scrap (P&S) in containers for buyer Zhejiang Metals and Materials Co, Seale said.

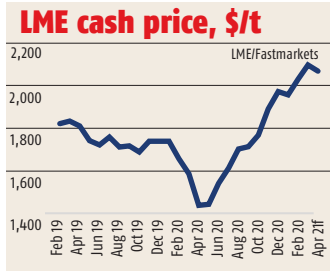
The cargo is scheduled for discharge at the Port of Jingtang in early May.

Market analysis

Aluminium

The best-performing base metal, for a change

Building on February's gains, aluminium prices pushed higher still. Approaching the end of March, it exceeded $2,300 per tonne for the first time since June 2018. Indeed, aluminium is the only base metal to have made higher highs in the past month, as the rest have consolidated. Sentiment around the light metal has responded to strong physical demand, tightening availability as LME warrant cancellations rise, and fresh supply worries out of China – a combination of factors that has sent premiums to multi-year highs too. The Chinese supply concerns are interesting. They stem from the government of Inner Mongolia mandating energy consumption restrictions which have led to

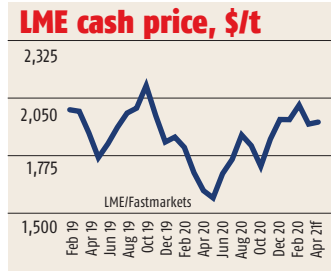


smelter capacity curtailments. The province is home to just over 6 million tonnes per year of aluminium smelting capacity. The tonnages of aluminium lost are actually small – we estimate that around 432,000 tpy of capacity has been affected so far. The concern is energy constraints like this could become more widespread across other Chinese provinces.

Lead

Retreat from February highs is orderly

From late February and through the first half of March, lead prices retreated from their 2021 high of $2,185 per tonne to consolidate around the level of the 200-day moving average sitting just above $1,900 per tonne. In general, since the lows of the Covid-19 crisis early last year, lead prices have recovered – as have all the metals – in up-channel. The pullback of the past few weeks is orderly as it went from the top boundary of the channel to the bottom, mirroring a similar move made from August to October last year. That correction was followed by consolidation and a rebound back to the top of the channel. The pattern may be repeated while the same

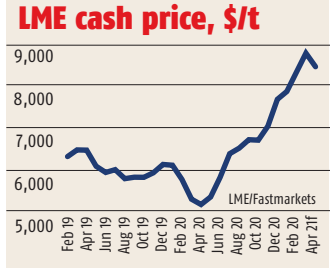


recovery narrative remains the theme. The February-March pullback also fits in with seasonal winter trends, which means the peak in replacement battery demand has passed. In addition, widespread lockdowns, especially across Europe, plus the semiconductor shortage, are no doubt hampering new vehicle production and sales.

Copper

Consolidation to continue, drift down lower in Q2

Last month we expected copper prices to consolidate in March after a strong start to the year that led to near-10-year highs at $9,600 per tonne – a performance we labelled as unsustainable. Consolidation did indeed turn out to be the theme for March, with LME copper trading in a sideways triangle formation that narrows towards the $9,000 per tonne level on the daily three-month price chart. The fundamental and macro drivers of copper prices provide conflicting indicators. On one hand, supply remains tight with Fastmarkets TC index around $30 per tonne and Chinese smelters talking about production cuts. On the other

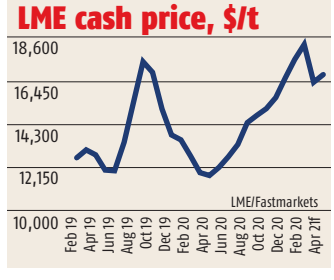


hand, rising stocks in Shanghai and weak premiums suggest demand is soft in the all-import Chinese market, while scrap availability has improved since last year, European demand will have been damaged by lockdowns, and a stronger dollar is a headwind for all metals. We maintain our view that for prices Q2 will be softer than the excesses of the first quarter.

Nickel

Bulls have been chased to the sidelines

After the soaring rally to $20,110 per tonne in February and the precipitous fall in early March that wiped out all of this year's gains, nickel prices have stabilized around $16,000 per tonne, but fell through the bottom of the year-long up-channel in the process. We think consolidation may continue for a while yet after such a shock in March. The trigger for the sell-off was news of Tsingshan's ambitious nickel production plans out to 2023, including the earlier-than-expected start of matte production for the battery supply chain via its Indonesian RKEFs, which surprised the market. We think the market overreacted, especially in



light of supply disruptions at VNC, Nornickel and Glencore's Murrin Murrin, among others, which amount to at least 78,000 tonnes of lost production so far this year. Nevertheless, nickel bulls have moved to the sidelines, especially with the US dollar index stronger and equity markets more volatile. We maintain a lower average price forecast for Q2 than Q1.

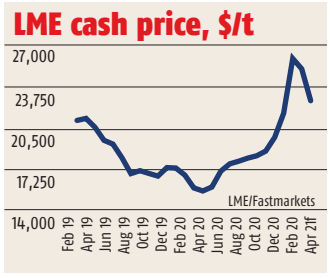
Fastmarkets MB

In this regular section, Fastmarkets MB's research team summarize their in-depth reports to highlight key factors driving the markets and their short-term price forecasts. The weekly service, Base Metals Market Tracker, provides independent analysis and forecasts for base metal markets and prices.

Tin

Worst of the supply shock has passed

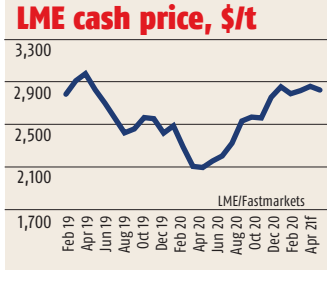
The first quarter of 2021 has been extreme for tin after the LME cash tin price raced to a ten-year peak above $30,000 per tonne, US and European premiums reached record highs and the LME cash/three-month backwardation flared to unprecedented levels. But March has seen signs of stabilization. While we do not think it is the end of a bull market, we expect supply to increase in Q2, which should result in softer refined market conditions and further natural consolidation in the tin price. But we see prices strengthening again down the road, due to a strong demand outlook and supply constraints. As for the Q2 consolidation, tightness has already begun to be relived as visible inventories have rebounded powerfully (albeit from a low base) since late January, to the tune of 4,450 tonnes or 72%; Indonesian exports have increased incrementally in response to higher prices; China has turned net exporter; and the US DLA has authorized sales from the government stockpile.



Zinc

Adjusting to more-balanced refined market

We have made revisions to our supply and demand forecasts for 2021 that have reduced the expected annual surplus this year from almost 400,000 tonnes to about 120,000 tonnes. In a near-14-million tonne-per-year market, this is balanced. Broader market consensus seems to have moved with us because prices have been resilient in March, consolidating in high ground near the January and February highs around $2,900 per tonne, supported by dip-buying interest. Tightness in the concentrate market after a number of mine disruptions recently are squeezing smelters' margins by keeping TCs low, while there are energy restrictions in Inner Mongolia. These constraints forced downward revisions to our refined zinc supply outlook. Meanwhile, our demand outlook has been raised in line with stronger economic growth projections for China and the US, which more than offset a more cautious view on Europe. Pricewise for zinc, having not previously overreacted spectacularly like some other metals, we expect zinc to be a strong performer in Q2.



Analysis by **Andy Cole**, Fastmarkets MB

Steel

Supply shortages push US flat steel prices to new highs

Impressive upward momentum persisted in US flat product prices through March, with the US HRC hitting new record highs, reaching $1,463 per tonne on March 24.

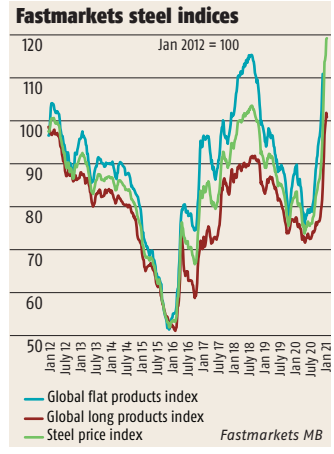
Domestic flat product prices remain supported by exceedingly tight supply, reflecting mill production discipline as well as low inventories, long lead times, and limited import availability. Prime scrap prices also settled higher in March on the back of reduced supply from automotive stoppages due to the semi-conductor chip shortage, as well as persistently strong scrap demand from steelmakers.

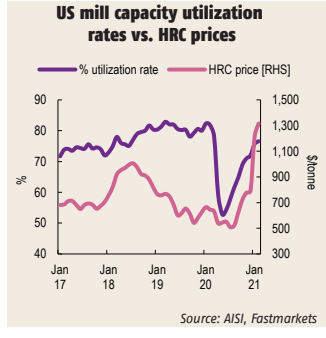
Crude steel production in the country has been steadily ticking up, with the capacity utilization rate at 77.3% in the week ending March 20, up from 74.6% at the start of the year, but availability of flat steel products in the spot market has been limited. Lead times at producers have stretched into May and sometimes June, and market participants reported delays to their orders, exacerbated by disruptions due to severe weather in February.

US mills are gradually restarting idled furnaces, while production from new capacity will increasingly influence the market as 2021 progresses. In mid-March, JSW restarted operations at its plant in Mingo Junction, Ohio, which has 1.5 million tonnes of melting capacity. SDI's new mill in Sinton, Texas, with 2.7 million tonnes of capacity is scheduled to start up in May, first with the coating lines before the rest of the plant comes online this summer. And later in 2021, Nucor expects to complete a 1.3 million tonnes expansion at its Gallatin plant.

But the immediate impact on domestic steel supply will be muted by planned blast furnace outages, as US Steel and AM/NS Calvert announced maintenance closures in May and NLMK in June. As a result, we do not foresee a significant improvement in domestic US supply before the second half of 2021.

Steel buyers may see some potential reprieve from the shortfall of supply and difficulty securing needed steel as we are beginning to see signs of imports returning to the US market. There was a sharp increase in ▶





BlueTechnology

SUSTAINABLE PRODUCTION LINES FOR NON-FERROUS METALS

BlueTechnology combines sustainability for production lines and an awareness of ethical and ecological non-ferrous metals production. We rely on 60 years of experience in non-ferrous metal solutions and have expanded our expertise from the smelting of ore and other metallic sources right up to the production of different LME grades.

Our 180 references in smelting, converting/refining, slag cleaning, and leaching form the basis for this. Our furnaces and equipment also provide the foundation for our holistic solutions in WEEE, battery, catalyst, and scrap recycling as well as for the processing of non-ferrous metal slags.

BlueTechnology stands for:

- Environmentally balanced processes, including CO_2-neutral metal production
- Avoidance of waste accumulation, as almost all waste is turned into products
- Maximized metal and byproduct yield
- Maximized recycling rate
- Minimized power, media, and water consumption
- Tracing of metals
- High standards in health and safety
- Sourcing from reliable suppliers

Leading partner in the world of metals

SMS group GmbH
Eduard-Schloemann-Strasse 4
40237 Düsseldorf, Germany
Phone: +49 211 881 6372
rolf.degel@sms-group.com
timm.lux@sms-group.com

SMS group
www.sms-group.com

HRC import licenses in February as volumes reached the highest level since October 2018. But import offers remain elevated, while delivery times are also extended as far as August, discouraging buyers from making bookings given the risks associated with lengthy lead times.

Demand has also been robust from all main flat steel consumers and signs of recovery in oil prices bodes well for energy sector demand, supporting HRC and plate prices. Motor vehicle production has been strong, although it has been negatively impacted by recent semi-conductor shortages, and Oxford Economics expects that there will be fewer cars produced in the US in the first quarter of 2021 relative to the last quarter of 2020. The auto industry has also been facing depleted inventories. Difficulties facing manufacturers will prolong the restocking cycle at OEMs, with manufacturers replenishing inventories even if consumer demand slows as spending eventually shifts away from steel-intensive goods towards experiences.

We are witnessing widening margins in both finished product prices, with strong automotive and appliance demand seeing CRC margins widen sharply over HRC, and in HRC versus busheling scrap prices as the gains in HRC, extenuated by the steel supply crunch, drive margins well above long-term historical averages. We believe widening margins highlight the underlying improvement in both supply and demand fundamentals driving flat product prices higher, indicating sustainability in pricing gains that was absent during the previous 2008 run-up in pricing.

Analysis by **Marina Maliushkina**, Fastmarkets MB

Steel raw materials

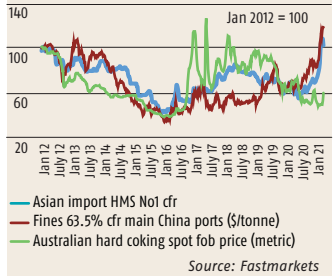
Recovering steel margins lend support to steel raw materials prices

Spreads for finished steel over hot metal production costs in China have been widening rapidly in March, resulting in producer operating margins returning to the positive territory in the month. This is after being negative in the first two months of this year for both hot-rolled coil and rebar in the Chinese domestic market, as the chart alongside illustrates. Recovering steel margins will continue to support steelmaking raw materials prices, and in particular those for higher-grade iron ore products, we anticipate.

Most recently, the blast furnace (BF) pellet price defied a downturn seen in iron ore fines and has reached its highest level on record. The 65% Fe BF pellet price has been supported by strong demand in China due to both stronger steelmaking margins for mills and the Tangshan authorities' increased supervision of mills in their abidance of the output restrictions. The weekly average of Fastmarkets' 65% Fe BF pellet price increased by 8.21% over the past month and reached $231.08 per tonne cfr Qingdao in the week ended March 19.

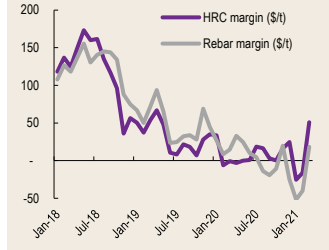
The municipality government in Tangshan put in place new emission restriction measures after it had been reported that not all steel mills had followed regulation and that they had informed each other of impromptu inspections. Seven steel mills have been ordered to cut production by 50% from the end of March until the end of June. They will also have to cut output by 30% in the second half of the year and other mills face restrictions as well. Mills in Tangshan make up over half of steel output in Hebei and BF utilization rates have already dropped to their lowest level in almost a year.

Fastmarkets MB steelmaking raw materials indices



Source: Fastmarkets

Operating margins for Chinese mills recovering in March



Source: Fastmarkets

Although the environmental restrictions in China have a bullish impact on the premium for high-grade fines and BF pellet, they are expected to have a more bearish impact on the demand for mid- and low-grade fines, adding to the downside risks for iron ore fines prices. Although the impact will likely be temporary, China's average BF utilization rate declined for the five consecutive weeks to 91.28% on March 19.

On the supply side, both Samarco and Vale are increasing their output and this adds to the downside price risks. Still, Chinese iron ore demand is expected to remain elevated and, combined with iron ore demand recovery in the rest of the world, will likely keep prices from falling below pre-pandemic levels.

Another downside factor for higher-grade iron ore products is falling domestic metallurgical coal prices in China. Elevated coal prices had incentivized mills to use more high-grade iron ore previously, we understand. This poses a downside risk to both record-high BF pellet prices and recently weakening seaborne coking coal prices. We estimate that local coals have become more price attractive for Chinese mills compared with imported material after a prolonged period of elevated premiums for domestic coals. That said, widening steel and coke margins will provide some support to coking coal prices, we expect.

The differential for Chinese coals over import material shrank to an equivalent of $18 per tonne (excluding taxes) on March 19 – its lowest level in over two years. This does not fully cover the service (transport) charges to bring imported coal to Tangshan, we estimate, making domestic coals increasingly price attractive. Last year, for example, with the restrictions imposed on imports at a time of strong domestic demand in China, the differential for locally produced and delivered coking coal over and above imported premium hard coking coal averaged at a record high of $57 per tonne, up from an average of $40 in 2019.

Analysis by **Alona Yunda**, Fastmarkets MB

MIDREX TECHNOLOGIES

Stephen Montague

'We want people who have the mindset to really love and serve others'

Midrex Technologies, owned by Kobe Steel Ltd of Japan, sets great store by the development of the major DRI and HBI production plants that it designs, supplies, and helps to maintain globally. President & CEO Stephen Montague tells Richard Barrett that he is passionate about the importance of people in his company's success and the attitude and focus needed to have a positive impact in a decarbonizing steel industry

When Midrex Technologies President and CEO Stephen Montague's colleague Robert Hunter – a long-serving, senior employee of Midrex and well known guru of all things HBI and DRI related – retired five years ago, the company's quarterly publication *Direct from Midrex* described Hunter as the personification of the business. The same could be said for Montague himself, with 34 years of service to Midrex and the experience of succeeding in multiple roles in the company – especially given his strong personal belief in the company's mission to love and serve others. He thinks as deeply about the human element as he does the technical implications of applying the company's technologies as the shape and priorities of the international iron & steelmaking industries evolve. His current focus and passion are to advance Midrex's technologies and people in a decarbonizing steel world, in which the attractions of and logic for EAF-based steelmaking and the direct reduction of iron are growing ever stronger.

He appeared as a modest, self-effacing leader during a mid-March interview with *Metal Market Magazine*. "I'm a blue-collar man in a white-collar job," he said with a smile and went on to recall that his first job with Midrex Technologies, back in 1987, came about as a financial necessity.

"I was in college and working for a metal fabricator, but that wasn't working out," he said. Unhappy with the job, he decided to leave.

"For a 19-year-old, that was a traumatic experience because I needed the money. When I left that job I didn't know what I was going to do. I was blessed to have an opportunity at Midrex to become a draftsman for the summer, and that got me started," he recalled. "Someone who knew me saw that I was struggling and gave me the chance," he explained.

'I think the role of DRI is changing and the importance of DRI is evolving as everyone is moving towards decarbonization'

Montague started working at Midrex during the summers while he was in college. "I did that for a couple of summers but bluntly, I needed a change and ran out of money," he said. "I left school and Midrex hired me full time. I worked for 2-3 years, learned a lot, and had some good managers," he recalled.

"A couple of them kept threatening to fire me if I didn't go back and finish my degree. In retrospect, I know now what they were doing, but it felt very serious at the time. It was the kick in the pants that I needed."

Taking their advice and a leave of absence, he returned to school and took "about a year" to ▶

R&D

Research and development are the lifeblood of any organization supplying technologies – both as a means of constantly improving existing processes for commercial advantage, and as support for clients looking to refine their plant's performance to suit their particular unique set of operational circumstances.

Midrex president and CEO Stephen Montague has personally helped develop new technologies at the company and he is co-inventor of several patents.

Much of the company's R&D efforts today focus on decarbonization. "Simply put, we are absolutely R & D-focused on lowering emissions," said Montague. "Not just the use of hydrogen, but also carbon capture and storage (CCS). Clearly, we have the technology to capture the carbon dioxide. We have to come up with economical solutions for what to do with it or where to put it," he explained.

"We additionally believe in merchant metallics *[see main article]*. I think there are a lot of opportunities to improve HBI and its application not only in electric steelmaking but also in the blast furnace and BOF."

He explained that electric steelmakers are looking for HBI that has, generally speaking, a higher metallization and an adjustable level of carbon: "Not always higher carbon, but the ability to vary the carbon in HBI depending on the amount of scrap they are using along with it." They are also looking for HBI that is stronger: "Something that will hold up even better to the rigors of shipping from location to location and will maximize the Fe yield."

There is an opportunity to look at lower-Fe feed materials (less than 67-68% Fe DR-grade pellets), to produce HBI that is better suited for the blast furnace and downstream steelmaking. "But there are a number of challenges beyond reducing lower-Fe material in DR plants, such turning the DRI into a quality briquette that can be sent to steelmakers – something we are working on," said Montague.

"If the world decarbonizes and everyone wants scrap, there will not be enough of it and they will need other sources of metallics, such as DRI," he said. "If users turn to DRI in a much stronger way, where will all the high-Fe pellets come from to satisfy the demand? DR plants need to have the flexibility to process lower Fe feed materials."

finish his Bachelor of Science degree in mechanical engineering at North Carolina State University. Returning to Midrex, which has its headquarters and R&D Technology Center in Charlotte, NC, it was not long before he got a taste for the excitement and challenges of working on-site at a plant location.

"I've always considered myself a technical person – not your PhD type but someone having a good aptitude for understanding the technical side – and that led me to really understanding how plants operate," he explained.

He said that one of the turning points for him was moving from the office environment, where the plants are designed, "to actually operating the plants and helping to get them up and running. When you have to work through issues and troubleshoot problems, your mind starts to see ways that things could be done better and before you know it, you're in technology development or R&D."

Life-cycle satisfaction

Montague said that the highlights of his career have come through the life-cycle satisfaction that planning and delivering plant projects offers. "You start with the dream, you design it, you build it, you start it up, you operate it, you see the mistakes, and then you fix them… and of course, there are the people you encounter along the way – that is the pay-off," he said.

He likes seeing how the pieces fit together, and he appreciates that "Nothing is really linear, you go around and around."

One of the earliest opportunities to experience that satisfaction came from a one-year posting to work on a project in India in 1994-95. "There was a lot of trust placed in me," he recalled. "I was a twenty-something responsible for the commissioning and start-up of a new MIDREX® plant in a place where at that time there was literally just a rice paddy between the river and the mountain. Now when I go back to JSW Dolvi they make about 5 million tonnes of steel each year, and you have to search to find the DR plant among all the other equipment."

He is also proud of the benefits that plant has brought to the local community in terms of well-paid employment. "We have a colleague working at one of our other facilities in the Middle East, who said that he was a boy when the Dolvi plant was built and his father, who worked in a nearby town, got a job at the steel mill. Because of that job, his father was able to put him and his siblings through school, which he would not have otherwise been able to do. He and his siblings have become quite successful – he is now a manager of a Midrex Plant."

Montague acknowledged that his current day job is pretty calm compared with working in the field, but he draws motivation from such memories: "When things really get tough and you wonder why you are doing the things you are, it is those real-life events and stories of the people you have met and worked with along the way that push you a little harder."

Reaching his present role as president and CEO was a further 23-year journey along a path that encompassed both technical and commercial roles, including engineering, operations, technology development, and sales. He was promoted to president and COO in 2016, and was named CEO the following year.

New steelmaking landscape

Montague acknowledged that the landscape for steelmaking has changed dramatically during his career, and that DRI plants have seen substantial increases in their annual production capacities.

"When I started as a draftsman, we were working on a state-of-the-art plant for Venezuela that was rated at 1 million tonnes per year (tpy) – amazing at the time! Within 6-7 years of that 1 million tpy

plant, we were seeing plants make close to 1.5 million tonnes. Last year, the Tosyali plant in Algeria set a world record, producing more than 2.23 million tonnes," he noted.

But the biggest factor in global steelmaking – the enormous growth in China's steelmaking capacity since the turn of the millennium – has had a relatively small and indirect impact on the DRI sector up to now, Montague observed.

"Clearly, the impact that China has had on the steel industry is unimaginable from what is was back in 2000, but most of that production is by traditional integrated mills. DRI is a niche material – or let's say it has been a niche – particularly if you look back to the turn of the century. I think it is safe to say that 'as EAFs and electric steelmaking go, so goes DRI.'

"Although Chinese steelmaking growth has had an impact on the steel industry, it has not had as big an impact on DRI per se. The impact that we've felt has been collateral, in the sense that the DRI-based steelmakers that we deal with have seen their business affected, and some now capitalize by providing merchant HBI to China. But I think the role of DRI is changing and the importance of DRI is evolving as everyone is moving towards decarbonization."

"It is critical that we really look at ways to move ahead together, as an industry," Montague observed. "I look at the trends and we are absolutely going to see the growth of electric steelmaking. We are already seeing that in China, as well. We have to push for lower emissions and find ways to make high-quality steel lighter and stronger.

"If you start to put those pieces together, they really point to DRI. I don't know how you get there with scrap alone – there is not enough of it, and even if you could get it, it is not always of the quality you need. It really is a driving force behind DRI use," he declared.

'We have to push for lower emissions and find ways to make high-quality steel lighter and stronger'

He said that he thinks that decarbonization is the biggest challenge to face the iron & steel industries in decades. "In my career, I have experienced the steel business cycles. Having to manage through them and now Covid-19 has been hard. But looking at the challenges ahead to decarburize the industry, it is going to be an even harder journey. It is not like a light switch that you just flip and everything is okay – it will require companies to transform how they think and their production facilities and everyone must be prepared to help. That is a role that DRI is going to play."

Hydrogen-based steelmaking

The global steelmaking industry's efforts to decarbonize production lie at the heart of the future for DRI production, and so they are also fundamental to the future of Midrex. Consequently, Montague sets out the case for expanding DRI production, stressing that solutions provided by existing and future DRI technologies offer a flexible transition from today's iron & steelmaking processes towards much lower carbon-emissions production.

"There is a reason why iron and steelmaking is one of the biggest producers of carbon dioxide emissions [about 7-9% of total emissions] and it comes down to the fact that making iron is energy intensive," he began. "Whether we make iron in a blast furnace or a DR plant, it's still energy intensive. But there are more options to select lower CO_2 energy sources for DRI production," he added.

In his view, there is no quick and easy fix. "We have leaders with an entrepreneurial mindset, which is fantastic because it gives us a vision of where to go. But the downside can be wanting it all and wanting it now. In many cases that can be self-limiting because it can become more difficult to take the first step.

"I see real challenges trying to make decarbonization happen on a significant scale in the very near term," he noted.

He acknowledged that there are some pioneers "who can really put together the right ingredients to make smart projects geared towards 'green' steel." For example, he believes in the next 5 years there will be some large-scale projects to make DRI from hydrogen, moving closer to 'green' steel, but "there will not be a long list of those."

Montague observed that at the opposite end of the industry's opinion spectrum "there are naysayers who think that the hydrogen technology is so far off and unaffordable, etc. and that we should talk about it in 2040. That's the wrong conclusion," he stressed.

Supporting the journey

Montague does not underestimate the scale of the task ahead: "There is an enormous transition that steelmakers are going to have to undergo – it's a journey. I think DRI is part of this journey for steelmakers. Our aim is to help with that journey through providing a technology that uses a wide range of iron ore feed and lower CO_2 energy sources. We will continue using high-Fe feed materials in MIDREX plants, as is traditionally done for EAF steelmaking, and begin using lower-Fe feeds to make a product that is more suitable for a blast furnace or even for a new kind of melter – one that is electric-based but optimized for lower-Fe DRI.

"All the while knowing that when hydrogen becomes available, we start using it. If hydrogen is not available, we use natural gas, but we do it in a location where there is going to be affordable 'green' electricity in the future to produce hydrogen. We can bring carbon dioxide emissions down 50-60% relative to BF/BOF by making high-quality steel from a blend of scrap and DRI. When we transition to hydrogen, just think how much better we can do over time," Montague said, adding, "Why not start moving that way with the technology that we already have?"

The vision and message are clear, but are steelmakers listening?

"There is a groundswell of momentum that is pushing this way. It's unbelievable. Each steelmaker has a unique situation for their mill and they are all in search of lower CO_2 solutions," he replied.

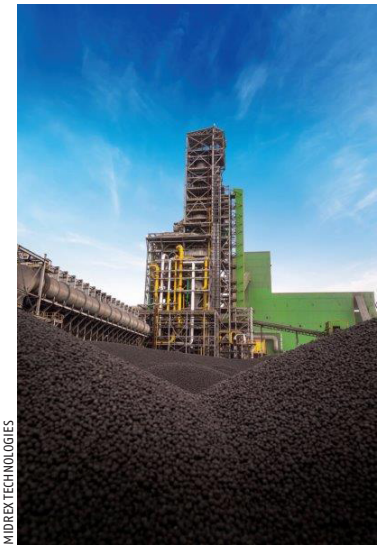
He is sympathetic to the challenges steelmakers face wanting or needing to transition to other ironmaking processes: "I can really appreciate the deep traditions that come from making iron at an integrated mill on a particular site for a really long period of time. I understand the social implications of making that iron differently or maybe even choosing to not make iron at that site but to become an importer of iron and not just iron ore."

He said that there is a real dilemma facing steelmakers: "DRI really aligns well with where the industry needs to go in the future; the best location for DRI plants is where they line up with the iron ore and the energy sources today and tomorrow; and there are different ways to look at all of this.

"If integrated mills today want to move towards electric steelmaking but also control some of their own iron production, and they start thinking about making DRI on site, what does that look like? Are they really in a location where the energy is at the right cost to make it happen now and in the future? Are they really in the location where, from the capex point of view, they get the biggest 'bang for their buck' by putting a plant there? Should they build a small-scale or a large-scale plant," he said, using the gap between finger and thumb to represent the former, and a much larger one between the palms of outstretched hands for the latter to emphasize the point.

"When I look at this, I really start to favor a solution where a lot of steelmakers could benefit from not just importing iron ore but by moving towards electric steelmaking and importing low CO_2 metallics produced in favorable locations at scale with MIDREX technology, using the energy source that is available today and operating with a wide range of iron ore quality, knowing that they have the flexibility to change to hydrogen as it becomes available.

'There are some very special locations, even today, where you can align direct reduction with renewable electricity sources to generate hydrogen and start moving towards 'green' steel'



MIDREX TECHNOLOGIES

The Tosyali plant in Algeria produced more than 2.23 million tonnes last year

"Could steelmakers benefit from clubbing together to share the offtake from these larger plants that produce at scale in the right locations? You bet!"

Location is key

Just as in the real estate business, it is often said that the three most important things to consider when buying a house are "location, location, and location." Montague said that his best advice to anyone looking to build a DR plant is to remember that, "the most successful DR plants are built around those kinds of notions, where any time you can align your iron ore source with your energy source and your market, it's boom time. The companies that find the best sites become the lowest-cost producers.

"There are some very special locations, even today, where you can align direct reduction with renewable electricity sources to generate hydrogen and start moving towards 'green' steel."

He also acknowledged the question of whether there has been enough progress made in hydrogen technology for there to be a lot of such locations to be available soon.

"Another factor is governmental assistance – how badly do governments want to make it happen? Does government assistance exist globally today? No, but the situation is changing rapidly and there are a few places where some pioneers will start showing the way. Those pioneers are moving sooner than people think," he added.

"But it doesn't mean that everybody else should sit on the sidelines and wait. This is where we really are missing the possibilities with DRI," he opined.

Combining those views with Midrex's own strategy, he said the company's vision is simple. "We have a technology platform that is ready to produce DRI using natural gas today, hydrogen if it is available, and increasing amounts of hydrogen as it becomes available in the future. We have the ability to make hot DRI available on-site for electric steelmaking and to make merchant HBI to ship to steelmakers. This lower CO_2 direct reduced iron is relevant not just to an EAF but also on a merchant basis, in the case of HBI, to the blast furnace and BOF to help with their transition," he explained.

For example, Midrex Technologies recently signed a contract with Mikhailovsky HBI for a plant in Zheleznogorsk in the Kursk region of Russia designed to produce 2.08 million tonnes of HBI per year, with start-up of the plant expected in the first half of 2024. By replacing natural gas with 'green' hydrogen there is potential to decrease carbon emissions in the future. The contracted plant is capable of being converted to use up to 100% hydrogen as a reducing agent. The feed for the new HBI plant will be pellets produced from Mikhailovsky GOK iron ore.

By its own estimates, MIDREX Plants annually produce more than 60% of the world's DRI, as cold or hot DRI and HBI. According to data compiled by Midrex and audited by World Steel Dynamics, global DRI output increased to 108 million tons in 2019, which was a nearly 49% increase over output just four years earlier.

Finding the sweet spots

Montague said that places where natural gas is cheap today and will be cheap for some time into the future are the best locations for DR plants, but also where 'green' electricity is expected to be available and affordable as time passes. "Places where we can use low-cost natural gas today, with the prospect, in the same location, of using hydrogen from low-cost 'green' electricity in the future are ideal. Then we have everything that we need," he summarized.

He believes that as the major components of the hot end of integrated steel plants inevitably wear out, their owners will be forced to make tough choices. "Let's say you're an integrated steelmaker today and you have a blast furnace or a coke oven, and maybe even a sinter plant, and it's time for a major overhaul, which is a huge investment, what do you do? Where do you go to borrow the money for that capital-intensive project? Do you continue to invest in that technology for another 20 years with the way the world is pointing? I think the answer is 'no'."

He does not think that steelmakers are inclined to make those choices right now, nor that financial institutions are of the mind to invest in those types of conventional processes, but he pointed out that the same requirements will be there for the alternatives, and if it is not those, then "What is it?" he asked.

"If the answer is 'let's go to electric steelmaking,' realizing that there is not going to be enough scrap, then what can you do? There also has to be an investment in low CO_2 metallics.

'The attitude you bring to how you serve is just as important as the act itself'

From that point of view, you have to invest in a technology that allows you to make the right products today, at the desired quality, at a reasonable price, and with a lower CO_2 footprint, but also having the ability to get to zero carbon dioxide emissions over time. That is what Midrex offers," he explained.

"MIDREX plants are designed to run 40 or 50 years or longer, but no-one is building a DR plant today without knowing they have the ability to change, even if the plant starts with natural gas, to hydrogen over time. I think that is a very smart way to go forward from where we are today: acknowledging our constraints while having a solid plan for the future without grinding to a halt with the mentality that I have got to have it all and have got to have it now," he concluded.

To love and serve

Montague said that Midrex was not as deliberate about stating its management philosophy in the past as it is today, but he added that his management predecessors "were very much geared in the same way, and I am a product of that."

"We have two bottom lines: people and profits. If you just focus on the money side and do not take care of the people – and I mean our teammates, our customers, our community, and their families – then what have you gained? At the same time, you can't take care of people if you don't make a profit.

"It may surprise you, but at Midrex our stated purpose is to love and serve others. It is a recognition that most people will talk about serving customers and the notion of service, but the attitude you bring to how you serve is just as important as the act itself. We are a service company and that's where we really put our focus – serving people," he explained.

He added that the company philosophy is not a pager-turner for Midrex. "I think it is what we have been about for a long time. We are just being more deliberate and upfront about saying. 'You know what, this is who we are, and this is what we believe.' Maybe some CEOs might see it as a weakness, but it is really our strength. We do things for the right reasons and, you know what, things seem to fall into place."

Amongst CEOs, he is not alone in declaring that a company's most important assets are its people, but at Midrex, Montague sees it as "what gets the job done. It's what drives project and technology development – the minds behind where we go and how we get there – and for those reasons, we want people who have the mindset to really love and serve others."

A noble philosophy, certainly, but how is it encouraged and manifested in Midrex's people from recruitment through to retirement?

"I think it really starts with integrity," said Montague. "Integrity is a cornerstone you can build from and putting people in an environment where they see it being practiced by those all around them is certainly a huge encouragement.

"From the very start, when we are talking about a new person becoming part of our team, we want people who are ready to walk in, act honestly and fairly, and do what is for the good of all people," he added.

Just as for the steel business cycles of the past few decades of Montague's career, no doubt the steel industry will present more opportunities and challenges for all the businesses and people active in it as the journey continues along the road towards substantial decarbonization. When the two aims of taking care of people and of profits occasionally conflict along the way, it is then that very senior managers like Montague will draw on all their experience and integrity to get the balance right. "It's the hardest issue to deal with for a management team that cares," he concluded, but one that he and his colleagues are determined to handle effectively.

PURPOSE-BUILT
FROM THE GROUND UP

What if YOUR material handler's purpose is a little different from the **OTHER** material handler's purpose?

When you want purpose-built, only SENNEBOGEN purpose-builds one machine at a time to meet your goals.

Think of the possibilities!

VISIT US VIRTUALLY AT

ISRI 2021

APRIL 20-22, 27-29

See how SENNEBOGEN can purpose-build the right machine for you

www.sennebogen-na.com | +1-704-347-4910

SENNEBOGEN®

Strength in scrap demand returns

The rapidly growing momentum in manufacturing in the United States has revealed pent-up demand for steel and non-ferrous metal scrap. Myra Pinkham surveys the US scene, including its multiple connections with international markets for secondary metals

GETTY IMAGES

Hot property – a recovery in manufacturing activity in many nations has seen demand for steel and metal scrap surge

While they have been on something of a rollercoaster ride, the US scrap metals markets have seen a dramatic turnaround in 2021, as both the US and global economies started to recover from last year's lows. "It has been much like the stock market – very volatile, yet up – with prices for both ferrous and non-ferrous scrap rising substantially year over year," Greg Dixon, chief executive officer of Smart Recycling Management, said.

According to Joseph Pickard, chief economist and director of commodities for the Institute of Scrap Recycling Industries (ISRI), many US metals recyclers believe that the current market conditions are stronger than ▶

they have been in several years with recent improvement in manufacturing activity.

There are also indications that manufacturing activity will continue to grow. For example, the Institute for Supply Management (ISM) US purchasing managers index registered 60.8% in February – its highest reading since February 2018, including a 3.7% month on month increase in the new orders component of that index to 64.8%, which indicates that new US manufacturing orders have now been growing for nine consecutive months.

Pickard said that this has resulted in a very metals-intensive economic recovery from last year, which was marked by dramatic manufacturing plant shutdowns that had occurred as the US looked to control the Covid-19 pandemic. Partly because of last year's supply chain issues, and with mills working down their raw materials inventories, there is now a significant amount of pent-up demand for scrap metals.

That is not to say that there are not challenges. "There continues to be supply chain issues that still need to be worked out," including the shortage of semiconductor chips, which is, at least temporarily, impacting automotive production, Pickard acknowledged. "Also, there are a number of logistics issues, which have been a real problem across the board," he said, noting that not only has the container market been particularly challenging, but there are also trucking and rail issues, all of which have resulted in extremely high freight costs for recyclers.

Margins, not prices

"While no one knows for sure given all the uncertainty in the metals market, I think that scrap prices will be good – or at least better than they were last year," Rose Mock, president of Allied Scrap Processors, said. "But it really isn't about the prices. It is about the margins. And even with prices higher than they had been, our margins haven't improved because scrap

'There has been a real scramble for steel mills to get the volumes that they need'

recyclers are all fighting with each other for material," she added.

That has especially been the case for ferrous scrap, given the global shortage of iron units at the same time as US mill capacity utilization rates have been rising and new domestic production capacity, particularly electric arc furnace (EAF) capacity, is starting to come online.

"There has been a real scramble for steel mills to get the volumes that they need," Alexander Kershaw, a research analyst for Fastmarkets MB, declared, especially with demand for ferrous scrap seemingly being very close to returning to pre-Covid levels.

John Tumazos, president and metals analyst of John Tumazos Very Independent Research, said that ferrous scrap availability is severely tight – and much tighter than for other types of scrap metals. Overall US steel mill capacity utilization rates have been steadily improving since the middle of last year, Tumazos pointed out, albeit still remaining about 8% lower than they had been prior to the pandemic. According to the American Iron and Steel Institute, average domestic mill operating rates had already moved back to over 77% by mid-March from a May 2020 low of about 53%.

Currently – and throughout the pandemic – much of that fluctuation was due to the idling of blast furnaces by the integrated steelmakers, for which, Don Martin, vice president for ferrous marketing and trading at Alter Trading Corp., noted, scrap only accounts for about 20-30% of their charge, compared with scrap being the lion's share of feedstock for EAF steelmakers, and particularly electric steelmakers making long products.

Even though many EAF-based flat-rolled steelmakers in their quest to make inroads into higher quality end-use markets, including automotive and appliances, have tried over the years to use a variety of other iron units to substitute for scrap – especially prime scrap – including direct reduced iron (DRI), hot briquetted iron (HBI) and pig iron, Dixon said that there is a limit to how much they can use in their melt, even for high quality steels, and the supply of such alternative iron units has been uneven.

Tumazos said that the global shortage of those iron units in general, but particularly iron ore, has had a big impact upon the ferrous scrap market. Reduced iron ore production by major suppliers Vale and Rio Tinto has come at the same time as Chinese steel demand has been increasing. "Chinese companies are currently trying to outbid EAF steelmakers for pig iron and scrap because they can't get enough iron ore," he explained, adding, "It would be a rational decision for Chinese companies to cut their steel production if they don't have enough iron units, but that isn't what they want to do."

Demand grows

Kershaw pointed out that new EAF steelmaking capacity expected to come online over the next several years will demand even greater ferrous scrap consumption.

Phil Gibbs, equity research analyst for KeyBanc Capital Markets, said that over the next few years about 7.6 million short tons of steelmaking capacity is expected to be added, including the 1.6 million ton expansion that Big River Steel completed in November and is ramping up very quickly. He said that just Steel Dynamics' 3 million ton per year greenfield mill in Sinton, Texas, and the 1.5 million ton per year EAF that Nucor is putting into its Gallatin, Kentucky, facility – both of which are expected to come online by the end of this year – will require an additional 3 million long tons of prime scrap and high-grade iron units. That calculation does not include the EAF that JSW restarted at its Mingo Junction, Ohio, facility in early March and the steelmaking capacity slated

to come online in 2022 and 2023, all of which, he said, will add to the current upside pressure on prime scrap.

ISRI's Pickard pointed out that while demand has been healthy for both obsolete and prime scrap, recently there has been a widening of the spreads between the two, with the tight supply of prime scrap that resulted from a lack of generation last year when there were widespread manufacturing shutdowns coupled with the recent increase in demand coming at the same time as inventories have been depleted.

Kershaw observed that in mid-March the differential between busheling and heavy melt steel (HMS), at $125 per long ton, is the widest it has been since 2010. But given how much US hot rolled coil (HRC) prices have been increasing in recent months, he also noted that the spread between HRC and busheling has also been widening dramatically to over $700 per ton in early March, from $170 per ton in early August.

He said that with auto output rebounding earlier this year, increasing generation of prime scrap, domestic mills are scrambling to get as much prime scrap as they can to take advantage of the HRC-busheling spread. That is even though the shortage of semiconductor chips has caused some automakers to temporarily close some of their plants, given that expectations are that North American auto output will be up 5% quarter on quarter, which will increase demand for prime scrap. One concern, however, is whether prime scrap prices have risen to the point where it is not competitive with pig iron and if that will result in buyers near the Gulf of Mexico to turn to imported pig iron for the next month or two.

Construction picks up

The dynamic could change. Will May, IHS Markit's senior economist for steel raw materials, said that both prime and obsolete scrap prices climbed so high in March, when prime scrap increased $70 per long ton and obsolete scrap increased $40-$50 per ton, that they could be approaching their peak. He said that one reason why obsolete scrap prices picked up in March was the frigid weather conditions throughout much of the US in February. But now with the weather improving, construction activity, including demolition activity, should also pick up, which means that obsolete scrap generation should also increase.

While it varies by sector, Pickard said that overall US construction spending is expected to increase this year, with concerns about commercial construction somewhat countered by pent-up housing demand and with the American Institute of Architects' Architecture Billings Index going positive at 53.3 points in February after a remaining below 50 points each month over the past year. If a comprehensive US infrastructure spending bill is passed, it would support demand for steel and other metals. The same is seen to be true for the recently passed $1.9 trillion pandemic-related stimulus bill.

"It is, however, probably somewhat of a misnomer to say that obsolete scrap is tight," Gibbs said, noting that it mainly looks that way given mills' preference to use scrap with iron ore prices so high. "There is always post-consumer supply of scrap. It is just a question of having a price that is high enough to incentivize people to take it off their hands," he explained.

Scrap exports

Dixon observed that US ferrous scrap exports have been relatively strong, bolstered by the fact that the world economy, and therefore global steel production, is waking up from last year's pandemic-related dormant period. In fact, according to the World Steel Association, overall global crude steel output was up 4.8% year on year in February, including a 3.4% year on year increase for Turkey, which, Pickard pointed out, is the United States' major ferrous scrap export market.

While US ferrous scrap exports were down by 27.6% year on year in January, including a 22.8% decline to Turkey, Pickard said that is not a good indication of what will occur for 2021 as a whole, given that it is just one month and data and is compared with prior to the pandemic. He said that he believes that US scrap exports to Turkey will likely be positive this year.

There is also speculation that, as part of their recently easing scrap metal import restrictions, China could start importing more ferrous scrap again, Pickard said, noting that US ferrous scrap exports to China had fallen to just 38,252 tonnes in 2020 from 416,350 tonnes in 2018, prior to the restrictions going into ▶

US ferrous scrap exports* (tonnes)

	Year 2018	Year 2019	Year 2020	Jan-20	Jan-21	YTD % CHG
Total:	15,663,266	15,840,957	15,773,186	1,484,733	1,074,229	-27.6%

* Ex-stainless steel and alloy steel

Sources: Census Bureau/U.S. International Trade Commission/ISRI

US copper and copper alloy scrap exports (tonnes)

	Year 2018	Year 2019	Year 2020	Jan-20	Jan-21	YTD % CHG
Total:	912,930	871,705	776,289	62,632	63,993	2.2%

Sources: Census Bureau/U.S. International Trade Commission/ISRI

US aluminum scrap exports (tonnes)

	Year 2018	Year 2019	Year 2020	Jan-20	Jan-21	YTD % CHG
Total:	1,760,545	1,860,208	1,846,224	145,971	152,508	4.5%

Sources: Census Bureau/U.S. International Trade Commission/ISRI

place. While Alter Trading's Martin said he has not heard of any buys yet, recent trade data indicates that US ferrous scrap exports to China were up 53.7% year on year in January.

"It could be more of a 2022 story," Kershaw said, noting that at this point China has been mainly importing ferrous scrap from Japan, with traders still uncertain how quickly it will be comfortable to buy from the US. IHS Markit's May said one barrier has been the high seaborne prices, stating that once Chicago HMS prices, which were $425 per long ton, fall back to $350-$400 per ton, Chinese buyers might start to be attracted to the seaborne market.

While overall the ferrous scrap market came in like a lion, Gibbs said he is expecting it to go out not quite as strong, although not quite like a lamb. May agreed, stating that while he believes that ferrous scrap prices will come down slightly from current levels, that is just because they have got so high. "I think that 2021 will continue to be a red-hot year for both steel and ferrous scrap," he said.

Non-ferrous scrap trends

While the story is similar for US non-ferrous scrap markets, Dixon pointed out that they are much more driven by global demand than is the case for ferrous scrap. This has clearly been supported by the recent dramatic, albeit volatile, price increases for such base metals as copper, aluminium, zinc and tin, Pickard pointed out, observing that with primary copper prices moving up by about 15% year to date through mid-March, and primary aluminium prices moving up about 10% over the same timeframe, that also bodes well for non-ferrous scrap.

"It has, however, been remarkable how volatile non-ferrous prices have been," Pickard said. For example, due to a combination of market fundamentals and investment fund activity, copper has been trading at its highest price since 2011 at about $9,100 per tonne.

'Overall, it should be a reasonably good year for both ferrous and non-ferrous scrap'

Non-ferrous metal prices have been supported by improvements in global manufacturing activity – particularly in China, but also in the US and elsewhere in the world. Stephen Moss, vice president of Stanton A. Moss, emphasized the importance of China, noting that there has been a big pick-up in industrial demand in China with the country's economy back in full swing.

John Mothersole, director of IHS Markit's pricing and purchasing service, said that perhaps the biggest thing to watch is what happens with US non-ferrous scrap exports, particularly copper and aluminium scrap exports, into China, now that since late last year the country is no longer classifying metal scrap as metallic waste. He said that Chinese officials are initially likely to be extremely conservative about what they let in, especially for copper scrap.

ISRI's Pickard observed that total US copper scrap exports were down 10.9% last year, to 776,289 tonnes, despite a 33% increase to China, to 117,258 tonnes. That, he said, was largely due to a 20% decline to Malaysia (176,734 tonnes in 2020), an 11% decline to South Korea (63,845 tonnes) and a 26% decline to India (44,462 tonnes), although he said he expects that will improve this year as those countries' economies ramp back up.

ISRI reports that total US aluminium scrap exports were only down 0.7% in 2020, to 1,846,224 tonnes, even with exports to China falling by 51% (to 154,379 tonnes). That is partly because US aluminium scrap exports to Malaysia, India and South Korea were significantly higher in 2020 than the previous year.

Freight issues

Non-ferrous scrap has been especially negatively impacted by logistics issues, particularly container availability. Pickard said that with the difference of container rates for freight coming from Asia and for those containers to get returned, shipping lines are trying to get their containers back to Asia as quickly as possible. He said that has not only made it difficult for companies to book containers, but they are also not guaranteed that they will have access to the containers they have already booked.

Non-ferrous scrap supply is so tight that recyclers must compete with each other to get enough material to meet their customers' needs, with scrap flows not being as steady as many would like. Moss said that is partly because of the impact of the tough winter scrap prices upon peddler traffic. But also because of lower than desired generation of certain scrap, including aluminium scrap, by some manufacturers, particularly airframe manufacturers, which continue to be impacted by the pandemic. Also, he said that even though the automotive market has been fairly strong this year, it would be stronger without the semiconductor chip shortage, which could also temporarily affect scrap generation.

There have also been numerous logistics issues affecting the movement of non-ferrous scrap both domestically and internationally, Mothersole point out. He said that also, somewhat surprisingly, even though the copper market has been so hot, copper scrap discounts are the widest that they have been in three to four years. He, expects them to narrow sometime before the end of the year, however, given expectations that primary copper prices are likely to correct more that copper scrap prices. Meanwhile, aluminium discounts have been flat to down slightly on the back of tight aluminium scrap supply.

"Overall, it should be a reasonably good year for both ferrous and non-ferrous scrap," Dixon said, although there could be more volatility for non-ferrous scrap than for ferrous.

DANIELI

DANIELI MIDA HYBRID MINIMILL FOR LONG PRODUCTS

Unique performances using patented

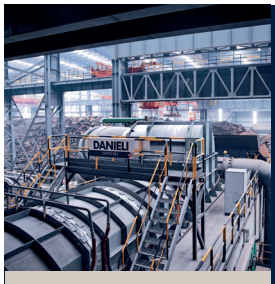
DIGIMELTER®, OCTOCASTER® AND QLP-DUE® TECHNOLOGIES

At Danieli we don't shop around for noble equipment

DANIELI GREEN METAL

DANIELI MIDA HYBRID MINIMILL FOR LONG PRODUCTS

A Green Steel technology for quality products at competive OpEx



SCRAP MANAGEMENT AND ENDLESS CHARGE

50 kWh/ton saving

DDM - DANIELI DIGIMELTER: THE EVOLUTION OF THE EAF

30 kWh/ton saving

OCTOCASTER® UP TO 10 M/MIN CASTING SPEED

DRI HOT CHARGE

100 kWh/ton saving

HYBRID VIA Q-JENIUS

50 kWh/ton saving

DANIELI QLP-DUE®

UNIQUE PERFORMANCES USING PATENTED: DIGIMELTER® OCTOCASTER® QLP-DUE®

Note: energy savings expressed in kWh/ton (1 kWh/ton = 3.6 MJ/ton)

DANIELI

Characterized by Digimelter power and melting intelligence, high-speed high-quality casting, and endless casting-rolling, QLP-DUE® minimills produce on a single strand up to 1.5 Mtpy of straight and spooled bars, wirerod and merchant bars. Productions exceeding 2 Mtpy can be achieved in multistrand configuration, with direct hot-charge.

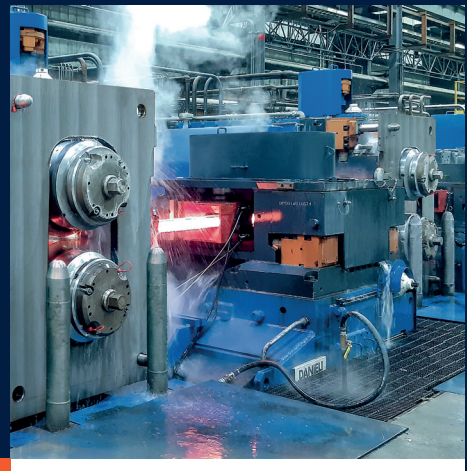
Featuring the Q-One power unit, Q-Melt intelligent controller and continuous scrap or DRI charge, Digimelter runs the melting processes automatically, in a stable and adaptive way, with minimal impact on the electric network.

Thanks to the revolutionary Octocaster®, QLP-DUE® technology allows the widest product mix from ULC to mild steels and up to SBQ grades.

Coil-to-coil, semi-endless and endless rolling modes make it possible to satisfy continuously changing market requests.

Danieli MIDA minimills are truly green, with the lowest power consumption and CO_2 release. Also, they are natively hybrid - making use of renewable energies by Digimelter, and hydrogen for DRI production.

Q-HEAT LONG INDUCTION-TEMPERATURE CONTROL



BARS, WIREROD, MERCHANT SECTIONS

DIGISAVER DIGITAL PROCESS ENHANCER
20 kWh/ton saving

Additional digital overall plant optimization

DUE@
Three rolling modes: coil-to-coil, semi-endless, and endless, for no steel-grade production limits.

Up to 330 kWh/ton saving.

UNIVERSAL ENDLESS FOR LONG PRODUCTS

DANIELI THE COMPETITIVE GREEN STEEL

At Danieli we don't shop around for noble equipment

DANIELI GREEN METAL

Getting a grip on India's scrap

Demand for ferrous scrap in India grows ever stronger. Kunal Bose reviews the market drivers and national plans for sources of supply

A distinguishing feature of India's annual budget is that, besides the routine tax proposals, it provides announcements of some important economic policy decisions. Much to the relief of the long-overlooked ferrous scrap sector and of electric-arc-furnace- and induction-furnace-based steelmakers in India, the country's 2021-22 budget (April to March) has emphasized the creation of a regulatory framework that will lead to the scrapping of mounting numbers of end-of-life vehicles (ELVs).

The move is seen as a victory for environmentalists who in campaigning note that roads packed with ELVs is a principal reason for the critical pollution levels seen in major Indian cities. Besides creating conditions for the routine consignment of ELVs to state-of-the-art recycling units to be set up in different parts of the country, finance minister Nirmala Sitharaman said in her budget speech that ship recycling capacity of around 4.5 million light displacement tonnes (LDT) at what is the world's largest ship-breaking center in Gujarat's coastal town of Alang "will be doubled by 2024."

At the same time, if the steel ministry's vision is implemented, Alang will also emerge as an "integrated center" for ship-breaking and the scrapping of ELVs. A detailed project report is being prepared about how the infrastructure developed over the years to support seamless operation of over 150 ship-breaking yards along the 10 km long coast at Alang can also be used to host a very large ELV scrapping center. For the plan to succeed, the challenge will be to procure and send ELVs from all over India, and probably also nearby countries, said an official of government-owned company MSTC, which – in partnership with leading automaker Mahindra – is already in the business of recycling old vehicles.

India has around 25 million ELVs and the government is laying down rules for 15-year-old commercial vehicles and 20-year-old cars owned by individuals to find their way to recycling units. An Indian ELV typically contains 65-70% steel. To make a success of the proposed voluntary recycling scheme, the road transport ministry will be advising all vehicle manufacturers to give a 5% price discount to buyers on their submission of certificates verifying that their old ones have been scrapped.

Dependence on imports

Unlike integrated steelmakers, such as Tata Steel, JSW and Steel Authority of India Limited (SAIL), which were allowed to stay in production during last year's two-month lockdown and then through phased reopening of the economy, steelmakers dependent on EAFs and IFs had harrowing times because of disruptions to their supply of raw materials, particularly steel scrap. In the absence of an all-encompassing industry status and a regulatory framework for the large-scale collection of scrap originating in different sectors – from units making finished steel products to ELVs to construction and housing, and segregation, shredding and transportation – EAFs and IFs, which are mostly small and medium in size and spread all over the country, were starved of their principal raw materials. Acknowledging the hardships that 'secondary' steelmakers suffered through 2020, in the budget Sitharaman waived the 2.5% "import duty on steel scrap for a period up to March 31, 2022."

Jindal Stainless managing director Abhyuday Jindal said: "The duty waiver on foreign-origin scrap will lend a degree of competitiveness in the domestic market for the feedstock for EAFs. But we are awaiting the finalization of a national material recycling policy that promises to usher in a truly organized scrap market in an environment of highly stepped-up generation of scrap from multiple local sources. I'm hopeful implementation of the policy will reduce our dependence on imports as it will bring quality consistency in locally generated scrap." The EAF is the principal route through which stainless steel is produced in India and the demand for scrap is now mostly met by imports. In tandem with the expected annual Indian demand rise for stainless steel of 5-6%, scrap requirements will rise, said Jindal.

"High dependence on imported scrap is always disadvantageous for EAF-based steelmakers. You have to maintain large inventories of imported scrap at all times and that requires so much more working capital," Jindal explained. The lack of shredding facilities has made India nearly 90% dependent on imports of shredded scrap. Similarly, its import dependence on mild steel shredded scrap is very high. Imports are made mainly from the UK, European Union, Australia, New Zealand, Malaysia and the US.

"At Jindal Stainless, we have, however, been successful in reducing our dependence on imported scrap through two-pronged initiatives. First, our links with domestic scrap traders are yielding good results. Second, we are consciously using domestically available ferrous variants in growing quantities. As a result, our reliance on imported scrap in the last few years is down from over 75% to 35%. This will further fall to 25% in the next two to three years," said Jindal.

An official of India's Ship Recycling Industries Association (SRIA) said the "outlook for the shipbreaking industry has considerably improved following New Delhi's enactment of Recycling of Ships Act 2019 and our simultaneous accession to the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships. As the finance minister said, around 90 yards at Alang have secured HKC-compliant certificates since. The development has created the ground for us to receive a greater number of ships

from the US, Europe and Japan, which are sticklers for an environment-friendly recycling system that also protects the health of workers engaged in shipbreaking." Ships sent for recycling are the source of high-quality scrap recovered from plates and this commands a premium price.

More electric steelmaking

In its pursuit of 300 million tonne per year steelmaking capacity by 2030-31, India wants the share of EAFs and IFs to be up to 40%. This, combined with the fact that the primary sector also uses scrap to the extent of 15% in the charge mix of the basic oxygen furnace (BOF) for efficiency and cost reduction, will require stepping up ferrous scrap generation at an accelerated rate from all possible sources, but particularly ELVs and shipbreaking.

On the assumption that Indian steel production will reach 255 million tonnes by 2030-31 and that direct reduced iron (DRI) will remain an important feedstock for EAFs and IFs, the country's scrap requirement will rise from around 30 million tonnes at present, to over 70 million tonnes, according to a steel ministry paper. The government's objectives as it encourages the creation of new EAF/IF-based steelmaking capacity are to promote the circular economy, bring down the industry's overall greenhouse gas emissions and strive for self-sufficiency in ferrous scrap.

"In our all-round efforts to step up local procurement of steel scrap and cut imports ranging from 7 to 8 million tonnes a year, it is only natural that we should be targeting a 50% share of global ship recycling business from 30% now," said the SRIA official. "The Chinese ban on recycling of foreign vessels on its shores since 2018-end has benefited shipbreaking yards in India and Bangladesh. We are even receiving some Chinese flagged vessels at Alang yards. But now we learn that Beijing will soon withdraw the ban on dismantling of foreign ships at its yards. That will mean the four Asian countries, including Pakistan, will be in intense competition to secure end-of-life vessels for dismantling," the official added, noting that the number of vessels sent to scrapyards was 674 in 2019, down from years when the number has been well over 1,000.

The winner in this race will be the one with impeccable credentials in environmental care and the health and safety of workers. There is tacit admission in the local industry that some of India's ship-breakers will have to make up some leeway to be at par with Chinese yards.

Balancing raw materials

According to SAIL director Anirban Dasgupta, "A compelling consideration for the country to turn its focus on scrap-based steelmaking is that, as we go forward, primary steelmakers will find it increasingly challenging to get supplies of high-quality lump ore. This is because most iron ore mines in India are operating for a very long time and as extraction is done at deeper and deeper levels, the ore quality goes down and you also end up with more fines."

Dasgupta himself is experiencing that at the group's largest unit, Bhilai steel plant (BSP). The mill is receiving an increasingly unfavourable lump-fines ratio for the ore coming from a group of mines at Dalli-Rajhara of 1960s vintage, he said. Feeding such ore into a blast furnace is generating about 430 kg of slag per tonne of hot

ONE PARTNERSHIP

FOR ALL YOUR SCRAP PROCESSING SOLUTIONS

WENDT Model 130 Shredding & Non-Ferrous Plant with Complete Emission Control System

Fully Integrated Systems with Best-in-Class Technology, Proven Processes, and Premier Service & Support through the Convenience of One Team.

Global Awards for **Steel Excellence**

2020 WINNER SCRAP EQUIPMENT COMPANY OF THE YEAR

WENDT

AUTO SHREDDERS · NON-FERROUS SEPARATION & SORTING · WIRE CHOPPING · SERVICE & SUPPORT

716.391.1200 | wendtcorp.com | sales@wendtcorp.com

metal, compared with less than 300 kg when "ideal" ore grades are used. BSP, as a result, is also using more energy in terms of its coke consumption.

Another factor that explains India's drive to increase the procurement of scrap to support new EAF operation across the country, and expansion of the existing ones, is the country's growing dependence on metallurgical coal imports. During 2019-20, India's imports of coking coal were up by 2% to 56.9 million tonnes. On the assumption that coke rate in Indian BFs over time will come close to the international benchmark, the national steel policy has assumed coal imports to be 161 million tonnes by 2030-31.

Tata Steel global CEO and managing director TV Narendran said consumers in places far away from major steel production centers will have easy access to the metal if EAFs come up in good numbers across the country. At the same time, as there has to be nationwide scrap collection on a large scale, effective coordination between scrap-producing units and steelmakers should be established. The country will have to have a mechanism for a fair scrap price settlement between scrap processing units and user industries.

Restructuring recycling

An official of the Confederation of Indian Industry said: "First things first. We have recently seen in a breakthrough development the automaker Mahindra and Tata Steel entering the business of automobile scrap recycling in a pollution-free environment. But the target is to have a scrap recycling zone at the outskirts of every city. As more state-of-the-art facilities are created for collection, segregation, shredding and delivery of scrap, the government in tie-ups with the private sector will have to open centers for manpower skilling."

In the meantime, in a novel attempt to bring transparency to the scrap market and provide a reliable procurement center for steelmakers, Tata Steel has launched FerroHaat, a live 24 x 7 marketplace.

Tata Steel chief of recycling business Yogesh Bedi said: "Scrap buying and selling is a challenging task. Prices change by the hour. In this environment, FerroHaat App makes all transactions user friendly. What will recommend it is that it provides scrap traders and yards with a transparent platform with stability in prices." For Narendran, getting a toehold in scrap recycling is only the first step to "our producing steel in the country through recycling route. Our involvement in steel scrap recycling is aimed at promoting sustainable steelmaking and creating a circular economy for the metal."

An official of the government think-tank Niti Aayog said: "The factors to drive development of ferrous scrap collection on an organized scale for steel production using EAFs and IFs are to cut scrap imports, create job opportunities and reduce the industry's overall greenhouse gas emissions." Recycling of 1 tonne of scrap results in the saving of about 1.1 tonnes of iron ore, up to 700 kg of coking coal and around 300 kg of fluxes. Moreover, it will cut greenhouse gas emissions by 58% and water use by 40%. Steel is the biggest carbon dioxide emitter among all Indian industries. If India is to be seen to be committed to combating carbon dioxide emissions, then serious action has to be taken on steel. A major part of that action will be the recycling of scrap.

An extraordinary spread squeeze

Tin market participants say they saw the recent record-breaking squeeze coming, but in pandemic-time trading, how does it get back to normal, asks Archie Hunter

It was at the beginning of the year when the phones started to ring. Hedge funds, eager to hitch a ride on the steadily rising price of tin, were in the market to buy physical stocks of the valuable metal, which is predominately used in electronics.

Solder producers and steelmakers, fresh from unsatisfactory annual contract discussions, were fielding booming orders and contacting suppliers, only to be told there was little material available.

At the time, cash prices for tin were trading above $20,000 per tonne on the London Metal Exchange. Selling at over at $27,850 per tonne at the time of writing in late March, tin's 35% increase in price makes it the top-performing base metal on the LME to date this year, as buyers continue to catch up with a chronic squeeze on spreads between futures and cash prices.

In the past month, players looking to roll positions from one day to the next have had to pay up to $600 per tonne to do so, but those short the spread between cash tin and the three-month delivery paid up to $5,000 per tonne, which was an all-time high.

Some involved in the market closely said they saw it coming. "It's an often-ignored market so people get surprised, but if you've been following tin, the writing has been on the wall. Everything was pointing to the market getting tight and tighter," Robin Bhar, an independent analyst who spent seven years heading metals research for Société Générale, said.

"Tin has always been a volatile market. In recent months, we have witnessed a perfect storm of supply and demand fundamentals," Michael Cuoco, head of hedge fund sales for metals and bulks at StoneX, said.

Indonesian supply shortfall

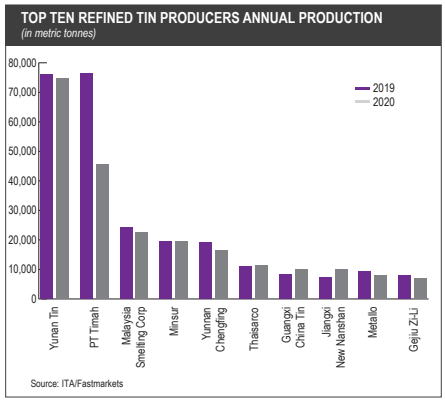
Tin supply slumped over the course of 2020, most notably in swing producer Indonesia, which acts as a key supplier to solder makers across Asia and the United States.

According to data from the International Tin Association, smelters largely shrugged off pandemic-related disruptions. A key exception was production from Indonesian state producer PT Timah, which has the world's second largest output, for which production dropped by 30,700 tonnes last year to 45,700 tonnes *(see chart)*. Against 2019 figures, that amount would constitute 8.4% of annual refined consumption globally, while production elsewhere among the market's largest ten producers was largely flat.

"Historically, Indonesia is the biggest source of supply ex-China and exports have been restricted throughout last year," Tom Mulqueen, an analyst at London brokers Amalgamated Metal Trading, said.

Moreover, Indonesia's independent smelters, clustered on the islands of Banka and Belitung, have struggled to export material since the start of the year, he added. Indonesian exports for February totaled 4,395 tonnes, an improvement from January, but still down by 40% compared with the same month last year.

"I have never seen a bigger deficit of any metal, nor am I aware of any one ever than we are currently seeing in tin," according to Mark Thompson, chairman of UK mining company Tungsten West and a former chief investment officer at Galena Asset Management.



Rush for physical

Premiums for tin, the fees paid on top of exchange prices to obtain specific metal in specific locations, have spiked since the start of the year to previously unheard of levels.

This was most pronounced in the US *(see next article)*, which is the world's second largest consumer of the metal at around 30,000 tonnes per year.

Fastmarkets assessed tin grade A min 99.85% ingot premium, ddp Midwest US at $1,500-1,950 per tonne on March 23, up significantly from $800-1,000 per tonne at the start of 2021.

The sharp rise has come after years of relatively low spot volatility, with most of the market securing supply on an annualized basis rather than buying when needed. "All the traditional demand sectors such as soldering seem to be firing on all cylinders and you've got all the promising green-driven prospects, like copper; tin's probably indispensable for that transition," Bhar said.

Tin premiums have spiked the world over as end-users grapple with disjointed supply chains and an influx of orders. Traders have come under pressure to fill supply gaps, with merchants from Tokyo to New York describing phones ringing daily with orders that they lack the units to fill.

"There is a genuine tightness of physical supply, no doubt of that whatsoever," according to Laila Zollinger, a director at London tin traders Wildshaw Ltd and Fenix

Metals, which produces tin ingots and solder alloys internationally. “We are getting new enquiries from people we haven’t heard from in years,” she said, adding that the company is focused on fulfilling commitments to long-term customers.

End-users are not the only ones in the market for tin, however, with several sources reporting that hedge funds are acquiring stocks of physical material with the intention of using it as a base for building positions in the derivatives markets. "I've been called by a few of the [commodity trading advisors] trying to get exposed to tin, but had to say sorry, we have nothing left," a long-time tin trader, who declined to be named, said of the situation.

Spread squeeze

Tin has been traded on the LME since the 19th century. The contract was suspended in 1985 with the collapse of the international tin cartel before being reinstated in 1989.

Since then, the contract has seen previous squeezes, but the market events of this year have eclipsed previous bouts of spread tightness, with one market participant needing to borrow tin for a day via the tom-next (tomorrow/next day) spread at an unprecedented price of $600 per tonne.

The LME's tom/next spread blew out to a $600 per tonne backwardation on Tuesday February 16. Spreads have since relaxed somewhat, although the exchange's three-month cash spread was last in a $2,000-per-tonne backwardation, a figure that dwarfed anything seen prior to the past two months. Spread volatility between LME tin contracts is not unusual, but it has reached unprecedented levels since the start of this year.

Stocks and the Ring

With the physical market in disarray, several market participants told Fastmarkets that managing positions in volatile times was made more difficult without a physical LME Ring available to set prices.

"All the way through, since last year, the fact that the Ring closed has contributed to the lack of spread liquidity across all of the metals, so when you have situations like this in less liquid contracts. It's an aggregating factor when you don't have the Ring as a forum to deal with it," Mulqueen said.

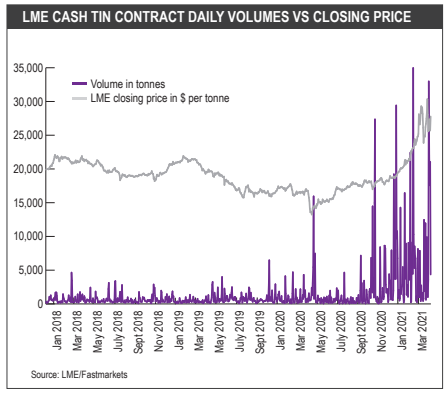
The Exchange has consulted the market as to whether it should close its 144-year-old Ring, which is the last open-outcry trading venue left in Europe, but has been unable to operate during the Covid-19 pandemic.

Traded volumes have successfully moved on to the LME's Select platform, but several market players have lamented the difficulties of doing business through a screen at a time when old-school, in-person deal-making may have helped to facilitate spread deals. “I am not surprised that the tin market has become more volatile recently than ever before. Without the in-person LME rings, the more illiquid markets like lead and tin have greater potential to become disjointed,” Cuoco said.

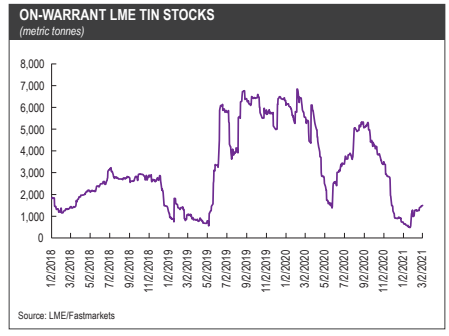
The LME has increased the monitoring of its tin market contracts since backwardations began to flare up and it has the ability to impose a variety of tools to regulate conditions and maintain and orderly market. "The LME notes current tightness in the tin market. At present, there is no indication that LME pricing has diverged from the underlying physical market," a spokesperson said.

Where to now?

The market has quietened down somewhat since the spikes of early February, in part due to an uptick in stocks delivered to LME warehouses. A total of 1,495 tonnes of tin are now warranted on the exchange at the time of writing, up from an all-time low of 485 tonnes of ‘on-warrant’ stocks on February 9.



Volumes on the LME's cash contract have risen since prices increased



After hitting record lows in February, warranted tin on the LME has since been on the up

Most of the inventory (1,325 tonnes) lies in Port Klang, Malaysia. According to brokers, the material is 99.85% purity that was produced by Malaysia Smelting Corporation (MSC), a deliverable quality for the LME, but below the 99.9% purity industry standard preferred by the majority of solder makers and produced by most other smelters.

With physical premiums so high, there remains a disincentive to deliver tonnages on to the exchange, even if it can be used to lend into a steady backwardation. "For me, there's no reason to put metal on-warrant. In fact, if I can get my hands on 99.9% warrants, I'll cancel and deliver to my customers," a tin producer told Fastmarkets.

Some market members are hopeful that a potential reopening of the LME's Ring will help unwind the current tight spreads. "The Ring would bring the main market makers together in the same location. That does a lot because the brokers are better able to ascertain who has what and make the needed markets," Cuoco said.

Others see the markets adage of higher prices being the best "cure" for high prices panning out, with alluvial miners incentivized to bring on more production.

"My personal view is it has to go to a price where demand is destroyed, because supply isn't there and because demand is so inelastic," Thompson said, citing an expectation that the cash price could be driven above $50,000 per tonne within the next 18 months. Whether that pans out remains to be seen, but with pandemic-era trading dominating markets in 2021, it looks like the tin market has potential for plenty more action yet.

Short supply hits US tin trading

Brian P. Helsel, president of the American Tin Trade Association, saw the recent squeeze on tin markets coming last year. He recalls a turbulent time for trading and discusses the outlook for the metal with Orla O'Sullivan

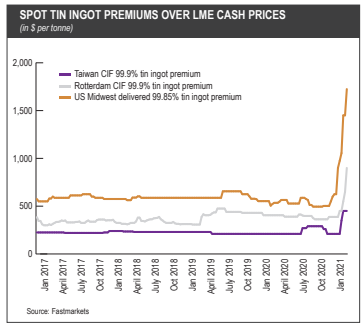
A microwave pinged in the background the first time that Brian P. Helsel, president of the American Tin Trade Association, talked to Fastmarkets about a tin shortage unlike any seen in recent years – and felt particularly acutely in the United States.

It was the end of a long week in the tin trade. By Friday, February 19, the tin cash price had seen its greatest weekly rise in 13 years, up by 16%. The price was near a peak on the London Metal Exchange, at $29,349 per tonne, and an exceptionally large backwardation had occurred within the week, with a $600 per tonne tom/next spread on February 16.

In the United States, premiums for those taking physical delivery of tin were at record levels and heading higher. "It's crazy," Helsel said over the pings. Then, re-directing his attention to his eleven-year old twins, he added, "Here, your mac' and cheese is ready."

President of Phoenixx International, a family-owned trading firm in Pittsburgh, Helsel – a single father to three boys – had to cut the conversation short. It would be the first of many exchanges over a month.

During the next call with Fastmarkets, exactly one week later, the LME cash price for tin had fallen by almost $2,000 per tonne, to $27,500 per tonne on Friday, February 26. However, US tin premiums had risen by upwards of 35% in Fastmarkets' February 23 fortnightly assessment. Even so, Helsel said that is not the most



volatile pricing he has encountered while trading about 50 types of metal and super-alloy scrap at different points since 1997.

"Nickel was the wildest ride, in the mid-2000s," on price alone, he recalled.

Distinctive tin market

Today's tin market is distinguished by the speed of change, a genuine physical shortage, and a completely altered conversation with buyers, Helsel said.

Situating tin within what he views as the beginning of an overall commodities boom, he said, "The difference between this and the last super cycle is that this one turned on a dime." The huge price move he witnessed in nickel in the 2000s took years, whereas tin prices have greatly changed in as many months, he said.

"The tin cash price has pretty much doubled from April [2020] to February, but most of the movement was in the last five months," he said. "And premiums five months ago were the usual, boring $400 per tonne." US market participants used to joke that you could set your watch by US tin premiums.

'The difference between this and the last super cycle is that this one turned on a dime'

Although the cash price for tin has eased, premiums have not, especially in the US. The US was the first region to break Fastmarkets records for tin premiums – now at record highs in all regions. Back on January 12, US tin premiums first hit levels unprecedented since 2003 in Fastmarkets' assessment.

They hit progressively higher highs in four of the next five assessments. Fastmarkets' price assessment of the tin, 99.85% ingot premium, in-whs Baltimore was $1,400-1,900 per tonne March 23, up 22% in the two-week assessment period and almost 3.5 times what it was when the rally began on December 1. That premium, most quoted lately, dates back to its launch in 2016. Fastmarkets' delivered tin premium dates back to its launch in 2003. Fastmarkets heard of isolated sales at a premium upwards of $2,000 per tonne and of prompt tin offered, delivered, at a premium near $8,200 per tonne.

Meanwhile, the LME tin official cash price rose, as Helsel noted, from $14,990 per tonne on April 22, 2020, to $17,755 per tonne on November 1. Less than five months later, it peaked at $30,995 per tonne on March 11.

The price retreated when some market participants cashed in by selling to the LME as future prices lost in value to cash prices. But tin remains near a 10-year high and the fastest-rising base metals price of 2021 to date.

LME stocks have risen from their extreme lows in February, but tin delivered to warehouses in Asia is of little benefit to US buyers in immediate need of the metal.

The US is hit hardest

Helsel was one of the first to call the impending calamity, saying on November 16 that "tin is about to go through the roof," reiterating on January 4 "very tight and lots of demand."

By then, Fastmarkets was reporting that tin offers to buyers were rising by the day and sources throughout the industry said sellers were able to name their price.

The global shortage was felt first and hardest in the US. It is the

world's second-largest consumer of tin, but produces essentially none, nor generally has any stocked domestically in LME-approved warehouses. Recent years were an exception in that tin came on to the LME in the US for the first time in four-and-a-half years, starting in March 2019, and building to 3,160 tonnes by April 2020.

That amount was about one tenth of the most conservative estimates of US consumption of 30,000 tonnes, and it quickly disappeared once demand rebounded strongly in the second half of 2020. Just two truckloads worth of tin were in the LME warehouses in the US as 2021 began, and not 1 lb by January 12 when premiums first hit record highs.

The pandemic contributes

The Covid-19 pandemic increased some types of tin demand, while it reduced and disrupted supply, including to date from the main US source, South America. Shipping costs also soared amid a container shortage.

"Covid issues, shipping, China aggressively buying tin, these are all factors, but they don't move markets that much and they don't last as long," Helsel said. "There is demand out there."

"Electronics is a huge area of growth," he said. People are spending more time on devices in an increasingly virtual existence during the pandemic and moving to bigger dwellings, fueling a construction boom.

That also means more use of tin solder and, Helsel said, "Some is going into the chemical industry, for PVC [polyvinyl chloride plastic pipes] and tin goes into glass."

Demand is likely to keep rising, but not supply, short-term, he said. "I don't see South America or any producer being able to change their production in any meaningful way to change the supply-demand balance.

"This bull run is underpinned by underinvestment in mining. How many tin mines have come on-line worldwide in the past 10 years?" he asked, adding, "There is some tin recycling, but there are no tin mines in the US."

'The most important thing in the supply chain is the actual supply, getting the material to the customer'

"This bull run is underpinned by underinvestment in mining," said Helsel

Manufacturing in jeopardy?

"We're getting close to the point where [US] manufacturers might not be able to make their products, I think, which in my 25 years in the business I never expected," Helsel said. Indeed, tin consumers first told Fastmarkets as much in early March.

"We're having an extremely difficult time finding spot tin and when we do we pay enormous prices. People understand. Now, certain buyers who are normally tough negotiators just call and say, 'What do you have?'" Helsel said.

"Manufacturers are now most concerned about availability. 'Can you get it there? is the question; the furnace doesn't know the price.

"The most important thing in the supply chain is the actual supply, getting the material to the customer. We're just at the beginning stages of this new development," Helsel added.

Can the government supply?

The pandemic has spotlighted the US reliance on remote overseas sources for many critical supplies, prompting President Biden to order a review of the nation's supply chains a month after he took office.

Some have long called for the US to replenish, for national security, its stockpile of tin, under The Defense Logistics Agency (DLA). China began last April to stockpile up to 40,000 tonnes of tin.

"It would be good long-term if the DLA built back up tin stocks, but short-term it would add to supply concerns," Helsel said.

A couple of weeks later, on March 8, the DLA made its first offer of tin to the market in 13 years. Just two truckloads of weather-damaged tin from the 1950s stirred great market interest. The tin, from a long defunct Texas smelter, symbolizes what market observers describe as a shrinking US tin industry offering traders diminishing returns, until recently.

The DLA's April offer is the first lot of perhaps 400 tonnes of tin to be offered through September, the Agency told Fastmarkets on March 17. The limit is not fixed, and the Agency has authorization to sell 4,034 tonnes of tin from a stockpile by September 30.

Helsel's reaction was that "Unmet demand is much more than 400 tonnes, but 4,000 tonnes would make a difference."

Stimulus ahead

Metals prices will rise further following all the government stimulus in the US and elsewhere, Helsel said. A US $1.9 trillion pandemic relief package passed on March 11, following a $2 trillion package in 2020.

"Supply is one part of this market, demand is another, and stimulus is another. Stimulus checks create what I call a trickle-up economy. If you're playing Monopoly and instead of getting $200 each time you pass 'Go' you get $400, the price of houses will go up."

Meanwhile, tin consumers have no tin substitutes for most of their products, including the main one, solder. "We're two years away from that," he said. However, Helsel said Phoenixx, founded by his father, Paul, in 1990, lost a customer who abandoned tin-coated wire in the last commodities boom, around 2007. "The tin story is still being written," he said.

As to the chapter on premiums, has their rise in the US seemed exaggerated because it was preceded by artificially low US premiums while LME stocks, a US abnormality, weighed on them?

"I don't know that I would say premiums were artificially low, but producers were very aggressive in late 2019 for 2020 contracts and that set the benchmark for the spot market.

"If the spot market stays as it is, next year could be a different story," Helsel concluded.

Access our Daily US HRC Index

A new era for the hot-rolled coil market

Providing an effective risk management tool for an increasingly volatile market.

Access this price for free each week

Fastmarkets

fastmarkets.com/hot-rolled-coil

Lead demand stays strong

The reliability, value and extensive recycling of lead-based batteries – plus an expanding role for them in stationary power storage – continues to create demand for the base metal, reports Gregory DL Morris

Despite all the attention lavished on lithium and other materials for new power-storage methods, the long-established lead battery remains a reliable and relatively inexpensive way to store electricity. Beyond its existing role in transportation, it is expected to play a major role in stationary power storage as an enabling technology in power generation diversity and grid reliability.

"If it has an internal-combustion engine, it most likely also has a lead battery," said Matthew Raiford, technology manager for the Consortium for Battery Innovation (CBI). That includes the well-known on-road private and commercial vehicles, but also construction equipment. "There are lead batteries on submarines, and even some applications for aviation," he noted.

And importantly, none of those applications are going away. Raiford explained that while hybrid and pure-battery electric vehicles primarily use lithium-ion for motive power, most still have standard 12-volt systems for the auxiliary equipment. The simple reason is their simplicity. The design and components are so standardized, they are also inexpensive and reliable.

"Automotive auxiliary [lead] batteries are a key growth area both for internal-combustion engines and beyond," said Raiford. "Even if all internal-combustion-engine vehicle manufacture stopped today, there would still be a robust replacement battery market for at least a decade," he added. And that only counts on-road cars and light trucks. Many emergency and construction apparatus and other heavy commercial and industrial vehicles are likely to remain diesel-powered for the foreseeable future.

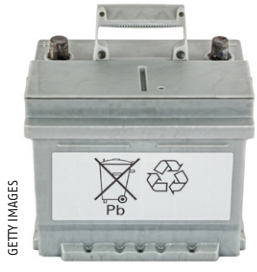
Stationary power

Stationary power storage is a promising market too. "In power reliability, the lead battery is very safe, especially compared to other chemistries," said Raiford. "The electrolyte is water-based, and the metal is non-reactive," he added. "There are always safety concerns with any electrical equipment, but from an operational and insurance perspective, the lead battery is very safe."

The deadly winter storm that battered Texas in February reminded that disruption to power supplies is a live issue. Back-up generation is being contemplated at many levels, from industrial to residential. Depending on exact circumstances, bigger batteries and smaller generators could be a better answer.

"There is actually a long legacy of stationary power storage for lead batteries, especially in telecommunications," said Raiford. "There are 750,000 stationary telecom storage installations used to support the communications network in the US. Data-center backup is now a very hungry market, especially as operators expand their 5G networks."

He reiterated that "in operation there is an extremely low incident rate [for lead batteries], and behind the installations is a strong manufacturing infrastructure with mass manufacturing and standardization. It is very feasible to extend that to the consumer level. We are already seeing an uptick in demand like that."



GETTY IMAGES

The extensive recycling of lead batteries remains a key strength of their use

Primary lead supply

This is an exciting time for lead, said João Jorge, director of market research for the International Lead Zinc Study Group (ILZSG). "We don't see any reduction in the original automotive market for at least five or ten years, and even then the replacement market will continue."

There may even be pockets of growth for transportation. "The demand in places like India for three-wheeled mini trucks is strong," said Jorge. "As is demand for scooters worldwide. Overall the trend toward electrification means demand for lead. Renewable energy needs storage. What lies ahead, the stationary storage market, could be even bigger than transportation. The future of lead is more positive than negative."

For 2020, ILZSG tabulated that 113,000 tonnes of lead mine capacity was idled or closed, compared with the commissioning of 102,000 tonnes of new output.

In Canada, Trevali's Caribou mine and Coeur Mining's Silvertip were idled. Separately, Industrias Peñoles' Francisco Madero mine in Mexico and the Raura operation in Peru were also idled. In Poland, the 20,000 tpy Olkusz-Pomorzany mine was closed in December.

The most significant additions were expansions at Hindustan Zinc's mines in India and the commissioning of the Qianjinda and the Juanicipio operations in China and Mexico, respectively. A further 135,000 tonnes of capacity is committed for this year, according to ILZSG data, including the reopening of Caribou, the commissioning of Glencore's 60,000 tpy Zhairem operation in Kazakhstan, as well as expansions at the Wuqia (Wulagen) mine in China, and Sierra Metals' Yauricocha mine in Peru.

In 2022 and 2023, an additional 313,000 tonnes of capacity is committed, ILZSG added, notably ▶

Fastmarkets

2021 Steel Tube & Pipe

Find out more about HRC capacity additions, inventory levels, demand, imports, scrap trends, and more

May 10 - 12
Virtual Event

Register Now

Knowledge Partner:

McKinsey & Company

Gold Sponsors:

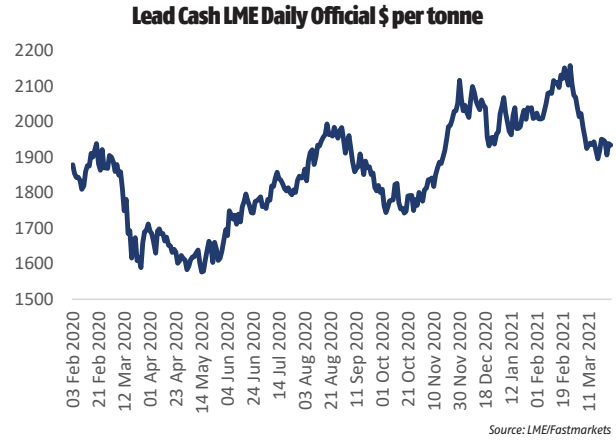
SeAH Steel USA

Silver Sponsors:

Matthews Marking Systems

Quaker Houghton
Forward Together

#FastmarketsSTP



Source: LME/Fastmarkets

Galena Mining's Abra facility in Australia, the Aripuana project in Brazil, Prairie Creek's operation in Canada, the Alaigyr project in Kazakhstan and Bear Creek Mining's Corani mine.

Global supply of lead relies mainly on recycled metal. The worldwide average supply is steady at about two-thirds secondary and one-third primary. In highly developed nations, battery recycling is better than 90%, which is at or near its practical limit. The supply chain for dead batteries is expected to resume normal operations this year. In addition to the lead content, there is significant recycling of acid electrolyte and even the polypropylene cases.

Market movements

For all the potential in its markets, lead is still not the top metal in the minds of investors. "Lead is not one of the sexier base metals," said Edward Meir, senior commodity independent consultant at ED&F Man Capital Markets. "People who want to play the growth story pile into aluminum or copper. Part of the reason is that lead is the only major metal where most of the supply comes from the secondary market. That keeps the upside in check. There is rarely any supply tightness [to drive up prices] because mining and recycling usually balance each other."

The LME Daily Official cash price for lead briefly fell below $1,600 per tonne in March and May last year *(see chart)* as global automobile sales plunged. "Prices then began a decent recovery in mid-August that took prices to around $2,000 per tonne before a more modest downswing to $1,750 per tonne set in during mid-October," the ED&F Man 2020-21 review and outlook noted, adding "On the whole, we don't expect much in the way of major fireworks in lead and see more of a trading-range affair."

'We're not just sitting around waiting for the sunset. We are working on technology, extending life'

The price climbed in January and February this year, peaking at over $2,150, but it has fallen back to trade between $1,900 and 2,000 per tonne for most of March. Increasing global auto sales bode well for lead, but stocks of the metal on the LME have risen recently.

Meir noted in mid-March that "Stocks of lead have increased in both China and on the London Metal Exchange. LME inventories went from 92,000 to 125,000 tonnes in just five days. To put that into perspective, the three-year high is 140,000 tonnes." Inventories on the Shanghai Exchange also rose from 10,000 to 58,000 tonnes at about the same time.

Looking longer term, he noted recent forecasts that do not anticipate EVs reaching half the fleet until 2050. "You can't write off lead batteries in transportation. The timeline for EVs is so elongated, and so far manufacturers have found it useful to retain a small battery," he added.

Meir also suggested that the size and importance of the existing conventional automotive industry could have an impact on the rate at which the transition from internal-combustion engines to electric vehicles proceeds, "in light of the major industrial disruption it will cause," noting that there are 800,000 people in Germany who make cars and trucks. "In India, it's 35 million who depend on the auto industry and related services," he added. "You don't need as many people to make an EV. Governments are setting arbitrary deadlines for eliminating internal-combustion engines. When they see the backlash they might have to reconsider."

"A battery maker came to us recently to hedge their physical risks," Meir added. "He told me, you know, we're not just sitting around waiting for the sunset. We are working on technology, extending life."

While ED&F Man sometimes uses contracts on the Shanghai or Singapore exchanges, it primarily uses the LME. "It's a good market, designed for the physical world," said Meir. "There is a push to go more electronic to cater to the investment funds, but I am not in favor of that."

Steady and sure

Unike the very volatile markets seen for other commodities during 2020 and into 2021, lead's price has moved within historical norms.

"The initial hit this time last year was the drop in demand," said William Adams, head of battery raw materials and base metals research at Fastmarkets. "China was the first to lock down, but while the Chinese market is very large, it is mostly close, does not import or export much."

Europe was next to lock down, "and that raised the fear for the supply chain," said Adams. "That is why we saw the price rally over the summer. South America was later to lock down, but that hit the mining sector quite hard."

Contrasting the market and the marketing of lead, Adams added, "The big thing I have noticed about lead is that markets do not see lead as an infrastructure metal. They might be missing a trick. The stimulus packages in the US focus on green energy. Lead storage goes hand in hand with renewable energy. Lithium ion storage will have a big role, but for uninterruptible power, lead batteries are extremely reliable, cheap and recyclable."

He and other sources stressed that last point: many materials can claim to be recyclable, but lead is already extensively recycled. Recycling of lead is largely post-consumer, and is also seasonal. "The extremely cold winter in the Northern Hemisphere will have killed a lot of batteries," Adams noted, "and that helped to drive the run up in prices in February of this year." At the same time, however, harsh weather hampers logistics, causing a lag in the recycling supply chain.

Those temporary situations notwithstanding, "lead is uniquely poised" for growth in demand and expanded markets, said Raiford at CBI. "There is a healthy supply chain that is standardized. There is great potential at all levels, from small systems to utility-scale installations. Lead batteries could even be used for peak shaving to help take the pressure off the grid on heavy-demand days," he concluded.

NEXT GEN CTRM SOFTWARE

Risk shouldn't be a balancing act.

Navigate the complexity of metals and metal concentrates trading, from deal execution through cash settlement, with a platform that brings you lower total cost of ownership, greater levels of business workflow automation, quick deployment and unparalleled service.

LEARN MORE TODAY

FENDAHL TECHNOLOGY

Alf Barrios moves on

The move of Rio Tinto's Alf Barrios to Singapore this year to become chief commercial officer for the mining major provided an opportunity for Andrea Hotter to review his legacy as chief executive of Rio Tinto Aluminium with him and to discuss his priorities now

RIO TINTO

"Aluminium has had to really think about value generation and positioning in a very different way to some other commodities," said Alf Barrios

When Alf Barrios arrived at Rio Tinto Aluminium in 2014, the outlook for the metal was relatively bullish. Within less than 18 months, aluminium prices had fallen 20% to levels last seen during the 2008-09 global financial crisis.

New York-born to Spanish parents, the new chief executive officer of one of the world's largest aluminium businesses was suddenly facing a very challenging situation. Coming from a 22-year career in the oil sector with industry giant BP, he was prepared for difficult times, but he told *Metal Market Magazine* that the resilience, creativity and perseverance he has since seen across the aluminium supply chain and within his own team is "really second to none."

Barrios is now in the process of departing Montreal, Canada, for Singapore, where he was recently appointed to lead the global commercial team of Rio Tinto. In his role as chief commercial officer, he will be responsible for global sales and marketing, procurement, marine and logistics.

He is leaving the aluminium division with Ebitda of $2.2 billion and an Ebitda margin of 26% last year, zero safety fatalities on his watch, and nearly $1 billion of free cash flow despite the tough demand and pricing backdrop of the Covid-19 pandemic. He is also departing a Montreal team that is now host to 48 nationalities and has women in half of its leadership roles and 43% of its site general management positions.

"The work the team has done in seven years has really positioned us well to be able to be strong even when the price is low, as it was last year," Barrios said. "After seven years, it's the right time for me to move on and hand over to Ivan Vella, who has experience across Rio Tinto's global operations and will challenge what the aluminium group does with fresh eyes," he added.

Trade challenges

One of the toughest challenges facing Rio Tinto, and indeed the entire North American aluminium industry, has been trade actions, and in particular the implementation by the United States of Section 232 tariffs against aluminium imports from Canada, Mexico and the EU, adding a 10% tax on aluminium from these areas.

The implications for the integrated regional network were huge. Canada supplies about 45% of US primary aluminium metal needs, with about 70% of the country's aluminium production destined for its neighbour. For its part, Rio Tinto Aluminium is the largest producer of primary aluminium in North America, with about 75% of its material supplying more than 35 US states.

"I often wondered, are we going to get a positive outcome at the end of this? But the industry came together with a common cause and worked through," Barrios said.

While trade discussions between the US and Canada were long and challenging, he said they were also highly rewarding, especially because the situation united the aluminium value chain and its stakeholders, including trade unions, industry associations and end-use industries. "We now have a much stronger position in North America, with both the US and Canadian governments really understanding the value of the regional aluminium industry and the role the low-carbon Canadian assets play to support manufacturing on both sides of the border," he said.

Three out of every four cars sold in America contain aluminium from Canada, while one out of every three car and truck wheels manufactured in the US contains aluminium that Rio Tinto produces in Canada, the company notes. Parts cross the border sometimes more than half-a-dozen times before finishing in a vehicle that ends up in a sales lot in either the United States or Canada, Barrios added.

"It's critical that we ensure we continue to highlight this interconnectedness because it allows us to provide a steady and reliable supply of metal across the supply chain, especially during challenging and uncertain economic conditions like we all saw in the last 12 months," Barrios said.

Responsible aluminium

Perhaps the most important development during his tenure with Rio Tinto Aluminium is in the area of responsible production.

Aluminium consumers are increasingly looking to reduce their emissions through the supply chain as the result of government-mandated programs and regulations across the world. At the same time, the mining sector has recognized that it needs to live up to increasing societal expectations.

Recyclable aluminium already had an advantage in sustainability terms, but Rio Tinto has been a leader among its peers in pushing the dial further. "It hasn't been just one thing: it's been a series of things, one after the other," Barrios said. Across its global aluminium operations, Rio Tinto's carbon footprint is 60% below the industry average, he noted.

In 2016, the company launched its ▶

Is green in your future?

Aluminium is set to play a central role in the future. Get ready today.

Fastmarkets is excited to work with Rusal and Allow in a joint partnership to provide you with a comprehensive and insightful green aluminium center loaded with:

- Latest market news
- Insightful research
- Exclusive interviews
- Live conversations

Prepare your future with this free information center now.

Go green today

Fastmarkets Allow RUSAL

certified low-carbon aluminium, RenewAl, production of which emits a maximum of four tonnes of carbon dioxide per tonne of aluminium produced. On average, the aluminium industry generates 12 tonnes of carbon dioxide per tonne of aluminium produced at the smelter, analysts estimate.

In 2018, Rio Tinto received Aluminium Stewardship Initiative (ASI) certification for producing responsible aluminium. It is also a partner with Alcoa in ELYSIS, a direct greenhouse-gas-emissions-free venture backed by US technology giant Apple and the governments of Canada and Quebec. ELYSIS uses zero-carbon technology to replace the carbon anode by an advanced conductive material, so it releases oxygen instead of carbon dioxide.

The company is working with key customers such as Nespresso to supply low-carbon aluminium to produce its coffee capsules, and with Apple and AB InBev to supply zero-carbon metal from its ELYSIS joint venture. Most recently, the company launched Start, the equivalent of a nutrition label for responsible aluminium.

"All the work we've done since 2016 is about putting the sustainability credentials of aluminium front and center, and starting the conversation about how important it is for us to play a role in this space," Barrios said.

"It's really important not just in terms of meeting customer needs and desires, but also our values as Rio Tinto. Not only did responsible production make good business sense, but it was the right thing to do, and we had to start moving in that direction," he added.

ELYSIS

The ELYSIS joint venture between Rio Tinto and Alcoa has been a real highlight for Barrios. "I would have never imagined we would team up with an arch-rival in this space!" he laughed.

After some matchmaking by Apple, a team of scientists and engineers from the two companies in France, the United States and Canada started to work together in secret, setting an ambitious target of one year to see whether the project could work. "Alcoa and Rio Tinto are part of the foundation of this industry and are both very proud of their leadership in technology," Barrios said. That made joining forces to create ELYSIS a "real breakthrough moment," he added.

Apple invested C$13 million, the governments of Canada and Quebec each invested C$60 million, and Alcoa and Rio Tinto each invested a total C$55 million in cash during the first three years of the venture. ELYSIS was launched at a ceremony in Quebec's Saguenay-Lac-Saint-Jean region in May 2018, surprising many in the aluminium industry.

"Being in the Saguenay with Alcoa CEO Roy Harvey, Canada's Prime Minister Justin Trudeau, plus the premier of Quebec and executives from Apple, and standing up there and presenting something that nobody expected, was one of the highlights of my time at Rio Tinto Aluminium," Barrios reflected. "People thought we were going to talk about something else; then we launched ELYSIS and everybody was amazed. It created a ripple effect of pride throughout the team," he said.

If it was implemented at Canada's existing aluminium smelters, the technology has the potential to reduce the country's annual carbon dioxide emissions by about seven million tonnes – the equivalent of taking 1.8 million light-duty vehicles off the road. Environmental benefits aside, it will boost anode life by 30 times, cut operating costs by 15% and increase productivity by the same amount.

"Driving sustainability is something I am passionate about and want to continue to work on – so keep watching this space; you'll see more over time," Barrios added.

Portfolio restructuring

Barrios is responsible for a new strategy dividing the Rio Tinto Aluminium business into three separate segments: bauxite, alumina and smelting. In the past decade, the portfolio has been restructured to reduce its refining and smelting capacity by about one-third: the company now has five bauxite mines, four refineries and 14 aluminium smelters, with a focus on value over volume.

His team has also developed the Amrun bauxite mine on the Cape York Peninsula in north Queensland, Australia, which Barrios said was "highly rewarding; you don't open a new mine every year!"

He said that Amrun is a great success story in how the bauxite business was repositioned "to be the largest player in the seaborne bauxite market in terms of third-party sales. It underpins our bauxite business for decades to come," he added.

Barrios and his team have also addressed smelter power supply issues at Isal in Iceland and Tiwai Point in New Zealand, with work at the latter ongoing, looking beyond the current expiration in 2024.

One of his regrets, however, is not being able to complete the repositioning of the power contract for Rio Tinto's Australian aluminium smelters, Bell Bay in Tasmania, Tomago in New South Wales and Boyne in Queensland, which depend on high-carbon power from the grid. "A lot of work has been done by the team to improve the productivity and efficiency of those smelters and we continue to have conversations with both the state and federal governments in Australia as well as power providers to find a solution to make them competitive in the longer term," Barrios said.

Commercial role

As he moves to the role of Rio Tinto chief commercial officer, Barrios has one strategy in mind for his first day: "Listen, listen, listen."

"One has to be humble. I won't go in with any set ideas or direction. People in the team know what needs to be done and what the opportunities are – it's not a newcomer from outside that's going to arrive with a ready-made strategy," he said. "It's about working with the team to help them identify opportunities, and then help them deliver on these aspirations," he added.

His experiences in aluminium should serve Barrios well in the new role, which will see his portfolio expand to include all of Rio Tinto's business divisions, ranging from iron ore, copper and diamonds through borates, salt and titanium dioxide.

"There is great work being done across Rio Tinto, but aluminium has had to really think about value generation and positioning in a very different way to some other commodities due to the industry challenges. That need has pushed the aluminium industry and Rio Tinto further than I've seen in other commodities in which we participate," he said.

Barrios also plans to bring his work on responsible aluminium production to bear in the new role, something he said is closely aligned with the priorities of the company's new chief executive officer, Jakob Stausholm.

A commercial role is not new for Barrios, however: he started his career in trading for BP and was central to Rio Tinto's creation of a standalone commercial organization, which went live in 2018. "They have done a great job and have a very robust strategy, and for me it's really about helping to accelerate this through the group with a pair of fresh eyes and build on what has been done by Simon Trott, who has moved to become Rio Tinto chief executive, iron ore," he concluded.

Powering all our futures

Electric vehicles, rechargeable batteries, energy generation and storage: the LME is the only exchange which offers price-risk management tools for all the raw material metals used by these industries.

And our new lithium contract will be the first of its kind, giving this innovative and fast-growing industry a robust and transparent way to manage price risk.

From miners to manufacturers, battery producers to automotive companies, we understand what our customers need from a global exchange to forge a sustainable future.

One exchange, all our futures.

lme.com/powering-futures

LME
An HKEX Company

SETTING THE GLOBAL STANDARD

Tight supply forecast

Lithium supply is set to be tight in 2021, despite a ramp-up in output, reports William Adams*

The run-up in lithium prices is a timely reminder of the need for more supply. Though more capacity is on the way, including processing capacity in China, the key will be whether there is sufficient raw material to enable processors to ramp-up output while they commission their new capacity.

Indeed, there is unlikely to be enough and we see availability of raw material as the current bottleneck in the lithium supply chain. Overall, our forecasts for supply suggest the market will remain in a supply surplus this year, at least in theory, but in reality that surplus is likely to be more than absorbed while the supply chain restocks and builds up working inventory.

The supply situation is complicated: there is existing production; there is idle capacity (some of which will be trying to restart and some of which is unlikely to be in a hurry to restart); there are capacity expansions; and there are existing stockpiles of lithium-bearing material. Combined, we expect more lithium will be produced than is consumed this year, but that does not mean the market will not suffer further bouts of tightness, which we are seeing now.

Fastmarkets estimates some 215,000 tonnes per year of extra lithium carbonate and hydroxide capacity will be commissioned in China this year. But this is capacity, not production. Production will fall well short of capacity for numerous reasons, including lack of enough feedstock, the time taken to ramp up output and the time needed to qualify the new production. In addition to some new Chinese raw material production, there will also be other supply increases from outside China *(see table)* and there is stockpiled material too that can be processed to boost this year's supply.

The increase in new capacity in China will mean availability of processed material will be responsive to any increase in raw material availability, especially amongst the non-integrated chemical convertors. In addition, the higher prices this year are expected to result in the processing of the remaining direct shipping ore (DSO) that China imported in 2017 and 2018, but which then became uneconomical to process after lithium prices fell.

The Wodgina mine and Pilbara Minerals' Pilgangora mine were the two main exporters of DSO, with Wodgina starting in 2017 and Pilbara in 2018. Pilbara exported some 350,000 tonnes of DSO, equivalent to around 4,000 tonnes of lithium carbonate equivalent (LCE), before it started to produce and export spodumene. Wodgina exported around 4.2 million tonnes of DSO in 2017-2018, before halting output after prices fell. Out of the some 4.5 million tonnes of DSO shipped, we estimate some 30% is still available, equivalent to some 15,000 tonnes LCE, but that might be a conservative estimate.

Table 1 Supply increases 2021 v 2020 (tonnes)

Company/ mine	Extra supply	Notes
SQM	20,000	Has stocks too
Albermarle	5,000	–
Livent	6,000	2,000 tonnes extra production above 2020 + 4,000 tonnes of sales from inventory
Greenbushes	30,000	Return to normal
Pilbara	20,000	Ramp to capacity
Altura	5,000	Expect Q4 start up
Galaxy	10,000	Ramp to capacity
Orocobre	1,500	Return to capacity
China- various	24,500	Expansions, DSO & stocks

Other main changes we expect outside of China are the ramp-up towards full capacity at Pilbara and Galaxy Resources, and a return to higher output at Talison Lithium's Greenbushes mine in Western Australia, following below-capacity production in 2020, owing to the oversupply and the low price environment. For Greenbushes, capacity has increased to 1.2 million tonnes of spodumene (150,000 tonnes LCE), from 600,000 tonnes (75,000 tonnes LCE) of battery-grade spodumene, but at what capacity utilization the mine operates remains to be seen and that is likely to be tied into when Albemarle's Kemerton lithium hydroxide processing plant starts up. We anticipate a restart at the Altura mine in the fourth quarter, the restart of Albemarle's North American operations, an increase in sales at Livent and slightly higher production at Orocobre.

Chile's Sociedad Quimica y Minera (SQM) plans to increase capacity to 120,000 tpy by the end of this year and, after it produced 70,000 tonnes in 2020 and sold 64,000 tonnes last year, we expect SQM to produce 85,000 tonnes this year, with sales nearer to 90,000 tonnes. SQM's sales could be even higher, as it managed to sell 25,800 tonnes in the fourth quarter 2020, meaning it has the logistics to do similar volumes in the quarters ahead, and it has stockpiles of lithium too.

In terms of extra tonnage this year, the big potential increases come from Greenbushes, Pilbara and SQM, plus Lanke Lithium in China, with smaller production increases at other operations. A restart at Altura could possibly be brought forward, but for now we are expecting a restart in the fourth quarter.

Most commentators expect lithium demand to increase by around 90,000 tonnes LCE this year, and given that will mean an increase in downstream manufacturing capacity, the increase in consumption will mean there is a need for the whole supply chain to run with more working stock, so apparent demand will rise by more than actual demand. Hence even though we think supply will outstrip consumption, we think the surplus will be absorbed by the supply chain requiring more stock.

Our forecast is for supply, including new production, processing of stockpiled material and destocking, to increase by around 122,000 tonnes this year – this should mean there is no shortage but, allowing for more restocking and more working stock, the market is likely to remain tight, especially for those who have not secured supply and who rely on the spot market.

The production cutbacks in recent years, combined with the faster uptake of electric vehicles and energy storage systems, have meant the lithium market has tightened sooner than most thought it would. There is new capacity and idle capacity and some companies could expand production at a fairly fast pace should they want, so we have now entered a period where producers are going to have to be very focused to ensure they have enough capacity available in a timely manner. It will likely be a precarious balance for a good few years now, and even more so further ahead because unless final investment decisions are made soon on the next generation of projects, shortages and supply tightness are likely to prevail.

**Fastmarkets head of research for base metals and battery materials*

LFP battery resurgence alters price dynamics

Changing preferences for lithium-ion battery chemistries in China have altered relative lithium prices report Susan Zou and Carrie Shi

The strong resurgence in the use of lithium iron phosphate (LFP) batteries in electric vehicles (EVs) produced by automotive manufacturers in China since 2020 has resulted in the rapid growth in demand for technical-grade lithium carbonate – altering the traditional price dynamics in lithium salts in both the domestic Chinese and seaborne Asian markets.

China's technical-grade and battery-grade lithium carbonate prices have both been on an upward trend after bottoming out in the second half of 2020 amid robust demand from the battery supply chain, and the upturns accelerated at the start of this year, with the price gap between the two grades narrowing considerably in February.

Technical-grade lithium carbonate is typically used to produce LFP batteries, while battery-grade lithium carbonate is mostly used to produce cobalt-rich nickel-cobalt-manganese (NCM) lithium-ion batteries – including NCM111 (Ni:Co:Mn: 1:1:1), NCM523 and NCM622 batteries. The nickel-rich NCM811 battery is produced using battery-grade lithium hydroxide.

Fastmarkets assessed the Chinese technical and industrial-grade lithium carbonate spot price at 79,000-81,000 yuan ($12,134-12,441) per tonne on Thursday March 18, up by 150% from 30,000-34,000 yuan per tonne between late June and early July 2020 – when the price plunged to its lowest level of the past year.

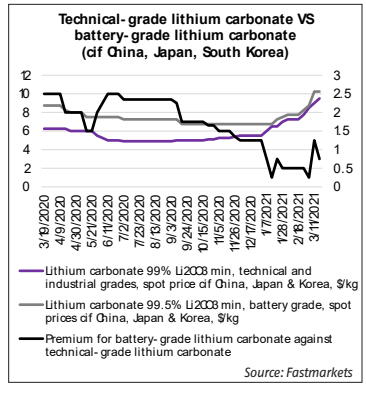
And Fastmarkets' weekly price assessment for lithium carbonate, 99.5% Li_2CO_3 min, battery grade, spot price range exw domestic China was 85,000-90,000 yuan per tonne on March 18, up by 124% from 37,000-41,000 yuan per tonne between early July and early October last year.

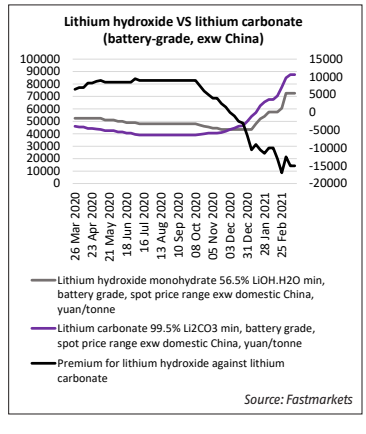
Technical-grade lithium carbonate was mostly trading at a discount of 7,500-8,500 yuan per tonne against battery-grade lithium carbonate in the first half of 2020 in the domestic Chinese market. Since mid-2020, the discount mostly hovered around 5,500-6,500 yuan per tonne, before hitting a low of 2,000 yuan per tonne in mid-February, according to Fastmarkets' data.

"The elevated technical-grade lithium carbonate [price] underlines the stockpiling drives among consumers who are anticipating increased demand for LFP batteries. Meanwhile, squeezed supplies have prompted lithium producers to keep raising their offers, some of which are increasingly closer to the level for battery-grade materials," a producer said.

LFP batteries are one of the earliest well-developed EV battery technologies in China and are well known for their stable and safe performance. They had been widely used in various types of EVs as a result, but in the second half of last decade, faced with appealing government incentives, most original equipment manufacturers (OEMs) in the country switched to NCM lithium-ion batteries, particularly pure EVs, because their higher energy density ensures a longer driving range per single charge.

But the OEMs' willingness to use NCM lithium-ion batteries – especially for nickel-rich NCM811, which generates the highest energy density among all NCM batteries – has recently been tempered by fast-rising cobalt and nickel prices this year, amid tight availability and just as subsidies are being phased out.





Prices for cobalt sulfate and nickel sulfate, two key raw materials to produce NCM lithium-ion batteries, were up by 43.86% and 13.11% respectively as of March 19, despite some recent retreats, according to Fastmarkets' data.

China produced 9.56 gigawatt hours (GWh) of LFP battery power in the first two months of 2021, accounting for 44.3% of the total battery output and up by 624.2% compared with the same period in 2020. NCM battery power was 12 GWh over the same period, accounting for 55.7% of the total and up by 385.1% from January-February 2020, according to the latest data released by the China Association of Automobile Manufacturers (CAAM).

A precursor materials producer told Fastmarkets that LFP batteries are likely to account for half of the market share over the course of 2021. Additionally, the slower pace of adoption of nickel-rich NCM batteries among OEMs has resulted in battery-grade lithium carbonate trading at a premium above hydroxide in China since early December last year – as opposed to the discount seen in the previous two to three years.

'The South Korean and Japanese lithium import markets are trying to keep in alignment with the China, but so far prices are comparatively more aligned in the carbonate market'

Seaborne Asian market

The seaborne Asian market is mirroring the trend in the Chinese domestic market, with the price gap between battery-grade and technical-grade carbonate also narrowing significantly.

Technical-grade lithium carbonate was mostly traded at a discount of $1.25-2.35 per kg against battery-grade lithium carbonate at spot cif China, Japan and South Korea basis in the second half of 2020, while the discount has been $0.25-0.75 per kg most of the time so far this year, according to Fastmarkets' data.

In addition, the seaborne Asian market also witnessed a narrowing gap between battery-grade lithium hydroxide and carbonate, which has more actively responded to the rally in China so far this year. Battery-grade lithium carbonate was trading at a discount of $2.15-2.25 per kg against the equivalent grade of lithium hydroxide, but the gap has narrowed to $1.25-1.75 per kg so far this year, Fastmarkets' data shows.

"The South Korean and Japanese lithium import markets are trying to keep in alignment with the China, but so far prices are comparatively more aligned in the carbonate market," a Japanese trader said.

The battery-grade lithium carbonate price in the seaborne Asian market has risen by nearly 52% so far this year, while the equivalent-grade hydroxide price has gained about 28%, according to Fastmarkets' data.

Lithium miners strengthen sustainability commitments

With demand for lithium continuing to recover in the wake of the Covid-19 pandemic, Chile's Sociedad Quimica y Minera (SQM) and other major lithium miners have announced plans to expand production while highlighting their commitments to sustainable lithium extraction.

SQM recently announced that it was the first lithium mining company to join the Initiative for Responsible Mining Assurance (IRMA), while committing to expand its capacity for lithium carbonate production in 2021 to 120,000 tonnes per year and to 180,000 tpy by 2023. This compared with output of 70,000 tonnes in 2020.

The producer was joined by a string of other major and junior miners that have pledged to reduce the carbon footprints of their operations in line with increasingly stringent requirements from automotive manufacturers. Lithium is a key ingredient in the manufacture of batteries for electric vehicles (EVs) and for energy storage systems, and lithium demand for both uses was expected to soar in the coming years.

Argentina, Chile and Bolivia form the so-called lithium triangle that holds more than 70% of the world's reserves of lithium underneath salt flats. Australia is another important source, where it is extracted via hard-rock mining.

In February, United States-based lithium producer Livent announced its new sustainability goals, which it said will lead to carbon neutrality by 2040. This will be achieved partly by the use of 100% renewable energy, it said. Livent has begun the relevant certification process for its operations in Argentina under IRMA.

"IRMA provides a credible solution for the growing demand for more socially and environmentally responsible mining standards," Livent president and CEO Paul Graves said. "Many of the leading automotive [original equipment manufacturers (OEMs)], including BMW, Mercedes and most recently Ford, have publicly announced their intention to accelerate the adoption of the IRMA standard across their supply chains."

The use of renewable energy throughout its operations has been highlighted by Canada-based junior miner Sigma Lithium. The company is developing a hard-rock-based lithium production plant in Brazil. This will be the first spodumene-based lithium mine in South America. According to the company, production is scheduled to start in the first quarter of 2021.

Lithium hard-rock miners in Western Australia are also increasing their sustainability commitments. Asked how Pilbara Minerals will track the sustainability of its operations, chief executive officer Ken Brinsden said: "We are very conscious of the need to both track the carbon footprint and reduce emissions in respect of our business activities."

"There are lots of opportunities in mines and services to reduce emissions," he added. "The Pilbara [area] hosts some of the world's greatest renewable resources in the form of solar radiation and wind. We look forward to being able to demonstrate our ability to capture these resources and materially lower the carbon footprint of our operations."

Fastmarkets' assessment of the lithium hydroxide monohydrate, 56.5% $LiOH.H_2O$ min, battery grade, spot price, cif China, Japan & Korea, was $10-11 per kg on March 4 this year. This compared with $9.50-11.00 per kg on March 12, 2020. The Asian spot price for battery-grade lithium hydroxide has gone up. Increasingly higher prices have been heard in the market, with China's domestic price progressively rising since the end of 2020 on demand recovery and tight spot supply.

Dalila Ouerghi

75 YEARS SHARING THE FUTURE

MAGNA
MAGNESITAS NAVARRAS

www.magnesitasnavarras.es

From the mine to the steel mill

MAGNA North America
Minneapolis, USA
Tel: +1 (612) 638 2160

MAGNA Magnesitas Navarras
Navarra, Spain
Tel: +34 948 421 644

MAGNA Refractarios México
Monterrey, Mexico
Tel: + 52 (81) 83367196

Graphite outlook

The flake graphite market, especially for fines, looks set to come under pressure through 2021 while increasing supply outweighs the growth of demand, report Jon Stibbs and Sybil Pan

The price of small flake graphite – graphite flake 94% C, -100 mesh (-194) – fell repeatedly from the first half of 2019 to the beginning of the fourth quarter of 2020 amid oversupply, weak demand and the fallout from the Covid-19 pandemic. Fastmarkets' price assessment for -194 fob China material was $630 per tonne on March 28, 2019. The price then dropped by 31.75% to hit a steady bottom of $430 per tonne in July-October 2020, while supply exceeded demand.

When supply tightened and excess material dried up in the market, the price gradually recovered to $560 per tonne by late January 2021. It has remained stable since then, with support from the seasonal winter stoppage of operations in Heilongjiang province, a Chinese production heartland.

There were indications, however, that the current balance would be disturbed when material from Heilongjiang and elsewhere returns to the market. Indeed, the price for -194 material was assessed at $550 per tonne on March 25 this year, down by 1.79% from the previous week.

The picture for large graphite flake – 94% C, +80 mesh, fob China (+894) – was different because the share of the material that is used in graphite processing accounts for about 20% of total flake graphite supply, according to market sources. The fob China price of +894 material went through a downward trajectory in 2019 and the first quarter of 2020, holding at a two-year low of $820 per tonne from August 2019 to March last year. The market recovered to reach $1,080 per tonne in March 2021 on growing supply tightness.

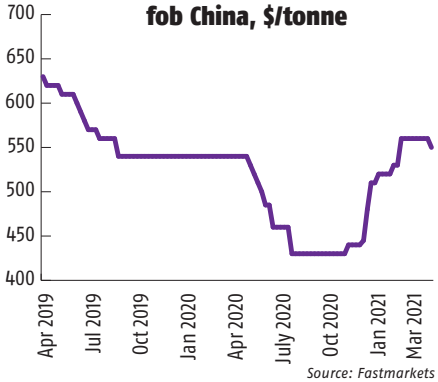
While the market was relatively firm for the time being, sources doubted that the current market performance of both large and small flake varieties would be sustainable over the second half of 2021, given evolving market dynamics. The first indications of weakness were identified on March 25, when Fastmarkets' price assessment for +894 material fell by 0.93% to $1,070 per tonne.

Supply – China and outside

Production of fine flake material outside of China soared in 2019 when Syrah Resources began commercial production at Balama in Mozambique. But following the halt in Syrah's graphite operations last March, in response to the Covid-19 pandemic, the flake graphite market has been increasingly balanced, especially for flake fines.

Since then, China has resumed its previous dominance as the world's major exporter of graphite, with production accounting for an estimated 62% of total world output last year, according to the annual update from the United States Geological Survey (USGS). Over the past winter in the East Asian country, there has been a seasonal halt in production. And this significant cut in output has given added support to the flake market.

Graphite flake 94% C, -100 mesh, fob China, $/tonne



Source: Fastmarkets

The expected restart of operations in two areas with strong graphite flake production capacity – Jixi city in April, and Luobei county in Heilongjiang in May – might add sufficient supply to disrupt the current market stability, market sources said. "There's no shortage of small flake graphite, especially in Luobei county. It is clear to see where the market is likely to go in April," a graphite producer in China said.

About 500,000 tonnes of graphite concentrates were produced last year in Luobei county, enough to meet 62.5% of China's annual flake demand, according to one source. Downstream production, including spherical graphite for anode manufacturing, reached 270,000 tonnes, sources told Fastmarkets.

Meanwhile, Syrah Resources restarted flake production in March and plans to achieve output of 15,000 tonnes per month. The company has told Fastmarkets that it is committed to adjusting its production according to market conditions, to avoid a return to oversupply.

But there were concerns among some market participants about the volumes of flake graphite that would accumulate over the next few months. "Supply from Syrah might not affect the graphite market in the first half [of 2021], given the lead time of one to two months, but the market could be under pressure in the second half of the year," a flake graphite trader said.

Soaring freight costs from China to major overseas markets could weigh on China's fob export and domestic prices. One-third of seaborne demand in China could shift to other sources, increasing the supply in the domestic market, according to the producer.

High freight costs can be expected to support the cif markets, however.

While there were indications that the fob China fines market may soften, there may also be downward pressure on prices for larger flake sizes in China. "A change in the market [for +894 material] could be attributed to weaker demand from the expandable graphite sector, as well as increasing shipments from areas outside China, such as Madagascar," a second graphite producer in China said.

The numbers of inquiries from the expandable graphite sector in the rest of the world have been steadily rising, according to a producer outside China. Imports of flake graphite from Madagascar into China, which were mostly larger flake graphite, soared to 7,646 tonnes during January and February 2021, from only 138 tonnes a year earlier, according to Chinese customs data. This followed the expansion and marketing of Madagraphite/Établissements Gallois. Both Tirupati Graphite and Madagraphite/Établissements Gallois have programs to ramp-up their outputs from Madagascar.

While supply was expected to grow in the remaining months of 2021, market participants expressed concern over downstream demand for flake fines in particular. Applications for fine flake graphite include the traditional refractories sector, and spherical graphite production for anodes.

"While there is high demand for spherical graphite production," a third producer in China said, "the flake fines market will be under pressure if the recovery of the refractories sector is slow."

Fastmarkets

Steel Success Strategies

June 21 - 25 | Virtual Event

5-day digital Summit in June providing attendees a strategic overview of market developments at a global level.

Nov 7 - 9 | Miami

First in-person gathering of the steel industry leaders in over a year in November in Miami.

Register Now

Providing leaders across the global steel industry with the essential insights and clarity into the forces driving price and market movements.

WSD WORLD STEEL DYNAMICS

Knowledge Partner:

McKinsey & Company

Gold Sponsors:

MOBIUS RISK GROUP

NUCOR

tenova

SMS group

Silver Sponsors:

BROWN GIBBONS LANG & COMPANY

PORT OF BROWNSVILLE the port that works

fives Industry can do it

上海期貨交易所 SHANGHAI FUTURES EXCHANGE

#FastmarketsSteelSuccess

Syrah Resources returns

Graphite company Syrah Resources plans to ramp up its flake output with a flexible approach to production, CEO Shaun Verner told Jon Stibbs in late-February

Australia-based Syrah Resources is restaffing in order to resume production at its Balama mine in Mozambique within the next two to three months. "Once we have restarted, we are targeting a ramp-up to production of around 15,000 tonnes per month, subject to market conditions," Verner said. "We see a positive cash flow operational position at that level."

The company suspended output in March 2020 due to restrictions on activity stemming from the Covid-19 pandemic. "We kept our plant ready to run – it was in temporary suspension rather than care and maintenance. The key focus is restaffing to restart production, with no significant capital requirement to do so," Verner said. "We are not planning to get there straight away as we manage our re-entry."

Syrah had already slowed its production rate in September 2019, prior to the suspension, in response to oversupply in the market, which had weighed heavily on prices. The company began commercial production at Balama, which predominantly makes fine flake, in early 2019.

The addition of material from Balama into the market at a time of slower than expected consumption from the anode battery sector weighed heavily on prices. Fastmarkets' assessment for graphite flake 94% C, -100 mesh, cif Europe (-194), was at $600 per tonne on February 25. That price was at $475 per tonne in September 2019, when Syrah slowed its output, down by 26.92% ($175 per tonne) from $650 per tonne on February 28, 2019.

"If the market falls into surplus, then we will adjust our production accordingly. We have shown we are not afraid to take tough decisions on this and are aware of the size of the production we can bring to the market," Verner said.

Since Syrah's 2019 suspension of operations, the company has identified greater strength in the market from the battery sector. "Back then, 2 million electric vehicles were being built per year, but year-on-year growth was actually declining due to lower demand in China following subsidy reductions," Verner said. "EV production is at 3 million plus [units] now and growth is up by more than 100% year on year. So both the base-line demand and momentum is now much stronger," he added.

Syrah has also changed the way it operates to lower its costs and to be more reflective of market conditions. In 2019, it sought to quickly ramp up production to maximize sales and lower unit costs. "We have also been through an in-depth restructure of the way we operate in order to lower costs. We will be able to really respond to the evolving market conditions between the mix of supply and demand through day-to-day market interaction," Verner said. "This means we have the flexibility to increase or moderate production," he explained.

The company will maintain a balance between spot versus contract agreements with its customers, but this is largely dependent on the market segment to which they belong. "The industrial sector – for coarse flake material – is more geared towards long-term contracts, while the fines market, especially in China, relies much more on spot pricing indications," Verner said. "So we have a combination of spot and contract pricing, as well as spot and fixed-term deals, and we are set up to have a process of constant price discovery," he added.

Increasing sources of material

Syrah's return to the market comes at a time that several producers are either ramping up output or emerging in the market. From Mozambique's east coast, for example, there are three graphite flake producers developing on the Indian Ocean island of Madagascar. However, Syrah does not feel it is in a race with other producers despite the competition felt among some market participants to ramp up and come to market.

"Demand is expected to increase strongly for the material which makes up 80% of our production [-194 graphite flake]. By the time most of the emerging projects actually get to the market, that demand will have been realized and our 350,000-tonne-per-year capacity will be fully utilized and we will be at the bottom end of our cost curve," Verner said. "We focus on our own position and our customers – can we sell at the price the market balance dictates," he said.

There has been a rise in religious insurgent activity in Cabo Delgado, which is the same Mozambiquan province that includes Balama. But Syrah said the violence has had no impact on the safety of its operations or its ability to restart.

"There has been some increase in insurgent activity in the north of the province, but it has had no impact on our ability to move material or people, or our operations. We would not be restarting if we weren't confident we could manage within the situation," Verner said.

The move to vehicle electrification can be expected to drive demand for fine graphite flake as a feedstock for lithium-ion batteries. And graphite is considered a critical mineral in Europe and the US, where there is concern about Chinese dominance over supply. "The development of the battery anode space in Europe and the US is going to be really important. However, we don't see it as a China versus non-China situation, but as a diversification of risk," Verner said.

China remains the world's biggest consumer, and producer, of flake graphite in the world. As a result, it is the most important market for Syrah. "We are driven by the consumption of natural graphite, and that is primarily in China. Battery anode pre-cursor production levels are almost zero outside of China, so China drives the upstream demand for fines," Verner said.

Downstream activity

Syrah achieved initial production of natural graphite active anode material (AAM) at its downstream plant in the US city of Vidalia, Louisiana, in the fourth quarter of 2020, using flake feedstock from Balama. "We will decide in the second half of this year whether the commercial underpinning is there to go ahead with this," Verner said. "However, we think the market needs to be more diversified and we are excited about the evolution of opportunities for providing a fully integrated alternative source of supply," he added.

Syrah is one of a cluster of companies, including other flake producers, developing AAM capabilities. "The key differentiator for us is that we can be the first fully integrated natural graphite AAM producer to the market outside China," Verner said.

Business intelligence from satellite data expands

Satellite technology and the growing number of constellations of small satellites in orbit are expanding the client base for service providers to offer ever more accurate Earth imagery. Seema Chaudhary outlines ways in which the metals and mining industry is benefiting from this trend

Satellite communication technology is increasing the breadth and depth of information it can provide from real-time high-resolution Earth imagery. The metals and mining industries are increasingly harnessing the huge quantities of geospatial data collected via satellites as a cost-effective means of gathering business intelligence. And, boosted by technological innovation in 5G telecommunications, CubeSats, low Earth orbit and medium Earth orbit satellite constellations and cheaper satellite components, more businesses can tap into the sector, taking commercial advantage of a domain that was previously available only to state governments.

Satellite Earth imagery can add significant value to mill and mining operations. With the increasing demand for metals to facilitate infrastructure growth, there is growing interest from industry stakeholders in the exploration of feedstocks needed for the foundations of smart cities, mega-rail systems and electric-vehicle mobility; utilizing space resources to find future raw materials will become ever more pertinent. High-quality images captured from space will also enable the metal mining industry to identify potential health and safety concerns earlier, helping to protect the ecosystem and the local population.

Major corporations are expanding the realm of what is achievable. For example, Inmarsat, a leading global provider of mobile satellite communications solutions in the mining industry will see seven further satellite launches by 2024 for more advanced communication for its customers. The company's clients, which also range from airlines and shipping fleet operators to the military and aid agencies – as well as mining and logistics to agritech – will ultimately benefit from this connectivity with remote sites.

The flurry of SpaceX constellations launched by Tesla chief executive Elon Musk in a bid to 'being a spacefaring civilization' has been highly publicized in making headway and disrupting the sector with a low cost of entry and greater levels of connectivity.

Airbus is paving the way for satellite constellations too, intended to provide solutions for greater efficiencies in security, planning and operation. Airbus will launch Pléiades Neo in April, capturing images to a resolution of 30 cm.

The aerospace business is also priming its factory-in-space technology to revolutionize the way manufacturing and assembly of space technologies for orbit are designed, built and operated. By contrast with the traditional approach in which items are produced on Earth and subsequently transported into space, Airbus notes that companies that master in-orbit manufacturing and assembly will be free from the constraints of launching complete products into space, being able instead to manufacture components and assemble them in space. Present constraints of manufacturing on Earth include the size and weight of a payload on launch and the necessity to make components, subassemblies or complete assemblies robust enough to survive the rigours of being launched into orbit.

Airbus is participating with in-space research programmes such as Metal3D printer, due to be deployed in space next year, in a project funded by the European Space Agency (ESA), and the MANTOS project, which demonstrated robotic and AI-based assembly operations with German Space Agency DLR.

"The next decade will see significant change in the space business," Christophe Figus, the ISMA (in-space manufacturing and assembly) Roadmap Owner at Airbus Defence and Space, said. "Companies that master in-orbit manufacturing and assembly will win the future," he declared.

AIRBUS

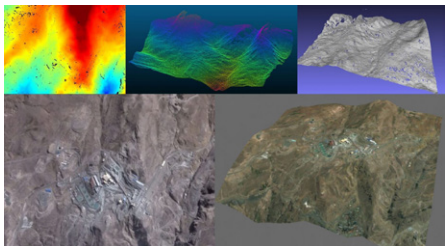
Airbus' technology for a new digital factory above Earth means objects made in space will be freed from the constraints of a launch vehicle

Earth-i launches satellite video AI on Vantage platform

Observations made via satellites are finding an increasing number of applications relevant to the metals and mining sectors. For example, stocks of metals stored outside can be monitored to assess inventory levels; very accurate images of tailings dams at mines monitor their performance for waste management; while safety and security at mills can be enhanced by monitoring activities at them.

Data captured through widespread surveillance can be combined to provide a clearer picture of macro trends and the overall health of the global economy.

Geospatial intelligence provider Earth-i offers advanced analytics by using automated assimilation of a range of geospatial Earth observation data sources, including colour imagery, video, infra-red and radar from satellite, drone, aerial and ground-based sensors. For metals, its data capture includes assessment of current



EARTH-I/VANTAGE PLATFORM

The ESA-funded Vantage platform computes a 3D model of the satellite scene in different formats

metal inventories – such as zinc, copper or iron ore stored outdoors – and can extend to recording the movement of vehicle and dump trucks.

Earth-i has recently added new satellite video AI on the Vantage platform, an ESA-funded earth observation video analytics and exploitation platform.

The Vantage platform computes a 3D model of the scene viewed by satellite and outputs it as a mesh, DSM and point cloud. The AI is compatible with the Earth-i Vivid-i and Planet SkySat satellite videos. Earth-i has added the new services to an existing range of Vantage services, which include a vessel detection system that detects and counts vessels in satellite video, and motion tracking – an AI algorithm that tracks the velocity and direction of vessels at sea.

From 2023, Earth-i will launch and operate its own Vivid-i constellation of satellites to provide a consistent and reliable data stream with very high resolution and very high frequency revisits. The constellation will offer businesses full-colour videos with sub-1m resolution data, multiple-frame-rate data collection and fast-streaming to ground stations across the globe, Earth-i noted.

UK's 'Satellite for Batteries'

Commercial satellites can help improve mining operations such that efficiencies can be had across the entire mine life cycles. Moreover, governments are increasingly seeing the necessity to invest in future mining for key feedstock in the electrification movement. One such project 'Satellite for Batteries', funded by the UK government, is tapping this need for better metal mining surveying.

As the electric vehicle revolution unfolds the world is bracing itself for a steep rise in the need for battery metals, so detecting potential battery minerals from space becomes ever more pertinent. Following on from a research study in 2018, the UK government is now funding companies at the forefront of space innovation and 21 organizations in the country have been awarded a share of over £7 million of funding to support their endeavours.

The Satellite Applications Catapult is one of a network of UK technology and innovation companies which aim to drive economic growth through the commercialization of research. It is expanding on an initial project financed by the UK, with a space and mining industry collaboration that will use satellite data combined with advanced analytics to help identify sources of lithium in the UK and globally.

The company will be working alongside mineral exploration company Cornish Lithium, data science and artificial intelligence company Decision Lab, and space technology companies CGG Satellite Mapping, Terrabotics and Pixalytics. The University of Exeter's Camborne School of Mines and the British Geological Survey will also support the project.

The Catapult science team will use combined ground survey data along with satellite data at different resolutions from Landsat, Sentinel-2, WorldView-3, ▶

GeoEye-1, ASTER, Sentinel-1, ALOS-1 and TerraSAR-X satellites. The team will be exploring the use of remote sensing with other data to generate a prospectivity map within part of Cornwall.

The science team is now exploring options for the next phase to increase the understanding of the sub-surface environment. The digital maps from data sets garnered from satellite signals display potential lithium hotspots which will be important for the UK to develop a source of lithium for initial investigation and validation. The project is attracting international interest from major lithium producers worldwide, said the company.

The UK's science minister Amanda Solloway commented: "We want the UK to be a world leader in space technology which is why we are supporting our most ambitious innovators who are developing first-of-a kind technologies to help solve some of our greatest challenges."

ICEYE SAR constellation images come back from space

Finland-headquartered ICEYE is helping to set the pace for satellite synthetic-aperture radar (SAR) technology after it received the first radar images back from a satellite put into space by SpaceX's Transporter-1. The Transporter-1 is SpaceX's first dedicated SmallSat Rideshare Program mission. The images of Earth captured by ICEYE will be available for customers to order. Three new satellites launched in January this year makes a total constellation of ten; the company aims to expand this to eighteen by 2022.

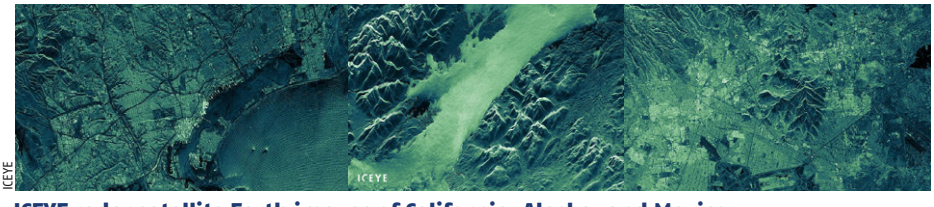
ICEYE's constellation offers persistent monitoring with radar satellite imaging from various angles, regardless of the time of day or weather conditions, even through cloud cover, said the company. The data will help companies make better decisions to address critical challenges in various applications, such as border security, flood monitoring and oil spill clean-ups. After calibration, the data can be disseminated to customers in the mining industry. The lower weight (under 100 kg) of the satellites makes them more cost-effective than larger radar satellites, ICEYE notes.

Data from the ICEYE SAR satellite constellation could help mitigate the risk of tailing dam failures since the technology enables them to be persistently monitored and land subsidence measured with millimetric accuracy. Detection of changes of the surface water within a mining area are also of value.

SAR satellite data supports potential dam failure planning, estimation of impacted area, and monitoring of a potential event to mitigate a crisis.

"Once we complete the calibration of these spacecraft, ICEYE will have the world's largest SAR constellation," said Jerry Welsh, chief executive officer of ICEYE US.

"As our constellation expands, we improve our target revisit capabilities. Thanks to our optimized design, we are able to capture even the most target congested areas and provide unmatched persistent monitoring capabilities," he added.



ICEYE radar satellite Earth images of California, Alaska, and Mexico

The roles of DRI in decarbonization

Major international suppliers of plants for DRI production see their technologies playing a key role in the global steel industry's mission to decarbonize steelmaking, writes Richard Barrett

Technology developments are driven by the demands of, and trends in, the markets that they serve. Over the long term, those markets are moved by the fundamentals of supply and demand and, for commodities, sometimes by the extent to which material flexibility is possible – often creating more complex dynamics from the choice of materials used when it is. They are also driven by global trends like decarbonization.

For ore-based metallics – direct reduced iron (DRI), hot briquetted iron (HBI) and pig iron – the demands of steelmakers and iron foundries drive their markets. And for steel production in particular, the fortunes of the presently dominant means of steel production, via the integrated blast furnace (BF)/basic oxygen furnace (BOF) route, which accounts for about 70% of global steel production, and the growing importance of electric-arc-furnace (EAF) based steelmaking, accounting for nearly all of the remaining 30%, are key.

While the impact that the relative demand for the major different steelmaking raw materials, including scrap, needed by steelworks influences demand for the output of today's fleet of direct reduction plants, it is also the long-term direction of steel production, and particularly the growing pressures within and upon the global steel industry to decarbonize steelmaking processes – together with questions about the future volume of scrap availability over the longer term – that encourages suppliers of direct reduction plants to highlight that both their existing plant designs and those being developed for the future have a promising outlook.

GETTY IMAGES

Ore-based metallics like DRI are making an increasingly significant contribution to the production of high-quality steel products

Ore-based metallic (OBM) suppliers note that the long-term growth in EAF-based steel production will continue to increase demand for their products. Growth in EAF-based steelmaking capacity is stimulated in part by expectations of more post-consumer scrap coming to market, but also on the understanding that the production of steel from scrap generates much less carbon dioxide per tonne of steel produced than the BF/BOF route consuming the virgin raw materials of coke and iron ore.

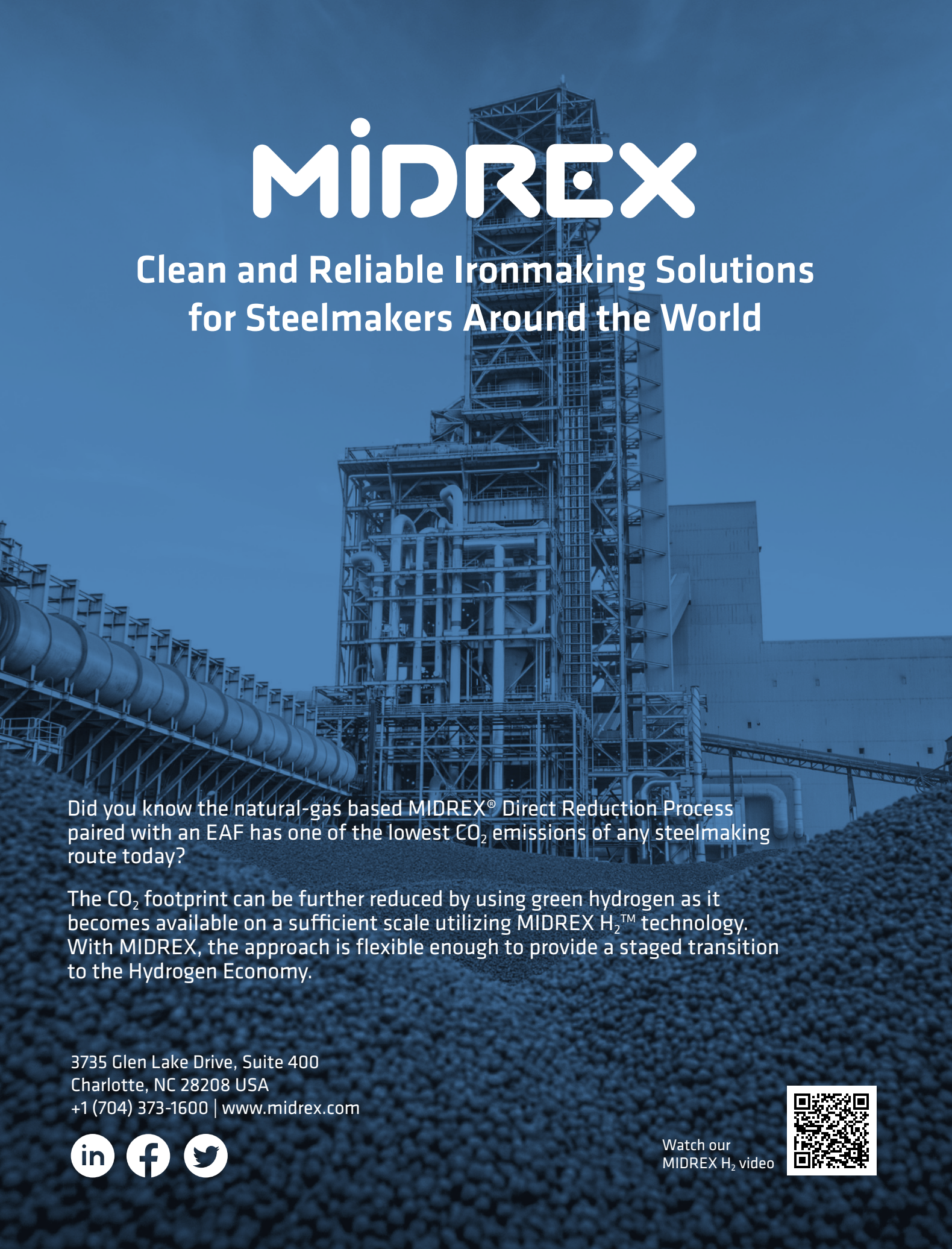
OBM producers also note that, without stricter rules to limit the climbing percentage of residual copper appearing in ferrous scrap supplies, the volumes of their products needed to dilute residual elements in molten steel will also continue to rise – another cause for optimism among DRI and HBI suppliers and the technology to produce both.

The United States is a good example of a nation where EAF-based steel production has become a high-percentage of domestic steel production, about 70%, and some high-quality steel producers, including flat-rolled products, are already using HBI to make the grades required. Some analysts note that, where the mature steel industries of the US and EU lead, other nations, including China with its fleet of predominately integrated steelworks, will follow.

Use of hydrogen

Some of the best locations for DRI plants are still where relatively cheap and plentiful energy supplies are readily available, such as those already supplied with natural gas in the Middle East, and where suitable qualities of iron ore are available.

Looking to the future, it is the increasing momentum towards hydrogen-based steelmaking and the promise that holds for reducing carbon emissions that DRI technology providers highlight. After all, they point out, significant percentages of hydrogen are already used in the process gas for DRI production in their existing plant designs. As and when a steelmaker has the means and desire to increase that percentage of hydrogen used, up to using 100% hydrogen when sufficient volumes at an economically viable cost are available – preferably supplied by means of its production via renewable power supplies – they already have the plant designs ▶


MIDREX
Clean and Reliable Ironmaking Solutions
for Steelmakers Around the World
Did you know the natural-gas based MIDREX® Direct Reduction Process paired with an EAF has one of the lowest CO_2 emissions of any steelmaking route today?
The CO_2 footprint can be further reduced by using green hydrogen as it becomes available on a sufficient scale utilizing MIDREX H_2™ technology. With MIDREX, the approach is flexible enough to provide a staged transition to the Hydrogen Economy.
3735 Glen Lake Drive, Suite 400
Charlotte, NC 28208 USA
+1 (704) 373-1600 | www.midrex.com
Watch our
MIDREX H_2 video

and technologies to run with it.

While acknowledging that some other novel 'breakthrough' technologies are being studied for future steel production, industry experts believe that the commercial realities of the huge amounts of capital already invested in the steelworks running mean that it will take many years to achieve the levels of decarbonization both the industry and governments want to achieve. It is in helping with that multi-year transition that DRI technology providers say they have a key role to play.

A three-step approach

Speaking at the International Iron Metallics Association's Conference 2021, held on-line on March 23-24, Christian Böhm, Primetals Technologies head of sales for direct reduction plants, in his presentation on decarbonizing the steel industry, outlined a potential timeframe for a three-step approach to decarbonization, comprising an optimization phase, a transition phase and a final phase of green steel production.

The optimization phase for existing steelworks up to 2025 would achieve 10-20% carbon dioxide reduction from current levels through process, energy and raw material optimization as well as technology improvements, including increasing scrap usage in BOFs. The transition phase would see carbon dioxide emissions reduce by 30-40% from present levels, through steps including hydrogen enrichment in existing DRI plants and increasing carbon capture and utilization. And the end phase of green steel production, during 2030-2050, could achieve 70-80% carbon dioxide reduction through 100% hydrogen-based direct reduction, major adoption of green electricity for EAFs, in addition to increased carbon capture and carbon dioxide utilization. The hot charging of DRI to EAFs, as already done by some steelmakers, also reduces carbon emissions.

Böhm noted that premises for decarbonized steelmaking for such an outline approach to proceed include an adequate supply of 'green/yellow' electrical power at an economic cost, a need for emissions of carbon dioxide to cost money, such as through emissions trading schemes or carbon taxes, and for an appropriate international legal framework and subsidies for transition to be in place.

'This will take time because it cannot be done in one step'

"I think this topic of decarbonizing the steel industry will accompany us for the next few years and decades," he said. "Let me say this will take time because it cannot be done in one step."

Evolving economics

DRI technology providers say that the technologies needed are already available, but that the broader economics have to be developed to encourage the investment needed to apply them.

Earlier this year, in a detailed article about the increasing momentum of hydrogen-based steelmaking and Tenova's contribution to that trend, executive vice-president Paolo Argenta told *Metal Market Magazine* (February 2021 issue, pp34-37) that while the environmental benefits of using hydrogen for steelmaking are clear, the additional costs of exploiting it remain a challenge. "Nowadays, the economics does not stand on its feet," he observed. "Producing hydrogen is still too expensive. In most countries, making DRI plus an EAF costs more than making steel via the blast furnace. I see that in the future there is still the need for governments, international trade associations, to support the change. Europe does a lot now, for example," he added.

Steelmakers choosing to introduce EAF-based steelmaking to replace BF/BOF production also introduce an ability to be more flexible in their choice of raw materials. "The capability of DRI plus the EAF to be more flexible – not only in terms of [ease of] switching on and off in order to follow the market conditions, but also the capability to use different quantities of scrap versus iron ore – is particularly important because certain steel qualities might require less or more virgin iron units. And there are big fluctuations in steel and iron ore prices," Argenta noted.

He pointed out that the ratio of raw materials in the charge can be changed according to the relative prevailing prices of scrap and iron ore. "You can always go for an increased amount of scrap when the quality [of the steel to be produced from it] is not particularly demanding," he said. So switching towards a solution of using DRI plus EAF also gives steelmakers more flexibility for their future in terms of where to source the raw material: "And at the end of the day, we are looking at way more than 50% of the cost of making steel is the cost of raw materials," he added. "As Tenova, we expect more EAFs to be built in the future, but much more metallics to go around and for there to be even more mining companies to enter the arena."

The journey ahead

Midrex Technologies president and CEO Stephen Montague discussed his company's vision for DRI in the cover profile interview of this April issue of *Metal Market Magazine*.

"We have a technology platform that is ready to produce DRI using natural gas today, hydrogen if it is available, and increasing amounts of hydrogen as it becomes available in the future. We have the ability to make hot DRI available on-site for electric steelmaking and to make merchant HBI to ship to steelmakers. This lower CO_2 direct reduced iron is relevant not just to an EAF but also on a merchant basis, in the case of HBI, to the blast furnace and BOF to help with their transition," he explained.

He said that he thinks that decarbonization is the biggest challenge to face the iron and steel industries in decades. "In my career, I have experienced the steel business cycles. Having to manage through them and now Covid-19 has been hard. But looking at the challenges ahead to decarburize the industry, it is going to be an even harder journey. It is not like a light switch that you just flip and everything is okay – it will require companies to transform how they think and their production facilities and everyone must be prepared to help. That is a role that DRI is going to play," he said.

Fastmarkets

Where is the steel scrap market heading?

Scrap, DRI and Mini-Mills 2021

April 13-15
Virtual Event

Register for Scrap, DRI and Mini-Mills to access the detail behind what's shaping the steel market.

- What's impacting the price of raw materials, availability, and production in the US market
- How to access alternative raw materials and increase profit margins
- Pricing and outlooks for scrap, steel, and raw materials to improve your business strategy
- The latest trends in green steelmaking and how to cut the risk of adopting low-carbon production methods
- How growing EAF capacity in the US will impact current and future market dynamics
- What changes to expect in trade and policy under a new political administration

Register today
events.fastmarkets.com/scrap-and-dri

Sponsors: BROWN GIBBONS LANG & COMPANY · MIDREX · tenova · ENERGIRON HYL DRI TECHNOLOGY BY TENOVA AND DANIELI · NUCOR

Fastmarkets.com · Fastmarkets · @Fastmarkets · #FastmarketsScrapDRI

Rio Tinto invests in US plant to harness copper by-product tellurium

Rio Tino is to invest $2.9 million into a plant that will recover tellurium, a mineral by-product from the copper smelting process, at its Kennecott mine near Salt Lake City, Utah.

Tellurium is classed as a critical mineral by the US Department of Energy's Critical Materials Institute (CMI). The element can be used as an additive to steel and copper for improving machinability; or added to lead to increase resistance to sulfuric acid, vibration and fatigue. In solar panels, tellurium is an essential component of cadmium telluride, a semiconductor used to manufacture thin film photovoltaic.

Production of tellurium at the new plant will begin in the fourth quarter 2021, potentially creating a new North American supply chain for the mineral, said the company.

"With abundant natural resources, Utah is ideally positioned to help supply the critical minerals essential to maintain American manufacturing competitiveness. Rio Tinto's smelter at Kennecott is one of only two that is capable of producing copper and other critical minerals. The new tellurium plant is another valuable contribution to critical mineral independence and energy security in the US," Utah Governor Spencer Cox said.

Kennecott's smelting process produces almost 20% of US copper, also recovers gold, silver, lead carbonate, platinum, palladium and selenium, while molybdenum is recovered from the Copperton concentrator.

RIO TINTO

Rio Tinto's Kennecott, Utah, smelting process produces almost 20% of US copper

Hydro and DNV to pilot blockchain validity for CIRCAL and REDUXA

Hydro and DNV GL are launching a pilot project using blockchain data to document the Hydro CIRCAL® and REDUXA® aluminium, tracing the metal from the factory gate to customer.

Hydro has responded to its customers' request for information documenting the metals footprint along the supply chain of its products. The project will test a platform that supports manufacturers' and brands' request for transparency to qualify their sustainability claims, said Hydro.

The aluminium producer and DNV will work with the sustainable-furniture maker Vestre, which uses Hydro CIRCAL in some furniture lines. The product data on the platform will allow customer traceability of the aluminium it uses and the carbon emissions from raw material to a finished bench in a public park.

Hydro will implement the DNV blockchain-powered 'Tag Trace Trust' service developed by DNV GL for its customers to quickly check the validity, data and authenticity of its products' environmental profile.

Hydro plans to roll out the platform to Hydro customers in 2021.

"Ultimately, this pilot is made possible through the work we have invested in our greener brands in recent years. As a result, we can now explore how new technology can provide the market and the conscious consumer with key data – presented in a way they understand and trust – as a part of our agenda of driving sustainability," Jørgen Hansson, project lead in Hydro, said.

HYDRO/CHARLOTTE SVERDRUP

Jan Christian Vestre, CEO of furniture maker Vestre, on a bench with a Hydro green aluminium QR code for blockchain traceability

University of Sheffield develops lightweight steel using copper

Engineers at the UK's University of Sheffield have developed a new way of making lightweight, high-strength steel that they say can be adapted to mass manufacturing and lower carbon emissions by making lighter vehicles.

The production method uses copper which has traditionally been avoided by the steel industry because of its adverse effects on certain types of steel.

Copper is increasingly being found in recycled steel, largely from cars containing copper wiring or engineered items. Steelmakers looking for sustainability are now seeing the metal as unavoidable in the manufacturing process.

A research study has been published in the journal *Nature* entitled: *Facile route to bulk ultrafine-grain steels for high strength and ductility*. It reports how ultra-fine-grained steel can be made with a strength of nearly 2GPa – for example a 1 cm diameter wire capable of holding a weight of 15 tonnes.

The new method can also produce steel with an elongation of 45%; ductile enough to be able to be formed into complex shapes.

The benefit of using high-strength steels is that less material can be used in the vehicle with the same performance level; the average car contains 900 kg of steel.

"Copper is typically seen as an element to avoid by steelmakers as it can have a negative impact on certain types of steel. However, what we've managed to do here at Sheffield is develop a completely new technique that is able to harness copper in a positive way in order to produce a truly world leading quality of steel," said Mark Rainforth, Professor of Materials Science and Engineering at the University of Sheffield.

NLMK group expands structural-grade steel production

International steelmaker NLMK has expanded production of hot-rolled steel grades C345 and C355 for Ventall – a manufacturer of building structures that needs steel used in applications that require reliable weldability in construction. Ventall specializes in making prefabricated buildings from metal structures, and building elements such as frames, enclosing structures, and other metal components.

NLMK notes that its structural-grade steel offers reliable weldability due to its chemical composition. The steelmaker also says its structural steel grades maintain high strength at low temperatures – a key requirement for construction.

"In 2021, we plan to double our supply of structural steel grades to Ventall. NLMK is developing the production of structural steel grades and plans to strengthen its presence in this market segment by upgrading its facilities," said Ilya Guschin, NLMK group vice president of sales.

In NLMK Group's 2020 financial results, the company noted that it had completed upgrades at its Lipetsk site blast furnace and steelmaking operations and construction of a coal charge stamping unit at Altai-Koks, both to be reflected in the 2021 financial results. This year it will complete the upgrade of its hot-strip mill in La Louvière, Belgium.

NLMK steel is used in various applications from construction and machine-building to the manufacturing of power-generation equipment and offshore wind turbines. With production facilities in Russia, Europe and the United States, NLMK's steel production capacity exceeds 17 million tonnes per year.

NLMK

NLMK is expanding its production of steel for applications in construction

TMK supplies pipes to transport gas from the UAE's new field

TMK has supplied a shipment of over 5,000 tonnes of seamless steel pipes to the Sharjah National Oil Corporation (SNOC) to transport Mahani Gas production to the Sharjah National Oil Corporation Sajaa Gas Plant in the UAE.

The 16-inch (406.4 mm) pipe was produced at TMK's Volzhsky Pipe Plant, and intended for use in aggressive environments, said TMK. For protection from corrosion, the 22-km-long gas pipeline is made with a three-layered polypropylene-coating.

TMK has also supplied SNOC with other structural components and equipment used in pipeline installation, under the companies integrated contract.

"The UAE energy companies are TMK's key customers in the Middle East. We have built a strong reputation as a supplier of tubular products for various purposes, including steel line pipe and premium connections. We are proud to participate in the development of the first onshore gas field in Sharjah in 37 years," said Vladimir Oborsky, TMK's vice president for sales.

Early this year, a year after the discovery of gas in the field, SNOC and partner company Eni announced the start-up of production from the Mahani-1 gas well, said TMK.

"This is our first collaboration with SNOC, and it has enabled our expansion in the UAE market. Despite significant transportation restrictions due to the pandemic, we were able to deliver all shipments strictly on schedule," noted Oborsky.

TMK

TMK supplied SNOC with seamless steel pipes to transport gas in the UAE

Scania opts for fossil-free steel with H2GS

Major truck manufacturing company Scania is to partner with start-up company H2 Green Steel (H2GS), based in Sweden, to move forward in supplying customers with emissions-free products containing green steel.

H2GS will commence production in 2024 at its new steel plant in Boden, north Sweden, where production will comprise around 90% of the various types of steel and qualities that Scania demands.

"Since each Scania truck contains around 5 tonnes of steel, we can use steel manufactured with H2GS technology to take a giant step in our journey towards products that are emission-free throughout the value chain. It is a real increase in ambition that will not only contribute to Scania being able to deliver on the climate goals in the Paris Agreement, but actually raise the bar further," Anders Williamsson, Scania's head of purchasing, said.

The H2GS business model draws on the same experiences and lessons learnt from the establishment of battery manufacturer Northvolt, which partnered with strategic customers, said Scania.

"One of the important success factors for H2 Green Steel is to bring in heavy industrial players from the start, with whom we can do early joint product development." said Carl-Erik Lagercrantz, chairman of the board of H2GS and Northvolt.

SCANIA

Scania is to partner with Swedish start-up company H2 Green Steel

Fastmarkets

Call for Nominations

Global Awards for **Steel Excellence**

Fastmarkets is now accepting nominations to recognize global innovation & initiative in the steel industry for the 2021 Awards program

Now in our 12th year of recognizing the highest achieving companies globally, nominate yourself for any of the 28 awards to take home. Could your company win one of these prestigious awards? Take the opportunity to highlight your company's successes during unprecedented times in our industry due to the COVID-19 pandemic.

The deadline to nominate is April 30, 2021

Nominate Now

#FastmarketsGlobalAwards


the port that *works*
PORT OF BROWNSVILLE
1000 Foust Rd., Brownsville, TX 78521 • (956) 831-4592 • 1-800-378-5395 • portofbrownsville.com